The D-M-E Integrity™ Control System User's Guide

For World Class Plastic Injection Molding

Integrity™ 24 Zone IMF2400 Mainframe, IFM1000 Frame Module and 24 Integrity ICM1502 Control Modules Shown

Integrity™ (Qty 2) IMC1215 Combined Power/TC Cables

Integrity™ (Qty 2) IMB1200 Mold Terminal Boxes

DME Company, 29111 Stephenson Highway, Madison Heights, MI 48071, www.dme.net
WARRANTY

D-M-E Company warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, D-M-E Company, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. D-M-E Company shall not be obligated to furnish service under this warranty; a) to repair damage resulting from attempts by personnel other than D-M-E Company representatives to repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; or c) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

This warranty excludes replacement of fuses (in the 15 amp models) and damage to the module from the use of improper styles of fuses. Use only ABC type replacement fuses. The maximum allowable fuse rating is 15 amps. Lower ratings may used for improved protection.

SAFETY

D-M-E Company products have been designed to be safe and simple to operate. As with any electronic equipment, you must observe standard safety procedures to protect both yourself and the equipment.

To Prevent Injuries:
- To avoid electrical shock or fire hazard, do not apply voltage to a terminal that exceeds the range specified for that terminal.
- To avoid mechanical injury, electrical shock or fire hazard, do not operate this product with covers or panels removed. All unused slots of a main frame must be covered with the appropriately sized blank panels.
- To avoid electrical shock or fire hazard, do not operate this product when wet.
- To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

To Prevent Product Damage:
- Do not operate this product from a power source that applies more than the voltages specified.
THE D-M-E INTEGRITY™ CONTROL SYSTEM USER'S GUIDE .................................................................1

FOR WORLD CLASS PLASTIC INJECTION MOLDING ..............................................................................1

1. INTEGRITY MAIN FRAME POWER CONSIDERATIONS ........................................................................6

1.1. Hook Up Power Consideration ..............................................................................................................6
1.2. Getting the Covers Off the Frame. (NO POWER ATTACHED.) ...............................................................6

1.2.1. Remove both side covers from the mainframe. They each have four small thumbnail type indents, which a small screwdriver can be placed under to pry the side covers off. ....................................................6
1.2.2. With both side covers off, the Top Cover can be removed by pulling from a side that was previously covered and lifting up off the top. Repeat with the other side of the top cover and the top cover should come off. .................................................................6
1.2.3. Single row 12 zone Frames will have a hinged power supply above the Power Input Hookup Lugs which can be swung up and out of the way. The Power Input Lugs are accessible with a 3/16" T-Handle Hex Wrench. .................................................................6

1.3. Example of Option A - (3 Phase Delta Power) 3 Power wires referenced to each other plus 1 Ground (NO NEUTRAL) .................................................................6

Top View with cover removed. Back View with Power Panel Off. .............................................................6
Option A Shown with Copper GND. Option A Configuration Straps Shown. .................................................................6
Lugs accept 2/0 to 14 AWG Wire. ......................................................................................................................6
1.4. Power Hook up Options at a Glance. All Zones Will Connected Properly - As Easy As 1 - 2 - 3 ............7

2. INTEGRITY SYSTEM QUICK START GUIDE - WITH FRAME MODULE - OUT OF THE BOX ...............8

3. INTEGRITY SYSTEM QUICK START GUIDE - WITHOUT FRAME MODULE - OUT OF THE BOX ..........9

4. ICM - INTEGRITY CONTROL MODULE .................................................................................................10

4.1. ICM - Quick View ........................................................................................................................................10
4.2. ICM - Alarm Icon's (Also See - Display Mode - Diagnostic Menu Display Items - Alarm Values in D.A.Xx) ....11
4.3. Local Power Off/Enable Button and Module Power Status Indicators ......................................................12
4.4. Display Mode Button and Indicators and Upper Display Overview ........................................................12
4.5. Control Mode Button and Status Indicators Overview ..............................................................................16

4.5.1. No Button Presses, Just Status Indicators ... ....................................................................................16
4.5.2. Button Presses with "No Blue Select" Light ....................................................................................16
4.5.3. Button Presses with "Blue Select" Light ON ....................................................................................16

4.6. Blue Module Select Status Indicator and Button Overview .......................................................................16

4.6.1. Select Individual Modules - Press Select Button to Toggle On then OFF .............................................17
4.6.2. Range Select Modules .........................................................................................................................17
4.6.3. Select All/Deselct All from the IFM Frame Module. Turns ALL Modules BLUE LEDS ON or OFF ....17
4.6.4. Group Select Modules from the IFM Frame Module. (Needs Custom Configuration Group Number for ICM's) .................................................................17
4.6.5. Layer Select Modules from the IFM Frame Module. (Needs Custom Configuration Layer Number for ICM's) .................................................................17

4.7. Making Changes Multiple Blue Selected Modules..................................................................................17
4.7.1. Make change from one module for All Selected Modules ........................................................................17
4.7.2. Send Delta +/- Value from the IFM Frame Module to All BLUE ON Selected Modules .................17

4.8. Lower Display with Adjustment Up/Down Digit Buttons Overview ......................................................17

4.8.1. Use the buttons above and below the lower display to adjust the individual digit on this display ............17
4.8.2. Special use of the buttons will be described in the special processing modes where required, such as in Calibration Mode or other Password Level Modes .................................................................18

4.9. ICM - Password Level P.001 - Reset - Normal Control Mode (Simulates a Power Off then ON sequence.) 18

4.9.1. Password to invoke this level is 1001 ........................................................................................................18
4.9.2. This mode basically forces a reset on the module which would be like turning power off then on ....18

4.10. ICM - Password Level P.002 - Select Recipe (F1-Deg F, F2-DegC, or U1 to U9 Custom Recipes) ............18

4.10.1. Password to invoke this level is 1002 ....................................................................................................18
4.10.2. The Lower Display should show "F2" ..................................................................................................18
4.10.3. Use Up/Down Arrows to select the Recipe you wish to load. F1,F2, U1, U2, U3, U4, U5, U6, U7, U8 or U9 ....18
4.10.4. Press the "enter" or Display Mode button. The Upper Display will show your Entry Value .................18
4.10.5. The Lower Value will Show 0. Enter 1 to load into the LOCAL memory and run, or 0 to cancel the entry....18
4.10.6. Press the "enter" or Display Mode button to finish. The module will either return to normal display mode or "Reboot" with the New Selected Recipe Choice. ................................................................. 18

4.11. ICM - PASSWORD LEVEL P.003 - COPY ONE RECIPE TO A CUSTOM RECIPE U1, U2, U3, U4, U5, U6, U7, U8 OR U9. ... 18

4.11.1. Password to invoke this level is 1003. ................................................................. 18
4.11.2. The Lower Display should show F1.U3 which is default for sending a copy of Factory Default F1 to U3. ....................... 18
4.11.3. Use up/down arrows to change the source to the destination recipe (ie F1.U3 has source F1 going to U3). ...................... 18

4.11.4. When you have your select 'source.destination' correct, then press "enter" or the Display Mode button. The displays will swap and the lower display will allow a 0 for cancel or change to 1 for perform copy. Press Enter or Display Mode button to invoke your choice and return to normal display. ................................................................................................................ 18

4.11.5. NOTE: This only copied one recipe to another. If did not reload a different recipe, you must go to Password Level 2 and select which recipe to load. ................................................................. 18

4.12. ICM - PASSWORD LEVEL P.004 - CONFIGURE CUSTOMER USER RECIPE. .......................................................................................................................... 18

4.12.1. Password to invoke this level is 1004. ................................................................. 18
4.12.2. The Lower Display will show " U.0.00 ". Where U.x.00 the x is the user recipe 1 through 9 ............................. 18
4.12.3. Use up/down arrows to select your recipe U.1.00 thru U.9.00. ................................................................. 18
4.12.4. When you have selected the desired recipe, Press the "enter" (Display Mode) Button to select the recipe. .................. 18

4.12.5. The Display will now show " U.1.01". U.1. is the recipe to modify. U.1.01 where .01 is the step or parameter that is showing in the upper display. ................................................................. 18

4.12.6. NOTE: U.1.01 through U.9.01 have step U.x.01 showing in the upper display set to either 0 for Deg F, or 1 for Deg C. It is recommended to start with your desired engineering units to begin with. If you change engineering units, the values in you recipe will NOT change, you will have to change each parameter. ................................................................. 18

4.12.7. General Rules: To select a step to change, use the up arrow button above the "U" in the U.1.01 recipe. This swaps the recipe to the upper display and puts the adjustable parameter in the lower display. Now use the setpoint up/down arrows to adjust this parameter. When done, press the "enter" (display mode key) to enter and swap the displays back. Keep making changes to the desired steps until complete. ................................................................. 18

4.12.8. To End: go to step 99. 1e - U.1.99, press the up arrow button above the "U", in the lower display type 1 to save changes to this recipe and enter 0 cancel this procedure. Press the "enter" (display mode) button to finish. The module will either save the recipe or cancel the recipe and reboot with the previous defaulted recipe. It will NOT necessarily use this recipe. You must go to Password Level 2 and enter this recipe number to load it, it has just been modified and stored. ................................................................. 18

4.13. ICM - PASSWORD LEVEL P.005 - DEFINE CUSTOMER PASSWORDS (NOT IMPLEMENTED.) ................................................................. 18

4.13.1. Password to invoke this level is 1005. ................................................................. 18

4.14. ICM - PASSWORD LEVEL P.006 - CALIBRATION MODE (WILL NOT CONTROL IN THIS MODE.) ................................................................. 19

4.14.1. How to Enter Calibration Mode Through Password Level P.006; Password to invoke this level is 1006. .................... 19
4.14.2. C.1.00 Thermocouple Calibration - done in Degrees F only. ................................................................. 20
4.14.3. C.2.00 Load Amps Calibration ................................................................. 20
4.14.4. C.3.00 AC Volts Calibration ................................................................. 20
4.14.5. C.4.00 Ground Fault "GFI" Calibration ................................................................. 20
4.14.6. C.5.00 Calibration Date Entry Storage (this is not necessary but helpful for ISO) ................................................................. 20

4.15. ICM - PASSWORD LEVEL P.007 - TRY TO RECOVERING FROM RECIPE ERROR BY LOADING ORIGINAL. ................................................................. 20

4.15.1. Password to invoke this level is 1007. ................................................................. 20

4.16. ICM - PASSWORD LEVEL P.008 - FORCE FACTORY DEFAULT CALIBRATION CONSTANTS - NEED TO RECALIBRATE!!! ................................................................. 21

4.16.1. Password to invoke this level is 1008. ................................................................. 21
4.16.2. This attempts to recover from "FErr2" message, which are EEPROM checksum errors. ................................................................. 21

Typically will only occur when new software is Flashed into the module by DME and variables are Added to the Calibration sections of the memory. Could happen if corruption of the memory occurs. ................................................................. 21

4.17. ICM - PASSWORD LEVEL P.009 - FORCE DME FACTORY MODE FOR ALL USER RECIPES - U1 THROUGH U9. ................................................................. 21

4.17.1. Password to invoke this level is 1009. ................................................................. 21
4.17.2. This will over-write all current user configurations Recipes U1 thru U9 and return them to Factory Defaults. ................................................................. 21

4.18. ICM - PASSWORD LEVEL P.010 - OPERATOR DISPLAY PANEL TEST MODE ................................................................. 21

