

MC704™ Panel Operation and Troubleshooting



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Introduction

MC704 Panel Operation and Troubleshooting

This document provides general information on **LOFA™ MC704** panels operation and troubleshooting. MC704 panels are a flexible platform for diesel engine control, monitoring, and protection, featuring LOFA's powerful **First Fault Diagnostics** (FFD). After pinpointing the initial failure, FFD stores it in memory and alerts the end user via a single bright LED. FFD monitors battery charge, low oil pressure, high temperature and one additional contact closure input. The microprocessor-based solid-state design uses high-power semiconductors instead of outdated electromechanical relays to ensure reliable high-current switching.

The MC704 panels are offered in two versions. The **MC704HP** has a built-in tamperproof LED hourmeter while the reduced cost **MC704LCP** eliminates the hourmeter. Both versions can be factory configured with specific preheat and afterglow requirements. If preheat is not required this output can function as an alarm.

All standard panels include feature a 12 inch wiring harness terminating into a sealed weather proof plug. This robust universal wiring connection performs well in harsh environments and allows interchanging a number of different panels and harnesses. This design allows for simplified installation as well as a flexible means to incorporate custom plug-and-play engine wiring harnesses and standard harness extension

Note

The engine harness is not included with the panel.

A number of standard engine harnesses are available or LOFA can develop a custom harness for your exact needs.

Generic harnesses in various lengths are available for field customization.

Warning!

When replacement parts are required, LOFA Industries recommends using replacement parts supplied by LOFA or parts with equivalent specifications.

Failure to heed this warning can lead to premature failure, product damage, personal injury or death.

Important Safety Information

The warnings in this publication are not all inclusive.

LOFA Industries cannot anticipate every potential hazard.

Appropriate safety rules and precautions should be followed with any tool, work method or operating procedure.

Improper procedures, tools and materials may cause damage or make the equipment unsafe to operate.

Only persons with appropriate training, skills and tools should perform these functions.

Improper operation, maintenance or repair of this product can be dangerous and may result in injury or death.

Do not operate or perform any maintenance or repair on this product until all operation, maintenance and repair information is read and understood.

The information, specifications, and illustrations in this publication are based on information available at the time of publication.

All items are subject to change at any time without notice.

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Operation

Turning the panel key to the run position starts a self-test which causes all LEDs to flash three times, activates the alarm output (if preheat is not used) for one second and enables the fuel run/stop solenoid output. After self-test, the LEDs indicate the state of the inputs they monitor. The normal indications are battery charge and oil pressure on most applications. If these LEDs are not illuminated at this time it may indicate the inputs are not properly connected.

The Preheat/OK LED begins to blink when the key switch is turned to the run position if automatic preheat is configured (See Preheat Options). Preheat time varies from application to application. After waiting for the Preheat/OK LED to become solid, the engine is cranked by turning and holding the key switch in the start position until the engine starts. The key switch is spring loaded to return automatically to the run position when released.

Note

The key switch is equipped with a mechanical start locking device. An attempt to crank the engine again can only be made by turning the key switch to the off position to reset the start locking mechanism.

If the engine is not started within 30 seconds of turning on the panel, the fuel run/stop solenoid output is turned off to prevent battery discharge when the key switch is left in the run position. The fuel run/stop solenoid output is turned off after 30 seconds even if preheating. As soon as the key switch is turned to the start position the solenoid output is enabled. The afterglow cycle begins when the key switch returns to the run position.

Note

If conditions do not warrant preheat, the engine may be started by turning the key to the start position without waiting for the preheat time to expire.

Panel instrument power, including the hour meter and voltmeter, is provided by the fuel run/stop solenoid output. If the instruments do not power up when the key is turned to the run position, this indicates a problem with the solenoid circuit (see Troubleshooting).

After the engine starts, the panel electronics ignore all shutdown conditions for the first 10 seconds. This delay eliminates the requirement to hold a by-pass override button during starting and allows the engine conditions such as oil pressure to normalize. The 10 second timer starts when the key switch returns to the run position.

Note

Starter input is required for correct panel operation. If the starter motor input is not activated (connected to battery positive) and the engine is started through another means (i.e. air starter) the engine will shutdown 30 seconds after the key switch is turned to the run position.

