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Code compliance

All Kraus CNG dispensers have been manufactured to comply with the following codes and standards:

North America
<ul style="list-style-type: none"> ✓ American Society of Mechanical Engineers (ASME) Boiler and Pressure Code ✓ American Society of Mechanical Engineers (ASME) B31.3 – Process Piping ✓ Canadian Gas Association (CGA) B108 NGV Refueling Stations Installation Code ✓ Canadian Standards Association (CSA) C22.1 Canadian Electrical Code (CEC) Part I ✓ National Fire Protection Association (NFPA) 52 Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems ✓ National Fire Protection Association (NFPA) 70 National Electrical Code

Europe
<ul style="list-style-type: none"> ✓ EN 50 014 Electrical Apparatus for Potentially Explosive Atmospheres – General Requirements ✓ EN 50 018 Electrical Apparatus for Potentially Explosive Atmospheres – Flameproof Enclosure ‘d’ ✓ 50 019 Electrical Apparatus for Potentially Explosive Atmospheres – Increased Safety ‘e’ ✓ 50 020 Electrical Apparatus for Potentially Explosive Atmospheres – Intrinsic Safety ‘i’

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DISCLAIMER

This manual and the information contained herein are not intended to provide you with any advice on product design, filling station specifications, installation of equipment, or similar matters and should not be relied upon for such purposes. Neither Compression Technology Corporation nor any of its employees or agents are your professional advisers. You should assess whether you require such advisers and additional information and, where appropriate, seek independent professional advice. Compression Technology Corporation, its subsidiaries and affiliates, are not responsible in any manner for direct, indirect, special or consequential damages however caused arising from your use of this manual and the information contained herein.

1. INTRODUCTION

1.1 About this manual

Purpose

This manual was designed to provide installation, operation, and maintenance guidelines for Kraus High Style compressed natural gas (CNG) dispensers.

Intended users

This manual is designed to be clear, comprehensive, and available to anyone installing, maintaining, or overseeing the operation of a Kraus Retail CNG dispenser.

Scope

This manual is divided into five chapters:

1. INTRODUCTION

This chapter provides general information about this manual and the High Style CNG dispenser.

2. SAFETY

This chapter provides general safety guidelines, as well as information regarding dispenser installation, operation, and maintenance safety.

3. INSTALLATION AND SETUP

This chapter provides installation and configuration guidelines and procedures for your High Style CNG dispenser.

4. OPERATION AND MAINTENANCE

This chapter provides operation and maintenance guidelines and procedures for your High Style CNG dispenser.

5. TROUBLESHOOTING

This chapter provides general troubleshooting guidelines for possible installation, operation, and maintenance issues.

1.2 Additional references

In addition to this manual, the following documents are also provided with each dispenser package:

- Quick-Start Guide—The High Style CNG Dispenser
- Micon 500C® Owner's Manual
- Engineering package
 - Flow schematic
 - Electrical schematic
 - Construction drawings
- Final inspection checklist
- Quality control notices
- Quality control information packages

If you are missing any of the documents listed above or require additional assistance at any time, please contact our Technical Support Department.

1.3 Contact information

ComTech Energy
8620 Escarpment Way, Units 11-14
Milton, Ontario
Canada, L9T 0M1

www.comtechenergy.ca

Phone: 1-833-264-3835

1.4 Warnings and notifications

The following indicators provide various warnings and notifications throughout this manual:



This indicator provides helpful tips and other advice on proper equipment installation, usage, and maintenance.



This indicator provides important notifications about the system and its components.



This indicator provides critical warnings that may help prevent human injury and equipment damage.

1.5 Warranty information

For any questions or concerns regarding warranty policies and procedures for your High Style CNG dispenser, please contact our Sales Department.

1.6 The High Style CNG dispenser

Kraus High Style CNG dispenser is available in a one, two, or three-line configuration. Each configuration is available for standard or high-flow systems with a single or dual dispensing hose setup, customizable for both buffer and cascade filling stations. *Table 1* below describes these customizable features.

Table 1: High Style dispenser configurations

Dispenser model	High Style CNG Dispenser							
Storage system	Buffer (1 large bank)				Cascade (up to 3 banks)			
Filling system	Standard-flow		High-flow		Standard-flow		High-flow	
Hose configuration	Single	Dual	Single	Dual	Single	Dual	Single	Dual

1.7 Dispenser theory of operation

This section explains how the Micon 500C® pump-controller and KAF 402™ solenoid valves operate to control gas flow within Kraus-CNG dispensers.

1.7.1 The Micon 500C®

Kraus Micon 500C® pump-controller is an inexpensive alternative to using PLC units for operating fuel dispensers. For CNG dispensers, the Micon takes readings from the mass flow meter, pressure transducer, and temperature probe to determine a final fill pressure that is based on a series of algorithms in accordance with the *Ideal Gas Law*, “ $PV = nRT$ ”. The result is a controlled fill of a vehicle’s CNG tank to a safe maximum limit.

After the fueling nozzle is attached and a fill is authorized, the Micon opens all KAF 402™ solenoid valve(s) and dispenses CNG into the vehicle’s receptacle for four seconds. After the four seconds, the Micon closes the valve(s) and performs a reading of the vehicle tank pressure and ambient temperature. Based on a combination of the initial reading and *Ideal Gas Law* calculations, the Micon determines a target-fill-pressure.

1.7.2 Buffer storage systems

A buffer storage system comprises a large storage bank with a single supply line to the dispenser, which is controlled by one KAF 402™ solenoid valve to start and stop gas flow.

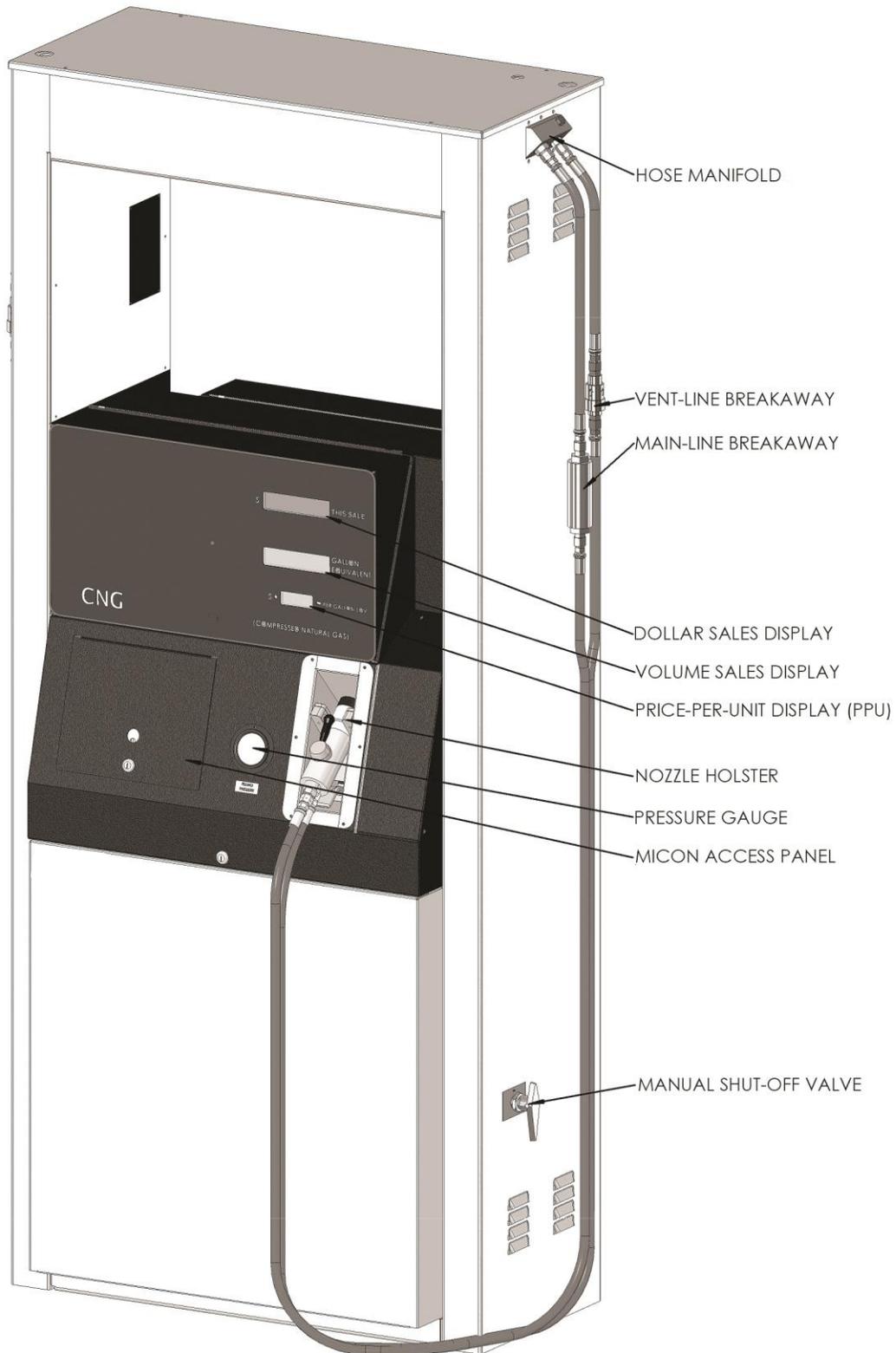
After the target-fill-pressure is calculated, the solenoid valve remains open for fuel delivery until the target-fill-pressure or minimum flow setting is reached.

