Mold Masters

TempMaster™ series M1 PLUS

User Manual

version 7



REMOVE AND KEEP THIS
SHEET SOMEWHERE SAFE

Every machine leaves our factory with two levels of password protection. We recommend that you remove this sheet in order to establish your own security.

User Password - unix

System Password - linux

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Section 1 - Introduction

The purpose of this manual is to assist users in the integration, operation and maintenance of the M1 Plus controller. This manual is designed to cover most system configurations. If you need additional information specific to your system please contact your representative or a *Mold-Masters* office whose location can be found in the “Global Support” section.

1.1 Intended Use

The M1 Plus Series controller together with the MTS console is an electrical distribution and control device designed as a multi-channel temperature controller for use in hot runner plastic molding equipment. It uses feedback from thermocouples within the nozzles and manifolds to give precise closed-loop temperature control, and it is designed to be safe during normal operation. Any other uses would fall outside the engineered intent of this machine which may be a safety hazard and would void any and all warranties.

This manual is written for use by skilled persons who are familiar with injection molding machinery and their terminology. Operators should be familiar with plastic injection molding machines and the controls of such equipment. Maintenance persons should have sufficient understanding of electrical safety to appreciate the dangers of 3-phase supplies. They should know how to take appropriate measures to avoid any danger from electrical supplies.

1.2 Document Release Details

Table 1-1 Release Details

Document Number	Release Date	Version
M1P-UM-EN-00-05-10	July 2019	5-10
M1P-UM-EN-00-06	January 2021	6
UM--M1P--ENG--06-1	November 2025	6-1
UM--M1P--ENG--07	September 2026	7

1.3 Warranty Details

For current warranty information please refer to the documents available from our website: https://www.moldmasters.com/support/warranty or contact your *Mold-Masters* representative.

1.4 Returned Goods Policy

Please do not return any parts to *Mold-Masters* without pre-authorization and a return authorization number supplied by *Mold-Masters.*

Our policy is one of continuous improvement and we reserve the right to alter product specifications at any time without giving notice.

1.5 Movement or Resale of Mold-Masters Products or Systems

This documentation is intended for use in the country of destination for which the product or system was purchased.

Mold-Masters takes no responsibility for documentation of products or systems if they are relocated or resold outside the intended country of destination, as stated on the accompanying invoice and/or waybill.

1.6 Copyright

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1.7 Units of Measure and Conversion Factors



NOTE

The dimensions given in this manual are from original manufacturing drawings.

All values in this manual are in S.I. units or subdivisions of these units. Imperial units are given in parenthesis immediately after the S.I. units.

Table 1-2 Units of Measure and Conversion Factors

Abbreviation	Unit	Conversion Value
bar	Bar	14.5 psi
in.	Inch	25.4 mm
kg	Kilogram	2.205 lb
kPa	Kilopascal	0.145 psi
gal	Gallon	3.785 l
lb	Pound	0.4536 kg
lbf	Pound force	4.448 N
lbf.in.	Pound force inch	0.113 Nm
l	Litre	0.264 gallon
min	Minute	
mm	Millimeter	0.03937 in.
mΩ	Milli Ohm	
N	Newton	0.2248 lbf
Nm	Newton Meter	8.851 lbf.in.
psi	Pound per square inch	0.069 bar
psi	Pound per square inch	6.895 kPa
rpm	Revolutions per minute	
s	Second	
°	Degree	
°C	Degree Celsius	0.556 (°F -32)
°F	Degree Fahrenheit	1.8 °C +32

Section 2 - Global Support

2.1 Worldwide Locations

To find your nearest Mold-Masters office for sales or service support, please visit www.moldmasters.com/location-map or scan this QR code:



Section 3 - Safety

3.1 Introduction

Please be aware that the safety information provided by *Mold-Masters* does not absolve the integrator and employer from understanding and following international and local standards for safety of machinery. It is the responsibility of the end integrator to integrate the final system, provide necessary e-stop connections, safety interlocks and guarding, to choose the appropriate electrical cable for the region of use and to ensure compliance with all relevant standards.

It is the responsibility of the employer to:

- Properly train and instruct its personnel in the safe operation of equipment, including the use of all the safety devices.
- Provide its personnel with all necessary protective clothing, including such items as a face shield and heat resistant gloves.
- Ensure the original and continuing competence of personnel caring for, setting up, inspecting and maintaining injection molding equipment.
- Establish and follow a program of periodic and regular inspections of injection molding equipment to ensure it is in safe operating condition and proper adjustment.
- Ensure that no modifications, repairs or rebuild of portions are made to the equipment that reduces the level of safety existing at time of manufacture or remanufacture.

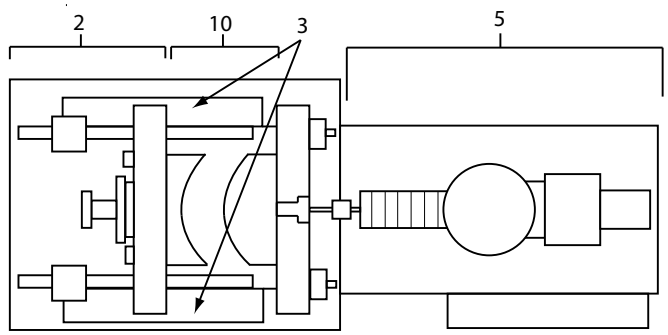
3.2 Safety Hazards

WARNING

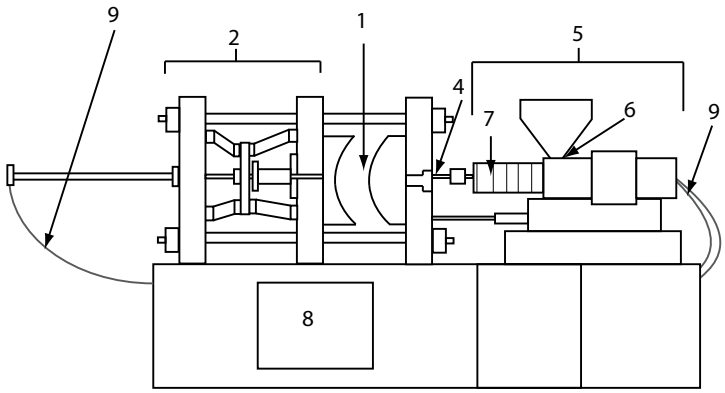
Also refer to all machine manuals and local regulations and codes for safety information.

The following safety hazards are most commonly associated with injection molding equipment. See European Standard EN201 or American Standard ANSI/SPI B151.1.

Refer to the illustration of hazard areas below when reading the Safety Hazards Table 3-1 on page 3-3.



Top view with guards removed



Front view with guards removed

1. *Mold area*
2. *Clamping mechanism area*
3. *Area of movement of core and ejector drive mechanisms outside areas 1 and 2*
4. *Machine nozzle area*
5. *Plasticating and / or injection unit area*
6. *Feed opening area*
7. *Area of the heater bands of the plasticizing and / or injection cylinders*
8. *Parts discharge area*
9. *Hoses*
10. *Area inside the guards and outside the mold area*

Figure 3-1 Injection molding machine hazard areas

Safety Hazards - continued

Table 3-1 Safety Hazards

Hazard Area	Potential Hazards
Mold Area Area between the platens. See Figure 3-1 area 1	**Mechanical Hazards** Crushing and / or shearing and / or impact hazards caused by: • Movement of the platen. • Movements of the injection barrel(s) into the mold area. • Movements of cores and ejectors and their drive mechanisms. • Tie bar motion. **Thermal Hazards** Burns and / or scalds due to operating temperature of: • The mold heating elements. • Material released from/through the mold.
Clamping Mechanism Area See Figure 3-1 area 2	**Mechanical Hazards** Crushing and / or shearing and / or impact hazards caused by: • Movement of the platen. • Movement of the drive mechanism of the platen. • Movement of the core and ejector drive mechanism.
Movement of Drive Mechanisms Outside the Mold Area and Outside the Clamping Mechanism Area See Figure 3-1 area 3	**Mechanical Hazards** Mechanical hazards of crushing, shearing and / or impact caused by the movements of: • Core and ejector drive mechanisms.
Nozzle Area The nozzle area is the area between the barrel and the sprue bushing. See Figure 3-1 area 4	M**echanical Hazards** Crushing, shearing hazards and / or impact hazards caused by: • Forward movement of the plasticizing and / or injection unit including nozzle. • Movements of parts of the power-operated nozzle shutoff and their drives. • Over pressurization in the nozzle. **Thermal Hazards** Burns and or scalds due to operating temperature of: • The nozzle. • Material discharging from the nozzle.
Plasticizing and / or Injection Unit Area Area from the adapter / barrel head / end cap to the extruder motor above the sled including the carriage cylinders. See Figure 3-1 area 5	**Mechanical Hazards** Crushing, shearing and / or drawn-into hazards caused by: • Unintentional gravity movements e.g. for machines with plasticizing and / or injection unit positioned above the mold area. • The movements of the screw and / or the injection plunger in the cylinder accessible through the feed opening. • Movement of the carriage unit. **Thermal Hazards** Burns and / or scalds due to operating temperature of: • The plasticizing and / or injection unit. • The heating elements e.g. heater bands. • The material and / or vapors discharging from the vent opening, feed throat or hopper. **Mechanical and / or Thermal Hazard** • Hazards due to reduction in mechanical strength of the plasticizing and / or injection cylinder due to overheating.
Feed Opening See Figure 3-1 area 6	Pinching and crushing between injection screw movement and housing.

Safety Hazards - continued

Table 3-1 Safety Hazards	
Hazard Area	**Potential Hazards**
Area of the Heater Bands of the Plasticizing and / or Injection Cylinders See Figure 3-1 area 7	Burns and / or scalds due to operating temperature of: • The plasticizing and / or injection unit. • The heating elements e.g. heater bands. • The material and / or vapors discharging from the vent opening, feed throat or hopper.
Parts Discharge Area See Figure 3-1 area 8	**Mechanical Hazards** Accessible Through the Discharge Area Crushing, shearing and / or impact hazards caused by: • Closing movement of the platen. • Movements of cores and ejectors and their drive mechanisms. **Thermal Hazards** Accessible through the discharge area Burns and or scalds due to operating temperature of: • The mold. • Heating elements of the mold. • Material released from / through the mold.
Hoses See Figure 3-1 area 9	• Whipping action caused by hose assembly failure. • Possible release of fluid under pressure that can cause injury. • Thermal hazards associated with hot fluid.
Area Inside the Guards and Outside the Mold Area See Figure 3-1 area 10	Crushing and / or shearing and / or impact hazards caused by: • Movement of the platen. • Movement of the drive mechanism of the platen. • Movement of the core and ejector drive mechanism. • Clamp opening movement.
Electrical Hazards	• Electrical or electromagnetic disturbance generated by the motor control unit. • Electrical or electromagnetic disturbance that can cause failures in the machine control systems and adjacent machine controls. • Electrical or electromagnetic disturbance generated by the motor control unit.
Hydraulic Accumulators	High pressure discharge.
Power Operated Gate	Crush or impact hazards caused by the movement of the power operated gates.
Vapors and Gases	Certain processing conditions and / or resins can cause hazardous fumes or vapors.

3.3 Operational Hazards



WARNINGS

- Refer to all machine manuals and local regulations and codes for safety information.
- The equipment supplied is subjected to high injection pressures and high temperatures. Ensure that extreme caution is observed in the operation and maintenance of the injection molding machines.
- Only fully trained personnel should operate or maintain equipment.
- Do not operate the equipment with unconfined long hair, loose clothing or jewelry, including name badges, neckties, etc. These may get caught in the equipment and can cause death or serious injury.
- Never disable or bypass a safety device.
- Ensure that the protective guards are placed around the nozzle to prevent the material from splashing or drooling.
- A burn hazard exists from material during routine purging. Wear heat-resistant personal protective equipment (PPE) to prevent burns from contact with hot surfaces or splatter of hot material and gases.
- Material purged from machine may be extremely hot. Ensure protective guards are in place around the nozzle to prevent material from splashing. Use proper personal protective equipment.
- All operators should wear personal protective equipment, such as face shields and use heat resistant gloves when working around the feed inlet, purging the machine or cleaning the gates of the mold.
- Remove purged material from the machine immediately.
- Decomposing or burning material could result in noxious gases being emitted from the purged material, feed inlet or mold.
- Ensure proper ventilation and exhaust systems are in place to help prevent inhalation of harmful gases and vapors.
- Consult manufacturer’s Material Safety Data Sheets (MSDS).
- Hoses fitted to the mold will contain high or low temperature fluids or air under high pressure. The operator must shut down and lockout these systems as well as relieving any pressure before performing any work with these hoses. Regularly inspect and replace all flexible hoses and restraints.
- Water and / or hydraulics on the mold may be in close proximity to electrical connections and equipment. Water leakage may cause an electrical short circuit. Hydraulic fluid leakage may cause a fire hazard. Always keep water and / or hydraulic hoses and fittings in good condition to avoid leaks.
- Never perform any work on the mold machine unless the hydraulic pump has been stopped.
- Check frequently for possible oil leaks / water leaks. Stop the machine and make repairs.

Operational Hazards - continued



WARNING

- Make sure that the cables are connected to the correct motors. Cables and motors are clearly labeled. Reversing the cables can result in unexpected and uncontrolled motion causing a safety risk or damage to the machine. A crushing hazard exists between the nozzle and mold melt inlet during carriage forward motion.
- A possible shearing hazard exists between the edge of the injection guard and the injection housing during injection.
- The open feed port could present a hazard to a finger or a hand inserted during operation of the machine.
- The electric servo motors could overheat presenting a hot surface which could cause burns to someone touching it.
- The barrel, barrel head, nozzle, heater bands and mold components are hot surfaces which could result in burns.
- Keep flammable liquids or dust away from the hot surfaces as they could ignite.
- Follow good housekeeping procedures and keep floors clean to prevent slips, trips and falls due to spilled material on the work floor.
- Apply engineering controls or hearing conservation programs as necessary to control noise.
- When doing any work on the machine that requires moving and lifting the machine, ensure that lifting equipment (eyebolts, fork lift truck, cranes, etc.) will have sufficient capacity to handle mold, auxiliary injection unit or Hot Runner weight.
- Connect all lifting devices and support the machine using a crane of adequate capacity before commencing work. Failure to support the machine can result in severe injury or death.
- Mold cable from the controller to the mold must be removed before servicing the mold.

3.4 General Safety Symbols

Table 3-2 Typical Safety Symbols	
Symbol	**General Description**
	**General – Warning** Indicates an immediate or potentially hazardous situation, which if not avoided, could result in a serious injury or death, and / or damage to equipment.
	**Warning – Barrel Cover Grounding Strap** Lockout / tagout procedures must be followed before removing the barrel cover. Barrel cover can become energized upon removal of grounding straps and contact can result in death or serious injury. Grounding straps must be reconnected before reconnecting power to machine.
	**Warning – Crushing and / or Impact Points** Contact with moving parts can cause serious crushing injury. Always keep guards in place.
	**Warning – Crush Hazard Closing Mold**
	**Warning – Hazardous Voltage** Contact with hazardous voltages will cause death or serious injury. Turn off power and review electrical schematics before servicing equipment. May contain more than one live circuit. Test all circuits before handling to make sure circuits have been de-energized.
	**Warning – High Pressure** Overheated fluids may cause severe burns. Discharge pressure before disconnecting water lines.
	**Warning – High Pressure Accumulator** Sudden release of high pressure gas or oil can cause death or serious injury. Discharge all gas and hydraulic pressure before disconnecting or disassembling accumulator.
	**Warning – Hot Surfaces** Contact with exposed hot surfaces will cause serious burn injury. Wear protective gloves when working near these areas.
	**Mandatory – Lockout / Tagout** Ensure that all energies are properly locked out, and remain locked out until the service work is completed. Servicing equipment without disabling all internal and external power sources can cause death or serious injury. De-energize all internal and external power sources (electrical, hydraulic, pneumatic, kinetic, potential, and thermal).
	**Warning – Molten Material Splashing Hazard** Molten material or high pressure gas can cause death or severe burns. Wear personal protective equipment while servicing the feed throat, nozzle, mold areas and when purging the injection unit.
	**Warning – Read Manual Before Operation** Personnel should read and understand all instructions in the manuals before working on equipment. Only properly trained personnel should operate the equipment.
	**Warning – Slip, Trip or Fall Hazard** Do not climb on equipment surfaces. Serious slip, trip, or fall injuries can result from personnel climbing on equipment surfaces.

General Safety Symbols - continued

Table 3-3 Typical Safety Symbols	
Symbol	**General Description**
	**Caution** Failure to follow instructions may damage equipment.
	**Important** Indicates additional information or used as a reminder.

3.5 Wiring Check



CAUTION

System Mains Supply Wiring:

- Before connecting the system to a power supply, it is important to check that the wiring between the system and the power supply has been done correctly.
- Particular attention must be given to the current rating of the power supply. For example, if a controller is rated at 63A, then the power supply must also be rated at 63A.
- Check that the phases of power supply are wired correctly.

Controller to Mold Wiring:

- For separate power and thermocouple connections, ensure that the power cables are never connected to the thermocouple connectors and vice-versa.
- For mixed power and thermocouple connections, ensure that the power and thermocouple connections have not been wired incorrectly.

Communications Interface and Control Sequence:

- It is the customer's responsibility to verify functionality of any custom machine interface at safe speeds, prior to operating equipment in the production environment at full speed in automatic mode.
- It is the customer's responsibility to verify all required motion sequences are correct, prior to operating equipment in the production environment at full speed in automatic mode.
- Switching the machinery into Auto mode without having verified the control interlocks and motion sequence are correct, may cause damage to machinery and / or equipment.

Failure to do wiring or connections properly will result in equipment failure.

The use of *Mold-Masters* standard connections can help to eliminate the potential for wiring errors.

Mold-Masters Ltd. cannot be responsible for damage caused by customer wiring and / or connection errors.

3.6 Lockout Safety



Warning

DO NOT enter the cabinet without first ISOLATING the supplies.

High voltage and amperage cables are connected to the controller and the mold. There is also a high voltage cable connection between the servo motor and the controller. Electrical power must be shut off and lockout / tagout procedures followed prior to installing or removing any cables.

Use lockout / tagout to prevent operation during maintenance.

All maintenance should be performed by properly trained personnel based on local laws and regulation. Electrical products may not be grounded when removed from the assembled or normal operating condition.

Ensure proper grounding of all electrical components before performing any maintenance to avoid potential risk of electrical shock.

Often power sources are inadvertently turned on or valves are opened mistakenly before maintenance work is completed, resulting in serious injuries and fatalities. Therefore, it is important to ensure that all energies are properly locked out and that they remain locked out until the work is completed.

If a lockout is not performed, uncontrolled energies could cause:

Electrocution from contact with live circuits

Cuts, bruises, crushing, amputations or death, resulting from entanglement with belts, chains, conveyors, rollers, shafts, impellers

Burns from contact with hot parts, materials or equipment such as furnaces

Fires and explosions

Chemical exposures from gases or liquids released from pipelines

3.7 Electrical Lockout



WARNING - READ MANUAL

Refer to all machine manuals and local regulations and codes.



NOTE

In some instances, there may be more than one power source feeding equipment and steps must be taken to ensure that all sources are effectively locked out.

Employers must provide an effective lockout / tagout program.

1. Shut down machine using normal operational shutdown procedure and controls. This should be done by, or in consultation with the machine operator.
2. After ensuring that the machinery has been completely shut down, and all controls in the “off” position, open the main disconnect switch located in the field.
3. Using your own personal padlock, or one assigned by your supervisor, lock the disconnect switch in the off position. Do not lock only the box. Remove the key and retain. Complete a lockout tag and affix to the disconnect switch. Each person working on the equipment must follow this step. The lock of the person doing the work or in charge must be installed first, remain throughout and be removed last. Test the main disconnect switch and make sure it cannot be moved to the “on” position.
4. Try to start the machine using the normal operation controls and point of operation switches to make sure that the power has been disconnected.
5. Other sources of energy that could create a hazard while working on the equipment must also be de-energized and appropriately “locked-out”. This can include gravity, compressed air, hydraulics, steam and other pressurized or hazardous liquids and gases. See Table 3-3.
6. When the work is completed, prior to removing the last lock, make sure the operational controls are in the “off” position so that the main disconnect switching is done under “no load”. Ensure all blocks, tools and other foreign materials are removed from machine. Also ensure that all personnel that may be affected are informed that the lock(s) will be removed.
7. Remove lock and tag, and close the main disconnect switch if permission has been given.
8. When the work has not been completed on the first shift, the next operator should install a personal lock and tag before the first operator removes the original lock and tag. If the next operator is delayed, a lock and tag could be installed by the next supervisor. Lockout procedures should indicate how the transfer is to be conducted.
9. It is important that, for their personal protection, each worker and/or foreperson working in or on a machine places his/her own safety lock on the disconnect switch. Use tags to spotlight work in progress and give details of work being done. Only when the work is completed and the work permit signed off, may each worker remove his/her lock. The last lock to be removed should be that of the person supervising the lockout and this responsibility should not be delegated.

