OWNER / OPERATOR MANUAL



Warranty

LIMITED WARRANTY

Brock Grain Systems, a division of CTB, Inc. ("Brock") warrants this new MEYER® Energy Miser® Tower Dryer ("Product") manufactured by Brock to be free from manufacturing defects in material or workmanship under normal usage and conditions, for two (2) years from the date of installation by an authorized Brock dealer or distributor ("Warranty"). If such a defect is determined by Brock to exist within the applicable warranty period, Brock will, at its sole option either repair or replace the Product at no charge. Labor costs associated with the removal and/or installation of replacement and/or repaired Products are not covered by this Limited Warranty. This Limited Warranty is not transferable, and applies only to the original purchaser who purchased the Product from an authorized Brock dealer or distributor.

CONDITIONS AND LIMITATIONS

THIS WARRANTY CONSTITUTES BROCK'S ENTIRE AND SOLE WARRANTY AND BROCK EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES, INCLUDING, BUT NOT LIMITED TO, EXPRESS AND IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSES. Brock shall not be liable for any direct, indirect, incidental, consequential or special damages which any original purchaser may suffer or claim to suffer as a result of any defect in the Product. Consequential or Special Damages as used herein include, but are not limited to, lost or damaged products or goods, costs of transportation, lost sales, lost orders, lost income, increased overhead, labor and incidental costs, and operational inefficiencies. Some jurisdictions prohibit limitations on implied warranties and/or the exclusion or limitation of such damages, so these limitations and exclusions may not apply to you. This Limited Warranty gives the original purchaser specific legal rights. You may also have other rights based upon your specific jurisdiction.

Compliance with federal, state and local rules which apply to the location, installation and use of the Product are the responsibility of the original purchaser. Brock will not be liable for any damages which may result from non-compliance with such rules.

The following circumstances shall render this Limited Warranty void:

- Modifications made to Brock Products that are not specifically delineated in the Product manual, or are not specifically approved in writing by a Brock Engineer.
- Products that are not installed and/or operated in accordance with the instructions published by Brock.
- All components of the Product are not original equipment supplied by Brock.
- The Product or Component Parts were not purchased from a Brock authorized distributor or dealer.
- The Product or Component Parts were not installed by a Brock authorized distributor or dealer, or third party acting under the direct supervision of a Brock authorized distributor or dealer.
- Product that experiences malfunction or failure resulting from misuse, abuse, mismanagement, negligence, alteration, accident, or lack of proper maintenance, use with grain that is not free flowing and/or out of condition, or from lightning strikes, electrical power surges or interruption of electricity.
- Product that experiences corrosion, material deterioration and/or equipment malfunction caused by or consistent with the application of chemicals, minerals, sediments or other foreign elements.

• Product that is used for any purpose other than for the storage, handling and/or conditioning of free flowing grain. This Limited Warranty may only be modified in writing by an officer of CTB, Inc. Brock shall have no obligation or responsibility for any representations or warranties made by or on behalf of any distributor, dealer, agent, certified representative, or other third party.

Effective March 2022

BROCK GRAIN SYSTEMS

A Division of CTB Inc.

611 N. Higbee Street • Milford, Indiana 46542-2000 U.S.A. Phone +1 (866) 658-4191 • Fax (574) 658-4133 • e-mail: brock@brockgrain.com Internet: www.brockgrain.com or http://www.brockgrain.com

IMPORTANT! To facilitate credit for returned Warranty parts or for other Warranty issues, the Installer or Service Provider should complete the Dryer Startup Report (inside the back cover), leave a copy with the Owner/Operator, and submit it to BROCK GRAIN SYSTEMS (Frankfort address below):

Brock Grain Systems, Frankfort, Indiana, Location:

1750 W. State Road 28 • Frankfort IN 46041

Phone (765) 654-8517 • Fax (765) 654-8510 • Toll Free (800) 541-7900 • (574) 658-9323 (International)

BROCK® Warranty Credit Policy

MOTORS ARE NOT TO BE RETURNED TO BROCK GRAIN SYSTEMS. Motor manufacturer's warranties and service policies can be found **online**.

Baldor Motors, *www.baldor.com*: Motors must be taken or shipped to a Baldor authorized service center. If this is not possible, any repairs outside an authorized center must be approved in advance by Baldor, as described on the website. See specific Warranty periods, all terms, limitations and conditions that apply. (continued)

WEG Motors, *www.weg.net*: General Purpose motors have 18 (eighteen) months of Warranty, as stated. General Purpose motors purchased by Brock have 24 months of Warranty. Claims will be handled on a case-by-case basis. All General Purpose motors of 215T frame or smaller are subject to WEG's No-Fault Warranty. Return the nameplate for credit/replacement.

OTHER RETURNABLE PARTS: All BROCK® parts returned to the manufacturer for Warranty consideration will require a valid RGA (Returned Good Authorization) NUMBER prior to returning the part. All Warranty claims must be pre-approved prior to action taken. Call the Brock Customer Service Department at 765-654-8517 to obtain an RGA number. You will need to provide the Dryer Serial Number and a description of what is suspected to be wrong with the part. If the original part is not returned within one month from the shipment of the replacement part, the replacement order will be due in full. Warranty parts needing to be returned must be received within 60 days from the date of the claimed failure to be eligible for credit. All parts returned for Warranty consideration will be checked for date code and tested for defects. If a part is not considered inoperable due to manufacturer's defect or if it is out of Warranty period, it will be disposed of by Brock Grain Systems or returned at the customer's expense, per the customer's direction. If the part is found by Brock to have a manufacturing defect, credit will be issued by Brock. Warranty replacement parts will be shipped via standard ground shipment. If overnight shipment is requested, the customer will be responsible for such overnight freight charges.

For Warranty questions on your equipment, contact your Brock Dealer. All non-Warranty returned parts may be subject to a 20% restocking and handling fee. An officer of CTB, Inc. must authorize any exceptions to this Warranty Credit Policy in writing. The Manufacturer reserves the right to change models and specifications at any time without notice or obligation to improve previous models.

Manufacturer's Intended Use: Considerations that may result in a hazard, damage your Dryer and/or void your WARRANTY

The BROCK® MEYER® Dryer is designed for grains and **free flowing** materials—not hazardous material (explosive, flammable, toxic or otherwise dangerous). See the **Definition of Dry, Free-flowing Grain** in **Appendix D**. BROCK® Dryers and related accessories are offered in several models for specific uses. In order to maintain your Warranty on this equipment and not damage your Dryer, the appropriate type of Dryer or accessory must be used. Consult BROCK Grain Systems or your BROCK Dealer. Do not use the Dryer for anything except its intended use. Dryer equipment shall be used to process only the specified commodities or materials within its rated capacity and rated heat wherein it may safely operate. Where special use is not indicated, or ratings are not available, good industry practice shall be used.



Using this Dryer for any purpose other than free-flowing grains or in a way not within the operating recommendations specified in this Manual—and supplemental Controller Manuals—is a misuse of the product. Such misuse could cause injury or death. Such misuse will void the Warranty.

Service and program the Intui-DRY® Controller properly. Failure to properly install and service this computer component according to its specific Manual could damage the equipment and void the Warranty. Installing a non-BROCK® (another manufacturer's) Controller or any other type Controller on this BROCK® MEYER® Dryer WILL VOID THE WARRANTY on the BROCK® Dryer.

Improper installation of electrical or fuel sources will void the Warranty and could cause death or serious injury. Installing any non-BROCK® (another manufacturer's) components to this Dryer WILL VOID THE WARRANTY on the BROCK® Dryer. Bypass of factory SAFETY controls and switches is strictly prohibited, and will void the Dryer Warranty. Any modifications to the Dryer must be factory-approved. See contact information on the inside cover and back cover of this Manual.

DO NOT use tanks for liquid propane (LP) fuel supply that have been previously used for anhydrous ammonia! This includes previously purged tanks that have been used for anhydrous: gas train components may be damaged as a result, causing a Dryer malfunction which could lead to serious safety hazards and/or fire. Brock Grain Systems will not be held liable for any purging and cleaning methods used for such tanks. If such a tank is used, this will void the Dryer Warranty.

Cables to support conveying equipment such as bucket elevators or conveyor legs must not be attached to the Tower roof or sidewalls. To do so would cause damage to the Dryer and void the Warranty. Do not use electrical cabinets or other components for storage.

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General

Remember! Think SAFETY First!

This symbol is used throughout this Manual to identify particular stages where the Contractor and/ or Operator need to take special note and precautions regarding the dangers described in these Instructions. Please read all the SAFETY information and the instructions completely prior to operating the Dryer.



Your MEYER® SUPERB Energy Miser® Grain Dryer

Your MEYER® Dryer combines a functional balance of heat and air with economical fuel conservation controlled by a reliable and precisely engineered control circuit. This is an industrial quality machine designed to give you long years of service with minimum maintenance. This Operator Manual tells you how to operate and service your Dryer to maintain efficiency over an extended service life. Study this Manual completely and carefully before starting your Dryer.

Using this equipment for any other purpose or in a way outside the operating recommendations specified in this Manual will void the Warranty and may cause injury or death. Operation, maintenance, and service procedures should be followed closely for good equipment performance.

GRAIN . 0 . ODEL ME2650S Nº DE SERIE ME2650S342021123Q AN 2297 APACITÉ DE CHARGE EN O PL ST. 1847 MINOTS PHASE 3 NO 60 VOLTAGE 460 120 VAC TENSION CIRCUIT CO CONTROL VOLTAGE MAX FLA 146.1 CV MAK KW MAX. 98.9 115 A.C. MIN. SURG MAX 150 170 NO 1 1 50 TM 1765 PLA MOTEURIS) VENTILA 59 FLA 59 11 1765 NO 2 50 TM 1760 FLA 13.5 27 10 NOTEUR DE DÉC FLA 6.6 1M 1725 5 TEUR COMPTEUR VOLTS FLA RBUR GAL PROP GAZ NAT. X PROP LIQUIDE PROP. LIQ. A NAT. OU GAZ PROP. A LIQ. PROP. 30 TO 299; NAT. OR PROP. GAS 10 TO SS ADMISS (L/P) PROP 10 10 30 NAT 15 10 SS. EN MARCHE (COL. BTUNR NER RATING: MAX 24,200,000 BTUHR, MIN 4,400,000 PLIMIN 02" PRESS. COL. MONT. P 102443 2.0 to 4.0 CHAUFFAGE EST POUR L'UTILISATION DANS LE SÉG HEATER UNIT FOR USE IN CROP DRYING NIMAL JUSQUA LA CONSTRUCTION CON EARANCE TO COMBUSTIBLE CONSTRUA VPE DE PLANCHER: NON COMBUSTIBLE TYPE OF FLOOR: NON-COMBUSTIBLE UNDURINANT PORE UTILISATION EXTER-STIBLE S FOR OUTDOOR INSTALLATION ONLY AND BENT TEMPERATURES DOWN TO 0" F. BROCK GRAIN SYSTEMS - Division of CTB Inc. FRANKFORT, INDIANA 46041 U.S.A.

Locate the Specifications Plate (with the Serial Number) inside the red Control Panel (CP) Outer Door.

This Plate contains specifications for natural gas and propane vapor, and additional information needed to answer questions about your Dryer. If you have a question about your Dryer, locate the Serial Number before calling Brock Grain Systems.

Figure 1, left. Specifications Plate Inside Control Panel (CP) Cabinet

Dealer and Installer Quick Reference

Dealers: Please provide the Customer with the information to complete the easy reference below. **Dealer or Customer:** Complete the following information about your BROCK® product. Store this Manual in a safe, dry place for future reference. For more complete information, refer to **Appendix J**, the **Startup Report**.

Dealer's Name	
Dealer's Address	
Dealer's Phone	Date of Purchase
Installer's Name	
Installer's Address	
Installer's Phone	Date of Installation
	Dryer System Specifications
Model:	Serial Number:
Monitor:	Serial Number:

About This Manual



The intent of this Manual is to help you follow step-by-step instructions for parts identification, care and use of your BROCK® MEYER® Dryer.

Pay particular attention to all SAFETY information in this Manual. For operation and use of your Dryer, read and understand this Manual. Failure to follow proper operational procedures may cause damage to equipment or personal injury.

Keep this Manual in a safe, dry place where the Dryer Operator can easily obtain it for future reference. Contact your Brock Dealer to replace a Manual should it become lost or damaged.

Warranty information for the Dryer is included on the inside front cover. Changes since the last version are listed on the back cover.

Definition of Terms, Symbols and Pictures

- P
- This **Planning** Symbol is used in areas where planning needs to take place **before** assembly and/or installation can continue.
- **Dryer/Equipment** Disconnect: (noun) lever/handle located on the inside of the Dryer Disconnect Box, to the left of the red Power Cabinet. Turns power ON/OFF to the Dryer.
- **Service** Disconnect: (noun) sometimes located away from the Dryer in an electrical room on the facility. Turns power ON/OFF from the outside power service provider.
- Orientation and direction: *Horizontal, vertical, bottom* and *top* refer to the Dryer as it is standing. *Left* and *right* refer to the Dryer or part as you are looking at it from the outside.

Measurements

English measurements are listed first. The symbol " equals **inches** and ' equals **feet**. Metric measurements follow the English measurement in *italics* inside square brackets. The metric measurement is in **millimeters** unless otherwise specified.

English/metric measurement example: 15' [4 572]A = amps or amperes FLA = full load amps sqft = square feet Ph = phase mV = 1/1000 of one volt (electrical potential) mb = millibar, metric unit for air pressure 24' [7 315] V = volts inwc = inches water column

Identification of Parts and Hardware

IMPORTANT!



Brock continually strives for product improvement in performance and SAFETY, and reserves the right to change specifications without notice. Therefore, component design(s) pictured throughout this Manual may vary slightly in appearance from each other and from those in actual use. Some Guards have been removed in Figures for illustrative purposes only. All Guards must be securely in place before the Dryer is operated, and at all times during operation.

Many assemblies described in this Manual have **Figures**. To identify components, **Figures** use Item keys with corresponding Item Tables. Tables common to more than one **Figure** may be shared. and/or may be noted on a facing page.

- **Items** identified include basic parts, hardware, and other parts pertinent to the assembly. Items keyed will vary among **Figures**.
- Item key for basic **parts** and components: black number in white circle.
- Item key for hardware: white number in a shaded circle.
- Item key for **dimensions** and lengths (variable or set): number/letter in a circle on an arrow or line. Numeric values are listed in the Item Table for that **Figure**.
- An **asterisk*** marks other specifics. These may be holes, notches, positions, other exceptions, or miscellaneous notes.



Additional MEYER® Manuals

Operators: Obtain these MEYER® Construction Manuals from your Installer or Dealer. These will be helpful in the event that service is needed on your Dryer. If you have additional questions, consult your Dealer or BROCK Conditioning Engineering at 765-654-8517.

Installers and Operators will need Intui-DRY® Controller Manual MFH2191 (Figure 6). Installers will need these Manuals.



Figure 3. MFH1968-1, MEYER® Base Construction Manual (Installers)



Figure 4. MFH1968-4, MEYER® Plumbing Manual (Installers)



Figure 5. MFH1968-5, MEYER® Ladder Manual (Installers)



BROCK

SAFETY



Recognize and Understand SAFETY Information

This is the Safety-Alert Symbol. When you see this symbol on your equipment or in this Manual, be alert to the potential for **personal injury**. It may be used alone or in conjunction with a **signal word**. Signal words **DANGER**, **WARNING**, or **CAUTION**, are used with the Safety-Alert Symbol. Be sure to follow ALL national, State and local safety standards governing each installation site.

Symbol	Description
A DANGER	DANGER is a signal word that indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.
A WARNING	WARNING is a signal word that indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.
	CAUTION is a signal word that indicates a hazardous situation which, if not avoided, MAY result in minor or moderate injury.
	<i>IMPORTANT indicates vital information or instructions, highly recommended and/or pertinent, for the safe installation or operation of your equipment. It may have a pictogram to indicate mandatory equipment (i.e., PPE) or action (i.e., grounding, read the manual).</i>
\bigcirc	This is the International PROHIBITION Sign, or NO Sign, which indicates something (i.e. smoking) is not permitted.

Even the SAFEST Dryer Poses Multiple Hazards

BROCK® Dryers are designed with your **SAFETY in mind**. However, accidents can happen with improper installation or use of any system using a flammable fuel, high-speed moving parts and high voltage. Grain Dryers *by their function* pose several types of significant operational **hazards** that cannot be completely eliminated or safeguarded.

BROCK strives to take every reasonable precaution to design equipment that is safe without compromising or restricting necessary movement of Dryer components. Installers, Owners and Operators are expected to take necessary precautions to reduce the risks associated with Dryers.

Regularly inspect wiring, cords, plugs, tools and equipment for obvious external damage. Watch for shorts and sparks in fittings, or loose wiring. Always hire a licensed electrical contractor to repair wiring, switches, fuses or equipment.

Minor fuel line leaks may go undetected; hire licensed fuel contractors to service the plumbing system and to check fuel line connections for leaks and other hazards. Dryer-related hazards in this Manual are represented by, but are not limited, to the following symbols:



Figure 9. ISO Symbols for Typical Dryer Hazards

Dryer Installations and Service

Contact only **qualified and licensed** electrical and gas contractors to install your Dryer and its power and fuel sources. Follow recommended precautions and safe operating practices of national and local codes at each installation site.

Installation is not complete until a SAFETY Systems checkout is run to see that all SAFETY systems are in working order. This must be done before initial startup. It should also be done at the beginning of each season, and any components replaced if necessary. See more about SAFETY systems on pages 86-94.



Electricity can KILL! All electrical installations and testing MUST be done by a QUALIFIED and properly certified/licensed ELECTRICIAN, in accordance with all applicable national, state/provincial and local codes. Brock Grain Systems neither will be liable for damage to the Dryer or to person(s) because of unqualified electrical testing, installation or use. Improper procedures will void the Warranty. Failure to follow these instructions will create an imminently hazardous situation which, if not avoided, will result in serious injury that could lead to death. See the chapter on Electrical Installations (pages 42-46).

IMPORTANT!



It is the responsibility of the Contractor, Installer, Owner and Operator to supplement the Dryer furnished by Brock Grain Systems with any necessary ELECTRICAL or STRUCTURAL items to make the Dryer installation comply with the <u>National Electric Code</u>, <u>National Electric Safety Code</u>, and OSHA (U.S.); the <u>Canadian Electrical Code</u> (Canada); and any other applicable federal, State/provincial and local laws and ordinances.



Dryer installations shall meet the <u>National Fire Protection Association Standard</u> <u>61B</u> for the prevention of fires and explosions in grain elevators and facilities handling bulk raw agricultural commodities. All components must meet the <u>National Fire Protection Association Standard NFPA No. 70, American National</u> <u>Standard Inst. ANSI-C1</u>, as well as all applicable state and local requirements. Failure to follow these instructions will create an imminently hazardous situation which, if not avoided, will result in serious injury that could lead to death.

DO NOT allow the Dryer to run while any adjustments are being made. SHUT OFF, LOCKOUT and TAGOUT all electrical power BEFORE working on or near the Dryer. Keep hands, feet, hair, and clothing away from all parts in motion. Failure to shut off, LOCKOUT and TAGOUT power to the Dryer will lead to personal injury or death.



NEVER ENTER a Dryer with flowing grain, a Dryer that has not cooled down, or in the event or suspicion of fire! Failure to follow these instructions will result in death or serious injury! If a fire is present, follow instructions on pages 30-31, which includes calling emergency responders.



Canadian Models Only:

The equipment shall be installed in accordance with the current *Installation Codes for Gas Burning Appliances and Equipment*, CAN/CGA-B149.1 and CAN/CGA-B149.2 or applicable provincial regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.



Maintain a SAFETY training and operations program for all Dryer Operators.





ATTENTION! Dryer Contractor, Installer, Owners, Operators:

Read and follow THIS MANUAL—especially the SAFETY section, all SAFETY Decals, precautions and recommended SAFETY practices.

Reading, understanding, and following this Manual is REQUIRED before Dryer operation or servicing. Failure to read this Manual by qualified personnel (Owners, Operators and Supervisors) BEFORE Dryer installation or usage, constitutes a misuse of the equipment and voids the Warranty. Failure to read this Manual could also result in death, serious injury, and/or equipment damage.

Make the above known to all who work with the equipment or who may be in the working area. Make your grain business safer for all—by educating, training and emphasizing the need to **avoid taking risks**.

Before it is too late: Talk to your children, co-workers, and neighbors about the SAFETY information in this Manual. Many lives depend on it.

Train Dryer Operators Properly

The Manufacturer requires that all persons who will be operating or working around this equipment be **trained** in proper operational and SAFETY procedures. Only Operators completely familiar with both the BROCK® MEYER® Tower Dryer and this Manual and its SAFETY/operational practices should be permitted to operate the Dryer. Make certain a **QUALIFIED** OPERATOR is in attendance at all times while the Dryer is operating.

It is essential that Owners and Operators know, use, instruct, and insist on responsible and **safe operation according to all applicable grain industry handling standards**. Know and observe all operating precautions, current practices and requirements listed in *OSHA Grain Handling Standard 1910.272*, and all other applicable federal, state and local codes.

This Manual is supplementary to any law or code covering fire or health regulations.

Failure to follow proper assembly and operational procedures may cause damage to equipment or personal injury.

Outfit Your Crew for SAFETY

If you should need to enter the Dryer (for an adjustment, inspection, etc.), enter only if you:

- Shut off, LOCKOUT and TAGOUT all power. See page 42 and Appendix C.
- Never enter a Dryer while it is in operation.
- Wear proper BREATHING equipment during cleanout.

Always wear appropriate PPE (Personal Protective Equipment)!

Make sure proper PPE is available so service personnel and Operators know its proper usage.

- Require hearing protection around grain equipment. Have an emergency hand-communication system where equipment noise is excessive.
- Station trained people to help from OUTSIDE the Dryer.
- Require hard hats be worn in all commercial installations.
- Because of the DANGER of flying debris, **protective eyewear**/safety glasses **must** be worn during assembly, installation, and servicing of this Dryer.
- Whenever working with steel, always wear **gloves** to help prevent injuries.
- Wear suitable footwear for grain handling areas. Keep shoestrings secured.
- Wear suitable fall restraint systems.
- Qualified personnel must use proper Lockout-Tagout procedures and tags.
- Use a **proper respirator** during cleanout and maintenance. See the note "There are inhalation dangers in grain" on the facing page.
- Qualified electrical personnel only: Always use and wear **properly rated/insu**lated equipment when working near sources of electricity.

Failure to follow these steps could result in death or serious injury:

It is important that all Operators remain alert and always be aware of and understand these additional SAFETY rules, which should be enforced:

- Clothing and jewelry: Never wear loose-fitting clothing or flowing scarves around moving parts. Keep long hair secured. Restrict or prohibit jewelry items (rings, earrings, body jewelry) that pose a hazard.
- Do not stand in the suction area of the Dryer Fans while they are in operation.
- Work alert after adequate rest. Never operate equipment when tired or distracted.
- Never operate the Dryer if intoxicated or under the influence of alcohol or drugs.
- Never work alone in the Dryer during a cleanout or after all other personnel have left the site. You may find yourself injured and unable to reach help or a way out.
- Make personal safety and the safety of others a priority. Do NOT allow any rough or boisterous "horseplay", or activity not of a productive and serious nature, to occur near the Dryer.



Falls from grain dryers can cause serious injury or death. Failure to properly use fall restraint systems, Ladders, and Platforms consistently when climbing on Dryers can cause serious injury or death. Always close Platform Safety Gates when using Dryer Ladder systems. See more about Ladder safety on pages 26-28.

There Are Inhalation Dangers in Grain

All feed and grain contains a certain amount of dust. However, spoiled material can release excessive dust and mold spores into the air during handling (especially during clean-out), which can cause serious long-term respiratory problems.

In order to avoid this hazard, follow these precautions:

- Never work in obviously dusty-moldy Grain without a respirator. Always wear an adequate dust mask or respirator. Ventilate the work area. Use a respirator capable of filtering fine dust. Be aware that your tolerance to a given material may be limited, and that you should not deliberately and knowingly expose yourself on the idea that it will not hurt you. Later in life, you may have used up all your tolerance.
- Never work alone when inside a Dryer or during clean-out. No matter what the breathing protection, always station a second person on safety standby outside.

IMPORTANT!



Before it is too late:

Talk to your children, co-workers, and neighbors about the SAFETY information in this Manual. Many lives depend on it.

Always follow other Manufacturers' SAFETY labeling on sensors and other equipment wired into the MEYER® Dryer.

Read and follow the SAFETY procedures and Decals in your Manuals to supplemental equipment and accessories.

General Safety

Make your farming business safer for all—by educating, training and emphasizing the need to avoid taking risks. Make certain a **QUALIFIED** OPERATOR is in attendance at all times while the Dryer is operating.

NEVER enter a Dryer while it is in operation! If you should need to enter the Dryer (for an adjustment, inspection, etc.), enter only if you:

- 1. Shut off, LOCKOUT and TAGOUT all power. See Appendix C.
- Never enter a Dryer while it is in operation.
- 2. Wear proper BREATHING equipment during cleanout.
- 3. Enforce a NO SMOKING policy on the premises.
- 4. Station trained people to help from OUTSIDE the Dryer.
- 5. Replace all Doors and Guards before resuming Dryer operation.
- 6. Be sure all safety Doors are functioning properly to shut down power if Doors come open.

Never enter a Dryer that has automatic unloading equipment without, shutting **OFF**, **LOCKING OUT** and **TAGGING OUT** the control circuit.

Overview: SAFETY Decal Placement

IMPORTANT!



Along with your Dryer shipment will be DANGER, WARNING and CAUTION Decals which have been placed on the Dryer to insure safe and proper use of the equipment. Locate, read and obey all SAFETY Decals on your Dryer, Control Cabinet, Dryer/Equipment Disconnect/Power Cabinet, in this Manual, and in all Installation Manuals. Check all equipment for DANGER, WARNING and CAUTION Decals and their proper placement, BEFORE equipment is OPERATED. Make sure Decals can be easily seen at all times. Keep them clean and grease-free.

Never use equipment if any Decals are missing, improperly placed, damaged or altered. Contact the Dealer or Manufacturer for immediate replacement. Do not remove any SAFETY Decals unless they are being replaced with proper Decals as shown here.

Figures on pages 14-29 show the proper location of SAFETY Decals as shipped from the factory and/or as-installed. Always observe SAFETY information on additional equipment from other Manufacturers.



Item	Part No.	Decal Description
1	13-26114	DANGER, Suffocation (English)
2	13-26114SP	DANGER, Suffocation (Spanish)
3	1315-00239	WARNING Decal (Canada)
4	1315-00247	WARNING Keep Doors Closed
5	3136-00038	WARNING Ladders/Walkways
6	1315-00236	WARNING High Operating Temps
7	1315-00238	WARNING Keep Guard On
8	1315-00251	WARNING Rotation Motion
9	3236-00017	DANGER Additional sources
10	3236-00006	460V Decal
11	5537-00052	WARNING Arc Flash
12	3236-00015	WARNING Multiple voltage sources

Item Table for Figures 10 and 11

Item	Part No.	Decal Description
13	1315-00240	WARNING
14	3734-00028	WARNING Do not Install
15	3236-00012	DANGER Electrical Hazard
16	3236-00013	DANGER High Voltage
17	5537-00049 5537-00050	WARNING Fuel Plate, NG WARNING Fuel Plate, LP
18		Dryer Control Panel
19	varies	Dryer Power Panel
20		Dryer Disconnect Box
21	13-23790	Ladder DANGER Decal
22	3936-00003	CAUTION Hot surface.
23	3936-00004	DANGER Hazardous voltage
24	3936-00005	DANGER Rotating parts
25	1315-00038	ROTATION Decal

Electrical Control Area DANGER! HIGH VOLTAGE!



Use extreme CAUTION around electrical components. SHUT OFF, LOCKOUT and TAGOUT electrical power BEFORE opening or servicing any electrical control boxes. Keep Control Box Doors CLOSED during Dryer operation. Do not use electrical cabinets for storage. Do not run with doors open. Failure to follow these instructions will result in an imminently hazardous situation that if not corrected, could cause serious personal injury that could lead to death.



Dryer Front Electrical Control Area at the Pad, Control Boxes shown CLOSED

Electrical Cabinets are **not** to be used as storage units for spare parts, supplies or food. This will cause debris and rust.



Electrical Power Cabinet (*aka* PC, Red Cabinet on the left)

The red Power Panel houses the AC Drive. Locate and read your literature (separate from this Manual) provided by the vendor/Manufacturer of the AC Drive.

An AC Drive must be GROUNDED and can be extremely dangerous if all safety precautions are not observed.

This Power Cabinet is not to be confused with the Service Disconnect. This Cabinet is NOT a service-rated disconnect! This is a Dryer/equipment Disconnect ONLY. This Cabinet IS NOT to be used as a feed for incoming electrical service from the Utility transformer! Any such use of this cabinet as a power SERVICE disconnect creates a dangerous situation for potential explosion or arc flash that could lead to serious injury or death.



1		Lice. I ower I aller, Outer Door
2	5537-00052	WARNING Arc Flash Decal
3	3236-00015	WARNING Multiple sources
4	3236-00017	DANGER Additional sources
5	3236-00013	DANGER High Voltage
6	3236-00012	DANGER Electrical Hazard
7	1315-00240	WARNING, General
8	3236-00006	Decal, Voltage

Door CLOSED

SAFETY Decals (5537-00052, 3632-00012, 3236-00013, 1215-00240 and 3236-00015) are located on the Outer Door of the Power Cabinet, with a Voltage Decal. DANGER Decal 3236-00017 reads "Additional sources of power supply into cabinet are provided by sources other than Dryer manufacturer. Make sure all such sources are safely disconnected before opening cabinet." Bilingual WARNING Decal 3236-00015 reads: "This Panel contains more than one source of voltage."

Bilingual WARNING Decal 5537-00052 reads: "Arc flash and shock hazard; appropriate PPE required." See references to PPE on page 12 of this Manual.

- WARNING Decal 1315-240 contains general precautions:
- 1. Read this Operators Manual for instructions and SAFETY precautions prior to installation and operation.
- 2. Install and keep all shields in place before operation.
- 3. Keep hands, feet and clothing away from motor drives, belts, and fan inlets.
- 4. HIGH VOLTAGE WITHIN THIS CABINET. Disconnect power and shut off fuel before servicing Dryer.
- 5. Wait for all motion to stop and for the Dryer to cool before servicing.
- 6. Make certain everyone is out of the Dryer before starting.
- 7. Wear hearing protection when near or operating Dryer for extended periods.

<section-header>

It is very important with an AC Drive to WAIT for capacitors to discharge stored electrical energy BEFORE any service is begun on the Drive. If a capacitor explodes, there will be a shotgun-like blast. The danger of a capacitor explosion is similar to that of an arc flash. Obey the Arc Flash Decal (5537-00052) on the Cabinet and wear proper PPE.

Do not use electrical cabinets for storage. Do not operate with doors open.

Allen Bradley Power Flex 525 Drive See Appendix E for a listing of fault codes on the display screen.

Figure 13. Red Power Panel, Door shown OPEN



The Drive Manufacturer recommends WAITING at least ten (10) minutes for the energy to dissipate from the capacitors. VERIFY THAT NO VOLTAGE IS PRESENT before proceeding. Obey all Safety Decals on this Cabinet. Qualified electrical personnel only: wear proper PPE while servicing. Failure to follow these instructions will result in an imminently hazardous situation that if not corrected, could cause serious personal injury that could lead to death.

CONTROL Cabinet (aka CC, Red Cabinet on the RIGHT)



Use extreme CAUTION around electrical components. SHUT OFF, LOCKOUT and TAGOUT electrical power BEFORE opening or servicing any electrical control boxes. Keep Control Box Doors CLOSED during Dryer operation. Failure to follow these instructions will result in an imminently hazardous situation that if not corrected, could cause serious personal injury that could lead to death.

Circuitry inside the Control Panel Cabinet communicates with the Intui-DRY® Controller Monitor. Indicator lights across the top are standard. Any shutdown of the Dryer is identified by the Safety circuit monitoring system so the malfunction can be corrected.



Bilingual WARNING Decal 1315-00247 is located on the Control Panel outer cover and Inner Door. It reads, "This compartment must be closed except when servicing." DANGER Decal 3236-00012 is located above the latch on the Inner Door.

Emergency Buttons: Three large buttons (Item 6 in Figures 14-17) are located on the front of the Cabinet Outer Door. These are extenders that, when pressed with the Outer Door closed, activate corresponding buttons on the Inner Door. See also pages 53-55, 72, 79-81, 88-89.

To make the Dryer STOP IMMEDIATELY for any reason, press this RED button.



To shut down the Dryer for a default time before a restart, press this BLACK button.

If the button is not pushed again within the default time, the Dryer goes into Shutdown/Cooldown mode.

Push this RED button to shut off the sound of the Alarm Horn.

Figure 16. **Emergency Buttons**

Bilingual WARNING Decal 3734-00028 is inside the Control Cabinet inside back housing. It reads, "WARNING: Do not install any auxiliary components in the Control Panel. Failure to comply will void the Manufacturer's Warranty."

Do not use electrical cabinets for storage. Do not operate with doors open.



Figure 17. Red Control Panel SAFETY Decals on Back Housing, **Outer and Inner Doors OPEN** See also pages 56-55.

1 2

3

6

9

10

11

Dryer (Equipment) Disconnect Box

The **Dryer Disconnect** supplied with the Dryer has a main circuit breaker/disconnect inside the cabinet for the <u>Dryer</u>.

This Box contains the Dryer **Disconnect Handle** (Item 5, below and **Figure 19**), which shuts down power to the Dryer. The *automatic trip* is indicated by the Handle position midway between ON and OFF. (To reset the Breaker, move the Handle first to the OFF position then to ON.



This Power Cabinet is NOT a "Service Rated" disconnect! It is a Dryer/Equipment Disconnect only. This Cabinet IS NOT to be used as a feed for incoming electrical service from the Utility transformer! Any such use of this cabinet as a power SERVICE disconnect creates a dangerous situation for potential explosion or arc flash that could lead to serious injury or death.



Figure 18. Dryer Disconnect Box

Item	Description
1	Disconnect Outer Door
2	Disconnect Inner Door
3	Dryer Disconnect Box
4	WARNING Arc Flash 5537-00052
5	Disconnect Handle
6	Power to Power Panel 230V only 1315-00248
7	Decal, Minnesota only (not shown)
8	Incoming power from utility

Figure 19, right. Dryer Disconnect Box (CLOSED, Power LOCKED OUT/TAGGED OUT)



Keep Doors Closed on Other Electrical Boxes

Linear Limit Electrical Boxes: See pages 34-35. Plumbing Electrical Boxes: See the **Figure** and Detail below.





Item	Description
1	Plumbing JIC Box/BASO Switch
2	WARNING Decal, This Compartment
3	Electrical Conduit to Plumbing
4	Main Plumbing to Burner
5	Pilot to Burner
6	Electrical Conduit to Burner
7	Unload Opening
8	Electrical to Control Panel



Figure 20. Internal Plumbing Electrical Junction Box (Inside Unload Module)

Always Keep Doors/Guards Closed on Electrical and Moving Parts



The Dryer may start without warning. Areas with DANGER and WARNING Decals are hazards.



On Electrical and Woving Parts If the Dryer is to be opened for inspection, cleaning or observation, all power must first be shut off. SHUT OFF, LOCKOUT and TAGOUT all electrical power BEFORE working on or near the Dryer so that it CANNOT be restarted by anyone remote from the area. DO NOT allow the Dryer to run while any adjustments made. Do not adjust, service, lubricate, clean, unclog or enter this equipment while in operation. Failure to SHUT OFF and LOCK OUT power to the Dryer will lead to personal injury or death.

Work around Dryers with extreme CAUTION! This Dryer is operated by AUTOMATIC CONTROLS that drive high-speed Fans, rotating parts, high voltages, burners, and other hazards. Areas with WARNING Decals are electrical and/or entanglement hazards. KEEP HANDS, FEET, LIMBS, HAIR, CLOTHING, AND ALL OTHER PARTS OF YOUR BODY AWAY from openings, belts, drives, and all Dryer parts in motion when the Dryer is running. Failure to follow proper operational procedures may cause damage to equipment or property and/or death or personal injury.

