XL-2-Series

user manual

revision 1.1

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TempMaster™ series

Mold Masters® performance delivered

Amendment Record XL-2 Series Manual

Issue	Date	Amendments	Author	Authorised
1.0	July 04	First Issue	DT	JN
1.1	Nov 05	Re-organized format	DT	JN

This manual is intended for use with the XL-2 Series Controller

Contents

Specifications

The following are general specifications. The actual controller supplied may differ in specified options.

Supply Voltage	380v 3 phase 50Hz with neutral, others available 220/60Hz Delta
Control Method	PIDD self optimising
Operating Range	0…450°C
Control Accuracy	+/-1°C
Earth Leakage Measurement	Earth leakage measurement on individual cards (set at 100KΩ)
Thermocouple input	Iron Constantan Fe/Con type 'J', type ‘K’, or type 'L'.
Power output	16A/3600W
Temperature scale	Centigrade (Celsius) or Fahrenheit
Output Overload protection	16A super-quick acting (FF) fuse
Card Diagnostics LED's	Zone1, Zone2, Ground Fault, T/C Fault, Temperature Alarm, and Current Overload
Alarm Output	Double-pole change-over volt-free contacts, 1A max burden
Interface	Optional
Case Details	Heavy duty metal cabinet

Safety Instructions


WARNING

DO NOT enter the cabinet without first ISOLATING the supplies – there are unguarded terminals inside the cabinet which may have a dangerous potential across them.

Where a three-phase supply is used then this potential may be at 380 volts or higher.

Safety Notices - an explanation

Within this manual, safety instructions are marked as follows:


WARNING

A WARNING symbol and message, shown here, identifies where there may be a hazardous situation which, if not avoided, may result in death or injury to personnel.

Most warnings pertain to electrical aspects and you must comply with them to minimise any personal danger.

Welcome

Mold-Masters® welcomes you to their XL-2 temperature controllers for hot runner injection moulding tools. This particular member of the proven family of Mold-Masters Hot Runner Controllers is user friendly and retains the standard control facilities associated with other Mold-Masters controllers.

How to use this manual

The purpose of this manual is to give you a complete understanding of how best to use the controller and to assist where there are problems or faults.

The “Navigation” section contains a brief technical description of the system components and a portrayal of the Mold-Masters operating philosophy that facilitates precision temperature control.

The following chapters then take you carefully through the stages of setting up, and running, a new control system. After considering system maintenance the final sections look at trouble shooting to assist in the unlikely occurrence of a system fault.

Installation

Where to use this equipment

WARNING

Mold-Masters Hot Runner temperature controllers are designed for use in the plastic injection moulding industry as temperature controllers for hot runner systems as commonly used in mould tools. The controllers must not be used in residential, commercial or light-industrial environments. Furthermore, they must not be used in an explosive atmosphere or where there is a possibility of such an atmosphere developing.

They should be installed in a clean dry environment where the ambient conditions do not exceed the following limits:

* Ambient temperature	0 to +50°C.
* Relative Humidity	90% (non-condensing)

When in use this equipment does not emit audible noise in excess of 10dBA.

Controller — Tool Connections

The various connections to the system using the cables supplied with the equipment are specified in Appendix A.

Controller Power Supplies

The control cabinet can be manufactured to accept a wide range of supplies and sequence of phases. Refer to the serial plate in the controller cabinet for confirmation of the supply requirements. If the local supply is outside the specified range please contact our Service department for advice.

Tel.: (1) 905-877-0185

(1) 800-450-2270

Fax: (1) 905-873-2818

Switching "On" and "Off"

The main Power Switch is a rotary Switch at the back of the cabinet. This Switch is sufficiently rated to disconnect the total load current during switch “On” and switch “Off”. You can use a suitably- sized padlock, or similar device, to lock the switch in the “Off” position to prevent operation during maintenance.

Although the main switch has the capacity to switch the whole system “Off”, we recommend that you only do this in an emergency situation. A sequenced method for switching “On” and “Off” protects the controller and keeps the switched load to a minimum to extend the life of the main Isolator.

Switching On

Once the controller card is on, it gets into “Run” mode automatically to start heating the tool.

Switching Off (or Shutting Down)

We recommend that you use the controller to shut down the heating load, and only use the main isolator to switch off the whole system once it is idle.

1. Shut down the heating

Use I/O switch to turn off each controller card.

2. Shut down the Controller

Now use the Main Rotary Switch on the cabinet to isolate all the power from the whole system.

Navigation

This part of the manual introduces you to the controller card to show what facilities are available and what information is available.

Main Screens

Once the controller card is turned on, it always shows Temperature Display Screen of the first zone in controller card. There are three main screens in total, they always display actual temperature on top display, and bottom displays are set temperature, current reading, and power output percentage in that specific zone. A decimal point beside the top right digit indicates the amount of output power.

Temperature Display → Current Display → Power Output Display

- Use to rotate through different screens

Zones Switching

There are two zones per controller card. The two blue LEDs on the right indicate which zone's information is currently shown. Zones can be switched anytime in Temperature Display, Current Display, or Power Output Display to show reading accordingly.

- Use to switch between two zones to view display.

Function Menu

In this menu, you can put the controller into particular working mode. However, Program Menu is used for changing controller set-up. Manual and boost mode can be set independently in each zone; however, standby mode always activate in both zones when the mould-tool is paused.

