

Operator Manual

MINI System

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YOUR #1 PARTNER IN RADIO REMOTE CONTROLS



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INTRODUCTION

THE MANUAL

Before operation of unit, carefully and completely read your manuals. The contents will provide you with an understanding of safety instructions and controls during normal operation and maintenance.

MODEL AND SERIAL NUMBERS

When contacting your dealer or Hetric about service, repair or replacement parts, know the model and serial numbers of the transmitter and receiver.

The numbers are located on the label that is affixed to the unit itself. Record the serial numbers here:

Transmitter

Receiver

UNAUTHORIZED REPLACEMENT PARTS

Use only Hetronic replacement parts. The replacement of any part with anything other than a Hetronic authorized replacement part may adversely affect the performance, durability, and safety of this system and may void the warranty. Hetronic disclaims liability for any claims or damages, whether warranty, property damage, personal injury or death arising out of the use of unauthorized replacement parts.

BEFORE ATTEMPTING TO OPERATE THIS SYSTEM:

1. Make sure all installation has been properly completed.

2. Understand all Safety Precautions provided in the manuals.
3. Review control functions and operation of the machine and this radio remote control system.

THEORY OF OPERATION

The Mini System includes a transmitter and a receiver. The hand-held transmitter generates the electronic signal that communicates with the receiver. Hetronic radio remote control systems operate in the 400-470 MHz range (70 cm band). The transmitter and receiver are set with identical address codes and frequency channels. This allows operation of multiple systems within the same area without signal interference.

SAFETY

SAFETY ALERTS



Look for this symbol to point out important safety precautions. They mean:

Attention!

Personal Safety Is Involved!

Become Alert!

Obey The Message!

The safety alert symbol is used in decals on the unit and with proper operation procedures in this manual. Understand the safety message. It contains important information about personal safety on or near the unit.



DANGER: IMMINENTLY HAZARDOUS SITUATION! If not avoided, WILL RESULT in death or serious injury.



WARNING: POTENTIALLY HAZARDOUS SITUATION! If not avoided, COULD RESULT in death or serious injury.



CAUTION: POTENTIALLY HAZARDOUS SITUATION! If not avoided, MAY RESULT in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTATIONS

NOTE: General reference information for proper operation and maintenance practices.

IMPORTANT: Specific procedures or information required to prevent damage to unit or attachment.

PRACTICES AND LAWS

Practice usual and customary safe working precautions, for the benefit of yourself and others. Understand and follow all safety messages. Be alert to unsafe conditions and the possibility of minor, moderate, or serious injury or death. Learn applicable rules and laws in your area.

REQUIRED OPERATOR TRAINING

Original purchaser of this unit was instructed by the seller on safe and proper operation. If unit is to be used by someone other than original purchaser; loaned, rented or sold, ALWAYS provide this manual and any needed safety training before operation.

ALWAYS review the operators manual of any machine to be controlled by radio remote control.

POSSIBLE SOURCES OF DANGER

This system makes remote control via radio signals possible. However, the transmission of control commands can take place around obstacles and out of the operator's direct sight. To prevent accidental start-up and possible injury or damage:

1. Always remove the battery pack from the transmitter when it is not in use or if the unit is placed any distance away from the operator.
2. Disconnect the power supply before any assembly, maintenance or repair work is done.
3. Never remove or alter any of the safety features of this system.

OPERATION AND WORK AREA SAFETY

The work area must be free from obstacles, debris or other tripping hazards. Avoid uneven work areas and any rough terrain. Always be sure of your footing.

Be aware of overhead obstacles that may interfere with machine operation.

PROTECTIVE FEATURES

This radio remote control system is equipped with electronic and mechanical safety features. Processing of control signals transmitted from other transmitters is not possible, since transmission coding is unique to each system.

These safety features help protect the operator, as well as others within the work area. The machine functions can be stopped by pushing the emergency stop button on the transmitter control panel (EMERGENCY STOP).

IMPORTANT: Before operation, always test all safety features.



WARNING: Accidental start-up can cause serious injury or death. NEVER remove or modify any safety feature.

TO STOP IN AN EMERGENCY

1. Press the red "EMERGENCY STOP" pushbutton.
2. Wait for all moving machine parts to stop.
3. Refer to machine's operator manual for further instructions.

MAINTENANCE AND STORAGE

Always shut off power to the machine and the radio remote control before any assembly, maintenance or repair.