Some parts and bearings must remain exposed to facilitate operation. Moving parts such as Fans and Belts pose a special danger of entanglement and traumatic amputation if approached or accessed improperly. To avoid injury or being struck, do not open Guards or Doors while the Dryer is running. Do not attempt to poke or prod material in any moving parts. Replace all Doors and Guards before resuming Dryer operation. Be sure all safety Doors are functioning properly to shut down power if Doors come open.

DO NOT OPERATE the Dryer with any Guards missing, removed or improperly attached. Safety devices and Guards must be securely in place. Failure to follow this instruction could result in serious personal injury that could lead to death.

External Access Doors at the Pad

There are two (2) walk-in Doors on the Unload Module: a main Door and a secondary Door. See page 46. These Doors should be kept **closed** at all times during operation. A **Door SAFETY Switch** is standard. If a Door is opened during operation, the Dryer will shut down.

No part of the Door Safety Switch is to be removed or modified in any way. Failure to observe this instruction will result in a potentially hazardous situation which, if not avoided, could cause injury or death.





Figure 21. Access Door OPEN to Show Door SAFETY Switch

Bilingual WARNING Decal 1315-00251 is used on both the Main and Secondary Access Doors. It reads, "Fan continues to rotate after power is disconnected. Do not enter or service until all motion stops. Make sure power is locked off while servicing." LOCKOUT/TAGOUT rules apply. Bilingual WARNING Decal 1315-00236 reads, "High operating temperature inside; Dryer parts may become hot during operation." Bilingual WARNING Decal 1315-00247 reads, "This compartment must be closed except when servicing."



Figure 22. WARNING Decals, Access Door at Pad

Item	Part No.	Description
1		Access Door
2	1315-00247	WARNING Decal This Compartment
3	1315-00251	WARNING Decal, Rotating
4	1315-00236	WARNING Decal, Heat
5		Door SAFETY Switch (inside)

Quick-Draw Slide Doors

Quick-Draw Slide Doors are in Dryer columns and at the bottom of each Dryer column section ending in a Hopper section at the Unload. Be sure these Doors are closed at all times of normal operation.



Slide Doors above the Unload Trough must be CLOSED before the Dryer is operated. If these Doors are open, exposed Unload components pose a moving hazard. Do not place hands or objects into this area. Failure to follow this instruction could result in personal injury and damage to the equipment.

WARNING A AVERTISSEMENT A

EMERGENCY DOORS MUST BE CLOSED BEFORE DRYER OR METERING ROLLS ARE OPERATED

◢

LES PORTES D'URGENCE DOIVENT ÊTRE FERMÉES AVANT QUE LE SÉCHOIR OU LE SYSTÉME DE DÉCHARGEMENT NE FONCTIONNE

> Figure 23, right. Slide Doors at Unload



Moving Hazards at the Unload Module Drag Conveyor Unload



Do not operate the Dryer without Unload Covers on. SHUT OFF, LOCKOUT and TAGOUT POWER before servicing motors or sensors on the Unload system. Failure to follow this instruction will result in potentially hazardous situation which, if not avoided, will lead to serious injury or death.

STAY CLEAR of the Unload Trough area. <u>Do not step on the Unload</u>. Never put fingers or limbs near or the Unload wheel while it is moving. Moving parts and equipment at this area may start without warning. Failure to follow this instruction will result in a potentially hazardous situation which, if not avoided, could cause serious personal injury that could lead to death.

Each Trough Cover has WARNING Decal 1315-00238 to warn the Operator to keep these Doors closed when the Dryer is in operation. Keep hands, feet and clothing away from belts and drives. At Startup (page 70) and restarts, be sure these Covers are secured.



Operating the Dryer with Unload Covers off will cause dust to be drawn into the Dryer, which leads to a higher risk of Dryer fires. Failure to follow this instruction could result in fire, personal injury, and damage to the equipment. Failure to follow this instruction could cause serious injury.



Figure 24. WARNING Decal 1315-00238 on Unload Cover

TrueGrain[™] Moisture Sensor System (Patent Pending)

SAFETY Decals for electrical and moving hazards are placed on the TrueGrainTM Moisture Sensor installed on the Discharge Chute. For additional information see Items 22-25 on pages 14-15.



Fans and Belts

There are suction hazards particular to the Unload area, because of the extreme air movement from Fans. Never leave loose materials, tools, or ropes here: they can be sucked into Fans. Do not wear loose clothing when entering the Dryer at this area.



The Fan continues to ROTATE after power is disconnected. Do NOT enter or service the Dryer until ALL Fan motion stops. Do not stand in front of the Blower while in operation. Suction may draw clothing into the Blower. Make sure the power is LOCKED OUT while servicing. Failure to follow this WARNING could result in death or serious personal injury.

Always wear a hard hat in this area as you work around overhead conveyors and other protrusions. Wear safety gloves, goggles and other PPE (see page 12).



Figure 26. Fan Motor and Belt (Typical Side)

Internal Areas and Surfaces Are HOT!

When the Dryer Burner has been operated, the Burner, grain columns, and Heat and Cool Plenum will all be hot. Always allow at least twenty (20) minutes of cool-down time before entering the Dryer for any inspection. If there is grain in the columns, it will be pitch black inside the Dryer above the Heat Plenum Floor. Always carry a spare safety light and spare equipment when working inside the Dryer. Always wear skid-resistant work shoes.



There are high operating temperatures inside the Dryer. Parts and surfaces become hot during operation. Allow internal Dryer areas to cool before entering! Keep all Doors closed except for service. Always wear safety gloves and footwear to service. Failure to heed these warnings could result in serious injury that could lead to death.





DANCE =

- The WORKING LOAD of th dder is 300 pounds [136 kg] Do not overload.
- Never climb a damaged or improperly assembled Ladder. Before use, inspect the Ladder
- carefully for deterioration from chemicals or weather. Keep the Ladder and Bin away
- from power lines and live electric wires.
- Keep rungs free from slippery material such as ice, snow, mu grease, manure, etc.
- Wear slip-resistant shoes. 6. DO NOT USE LADDERS if you tire
- easily, or are subject to fainting spells, or use medicine or alcohol
- or are physically handicapped. or descending. Maintain a firm grip. Center your body between side rails. FACE THE LADDER when ascending
- 8. Discard and replace the Ladder
- if it is exposed to fire or damaging chemicals. Never use the Ladder as a horizontal
- platform, plank, or material hoist,
- Never apply a side load. Never push or pull anything while on the Ladder.
 Never drop or apply an impact load
- to the Ladder 12. Never sit on the ends of Ladde
- Never use the Ladder as a scaffold 4. Never use the Ladder when in
- poor health. 13-23790 12/0

Figure 27. Ladder DANGER Decal

Use CAUTION when Climbing on Ladders and Walkways

Because of the substantial height of this Dryer, extreme CAUTION should be used at all times if there is a need for climbing. Access Platforms with safety Handrails extend around the exterior tower. Walkways have left and right Gates at Ladder entrances. Always use and latch Platform Gates.

- Use Ladders and Walkways when servicing the Dryer. Do not climb on other • Dryer areas not made for climbing or weight-bearing. Do not attach weights to Ladders, Walkways, Platforms or Gates.
- Always wear skid-resistant work shoes and a safety harness. Moisture-laden grain, when heated, leaves slippery surfaces on Walkways.

NEVER sit or stand on Handrails or Guardrails! The Operator MUST use and latch all Platform Gates. Whether inside or outside, a fall from such heightscaused by failure to follow these instructions—could lead to serious injury that could result in death.

NEVER exceed the maximum load, apply a side load, attach weights to the Ladder/Walkway/Platform, or use the Ladder as a scaffold. DO NOT drop or apply an impact load to the Ladder; push or pull anything while on the Ladder; or use the Ladder as a horizontal platform, plank or material hoist. To do so is a misuse of the equipment and could cause personal injury or equipment damage.

DANGER Decal 13-23790 (left) is on the BOTTOM of each Ladder section. Failure to comply with the following instructions are a misuse of the Ladder and may result in death or serious injury.

- 1. The WORKING LOAD of the Ladder is 300 lbs *[136 kg]*. Do not overload.
- 2. Never climb a damaged or improperly assembled Ladder. Before use, inspect the Ladder carefully for deterioration from chemicals or weather.
- 3. Keep the Ladder away from power lines and live electric wires.
- 4. Keep rungs free from slippery material such as ice, snow, mud, grease, manure, etc.
- 5. Wear slip-resistant shoes.
- 6. DO NOT USE LADDERS if you tire easily, or are subject to fainting spells, or use medicine or alcohol, or are physically handicapped.
- 7. FACE THE LADDER when ascending or descending. Maintain a firm grip. Center your body between Side Rails.
- 8. Discard and replace the Ladder if it is exposed to fire or damaging chemicals.
- 9. Never use the Ladder as a horizontal platform, plank or material hoist. (continued)
- 10. Never apply a side load. Never push or pull anything while on the Ladder.
- 11. Never drop or apply an impact load to the Ladder.
- 12. Never sit on the ends of Ladder Side Rails.
- 13. Never use the Ladder as a scaffold.
- 14. Never use the Ladder when in poor health.

Watch your step when climbing!

Interior and exterior Ladder systems begin at the Unload Module.





Interior Ladder in the Unload Module





Use CAUTION when climbing through the Heat Plenum Floor access opening. There may be Steps, Platforms, and/or areas where a Ladder section ends and another begins. The Cooling Floor Hatch and Plenum Hatch are areas where an Operator must go from one Ladder to another and re-establish footing. Use CAUTION when climbing onto outside Ladder-and-Cage runs between Walkways.

If there is grain in the columns, it will be pitch black inside the Dryer above the Plenum Floor. Always carry a spare safety light and spare equipment.

An Inside Work Platform is located approximately two-thirds of the distance UP the Tower on these models:

- at the top of Ring 24, ME1400 and ME1600;
- at the top of Ring 29, ME1400 and ME1800; at the top of Ring 34, ME2000 ME2400;
- and at the top of Ring 27, ME2650.



Figure 30. Inside Work Platform 3121-00160

Use CAUTION at Roof Heights

The Outer Roof is equipped with an Eave Platform and Manhole. Roof ribs and the eave edge may vary in appearance from the **Figures** on this page.

Should access onto the Outer Roof be necessary, the Operator must be wearing a safety harness. A fall from Tower heights caused by failure to follow this instruction—could lead to death or serious injury. Step only on the Steps and/or Platforms. Roof Panels and other sensing equipment are not designed as steps. Failure to follow this warning could result in death or serious injury.



Figure 31, right. Roof Platform and External Walkways







Figure 32, above and left. Eave Platform and Outer Roof

Item	Outer Roof Parts	
1	Roof Panel	
2	Manhole Cover	
3A	DANGER Decal 13-26114-EN	
3B	DANGER Decal 13-26114-SP	
3C	DANGER Decal 13-26114-FR (optional)	
4	Fillhole Lid Weldment	
5	Top Moisture Sensor	
6	Grain Level Switch	
7	Stiffener Ring (do not stand on this!)	
8	Top Ladder	
9	Roof Platform	

Optional Roofs with a Handrail and Steps, and a Fillhole Guardrail or Platform, are available through your Brock Dealer.



Figure 33. Optional MEYER Roofs



Manhole Access Inside the Dryer

The **Manhole** is intended for access during servicing or cleaning the Top Moisture Sensor and Grain Level Switch. The Manhole **must remain latched** at all other times when the Dryer is in operation or not in operation (out-of-season).

Never enter a Dryer that has automatic unloading equipment without **LOCKING OUT** and **TAGGING OUT** the control circuit.

DANGER Decal (13-26114) below is located both on the inside and outside of the Manhole Cover. It appears in Spanish next to the English Decal. A French language Decal are also available. Other languages may be available upon request.

The Manufacturer strongly recommends that the Owner/Operator install a padlock or locking device in the Manhole (Roof Hatch) to reduce the risk of unauthorized entry into the Dryer from above.



Figure 34. DANGER Decal 13-26114



Figure 35. DANGER Decal 13-26114SP

If you must enter a Dryer, use a rope and safety harness (over-the-back type) for support. It is **always** advisable to have three people involved.

When entering the Tower from above, the person in the Dryer should be secured or fastened to a safety harness with at least two persons outside capable of lifting that person out without entering the Dryer. Walking surfaces may be slippery from grain dust and steam.

One person outside cannot go for help and maintain preliminary aid. **Never** depend on a second person only, either on the Roof, ground, or any remote point to whom you shout instructions—to start or stop equipment. Noise can block out cries for help.



Never enter the Dryer through the Manhole during the filling/unloading operation or while the Dryer is in operation! When the Dryer and auxiliary equipment are not LOCKED OUT, grain filling or unloading may start at any time without warning. Failure to SHUT OFF, LOCKOUT and TAGOUT power to the Dryer will lead to injury or death.

Fire SAFETY and Site Security

EMERGENCY PROCEDURES:



ACT IMMEDIATELY if there are gas FUMES or unusual noises or vibrations. ACT IMMEDIATELY at the FIRST APPEARANCE of smoke or smolder. In the event of a FIRE, CALL 9-1-1* IMMEDIATELY

*or appropriate emergency number

Below: Take Step 1 or Step 2 FIRST, whichever control you are closest to. Then shut off power at the other control.

ONE. Press the RED EMERGENCY STOP Button on the red Control Panel (Item 1) to shut down the Dryer immediately.

This stops the Fans to eliminate air supply to the fire. Remember: Doing this does NOT yet shut off the incoming power from the Electrical Power Cabinet to the Control Panel.



TWO. Open the cover of the Disconnect Box (Item 3) and pull DOWN the DISCONNECT Handle located inside.

This shuts off electrical current to the Dryer Power Panel and Control Panel, and trips the main breaker.

Remember: Doing this does NOT yet shut off the Electrical Power Cabinet's INCOMING power from the outside electrical Service Provider.



THREE. Shut off power from the Provider's incoming lines at the Service Disconnect (not shown; location varies) so there is NO POWER AT ALL coming to the Dryer.

It is important for all Operators to know the location of the power Service Provider's **Service Disconnect**, sometimes in a building away from the Dryer.



Figure 36. Initial EMERGENCY Shutoffs



Item	Description
1	Red Control Panel
2	Red Power Panel
3	Dryer Disconnect
4	Disconnect Handle

Immediately follow Steps ONE and TWO above with Step THREE (left) and Step FOUR (facing page).

*or appropriate code for your country or locale

FOUR. Shut off the fuel supply valve closest to the fire and at the Tank (if LP is used). Turn the Gas Hand Shutoff Valve at a 90-degree angle to the Lower Plumbing Train to CLOSE.

Follow applicable procedures for such an emergency.





Figure 37. Gas Hand Shutoff Valve, shown CLOSED, U.S. Model (Canadian model shown on pages 50-51)

IMPORTANT!

Locate the fire and determine: Can it be quickly contained / extinguished? Failure to quickly recognize the need for professional fire fighters could result in the loss of life, and will result in increased property loss.

To avoid becoming trapped above the fire, DO NOT CLIMB up to any area of the Dryer to attempt to put out the fire yourself!



There is toxic gas and smoke in the event of a fire. DO NOT ENTER the fire area or any enclosed space within the Dryer. Failure to follow this warning could lead to death or serious injury.

> Do not rely on fire extinguishers to put out grain fires on this Dryer.

A fire extinguisher may only be useful for small, containable fires near the pad.

Use water wisely:

Hose down / cool propane tanks and the grass surrounding the area.



Stop all nearby equipment. Protect and move nearby equipment and other combustibles. Monitor the temperature in adjacent bins and structures.

Check grain storage for any signs of hot embers that may have been conveyed before Dryer shutdown occurred.

If it becomes necessary to dump burning grain on the ground, open the **Quick-Draw Slide Doors** in the Hopper; however, **do not dump grain until the fire department and water are available** to extinguish burning embers that may come out.



Figure 38. Dryer Fire Simulation





Always consult your local fire/emergency department for their recommendations given any emergency, and HAVE AN EMERGENCY PLAN IN PRACTICE for your facility.



Fire SAFETY Can Prevent Loss of Life and Property

Taking preventive measures will help increase your chances to avoid a Dryer fire. Dryer fires can be especially costly because they can be hard to locate, hard to extinguish, and pose the potential for secondary fuel explosions. Injuries and fatalities occur annually from Dryer fires and secondary fires. There may also be fines/penalties and insurance consequences, long shutdowns for inspection, evaluation, and rebuilding.

Fires have an increased chance of happening when weather or grain conditions have been extra dry or when grain is exceedingly wet. Weeks of hot, dry weather can provide extremely dry, harvested material, chaff and foreign particles—which can become fuel for Dryer fires.



Plan and evaluate the location of the Dryer and nearby SAFETY equipment to minimize a fire hazard and to be prepared in case of emergency.

• Install Dryers upstream of area dust sources (unload pits, etc.). Install dust management devices that reduce dust in grain-handling facilities. Locate the Dryer where combustible material will not be easily drawn into it. Manage incoming grain with aeration.



- Install and maintain a **water source** nearby. If your facility is in town, check for the nearest **fire hydrant**.
- Maintain an absolute minimum 8' [2.438 m] clearance between the Dryer and any surrounding structures or obstructions. Where there could be heat buildup, do not store fertilizer or other flammables.
- Take care not to steer moveable equipment near the Dryer area or combustible propane tanks. Do not block emergency vehicle access to the Dryer or tank(s).
- Propane tanks, if struck and damaged, may result in injury and/or fire. Store LP tanks on level ground capable of supporting their maximum full weight. Follow local LP suppliers' codes for tank placement and recommended distances away from the Dryer.

Emergency Preparedness and Prevention

• Purchase and keep ABC or carbon dioxide (CO₂) **fire extinguishers** nearby and ready. Instruct all personnel how to properly use them. A fire extinguisher may be useful for a small fire near the pad.



- Enforce a **NO SMOKING** policy on the premises. Ideally there should be no smoking within 50 feet [15.24 m] of any grain facility. Follow all local smoking ordinances, which may entirely prohibit smoking in public places.
- DO NOT OPERATE the Dryer while the LP tank is being filled—until ten minutes after the truck filler hose is removed.

Restrict Dryer areas. See more information on page 37.

Develop and practice emergency procedures and fire drills.

Four Main Causes of Dryer Fires

1. Lack of Dryer cleanliness and maintenance

Develop and practice emergency procedures and fire drills. Fines and chaff are notorious for causing Dryer fires when the Dryer is not kept clean. When fines or debris accumulate on the Dryer floors or walls, they become extremely dry and combustible. When trash passes through the Burner it may ignite and burn out quickly on the Plenum Floor. Although this is normally no more than a spark, it is enough to ignite the pile of combustible debris and start a fire that may spread to the rest of the Dryer.

IMPORTANT!



Good housekeeping reduces fire risk. Inspect the Dryer DAILY when in use for debris on the Heat Plenum Floor and inside Screens. Make periodic inspections of the Dryer as described in the Preventive Maintenance section on pages 97-108. Clean as required.

Be sure the Dryer is clean and operating efficiently. Chaff can be sucked through the Fan into the Burner and Air Duct. Dirty Dryers can form "hot spots" or a slower grain column, which can ignite because some material is exposed to high temperatures longer than other grain areas.

Keep the ground area and concrete pad around the Dryer clean and free of obstacles. This provides easy access in case of emergency, reduces the possibility of fire and tripping, and avoids interference with Dryer function (*i.e.*, suction of debris into the Dryer). Be vigilant to clean scraps of wire, etc., if accessories are installed later.

2. Excessive Burner Flame

Burner flames may become excessive when the grain seal is broken due to inadequate filling. The Burner control tries to maintain temperature and make up for lost heat. Typically this can occur when incoming moistures are low and the fill system is struggling to keep up with the Dryer discharge rate. This combination of heat and combustible material pose a risk of fire.

IMPORTANT!



Reduce unload rate limits below the fill rate. Don't take grain out faster than it is put in.

3. Blocked Dryer Column

Over-drying a non-moving area in a blocked column creates a hot spot that can become a fire. Grain bridging in a column can be caused by a foreign object in the column, grain left in the Dryer too long and too wet since its last operation, or grain freezing since its previous run. Grain below the bridge creates a loss of grain seal and causes excessive Burner flame. Check that all columns are flowing at Dryer restart, if it has been shut down: 1) for an extended period of time, or 2) in freezing conditions which can cause crusting.

4. Running excessive Burner temperatures to hurry the drying process

This occurs typically at the beginning of season when moistures are high and the drying process is slow, or the end of the season when no adjustment has been made to drying temperatures for lower moisture grain. Also, it is not necessary to run the Burner in extreme cold at the same temperature as it would be run in warmer weather. Both the Burner and the dryness of the plenum air are directly related to temperature rise. Set plenum temperatures lower during cold weather.

Maintain Dryer components. Make periodic inspections of the Burner.

- Inspect the Burner to make sure the Burner holes are clean and clear.
- Check and service the Burner and other components **before** drying season. Use a wire brush, tip cleaner and vacuum to service the Burner to open all the holes and remove any rust or debris. See additional information for Burner care on pages 107-108.
- · Check solenoids for leaks and gauges for proper operating pressure.
- Visually inspect the Dryer prior to operation and especially prior to harvest season, when it will be used heavily. Correct any hazardous situation. Repair any faulty equipment.

Monitor Dryer activity on a regular basis.





This Dryer is designed and built with SAFETY features. Under no circumstances shall the safety characteristics of this Dryer be altered.

Do Not Modify Dryer Wiring to Bypass SAFETY Features!

Your Dryer Installer has wired in Hi-Limit Sensors. This is a SAFETY feature that will sense dangerously high temperatures, and/or in case of failure, alert the Intui-DRY® Controller to shut down the Dryer. Do NOT make any modifications to bypass these features. If this instruction is not followed, an unsafe situation is created that will result in extreme danger to life and property if the Dryer is operated.

Linear Limit System

A Linear Limits thermostat system senses any Dryer temperature variation outside an acceptable range, tripping the Linear Limit switch, and setting off alarms (see page 94). Exhaust air and operating temperatures are monitored with internal and external copper wires/thermostats (around the circumference of the Tower) in upper and lower locations. These thermostats are set to trip at 210°F [98.88°C], which will shut down the Dryer and activate an alarm (see pages 91- 93). In the event these components need replacement or repair contact Brock Grain

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AMC Probe

In the event these components need replacement or repair, contact Brock Grain Systems at 1-800-541-7900.



Figure 39. Jpper Hi-Limit Junction Box



The Upper Junction Box is at the Burner on the Heat Duct inside wall.



UPPER JUNCTION BOX AT HEAT DUCT

Keep Doors closed. DO NOT modify wiring!

Item	Description
1	Heat Duct inner wall
2	BASO Box at Internal Heat Duct
3	Flame Safety Switch (Decal 1315-00234)
7	Burner
8	BASO Safety Switch
9	Lower Hi-Limit
10	Heat Duct outer wall
13	WARNING Decal, This Compartment (1315-00247)
14	Upper Junction Box on Heat Duct
17	Ignition Transformer (Honeywell)
18	Duct Service Door



BASO BOX DOOR OPEN

Figure 41. Upper and Lower Hi-Limit / BASO Junction Box, on Heat Duct



DO NOT RUSH the Dryer in times of high humidity and wet grain by running the Burner too high in an attempt to dry the grain faster! Do not exceed maximum temperatures recommended by the Manufacturer.



BASO BOX DOOR CLOSED OUTSIDE DUCT AT UNLOAD MODULE

The **Lower Junction Box** (BASO) is in the Unload Module on the Heat Duct.



Item	Description
2	BASO Box at Internal Heat Duct
3	Flame Safety Switch (Decal 1315-00234)
7	Burner
8	BASO Safety Switch
9	Lower Hi-Limit
10	Heat Duct outer wall
13	WARNING Decal, This Compartment (1315-00247)
14	Upper Junction Box on Heat Duct
17	Ignition Transformer (Honeywell)
18	Duct Service Door

Figure 42. Upper and Lower Hi-Limit / BASO Junction Box, on Heat Duct, Canadian CLOSED

Figure 43. Upper and Lower Hi-Limit / BASO Junction Box, Canadian OPEN


Restrict Grain Dryer areas! Designate a SAFETY Zone.



Security Installations for the Dryer Site

Designate a **SAFETY zone** for unauthorized personnel or visitors. Provide adequate fencing and security for restricted areas. Unauthorized entrance to restricted areas around the Dryer exposes persons to hazards. This area should only be entered by authorized personnel with proper personal protective equipment (PPE). Be sure this designated area is clear before turning power on to the Dryer.

BROCK can provide an optional "Hazardous Area" Decal (lower left) for areas where only trained Dryer Operators have authorized access. It is the responsibility of the Installer and/or Owner/Operator to post and comply with governing standards that may apply.

Install Locking Devices at Points of Entry

It is the Dryer Owner's responsibility to secure or fence the Dryer area to reduce or eliminate risk of unauthorized persons gaining entry or seeking habitation inside the Dryer. On non-commercial farms, it is essential to keep unqualified/untrained personnel, especially children, out of the working area at all times. Commercial sites may be subject to additional code enforcement.

IMPORTANT!



Hazardous area

Authorized personnel only

Figure 44. **CAUTION Decal 1-41934**

To reduce the risk of unauthorized entry to the Dryer, the Owner/Operator should supply and install PADLOCKS wherever appropriate, especially on Access Doors in the Cooling Floor / Plenum, the Roof Manhole, and any other point of entry. Install Locks on electrical cabinets/boxes.

Consider adding an optional BROCK® Locking Ladder Door (9-41037) or Internal Cage Door (9-24065 or U-24066), to increase security at access areas to unauthorized climbing on the Tower Dryer.

The Locking Ladder Door (Figure 45) is installed on a bottom Outside Ladder section. Plan whether your Ladder Door is to be LEFT- or RIGHT-opening. The Door may be secured with a padlock (not included). Refer to BROCK® Instruction MGB1546.

The Locking Internal Cage Door (Figure 46) is installed in the second Ladder Hoop from the bottom. The Door may be secured with a chain and padlock (not included). Refer to BROCK® Instruction MLD1486.





Figure 45. Locking Ladder Door 9-41037

Figure 46. Internal Cage Door U-24066



Planning the Installation







IMPORTANT! Follow all applicable national, State/Provincial, and local building codes.

Dryer Location

It is the responsibility of the Contractor, Installer, Owner and Operator to supplement the Dryer furnished by Brock Grain Systems with any necessary <u>STRUCTURAL</u> or <u>ELECTRICAL</u> items to make the Dryer installation comply with the <u>National Electric Code</u>, <u>National Electric Safety Code</u>, OSHA, the <u>Canadian Electrical Code</u> (Canada), and any other applicable federal, state/ provincial and local laws and ordinances.

Plan your layout to with the following considerations in mind:

- Leave space for future equipment.
- Clearance: A minimum of eight (8') feet [2.438 m] should be maintained between the Dryer and driveways or other structures, and nearest combustible / storage structures.
- **Dust**: Locate the Dryer away from sources of dust. Consider direction of prevailing winds to avoid blowing dust into the Dryer's free air openings, creating additional maintenance and/or hazards in the drying operation.
- **Handling**: Minimize handling distances and number of handling operations. Consider spouting heights, angles, and conveyor paths. Refer to profile drawings shown in the **Specifications** section of this Manual for key dimensions.
- **Drainage** and Supply: Locate the Dryer pad in a well-drained area, or provide an adequate tile drainage system.
- Utilities: Plan path for gas lines and electrical service to enter the Dryer.
- **Control House**: Plan location with easy access to the control house where the Intui-DRY® Monitor will be located and grain testing can take place.

When positioning the Dryer, consideration must be given to conveyor paths, fuel train, and the electrical power source. Controller Monitor location should be planned in detail with your installation provider before installing the Dryer.

Foundation

Foundation prints are available based on 3000 psf soil bearing. Other conditions or local building codes may require additional foundation design work for your particular installation. The diameter of the Brock-designed foundation is a minimum diameter requirement for construction purposes. Contact Brock for any foundation design that may be smaller than this diameter. Refer to the Base Construction Manual MFH1968-1.

Follow Specifications and Schematics for THIS Dryer

The **Serial Number/Specifications Plate** is mounted on the back side (inside) of the red Control Panel Cabinet <u>outer</u> door. The Plate has specifications and power requirements for your model. The **Electrical Specifications Table** (**Appendix A**) also lists power requirements. The Dryer is supplied to specifications ordered.

MEYER® Electrical and Fault Code Charts are located in Manual MFH1968-3F.

MEYER® Electrical Schematic Diagram(s) are located in Manual MFH1968-3F-S.

Usually the two above Manuals will be clipped together. Online, these two (2) files may be separate to preserve graphic resolution in each. Schematics clearly show how various controls are interlocked. Schematics allow a qualified electrician to quickly troubleshoot problems or malfunctions. Ask for this Manual (shown on page 9) from your Installer or Dealer. Keep supplemental Manuals in a handy place for future reference in case of the need for service.

IODEL ME26	50S	Nº I	LAL NO.	ME	2650S	3420211230	2
APACITÉ DE CHARGE GRAIN HOLDING CAPA	EN GRAIN	2297		PI. CU	3 . FT.,	1847	BUSHELS
HASE 3 HZ 60		AGE	460		TROL VOL	UIT COMMANDE	120 VAC
LA MAX. MAX. FLA146."	1	KW M	AX. KW	98.9		CV MAX. MAX. HP	115
INCOL 150	0		A. C. MIN.	MIN.	MP	170	
IOTEUR(S) VENTILATE	UR	NO. 1	CV HP	50	FLA	59	T/M 1765
		NO. 2	CV HP	50	FLA	59	T/M 1765
OTEUR DE CHARGEM	ENT		CV	10	FLA	13.5	T/M 1760
INTEUR DE DÉCHARG	EMENT		CV HP_	5	FLA	6.6	T/M RPM 1725
IOTEUR COMPTEUR	VOLTS		CV HP_		FLA		T/M RPM
ARBUR.: GAZ PROP. UEL: PROP. GAS		GAZ NA	Г. X	LIQUID	PROP.		
RESS. ADMISS. (L/P): Pi	Q. PROP	30	A TO 200;	NA	T. OU GAZ PR	OP. A BAS 10 TO 15
RESS. EN MARCHE	("COL. MO	NT.):	ROP. 10		30	NAT. 15	
EGIME BRÛLEUR: MA	AX2	4,200,	000	BTU/HRE, BTU/HR,	MIN.	4,400,000	BTU/HRE BTU/HR
ÉGIME VENTILATEUR AN(S) RATING (TOTAL	(S) 10	2443		PL. ³ /MIN. (2" PRE 2" W.C. F	SS. COL. MON	T. PLÉNUM URE
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Figure 47. Serial Number/Specifications Plate

Fuel Suppliers and Plumbing Installations

The MEYER® Dryer runs on NATURAL GAS or PROPANE VAPOR. If liquid propane (LP) gas is to be used, the (LP) storage tanks are to be supplied by the Owner. The Specifications Plate (previous page) inside the red Control Panel outer door. This plate contains specifications for natural gas and propane vapor. See the Fuel Specification Chart within Appendix A.

Contact only **qualified and licensed** gas contractors to install your Dryer and connect its fuel sources. Follow recommended precautions and safe operating practices of national and local codes at each installation site.

Fuel WARNING Plates are also located on the exterior Plumbing Train. Plate 5537-00049 is used for natural gas (NG) and Plate 5537-00050 is used for liquid propane (LP) combo units. <u>These Plates should not be removed</u>.





Proper Fuel Line Connection Is Critical

It is of utmost importance that care be taken by the Dealer and Installer to match the type of FUEL noted on the Fuel Warning Plates and Dryer SN Plate. Starting the Dryer one time on the wrong fuel can produce a firestream tens of feet in length, that can destroy many components and possibly the entire Dryer. Failure to follow specific instructions on Fuel WARNING Plates could also result in fire, explosion, that could result in equipment damage, personal injury, or death.

- Line sizing: Fuel lines should be sized by your fuel supplier to deliver an adequate fuel volume at 8-15 psi to the Dryer inlet connection. Although the Inlet Valve connection for ME1000S through ME2650S Models is 2" [5.1 cm] NPT, the fuel line size required may be larger depending on the Model, fuel type, and length of supply pipe.
- Typical operation: The average ME2400S burns 125 gallons of gas per hour.
- **Fuel controls**: The Dryer is supplied with an electronic Maxon valve for fuel shutoff. The Dryer is equipped with the necessary final pressure regulation, automatic fuel modulation and flame safeguards for safe operation. **Plumbing Schematics** in this Manual (**Appendix G**) show these controls. More detailed specifications are available upon request.



- **Block and Bleed** standard on European and Canadian, optional on domestic models (U.S.): includes **double** blocking electronic Maxon valves, and high and low pressure switches.
- Liquid Propane: The Vaporizer is electrically interlocked to the Dryer Control Panel. Follow all local and national codes for locating LP storage tanks and installing propane lines.
- **24-hour operation**: To assure an adequate fuel supply for **24-hour operation**, without daily fill-up, recommended LP gas fuel tank storage should be a **minimum** of 10,000 gallons. 250 gph x 24 hours / 75% = 8000 gallons. If there are multiple tanks, multiples of 10,000 gallons (20,000 or 30,000, etc.) are recommended. An LP fuel tank contains a usable fuel supply of approximately 75% of tank water volume capacity. For example, a 1000-gallon water-volume tank contains approximately 750 gallons of usable LP. Tanks should be refilled when the supply level reaches 10%.



DO NOT OPERATE the Dryer while the LP tank is being filled—wait for ten minutes after the truck filler hose has been removed.

Natural Gas (NG) Supply Requirements (U.S.)

Natural-gas Dryers must have a MANUAL SHUTOFF VALVE installed on the supply line at least 25' [7.620] from the Dryer and be easily accessible.

Installation of and materials used in NATURAL GAS (NG) transfer systems must conform with <u>National Fire Protection Association Standard: Natural Fuel</u> <u>Gas Code, NFPA No. 54</u> (or current edition in effect at the time of the installation). Installation and/or service must be done only by licensed gas contractors conforming to all national and local applicable codes. Failure to follow these requirements will create an imminently hazardous situation which could result in death, serious injury, and/or equipment damage.

Liquid Propane (LP) Supply Requirements to Convert to Propane Vapor (PV)

LP Dryers must have one SHUTOFF VALVE at each tank, and should have another valve within 5' - 25' [1.524 - 7.620] of the Dryer. All valves must be easily accessible. All LP Dryers must have a proper EXCESS FLOW valve—in the LP fuel line at the tank—sized according to fuel line size. This is provided by the LP or tank supplier.

Installation and filling of LIQUEFIED PROPANE (LP) gas storage and transfer systems must conform with <u>National Fire Protection Association Standard</u> <u>Storage and Handling of Liquefied Petroleum Gases, NFPA No. 58</u>, (or current edition in effect at the time of the installation). Installation and/or service must be done only by licensed gas contractors conforming to all national and local applicable codes. Failure to follow these requirements will result in death, serious injury, and/or equipment damage.

DO NOT use tanks for liquid propane (LP) that have been previously used for ANHYDROUS ammonia! Installing any tank (for an LP fuel supply to the Heater) which has previously been used for anhydrous ammonia poses a safety threat. This includes previously purged tanks that have been used for anhydrous. If you cannot determine the origin of a used propane tank, do not use it for this Dryer. Dryer gas train components may be damaged, causing a Dryer malfunction which could lead to serious safety hazards and/or fire. Installing any tank (for an LP fuel supply to the Dryer) which has previously been used for anhydrous ammonia poses a safety threat. Brock Grain Systems will not be held liable for any purging and cleaning methods used for such tanks. If such a tank is used, this will void the Dryer Warranty.

Planning Grain Flow Installations

Grain should be conveyed to and from the Dryer at a rate exceeding the nominal 5% drying capacity by approximately 30%. If capacities are restricted, the Intui-DRY® Controller can be adjusted to limit unloading rates to match reduced capacities. See the **Specifications and Capacities Table** in **Appendix A** for the maximum unload rate of each model.

The **Roof** is designed for a maximum conveyor or spouting load of 4000 pounds $[1\ 814\ kg]$ with a 40 psf snow load. If loads are greater than 4000 lbs, they cannot be supported from the Roof and a separate support mechanism is required.

Peak load capacity to support filling equipment or catwalks varies with the Roof diameter and local snow zone.

