La Marche Manufacturing Company
www.lamarchemfg.com

ITSM

Isolation Transformer for Marine Applications

Installation and Operation Manual

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CPN 137588

Instruction Drawing Number: P25-LITSM-1
Revision A00 Rev. Date: ECN: 21619

Important Safety Instructions

Before using this equipment read all manuals and other documents related to this unit and other equipment connected to this unit. Always have a copy of a units manual on file nearby, in a safe place; if a replacement copy of a manual is needed it can be found at the www.lamarchemfg.com.

Electrical Safety

WARNING: Hazardous Voltages are present at the input and output of power systems.

When working with any live power system, follow these precautions:
- Never work alone on any live power system, someone should always be close enough to come to your aid
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Wear complete eye protection (with side shields) and clothing protection.
- Always wear gloves and use insulated hand tools.

WARNING: Lethal Voltages are present within the power system. Parts inside the unit may still be energized even when the unit has been disconnected from the AC input power. Check with a meter before proceeding. Do not touch any uninsulated parts.

- A licensed electrician should be used in the installation of any unit.
- Always disconnect the unit from the supply, batteries and loads before performing maintenance or cleaning.
- If the unit is hot-swappable, simply remove it from the shelf for any maintenance or cleaning.
- Always assume that an electrical connection is live and check the connection relative to ground.
- Be sure that neither liquids nor any wet material come in contact with any internal components.
- Do not operate this unit outside the input and output ratings listed on the unit nameplate.
- Do not use this unit for any purpose not described in the operation manual.

Mechanical Safety

- This unit or parts of the unit may get very hot during normal operation, use care when working nearby.
- Do not expose equipment to rain or snow. Always install in a clean, dry location.
- Do not operate equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- Do not disassemble this unit. Incorrect re-assembly may result in a risk of electric shock or fire.

Unit Location

- Allow at least 6 inches of free air on all vented surfaces for proper cooling.
- Allow sufficient clearance to open the front panel for servicing.
- Do not operate this unit in a closed-in area or restrict ventilation in any way.

Check for Damages

Prior to unpacking the product, note any damage to the shipping container. Unpack the product and inspect the exterior of product for damage. If any damage is observed, contact the carrier immediately. Continue the inspection for any internal damage. In the unlikely event of internal damage, please inform the carrier and contact La Marche for advice on the risk due to any damage before installing the product. Verify that you have all the necessary parts per your order for proper assembly.

CAUTION: Failure to properly file a claim for shipping damages, or provide a copy of the claim to La Marche, may void warranty service for any physical damages reported for repair.

Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is damaged/unavailable, make sure the product is packed with at least three inches of shock-absorbing material to prevent shipping damage. *La Marche is not responsible for damage caused by improper packaging of returned products.*

Inspection Checklist

- Enclosure exterior and interior is not marred or dented.
- There is no visible damage components.
- All internal components are secure.
- All hardware and connections are tight.
- All wire terminations are secure.
- All items on packing list have been included.

Handling

Equipment can be very heavy and/or top heavy. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent the equipment from being accidentally tipped over.