To prevent unintentional engine shutdowns caused by intermittent conditions (i.e., pressure spikes, coolant movement) the panel requires a constant 1/3 second fault input to cause engine shutdown.

Warning!

When used in combination with mechanical float type switches engine vibrations may prevent constant contact closure.

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Preheat Options

Preheat Output

Preheat is a 3 A positive output for control of an external power relay with predetermined preheat and afterglow times. A relay should be selected with appropriate amperage capacity for the installed cold starting aid (glowplug, intake air heater, etc.). Applications using multiple cold starting aids may require multiple relays.

Note

Consult engine documentation when selecting cold starting aid, power relay and heating specifications.

Indicators



Battery LED (Red)

A solidly illuminated Battery LED indicates a battery charge failure. A battery charge failure may be caused by a faulty alternator, broken drive belt or the alternator not excited. A battery voltage reading of approximately 14 volts on 12 volt systems (28 volts on 24 volt systems) while the engine is running indicates the battery is charging properly. Irregular blinking of the Battery LED may indicate a failing charge circuit. The panel can be factory configured for battery charge failure to indicate only.



Oil Pressure LED (Red)

A solidly illuminated Oil Pressure LED indicates low oil pressure failure. The panel typically senses low oil pressure from a ground contact switch on the engine. When a sender/switch combination is used on the engine, the marking **WK** generally indicates the switch terminal. This input typically expects a normally closed switch (ground contact when oil pressure is low). A defective switch or shorting the shutdown input to ground can cause low pressure fault indication. Additionally, when using sender/switch combinations, swapping the **WK** and **G** terminal can cause unintended shutdowns. The panel can be factory configured for oil pressure failure to indicate only.

Warning!

Low oil pressure is not an indication of low oil level.

For best possible protection LOFA recommends using our solid-state oil level shutdown switch.

Note

Most shutdown switches are grounded through the switch body.
Do not use insulating sealant (i.e. Teflon tape) when installing switches.



Temperature LED (Red)

A solidly illuminated Temperature LED indicates high engine temperature failure. The panel typically senses high temperature from a ground contact switch on the engine. When a sender/switch combination is used on the engine, the marking **WK** or **W** generally indicates the switch terminal. This input typically expects a normally open switch (ground contact when engine temperature is too high). A defective switch or shorting the shutdown input to ground can cause over temperature fault indication. Additionally, when

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using sender/switch combinations, swapping the **WK** or **W** and **G** terminal can cause unintended shutdowns. The panel can be factory configured for temperature failure to indicate only.

Warning!

If the temperature switch is not in contact with coolant due to coolant loss the engine is not protected from overheating.

For best possible protection, LOFA recommends using our solid-state coolant level shutdown switch.

Note

Most shutdown switches are grounded through the switch body. Do not use insulating sealant (i.e. Teflon tape) when installing switches.

Some thermostat housings are composites and do not provide ground for the switch.



AUX LED (Red)

A solidly illuminated AUX LED indicates an auxiliary failure (i.e., coolant level, oil level, belt breakage, hydraulic pressure, etc.). The panel typically senses failure using a ground contact switch. Auxiliary inputs are equipment specific and determined by the equipment manufacturer. A defective switch or shorting the shutdown input to ground can cause fault indications. The panel can be factory configured for auxiliary failure to indicate only.

Preheat/OK LED (Green)

A blinking green Preheat/OK LED is the panel preheat indication. When the LED changes to solid the preheat period is complete and the engine may be cranked. The LED changes to solid illumination when the engine starts. There is no indication of afterglow.

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Harness

Sealed Connectors

The provided sealed weather proof plug includes a grey locking device which must be released to separate the connectors. Press the tab on the connector housing to release the connectors.

Warning!

LOFA does not recommend using dielectric grease or sealant with sealed connectors.
These chemicals may cause seal damage and allow water entry.

Use LOFA provided cavity plugs to seal the connector if wires are removed.

Unsealed Connectors

For unsealed connectors exposed to the elements, LOFA recommends using dielectric grease to protect contacts.

Warning!

LOFA does not recommend using sealant with unsealed connectors.
Sealant traps moisture in the connector and encourages corrosion.

Harness Routing

The minimum routing of radius of the wiring harnesses should be at least two times the diameter of the wiring harness. Bends should be avoided within 1 inch (25 mm) of any connector in order to avoid seal distortion allowing moisture to enter the connector.