INSTALLATION



WARNING: FAILURE TO FOLLOW INSTRUCTIONS could result in personal injury and/or damage to equipment. Read and understand the safety instructions in all manuals provided.

MOUNT THE RECEIVER

Install Receiver and Output Wiring

Select a position for the receiver that provides protection from violent impact from debris or thrown materials and is easily accessible. The receiver housing is rated IP66, can withstand direct water jet spray and is protected against penetration of dust. Therefore, weather and elements should not be the primary concern when installing the receiver.

Four mounting holes are required when installing the receiver unit. The drill pattern is shown in Figure 1.

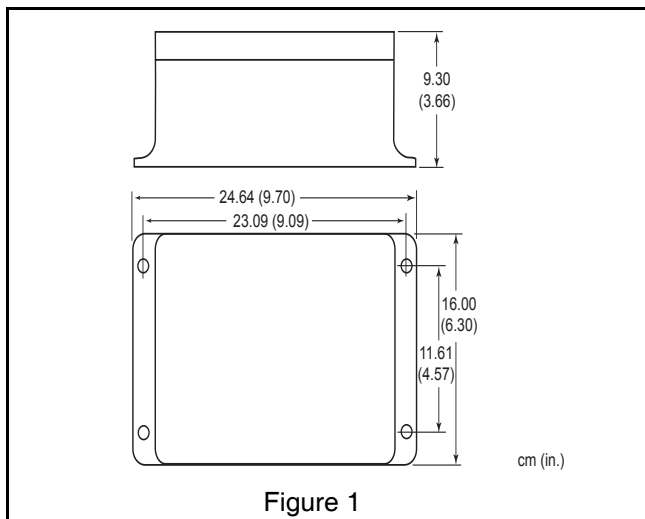


Figure 1

The receiver wiring is critical for proper system operation. Make all connections with good quality contacts or solder joints to ensure proper electrical contact.

Supply voltage and ground wiring are crucial and must be connected to reliable connecting circuitry if using a DC power source. Do not use a chassis ground for this equipment. The ground wire must be connected directly to the vehicle battery negative post.

The output control signals should be routed separately from any wiring that could produce transient voltage interference. Interference or "induced voltage spikes" could cause erratic performance.

Connect Electrical Wiring

Connect all remaining wires (power supply, start-stop, etc.) according to the wiring diagram of the crane and the radio remote control. Refer to the *Wiring Diagram* for your unit that is included in the *Technical Documents Section* for detailed wiring specifications.

CONNECTING STANDARD EXTERNAL ANTENNA

If it is necessary to mount the receiver inside a panel enclosure, an external antenna is required. Mount the antenna onto a metal surface that has the same ground as the receiver. The antenna should be pointing upward. The area around the antenna should be free of obstructions, especially metal. See Figure 2.

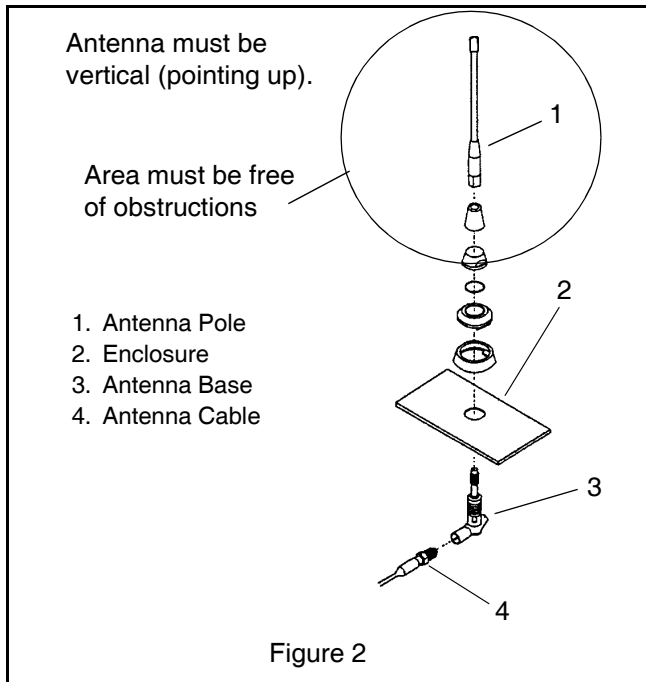


Figure 2

NOTE: Improper installation of the antenna will result in intermittent operation.