The **grain inlet** is designed with a 24" [61 cm] long straight section of pipe to straighten grain flow before entering the wet bin. This helps the Dryer to evenly fill, and should not be removed during installation. A dead head or grain retarder should be installed at the end of the fill spout to slow the grain and reduce kernel breakage.





Electrical Installations



All electrical installation and testing MUST be done by a QUALIFIED and properly certified/licensed ELECTRICIAN, in accordance with all applicable national, state and local codes. Brock Grain Systems neither will be liable for damage to the Dryer/ Controller or to person(s) because of unqualified electrical testing, installation or use. Improper procedures will void the Warranty. Failure to observe this instruction will result in potentially hazardous situation which, if not avoided, could cause serious injury that could lead to death.

Installers will need the instructions shown in the **Figure** below. If you have additional questions, consult your Dealer or BROCK Conditioning Engineering at 765-654-8517.



MFH1968-3, MEYER® Electrical Installation Manual (Installers)



INCLUSION in this Operators Manual of any electrical procedures and/or safety reminders for SERVICE of equipment—is a precaution by the Manufacturer to help insure that safety requirements are met both for the country of manufacture and the countries of usage..

INCLUSION of any technical procedures—outside the normal OPERATION of this equipment by a trained USER—does NOT in any way imply that these procedures are to be used BY unqualified personnel or in substitution FOR qualified electrical or service personnel.



Figure 50. Typical LOTO Tag

Follow Power Lockout /LOTO Procedures

IMPORTANT!

When "Lockout/Tagout/LOTO" is referred to in this Manual, it is always with the understanding that procedures are to be done only by qualified, licensed electrical personnel who are following all applicable national, provincial/state and local codes.

Lockout/Tagout (**LOTO**) refers to the systematic procedures as outlined by OSHA (29 CFR 1910.147) for dealing with hazardous electrical energy. LOTO is the procedure by which qualified and licensed electrical personnel must abide to approach electrical testing and maintenance on this equipment.

Establish a **Lockout/ Tagout** policy for the work site/Grain facility. Be sure all personnel are trained in and follow all LOTO procedures. Qualified, licensed electricians: Review and always follow the "Electrical Connection/Disconnection Procedures for Dryer Testing" (**Appendix B**), and the "Manufacturer's Recommended Minimum LOCKOUT/TAGOUT Energy Control Procedures" (**Appendix C**) in this Manual.



IMPORTANT!

SAFETY During Initial Startup or Testing

If an energized power panel is to be opened during initial startup or testing, a 10' [3.048] SAFETY perimeter should be blocked off with a non-conductive guard. When instructions call for or when service requires live panel testing or troubleshooting, it should only be done by qualified electricians using appropriate PPE and extreme CAUTION. Qualified Installers see Appendix B.

It is the responsibility of the Contractor, Installer, Owner and Operator to supplement the Dryer furnished by Brock Grain Systems with any necessary ELECTRICAL or STRUCTURAL items to make the Dryer installation comply with the <u>National Electric Code</u>, <u>National Electric Safety Code</u>, and OSHA (U.S.); the <u>Canadian Electrical Code</u> (Canada); and any other applicable federal, State/provincial and local laws and ordinances.

IMPORTANT!



To guard against electrical shock, all Dryers shall have a GROUND connection. Make sure electrical equipment and the Dryer are properly installed and grounded by a QUALIFIED AND/OR CERTIFIED ELECTRICIAN according to all the above applicable Codes.

Power Requirements and the Service Disconnect (Customer-provided)

The incoming **Power Service Disconnect** (noun) from the outside electrical power service utility is often referred to as "Switch Box." Plan the power requirements and any needs for reduced voltage starting with your local electrical supplier.

The Customer must supply appropriate Disconnect equipment between the Dryer Equipment Disconnect and the electrical utility as required by all above applicable Codes.

The Installer should have the Electrical Service Provider check the transformer and lead wires to be sure they are an adequate gauge to carry the starting and full-load operating conditions. Failure to follow these instructions will result in an imminently hazardous situation that, if not corrected, could result in serious personal injury that could lead to death.

The **Service Disconnect** turns power ON/OFF from the power service provider. It should be located: away from livestock but as conveniently as possible for the Dryer Operator, especially in case of emergency. It may be located separately from the Dryer in an electrical room/area on the facility. The Service Disconnect (Box) MAY be located near the Electrical Control area at the Dryer pad. (The Service Disconnect is **not to be confused** with the <u>Dryer</u> Disconnect on the base of the Dryer.) Ideally, the Operator should be able to view the entire Dryer from this location. The area must remain unobstructed and must be clearly marked as to its function.

The Service Disconnect should be provided with a STOP button and LOCKOUT/ TAGOUT (LOTO) features. Depending on local codes, it is the responsibility of the Service Provider and/or Owner to clearly mark the Service Disconnect and apply SAFETY Decals for HIGH VOLTAGE DANGERS within.

To guard against electrical shock, it is imperative that the POWER SERVICE DISCONNECT have its own ground wire from the main three-phase power coming into the BROCK® Power Panel. If the main electrical service is a 3-wire non-grounded Delta supply, consult a qualified electrician for installation.

It is important for all Operators to know the location of, and obey safety warnings regarding, the power Service Provider's Service Disconnect, sometimes located in a building away from the Dryer. The Service Disconnect is provided by the Owner.

Operator: Always obey electrical WARNINGS your Installer had placed on the Service Disconnect enclosure. This enclosure is to be opened ONLY by qualified, properly licensed electrical personnel following all applicable codes and LOTO procedures. The door is to be secured at all times unless service is required. Failure to follow this instruction will result in an imminently hazardous situation that if not corrected, could cause serious personal injury that could lead to death.







IMPORTANT!





Wiring Requirements

A LOCKOUT/TAGOUT DEVICE must be installed on Control enclosures containing hazardous voltage. This should be done at the time of the Dryer installation to prevent the machine from starting during a safety check, maintenance, etc. All electrical equipment must be grounded.

Refer to the **Specifications and Capacities Tables** in **Appendix A** for the maximum unload rate of the model Dryer to be installed.

Use extreme CAUTION around electrical components. Be sure wires are an adequate gauge to carry the load of the Dryer motors, including starting and full load operating conditions. Failure to follow these instructions will result in an imminently hazardous situation that if not corrected, could cause serious personal injury that could lead to death.



Reminder: All electrical installation and testing MUST be done by a QUALI-FIED and properly certified/licensed ELECTRICIAN, in accordance with all applicable national, state and local codes. Brock Grain Systems will not be liable for the electrical wiring used with this Dryer or Dryer Controller or failure of equipment due to improper electrical installation.Brock Grain Systems neither will be liable for damage to the Dryer/Controller or to person(s) because of unqualified electrical testing, installation or use. Improper procedures will void the Warranty. Failure to follow these instructions will result in an imminently hazardous situation that if not corrected, could cause serious personal injury that could lead to death.

If the Dryer is to be opened for inspection, cleaning or observation, all power must first be shut off. SHUT OFF, LOCKOUT and TAGOUT all electrical power BEFORE working on or near the Dryer so that it CANNOT be restarted by anyone remote from the area. DO NOT allow the Dryer to run while any adjustments are made. Do not adjust, service, lubricate, clean, unclog or enter this equipment while in operation. Failure to SHUT OFF and LOCK OUT power will lead to personal injury or death.

Auxiliary Load and Unload

A **Load** interlock relay is standard on MEYER®-S models. A 10 HP **Auxiliary Load** starter is optional. The overload relay will need to be modified for lower horsepower connections. It can also be used as a control relay to start loading conveyors or gates on demand fill systems.

An **Auxiliary Unload** conveyor should be interlocked into the Dryer to confirm that the unload path is operating. An unload interlock relay is provided and accepts a 120vac signal from the conveyor.

Volts	Phase	Hertz	Standard Starter	Optional Starter
230	3	60	across line	Electronic Soft Start, part wind
460	3	60	across line	Electronic Soft Start, wye-delta
575	3	60	across line	Electronic Soft Start
380	3	50	wve-delta	Electronic Soft Start

See the notes on preventing hazardous conditions above.

Install Interlocked Emergency Shut-Off Devices

Industrial/commercial-grade **SAFETY Controls** for automatic Dryer shutdown are standard equipment. Any shutdown is identified by the Safety circuit monitoring system so the malfunction can be corrected. Included are IEC Ambient Compensated Motor Starter and Motor Circuit Protectors, and an electronic Moisture Control to insure uniform drying of all moisture ranges of wet grain.



It is the responsibility of the Contractor, Installer, Owner and Operator to supplement the Dryer furnished by Brock Grain Systems with any necessary ELECTRICAL or STRUCTURAL items to make the Dryer installation comply with the <u>National Electric Code</u>, <u>National Electric Safety Code</u>, and OSHA (U.S.); the <u>Canadian Electrical Code</u> (Canada); and any other applicable federal, state and local laws and ordinances.

In selecting electrical CONTROL equipment to be used with any installation, the purchaser must use equipment conforming to **all the above Codes** and all other applicable local or national codes or regulations.

Wiring Schematics (see Manuals MFH1968-3F and MFH1968-3F-S) show how various Controls are interlocked. These diagrams allow a qualified electrician to quickly troubleshoot electrical problems or malfunctions. Keep this Manual in a handy place for future reference.

If any options (Block/Bleed, Aux Unload, Rear Wet Fill, etc.) are to be used, Installers need to order the appropriate wiring/cable assembly from Brock.



All SAFETY devices, including wiring of electrical devices, shall be arranged to operate in a "FAIL-SAFE" manner. That is, if a power failure or failure of the device occurs, a HAZARDOUS CONDITION will not result. To prevent a hazardous condition, the machine and all associated equipment MUST BE PREVENTED FROM RESTARTING on its own when power returns after a power failure or a jam is cleared. A MANUAL re-start must be required. Failure to follow this instruction could result in an imminently hazardous situation that if not corrected, could cause serious personal injury that could lead to death.

IMPORTANT!

DO NOT take shortcuts or bypasses in installation instead of using proper means. DO NOT remove any SAFETY devices installed on the Dryer. Do not install or use any method to start or restart the Dryer which bypasses factory-installed SAFETY features.

An **emergency shut-off switch** with power LOCKOUT/TAGOUT provisions must be provided at the Drive of the Unload. Unload Controls shall be so arranged that, in the case of an emergency stop, a manual reset or start—at the location where the emergency stop initiated—shall be required for the Unload and associated equipment to resume operation.

Mount Controls at a convenient place, a safe distance from the machine. Make sure controls are readily accessible in the event of an emergency. It is strongly recommended that another qualified person who knows the shutdown procedure is in the area in the event of an emergency.

Brock Grain Systems strongly recommends installation of the following devices:

- **Overload protection devices** such as shear pins, torque limiters, zero speed switches, etc., to shut off, **LOCKOUT and TAGOUT** power to the Drive whenever operation of equipment is stopped (as a result of excessive Grain, foreign objects, excessively large lumps, etc). Motor overload protection and over-current protection are not supplied with the equipment.
- **Emergency STOP switches** readily accessible wherever required; Bin Sweeps should be furnished with an easily identifiable EMERGENCY STOP button or an EMERGENCY STOP device. Such devices should be installed so they cannot be overridden from other locations.
- Electrical interlocking to shut down the feeding auger whenever a receiving auger stops;
- **Signal devices** to warn personnel of possible startup of the auger, especially if started from another location.

Intui-DRY® Basics: the Brain of the Dryer

The Intui-DRY® Controller is designed to perform both MANUAL and AUTO(MATIC) operations. Manual MFH2191 is essential to learning how to set and operate the Controller. The Manual also contains detailed instructions on how to connect the Monitor to the Controller in the red Control Panel.





Service and program the Intui-DRY® Controller properly. Failure to properly install and service this computer component according to its specific Manual could damage the equipment and void the Warranty. Installing a non-BROCK® (another manufacturer's) Controller or any other type Controller on this BROCK® Commercial Tower Dryer WILL VOID THE WARRANTY on the BROCK® Dryer.

The Intui-DRY® **Monitor** should be located in a control room near the Dryer. Although it can be located up to 1000 ft [3 048 m] away, keep in mind that starting, calibrating and servicing the Dryer will require routinely walking between the Monitor and the Dryer. Carefully unpack the Monitor and take it to the indoor site where it will be installed and programmed. For programming the Intui-DRY® Controller refer to the Controller Manual MFH2191.



Figure 51. Intui-DRY® Monitor

Most routine checks of temperature, pressure and other activity can be viewed on the Monitor to verify that systems are working properly. Animations show when a system is operating. Green lights indicate the system is ON; red lights indicate the system has stopped.

Routine checks should also be made at the Control Panel, where the actual Controller <u>wiring</u> is located. Instruments mounted in the inner Door can be accessed to support the overview sent to the Monitor.



Other than factory-approved software options or upgrades described in the Manual, **no other equipment or devices** are to be mounted or installed inside the red Control Panel. All auxiliary equipment (contactors, relays, motors, etc.) must be mounted separately in the red MEYER® Power Cabinet. Your Installer will need schematic drawings 3924-00001, 3924-00047 and 3924-00048 (Block-and-Bleed) to install the Intui-DRY® Controller on the MEYER® Dryer. See page 9 of this Manual. Necessary Schematics are included in Manual MFH1968-3.

Figure 52, left. Intui-DRY® Manual MFH2191

Dryer Features and Parts Identification



Figure 53. MEYER 2400S

Safe operation is BROCK's #1 priority when designing products.

Features include:

- Standard Intui-DRY® Controller.
- Standard TrueGrainTM Moisture Sensor System (Patent Pending).
 - High-efficiency, corrosion-resistant, low-emission Maxon Burner.
- Roof and Garner Area: Moisture probes sense exact moisture of grain at the Inlet
- Variable-width grain columns: Grain entering the Dryer is preheated and has unobstructed gravity flow to the bottom. Grain is distributed evenly around the perimeter of the grain columns. All inside and outside sheets (perforated, 18-ga.) are smooth on the inside/column side, with no bolts or nuts extending inward. The upper 22% has been designed with 10" [25.4 cm] vertical grain columns to allow more airflow through even the wettest grain. 9 5/8" [24.45 cm] in top 22% of the Dryer accelerates the drying process more efficiently Lower Columns transition to 12" [30.5 cm] for longer saturation of heated air.
- **Patented Moisture Equalizers** and unique drying features improve grain quality and test weight; additional Moisture Equalizers are available.
- 60° Cool Deck Floor with automatic clean-outs minimizes particulate accumulation.
- **Patented E-Z Flow® Unload** incorporates a variable speed motor, which automatically speeds up or slows down to allow for moisture variations of incoming wet grain. The Unload is located inside a full-floor air seal. This is a non-jamming metering system with a circular trough; design allows for Side Discharge in four different positions.
- Propane Internal Vaporizer: 230 Volt Electrical, 3-phase;
- Heavy-duty steel Legs 1/4" [6.4 mm] thick, anchored/rated for wind loads up to 80 mph;
- Two (2) Industrial Grade 40-1/4" *[102.2 cm]* double-inlet, Air Foil Centrifugal Backward Curve TEFC centrifugal **Blowers**;
- Two (2) 30-50 HP TEFC Baldor Motors with 1.15 service factor, accessible from the ground level.
- Additional Platforms and Ladders are available upon request.

Multi-Mode Drying

Your MEYER® Dryer is to be used for **continuous optimum drying** of many crops ranging from seed grains and commercial grains such as corn, soybeans, wheat, oats and barley—to sensitive grains such as white corn, rice and edible beans—to volatile grains such as sunflowers and sorghum—and small grains such as rape and flax seed.

The MEYER® Dryer offers energy efficiency on capacities from 1000 to 2,650 bushels per hour. In order to maintain your Dryer and its Warranty, the appropriate type Dryer must be used. Consult BROCK Grain Systems or your BROCK Dealer.

The MEYER® unique multi-mode design is centered on Air Splitter Panels (Item 8); Plenum Divider Doors (Item 5); Louvered Air Inlets (Item 2); and Screened Free Air Inlets (Item 1). **Proper adjustment** of these components provides **three drying modes**:

Mode I - Pressure Heat, Suction Cool - Recirculation of all cooling air; see page 67.

Mode II - Pressure Heat, Pressure Cool - Full exhaust of all air; see page 68.

Mode III - Full Dryer Pressure Heat - No cooling, all heat with full exhaust; see page 69.



NOTE: The Roof and/or Manhole may vary slightly in appearance from the Figures on these pages.

(49) (32) (13) (31) (33) 48

Figure 55, right. Roof 2022+

Item	Description
1	Leg # 1
2	Leg # 2
3	Leg # 3
4	Leg # 4
5	Leg # 5
6	Leg # 6
7	Leg # 7
8	Leg # 8
9	Leg # 9
10	Leg # 10
11	Leg # 11
12	Leg # 12

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Item	Description						
13	Outer Roof (appearance varies)						
14	Hopper Slide Door						
15	Garner Rings (2, Solid Sheet) have 220 bushels holding capacity; Customer's Name Decal location						
16	Roof Platform						
17	Ladder and Cage (Cage not shown)						
18	Fillhole Tube location 10" dia.						
19	Secondary Door						
20	Inside Screen						
21	Outside Screen						
22	Unload Module						
23	Fillhole Flange Ring (facing page)						
24	Adjustable Fresh Air Louver						
25	Discharge Spout (3 of 4 locations)						
26	Main Access Door						
27	Heat Duct						
28	Lower Plumbing (pp. 50-53)						
29	Hopper						
30	Unload Trough						

Item	Description
31	Manhole
32	Top Grain Level Switch (starter located for auto-fill shutoff)
33	Top Moisture Sensor
34	Lower Partial Walkway
35	Lower Wet Grain Sampler Handle
36	10" Grain Column
37	12" Grain Column
38	Discharge Spout
39	Exterior Walkway
40	Dryer Disconnect Box (pp. 15, 21)
41	Electrical Power Cabinet/AC Drive
42	Control Panel (pp. 15, 18-19, 54-55)
43	Wet Grain Sampler Tube
44	Ext. Upper Hi-Limit Junction Box
45	Electrical Conduit
46	Linear Limit Box
47	Free Air Inlet (screened)
48	Sealtite Conduit
49	Rotary Level Indicator (option)
50	TrueGrain Moisture Sensor



MFH1937H





Figure 57. Exterior Lower Plumbing (Standard) Item Table on facing page.

Item	Part No.	Description								
	Main Fuel Train (M)									
1		Propane Vapor Inlet 8-15 psi								
2		Natural Gas Inlet 8-15 psi								
3	2434-00164	Valve Gas 2" 3-way, Gas Shutoff								
4	2448-00011	Pressure Regulator 2" 1-2 psi (main)								
5	2433-00005	Valve, Safety Pressure Relief 1" 289H 4.5 psi								
6	2431-00023	Maxon Shutoff Valve 2 1/2" Manual Reset								
10 2541-00056 Modulating Actuator Motor, 3-position step										
11	2431-00033	Butterfly Valve 2 1/2"								
12 2430-00009 Heat Solenoid Valve 2 1/2"										
13	2434-00201	Ball Valve 2 1/2"								
14	2460-00026	Pressure Gauge, 0-60 inwc								
15	2434-00004	Ball Valve 3/4"								
15A	2434-00004	Ball Valve 1/2" (Main Line Drain; inside)								
		Pilot Fuel Train (P)								
15	2434-00004	Ball Valve 3/4"								
16	2460-00027	Inlet Gas Pressure Gauge, 0-30 psi								
17	2446-00034	Pilot Regulator, 1/2" 6-14 inwc								
18	2430-00016	Pilot Solenoid Valve 1/2"								
19	2460-00025	Pressure Gauge, 0-30 inwc								
26	2430-00018	Valve, Main Solenoid 3/4" NC LP								
30	5537-00049 5537-00050	WARNING Fuel Plate								



Figure 58, left. Detail, Fuel WARNING Plate



IMPORTANT! All Hand Valves should be opened very slowly to allow the downstream line pressure to build up and equalize pressure through the system.

Exterior Lower Plumbing: Block-and-Bleed



Figure 59. Exterior Lower Plumbing: Block-and-Bleed Natural Gas (NG) shown Item Table on facing page.

	Item	Part No.	Description					
			Main Fuel Train (M)					
			Propane Vapor Inlet 8-15 psi					
1			Natural Gas Inlet 8-15 psi					
	1	2434-00161	34-00161 Valve, 2" Ball-CGA (Legend T-1002)					
	2	2448-00011	Pressure Regulator 2" 1-2 psi (main) 121-8					
	3	2429-00030	Pressure Switch Low Gas UE 2.5-50" wc					
	4	2431-00014	Switch, Maxon 18428 VCS01Manual Reset					
	5	2430-00078	Solenoid Vent Valve 1 1/4" npt NO 120vac					
	6	2431-00007	Maxon Shutoff Valve 2 1/2" Manual Reset					
	7	2429-00031	Pressure Switch 1-10 psi High gas NC					
	8 2431-00033 Butterfly Valve 2 1/2"							
	9 2541-00056 Modulating Actuator Motor, 3-position step							
	10 2434-00201 Ball Valve 2 1/2"							
	11 2460-00026 Pressure Gauge, 0-60 inwc, Ashcroft							
	12 2434-00004 Ball Valve 1/2" (Main Line Drain)							
	13	CV Valve Microswitch, Proof-of-Closure Kit, w/ Bracket (Canada)						
	19	5537-00049	Fuel Plate, Natural Gas					
	21	2433-00005	Valve, Safety Pressure Relief 1" 289H 4.5 psi					
	22	2434-00201	Ball Valve 2 1/2" (HAND SHUT-OFF)					
			Pilot Fuel Train (P)					
	14 2460-00027 Pressure Gauge, 0-30 psi							
	15 2434-00004 Ball Valve 1/2" (HAND SHUT-OFF)							
	16	2433-00019	Valve, Pressure Relief 1 npt 25 psi					
	17	2430-00066	Pilot Solenoid Valve 1/2"					
	18	2460-00025	Pressure Gauge, 0-30 inwc					
	20	2449-00034	Pressure Regulator, 1 npt 10-20-psi					



IMPORTANT! All Hand Valves should be opened very slowly to allow the downstream line pressure to build up and equalize pressure through the system.

Control Cabinet Outer Door

Alarm Horn: Anytime the Dryer is in an *Idle* state and the Operator starts a system, there will be a five-second Horn before anything starts moving. If another component is already moving there will be no Horn. The best way to determine the cause of the Horn sounding is to look at the SYSTEMS/SAFETY screen voltage chain (page 95); check from the point where the green lights stop and red lights begin. The **Dryer Alarm Code Color Chart** (pages 91-93) notes Alarm levels that will sound the Horn. To silence the Horn at the Dryer, locate the (3) Emergency Buttons on the Outer Door (below) and push the red button on the far right.

Emergency Buttons are part of the safety markings on the Outer Door.



Control Cabinet Inner Door



Figure 61A. MEYER® (Standard) Inner Door

Item Table on facing page.

Figure 61B. MEYER® (with Honeywell®) Inner Door



Control Panel Inner Door Component Identification

Item	Description	Function					
1	Inner Door Panel						
2	Flame Signal Meter	Installed in some MEYER® models <u>instead of</u> the Honeywell® Burner Control.					
3	Burner Hours Counter	Tracks Burner hours used.					
4	Plenum Static Air Pressure Gauge	High pressure can be a sign of a dirty Dryer. Low pressures can be a sign that the Dryer is not being filled properly.					
5	Window to:						
6	Honeywell® Burner Control	Installed in some MEYER® models <u>instead of</u> a Flame Signal Meter (Item 2). See the Honeywell® Burner Control Faults Chart in Appendix D . This Contro mounted to the back panel and can be viewed through the window. View the dig display of the Honeywell here. Reset from the START button on the Inner Doo					
7	Control Switches, left to right: START STOP HOLD/RESUME ALARM SILENCE SERVICE LIGHT	The three (3) switches in the center are also activated by pushing the corresponding buttons on the outer Door. See also Figures 14 and 15 , page 18. HOLD/RESUME: The Dryer can be placed into a HOLD or <i>pause</i> mode by pressing the center HOLD/RESUME button. This pauses the Dryer for three (3) minutes (default setting). This delay allows the Operator time to change what grain is filling the Dryer. While in HOLD the Dryer will continue to run for preset delay time period with the Fan(s) operating and Burner lit but closed down to its lowest flame. Press the same button again to RESUME operation. If the Dryer is restarted within the preset delay period, the moisture control does not lose its drying profile history. Moisture control continues seamlessly without re-initializing the profile. If the Dryer is not restarted during the delay period, the Intui-DRY® will timeout, transition to a <i>Cooldown</i> mode, and turn off the Pilot. The Operator may <u>silence</u> (but not <u>acknowledge</u>) Alarms by pressing the red ALARM SILENCE button.					
8	Relia-Dry™ Controller	In the event of Monitor failure, the Controller system can be run in MANUAL override by this smaller Relia-Dry [™] computer, standard on every new Intui-DRY® system. See the Figure below, and more information under Relia-Dry[™] Backup Controller in the Intui-DRY® Manual MFH2191.					
9	Latch, Inner Door	Keep closed except when the Controls are being serviced or checked.					
10	WARNING Decal	1315-000247: WARNING: This door/compartment must be closed except when servicing. EN/FR					
11	DANGER Decal	3236-00012 DANGER: Electrical Hazard EN/FR					
12	WARNING Decal	3236-00015: WARNING: This Panel contains more than one source of voltage EN/FR					
13	Notice	NOTICE: Read Operator's Manual before starting					







Figure 62B. Control Panel, MEYER® Dryer with Honeywell® Item Table on facing page. See also Figure 17 on page 19.

Dryer Features and Parts Identification

Control Cabinet Internal Circuit Board

MF	Item	Description	Function
11937H	1	CPU Board (Central Processing Unit)	 BRAIN of the system: Manages Dryer operation through the other Boards Communicates with the Monitor and the outside world; Communicates with and manages moisture sensors Regulates +24VDC down to +5VDC and +3.3VDC and provides those to the other Boards via the MCU BUS ribbon cable
	2	24V / Analog I/O Board	 Monitors all 24VDC, analog and input signals not safety-related Controls outputs to 24V loads not safety-related Monitors RTDs Controls analog output signals
	3	120VAC Board	 Controls outputs to 120VAC loads Controls outputs to mixed 120VAC and 24VDC equipment Controls miscellaneous 120VAC capable relays
	4	Safety Board	 Primary connection of all supplied power (120VAC). Flame control, safety monitoring and shutdown of flame, of 120VAC and 24VDC power for safety-related items Monitors all safety-related signals; overrides CPU when a danger is sensed. Controls 120VAC and 24VDC outputs for safety-critical items Provides safety-related input to CPU Board for warnings, faults and alerts Provides all 120VAC to other Boards
	5	Allen Bradley Power Supply 1606-XLE	 Regulates AC feed down to +24VDC to the CPU Board and to the Safety Board. Directly supplies the CPU Board to provide constant 24V to other Boards, including Safety Board when shutdown has occurred Low-voltage DC is regulated on the CPU Board
	*6	Intui-DRY® Plug-In Area	Ethernet Port, Communication Cable input.
-	7	Honeywell® Burner Control	Installed in some MEYER® models instead of a Flame Signal Meter (Item 2). See the Honeywell® Burner Control Faults Chart on page 132 in Appendix E . This Control is mounted to the back panel and can be viewed through the window.
	*8	Internal Circuit Board	 Combination of Items 1, 2, 3 and 4. Available as complete unit for replacement: 3923-00005.
	*9	Termination of Auxiliary area	This area at the top of the Safety Board (Item 4) includes (2) green Connectors J19 and J17 above Jumpers 11 and 12. Jumpers provide dry contact plug-ins to bypass Aux1 and/or Aux2 Safety Switches and hard-wire in Auxiliary equipment and/or overloads directly to the Control Panel Safety Chain. See "Plug-ins for Auxiliary Load and Unload" in the Intui-DRY® Manual.
-	10	Error Codes Decal	Indicates Linear Limit trips corresponding to Linear Limit junction boxes on Tower Dryers. When the Dryer is completely or partially stopped, one or more lights in the positions noted will be lit on the Intui-DRY® screen.
-	11	Bilingual Decal 3734-00028	"Do not install any Auxiliary equipment in the Control Panel. Failure to comply will void the Manufacturer's Warranty."
-	12	Service Light	The Service Light is behind the Inner Door; turn ON with the black far-right button enlarged in Detail A on the facing page. If the outside temperature is below 32° F [0° C]: To keep electrical control circuit components warm, turn on the Service Light at least one hour prior to daily startup (or leave on overnight). Do not use this light in the daytime if the temperature is above freezing (32 degrees F).
	13	TrueGrain [™] Breaker	2509-00201 added to end of DIN Rail 2022+
	14	Plenum Air Pressure Gauge	Mounted in the Inner Door.
	15	Honeywell Fault Blink Codes Decals	Posted in English and French on the back of the Panel. An English copy of these is found in the Intui-DRY® Manual MFH2191 and the MEYER® Schematics and Fault Codes Manual, MFH1968-3.
-	. ~		

*See the Intui-DRY® Manual, MFH2191.

Dryer Component Identification



Item	Descr.	Item	Description	Ite	m	Description	Iten	Description
1	Leg # 1	13	Burner Access	25	5	Adjustable Air Louver	37	Unload Discharge Chute
2	Leg # 2	14	Inside Plumbing	26	5	Power Panel	38	Paddle
3	Leg # 3	15	Exterior Plumbing	27	7	Control Panel	39	Trough Scraper
4	Leg # 4	16	Dryer Disconnect	28	3	Inside Stairs	40	Unload Wheel
5	Leg # 5	17	Main Entrance	29)	Gear Speed Reducer	41	Outside Hopper
6	Leg # 6	18	Secondary Entrance	30)	Wet Grain Sample Lever	42	Hopper Divider
7	Leg # 7	19	Ground Ladder	31	l	Wet Grain Sample Tube	43	Trough Cover Latch
8	Leg # 8	20	Chord Brace	32	2	Trough Cover	44	Trough Bottom
9	Leg # 9	21	Blower	33	3	Grain Column	45	Pilot Plumbing
10	Leg # 10	22	Heat Duct	34	1	Unload Motor	46	Plumbing to Burner
11	Leg # 11	23	Floor	35	5	Discharge Opening	47	TrueGrain TM location
12	Leg # 12	24	Blower Motor	36	5	Unload Trough	4/	(four possible)

Accessible, Open-Chamber Unload Module



MFH1937H

Item Table on facing page.

Internal Overview



⁽ME1400S shown)



Burner: Stainless steel baffles produce more square footage of flame surface, thus reducing fuel usage. A long mixing chamber transition (from the Burner into the Dryer's Upper Plenum) produces more uniform drying air, thus allowing for uniform drying of the grain.



The **Heat Plenum Duct** (Item 9) acts as a mixing chamber for heated air and isolates the Burner away from dirt and grain.

Heat Plenum Divider Floor (Item 27): A steeping section at the base of the Plenum allows grain moisture and temperature to equalize before cooling; fines and trash are discharged by static pressure with fine grain.

Item	Description							
1	Outer Roof							
2	Inner Roof							
3	Garner Rings							
4	Unload Trough							
5	Ladder and Cage							
6	Discharge Chute							
7	Duct Door to Burner							
8	Burner							
9	Air Duct (Internal)							
10	Unload Module							
12	Adjustable Fresh Air Louvers							
14	Door							
22	Blower							
24	10" Grain Column							
25	12" Grain Column							
27	Heat Plenum Floor							
34	Linear Limit Box							
35	Exterior Walkway							
37	Inside Screen							
38	Outside Screen							
39	Air Splitter Panel							

Drying Modes



Temperature-Based vs. Moisture-Based Drying

Typical automated Controllers for full heat Dryers use either grain <u>moisture</u> OR grain <u>temperature</u> to determine when grain is best removed from a Dryer.

Automated MOISTURE-based control detects the grain moisture content, and the grain is discharged when a target moisture is met. This system may have grain leaving the Dryer at the <u>same moisture</u> but at different temperatures. Note that HEAT/COOL Moving Target Drying (page 63) may be better suited for moisture control.

Automated TEMPERATURE-based control determines the temperature of the grain near the Unload; unload rate is adjusted if a pre-selected <u>temperature</u> is not met. This mode may have grain leaving the Dryer at the same temperature but at different moistures.

For both temperature- and moisture-based systems, either a <u>Controller</u> (automatically) or <u>Operator</u> (manually) determines the *Bin Factor: i.e.*, the additional amount of moisture that should be removed in the Bin per unit temperature during the cooling process.

In both systems, the Operator—or Controller—must measure and approximate data about moisture and temperature <u>at the Unload</u> to calculate the final moisture content expected in the Bin after the grain cools down. This information is used to adjust the target Unload temperature OR moisture content before the grain goes to the Bin.

Drying Temperature Settings



DO NOT RUSH the Dryer in times of high humidity and wet grain by running the Burner too high in an attempt to dry the grain faster! Do not exceed maximum temperatures recommended by the Manufacturer. Do not run the Dryer too hot or there will be Grain damage and possible fire. Failure to follow this instruction could create a potentially hazardous situation which, if not avoided, could cause serious injury that could lead to death. Such failure resulting in fire will void the Warranty.



Drying of Milo, Sunflowers, and other volatile type grain is not recommended in vacuum-cool BCT Tower models. Consult BROCK Grain Conditioning for available Dryers for other grains. Non-recommended use may lead to equipment damage or void the Warranty.

Selecting the correct Dryer plenum temperature is a balance between capacity, grain quality, efficiency, safety, and cooling. The ideal drying temperature will vary depending on what is most important to you.

- Capacity bushels processed per hour; increases with temperature (for a fixed MPTS reduction). Capacity = bushels between sensors is determined by Dryer construction. Higher temperature increases capacity.
- Efficiency higher temperature increases efficiency (less fuel per pound of water removed).
- Quality lower temperature increases Grain quality.
- Safety lower temperature can reduce risk of Dryer fires in adverse conditions.
- Cooling lower plenum temperature can improve Grain cooling capacity in lowmoisture removal drying.

Thermal shock results from flash cooling. Stress cracks increase with thermal shock; starch extraction values for milling are lost with excessive kernel temperature. Energy efficiency increases with plenum temperature, therefore a balance must be determined.

Suggested Drying Temperatures (at 5% moisture removal)

Grain	Manual Plenum Temperature	Plenum Temperature Limit
Corn	180° - 200°F [82.2°-93.3°C]	220°F [104.4°C]
Wheat, Barley	140° - 160°F [60° - 71.1°C]	180°F [82.2°C]
Soybeans	120° - 140°F [48.9° - 60°C]	160°F [71.1°C]

Continuous Drying: Wet or Dry Grain Startup Fill?

The Dryer can be started with **Dry Grain** or **Wet Grain** methods. Have the grain's loading path set for the desired initial fill method. In operation, the grain at the top of the Dryer will be **wet**, the grain at the bottom will be **dry**, and the remaining grain will be at various stages of moisture content. Startup conditions will vary primarily between:

- **Dry grain** initial fill followed by wet grain. Filling with **dry grain** will result in some over-drying of the Grain. This is the preferred method if the wet grain supply is above 20% moisture, **and**
- An initial fill of **wet grain** *only*. Filling with **wet grain** will result in some grain being discharged too wet. Under-dried grain should be recycled back to the wet tank if such a grain path is available.

IMPORTANT!



Since only wet or dry grain will be available when the Dryer is filled for the first time, a special procedure must be followed to reach a steady operating state. This is more critical with very wet grain (10 - 15 point removal) than with fairly dry grain (5 - 7 point removal).

What Is "Wet Grain?" How long can it be stored?

The moisture content of freshly harvested grain must be lowered before storage to prevent spoilage.

- A moisture content of 15% is considered optimum by commercial grain elevator operators for long-term grain storage when grain is exposed to air.
- A moisture content of 14% is preferred to retard spoilage of stored grain where access to air is limited.
- If the Grain is "dry" (under 13-14% moisture) there should not be enough shrinkage to cause problems.

The removal of too much moisture is wasteful of drying energy and usually results in shrinkage, which decreases the grain value. If moisture is removed too rapidly, damage to the grain results.

IMPORTANT!



Grain in initial poor condition may need to be dried to an even lower moisture content to retard spoilage. Cracked grain is compromised because the kernel's shell is broken and can be attacked by microorganisms.