Note

For harness length in excess of 10 ft a relay must be added to the start solenoid circuit.
A relay may also be required for the fuel run/stop solenoid.

LOFA offers starter relay kits for mounting near the engine.

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Battery Circuit Requirements

Battery Positive Connection

The electronic panel operates on either a 12 VDC or 24 VDC electrical systems. The unswitched battery positive connection to the panel is made at the weather proof connector. The panel provides switched positive battery

Protection for the unswitched battery positive circuit is dependent on specific equipment configuration. The overload protection should not exceed 125% of the sum of all output currents plus 5 Amps for the panel. Powering the panel through dedicated circuits with appropriate overload protection reduces the possibility of panel damage.

Circuit breakers are preferred over in-line fuses for circuit protection. Over current protection devices should ideally be located in a central location. If automatic reset circuit breakers are used, consideration of the environment of the breaker is critical and may affect the trip point. The trip point of some circuit breakers can be significantly reduced below the rated trip point if the circuit breaker is exposed to high temperatures.

Warning!

Disconnecting the battery while the engine is running may damage electrical components.

When using a battery disconnect switch, LOFA recommends using a 2 pole switch to disconnect both the battery and alternator output.

Battery Negative Connection (Grounding)

Warning!

Improper grounding can cause electrical noise, unreliable operation and may damage the panel or other components. All ground connections must be free from foreign materials, including paint, which may interfere with proper grounding.

A reliable ground must be provided for the panel.

LOFA recommends the ground connection be made directly to the battery negative. Grounding through frame members is not recommended.

All ground paths must be capable of carrying any likely fault currents.

Do not reverse the battery polarity. Attempting to crank the engine when the polarity of the battery connections is reversed may damage the panel.

Note

A maximum of three ring terminals should be connected to a ground stud in order to ensure integrity of the ground connection. The use of more than three terminals can cause the connection to become loose.

Voltage Drop

If panel voltage drops below 6 volts for more than one tenth of a second, the panel may reset causing the self-test to reactivate and the engine to shut down after 30 seconds. Resetting the panel is equivalent to quickly turning the key switch to off and back to run without starting the engine. Since the panel did not

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sense a start signal, the fuel run/stop solenoid deactivates after 30 seconds. Voltage drops can be caused by external equipment inrush current, improper wire sizes or faulty wiring. Relays may be needed for long wire runs.

Suppression of Voltage Transients (Spikes)

Warning!

The installation of voltage transient suppression at the transient source is required.

LOFA follows SAE recommended electrical environment practices.

Inductive devices such as relays, solenoids and motors generate voltage transients and noise in electrical circuits. Unsuppressed voltage transients can exceed SAE specifications and damage electronic controls.

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Relays and solenoids with built-in voltage transient suppression diodes are recommended whenever possible. Refer to the illustration for proper installation of diodes when built-in voltage transient suppression is not available.

Locate inductive devices as far as possible from the components of the electronic panel. When using electric motors it may also be necessary to add isolation relays to eliminate voltage transients, noise and prevent back feed.

Note

LOFA harness assemblies typically include all required engine control suppression devices.

Added equipment will require additional protection.

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Welding on Equipment with Electronic Controls

Proper welding procedures are required to avoid damage to electronic controls, sensors, and associated components. The component should be removed for welding if possible.

The following procedure must be followed if the component must be welded while installed on equipment with electronic controls. This procedure will minimize the risk of component damage.

Warning!

Do not ground the welder to electrical components such as the control ground or sensors.

Improper grounding can cause damage to electrical components

Clamp the ground cable from the welder to the component being welded. Place the clamp as close as possible to the weld to reduce the possibility of damage.

1. Stop the engine. Turn the key switch to the OFF position.
2. Disconnect the negative battery cable from the battery.
3. Open any installed battery disconnect switch.
4. Unplug the panel if possible.
5. Connect the welding ground cable as close as possible to the area to be welded.
6. Protect the wiring harness from welding debris and spatter.
7. Use standard welding methods to weld the materials.

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General Troubleshooting

For additional information, refer to engine manufacturer troubleshooting guide.