1. Drill hole, 1.42 cm (.56 inch) dia. through the enclosure.
2. Remove any burrs from drilled hole and scrape paint from the area that will ground the antenna to the enclosure.
3. Assemble the antenna as shown in Figure 2.
4. Disconnect the internal antenna from the circuit board in the receiver.
5. Connect the external antenna cable to the antenna connector on the circuit board.
6. Secure extra antenna cable with tie wraps.

IMPORTANT: DO NOT run the antenna cable along with control or power wiring. Incorrect installation will cause intermittent operation.

CONNECTING A GAIN FLEX ANTENNA

The Gain Flex antenna can extend the operating range of the unit up to 300 meters (1000 feet). Be sure there are no metallic or conductive materials within a 2 meter (6 feet) radius of the antenna. For the best results, mount the antenna pointing upward. See Figure 3.

IMPORTANT: Incorrect installation will cause intermittent operation.

1. Mount the antenna base vertically with the two tie wraps included in the antenna kit. The antenna should point upward.
2. Screw the antenna pole onto the antenna base.
3. Disconnect and remove the internal antenna from the printed circuit board.
4. Connect the antenna cable connector to the antenna connector on the printed circuit board.
5. Gather extra antenna cable and secure with tie wraps.

NOTE: Do not run the antenna cable with power or control wiring. Intermittent operation will result.

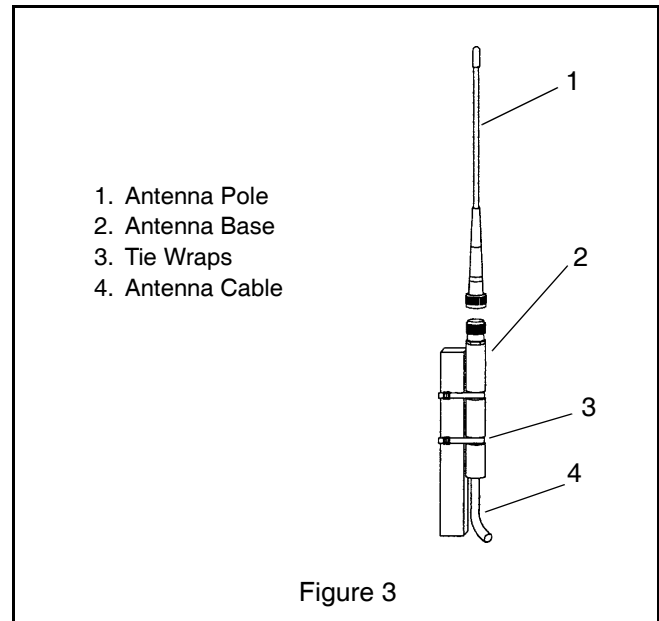


Figure 3

INSTALL TRANSMITTER BATTERY

Place the battery in the transmitter at an angle, with the contacts facing inside. Push the battery into the cavity until the case is flush against the housing wall. The battery should now be positioned securely inside the transmitter. See *Maintenance* section for detailed instructions on charging the battery.

ADJUSTMENTS

FREQUENCY CHANNEL

Each Hetronic radio remote control system contains a registration-free radio frequency unit. Each system consists of a transmitter RF unit and a receiver RF unit.

Standard RF Module

The receiver is capable of receiving one of 16 discrete frequency channels. The frequency channel is set by Hetronic at the factory. If interference occurs on a particular frequency, it may be necessary to change the channel of the receiver and transmitter.



WARNING: DO NOT change the address code or frequency channel of the original transmitter. Contact Hetricnic or your authorized dealer.

DO NOT change the address code settings in the receiver.

DO NOT operate two transmitters set with the same frequency and address as the receiver at the same time.



CAUTION: AVOID INJURY OR DAMAGE - Operating the transmitter without its antenna could destroy the final stage of the RF module. DO NOT attempt to change the Hetricnic pre-set frequency or the 16-bit address. Personal injury and property damage could result from transmission interference and may void the warranty.

If there are multiple radio remote control systems operating in the same vicinity, take care when selecting frequency channels that operate each system. Residual energy from one system can interfere with other systems if they are in close proximity. Contact Hetricnic or your authorized dealer for assistance in resetting frequency channels.

OPERATION



WARNING: FAILURE TO FOLLOW INSTRUCTIONS could result in personal injury and/or damage to equipment. Read and understand the safety instructions in all manuals provided.