Table of Contents

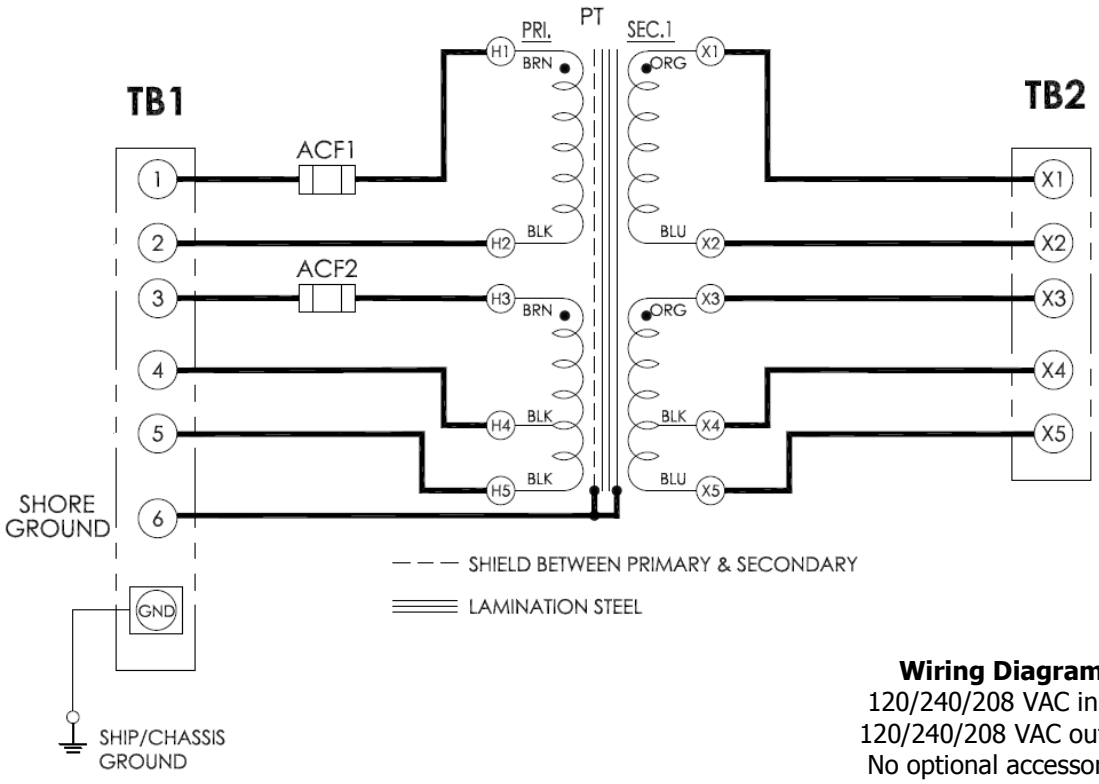
ITSM General Description

The La Marche Marine Isolation Transformer Series (ITSM) is designed for installation in marine and harsh environment applications where reliable power is required. The transformers are designed per UL safety requirements and manufactured using insulated copper windings with Class H insulation system. The La Marche ITSM transformers are specifically engineered to operate at full load and full harmonic rating providing years of trouble free service.

The function of the La Marche Marine Isolation Transformer is to reduce the potential between the ship and the shore in order to achieve:

- Personnel boarding the ship, personnel aboard the ship and the ship's metal parts will not be subject to electrical shock
- Electrolysis corrosion of the metal hull or hull fastenings will be reduced to a safe level
- Reduce EMI interference and static from affecting the ship's electronic components

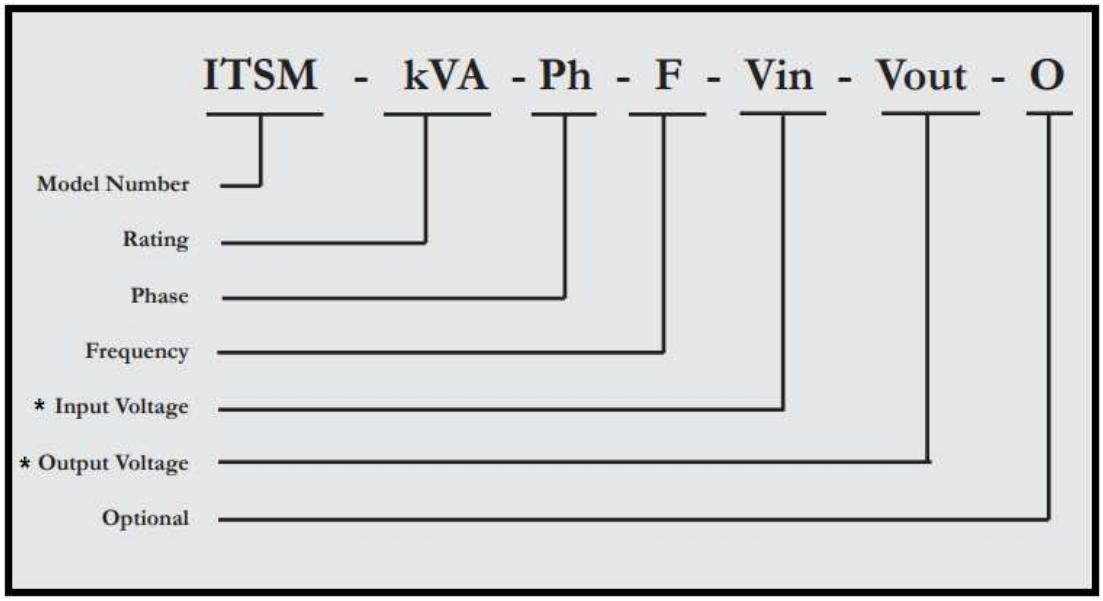
The La Marche Marine Isolation Transformer features a Ground (Faraday) Shield between the power windings. This ground shield, when connected to the shore ground, provides protection against capacitive coupling between the shore power and the ship's electrical systems. This protects the ship electrical equipment against shore power issues, common mode voltage spikes, and the transfer of harmful energy between both systems.