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3.7.1 Energy Forms and Lockout Guidelines

Table 3-3 Energy Forms, Energy Sources and General Lockout Guidelines		
Energy Form	**Energy Source**	**Lockout Guidelines**
Electrical Energy	• Power transmission lines • Machine power cords • Motors • Solenoids • Capacitors (stored electrical energy)	• Turn off power at machine first (i.e., at point of operation switch), and then at the main disconnect switch for the machine. • Lock and tag the main disconnect switch. • Fully discharge all capacitative systems (e.g., cycle machine to drain power from capacitors) according to the manufacturer's instructions.
Hydraulic Energy	• Hydraulic systems (e.g., hydraulic presses, rams, cylinders, hammers)	• Shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves. • Bleed off and blank lines as necessary.
Pneumatic Energy	• Pneumatic systems (e.g.,lines, pressure reservoirs, accumulators, air surge tanks, rams, cylinders)	• Shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves. • Bleed off excess air. • If pressure cannot be relieved, block any possible movement of machinery.
Kinetic Energy (Energy of a moving object or materials. Moving object may be powered or coasting)	• Blades • Flywheels • Materials in supply lines	• Stop and block machine parts (e.g. stop flywheels and ensure that they do not recycle). • Review entire cycle of mechanical motion, ensure that all motions are stopped. • Block material from moving into area of work. • Blank as necessary.
Potential Energy (Stored energy that an object has the potential to release due to its position)	• Springs (e.g., in air brake cylinders) Actuators • Counterweights • Raised loads • Top or movable part of a press or lifting device	• If possible, lower all suspended parts and loads to the lowest (rest) position. • Block parts that might be moved by gravity. • Release or block spring energy.
Thermal Energy	• Supply lines • Storage tanks and vessels	• Shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves. • Bleed off excess liquids or gases. • Blank lines as necessary.

3.8 Ground Connection

A ground connection is in the following location on the M1 Plus controller:

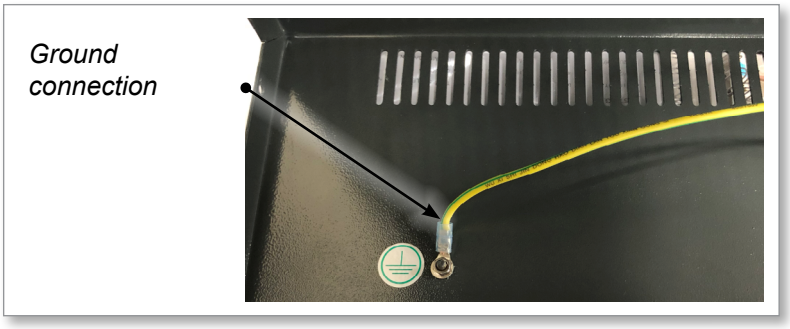


Figure 3-2 Ground connection on the lid

3.9 Disposal

WARNING

Milacron *Mold-Masters* declines any responsibility for personal injury or personal damage arising from reuse of the individual components, if these parts are used other than for the original and proper intended purpose.

1. Hot runner and system components must be disconnected from the power supply fully and properly before disposal, including electricity, hydraulics, pneumatics and cooling.
2. Ensure that the system to be disposed of is free from fluids. In the case of hydraulic needle valve systems, drain the oil from the lines and cylinders and dispose it in an environmentally responsible manner.
3. The electrical components are to be dismantled, separating them accordingly as environmentally-friendly waste or disposed as hazardous waste if necessary.
4. Remove the wiring. The electronic components are to be disposed in accordance with the national electric scrap ordinance.
5. The metal parts are to be returned for metal recycling (waste metal and scrap trade). The instructions of the corresponding waste disposal company are to be observed in this case.

Recycling of all possible materials should be at the forefront of the disposal process.

3.10 M1 Plus Controller User Hazards



WARNING - ELECTRIC SHOCK HAZARD

It is crucial to comply with these warnings to minimize any personal danger.

- Ensure that all energies are properly locked out in the controller and mold machine before installation of the controller into the system.
- 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, this potential may be up to 600VAC.
- Voltage and amperage cables are connected to the controller and the mold. Electric power must be shut off and lockout / tagout procedures followed prior to installing or removing any cables.
- Integration should be done by properly trained personnel based on local codes and regulations. Electrical products may not be grounded when removed from the assembled or normal operating condition.
- Do not mix electrical power cables with thermocouple extension cables. They are not designed to carry the power load or list accurate temperature readings in each other's application.
- The main power switch is found on the front of the controller. It is sufficiently rated to disconnect the total load current during switch on and switch off.
- The main power switch can be locked using a padlock applied under the lockout / tagout procedure found in "3.6 Lockout Safety" on page 3-9.
- Use lockout / tagout to prevent operation during maintenance.
- All maintenance should be performed by properly trained personnel based on local codes and regulation. Electrical products may not be grounded when removed from the assembled or normal operating condition.
- Ensure proper grounding of all electrical components before performing any maintenance to avoid potential risk of electrical shock.

3.10.1 Operational Environment



WARNING

The display console and controller cabinet together are designed for use in the plastic injection moulding industry as temperature controllers for third party hot runner systems as commonly used in mold tools. They 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.

The controller cabinet and touchscreen console should be installed in a clean dry environment where the ambient conditions do not exceed the following limits:

- Temperature +5 to +45°C
- Relative Humidity 90% (non-condensing)

Section 4 - Overview

WARNING

Ensure that you have fully read “Section 3 - Safety” before connecting or operating the controller.

4.1 Specifications

The following are general specifications. The actual controller / console supplied may have contractual variations and differ in some specified options.

Table 4-1 General Specifications	
Alarm Output	Closing Contact Relay 5 Amp max
Control Range	0 - 450 Celsius (Centigrade), 32-842 Fahrenheit
Data Communications	RS-232 serial, DB9 male connector
Heater Tool Connector	Harting type Han E or equivalent
Mains Voltage Output Pattern	Burst-fired or zero voltage crossover
Output Overload Protection	High-speed semiconductor fuse links
Overload Protection	Miniature Circuit Breaker
Printer Output Connector	USB port
Relative Humidity Limit	90% (non-condensing)
Supply Earth-Leakage Trip	300 mA Note: this is for tool protection
Supply Voltage	415 Volts 3-phase 50/60 Hz with neutral. Other available include 240/380/400 and 600 volts in Star or Delta configuration
T/C Tool Connector	Harting type Han A or equivalent
Temperature Control Method	Closed loop (Auto) or open loop (Manual) with HR software
Temperature Scale	Celsius (Centigrade) or Fahrenheit
Voltage Bandwidth	Stable within (20% supply voltage swing)

4.2 Controller Cabinet

The power supply to the control cabinet is via a strain-relief mounted cable and plug, and it may be wired in Star or Delta configuration. Please check your specifications for details on which style has been configured. There are normally two types of cables supplied: a thermocouple connection and a power connection, both using type HAN24E as a preferred connector.

Refer to “Section 9 - Hot Runner Controller Wiring Details” for more information.

An alarm output option is available for extending the alarm or inhibiting the injection process.

4.2.1 Controller Modules

The controller uses six-zone modules that provide real time temperature control.

Each card has three main components:

- thermocouple input CPU
- two control CPUs
- multi-voltage output triacs

4.2.2 Thermocouple Inputs

The thermocouple inputs have preset responses for both J and K- type thermocouples. The associated console provides means of selecting the sensor type which, in turn, sets the CPU linearization to match the selected thermocouple type.

4.2.3 Central Processor Units (CPUs)

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

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

4.2.4 Output Triacs

The controller card has six on-board triacs, one for each channel that are capable of controlling heating loads of up to 16 Amps peak.

4.2.5 Power Supply

The DC power supplies for the cards, data communications and an alarm output relay are all provided by a single power supply unit. This is located on top of the upper chassis panel.

4.3 Screen Layout

Monitor and Information

The bottom row shows overall information. Reading left to right this includes:

- the current operating mode
- a message bar
- the current health status



Control

Side command buttons that change from page to page.



Navigation

The Main page has a [**Menu**] button at the bottom of the side buttons that activates the navigation screen.

All other pages use the [**Back**] button on the sidebar to return to the main page.

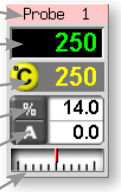
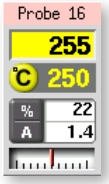
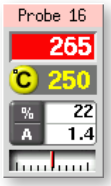
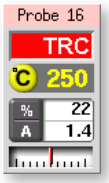
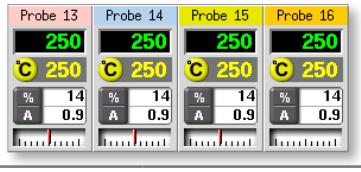


4.4 Main Page

Can be used for:

- **Monitor** – observe zone condition
- **Control** – Start / Stop and Boost / Standby immediately available. All other modes (Standby, Shutdown, Stop) available from [**Mode**] button.
- **Set** – choose one or more zones to get [**Set**] function to set or alter zone setpoints or run modes.

4.4.1 Monitoring

Healthy Zone which shows Zone Name (Alias) Actual Temperature Scale + Set Temperature Percentage Power Flow Current Deviation for Set Temperature		Actual temperature is green text on black background.
Warning Zone Deviation exceeds first stage (Warning).		Actual temperature is black text on a yellow background.
Alarm Zone Deviation exceeds second stage (Alarm).		Actual temperature is white text on red background.
Fatal Error Problem detected See Table 8-1 for a list of possible error messages.		Error message reads as white text on red background.
Zone Off Individual zone switched off.		
Different Header Colors User-configurable colors.		

4.5 Main Page – Display Options

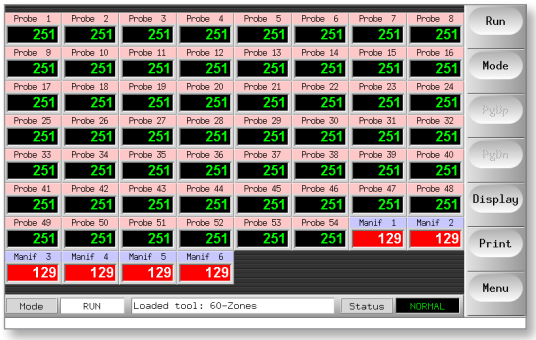
1. Choose [**Display**] button to display the following options:



2. Touch it once more to show 40 zones. Each zone displays name, Actual Temperature and Set Temperature.



3. Touch again to show 60 zones. Each zone shows name and Actual Temperature.



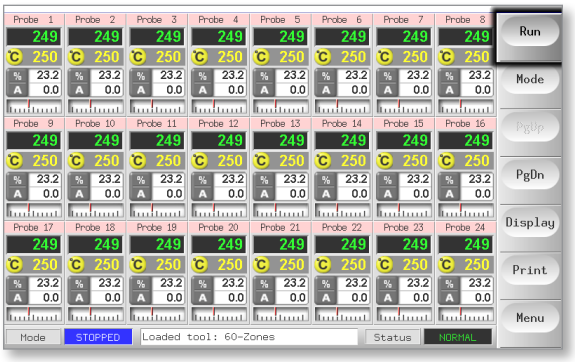
4. Touch button again to show the Data page, which displays the setup and data for all of the zones.

   A fixed window below the scrolling pane displays the total current and total power.



4.6 Main Page - Start, Stop and More Options

Button 1 can appear as [**Run/Stop**] or [**Startup/Shutdown**].



Button 2 is [**Mode**].

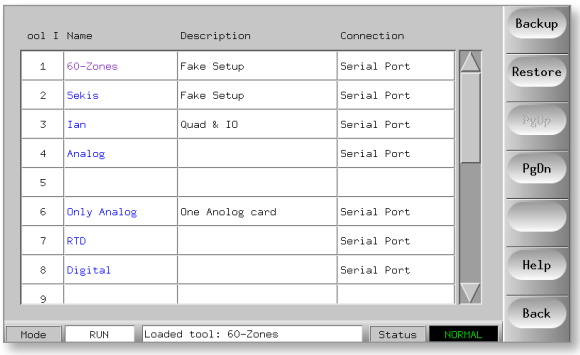


Choose [**Mode**] to reveal all other Run mode options.

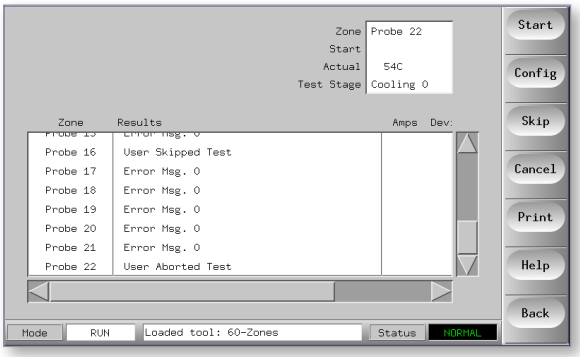


4.7 More Pages

The **ToolStore page** is a tool bank, which can store up to 20 tool configurations.

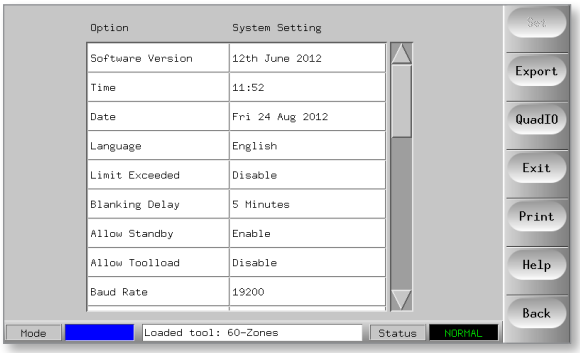


The Diagnose page is used to test zones and / or perform wiring checks on a new or recently maintained system.



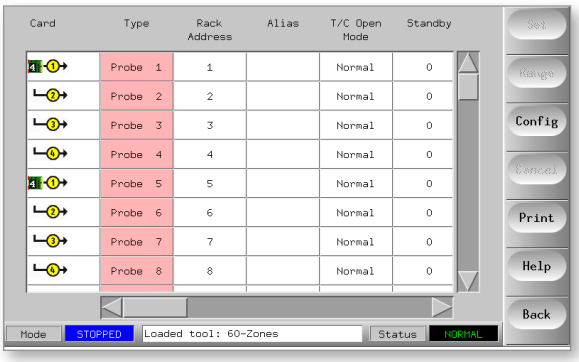
The Utilities page gives access to these features:

- an [**Exit**] button to shut down the system
- a [**Config**] button to setup system parameters - see “Configure the Control Cards” on page 5-4
- an [**Export**] function - see page 7-2 and a [**QuadIO**] button - see page 6-30

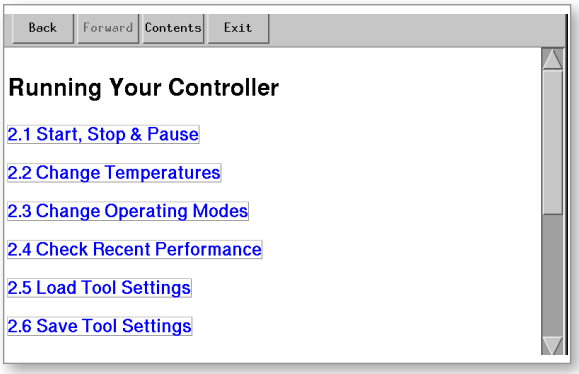


More Pages - continued

The SetUp page is used to setup and configure various global and specific tool parameters.



The Help pages offer user help.



4.8 Keypad

Where the configuration of parameters requires a user interface then either a keyboard or a keypad is displayed.

Keyboard - for alphanumeric input

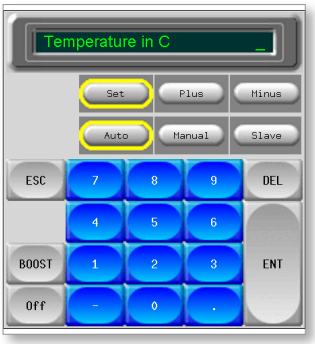


Keypad 1 - for basic numeric input

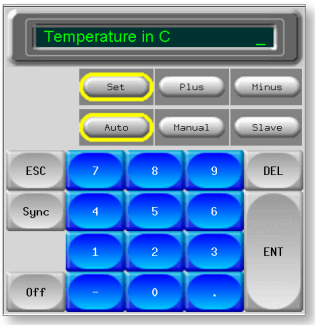


Keypad 2 - is an extended keypad which adds:

- **Value Keys** – Set, Temp, Add and Subtract, to set temperature
- **Mode Keys** – Auto, Manual and Slave, to set working mode



Keypads 3 and 4 - offer more buttons to choose and configure synchro or spear tips



Section 5 - Setup

5.1 Introduction



WARNING

Ensure that you have fully read “Section 3 - Safety” before connecting or operating the controller.

It is the responsibility of the integrator to understand and follow international and local standards for safety of machinery when integrating the controller with the molding system.

The M1 Plus controller should be located in such a way that the main disconnect is easily accessible in case of emergency.

M1 Plus controllers are shipped with a power cable, which is a correct size to run the system. When you install a connector on the cable, ensure that the connector can safely withstand the full system load.

The M1 Plus controller supply should have a fused disconnect or main circuit breaker according to local safety codes. Refer to the serial plate on the controller cabinet for confirmation of the supply requirements. If the local supply is outside the specified range, please contact *Mold-Masters* for advice.



WARNING - ELECTRIC SHOCK HAZARD

It is crucial to comply with these warnings to minimize any personal danger.

- Ensure that all energies are properly locked out in the controller and mold machine before installation of the controller into the system.
- 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, this potential may be up to 600VAC.
- Voltage and amperage cables are connected to the controller and the mold. Electric power must be shut off and lockout / tagout procedures followed prior to installing or removing any cables.
- Integration should be done by properly trained personnel based on local codes and regulations. Electrical products may not be grounded when removed from the assembled or normal operating condition.
- Do not mix electrical power cables with thermocouple extension cables. They are not designed to carry the power load or list accurate temperature readings in each other’s application.



WARNING - TRIP HAZARD

The integrator should ensure that the controller cables do not present a trip hazard on the floor between the controller and the mold machine.



IMPORTANT

We recommend that you run a self diagnostic routine (see Section 7.5) to check that all zones are correctly sequenced and that there is no crosswiring between zones or between heater outputs and thermocouple inputs.

5.2 Setup the Console

5.2.1 Create a First Tool

At the Tool page, the [**Detect**] command searches the cabinet to see what cards are available and then puts that information into the SetUp page.

5.2.2 Setup Tool Parameters

Once the card information has been written into the SetUp page, the displayed cards must have zones allocated to them.

Setting the zones to reflect the tool makes it easier to use, as control card characteristics are preprogrammed so they are more likely to match the heat load. Automatic first time start will perform this routine, but it is helpful to have the cards designated before they are first used.

The various tool parameters have default values set which depend on how the card was allocated. These values are for general use but many tool parameters, such as warning and alarm levels, may require fine tuning for a particular tool. All values are configured on a zone-by-zone basis to allow for precise settings.

All the values on the SetUp page are stored with the tool setting that is currently selected on the Tool page. If a new tool is loaded for a different purpose, then this new tool will bring its own settings into the Tool page.

5.2.3 Configure System Settings

The [**Config**] button opens more settings, such as Startup and Boost, and tool parameters, such as Alarms and Limits, which are all configured on the SetUp page.

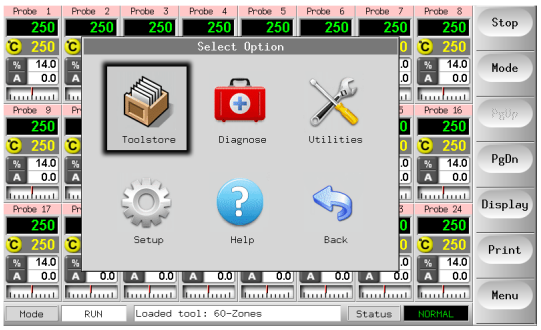
5.2.4 Setup Operating Parameters

Once all of the above system settings are configured, a user can go back to the Main page and set the main operating temperatures.