Manual Mode (Hnd) → Standby Mode (tdn) → Boost Mode (tUP) → Program Mode (Prog)

- From any of the main screens, press and hold for at least 2 seconds to get into Function Menu.
- Use or to scroll through the menu.
- Press to enter into your desire mode, or press to get back to Temperature Display Screen without changing to other mode.

Program Menu

Within this menu there are a number of controls that are provided for you to customize your controller. You can select this menu from the Function Menu only. Each zone has its own program menu items to meet its own needs; however, there are some items shared by two zones. Refer to “Customize your controller” section for detailed explanation on each parameter in the menu.

- In Function Menu, use ⩓ to scroll to “Prog”, and then press ↻ to enter into Program Menu.
- Scroll through the menu by using ⩓ or ⩔ to. Top display shows menu item, bottom shows setting. You cannot change setting when bottom display is flashing.
- Press ↻ to gain access for any changes by, bottom display then stays.
- Use ⩓ or ⩔ to change setting, press ↻ to save the change. Bottom display starts flashing again. If bottom display stays, pressing ◷ to escape from Program Menu without changing setting.
- After changes are made, press ◷ to return to Temperature Display Screen.

Front Panel Status Indication

There are two blue and four red LED indicators to show the status of the controller card:

 Zone1 display

 Zone2 display

 GND – earth leakage alarm indicator

 Thermocouple failure – T/C break (LED stays) or

T/C polarity (LED blinks)

 Temperature alarm – Over/under temperature alarm indicator

 Overload – Excess current cut-out alarm indicator

Keys Description

 Increment up

- Change set temperature, power output % in manual mode, or program parameter values
- Rotate through function and program menu

 Decrement down

- Change set temperature, power output % in manual mode, or program parameter values
- Rotate through function and program menu

 Enter

- Rotate through Temperature, Current, and Power display
- Gain access and confirm program menu changes
- Press and hold it for 2 seconds to get out from special working mode

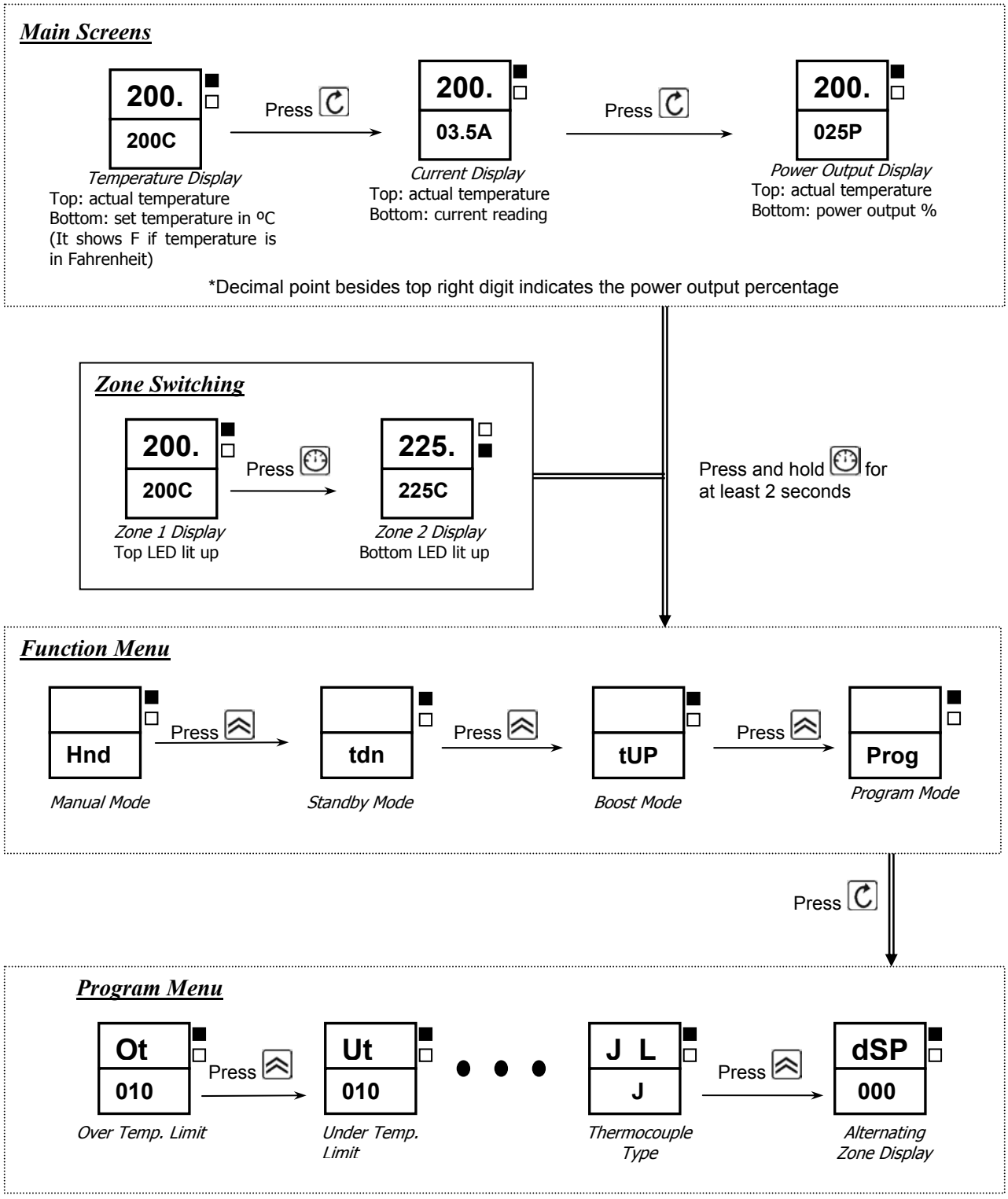
 Selector

- Toggle between two zones
- Press and hold it for 2 seconds to get into function menu
- Escape from function or program menu