1.7.3 Cascade storage systems

Cascade storage systems typically consist of three separate storage banks—a low, mid, and high bank. The low bank holds approximately 70% of the total volume of storage, while the mid and high banks hold 20% and 10% respectively.

Upon authorization, the Micon will open all three banks for 4 seconds to ensure there is sufficient gas flow to continue with the fill. The banks will then close for another 4 seconds for the target-fill calculation. Once the target-fill-pressure is calculated, the low-bank will reopen and deliver fuel until the flow rate drops to a predetermined level—set in the Micon. When this level is reached, the mid-bank solenoid valve will reopen to deliver the fuel. If more pressure is needed, the same sequence will occur to access the high-bank until the target-fill-pressure or minimum flow setting is reached.

1.7.4 The High Style unit layout



A single-hose High Style CNG dispenser—Please refer to the *Engineering package* for a view of internal components

2. SAFETY



Compressed Natural Gas (CNG) can pose great danger if mishandled. Please be sure to read and understand this section before installing, operating, or maintaining CNG dispensers.



It is necessary to comply with all safety precautions and other instructions described throughout this manual to safely install, operate, and maintain ComTech Energy-manufactured CNG dispensers.

2.1 General safety

Where it is applicable, local regulations take precedence over the guidelines listed in this section. Please ensure that all personnel are familiar with all applicable regulations and observe the following guidelines when working with fuel dispensers:

- Do not smoke or allow open flames and naked lights within 15 feet or 5 meters of any gas installation.
- Do not adjust, remove, or bypass any protective devices.
- Electrical equipment and its protection must comply with the regulations applicable to the hazard of the location.
- Transportation, installation, commissioning, operation, maintenance, and repairs should only be carried out by qualified personnel in accordance with the regulations for operation and safety.
- Electrical connections must comply with applicable local regulations.
- Piping and other components, which are not supplied by ComTech Energy, must be suitable for the respective working pressure. If necessary, they must be tested and protected by pressure-unloading devices.
- Systems must be entirely vented before any maintenance or repair procedures are carried out.
- Do not store flammable materials, such as oily rags, in or around the dispensing unit.

2.2 Filling safety

Please observe the following guidelines when overseeing the use of all Kraus-CNG dispensers:

- Be aware of emergency procedures and emergency telephone numbers.
- Be aware of the locations of fire extinguishers and the “Emergency Shut Down” (ESD) buttons.
- Ensure all operators and users are properly trained before any fueling transactions.
- Do not allow any vehicles to be unattended while fueling.
- Ensure that all automatic transmission vehicles are placed in “park” or the emergency brake is applied for all manual transmission vehicles before allowing any fueling transactions.
- Ensure that all vehicle ignitions, electrical systems, and radios—including short-wave communication equipment—are shut-off before allowing any fueling transactions.
- Ensure the fuel receptacle is inspected and matches the dispenser filling nozzle before attempting any fueling transactions.
- Ensure all users adhere to the operating procedures described in *Section 4.1* when fueling.
- Ensure all users are aware that pressure from the nozzle must be vented before disengaging it from the vehicle.
- Ensure that all users replace the dispenser nozzle firmly onto the holder immediately after refueling.

2.3 Dispenser hose safety

Please observe the following guidelines prior to installing or maintaining CNG dispenser hoses and hose-components:

- Inspect the hose assembly before each use.
Replace the hose immediately if any of the following conditions are observed:
 - The jacket of the hose appears abnormal
 - A gas leak or any reason to believe there is a gas leak
 - The couplings are damaged
 - The hose is damaged in any way, including cuts, cracks, bulges, blisters, or abrasions
 - The reinforcement is exposed through the jacket
 - Spring guards are missing or detached from couplings
 - Couplings and spring guards show evidence of slippage or looseness
- Do not exceed the maximum recommended working pressure of the hose: 5,000 psi; 345 bar.
- Do not twist, kink, or torque the hose assembly.
- Never attempt to repair or re-couple a damaged hose.
- Do not use a strength member for pulling or lifting equipment.



The hose assembly for High Style CNG dispensers are designed to convey static electricity. It is imperative that the hose assembly be properly grounded to the CNG unit to which it is attached.



For additional information about dispenser hoses, please refer to the specification tag provided by the manufacturer or contact ComTech Energy's Technical Support Department.

2.4 Maintenance safety

Please observe the following guidelines prior to maintaining any ComTech Energy-manufactured CNG dispenser:

- Only properly trained or qualified personnel should be permitted to maintain and repair CNG equipment. When in doubt, please refer to the equipment supplier or service agent.
- Always adhere to the manufacturer guidelines for proper installation and maintenance of all dispensers and dispenser-components.
- All maintenance and repair work of pressure vessels and other safety equipment must be conducted under the appropriate codes, then tested and accepted by the inspection authority.
- The dispenser must be powered-off and completely vented, unless otherwise specified.
- Never perform welding processes near gas systems.
- Always cover disassembled parts and openings with a clean rag, paper, or adhesive to keep them clean and avoid contamination.
- Do not clean any parts with flammable solvent. Clean and rinse all parts carefully with compressed air.
- Be sure to wear necessary safety equipment during maintenance and repair. Eye protection is absolutely necessary when cleaning with compressed air.
- Wear hearing, hand, and eye protection when bleeding filters and lines. Be sure to keep body parts away from the discharge orifice.
- Do not touch bare wires and live current-carrying parts while the electrical system is energized.
- Never tighten or loosen any fitting when it is under pressure.
- Always use proper thread lubricants and sealant on tapered pipe threads.
- Never turn a fitting body. Instead, hold fitting body and turn the nut.
- After completing any work on process gas piping systems and its components, always purge the system thoroughly with a non-corrosive inert gas, such as nitrogen, before introducing natural gas.
- Ensure that you have not left any tools, cleaning equipment, or any loose parts inside the dispenser.



Never allow problems to go unreported. Both your company and supplier will benefit from the full disclosure of all dispenser issues.

2.5 Leak-test safety

Please observe the following guidelines before performing leak-tests on ComTech Energy-manufactured CNG dispensers:

- Ensure the area surrounding the dispenser being serviced is closed off to all customers and unauthorized personnel. Use any appropriate barricade and signage to ensure safety.
- It is recommended that protective shields are placed around potentially harmful areas of the dispenser being serviced.
- Service personnel must wear all appropriate safety gear, such as helmets with eye or facial protection and body shields.

3. INSTALLATION AND SETUP

3.1 Installation guidelines

Please observe the following guidelines prior to installing any ComTech Energy-manufactured CNG dispenser:

- All electrical and mechanical installations must comply with the provisions of the local authority having jurisdiction.
- All electrical installations must only be carried out by a licensed electrical journeyman.
- All high-pressure gas connections should only be carried out by qualified and experienced personnel.
- Safety valve discharge gases must be funneled safely away from the working area.
- Be sure to allow room inside the dispenser pit to properly tie-in the gas lines to the inline filters and manual isolation valves.
- The dispenser frame enclosure must be securely bolted to a concrete foundation or to a structural steel base. Adequate support must be provided for each unit of the dispensing system, independent of piping, tubing, or conduit that may be connected to the dispenser.
- A pressure relief device may be installed directly upstream of the dispenser—in compliance with the ASME Boiler and Pressure Vessel Code—to limit the pressure at the inlet of the dispenser to a value no greater than the maximum working pressure of the dispenser.
 - The pressure relief device must communicate directly with the pressure-containing component it is designed to protect—valves between the protected component and the inlet to the pressure relief device are not permitted.
- It is highly recommended that an emergency shut-off device that will terminate the gas supply to the dispenser is installed in an easily accessible area near the dispenser.
- All dispensers must only be used for gas compositions specified within *SAE J1616: Recommended Practice for Compressed Natural Gas Vehicle*.