The safety checks as described in the following paragraphs must be completed before the radio remote control system is activated. These checks must be performed at least once a day, before the start of any operation and at all shift changes.

IMPORTANT: A transmitter drawing is included with each system. Transmitter layout and inscriptions may vary according to customer requests.



WARNING: FAILURE TO FOLLOW INSTRUCTIONS could result in personal injury and/or damage to equipment. Test the "EMERGENCY STOP" function as described in the machine manufacturer's operator manual before beginning any operation.

VISUAL CHECK

Always check the transmitter for any physical damaged before any operation.

- Always keep safety features, guards and controls in good repair, in place and securely fastened.
- Check equipment for wear or damage.
- Check housings and pushbutton caps for wear or damage.

IMPORTANT: Never operate a transmitter with worn or damaged parts. Replace immediately with only Hetricnic parts. Contact Hetricnic or your Dealer.

START-UP PROCEDURE

This checklist must be carefully followed before beginning any operation.

1. Insert battery into the transmitter.
2. Be sure no motion pushbuttons are depressed.
3. Press the Start/Horn button. The transmitter completes its self-checks and is activated. The transmitter is now transmitting and ready for use.

IMPORTANT: If any function of the radio remote control activates with the "EMERGENCY STOP" engaged, the radio remote control must not be used until it is repaired.

1. Antenna
2. E-Stop button
3. Start/Horn button
4. Function up
5. Function down

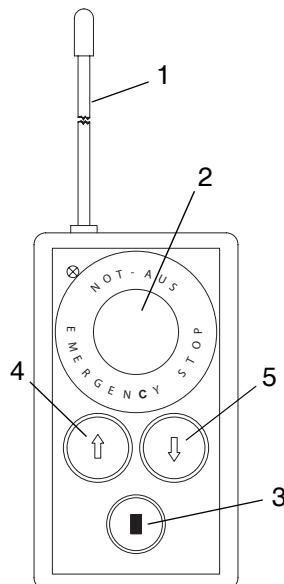


Figure 4

IMPORTANT: To avoid accidental start-up, always switch the transmitter "OFF" by pressing the E-stop button and remove the battery when not in use. When the transmitter is not attached to the operator, the battery should be removed and stored in a secure place.

EMERGENCY STOP

In any emergency situation, push the E-Stop pushbutton. To restart, press the Start/Horn button.

USING MOTION PUSHBUTTONS

The transmitter controls the up and down motion. Only one pushbutton in each horizontal row should be activated at a time.

SYSTEM SHUTDOWN

To shut down the radio remote control system, press the E-stop button and remove the battery. Power is no longer supplied to the transmitter.

LOW BATTERY

If the transmitter battery voltage drops below a safe level, approximately 3.6 volts, the Power LED flashes red for about half a minute. At the end of 30 seconds, the transmitter shuts itself off and disables the receiver to block all machine commands.

Shut down the machine according to the manufacturer's instructions. Insert fully charged batteries into the transmitter.

MAINTENANCE

The owner of this radio remote control system should have the system inspected by a qualified technician at least once every year.

A qualified technician has professional training, experience and extensive knowledge in wireless transmission of control signals. This includes familiarity with normal regulations for safe working conditions, accident prevention, guidelines and general regulations of technology for the respective countries (CE).

BATTERY CHARGER (OPTIONAL)

The battery charger processor checks the capacity of the battery until it is fully charged. The maximum charging time is 4 hours. When the battery is fully charged, the green LED flashes. You can leave the battery in the charger until it is needed. This ensures a full charge. While the battery is charging, the green LED emits a steady light.

Battery charger uses 115/230 VAC (DC optional) and plugs into a typical wall outlet.

To prolong battery life, be sure the battery is fully discharged before recharging. Charging a partially charged battery shortens the effective life of the battery.

BATTERY DISPOSAL

IMPORTANT: AVOID ENVIRONMENTAL POLLUTION. Electronic equipment and components are considered to be hazardous waste. Discarded rechargeable batteries are hazardous waste and must not be disposed of with typical refuse. Contact a professional hazardous waste disposal service or Hetric.

TROUBLESHOOTING

If the system does not operate after normal start-up as described in Operation Section of this manual, follow the recommended troubleshooting sequence to help isolate the cause and determine corrective action.

If the system will not respond to the steps below or the LEDs indicate a failure, contact the Hetronic Service Department or your authorized dealer.