Other values for any monitoring zones in the console, such as steel temperature, water flow, coolant temperature or other ancillary facilities, can also be set on the Main page.

5.3 Create the First Tool

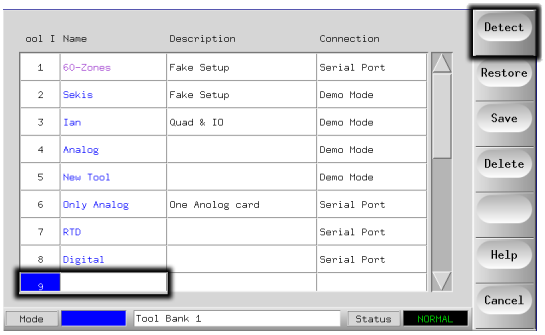
1. Choose [**Menu**] and open the Tool page.



2. Choose a blank tool slot and choose [**Detect**].

Create the First Tool - continued

3. Enter the System password.



4. Type in a new name for the proposed tool and press [**Ent**].
5. If the tool is connected via a network to any other cabinet, the next step presents an option to choose the local controller (labelled “Serial Port”) or a remote controller (labelled “hrcnetx”).
   - If no network connected controllers are detected, then it automatically skips this step and goes straight to step 6.
6. The console runs an automatic card detect routine to find out what type and how many cards are fitted in the selected controller.
7. Once the routine is complete, the SetUp page opens and the controller parameters can be configured for this tool.

NOTE

If the system has any problem running the detect sequence, it may report “Auto Detect Failed” and ask if you want to repeat the Detect routine. If the reason for failure is obvious, such as a loose network cable or a mains glitch, then you may choose [**OK**] to retry card detection.

If the detection routine continues to fail, contact your supplier for advice.

5.4 Cards That May Be Detected

Table 5-1 Cards That May Be Detected	
	6-zone card at 15 Amp rating for probes and manifolds
	Quad Input/Output card with programmable input and output options

5.5 Configure the Control Cards

The SetUp grid displays icons in the first column to show what cards have been detected.

All temperature control cards initially default to “Probe” zone and use probe default values, as seen in the first picture below.

The tool may run on this basic setting, but it is better to configure larger, slower zones, such as manifolds.

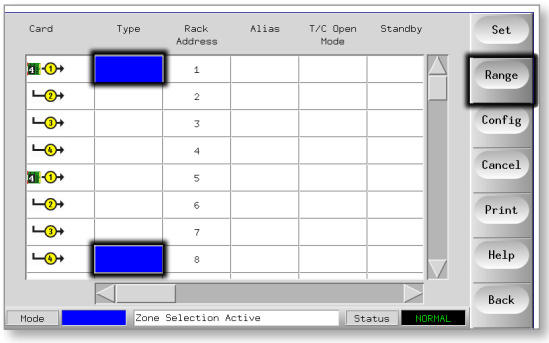
Surplus zones should be set to “Not Used” to prevent false alarms.

Example: if you have six cards offering 36 control zones, but are only using 32 actual zones, it is best to set the last four zones to [**Not Used**] so they do not display false alarms such as T/C Fail.

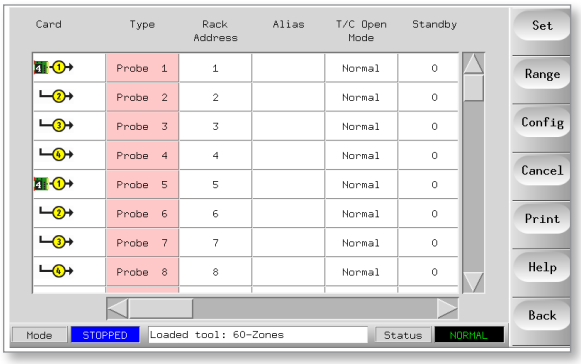
5.5.1 Set Zone Types

Choose one or more zones, using one of the following methods:

1. Choose one zone at a time until you have selected all the required zones.
   – Or –
   Choose the first zone, then the last zone, then choose [**Range**] to include all the zones in between, as shown below:



2. Choose [**Set**] to see the Configure Card Slot menu.



Set Zone Types - continued

3. Choose Zone Type which could be:
    a) [**Not Used**] - switches off unwanted card zones
    b) [**Manifold**] - sets the zone to a slower response curve
    c) [**Probe**] - sets the zone to a faster response curve
    d) [**Monitor**] – allows you to set any control zone from any card, as a monitor zone only with no control function
    e) [**Special**] - available if Auto-Detect sees that a Quad IO card is fitted
4. Choose any header color if the default selection is not required.

5.6 Preconfigured Setup Values

Table 5-2 shows the whole setup chart and the pre-configured values that are given to probe and manifold zones. These values may be changed to suit each tool.

Table 5-2 Pre-Configured Setup Values

Parameter	Probe and Manifold Cards	Other Monitoring Cards
Alarm Hi and Lo	25ºC or 45ºF	25ºC or 45ºF
Alias	blank	blank
Analogue Input	blank	20 lt / min flow
Display Group	1	blank
Master Zone	blank	blank
Max Power Setting	80%	blank
Max Setpoint Setting	350ºC or 662ºF	350ºC or 662ºF
Min Setpoint Setting	0ºC	blank
Rack Position	slot address	slot address
Sensor	J-type	blank
Shutdown Stage	off	off
Speed	Auto	blank
Standby and Boost	0ºC or 0ºF	blank
Startup Stage	off	off
T/C Offset Value	0ºC or 0ºF	blank
T/C Open Mode	Normal	blank
Triac	On-board	blank
Warn Hi and Lo	5ºC or 9ºF	blank

5.7 Configure the Controller

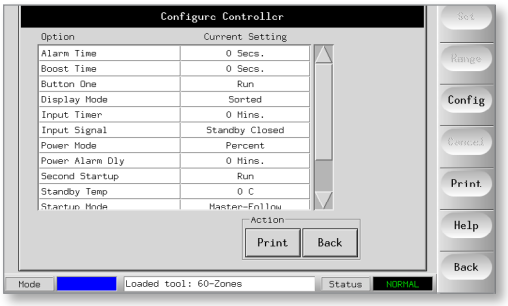
The Configure Tool panel lists the various Global parameters and a short description of each parameter.

1. Choose [**Config**] to view the controller parameters.





2. Choose [**List**] for an overview of controller parameters and how they are currently set.



NOTE

Parameters can have either:

Value settings - use the [**Edit**] button to bring up a keypad to enter values
or
Tick boxes - select or deselect the parameter

5.8 Global Parameters

Table 5-3 Global Parameters

Function	Description	Limits
Alarm Time (seconds)	Sets a fixed delay time between an alarm condition being detected and an external alarm being sent.	The maximum setting for Alarm Time is 999 seconds
Boost Time	Sets the length of the Boost temperature period.	The maximum period for Boost Time is 999 seconds.
Button One Mode	Sets the function of the first [**Mode**] button on the main page. Choices include paired combinations, including Run, Stop, Startup and Shutdown	
Display Mode	Sets the main page and SetUp page to group the zones as: • [**Sorted**]: all Spear zones displayed first, followed by Probes, then Manifolds, then Specials. • [**Mixed**]: groups the Probe and Manifold zones by their position in the card rack. Manifolds may appear out of sequence order, but will be grouped with their corresponding Probe zones.	
Input Signal	Sets how the console responds to a remote input, normally open pair, at the HAN4A connector on the rear panel: **STANDBY** - switches the controller into Standby mode when the remote input is closed and returns the controller to its previous state when the signal is removed. • If this option is selected then you can also use the Input Timer option to defer the Standby condition for a preset time. **AUTO-STANDBY** – prevents the Input timer from going to Standby as it resets the timer on each cycle to keep the temperature at normal, if cycling is applied. • If the cycling stops, the Input Timer times out and sets the temperature down to its Standby level. **STOP** - switches the controller into Stop mode when the remote line is closed. • If this option is selected, the Input Timer option can be used to defer the Standby condition for a preset time. **AUTO-STOP** – prevents the Input Timer from going to Stop as it resets the timer on each cycle to keep the temperature at normal, if cycling is applied. • If the cycling stops the Input Timer times out and the console goes to Stop. **BOOST** - switches the controller into Boost mode.	**NOTE:** The remote input is only effective when the system is in Run mode. This function defaults to Boost when the controller has Spear zones. Only those zones that have Boost or Standby temperatures configured in their setup will respond to the remote input signal.

Table 5-2 Global Parameters		
Function	**Description**	**Limits**
Input Timer (minutes)	**As a Countdown Timer** – If Auto Stop or Auto Standby is chosen, then the Input Timer works as a countdown timer, which waits for the next cycling pulse. Each cycle-pulse resets the timer so that the console does not go into the Stop or Standby mode. **As a Delay Timer** – If Stop or Standby is chosen, then this timer starts as soon as the input pulse is received and after a preset time period it switches the console into the selected Stop or Standby mode.	This option is dependent on the Input Signal option. The maximum period for Input Timer is 25 minutes.
Power Alarm Display	Pauses the Power Alarm by a preset time (in minutes), so it does not instantly cause an alarm effect.	Defaults to 0 minutes delay.
Power Mode	Chooses how power levels are shown on the Main page for controllers with normal probes. • If you have control cards with current measuring coils, this option allows the main page to show either [**Current**] or Percentage [**Power**]. • If there are no current measuring coils, the option should be set to percent, otherwise the Power / Current display will show zero for controllers with spear probes. Also chooses if amps or percentage power is displayed while a boost signal is received. • Choosing [**Percent**] will display the percentage power level that is being applied to the tips during the Boost part of the mold cycle. • Outside the Boost period, each zone displays the percentage power that is being applied to the body only • Selecting [**Amps**] allows you to see the preheat and boost current in the tips.	
Second Startup	Chooses a final operating mode for the console once it has completed a Startup sequence and reached normal temperature • [**RUN**] is the default condition. • [**BOOST**] will temporarily apply boost settings until it times out. • [**STANDBY**] will reduce temperature to Standby temperature until it is manually or remotely changed.	
Standby Temp	Sets an overall Standby temperature, which will override individual Standby temperature settings. • Leave this value set to 0° for individual standby values to remain valid.	The maximum Standby Temperature is 260° C.

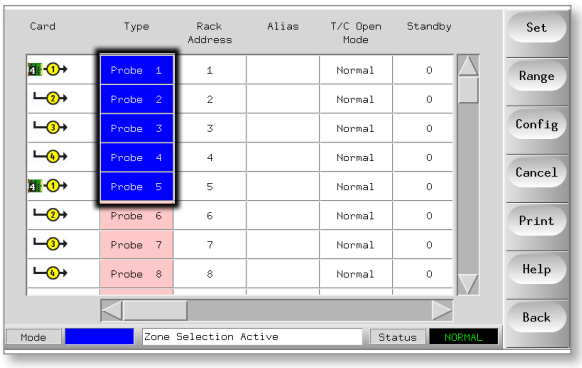
Table 5-2 Global Parameters		
Function	**Description**	**Limits**
Shutdown Temperature	Sets the temperature to which each Shutdown group must fall before the next group is switched off. • Raising the Shutdown temperature means that zones do not have to cool down as much before subsequent stages are switched off, which shortens the overall shutdown time. • Lowering the Shutdown temperature has the opposite effect and lengthens the shutdown time. • If this set value is equal to or higher than the normal temperature, then it has no effect on the Shutdown sequence, and the shutdown interval is then based only on the Shutdown Timer.	The Shutdown temperature setting defaults to 0, which represents an extremely long shutdown interval. The highest Shutdown temperature permitted is 260°C or 500°F.
Shutdown Timer	Sets a delay period (in minutes) to hold off the action of successive groups during a Staged Shutdown • Sets the time that successive zone groups must wait before each switches off. • Setting this option to zero makes the Shutdown Timer ineffective, and a Staged shutdown is then based only on Shutdown Temperature.	The maximum period for Shutdown Timer is 99 minutes.
Startup Mode	Chooses between three different Startup modes: **MASTER-FOLLOW** - a default option that ties the faster-acting nozzles' set temperature to slower manifolds' actual temperature to produce a homogenous rise of all zone temperatures. **MASTER-ONLY** – heats only the nominated Master zones first • No power is supplied to the subordinate nozzles until the Master zones have reached their set temperature. **STAGED** – allows you to nominate up to eight Stage Groups that will heat up in successive stages. • When Staged Startup is selected, the shutdown sequence automatically follows a staged shutdown. • Shutdown pattern has a separate allocation, and this pattern does not have to match the Startup sequence.	
Temp Scale	Chooses [**Degree C**] or [**Degree F**] as required.	

5.9 Save the Configured Settings

1. Choose [**OK**] to save all the configuration settings.
2. Choose [**Cancel**] to leave the page without making any changes.

5.10 Set the Tool Parameters

1. Choose the zones.



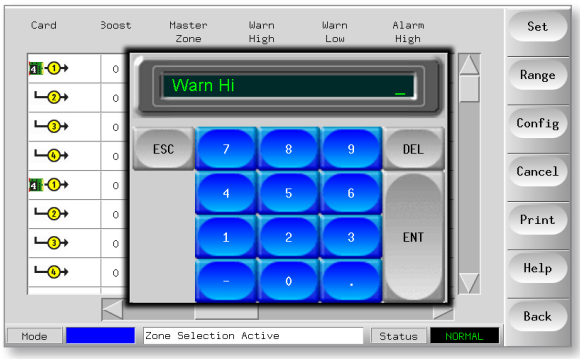
2. Choose the parameter.



3. Choose [**Set**].



4. Set the value.



5.11 Tool Parameters

Table 5-4 Tool Parameters

Function	Description	Setting Limits
Alarms Active	Offers a selection table which allows you to decide how any of the following alarm conditions should affect the system: • High Temperature Alarm • Low Temperature Alarm • Zone Alarm • Power Alarm • Reynolds Number Alarm	Option for alarm actions: **Console** – displays the alarm condition in that one panel and the Status panel. **Beacon** – extends the alarm to activate an attached Alarm Beacon and Sounder. **Mold Protect** – puts the console into Stop mode. All zone heaters will cool down. **Injection Disable** – sends out a shutdown signal from the IO card, which may be externally configured to stop the molding machine.
Alarm Power	Generates an alarm if any average power level, which is measured over the previous eight minutes, exceeds this setting.	This defaults to 100% or to Off. Maximum power can be sutained without generating any power alarm.
Alias	Input for alternative zone names.	Has an auto-increment number facility.
Analogue Sensor Type	Configures analogue inputs to match analogue flow sensors.	
Boost (temperature)	Sets the increase in temperature when Boost is selected.	The maximum Boost value is 250°C or 450°F above the normal set temperature.
Display Group	Chooses groups of zones to display on separate main page. By default, all zones are in group one but selected zones can be allocated to subsequent groups. Zones that need not be shown on the main page can be put in display group zero.	There is a limit of six display groups.
Master Zone	Chooses a Master zone for any group of sub-zones.	Do not choose until all zones have been configured to correct types.
Maximum Power Setting	Sets the highest permitted power level for the zone(s).	The highest Maximum Power Setting is 100% power.
Maximum Setpoint Setting	Sets the highest permitted setpoint for the zone(s).	The highest Maximum Setpoint temperature is 450°C or 842°F.
Minimum Setpoint Setting	Sets the lowest permitted setpoint for the zone(s).	The lowest Minimum Setpoint temperature is 0°C or 0°F.

Tool Parameters - continued

Table 5-4 Tool Parameters		
Function	**Description**	**Setting Limits**
Rack Position	Identifies the position of the card within the rack.	This is not user-configurable.
Sensor	Chooses temperature sensor for the zone(s) (J or K-type).	
Shutdown Stage	Configures groups of zones into separate shutdown groups.	There is a limit of six shutdown groups.
Speed	Chooses or overrides the Auto-Speed setting to determine the control characteristic for the zone temperature.	
Standby (temperature)	Sets the Standby temperature for any zone.	The maximum Standby temperature is 250°C or 450°F.
Startup Stage	Configures groups of zones into separate startup groups.	There is a limit of six startup groups.
T/C Offset Value	Sets a proportional value between measured and displayed temperature to compensate if a thermocouple is not close enough to the probe tip.	The highest T/C Offset temperature is ±75°C or ±135°F.
T/C Open Mode	Chooses a response for any zone that detects a failed thermocouple: **Normal** – No action corrective taken. The zone power sets to 0% and it shows a T/C fatal alarm. **Auto Manual** - The zone has enough data after ten minutes of steady operation to switch to Manual mode at a power level that should hold the previous temperature. **Auto Slave** – The zone has sufficient data after ten minutes of steady operation to slave the failed zone to another similar zone. **Nominated Zone Slaving** – Allows the user to specify a zone to act as a master for another zone, if it were to fail.	
Warning and Alarm Levels	Sets the first (Warning) and second (Alarm) stage alarms.	The maximum Warning or Alarm value is 99°C or 178°F.

5.12 Set the Operating Parameters

5.12.1 Choose Zones

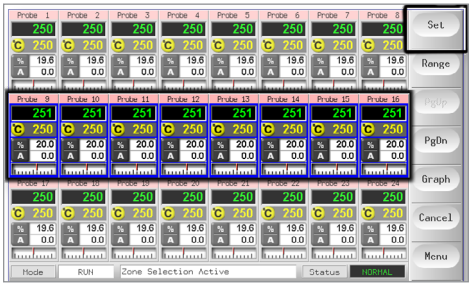
1. Choose the first zone.



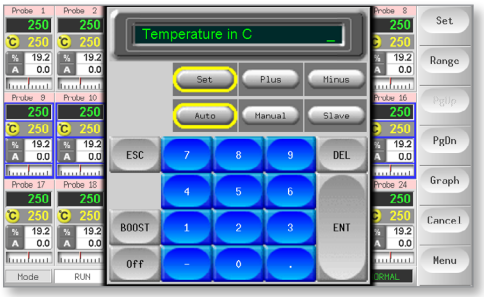
2. Choose the last zone.



3. Choose [**Range**].

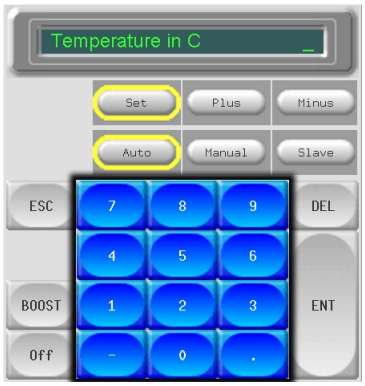


4. Choose [**Set**].



Set the Operating Parameters - continued

5. Set the value.



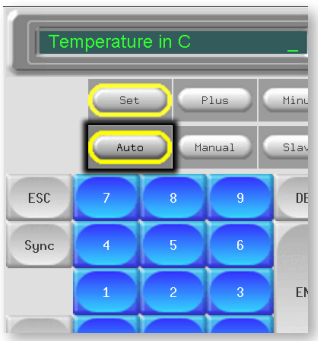
6. Choose [**Ent**] to confirm the settings or [**Esc**] to leave the page without making any changes.