 I/O

- Turn controller card ON/OFF

XL-2 Operation Diagram



The Controller Cabinet

The power supply to the control cabinet is via a strain-relief mounted cable gland plug wired in star or delta configuration. (Please check your specifications for details of which configuration has been configured.) Connections to the tool are by looms terminating type Contact 24pole connectors with 48pole housing or their equivalents. There are normally two types of cables supplied; a thermocouple connection, using type H-BE24BS and typical connector and wiring details are shown in Appendix A. An alarm output option is available for extending the alarm, or, perhaps, inhibiting the injection process.

Controller Cards

The controller card is dual-zone modular that provides real time temperature control.

Each card has three main components:

- thermocouple amplifiers,
- CPU,
- multi-voltage output triacs.

Thermocouple Amplifiers

The thermocouple amplifiers have preset responses for both J and L type thermocouples. The selection of sensor type can be done in Program Menu; this in turn sets the differential amplifier to match the selected thermocouple type.

Central Processor Unit (CPU)

The CPU provides the following facilities:

- closed and open loop control of the zones,
- processes thermocouple and current readings to show on display,
- checks for alarm conditions, including excess current, incorrect thermocouple wiring, zone over temperature condition, low impedance between heater and ground, and generates alarm information for the display screen and alarm relay,
- controls the output power to the on-board triac using a number of self-tuning algorithms
- controls a row of diagnostic status indication

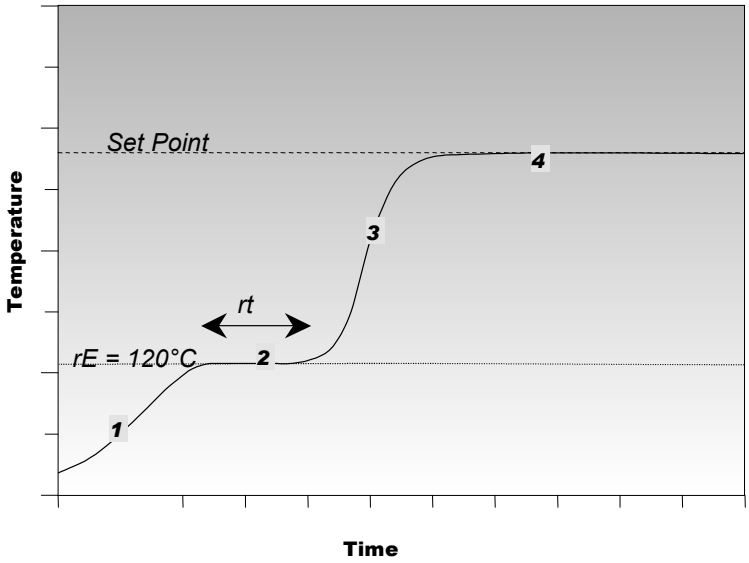
The card requires no analogue calibration and is ready for use once set up from the display console.

Output Triacs

The controller card has an on-board triac that is capable of controlling heating loads of up to 16 Amps peak.

How the XL-2 Controller Works

Mold-Masters® controllers are designed to perform in closed and open loop configurations. However, we consider that the normal operating mode is closed loop. This is illustrated in the following diagram and explained below.



1. The zone controller slowly ramps up the heater power and simultaneously looks for a positive temperature change at the thermocouple input. The controller verifies the actual rate of rise against a predetermined value in program parameter r1. Power is slowly increased until the correct rate of rise is achieved.
2. At ramp temperature rE, the dwell time rt is activated (2minutes), this permits any residual moisture in the heating elements to be eliminated. After *all* zones reached to ramp temperature, they will start heating up together again.
3. The controller continues to ramp up the temperature to the set point with the speed set in program parameter r2, which should be achieved with minimum over-shoot.
4. Having built a virtual model to map the tool and heater characteristics, the controller can maintain the temperature at an accurate point with virtually no deviation.

Setting up your controller

New XL-2 series controllers are correctly configured at the factory and you should not need this section for a new system. However, if you are reconfiguring your controller to a new tool or environment then you may need this chapter of the manual.

This initial set up is detailed here in easy-to-follow steps that help you to become familiar with your new equipment.

What is covered in this section

Setting your preferred Temperature Unit

Matching Sensor Types

Setting the Required Temperatures

Setting Boost Level

Setting Standby Level

Monitoring Temperature Limits

Setting the Temperature Scale

Whether your display shows temperature in Fahrenheit or Centigrade, changes in this parameter apply to both zones of the controller card.

1. From the Temperature Display Screen, press and hold button for at least 2 seconds until you get into Function Menu.
2. Use to scroll to “Prog”. Press to choose Program Menu.
3. Use to scroll to temperature unit parameter “C F”. You will see the bottom display flashing.
4. Press to get access to change parameter setting. Bottom display should stay.
5. Use or button to change setting.
6. Press to store the change. Bottom display should be flashing again.
7. Press to get back to Temperature Display Screen.