Wiring Diagram
120/240/208 VAC input
120/240/208 VAC output
No optional accessories

Understanding the Model Number

The ITSM model is coded to describe the options that are included. Find the model number on the nomenclature nameplate of the isolation transformer. Then follow the chart to determine the configuration of your isolation transformer.



** AC Voltage Codes: A – 120V, B – 240V, C – 480V, D – 208V, L – 220V, ZD – 600V*

Optional Accessories Included in the Unit

This unit may have been outfitted with a number of optional accessories or option packages. To find out what options this unit has (if any) refer to the very first page of the manual package.

Storing the ITSM

If the ITSM is to be stored for more than a few days after delivery, it should be stored within its shipping container. The location chosen for storage should be within an ambient temperature of -40 to 185° F (-40 to 85° C) with a non-condensing relative humidity of 0 to 95%.

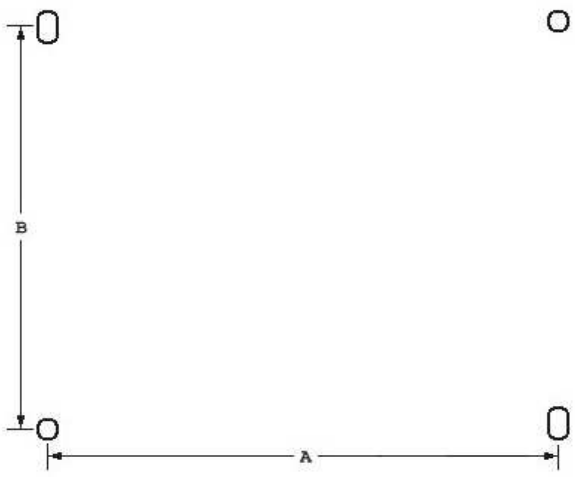
Mounting the ITSM

When mounting the ITSM, consider the size and weight of the unit. The floor must be able to support the weight of the unit as well as an additional safety factor. The location chosen for the ITSM should be within an ambient temperature range of 32 to 122°F (0 to 50°C) with a non-condensing relative humidity no higher than 95%. The ITSM should be mounted in an area free of explosive materials and away from drips and splatter. The ITSM utilizes convection cooling so a clearance of at least 6in (152mm) of free air must be maintained on the top, bottom, back and both sides for cooling air. Maintain 36in (914mm) or more of clearance at the front of the unit in order to allow for operation and maintenance.

Case number	Cable Entry		Mounting
	AC input	AC Output	
108	Top Right	Top Left	Floor

Floor-Mounting the ITSM

Floor mounting the 108 cases is standard. To floor-mount the ITSM, install four bolts into the floor. Place the ITSM on the bolts, add appropriate mounting hardware, and tighten securely. The figure below shows the footprint and the bolt size of each ITSM case style. (All dimensions are in inches)



Case number	Dim. A	Dim. B	Bolt Size
108	18.288	11	3/8

Changing Transformer Taps Procedure

*NOTE: This procedure refers **only** to ITSM Isolation Transformers that accept multiple input or multiple output voltages. Single input and output Isolation Transformers do not include taps.*

Before wiring AC power, check the taps, to be sure the Isolation Transformer is set for the correct AC input and output voltage. Before changing the taps, be sure that AC supply is turned off and locked out. Verify that no voltage is present by using a voltmeter at all input and output terminals.

Change the connections to the input and output terminals for transformers with 120/240/208 VAC input and 120/240/208 VAC output as shown:

120 VAC Input Voltage
a. Connect jumper **JP1** from pin **1** to pin **3** of **TB1** terminal
b. Connect jumper **JP2** from pin **2** to pin **5** of **TB1** terminal
c. Connect power line **L1** to pin **1** of **TB1** terminal
d. Connect power line **L2** (Neutral) to pin **5** of **TB1** terminal

208 VAC Input Voltage
a. Connect jumper **JP1** from pin **2** to pin **3** of **TB1** terminal
b. Connect jumper **JP2** from pin **2** to pin **3** of **TB1** terminal
c. Connect power line **L1** to pin **1** of **TB1** terminal
d. Connect power line **L2** to pin **4** of **TB1** terminal

240 VAC Input Voltage
a. Connect jumper **JP1** from pin **2** to pin **3** of **TB1** terminal
b. Connect jumper **JP2** from pin **2** to pin **3** of **TB1** terminal
c. Connect power line **L1** to pin **1** of **TB1** terminal
d. Connect power line **L2** to pin **5** of **TB1** terminal