5.12.2 Set Probe and Manifold Temperatures

1. Choose [**Set**].

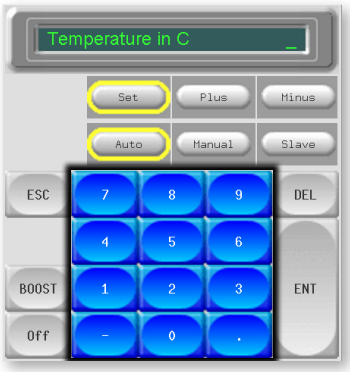


2. Choose [**Auto**].

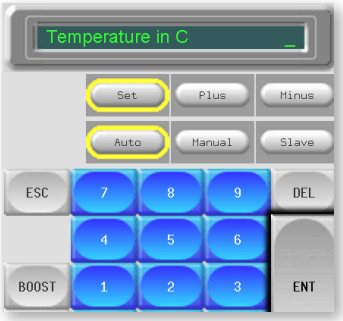


Set the Probe and Manifold Temperatures - continued

3. Set the temperature value or choose [**Delete**] to clear the last input..

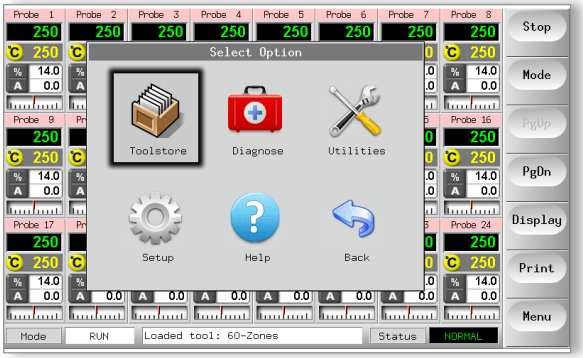


4. Choose [**Ent**] to confirm the settings or [**Esc**] to leave the page without making any changes.

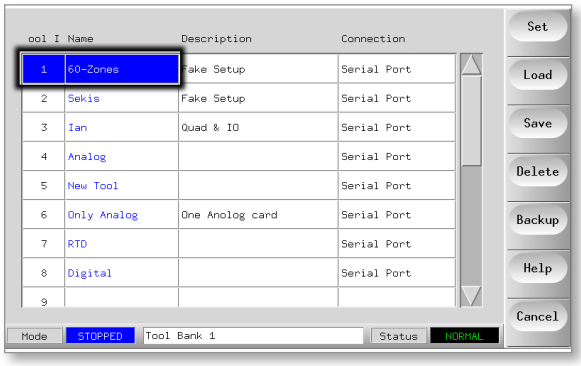


5.12.3 Save Settings to the Tool Bank

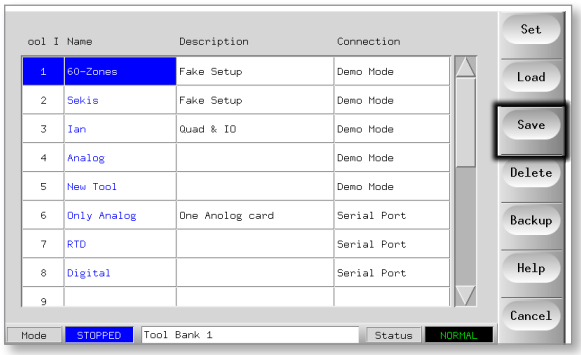
1. Choose the ToolStore page.



2. Choose the new tool named earlier.
See “5.3 Create the First Tool” on page 5-2



3. Choose [**Save**].



5.12.4 Setup Other Utilities

The Utilities screen gives access to parameters and also lists the current software version. The Software Version parameter always shows the version date, and it is not configurable. It will update automatically if the software is upgraded.

Please make a note of the software version date before you contact your supplier with any technical questions.

5.12.5 Utilities Parameters

Table 5-5 Utilities Parameters

Function	Description	Notes
Allow Standby	If set to [**Enable**], then the console can be switched to Standby mode from any other operating mode. If set to [**Disable**], then the console cannot switch from Stop mode to Standby mode. • It must first be put into Run or Start mode before Standby mode is available.	
Allow ToolLoad	Choose [**Enabled**] to be able to change tools while in Run mode. Choose [**Disabled**] to force the operator to shut down to swap tools.	If ToolLoad is disabled, then the [**Load**] button on the ToolStore page is greyed out while the system is in Run mode.
Baud Rate	Sets the communication rate between the console and the control cards. • Newer cards can work at [**High**] speed but older cards might require [**Low**] speed.	
Blanking Delay	Sets how long the screen remains visible.	The maximum period for Blanking Delay is 98 minutes. • Blanking Delay will remain permanently visible if set to 99 minutes.
Calibrate Touch	Sets the screen response to align with point of touch.	See “7.3 Check Touchscreen Alignment” on page 7-4 for more details.
Console Startup	Chooses the operating mode that is used after initial switch on.	
Date / Time	Sets the correct time and date, so that any hard copies of Tool Test or Export Data will be correctly marked up when printed out.	
Domain Name **IP Address** **Machine Name** **Net Mask** **Obtain Address** **SPI Interface**	Used by IT staff to set the configuration to operate within a network.	For more information, contact your supplier.
Edit System Password	Sets the Level 2 password.	See “5.13.1 Edit the System Password” on page 5-20 for more details.
Edit User Password	Sets the Level 1 password.	See ”5.13.2 Edit the User Password” on page 5-20 for more details.

Utilities Parameters - continued

Table 5-5 Utilities Parameters

Function	Description	Notes
Language	Sets the language used for the screen text. User can choose any language listed.	After choosing a different language, the console will temporarily shut down and restart in the new selected language. • If the system is in Run mode, then the control cards will maintain the working temperatures during this brief changeover.
Limit Exceeded	[**Disabled**] – means that an attempt to set the temperature above the limit has not been effective and the set temperature will stay the same. [**Enabled**] – means that an attempt to raise the set temperature above the limit will increase the set temperature to the limit.	
N/Z Alarm	[**Disabled**] – leaves N/Z in its normal condition which does not raise a system alarm if it occurs. [**Enabled**] – allows N/Z condition to initiate a system alarm notification in the lower status window. • At the same time it energizes the Alarm Relay for remote signaling.	
Paper Size	Chooses A4 or letter sized printer paper.	
Password Timer	Sets the Password-Active timer.	
Power Display	**[Peak]** option shows the peak amps delivered. [**Derived**] modifies the peak power by the percentage time for which it is switched on. • it will usually read less than [**Peak**]	
Printer	Chooses a connected printer from a stored list.	
Printer Address	Chooses a local connected or network connected printer.	
Protocol Address	Enters an address for the console when it needs to communicate via an external protocol.	
Protocol Installed	Shows the Protocol which is currently installed and which will be used to communicate with remote terminal.	Defaults to SPI and is not user-configurable • can be set to Kistler protocol if requested when ordered.

Utilities Parameters - continued

Table 5-5 Utilities Parameters		
Function	**Description**	**Notes**
Software Version	Shows which version of the software is installed.	Not user-configurable.
Supply Voltage	Sets the system supply voltage, which is used to calculate the watts display. • This is normally the phase-neutral voltage on a Star supply and the phase-phase voltage on a Delta supply.	Maximum supplied voltage is 600V.
Temperature Precision	Sets the resolution for the Actual temperature seen on the Display page. **Floating point scale**: displays temperature to within one tenth of a degree. **Integer scale**: rounds the displayed temperature to the nearest whole degree.	
User Password	If set to [**Enabled**] then all password-protected functions need either a User (Level 1) or System (Level 2) authorization as shown in Table 5-6. If set to [**Disabled**] then all the lower functions become available without the need for any password. **Note:** Only those higher functions that require a System (Level 2) password retain their password protection.	

5.13 Password Security

Every machine leaves our factory with two levels of password protection, and these passwords are provided on a detachable page at the front of the manual. We recommend that you change these passwords as soon as possible to establish your own security.

Some functions of the touchscreen controller are protected by password access. A prompt in the message window at the bottom of the screen indicates whether the particular function requires a User or a System password.

5.13.1 Edit the System Password

1. Choose [**Menu**] and open the Utils page.
2. Choose [**Edit System Password**].
3. Choose [**Set**].
4. Enter the existing System password.
5. Enter the new System password.
6. Re-enter the new System password to confirm it.
7. Choose [**Back**] to return to the Main page.

5.13.2 Edit the User Password

1. Choose [**Menu**] and open the Utilities screen.
2. Choose [**Edit User Password**].
3. Choose [**Set**].
4. Enter the existing System password.
5. Enter the new User password.
6. Re-enter the new User password to confirm it.
7. Choose [**Back**] to return to the Main page.

5.13.3 Set the Password Timer

1. Choose [**Menu**] and open the Utils page.
2. Choose [**Password Timer**].
3. Choose [**Set**].
   If required, type in the System password at the next prompt.
4. Type in the required password active time, in minutes, and then press [**Ent**].
5. Choose [**Back**] to return to the Main page.

5.13.4 Password Override

To override the user and System password control, set the password timer to 99. This setting eliminates the need to enter a password at any of the usual checkpoints such as Load Tool or Temperature Change.

The only function that will still require a password input is the Change Password action.

5.14 Password Options

5.14.1 Password Enabled

If the user password option is set to [**Enabled**] then there are three levels of control:

1. Open Level - includes various functions that need no password, such as Start and Stop
2. User is a Level 1 password which gives low level access to:
   a) switch the tool on and off
   b) change temperatures
   c) choose different tools
3. System is a Level 2 password which gives high level access to:
   a) all user level functions
   b) set the user password
   c) reconfigure the settings for a new tool
   d) store and load new tool settings to or from the disk

5.14.2 Password Disabled

If the password option is set to [**Disabled**], then all those functions that would normally need a User / Level 1 password become Open level and no longer require any password to access.

Only those higher functions that require a System / Level 2 password retain their password protection.

5.14.3 Password Active Times

After you key in a password, access is possible while you continue to input data. Each keytouch resets the timer. After 20 seconds of inactivity, the screen will time out.

NOTE

This is the same for both User / Level 1 and System / Level 2 passwords.

If the System password is active but the user visits a page requiring a Level 1 password or no password, then the System password will expire after 20 seconds. The user will still be able to access any page that requires a Level 1 password or no password.

5.15 Password Application Table

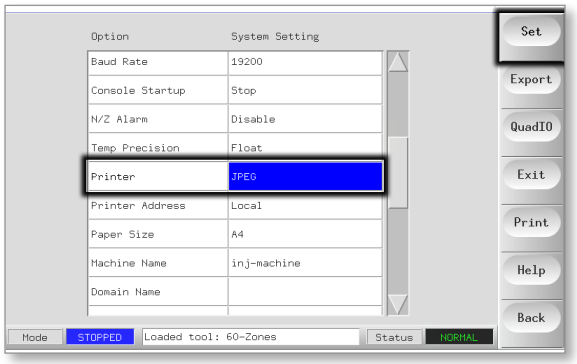
Use Table 5-6 below as a quick reference tool for password level requirements:

Table 5-6 Password Application Table

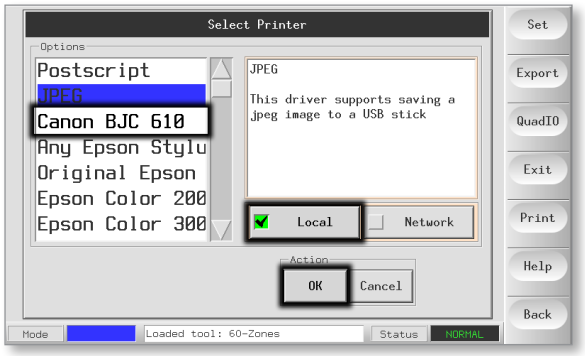
Page/ Screen	No Password Required to	Level 1 (User) Password Required to:	Level 2 (System) Password Required to:
Main	Run / Stop / Change Modes Change display options Go to Zoom or Graph page	Set (Alter temperatures or modes)	
Zoom		Set (Alter temperatures or modes)	
Graph	View / Keys / Print		
Tools	Export / Exit (shut down console)	Load, Save, Backup Restore, Delete	New (Create new tools)
Utils	Set / Change Time		Change any Utility values
SetUp			Set, Config (Change any values)

5.16 Configure a Printer

1. Choose [**Menu**] and open the Utils page.
2. Choose [**Printer**].
3. Choose [**Set**].



4. Scroll down to find a suitable printer driver.
5. Choose [**Local**] for the printer connection then [**OK**].
6. Choose [**Paper Size**].
7. Choose [**Set**] to see the Paper-size selection panel.
8. Choose [**A4**] or [**Letter**] and choose [**OK**].
9. Choose [**Back**] to return to the Main page.

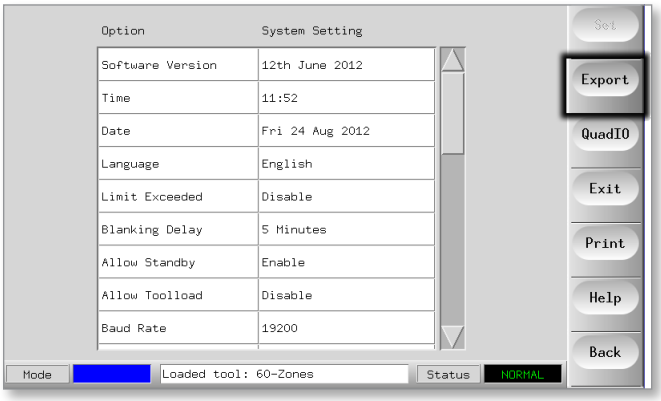


5.17 More Utilities Function Buttons

5.17.1 Export

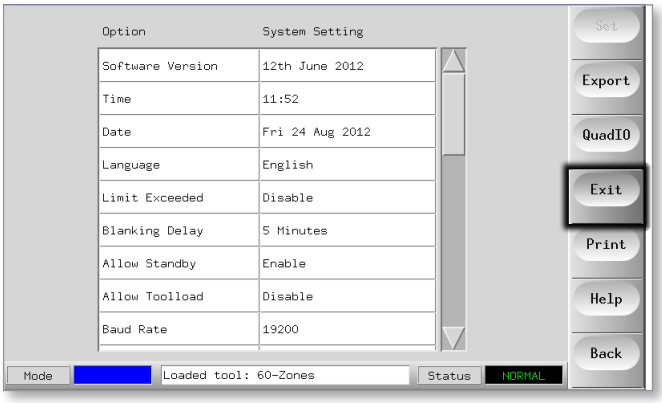
Exports historical performance data.

See “7.2 Export Facility” on page 7-2.



5.17.2 Exit

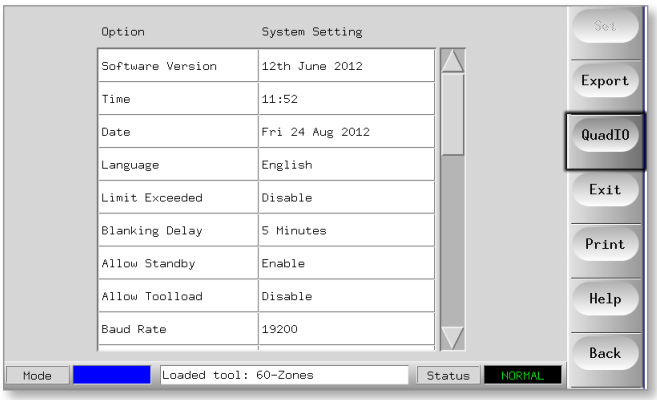
The correct method to shut down the console computer is to choose [**Exit**] and let it power down the console before you turn the main isolator to off.



5.17.3 Quad IO

This is a digital Input / Output card that offers up to four separate inputs and outputs to facilitate remote interaction with the controller.

Refer to ““QCIO - 4-Channel Input / Output Card” on page 6-30 for setup instructions.



Section 6 - Operation

WARNING

Ensure that you have fully read “Section 3 - Safety” before operating the controller.

The Operation section of the manual describes how use the controller. This includes stopping and starting the controller, how to adjust temperatures and settings and how to recognize alarms.

It also introduces the extra features which are there to help the user, such as historic logs, and the flexibility offered by using the ToolStore page and the IO card.

6.1 Isolate the Controller

The main power switch is sufficiently rated to disconnect the total load current during switch on and switch off. To prevent its operation during maintenance, you can use a suitably-sized padlock or similar device to lock the switch in the off position.

The main isolator is a rotary switch on the M1-48 and a switched breaker on the smaller M1-12 and M1-24 controllers.

6.1.1 Switch On

Switching on the main isolator for the controller energizes the cabinet and the console, which automatically starts its bootup sequence.

Once the display screen is on, the console has two options:

- If console startup is set to **Stop**, then the tool remains at zero power, and it does not heat up.
- If console startup is set to **Startup, Standby or Run**, the controller applies power to the zones so that they heat up.

6.1.2 Switch Off (Shutdown)

NOTE

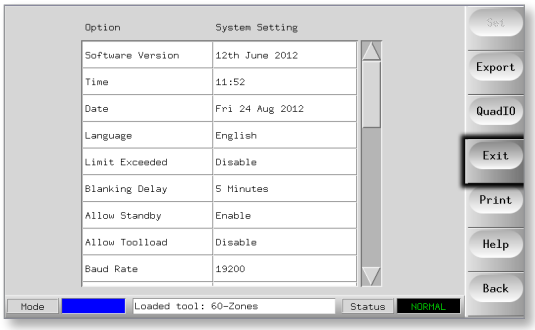
We recommend that the console is used to shut down the heating load and the main rotary isolator (M1-48) or the breaker switch (M1-12 and 24) are only used to switch off a dormant controller.

1. Shut down the heating.
   On the Main page, choose [**Stop**] mode to reduce the heating to zero.



Switch Off (Shutdown) - continued

2. Shut down the console.
   On the Utils page, choose [**Exit**] to shut down the console computer.

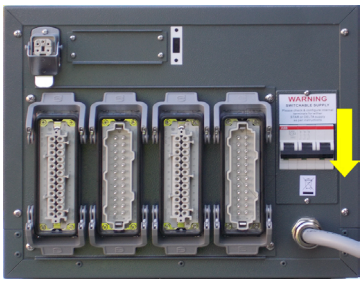


3. Shut down the controller.
   Use the main power switch to isolate all the power to the whole system.

On the M1-48 use the rotary isolator.



On the smaller M1-12 or M1-24 controllers use the breaker switch.



6.2 Control Modes for All Zones

WARNING

Choosing Stop mode does not remove voltage from the heaters. **Do not try to change fuses or disconnect units while in this mode.**

These modes can be accessed from the Main page.

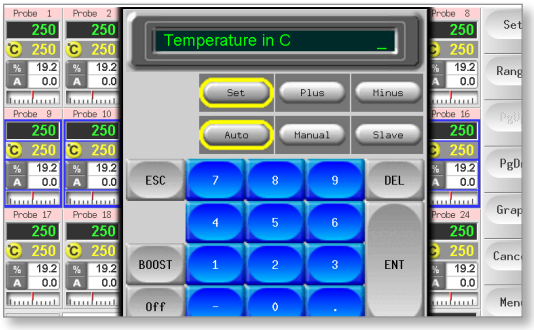
Control Modes for All Zones - continued

Table 6-1 Control Modes for All Zones

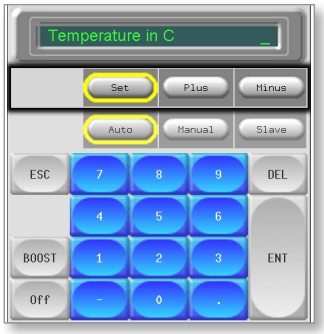
Operation	Available By	Description
BOOST	Button One or Mode Button	Temporarily raises the temperature of all zones that have any Boost temperature configured on the SetUp page. • When the Boost period is over, the zone temperatures return to normal set levels.
PURGE	Mode Button	This can only be initiated while in Run mode. • Guides the operator through a color change routine.
RUN	Button One or Mode Button	Switches on all zones.
SHUTDOWN	Mode Button	Initiates a switch off sequence that is determined by the Startup mode. With the Startup Mode set to **Master-Follow** or **Master-Only**: • Shutdown switches off the nominated Master zones then adjusts all other zones' Set Temperatures to the manifold actual temperatures. The whole tool cools in a homogeneous manner. With the Startup Mode set to **Staged**: • Shutdown consecutively switches off the zone groups in timed intervals and in the order as nominated by Shutdown Stage configuration. • When the Shutdown sequence finishes, the system goes to **STOP** mode.
STANDBY	Mode Button	Reduces the temperature of all zones that have any Standby Temperature configured on the SetUp page. Temperature remains reduced until Run command is given.
STARTUP	Button One or Mode Button	**FIRST STARTUP -** Initiates a starting sequence that is configured on the SetUp Page **MASTER-FOLLOW** – Applies power to Master zones then adjusts other zones' Set Temperature to follow Master zones' Actual Temperature. • Produces a homogenous heat rise. **MASTER-ONLY** – Applies power to Master zones but waits until they are at full temperature before switching on all other zones. **STAGED** – Applies power to nominated stage zones and then waits until they reach normal temperature before switching on next stage zones. • The startup sequence will progress through several stages. **SECOND STARTUP** - When all the zones have reached their set temperatures, the system then goes into **SECOND STARTUP** mode which may be configured to either: • **RUN** – maintain set temperature. • **BOOST** – temporarily raise the temperature and then return to normal Set Temperature. • **STANDBY** – lower zone temperatures until the Run command is given.
STOP	Button One or Mode Button	Switches off all zones.

6.3 Change or Set Zone Temperatures

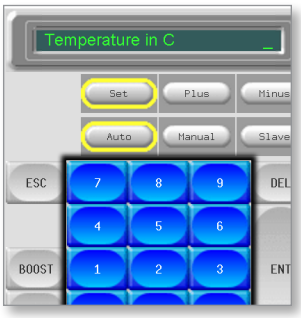
1. Choose the required zones.
2. Choose [**Set**].