Matching Sensor Types

There are two different types of probe sensors, J type and L type, with different characteristics. The sensor type is normally configured to a J-type before leaving the factory and should only need to be altered in rare circumstances. Changes in this parameter apply to both zones of the controller card.

1. From the Temperature Display Screen, press and hold for at least 2 seconds until you get into Function Menu.
2. Use to scroll to “Prog”. Press to choose Program Menu.
3. Use to scroll to “J L”. You will see the bottom display flashing.
4. Press to get access to change parameter setting. The bottom display should stay.
5. Use or button to change to your desire setting.
6. Press to store the change. The bottom display should be flashing again.
7. Press to get back to Temperature Display Screen.

Setting the Required Temperatures

1. From the Temperature Display Screen of the desired zone, use or button to change the temperature setting.
2. Press to switch to the other zone and repeat the above step if necessary.

Setting Boost up level

Before you activate Boost function, you must first configure the amount. When boost is activated, the controller will raise up to boost temperature. Boost up level is to determine the increment for the zone during boost function activated. Please note that, on a slow responding manifold, if you set a high boost temperature, the zone is unlikely to reach your set boost temperature before the boost time limit expires.

Boost up level from factory setting is 75°C or 135°F, which means if your controller is set at 200ºC, temperature will raise to 275ºC. On the other hand, if controller is set in Fahrenheit, set-temperature is at 400ºF; temperature will boost up to 535ºF.

1. From the Temperature Display Screen, press and hold button for at least 2 seconds until you get into Function Menu.
2. Use to scroll to “Prog” then press button to enter.
3. Use to scroll to parameter ”tUP”. You will see the bottom display flashing.
4. Press to get access to change parameter setting. The bottom display should stay.
5. Use or change to your desire setting.
6. Press to store the change. The bottom display should be flashing again.
7. To return to Temperature Display Screen by pressing .

Setting Standby Level

Before you activate Standby function, you must first configure the amount. When standby is activated, the controller will reduce to standby temperature. Standby level is to determine the decrement for the zone during standby function activated.

Standby level from factory setting is 100°C or 180°F, which means if your controller is set at 260ºC, temperature will reduce to 160ºC. On the other hand, if controller is set in Fahrenheit, set-temperature is at 400ºF; temperature will drop to 220ºF.

1. From the Temperature Display Screen, press and hold button for at least 2 seconds until you get into Function Menu.
2. Use to scroll to “Prog”. Press to enter Program Menu.
3. Use to scroll to parameter “tdn”. You will see the bottom display flashing.
4. Press to get access to change parameter setting. The bottom display should stay.
5. Use or button to change to your desire setting.

6. Press to store the change. The bottom display starts flashing again.
7. To exit from Program Menu, press .

Monitoring Temperature Limits

Your controller card looks at the actual temperature of each zone and verifies that the zone is operating within specific limits. Rather than fixed points of temperature, the Ot and Ut Limits are set to degrees above the and below the set point. If these temperatures are exceeded, the alarm relay on the XL-2 card changes state to raise a disable injection interlock or alarm.

Setting Over Temperature Limit - Ot:

1. From the Temperature Display Screen, press and hold button for at least 2 seconds until you get into Function Menu.
2. Use to scroll to “Prog”. Press to get into Program Menu.
3. The first parameter in Program Menu is Ot. You will see the bottom display flashing.
4. Press to get access to change parameter setting. The bottom display should stay.
5. Use or change to your desire setting.
6. Press to store the change. The bottom display should be flashing again.
7. Press to get back to Temperature Display Screen.

Setting Under Temperature Limit - Ut:

1. From the Temperature Display Screen, press and hold button for at least 2 seconds until you get into Function Menu.
2. Use to scroll to “Prog”. Press to enter Program Menu.
3. Use to scroll to parameter “Ut”. You will see the bottom display flashing.
4. Press to get access to change parameter setting. The bottom display should stay.
5. Use or change to your desire setting.
6. Press to store the change. The bottom display starts flashing again.
7. Press to get back to Temperature Display Screen.

Running your controller

'Running your controller' is concerned with everyday use of the controller for normal production use. This is considered as selecting an appropriate run mode for the machine according to whether the tool is working or waiting. It may also be necessary to make changes to the heater temperatures and using the graphical display of recent performance, may help such decisions.

What is included in this section

Run Mode

Off Mode

Standby Mode "tdn"

Manual Mode "Hnd"– open loop control

Boost Mode "tUP"– how to apply a short increase

Changing Set Temperature

Toggling Zone Display

Run Mode

1. Press I/O to turn on the controller card. Once the card is on, it is already in Run Mode. Both zones are running.

Off Mode

Each card controls two zones at a time, which can be turned off together or individually.

Turn both zones off at the same time:

1. Press I/O to turn the controller card off. Display is off.

Turn one zone off:

1. Use to reduce the set temperature of your desired zone. Top display on the zone shows “OFF”.

Standby Mode – “tdn”

This mode is available for times when the mould-tool is paused. In this condition, all the zones can be reduced by the certain amount temperature, which helps to prevent degradation on certain materials. To determine the decrement, refer to “Setting Standby Level”. Once standby mode is activated, both zones would be reducing to standby temperature.