You may have "wet grain"—if it is above 16% moisture. Avoid putting wet grain above 16% moisture in "storage" Bins.

If your Bin is for storage (not a drying Bin), do not load grain over 16% moisture.

Maintain **moisture content** of grain within safe storage levels that depend on your locale. Contact your local county extension agent for these values.

With the use of **aeration**, the amount of moisture removal should be at such a slow pace that voids should not be formed unless a crust is formed. If a crust is formed, this will restrict airflow. Sample your grain to avoid moisture points varying more than two points within the same bin.

Dry Grain Startup

Fill the Dryer completely with dry grain. Then operate the Unload system until the grain is just below the vertical sidewall of the Dryer. Top off the Dryer with wet grain. Enable the Load, Fan, Burner, and Unload. Start the Dryer.

- 1. Inspect the inside of the Dryer:
 - a. Shut off the Dryer and turn off the Dryer Disconnect. Follow LOTO procedures. See **Disconnecting Procedures** under **Appendices C** and **D**.
 - b. Inspect the inside of the Dryer for dust or debris on the heating floor and in the Burner. Clean as required.
 - c. Turn on the Dryer Disconnect and start Intui-DRY® Controls to continue.
- 2. Change the grain path to direct wet grain to the Dryer's fill spout.
- 3. With the Fans and Load still enabled, set the Drying Mode to MANUAL, the Unload Rate speed to approximately 50%, and enable the Unload.
- 4. Unload Grain without the Burner for about thirty (30) minutes at 50% rate. During this time period, sample the outgoing grain. See page 84 for wet grain sampling.

- 5. At the end of the thirty (30) minutes, light the Burner in the following order. a. Set the maximum plenum temperature. Set the maximum auxiliary unload
 - a. Set the maximum plenum temperature. Set the maximum auximity unload rate limit according to the grain being dried and based on what your unload equipment can handle.
 - b. Set the desired outlet target moisture.
 - c. Enable the Burner.
 - d. Open the manual Maxon shutoff valve.
 - A thirty (30)-second purge time will begin.
 - First the Burner pilot, and then main flame should ignite.
 - Observe an increasing Plenum temperature on the Intui-DRY® STATUS screen should be observed. It may take several minutes to reach full operating temperature.
 - e. Set the moisture control Mode to AUTO.
- 6. The Dryer will begin automatic control of the Unload rate and Plenum temperature to reach the preset outlet target moisture.
 - a. Continue sampling dry grain until moisture samples are close to those indicated on the calibrations screens.
 - b. It may take two-to-three (2-3) Dryer passes for the discharge moisture to stabilize on target. Try to avoid interrupting this stabilizing process by stopping the Dryer, changing control modes, or changing other parameters that will re-initialize the learning process.

Wet Grain Startup: Batch Method

Fill the Dryer initially with wet grain. In MANUAL mode enable the Load, Fan, and Burner. Select the appropriate plenum temperature for the incoming moisture level. Allow six (6) minutes of drying per point of moisture to be removed at a plenum temperature of 210 degrees F [98.9 degrees C] for yellow corn. For higher or lower plenum temperatures reduce or increase the minutes per point respectively. Cool the Grain if this is a Heat-and-Cool Dryer. Then operate the Unload system until the Grain is just below the vertical sidewall of the Dryer. Follow the **Dry Grain Startup** instructions.

- 1. With the Fans and Load still enabled, the Unload disabled, and the Drying Mode to MANUAL, begin a Batch Drying process.
- 2. Light the Burner as follows:
 - a. Set the maximum drying temperature limit. Set the manual plenum temperature under the DRYING MODES menu.
 - b. Enable the Burner.
 - 30-second purge time begins. Reset the Maxon shutoff valve during this period.
 - First the Burner pilot, and then main flame should ignite.
 - An increasing plenum temperature on the Intui-DRY® STATUS screen should be observed. It may take several minutes to reach full operating temperature.
- 3. Batch-dry grain (with unload OFF) for approximately 4 minutes per point, *i.e.*,
- 20% to 15% moisture = 5 points, 5 points x 4 minutes = 20 minutes
- 4. At the end of the batch drying time:
 - a. Set the desired outlet target moisture.
 - b. Set the moisture control Mode to AUTO.
 - c. Enable the Unload.
- 5. The Dryer will begin automatic control of the unload rate and plenum temperature to reach the preset outlet target moisture.
 - a. During the first grain pass, you may want to return any under-dried grain to wet storage.
 - b. Begin the Moisture Sensor calibration process. Wait until the discharge moisture is within two (2) points of *target* before attempting to calibrate the discharge moisture sensors. Continue until moisture samples are close to those indicated on the calibrations screens.
 - c. It may take two-to-three (2-3) Dryer passes—approximately three-to-four (3-4) hours at 50% rate) for the discharge moisture to stabilize on target. Try to avoid interrupting this tuning process by stopping the Dryer, changing control modes, or changing other parameters that will re-initialize the learning process.

Wet Grain Startup: Recycle Method

Set the grain system to direct the grain from the Dryer to recycle to the Wet Grain Bin. Fill the Dryer with wet grain. Enable the Load, Fan, Burner, and Unload. Start the Dryer. When desired moisture level is attained, direct grain from the Dryer to the Dry Grain Bin.

- 1. Push the START on the Dryer red Control Cabinet.
- 2. The filling process may take 30-60 minutes to complete on the initial fill. When the Load Status has changed from "Running" to "Grain Full", a Wet Sensor Moisture reading will appear on the Intui-DRY® Monitor STATUS screen. Once grain covers the Wet Moisture Sensor, the HMI will display moisture content. Outgoing moisture content will be displayed after Unload has been started.
- 3. Grain discharge temperatures can be adjusted by changing fresh air Louver settings. The Dryer should be operating in a stable mode for at least one (1) grain pass (1 2 hours) before making a decision to adjust grain temperatures. After the adjustment has been made, it will take approximately 1/3 grain pass to see the full results. Louver(s) must be adjusted **manually**. Loosen the wing nut on the bolt securing the Handle in position. Open/close the Louver to the desired airflow. Tighten the wing nut.





Figure 67. Louver Handle Detail

Item	Description				
1	Louver				
2	Louver Handle				
3	Wing Nut				

FULL HEAT Moving Target Drying

To achieve the same outgoing moisture, the Drying Index may change 30% between two hybrids, with all other conditions the same. Exit Grain Temperature may be much higher in low-permeability corn. As a result, more moisture will be taken out in the Bin. Raising Target value will provide the same in-Bin moisture after cooling.

This system predicts Bin moisture removal and adds that amount to the Bin Target after cooling. Predicted removal is based on the grain temperature as it leaves the Dryer, and is also determined by the Bin coefficient, which factors the cooling rate of the grain in the Bin.

Example 1: With a Moisture IN of 25% the grain is heated during Drying to 140°F. Since during Cooling we expect to remove 1/3 of a point of moisture for each 10° above 80° , the predicted removal is 2%.

The Moving Target for grain leaving the Dryer will be the Bin Target of 15% plus 2% for the Predicted Removal, for al overall Moving Target of 17%.

Moisture IN	25%	Grain Temp Out140°			Bin Coefficient33%			
Predicted R <u>140° - 80°F</u> 10	emoval: x 0.33 =	= 1.98 or 2%	Bin Target 15%	+	Predicted Removal 2%	=	Moving Target 17%	

Example 2: Grain starts at a lower Moisture IN of 20% and reaches a temperature of 120° , expected to remove only 1.3% of moisture during cooling. The Moving Target Value is 16.3%.

Moisture IN	20%			
Grain Temp Out	120°			
Bin Coefficient	33%			
Predicted Rem 120° - 80°F	oval: x 0.33 = 1.32 or 1.3%	Bin Target	+	Pr R

l:	Bin		Predicted		Moving Target
.33 = 1.32 or 1.3%	15%	+	1.3%	=	16.3%

When grain is cooled faster, the amount of moisture removed is less and the coefficient is less.

Warm dry air would reduce the heat slowly and would raise the coefficient.

High test weight or dense grain will be harder to cool, will increase the coefficient and remove more moisture during cooling.

Bin Moisture Removal (Coefficient)

10

Once an initial Coefficient (i.e., 33%) is determined, it is important to sample grain in the Bin after cooling to see if Target Moisture was attained. If the moisture is above Target it means less moisture was pulled out than expected; the Coefficient must be reduced. If the moisture is below Target, the Bin Coefficient must be increased.

When sampling, be sure to select grain fully cooled to within 5° of Ambient Temperature. Usually it is best to sample below the surface: feel if grain is any cooler than at the surface.

After the Dryer stops, the Dry Moisture and Exit Grain Temp are logged into history. See also "Moisture Sensor calibration."

Full-Heat moisture measurement is the same process as Heat and Cool moisture measurement, except the temperature correction is critical. Correction is necessary for both hot and cold grain. All capacitance based on testers must be corrected for temperature, the amount is universal. Base temperature for charts varies form tester to tester, but is usually around 80°F. If grain is at 60°F it will read 1% Dryer than it actually is. Grain at 140°F will read approximately 3% wetter than it actually is.

Maximum Moisture Contents for Safe Grain Storage				
Grain Type and Storage Time	Maximum Moisture Content for Safe Storage, %			
Shelled Corn and Sorghum Sold as #2 grain by spring Stored 6-12 months Stored more than 1 year	15 1/2 14 13			
Sold by spring Stored up to 1 year Stored more than 1 year	14 12 11			
Wheats, Oats, Barley Stored up to 6 months Stored more than 6 months	14 13			
Sunflower Stored up to 6 months Stored more than 6 months	10 8			
Flaxseed Stored up to 6 months Stored more than 6 months	9 7			
Edible Beans Stored up to 6 months Stored more than 6 months	16 14			

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IMPORTANT!

Misuse of drying equipment may cause damage to Grain Bins. Consult your Dealer on the proper drying procedures for your installation. To maintain good quality grain, aeration time requirements may vary. Consult your region's agriculture extension services for accepted grain industry drying information suited to your area.

ACAUTION

Drying of Milo, Sunflowers, and other volatile type grain is not recommended in vacuumcool Tower models. Consult BROCK Grain Conditioning for available Dryers for other grains. Non-recommended use may lead to equipment damage or void the Warranty.

Multi-Mode Drying

MODE I Drying (Figure 68):

Pressure Heat/Suction Cool - Recirculation of All Cooling Air

This drying method can be used on any grains that are not considered hazardous or highly combustible. These components are *always set*:

- CLOSE the Air Splitter Panels (Item 8)
- CLOSE the Plenum Divider Doors (Item 5)

Devices that are *adjustable* in Mode I for desired grain cooling and must be managed/ controlled by the Dryer Operator:

• ADJUST Louvered Air Inlets (Item 2) for desired grain cooling. The greater percentage they are *closed*, the *cooler* the grain will exit the Dryer. Keep ALL Louvered Air Inlets open the same percentage to maintain a balance in air supplied to the fans.

Blowers push the blended air through the Burner and into the Heat Plenum. The air is distributed throughout the Heat Plenum chamber by static pressure, which forces it through the grain column. The grain column in the upper portion of the tower is 10", transitioning to 12" at a lower level. The air volume goes through the wettest grain in the 10" grain column and cools down while becoming moisture-laden, much of it at, or near saturation (saturation is 100% R.H.).

Suction pressure from the Blowers also draws outside air through the cooling zone of the grain column into the Cooling Plenum, and into the inlet of the Blowers.

The final sources of Blower inlet air are the *Free* Air Inlets and the *Louvered* Air Inlets. The Blowers have to expend very little energy pulling outside air through these openings (unlike the cooling airflow stream, which must travel through the grain bed). The *Louvered* Air Inlets are adjusted to supply additional air to the Blower when the recycled airflow needs are met and the grain is still being overcooled. Adjustment of the louvered air supply controls the cooling air volume and allows the Blower to maximize the total air volume used for drying. The amount of cooling airflow depends on the suction pressure level in the Cooling Plenum, which is controlled by the Louvered Air Inlets.



Mode 1 Drying

To maximize drying: The dried grain should not be cooled more than necessary. This requires an unnecessary expenditure of fan energy to pull the air through the cooling grain column--energy that could be better utilized to draw in a greater amount of outside air through the Louvered and Free Air Inlets for increased drying. This is one of the key MEYER® features: optimum cooling and maximized drying.



Item Description Free Air Inlet 1 2 Adjustable Louvers 3 Blower Return Air Doors 4 Plenum Divider Door 5 6 Heat Duct 7 Burner 8 Air Splitter Panel (2) 9 Exhausted Air Reclaimed Heated Air 10 11 Blended Air 12 Fresh Incoming Air 13 Heated Air



MODE II Drying (Figure 69): Pressure Heat, Pressure Cool -Full Exhaust of All Air Flow

This method is used on any product considered to have hazardous or highly combustible dust, hairs, leaves, or stalks, such as sunflower or sorghum (milo).

Mode II settings always are:

- OPEN Louvered Air Inlets 100% (Item 2)
- CLOSE Plenum Divider Doors (Item 5)

Devices that require *variable adjustment* in Mode II for desired grain cooling and must be managed/ controlled by the Dryer Operator:

• ADJUST Air Splitter Panels (Item 8); OPEN or CLOSE to provide a desired amount of pressure cooling airflow to the Cooling Plenum, optimizing cooling and letting the remainder of the airflow go to heated air drying.

Blowers draw in fresh outside air through the *Free* Air Inlets and *Louvered* Air Inlets, directly in front of the Blower inlets. The Blowers discharge the air into the Air Duct where the Air Splitter Panels are. These Panels can be adjusted to divert from 0% to approximately 33% of the total airflow to the cooling zone. This airflow travels through these openings and into the Cooling Plenum, pressurizing the Plenum and forcing cool air through the lower grain column, cooling the grain before it exhausts to the atmosphere.

The portion of the Blower airflow which travels past the Air Splitter Panels (Item 8) continues through the Burner (Item 7), where it is heated to drying temperature, then passes into the Heat Plenum and through the grain column before being exhausted to the atmosphere.



See Item Table on the facing page.

MODE III Drying (Figure 70): Full Pressure Heat in Both Plenum Zones -Full Exhaust

This drying method is used for drying sunflowers, sorghum, or other grains with hazardous or highly combustible residues requiring full exhaust drying with no cooling in the Dryer, or in corn and other grains using Dryeration or Combination Drying principles. **Figure 72** illustrates **Mode III** drying airflow patterns and key components to be adjusted.

Mode III settings always are:

- OPEN Louvered Air Inlets100% (Item 2)
- CLOSE Air Splitter Panels (Item 8)
- OPEN Plenum Divider Doors (Item 5)

The Blower draws in fresh outside air through the Free and Louvered Air Inlets and discharges it through the Air Duct and Burner. The Burner (Item 7) heats the air, which flows out of the Burner Air Duct into the Upper Plenum Chamber. Part of the heated air then flows through the open Plenum Divider Doors (Item 5) into the lower plenum, pressurizing the chamber and flowing through the lower grain column, exhausting to the atmosphere. The remaining heated air in the upper plenum is forced by pressure through the upper grain column, also exhausting directly to atmosphere.

See Airflow Key on facing page.

Item	Description
1	Free Air Inlet
2	Adjustable Louvers
3	Blower
4	Return Air Doors
5	Plenum Divider Door
6	Heat Duct
7	Burner
8	Air Splitter Panel (2)
9	Exhausted Air
10	Reclaimed Heated Air
11	Blended Air
12	Fresh Incoming Air
13	Heated Air



Dryer Startup and Operation

IMPORTANT!



Failure to precisely follow the following directions may result in an unsafe situation. If the Controller is set to run the Dryer on AUTO (Automatic), monitor the Dryer routinely. If you are running the Dryer MANUALLY, do NOT leave the Dryer unattended.

During initial startup and at the beginning of each season, follow the steps in this Manual for proper operation. Parts should be replaced or repaired if necessary.

Be sure all Trough Covers are in place and latched securely. Do not remove these Covers while the Dryer is in operation.

- Visually check grain movement in each column.
- Check *daily* for dangerous debris accumulations on the Plenum Floor and inside wall sheets.

Safety Systems Checkout Is Required Before Operation

See pages 86-88.

Monitor the Dryer During Initial Operation

Perform an initial checkout at the Monitor. When starting the Dryer for the first time, it is a good idea to enable only one item at a time in MANUAL mode so overall operation can be checked out.



Figure 71. Overview Screen, Dryer Set to MANUAL

When this initial checkout has been completed and the Dryer is ready to be operated, keep in mind the following:

- The Unload Auger will not operate until the Burner is ON. This is also a feature which will not let the Dryer discharge grain in the event of a Burner or flame failure.
- **To manually unload the Dryer**: After the Dryer has been started, use the Unload System to start the Unload.

As the Dryer operates, periodically monitor the following on the Intui-DRY® screen and/or at the Dryer Control Panel.

The monitor screen left sidebar has wet incoming and dry outgoing moisture **Visual Indicator Bars** that track this information:



Figure 72. Wet and Dry Moisture Visual Indicator Bars

- Check plenum temperatures. Check moisture calibrations several times per day.
- The Monitor under *Systems\Burner* has indicator lights for *Gas Pressure Low* and *Gas Pressure High*. Check that gas pressures are within normal operating ranges, according to the **Fuel Specifications** Chart in the Intui-DRY® Manual or in **Appendix A** of this Manual. Exact gas pressure can be checked on gauges on the Lower Plumbing train (pages 50-53 and 142-147 in this Manual).
- Check plenum static pressures. This gauge (Item 4, pages 54-57) is on the Inner Door of the red Control Panel. High pressure can be a sign of a dirty Dryer. Low pressures can be a sign that the Dryer is not being filled properly.
- The Intui-DRY® monitor screen under *Systems/Load* has indicator lights for *Grain Status*. Check that the Dryer is staying filled with grain and refilling in a timely manner. Watch for unusual fluctuations in wet grain moisture indicating an inadequate flow of wet grain problem.
- Visually check grain movement in each column.
- Observe the Dryer for any signs of unusual operations such as smoke, dust, noise, vibration, gas leaks indicating an operation problem.

Initial Startup Procedures (Empty Dryer)



DO NOT OPERATE the Dryer with any Guards off. Failure to follow these instructions could create a potentially hazardous situation which, if not avoided, could result in serious injury that could lead to death.

Proceeding with STARTUP assumes all necessary testing procedures have been done by the Installer as per Appendices B and C.

See the Important note on initial Gear Reducer care on pages 103-105.

- 1. Turn ON the Electrical Power Service Disconnect (Customer-provided).
- 2. Turn ON the Dryer Equipment Disconnect handle on the Power Cabinet.
- 3. Turn ON the fuel Main and Pilot Inlet Valves. See pages 54-57 for the locations of these valves. If propane fuel is used, open fuel tank valves. **Slowly** open the gas valve at the LP tank or natural gas supply line to its full OPEN position. This is especially important with LP gas to keep from "flashing" or freezing the line as the liquid propane expands from the highly pressurized tank into the unpressurized fuel line.
- 4. The Dryer can be started with *Dry Grain* or *Wet Grain* methods. Have the grain's loading path set for the desired initial fill method.
 - a. Filling with dry grain will result in some over-drying of the Grain. This is the preferred method if the wet grain supply is above 20% moisture.
 - b. Filling with wet grain will result in some grain being discharged too wet. Under-dried grain should be recycled back to the wet tank if such a grain path is available.

Dryer Startup with the Intui-DRY® Monitor

Turn on the Intui-DRY® Control Monitor. For additional information, see "Monitor Base" and "Screen Sidebar" in the Intui-DRY® Manual.

Before starting the Dryer, ensure the Controller is set up correctly for your model:

Use the SETTINGS button at the far right of the Navigation Bar at the top of the Monitor screen. The SETTINGS button brings up a screen with a DRYER CONFIGURATION button. THE DRYER CONFIGURATION button allows for input of Dryer type, capacity, Minutes to Unload, and other settings. Grayed-out boxes are set by the factory or Installer and are not changeable by the Operator.

In the OFF state, touch the screen Power Bar red icon to turn the Dryer \underline{ON} . This activates power \underline{ON} to the **circuit boards** in the Control Panel in the back of the red Control Cabinet <u>at the Dryer</u>.

The Power Bar appearance changes to RUN/STOP.

The Status Bar message now says Press Control Panel Start.









Figure 74. Press Control Panel Start on the Dryer

Go to the Dryer Site; START Dryer Power

At this time the Operator is required to physically go to the Dryer to turn power ON. Press the far-left black START button on the red Control Cabinet Inner Door.



If all other switches in the safety chain are complete, this allows power to flow through to the Master Control Relays and physically complete the **safety** power chain. See the Intui-DRY® Manual for more information on viewing the Safety system chain on the Monitor.



Figure 75. Dryer Power ON (START)

Resume Dryer Control at the Intui-DRY Monitor: RUN

Powering the Dryer changes the Monitor Status Bar from *Press Control Panel Start* to *Idle*.



Status: Idle


The OVERVIEW screen indicates only Ambient/Incoming AIR temperatures.

In *Idle*, most Drver SYSTEMS are OFF; however, the Safety System is always operating when power is applied. The Safety System will indicate which elements in the safety chain (Safety Circuit + Flame Circuit) pass checks. At this point the process should be good down to Air Flow Confirmed. All other BURNER lights are red/OFF.

Press RUN to start the Dryer.

Figure 77, right.

Power is provided to many of the Safety circuits when equipment power is applied at the Dryer. When RUN is pressed on the Monitor, the Master Control Relay (MCR) passes power to the remaining circuits, all the way down to Air Flow Confirmed (6th up from the bottom on the Flame Circuit section).



Any time the system is started from *Idle* state, there will be a five-second Horn sound (on the red Control Box at the Dryer) before anything begins moving. This also provides power to the safety circuit. Final (lower 4) lights will be red.

If another Dryer function is already operating, there will be no Horn.

The top (upper left) Status Bar reads Sounding Horn, while the Horn starts for five seconds. Fans start, then the Pilot starts, followed by the Burner, with appropriate safety delays. The Status Bar will display cycles such as Sounding Horn, Fan Startup, Burner Startup, and Drying.



AUTO Mode

IMPORTANT!



For more information on AUTO Mode, see the Intui-DRY® Manual.

AUTO mode:

Maintains the Burner cycle timer, AMC, batch timer kit, auxiliary unload delay timer, minor alarm timer, cool down timer, exit grain temperature limit, Wet Grain Sampler, unload rate limit, moisture sensors;

Adjusts outlet speed to maintain uniform target moisture levels on dried grain. AUTO is a hands-off mode, unnecessary for the Operator to modify. AUTO mode adjusts Plenum temperature and/or Unload rate to maintain uniform target moisture levels on dried grain. The algorithm will calculate proper operation. (continued)



The Unload would be running as the Algorithm calculates the temperature *Setpoint* (*i.e.*, 200° F). The Unload has to be running for grain to be passing over that sensor. If the Unload is running, the Controller is also estimating bushels per hour (bph) based on the Unload speed.

Visual Indicator Bars on the left Sidebar show actual temperatures as they change.

You can see Setpoint vs. actual Temperature.

AUTO mode:

- Maintains the Burner cycle timer, AMC, batch timer kit, auxiliary unload delay timer, minor alarm timer, cool down timer, exit grain temperature limit, Wet Grain Sampler, unload rate limit, moisture sensors;
- Adjusts outlet speed to maintain uniform target moisture levels on dried grain.

To begin Dryer operation, touch RUN. A popup box appears.

After finishing questions in the RUN popup box, automatic drying begins.

Status bars on the Sidebar display *target* and *actual* settings for the Dryer.

The **Temperature** bar (with the thermometer icon) shows the current *Setpoint* temperature (Item A) in the left box and the <u>actual</u> <u>measured</u> *Plenum Temperature* (Item B).

The **Moisture Content** bar (with the water drop icon) displays the target Moisture percentage (Item C) and actual moisture (Item D).

The **Unload** bar (with the Gear icon) shows the Unload speed (Item E) and the bushels per hour being unloaded (Item F).

Visual Indicator Bars show the incoming (Item G) and outgoing (Item H) grain moisture content.



Figure 80. Wet and Dry Moisture Visual Indicator Bars

Intui-DRY® AUTO Mode Sets Drying Temperature

After finishing questions in the START pop-up box, automatic drying begins. In AUTO mode the Intui-DRY® moisture algorithms will automatically set drying temperature based on incoming grain moistures to balance Capacity/Quality factors when set to the default value of 5/5. The Controller will reduce the plenum temperature as the incoming grain moisture drops. The Plenum Temperature Limit should be adjusted as shown in the **Suggested Drying Temperatures Chart** on the facing page. This is the maximum automatic drying temperature used in the wettest grain conditions. The plenum temperature will also automatically be reduced to control moisture if the unload rate limit is reached. **IMPORTANT!**

MANUAL Mode

For more information on MANUAL Mode, see the Intui-DRY® Manual.



Touch MANUAL Mode below the Power Bar.

The System will not be in any particular drying mode. The values will be set as they were for the previous MANUAL operation.

The Operator will need to confirm/adjust the Setpoint temperature, Moisture content, Load and Unload information from either the Status bars on the Sidebar (see previous page) or the appropriate System screens.



Select MANUAL Mode

Visual Indicator Bars on the left Sidebar show actual temperatures (find the top Bar with the thermometer icon) as they change.

—Current *Setpoint* temperature is in the left box. In MANUAL mode, the User can click the *Setpoint* to change it.



The <u>actual measured</u> *Plenum Temperature* is at the right, outside the box.



Figure 82. Plenum Temperature Indicator Bar

With a MANUAL start, the screen will say *System Control*. The System is not in any particular drying mode currently; it is doing what the User tells it to do. Nothing on the screen is moving because the Dryer senses it is already full of grain.

SettingDrying Temperature in Intui-DRY® MANUAL Mode

Selecting the correct Dryer plenum temperature is a balance between capacity, grain quality, efficiency, safety, and cooling. The ideal drying temperature will vary depending on what is most important to the Operator. Grain would most likely be run in MANUAL until the grain unloads at the preferred temperature.

Grain	Manual Plenum Temperature	Plenum Temperature Limit
Corn	180° - 200°F [82.2°-93.3°C]	220°F [104.4°C]
Wheat, Barley	140° - 160°F [60° - 71.1°C]	180°F [82.2°C]
Soybeans	120° - 140°F [48.9° - 60°C]	160°F [71.1°C]

Suggested Drying Temperatures (at 5% moisture removal)

RUN Button and Startup Options

After selecting either AUTO or MANUAL Mode, touch START on the screen sidebar.



Figure 83. Press RUN from *Idle* State

A **Startup Options Box** appears and offers two (2) options. The first option is: **Timed Preheat**?





If the grain has been in the Dryer only a day or two, leave this as <u>NO</u> and use the current moisture profile.

Figure 85. Timed Preheat Option

After selecting preferences for both options, touch START in the pop-up box. The Controller will sound the Horn again and enable the various Systems by progressing through the Startup states: *Sounding Horn, Fan Startup, Burner Startup, Preheating* (if selected), *Drying*, etc.



Start

During Startup, the lower Sidebar moves through a "Starting Dryer" sequence showing the current and next step in Startup. At the same time the OVERVIEW, SYSTEMS or ALARMS tabs on the Navigation Bar also show this information as red lights turn to green when systems are enabled. Stages displayed may vary with different drying applications, according to User choices (*i.e.*, *Preheating*).



Figure 87. Startup Stages Displayed

Burner Startup



Figure 88. SYSTEMS: Burner: Air Purge Countdown



When the Air Purge and Homing Mod *Motor* are complete, more lights will turn green, indicating those systems are now active. If Timed Preheat is not selected, the Status Bar changes to Drying.

When the **Air Purge** is complete, the Status Bar will change to Homing Mod Motor.

Figure 89. **Homing Mod Motor**

If **Timed Preheat/YES** is chosen, the Status Bar changes to *Preheating* for the number of minutes set. This process can be viewed on other screens. From the OVERVIEW screen, the Preheat Timer can be viewed in countdown mode. The individual SYSTEMS screens will show visually what is happening. The Status Bar will indicate what is happening (*i.e.*, *Burner Starting*, *Batch Drying*, etc).



Figure 90. **Timed Preheat YES**

Animation: Burner is LIT with a blue flame.

runs in both

MANUAL moisture

control and AUTO

modes of operation.

moisture control



Gas Pressure Check

On **MEYER®** models that have Maxon valves with Modulating Motors and Butterfly Valves: the Operator must physically go to the Dryer.

There is no Controller screen for this step. Therefore the screen step called *Gas Pressure Check* is where this is done. The Operator must physically go to the Dryer and engage the MANUAL Maxon valve. it means: <u>ROTATE the MANUAL Maxon lever on the Dryer lower plumbing train to the OPEN position</u>. All Hand Valves should be opened very slowly to allow the downstream line pressure to build up and equalize pressure through the system.

<u>PRESS</u> the black START button, farthest left in the row of control Switches on the Control Cabinet Inner Door.



Figure 91. START Button, Control Switches, Control Panel Inner Door

Standard MEYER models (**Figure 92**) have a single Maxon Manual valve. <u>ROTATE</u> the Maxon lever to the OPEN position.

MEYER Block-and-Bleed models (**Figure 93**) have two (2) Maxon valves. Gas flow reaches the #1 MANUAL Maxon on the RIGHT before it reaches the #2 electric/AUTO-matic Maxon valve on the left. <u>ROTATE the MANUAL RIGHT Maxon lever to the OPEN position</u>.

Manual Reset



Figure 92. MEYER Manual Maxon Valve, Standard Plumbing Figure 93. MEYER Automatic (left) and Manual (right) Maxon Valves, Block-and-Bleed Plumbing

All manual Valves should be opened very slowly to allow the downstream line pressure to build up and equalize pressure through the system.

HOLD and RESUME Modes to Pause Dryer Operation

The purpose of these modes is to PAUSE the Dryer for a default time setting to allow the Operator to change the type of grain filling the Dryer.

IMPORTANT!

HOLD/RESUME is NOT a preferred mode for Dryer shutdown.

0

The Dryer can be temporarily placed into a HOLD or *pause* mode by pressing either:

- the HOLD/RESUME Button on the red Dryer Control Panel (Method A).
- the RESUME/HOLD button on the Intui-DRY® Monitor (Method B), OR

Method A: Press HOLD/RESUME at the Dryer

Press the black HOLD/RESUME button on either the red Dryer Control Panel <u>Outer</u> or <u>Inner</u> Door. See the following page. (continued)

The Dryer will continue to run for preset delay time period with the Burner at LOW and the Fans continuing to run; the Burner is lit but closed down to its lowest flame.

To restart, press the button again. If the Dryer is restarted within the preset delay time period, the moisture control does not lose its drying profile history, and moisture control continues seamlessly without reinitializing the profile. If operation is not resumed during that time period, the Controller transitions to a *Cooldown* mode and turns off the Burner. After *Cooldown*, the Controller will turn off the Fans.



Figure 95. Dryer HOLD/RESUME Button, Red Control Panel INNER Door

Method B: Press HOLD/RESUME on the Intui-DRY® Monitor

Press HOLD on the left sidebar.

The Dryer will continue to run for preset delay time period (default) with only the Fan and Pilot operating the Burner (closed down to its lowest flame). In AUTO mode, the HOLD state leaves the Loader and Unloader stopped while the Pilot and Fans are working. The Button will change from HOLD to RESUME.

Touch the same button again to RESUME operation. The Status Bar reads *Unloader Startup* for a moment, then *Startup Complete*. Load and Unloader animations will resume movement. The button will change back to HOLD.

If the Dryer is **not** restarted with RESUME during the preset delay time period, the Intui-DRY® will timeout, transition to a *Cooldown* mode, and turn off the Pilot. (If *Cooldown* is the desired action, the User can go <u>directly</u> to *Cooldown* by using a SOFT STOP as shown on page 82. After *Cooldown*, the Intui-DRY® will turn off the Fans.)



Figure 96. Drying Status: HOLD Activated, RESUME Appears

To shut down the Dryer for a default time before a restart, press this BLACK button.

If the button is not pushed again within the default time, the Dryer goes into *Shutdown/Cooldown* mode.

Or if the Outer Door is open, press the HOLD/ RESUME button on the <u>Inner</u> Door:

STOP Modes for Dryer Shutdown

Note that a Shutdown <u>at the Dryer</u> is the preferred method of stopping power when an emergency situation is not present. This method allows the Unload system to clean out, and automatically cools the grain before shutdown.

IMPORTANT!



If the Dryer has been shut down by the EMERGENCY SHUTDOWN method or by a major alarm, the unloading trough will not go through its normal cleanout cycle. If the Dryer is not going to be used within a few hours, resolve the emergency situation, restart the Dryer, and then follow the Resume Hold Shutdown method to allow the normal trough cleanout and the COOL DOWN cycle to occur. This is especially critical in wet and/or cold operating conditions.

Method A: STOP Buttons at the Dryer

Three large Emergency Buttons are located on the front of the Control Cabinet <u>Outer</u> door. These are connected by extenders that activate corresponding Buttons on the <u>Inner</u> Door (see below).

To make the Dryer STOP IMMEDIATELY for any reason, press either the red **EMERGENCY STOP** button on the Dryer Control Cabinet **Outer** Door or the red **STOP** button on the Dryer Control Cabinet **Inner** Door. Pushing either of these buttons will immediately terminate all Dryer functions.



Method B: Press the STOP Button on the Monitor Sidebar

From any screen, press the STOP button on the Intui-DRY® Monitor left sidebar. Typical of software, the STOP will not be immediate: the Operator must press a dialog box more than one time to assure the program that this is the Operator's intention and not an accidental touch. Therefore it is not the preferred Shutdown method in an **emergency**, but is effective if the Operator is not physically near the Dryer.



Figure 98. STOP Button Touching STOP gives a pop-up box with two (2) options: *SOFT STOP/ EMERGENCY STOP*. The *EMERGENCY STOP* button is highlighted by default until the next action by the Operator.



Figure 99. STOP Button Pop-Up Box

Emergency STOP

An EMERGENCY STOP will **shut down** the Dryer and cause the START/STOP button to go away. The POWER ON/OFF icon reappears in the Power Bar. The STOP is entered in the Alarms *eventlog*. The lights on the Safety Systems page should all be red at this point.



EMERGENCY STOP Turns Power OFF

Soft STOP

Pushing SOFT STOP changes the Status Bar to *Cooldown* mode and turns off the Burner (in both MANUAL and AUTO). This leaves only Fans running; other systems are shut down as indicated by red lights. After *Cooldown* is accomplished, when Fans are turned OFF, the STATUS returns to *Idle*.

The Operator can also go into SYSTEMS: FANS and turn Fans OFF during the *Cooldown* period.

NOTE: If the Fans are running before pushing SOFT STOP, Fans will continue to run for the *Cooldown* period. If a SOFT STOP is made when Fans are <u>not</u> running (*i.e.*, Unload running only), Fans will not startup and the Dryer will not go into *Cooldown* mode. *Cooldown* mode is activated only if Fans are already ON.

The COOLDOWN will go for the period set in SETTINGS: Utilities Configuration.



SOFT STOP Initiates Cooldown

In the lower left Sidebar, the *Cooldown Timer* will appear counting down with time remaining. It runs in both MANUAL moisture control and AUTO moisture control modes of operation.



Full Shutdown

Depending on the situation, the Operator may want to initiate a Full Shutdown.

From the *Cooldown* state, touch STOP a second time. The pop-up box will appear. Touch EMERGENCY STOP. The START/STOP button will go away. The POWER ON/OFF icon reappears in the Power Bar. See below.

The Dryer is OFF and cannot be restarted until the User goes to the Alarms screen and acknowledges the Alarm.



Figure 103. From the COOLDOWN State

End-of-Season Shutdown

See detailed procedures on page 101 in the Maintenance chapter.

Restarting the Dryer

Safe restarts—after emergency stops—require an inspection.



Before restarting a Dryer that has been stopped because of an emergency, an inspection of the Dryer shall be made and the cause of the stoppage determined. The starting device shall be locked and/or tagged out before any attempt is made to correct the cause of the stoppage.

Once the cause of the stoppage has been identified and corrected, follow the Startup Procedures as described on page 71.

After turning on the Intui-DRY® Control Monitor, go to the *Alarms* screen and acknowledge the alarm. Confirm the Dryer settings are correct before starting the Dryer again.