3. And then:
   - To set a new temperature - Choose [**Set**]
   - To raise the overall temperature - Choose [**Plus**]
   - To lower the overall temperature - Choose [**Minus**]



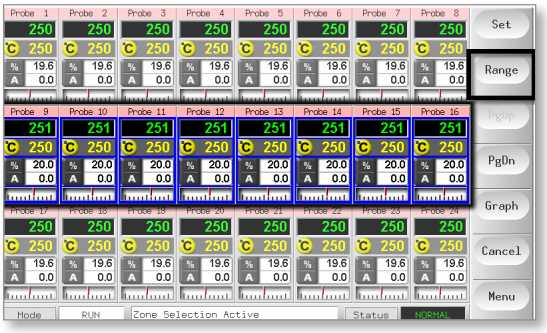
4. Enter the temperature setting or change.



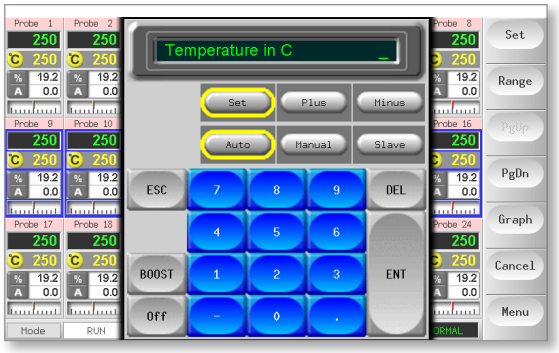
5. Choose [**Ent**] to set the required temperature or [**Esc**] to leave the page without making any changes.

6.4 Change Modes

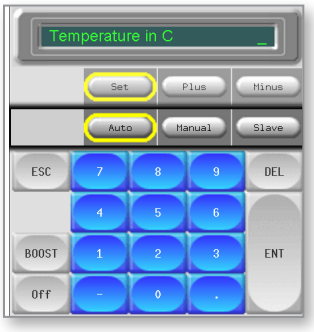
1. Choose the required zones.
   - The function keys will automatically change from Global to Zone.



2. Choose [**Set**] to display the keyboard.



3. And then:
   - To change to Manual mode - Choose [**Manual**] and set percentage power.
   - To Slave a zone - Choose [**Slave**] and choose a similar master zone from the Zone list.
   - To return to Auto mode - Choose [**Auto**] and enter the required zone temperature.



4. Choose [**Ent**] to set the required temperature or [**Esc**] to leave the page without making any changes.

6.5 Control for Individually Selected Zones

Table 6-2 Control for Individually Selected Zones		
Operation	**Available By**	**Description**
BOOST	1. Choose zone. 2. Choose [**Set**]. 3. On keypad, choose [**BOOST**].	Temporarily raises the temperature of the selected zones until Boost time expires.
STOP	4. Choose zone. 5. Choose [**Set**]. 6. On keypad, choose [**OFF**].	Switches off the one zone.

6.6 Boost Mode

Boost mode is determined by two quantities that determine Boost

- Boost temperature
- Boost time

Boost time takes precedence over Boost temperature. Once the Boost period expires, then the extra heating power is removed regardless of whether the zones actually reach the configured Boost temperature.

NOTE

Boost only raises the temperatures of those zones that have a Boost temperature configured.

Boost mode is only available while the system is in RUN mode.

The Boost command may be received locally through the console interface or remotely via the remote console interface or the Quad IO card.

6.6.1 Manual Boost Display

When the manual Boost command is given, the Mode window shows BOOST in black letters on a yellow background. The BOOST message displays until Boost time period expires, after which the zones returns to normal set temperature and the Mode window shows RUN.

6.6.2 Remote Boost Display

When a Boost command is received from an external source, the Mode window shows **M/C BOOST** as black letters on a white background.

The length of time that the message displays for is dependent on the external signal.

If **set Boost time > signal length**, then the message [**M/C BOOST]** will display for the entire Boost period.

If **set Boost time < signal length,** then the message [**M/C BOOST]** will display for the entire time that the signal is present, although the Boost current will only be applied for the set Boost time.

6.7 Zone Slaving

There are several points to remember when using zone slaving:

1. You can only slave like zones for like zones.
   - You cannot slave a probe zone to a manifold zone.
2. You cannot choose a zone that is already slaved to another zone.
   - For example: if zone 2 is currently slaved to zone 3, you cannot slave zone 1 to zone 2. The leading zone must already be a healthy zone.
3. You cannot choose a zone that creates a loop.
   - For example: if zone 2 is slaved to zone 3, then you cannot slave zone 3 back to zone 2.
4. When selecting a lead zone to slave to you should find a similar zone type that is currently operating at the same temperature and at the same power level.

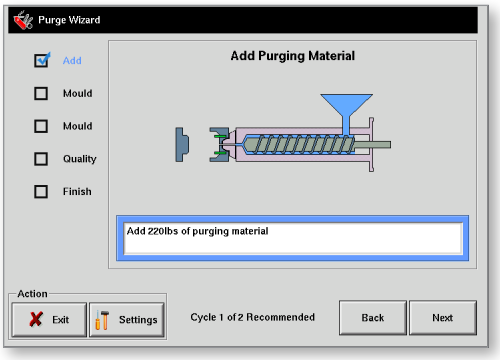
If you choose a lead zone that is working at the same temperature but outputting a noticeably different power level, then the slaved zone may not regulate efficiently.

6.8 Purge Function

The Purge function is only available while the tool is in Run mode, and it has two different options:

6.8.1 Mechanical Purge

Mechanical purge guides the operator through four programmed steps to expel one color and to introduce a new color.

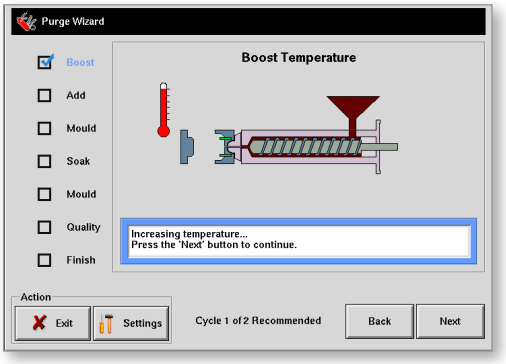


Mechanical Purge - continued

1. Choose [**Purge**] from the [**Mode**] dropdown menu.
   - The screen changes and guides the operator through the four steps.
   - Each step tells the operator to perform a preset action.
   - Choose [**Next**] to move the procedure to the next stage.
2. Once the routine is complete, the operator will be asked if the quality of the new color is acceptable.
   - Choose [**No**] to run the sequence again.
   - Choose [**Yes**] to close the purge screen and return to the Main page.
3. Choose [**Exit**] leave the Purge wizard at any time.

6.8.2 Chemical Purge

Chemical purge is the preferred sequence and uses a proprietary purge agent.



1. Choose [**Purge**] from the [**Mode**] dropdown menu.
   - The screen changes and guides the operator through the seven steps.
   - The Boost function is initiated and the normal Boost time is overridden.
   - Boost temperature will be held until the operator chooses [**Next**].
2. During the Soak stage, the controller will hold the mold at temperature for at least the preset Soak time.
   - The [**Next**] and [**Back**] buttons are faded and unavailable during this stage.
   - Once the timer expires the operator chooses [**Next**] to continue with the final Mold step and quality checks.

NOTE

Choose [**Exit**] leave the Purge wizard at any time.

6.8.3 Configure Purge Parameters

1. Choose [**Purge],** which offers three options:
   - Enter Purge mode
   - Cancel the selection and return to Main page
   - Enter the Purge settings page

The last option gives access to the Purge settings panel that includes the Purge parameters.

NOTE

The Purge parameters can be set any time the Purge wizard is on the screen.

6.8.4 Preset Purge Parameters

Table 6-3 Preset Purge Parameters

Parameter	Description	Notes
Normal Cycles	The number of cycles that the operator is told to run using the normal production material.	• The maximum value for this setting is 1000.
Purge Cycles	The number of cycles that the operator is told to run using the purging material.	• This setting is only applicable to the chemical purging process. • The maximum value for this setting is 1000.
Purge Material	The amount of purging material that the operator will be told to add to the machine.	• This value can be entered in either kilograms or pounds. • The unit for weight can be changed in the menu that comes up after choosing [**Config**] under the SetUp tab from the Main screen. • The maximum value the operator can enter is 200 kg (440 lbs).
Purge Mode	The operator can choose either the Mechanical or the Chemical purge sequence.	• This option is not available if you choose [**Settings**] from the Purge wizard. • You may set Purge mode if you choose [**Settings**] at the pre-run panel.

Chemical Purge - continued

Table 6-3 Preset Purge Parameters		
Parameter	**Description**	**Notes**
Recommended Cycles	The recommended number of times that the entire purging process should be repeated.	• Displayed in the bottom left of the Purge wizard. • Although this value should be followed by the operator, it does not restrict the amount of cycles that can be done. • The operator has the option to finish the process early based on their discretion. • The maximum setting for Recommended Cycles is five cycles. • If five cycles seems to be insufficient for your tool, please contact your supplier for further advice.
Soak Time	The wait period that the operator is to hold the purge material in the barrel and mold.	• Only available when Chemical purge is active. • The maximum value for this setting is 10 minutes.

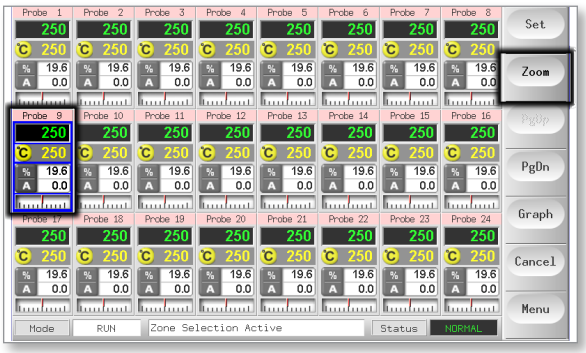
6.8.5 Record a Color Purge Cycle

At the end of a satisfactory purge run, the parameters are displayed along with an option to print them out.

Choose [**Exit**] to leave the screen.

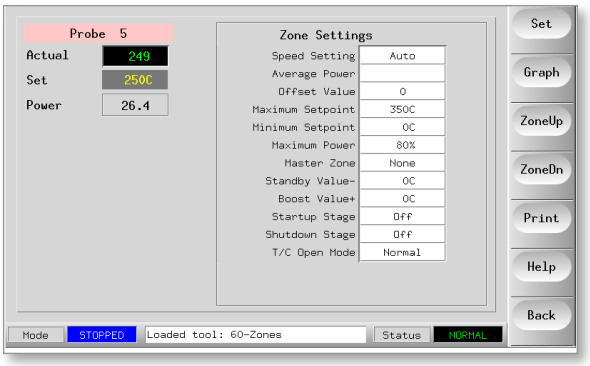
6.9 Check Zone Settings

1. Choose any zone.



Check Zone Settings - continued

2. Choose [**Zoom**].



The top of the page shows the zone name or alias in its appropriate color background, along with real-time temperature information.

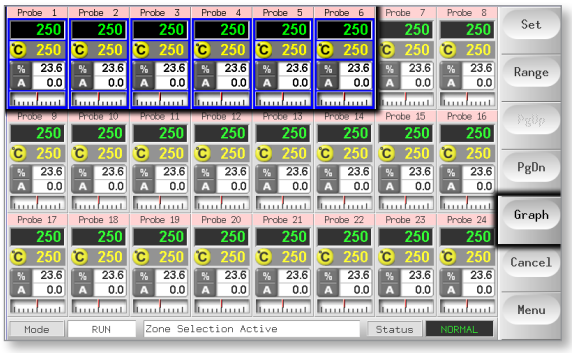
The lower half shows the current setup configuration.

[**ZoneUp**] and [**ZoneDn**] buttons are used to browse other zones without returning to the Main page.

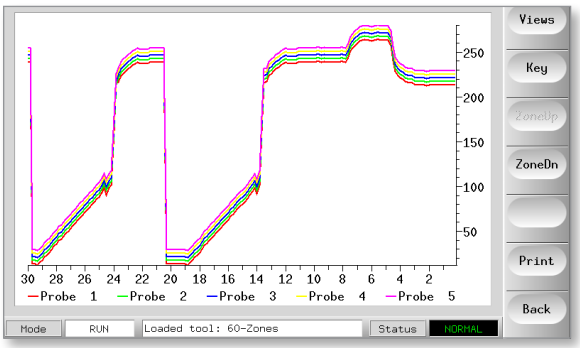
6.10 Graph a Zone's Past Performance

The controller can record the past 30 minutes of temperature history and display this information in a graph.

1. Choose up to six zones.

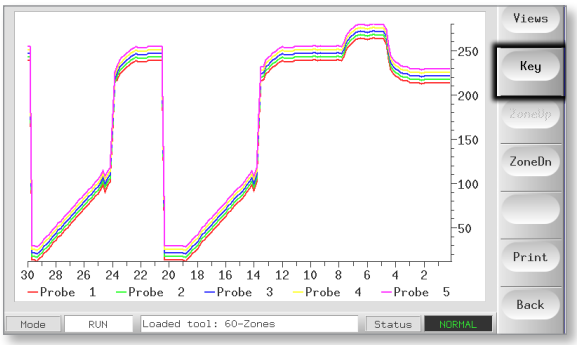


2. Choose [**Graph**].

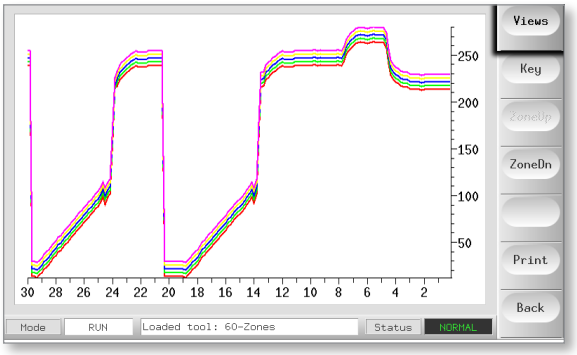


Graph a Zone's Past Performance - continued

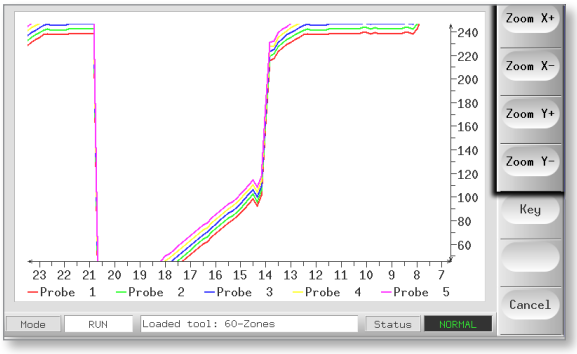
3. Choose [**Key**] to expand graph size.
   - This action loses the bottom key color information.



4. Use the [**Views**] button to zoom the axes.



5. Use the four [**Zoom**] keys to expand time of temperature scales. Drag either scale to shift the display.



NOTE

Once any zoom is used the graph freezes in time and does not update.

6.11 Alarms

The Mode and Status window is found at the bottom of every page:



If the controller is switched on and running normally, then the left hand Mode window will show RUN and the opposite Status window will show NORMAL.

6.11.1 Mode Window

If the controller is manually switched out of Run mode, then the Mode window shows the selected function and flashes on and off.

The table below lists the different displays:

Table 6-4 Mode Window Displays

Mode	Display	Description
RUN	Black text in white box	All control zones are working normally.
STOP	White text in blue box	The system has been shutdown and the heaters are at room temperature.
STANDBY	Yellow text in black box	Any zones with Standby temperatures configured have been reduced in temperature until the next command is given.
STARTUP		The system has been started in a homogenous or staged heat-rise. It will switch to RUN when working temperature has been reached.
SHUTDOWN		The system has been shut down in a homogenous or staged heat fall. It will switch to STOP when room temperature has been reached.
BOOST	Black text in yellow box	Any zones with Boost temperatures configured are being temporarily raised. (manual request)
M/C BOOST	Black text in white box	Any zones with Boost temperatures configured are being temporarily raised. (machine request)
PURGE	Yellow text in black box	This can only be started in Run mode and then goes on to guide you through a typical color change routine.

6.11.2 Status Window

The right hand Status window shows NORMAL if all the zones are at their set temperature and no faults have been detected. If any zone detects a fault, then the Status window changes its display and color. See Table 6-5.

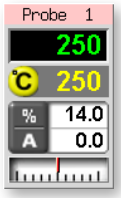
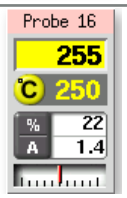
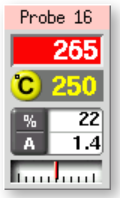
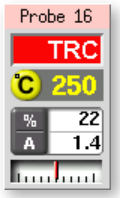
Table 6-5 Status Window		
Display	**Color**	**Description**
NORMAL	Green text in black box	Controller is running normally.
WARNING	Black text in yellow box	A zone's temperature exceeds the warning limits.
ALARM	White text in red box	This shows either a Fatal Error or that a zone's temperature exceeds alarm limits.

NOTE

The Status Alarm is only active when in Run mode to prevent slower systems, such as Master-Follow, from raising unnecessary alarms.

Once at their set temperature, systems will switch to Run mode and the alarm becomes active.

6.11.3 Identify Zone Alarms

Table 6-6 Zone Alarms		
Zone	**Display**	**Description**
Normal Zone This shows a healthy zone.		The Actual Temperature is green text on black background.
Warning Zone This shows a first stage warning.		The Actual Temperature is black text on yellow background.
Alarm Zone This shows a second stage alarm.		The Actual Temperature is white text on red background.
Fatal Error This shows an abbreviated error message. For a list of error messages see Table 8-1.		The error message is white text on red background.

6.11.4 Beacon and Sounder Extension

A beacon and sounder extends any second stage temperature alarm or fatal error alarm. Fixing the reason for the alarm condition automatically stops the beacon / sounder.

A key switch is also provided to mute the sounder at any time.

NOTE

No reminder is given to show that the sounder is muted when the system is healthy.

Reoccurrence of subsequent alarm conditions will cause the beacon to light up but will not create an audible alarm.

6.12 Card Indicators

Zone control cards also have their own LED indicators that give a state-of-health display and which can be seen through the cabinet windows.

SCAN – This LED flashes briefly as the controller scans each card in sequence.

FAULT – Should normally be unlit. It lights up to show that one zone on the card has detected an error. The nature of that error is displayed in the particular zone on the console.

A list of fault and error messages can be found in “Table 8-1 Fault and Warning Messages” on page 8-2.

6.13 Training and Demonstration Mode

The controller has a Demo mode to use for training or demonstration purposes.

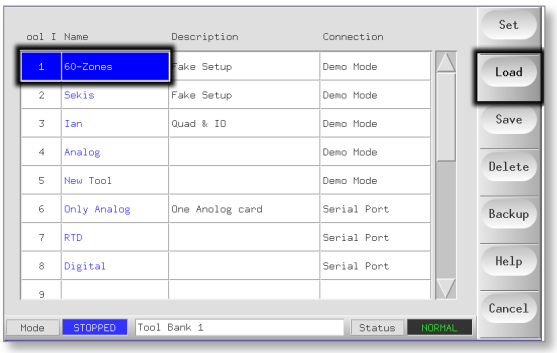
The controller will not communicate with the associated controller cabinet when in Demo mode. It is recommended that the system is idle before using the Demo mode function.

6.13.1 About Demo Mode

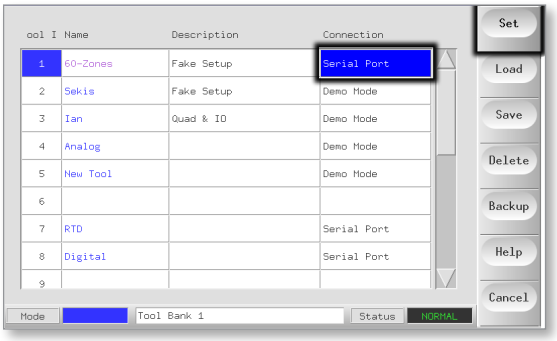
Demo mode feeds every zone within the selected tool with a stream of pre-recorded temperature data. The console appears to be working, and it gives a real trace when the Graph page is selected.

6.13.2 Select Demo Mode

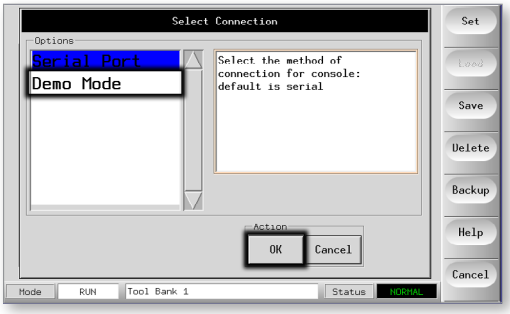
1. Open the ToolStore page to select and load any tool.
   - Note its current connection setting.