4.18.1. Password to invoke this level is 1010. ................................................................. 21
4.18.2. Stage 1: Turn ON all LED's on Display ................................................................. 21
4.18.3. Stage 2: Press any Operator Panel Button Once - goes into "Scroll ONE LED" at a time mode. ................................................................. 21
4.18.4. Stage 3: Press any Operator Panel Button Once - goes into I/O test Mode. ................................................................. 21
4.18.5. Stage 4: Press both the Enter and the Special Power button together to exit. These buttons are both just below the.. Down Adjustment buttons for the setpoint entry. ................................................................. 21

4.19. JUMPER ON PINS 4&5 CAUSES FRAM TO FACTORY DEFAULTS. SHOULD NEVER BE USED EXCEPT IN RARE OCCASIONS. ................................................................. 21

4.20. ICM1502 - PART NUMBERS AND SPARE PARTS. ................................................................. 21
5. IFM - INTEGRITY FRAME MODULE

5.1. IFM - QUICK OVER VIEW

5.2. IFM - IN A FRAME WITH MULTIPLE ICM MODULES

5.2.1. Display Mode Function (Press Button to Scan the 4 different Display Functions in Normal Use.)

5.2.2. Alarm Acknowledge Function - Silences Internal Latched HORN until New Alarm

5.2.3. Select/Deselect All Function. Turns ALL Modules BLUE LEDS ON or OFF

5.2.4. Special Power Functions - OFF, IDLE, NORMAL, BOOST

5.2.5. Special Processing Functions - Send Delta +/-, Group Select, Layer Select

5.2.6. Enter Button for Special Functions

5.2.7. Master Stop/Setup/Start Function

5.3. IFM - RUNNING WITH MULTIPLE FRAMES AND IFM MODULES

5.4. IFM - SPI (SOCIETY OF PLASTICS INDUSTRY) INTERFACE PORT (NOT IMPLEMENTED)

5.5. IFM - DMECAN GUI INTERFACE PORT WHEN IT BECOMES AVAILABLE

5.6. IFM - ALARM OUTPUT CONNECTOR - LOCATED ON FAN PANEL ON REAR OF MAINFRAME

5.7. IFM - PAGER SERIAL OUTPUT PORT (NOT IMPLEMENTED)

5.8. IFM - PASSWORD LEVELS

5.8.1. Password Level 1 - Frame Number Valid 1-223, default 1

5.8.2. Password Level 2 - Machine ID Valid 0-9999, default 1

5.8.3. Password Level 3 - Horn Alarm Function

5.8.4. Password Level 4 - External Input 2 Function show "EI2.x"

5.8.5. Password Level 9 - Force Factory Defaults

5.8.6. Password Level 10 - Run Display Test Sequence. Diagnostics for buttons and display digits

5.8.7. Jumper on pins 4&5 causes FRAM to Factory Defaults. Should never be used except in rare occasions. Module will

6. IMB-1200 - INTEGRITY MOLD BOX

6.1. IMB - SETTING THE "BOX NUMBER" CONFIGURATION JUMPERS

6.2. IMB-1200 - WIRING TO THE MOLD INFORMATION AND MOUNTING TO THE MOLD DETAILS

7. LEGACY INTEGRITY TO G-SERIES SUPPORT CONVERSION ITEMS

7.1. IMC-1221 INTEGRITY MAIN FRAME CABLE TO G-SERIES "Y" POWER AND J T/C MOLD TERMINAL BOXES

7.2. IMC-1212 G-SERIES "Y" MAIN FRAME CABLE TO INTEGRITY MOLD CONNECTOR BOX IMB-1200

8. SPARE PARTS AND EXPLODED DETAILED VIEWS

8.1. INTEGRITY MAIN FRAME

8.1.1. Frame Connector ID Board Factory Settings

8.1.2. Reserved for next step

8.2. INTEGRITY CONTROL MODULES

8.3. INTEGRITY MOLD TERMINAL BOXES

8.3.1. Mold Terminal Box Factory Settings

8.3.2. Reserved for next step

8.4. INTEGRITY CABLES

8.5. INTEGRITY MAIN FRAME STANDS

8.6. INTEGRITY ACCESSORIES

APPENDIX A: MOLD POWER REQUIREMENT TECHNICAL NOTES

APPENDIX B: TRANSFORMER SIZING TECHNICAL NOTES

APPENDIX C: RECIPE CONFIGURATION SUMMARY DETAILS AND WORKSHEETS
1. Integrity Main Frame Power Considerations

1.1. Hook Up Power Consideration

- A Local Licensed Electrician who knows the local electrical codes should perform the electrical hookup.
- Standard Operation Voltage is 240Vac Nominal 50/60Hz.
  Note: See Appendix B for information on Transformer Sizing for Higher supply Voltages. Also, one should consider that most Hot Runner Plastic Injection Molding Heaters are rated at 240Vac Nominal. If the supply is only 208Vac, the actual wattage that the heater is rated for will be lowered by 25%, ie - a 1,000Watt 240Vac heater running at 208Vac can only supply 750Watts. This can drastically slow down the heat-up rate or effect the ability to get the desired temperatures. See Appendix C for Voltage Correction Factors for heaters.
- The Main Frame Circuit Breaker Amperage Rating Determines the Maximum Available Power that the Frame can deliver.
  Note: A 100 Amp 3 Phase, 3 Wire breaker will allow all 12 zones of Temperature Control to run the full rated 15Amps. In a 24 zone Main Frame the 24 zones of Temperature Control would Average a Maximum of 7.5 Amps per Zone. Many molds do not require this much power and the electrician could figure out the requirements and externally fuse protect the Frame with a lower supply current. This would have to be figured out on a mold by mold basis. See Appendix A for an in-depth discussion on this subject.
- Wire Sizing is recommended to be de-rated for a Maximum Ambient Temperature of 135F inside the DME Main Frame.
- There are 4 different combinations for 240Vac power hookup.
  - (3 Phase Delta Type Power) 3 Power wires referenced to each other plus 1 Ground
  - (3 Phase Wye Type Power) 3 Power Wires Referenced to 1 Neutral Wire plus 1 ground
  - (Single phase Type Power) 2 power wires Referenced to each other plus 1 ground.
  - (Single phase Type Power) 1 Power wire Referenced to 1 Neutral wire plus 1 Ground.

WARNING: The sections following will discuss proper placement of the jumper straps. Improper jumper strap placement can cause power wires to be directly shorted to each other and/or with ground. The straps are located after the mainframes built in circuit breaker.

1.2. Getting the Covers off the Frame. ( NO POWER ATTACHED.)

1.2.1. Remove both side covers from the mainframe. They each have four small thumbnail type indents, which a small screwdriver can be placed under to pry the side covers off.

1.2.2. With both side covers off, the Top Cover can be removed by pulling from a side that was previously covered and lifting up off the top. Repeat with the other side of the top cover and the top cover should come off.

1.2.3. Single row 12 zone Frames will have a hinged power supply above the Power Input Hookup Lugs which can be swung up and out of the way. The Power Input Lugs are accessible with a 3/16" T-Handle Hex Wrench.

1.3. Example of Option A - (3 Phase Delta Power) 3 Power wires referenced to each other plus 1 Ground (no neutral)

![Image of Power Input Hook-up Lugs](image1.png)

![Image of Input Power Configuration Straps](image2.png)

**Fig. 1 - Power Input Hook-up Lugs.**
Use 3/16" T-Handle Hex Wrench
Top View with cover removed.
Option A Shown with Copper GND.
Lugs accept 2/0 to 14 AWG Wire.

**Fig. 2 - Input Power Configuration Straps.**
Use 10mm Deep-Well Socket Wrench.
Back View with Power Entry Panel Off.
Option A Configuration Straps Shown.
1.4. Power Hook up Options at a Glance.  All Zones will Connected Properly - as Easy as 1 - 2 - 3.
   Step 1) Arrange "Input Power Configuration Straps"
   Step 2) Connect Your Power Wires to the  "Power Input Hook Up Lugs"
   Step 3) Make Sure "Line Voltage Select for Fan" is in the proper position (230 or 115 Vac for Fans)

**DONE !!!**

Thanks to the Patented "DME Input Power Configuration Straps and Buss Bar", there is no need to mess with rewiring individual zones !!! What a time saver !!! (Covered by DME Patent #6674006.)
2. Integrity System Quick Start Guide - With Frame Module - Out of the Box

- **FRAME MODULE**
  - RED LED will light for no cable attached or System is turned OFF. Cannot change until a cable is connected to the mold.
  - YELLOW LED will light when power up & Cable attached. It is in a Setup Mode to Adjust modules before starting. Flashes if Cable Type mismatch Alarm.
  - GREEN LED will light when Operator pushes button from Setup Mode YELLOW LED to GREEN Run mode.

- **ICM Module Power**
  - No LED - Disabled
  - LED Flashing - Setup
  - LED Solid - Enabled
  - Press Power Button Module Toggles OFF

- **Display Process Temperature**
  - Automatic Setpoint
  - Boost Normal Idle Off

- **Power Up Delay**
  - Power Up with Cable(s) Connected - Setup Mode
  - Engineering Units on Power Up - Degrees F
  - Cables connected and Mold at Room Temperature - Setup Mode

Note: Set BOX number Jumpers, BOX 1 & BOX 2.
3. Integrity System Quick Start Guide - Without Frame Module - Out of the Box

With no IFM Frame Module, the modules do not know if the cable is connected or disconnected. The individual ICM Control Modules must be turned on one at a time by Pressing the Module Power Button.
4. ICM - Integrity Control Module

4.1. ICM - Quick Overview

Alarm ICON’s and Deviation Meter

Upper Display

Lower Display with Adjustment Up/Down Digit Buttons

Local Power OFF/Enable Button and Module Power Status Indicators

Blue Module Select Status Indicator and Button (Note: When button held down, upper display shows Module Address, Lower Display Shows Frame Number)

Display Mode Button and Indicators
- T/C Temperature
- Percent Power
- Diagnostic Values (Amps, Alarms, etc.)
- Restricted Password Modes

Control Mode Button and Status Indicators (Indicators: Dryout, Automatic, Manual, Slave)
- with Blue Select OFF
  - Automatic Mode
  - Manual Mode
- with Blue Select ON
  - Automatic Mode
  - Master Automatic
  - Manual Mode
  - Master Manual
4.2. ICM - Alarm Icon's (also see - Display Mode - Diagnostic Menu Display Items- Alarm Values in d.A.xx)

- Deviation Meter: High Red Flashing - Alarm Condition
  Factory Default 1 > 40°F, Factory Default 2 > 23°C (User values vary per customer entry)
  Alarm will not be Flashing if a Downward Setpoint Change caused the condition

- Deviation Meter: Low Red Flashing - Alarm Condition
  Factory Default 1 < 40°F, Factory Default 2 < 23°C (User values vary per customer entry)
  Alarm will not be Flashing if Startup or an Upward Setpoint Change caused the condition

- Open Input Alarm (formerly known as OPI)
  Thermocouple Input Opened and Temperature went full scale.

- Reversed Input Alarm (formerly known as BAC)
  Thermocouple Value Decreased and Temperature went to minimum scale.

- Shorted Input Alarm (formerly known as SHI)
  Factory 1 and 2 Default with Thermal Response Alarm Enabled and Minimum Thermal Heatup Rate at maximum power was not maintained; i.e. no thermal response from thermocouple.

- Open Output Alarm (formerly known as OPO)
  A. Applying power to heater and no minimum current in amps is detected.
     - check heater if it is resistively open
     - if heater ok, then check Triac and opto-isolator to see if they failed.
  B. Power Relays are On and No Zero Cross - Blown Load Power Fuse.

- Ground Fault Alarm (formerly known as GFI)
  Current in Amps from One leg of outgoing power to heater does not match the incoming Current Amps from the other outgoing power leg. Heater could be shorted to another source and electrical shock could occur.