3.2 Pre-installation



Kraus CNG dispensers must be situated in such a way that there are no obstructions, such as a wall or gate, that may entangle the dispenser hose. This is to ensure proper functioning of the hose assembly's breakaway coupling.

3.2.1 Site preparation

Please observe the following guidelines prior to constructing the dispenser pit:

- When preparing the site, be sure to allow room inside the dispenser pit to properly tie-in the gas lines to the inline filters and manual isolation valves.
- Make provisions for tubing and electrical conduit prior to pouring the concrete pad.
- Filters must be installed upstream of the dispenser.
- Due to potential weld slag, filings, rust, dirt, and water, dispensing lines should be purged to the atmosphere at the dispenser. This can be done by blowing nitrogen through the lines.
- All dispensing lines must be purged, pressurized, and leak-tested. Afterwards, manual isolating valves in the dispenser pit must also be leak-tested. The dispenser must only be connected to the lines after these have been accomplished.



Please refer to your *Construction drawings* for dispenser dimensions.

3.2.2 Uncrating and placing the dispenser



Ensure that the dispenser crate is placed on a smooth and level surface before removing any crate panels.



All dispenser packages contain additional parts, accessories, and documents that are vital to the installation, operation, and maintenance of the dispenser. Be sure to set these items aside in a safe and easily accessible area.

Dispenser keys can be found on one of the authorization handles.

1. Inspect the crate for any damages that may have occurred during shipping. If any damages are found:
 - Take pictures of the damages
 - Note the damages
2. Starting with the top panel, remove all screws and/or nails and detach the top panel. Repeat this process to remove all side panels.
3. Remove all protective wrapping by hand; knives and other sharp objects may damage the dispenser.
4. Inspect the dispenser for any damages. If any damages are found, repeat the procedure indicated in *step 1*.
5. Locate and review the crating check list to ensure that all items are accounted for. If you are missing any items, please contact ComTech Energy's Logistics Department.
6. Use a forklift to move the dispenser as close to the dispenser pit as possible with the dispenser is still bolted to the bottom pallet.
7. Remove lag bolts from base rails to free the dispenser from the bottom pallet.
8. Slide the dispenser off the pallet and onto the pit frame.

It will take at least 2 workers to ensure the dispenser is placed safely and correctly.
9. Fasten the dispenser to the pit frame or concrete base with, at the minimum, 1/2" NC grade-8 steel bolts.

NOTE: Please be sure to read and understand the notifications on the following page before proceeding to any installation procedures.

3.2.3 Additional notifications



Lifting chains, straps, and other tools used to lift and anchor Kraus CNG dispensers must be rated for at least 1,200 lbs; 545 kg.



Ensure there is sufficient room to complete tubing and wiring connections before securing the dispenser to the foundation.



The supply ground cable must be securely connected to the dispenser frame.

3.3 Installation

3.3.1 Electrical and communication connections



Electrical installations must only be carried out by licensed electrical journeymen.



All interconnection fittings and tubing are sold independently of ComTech Energy. Always adhere to manufacturer standards for appropriate swaging and tightening specifications.

The dispenser's main electrical and communication connections are done at the terminal strip, located in the explosion-proof junction box in the lower cabinet of the dispenser.

Please refer to the electrical schematic in the *Engineering package* for electrical and communication connection specifications.



The dispenser is shipped in “standalone mode.” It is recommended that the dispenser remains in this mode throughout the initial power-up process.



If you are incorporating a POS or card-lock system with the dispenser, you must disengage the dispenser from “standalone mode” by removing the authorization jumper from the terminal strip before initial use.

Please refer to the electrical schematic in the *Engineering package* for further details.

3.3.2 Pressure line connection



High-pressure gas connections must only be carried out by qualified and experienced personnel.

Please refer to the flow schematic in the *Engineering package* for pressure line connection specifications.

3.3.3 Filters

CNG may be filtered in one of two methods:

- **Particulate** filtration removes solid particles from gases; ensuring only clean gas is dispensed into a vehicle.
- **Coalescing** filtration removes solid particles with the same efficiency as particulate filtration, but also removes water aerosols and droplets from gases; ensuring only clean and dry gas is dispensed into a vehicle. This is the standard and recommended method of filtration for all Kraus CNG dispensers.

Filter size and placement

Filter sizes and their placement depend on the configuration of the dispenser. High-flow dispensers require large filters that may be placed in one of the following locations:

- In the dispenser pit if it is large enough to house the filters, while providing enough room to drain and change filter elements
- Upstream of the dispenser pit, on the dispenser supply lines between the priority panel and the dispenser

See *Figure 1* below for high-flow filter placement options.

Standard-flow dispensers use smaller filters that can often be placed in the lower cabinet of the dispenser unless otherwise indicated.



If filters are not being supplied by ComTech Energy, ensure that they are properly rated for the dispenser's filling system.

You may contact Technical Support for any questions regarding dispenser configurations.

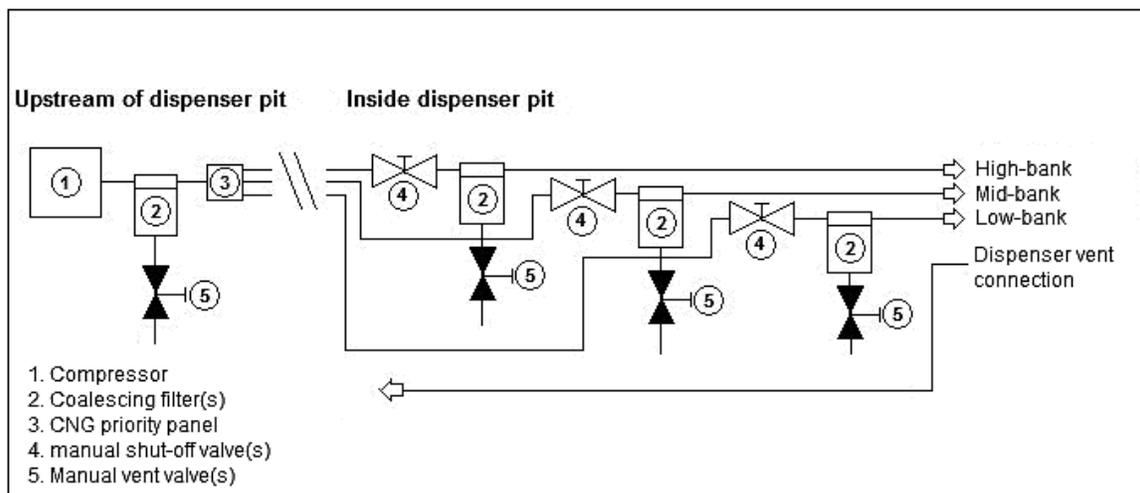


Figure 1: High-flow filter placement

Filter installation guidelines



Filter housings are pressure vessels and must only be used within their allowable working pressure, within their stated temperature range.

- As pressure vessels, filter housings must be leak-tight. It is considered good practice to use pipe sealants on fittings prior to connecting the filter housing ports.
- Ensure the filters are visible and easily accessible for periodic draining and maintenance.
- Install the filters on a level pipeline and mount vertically. Be sure to leave one bowl length of clearance to allow for element removal.
- Ensure that fittings are always inspected during servicing and adjusted accordingly.
- Avoid swapping the heads and bowls of one filter assembly to another.

3.3.4 Attaching the hose

Kraus CNG dispensers use Parker brand hoses and hose fittings. The hose size is specific to the dispenser's filling system, but is available in various lengths. Please see the information sheet attached to the hose package or contact our Technical Support Department for further specifications.

Please be sure to read and understand *section 2.3—Dispenser hose safety* before proceeding.



If your hose is unusable or if you have any reason to believe it may be unusable, please contact our Technical Support Department immediately. Do not use defective or damaged hoses.



If you are operating a split-pressure or split-flow dispenser, ensure that you attach the correct hose to the proper connection.

1. Remove the hose from its packaging.
2. Inspect for any defects or damages that may have occurred during shipment. **Do not use defective or damaged hoses.**
3. Attach the main line to the hose manifold, located on the side and near the top of the dispenser. Hose manifolds may be on both sides, depending on the dispenser's hose configuration.
4. Hand-tighten the main line fitting to the manifold so that it may still be loose enough to turn.
5. Straighten the hose and place the nozzle into the dispenser holster. The loose fitting should allow the hose to find its natural resting position.
6. Tighten the main line fitting at the manifold using a backup wrench. Hose connections **do not require** sealants or Teflon tape.
7. Attach the vent line to its corresponding manifold connection and tighten using a backup wrench.