AC INPUT **TB1**						
VOLTAGE	L1	L2	JP1	JP2	SHORE GROUND	SHIP GROUND
120	1 (Line)	5 (Neutral)	1 TO 3	2 TO 5	6	⏚
208	1	4	2 TO 3	2 TO 3		
240	1	5				

120 VAC Output Voltage
a. Connect jumper **JP3** from pin **X1** to pin **X3** of **TB2** terminal
b. Connect jumper **JP4** from pin **X2** to pin **X5** of **TB2** terminal
c. Connect equipment line **L1** to pin **X1** of **TB2** terminal
d. Connect equipment line **L2** (Neutral) to pin **X5** of **TB2** terminal

208 VAC Output Voltage
a. Connect jumper **JP3** from pin **X2** to pin **X3** of **TB2** terminal
b. Connect jumper **JP4** from pin **X2** to pin **X3** of **TB2** terminal
c. Connect equipment line **L1** to pin **X1** of **TB2** terminal
d. Connect equipment line **L2** to pin **X4** of **TB2** terminal

240 VAC Output Voltage
a. Connect jumper **JP3** from pin **X2** to pin **X3** of **TB2** terminal
b. Connect jumper **JP4** from pin **X2** to pin **X3** of **TB2** terminal
c. Connect equipment line **L1** to pin **X1** of **TB2** terminal
d. Connect equipment line **L2** to pin **X5** of **TB2** terminal

AC OUTPUT **TB2**				
VOLTAGE	L1	L2	JP3	JP4
120	X1 (Line)	X5 (Neutral)	X1 TO X3	X2 TO X5
208	X1	X4	X2 TO X3	X2 TO X3
240	X1	X5		

Making the AC Input/Output Connections

Before making any connections to the Isolation Transformer ensure that the AC Power is off at the main breaker box. Check that the source voltage and frequency matches the voltage and frequency listed on the unit's nameplate. For units with transformer taps, verify that the tap has been set to the correct AC input. (See Changing Transformer Taps procedure for details). Select wire size, using the table below, based on the input protection. These are recommended sizes. All National and Local Wiring Codes must be followed.

NOTE: For transformers with 120/240/208 VAC input:

- *120 VAC input arrangement has input fuses or breaker poles wired in **parallel***
    - *Example: ACF1 = 70 amp, ACF2 = 70 amp. Input protection = 140 amps.*
- *240/208 VAC input arrangement has input fuses or breaker poles wired in **series***
    - *Example: ACF1 = 70 amp, ACF2 = 70 amp. Input protection = 70 amps.*

BREAKER\FUSE SIZE (AMPS)	WIRE SIZE REQUIREMENT FOR CUSTOMER CONNECTION	EQUIPMENT GROUNDING CONDUCTOR MINIMUM
1	#14	#14
3	#14	#14
4	#14	#14
5	#14	#14
6	#14	#14
10	#14	#14
15	#12	#12
20	#12	#12
25	#10	#12
30	#10	#10
35	#8	#10
40	#8	#10
45	#8	#10
50	#8	#10
60	#6	#10
70	#6	#8
80	#4	#8
90	#4	#8
100	#4	#8
110	#2	#6
125	#2	#6
130	#2	#6
140	#1	#6
150	#1	#6

AC Input Connection Procedure

First connect a shore ground lead (for sizing use table on page 4) to the pin marked **6** on the terminal block **TB1**. Then connect the ship ground lead to the pin marked with a **GROUND** symbol on the terminal block **TB1.** Enclosure's stud located by the input terminal block may also be used for connecting the ship ground lead. Run the input AC power wiring to terminals marked **1, 4** or **5** (depending on the input voltage) on the terminal block **TB1.**

AC Output Connection Procedure

Run the equipment AC wiring to terminals marked **X1, X4** or **X5** (depending on the output voltage) on the terminal block **TB2.**

Appendix A: Manufacturer's Standard Warranty

(IF THE INVOICE SHOWS THAT YOU HAVE PURCHASED THE EXTENDED PARTS WARRANTY OR IF YOU ARE INTERESTED IN PURCHASING THE EXTENDED PARTS WARRANTY, SEE THE MANUFACTURER'S EXTENDED PARTS WARRANTY)

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory and is warranted to be free from any defect in workmanship and material that may develop within one year from date of purchase. In addition to the standard one (1) year warranty, La Marche warrants its magnetics on a parts replacement basis only for nine (9) more years under normal use.