Moisture Control and Grain Sampling

Calculate Minutes to Unload

The *Minutes to Unload* calibration is important for good responsive moisture control. The Intui-DRY® depends on this calibration to properly calculate drying rates and receive accurate feedback to the Control. Charted below are the default variables for MEYER® models. However, any variation in actual unloading rate will require a recalibration of the *Minutes to Unload*. The following is also found in the Intui-DRY® Manual (MFH2191) Appendices.

Model	Sprocket Teeth	Bushels between Sensors (BBS)	100% Unload Rate (BPH)	Minutes to Unload
ME1000S	13	853	1750	29.3
ME1200S	15	985	2019	29.3
ME1400S (1999-2004)	16	1144	2153	29.9
ME1400S (2005+)	16	1144	2153	31.9
ME1600S	18	1243	2423	30.8
ME1800S	19	1336	2557	31.3
ME2000S	21	1468	2826	31.2
ME2400S	24	1693	3230	31.4
ME2650S	26	1858	3500	31.9

Follow this procedure* to calibrate Minutes to Unload:

- 1. Set the Dryer to MANUAL control and unload at a constant speed during the test.
- 2. Divert grain to a truck during the test, and note the time to collect the sample. Record the grain's test weight during this time period.
- 3. Calculate the new *Minutes to Unload* as follows.

Bph=bushels per hour BBS=Bushels between sensors

- $bph = (LBS / TW) \times (100\% / ULR) \times (60 / MIN)$
 - Minutes to Unload = BBS / bph x 60
 - Example: Product Corn
 - Model ME2000S

BBS = 1468

Unload speed at 50%, Discharged for 20 minutes Collected 25,850 lbs TW = 55 lb/bu

- bph = $(25,850 / 55) \times (100\% / 50\%) \times (60 / 20) = 2820$ bph @ 100% rate Minutes to Unload = $1468 / 2820 \times 60 = 31.2$
- 4. Enter the new Minutes to Unload into the Intui-DRY® Monitor under SETTINGS/ Dryer Configuration screen.

Wet Grain Sampling Procedure

Moisture Sensor calibration is critical to successful moisture control. If either the wet or dry Sensor calibration is 1% off, the control will not act in a proportional and rational manner. Take samples of both incoming and discharge Grain. Calibrate three (3) times a day or more until you are convinced the sensors are tracking properly. Then calibrate three (3) times a day for peace-of-mind. The wet grain sample is obtained by placing a bucket under the sample tube and rotating the Grain Sampler Lever (Item 2) downward.

Item	Description
1	Sampler Cable
2	Wet Grain Sampler Lever
3	Wet Sample Tube

Figure 104, right. WET Grain Sampler, Unload Module



Detail A: Lever UP



 Press the "2 Minute sample for calibration" button. The Intui-DRY® is set to use a two-minute sample procedure. This time length will ensure a representative sample.

2. Collect samples from the wet grain. Devise a WET GRAIN SAMPLE HISTORY sheet for your business, or copy and enlarge the one in Appendix F at the back of this Manual.

bph –	unload rate in bushel
	per hour at 100%
BBS –	bushels between
	sensors
LBS –	pounds of grain in
	sample weighed
TW –	test weight sampled
	(lb / bu)
ULR –	unload speed in %
MIN –	sample time in

minutes

TrueGrain[™] Moisture Sensor System (Standard on MEYER® Dryers)



Manual MFH2228

This NEW system (Patent Pending), is shipped loose with new Dryer installations. It is mounted under one of four possible locations where the Customer may designate the Grain Discharge. See Item(s) 47 on page 58 of THIS Manual.

Your MEYER® Installer has attached the Moisture Sensor body to the factorymounted Chute.

The sample is obtained manually by placing a bucket under the Sample Chute and rotating the Dry Grain Sampler Handle.

Refer to the TrueGrainTM Owners Manual MFH2228 (left) for operation and simple calibration that communicates with the Intui-DRY® Controller.

The Intui-DRY® Controller screen will AUDIT moisture and display results to the User.

Before and after the calibration process, the Sampler grain flow **rejoins** the grain flow in the Main Discharge Chute, as shown in the MEYER model below.



Figure 105. TrueGrain™ Moisture Sensor



RIGHT SIDE VIEW

MEYER Safety System: Alarms, Faults and Error Codes

Standard Interlocked Safety Controls

This Dryer has SAFETY controls to stop the Dryer if a hazardous condition develops. The following controls stop all Dryer functions immediately, and necessitate a MANUAL restart of the Dryer:

SAFETY Control	Function
High Limit Thermostat	Protects against excessive plenum temperature; Set Point is operator- adjustable (MEYER®-S models only) to 75-85 degrees F above operating temperature. Thermostat must be manually reset before restarting Dryer.
Blower, Load Auger, and Unload Drag Conveyor Motor Overload Relays	Protect against excessive motor overloading. Relays must be manually reset before restarting Dryer.
Auxiliary Conveyors Motor Overload Relays	Protect against excessive Motor amperages due to motor failures or overloading if motor starters and relays have been factory pre-wired. Relays must be manually reset before restarting Dryer.
Master Relay (Control Box)	Protects Dryer against a temporary power loss. Shuts down all Dryer functions and requires a manual restart.
Wet Grain Timer	Protects against lack of Grain refill; shuts down Dryer when air seal is lost in plenum.
Metering Sensor Timer	Protects against stoppage or severe slow down of the Unload system due to chain or drive shaft breakage, or plugging of the Unload.
High Fuel Pressure Switch Dryers (Canadian Dryers only)	Protects against excessive fuel pressures downstream of the Primary Regulator, must be manually reset.

The following controls and equipment provide these additional SAFETY features:

SAFETY Control	Function
Flame Sensor	Protects against loss of Burner flame; continuously monitors flame during startup and operation.
Circuit Breakers	Protect all motor branch circuits and control circuit.
Air Proving Switch	Guarantees positive airflow from the blower before energizing the flame circuit.
Purge Delay	Allows blower to purge the air in the heat plenum for 30-60 seconds before initiating Burner startup.
Ignition Delay	Allows the Burner pilot 45 seconds to heat the Flame Sensor Switch thermocouple and "prove" the pilot flame. Timer closes all automatic gas valves and triggers the alarm circuit if the pilot does not prove itself within 45 seconds. Allows the Burner pilot 10 seconds to for the ultraviolet Flame Sensor to detect the pilot flame.
Modulating Valve (on Plumbing)	Automatically maintains drying air temperature at a preselected level.
Hydrostatic Relief Valves	Located in liquid line of LP gas Dryers, it allows fuel to be vented away from the Dryer if pressure in the high-pressure liquid plumbing exceeds 300 psi [2 068.4 kPa].
Safety Relief Vent Valve	Located in vapor line of LP gas Dryers, it allows vapor fuel to be vented away from Dryer in the event of excessive gas pressure downstream of the primary regulator.
Low Fuel Pressure Switch (Canadian Dryers only)	Shuts off the Burner if insufficient fuel supply is detected.

Safety Systems Checkout

Installation is not complete until a SAFETY Systems checkout is run to see that all SAFETY systems are in working order. This should be done before initial startup. It should also be done at the beginning of each season, and any components replaced if necessary.

Red Power Light (optional): Turn the Dryer Disconnect Circuit Breaker ON. Observe the red light on the front of the Control Cabinet.

Fuel Line Shutoff Valves:

- 1. Individually test for complete closure of each shutoff Valve between the Dryer and LP gas tank or natural gas meter.
- 2. Start the Fan and Burner.
- 3. Close each Valve separately and observe if the fuel supply is definitely cut off to the Dryer by each Valve.

This is a **troubleshooting** screen: every system start is dependent on the one above it. Upper and Lower Plenum Switches must all be good, doors all closed, etc., for anything to be turned ON. The Voltage chain goes from the top down. Go here to see where the green lights stop and the red lights begin, and that will be where the problem lies. All lights/items above must be satisfied before the Burner will start. In OFF state, all lights on SYSTEMS/SAFETY are red.

The following functions and Indicator Lights are viewable on the SAFETY screen:



Figure 106. SYSTEMS/SAFETY Screen



Safety Circuit – This circuit is energized when the User touches the POWER button. The **Safety Circuit** must complete before any of the **Flame Circuit** indicators will light. If everything is good:

- All lights will turn green up through the STOP Button;
- The message on this screen will say *Waiting for MCR* (Master Control Relay).
- Power will flow through every system that is ready to go. (continued)

- The 24V DC could be lit, even though Over Temps are red. The temperature sequence must be complete **and** AUX (sequence of two) must complete for the sequence below them to light up. However the Temp and AUX are independent of each other.
- Diagnostic help for Safety System faults is available by touching the light of interest. This will pop up a window with context-related information to assist in troubleshooting.

The User then needs to go to the Dryer and press the START button, far left on the Dryer Inner Door, to complete the portion of the Safety Circuit from "Stop Button" down. This allows power to flow through to the Master Control Relays. Now the Dryer is powered and ready to run. For further information on this procedure, see page 94.



Figure 108. Dryer Power ON, Dryer Inner Door

Once the above step is done, the remaining Safety System lights on the Monitor should turn green and stay green.

The Status Bar on the Monitor screen now says *Idle*. Any time the System is in an *Idle* state and the System is started, there will be a five (5)-second Horn before any System starts moving. If a System (*i.e.*, Fans) is already moving there will be no Horn.

To start the Dryer, touch RUN on the Sidebar of the Overview screen. Individual systems can be started from their respective System page but for the Dryer to operate in Automatic Moisture Control mode, the RUN button must be used.

Flame Circuit – These lights will turn green as the Burner is started. Each item is dependent on the item before it, creating one long daisy chain. If any point in the chain fails, all points afterwards will also fail.

Alarms

Alarms may trigger based on severity of a condition, duration of the condition, or combinations of both. The problem must be corrected and acknowledged before Dryer restart. At the Monitor, the Operator must correct the problem with onscreen <u>acknowledgment</u> (see the following page) before the system will restart.

These issues include the standard interlocked Safety Controls listed on this page. There are three (3) ALARM severity levels:

- <u>RED</u> /CRITICAL Alarms (critical action has taken place)
- <u>YELLOW</u> /WARNING Alarms (a condition exists that likely requires action)
- <u>BLUE</u> /OPERATOR Notifications (supplemental information)

Refer to the full chapter on ALARMS in the Intui-DRY® Controller Manual MFH2191.

Alarms Sound the Horn on the Red Control Cabinet

The **Dryer Alarm Code Color Chart** (pages 90-92) notes that RED and YELLOW Alarms sound the Alarm Horn.

The SYSTEMS/SAFETY screen voltage chain (page 95) is an indicator why the Horn is sounding; check from the point where the green lights stop and red lights begin.

To silence the Horn <u>at the Dryer</u>, locate the (3) Emergency Buttons on the Outer Door (below) and push the red ALARM SILENCE button on the far right.

The Horn will silence itself after a period of time but the alarm will remain on the screen until the condition is resolved and acknowledged.



Alarms Displayed on the Intui-DRY® Screen

On the ALARMS screen, a blinking bar flashes the Alarm <u>color/severity</u> and time.

Only Alarms in the safety chain will change the System state to *Idle* and the Power Button to RUN/STOP.

For example, an Alarm for the Unload Popup Switch might say ON_NACK. If the Operator touches the ACKNOWLEDGE button, the message stops flashing and the Horn stops sounding. However, the Switch is still ON, popped up; the Switch is still a problem that must be resolved before a restart.

All Alarms of any level will trigger an "Event" log. If the User clears out an Alarm – and forgets what kind of Alarm it was, the User can easily go back in the Events Log and locate it.

-BROCK SOLID-	OVERVIEW	SYST	TEMS GR	APHS	ALARMS	*
Off	Alarms	_				Horn
	Alarm	Status	Timestamp	Severity	Description	
	() Denset Overfreite	Not Accomment	ment officialities manufate	Central		10
MANUA	AL.					
170°F 169*	F					
						0.05
16% 15.9	NC					
60% 1286	bu/hr					
- Carlo Illan	ACKNOWLEDGE					
n Stability	Events					
Stability	Events Timestamp	Description	_		_	
Stability 5 10 p Rec. Unload	ACKNOWLEDGE Events Timestamp 07/17/2020 at 02:04PM	Description -ALM- Pienum	Overtemp unacked alarm clear	ed.	_	
5 10 mp Rec. Unload	ACKNOWLEDGE Events Timestamp 07/17/2020 at 02:04PM 07/17/2020 at 02:04PM	Description -ALM- Plenum -ALM- Plenum	Overtemp unacked alarm clear Overtemp alarm raised. (C)	ed.	_	
5 10 s Rec. Unioae	ACKNOWLEDGE Events Timestamp 07/17/2020 at 02:04PM 07/17/2020 at 02:04PM 07/17/2020 at 02:04PM	Description -ALM- Plenum -ALM- Plenum -ALM- Door Op	Overtemp unacked alarm clear Overtemp alarm raised. (C) ven unacked alarm cleared.	ed.	_	
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n Stability 5 10 mp Rec. Unioae 22 HOLD	ACKNOWLEDGE Events Timestamp 07/17/2020 at 02:04MM 07/17/2020 at 02:04MM 07/17/2020 at 02:03MM 07/17/2020 at 02:03MM 07/17/2020 at 02:03MM	Description -ALM- Pienum -ALM- Pienum -ALM- Door Op -ALM- Door Op -ALM- Door Op	Overtemp unacked alarm clear Overtemp alarm raised. (C) een unacked alarm cleared, een alarm raised. (C) VG_FAULT unacked alarm clear	ed.	_	DOV

Figure 110. RED/CRITICAL Alarm

IMPORTANT!

The Operator must ACKNOWLEDGE the Alarm on the HMI screen (Figure 102 above) before a Dryer restart.

Diagnostic help for Alarms and Events is available by selecting the ALARM screen and touching the desired Alarm or the desired Event. This will pop up a window with context-related information to assist in diagnosing the issue.

An Alarm for the Unload Popup Switch, for example, might say ON_NACK. If the Operator touches the ACKNOWLEDGE button, the message will stop flashing and the Horn will stop sounding. However, the Switch is still ON, popped up; the Switch is still a problem that must be resolved before a restart.



Figure 111. RED: Diagnostic Popup

Alarm Levels

	When a RED/CRITICAL Alarm is raised, a critical action is automatically taken; the Alarm Horn will sound. A RED/CRITICAL Fault may completely shut down the Dryer or may just put the Dryer into <i>Cooldown</i> .						
	May just put the Dryer into	COOLAOWN.	Timestamp	Severity			
\wedge	Door Open	Not Acknowledge	d 07/22/2020 at 05:26PM	Critical			
RED Critical	Figure 112, ALARMS/Red Critical	right. ALARM Screen	- HOC S SUCH -	SYSTEMS Dimensional Dimensional <thdimensional< th=""> <thdimensional< th=""> <th< th=""><th></th></th<></thdimensional<></thdimensional<>			
	If a safety issue is sensed in the generating a CRITICAL Alarna about the problem may be pro- A RED/CRITICAL Alarm content Master Relay to open immediate Opening of the High-Limit Opening of an overload re- voltage condition causing	ne power safety cha m; the Dryer will b ovided by the Blue onsists of any of t <u>diately and stop al</u> Thermostat due to lay contact protect a higher-than-all	ain, the Dryer will a e put in the <i>Idle</i> sta Operator Alarms th he following situa <u>1 Dryer functions</u> : excessive drying a sting any Motors, o	shut down immediatel ate. Additional informa- at trigger at the same tions which cause th ir temperature; lue to an overload or amperage flow throu	y, ation time. <u>e</u>		
	 vonage condition, causing the relay contacts. Opening of an overload (if the conveyor motor, due to an orable current or amperage flowshown above: Opening the Door Safety Switch to shut Exhaust air (being monitored the Exhaust Air High Temp sive heat can be determined Stoppage at the Unload will A momentary power failure 	the overload is wir overload or low-vo ow through the rela Rear Plenum Door down the Dryer in ed for temperature) erature Switch to s l; cause a popup sw	ed into the system) ltage condition, can by contacts; while the Dryer is imediately; exceeds 210° F [9 hut down the Drye itch to shut the Dry	protecting an auxiliar using a higher-than-all operating, causing th 8.89°CJ, thereby caus r so the cause of the ex- ver down.	y low- e ing xces-		
YELLOW Warning	WARNING alarms indicate i Alarm Horn will sound until has expired, whichever come the ALARMS page until ack WARNING may escalate to	important condition acknowledged or us first. If the Horn s nowledged. If no a a CRITICAL Alar	ns that may require until the configurab silences itself, the V ction is taken, the o m; the Dryer enters	action to be taken. The le Alarm Horn duration VARNING will remain condition that led to the <i>cooldown</i> .	ie on n on ie		
BLUE Notification	Less severe conditions resu the Operator being notified BLUE Operator Alarms. Th messages do not trigger Dry Shutdown or the Horn. Figure 113, right. ALARMS\Blue Notification	It in by nese yer BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN BUN	DVERVIEW Stop Stop Stop Marma Stop Marma Stop Marma Stop Marma Stop Marma Stop Marma Stop Tablet Acchowlende Treatange Treatange Treatange Stop Treatange Stop Treatange Stop Treatange Stop Stop Stop	In Takestamp GRAPHS ALARM Takestamp Security Decry In C2202024 (01509M Cycenive Proper Fallow adam rated. (0) R Fp3U valobet alem (bared.	S Nors C		

Many alarm conditions are configurable under SETTINGS>UTILITIES CONFIG-URATION. Availability of some of them depend on the specific hardware of the Dryer as identified in SETTINGS>DRYER CONFIGURATION.

-ALM- Door Open unacked alarm d -ALM- Door Open alarm raised. (C)

Dryer Alarm Code Color Chart

ALARM CODE	Description	Behavior	Color	Horn
120V POWER FAILURE	Loss of power at the start of the safety chain.	Process STOP	RED	YES
24V AUX POWER	Loss of power on the Aux connections at the top of the Safety Board. Jumpers may possibly be missing if nothing else is wired in.	Emergency STOP	RED	YES
AIRFLOW FAILURE	Loss of power at the airflow input in flame circuit	Process STOP	RED	YES
AMC-T OVERTEMP	AMC-T Probe is over temperature.	Process STOP	RED	YES
AUX LOAD FEEDBACK FAILURE	Loss of feedback from the Auxiliary load system.	Process STOP	RED	YES
AUX UNLOAD FEEDBACK FAILURE	Aux Unload is on, feedback is enabled, but no feedback is received.	Process STOP	RED	YES
	Active Bin hits the WARNING level.	Notification	YELLOW	YES
	Active Bin hits the SHUTDOWN level.	Process STOP	RED	YES
COMM FAILURE 120V	Error reading data from 120V Board; Event Log will provide additional detail.	Process STOP	RED	YES
COMM FAILURE 24V	Error reading data from 24V Board; Event Log will provide additional detail.	Process STOP	RED	YES
COMM FAILURE SAFETY	Error reading data from Safety Board; Event Log will provide additional detail.	Process STOP	RED	YES
	Statio magazine is shown Harm defined lowel	Notification	BLUE	NO
	Static pressure is above User-defined level.	Process STOP	YELLOW	YES
DOOR OPEN	Door is open.	Emergency STOP	RED	YES
	Failure to read from Dry Moisture Sensor	Notification	BLUE	NO
DRY MOISTURE FAILURE	Failure to read from Dry Moisture Sensor when in AUTOMATIC continuous control	Process STOP	RED	YES
	Moisture is out of Hear defined range for the specified time	Notification	YELLOW	YES
	Monstare is out of Oser-defined range for the specified time.	Process STOP	RED	YES
	Moisture is out of User-defined range for the specified time	Notification	YELLOW	YES
	Monsure is out of Oser-defined range for the specified time.	Process STOP	RED	YES

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Dryer Alarm Code Color Chart

ALARM CODE	Description	Behavior	Color	Horn
EXHAUST OVERTEMP	Exhaust Limit Switch tripped	Emergency STOP	RED	YES
EXIT OVERTEMP	Outgoing grain is over the specified temperature.	Process STOP	RED	YES
FAN MOTOR 1 OVERLOAD	Fan Motor 1 Overload.	Emergency STOP	RED	YES
FAN MOTOR 2 OVERLOAD	Fan Motor 2 Overload.	Emergency STOP	RED	YES
FAN MOTOR 3 OVERLOAD	Fan Motor 3 Overload.	Emergency STOP	RED	YES
FAN MOTOR 4 OVERLOAD	Fan Motor 4 Overload.	Emergency STOP	RED	YES
FAN POWER FAILURE	Loss of Fan power feedback on 24V Board	Notification	BLUE	NO
FLAME CIRCUIT ERROR	Unexpected input on Safety Board; potentially indicates a failing component.	Notification	BLUE	NO
FLAME REQUEST FEEDBACK FAILURE	Loss of power at the flame request input in the flame circuit.	Process STOP	RED	YES
GAS PRESSURE HIGH	Loss of power at the gas pressure high input in flame circuit	Process STOP	RED	YES
GAS PRESSURE LOW	Loss of power at the gas pressure low input in flame circuit	Process STOP	RED	YES
LOAD FEEDBACK FAILURE	Loss of feedback from Load system	Process STOP	RED	YES
LOAD MOTOR OVERLOAD	Load Motor overload.	Emergency STOP	RED	YES
	Triggers if the grain switch stays low for too long while the load is running; indicates no grain is entering, or that the load cannot	Notification	YELLOW	YES
	keep up.	Process STOP	RED	YES
MAIN BURNER FAULT	Triggers if the main Burner is not detected when it should be ON	Process STOP	RED	YES
MCR CIRCUIT ERROR	Unexpected input on Safety Board; potentially indicates a failing component.	Notification	BLUE	NO
MCR FAULT	Master Control Relay lost power.	Emergency STOP	RED	YES
METERING FAULT	Unload is running, but metering switch is not being hit.	Process STOP	RED	YES

MFH1937H

RED

RED

RED

YELLOW

RED

BLUE

RED

Notification

Notification

Notification

Process STOP

Process STOP

Process STOP

Emergency STOP

Horn YES

YES

YES

YES

NO

NO

YES

NO

YES

NO

YES

YES

YES

YES

YES

YES

NO

YES

ALARM CODE	Description	Behavior	Color
PILOT DETECTION FAILURE	Loss of power at the pilot detected input in flame circuit.	Process STOP	RED
PILOT LIGHT FAULT	Pilot light is not detected during ignition window.	Process STOP	YELLOW
PILOT OPEN FAILURE	Loss of power at the pilot open input in flame circuit.	Process STOP	RED
PLENUM OVERTEMP	Plenum temperature is above limit.	Emergency STOP	RED
PROGRAM FAULT	Program crashed unexpectedly and was reset.	Notification	BLUE
RTD FAILURE	A non-critical temperature probe cannot be read. Event log will provide additional details.	Notification	BLUE
RTD FAILURE	A critical temperature probe cannot be read. Event log will provide additional details.	Process STOP	RED
SAFETY CONFIG ERROR	Unexpected input on Safety Board; potentially indicates a failing component	Notification	BLUE
SUBSYSTEM BURNER SAFETY TIMEOUT	Burner is running in Sub-system Control with the Unload stopped for an extended period of time.	Process STOP	RED
TEMP CIRCUIT ERROR	An unexpected input on Safety Board potentially indicates a failing component.	Notification	BLUE
TEMPERATURE OUT OF RANGE	Temperature fails to reach 100 degrees (and more than 50 degrees from Setpoint).	Notification	YELLOW

Temperature is more than 50 degrees above/below the Setpoint.

Failure to read from Wet Moisture Sensor in AUTOMATIC

Loss of feedback from Unload system

Failure to read from Wet Moisture Sensor

Unload Motor overload

Unload popup switch

continuous control

Dryer Alarm Code Color Chart

UNLOAD FEEDBACK FAILURE

UNLOAD MOTOR OVERLOAD

UNLOAD PRESSURE FAULT

WET MOISTURE SENSOR

Fault Codes for the Honeywell® Burner Control See Appendix D.

Fault Codes for the AC Drive

See Appendix E.

Error Codes Indicate Linear Limit Trips

When the Dryer is completely or partially stopped, one or more lights in the following positions (corresponding to Linear Limit junction boxes on the tower) will be lit on the Intui-DRY® screen. Decal 3136-00074 shown below should also be on the inside Door of the red Control Panel for easy reference.



Figure 114. Linear Limit Decal 3136-00074 Location

LINEAR LIMIT TOWER LOCATION								
LUGAR LINEAL LUGAR DE LA TORRE								
							SUPERIOR	
CÅBLE #					80/80A	80/80A		
	76/76A					81/81A	81/81A	
LINE	AR LIMIT JUNCT	ION BOXES						
LIMITES BOITES	DE JUNTAS DE DE JONCTION LI	LIMITE LINEAL	$\overline{}$		78/78A	78/78A	78/78A	
					79/79A	79/79A	79/79A	
			1					
76/76A	76/76A	76/76A	76/76A	76/76A	76/76A	76/76A	76/76A	
77/77A	77/77A	77/77A	77/77A	77/77A	77/77A	77/77A	77/77A	
74/74A	74/74A	74/74A	74/74A	74/74A	74/74A	74/74A	74/74A	
75/75A	75/75A	75/75A	75/75A	75/75A	75/75A	75/75A	75/75A	
ME1000S	ME1200S	ME1400S	ME1600S	ME1800S	ME2000S	ME2400S	ME2650S	
						вот	том	
						FOI	NDO AS	
3339 (0074							-	

Set-Reset L/R Thermostats

Remove the cover to the LO-Limit Thermostat (on the RIGHT) and set the temperature appropriate to grain type. Push the RESET tabs (Item 17) on top of the LO-Limit Transformer.



Upper Hi-Limit Junction (JIC) Box as Shipped, Oper

Item

1 2

3

4

5

6

7

8

9

Troubleshooting

Most Stoppages Can Be Resolved

Dealer service is available for your Dryer. Good service is a trademark of Brock Grain Systems. However, by developing a good understanding of the equipment and how it functions, Operators or their local electricians and gas servicemen can resolve most Dryer stoppages themselves. The most critical part of correcting an apparent malfunction is *identifying and systematically isolating the problem*. The annunciator light system and Dryer Log feature of the Intui-DRY® Controller greatly simplifies this task. We hope this **Troubleshooting** checklist will aid in solving service problems and help you get your Dryer back in operation quickly.

Stoppage	Area	Probable Cause:	
Entrance Door Open	Load	No Wet Grain	
Plenum 1 High Limit			
Plenum 2 High Limit	Fans	Dirty Heat Zone Skins	
Motor Overload			
Exhaust Air High Temp		Gas Pressure Problem	
Fan 1 Starter Stop		Pilot Failure	
Fan 2 Starter Stop		Premature Flame Detect	
Fan 3 Starter Stop	Burner	Low Air Flow	
Fan 4 Starter Stop	Durner	Plenum 1 High Temp	
Aux Unload Starter Stop		Plenum 1 Low Temp	
Communications Stopped		Plenum 1 Startup High Temp	
Gas Valve Timeout		Plenum 1 Startup Low Temp	
	Unload	Metering System Timeout	
	omoau	Unload Popup Switch	
		Exit Grain Temp Limit	
		Exit Moisture Hgh Limit	
	Moisture	Exit Moisture Low Limit	
	Control	Inlet Moisture Less Than Target	
		Outlet Sensor Failure	
		Inlet Sensor Failure	
	Bin Management	Bin Full Alarm	



Troubleshooting with the Intui-DRY® SAFETY Screen

Troubleshooting procedures are built-in to the Intui-DRY® program. Touch the SAFETY icon (left) on the SYSTEMS screen.



Figure 116. SYSTEMS Screen/SAFETY Function Selected

This is a **troubleshooting** screen: every system start is dependent on the one above it. Upper and Lower Plenum Switches must all be good, doors all closed, etc., for anything to be turned ON.

The Voltage chain goes from the top down. Go here to see where the green lights stop and the red lights begin, and that will be where the problem lies. All lights/items above must be satisfied before the Burner will start.

In OFF state, all lights on SYSTEMS/ SAFETY are red. The following functions and Indicator Lights are viewable on the SAFETY screen:

> Figure 117, right. SYSTEMS\SAFETY Screen

BROCK		OVERVIEW	SYSTEMS	GRAPHS	ALARMS	*
Dr	ying	Safety			4	BACK
RUN	STOP	Safety C	ircuit	Flame Circu	lit	
-		Upper Plenum Over Temp 🚫	Fan 3 Overload 🔵	Low Gas Pressure	•	
AUTO	MANUAL	Lower Plenum Over Temp 🚫	Fan 4 Overload 🛛 🔘	High Gas Pressure	•	
1 206	205*F	24VDC Aux Overloads	Loader Overload 🔵	Fan 1 Safety	•	
		Exhaust Over Temp	Unloader Overload 🔘	Fan 2 Safety	•	
159	14.9%	Door 1 Closed	Stop Button	Fan 3 Safety	•	
* 159	6 775 bu/hr	Door 2 Closed	24V DC	Fan 4 Safety	•	
Wet	Dry	Fan 1 Overload	120V AC	Air Flow Confirmed	•	
25%	Moisture 19%	Fan 2 Overload	MCR 1	Purge Complete 1	•	
			MCR 2	Purge Complete 2	•	
20%	15%			Pilot Opened	•	
		Proof of Closur	e Interlocks	Pilot Detected	•	
15%	115	Gas Block	1 0	Main Burner Detect	ed 🔴	
н	DLD	Gas Block	2 🔘			

Restarting the Dryer After an Alarm

Safe restarts after emergency stops-require inspection.

Before restarting a Dryer that has been stopped because of an emergency, an inspection of the Dryer shall be made and the cause of the stoppage determined. The starting device shall be locked or tagged out before any attempt is made to remove the cause of the stoppage.

- 1. Turn ON the electrical Service Disconnect and Dryer Equipment Disconnect.
- 2. Turn ON the fuel Inlet Valve. If propane fuel is used, open fuel tank valves and turn ON external vaporizers.
- 3. Turn ON the Intui-DRY® Control Monitor and check the following SETTINGS:
 - a. Enable Load, Enable Fan, Enable Unload, Enable Burner. These settings will be retained. Re-enable any functions that were disabled prior to the shutdown.b. Touch the START button on the Intui-DRY® screen.
- 4. Push the START button on the Control Cabinet inner door at the Dryer.
- 5. The Dryer will begin automatic control of the unload rate and plenum temperature to reach the preset outlet target moisture.

The Problem May Require Professional Service



IMPORTANT!

All electrical <u>testing</u> must be done by a QUALIFIED ELECTRICIAN, in accordance with all applicable national, state and local electrical SAFETY codes, including the <u>National Electric Code</u>, <u>National Electric Safety Code</u>, and OSHA (U.S.); the <u>Canadian Electrical Code</u> (Canada); and any other applicable federal, state and local laws and ordinances. Brock Grain Systems neither will be liable for damage to the Dryer or to person(s) because of unqualified electrical testing or use. Improper testing or use will void the Warranty.

Regularly inspect wiring, cords, plugs, tools and equipment for obvious external damage. Watch for shorts and sparks in fittings, or loose wiring. Always hire a licensed electrical contractor to repair wiring, switches, fuses or equipment.

Minor fuel line leaks may go undetected; hire licensed fuel contractors to service the plumbing system and to check fuel line connections for leaks and other hazards. Minor leaks can go undetected a long time.



Electricity can KILL! Moving parts, fires, and explosions can KILL! Use extreme CAUTION around electrical, mechanical and plumbing components of this Dryer. Always shut off, disconnect, LOCKOUT and TAGOUT all power before adjusting, inspecting, servicing, cleaning, repairing, unclogging, or entering the Dryer in any way.

However, some checkout procedures must be made with the power ON or within the high voltage Disconnect Panel. When instructions call for live panel testing for troubleshooting, testing should only be done by qualified electricians using appropriate PPE and extreme CAUTION. Be extremely careful not to touch any live wires or terminals. Contact with 230/460V could be fatal. Failure to follow these instructions will result in death or serious injury.

Preventive Maintenance

Service and maintenance of Dryers must be done only by a **qualified technician**. Dryer maintenance must be documented as being performed according to the written procedures such as the following. Appoint an accountable person who will properly follow the procedures and document them.

Inspect the Foundation

This should be done annually. Radial cracks in the foundation are a DANGER signal. The Foundation may be growing outwardly, and will pull the Tower with it. These forces can be large enough to cause bolt damage in the vertical seams of the Tower wall. It is suggested that if cracks are present they be monitored for any changes, and remedial action taken if needed.



Preventive Maintenance Schedule

The following are MINIMUM maintenance requirements.

MEYER® Maintenance Schedule		Daily	1 wk	2 wks	6 wks	end of season	start of season	Other
Check and clean Inside Screens	Х	X				X	X	
Check and clean Heat Plenum Floor	X	х				X	X	
Check and clean Burner	X	x				X	X	
Check for tight Unload Trough Covers		x				X	X	
Check and clean Cool Plenum Floor			X			X	X	
Check and clean Outer Screens				X		X	X	
Drain plumbing lines, Main and Pilot				X		X	X	
Inspect Thermocouple and ignitor, clean or replace				x		X	X	
Inspect Belts and Belt tension				х		X	X	
Lube Blower bearings					Х	X	X	See tables
Lube Blower Motor bearings						X		or 1800 hrs
Lube Unload Motor								3600 hrs
Check Gearbox oil level					X	X		
Change Gearbox oil								1500 hrs initial, 5000 hrs
Inspect Wet Moisture Sensor						X		
Inspect Dry Moisture Sensor			Х			X	X	as needed
Inspect and clean Moisture Equalizers						X		
Inspect Wet Grain Switch						X		
Clean Inlet Grain Buffer Ring						X		
Inspect and adjust Unload Gearbox sprocket						X		
Clean Unload Grain Shelf and Trough						X		
Inspect all SAFETY Decals, clean or replace						X	X	
Inspect all SAFETY Guards						X	X	
Inspect foundation and Anchor Bolts						X	X	

Pre-Season Inspection (Seasonally and Annually Thereafter)

Plan well in advance in case repairs or parts are needed. Carefully perform all procedures listed in the **Maintenance Schedule**.

Inspect all wiring for rodent and pest damage and debris.

Rodents love coatings on wires. Proper end-of-season Dryer cleanout will reduce the primary lure of grain food inside the Dryer to attract rodents in the first place. Clean fines from inside the heat chamber and outside the Dryer. If a Dryer has been idle before harvest season, check for—and clean out—animal nests and other blown-in debris.

Clean out all accumulated foreign material and fines:

from the Dryer plenum, grain columns, and around the Blower. Develop and implement a written housekeeping program that identifies high-dust-collecting areas and 1) the methods by which "fugitive grain dust" will be eliminated from exposed surfaces such as ledges, floors, and other equipment; 2) establishes how often the cleaning will be done; and 3) documents in writing that the above cleaning has been done properly.



Figure 118. Debris in Plenum Cleanout Ports

Do a SAFETY check.

Check for missing and damaged DANGER, WARNING or CAUTION Safety Decals. Obtain replacements if required. Perform all **Safety Systems Checkout** instructions; see pages 86-88.

Check components for wear and tightness.

- Check the tightness of screws on major Control Panel components (starters, relays, circuit breakers, etc.) Loose electrical connections can cause overheating and erratic operation.
- Check all **non-moving parts**: Panels, Doors and Guards for tightness of fit, and to see they are not rubbing Belts. Examine all rubber hoses and gaskets and replace as needed.
- Check all **moving and rotating parts** for vibration, wear or damage, and lubricate as needed.
- Check the Fan and Motor assembly for blade damage, or a shift in blade clearance.
- Check for loose balance-weight Bolts—indicated by a "clicking" sound when a vane axial Fan is rotated slowly.
- Check the Motor rotation on three-phase models—if power wires have been disconnected since their last use.



Pay attention to lubrication notes on Motor Decals. Failure to follow the instructions on these Decals could result in equipment damage and void the Warranty.

Pre-Startup Inspection (Seasonally)

This inspection should be done seasonally and assumes that all new Dryer connections and testing have been completed by your service provider.

Electricity can kill! Startup inspections MUST be done with the MAIN POWER LOCKED OUT and TAGGED OUT. Failure to follow these instructions will result in serious injury or death.

With MAIN POWER LOCKED OUT and TAGGED OUT, and with NO VOLTAGE detected, inspect electrical controls and wire connections for tightness. Make sure your fuel supply is adequate.