To help avoid abrasive damage to the hoses, do not allow any part of the hose to be in contact with the ground or dispenser while it is holstered. If this is the case, the hose may be too long; please contact our Technical Support Department immediately.

Breakaway couplings

All Kraus CNG dispenser hoses are equipped with a breakaway safety feature. Breakaway couplings are in place to prevent the flow of natural gas should a vehicle drive away from a dispenser while the nozzle and hose are still connected to the vehicle's receptacle.



If a breakaway occurs, the entire hose assembly must be examined by a qualified service representative prior to any reconnections.



In the event of a breakaway, dispenser hose assemblies may only be reconnected if the breakaway was clean; otherwise, the assembly will have to be rebuilt using breakaway rebuild kit or completely replaced with new parts and fittings. Please contact our Technical Support Department before proceeding with any solution.

Reconnecting procedure

1. Vent the dispenser system and hose assembly before attempting any reconnections. Please refer to *section 4.2—Maintenance* for dispenser-venting procedures.
2. Clean dirt, debris, and other obstructions from both sides of the breakaway unit.
3. Inspect both parts of the breakaway unit. Ensure that O-ring seals are not damaged.
Do not reconnect assemblies if any components are damaged.
4. Inspect the stationary module and ensure that the inner garter spring is intact and properly situated in the groove.
5. Insert the breakaway unit into the stationary module by aligning the wrench flats of the unit with the lining of the module.
6. Push the breakaway unit into the stationary module until you feel a click.
7. Perform a leak test to ensure the system and hose assembly are in working condition. Please refer to *section 4.2—Leak monitoring* for this procedure.



Breakaway may require a specialized reconnection tool. Please contact our Technical Support Department for questions regarding the breakaway system.

3.3.5 Micon power-off mode

In the absence of AC power—during a power failure, for example—the Micon register will go into “battery mode” for approximately one minute before entering “sleep mode.”

Battery mode

The dispenser’s dollar and volume displays will flash to indicate that the dispenser has entered “battery mode.” In this state, the dispenser is powered only by its 6-volt standby battery. After approximately one minute without activity, the dispenser will enter “sleep mode.”



The dispenser **must** be placed in “battery mode” to set fuelling prices. The Micon Communicator will not engage with the dispenser while the AC power is connected.

Sleep mode

During “sleep mode,” all power is removed from the unit with the exception of the Micon’s last sale, price, and totalizer memory. The Micon is able to retain this data for up to six months while in “sleep mode.”

After entering “sleep mode,” the Micon can be brought back to “battery mode” by resetting the dispenser.

Resetting the dispenser

1. Lift the refueling nozzle from its holder.
2. Flip the authorization handle from the **OFF** position to the **ON** position, and then back to the **OFF** position.

NOTE: The dispenser’s software version will be displayed in the PPU display after completing the procedure above.

3.3.6 Communicator operation

Kraus dispenser packages include a Communicator remote for setting dispenser prices and reading totalizers; this section describes both procedures. For additional uses and operation of the Communicator, please refer to the *Micon 500C® Manual*, also located in your dispenser package.

NOTE: Your purchase may also include a Micon 500C® Info-Pac controller. Please refer to the *Micon 500C® Programming Manual* for operating instructions.

Setting prices

1. Place the dispenser in “battery mode” by disconnecting the AC power to the Micon from the breaker box. The volume and dollar displays will flash when the dispenser enters “battery mode.”
2. Ensure the dispenser’s authorization handle is in the **OFF** position and the refueling nozzle is placed in its holder.
3. Aim the Communicator to the optical sensor, located to the right of the PPU display; see *Figure 2* below.
4. Press and hold the **SET** button on the Communicator. Starting with the .0 digit, the number will count up until the button is released.
5. Release the **SET** button when the count reaches the desired number.
6. Press the **SEL** button to proceed to the next digit and repeat *step 4* and *step 5* until the full price is entered.
7. Ensure the correct price-per-unit has been entered and then restore the AC power.

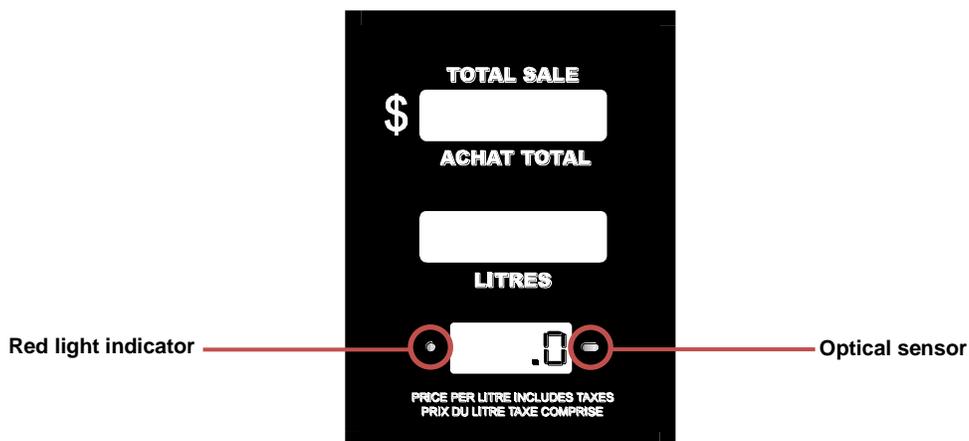


Figure 2: The Micon display

Reading totalizers

1. Ensure the dispenser's authorization handle is in the **OFF** position and AC power is connected.
2. Aim the Communicator to the optical sensor, located to the right of the PPU display; see *Figure 2*.
3. Press and hold the **SEL** button on the Communicator. The red light indicator, to the left of the PPU display, will flash as the Micon receives the Communicator's signal and the dollar sales total is displayed. The sales total is preceded by the "d₁" indicator.
4. Press the **SEL** button again to show the volume total. The volume total is preceded by the "U₁" indicator.

At this point, the **SEL** button will allow you to toggle back and forth between volume and dollar totals.



The dollar sale and volume totals use a ten-digit display that begins at the "total sale" display and continues to the "unit sale" display. See *Figure 3* below.

The total dollar sale display below reads
"\$782564.93"

The total unit sale display below reads
"96154.823" units

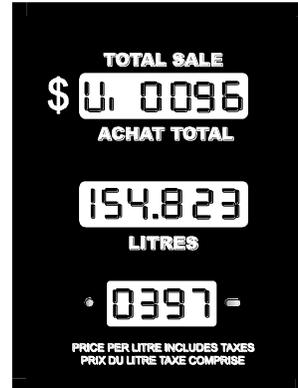


Figure 3: Sales and volume total displays

Resetting totalizers

Totalizers must be reset once the maximum dollar sales total or volume total is reached, which occur at "d₁: 99999999.99" and "U₁: 9999999.999" respectively. After reaching any one of these totals, the dispenser will terminate the current fueling transaction and disallow any further authorizations.

Performing a "cold-start" will reset all totalizers—please refer to the *Micon 500C® Manual* for this procedure.

3.4 Dispenser startup procedures

3.4.1 Powering the dispenser

The following procedure describes the initial startup process. Please ensure that all electrical and mechanical connections have been properly installed and you have read and understood *Chapter 2—Safety* before proceeding.



The dispenser is shipped in “standalone mode.” It is recommended that the dispenser remains in this mode throughout the initial power-up process.

1. Locate the actuator shaft(s) protruding from the Micon head(s).

NOTE: For shipping and storage purposes, the Micon 500C® is placed in “battery-save mode.” The dispenser will not operate properly while in this mode.

2. Remove the cotter pin from the actuator shaft.
3. Rotate the actuator shaft until the beveled edge is facing upwards. This disengages the Micon from “battery-save mode.”
4. Replace the cotter pin.
5. Remove the bottom panels of the dispenser to access the lower cabinet.
6. Close all manual filter inlet valves, vent valves, and manual shut-off valves.
7. Turn-on the power from the breaker box.

NOTE: The dispenser will display a power-up sequence and countdown from 25 seconds. After the countdown, the volume and dollar displays will read zero.



If you encounter errors, please refer to *Chapter 5* or the *Micon 500C® Manual* for a description of fault codes and recommended actions.

8. Remove the refueling nozzle from its holder and flip the authorization handle upwards to the **ON** position.

NOTE: The volume and dollar displays will flash all 8’s as the dispenser authorizes.