1. From the Temperature Display Screen, press and hold for at least 2 seconds until you get into Function Menu.
2. Use to scroll to “tdn”.
3. Confirm your decision by pressing to activate this function or to exit without changing operating mode.
4. Once standby mode is enabled, top display is alternating between “tdn” and actual temperature reading. Bottom display shows the standby temperature. You may adjust the standby temperature by using or .
5. To exit from Standby Mode, simply press to get back to normal operating mode.

Note: This feature cannot be disabled completely by setting “Etd” in program menu to “0” for preventing accidental change of mode.

However, this feature can also be initiated by the moulding machine via the rear panel connector. In this case, the standby enable or disable is controller by the signal injected by the moulding machine.

Manual Mode – "Hnd"

When Closed Loop (Auto) mode is not your preferred or the controller detects thermocouple failure in the system, this mode helps to continue the operation with constant power output.

1. From the Temperature Display Screen, press and hold for at least 2 seconds until you get into Function Menu. Manual mode "Hnd" is the first item in the Function Menu.
2. Confirm your decision by pressing to activate this function, or to exit without changing operating mode.
3. When Manual Mode is enabled, it goes to Power Display Screen. Top display is alternating between "Hnd" and actual temperature reading; bottom shows power percentage.
4. Use or to adjust to desire power output percentage.
5. To exit from Manual Mode, simply press to get back to normal operating mode.

Manual mode in each zone activates independently. If both zones need to be running in this mode, use to switch to another zone, repeat the above steps again.

Note: This feature cannot be disabled completely by setting "EHd" in program menu to "0" for preventing accidental change of mode.

Boost Mode – "tUP"

This mode provides a means of temporarily boosting the zone temperature for 2 minutes. To determine the increment, refer to "Setting Boost Up Level".

1. From the Temperature Display Screen, press and hold for at least 2 seconds until you get into Function Menu.
2. Use to scroll to "tUP".
3. Confirm your decision by pressing , or press to exit without changing operating mode.
4. Once boost mode is enabled, top display is alternating between "tUP" and actual temperature reading. Bottom display shows the boost temperature. You may adjust the boost temperature by using or .
5. To exit from boost mode, simply press to get back to normal operating mode.

Boost mode in each zone activates independently. If both zones need to be running in this mode, use to switch to another zone, repeat the above steps again.

Note: This feature cannot be disabled completely by setting "EtU" in program menu to "0" for preventing accidental change of mode.

Changing Set Temperature

Increase Setting

1. From the Temperature Display Screen, press ⩓ to bring the setting up.

Decrease Setting

1. From the Temperature Display Screen, press ⩔ to decrease set temperature.

Toggling Zone Display

View Zone Display Manually

1. From the Temperature Display Screen, press ⏲ to toggle between two zones' display. The blue zone LED lights up accordingly.

View Zone Display Automatically

The controller card is able to display two zones' temperature reading alternatively every 10seconds automatically in Temperature Display Screen.

1. From the Temperature Display Screen, press and hold ⏲ for at least 2 seconds until you get into Function Menu.
2. Use ⩓ to scroll to "Prog". Press ↻ to choose Program Menu.
3. Use ⩔ to scroll to "dSP". You will see the bottom display flashing.
4. Press ↻ to get access to change parameter setting. The bottom display should stay.
5. Use ⩓ button to change to setting to "1" to enable this feature.
6. Press ↻ to store the change. The bottom display should be flashing again.
7. Press ⏲ to get back to Temperature Display Screen. The controller card alternates two zones' display reading automatically in every 10seconds. The blue zone LED lights up accordingly.

Note: This feature will only kick off provided "dSP" is set as "1" and both zones are in Temperature Display Screen.

Customizing your controller

Program Menu is where you may set controller to different output alarm, temperature alarm limits, heating characteristics, and other special operating mode.

What is included in this section

Functions of Menu Items

Viewing current item parameters

Changing menu item parameters

Recalling factory settings

The following table shows all menu items factory setting and their adjusting range:

Menu items	Symbol	Factory Setting	Adjusting Range
EXTERNAL ALARM OUTPUT ACTIVATION			
Excess temperature	AOt	1	0 / 1
Low temperature	AUt		
Current overload	ACU		
Thermocouple breakage	Abr		
Reversed thermocouple	APo		
Earth leakage	AEL		
Standby mode	Atd	0	
Manual mode	AHd		
ALARM			
Input from moulding machine	EI	1	0 / 1
Over temperature range	Ot	10ºC or 18ºF	0 - 25ºC or 0 - 45ºF
Under temperature range	Ut		
SOFT START			
Ramp1 end temperature	rE	120ºC or 248ºF	120-160ºC or 248-320ºF
Ramp1 temperature	r1	1ºC/6s or 1ºF/4s	1ºC/10s...1ºC/6s or 1ºF/6s...1ºF/4s
Ramp2 temperature	r2	1ºC/3s or 1ºF/2s	1ºC/10s...1ºC/1s or 1ºF/6s…1ºF/1s
Dwell time at Ramp1 end temperature	rt	2min	1...10min
SPECIAL OPERATING MODE			
Control mode at thermocouple leakage	not	1	0 / 1
Manual mode enable	EHd	1	0 / 1
Standby mode enable	Etd	1	0 / 1
Boost mode enable	EtU	1	0 / 1
OTHERS			
Over current shut-off	Cur	18.0A	18.0A
Standby level	tdn	100ºC or 180ºF	1…set temperature
Max temperature limit	tLi	450ºC or 842ºF	100... 450ºC or 212…842ºF
Boost level	tUP	75ºC or 135ºF	1... (Max. temp. limit - Set temp.)
Communication address	Adr	0	0...99
Temperature scale	C F	ºC	ºC / ºF
Thermocouple type	J L	J	J / L
Alternating Display	dSP	0	0 / 1