- Shorted Output Alarm (formerly known as SHO)
  Power Relays are Enabled and Output Power is 0% and the minimum current in amps is exceeded. Power Relays are Enabled and Current Exceeds the "Over Current Detection is exceeded (default is 15amps.) Alarm Latches until problem corrected. Heat Sink Temp Exceeded.
4.3. Local Power Off/Enable Button and Module Power Status Indicators

- **No IFM Frame Module Attached**

  POWER UP DEPENDS ON LAST STATE OF CONTROL CANNOT RETURN TO "ON" BUT RETURNS TO SETUP

  - LOCAL "OFF" MODE
  - FLASHING SETUP MODE - NO POWER
  - "ON" MODE

- **IFM Frame Module is Attached with ICM Temperature Control Modules in Frame**

  IFM FRAME Module Powers up to either Master Off (Red LED) or Master Setup (Yellow LED)

  - IFM FRAME RED MASTER OFF
  - IFM FRAME YELLOW CABLE CONNECTED AND MASTER SETUP MODE
  - IFM FRAME MASTER RUN MODE AND CABLE CONNECTED

  + Red ON
  - Yellow ON
  - Green ON

  ( ALL OFF )

  ICM REMOTE OFF OR CABLE NOT CONNECTED

  - OR -

  ICM LOCAL "OFF"

  PRESS BUTTON

  PRESS BUTTON

  PRESS BUTTON

  ICM SETUP MODE

  ICM LOCAL "OFF"

  ICM RUN MODE

  ICM LOCAL "OFF"

  +

4.4. Display Mode button and Indicators and Upper Display Overview
Diagnostic Menu Display Items - Read Only

Process Values in d.P.xx

<table>
<thead>
<tr>
<th>Lower Display</th>
<th>Upper Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>d.P.00</td>
<td>°F</td>
<td>Engineering Units (Degrees F or Degrees C)</td>
</tr>
<tr>
<td>d.P.01</td>
<td>1.51 **</td>
<td>Load Current in Amps (0.00 to 15.00) &quot;Peak RMS Amps&quot;</td>
</tr>
<tr>
<td>d.P.02</td>
<td>237 **</td>
<td>Line Voltage (85 to 265 Vac)</td>
</tr>
<tr>
<td>d.P.03</td>
<td>60</td>
<td>Hertz Detection (50 or 60)</td>
</tr>
<tr>
<td>d.P.04</td>
<td>.01</td>
<td>GFI Ground Fault Amps</td>
</tr>
<tr>
<td>d.P.05</td>
<td>355</td>
<td>Wattage of Heater Maximum Available (P=VxI)</td>
</tr>
<tr>
<td>d.P.06</td>
<td>158</td>
<td>Resistance of Heater in Ohms (R=V/I)</td>
</tr>
<tr>
<td>d.P.07</td>
<td>1</td>
<td>Mold Terminal Box Number if connected</td>
</tr>
<tr>
<td>d.P.08</td>
<td>5</td>
<td>Zone in Mold Terminal Box if connected</td>
</tr>
</tbody>
</table>

** note: values will flash in Phase Angle firing mode when not accurate.

Alarm Values in d.A.xx (also see - ICM - Alarm Icon’s)

<table>
<thead>
<tr>
<th>Lower Display</th>
<th>Upper Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>d.A.00</td>
<td>nOnE</td>
<td>Alarm Horn (&quot;nOnE&quot; or LA Latched Alarm or A Alarm)</td>
</tr>
<tr>
<td>d.A.01</td>
<td>OFF</td>
<td>Shorted Output Alarm (On or OFF)</td>
</tr>
<tr>
<td>d.A.02</td>
<td>OFF</td>
<td>Open Output Alarm (On or OFF)</td>
</tr>
<tr>
<td>d.A.03</td>
<td>OFF</td>
<td>Ground Fault Alarm (On or OFF)</td>
</tr>
<tr>
<td>d.A.04</td>
<td>OFF</td>
<td>Shorted Input Alarm (On or OFF)</td>
</tr>
<tr>
<td>d.A.05</td>
<td>OFF</td>
<td>Reversed Input Alarm (On or OFF)</td>
</tr>
<tr>
<td>d.A.06</td>
<td>OFF</td>
<td>Open Input Alarm (On or OFF)</td>
</tr>
<tr>
<td>d.A.07</td>
<td>OFF</td>
<td>Heat Sink Alarm (On or OFF)</td>
</tr>
<tr>
<td>d.A.08</td>
<td>OFF</td>
<td>Load Fuse Failure Alarm (On or OFF)</td>
</tr>
<tr>
<td>d.A.09</td>
<td>OFF</td>
<td>Deviation Horn Alarm (Process Deviation Band- On or OFF)</td>
</tr>
<tr>
<td>d.A.10</td>
<td>OFF</td>
<td>Over Current (Amps) Detection (On or OFF)</td>
</tr>
<tr>
<td>d.A.11</td>
<td>OFF</td>
<td>Dryout Alarm - Dryout Lock Mode Only (On or Off)</td>
</tr>
</tbody>
</table>
**Calibration Date Values in d.C.xx**

<table>
<thead>
<tr>
<th>Lower Display</th>
<th>Upper Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>d.C.00</td>
<td>2007</td>
<td>Year of Calibration xxxx</td>
</tr>
<tr>
<td>d.C.01</td>
<td>03</td>
<td>Month of Calibration xx</td>
</tr>
<tr>
<td>d.C.02</td>
<td>05</td>
<td>Day of the Month of Calibration xx</td>
</tr>
</tbody>
</table>

**Firmware Values in d.F.xx**

<table>
<thead>
<tr>
<th>Lower Display</th>
<th>Upper Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>= DME catalogue model number =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.F.00</td>
<td>0001</td>
<td>ModelNumber ICM 1502</td>
</tr>
<tr>
<td>d.F.01</td>
<td>0001</td>
<td>ModelReleaseVersion</td>
</tr>
<tr>
<td>d.F.02</td>
<td>0000</td>
<td>ModelSpecialVersion</td>
</tr>
<tr>
<td>= ICM software =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.F.03</td>
<td>0001</td>
<td>SoftwareReleaseVersion</td>
</tr>
<tr>
<td>d.F.04</td>
<td>0000</td>
<td>SoftwareMajorVersion</td>
</tr>
<tr>
<td>d.F.05</td>
<td>0000</td>
<td>SoftwareMinorVersion</td>
</tr>
<tr>
<td>= DME CAN Protocol =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.F.06</td>
<td>0001</td>
<td>ProtocolReleaseVersion</td>
</tr>
<tr>
<td>d.F.07</td>
<td>0000</td>
<td>ProtocolMajorVersion</td>
</tr>
<tr>
<td>d.F.08</td>
<td>0000</td>
<td>ProtocolMinorVersion</td>
</tr>
<tr>
<td>= ICM module types =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.F.09</td>
<td>03</td>
<td>NumberOfTypes</td>
</tr>
<tr>
<td>d.F.10</td>
<td>00</td>
<td>GlobalType</td>
</tr>
<tr>
<td>d.F.11</td>
<td>01</td>
<td>FamilyType</td>
</tr>
<tr>
<td>d.F.12</td>
<td>254</td>
<td>ICM Type (254 = FE hex)</td>
</tr>
</tbody>
</table>
### Local Configurations d.L.xx