2. Choose [**Connection**] and then [**Set**].



3. Choose [**Demo Mode**] in the Select-Connection option box.

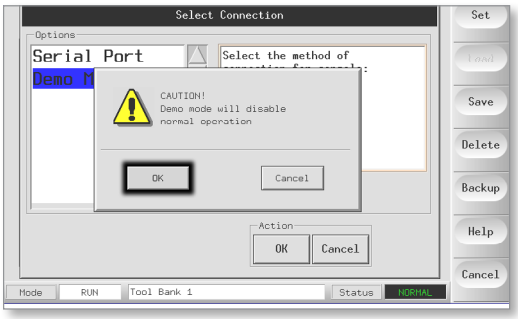


4. Accept the warning that this option will disable the console.

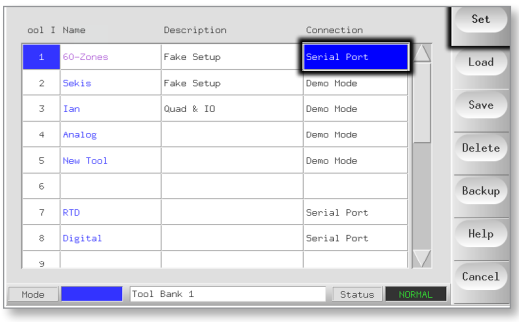
6.13.3 Deselect Demo Mode

To leave Demo mode, do the reverse of the selection procedure.

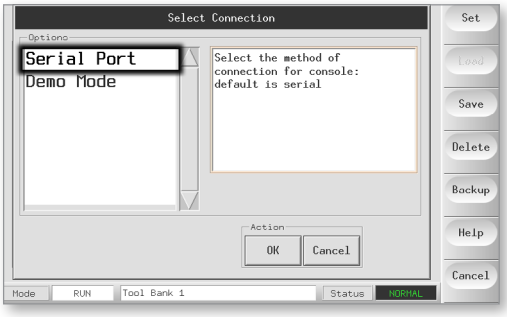
1. Choose the current tool.



2. Choose [**Connection**] and [**Set**].

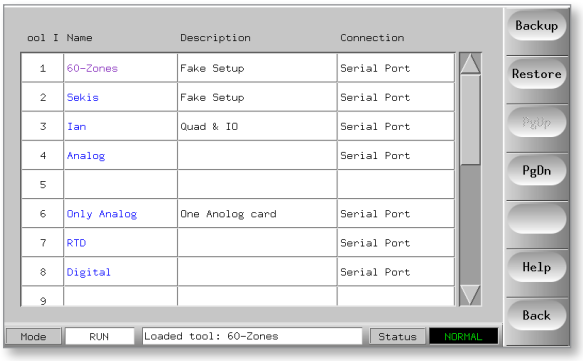


3. Choose the original setting that was noted at step 2 while selecting Demo mode previously.



6.14 Use the ToolStore Page

The initial window shows the 20 tool slots alongside which the [**PgUp**] and [**PgDn**] buttons scrolls to five more tool pages giving a total capacity of 100 different tool settings.



The main window has four columns containing the following information:

1. **Tool** - the allocated tool number
2. **Name** - a user-configurable text field for tool name

   The color of the name is a key that shows the state of tool:

   - **black** - a tool store that has been named, but holds no settings
   - **blue** - a tool that has been saved and named, but is not in current use
   - **purple** - a tool that is currently in use and that has no changes to any settings
   - **red** - a tool that is in current use but which has been changed from its stored settings
3. **Description** - a user-configurable text field that may be used to hold an expanded description of the tool
4. **Connection** - normally defaults to Local Serial, which indicates that the tool settings are stored locally within the console memory

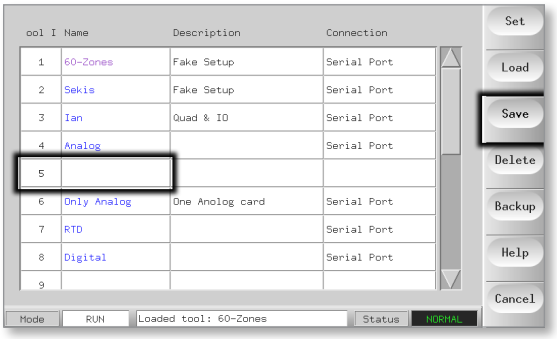
   If the console is networked and connected to more than one controller cabinet, this column may show the name of one or more remote HRC-NET cards.

   The Connection column also provides a demo facility. See “6.13.1 About Demo Mode” on page 6-15 for more information.

6.15 Create a New Tool

If you need to have different tools to use for different applications then you will need to create new tools to hold the alternative settings.

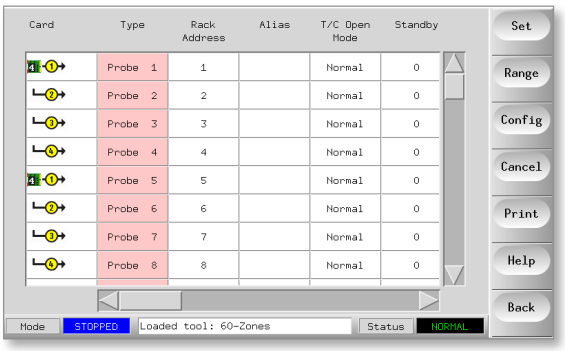
1. Choose a blank tool slot and then choose [**Save**].



2. Use the keyboard and name the new tool.

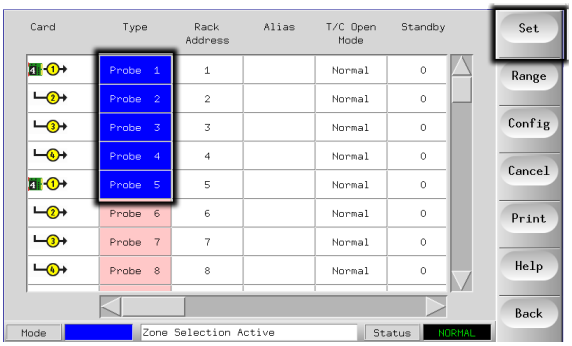


3. Open the SetUp page.



Create a New Tool - continued

4. Choose the zone(s) that need to change in the new tool and choose [**Set**].



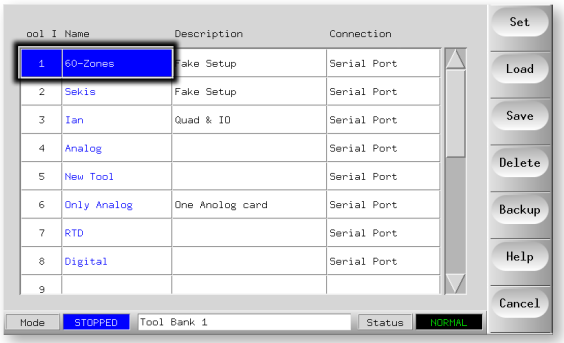
5. Use the keyboard to input new values.



6. Finish the changes required for the new tool, then return to the Tool page and choose [**Save**].

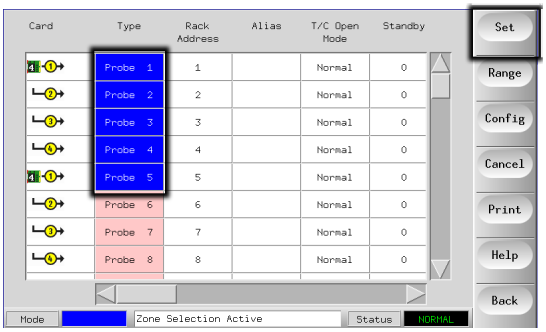
6.16 Rename an Existing Tool

1. Choose the relevant tool tab.

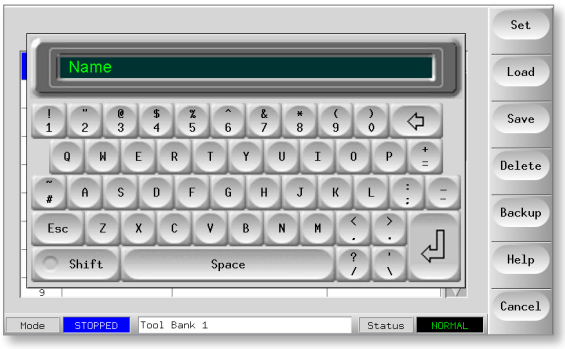


Rename an Existing Tool - continued

2. Choose the [**Set**] button.



3. Edit the name.



4. Choose [**Enter**].

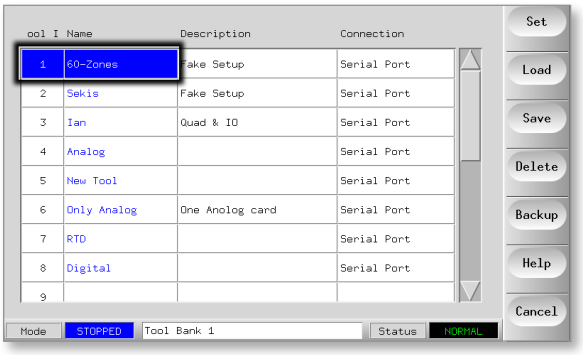


6.17 Load Tool Settings Locally

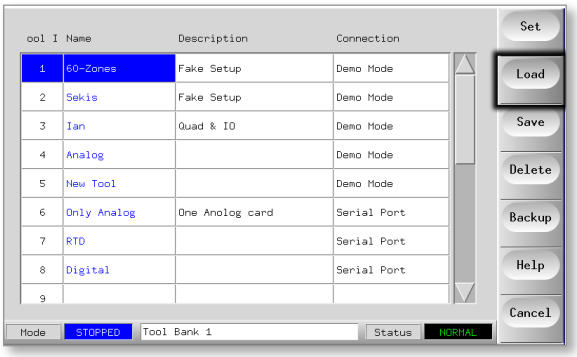
NOTE

If the controller is in RUN mode and another tool setting with a different temperature is selected and loaded, then the tool will immediately change to run at the new incoming temperature setting.

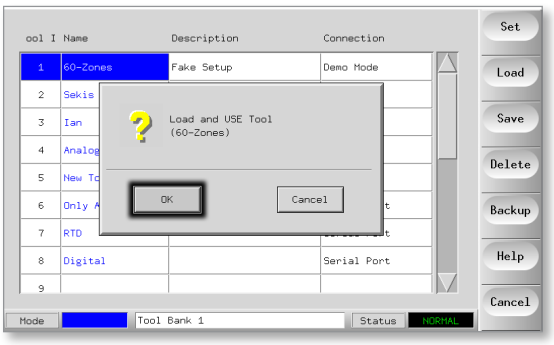
1. Choose the required tool.



2. Choose [**Load**].
   - If the [**Load**] button is greyed out then the option to be able to change tools while in Run mode has been disabled. See Allow ToolLoad in “Table 5-5 Utilities Parameters” on page 5-17.

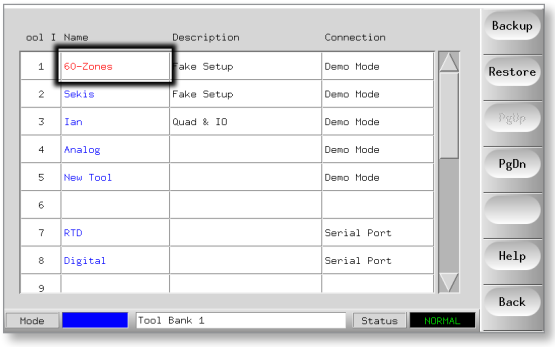


3. Choose [**OK**] to save or [**Cancel**] to exit.



6.18 Save Tool Settings (Remotely)

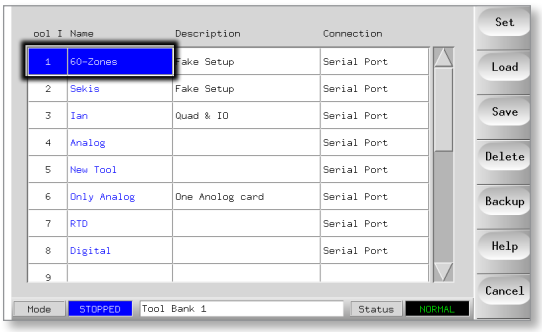
There are two options for saving changed tool settings.



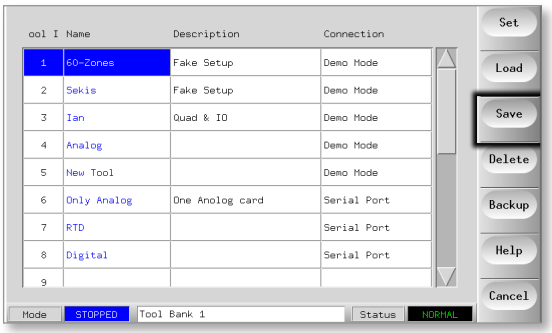
6.18.1 Overwrite with Saved Settings

If the new settings are satisfactory, then they can be saved into the same tab in the ToolStore.

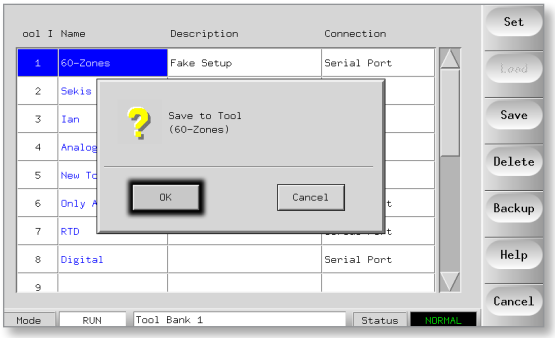
1. Choose the tool.



2. Choose [**Save**].



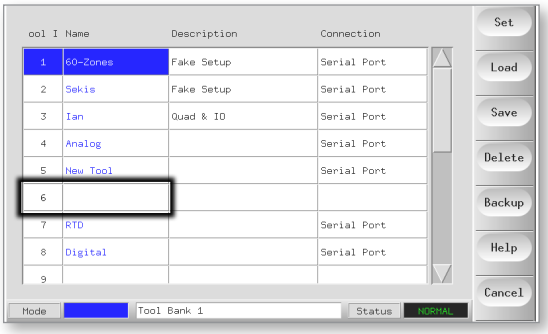
3. Choose [**OK**].



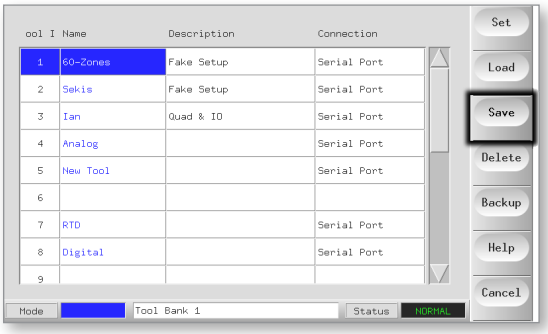
6.18.2 Save Old and New Settings

To save new tool settings and still keep the original settings, the new settings must be created and saved into a new tool tab in the ToolStore.

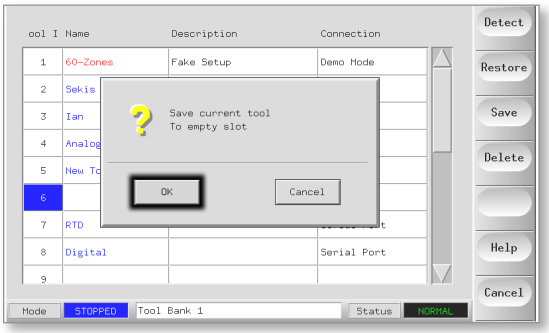
1. Choose a blank tool tab.



2. Choose [**Save**].



3. Choose [**OK**].



4. Type in a new tool name and choose [**Ent**].

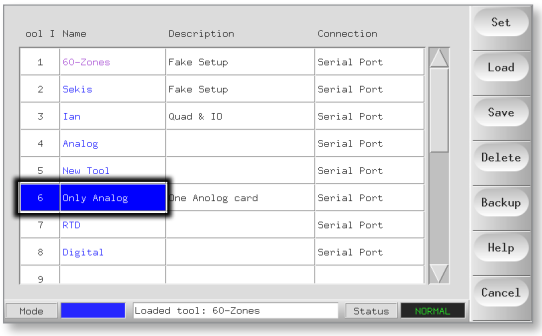


6.19 Delete a Tool

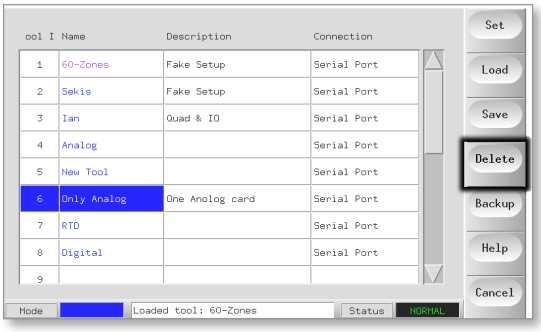
NOTE

Once you have deleted a tool there is no way to recover its previous settings. Ensure that you are deleting the correct tool.

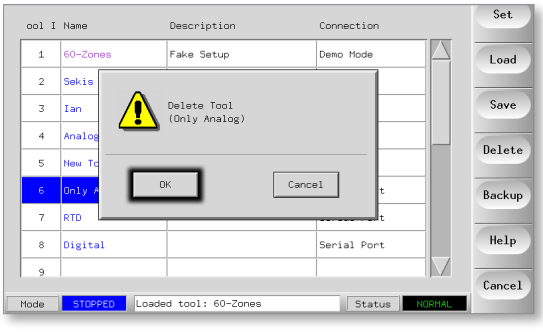
1. Choose the unwanted tool.



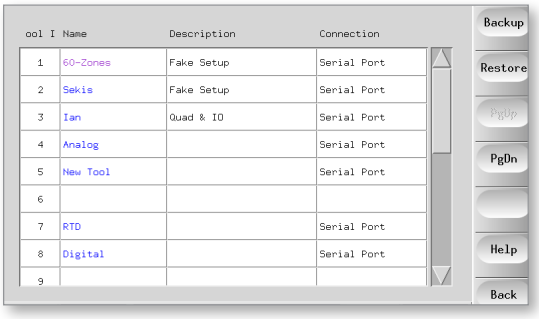
2. Choose [**Delete**].



3. Choose [**OK**].



4. Return to ToolStore page to check that unwanted tool has been deleted.

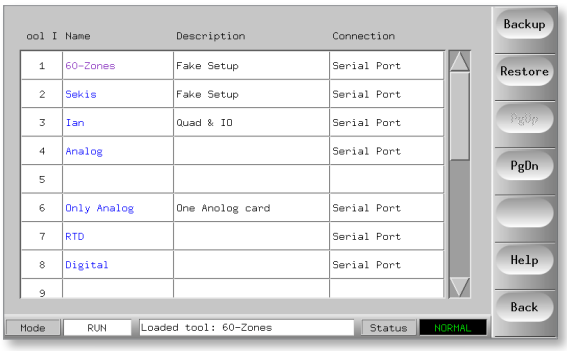


6.20 Backup Tool Settings

Backing up tools saves tool settings to an external storage device. The saved settings can be used for secure recovery or can be transferred to another controller for use.

6.20.1 Backup All Tools

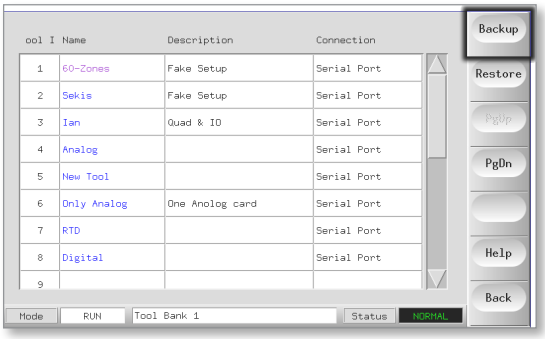
1. Open the ToolStore page.



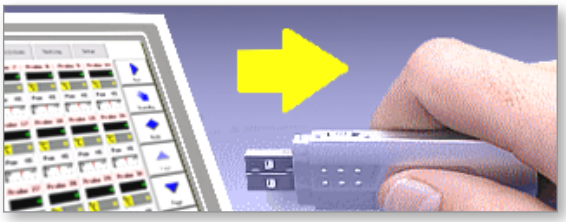
2. Insert memory stick and wait until it is ready to use.