Functions of Menu Items

External Alarm Output Activation Items

There is a remote alarm connector located on the side of the cabinet, which has a relay to turn on audible alarms, or lights, or to turn off other machinery. Parameters in “External Alarm Output Activation” are provided for the user to choose under what circumstance to trigger the alarm relay. External alarm will be switched on if the specific instance happens and its menu item is set to 1. For instance, if thermocouple break happens and the value in “Abr” is set 1, external alarm will then be triggered. To disable the alarm triggering in any specific condition, set its value to “0”.

Alarm Items

In “Alarm” parameters, you may adjust either over or under temperature alarm limits. If these temperatures are exceeded, the alarm relay on the card changes state, and  Led will be lit up. There is a remote standby connector is available on the side of the cabinet. The user can use this input point to switch the XL-2 into Standby Mode remotely as long as Menu Item “EI” is set to 1. To disable this feature, simply set its value to “0”.

Soft Start Items

Parameters in “Soft Start” will define the heating profile. Controller will have a virtual model built to map the tool and heater characteristics, these parameters do not need to be adjusted unless there is an unusual large heating plate.

Special Operating Mode Items

Control mode is used when a thermocouple fails, the operation can still carry on. The controller card holds historical power level for that specific zone after reaching set temperature and maintaining for at least 5 minutes. This mode will be kicked in if “not” is set to 1 and thermocouple break happens.

The user can enable special operating mode in the Function Menu; however, the mode cannot be turned on if its corresponding enable setting is set as “0” in the program menu. For example, if “EHd” item is set to “0”, manual mode cannot be activated completely, which is for preventing accidental change of mode.

Others Items

These parameters are to set over current limit, standby level, boost level, and temperature scale. Max. temperature limit item is to set maximum temperature permitted fro this specific zone. Item

"Adr" is only used for establishing serial communication with Graphical Interface via RS485.

Item "dSP" can be set to alternate temperature reading between two zones automatically in every 10seconds.

Viewing current parameters

To see Menu Item values:

1. From the Temperature Display Screen, press and hold button for at least 2 seconds until you get into Function Menu.
2. Use to scroll to "Prog" then press button to enter Program Menu.
3. Use or scroll the menu. Top display shows Menu Item symbol, bottom shows value.

Changing menu item parameters

1. From the Temperature Display Screen, press and hold button for at least 2 seconds until you get into Function Menu.
2. Use to scroll to "Prog" then press button to enter Program Menu.
3. Use or scroll to your desire item. You will see the bottom display flashing.
4. Press to get access to change parameter setting. The bottom display should stay.
5. Use or change to your desire setting.
6. Press to save the change. The bottom display should be blinking again. (To exit from Program Menu without changing setting, press to return to Temperature Display Screen.)
7. You may repeat step 3-6 to change other parameter settings.

Restoring all Parameters to factory settings

In order to restore the parameters back to their original factory setting:

1. From the Temperature Display Screen, press and hold both and together for at least 2 seconds until "Std" is shown on the top display.
2. Press to restore the factory settings; the display should go back to Temperature Display Screen. Or press to escape without loading settings.

Servicing and repairing your controller

WARNING

Always isolate your controller at source before you open the unit to inspect it or replace fuses.

When it comes to machine maintenance there is very little that you need to do to look after it.

Replacement parts

We do not expect that you will need to repair any controller parts at board level, other than fuses. In the unlikely event of any board failure then we provide an excellent repair and exchange facility for all our customers.

Cleaning and Inspection

Any excess dust that has entered into the cabinet may be removed with a light brush and vacuum cleaner.

Any internal cable forms, that flex to accommodate opening doors, should be checked to see that there is no fraying, or damage, to cable insulation.

External cables should be checked to see that there has no damage to the flexible conduit, plugs or sockets. If the flex has been squashed, if there is visible damage, or if there are any exposed conductors, then, for your own safety, it must be replaced.

If the equipment is subject to vibration then we recommend that you use an insulated screwdriver to check that no terminals have become loose.

Troubleshooting

The control system has several features, which provide an early diagnosis of faults in the control system, the tool heaters and thermocouple sensors.

Individual Card Diagnostics

If a fault on a controller card is suspected, check the LED card status lamps on the controller card.

From left to right they are:

- LED is lit if heater has more than 100KΩ leaking to chassis ground. Message “Gnd” shows in faulty zone.
- LED is lit when the thermocouple is open or flashing reversed. Message “- - -” shows in faulty zone.

LED is lit when temperature reading exceeds over/under temperature limit.

LED is lit if the zone contains low resistance in the heater circuit, or current reading exceeded maximum current limit “Cur” in Program Menu. Message “Cur” shows in faulty zone.

WARNING

To remove a card from its slot, unscrew four corner screws first. There is no need to switch off the main supply. However, if operational requirements allow, the cabinet may be isolated.