<table>
<thead>
<tr>
<th>Menu</th>
<th>Description</th>
<th>Upper Display</th>
<th>Customer Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>d.L.00</td>
<td>Source of Running Configuration</td>
<td>F1 F2</td>
<td>F1 = Deg. F Default, F2 = Deg. C Default, U1,...,U9 = custom configurations</td>
</tr>
<tr>
<td>d.L.01</td>
<td>Engineering Units - Deg F/C</td>
<td>0 1</td>
<td>0=F(50-1200F), 1=C(10-650C)</td>
</tr>
<tr>
<td>d.L.02</td>
<td>Sensor Type</td>
<td>1 1</td>
<td>0=none, 1=J T/C, 2=K T/C</td>
</tr>
<tr>
<td>d.L.03</td>
<td>GACF Boost Enable</td>
<td>1 1</td>
<td>0=disabled, 1=enabled</td>
</tr>
<tr>
<td>d.L.04</td>
<td>GACF Boost Value</td>
<td>50 25</td>
<td>+1 to +255 (Deg F/C)</td>
</tr>
<tr>
<td>d.L.05</td>
<td>GACF IDLE Enable</td>
<td>1 1</td>
<td>0=disabled, 1=enabled</td>
</tr>
<tr>
<td>d.L.06</td>
<td>GACF IDLE Value</td>
<td>212 100</td>
<td>Refer to Engineering Units Deg F/C</td>
</tr>
<tr>
<td>d.L.07</td>
<td>GACF OFF Enable</td>
<td>1 1</td>
<td>0=disabled, 1=enabled</td>
</tr>
<tr>
<td>d.L.08</td>
<td>AutoSetPointMode</td>
<td>0 0</td>
<td>0=Normal, 1=Enable fixed +/- Adj. Bands</td>
</tr>
<tr>
<td>d.L.09</td>
<td>Auto Setpoint Fixed +Adj.</td>
<td>450 235</td>
<td>&gt;=Adj. (Refer to Engineering Units Deg F/C)</td>
</tr>
<tr>
<td>d.L.10</td>
<td>Auto Setpoint Fixed -Adj.</td>
<td>400 200</td>
<td>&lt;=Adj. (Refer to Engineering Units Deg F/C)</td>
</tr>
<tr>
<td>d.L.11</td>
<td>ManualSetpointMode</td>
<td>0 0</td>
<td>0=Normal, 1=Enable fixed +/- Adj. Bands</td>
</tr>
<tr>
<td>d.L.12</td>
<td>Manual Setpoint Fixed +Adj.</td>
<td>15 15</td>
<td>1 to 100 &gt;-Adj. (percent power)</td>
</tr>
<tr>
<td>d.L.13</td>
<td>Manual Setpoint Fixed -Adj.</td>
<td>5 5</td>
<td>0 to 99 &lt; +Adj. (percent power)</td>
</tr>
<tr>
<td>d.L.14</td>
<td>Automatic Boost Enable</td>
<td>0 0</td>
<td>0=disabled, 1=enabled</td>
</tr>
<tr>
<td>d.L.15</td>
<td>Automatic Boost Value</td>
<td>50 25</td>
<td>+1 to +255 (Deg F/C)</td>
</tr>
<tr>
<td>d.L.16</td>
<td>Lights Out Enable</td>
<td>0 0</td>
<td>0=disabled, 1=enabled</td>
</tr>
<tr>
<td>d.L.17</td>
<td>Auto Bumpless Transfer Enable</td>
<td>1 1</td>
<td>0=disabled, 1=enabled</td>
</tr>
<tr>
<td>d.L.18</td>
<td>Maximum Power Auto Mode</td>
<td>100 100</td>
<td>25 to 100 (percent power upper limit)</td>
</tr>
<tr>
<td>d.L.19</td>
<td>Maximum Power Manual Mode</td>
<td>100 100</td>
<td>25 to 100 (percent power upper limit)</td>
</tr>
<tr>
<td>d.L.20</td>
<td>Over Current Detection</td>
<td>15 15</td>
<td>3 to 15 amps</td>
</tr>
<tr>
<td>d.L.21</td>
<td>Thermal Response Alarm Enable</td>
<td>1 1</td>
<td>0=disabled, 1=enabled</td>
</tr>
<tr>
<td>d.L.22</td>
<td>Thermal Response Normal/Slow</td>
<td>0 0</td>
<td>0=Normal, 1=Slow Response (large manifolds)</td>
</tr>
<tr>
<td>d.L.23</td>
<td>Deviation Meter: High Red Flashing</td>
<td>30 17</td>
<td>3-255 &gt;High Red Solid (Units per Deg F/C)</td>
</tr>
<tr>
<td>d.L.24</td>
<td>Deviation Meter: High Red Solid</td>
<td>20 11</td>
<td>2-254 &gt;High Yellow Solid (Units per Deg F/C)</td>
</tr>
<tr>
<td>d.L.25</td>
<td>Deviation Meter: High Yellow Solid</td>
<td>10 6</td>
<td>1-253 &gt;Units per Deg F/C (0 at setpoint)</td>
</tr>
<tr>
<td>d.L.26</td>
<td>Deviation Meter: Low Yellow Solid</td>
<td>10 6</td>
<td>1-253 &gt;Units per Deg F/C (0 at setpoint)</td>
</tr>
<tr>
<td>d.L.27</td>
<td>Deviation Meter: Low Red Solid</td>
<td>20 11</td>
<td>2-254 &gt;Low Yellow Solid (Units per Deg F/C)</td>
</tr>
<tr>
<td>d.L.28</td>
<td>Deviation Meter: Low Red Flashing</td>
<td>30 17</td>
<td>3-255 &gt;Low Red Solid (Units per Deg F/C)</td>
</tr>
<tr>
<td>d.L.29</td>
<td>Dryout Type</td>
<td>0 0</td>
<td>0=Step Start,Zero Cross, 1=Patented GFI, Phase Angle Fire</td>
</tr>
<tr>
<td>d.L.30</td>
<td>Dryout Lock</td>
<td>0 0</td>
<td>0=No Lock, 1=Locked Dryout</td>
</tr>
<tr>
<td>d.L.31</td>
<td>Controller Control Output</td>
<td>0 0</td>
<td>0=Zero Cross Triac Firing, 1=Phase Angle Triac Firing, 2=Time Proportion</td>
</tr>
<tr>
<td>d.L.32</td>
<td>2)Time Proportion-Cycle Time</td>
<td>10 10</td>
<td>10 to 60 seconds</td>
</tr>
<tr>
<td>d.L.33</td>
<td>2)Time Proportion-Minimum On Time</td>
<td>1 1</td>
<td>0.1 to 60.0 seconds increments of 100 milliseconds</td>
</tr>
<tr>
<td>d.L.34</td>
<td>2)Time Proportion-Minimum Off Time</td>
<td>1 1</td>
<td>0.1 to 60.0 seconds increments of 100 milliseconds</td>
</tr>
<tr>
<td>d.L.35</td>
<td>PID Overshoot Control Enable</td>
<td>1 1</td>
<td>0=disabled, 1=enabled</td>
</tr>
<tr>
<td>d.L.36</td>
<td>PID Control Type</td>
<td>1 1</td>
<td>0=Monitor Mode, 1=Legacy PID, n/a 2=Select PID, 3=Operator Tune, n/a 4=AutoTune</td>
</tr>
<tr>
<td>d.L.37</td>
<td>3) Operator Tune - Gain</td>
<td>100 100</td>
<td>Only when d.L.36 PID Control Type = 3 Operator Tune</td>
</tr>
<tr>
<td>d.L.38</td>
<td>3) Operator Tune - Reset</td>
<td>100 100</td>
<td>Only when d.L.36 PID Control Type = 3 Operator Tune</td>
</tr>
<tr>
<td>d.L.39</td>
<td>3) Operator Tune - Derivative</td>
<td>0 0</td>
<td>Only when d.L.36 PID Control Type = 3 Operator Tune</td>
</tr>
<tr>
<td>d.L.40</td>
<td>Process Loading Area</td>
<td>1 1</td>
<td>0=reload original values, 1=reload last changed values for d.L.41 - d.L.46</td>
</tr>
<tr>
<td>d.L.41</td>
<td>First Time Autotune Bit</td>
<td>0 0</td>
<td>Not Available</td>
</tr>
<tr>
<td>d.L.42</td>
<td>Autotune PID Proportional Band</td>
<td>0 0</td>
<td>Not Available (Gain)</td>
</tr>
<tr>
<td>d.L.43</td>
<td>Autotune PID Integration</td>
<td>0 0</td>
<td>Not Available (sample time)</td>
</tr>
<tr>
<td>d.L.44</td>
<td>Autotune PID Derivative</td>
<td>0 0</td>
<td>Not Available (currently not used)</td>
</tr>
<tr>
<td>d.L.45</td>
<td>First Time Bumpless Bit</td>
<td>0 fixed</td>
<td>X=0 for original values, X can only become 1 when stable %Power learned</td>
</tr>
<tr>
<td>d.L.46</td>
<td>Bumpless Transfer Value</td>
<td>0 fixed</td>
<td>X=0 for original values, X becomes stable % Power when learned</td>
</tr>
<tr>
<td>d.L.47</td>
<td>GUI Loading Area</td>
<td>1 1</td>
<td>0=reload original values, 1=reload last changed values for d.L.48 - d.L.56</td>
</tr>
<tr>
<td>d.L.48</td>
<td>T/C Swap Enable Bit</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>d.L.49</td>
<td>T/C Swap Frame ID</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>d.L.50</td>
<td>T/C Swap Address ID</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>d.L.51</td>
<td>Groups Enable Bit</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>d.L.52</td>
<td>Group Number</td>
<td>1 1</td>
<td></td>
</tr>
<tr>
<td>d.L.53</td>
<td>Layers Enable Bit</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>d.L.54</td>
<td>Layer Number</td>
<td>1 1</td>
<td></td>
</tr>
<tr>
<td>d.L.55</td>
<td>Calibrated T/C Trim Enable Bit</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>d.L.56</td>
<td>Calibrated T/C Trim Value</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>d.L.57</td>
<td>Operator Loading Area</td>
<td>1 1</td>
<td>0=reload original values, 1=reload last changed values for d.L.58 - d.L.60</td>
</tr>
<tr>
<td>d.L.58</td>
<td>Auto Setpoint</td>
<td>212 100</td>
<td></td>
</tr>
<tr>
<td>d.L.59</td>
<td>Manual Setpoint</td>
<td>7 7</td>
<td></td>
</tr>
<tr>
<td>d.L.60</td>
<td>Slave's Trim % Power Value</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>d.L.61</td>
<td>d.L.98</td>
<td>0 0</td>
<td>Not Used</td>
</tr>
<tr>
<td>d.L.62</td>
<td>End of Recipe</td>
<td>0 0</td>
<td>Read Only (0 = cancel, 1= save when in configuration mode only)</td>
</tr>
</tbody>
</table>
4.5. Control Mode Button and Status Indicators Overview

4.5.1. No Button Presses, Just Status Indicators

- Automatic Mode

- Manual Mode

- Dryout Modes (power up control mode which applies power to heater to bake moisture out)

  Dryout Mode (default) - Flashing

  Dryout Mode "LOCKED" Solid

  Flashing Control Mode Which will follow Dryout Mode - Shown as Automatic Mode. Could be different combinations of LED's.

  Dryout "Solid" Indicator

  Flahsing Control Mode Which will follow Dryout Mode - Shown as Automatic Mode. Could be different combinations of LED's.

- Master Modes (sends % power to Slaves linked to it)

  Master Automatic Mode

  Master Manual Mode

- Slave Mode (gets % Power from Master Module)

- Bumpless Transfer Mode (Alarm T/C Failure Mode to use last obtained stable % power)

  Automatic and Manual Mode LED Alternate Flashing when in Bumpless Transfer

4.5.2. Button Presses with "NO BLUE SELECT" Light

Blue Select OFF

Auto

Manual

4.5.3. Button Presses with "BLUE SELECT" Light ON

Blue Select ON

Auto

Master/Auto

Manual

Master/Manual

4.6. Blue Module Select Status Indicator and Button Overview
4.6.1. Select Individual Modules - Press Select Button to Toggle On then OFF.

Note that while Pressing the Select Button Down, the Upper display shows the Modules Address and the Lower Display shows the Frame ID. (ie. Upper "A.002", Lower "F.001" which means Frame 1, Module 2)

4.6.2. Range Select Modules
Same procedure above, except, hold the First Module Select Button Down then press a second module Select button down. All the modules with Frame ID's and Module Address which fall within this range will toggle their BLUE SELECT LEDS.

4.6.3. Select All/Deselect All from the IFM Frame Module. Turns ALL Modules BLUE LEDS ON or OFF.

Note that while Pressing and holding this button down, ALL modules Upper display shows the Modules Address and the Lower Display shows the Frame ID. (ie. Upper "A.002", Lower "F.001" means Frame 1, Module 2)

4.6.4. Group Select Modules from the IFM Frame Module. (Needs Custom Configuration Group Number for ICM's)

Any ICM modules which Matches this Group number will toggle it's Blue Select LED ON/OFF.

4.6.5. Layer Select Modules from the IFM Frame Module. (Needs Custom Configuration Layer Number for ICM's)

Any ICM modules which Matches this Layer number will toggle it's Blue Select LED ON/OFF.

4.7. Making Changes multiple Blue Selected Modules

4.7.1. Make change from one module for All Selected Modules
Make a set-point change on one BLUE ON Selected module then PRESS and HOLD it's Select Button until all the BLUE LED's go OFF. New Set-point should be on all Selected modules and the BLUE LED's are now OFF.

4.7.2. Send Delta +/- Value from the IFM Frame Module to All BLUE ON Selected Modules.

ICM modules with BLUE LED's ON will add or subtract the Offset value from it's current Auto Set-point.

4.8. Lower Display with Adjustment Up/Down Digit Buttons Overview

4.8.1. Use the buttons above and below the lower display to adjust the individual digit on this display.
4.8.2. Special use of the buttons will be described in the special processing modes where required, such as in Calibration Mode or other Password Level Modes.

4.9. ICM - Password Level P.001 - Reset - Normal Control Mode (Simulates a Power Off then On sequence.)
4.9.1. Password to invoke this level is 1001. (See Password Level 6 for the first 5 thumbnails but enter this password.)
4.9.2. This mode basically forces a reset on the module which would be like turning power off then on.

4.10. ICM - Password Level P.002 - Select Recipe (F1-Deg F, F2-DegC, or U1 to U9 custom Recipes.)
4.10.1. Password to invoke this level is 1002. (See Password Level 6 for the first 5 thumbnails but enter this password.)
4.10.2. The Lower Display should show "F2".
4.10.3. Use Up/Down Arrows to select the Recipe you wish to load. F1,F2, U1, U2, U3, U4, U5, U6, U7, U8 or U9.
4.10.4. Press the "enter" or Display Mode button. The Upper Display will show your Entry Value.
4.10.5. The Lower Value will Show 0. Enter 1 to load into the LOCAL memory and run, or 0 to cancel the entry.
4.10.6. Press the "enter" or Display Mode button to finish. The module will either return to normal display mode or "Reboot" with the New Selected Recipe Choice.

4.11. ICM - Password Level P.003 - Copy one Recipe to a Custom Recipe U1, U2, U3, U4, U5, U6, U7, U8 or U9.
4.11.1. Password to invoke this level is 1003. (See Password Level 6 for the first 5 thumbnails but enter this password.)
4.11.2. The Lower Display should show F1.U3 which is default for sending a copy of Factory Default F1 to U3.
4.11.3. Use up/down arrows to change the source to the destination recipe (ie F1.U3 has source F1 going to U3).
- F1 is the Factory Default for Degrees F.
- F2 is the Factory Default for Degrees C.
- L1 is currently running in "LOCAL" memory in the controller which has the latest set-point changes, etc.
- U1 thru U9 are available for user custom configurations. (these have a default shipped form the factory but can be changed per the customers needs.