Procedure continues on the following page

3.4.1 Powering the dispenser (continued)

9. Flip the authorization handle back to the **OFF** position and replace the refueling nozzle into its holder.
10. Set the dispenser prices; see the *Communicator operation* section in this chapter or the *Micon 500C® Manual* for this procedure.

3.4.2 Pressurizing the dispenser

Please ensure that the dispenser has been properly powered-up and you have read and understood *Chapter 2* of this manual before proceeding.



To ensure peak performance, all Kraus CNG dispensers should be leak-tested before initial operation. The first leak test should be done while initially pressurizing the dispenser.

1. Open all manual shut off valves.
2. Flip the authorization handle to the **ON** position. This will enable you to see the pressure reading through the pressure gauge.
3. Slowly open the inlet valve and allow 100 psi of gas to fill the dispenser.



If your dispenser has two or three-inlet lines, begin this procedure with the low-bank and repeat it for the mid-bank, then high-bank.

4. Close the inlet valve and flip the authorization handle to the **OFF** position once the pressure gauge indicates 100 psi.
5. Apply a leak detector to all fitting connections—we recommend using **Snoop® Liquid Detector**.

NOTE: If any leaks are detected, please refer to *section 4.2—Maintenance* for leak repair procedures.

6. If no leaks are found, reauthorize the dispenser by flipping the authorization handle up to the **ON** position.
7. Slowly reopen the valve to allow 500 psi of gas to fill the dispenser.

Procedure continues on the following page

3.4.2 Pressurizing the dispenser (continued)

8. Close the valve once the pressure gauge indicates 500 psi and reapply the leak detector. See the previous *Note* if leaks are detected.
9. Repeat this process at 500 psi increments until the regular operating pressure is reached. Repeat the process for each subsequent inlet valve.

After this procedure, your dispenser should be ready for fueling operations. Please contact our Technical Support Department for any questions or concerns.

3.4.3 Commissioning

Commissioning is necessary to ensure all dispenser systems, including all components, are installed and function properly, and are successfully turned over. Documenting the commissioning process allows for traceable verification and ensures a systematic approach to minimizing any commissioning oversights.

A commissioning sign-off sheet is included within your dispenser package. This form must be completed, signed, and sent to ComTEch Energy within 30 days of commissioning, otherwise the warranty may be voided.

Completed forms may be mailed or emailed to ComTech Energy using the following information:

ComTech Energy.
8620 Escarpment Way, Units 11-14
Milton, ON
Canada, L9T 0M1
Email: support@comtechenergy.ca

4. OPERATION AND MAINTENANCE

4.1. Filling procedure

The following is the procedure for filling CNG approved vehicles with the Retail CNG dispenser. Ensure all users observe the guidelines described in *Section 2.2* and adhere to this procedure when fueling.



Ensure all personnel, including users, are aware of emergency shut-down buttons prior to operating CNG fuel dispensers.

1. Ensure the vehicle is in “park” or the parking brake is applied, and the vehicle ignition is turned OFF.
2. Inspect the vehicle’s receptacle and the dispenser hose and nozzle. Do not proceed with fueling or allow further use of the dispenser if any damages or signs of tampering are found; you may contact our Technical Support Department for further assistance: 1-833-264-3835.
3. Remove the dust plug from the vehicle’s CNG receptacle.
4. Lift the refueling nozzle from the holder.
5. Connect the refueling nozzle to the vehicle receptacle.
6. Turn the valve on the nozzle to **FILL**.
7. Flip the authorization handle up to the ON position; fueling will begin after a three-second beep.



Note the following during gas delivery:

- **Gas delivery may create a loud whining sound. This is due to the pressure differential between the dispenser and the vehicle’s storage bank. This is normal and is not a cause for concern.**
- **There may be noticeable pauses as the dispenser accesses multiple storage banks; delivery is not complete until the dispenser beeps for three full seconds.**

8. Flip the authorization handle back down at the end of delivery; a three-second beep will signify the end of delivery.
9. Turn the valve on the nozzle to **VENT**. This will vent a small amount of gas into the atmosphere and allow you to disconnect the nozzle.
10. Replace the nozzle onto the holder.
11. Replace the dust plug into the vehicle’s CNG receptacle.

4.2 Dispenser maintenance



Please read and understand *section 2.4—Maintenance safety* before performing any maintenance on fuel dispensers.



Be sure to note and report all dispenser issues. It is considered good practice to use a maintenance log sheet to document all dispenser issues and repairs.

4.2.1 General dispenser maintenance guidelines

- Please refer to the *Maintenance task list* within the *Appendix* for a detailed maintenance schedule.
- Shut off all manual isolation valves in the dispenser pit after hours and other times when the dispenser will not be in use.
- Ensure that all valves, gauges, and displays are free of obstructions.
- Clean the dispenser on a regular basis. Avoid using pressurized water.
- Perform daily checks for signs of leakage.
- Perform leak inspections of all hoses and fittings every six months with an approved leak detector fluid. Ensure that all leaks are repaired by qualified personnel immediately.
- Perform monthly hose inspections. Check for abrasions, swelling, flatness, cuts, damaged couplings, and other abnormal signs. Replace the hose immediately if any abnormalities are found.
- Depending on installation requirements, we recommend that inline filter elements are checked and replaced two weeks after initial installation.
- Check filter elements every month and replace when necessary.

4.2.2 Dispenser venting procedure



All Kraus CNG dispensers must be completely vented prior to any maintenance work, including leak-testing and repairs.

1. Isolate the dispenser by placing highly visible signs or physical barriers to avoid traffic through the immediate area.
2. Ensure the refueling nozzle is replaced in its holder.
3. Ensure there is still power to the dispenser. The dispenser must be electrically functional to operate the solenoid valves.
4. Ensure the manual vent valves, located along the hose-side of the dispenser, are open (**ON** position).
5. Close all manual filter inlet valves to terminate gas flow to the dispenser from the storage vessels.
6. Slowly loosen the vent valves at least 3 to 4 turns to allow the gas in the dispenser to escape.

NOTE: Read the pressure gauges to confirm the gas is being vented.



Do not touch any venting pipes throughout this procedure. Rapidly expanding gases may cause sub-zero temperature drops within the vent stacks, which may cause cold burns.

NOTE: At this point, only gases upstream of the sequencing valves, including gas inside the hoses, have been vented; **there may still be gases trapped downstream of the sequencing valves down to the filter isolation valves.**

7. Lift the authorization handle to authorize a fill. This will open the sequencing valves, allowing the trapped gases to escape.

NOTE: Because the solenoid valves are only open for 4 seconds at a time, you may need to authorize a fill several times to vent all trapped gases. Continue authorizing a fill until the pressure gauge reads 0 psi and all venting sounds have ceased.



Although the dispenser may be completely vented, it is considered good practice to maintain a proper wrenching technique when loosening threaded fittings and dispenser components.

4.2.3 Leak monitoring

Leaks in dispenser equipment may develop within the first few weeks of operation and, therefore, must be closely monitored throughout that time. Thereafter, routinely scheduled maintenance must be carried out to correct and prevent further leaks.



NEVER TIGHTEN, LOOSEN, OR ATTEMPT TO REMOVE A PRESSURIZED FITTING.

Leak-testing procedure

1. Remove the bottom panels of the dispenser to access the lower cabinet.
2. Apply a leak detector to all fitting connections—we recommend using Snoop® Liquid Leak Detector.
3. Thoroughly inspect all fitting connections for bubbles, which indicate a leak. Be sure to note or mark the locations where leaks are found.
4. If leaks are found, vent gas from the dispenser—see *Dispenser-venting procedure*—and proceed with repairing the leak.



If a leak appears downstream of an inlet valve, you must authorize a fill to vent trapped gases. Continue authorizing a fill until the pressure gauge reads 0 psi and all venting sounds have ceased.

Leak repairing procedure

1. Ensure the dispenser is completely vented.
2. Loosen and retighten the fittings where leaks are found; most fittings can be repaired simply by tightening it.
3. Pressurize the dispenser to 100 psi and reassess all fitting connections with a leak detector.

NOTE: Refer to *step 4* of the *Leak-testing procedure* if further leaks are discovered.

4. Continue pressurizing the dispenser and testing for leaks at 500 psi intervals until the dispenser reaches regular operating pressures.

NOTE: If leaks persist, contact our Technical Support Department.

4.3 Component maintenance

4.3.1 Micon 500C®

This section provides guidelines and important notifications regarding the maintenance of vital dispenser components

Micon mainboard

The following steps are guidelines for replacing the Micon mainboard.