The shrouded terminals on the euroback board are live unless the power supply is switched to OFF.

Specific Faults

Rapid Temperature Fluctuations

The most likely cause of temperature fluctuations is extraneous voltages being picked up by the thermocouple cable, i.e. common mode. This may be due to poor earthing of the tool or, a faulty shielded thermocouple wire or, alternatively, a faulty heater. We recommend that all earth connections be tested.

Not able to set a Higher Temperature

This problem can occur if you try to set the temperature above the limits. Check the Max. Temp setting, tLi in Program Menu and revise it if necessary.

Ground fault detection

The Ground fault detection detects any fault caused by earth leakage current. Earth faults can be caused if a tool has been idle for some time and damp has got into one heater. It may be possible to identify the heater and repair the faulty zone by using the adjacent heaters to heat it up and dry it out, so curing the original problem.

Fuses

There are supply fuses for four separate functions for the whole unit. In the unlikely event of a fuse failure **always** isolate the incoming main supply before opening the cabinet door or removing any panels.

WARNING

Replacement Fuses

If you find that any fuse has ruptured then please make sure that you replace the faulty fuse for a new one with identical characteristics. All the fuse types are listed in the attached tables.

Fans

Every Cabinet has auxiliary fans to ensure adequate cooling. If any fan has stopped working then first inspect the unit to see if there are any blockages or objects fouling the impellors. Once you are certain that the fan is free to rotate then proceed to check its supply fuse that is located on the main termination rail.

Class	1 1/4 " Glass Fuse Antisurge
Rating	2A

Controller Cards

There is a protection fuse for power input on the controller card.

Fuse Rating	500mA

Output Overload Protection Fuse

On the back of 4, 12, 18 zones cabinet, there are fuses for protecting the heating load output.

Class	Fast blow
Rating	16A

Appendix A

XL-2 Wiring Standards

XL-2 WIRING STANDARDS

The following standards only apply to controllers wired to Mold-Masters standard. Other specifications may have been stated when the controller was ordered. Please refer to the supplied specification details.

1. CONNECTION INFORMATION

1.1 Three Phase Designation

Please take extreme care when connecting the controller to the three-phase supply. Incorrect connection may appear to work but can result in damage to the controller. The controller is supplied according to your requirements in either a star or delta supply.

WARNING

For European Star 380V:

Use 5 conductors. Change jumper settings by joining all MP1, MP2, and MP3 to the blue (N) conductor at the terminal blocks.

Cable Marking	Supply Description	
R	Phase 1	black
S	Phase 2	brown
T	Phase 3	black
N (Mp1, Mp2, Mp3)	Neutral	blue
Earth Symbol	Earth	green/yellow

For American Delta 240V:

Use 4 conductors. Change jumper settings by joining R-MP3, S-MP1, and T-MP2 at the terminal blocks. Do **not** link all MP1, MP2, and MP3 together.

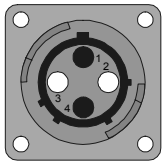
Cable Marking	Supply Description	
L1	Phase 1	black
L2	Phase 2	brown
L3	Phase 3	black
Earth Symbol	Earth	green/yellow

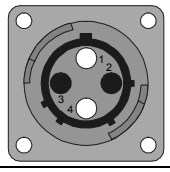
N.B. The delta supply cable does not have a neutral wire.
Cable colours may vary therefore wire up according to the Cable Markings.

1.2 Alarm Output

A cabinet connector provides an alarm output from an internal set of relay contacts. Using an external power source the cabinet can initiate a number of warning devices whenever any zone goes into an alarm state. This is commonly used for beacons, audible alarms or informing the moulding machine. The contacts are rated for 1A at 220V.

An input can be accepted through the same connector. It may be used for Remote Standby Mode or any other user-definable function. For exact details, consult the specification for the particular model.

Pin	Connection	Input / Output	
2	Auxiliary Input signal	Standby Port	
3	Auxiliary Input Gnd		

Pin	Connection	Input / Output	
1	Alarm 220v contact 1 100mA	Alarm Port	
4	Alarm 220v contact 2 100mA		

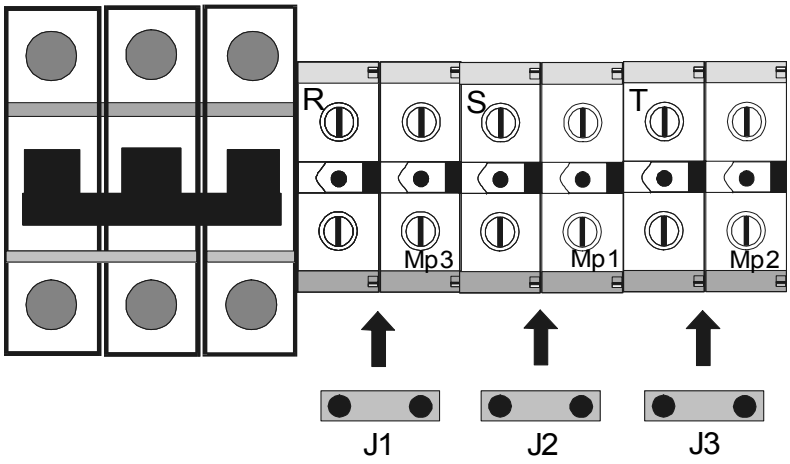
1.5 Serial Port

A male 9 way 'D' panel connector is provided for an RS-485 serial port. It can communicate with a remote computer for data collection. The pin outs are as follows.