3. Choose [**Backup**].

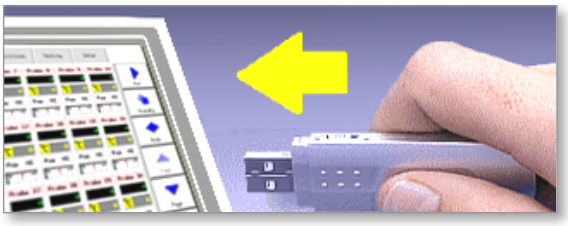


4. Wait about 10 seconds, then remove memory stick.

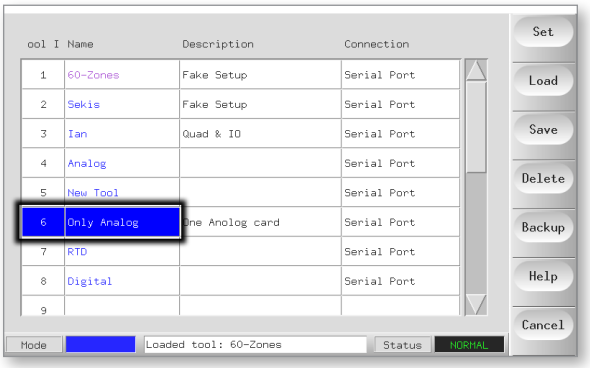


6.20.2 Backup One Selected Tool Setting

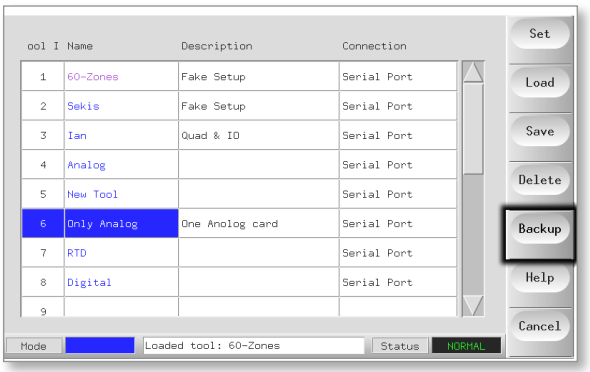
1. Insert memory stick and wait until it is ready to use.



2. Choose the tool to backup.



3. Choose [**Backup**].



4. Wait about 10 seconds, then remove the memory stick.

6.21 Restore Tool Settings

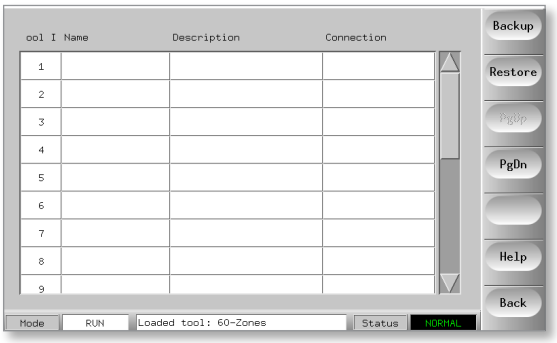
There is an option within this sequence to restore either all of the stored tools or just one selected tool.

IMPORTANT

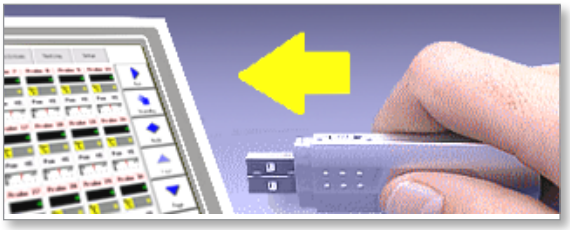
Any information stored in a selected tool bank or slot will be overwritten with the information from the memory stick.

6.21.1 Restore All Tools

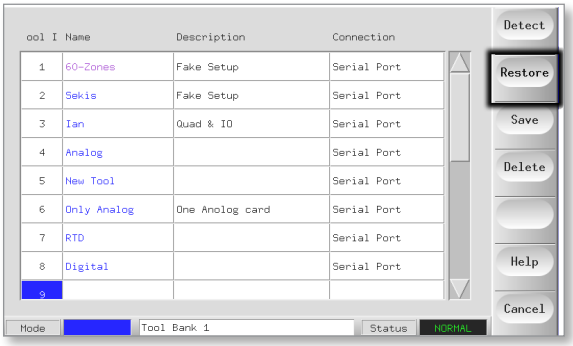
1. Open the ToolStore page.



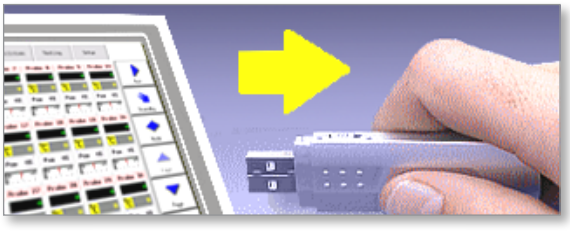
2. Insert the memory stick with the data and wait until it is ready to use.



3. Choose [**Restore**].

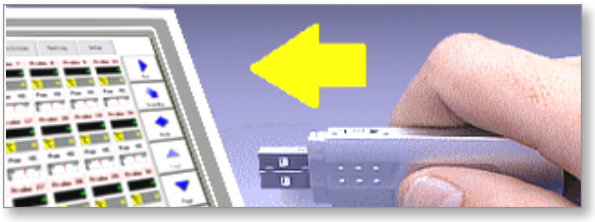


4. Wait about 10 seconds, then remove the memory stick.

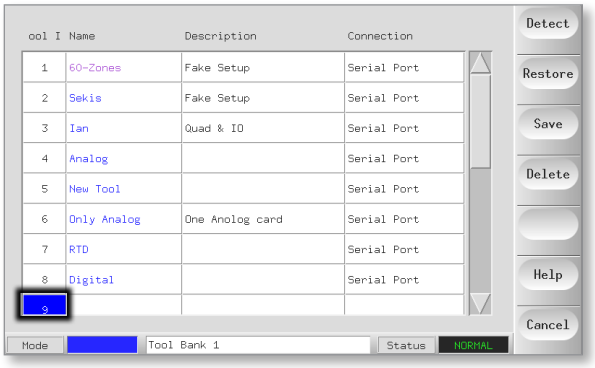


6.21.2 Restore a Single Tool

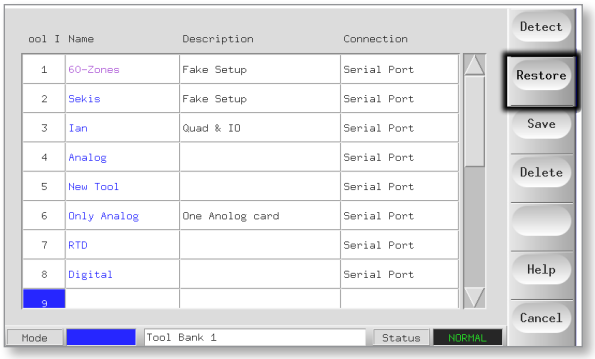
1. Insert the memory stick, then wait until it is ready to use.



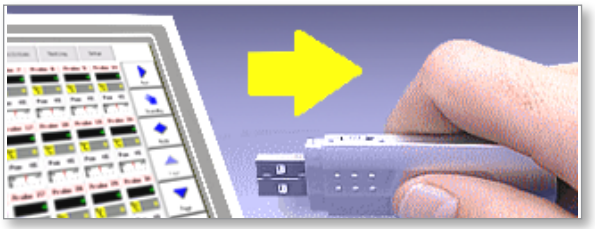
2. Choose the Tool tab.



3. Choose [**Restore**].



4. Wait about 10 seconds, then remove the memory stick.



6.22 QCIO - 4-Channel Input / Output Card

The digital Input / Output card offers up to four separate inputs and outputs to facilitate remote interaction with the controller.

Setup is available on the Utilities page.

Choose [**QuadIO**] to see the input and output selection.

6.22.1 Inputs

Each input circuit requires an incoming pair that is volt-free and normally open. The incoming pair must go to short circuit (or close) to trigger the required command.

Optional inputs that may be selected are as follows:

Table 6-7 Quad IO Inputs

Option	Description
Boost	Puts the Controller into BOOST mode.
Inactive	This input will not be used and remains inactive.
Machine OK	When closed, console can go to RUN mode or STARTUP mode. When opened, the console is put into STOP mode with Mold Protect.
Passkey	Responds to an external cardkey reader, which is used to simulate User level authentication. A passkey input then allows any operation which would normally require a User / Level 1 password.
Run	Puts the Controller into RUN mode.
Shutdown	Puts the Controller into SHUTDOWN mode.
Standby	Puts the Controller into STANDBY mode.
Startup	Puts the Controller into STARTUP mode.
Stop	Puts the Controller into STOP mode.

6.22.2 Outputs

Each output group is a single-pole changeover relay element that is rated at 240 volts, 1 amp maximum.

It is comprised of a moving contact (MC) is connected to a normally-closed (NC) contact when de-energized. When the controller activates output 1 or 2, the normally closed (NC) and moving contact (MC) go to open circuit while the normally open (NO) and moving contact (MC) go to short circuit.

Optional outputs that may be selected are as follows:

Table 6-8 Quad IO Outputs

Option	Description
Boost	An output is given if the controller is put, either locally or remotely, into Boost mode.
Cavity Alarm	Output is given if any cavity zone (usually an RTD sensor) deviates from its set temperature enough to generate a second stage alarm.
Controller Alarm	Output is given if any alarm is generated. This mimics the secondary output alarm / beacon.
Hot Runner	Output is given if any probe (nozzle) or manifold deviates from its set point enough to generate a second stage alarm.
Inactive	Output will not be used and remains inactive.
Inj Disable	Output is seen if the system is idle. Output is cleared once the system has started up and gone into Run mode. Output is given if system has an out-of-limits alarm. No other alarm, for example Fuse or T/C, causes output to be given.
Inj Disable Ext	Output mimics Injection Disable in order to provide two identical outputs.
Pressure Alarm	Output is given if any pressure sensor gives a pressure reading that deviates from its setpoint enough to generate a second stage alarm.
Stopped	Output is given if the controller is automatically put into Stop mode by any detected alarm condition. It is not activated if the controller is manually put to Stop mode by the user.
Temp Dist	Output is given if any Fatal Error occurs, for example Fuse or T/C.
Warn	A new proposed output which will be given if any zone deviates from its setpoint enough to generate a first stage warning.
Water Flow	Output is given if any flow sensor gives a flow reading that deviates from its nominal setpoint enough to generate a second stage alarm.

6.22.3 Default Input / Output Selection and Connector Pin Table

The standard interface is a Harting STA 20-pin female connector within an H-A16 housing.

Input / output channels may be individually configured to perform different functions. The default options and connector pin configurations are shown in Table 6-9:

Table 6-9 IO Connections

Description	STA 20 pin no.	Circuit	Default Input Function	Default Output Function
Input 1	1	Input 1	Go to RUN mode	
Input 1	2			
NO Contact 1	3	Output 1		Injection Disable
MC Contact 1	4			
NC Contact 1	5			
Input 2	6	Input 2	Go to STANDBY mode	
Input 2	7			
NO Contact 2	8	Output 2		Temperature Disturbance
MC Contact 2	9			
NC Contact 2	10			
Input 3	11	Input 3	Go to STARTUP mode	
Input 3	12			
NO Contact 3	13	Output 3		Boost
MC Contact 3	14			
NC Contact 3	15			
Input 4	16	Input 4	Go to STOP mode	
Input 4	17			
NO Contact 4	18	Output 4		Spare / Inactive
MC Contact 4	19			
NC Contact 4	20			

Section 7 - Maintenance

WARNING

Ensure that you have fully read “Section 3 - Safety” before doing maintenance procedures on the controller.

Maintaining the controller includes checking records and settings, and running self-diagnostic tests.

There are no user serviceable parts inside the touchscreen controller. In the unlikely event of equipment failure, return the unit for repair.

7.1 Print Out Facility

Most of the pages on the controller contain a Print button on the side screen, and the printed output is described in Table 7-1:

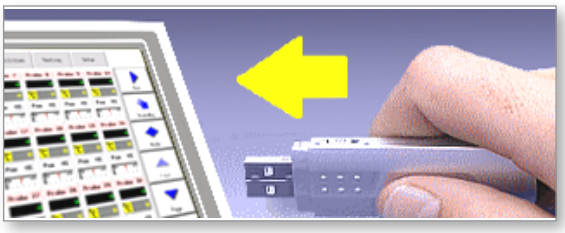
Table 7-1 Page Printout

Page	Printout
Main	Prints out the zone name, actual and set temperatures and power level for all zones regardless of how the main page display is currently set.
Tool	Chooses any tool and prints out the tool details. The printout is similar to the SetUp page. The tool does not have to be loaded to print out its details.
Diagnose	Prints out the results of a tool test.
Utils	Prints out all the current Utility settings for the tool that is currently loaded.
SetUp	Prints out the whole SetUp page with all the current settings for the current tool.
Graph	Prints out an image of the current graph trace when it is not in any Closeup view mode.

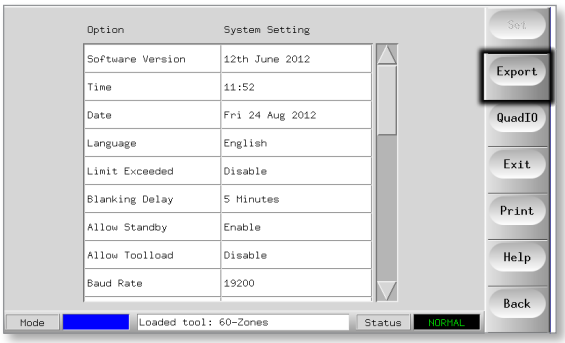
7.2 Export Facility

The last 30 minutes of zone performance data can be extracted as a zipped spreadsheet. This data is written in a CSV (comma separated value) form, and then compressed into a zip file.

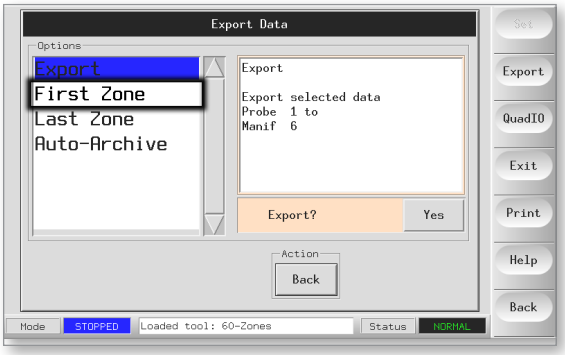
1. Insert a memory stick and wait until it is ready to use.



2. Choose Utilities page and choose [**Export**].



3. Choose the [**First Zone**] and pick the first zone from the list.

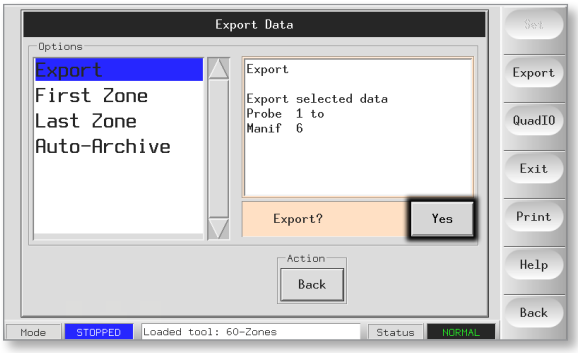


4. Repeat for the [**Last Zone**].

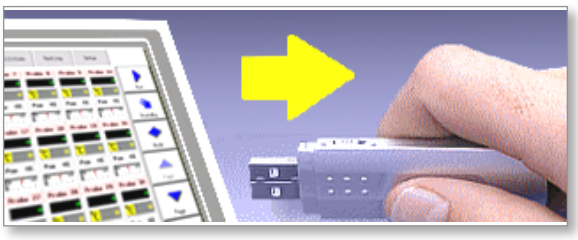


Export Facility - continued

5. Choose [**Export**] and [**Yes**].



6. Remove the memory stick and take it to a personal computer.

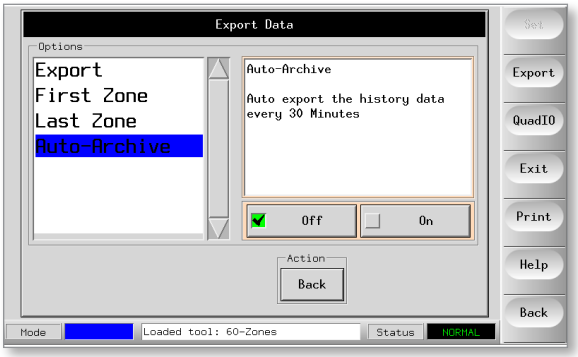


7. Import all the data into a spreadsheet.



NOTE

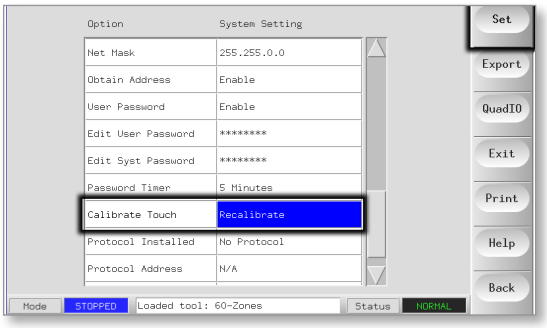
Performance data can be autoarchived. If the [**Auto-Archive**] option is on and a memory stick is left plugged into the console, then historic data is written to that memory stick every 30 minutes.



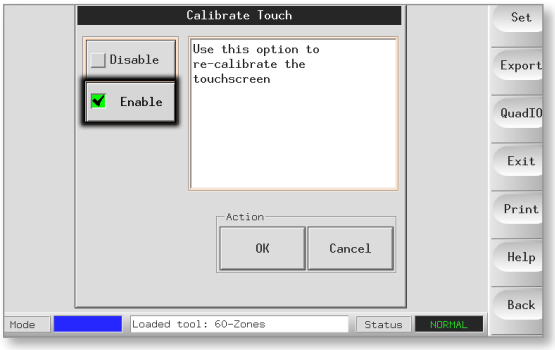
7.3 Check Touchscreen Alignment

To reset touchscreen alignment, use the Calibration routine found on the Utilities page. The Calibration routine places a crosshair target at five different positions on the screen. A suitable stylus should be used to make a small point of contact with the screen. The stylus should be held in position for a couple of seconds to provide a good reading for calibration.

1. On the Utilities page choose [**Calibrate Touch**] and then choose [**Set**].



2. Choose [**Enable**] and choose [**OK**].



3. Touch the center point of the crosshairs.
   - When you stop touching the screen, the crosshair target will move to another position.



4. Repeat until all five locations have been tested.

7.4 Self Diagnostic Tests

The controller can perform two types of diagnostic tests.

1. Power Test

Power test can only be used on current measuring cards, and it is designed as a maintenance aid only.

It checks that:

- the heater zones are functioning correctly
- that the feedback from current sense coils are consistent with tool's history file

IMPORTANT

The Power Test **does not** check for zone wiring errors or anything similar.

2. Full System Test

The Diagnostic test checks that every zone is functioning correctly. It can be used:

- as an acceptance check
- to see that a new tool is wired up correctly
- as a maintenance aid, to check that a working tool is functioning correctly

Please see below for the test sequence:

1. It cools the whole tool.	During this time, all zones are checked to see that none experience a significant temperature rise.
2. It heats the first zone and checks to see that:	a) the first zone rises sufficiently to qualify as a "Good Rise" • if not it increases the applied power and looks for the "Good Rise". • it continues to raise the power and look for a "Good Rise" until the configured Heat Time expires. • if it does not see a "Good Rise" within that time then the zone has failed. b) the temperature of the zone under test does not reduce further, which would indicate a reversed thermocouple on that zone. c) no other zone rises enough to become a "Bad Rise," which would indicate excessive thermal conduction between adjacent zones. d) no other zone rises by as much as the "Good Rise" which would indicate cross-wiring between the zone under test and another thermocouple.
3. Once the test is done, the routine tests the other zones until all have been completed.	

7.4.1 Change Test Parameters

Normally there is no reason to alter the test parameters in the self diagnostic routine. If you have any doubts or questions, please contact your supplier for advice before you change any test parameters.

7.5 Run a Self Diagnostic Test

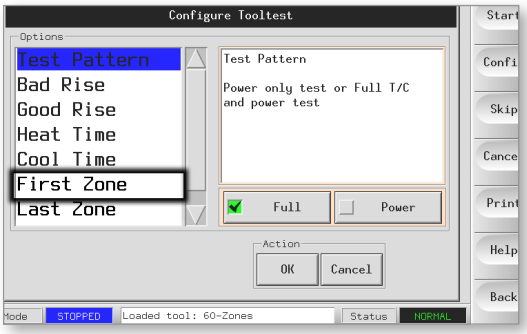
The diagnostic routine may be performed at any time that the controller is connected to the tool, provided that it is not in use for production.