NOTE: Updating a Custom Recipe U1 thru U9. Lets say you have been using U3 as a custom recipe and have made operator adjustments to set-points. These values are stored in the LOCAL memory and NOT the original U3 recipe memory. Even though on power up, the new information can be read from the LOCAL, the LOCAL is not the U3 custom recipe. You have to copy the L1.U3 to update the U3 memory with the current operator changes in the LOCAL. Why update? If you change recipes, then the LOCAL memory will be over-written and the stored information will be lost. Reloading U3 will get the original recipe as stored, NOT the LOCAL memory as modified while being used in production.
4.11.4. When you have your select 'source.destination' correct, then press "enter" or the Display Mode button. The displays will swap and the lower display will allow a 0 for cancel or change to 1 for perform copy. Press Enter or Display Mode button to invoke your choice and return to normal display.
4.11.5. NOTE: This only copied one recipe to another. It did not reload a different recipe, you must go to Password Level 2 and select which recipe to load.

4.12. ICM - Password Level P.004 - Configure Customer User Recipe
(See Appendix C: Recipe Configuration Details and Worksheets.)
4.12.1. Password to invoke this level is 1004. (See Password Level 6 for the first 5 thumbnails but enter this password.)
4.12.2. The Lower Display will show "U.0.00 ". Where U.x.00 the x is the user recipe 1 through 9.
4.12.3. Use up/down arrows to select your recipe U.1.00 thru U.9.00.
4.12.4. When you have selected the desired recipe, Press the "enter" (Display Mode) Button to select the recipe.
4.12.5. The Display will now show "U.1.01". U.1. is the recipe to modify, U.1.01 where .01 is the step or parameter that is showing in the upper display.
4.12.6. NOTE: U.1.01 through U.9.01 have step U.x.01 showing in the upper display set to either 0 for Deg F, or 1 for Deg C. It is recommended to start with a recipe which has your desired engineering units to begin with. If you change engineering units, the values in your recipe will NOT change, you will have to change each parameter.
4.12.7. General Rules: To select a step to change, use the up arrow button above the "U" in the U.1.01 recipe. This swaps the recipe to the upper display and puts the adjustable parameter in the lower display. Now use the setpoint up/down arrows to adjust this parameter. When done, press the "enter" (display mode key) to enter and swap the displays back. Keep making changes to the desired steps until complete.
4.12.8. To End: go to step 99. Ie - U.1.99, press the up arrow button above the "U", in the lower display type 1 to save changes to this recipe and enter 0 cancel this procedure. Press the "enter" (display mode button) to finish. The module will either save the recipe or cancel the recipe and reboot with the previous defaulted recipe. It will NOT necessarily use this recipe. You must go to Password Level 2 and enter this recipe number to load it, it has just been modified and stored.

4.13. ICM - Password Level P.005 - Define Customer Passwords (NOT IMPLEMENTED.)
4.13.1. Password to invoke this level is 1005. (See Password Level 6 for the first 5 thumbnails but enter this password.)
4.14. ICM - Password Level P.006 - Calibration Mode (Will not control in this mode.)

*** NOTE: These routines must be followed exactly in order to prevent problems.

4.14.1. How to Enter Calibration Mode Through Password Level P.006; Password to invoke this level is 1006.

The Following are the Calibration Mode Selections

C.1.00 Thermocouple Calibration
C.2.00 Load Current in Amps
C.3.00 AC Volts Calibration
C.4.00 Ground Fault "GFI" Calibration
C.5.00 TC CAL Verification

See the appropriate section following to get details on each Calibration routine.

ENTER Procedure for Specific Calibration Mode

Select the Item "X" to Calibrate C.X.00

When Correct, press "Enter" - the Display Mode Button

You are in the first step of C.1.00 Calibration Procedure - see individual Calibration Steps

EXIT Procedure

Press "Enter" (Display Mode) to Exit Calibration Mode

Back to Normal Mode
4.14.2. C.1.00 Thermocouple Calibration - done in Degrees F only.
   C.1.01 =>  1 = J type T/C being used for calibration in Degrees F
              2 = K type T/C being used for calibration in Degrees F
               Press Enter
   C.1.02 =>  Enter Actual Room Temperature in Degrees F, press enter
   C.1.03 =>  Short Input on white expansion connector 0 milli-volts, press enter
   C.1.04 =>  Connect 35,000 milli-volts to Input on white Expansion, press enter.
   C.1.05 =>  Upper display will show actual millivolts. Press Enter when satisfied.
   C.1.06 =>  Upper display will show actual CJC Room Temperature in Degrees F.
   C.1.07 =>  Input 500F for Current T/C type from a calibrated source and press enter. This will
              make the final minor offset adjustments.
   C.1.08 =>  Upper display will show the current calculated Thermocouple reading in Degrees F.
               End (upper) 0 (lower) in the lower display either 1= save new calibration values or
               0 = discard new calibration values. Press enter to then proceed.
   C.1.00 in lower display 0 in upper. Select Specific Calibration Mode or Exit Calibration Mode
               procedure.

4.14.3. C.2.00 Load Amps Calibration
   C.2.01 =>  Enter in lower display the actual Load Current in Amps. Press enter.
   C.2.02 =>  Upper display will show the current calculated Amps reading. Press enter when
              satisfied.
               End (upper) 0 (lower) in the lower display either 1= save new calibration values or
               0 = discard new calibration values. Press enter to then proceed.
   C.2.00 in lower display 0 in upper. Select Specific Calibration Mode or Exit Calibration Mode
               procedure.

4.14.4. C.3.00 AC Volts Calibration
   C.3.01 =>  Enter in lower display the actual AC rms Voltage. Press enter.
   C.3.02 =>  Upper display will show the current calculated AC Volts rms reading. Press enter
              when satisfied.
               End (upper) 0 (lower) in the lower display either 1= save new calibration values or
               0 = discard new calibration values. Press enter to then proceed.
   C.3.00 in lower display 0 in upper. Select Specific Calibration Mode or Exit Calibration Mode
               procedure.

4.14.5. C.4.00 Ground Fault "GFI" Calibration
   C.4.01 =>  Enter in lower display the actual Ground Fault Current in Amps.
               Press enter.
   C.4.02 =>  Upper display will show the current calculated Ground Fault Current in Amps
               reading. Press enter when satisfied.
               End (upper) 0 (lower) in the lower display either 1= save new calibration values or
               0 = discard new calibration values. Press enter to then proceed.
   C.4.00 in lower display 0 in upper. Select Specific Calibration Mode or Exit Calibration Mode
               procedure.

4.14.6. C.5.00 Calibration Date Entry Storage (this is not necessary but helpful for ISO)
   C.5.01 =>  Enter 4 digit Year Code (ie Year 2005) Press enter.
   C.5.02 =>  Enter 2 digit Month Code (ie - 11 for November) Press enter.
   C.5.03 =>  Enter 2 digit Day Code (ie - 14 for the 14th day of the month)
               Press enter.
               End (upper) 0 (lower) in the lower display either 1= save new calibration values or
               0 = discard new calibration values. Press enter to then proceed.
   C.5.00 in lower display 0 in upper. Select Specific Calibration Mode or Exit Calibration Mode
               procedure.

4.15. ICM - Password Level P.007 - Try to Recovering from Recipe Error by loading original.
   4.15.1. Password to invoke this level is 1007. (See Password Level 6 for the first 5 thumbnails but enter this password.)
NOTE: On power up, recipes load from a LOCAL copy in memory. The LOCAL copy can allow the operator to keep the last changes to setpoints and other operator variables. If the LOCAL copy gets corrupted, which should not happen, using this password level loads the original Recipe that the operator was using. Ie- if custom Recipe U3 was chosen from Password Level 2, then it will copy the contents of U3 and place them in the LOCAL memory. This LOCAL memory is where operator changes are kept track of. If the operator changes a setpoint, LOCAL is changed, NOT U3. If this LOCAL memory gets corrupted, then this password attempts to recover by reloading a fresh U3 recipe into the LOCAL. It should be close to what was last used.

4.16. ICM - Password Level P.008 - Force Factory Default Calibration Constants - Need to Recalibrate!!!
   4.16.1. Password to invoke this level is 1008. (See Password Level 6 for the first 5 thumbnails but enter this password.)
   4.16.2. This attempts to recover from "FEr2" message, which are EEPROM checksum errors.
   Typically will only occur when new software is Flashed into the module by DME and variables are Added to the Calibration sections of the memory. Could happen if corruption of the memory occurs.

4.17. ICM - Password Level P.009 - Force DME Factory Mode for all User Recipes - U1 through U9.
   4.17.1. Password to invoke this level is 1009. (See Password Level 6 for the first 5 thumbnails but enter this password.)
   4.17.2. This will over-write all current user configurations Recipes U1 thru U9 and return them to Factory Defaults.

4.18. ICM - Password Level P.0.10 - Operator Display Panel Test Mode.
   4.18.1. Password to invoke this level is 1010. (See Password Level 6 for the first 5 thumbnails but enter this password.)
   4.18.2. Stage 1: Turn ON all LED's on Display
      Press/release one button at a time and watch the UPPER associated LED turn ON/OFF.
      Lower display Left Three digits show Module Address as Detected.
      Lower display Right Most Digit shows Misc. I/O on board.
      Upper "-" shows I/O status of Heat sink temperature alarm
      Middle "-" shows I/O status of Frame Data Input Line
      Lower "-" shows I/O status of Frame Clock Input Line
   4.18.5. Stage 4: Press both the Enter and the Special Power button together to exit. These buttons are both just below the Down Adjustment buttons for the setpoint entry.

   Module will need re-calibration and module will loose all stored recipes. Will be returned to Factory conditions, not off the shelf conditions which would add calibration procedures to this. This should only be done if module will not run or light up. Check Module Fuses first and try another module in same slot.

4.20. ICM1502 - Part Numbers and Spare Parts
5. IFM - Integrity Frame Module

5.1. IFM - Quick Over View

- Master Stop/Setup/Start
  - Stop / No Cable Connected
  - Setup / Cable(s) Connected
  - Flashes if Cable Type Mismatch Alarm
  - Run / Cable(s) Connected

- "Enter" Button for Special Functions.
  Press after “Special function” flashing

- Display with Adjustment Up/Down Digit Buttons

- Special Power Functions
  - Boost, Normal, Idle, Off, (Blank/Cancel)
  - Toggle Flashing, then Press "Enter" Sets

- Toggle Select/Deselect All Modules

Special Processing Functions
- Send Setup Info to Modules
- Get and Store Setup Info from Modules
- Power User Functions Menu
  - ie - send +/- Deviation to Selected Modules
  - Toggle Flashing, then Press "Enter" Sets

Display Mode Button and Indicators
- Frame Number
- Local Alarm Horn On/Off Info
- Last Module Alarm Memory and Status
- Restricted Password Modes

Alarm Acknowledge Button and Indicators
- Red Alarm (Sounds Horn)
- Deviation Alarm (No Horn)
- Normal
- Operator Acknowledge (Sounds Horn)
  Press the button to turn off horn till next Alarm occurs.

5.2. IFM - In a Frame with Multiple ICM Modules

5.2.1. Display Mode Function (Press Button to Scan the 4 different Display Functions in Normal Use.)

**Frame Number LED**
Shows the current setting for the Frame Number "F.001" factory default, frame #1
Can be changed through password level 1.