Ensure that the replacement mainboard has identical software parameter configurations as the previous mainboard.

1. Record totalizer readings and Micon parameters, as they will be erased once the main power and battery power are disconnected.

NOTE: Please refer to the *Micon 500C® Owner's Manual* for Communicator operations and procedures and the *Info-Pac Programming Manual* for Info-Pac operations.

2. Disconnect the AC power from the breaker box.
3. Remove the cover from the Micon's explosion-proof housing.
4. Place the handle actuator shaft in the **BATTERY OFF** position.
5. Remove the two screws securing the mainboard to the enclosure.
6. Disconnect all connectors and harnesses until the mainboard is free.

NOTE: Be sure to note or have an understanding of these connections, as they must be reconnected to the replacement mainboard. You may refer to the *Info-Pac Programming Manual* for connector designation.

7. Install replacement mainboard by reversing this procedure. Ensure that you have:
 - Secured all previous connections
 - Replaced both screws to secure mainboard to the enclosure
 - Placed the handle actuator shaft back to the BATTERY ON position
 - Replaced the cover of the explosion-proof housing
8. Use the Info-Pac to reconfigure the Micon to your preferred parameters.
9. Reconnect the AC power to the Micon from the breaker box

Micon standby battery

The Micon's mainboard includes a low battery detection circuit that causes the red status indicator on the front display to flash approximately once per second when the battery is low.

Under normal operating conditions, the 6-volt standby battery should last up to five years. The battery's lifespan may be shortened due to an improper charging voltage, a defective battery, or prolonged use.



The standby battery also discharges during shipping or storage, and therefore, may require up to 8 hours to fully charge depending on the extent of discharge.

If a low battery is detected, use a voltmeter to measure the charging-circuit, located inside the Micon's explosion-proof lid. The voltage should measure approximately 7 volts with the AC power on. If this is the case, then the battery may be defective or is worn out and must be replaced. If the voltage measures much higher or lower, the mainboard may be defective and should be replaced.

Micon standby battery replacement procedure

1. Remove the Micon mainboard by following *step 2 to step 6 of The Micon mainboard replacement procedure*.
2. Remove the wingnut and bracket holding the battery in place.
3. Disconnect the positive and negative leads from the battery.
4. Remove the current battery.
5. Install the replacement battery by reversing this procedure.
Ensure that you have:
 - Reconnected the positive and negative leads to the battery
 - Replaced the bracket and wingnut securing the battery in place
 - Replaced the Micon mainboard
6. Measure the battery charging voltage; voltage should be at approximately 7 volts.

4.3.2 KAF 402™ solenoid inlet valve

Kraus KAF 402™ solenoid valve has been specifically engineered for high-pressure CNG service. It is constructed of materials suitable for use with natural gas and is rated for a burst pressure in excess of 25,000 psi.

To ensure the proper solenoid valve(s) are in proper working condition please observe the following maintenance guidelines:

- The valve(s) must be leak-tested after every 35,000 cycles or every six months, whichever comes first.
- The valve(s) must be rebuilt at least once every three years by qualified service personnel and in accordance with the rebuild procedure described in the KAF 402™ rebuilding specification sheet.



Rebuild kits are required to properly rebuild KAF 402™ solenoid valves for any maintenance or reparation purposes. They are sold separately from any dispenser systems; please contact our sales or technical support department for any questions.

4.3.3 Inline filters

CNG filtering is a balanced, continuous, and steady state condition occurring at or below rated flow. In order to maintain high-efficiency filtration for your CNG dispenser, ensure that the bowl is kept clean and free of waste build-up.

Filter element replacement procedure

1. Depressurize the system
2. Open filter drain valve to ensure all pressure has been vented.
3. Unthread and remove the bowl—set it aside in a secure location.
4. Remove and discard clogged filter element and O-ring.
5. Install new element.
6. Install new O-ring. Lightly lubricate O-ring using clear silicon-based grease.
7. Apply a thin layer of anti-seize onto the filter bowl threads.
8. Thread the filter bowl to the head, making sure not to pinch O-ring.

5. TROUBLESHOOTING

5.1 Micon fault codes

In the event of a Micon-related malfunction, the Micon will display an error code in the PPU display. This section provides a description of all Micon error codes and possible solutions to remedy the errors.

Table 2 below provides a summary of all Micon fault codes, possible causes, and recommended actions for addressing the errors.

Table 3 provides a list of procedures for clearing Micon error code messages from the PPU display.

Table 2: Micon fault code summaries

ERROR CODE	DESCRIPTION	POSSIBLE CAUSE	RECOMMENDED ACTION
• co26	• Pulser fault	• Pulser is missing or disconnected	<ul style="list-style-type: none"> • Not applicable when using CNG050 mass flow meter • If fault occurs, use the Micon Info-Pac to set “Pulser” option to conduit-s
• co27	• Pulser buffer overflow fault	• Input pulses coming in may be faster than what the Micon 500C® is rated to handle	<ul style="list-style-type: none"> • Ensure the Micon incount and multiplier values are set to factory settings • Ensure that mass flow meter frequency and rate factors are set to factory settings
• co28	• Display disconnect fault	• LCD display lost connection	<ul style="list-style-type: none"> • Check all display harness connections between display and Micon mainboard • If all connections are good, replace LCD display
• co29	• CPU fault	• Corrupt CPU	<ul style="list-style-type: none"> • Perform cold start on Micon 500C® • Replace CPU chip
• co30	• Excessive reverse count fault	• Pulser is connected backwards	• Not applicable when using CNG050 mass flow meter
• co40	• Power failure during sale fault	• AC power disconnected during a transaction	• Flip authorization handle to the OFF position and restore power
• co51	• Excess flow fault	<ul style="list-style-type: none"> • A hose is ruptured • Flow rate has exceeded Micon 500C® max flow setting 	<ul style="list-style-type: none"> • Check hose for ruptures or any other damage • If no hose damage is present, max flow setting may need to be adjusted using Micon Info-Pac

Table 2: Micon fault code summaries (continued)

ERROR CODE	DESCRIPTION	POSSIBLE CAUSE	RECOMMENDED ACTION
• co76	• Pressure transmitter range fault	• Pressure transmitter has gone beyond its 4-20 mA range	<ul style="list-style-type: none"> • Check wire connection at transmitter and all harness connections • Use Micon Communicator to display P1 pressure—if the pressure is fluctuating more than 50 psi when dispenser is static, then replace transmitter • If pressure is not fluctuating, but reading different pressure than pressure gauge, check that the pressure scaling in the Micon is set to factoring setting or is set the same as the scaling on the transmitter
• co77	• Pressure transmitter 2 range fault	• Pressure transmitter 2 has gone beyond 4-20 mA range	<ul style="list-style-type: none"> • See co76 remedies • If secondary transmitter is not being used, ensure that Micon PTX2 option is set to disab
co78	• Ambient temperature probe fault	• Probe has open or shorted circuit	<ul style="list-style-type: none"> • Check probe connections • Replace probe
co79	• Gas temperature transducer range fault	• Gas temperature transducer has gone out of operating range	<ul style="list-style-type: none"> • Not used in CNG application • If error code is present, ensure that Micon TRX TEMP option is set to disab
co80	• Pressure transmitters 1 and 2 tolerance fault	• Pressure transmitters PTX1A and PTX2A have exceeded a 3% difference in readings	<ul style="list-style-type: none"> • Ensure that Micon PTX2 option is set to disab • Only used in European applications
co81	• Air purge or pressure switch kill fault	• Loose harness or jumper connection is on 10-pin harness	<ul style="list-style-type: none"> • Check harness connection on Micon mainboard • Check that jumper is connected on the I.S. harness connector
co82	• Excess flow fault	<ul style="list-style-type: none"> • A hose rupture has occurred • Flow rate exceeding Micon 500C® max flow setting 	<ul style="list-style-type: none"> • Check hose for ruptures or other damages • If no hose damage is present, max flow setting may need to be adjusted using Micon Info-Pac
co86	• Pressure transmitter 1B out of range	• Pressure transmitter 1B has gone beyond 4-20 mA range	• NOT APPLICABLE
co87	• Pressure transmitter 2B out of range	• Pressure transmitter 2B has gone beyond 4-20 mA range	• NOT APPLICABLE
co90	• Pressure transmitter 1B and 2B out of range	• Pressure transmitters PTX1B and PTX2B have exceeded a 3% difference in readings	• NOT APPLICABLE

5. TROUBLESHOOTING

Table 3: Micon fault code clearing procedures

ERROR CODE	SUMMARY OF FAULT CLEARING ACTIONS
co26 – co30	<ol style="list-style-type: none">1. Correct the source of error—see <i>Table 3</i>.2. Flip the authorization handle down to the OFF position, then back up to the ON position.
co51	<ol style="list-style-type: none">1. Correct the source of error—see <i>Table 3</i>.2. Flip the authorization handle down to the OFF position, then back up to the ON position—or—activate the manual reset switch (MRST).
co76 – co90	<ol style="list-style-type: none">1. Correct the source of error—see <i>Table 3</i>.2. Activate MRST.