Any part or parts of the equipment (except protective devices, DC connectors and other wear-related items) that prove defective within a one (1) year period shall be replaced without charge providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. Magnetics are warranted for ten (10) years after date of purchase. During the last nine (9) years of this ten (10) year warranty period, the warranty covers parts replacement only, no labor or other services are provided by La Marche, nor is La Marche obligated to reimburse the owner or any other person for work performed.

Should a piece of equipment require major component replacement or repair during warranty period, these can be handled in one of three ways:

1. If the Purchaser elects to take the responsibility of repairing the equipment and requests replacement part(s), Purchaser or Sales Representative must contact Factory for return authorization and a purchase order must be issued. Replacement part(s) will be promptly shipped and invoiced. After the defective part(s) are returned and inspected at the Factory, if the defect(s) were due to faulty material or workmanship, credit will be issued.
2. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer during the first year. If the Extended Warranty is purchased, the parts required for repair will also be at no cost but La Marche will notify the Purchaser of the costs of Labor to replace the defective part(s). A Purchase Order to cover this labor is required before repairs will be initiated. Transportation charges or duties shall be borne by Purchaser.
3. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard La Marche chargers will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special chargers are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void. Failure to follow safety precautions specified by the manufacturer during replacement of components or verifications renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

THE ABOVE WARRANTY IS EXCLUSIVE, SUPERSEDES AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS. NO PERSON, AGENT OR DEALER IS AUTHORIZED TO GIVE ANY WARRANTIES ON BEHALF OF THE MANUFACTURER, OR TO ASSUME FOR THE MANUFACTURER ANY OTHER LIABILITY IN CONNECTION WITH ANY OF ITS PRODUCTS UNLESS MADE IN WRITING AND SIGNED BY AN OFFICIAL OF THE MANUFACTURER.

Appendix B: Manufacturer's Extended Parts Warranty

(THIS IS YOUR WARRANTY IF YOU HAVE PURCHASED THE EXTENDED PARTS WARRANTY AS SHOWN ON OUR INVOICE TO YOU OR IF YOU PURCHASE THE EXTENDED PARTS WARRANTY ANYTIME DURING THE FIRST 12 MONTHS AFTER THE DATE OF OUR INVOICE)

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory. Any part or parts of the equipment (except protective devices, d.c. connectors and other wear-related items) that prove defective within a one (1) year period from the date of our invoice to you shall be replaced without charge providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. Labor and parts are covered during this one (1) year period.

For the next four (4) years after the expiration of the one-year warranty, on a parts replacement only basis, any part or parts of the equipment (except protective devices, d.c. connectors and other wear-related items) that prove defective within the additional four (4) year period shall be replaced providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation. During this four (4) year period, the warranty covers parts replacement only, no labor or other services are provided by La Marche, nor is La Marche obligated to reimburse the owner or any other person for work performed. If you return the equipment to our factory (freight prepaid), we will repair and cover parts and labor.

In addition, magnetics are warranted for ten (10) years after the date of our invoice to you. The defect in the magnetics must, in our opinion, be due to faulty material or workmanship and not caused by tampering, abuse misapplication, or improper installation. Labor and replacement magnetics are covered under the extended warranty during the initial five (5) year period from the date of our invoice to you. During the next five (5) years of this ten (10) year warranty period for magnetics, the warranty covers parts replacement only, no labor or other services are provided by La Marche, nor is La Marche obligated to reimburse the owner or any other person for work performed.

Should a piece of equipment require major component replacement or repair during the extended warranty period, these can be handled in one of three ways:

1. If the Purchaser elects to take the responsibility of repairing the equipment and requests replacement part(s), Purchaser or Sales Representative must contact Factory for return authorization and a purchase order must be issued. Replacement part(s) will be promptly shipped and invoiced. After the defective part(s) are returned and inspected at the Factory, if the defect(s) were due to faulty material or workmanship, credit will be issued.
2. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer under the Extended Warranty. Transportation charges or duties shall be borne by Purchaser.
3. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard La Marche units will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alteration of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.
The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

THE ABOVE WARRANTY IS EXCLUSIVE, SUPERSEDES AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS. NO PERSON, AGENT OR DEALER IS AUTHORIZED TO GIVE ANY WARRANTIES ON BEHALF OF THE MANUFACTURER, OR TO ASSUME FOR THE MANUFACTURER ANY OTHER LIABILITY IN CONNECTION WITH ANY OF ITS PRODUCTS UNLESS MADE IN WRITING AND SIGNED BY AN OFFICIAL OF THE MANUFACTURER.

Appendix C: Document Control and Revision History

Part Number: 137588
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Issue ECN: 21619 – 11/17