No response from starter motor

Possible Cause	Possible Remedy
No battery voltage to starter	Verify wiring and battery connection (power and ground)
Battery discharged	Charge or replace battery, verify alternator charging
Tripped overcurrent protection	Correct fault, replace or reset overcurrent protection
No signal from panel	No power to panel (see Panel Troubleshooting below)
Defective starter solenoid	Replace starter solenoid
Defective starter motor	Replace starter motor

Engine will crank but not start

Possible Cause	Possible Remedy
Engine not getting fuel	Check fuel level, filter, fuel pump, verify no air in fuel lines
Fuel run/stop solenoid not engaged	See Fuel Solenoid Run/Stop Troubleshooting (below)
Tripped overcurrent protection	Correct fault, replace or reset overcurrent protection
No preheat (cold condition)	See Preheat Troubleshooting

Engine runs for 10 seconds and shuts down

Possible Cause	Possible Remedy
Shutdown switch input active	Verify shutdown source exists, correct condition or correct faulty circuit
Battery not charging	Verify alternator charging (see Alternator not charging battery below)
Control board did not sense start signal	Engine started through alternate method (i.e., manual air start, push start, etc.)
Defective panel	See Panel Troubleshooting (below)

Engine runs longer than 10 seconds and shuts down

Possible Cause	Possible Remedy
Shutdown switch input active	Correct engine fault, verify shutdown switch wiring
Circuit overload protection tripped	Correct overload, keep panel from overheating (over 185° F/85° C)
Voltage transients (spikes)	Add suppressor diodes, protect from nearby lightning strikes, shield induced spikes from other equipment, add electric motor control relay
Defective panel	See Panel Troubleshooting (below)

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Alternator not charging battery

Possible Cause	Possible Remedy
Broken or slipping alternator drive belt	Adjust or replace alternator drive belt
Alternator not excited	Verify excitation circuit connected, replace faulty regulator, add additional excitation resistor
Alternator output not connected	Install charge wire
Alternator not grounded	Clean or add ground connection
Alternator faulty	Replace faulty alternator

Fuel Run/Stop Solenoid Troubleshooting

Engine does not stop immediately

Possible Cause	Possible Remedy
Back feed from motor (i.e., cooling fan)	Add relay or blocking diode
Sticking solenoid linkage	Repair or replace solenoid linkage
Fuel valve without check valve	Install or repair check valve

Fuel run/stop solenoid does not engage

Possible Cause	Possible Remedy
No power to solenoid	Locate reason for lack of power and correct (Circuit overloaded? Failed suppressor diode? Faulty wiring?)
No power to solenoid pull coil	Correct faulty wiring, check pull control circuit (see Power Box Troubleshooting below)
Incorrect linkage adjustment	Adjust solenoid linkage
Faulty solenoid	Replace solenoid
Failed suppressor diode	Correct wiring (diode reversed?), replace suppressor diode
Optional e-stop engaged	Disengage e-stop

Engine not getting fuel

Possible Cause	Possible Remedy
Empty fuel tank	Fuel engine
Clogged filter	Replace filter
Air in fuel lines	Bleed fuel lines
Low fuel pressure	Replace faulty fuel pump and/or clogged filter
Faulty fuel pump	Replace fuel pump, correct wiring fault (electric fuel pump)

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Preheat Troubleshooting

Engine is hard to start in cold conditions

Possible Cause	Possible Remedy
Start attempt before preheat complete	Wait for preheat time to elapse, crank as soon as time elapses
Incorrect preheat specification	Correct panel configuration, install correct panel
Heater faulty	Replace heater
Heater relay faulty	Replace relay
Preheat control not functioning	Correct wiring, correct panel configuration
Faulty panel	See Panel Troubleshooting (below)

Engine produces excessive white smoke after starting

Possible Cause	Possible Remedy
Afterglow not enabled	Reconfigure panel
Heater faulty	Replace heater
Heater relay faulty	Replace relay
Preheat control not functioning	Correct wiring, correct panel configuration
Faulty panel	See Panel Troubleshooting (below)

Panel Troubleshooting

Panel does not perform self-test

Possible Cause	Possible Remedy
Tripped overcurrent protection	Correct fault, replace or reset overcurrent protection
Faulty connection to battery	Correct battery connections (see Battery Circuit Requirements above)