Please contact our Technical Support Department at 1-833-264-3835 for any issues not covered in the tables above.

5.2 Dispenser issues



Only trained and qualified service personnel may attempt any troubleshooting and service work to any CNG electrical and mechanical components.

Table 4: Troubleshooting dispenser issues

ISSUE	POSSIBLE CAUSE(S)	RECOMMENDED ACTION(S)
<ul style="list-style-type: none"> Dispenser allows CNG flow into vehicle without authorization 	<ul style="list-style-type: none"> Low-bank inlet valve is stuck open 	<ul style="list-style-type: none"> Rebuild low-bank solenoid valve—see <i>Component maintenance</i> section in <i>Chapter 4</i>
<ul style="list-style-type: none"> Dispenser authorizes and display resets, but no CNG flow present 	<ul style="list-style-type: none"> Manual shutoff valve is closed Filter isolation valves are closed Hose nozzle is faulty No gas supply from storage Vehicle fill line valve is closed Dispenser low-bank valve is stuck closed Low-bank coil is faulty 	<ul style="list-style-type: none"> Ensure the manual shut off valve is in the open position Ensure the filter isolation valves are in the open position Ensure CNG nozzle is in good working order Check if storage gas supply is present Ensure all vehicle line valves are open Rebuild low-bank solenoid valve, see <i>Component maintenance</i> section in <i>Chapter 4</i>
<ul style="list-style-type: none"> Display does not reset upon authorization 	<ul style="list-style-type: none"> Dispenser handle micro-switch is faulty Dispenser authorization harness is disconnected If “standalone” mode is engaged, authorization jumper may not be in place POS or card-lock system is not allowing authorization, disconnected, or not properly configured POS pump ID is not set 	<ul style="list-style-type: none"> Check function of authorization micro-switch Ensure that authorization harness connections are good Ensure that authorization jumper is in place and terminations are tight Ensure POS or card-lock system is properly connected and configured Ensure hose ID in Micon is set to match POS
<ul style="list-style-type: none"> Display does not show readings while fueling 	<ul style="list-style-type: none"> Loose or disconnected wires on Mass Flow Meter or in main electrical explosion proof box Faulty mass flow meter Faulty Micon mainboard 	<ul style="list-style-type: none"> Ensure that all wire connections are correct Refer to Micro Motion ProLink to diagnose problem Replace Micon mainboard
<ul style="list-style-type: none"> Display stops counting within 5 – 10 seconds of authorization, but CNG continues to flow 	<ul style="list-style-type: none"> Low-bank inlet valve remains open during temperature compensation end-of-fill calculation 	<ul style="list-style-type: none"> Rebuild low-bank solenoid valve—see <i>Component maintenance</i> section in <i>Chapter 4</i>

Table 4: Troubleshooting dispenser issues (continued)

5. TROUBLESHOOTING

ISSUES	POSSIBLE CAUSE	POSSIBLE SOLUTION
<ul style="list-style-type: none"> Dispenser overfills vehicles 	<ul style="list-style-type: none"> Micon parameters are not configured properly Temperature probe is not reading correctly Low-bank inlet valve is stuck open Pressure transmitter is faulty 	<ul style="list-style-type: none"> Ensure that the Micon is correctly configured Compare displayed temperature to actual ambient temperature to ensure that the temperature probe is reading correctly Rebuild low-bank solenoid valve, see <i>Component maintenance</i> section in <i>Chapter 4</i> Compare pressure transmitter to pressure gauge to see if there are discrepancies
<ul style="list-style-type: none"> Dispenser under-fills vehicles 	<ul style="list-style-type: none"> Micon parameters are not configured properly Temperature probe is not reading correctly Micon is ending transactions on min. flow conditions Micon min. flow is set too high Temperature probe is faulty 	<ul style="list-style-type: none"> Ensure that the Micon is correctly configured Compare displayed temperature to actual ambient temperature to ensure that the temperature probe is reading correctly Storage supply may not be sufficient to continue transaction and terminate on min. flow conditions Compare displayed temperature to actual ambient temperature to ensure that the temperature probe is reading correctly
<ul style="list-style-type: none"> Pressure gauge does not correspond with vehicle gauge 	<ul style="list-style-type: none"> Faulty dispenser gauge Faulty vehicle gauge 	<ul style="list-style-type: none"> Confirm the dispenser's pressure gauge accuracy by comparing it with the pressure transmitter reading using the Micon Communicator, see <i>Micon 500C® Manual</i> Compare dispenser pressure gauge, vehicle pressure gauge and dispenser pressure transmitter to determine if vehicle gauge is accurate Replace pressure gauge



ADVICE

For any issues or concerns not covered in the table above or any other troubling matters concerning the installation, operation, and maintenance of Kraus CNG dispensers, please contact our technical support department at 1-833-264-3835.

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APPENDIX

A.1 Component description and specifications

KAF 402™ solenoid inlet valve



The Kraus KAF 402™ solenoid valve has been specifically engineered for high-pressure CNG service. It is a unique valve that features a high flow rate; a high-pressure rating; a compact design; and low power requirements, meaning that it does not require the assistance of a lifting coil and relay. These features make this panel mount control valve an excellent choice for sequencing or ESD applications in natural gas dispensing systems.

The KAF 402™ series is available in North American (N) and European (E) models. The KAF 402™-N is approved by the CSA, designed to the ASME code, and complies with NFPA 52 and CGA B108 standards. The KAF 402™-E is TÜV and ATEX approved, and complies with European PED standards.

Technical data	(N)	(E)
Operation	2-way solenoid valve, normally closed	
Design pressure	5,000 psi	345 bar
Operating pressure range—TÜV approved values	73 to 5,000 psi	5 to 345 bar
Test pressure	6,000 psi	414 bar
Burst pressure	25,000 psi	1,700 bar
Operating temperature—CSA approved values	-40°F to +150°F	-40°C to +66°C
Operating temperature—TÜV approved values	-40°F to +122°F	-40°C to +50°C
Flow coefficient (Cv)	3.3	
Inlet and outlet ports	SAE-8 (3/4 – 16)	G1/2" ISO228/1
Electrical specifications	(N)	(E)
Connection	1/2" NPT (North American)	DIN (European) Cable
Power consumption	10 Watts (average)	
Materials		
Body	7075 Aluminum, Anodized	Seat 304 Stainless Steel
Piston	PEEK	Seals Nitrile

Micro Motion® CNG050 flow meter

The Micro Motion® CNG050 is a Coriolis mass flow meter designed specifically for measuring CNG. The meter's refined accuracy and sensitivity allow users the flexibility of using the sensor for standard automobile dispenser configurations or high-flow dispensers for heavy duty fleets.

Flow specifications

	Mass		Standard volume ⁽¹⁾	
	lb/min	kg/min	SCFM	Nm ³ /hr
Flow range	2 to 220	1 to 100	40 to 4444	68 to 7550
Zero stability	0.02	0.009		
Batch accuracy⁽²⁾⁽³⁾	±0.50% of batch			
Repeatability⁽²⁾	±0.30% of rate			

(1) CNG with SG = 0.66 at 60°F (15.5°C) and 14.73 psia (1 bar-a).

(2) In terms of percent of total batch delivered on CNG.

(3) Accuracy is under typical CNG batch/dispensing conditions. Typical batch/dispensing conditions are defined as those where the flow rate is greater than 4lbs/min or 109kg/hr.

Pressure ratings

	psi	bar
Flow tube rating	5,000	345
Pressure limits⁽¹⁾	5,000	345
Union to NPT adapter piece rating⁽²⁾	4,600	317
House rating	Housing is not rated for pressure containment.	
PED compliance	Sensor complies with council directive 97/23/EC of 29-May-1997 on Pressure equipment	

(1) All fittings are rated to 5,000 psi (345 bar) – the Union SWG type fitting according to ASME B31.3, and the SAE fitting according to SAE J1453.

(2) Pressure rating of the additional adapter piece (#12 O-ring face seal to female NPT) that is provided with process connection option 239.