PROBLEM	PROBABLE CAUSE	CORRECTION
Transmitter is activated but does not broadcast. (Power LED not flashing.)	Discharged batteries	Replace with fully charged batteries.
	Failed electronics board	Contact Hetronic or your Dealer for repairs.
Transmitter is broadcasting, but machine functions are not working.	Transmitter is out of range.	Move transmitter into designated range.
	A motion function was not "Off" when transmitter was activated.	Be sure all buttons are in "Off" position. Press Start/horn button.
	No power to receiver.	Turn on power to receiver.
	Fuse is blown in receiver.	Check fuses and replace if necessary.
	Receiver is set for different address or frequency channel.	Be sure receiver address and frequency channel match transmitter. Contact Hetronic or your Dealer.
All machine motion works intermittently.	Antenna is loose or disconnected.	Secure or replace antenna.
	Power transients affecting control.	Be sure all contactors being controlled by the receiver have surge suppressors installed.
	Control wiring run too near power wiring.	Be sure that control wiring is run separately from control wiring.
	Transmitter interference from another Hetronic radio remote control system.	Two systems within 200 feet of each other must be at least 2 channels apart. Two systems within 50 feet must be at least 3 channels apart. Contact Hetronic or your Dealer for assistance.
Some machine motions work intermittently.	Loose wiring to that motion.	Check wiring for secure connections.
	Loose connector inside receiver.	Check terminal block connectors. Contact Hetronic or your Dealer for assistance.
	Power transients affecting control.	Be sure all contactors being controlled by the receiver have surge suppressors installed.
	Control wiring run too near power wiring.	Be sure that control wiring is run separately from control wiring.

SPECIFICATIONS

General Data	
Frequency	70 cm Band (Selectable 400 Mhz to 470 Mhz) 16 Preset
Range	approx. 100 m (330 ft.)
Address	16-bit - 65,000 possible
Operating temperature	-25° to +70° C (-18° F to 158° F)
Data Format	4800 Baud (approx. 55 msec response time)
Hamming distance	4
Receiver	
Protective System	IP 66
Voltage Supply	50/110/240 VAC 50/60Hz or 12 to 24 VDC (-50% - +20%)
Output	1 E-Stop relay 6 Motion/function relays - NO
Static current	<100 mA
Antenna	Built-in (External Optional)
Dimensions L x W x H cm (in.)	24.6 x 16.0 x 19.3 (9.70 x 6.30 x 3.66)
Weight - Kg (lbs)	2,5 (3.6)
Transmitter	
Enclosure	IP65 Weatherproof
Battery Pack	AA [Optional 3.6 V / 1200 mAh (NiMh)]
Operating time	24 hours continuous with AA batteries, 30 hours continuous with rechargeable battery.
Transmitting power	< 10 mW
Weight	Less than 1 lb. (including battery)
Dimensions L x W x H cm (in.) (Not including antenna)	12.3 cm x 6.9 cm x 3.3 cm (4.84 x 2.72 x 1.31)
Battery Charger - Optional	
Operating voltage	115/220 VAC
Charging time	4 Hours

Definitions and Abbreviations

The following terms and abbreviations may be used in this Operator Manual.

A/D	Analog to digital conversion
AK	Analog channel (German: Analog Kanal)
AMP	Ampere
Analog	Proportional-stepless or infinite control
AWG	American wire gauge
Baud	Transmission speed measured in bits per second
BPS	Bits per second
Coder	Device that converts parallel signals into a serial data message
Decoder	Device that converts a serial data message into parallel signals
EMC	Electromagnetic compatibility
EMI	Electromagnetic immunity
EPROM	Electrical programmable read-only memory
FM	Frequency modulation
GND	Ground
Hamming distance	The measurement of data transmission safety. A low hamming distance indicates a less sensitive test. A high hamming distance indicates extreme sensitivity and is susceptible to noise interference.
HF	High frequency
KHz	Kilohertz
Latching	An auxiliary function activates when the option button is pressed once and released. The function is deactivated when the option button is pressed again.
Maintained	An auxiliary function activates when the switch is flipped to an appropriate position. The function is deactivated when the switch is flipped to the "OFF" position.
Momentary	An auxiliary function activates when the option button is pressed and held. The function is deactivated when the button is released.

mAH	Milliampere hours
mA	Milliampere
msec	millisecond
MHz	Megahertz
mW	Milliwatt
NiCd	Nickel cadmium (battery)
NiMH	Nickel metal hydride (battery)
PLC	Programmable logic controller
PLL	Phased locked loop
PWM	Pulse width modulation
RF	Radio frequency
RMS	Root mean squared
Rx	Receiver
RxD	Receiving data
SMD	Surface mount device
SMT	Surface mount technology
Synthesizer technology	Method to electronically generate a transmitter carrier frequency
TTL	Transistor logic
Tx	Transmitter
TxD	Transmitting data
Ub	Operating power
Uv	Microvolts
VAC	Volts alternating current
VDC	Volts direct current

INSTALLATION AND SAFETY TEST DATA

This form must be completed and signed by the person responsible for installation of this radio remote control system.