Panel performs normal self-test, engine cranks, runs and shuts down

Possible Cause	Possible Remedy
Only Battery LED illuminated	Correct battery charge failure (see Battery not charging above)
Only Oil Pressure LED Illuminated	Correct low oil pressure condition or faulty switch, correct wiring fault
Only Temperature LED Illuminated	Correct overheating condition or faulty switch, correct wiring fault
Only Aux LED Illuminated	Correct fault condition (i.e. v-belt, coolant level) or faulty switch, correct wiring fault
All normally closed shutdowns illuminate for one second (panel reset)	Add suppressor diodes, protect from nearby lightning strikes, shield induced spikes from other equipment, add electric motor control relay

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Testing Shutdown Inputs

Shutdown switches signal a fault by ground contact on most engines. Shutdown operation can be verified by grounding the shutdown inputs individually. It may be necessary to remove the wire from the shutdown switch to perform this test.

Note

Most shutdown switches are grounded through the switch body.
Do not use insulating sealant (i.e. Teflon tape) when installing switches.

Some thermostat housings are composites and do not provide ground for the switch.

Document Revision History

Rev A: 22-May-2006. Corrected typographical errors

Rev B: 26-Oct-2006. Add symbols to ***Indicators***, corrected typographical errors

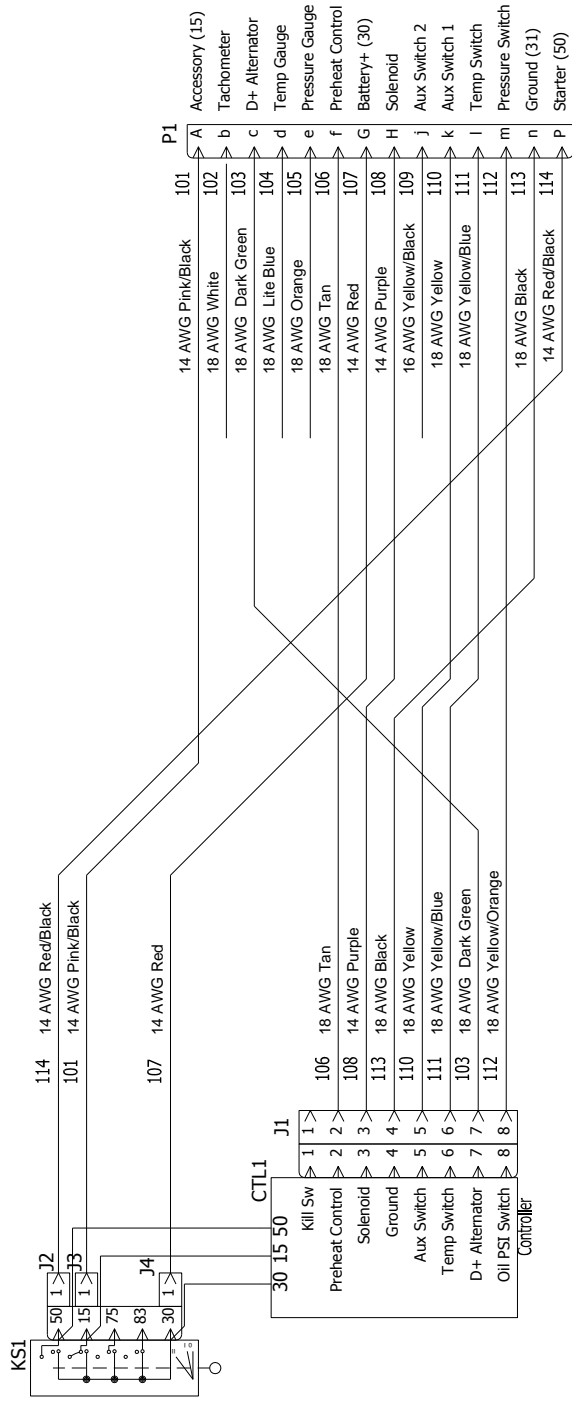
Rev C: 8-Jan-2007. Updated schematics, removed Power Box information

Rev C.1: 28-Feb-2007 Added part numbers

Rev D: 13-Jun-2013 Updated format, added schematics, removed Power Box information.

Typical Schematics

The following pages show typical schematics.
Details vary from installation to installation.
See the specific schematics for installation for details.