**Local Alarm Horn On/Off Info LED**
Shows status of the built in Alarm Horn "H. On" Enabled or "H.OFF" Disabled.
This allows the Internal Horn to Always Sound or Always be Silenced.
It does not effect the External contacts, they always Work if Alarms Exist.
Password Level 3 Controls this function
1=Horn Disabled "off" (Internal Horn Will never Sound on an Alarm)
2=Horn Enabled "on" (Internal Horn Will Always Sound on an Alarm)
3=user selectable. factory default (Operator Can Turn Horn "H. On" or "H.OFF")
(Operator Uses the Right Most Up/Down Set-point Adjust Button to Turn On or OFF)
(Operator should use the Alarm Acknowledge to silence the Horn, only use this function
to turn Off the Horn if trouble shooting a problem that continually triggers to horn.)
Alarm Message Additional Information Decoding for ICM-1502/1501 Temperature Control Modules

<table>
<thead>
<tr>
<th>&quot;b.xxx&quot; Left Down Setpoint Adjust Button Held</th>
<th>&quot;c.yyy&quot; Right Down Setpoint Adjust Button Held</th>
</tr>
</thead>
<tbody>
<tr>
<td>x in</td>
<td>Decimal</td>
</tr>
<tr>
<td>Binary Bit Position Description</td>
<td>If Binary x=1</td>
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<tr>
<td>d000 0000</td>
<td>Reserved for future use</td>
</tr>
<tr>
<td>d000 0000</td>
<td>Heat Sink Temp Alarm 1=Alarm, 0=OK</td>
</tr>
<tr>
<td>d000 0000</td>
<td>Open TC Alarm 1=on, 0=off</td>
</tr>
<tr>
<td>d000 0000</td>
<td>Reverse TC Alarm 1=on, 0=off</td>
</tr>
<tr>
<td>d000 0000</td>
<td>Shorted TC Alarm 1=on, 0=off</td>
</tr>
<tr>
<td>d000 0000</td>
<td>Ground Fault Alarm 1=on, 0=off</td>
</tr>
<tr>
<td>d000 0000</td>
<td>Open Output Device 1=on, 0=off</td>
</tr>
<tr>
<td>d000 0000</td>
<td>Shorted Output Device 1=on, 0=off</td>
</tr>
</tbody>
</table>

**Conversion Lookup Table Decimal 0-255 to Binary (use b.xxx or c.yyy to lookup xxx or yyy to get Binary)**

<table>
<thead>
<tr>
<th>Binary Value</th>
<th>Decimal</th>
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<td>79</td>
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</tbody>
</table>

- **Conversion Lookup Table**
- **Decimal 0-255**
- **Binary (use b.xxx or c.yyy to lookup xxx or yyy to get Binary)**

---

**Restricted Password Modes LED**
- When the LED is on, it shows a Password Level. See Individual IFM Password Level Section.

5.2.2. Alarm Acknowledge Function - Silences Internal Latched HORN until New Alarm.
- This Button should be the preferred way to Silence the Internal Alarm Horn. The other method for the "Local Alarm Horn On/OFF Info Feature" should only be used when an operator is debugging a currently re-occurring alarm and wants to totally shut the Internal Horn OFF until appropriate, otherwise this feature is On.
- When the Internal Alarm Horn Sounds, Pressing this button will silence the Horn Until the Next New Alarm Occurs.
- The RED Alarm LED may be ON or OFF. If ON -a module is in Alarm; if OFF - no modules are in Alarm

5.2.3. Select/Deselect All Function. Turns ALL Modules BLUE LEDS ON or OFF.

5.2.4. Special Power Functions - OFF, IDLE, NORMAL, BOOST

Pressing the Special Power Functions Button Will Toggle one LED FLASHING. When function is what the operator wants, Press the Enter Button and LED will Go Solid.

Any ICM modules which Matches this Configuration Function Enable Feature will change to this mode, otherwise, then will default to NORMAL. Only one alternate YELLOW LED state per system plus Default GREEN is allowed.
5.2.5. Special Processing Functions - Send Delta +/-, Group Select, Layer Select.

**Send Delta +/- Value to All BLUE ON Selected Modules.**

**Group Select Modules. (Needs Custom Configuration Group Number Match In ICM Modules)**

- **Step 1:** Push till Delta +/- Icon LED is ON.
- **Step 2:** Push Up Arrow till "G" Appears for Group Number.
- **Step 3:** Use Up/Down Arrows to dial in Group Number. Valid between 1 to 255.
- **Step 4:** Press Enter

Any ICM modules which Matches this Group number will toggle it's Blue Select LED ON/OFF.

**Layer Select Modules. (Needs Custom Configuration Layer Number Match in ICM Modules)**

- **Step 1:** Push till Delta +/- Icon LED is ON.
- **Step 2:** Push Up Arrow till "L" Appears for Layer Number.
- **Step 3:** Use Up/Down Arrows To dial in Layer Number. Valid between 1 to 255.
- **Step 4:** Press Enter

Any ICM modules which Matches this Layer number will toggle it's Blue Select LED ON/OFF.

5.2.6. Enter Button for Special Functions

See use in 4.21.4 Special Power Functions - OFF, IDLE, NORMAL, BOOST and 4.21.5 Special Processing Functions - Send Delta +/-, Group Select, Layer Select.
5.2.7. Master Stop/Setup/Start Function

- **IFM Frame Module is Attached with ICM Temperature Control Modules in Frame**
  IFM FRAME Module Powers up to either Master Off (Red LED) or Master Setup (Yellow LED)

IFM FRAME RED MASTER OFF

IFM FRAME YELLOw CABLE CONNECTED AND MASTER SETUP MODE

IFM FRAME MASTER RUN MODE AND CABLE CONNECTED

ICM REMOTE OFF OR CABLE NOT CONNECTED

ICM LOCAL "OFF"

PRESS BUTTON

PRESS BUTTON

PRESS BUTTON

PRESS BUTTON
5.3. IFM - Running with Multiple Frames and IFM modules

Daisy Chain Cable 1 to 1 using DME Catalog Number ICAN-1700. If more than 2 Frames are connected, use additional DME Catalog Number ICAN-1700 cables to Daisy Chained them together.
Each IFM Frame Module MUST BE UNIQUE, ie - F.001, F.002, ... F.00x.
Do NOT Exceed 3 Ft. Length of Cable! ! ! !
Keep Cables as Short As Possible.

5.4. IFM - SPI (Society of Plastics Industry) Interface Port (Not Implemented)
5.5. IFM - DMECAN GUI Interface Port when it becomes available.

DME GUI (Graphical User Interface)
Computer System Connects Here, see the DME GUI Manual.
Daisy Chain Cable 1 to 1 using DME Catalog Number ICAN-1700. If more than 2 Frames are connected, use additional DME Catalog Number ICAN-1700 cables to Daisy Chained them together.
Each IFM Frame Module MUST BE UNIQUE, ie - F.001, F.002, ... F.00x.
Do NOT Exceed 3 Ft. Length of Cable! ! ! !

5.6. IFM - Alarm Output Connector - Located on Fan Panel on Rear of Mainframe.

Daisy Chain Cable 1 to 1 using DME Catalog Number ICAN-1700. If more than 2 Frames are connected, use additional DME Catalog Number ICAN-1700 cables to Daisy Chained them together.
Each IFM Frame Module MUST BE UNIQUE, ie - F.001, F.002, ... F.00x.
Do NOT Exceed 3 Ft. Length of Cable! ! ! !

5.7. IFM - Pager Serial Output Port (Not Implemented)
5.8. IFM - Password Levels

Following procedure shows how to change Frame Module Frame Number to F.002.

Password Menu   Select Level     Swap/Select     Enter Password     Press Enter     Adjust Frame #     Press Enter
Use Up/Down Level - Press for Level
Above ".001" Above "P"

Follow Procedure for Entering Password Levels Below.

5.8.1. Password Level 1 - Frame Number Valid 1-223, default 1.
➤ Each Integrity Frame Module Must be unique. This procedure allows the operator to change the Frame Number.
5.8.1.1.   Enter Password Level P.001
5.8.1.2.   Enter Password for this Level = 2001
5.8.1.3.   Adjust Frame Number F.xxx to desired value. Ie F.002. Note: all units reboot.
5.8.1.4.   Press Enter and you are done. Back to P.001.

5.8.2. Password Level 2 - Machine ID Valid 0-9999, default 1.
➤ Each Injection Molding Machine Station can be identified with a unique number. Useful in future expansion products.
5.8.2.1.   Enter Password Level P.002
5.8.2.2.   Enter Password for this Level = 2002
5.8.2.3.   Adjust Machine ID # xxxx to desired value. Ie factory default = 1.
5.8.2.4.   Press Enter and you are done. Back to P.002.

5.8.3. Password Level 3 - Horn Alarm Function
➤ This feature controls the preference of the internal Horn Alarm Operation.
5.8.3.1.   Enter Password Level P.003
5.8.3.2.   Enter Password for this Level = 2003
5.8.3.3.   Adjust the Internal Horn Preference mode
1=Horn Disabled "off" (Internal Alarm Horn Will Never Sound )
2=Horn Enabled "on" (Internal Alarm Horn Will always sound on new alarm)
3=user selectable. factory default (operator will be able to select on or off)
5.8.3.4.   Press Enter and you are done. Back to P.003.
5.8.4. Password Level 4 - External Input 2 Function show "EI2.x"

- This feature controls the preference of the External Contact Input #2 from the rear of the mainframe. It allows the selection of one of the Special Power Functions, Idle/Standby Heat, Boost or Off to be activated by the external input #2.

5.8.4.1. Enter Password Level P.004
5.8.4.2. Enter Password for this Level = 2004
5.8.4.3. Adjust the Internal Horn Preference mode
  EI2.1 = Standby, factory default
  EI2.2 = Boost
  EI2.3 = OFF

5.8.4.4. Press Enter and you are done. Back to P.004.

5.8.5. Password Level 9 - Force Factory Defaults

- Return Integrity Frame Module to the Factory Default.

5.8.5.1. Enter Password Level P.009
5.8.5.2. Enter Password for this Level = 2009
5.8.5.3. Press Enter and you are done. Back to P.001. Note: all units reboot

5.8.6. Password Level 10 - Run Display Test Sequence. Diagnostics for buttons and display digits.

Password to invoke this level P.010 is 2010.

Stage 1: Turn ON all LED's on Display
Stage 2: Press any Operator Panel Button Once - goes into "Scroll ONE LED" at a time mode.
Stage 3: Press any Operator Panel Button Once - goes into I/O test Mode.
  Press/release one button at a time and watch the Display associated LED turn ON/OFF.
Stage 4: Press both the Enter and the Special Power button together to exit. These buttons are both just below the Down Adjustment buttons for the setpoint entry.

5.8.7. Jumper on pins 4&5 causes FRAM to Factory Defaults. Should never be used except in rare occasions. Module will loose stored recipe conditions and will be returned to Factory Default conditions. This should only be done if module will not run or light up. First have a qualified electrician to check the internal 5 volt supply behind the main breaker and the Option/Fan fuses behind the power entry rear panel. Make sure POWER IS COMPLETELY DISCONNECTED from the Integrity system before this servicing type work.

5.9. IFM1000 - Part Numbers and Spare Parts
6. IMB-1200 - Integrity Mold Box  
6.1. IMB - Setting the "BOX NUMBER" Configuration Jumpers

Each Mold Terminal Box needs a unique "BOX Number" and the customer must set them when installing the boxes on the Mold. See the pictures below to set the box numbers. Always start with Box #1, then 2, etc.
6.2. IMB-1200 - Wiring to the Mold Information and Mounting to the Mold Details
7. Legacy Integrity to G-Series Support Conversion Items
   7.1. IMC-1221 Integrity Main Frame Cable to G-Series "Y" Power and J T/C Mold Terminal Boxes

   NOTE: Cable Connect Signal is limited to the cable being attached at the Main Frame, NOT the MOLD. NOT recommended for new designs.