Monitor the Dryer routinely.

Do not allow the Dryer to run while any mechanical adjustments are being made. Failure to shut the Dryer off will lead to personal injury or death. Disconnect electrical power BEFORE inspecting or servicing equipment unless maintenance instructions specifically state otherwise. Failure to do so will result in death or serious injury.

- 1. Check that the Service Disconnect is OFF and LOCKED OUT (follow LOTO procedures). See **Disconnecting Procedures** on page 128/**Appendix B**.
- 2. Check inside the Electrical Power Cabinet and red Control Panel for any moisture, dust, or rodent damage. Clean and repair as required.
- 3. Perform preventative maintenance steps. See details in the **Preventive** Maintenance section of this Manual.
 - a. Lubricate Blowers and Motors.
 - b. Check Belt conditions and tensions.
 - c. Check the Gearbox oil level. See the Lubrication Chart on page 105.
 - d. Inspect Chain and Sprocket conditions.
 - e. Inspect the Burner. Remove the tarp if the Burner has been covered over winter.
- 4. Close all plumbing Drain Valves. If they are already in a closed position, open and drain any accumulations of water, then close. In the closed position, the drain handle is parallel to the ground. See pages 100-101.
- 5. Check that all grain column and Hopper Cleanout Doors are closed.
- 6. Check that all Access Doors are closed to the Cooling Floor, Plenum Floor, and Roof Hatch.
- 7. Open fresh air Louvers about 50% if they have been closed for the season.
- 8. Reconnect the Intui-DRY® to power and Dryer communications if it has been seasonally disconnected.
- 9. Turn ON the electrical Service Disconnect and Dryer Disconnect.
- 10. Check the fuel train.
 - a. Check for external leaks.
 - b. Check the main Safety Valves for leaks.

With the fuel in the Plumbing Train, check the complete plumbing system for leaks or tightness of fittings, especially at unions. Use a liquid soap solution with the plumbing train under normal operating pressure. Purge new plumbing lines before final assembly to blow oil, dirt, and thread chips out of the lines that could interfere with proper operation and damage plumbing components.

- 11. Test-fire the Dryer before loading it with grain.
 - a. Run the Unload system and listen for smooth operation.
 - b. Test Burner lockout by closing the test-firing valve on Pilot line.
 - c. Re-light the Burner. Check the setting on the main Regulator.
 - d. Test auxiliary loading and unloading conveyors for proper operation.

Disconnect the Main Power to the Dryer when these initial startup tests are completed. See "Disconnecting Procedures" on page 128.



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Blower Motor Belt Care: Check Belt Tightness

DISCONNECT POWER prior to maintaining or cleaning the Dryer! Electricity can kill! Inspections MUST be done with the main power disconnected, LOCKED OUT and TAGGED OUT. Failure to follow these instructions will result in serious injury or death. The Dryer may start automatically causing serious injury or death.

Model	Motor HP	Motor Part No.	Amount of Deflection	Belt Deflection Force (Load Lb.)	
1000S	30	2475-03021	0.342	14	
1200S	30	2475-03021	0.342	14	
1400S	30	2475-03021	0.342	14	
1600S	40	2475-04021	0.334	15	
1800S	40	2475-04021	0.334	14	
2000S	50	2475-05021	0.324	16	
2400S	50	2475-05021	0.324	14	
2650S	60	2475-06021	0.324	14	
based on T.B. Wood's table					

amount of deflection should = 1/64 per inch of span



Fan Belt Tension Adjustment: Force and Deflection Method

Lubricate Blower Bearings and Motors

Lubricate Motors as specified on the equipment (pre-affixed CAUTION Decal 001948) and in the **Blower Motor and Bearing Lubrication Chart** below.



Lubricate Blower Bearings and Motors as specified in the Chart at

right.

Special grease and procedures are required for the Blower Motor. Failure to FIRST read and follow instructions in the Lubrication Chart below could cause damage to the Dryer. Pay attention to lubrication notes on Motor Decals. Failure to follow the instructions on these Decals could result in equipment damage and void the Warranty.

Model	Component	Frequency	Oz.	Strokes*
	Blowers	6 wks or annually		
ME1000S-2650S	front		0.68	15
	rear		0.68	15
	Motors			
	5 HP	annually or 2750 hrs		
ME1000S-2650S	front		0.10	2
	rear		0.08	1
	30 HP	annually or 3700 hrs		
ME1000S-1400S	front		0.31	7
	rear		0.24	4
	40 HP	annually or 3700 hrs		
ME1600S-1800S	front		0.38	9
	rear		0.24	4
	50-60 HP	annually or 3700 hrs		
ME2000S-2650S	front		0.38	9
	rear		0.24	4

Blower Motor and Bearing Lubrication Chart Shell Alvania RL2 or equivalent

*based on hand gun with 22 strokes / ounce (1 oz. = 28 g or 2 tablespoons or 59 ml)

Gearbox Lubrication Chart

Mobil SHC-634 or equivalent -30° to 134° F [-1.11° to 56.67°C] ambient

	•	-	-
Model	Gearbox	Frequency	Capacity (pints)
ME1000S-2650S	943MDN	1500 hrs initial, then 5000 hrs	3.1

Check the Upper Plumbing Train to the Burner



Figure 120. Plumbing Drain Valves (CLOSED) Inside Unload Module

- Clean the gas line Strainer *only* if fuel restriction or starvation is indicated by high upstream pressure with lower-than-normal downstream pressure on the liquid pressure Gauge (LP gas). Use pipe joint compound when replacing plug threads. If a new inlet line has been installed, or the Dryer has been moved to a new location, check for pressure drop across the Strainer **after the first day of operation**.
- Clean the Burner Igniter and re-gap it to 3/16" [4.7 mm] if necessary.
- Check the Burner. Clean plugged orifices with a drill bit (50# drill, .070") or an acetylene torch tip cleaner. Check the tightness of bolts and nuts attaching perforated baffles to the Burner. Replace as required.
- Using a liquid soap solution, check for plumbing leaks.

Drain the Inner Plumbing Train

Inspect the Plumbing Train every two weeks. Drain the Plumbing and Pilot lines. Use pipe joint compound on pipe threads when replacing the plug. It may be necessary to clean these each week *or more often*, as fuel quality in some areas is poor. Check for and correct gas leaks around plumbing fittings, especially on high-pressure vaporizer lines.



A DANGER DISCONNECT POWER prior to maintaining or cleaning the Dryer! Electricity can kill! Inspections MUST be done with the main power disconnected, LOCKED OUT and TAGGED OUT. Failure to follow these instructions will result in serious injury or death. The Dryer may start automatically causing serious injury or death.

End-of-Season Shutdown Procedures

- 1. With the Dryer Burner operating in MANUAL mode, close the supply inlet gas Valve, and burn gas from lines until flame lockout occurs. The Dryer will go into a minor alarm, and then a normal COOL DOWN sequence.
- 2. Turn off or redirect the wet grain source filling the Dryer, and disable Load.
- 3. Unload grain from the Dryer.



Figure 121. Gas Hand Shutoff Valve, CLOSED, U.S. Model (Canadian shown, pages 50-51)





Do not store grain in the Dryer for extended periods of time or during wet weather. Failure to follow this instruction may cause the grain to expand and swell and damage the Dryer columns or components!

- 4. Turn the Dryer Equipment Disconnect and Service Disconnect OFF. Follow LOCKOUT/TAG OUT procedures.
- 5. Perform maintenance work. See detailed schedules in the **Maintenance** section of this Manual.
 - a. Check the oil level in the primary and secondary gearbox.
 - b. Check dry grain moisture sensor for excessive wear. Replace as required.
 - c. Lubricate Blower bearings and motor at end of season or as suggested in the maintenance section of this Manual on page 99.
 - d. Check Blower Belt condition and adjust Belt tension. See page 99.
- 6. Clean the Dryer from the top down.
 - a. Clean the roof and roof platforms.
 - b. Clean out the inlet grain buffer ring inside the Dryer roof.
 - c. Inspect the Wet Grain Sensor and Fill Switch.
 - d. Remove any debris from grain turners or Moisture Equalizers.
 - e. Clean inner screens and catwalks.
 - f. Clean outer screens and catwalks.
 - g. Clean the Heat Plenum Floor.
 - h. Vacuum out and lay a tarp over the Burner.
 - i. Clean the Cooling Floor.
 - j. Remove Unload Trough covers and clean grain from the grain shelf. Run the unload to clean out the trough.
 - k. Clean the foundation area under the Dryer.
- 7. Close fresh air Louvers and all entrance doors to keep birds out of the Dryer.
- 8. Drain the Main Plumbing line and drain the Pilot Plumbing line. Leave valves open until they are ready to operate.
- 9. Indoors: Unplug the Intui-DRY® HMI Monitor power. To reduce risk of lightning damage during the off-season, disconnect the ethernet communication cable that runs between the Monitor and the Dryer red Control Box. Store the HMI in a climate-controlled environment when not in use.

End-of-Season: CLEAN THE TOWER THOROUGHLY from Top-to-Bottom Before Cold Weather!

Remember that grain is highly abrasive and corrosive.

- Turn OFF all Disconnects to the Dryer to reduce the risk of power surge damage.
- Unload grain from the Dryer and check columns for **complete removal**. If you use a fill-leg, **close off the fill-leg** so there is no accidental out-of-season filling of the Dryer. Clean out incoming and outgoing auxiliary **conveyors** of material that may spoil.
- Wipe off grain dust/fines from the tops of **Electrical Cabinets** to retard rust. Place a cardboard shield in the Control Cabinet window to block sun damage from the controls.
- **Clean dust** off walls, ledges and floors of nearby structures. Keep the area around the Dryer clean of dust and excessive accumulation of fines.
- Lock all Ladder Doors and Cage Doors. Leave nothing on any walkway which could blow off or cause damage, trip, or cause other physical harm.
- Cleaning Louvers and Bird Screens of collected debris is critical to safe and efficient performance of the Dryer!
- **Close the Louvers** to prevent birds and rodents and their droppings/feeding from damaging the Dryer.



Figure 122. Clean Exterior Louvers and Ledges

- **Open plumbing up** so moisture cannot collect in the lines. Leave the valves on both drains OPEN (main Plumbing train and Pilot line) by leaving Valves *in line with* the Plumbing train. Close lines by turning the Valves 90° to the line.
- Cover the **Burner** with a tarp. Leave a reminder note in the Control Panel to remove the tarp off the Burner—before firing.
- Check the **Unload Rollers** for wear to see if they spin freely. Note there are horizontal-mount and vertical-mount Rollers. Each may need to be removed for a thorough check. Order replacements if necessary.



Consider a professional, high pressure, low-water power-wash "washdown" to reduce grain dust. Wash down the Dryer inside and out (optional). <u>Seal</u> <u>all electrical boxes, Burner and Blower Motor</u> to keep water/moisture out during this process. When finished washing, remove the plastic sheets and fire the Dryer at a low plenum temperature until all parts are dry. Remove the Trough Covers from the Unload and blow it clean. Temporarily remove one Trough Bottom Panel to drain the water.

Special Care of the Unload Gear Speed Reducer

This is the most sensitive motorized part of your Dryer. Always refer to your Manufacturer's literature for care of the Gear Reducer. Speed Reducers are oil-filled at the factory to the proper level for standard mounting position. The Manufacturer recommends that the oil level be checked and adjusted (if necessary) **prior to operation**, using the oil level plug provided, and while the unit is oriented in the operating position.



IMPORTANT!

Do NOT impact-tighten the Gear Reducer or other parts in the Unload system!

Hand wrench-tighten only. Impact-tightening will damage or destroy the integrity of the hardware/connection.

Item	Description
1	Unload Motor
2	Unload Gear Reducer

Figure 123. Gear Reducer 2419-00080



Damage to the Speed Reducer resulting from failure to follow the following instructions for its care, will void the Speed Reducer Warranty. Continuous operation of the Gear Reducer above 225° F [107.2° C] may cause damage to seals or other components.

Speed Reducers in normal operation can generate temperatures up to $200^{\circ}F[93.3^{\circ}C]$ depending on the type of reducer and the severity of the application (loading, duration of service, ambient temperatures). Excessive oil temperatures may be the result of one or more of the following factors:

- **Over-filling**: If a speed reducer is overfilled with oil, the energy used in churning the excessive oil can result in overheating. If this occurs, shut down the drive, remove the oil level plug, and allow the oil to drain until oil ceases to drain from the level hole; reinstall the oil level plug and restart the drive.
- Under-filling: If the speed reducer is under-filled, the resulting friction can cause overheating and possible damage. If this occurs, fill the speed reducer to the oil level plug hole and check the gearing for excessive wear.

Initial Start-Up

During the initial start-up operation, a break-in period is necessary before the Gear Reducer reaches a maximum operating efficiency. It may run hot for the first several hours after start-up, and it may also be possible for a few drops of oil to be purged from the lip seals during the break-in period. After a short period of operation, clean off any excess oil around the shaft seals, and re-check the oil level and adjust, if necessary.

Ambient Temperature

If the ambient temperature is other than 51° - 95° F [10.55° - 35° C], refer to the **Lubrication Chart** on page 105 and refill the unit with the correct grade oil based on actual ambient temperatures and operating speed.

A DANGER

DISCONNECT POWER prior to maintaining or cleaning the Dryer! Electricity can kill! Inspections MUST be done with the main power disconnected, LOCKED OUT and TAGGED OUT. Failure to follow these instructions will result in serious injury or death. The Dryer may start automatically causing serious injury or death.

Synthetic Oil in the Gear Reducer

Synthetic lubricants can be advantageous over mineral oils in that they generally are more stable, have a longer life, and operate over a wider temperature range. These oils are appropriate for any application, but are especially useful when units are subjected to low start-up temperatures or high operating temperatures. However, continuous operation above 225° may cause damage to seals or other components.



Oil Changing: Refer to the Lubrication Chart on page 106.

When changing the oil for any reason, it should be remembered that oils of various types may not be compatible. When changing to a different oil, thoroughly drain the housing and flush it with a light flushing oil prior to refilling with the appropriate lubricant. The oil level should be rechecked after a short period of operation and adjusted, if necessary. When changing double reduction models, each housing should be drained and filled independently, even though there may be a common level.

It is recommended that the initial oil also be changed or filtered after the first 1500 hours of operation to remove metal particles that accumulate during breakin. Subsequent oil changes should be made after 5000 hours of operation.

About Mineral Oils: Under **normal** conditions, subsequent oil changes should be made every 2500 hours of operation, or every six (6) months, whichever occurs first. Under severe conditions (rapid temperature changes, moist, dirty or corrosive environment), it may be necessary to change oil at intervals of one-to-three months. Periodic examination of oil samples taken from the unit will help establish the appropriate interval.

Long-term Storage or Infrequent Operation

If a speed reducer is to stand idle for an extended period of time, either prior to installation or during use, it is recommended that the unit be filled completely with oil to protect interior parts from rust corrosion due to internal condensation. Be sure to drain the oil to the proper level before placing the speed reducer in service. Contact the speed reducer Manufacturer for more information.

Grease Fittings

Some speed reducers are equipped with grease fittings to lubricate those bearings not adequately lubricated by the oil splash. These fittings must be lubricated every 3-6 months depending on operating conditions. Bearing greases must be compatible with the type of gear lubricant being used (*i.e.*, mineral, synthetic, food grade, etc.).

- For mineral oils, use a high-quality lithium base NLGI#2 bearing grease.
- For **synthetic** oils, use a synthetic bearing grease such as Mobil Synthetic Universal grease, Mobilith SHC 100 or a suitable equivalent.
- For food-grade lubricants, use Chevron FM grease, NGLI@2, or an equivalent.



Replacing Oil Seals

When replacing a shaft oil seal with a new seal, follow these steps:

- Use smooth tape to cover the keyway and any other surface discontinuity, to protect the seal lip from being damaged.
- Use a sealant between the outside diameter of the seal and inside diameter of the bore into which the seal is installed. The seal bore should be free of any burrs, nicks or scratches.
- Be sure the seal is not cocked on the seal bore. The outer face of the seal should be flush with the surface into which it is mounted.

Lubricants for Worm-Gear Reducers

For special applications that involve severe ambient temperature extremes or a seasonal oil requirement, the Manufacturer, based on extensive testing and field experience, recommends the use of Mobil SHC synthetic lubricants.

Ambient Temperature	-30° to 15°F <i>-34.4° to 9.4°C</i>	16° to 50°F <i>-8.9° to 10°C</i>	51° to 95°F <i>10.6° to 35°C</i>	51° to 95°F <i>10.6° to 35°C</i>	96° to 131°F <i>35.6° to 55°C</i>	96° to 131°F <i>35.6° to 55°C</i>
Final Stage Worm Speed	up to 2000 FPM	up to 2000 FPM	up to 450 FPM	above 450 FPM	up to 450 FPM	above 450 FPM
ISO Viscosity Grade	220	460	680	460	680	460*
AGMA Lubricant No.	5S**	#7 Compounded***	#8 Compounded***	#7 Compounded***	8S**	7S**
Mobil	SHC 630	600W Super Cylinder	Extra Hecla Super	600W Super Cylinder	SHC 636	SHC 634
American Lubricants	SHC-90W	AGMA #7 Gear Oil	AGMA #8 Gear Oil	AGMA #7 Gear Oil	N/A	N/A
Castrol	Tribol 800/220	Tribol 1105-7C	Tribol 1105-8C	Tribol 1105-7C	Tribol 800/680	Tribol 800/460
Chevron	Tegra 220	Cylinder Oil W460	Cylinder Oil W680	Cylinder Oil W460	Tegra 680	Tegra 460
Conoco	Syncon R&O 220	Inca Oil 460	Inca Oil 680	Inca Oil 460	N/A	Syncon R&O 460
Exxon (Esso)	Teresstic SHP 220	Spartan EP 460	Spartan EP 680	Spartan EP 460	Teresstic SHP 680	Teresstic SHP 460
Fiske Brothers	SPO-MG	SPO-277	SPO-288	SPO-277	N/A	N/A
Shell	Omala RL 220	Valvata J 460	Valvata J 680	Valvata J 460	Omala RL 680	Omala RL 460
Техасо	Pinnacle 220	Vanguard 460	Vanguard 680	Vanguard 460	Pinnacle 680	Pinnacle 460

**synthetic oil

106

***3% to 10% fatty or synthetic oils or mild EP additives

Lubricant selections are provided by the lubricant Manufacturer based on AGMA-recommended viscosity grades. Viscosity grades are based on *Lubrication Standard* ANSI/ AGMA 9005-D94.

*The sliding velocity in feet-per-minute (FPM) for standard ratios is determined by multiplying the speed of the worm in RPM by the factor from the following table. For selecting the proper lubricant, use the speed of the worm in the final stage (input RPM divided by the first stage ratio).

Maintenance of Burner Gas Ports

Inspect to make sure the gas inlet holes are clean and clear. Check and service the Burner and other components **before** the drying season.

Use a wire brush and tip cleaner to service the Burner to open all the holes and remove any rust or debris.

Conduct an initial inspection within the first month of use.

Visually check the gas ports of a new Burner for any piping scale or debris. Once initial piping debris is removed, inspect the Burner annually.

Operating conditions of the Burner will determine how frequently maintenance is actually required.



Burner Port Identification ME1000S - ME2400S

Item	Part No.	Description
1	5508-00001G02	Burner
2	2086-06083	Adapter, 3/8" OD x 3/8" MPT Brass
3	2003-05160	Elbow, 3/8" x 90° st-300#wog
4	1268-00003	Coupling, Thermocouple Bracket
5	2403-00003	Spark Plug, 1-64-1 Auburn
6		Tip Cleaner, #50



1. Shut the system down totally. Disconnect and lock out/tagout the power supply so there can be no accidental startup during the Burner inspection.

Do not enlarge/warp Burner ports with drills, or performance may be drastically affected. USE A TORCH TIP CLEANER ONLY. Damage to the Burner will void the Warranty. An electric drill bit is not to be used because it is easy to enlarge/warp the hole or to snap bits off in a port. It is difficult to remove broken bits from gas ports.

- 2. Inspect the Burner carefully, including upstream and downstream sides of mixing plates, as well as the Burner body face. Any accumulation of scale or foreign material on either side of the mixing plates should be removed with a wire brush. Check visually that no holes in the mixing plates are blocked. If any mixing plates are loose or missing fasteners, tighten or replace as necessary. Always use zinc-plated or stainless metric fasteners. If gas ports are clogged, use a #50 (drill tip) size, or approximately 1/16", decimal equivalent .0700 inches [1.777 mm].
- 3. After carefully cleaning, put the system back into operation. View the system from the downstream side while cycling the Burner through the full firing range. This will give a visual check for blocked Burner ports.
- 4. Observe the flame pattern and, if necessary, take steps to correct velocity and/or air distribution problems.


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Appendix A: Specifications and Dimensions

MEYER® Commercial Tower Dryers are partially pre-assembled at the factory to reduce installation time and expense. They are tested before shipment to insure maximum quality and trouble-free operation.



*These models delivered complete on trailer (Tower and Roof), less Catwalk(s) and Base Unload Module. **Ship-loose Module widths and heights are in the Installation Manual only. Eave Platform = 310 lbs: Service Platform = 425 lbs: Ext. Platform = 1050 lbs

Eave Platform = 310 lbs; Service Platform = 425 lbs; Ext. Platform = 1050 lbs



*Drying capacities are the result of a combination of field tests and averages of customer-reported capacities. These capacities should be attainable in one pass with mature, unfrozen, clean (maximum of 2% fines) grain when operating the dryer at the recommended drying temperature. Drying capacities will vary depending upon weather conditions, hybrid variety, grain maturity, and cleanliness of the grain.

** Final moisture in bin after steeping and cooling. Final moisture in bin can be affected by ambient conditions, steeping times, and cooling rates.

Model ME1000S



Model ME1000S with Options

Item	Description
1	Sidewall Dia. 11'-6" [3 505]
2	Burner
3	Height, Pad to Discharge: 2'-6 1/2" [775 cm]
4	Overall Height: 42'-10 1/8" [13.06 m]
5	Walkway Handrail-to-Handrail Outside Dia.: 17'-10" [5.44 m]
6	Garner: Solid Skin Outside
7	Top Moisture Sensor
8	Top Grain Level Switch
9	Plenum Floor
10A 10B	Moisture Equalizer Level 1 Level 2
11	Discharge from Sidewall: 1'-11" [58.4 cm]
12	Steep: Solid Skins Inside and Outside
13	Pad to First Walkway Floor: 10'-7 1/8' [3.23 m]
14	Air Duct
15	Fillhole Dia. 10" [254 cm]
16	Dryer Center to Spout: 7'-3 3/4" [2.22 m]
	Modules:
17	3157-102
18	3157-52
19	3157-53
20	3157-58
21	3157-63
22	3157-64
23	3157-71
24	3157-72
25	3157-78
26	3157-79
27	3157-83 (ME)
28	3157-100 (ME)
29	Linear Limits
30	AMC
31	HL
42	External Service Walkway
43	Roof Platform

Model ME1200S



Item	Description
1	Sidewall Dia. 11'-6" [3 505]
2	Burner
3	Height, Pad to Discharge: 2'-6 1/2" [775 cm]
4	Overall Height: 47'-10 1/8" [14.58 m]
5	Walkway Handrail-to-Handrail Outside Dia.: 17'-10" [5.44 m]
6	Garner: Solid Skin Outside
7	Top Moisture Sensor
8	Top Grain Level Switch
9	Plenum Floor
	Moisture Equalizer
10A	Level 1
10B	Level 2
11	Discharge from Sidewall: 1-11" [58.4 cm]
12	Steep: Solid Skins Inside and Outside
13	Pad to First Walkway Floor: 11-10 1/8" [3.01 m]
14	Air Duct
15	Fillhole Dia. 10" [254 cm]
16	Dryer Center to Spout: $7-3 \ 3/4'' \ [2.22 m]$
15	Modules:
17	3157-102
18	3157-52
19	3157-53
20	3157-58
21	3157-63
22	3157-64
23	3157-71
24	3157-72
25	3157-78
26	3157-79
27	3157-83 (ME)
28	3157-100 (ME)
29	Linear Limits
30	AMC
31	HL
42	External Service Walkway
43	Roof Platform

Model ME1400S







Figure 133. Model ME1400S with Options

Item	Description
1	Sidewall Dia. 11'-6" [3 505]
2	Burner
3	Height, Pad to Discharge: 2'-6 1/2" [775 cm]
4	Overall Height: 54'-1 1/8" [16.489 m]
5	Walkway Handrail-to-Handrail Outside Dia.:17'-10'' [5.44 m]
6	Garner: Solid Skin Outside
7	Top Moisture Sensor
8	Top Grain Level Switch
9	Plenum Floor
	Moisture Equalizer
10A	Level 1
10B	Level 2 Discharge from Sidemally 1, 11, 11, 59, 4 and
11	Discharge from Sidewall: 1-11 [58.4 cm]
12	Steep: Solid Skins Inside and Outside
14	Air Duct
15	Fillhole Dia.: 10^{-1} [254 cm]
16	Dryer Center to Spout: 7-3 3/4" [2.22 m]
17	Linear Limits
18	AMC
19	HL
20	10'-7 1/8' [3.23 m]
	Modules:
21	3157-102
22	3157-55
23	3157-58
24	3157-67
25	3157-68
26	3157-69
27	3157-73
28	3157-77
29	3157-78 Roof Module
30	3157-90
31	3157-114
32	3157-118
33	3157-119
34	3157-100 (ME option)
35	3157-85 (ME option)
40	Internal Platform 3121-00160
42	External Service Walkway
43	Roof Platform

Model ME1600S



Model ME1600S with Options

Item	Description
1	Sidewall Dia. 11'-6" [3 505]
2	Burner
3	Height, Pad to Discharge: 2'-6 1/2" [775 cm]
4	Overall Height: 57'-10 1/8" [17.63 m]
5	Walkway Handrail-to-Handrail Outside Dia.:17'-10" [5.44 m]
6	Garner: Solid Skin Outside
7	Top Moisture Sensor
8	Top Grain Level Switch
9	Plenum Floor
10A 10B	Moisture Equalizer Level 1 Level 2
11	Discharge from Sidewall: 1'-11" [58.4 cm]
12	Steep: Solid Skins Inside and Outside
13A 13B 13C	Pad to Walkway Floor: 14'-4 1/8" [4.37 m] 30'-7 1/8" [9.32 m] 41'-10 1/8" [12.75 m]
14	Air Duct
15	Fillhole Dia.: 10" [254 cm]
16	Dryer Center to Spout: 7'-3 3/4" [2.22 <i>m</i>]
17	Linear Limits
18	AMC
19	HL
20	10'-7 1/8' [3.23 m]
	Modules:
21	3157-102
22	3157-55
23	3157-58
24	3157-67
25	3157-68
26	3157-69
27	3157-73
28	3157-77
29	3157-78 Roof Module
30	3157-90
31	3157-114
32	3157-118
33	3157-119
34	3157-100 (ME option)
35	3157-85 (ME option)
40	Internal Platform 3121-00160
42	External Service Walkway
43	Roof Platform

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(10B)

12

(11)

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Model ME1800S



Model ME1800S

Figure 137. Model ME1800S with Options

Item	Description
1	Sidewall Dia. 11'-6" [3 505]
2	Burner
3	Height, Pad to Discharge: 2'-6 1/2" [775 cm]
4	Overall Height: 61'-7 1/8" [18.77 m]
5	Walkway Handrail-to-Handrail Outside Dia.: 17'-10" [5.44 m]
6	Garner: Solid Skin Outside
7	Top Moisture Sensor
8	Top Grain Level Switch
9	Plenum Floor
10A 10B 10C	Moisture Equalizer Level 1 Level 2 Level 3 Distance from Sidewall: 1'-11" [58.4 cm]
12	Steen: Solid Skins Inside and Outside
14	Air Duct
15	Fillhole Dia · 10" [254 cm]
16	Drver Center to Spout: $7'-3 3/4'' [2.22 m]$
17	Linear Limits
18	AMC
19	HL
20	10'-7 1/8' [3.23 m]
	Modules:
21	3157-102
22	3157-56
23	3157-57
24	3157-59
25	3157-60
26	3157-67
27	3157-73
28	3157-74
29	3157-75
30	3157-77 Roof Module
31	3157-78
32	3157-79
33	3157-80
34	3157-108
35	3157-114
36	3157-109 (ME option)
37	3157-86 (ME option)
38	3157-89 (ME option)
40	Internal Platform 3121-00160
42	External Service Walkway
43	Roof Platform

Model ME2000S



Figure 138. Model ME2000S



Figure 139. Model ME2000S with Options

Item	Description
1	Sidewall Dia. 11'-6" [3 505]
2	Burner
3	Height, Pad to Discharge: 2'-6 1/2" [775 cm]
4	Overall Height: 66'-7 1/8" [20.29 m]
5	Walkway Handrail-to-Handrail Outside Dia.: 17'-10" [5.44 m]
6	Garner: Solid Skin Outside
7	Top Moisture Sensor
8	Top Grain Level Switch
9	Plenum Floor
10A 10B 10C	Moisture Equalizer Level 1 Level 2 Level 3
11	Distance from Sidewall: 1-11 ^m [58.4 cm]
12	Steep: Solid Skins Inside and Outside
14	Air Duct
15	Fillhole Dia.: 10" [254 cm]
16	Dryer Center to Spout: 7'-3 3/4" [2.22 m]
17	Linear Limits
18	AMC
19	HL
20	10'-7 1/8' [3.23 m]
	Modules:
21	3157-102
22	3157-56
23	3157-57
24	3157-59
25	3157-60
26	3157-67
27	3157-73
28	3157-74
29	3157-75
30	3157-77 Roof Module
31	3157-78
32	3157-79
33	3157-80
34	3157-108
35	3157-114
36	3157-109 (ME option)
37	3157-86 (ME option)
38	3157-89 (ME option)
40	Internal Platform 3121-00160
42	External Service Walkway
43	Roof Platform

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(42)

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(10A)

(12)

(10C)

(12)

Model ME2400S



Figure 141. Model ME2400S with Options

(16)

(11)

Item	Description
1	Sidewall Dia. 11'-6" [3 505]
2	Burner
3	Height, Pad to Discharge: 2'-6 1/2" [775 cm]
4	Overall Height: 75'-4 1/8" [22.96 m]
5	Walkway Handrail-to-Handrail Outside Dia.: 17'-10" [5.44 m]
6	Garner: Solid Skin Outside
7	Top Moisture Sensor
8	Top Grain Level Switch
9	Plenum Floor
10	Moisture Equalizer 10A: Level 1 10B: Level 2 10C: Level 3
11	Discharge Distance from Sidewall: 1'-11" [58.4 cm]
12	Steep: Solid Skins Ins/Outside
13B 13C 13D	Pad to Walkway Floors 60'-7 1/8" [18.47 m] 49'-4 1/8" [15.04 m] 36'-10 1/8" [11.23 m]
14	Air Duct
15	Fillhole Dia. 10" [254 cm]
16	Dryer Center to Spout: 7'-3 3/4" [2.22 m]
17	Linear Limits
18	AMC
19	HL
20	10'-7 1/8' [3.23 m]
	Modules:
21	3157-102
22	3157-57
23	3157-61
24	3157-62
25	3157-66
26	3157-67
27	3157-69
28	3157-70
29	3157-71
30	3157-76
31	3157-78 Roof Module
34	3157-117
35	3157-89 (ME option)
36	3157-103 (ME option)
37	3157-108
38	3157-113 (ME option)
39	3157-114
40	Internal Platform 3121-00160
41	3157-121
42	External Service Walkway
43	Roof Platform

Model ME2650S





Item	Description
1	Sidewall Dia. 11'-6" [3 505]
2	Burner
3	Height, Pad to Discharge: 2'-6 1/2" [775 cm]
4	Overall Height: 81'-7 1/8" [24.87 m]
5	Walkway Handrail-to-Handrail Outside Dia.: 17'-10" [5.44 m]
6	Garner: Solid Skin Outside
7	Top Moisture Sensor
8	Top Grain Level Switch
9	Plenum Floor
10	Moisture Equalizer 10A: Level 1 10B: Level 2 10C: Level 3
11	Discharge Distance from Sidewall: 1'-11" [58.4 cm]
12	Steep: Solid Skins Ins/Outside
	Pad to Walkway Floors
13B	76'-10 1/8" [23 422]
13C	66'-10 1/8" [20 374]
13D	55-1 1/8 [10 185]
14	
15	Filinole Dia. $10^{-} [234 \text{ cm}]$
10	Dryer Center to Spoul: 7 - 3 3/4 [2.22 m]
1/	Linear Limits
18	AMC
19	HL
20	10-/ 1/8 [5.25 m]
21	Modules: 2157-102
21	2157 57
22	2157 61
23	2157.62
24	2157 66
25	2157 67
20	2157.60
21	2157.70
20	2157 71
29	2157.76
21	2157 79 Doof Module
24	2157-10 KOOI WIOUUIE
25	2157 80 (ME option)
20	2157-69 (ME option)
27	2157-109 (ME Option)
20	2157-112 (ME option)
20	2157-115 (IVIE OPHOII)
39	J1J7-114 Internal Distform 2121 00160
40	111011111 F141101111 5121-00100 2157 101
41	5157-121 External Service Walleway
42	External Service Walkway
43	KOOI Plationii (neight): $\delta 1 - 1/\delta [24 \delta/0]$
*	TOWER OF MIODULE BREAK

230v	3ph	Model	ME1000S	ME1200S	ME1400S	ME1600S	ME1800S	ME2000S	ME2400S	ME2650S
Fan Motor HP			30	30	30	40	40	50	50	60
Fan M	lotor FLA		72	72	72	94	94	118	118	135
Fan M	lotor QTY		2	2	2	2	2	2	2	2
Unloa	d Motor H	IP	5	5	5	5	5	5	5	5
Unloa	d Motor F	LA	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2
Load	Motor HP		10	10	10	10	10	10	10	10
Load	Motor Am	ps	25	25	25	25	25	25	25	25
Contro	ol FLA		4	4	4	4	4	4	4	4
	Total FL	A Amps	186	186	186	230	230	278	278	312
Main	CB Size (A	Amps)	300	300	300	350	350	400	400	500
460v	3ph	Model	ME1000S	ME1200S	ME1400S	ME1600S	ME1800S	ME2000S	ME2400S	ME2650S
460v Fan M	3ph lotor HP	Model	ME1000S 30	ME1200S 30	ME1400S 30	ME1600S 40	ME1800S 40	ME2000S 50	ME2400S 50	ME2650S 60
460v Fan M Fan M	3ph lotor HP lotor FLA	Model	ME1000S 30 36	ME1200S 30 36	ME1400S 30 36	ME1600S 40 47	ME1800S 40 47	ME2000S 50 59	ME2400S 50 59	ME2650S 60 68
460v Fan M Fan M Fan M	3ph lotor HP lotor FLA lotor QTY	Model	ME1000S 30 36 2	ME1200S 30 36 2	ME1400S 30 36 2	ME1600S 40 47 2	ME1800S 40 47 2	ME2000S 50 59 2	ME2400S 50 59 2	ME2650S 60 68 2
460v Fan M Fan M Fan M Unloa	3ph lotor HP lotor FLA lotor QTY d Motor H	Model P	ME1000S 30 36 2 5	ME1200S 30 36 2 5	ME1400S 30 36 2 5	ME1600S 40 47 2 5	ME1800S 40 47 2 5	ME2000S 50 59 2 5	ME2400S 50 59 2 5	ME2650S 60 68 2 5
460v Fan M Fan M Fan M Unloa Unloa	3ph lotor HP lotor FLA lotor QTY d Motor H d Motor F	Model IP LA	ME1000S 30 36 2 5 6.6	ME1200S 30 36 2 5 6.6	ME1400S 30 36 2 5 6.6	ME1600S 40 47 2 5 6.6	ME1800S 40 47 2 5 6.6	ME2000S 50 59 2 5 6.6	ME2400S 50 59 2 5 6.6	ME2650S 60 68 2 5 6.6
460v Fan M Fan M Fan M Unloa Unloa	3ph lotor HP lotor FLA lotor QTY d Motor H d Motor F Motor HP	Model IP LA	ME1000S 30 36 2 5 6.6 10	ME1200S 30 36 2 5 6.6 10	ME1400S 30 36 2 5 6.6 10	ME1600S 40 47 2 5 6.6 10	ME1800S 40 47 2 5 6.6 10	ME2000S 50 59 2 5 6.6 10	ME2400S 50 59 2 5 6.6 10	ME2650S 60 68 2 5 6.6 10
460v Fan M Fan M Fan M Unloa Unloa Load I Load I	3ph lotor HP lotor FLA lotor QTY d Motor F d Motor F Motor HP Motor Am	Model IP LA ps	ME1000S 30 36 2 5 6.6 10 12.5	ME1200S 30 36 2 5 6.6 10 12.5	ME1400S 30 36 2 5 6.6 10 12.5	ME1600S 40 47 2 5 6.6 10 12.5	ME1800S 40 47 2 5 6.6 10 12.5	ME2000S 50 59 2 5 6.6 10 12.5	ME2400S 50 59 2 5 6.6 10 12.5	ME2650S 60 68 2 5 6.6 10 12.5
460v Fan M Fan M Fan M Unloa Unloa Load I Load I Contro	3ph lotor HP lotor FLA lotor QTY d Motor F d Motor F Motor HP Motor Am ol FLA	Model IP LA ps	ME1000S 30 36 2 5 6.6 10 12.5 4	ME1200S 30 36 2 5 6.6 10 12.5 4	ME1400S 30 36 2 5 6.6 10 12.5 4	ME1600S 40 47 2 5 6.6 10 12.5 4	ME1800S 40 47 2 5 6.6 10 12.5 4	ME2000S 50 59 2 5 6.6 10 12.5 4	ME2400S 50 59 2 5 6.6 10 12.5 4	ME2650S 60 68 2 5 6.6 10 12.5 4
460v Fan M Fan M Fan M Unloa Load I Load I Contro	3ph lotor HP lotor FLA lotor QTY d Motor H d Motor HP Motor Am ol FLA Total FLA	Model IP LA ps A Amps	ME1000S 30 36 2 5 6.6 10 12.5 4 95	ME1200S 30 36 2 5 6.6 10 12.5 4 95	ME1400S 30 36 2 5 6.6 10 12.5 4 95	ME1600S 40 47 2 5 6.6 10 12.5 4 117	ME1800S 40 47 2 5 6.6 10 12.5 4 117	ME2000S 50 59 2 5 6.6 10 12.5 4 141	ME2400S 50 59 2 5 6.6 10 12.5 4 141	ME2650S 60 68 2 5 6.6 10 12.5 4 159