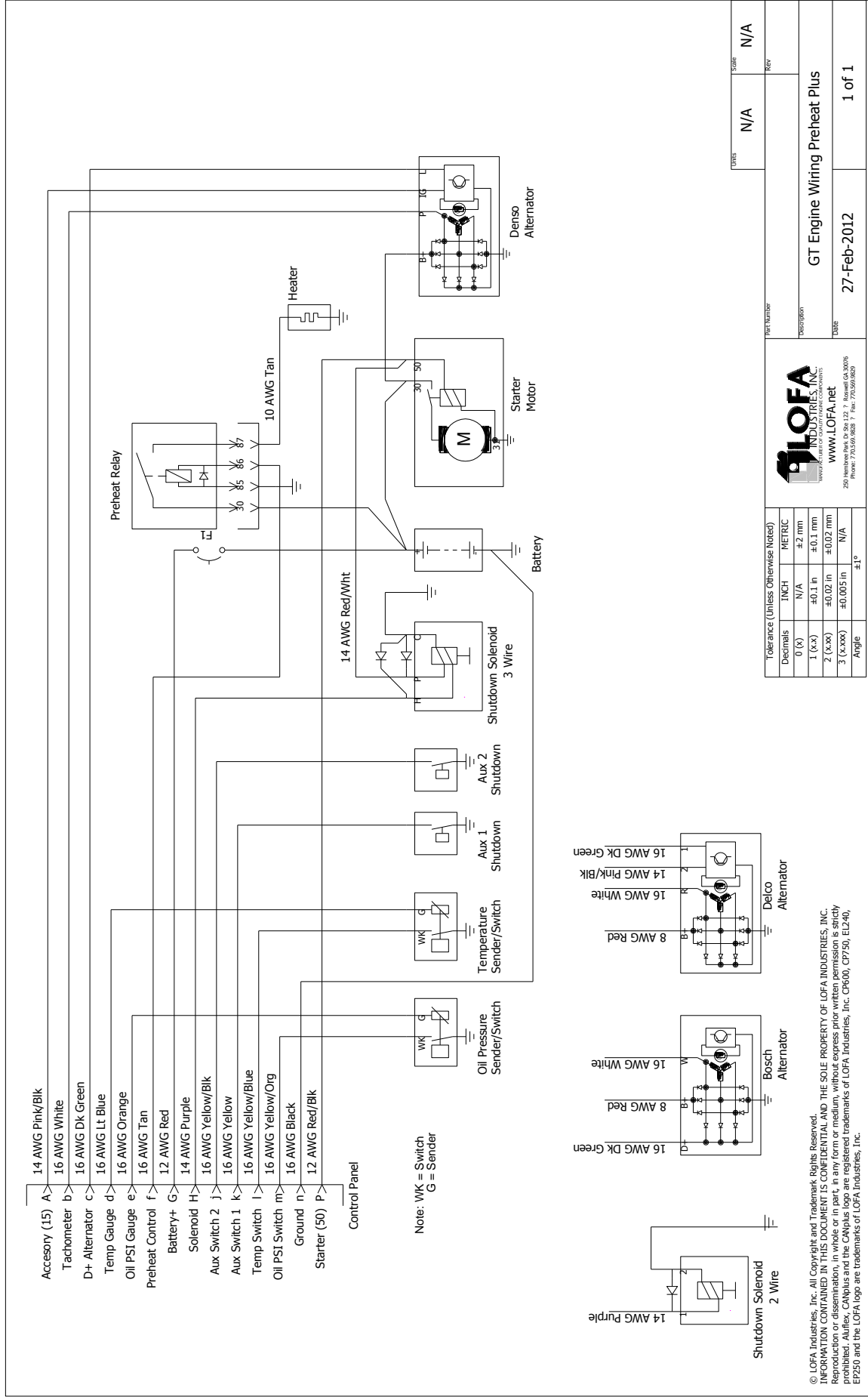
Decimals	INCH	METRIC
0 (x)	N/A	±2 mm
1 (x-x)	±0.1 in	±0.1 mm
2 (x-xx)	±0.02 in	±0.02 mm
3 (x-xxx)	±0.005 in	N/A
Angle	±1°	

DATE	USER
N/A	N/A

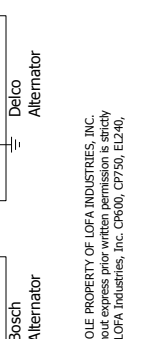
Part Number	MC704 with GT Point to Point
Description	27-Feb-2012
Date	1 of 1