7.2. IMC-1212 G-Series "Y" Main Frame Cable to Integrity Mold Connector Box IMB-1200

   NOTE: This is for legacy support to use existing Smart Series (tm) Main Frames with the new Integrity Mounting Boxes. NOT recommended for new designs.
8. Spare Parts and Exploded Detailed Views

8.1. Integrity Main Frame

8.1.1. Frame Connector ID Board Factory Settings

8.1.2. Reserved for next step

8.2. Integrity Control Modules

8.3. Integrity Mold Terminal Boxes

8.3.1. Mold Terminal Box Factory Settings

8.3.2. Reserved for next step

8.4. Integrity Cables

8.5. Integrity Main Frame Stands

8.6. Integrity Accessories
Appendix A: Mold Power Requirement Technical Notes

Appendix B: Transformer Sizing Technical Notes

Appendix C: Recipe Configuration Summary Details and Worksheets.
Appendix A: Mold Power Requirement Technical Notes

HOW TO CALCULATE THE REQUIRED KVA SIZE NEEDED FOR A D-M-E 3 PHASE POWER TRANSFORMER

(G-series document revised for Integrity Product.)

1. What is worst case phase wattage? _____________ (see example below)

2. Multiply worst case phase wattage x 3 phases. The resultant is the total wattage. _____________

3. Sizing the fuse for the transformer is: Amps = Total Wattage / (1.73 X Voltage) = _____________ Amp Fuses

MAINFRAME PHASING PHASES TO REFERENCE
APPLIED ZONES PHASE
L1 - L2 1,4,7,10,13,16,19,22 A
L2 - L3 2,5,8,11,14,17,20,23 B
L3 - L1 3,6,9,12,15,18,21,24 C

Add all "A" zones wattages to give total watts "A". Repeat for "B" and "C".

The worst case phase wattage is the largest total wattage "A", "B" or "C".

Example: using only 12 zone mold

Total watts "A" = 1200 + 600 + 340 = 2140 W
Total watts "B" = 750 + 240 + 340 = 1330 W
Total watts "C" = 2000 + 600 + 800 = 3400 W
Worst case phase wattage = 3400 W ("C")
Total Wattage = 3400 X 3 = 10,200 W
Requires min. of 10.2KVA transformer. Rounding to next available = 15 KVA

Fuse for transformer legs =
10,200 W / (1.73 X 240 V) = 24.5 Amp fuse
Rounding to next available = 25 Amp *

*Note: 50 Amps max. for 50 Amp circuit breakers, 70 Amps max. for 70 Amp circuit breakers,
100 Amp max. for
100 Amp circuit breaker.

6 KVA, 9 KVA & 15 KVA transformers are standard sizes available. Other transformer sizes available on special request.
For Option A and using full power of the Circuit Breaker and ignoring the loads, rule of thumb:
100 Amp Breaker === use 45KVA 3 Phase XFMR minimum – Integrity Standard Breaker.
70 Amp Breaker === use 30 KVA 3 Phase XFMR minimum.
50 Amp Breaker === use 22.5KVA 3 Phase XFMR minimum.

---

Add all "A" zones wattages to give total watts "A". Repeat for "B" and "C".

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Appendix B: Transformer Sizing Technical Notes – Standard Integrity™ uses 100 Amp Breaker

(D-M-E G-series document used for General Reference for the Integrity Product.)

D-M-E TRANSFORMER APPLICATIONS
CURRENT/POWER SPECIFICATIONS (OPTION A)

---

**PRIMARY CURRENT DRAW IN AMPS FOR VARIOUS 3 PHASE TRANSFORMERS**

<table>
<thead>
<tr>
<th>TRANSFORMER</th>
<th>240 VAC</th>
<th>480 VAC</th>
<th>580 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 KVA</td>
<td>15.0</td>
<td>18.0</td>
<td>21.5</td>
</tr>
<tr>
<td>10 KVA</td>
<td>30.0</td>
<td>36.0</td>
<td>42.5</td>
</tr>
<tr>
<td>15 KVA</td>
<td>45.0</td>
<td>54.0</td>
<td>65.5</td>
</tr>
<tr>
<td>20 KVA</td>
<td>60.0</td>
<td>72.0</td>
<td>88.5</td>
</tr>
<tr>
<td>30 KVA</td>
<td>90.0</td>
<td>108.0</td>
<td>126.0</td>
</tr>
</tbody>
</table>

**SECONDARY CURRENT DRAW IN AMPS FOR VARIOUS 3 PHASE TRANSFORMERS**

- **AT X1, X2, OR X3**

---

**TRANSFORMER SECONDARY POWER TO D-M-E MAINFRAME INPUT**

---

**OPTION A**

---

**LOAD SPECIFICATIONS (240 VAC)**

<table>
<thead>
<tr>
<th>TRANSFORMER</th>
<th>240 VAC</th>
<th>CIRCUIT BREAKER</th>
<th>AVAILABLE AMPS</th>
<th>MAX LOAD CURRENT</th>
<th>MAX LOAD DRAW AT 240 VAC (WATTS)</th>
<th>TOTAL LOAD DRAW AT 240 VAC (WATTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 KVA</td>
<td>30 AMP</td>
<td>14.4</td>
<td>12.5</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>10 KVA</td>
<td>60 AMP</td>
<td>42.4</td>
<td>38.0</td>
<td>3800</td>
<td>3800</td>
<td>3800</td>
</tr>
<tr>
<td>15 KVA</td>
<td>90 AMP</td>
<td>64.7</td>
<td>59.0</td>
<td>5900</td>
<td>5900</td>
<td>5900</td>
</tr>
<tr>
<td>20 KVA</td>
<td>120 AMP</td>
<td>94.0</td>
<td>85.5</td>
<td>8500</td>
<td>8500</td>
<td>8500</td>
</tr>
</tbody>
</table>

---

D-M-E COMPANY PROVIDES THESE APPLICATION NOTES AS A SUGGESTED METHOD BASED UPON PRIOR APPLICATIONS AND EXPERIENCE. D-M-E COMPANY ASSUMES NO LIABILITY, OR RESPONSIBILITY, FOR THE USE OF THIS DOCUMENT FOR CUSTOMER APPLICATIONS.
Appendix C: Recipe Configuration Summary Details and Worksheets.

DME Integrity Controller ICM User Configuration Sheet - Operator Front Panel Entry Method

Factory Standard Fixed Recipes (Shipped out of the box as F.1 US Standard Degrees F)
F.1.00 = US Standard Configuration in Degrees F (Factory Set as Degrees F and SSM/CSS PID and Step Start SmartStart Dryout)
F.2.00 = SI Units Standard Configuration in Degrees C (Factory Set as Degrees C and SSM/CSS PID and Step Start SmartStart Dryout)

User Configurable Recipes - Loaded from the Factory with the Following Default Values.

**Degree F; J Type T/C - Factory Default User Configurable Recipes (Can be changed/modified by user.)**

U.1.00 = User Config. Recipe #1 => Slow Manifold, F.1 Recipe without GACF functions enabled, Thermal Response Slow, Layer & Group = 1
U.2.00 = User Config. Recipe #2 ==> MEN Zone, F.1 Recipe without GACF functions enabled, Layer & Group = 2
U.3.00 = User Config. Recipe #3 ==> Fast Nozzles, Patented GFI Dryout, Zero Cross Operator Tune PID Control, Layer & Group =3
U.4.00 = User Config. Recipe #4 ==> Faster Nozzles, Patented GFI Dryout, Phase Angle Fire Operator Tune PID Control, Layer & Group =3

**Degree C; J Type T/C - Factory Default User Configurable Recipes (Can be changed/modified by user.)**

U.5.00 = User Config. Recipe #5 => Slow Manifold, F.1 Recipe without GACF functions enabled, Thermal Response Slow, Layer & Group = 1
U.6.00 = User Config. Recipe #6 ==> MEN Zone, F.1 Recipe without GACF functions enabled, Layer & Group = 2
U.7.00 = User Config. Recipe #7 ==> Fast Nozzles, Patented GFI Dryout, Zero Cross Operator Tune PID Control, Layer & Group =3
U.8.00 = User Config. Recipe #8 ==> Faster Nozzles, Patented GFI Dryout, Phase Angle Fire Operator Tune PID Control, Layer & Group =3

**Degree F; J Type T/C – Factory Default - Monitor Mode Only – Does not control temperature (Can be changed/modified by user.)**

U.9.00 = User Configuration Recipe #9 (Factory Set as F.1 except it is a Monitor Mode Only and NO PID Temperature Control)

**LOCAL Recipe - One Recipe above is Loaded in LOCAL and Run in the Module.**

Operator Adjustments are stored in LOCAL, not Above Recipes.

L.1.00 = Current Running Recipe. Note: can be viewed only in Diagnostic Menu under d.L.SS where SS are the Recipe Steps.
This Recipe Can be copied back into the User configuration Recipes Above to update user adjustments.

U.X.SS = User configurations from X = 1 to 9 and SS is the Configurations Step or Value being entered. All the Recipes has the same SS steps.

**NOTE:** "GACF" = Global Alarm/Control Functions from IFM Frame Module (OFF, IDLE, NORMAL, BOOST)
(G-Series referred to as TAS - Temperature Alarm/System Control Module)