Micro Motion® CNG050 flow meter (continued)

Environmental limits

		°F	°C
Process fluid temp. limits		-40 to +257	-40 to +125
Ambient temp. limits	CSA and MMI standard (no approval)	-40 to +140	-40 to +60
	ATEX		
Humidity limits	5 to 95% relative humidity, non-condensing at 140°F / 60°C		
Vibration limits	Meets IEC 68.2.6, endurance sweep, 5 to 2,000 Hz, 50 sweep cycles at 1.0 g		

Weight

Sensor with core processor	16 lbs / 7 kg
Sensor with integrally mounted transmitter	18 lbs / 8 kg

Materials

Wetted parts ⁽¹⁾	316L stainless steel
Sensor housing	304L stainless steel
Core processor housing	CF-3M stainless steel or polyurethane-painted aluminum; NEMA 4X (IP65)

(1) General corrosion guidelines do not account for cyclical stress and therefore should not be relied upon when choosing a wetted material for your Micro Motion® flow meter. Please refer to Micro Motion's corrosion guide for material compatibility information.



Micro Motion® CNG050

Parker Parflex CNG hose

Parker’s Parflex refueling hose is specifically designed for the transmission of CNG. Its electrically conductive nylon core and fiber reinforcement help to eliminate static build-up while maintaining maximum pressure and flexibility. The hose also incorporates a polyurethane jacket to protect it from abrasions and other outdoor elements, including ultraviolet light.

Description	Specification			
	5CNG-8 ⁽¹⁾		5CNG-12 ⁽²⁾	
Part #	5CNG-8 ⁽¹⁾		5CNG-12 ⁽²⁾	
Minimum inside diameter	½ inch	13 mm	¾ inch	19 mm
Maximum outside diameter	.9 inches	23 mm	1.15 inches	29 mm
Working maximum pressure	5,000 psi			
Minimum bend radius	4 inches	102 mm	7½ inches	191 mm
Weight	.21 lbs/ft	.31 kg/m	.24 lbs/ft	.36 kg/m
Permanent crimp fitting	58 Series		58H Series	

(1) Sizing used for standard-flow dispensers

(2) Sizing used for high-flow dispensers

Construction

Tube	Electrically conductive nylon
Reinforcement	Fiber
Cover	Polyurethane

Operating parameters

Temperature range	-40°F to +180°F ; -40°C to +82°C
Vacuum rating	28 inch Hg
Minimum burst pressure	4x maximum working pressure



The total resistance, measured from end to end, must be less than 1 megaohm for assemblies up to 15 feet in length and less than 5 megaohm for any length or combination of lengths greater than 15 feet.

Fueling nozzles

Kraus CNG dispensers are compatible with Type 1 and Type 2 nozzles for use in either NGV1 (passenger vehicles) or NGV2 (large fleet vehicles) refueling applications. The following are some examples of commonly used nozzles; please contact your salesperson or our Technical Support Department for ordering information and other details.

Type 1 nozzle

The Type 1 nozzle incorporates an integrated vent valve that allows for safe venting and detaching in a single motion.



WEH-TK16, a Type 1 nozzle for NGV1 applications



OPW CT1000S, a Type 1 nozzle for NGV1 applications



WEH-TK17, a Type 1 nozzle for NGV1 applications



OPW CT5000S, a Type 1 nozzle for NGV2 applications

Type 2 nozzle

The Type 2 nozzle must be coupled with an external vent valve that requires you to vent the gas before choosing to disconnect the nozzle from the vehicle's receptacle.



Staubli-CMV 08, a Type 2 nozzle for NGV1 applications

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A.2 Maintenance task list

SCHEDULE	MAINTENANCE TASK
AT STARTUP	<ul style="list-style-type: none"> • Inspect fill hoses and breakaway components • Tighten all electrical terminal connections and check all harness connections • Dispenser leak test
DAILY	<ul style="list-style-type: none"> • Inspect the dispenser and all of its components. If any damages are found, vent, disconnect AC power, and disallow further use until maintenance authority can repair the damages. • Drain dispenser filters
2 WEEKS AFTER STARTUP	<ul style="list-style-type: none"> • Change filter elements—it is common that above normal amounts of debris or liquids from newly installed pressure lines may be present
EVERY 2 WEEKS	<ul style="list-style-type: none"> • Inspect fill nozzle seals for leaks and wear • Inspect flow control or sequencing valves during filling operation • Inspect the sequencing valves for leaks • Inspect fill hoses and hose breakaway components
EVERY 6 MONTHS	<ul style="list-style-type: none"> • Change dispenser filters • Dispenser leak test • Visual leak inspection of pressure relief device—if internal leakage has occurred there will be visible frosting on the outlet tubing
EVERY YEAR	<ul style="list-style-type: none"> • Tighten all electrical terminal connections and check all harness connections • Rebuild sequencing valve • Inspect fill nozzle valve, rebuild if necessary • Inspect pressure regulator, rebuild if necessary
EVERY 2 YEARS	<ul style="list-style-type: none"> • Replace fill hose
EVERY 5 YEARS	<ul style="list-style-type: none"> • Recertify pressure relief device

GLOSSARY

B

Bar. A metric unit of pressure; 1 bar = 14.5038 psi.

Breakaway. A CNG hose feature that allows the hose to break apart and cease gas flow in the event that a vehicle drives away while the dispenser nozzle is still connected to the vehicle's receptacle.

Buffer storage system. A fuel storage system consisting of a single large storage bank, generally used, but not limited to, large vehicles, such as buses and trucks.

C

Card-lock system. A security system incorporated into a dispenser to prevent any unauthorized use. Fleet/fuel cards are required to authorize a transaction.

Cascade storage system. A fuel storage system consisting of two or three storage banks pressurized at different levels. The storage banks are used sequentially in a pre-determined sequence.

CNG. Compressed Natural Gas; an alternative, and considered a more environmentally friendly, fuel used to substitute petrol (gasoline), diesel, and propane.

CNG050. A mass flow meter designed to measure CNG flow, manufactured by Micro Motion®.

Coalescing filtration. A filtration method that separates water aerosols and droplets, as well as solid particles, from gases; the standard and recommended method of filtration for all Kraus CNG dispensers.

Communicator. A standard Micon remote used to set dispenser prices and check totalizer readings.

E

ESD. Emergency Shut Down; a dispenser feature that terminates all power to major components, when activated, to disallow further gas flow and use of dispensers. ESD buttons are not standard features, but Kraus CNG dispensers are equipped with ESD terminals that can enable this function.

H

High-flow dispenser. A CNG filling system designed to quickly refuel vehicles.

High Style. A Kraus-original dispenser frame.

I

Info-Pac. A Micon 500C® remote-control programmer.

K

KAF 402™. A Kraus-original solenoid valve, engineered specifically for high-pressure CNG applications; see *Solenoid valve*.

M

Mainboard. The Micon's main circuit board housing critical electrical components, such as the CPU; also known as the *motherboard*.

Micon 500C®. A Kraus-manufactured pump-controller—an inexpensive alternative to using PLC units to operate fuel dispensers; see also *Pump-controller*.

O

O-ring. A small, circular elastic joint used to seal or fill space between mating components.

P

Particulate filtration. Particulate filtration is a filtration method designed to remove solid particles from gases.

PLC. Programmable Logic Controller; a computer used to automate electromechanical processes, such as dispensers and assembly lines.

POS system. Point-of-Sale system; a system that allows fuel station attendants to control and authorize fuel dispensers from their terminal.

Pressure vessel. A sealed container designed to hold gases or liquids at a considerably higher pressure than that of the ambient atmosphere.

PSI. Pound-force per Square Inch; a unit of pressure.

Pump-controller. An electronic device used to control the voltage supplied to the fuel-pump and other signals used within the fuel-pump.

R

Rebuild kit. A Krause package that includes parts and instructions necessary to rebuild a dispenser component, such as a solenoid valve. Rebuild kits are sold separately from dispenser packages.

S

SAE J1616. A standard developed SAE International that describes recommended practices for using compressed natural gas as fuel for vehicles.

Solenoid valve. An electromechanically controlled valve. For CNG dispensers, it is used to control gas flow from the storage banks to a vehicle's receptacle.

Split-flow. A single fuel dispenser with one hose designed for a standard-flow filling system and another designed for a high-flow filling system.

Split-pressure. A single fuel dispenser designed to dispense fuel at two different pressures.

Standard-flow dispenser. A CNG filling system designed to refuel passenger vehicles.

T

Totalizer. A function within the Micon 500C® that sums up the total dollar and volume sales.

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