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Tolerance (Unless Otherwise Noted)		
Decimals	INCH	METRIC
0 (x)	N/A	±.2 mm
1 (xx)	±0.1 in	±0.1 mm
2 (xxx)	±0.02 in	±0.02 mm
3 (xxxx)	±0.005 in	N/A
Angle		±1°



UNIT NUMBER	TERSE	SCORE
GT Engine Wiring Preheat Plus	N/A	N/A

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27-Feb-2012

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- (c) **Consequences.** Upon the termination of this Agreement for any reason: (i) all rights granted hereunder will automatically revert to LOFA; (ii) Licensee must (A) return to LOFA (or, at LOFA's option, destroy) the originals and all copies of the Materials in Licensee's possession or control; (B) erase any and all of the foregoing from all computer memories and stored Licensee Devices within its possession or control; and (C) provide LOFA with a written statement certifying that it has complied with the foregoing obligations. End use licenses to Licensee Devices for Customers granted by Licensee to Customers prior to termination will survive any such termination.

10. Limitation of Liability.

- (a) LICENSEE AGREES THAT ANY LIABILITY ON THE PART OF LOFA FOR BREACH OF THE WARRANTIES CONTAINED HEREIN OR ANY OF THE OTHER PROVISIONS OF THIS AGREEMENT OR ANY OTHER BREACH GIVING RISE TO LIABILITY OR IN ANY OTHER WAY ARISING OUT OF OR RELATED TO THIS AGREEMENT FOR ANY CAUSE OF ACTION WHATSOEVER AND REGARDLESS OF THE FORM OF ACTION (INCLUDING BREACH OF CONTRACT, STRICT LIABILITY, TORT INCLUDING NEGLIGENCE OR ANY OTHER LEGAL OR EQUITABLE THEORY), WILL BE LIMITED TO LICENSEE'S DIRECT DAMAGES IN AN AMOUNT NOT TO EXCEED THE TOTAL AMOUNT PAID TO LOFA BY LICENSEE FOR THE LOFA HARDWARE.
- (b) LICENSEE AGREE THAT IN NO EVENT WILL LOFA BE LIABLE FOR DAMAGES IN RESPECT OF INCIDENTAL, ORDINARY, PUNITIVE, EXEMPLARY, INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES EVEN IF LOFA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES INCLUDING, BUT NOT LIMITED TO, BUSINESS INTERRUPTION, LOST BUSINESS REVENUE, LOST PROFITS, FAILURE TO REALIZE EXPECTED SAVINGS, ECONOMIC LOSS, LOSS OF DATA, LOSS OF BUSINESS OPPORTUNITY OR ANY CLAIM AGAINST LICENSEE BY ANY OTHER PARTY.
- (c) LICENSEE ACKNOWLEDGES THAT LOFA'S LIMITED LIABILITY EXPRESSED IN THIS AGREEMENT REPRESENTS A MATERIAL BASIS FOR SETTING THE FEES FOR LOFA HARDWARE.

11. Use of Trademarks.

Any and all trademarks and trade names which LOFA uses in connection with the license granted hereunder ("LOFA Marks") are and remain the exclusive property of LOFA. Nothing contained in this Agreement may be deemed to give Licensee any right, title or interest in any LOFA Marks. Subject to notice from LOFA in writing which modifies or cancels such license at LOFA's sole discretion, during the continuance of this Agreement, LOFA hereby grants Licensee a nonexclusive, revocable license to the LOFA Marks for normal advertising, marketing and promotion of Licensee Devices according to guidelines that LOFA may issue from time to time. Licensee must act consistently with LOFA's ownership of the LOFA Marks and may not use LOFA Marks in a disparaging manner. Licensee agrees to use correct trademark notices on advertisements, sales literature, dealer materials, press releases and other marketing materials, which use or display LOFA Marks. Licensee agrees to provide samples of all Licensee's marketing materials and Licensee Devices containing LOFA Marks to LOFA for prior approval. If LOFA rejects any of Licensee's use of LOFA Marks, then the parties may cooperate reasonably in order modify such materials for approval prior to release or use by Licensee. To the extent that LOFA withdraws any portion of the trademark license granted in this subsection, Licensee's obligations under this Section, above, will also terminate if the rights necessary to comply with such obligation are withdrawn.