Hetronic assumes no responsibility for the correct installation of the radio remote control system. The equipment operator must ensure that the radio remote control system and the crane/machine operate correctly together. The operator must also ensure that all safety devices and features are in place and operating correctly. The operator is responsible for understanding and following all safety precautions in this and other applicable operator manuals.

Machine Data	
Manufacturer	
Model Number	
Serial Number	
Year of Production	
Radio Remote Control Data	
Manufacturer	Hetronic
Model	Mini
System Type	GA 610
Serial Number	
I/We installed the radio remote control system, performed the safety test and inspected the crane/machine. The appropriate instructions and rules of this machine type are followed.	
Place	
Date	
Company	
Name of Installation Technician	
Signature	



LIMITED WARRANTY AND TERMS OF SALE

Hetronic, Inc.

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Price: Subject to change without notice
Terms: Net 30 Days
F.O.B.: Hetronic USA, Inc.
Oklahoma City, Oklahoma

Hetronic, Inc., hereafter referred to as Company, guarantees all items manufactured by it against any defects of material and/or workmanship for a period of one year from the date of shipment. Company makes NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AS TO THE MERCHANTABILITY OR FITNESS OF THE ITEMS FOR THEIR INTENDED USE OR AS TO THEIR PERFORMANCE. Any statement, description or specification in Company's literature is for the sole purpose of identification of items sold by the Company and imparts no guarantee, warranty or undertaking by company of any kind. Components and accessories not manufactured by Hetronic are not included in this warranty and are warranted separately by their respective manufacturers.

Company's sole liability shall be to repair at its factory, or replace any item returned to it within one year from date of shipment, which Company finds to contain defective material or workmanship. All items to be repaired or replaced shall be shipped to Company (Note: return authorization by Company is required) within said one year period, freight prepaid, as a condition to repair or replace defective material or workmanship. Company's herein assumed responsibility does not cover defects resulting from improper installation, maintenance, or improper use. Any corrective maintenance performed by anyone other than the Company during the warranty period shall void the warranty. Company shall not be liable for damages of any kind from any cause whatsoever beyond the price of the defective Company supplied items involved. Company shall not be liable for economic loss, property damage, or other consequential damages or physical injury sustained by the purchaser or by any third party as a result of the use of any Company supplied items or materials.

List prices or discounts are subject to change without notice. Quoted prices will be honored for a period of 90 days from the date of the written quotation unless otherwise stated.

Orders are not subject to alteration or cancellation except upon written consent of Company and payment of proper cancellation charges, when deemed applicable by Company.

Materials or items may not be returned for credit, without the prior written consent of the Company. Any authorized return of materials or items shall be subject to a restocking charge equal to 20% of the net invoiced amount after Company determines that the material or item is in good condition and may be resold without alteration or service.

Terms of payment are NET 30 days. All materials and items are sold F.O.B. Company's shipping point. Company retains a security interest in all items sold by it so long as they remain in Company's possession to secure all obligations of purchaser to Company. A processing fee will be applied to all invoices for requested prepaid freight charges other than UPS. A service charge will be incurred on past due accounts extending beyond the terms of sale described above, at a rate of 1.5% per month of the net balance extending beyond 30 days

The buyer should inspect the goods immediately on their arrival and shall within five days of their arrival give written notice to the company of any claim that the goods do not conform with the terms of the contract. If the buyer shall fail to give such notice, the goods shall be deemed to conform with the terms of the contract. Any claim for material or item shortages must be accompanied by copies of the bill of lading and packing slip.

Delivery schedules or commitments are based upon current production capacities, material or component availability and inventory and may be changed as conditions require. Company shall not be liable for loss or damage of any kind resulting from delay or inability to deliver on account of fire, labor troubles, accident, acts of civil or military authorities, or from any other cause beyond the company's control.