Electrical Loads

Blower Drives

Model	ME1000S	ME1200S	ME1400S	ME1600S	ME1800S	ME2000S	ME2400S	ME2650S
Motor		•	•	•		•	•	•
(Cat. No.)	M4104T	M4104T	M4104T	M4110T	M4110T	M4115T	M4115T	M4115T
Frame	286T	286T	286T	324T	324T	326T	326T	326T
HP	30	30	30	40	40	50	50	60
PN	2475-03021	2475-03021	2475-03021	2475-04021	2475-04021	2475-05021	2475-05021	2475-06021
Delta FLA 230	72	72	72	94	94	118	118	135
Delta FLA 460	36	36	36	47	47	59	59	68
RPM	1760	1760	1760	1770	1770	1765	1765	1780
Sheave	5V-8.0" x 2	5V-7.1" x 2	C-8.0" x 2	5V-10.3" x 2	5V-8.5" x 2	5V-12.5" x 3	5V-9.75 x 3"	5V-10.3 x 3"
PD	8	7.1	8	10.3	8.5	12.5	9.75	10.3
PN	2477-00802	2477-00712	2495-00802	2477-01032	2477-00852	2477-01253	2477-00973	2477-01033
Bushing	SK - 1 7/8"	SK - 1 7/8"	SF - 1 7/8"	SK - 2 1/8"	SK - 2 1/8"	SF - 2 1/8"	SF - 2 1/8"	SF - 2 3/8"
PN	2485-00001	2485-00001	2486-00012	2496-00007	2496-00007	2486-00001	2486-00001	2486-00006
Blower		1	1	1	L	1	1	1
Size	40.25"	40.25"	40.25"	40.25"	40.25"	40.25"	40.25"	40.25"
PN	2483-00407	2483-00407	2483-00407	2483-00407	2483-00407	2483-00407	2483-00407	2483-00407
RPM	880	892.6	901.5	977.7	1005.8	1043.6	1078.6	1139.4
Sheave	5V-16.0" x 2	5V-14.0" x 2	C-16.0" x 2	5V-18.7" x 2	5V-15.0" x 2	5V-21.2" x 3	5V-16.0 x 3"	5V-16.0 x 3"
PD	16	14	16	18.7	15	21.2	16	16
PN	2477-01602	2477-01402	2495-01602	2477-01872	2477-01502	2477-02123	2477-01603	2477-01603
Bushing	SF-2 15/16"	SF-2 15/16"	SF-2 15/16"	SF-2 15/16"	SF-2 15/16"	SF-2 15/16"	E-2 15/16"	E-2 15/16"
PN	2486-00010	2486-00010	2486-00010	2486-00010	2486-00010	2486-00010	2477-00211	2477-00211
Belt								•
Size	80	75	78	85	80	95	80	83
Qty	2	2	2	2	2	3	3	3
PN	2494-00805	2494-00755	2492-00783	2494-00855	2494-00805	2494-00955	2494-00805	2494-00835
Belt Tension								
Defl. Inch	0.342	0.342	0.342	0.334	0.334	0.324	0.324	0.324
Load lb.	14-22.1	14-22.1	14-21.8	15-22.1	14-22.1	16-25.5	14-22.1	14-22.1

		Mot	or/Gearbox			Unload Ri r	Intui-DRY® Setup		
Model	HP	RPM	Ratio xx:1	RPM	DR Sprkt	DN Sprkt	RPM	BPH	Min. to Unload
ME1000S	5	3450	60:1	60	13	304	2.46	1750	29.3
ME1200S	5	3450	60:1	60	15	304	2.84	2019	29.3
ME1400S	5	3450	60:1	60	16	304	3.03	2153	31.9
ME1600S	5	3450	60:1	60	18	304	3.4	2423	30.8
ME1800S	5	3450	60:1	60	19	304	3.59	2557	31.3
ME2000S	5	3450	60:1	60	21	304	3.97	2826	31.2
ME2400S	5	3450	60:1	60	24	304	4.54	3230	31.4
ME2650S	5	3450	60:1	60	26	304	4.92	3500	31.9

Unload Drives

Fuel Specifications

Model	ME1000S	ME1200S	ME1400S	ME1600S	ME1800S	ME2000S	ME2400S	ME2650S
Supply Pressure (psi)	8-15 psi							
Typical Burner Usage at 60°F / 15.6°C (drying temp 210°F) (mil. Btu/hr)	5.8	6.4	6.7	8.6	8.8	9.6	10.8	11.4
Typical Burner Usage at 10°F / 12.2°C (drying temp 210°F) (mil. Btu/hr)	7.5	8.2	8.6	11.0	11.2	12.2	13.8	14.5
Pilot Regulator								
Size / model	1/2" / 043-B							
Pilot Regulator Setting (in. wc)	14	14	14	14	14	14	14	14
Spring color / pressure (psi)	green 6-14"							
Main Regulator								
Size / model	2" / 121-8	2" / 121-8	2" / 121-8	2" / 121-8	2" / 121-8	2" / 121-8	2" / 121-8	2" / 121-8
Main Regulator								
Spring color / pressure (psi)	orange 1-2	black 2-4 1/4						

Appendix B: Pre-Startup Electrical Testing and Inspection



Pre-Startup Electrical Testing Is Required!

Electricity can kill! Startup inspections MUST be done with the MAIN POWER LOCKED OUT and TAGGED OUT. Failure to follow these instructions will result in serious injury or death.

With MAIN POWER LOCKED OUT and TAGGED OUT, and with NO VOLTAGE detected, inspect electrical controls and wire connections for tightness.

Review and follow the "Electrical Connection/Disconnection Procedures for Dryer Testing" below, OSHA Lockout/Tagout regulation 1910.33(b)(2) through 1910.333(c)(2), and the "Manufacturer's Recommended Minimum Lockout/ Tagout Energy Control Procedures" in this Manual.

Electrical Connection/Disconnection Procedures for Equipment Testing

A WARNING

IMPORTANT!

Pre-Startup electrical testing is REQUIRED. Procedures outlined on this page provide MINIMUM instructions to be followed by the QUALIFIED ELECTRICAL PERSONNEL performing Startup on this Dryer. Any additional applicable laws, regulations, and codes that may apply to such procedures MUST be followed. Inclusion of these procedures in this Manual does NOT in any way imply that these procedures can be used by unqualified personnel or in substitution for Qualified Electrical Personnel.



These procedures MUST be followed by Installers of BROCK® equipment. Failure to follow these procedures could create a potentially hazardous situation which, if not avoided, could cause serious injury that could lead to death. See the note at left about gualified Installers.

Connecting Procedures:

1. BEFORE ANY TESTING, make certain all Service Disconnects are in the OFF position and LOCKOUTS/TAGOUTS are in place!

- 2. Verify that the Disconnect to the equipment being tested is in the OFF position.
- 3. Verify proper voltage to be used; see the Electrical Loads Chart for this equipment.
- 4. Verify that your voltage tester is operating properly: Test it on a **known live** voltage source to verify that the tester is working properly **before** testing the power source to the equipment.
- 5. Check for voltage at the equipment Disconnect. **NO VOLTAGE** should be present!
- 6. Before powering up, a 10' [3.048 m] area around the open panel to be "energized" will need to be blocked off with a non-conductive perimeter guard. Only properly protected and trained personnel can enter this area when the open Panel is energized.
- 7. You may now TURN ON the Service Disconnect (wherever it is located for your facility, usually in a building away from the equipment), and then turn on the equipment Disconnect to perform all required tests.

Disconnecting Procedures:

- 1. Turn OFF the Motor or Motors, and then turn off the equipment Disconnect.
- 2. Turn OFF, LOCKOUT and TAGOUT the Service Disconnect (wherever it is located at your facility).
 - 3.a. If the purpose of the disconnection is to POWER DOWN while not in use: After the power is locked/tagged OUT, check that all is clear. Then push the START switch to confirm that the unit will not start, as instructed in the Manufacturer's LOCKOUT/TAGOUT Procedures.
 - b. If the purpose of the disconnection is to WORK on the electrical controls, a qualified electrician with proper PPE should perform these tests, after following LOCKOUT/TAGOUT (LOTO) Procedures. The qualified electrician must: verify that the voltage meter being used is working properly (*i.e.*, with a fully charged battery source that will give an accurate reading). Test the voltage meter on a known voltage source, and then confirm after Locking/Tagging out the power source, so there is no voltage present.
 - 4. All Disconnects MUST ALWAYS REMAIN IN THE "OFF" POSITION, LOCKED OUT and TAGGED OUT when not in use!

Manufacturer's Recommended MINIMUM

APPENDIX C: LOCKOUT/TAGOUT Energy Control Procedures

The following procedures amount to minimum instructions for Lockout/Tagout. Any more stringent, current, or up-to-date requirements pursuant to OSHA or other regulations must be followed to the extent applicable.

Purpose

The procedures listed herein are intended to provide minimum instructions to operators and/or end users of products supplied by the Manufacturer. To the extent that applicable laws, regulations, and/or codes, (such as, without limitation, OSHA regulations and requirements), provide more stringent requirements, all erectors, installers, operators and/or end users of the products referenced in this manufacturer's product manual, such applicable laws, regulations and/or codes MUST be followed. Whenever maintenance or servicing is completed to machines or equipment, all such maintenance and servicing shall be completed in accordance with the requirements of OSHA's 1910.147, et seq., including any amendments thereto. Such requirements are designed to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees or operators perform any maintenance or servicing where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Authorized and Affected Individuals

Authorized operators and individuals who must be trained on these procedures include, without limitation, individuals who must lock out or tag out machines or equipment in order to perform servicing or maintenance on that machine or equipment. Affected individuals who must follow these procedures and be trained on the minimum requirements stated herein include individuals whose job responsibilities or operational responsibilities require him/her to operate or use a machine or equipment on which servicing or maintenance may be performed, or whose job responsibilities or operational responsibilities require him/her to work in an area in which such servicing or maintenance is being performed. An individual should not be authorized to perform such job responsibilities and/or operational responsibilities until he/she is properly trained on these procedures and is properly trained to complete such servicing or maintenance tasks.

Service and/or Maintenance

Work place activities such as construction, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines or equipment must be subject to the minimum procedures stated herein and any additional procedures required by applicable law, regulation or code. Additional activities, such as lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes, where the individual performing the activity may be exposed to the unexpected energization or start up of the equipment or release of hazardous energy must also be subject to the minimum procedures stated herein and any additional procedures required by applicable law, regulation or code.

These minimum procedures must be followed by maintenance and setup personnel. Maintenance personnel must follow such minimum procedures in the event that any type of required repair, cleaning, maintenance, inspections, adjusting, or servicing (e.g., electrical, mechanical, or other such servicing that requires entrance into or close contact with the machinery).

Setup personnel must follow these minimum procedures in the event that any type of setup is required (e.g., replacing dies, adjusting guards, adjusting die components / tooling, removal of jammed parts, or other such activities that require entrance into or close contact with the machinery).

Machinery and Equipment

Unlike small appliances or hand tools, industrial machinery requires more than turning off a switch and unplugging. The power for such equipment comes from multiple, interactive energy sources. If all energy sources are not isolated before service (setup and/or maintenance) is performed, an accidental release of energy could occur which could result in serious injury or even death. These forms of energy include: electrical, pneumatic, chemical, thermal, hydraulic, mechanical, or gravity. When machines or equipment need to be serviced, this energy must be isolated so authorized personnel can safely perform the work.

Each individual fitting the above descriptions must be issued locks, with identifying tags, which must be used only by that person. Locks must not be transferable from person to person, and each individual must be held responsible for his/her own locks and keys. Each lock must be numbered and a master list showing the number, and the individual using it, must be under the supervision of the facilities or project site manager.

Lockout/Tagout Procedures

Lockout/Tagout is the preferred method of isolating machines, or equipment, from energy sources. Tagout is to be performed, instead of lockout, only when there is no way to lockout a machine. The authorized maintenance supervisor must be notified if there is no way to lockout a machine. The authorized maintenance supervisor must be notified if there is no way to lockout a machine. The authorized maintenance supervisor must be notified if there is no way to lockout a machine.

Affected individuals must be notified when their machine is to be locked out according to the following method. All types of machinery and equipment mentioned above must be subject to these minimum shutdown, isolation, blocking and securing procedures for Lockout/Tagout.

Step One: Preparation for shutdown

Before an authorized or affected individual turns off a machine or equipment, the authorized individual shall have a working knowledge of the specific equipment, the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

Step Two: Machine or equipment shutdown

The machine or equipment shall be turned off or shut down using the procedures established for that specific machine or piece of equipment. An orderly shutdown must be utilized to avoid any additional, or increased, hazard(s) to individuals as a result of equipment stoppage.

Step Three: Machine or equipment isolation

All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated, in such a manner, as to isolate the machine or equipment from the energy source(s).

Step Four: Lockout/Tagout device application

All types of machinery and equipment listed above fall under these lockout placement, removal, transfer, and responsibility minimum

procedures. Lockout/Tagout devices shall be affixed to each energy isolating device by authorized individuals. Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position. Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited. Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

Step Five: Stored energy

Following the application of Lockout/Tagout devices to energy isolating devices, all potentially hazardous stored or residual energy must be relieved, disconnected, restrained, and otherwise rendered safe. If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

Step Six: Verification of isolation

Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized individual shall verify that isolation and de-energization of the machine or equipment have been accomplished, even though isolation is performed prior to shutdown and is checked at that point. Verify the isolation of the equipment by operating the push button or other normal operating or startup control(s) to make certain the equipment will not operate. Return the operating control(s) to neutral or "off" position after verifying that the equipment is isolated. The machine or equipment is now locked out and servicing or maintenance may safely begin.

Step Seven: Release from Lockout/Tagout.

Before Lockout/Tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized individual(s) to ensure the following:

The machine or equipment: The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

Individuals Present: The work area shall be checked to ensure that all individuals have been safely positioned or removed. After Lockout/ Tagout devices have been removed and before a machine or equipment is started, affected individuals shall be notified that the Lockout/ Tagout device(s) have been removed.

Step Eight: Lockout/Tagout Devices Removal

Each Lockout/Tagout device shall be removed from each energy isolating device by the individual who applied the device. Exception: When the authorized individual who applied the Lockout/Tagout device is not available to remove it, that device may be removed under the direction of the authorized supervisor, provided that specific procedures and training for such removal have been developed, documented and incorporated into the owner's control program. The owner shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized individual who applied it. The specific procedure shall include at least the following elements:

a. Verification by the owner (supervisor / manager) that the authorized individual who applied the device is not at the facility / project site. b. Making all the reasonable efforts to contact the authorized individual to inform him/her that his/her Lockout/Tagout device has been removed.

c. Ensuring that the authorized individual has the knowledge before he/she resumes work at that facility / project site.

Shift or Personnel Changes

When a shift or personnel change occurs, a designated individual shall ensure the continuity of Lockout/Tagout protection.

The designated individual shall provide for the orderly transfer of Lockout/Tagout devices between off-going and on-coming individuals to minimize risk from stored energy.

In general, if a piece of equipment is locked out at shift change, the person on the next shift must apply their lock before the individual who is leaving can remove their lock. In the event that no authorized individual or supervisor is available to transfer the Lockout/Tagout device, a designated department lock can be used to lockout the equipment during this time frame. As soon as the next shift authorized individual is available, he/she must ensure the equipment is properly de-energized and then place their own Lockout/Tagout device on the equipment.

At this point in time the department lock should be removed and returned to its designated storage location. The department lock is never to be used as an individual lockout protection device while servicing or repairing equipment.

Group Lockout/Tagout

If more than one individual is servicing or setting up the machinery, each individual will use their own lock on the lockout. This prevents undue exposure to a potential hazard. The last individual working on the machinery will remove his/her lock and the tag indicating the work has been completed. The locks should remain on the switch until all work has been completed unless it is necessary for the machinery to be operable between servicing and/or maintenance and does not expose the worker or operator to any unnecessary danger.

Operator Training

The owner must provide effective initial training and retraining as necessary and must certify that such training has been given to all workers and operators covered by these minimum procedures. The certification must contain each worker and/or operator's name and dates of training.

For the purposes of these minimum procedures, there are three types of individuals — authorized, affected, and other. The amount and kind of training that each individual should receive is based upon (1) the relationship of that individual's responsibilities in relation to the machine or equipment being locked and tagged out, and (2) the degree of knowledge relevant to hazardous energy that he or she must possess.

For example, the owner's training program for authorized individuals (those who are charged with the responsibility for implementing the energy control procedures and performing the service and maintenance) must cover, at minimum, the following areas: (1) details about the type and magnitude of the hazardous energy sources present in the workplace; and (2) the methods and means necessary to isolate and control those energy sources (i.e., the elements of the energy control procedures). By contrast, affected individuals (usually the machine operators or users) and all other individuals who have access to such machines and/or equipment must be able to: (1) recognize when the control procedure is being implemented; and (2) understand the purpose of the procedure and the importance of not attempting to start up or use the machinery and/or equipment that has been locked or tagged out.

Because an "affected" individual is not one who is performing the service or maintenance, that individual's responsibilities under these minimum procedures are more simple (i.e., whenever there is a Lockout/Tagout device in place on an energy-isolating device, the affected individual must leave it alone and never attempt to operate the machinery and/or equipment).

Every training program must ensure that all authorized and affected individuals understand the purpose, function and restrictions of these minimum energy control procedures and that authorized individuals possess the knowledge and skills necessary for the safe application, use, and removal of energy controls.

Training programs used for compliance with these minimum procedures and/or other more stringent applicable procedures, which are performance-oriented, should deal with the equipment, type(s) of energy, and hazard(s) specific to the environment being covered.

Retraining must be provided, as required, whenever there is a change in work and/or operational assignments, a change in machines, equipment or processes that present a new hazard, or a change in minimum energy control procedures. Additional retraining must be conducted whenever a periodic inspection reveals, or whenever the relevant authorized supervisor has reason to believe, that there are deviations from or inadequacies in the authorized individual's knowledge or use of the minimum required energy control procedure.

Periodic Inspection

A periodic inspection is done, looking at the minimum energy control procedures performed to ensure that such minimum procedures and requirements are being followed. The inspection should be performed monthly by the authorized supervisor with the intent of evaluating the authorized individuals at least once per year. This information should be recorded on a Lockout/Tagout Inspection Sheet / Log. All original copies should be maintained by the owner of the equipment and/or machinery.

Outside personnel (contractors, etc.)

The owner and any third party contractor engaged to perform installation, maintenance or operation of the equipment and/or machinery must advise each other of their respective minimum Lockout/Tagout procedures. Each party must ensure that his or her personnel must understand and comply with all restrictions and / or prohibitions of the other party's minimum energy control procedures.

Administrative Duties

The authorized supervisors are responsible for the daily follow-through of the required minimum procedures for each applicable piece of equipment and/or machinery. Violation of the required minimum procedures set by the owner must be addressed appropriately by the owner and/or authorized supervisor. The owner of the applicable equipment and/or machinery must review and update the required minimum procedures as necessary.

Rev. 09/18/07

Appendix D: Definition of Dry, Free-flowing Grain

The natural angle the Grain or bulk material will form (between the surface where it is placed and the incline face of the conical shape) is the angle of repose for such materials. *CEMA Standard 550* provides expanded definitions and testing procedures used to determine the angle of repose for many different bulk materials. CEMA and ASABE also provide a list of predefined common bulk materials where industry standards are referenced.

This equipment is designed for free-flowing Grain. Grain is free-flowing if the material when poured onto a flat surface will flow in a consistent uniform stream. The content will pile or form a conical shape with the angle of repose consistent with the values stated in CEMA (Examples: typically 21° angle for dry corn and 25° for soybeans). Flowability, a calculation to determine how Grain flows, provides a computational approach to this measurement. If flowability values are greater than 4 and less than 10, they are considered to be free-flowing granular material. (Reference *CEMA Standard 550* for further definition and method of calculation.)

CEMA - Conveyor Equipment Manufacturers Association

ASABE – American Society Agricultural and Biological Engineers

Appendix E: Honeywell Fault Codes

Blink Code* **Fault Description Blink Code* Fault Description** Flame Amplifier Problem Low AC Line Voltage 4-3 1-1 1-2 **AC Quality Problem** 4-4 **Configuration Jumper Problem** 2-1 Unexpected Flame Signal 5-1 PII Fault 2-2 HFS/LFS Fault Flame Signal Absent 5-2 5-3 2-3 Flame Signal Over-range MOS/Start Switch 3-1 **Running ILK Switch Problem** 6-1 **Output Drive Failure** 3-2 Running ILK Switch in Standby 6-2 Internal Fault 3-3 Valve Proving Fault 6-3 **Device Specific Fault** 4-1 Purge Card Problem 6-4 Accessory Fault 4-2 Wiring Problem/Internal Fault 7-7 **Unrecognized Fault**

HONEYWELL Blink Codes

* Blink Codes are read from the green power LED when the relay module is locked out (alarm LED is on). A Blink Code consists of one or more fast blinks followed by one or more slow blinks.

HONEYWELL Keyboard Display Module Sequence and Status Hold Messages

Sequence	Status
INITIATE mm:ss	The Keyboard Display Module (KDM) indicates the burner status, INITIATE, a stabilization period for the relay module to check for any fluctuations in ac line voltage inputs or control inputs on powerup or during normal operation. The timing of the INITIATE period is either two seconds or ten seconds, depending on the model, before entering STANDBY.
If the relay module is in a	n INITIATE HOLD status, the following conditions could exist:
INITIATE HOLD: (AC Frequency/Noise)	The KDM indicates the burner status and that it is waiting for excess line noise to clear up, which prevents sufficient reading of the line voltage inputs. The burner sequence does not advance into STANDBY until the excess line noise ceases or a line frequency error occurs; this is caused by using a 60 Hz device on a 50 Hz line, or vice versa on devices with a date code earlier than 9804.
INITIATE HOLD: (AC Line Dropout)	The KDM indicates the burner status and that ac line power has momentarily dropped out. The burner sequence does not advance into STANDBY until the ac line voltage has stabilized throughout the INITIATE sequence.
INITIATE HOLD: (AC Frequency)	The KDM indicates the burner status and that line frequency is faster than the expected value. The burner sequence does not advance into STANDBY until the line frequency returns to the proper value; this is perhaps caused by using a 60 Hz device on a 50 Hz line for devices with a date code earlier than 9804.
INITIATE HOLD: (Low Line Voltage)	The KDM indicates the burner status and that low line voltage (10% lower than rated voltage) has occurred. The burner sequence does not advance into STANDBY until the line voltage is at a sufficient level for proper operating parameters.
STANDBY	The KDM indicates the burner status, STANDBY. The burner can be placed in STANDBY by opening the burner switch or if the operating controller indicates its setpoint is satisfied. If a demand is present for burner operation, the burner sequence does not advance from STANDBY to PURGE until the recycle limits close. If an Expanded Annunciator is connected, the display messages are enhanced.
If the relay module is in a	STANDBY HOLD status, the following conditions could exist:
STANDBY HOLD: F/G (Flame Detected)	The KDM indicates the burner status and that a flame is detected. A demand is present for burner operation. The sequence does not advance to PREPURGE until the flame signal clears. If the flame signal does not clear within 40 seconds, the relay module locks out.
STANDBY HOLD: T20 (Pre-Ignition Interlock)	The KDM indicates the burner status and that the Pre-Ignition Interlock is not closed. A demand is present for burner operation but the burner sequence does not advance to PREPURGE until the Pre-Ignition Interlock proves closed. If this time exceeds a 30 second hold, the relay module locks out.
STANDBY HOLD: T7 (Lockout Interlock)	The KDM indicates the burner status and that the Lockout Interlock is closed. A demand is present for burner operation but the burner sequence does not advance to PREPURGE until the Lockout Interlock proves open. If this time exceeds the 120 second hold, the relay module locks out.
STANDBY HOLD: T7 (Running Interlock) T17 for EC/RM7810, 7820, 7830, 7850 devices	The KDM indicates the burner status and that the Running Interlock is closed. A demand is present for burner operation, but the burner sequence does not advance to PREPURGE until the Running Interlock proves open. If this time exceeds the 120 second hold, the relay module locks out.

HONEYWELL Keyboard Display Module Sequence and Status Hold Messages (cont'd)

Sequence	Status		
PURGE	The KDM indicates the burner status, PURGE, which is the period of time the blower motor is running before the Ignition period. The timing of the PURGE period is selectable.		
If the relay module is in a	PURGE HOLD status, the following conditions could exist:		
PURGE HOLD: T19 (High Fire Switch)	The KDM indicates the burner status and that the High Fire Switch is not closed. The firing rate motor is driving to its PURGE rate position. If this time exceeds 4 minutes 15 seconds, the relay module locks out.		
PURGE DELAY: T19 (High Fire Switch Jumpered)	The KDM indicates the burner status and that the High Fire Switch is jumpered. The High Fire Switch is bypassed, welded or otherwise prematurely closed. The system automatically adds 30 seconds to allow the firing rate motor additional drive time to reach or near the open damper position before starting the PURGE sequence.		
PURGE HOLD: TEST (Run/Test Switch)	The KDM indicates the burner status and that the Run/Test Switch is in the TEST position. The sequence does not continue until the Run/Test Switch is placed in the RUN position.		
If the relay module is in a	PURGE HOLD status, the following conditions could exist:		
PURGE HOLD: T18 (Low Fire Switch Jumpered)	The KDM indicates the burner status and that the Low Fire Switch is jumpered. The Low Fire Switch is bypassed, welded or otherwise prematurely closed. The system automatically adds 30 seconds to allow the firing rate motor additional drive time to reach or near the closed damper position before starting the ignition sequence.		
PURGE HOLD: F/G (Flame Detected)	The KDM indicates the burner status and that a flame is detected. The burner sequence does not advance through PREPURGE because a flame is detected as being present. The sequence holds waiting for the flame signal to clear. If the time exceeds 30 seconds, the relay module locks out.		
PURGE HOLD: T18 (Low Fire Switch)	The KDM indicates the burner status and that the Low Fire Switch is not closed. The firing rate motor is driving to its Low Fire position in preparation for Ignition Trials. If this time exceeds 4 minutes 15 seconds, the relay module locks out.		
PURGE HOLD: T7 (Running Interlock)	The KDM indicates the burner status and that the Running Interlock is not closed. The sequence does not advance to Ignition until the Running Interlock proves closed. If this time exceeds 30 seconds, the relay module locks out.		
PILOT IGN mm:ss	The KDM indicates the burner status, PILOT IGN, and the timing of the PILOT IGN trial begins, in seconds. During this period, the relay module permits the pilot valve to open and the pilot flame to establish.		

If the relay module is in a PILOT HOLD status, the following condition could exist:

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PILOT HOLD: TEST (Run/Test Switch)	The KDM indicates the burner status, PILOT IGN, and that the Run/Test Switch is in the TEST position. The sequence does not continue until the Run/Test Switch is placed in the RUN position.	
MAIN IGN mm:ss	The KDM indicates the burner status, MAIN IGN, and the timing of the MAIN IGN trial begins, in seconds. During this period, the relay module permits the main valve to open and the main flame to establish.	
RUN	The KDM indicates the burner status, RUN, which is the period of time after the Ignition Trials and before the operating controller setpoint is reached. During this time, the burner is firing under control of the firing rate control.	
If the relay module is in a	RUN HOLD status, the following condition could exist:	
RUN LOWFIRE: TEST (Run/Test Switch)	The KDM indicates the burner status and that the Run/Test Switch is in the TEST position. Normal modulation or operation does not continue until the Run/Test Switch is placed in the RUN position.	
POSTPURGE mm:ss	The KDM indicates the burner status, POSTPURGE, which is the period of time after the RUN period when the blower motor continues to run. The timing of the POSTPURGE period is fifteen seconds.	
Waiting for connection	The KDM has power but is waiting to receive a signal from the relay module to continue operation.	
RESET/ALARM TEST	The KDM indicates the burner status, RESET/ALARM TEST. This condition indicates that the reset button is pressed. If it is held for more than four seconds, the alarm output is energized. The alarm output is de-energized when the reset button is released.	
Additional sequence status information when an expanded annunciator is connected to the relay module:		
BURNER OFF: T6 (Burner Switch) STANDBY	The KDM indicates the Burner Switch is not closed. The burner sequence does not advance to PREPURGE until the Burner Switch closes.	
STANDBY	The KDM indicates the burner status, STANDBY, and that the Operating Control is not closed. The burner sequence does not advance to PREPURGE until the Operating Control closes.	
STANDBY HOLD: T6 (EA Hold Message)	The KDM indicates the burner status, STANDBY, and that a limit is not closed. The burner sequence does not advance to PREPURGE until one or all limits close downstream from the Operating Control.	
STANDBY HOLD: T6 (Circuit Fault)	The KDM indicates the burner status, STANDBY, and that the control input is not closed. The burner sequence does not advance to PREPURGE until the control input closes.	

NOTE: Normal sequences are in bold type, while abnormal sequences are in regular type. This table is for all 7800 SERIES Relay Modules, so all listed steps may not apply to the unit installed.

HONEYWELL Fault Codes: Hold and Fault Message Summary

Fault Code	System Failure	Recommended Troubleshooting
Fault 1 *No Purge Card*	No card is plugged into the purge card slot.	 Make sure the purge card is seated properly. Inspect the purge card and connector on the relay module for damage or contaminants. Reset and sequence the relay module. If the fault code reappears, replace the purge card. Reset and sequence the relay module. If the fault persists, replace the relay module.
Fault 2 *AC Frequen/Noise*	Excess noise or device running on slow ac.	 Check the relay module and display module connections. Reset and sequence the relay module. Check the relay module and make sure that both free
Fault 3 *AC Line Dropout*	Ac line dropout detected.	 Check the relay module power supply and make sure that both fre- quency and voltage meet the specifications. Check the backup power supply, as appropriate.
Fault 4 *AC Frequency*	Device running on fast ac.	
Fault 5 *Low Line Voltage*	Low ac line detected.	
Fault 6 *Purge Card Error*	Purge card timing changed since card was initially read.	 Make sure the purge card is seated properly. Inspect the purge card and connector on the relay module for damage or contaminants. Reset and sequence the relay module. If the fault code reappears, replace the purge card. Reset and sequence the relay module. If the fault persists, replace the relay module.
Fault 7 *Flame Amplifier*	Flame sensed when flame not present.	 Check wiring and correct any errors. Make sure that flame sensor wires are in separate conduits. Check for noise coupling into the flame
Fault 8 *Flame Amp/Shutr*	Flame sensed when no signal expected during shutter-check or Ampli-Check versions.	 detector leadwires. Make sure that flame detector and flame amplifier are compatible. Remove the flame amplifier and inspect connections. Reseat the amplifier. Reset and sequence the relay module. If the code reappears, replace the amplifier and/or the flame detector. If the fault persists, replace the relay module.
Fault 9 *Flame Detected*	Flame sensed when shutter open and no flame is expected during STANDBY.	 Check that flame is not present in the combustion chamber; correct any errors. Check wiring and correct any errors. Make sure that flame sensor wires are in separate conduits. Check for noise coupling into flame detector leadwires. Remove the flame amplifier and inspect its connections. Reseat the amplifier. Reset and sequence the relay module. If the code reappears, replace the amplifier and/or the flame detector. If the fault persists, replace the relay module.
Fault 10 *Pre-Ignition ILK*	Pre-Ignition Interlock fault during STANDBY *EC/ RM7800, 7840, 7838B only).	 Check wiring and correct any errors. Check Pre-Ignition Interlock switches to assure proper functioning. Check fuel valve operation. Reset and sequence the relay module; monitor the Pre-Ignition Interlock status. If the code persists, replace the relay module.
Fault 11 *Running ILK On*	Running Interlock powered at improper sequence point.	 Check wiring to make sure that interlocks are connected properly between terminals 6 and 7. Correct any errors.
Fault 12 *Lockout ILK On*	Lockout Interlock powered at improper point in sequence.	 Reset and sequence the relay module. If the fault persists, measure the voltage between terminals 6 and G (ground), then terminals 7 and G. If there is line supply voltage present at terminal 6.
Fault 13 *Airflow Sw. On*	Combustion airflow interlock fault during STANDBY.	 when the controller is off, the controller switch may be bad or is jumpered. If steps 1 through 3 are correct and there is line supply voltage present at terminal 7 when the controller is closed and the fault persists, check for a welded or jumpered Running Interlock, Lockout Interlock, or Airflow Switch. Correct any errors. If steps 1 through 4 are correct and the fault persists, replace the relay module.