- 12. **Interpretation of This Agreement.** This Agreement is the entire Agreement to date between the parties regarding the Materials and supersedes any such prior agreement or communication. Any subsequent waiver or modification of this Agreement, or any part, shall only be effective if reduced to writing and signed by both parties. No delay or failure to enforce any right under this Agreement will be considered a waiver of a party's rights thereafter to enforce each and every right and provision of this Agreement. If any provision of this Agreement is declared by a court of competent jurisdiction to be invalid, illegal, or unenforceable, such provision will be severed from this Agreement and the other provisions will remain in full force and effect. This Agreement will be binding upon, and inure to the benefit of, the successors, heirs and assigns of the parties. Neither Licensee nor Licensee employees, consultants, contractors or agents are agents, employees or joint-venturers of LOFA, nor do they have any authority to bind LOFA by contract or otherwise to any obligation. Licensee agrees not to make any statements that state or imply that LOFA certifies or guarantees Licensee Devices or that Licensee Devices are warranted, tested or approved by LOFA. Dates and times by which either party is required to render performance will be postponed automatically to the extent and for the period of time that such party is prevented from meeting them by reason of any cause beyond its reasonable control. Unless otherwise specifically expressed in this Agreement, the specific business terms and negotiated customisations to this Agreement will be considered confidential ("Business Terms"), and neither party may disclose such information to third parties except as follows: (a) to employees, advisors, financing parties or contractors who are under an obligation of confidentiality to the extent reasonably necessary to conduct business; (b) to the extent that such Business Terms become publicly known through no fault of the parties; (c) to the extent required to comply with any valid law, regulation, statute, or order so long as the non-disclosing party receives reasonable advance notice of such potential disclosure; and (d) to the extent required to enforce, establish, or interpret any right or duty at law or equity with respect to this Agreement.

13. General.

- (a) All notices hereunder will be in writing and must be duly given if delivered personally or sent by registered or certified mail, return receipt requested, postage prepaid, to the respective addresses of the parties appearing in this Agreement. Any notice given will be deemed to be received: (i) on the date which it is delivered if delivered personally, (ii) or, if mailed, on the fifth business day next following the mailing thereof. Either party may change its address for notices by giving notice of such change as required in this clause.
- (b) This Agreement, the license rights granted hereunder and the Materials, or any part thereof, may not be assigned or transferred by Licensee, including by operation of law ("Transfer"), without the prior written consent of LOFA. Any such transfer without the prior written consent of LOFA will be ineffective. In any case, any such Transfer absent LOFA's written permission will immediately and automatically terminate this Agreement without further action by LOFA. A change

Software License Agreement

of control of Licensee, whether by sale or issuance of shares (except in the ordinary course of raising capital by public offering), or merger, or otherwise, will be deemed to be an assignment.

- (c) The laws in force in the State of Georgia will govern this Agreement; the parties hereby consent to jurisdiction and venue in the courts of Georgia.
- (d) The provisions in Sections - Licensee's Indemnification, - Ownership, Protection, -Fees - Limited Warranty, - Warranty Disclaimer, -Indemnification, -Term and Termination, Limitation of Liability, - Interpretation of Agreement, and -General (inclusive), remain in force and effect after the termination of this Agreement.

Special License Terms

THE LICENSE GRANTED HEREUNDER IS RESTRICTED SOLELY TO THE OPERATION OF THE LOFA HARDWARE AND FOR NO OTHER PURPOSE. NO SUCH LICENSEE DEVICE INCORPORATING ANY OF THE MATERIALS MAY BE DISTRIBUTED, LICENSED, SOLD, RENTED, OR OTHERWISE PROVIDED TO THIRD PARTIES WITHOUT LOFA'S EXPRESS WRITTEN PERMISSION.

Exhibit B – PRODUCTS/DELIVERABLES

Licensed Product Information

Software codes with product numeric values equal to 001-xxxx-yyyy-zzz; where xxxx, yyyy, and zzz equal (0000...9999).

Software codes qualified under the same numeric regimen detailed above or including the verbal description of "CANPlus™" products and/or the "CANPlus Suite" of products.

Maintenance and Technical

Platform Requirements

.NET Framework 3.5

Windows® XP, Windows Vista (32/64-bit), Windows 7 (32/64-bit)



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