**NOTE:** Recipe Password Level Quick Reference. Refer to Password Level in this manual for more detailed information.
P.002 Selects Recipe to Load and Run
P.003 copy one recipe to one of U.1 – U.9 recipes
P.004 Modify one User Config. Recipe U.1 thru U.9 (after saving modified recipe, you must run P.002 password to Load and Run Recipe.)
P.007 Recipe Error Recovery (try to recover original settings, not operator last adjusted readings.)
P.009 RESET All Recipes to These Factory Defaults.
### D-M-E Factory ICM1502 Module Default Recipes (Only U.1 thru U.9 can be changed by customer, F.1 and F.2 are fixed.)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Engineering Units - Deg F/C</td>
<td>0</td>
<td>1</td>
<td>0=F(50-1200F),1=C(10-650C)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>02 Sensor Type</td>
<td>1</td>
<td>1</td>
<td>0=none, 1=J T/C, 2=K T/C</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
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<tr>
<td>03 GACF Boost Enable</td>
<td>1</td>
<td>1</td>
<td>0=disabled, 1=enabled</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<td>1</td>
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<tr>
<td>04 GACF Boost Value</td>
<td>50</td>
<td>25</td>
<td>+1 to +255 (Deg F/C)</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>50</td>
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<td>05 GACF IDLE Boost Enable</td>
<td>1</td>
<td>1</td>
<td>0=disabled, 1=enabled</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>1</td>
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<td>1</td>
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<tr>
<td>06 GACF IDLE Value</td>
<td>212</td>
<td>100</td>
<td>Refer to Engineering Units Deg F/C</td>
<td>212</td>
<td>212</td>
<td>212</td>
<td>212</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>212</td>
</tr>
<tr>
<td>07 GACF OFF Enable</td>
<td>1</td>
<td>0</td>
<td>1=disabled, 0=enabled</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>08 AutoSetPointMode</td>
<td>0</td>
<td>0</td>
<td>0=Normal, 1=Enable fixed +/- Adj. Bands</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>09 Auto Setpoint Fixed + Adj.</td>
<td>450</td>
<td>235</td>
<td>&gt;&gt;Adj. (Refer to Engineering Units Deg F/C)</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>235</td>
<td>235</td>
<td>235</td>
<td>235</td>
<td>450</td>
</tr>
<tr>
<td>10 Auto Setpoint Fixed - Adj.</td>
<td>400</td>
<td>200</td>
<td>&lt;&lt;Adj. (Refer to Engineering Units Deg F/C)</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>11 ManualSetpointMode</td>
<td>0</td>
<td>0</td>
<td>0=Normal, 1=Enable fixed +/- Adj. Bands</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>12 Manual Setpoint Fixed + Adj.</td>
<td>15</td>
<td>15</td>
<td>1 to 100 &gt;&gt;Adj. (percent power)</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<tr>
<td>13 Manual Setpoint Fixed - Adj.</td>
<td>5</td>
<td>5</td>
<td>0 to 99 &lt; + Adj. (percent power)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
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<tr>
<td>14 Automatic Boost Enable</td>
<td>0</td>
<td>0</td>
<td>0=disabled, 1=enabled</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>15 Automatic Boost Value</td>
<td>50</td>
<td>25</td>
<td>+1 to +255 (Deg F/C)</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>50</td>
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<tr>
<td>16 Lights Out Enable</td>
<td>0</td>
<td>0</td>
<td>0=disabled, 1=enabled</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>17 Auto Bumpless Transfer Enable</td>
<td>1</td>
<td>1</td>
<td>0=disabled, 1=enabled</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
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<tr>
<td>18 Maximum Power Auto Mode</td>
<td>100</td>
<td>100</td>
<td>25 to 100 (percent power upper limit)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>19 Maximum Power Manual Mode</td>
<td>100</td>
<td>100</td>
<td>25 to 100 (percent power upper limit)</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>20 Over Current Detection</td>
<td>15</td>
<td>15</td>
<td>3 to 15 amps</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<tr>
<td>21 Thermal Response Alarm Enable</td>
<td>1</td>
<td>1</td>
<td>0=disabled, 1=enabled</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>22 Thermal Response Normal/Slow</td>
<td>0</td>
<td>0</td>
<td>0=Normal, 1=Slow Response (large manifolds)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<tr>
<td>23 Deviation Meter: High Red Flashing</td>
<td>30</td>
<td>17</td>
<td>3-255 &gt;High Red Solid (Units per Deg F/C)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>24 Deviation Meter: High Red Solid</td>
<td>20</td>
<td>11</td>
<td>2-254 &gt;High Yellow Solid (Units per Deg F/C)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>20</td>
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<tr>
<td>25 Deviation Meter: High Yellow Solid</td>
<td>10</td>
<td>6</td>
<td>1-253 &gt;0 (Units per Deg F/C) (0 at setpoint)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>6</td>
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<tr>
<td>26 Deviation Meter: Low Yellow Solid</td>
<td>10</td>
<td>6</td>
<td>1-253 &gt;0 (Units per Deg F/C) (0 at setpoint)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>6</td>
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<td>10</td>
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<tr>
<td>27 Deviation Meter: Low Red Solid</td>
<td>20</td>
<td>11</td>
<td>2-254 &gt;Low Yellow Solid (Units per Deg F/C)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>11</td>
<td>11</td>
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<td>20</td>
</tr>
<tr>
<td>28 Deviation Meter: Low Red Flashing</td>
<td>30</td>
<td>17</td>
<td>3-255 &gt;Low Red Solid (Units per Deg F/C)</td>
<td>30</td>
<td>30</td>
<td>30</td>
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<td>17</td>
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<td>30</td>
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<tr>
<td>29 Dryout Type</td>
<td>0</td>
<td>0</td>
<td>0=Step Start;Zero Cross, 1=Patented GFI; Phase Angle Fire</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td>30 Dryout Lock</td>
<td>1</td>
<td>1</td>
<td>0=No Lock, 1=Locked Dryout</td>
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<tr>
<td>31 Controller Control</td>
<td>0</td>
<td>0</td>
<td>0=Zero Cross Triac Firing, 1=Phase Angle Triac Firing, (Not Available = Time Proportion)</td>
<td>0</td>
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<td>1</td>
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<tr>
<td>32 2) Time Proportion - Cycle Time</td>
<td>10</td>
<td>10</td>
<td>Not Available: 10 to 60 seconds</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
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<td>10</td>
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</tr>
<tr>
<td>33 2) Time Proportion - Minimum On Time</td>
<td>1</td>
<td>1</td>
<td>Not Available: 0.1 to 60.0 seconds increments of 100 milliseconds</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>34 2) Time Proportion - Minimum Off Time</td>
<td>1</td>
<td>1</td>
<td>Not Available: 0.1 to 60.0 seconds increments of 100 milliseconds</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>35 PID Overshoot Control Enable</td>
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<td>0=disabled, 1=enabled</td>
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<tr>
<td>36 PID Control Type</td>
<td>1</td>
<td>1</td>
<td>0=Monitor Mode, 1=Legacy PID, (N/A: 2=Select PID), 3=Operator Tune, (N/A: 4=AutoTune)</td>
<td>1</td>
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<td>3</td>
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<tr>
<td>37 3) Operator Tune - Bandwidth</td>
<td>100</td>
<td>100</td>
<td>1 to 100 degrees F Bandwidth (If 100, Low Gain=1, If 1, High Gain = 100)</td>
<td>100</td>
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<tr>
<td>38 3) Operator Tune - Reset</td>
<td>100</td>
<td>100</td>
<td>Resets per minute entered in .01 to 2.55 (100 = 1.00 higher values make Gain Higher)</td>
<td>100</td>
<td>100</td>
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<td>01</td>
<td>Engineering Units - Deg</td>
<td>0</td>
<td>1</td>
<td>0=F(50-1200F),1=C(10-650C)</td>
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<td>02</td>
<td>Sensor Type</td>
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<td>0=none, 1=J T/C, 2=K T/C</td>
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<td>03</td>
<td>GACF Boost Enable</td>
<td>1</td>
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<td>04</td>
<td>GACF Boost Value</td>
<td>50</td>
<td>25</td>
<td>+1 to +255 (Deg F/C)</td>
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<td>05</td>
<td>GACF IDLE Boost Enable</td>
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<td>GACF IDLE Value</td>
<td>212</td>
<td>100</td>
<td>Refer to Engineering Units Deg F/C</td>
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<td>07</td>
<td>GACF OFF Enable</td>
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<td>0=disabled, 1=enabled</td>
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<tr>
<td>08</td>
<td>AutoSetPointMode</td>
<td>0</td>
<td>0</td>
<td>0=Normal, 1=Enable fixed +/- Adj. Bands</td>
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<td>09</td>
<td>Auto Setpoint Fixed +Adj.</td>
<td>450</td>
<td>235</td>
<td>&gt;-Adj. (Refer to Engineering Units Deg F/C)</td>
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<td>Auto Setpoint Fixed - Adj.</td>
<td>400</td>
<td>200</td>
<td>&lt;=Adj. (Refer to Engineering Units Deg F/C)</td>
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<td>11</td>
<td>ManualSetpointMode</td>
<td>0</td>
<td>0</td>
<td>0=Normal, 1=Fixed +/- Adj. Bands</td>
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<td>12</td>
<td>Manual Setpoint Fixed +Adj.</td>
<td>15</td>
<td>15</td>
<td>1 to 100 &gt;-Adj. (percent power)</td>
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<td>13</td>
<td>Manual Setpoint Fixed - Adj.</td>
<td>5</td>
<td>5</td>
<td>0 to 99 &lt;= Adj. (percent power)</td>
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<td>14</td>
<td>Automatic Boost Enable</td>
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<td>15</td>
<td>Automatic Boost Value</td>
<td>50</td>
<td>25</td>
<td>+1 to +255 (Deg F/C)</td>
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<td>16</td>
<td>Lights Out Enable</td>
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<td>Auto Bumpless Transfer</td>
<td>1</td>
<td>1</td>
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<td>18</td>
<td>Maximum Power Auto Mode</td>
<td>100</td>
<td>100</td>
<td>25 to 100 (percent power upper limit)</td>
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<td>19</td>
<td>Maximum Power Manual</td>
<td>100</td>
<td>100</td>
<td>25 to 100 (percent power upper limit)</td>
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<td>20</td>
<td>Over Current Detection</td>
<td>15</td>
<td>15</td>
<td>3 to 15 amps</td>
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<td>21</td>
<td>Thermal Response Alarm</td>
<td>1</td>
<td>1</td>
<td>0=disabled, 1=enabled</td>
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<td>22</td>
<td>Thermal Response Normal/Slow</td>
<td>0</td>
<td>0</td>
<td>0=Normal, 1=Slow Response (large manifolds)</td>
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<td>23</td>
<td>Deviation Meter: High Red Flashing</td>
<td>30</td>
<td>17</td>
<td>3-255 &gt;High Red Solid (Units per Deg F/C)</td>
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<td>24</td>
<td>Deviation Meter: High Red Solid</td>
<td>20</td>
<td>11</td>
<td>2-254 &gt;High Yellow Solid (Units per Deg F/C)</td>
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<td>25</td>
<td>Deviation Meter: High Yellow Solid</td>
<td>10</td>
<td>6</td>
<td>1-253 &gt;0 (Units per Deg F/C)</td>
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<td>26</td>
<td>Deviation Meter: Low Yellow Solid</td>
<td>10</td>
<td>6</td>
<td>1-253 &gt;0 (Units per Deg F/C)</td>
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<td>27</td>
<td>Deviation Meter: Low Red Solid</td>
<td>20</td>
<td>11</td>
<td>2-254 &gt;Low Yellow Solid (Units per Deg F/C)</td>
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<td>28</td>
<td>Deviation Meter: Low Red Flashing</td>
<td>30</td>
<td>17</td>
<td>3-255 &gt;Low Red Solid (Units per Deg F/C)</td>
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<tr>
<td>29</td>
<td>Dryout Type</td>
<td>0</td>
<td>0</td>
<td>0=Step Start;Zero Cross, 1=Patented GFI; Phase Angle Fire</td>
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<tr>
<td>30</td>
<td>Dryout Lock</td>
<td>1</td>
<td>1</td>
<td>0=No Lock, 1=Locked Dryout</td>
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<td>31</td>
<td>Controller Control Output</td>
<td>0</td>
<td>0</td>
<td>0= Zero Cross Triac Firing, 1=Phase Angle Triac Firing, (Not Available 2=Time Proportion)</td>
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<td>32</td>
<td>2) Time Proportion - Cycle Time</td>
<td>10</td>
<td>10</td>
<td>Not Available: 10 to 60 seconds</td>
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<tr>
<td>33</td>
<td>2) Time Proportion - Minimum On Time</td>
<td>1</td>
<td>1</td>
<td>Not Available: 0.1 to 60.0 seconds increments of 100 milliseconds</td>
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<tr>
<td>34</td>
<td>2) Time Proportion - Minimum Off Time</td>
<td>1</td>
<td>1</td>
<td>Not Available: 0.1 to 60.0 seconds increments of 100 milliseconds</td>
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<td>35</td>
<td>PID Overshoot Control Enable</td>
<td>1</td>
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<td>0=disabled, 1=enabled</td>
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<td>36</td>
<td>PID Control Type</td>
<td>1</td>
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<td>0=Monitor Mode, 1=Legacy PID, (N/A: 2=Select PID), 3=Operator Tune, (N/A: 4=AutoTune)</td>
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<tr>
<td>37</td>
<td>3) Operator Tune - Bandwidth</td>
<td>100</td>
<td>100</td>
<td>1 to 100 degrees P Bandwidth (If 100, Low Gain=1, If 1, High Gain = 100)</td>
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