HONEYWELL Fault Codes: Hold and Fault Message Summary

Fault Code	System Failure	Recommended Troubleshooting
Fault 14 *High Fire Sw.*	High Fire Interlock Switch failure to close during PREPURGE.	 Check wiring and correct any errors. Reset and sequence the relay module. Use either the manual motor potentiometer to drive the motor to the High Fire position or use the Run/Test Switch option, if available. Sequence to Prepurge drive to High Fire and place in the Test position. Adjust the High Fire Switch while in this state to make sure that it closes properly. Measure the voltage between terminal 19 and G (ground) while in the Prepurge drive to High Fire state. Line supply voltage should be present. If not, the switch adjustment is incorrect and/or the switch is defective and needs replacing. Reset and sequence the relay module. If line supply voltage was present between the High Fire Switch and terminal 19, and the fault still persists, replace the relay module.
Fault 15 *Flame Detected*	Flame sensed when no flame is expected during STANDBY.	 Check that the flame is not present in the combustion chamber; correct any errors. Make sure that the flame amplifier and flame detector are compatible. Check wiring and correct any errors. Remove the flame amplifier and inspect the connections. Reseat the amplifier. Reset and sequence the relay module. If the code reappears, replace the amplifier and/or the flame detector. If the fault persists, replace the relay module.
Fault 16 *Flame-Out Timer*	No flame detected during Pilot Flame Establishing Period.	 Measure the flame signal. If one exists, make sure it meets specifications. Make any necessary burner adjustments using manufacturer instructions. Make sure that the flame amplifier and flame detector are compatible. If the code reappears, replace the amplifier and/or the flame detector. If the fault persists, replace the relay module.
Fault 17 *Main Flame Fail*	Main flame failure during RUN after flame is established and on for at least 10 seconds.	 Inspect the main fuel valve(s) and connection(s). Make sure that the fuel pressure is high enough to supply fuel to the combustion chamber. Check the flame detector sighting for adequate flame signal throughout the burner firing rate.
Fault 18 *Flame Detected*	Flame sensed when shutter is open and no flame is expected during PREPURGE.	 Check that flame is not present in the combustion chamber. Correct any errors. Make sure that the flame amplifier and flame detector are compatible. Check the wiring and correct any errors. Make sure F and G wires are in individual conduits and protected from stray noise pickup. Remove the flame amplifier and inspect the connectors. Reseat the flame amplifier. Reset and sequence the relay module. If the code reappears, replace the flame amplifier and/or the flame detector. If the fault persists, replace the relay module.
Fault 19 *Main Flame Ign.*	Flame was lost during MFEP or the first 10 seconds of the RUN state.	 Inspect the main fuel valve(s) and connection(s). Make sure that the fuel pressure is high enough to supply fuel to the combustion chamber. Make sure the flame detector is positioned to obtain the required flame signal strength; reset and recycle.
Fault 20 *Low Fire Sw. Off*	Low Fire Interlock switch failure to close during PREPURGE.	 Check wiring and correct any errors. Reset and sequence the relay module. Use either the manual motor potentiometer to drive the motor to the Low Fire position or use the Run/Test Switch option, if available. Sequence to Prepurge drive to Low Fire and place in the Test position. Adjust the Low Fire Switch to make sure that it closes properly. Measure the voltage between terminal 18 and G (ground) while in the Prepurge drive to Low Fire state. Line supply voltage should be present. If not, the switch adjustment is incorrect and/or the switch is defective and needs replacing. Reset and sequence the relay module. If line supply voltage was present between the Low Fire Switch and terminal 18, and the fault still persists, replace the relay module.

HONEYWELL Fault Codes: Hold and Fault Message Summary

Fault Code	System Failure	Recommended Troubleshooting
Fault 21 *Running ILK* Fault 22 *Lockout ILK* Fault 23 *Airflow Switch*	Running Interlock fault during PREPURGE. Lockout Interlock fault during PREPURGE. Combustion airflow interlock fault during PREPURGE.	 Check wiring; correct any errors. Inspect the fan; make sure there is no blockage of the air intake and that it is supplying air. Make sure the Interlock Switches are working properly and that all switch contacts are free of contaminants. Reset and sequence the relay module to PREPURGE (place the Run/Test Switch in the Test position, if available). Measure the voltage between terminals 7 and G (ground). Line voltage should be present. If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 24 *Call Service* Fault 25 *Call Service*	The flame interlock (relay module) was on when it should be off. The flame interlock (relay module) was off when it should be an	 Check for F leadwire routing. Make sure routing is in its conduit and isolated from noise-producing circuits.
Fault 26 *Man-Open Sw. Off*	The Manual Open Valve Switch was off when it should be on (RM7838B only).	 Check wiring and correct any errors. Make sure that the Manual Open Valve Switch is fully open. Make sure that the Manual Open Valve Switch is functioning properly and that the switch contacts are free from contaminants. Reset and sequence the relay module. Make sure that the Manual Open Valve Switch provides an electrical path when closed. Verify that the relay module is receiving power at terminal 17. If steps 1 through 5 are correct and the fault persists, replace the relay module.
Fault 27 *Start Switch On*	Start Switch was on during PREPURGE (RM7838A, RM7838B only).	 Start Switch held on too long. Check wiring; verify that Start Switch is correctly connected. Make sure that the Start Switch is functioning properly and that the switch contacts are free of contaminants. Reset and sequence the relay module to PREPURGE; set the Run/Test Switch to Test. Make sure there is no power at terminal 6 during PREPURGE. If steps 1 through 3 are correct and the fault persists, replace the relay module.
Fault 28 *Pilot Flame Fail*	Pilot flame failure.	 Check pilot valve wiring and operation. Correct any errors. Check fuel supply. Check pilot pressure and repeat pilot turndown test. Check ignition transformer electrode, flame detector, flame detector sighting and flame amplifier. If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 29 *Lockout ILK*	Lockout Interlock fault.	 Check wiring; correct any errors. Inspect the fan; make sure that there is no blockage of the air intake and that it is supplying air. Make sure that the Lockout Interlock Switches are working properly and that all switch contacts are free of contaminants. Reset and sequence the relay module to PREPURGE (place the Run/Test Switch in the Test position, if available). Measure the voltage between terminals 7 and G (ground). Line voltage should be present. If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 30 *Running ILK*	Running Interlock fault.	 Inspect the Running Interlocks, including the Airflow Switch, and the connections. Make sure that the Running Interlocks, including the Airflow Switch, are functioning properly and that switch contacts are free of contaminants. Reset and sequence the relay module to PREPURGE. Set the Run/Test Switch, if available, to Test. Measure the voltage between terminal 7 and G (ground). Line voltage should be present. If steps 1 through 3 are correct and the fault persists, replace the relay module.

Fault Code	System Failure	Recommended Troubleshooting
Fault 31 *Low Fire Sw. Off*	Low Fire Interlock Switch failure to close during RUN (RM7838B only).	 Check wiring; correct any errors. Reset and sequence the relay module. Use either the manual motor position to drive the motor to the Low Fire position, or use the Run/Test Switch option, if available. Sequence to Run drive to Low Fire and place in the Test position. Adjust the Low Fire Switch while in this state to make sure it is closing properly. While in Run, drive to Low Fire state, measure the voltage between terminal 18 and G (ground). Line voltage should be present. If not, the switch adjustment is incorrect and/or the switch is defective and needs replacement. Reset and sequence the relay module. If line voltage was present between the Low Fire Switch and terminal 18 and the fault persists, replace the relay module.
Fault 32 *Airflow Switch*	Combustion Airflow Interlock fault.	 Check wiring; correct any errors. Inspect the fan; make sure there is no blockage of the air intake and it is supplying air. Make sure the Airflow Interlock Switches are working properly and all switch contacts are free of contaminants. Reset and sequence the relay module to PREPURGE. Place the Run/Test Switch in the Test position, if available. Measure the voltage between terminals 7 and G (ground). Line voltage should be present. If steps 1 through 4 are correct and the fault persists, replace the relay module.
Fault 33 *Pre-Ignition ILK*	Pre-Ignition interlock fault.	 Check wiring; correct any errors. Inspect the Pre-Ignition Interlock switches and make sure they function properly. Check fuel valve operation. Valve must close within five seconds. Reset and sequence the relay module. During STANDBY or PREPURGE, measure the voltage between terminal 20 and G (ground). For EC/RM7810, 7820, 7830, 7850, check voltage between terminal 17 and G. Line voltage should be present. If not, the Pre-Ignition Interlock switches could be defective and need replacing. If the fault persists, replace the relay module.
Fault 34 *Control On*	CTL input was energized at the wrong time for the relay module. This fault implies a field wiring error.	 Check wiring; correct any errors. Reset and sequence the relay module. If fault persists, replace the relay module.

Appendix F: Allen Bradley Power Flex 525 Fault Codes, AC Drive

Fault Types, Descriptions and Actions

No.	Fault	Type ⁽¹⁾	Description	Action
F000	No Fault	-	No fault present.	-
F002	Auxiliary Input	1	External trip (Auxiliary) input.	 Check remote wiring. Verify communications programming for intentional fault.
F003	Power Loss	2	Single phase operation detected with excessive load.	 Monitor the incoming AC line for low voltage or line power interruption. Check input fuses. Reduce load.
F004	UnderVoltage	1	DC bus voltage fell below the minimum value.	Monitor the incoming AC line for low voltage or line power interruption.
F005	OverVoltage	1	DC bus voltage exceeded maximum value.	Monitor the AC line for high line voltage or transient conditions. Bus overvoltage can also be caused by motor regeneration. Extend the decel time or install dynamic brake option.
F006	Motor Stalled	1	Drive is unable to accelerate or decelerate motor.	 Increase <u>P041</u>, <u>A442</u>, <u>A444</u>, <u>A446</u> [Accel Time x] or reduce load so drive output current does not exceed the current set by parameter <u>A484</u>, <u>A485</u> [Current Limit x] for too long. Check for overhauling load.
F007	Motor Overload	1	Internal electronic overload trip.	 An excessive motor load exists. Reduce load so drive output current does not exceed the current set by parameter <u>P033</u> [Motor OL Current]. Verify <u>A530</u> [Boost Select] setting.
F008	Heatsink OvrTmp	1	Heatsink/Power Module temperature exceeds a predefined value.	 Check for blocked or dirty heat sink fins. Verify that ambient temperature has not exceeded the rated ambient temperature. Check fan.
F009	CC OvrTmp	1	Control module temperature exceeds a predefined value.	 Check product ambient temperature. Check for airflow obstruction. Check for dirt or debris. Check fan.
F012	HW OverCurrent	2	The drive output current has exceeded the hardware current limit.	Check programming. Check for excess load, improper <u>A530</u> [Boost Select] setting, DC brake volts set too high or other causes of excess current.
F013	Ground Fault	2	A current path to earth ground has been detected at one or more of the drive output terminals.	Check the motor and external wiring to the drive output terminals for a grounded condition.

No.	Fault	Type ⁽¹⁾	Description	Action
F015	Load Loss	2	The output torque current is below the value programmed in <u>A490</u> [Load Loss Level] for a time period greater than the time programmed in <u>A491</u> [Load Loss Time].	 Verify connections between motor and load. Verify level and time requirements
F021	Output Ph Loss	2	Output Phase Loss (if enabled). Configure with <u>A557</u> [Out Phas Loss En].	Verify motor wiring.Verify motor.
F029	Analog In Loss	1	An analog input is configured to fault on signal loss. A signal loss has occurred. Configure with <u>t094</u> [Anlg In V Loss] or <u>t097</u> [Anlg In mA Loss].	 Check for broken/loose connections at inputs. Check parameters.
F033	Auto Rstrt Tries	2	Drive unsuccessfully attempted to reset a fault and resume running for the programmed number of <u>A541</u> [Auto Rstrt Tries].	Correct the cause of the fault and manually clear.
F038	Phase U to Gnd	2	A phase to ground fault has been detected between the drive and motor in this phase.	 Check the wiring between the drive and motor. Check motor for grounded phase.
F039	Phase V to Gnd	-		
F040	Phase W to Gnd			Replace drive if fault cannot be cleared.
F041	Phase UV Short	2	Excessive current has been detected between these two output terminals.	Check the motor and drive output terminal wiving for a shorted
F042	Phase UW Short			condition.
F043	Phase VW Short			 Replace drive if fault cannot be cleared.
F048	Params Defaulted	1	The drive was commanded to write default values to EEPROM.	 Clear the fault or cycle power to the drive. Program the drive parameters as needed.
F059	Safety Open	1	Both of the safety inputs (Safety 1, Safety 2) are not enabled. Configure with <u>t105</u> [Safety Open En].	 Check safety input signals. If not using safety, verify and tighten jumper for I/O terminals S1, S2 and S+.
F063	SW OverCurrent	1	Programmed <u>A486</u> , <u>A488</u> [Shear Pinx Level] has been exceeded for a time period greater than the time programmed in <u>A487</u> , <u>A489</u> [Shear Pin x Time].	 Verify connections between motor and load. Verify level and time requirements.
F064	Drive Overload	2	Drive overload rating has been exceeded.	Reduce load or extend Accel Time.
F070	Power Unit	2	Failure has been detected in the drive power section.	 Check maximum ambient temperature has not been exceeded. Cycle power. Replace drive if fault cannot be cleared.

No.	Fault	Type ⁽¹⁾	Description	Action
F071	DSI Net Loss	2	Control over the Modbus or DSI communication link has been interrupted.	 Cycle power. Check communications cabling. Check Modbus or DSI setting. Check Modbus or DSI status.
F072	Opt Net Loss	2	Control over the network option card's remote network has been interrupted.	 Cycle power. Check communications cabling. Check network adapter setting. Check external network status.
F073	EN Net Loss	2	Control through the embedded EtherNet/IP adapter has been interrupted.	 Cycle power. Check communications cabling. Check EtherNet/IP setting. Check external network status.
F080	Autotune Failure	2	The autotune function was either cancelled by the user or failed.	Restart procedure.
F081	DSI Comm Loss	2	Communications between the drive and the Modbus or DSI master device have been interrupted.	 Cycle power. Check communications cabling. Check Modbus or DSI setting. Check Modbus or DSI status. Modify using <u>C125</u> [Comm Loss Action]. Connecting I/O terminals C1 and C2 to ground may improve noise immunity. Replace wiring, Modbus master device, or control module.
F082	Opt Comm Loss	2	Communications between the drive and the network option card have been interrupted.	 Cycle power. Reinstall option card in drive. Modify using <u>C125</u> [Comm Loss Action]. Replace wiring, port expander, option card, or control module.
F083	EN Comm Loss	2	Internal communications between the drive and the embedded EtherNet/IP adapter have been interrupted.	 Cycle power. Check EtherNet/IP setting. Check drive's Ethernet settings and diagnostic parameters. Modify using <u>C125</u> [Comm Loss Action]. Replace wiring, Ethernet switch, or control module.
F091	Encoder Loss	2	Requires differential encoder. One of the 2 encoder channel signals is missing.	 Check Wiring. If <u>P047</u>, <u>P049</u>, <u>P051</u> [Speed Referencex] = 16 "Positioning" and <u>A535</u> [Motor Fdbk Type] = 5 "Quad Check", swap the Encoder channel inputs or swap any two motor leads. Replace encoder.
F094	Function Loss	2	"Freeze-Fire" (Function Loss) input is inactive, input to the programmed terminal is open.	Close input to the terminal and cycle power.
F100	Parameter Chksum	2	Drive parameter non-volatile storage is corrupted.	Set <u>P053</u> [Reset To Defalts] to 2 "Factory Rset".
F101	External Storage	2	External non-volatile storage has failed.	Set <u>P053</u> [Reset To Defalts] to 2 "Factory Rset".

No.	Fault	Type ⁽¹⁾	Description	Action
F105	C Connect Err	2	Control module was disconnected while drive was powered.	Clear fault and verify all parameter settings. Do not remove or install the control module while power is applied.
F106	Incompat C-P	2	The control module could not recognize the power module.	 Cycle power. Flash with newer firmware version. Replace drive if fault cannot be cleared.
F107	Replaced C-P	2	The control module was mounted to a power module with a different power rating.	Set <u>P053</u> [Reset To Defalts] to any of the reset options.
F109	Mismatch C-P	2	The control module was mounted to a different drive type power module.	Set <u>P053</u> [Reset To Defalts] to any of the reset options.
F110	Keypad Membrane	2	Keypad membrane failure / disconnected.	 Cycle power. Replace control module if fault cannot be cleared.
F111	Safety Hardware	2	Safety input enable hardware malfunction. One of the safety inputs is not enabled.	 Check safety input signals. If not using safety, verify and tighten jumper for I/O terminals S1, S2 and S+. Replace control module if fault cannot be cleared.
F114	uC Failure	2	Microprocessor failure.	 Cycle power. Replace control module if fault cannot be cleared.
F122	I/O Board Fail	2	Failure has been detected in the drive control and I/O section.	 Cycle power. Replace drive or control module if fault cannot be cleared.
F125	Flash Update Req	2	The firmware in the drive is corrupt, mismatched, or incompatible with the hardware.	Perform a firmware flash update operation to attempt to load a valid set of firmware.
F126	NonRecoverablErr	2	A non-recoverable firmware or hardware error was detected. The drive was automatically stopped and reset.	 Clear fault or cycle power to the drive. Replace drive or control module if fault cannot be cleared.
F127	DSIFlashUpdatReq	2	A critical problem with the firmware was detected and the drive is running using backup firmware that only supports DSI communications.	Perform a firmware flash update operation using DSI communications to attempt to load a valid set of firmware.

Appendix G: Plumbing Schematics



Plumbing Train Schematic: Standard LP Domestic


Item	Part No.	Description					
	Main Fuel Train (M)						
1	2434-00164	Valve Gas 2" 3-way, Gas Shutoff					
2	2448-00011	Pressure Regulator 2" 1-2 psi (main)					
3	3 2433-00005 Valve, Safety Pressure Relief 1" 289H 4.5 psi						
4	4 2431-00007 Maxon Shutoff Valve 2 1/2" Manual Reset						
8	2431-00033	Butterfly Valve 2 1/2"					
9	2541-00056	Modulating Actuator Motor, 3-position step					
10	2430-00009	Heat Solenoid Valve 2 1/2"					
11	2434-00201	Ball Valve 2 1/2"					
12A	2460-00026	Pressure Gauge, 0-60 inwc					
12B	2460-00028	Pressure Gauge, 0-100 inwc for SS Burner					
13	2434-00004	Ball Valve 1/2"					
		Pilot Fuel Train (P)					
14	2460-00027	Inlet Gas Pressure Gauge, 0-30 psi					
15	2434-00004	Ball Valve 1/2"					
16	2446-00034	Pilot Regulator, 1/2" 6-14 inwc Spring, 13-20 inwc (orange)					
17	2430-00016	Pilot Solenoid Valve 1/2"					
19	2460-00025	Pressure Gauge, 0-30 inwc					
		Burner Assembly					
20	5508-00001G02	2 Burner Assy, MES w/Baffle					
18.1	2533-00001	Flame Safety Device					
18.2	1268-00003	Flame Sensor - Thermocouple					
18.3	2403-00003	Pilot Spark Ignitor 1-64-4					
18.4	2502-00001	Ignition Transformer .175va 120vac					
		Liquid Propane Fuel Train					
27.1	2433-00017	Valve, Hyd Relief 1/2" npt 300 psi					
27.2	2433-00018	Adapter, Relief Valve					
28	2434-00006	Valve, 3/4" Ball					
30	2430-00061	Valve, 3/4" Ball NC Solenoid-250 psi MOPD					
31	2449-00030	Regulator, 1 npt 10-20 psi					
32	3130-00035	Vaporizer Assembly					



Item	Part No.	Description					
	Main Fuel Train (M)						
1	2434-00161	Valve, 2" Ball CGA (Legend T01002)					
2	2448-00011	Pressure Regulator 2" 1-2 psi (main)					
3	2433-00005	Valve, Safety Pressure Relief 1" 289H 4.5 psi					
4	2431-00007	Maxon Shutoff Valve 2 1/2" Manual Reset					
6A	2431-00033	Butterfly Valve 2 1/2"					
6B	2541-00056	Modulating Actuator Motor, 3-position step					
7	2430-00009	Heat Solenoid Valve 2 1/2"					
8	2434-00201	Ball Valve 2 1/2"					
9A	2460-00026	Pressure Gauge, 0-60 inwc					
10	2434-00004	Ball Valve 1/2"					
11	2445-00015	Spring, Black-121 and 243 VAPO					
	Pilot Fuel Train (P)						
12	2460-00027	Inlet Gas Pressure Gauge, 0-30 psi					
13	2434-00004	Ball Valve 1/2" (Pilot Line Drain)					
14	2446-00034	Pilot Regulator, 1/2" 6-14 inwc					
1.	2110 00021	Spring, 13-20 inwc (orange)					
16	2430-00016	Pilot Solenoid Valve 1/2"					
17	2460-00025	Pressure Gauge, 0-30 inwc					
	Burner Assembly						
18.1	2533-00001	Flame Safety Device					
18.2	1268-00003	Flame Sensor - Thermocouple					
18.3	2403-00003	Pilot Spark Ignitor 1-64-4					
18.4	2502-00001	Ignition Transformer .175va 120vac					
20A	5508-00001G02	Burner Assy, MES w/Baffle					



Appendix G: Plumbing Schematics

Item	Item Part No. Description						
	Main Fuel Train (M)						
1	2448-00011	Pressure Regulator 2" 1-2 psi (Main) 121-8					
2	2429-00030	Pressure Switch Low Gas NO 1-20" wc					
3	2421-00007	Shutoff Valve, 2 1/2"					
4	2431-00023	Switch, Maxon 18428 VCS01Manual Reset					
5	2430-00078	Solenoid Vent Valve 1 1/4" npt NO 120vac					
6	2431-00011	Safety Shutoff Valve 3 npt Auto VOS-2 Motorized Reset					
7	2429-00031	Pressure Switch 40-200" High Gas NC					
8	2431-00033	Modulating Butterfly Valve 2 1/2"					
9	2541-00056	Modulating Actuator Motor, 3-position step					
10 2	2431-00035	CV VLV Proof-of-Closure (POC) Switch Kit					
10	2151 00055	(Canada) 1036373					
11	2434-00201	Ball Valve 2 1/2"					
12	2460-00026	Pressure Gauge, 0-60 inwc, Ashcroft					
13	2434-00004	Ball Valve 1/2" (Main Line Drain)					
13A	2434-00004	Ball Valve					
		Pilot Fuel Train (P)					
14	2460-00027	Pressure Gauge, 0-30 psi Ashcroft w/Plus					
13A	2434-00004	Ball Valve					
15	2446-00034	Pilot Regulator, 1/2" FPT, 6-14" r622-4FISHR					
16	2430-00066	Pilot Solenoid Valve 1/2"					
17	2460-00025	Pressure Gauge, 0-30 inwc, Ashcroft					

Item	Part No.	Description				
	Burner Assembly					
18	3108-00070	Burner Assy, Stainless Steel UV Sensor				
10	3108-00080	Burner Assembly, CS UV				
19	2542-00062	Mini Peeper 1/2" MTG and 24' Leads				
20	2403-00003	Pilot Spark Ignitor 1-64-1				
21	2542-00040	Flame Controller				
22	2502-00001	Ignition Transformer 66VA 120V-10000V 60Hz				
		Liquid Propane Fuel Train				
23	2433-00017	Hydro-Relief Valve 300 psi 1/2" npt				
23	2433-00018	Adapter, Relief Valve				
24	2436-00004	Quick-Release Valve 3/4 npt				
25	2790-00001	Strainer "Y" 3/4" npt				
26	2430-00061	Liquid Solenoid Valve 3/4 npt NC LP				
27	2120-00073	Vaporizer Coil Assembly				
28	2449-00030	Pressure Regulator, set to 10-15-psi				
20	2447-00030	1" - 1/2" orifice, 10-20 Fisher 627				
29	2433-00019	Valve, Pressure Relief 1 npt 25 psi				

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Item	Item Part No. Description					
Main Fuel Train (M)						
1	2434-00161	Valve, 2" Ball-CGA (Leend T-1002)				
2	2448-00011	Pressure Regulator 2" 1-2 psi (Main) 121-8				
3	2433-00005	Pressure Relief Valve 1" 4.5 psi				
4	2425-00030	Pressure Switch Low Gas 1-20" wc				
5	2431-00007	Shutoff Valve, 2 1/2"				
6	2431-00023	Switch, Maxon 18428 VCS01Manual Reset				
7	2430-00078	Solenoid Vent Valve 1 1/4" npt NO 120vac				
8	2431-00011	Safety Shutoff Valve 3 npt Auto VOS-2 Motorized Reset				
9	2429-00031	Pressure Switch 40-200" High Gas NC				
10	2431-00033	Modulating Butterfly Valve 2 1/2"				
11	2541-00056	Modulating Actuator Motor, 3-position step				
12	2 2431-00035 CV VLV Proof-of-Closure (POC) Switch Kit (Canada) 1036373					
13	2434-00201	Ball Valve 2 1/2"				
14	2460-00026	Pressure Gauge, 0-60 inwc, Ashcroft				
15	2434-00004	Ball Valve 1/2"				
		Pilot Fuel Train (P)				
16	2460-00027	Pressure Gauge, 0-30 psi Ashcroft w/Plus				
17	2434-00004	Ball Valve				
18	2446-00034	Pilot Regulator, 1/2" FPT, 6-14" r622-4FISHR				
19	2430-00066	Pilot Solenoid Valve 1/2"				
20	2460-00025	Pressure Gauge, 0-30 inwc, Ashcroft				

Item	Part No.	Description		
		Burner Assembly		
21	3108-00070	Burner Assy, Stainless Steel UV Sensor		
21	3108-00080	Burner Assembly, CS UV		
22	2542-00062	Mini Peeper 1/2" MTG and 24' Leads		
23	2403-00003	Pilot Spark Ignitor 1-64-1		
24	2542-00040	Flame Controller		
25	2502-00001	Ignition Transformer 66VA 120V-10000V 60Hz		

Appendix H: Wet Grain Sample History Sheet

	WET GRAIN SAMPLE HISTORY									
DATE	DATE		Shift		Grain Type		Operator			
Time	Wet Sample Moisture/Temp		Wet Computer Moisture/Temp		Dry Sample Moisture/Temp		Dry Computer Moisture/Temp		Discharge Percent	Burner Temp
						-				

Appendix I: Suggested Replacement Parts List for Dealers

Obtain the Installation Manual from Your Installer

The MEYER® Installation Manual MFH1968 contains additional structural and Parts information. Contact Brock Customer Service at 1-800-541-7900 for this Manual.

Read Your Vendor Literature

Refer to your Vendor literature CD about important Dryer components made by other manufacturers and used by Brock to complete your MEYER® Dryer. If you should require a hard copy of Vendor information, please call Brock Customer Service at 1-800-541-7900, and the information will be mailed to you in hard copy free of charge.

REPLACEMENT PARTS						
Part Number	Description					
2403-00003	Spark Plug, I-64-1 Auburn					
2533-00001	Safety Switch-Flame Relay-BASO					
2534-00060	Thermocouple-60" For BASO					
2460-00025	Gauge, 0-30 Iwc - Ashcroft					
2460-00026	Gauge, 0-60 Iwc - Ashcroft					
2460-00027	Gauge, 0-30 Psi - Ashcroft w/plus Opt					
2502-00001	Transformer, Ign 175va 120v-6000v 60hz					
2539-00020	BMRX-24DC BMRX Rotary					
2539-00021	PCB Assembly-BMRX 12 to 24 VD					
2539-00022	Motor Sync 1-RPM 6V 50/60 Hz					
2541-00056	Mod Motor 3-Position Step					
2541-00071	Probe, Rtd Sensor-oper. Temp.					
2541-00161	Transformer 120vac-24vac-24va Mo					
2541-00076	Probe, Rtd Sensor - AMC					
2542-00063	T-stat: 90-325f, 20' cap					
2542-00046	Switch, Linear Limit 18 ft 210					
2547-00019	Switch, Limit-Oiltight w/Rol					
2547-00052	Switch, Limit-Oiltight Door S					
2601-00003	Wheel, 5" Dia x 2" Wide x .5" ID					
3104-00176	Vertical Roller Assembly					
3104-00177	Radial Roller Assembly					
3725-00015	Moisture Sensor/Connector Assembly					
3728-00082	120Volt AC I/O PCB Intui-DRY®					
3728-00083	CPU PCB Intui-DRY® System					
3728-00084	Safety PCB Intui-DRY®					
3728-00085	24VDC 1/O PCB Intui-DRY®					

Appendix J: Intui-DRY® Quick Start Guide*

NOTE: This Quick Start Guide is an independent document, included here for your convenience. The screens shown may not reflect your particular Dryer type.



INTUI-DRY® DRYER CONTROL QUICK START GUIDE*

Begin by checking that the Intui-Dry® Dryer Control display is connected to the dryer. set-up tests and checks are complete and the main power and gas are on!

Power up the control's display (power up button is located on the underside edge of display)





Startup Options Timed Preheat? Has the dryer been emptied since the last run?

TIP: Typical Pre-heat, for corn at the beginning of the season would be 4 minutes per point of moisture removal e.g. 20% → 15% = 20 minutes. Some recommend 165° F.

START-UP OPTIONS

After pressing RUN, a Start-up Options window appears with these choices:

(5A) Timed Pre-heat? Choose YES for Timed Pre-heat or NO for no Pre-heat

(5B) Dryer Emptied? Select YES or NO if the dryer has been emptied since the last run.

TIP: If dryer was not emptied from last drying session, limit Pre-heat to 5-10 minutes at restart.

TIP: RUN in Auto or Manual mode will

automatically start all systems to begin drying. No need to start the individual systems first.

TIP: At start of a new harvest season or for recently emptied dryers choose YES for Timed Pre-heat.

TIP: Emptied=Yes? The dryer will clear the operating information from the last run and start learning anew. Emptied=No? The dryer will use the information learned from the last drying session to set the operating parameters.

*INTUI-DRY® DRYER CONTROL QUICK START GUIDE is a reference tool for the INTUI-DRY Drver Control and does not replace training and/or operation manual instructions. Refer to the Brock INTUI-DRY Drver Control Operation Manual for expanded explanation of the INTUI-DRY Drver Control.



2-minute sensor calibration, collecting samples of both wet and dry grain, to establish the proper offsets to match up the moisture sensors in the dryer to your moisture

tester. Repeat calibrations every 4 to 5 hours.

*INTUI-DRY® DRYER CONTROL QUICK START GUIDE is a reference tool for the INTUI-DRY Dryer Control and does not replace training and/or operation manual instructions. Refer to the Brock INTUI-DRY Dryer Control Operation Manual for expanded explanation of the INTUI-DRY Dryer Control.

DISTURE SENSO

Page 2 of 4 (Continued on next page)

169°F

13% 13.6% • 33%



(BRO	oc	K)				
- 1	-BROCK SOLID-						
	Dry	ing					
RU	RUN STOP						
AUT	ю	м	ANUAL				
1	169	۴	169°F				
	13%						

D RE-STARTING THE DRYER

in this guide.

1. Acknowledge the error from the alarm screen

SHUTDOWN GUIDE

After pressing STOP, a window opens with TWO Shutdown Choices:

EMERGENCY STOP is immediate

· SOFT STOP puts dryer into cool down phase and then stops



TIP: Make SOFT STOP the first choice

If the dryer shuts down due to an error, the status screen will display OFF.

2. Press the Power Button on the Intui-Dry Control display to restart the dryer and follow the same sequence of choices and events as outlined Cool Down phase operates the fan for a time then stops and Status displays IDLE.

TIP: Any auxiliary reclaim equipment, not controlled by the dryer should be shut down once the cool down is complete.



Alarm Screen Display and Acknowledge button

CONTROLLING INDIVIDUAL SYSTEMS



TIP: If starting systems individually when the dryer is full of grain, turn off the Unload if running. You can start the drying process without needing to stop the Fan or the Load.

*INTUI-DRY® DRYER CONTROL QUICK START GUIDE is a reference tool for the INTUI-DRY Dryer Control and does not replace training and/or operation manual instructions. Refer to the Brock INTUI-DRY Dryer Control Operation Manual for expanded explanation of the INTUI-DRY Dryer Control.

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MFH1937H

CONTROLLING INDIVIDUAL SYSTEMS (Continued)



The Quality/Capacity setting found here. Raising this number will reduce average plenum temperature.

Sensor Calibration process is found here.

TIP: If the Sensor readings are within 0.4% of your tester settings, do not input a change. This is within the margin of error in your tester, the dryer sensors and the sampling process.



Moisture Control display screen



Algorithm Details access is available on Moisture Control display screen



Burner display screen - Plenum Temp



Unload display screen - Unload Rate



Algorithm Details display screen

TIP: Adjust initial **Drying Index** to 1.20 for SQ Series dryers and 1.10 for Tower dryers. Adjustments are not needed after drying begins.

Need More Help? Call Your Brock dealer with your technical support questions.



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BROCK GRAIN SYSTEMS

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*INTUI-DRY® DRYER CONTROL QUICK START GUIDE is a reference tool for the INTUI-DRY Dryer Control and does not replace training and/or operation manual instructions. Refer to the Brock INTUI-DRY Dryer Control Operation Manual for expanded explanation of the INTUI-DRY Dryer Control.

Appendix K: Dryer Startup Report

To insure prompt credit for returned Warranty repair parts, this Report must be completed and submitted to: **Brock Grain Systems**, Grain Conditioning Division, 1750 W. State Road 28, Frankfort IN 46041.

Structural Installation	Complete		Complete
	Incomplete		Incomplete
Platform / Safety Cage Installation	Complete	AC Drive / Soft Start Programming	Complete
Thatform / Safety Cage Instantation	Incomplete	FLA Set	Incomplete
Sensor Installation	Complete	Fan Test / Test Amns	Complete
	Incomplete		Incomplete
Electrical Installation	Complete	Dryer Unload Test / Test Amps	Complete
	Incomplete Dryer Unload Test / Test Amps		Incomplete
Pipe Train / Fuel Supply	Complete	Burner Test (Signal)	Complete
Installation	Incomplete		Incomplete
Plumbing Leak Test	Complete	Sensor Test	Complete
	Incomplete		Incomplete
Voltaga Tast	Complete	Lockout	Complete
voltage lest	Incomplete	LOCKOU	Incomplete
SAFETY Guards in Place	Complete	SAFETY Decels in Place	Complete
	Incomplete		Incomplete
NOTES	~		

Final Test Certificate of Completion

Dryer Model:
Dryer Serial Number:
Facility Name:
Location:
Startup Date:
Technician Name:
Installation Contractor:

We have reviewed the SAFETY Decals, SAFETY instructions, and WARNINGS on the BROCK® MEYER® Dryer and in this Operators Manual. I understand the hazards involved in operating this Dryer and auxiliary equipment.

DATE: / / Signature, Owner-Operator:

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- BROCK SOLID®

Safeguarding Your Grain[®] Since 1957

BROCK GRAIN SYSTEMS A Division of CTB Inc.

Frankfort, Indiana, location: 1750 W. State Road 28 • Frankfort IN 46041 Phone (765) 654-8517 • Fax (765) 654-8510 • Toll Free (800) 541-7900 e-mail: brock@brockgrain.com • Internet: www.graindryers.com

and

P.O. Box 2000 • Milford, Indiana 46542-2000 • U.S.A. Phone +1 (866) 658-4191 • Fax (574) 658-4133

e-mail: brock@brockgrain.com • Internet: http//www.ctbworld.com or www.brockgrain.com

Printed in the U.S.A.

Changes this issue:

There were changes to the Intui-DRY® Controller main screen and other Systems screens; (i.e.), the START button changed to RUN. There were adjustments to the preferred means of operation and stopping the Dryer.

Pages 14-15: TrueGrain[™] Moisture Sensor System (Patent Pending) Decals were added to the diagram.

Page 17: The Power Panel (PP) changed.

Pages 18, 52-53: Control Cabinet Inner Door components were updated. The QPS has been discontinued.

Likewise, the Piston Sampler has been removed from the Base Module of the Dryer.

Page 24: Safety Decals were highlighted on the TrueGrain[™] Moisture Sensor System.

Page 36: Views of the Canadian JIC Box were added.

Page 46: Schematic 3924-00013 has changed to 3924-00047. 3924-00017 has changed to 3924-00048.

Page 47: The TrueGrainTM Moisture Sensor System (Patent Pending) is now a standard feature. Pages 48-49: A note on Roof and/or Manhole variance was added.

Pages 14, 52-53: The Canadian Plumbing Train was updated.

Pages 56-57: A Figure of the Control Board with Honeywell® Burner control was added.

Page 58: The TrueGrain[™] Moisture Sensor System can be mounted in four (4) possible positions.

Page 79: the double Maxon Valves for B&B were updated.

Page 85: The new TrueGrain[™] Moisture Sensor System (Patent Pending) is now standard on MEYER Dryers.

Pages 87-89: Intui-DRY® Alarms changed. The Dryer Alarm Code Color Chart was updated.

Page 102: End-of-Season Shutdown Procedures was moved to this chapter.

Page 116: Appendix D, The **Definition of Dry, Free-flowing Grain** was added. Page 117: **Honeywell Blink Codes** were updated.

Page 132: The Canadian Plumbing Train schematic was updated.

Pages 136-139: The Intui-DRY® Quick-Start Guide was updated.

Pages 146-147: The Fuel Schematic for Canadian Block-and-Bleed LP was updated.

Pages 148-149: Fuel Schematics for Canadian Block-and-Bleed NG was added.

There were trademark updates.

The Brock Grain Systems corporate phone number changed from (574) 658-9141 to (866) 658-9141.

Changes last issue, April 2020 (G.1)

To preserve print resolution, Schematics from the March 2020 issue (G) were moved to a separate online Manual, MFH1968-3E-S.

This change is referenced on pages 6, 9, 37, 40 and 44. There were no other content changes.

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