Pin	Connection
1	-
2	Transmit
3	Receive
4	-
5	Ground
6	-
7	-
8	-
9	-

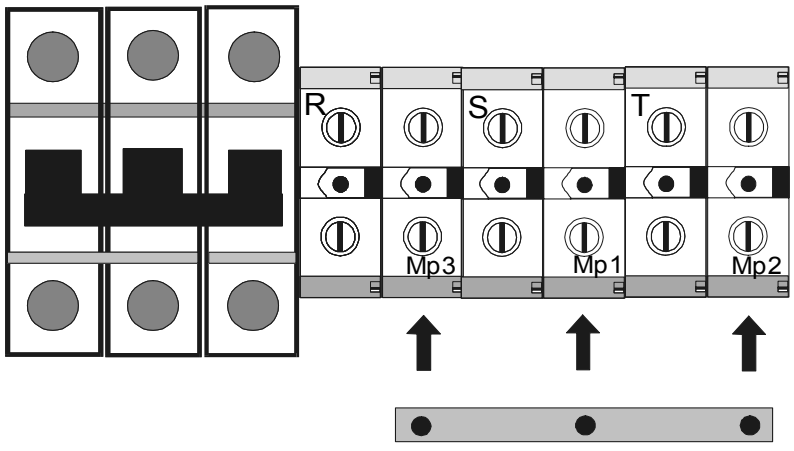
INSTRUCTION HOW TO CONVERT DELTA-WYE
FOR SINGLE BREAKER SYSTEM

AMERICAN DELTA 220V PHASE-PHASE



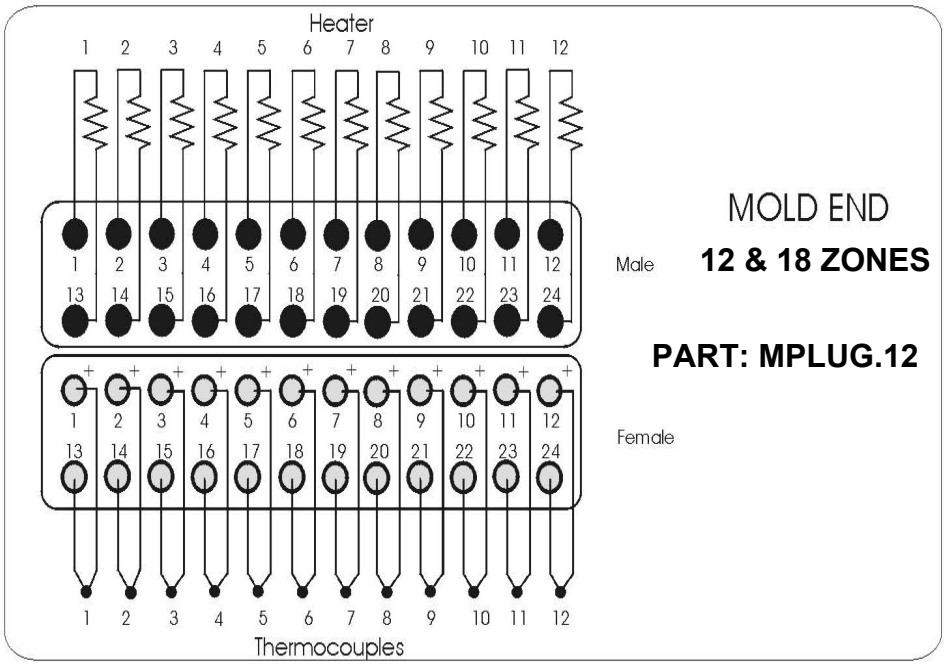
Install jumpers J1, J2, J3.
Do not connect Neutral (Blue) conductor.
Use black , brown, black conductor for 3 phases,
Green for GND (Delta-4 wires System)

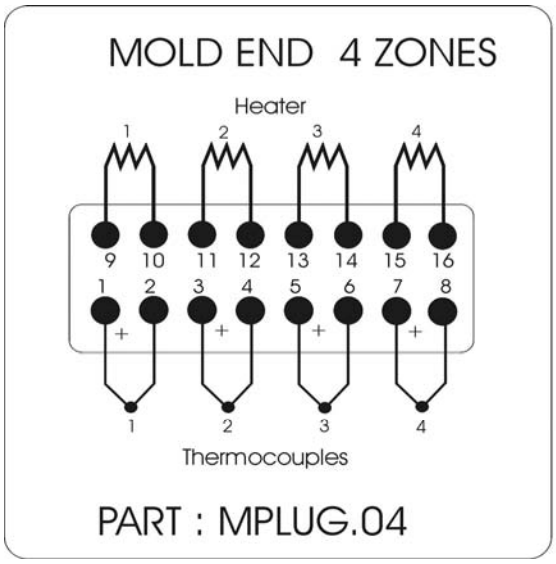
EUROPEAN/STAR 380v PHASE-PHASE ,220v PHASE-NEUTRAL



Use 3 stand offs to install Interconnected Jumper J4
Do not install J1,J2,J3
Connect Neutral (Blue conductor) to Mp2
Use black, brown,black for 3 phases and Green for
GND (WYE/STAR 5 wires Systems)

Plugs Configuration





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