The other panels on the page give feedback about how the test is progressing.

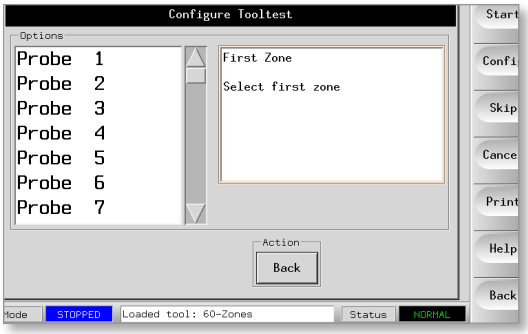
1. Open the Diagnose Page and choose [**Config**].



2. Choose [**First Zone**].

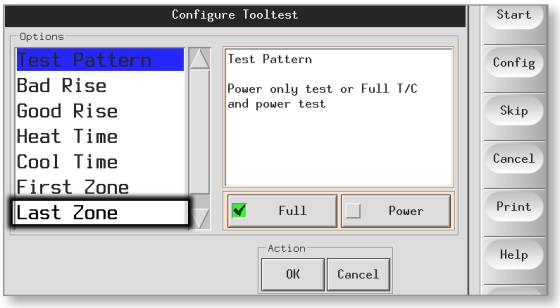


3. Choose the first zone in the test sequence.



Run a Self Diagnostic Test - continued

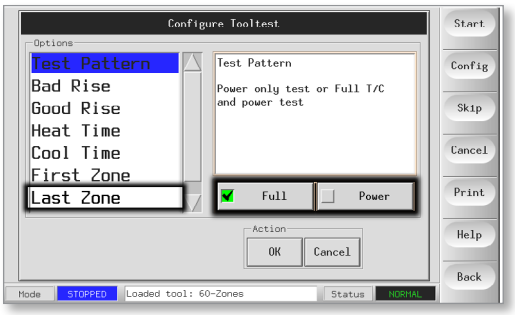
4. Choose [**Last Zone**] and choose the last in the test sequence.



5. Choose [**Full**] to run a complete test.

   Choose [**Power**] for a quicker power check only.

   - This heats the zones to see current draw but does not check zone interaction.



6. Choose [**Start**] and note that:

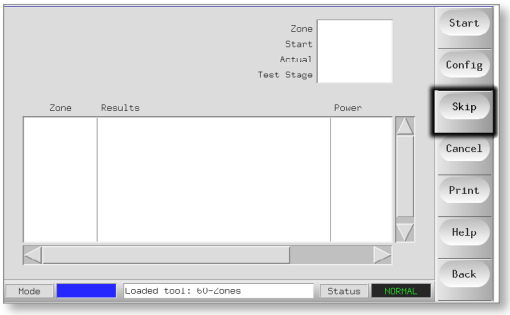
   a) Test progress for each zone is shown in the upper right panel.

   b) Test history for all zones is shown in the lower main panel.

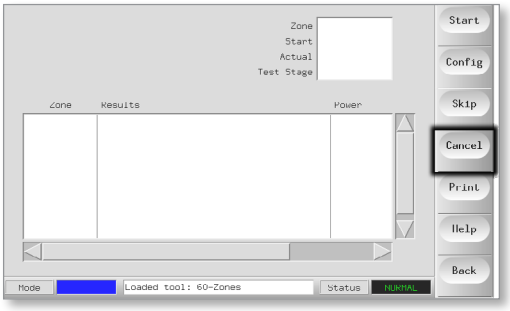


Run a Self Diagnostic Test - continued

7. Choose [**Skip**] to pass by or skip any zones.



8. Choose [**Cancel**] to stop the test and omit remaining zones.



7.6 System Diagnosis Results

The Test page stores information about any test that is run.

Results can be viewed on the screen or the user can choose [**Print**] to produce a hard copy.

7.7 Interpret the Test Results

7.7.1 Satisfactory Test

If the diagnostic test finds no fault with any zone then the message “Zone Test OK” is displayed.

7.7.2 Unsatisfactory Test

If the test detects any problems then it displays an error message against the particular zone.

A complete list of error messages and possible causes is found in “Table 7-2 System Diagnosis Error Messages” on page 7-9.

Unsatisfactory Test - continued

Table 7-2 System Diagnosis Error Messages	
Error Message	**Description**
Below 0 or Reversed T/C	May be caused by a reversed thermocouple. **Note**: if the test was carried out at an ambient temperature below 0°C, the controller would not work with the resulting negative temperature readings.
Blown Fuse	Check card fuse. This message is also displayed if the zone was set to use an off board triac that was not installed. **Note**: Off board triacs have their own fuse.
Check for Reversed T/C	Temperature appeared to be decreasing when power was applied.
Cooling Test Failed	All zone temperatures had to be stable or falling before the heating test begins. If any zones continued to rise with power set to zero within the cooling period, this error is raised.
Failed to React Correctly	Unexpected results. This message is followed by further error messages.
Heater / T/C Common with Zone NN?	Crosswiring fault between displayed zones. Could be either heater or thermocouple wiring at fault.
Heating Test Failed	Temperature did not rise by the set number of degrees within the heating period. This may be caused by an open circuit heater, a pinched, shorted or dislodged thermocouple, or the zone was set to on board triac when the cabinet was wired for off board triacs.
Message Overflow	There is a limited amount of memory available to store test results. If this message is seen, too many errors have occurred to store them all.
No Card Present	No card was detected in the rack at the slot identified with the displayed zone.
No Mains Sync. Pulse	Likely due to an error in the supply wiring.
Open Circuit T/C	Thermocouple detected as being open circuit. Check thermocouple wiring for displayed zone.
T/C Interaction with Zone NN?	Different zone(s) to the one being tested had an unacceptable rise in temperature, greater than Bad Rise set in test values. Indicates faulty T/C positioning or close zone proximity.
User Aborted Test	The test was stopped.
User Skipped Test	The test for this zone was skipped while it was being tested.

7.8 Service and Repair the Controller



WARNING - HIGH VOLTAGE

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



CAUTION

External cables should be checked to see that there has been no damage to the flexible conduit, plugs or sockets. If the flexible conduit has been damaged or if there are any exposed conductors, it must be replaced.

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.



CAUTION

Only use ceramic body fuses on control cards. Never use glass-bodied fuses.

7.8.1 Replacement Parts

Mold-Masters does 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.

7.8.2 Cleaning and Inspection

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

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

7.9 Upgrade the Software

In order to maintain our high quality, our development engineers are making continual improvements to our control system.

It may be possible to apply system upgrades to your own controller depending on the type and age of your equipment. Please contact your supplier and provide the serial number for your model to find out if your particular console can be upgraded.

There is usually no need to return your control system to your supplier for any upgrades. They may be downloaded via the internet.

7.9.1 Preparation

1. Download the upgrade from the internet onto a personal computer.
2. Copy the upgrade program / data onto memory stick.



IMPORTANT

Before you start any upgrade, shut down the machine to leave the console free.

7.9.2 Procedure

1. Release the controller from any production working.
2. Plug the memory stick into the MTS USB socket and wait until the memory stick is ready to use.
3. Reboot the console:
   a) Choose [**Menu**].
   b) Choose **[Utilities]**.
   c) Choose [**Exit**].
   d) Restart and let the upgrade self-install.
4. Remove the memory stick and return the controller back to production working.

7.10 Fuses and Overcurrent Protection



WARNING - HIGH VOLTAGE

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



CAUTION

The fuse detection circuit requires a continuous low level current through a high impedance bleed resistor to maintain the alarm condition.

As a result the load circuit is still connected to the mains voltage supply and it is not safe to attempt to repair or replace the fuse without first isolating the circuit.

There is a miniature circuit breaker that offers general overcurrent protection for the complete unit.

7.10.1 Replacement Fuses

If any fuse has ruptured, it must be replaced with a new fuse that has identical characteristics. See Table 7-3, Table 7-4 and Table 7-5 for the correct fuse types.

7.10.2 Supplementary Fuses

All the supplementary circuits (console supply, power supply, fans) are protected by a pair of fuses which are fed from the upper and lower supply busbars.

These are DIN-rail mounted and can be found inside the left side cover (viewed from the front) of an M1-48 and under the cover at the top on an M1-12.

Table 7-3 Supplementary Fuses

Fuse	20mm Anti-surge
Rating	10 A

7.10.3 Controller Card Fuses

CAUTION

Only use ceramic body fuses on control cards. Never use glass bodied fuses.



Figure 7-1 Ceramic body fuses

The current controller card has protection fuses for both the thermocouple input and for the heating load output.

If the TC LED indicator shows an open thermocouple circuit, this may indicate that the input fuse has ruptured.

Table 7-4 Input Fuse Type	
Fuse	Nano Ceramic Very Fast
Rating	62 mA

If the fuse LED indicator shows that the output fuse has ruptured, remove the card and change the fuse.

Table 7-5 Output Fuse Type	
Fuse	32 mm Ceramic FF Ultra-Fast
Rating	15 A

Section 8 - Troubleshooting



WARNING

Ensure you have fully read “Section 3 - Safety” before troubleshooting any issues with the controller.



CAUTION

The fuse detection circuit requires a continuous low level current through a high impedance bleed resistor to maintain the alarm condition.

As a result the load circuit is still connected to the mains voltage supply and it is not safe to attempt to repair or replace the fuse without first isolating the circuit.

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

If the system detects any abnormal condition, it displays a warning message on the Main page.

If a zone temperature is seen to deviate from the actual setting beyond the alarm limits then the display will change to white text in red box and generate a remote alarm.

If the system detects a malfunction in one or more of the control zones, then it displays an error message on the Main page in place of a temperature value.

See “Table 8-1 Fault and Warning Messages” for more details.



8.1 Individual Controller Card Diagnostics

WARNING - HIGH VOLTAGE

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

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

From top to bottom they are:

SCAN – This LED flashes briefly as the controller scans each card in sequence.

FAULT – Should normally be unlit. It lights to show that one zone on the card has detected an error.

An error message is displayed in the particular zone on the console. Please see “Table 8-1 Fault and Warning Messages” on page 8-2 for a full list of fault and error messages.

To remove a card from its slot, pull the red handles forwards and gently pull the card out. There is no need to switch off the main supply.

8.2 Fault and Warning Messages

Table 8-1 Fault and Warning Messages

Error Message	Cause	Action
AMPS	The controller is unable to supply the current requested. **Note**: This error message is most likely to be seen if the particular zone is set as a Spear type.	• Isolate system supply, check loom and check heater wiring continuity. • Check the heater resistance against other known good zones to see that it is not noticeably higher than average.
ERR!	Little or no temperature rise has been detected in that zone. When the console starts to apply power it expects to see an equivalent heat rise at the thermocouple. If the thermocouple has been trapped and pinched in the tool or cable then the console cannot see the full heat rise that occurs at the tip. If left uncorrected there is a danger that the zone could overheat and damage the tip. The circuit maintains the output at whatever level it reached when the monitor circuit detected the fault	• Check thermocouple wiring, which may be reversed. • Heater wiring may be faulty or element may be open circuit.
FUSE	The output fuse for that zone has failed. **IMPORTANT: Read hazard warnings at the start of Section 8.** **IMPORTANT**: A fuse can only fail due to a fault external to the controller. Identify and rectify the fault before replacing the fuse. **Note:** If the fuse in question is mounted on a control card then it is safe to unplug the board in order to isolate the circuit and replace the fuse on the card.	• Replace the fuse with one of the same rating and type [High Rupture Current load fuse]. **NOTE:** The blown fuse is located either on the control card or on the off board triac module, if fitted.
GND	The system has detected an earth fault.	• Check your heater wiring for a low impedance path to earth.
HELP	There is a system failure and the console does not know how to respond. This alarm may occur if an older model console is connected to a later version cabinet. If the early version console does not recognize an alarm that has been generated by a later model control card, then it cannot display an appropriate alarm message. The console software has a routine to check incoming messages and it flags up a HELP message if such a condition arises.	• Make a note of the serial numbers for both the controller and console. • Also note the console software date on the Utilities page. • Contact your supplier with this information.

Fault and Warning Messages - continued

Table 8-1 Fault and Warning Messages

Error Message	Cause	Action
LINE	No mains supply synchronization pulses being received. The three-phase supply is used in a crossover detection circuit to generate timing pulses for accurate phase control and firing the triac. If the phase detection fails on one or two phases then there is no pulse to use to measure phase angle and the LINE error message is generated. All circuits on the healthy phases will continue to work normally.	• There is a phase detection circuit on each card and a common phase detection circuit on all other controller types. • Although a fault in such circuits may cause the LINE error message, such fault is very rarely seen. • The most common error is either the absence of one phase or, if a plug has been rewired incorrectly, a swapped phase and neutral. • If a LINE error message occurs then switch off and isolate the controller and check supply wiring for presence of all three phases.
LINK	The console is switched to a remote controller with a network link but it cannot communicate with the remote unit. The console can display the appropriate zones for the particular tool but it cannot relay any temperature information. It shows a LINK fatal error in place of the actual temperature.	• Check that the network link is good and / or the remote controller is still switched on and available.
LOAD	No load on that zone. Only occurs when in manual closed loop mode where the current is pre-set. The current sensing circuit has not detected a current flow. The zone is flagged as not having a load.	• Isolate the system supply and check the connections between the controller and the tool heaters. • Also check the heater for continuity.
N/Z	The console has detected a control card but the card cannot communicate with the console.	• If all zones show N/Z and no cards show / flash their SCAN LEDs, check the communication lead between the console and the controller cabinet. • If only one or two zones show N/Z, check the card for faults.
NONE	The console has detected a control card that has no settings.	• This error message may be seen briefly during switch on, but it should disappear after the initial card scan. • If the message persists then you may need to reapply the correct card settings on the SetUp page.
REV	The card has detected an abnormal input at the T/C termination that indicates a shorted or reversed thermocouple.	• If the **REV** alarm persists, switch off the controller and investigate the zone. The offending zone can also be slaved to a good zone until the fault can be cleared.

Fault and Warning Messages - continued

Table 8-1 Fault and Warning Messages

Error Message	Cause	Action
T/C	An open circuit thermocouple has been detected and no auto-response has been selected in the T/C Open Error column of the SetUp page.	For immediate recovery: • Slave that control zone to an adjacent zone OR change to open loop control. • When the controller is free, check to see whether the input fuse on the control card has ruptured. • If the fuse is good, then check the wiring for faults or replace the thermocouple.
TRC	If a triac fails it goes short circuit and passes full load current. In such a condition you have lost control of the load and cannot switch it off from the console. The TRC alarm flags up the fault state which relies on operator intervention to manually shut the system down. **Note**: The triac monitor does not function in Auto mode. If the triac fails with the zone in Auto mode, the only indication will be an abnormally high zone temperature due to the triac is passing high, uncontrolled current. The TRC alarm is only seen if a triac fails on a zone that is running in closed-loop manual condition.	• If the triac has failed, return to your supplier for repair.

8.3 System Warning Messages

These messages also warn of an abnormal condition.

Table 8-2 System Warning Messages	
Warning Message	**Abnormal Condition**
FAIL	The zone under test has failed.
MAN	The control zone is in Manual mode.
S #	The zone is slaved to another control zone, where # represents the number of that zone. For example, S 2 means the zone is slaved to Zone 2. The same power is being sent to both zones. In the Main page, the setpoint displayed on the selected zone is the same as that on the slave zone.
TEST	Displayed when the zone is in Diagnostic Test mode.
WARN	Displayed if a temperature interaction is found between zones during a test.

8.4 Other Issues

If the controller is not running correctly and the problem cannot be fixed with the manual or online help, then it is necessary to contact *Mold-Masters*. Before contacting *Mold-Masters*, we recommend that a copy of the controller's configuration setup be made.

1. Insert memory stick and wait until it is ready to use.

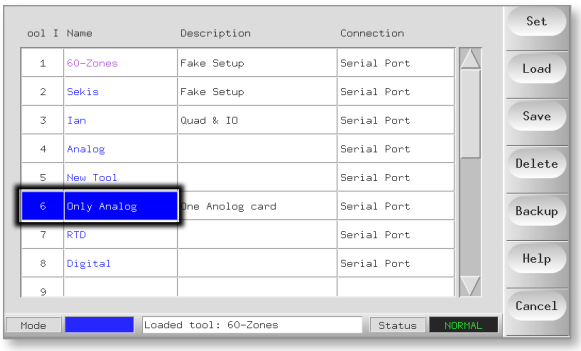


2. Open the ToolStore page.

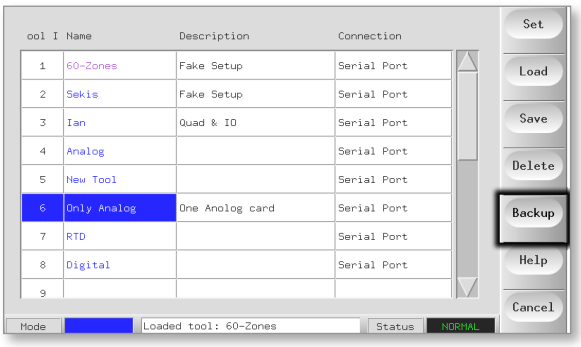


Other Issues - continued

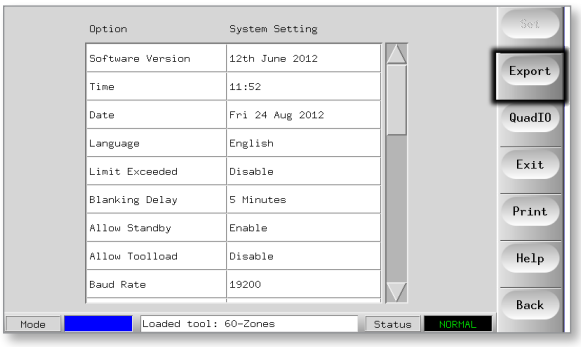
3. Choose the tool.



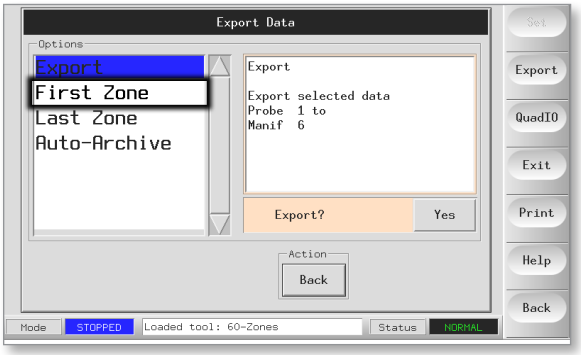
4. Choose [**Backup**].



5. Choose [**Export**] on the Utilities page.

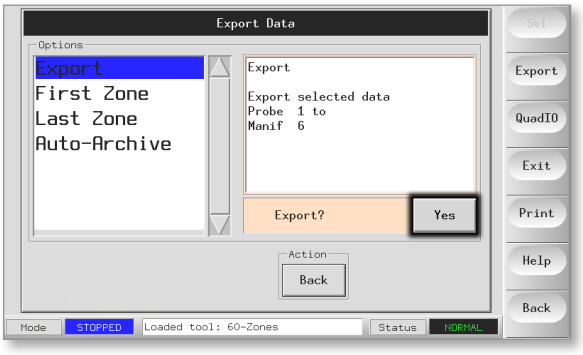


6. Choose the First and Last Zones to include all zones.



Other Issues - continued

7. Choose [**Export**].



8. Wait about 10 seconds, then remove the memory stick.



9. Copy the files to a personal computer, and email them to “help@moldmasters.com”.

Section 9 - Hot Runner Controller Wiring Details



WARNING

Ensure that you have fully read “Section 3 - Safety” before connecting the controller.



WARNING - HIGH VOLTAGE

Please take extreme care when connecting the controller to the three-phase supply.

Do not change the supply wiring until the controller has been disconnected from all electrical supplies.

If you change the configuration from Star to Delta, then the neutral wire must be disconnected and made safe in order to protect from a live back feed.



CAUTION

Please take care with Star / Delta configuration since incorrect connection may appear to work but can result in damage to the controller.

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.

9.1 Three Phase Designation - Star / Delta Option

The cabinet comes with a five-core mains 3-phase cable which may be used for either Star or Delta configuration. There are connectors within the case to change between Star and Delta supply.

At the upper connection blocks, located behind the left hand panel, change the Star / Delta cross-links using a single 3-way link for Star supplies or three 2-way links for Delta supplies. The connector strip shows the appropriate cross-links to use.

9.1.1 Set Power Rail to Star Configuration

WARNING

Ensure that the controller has been isolated from all power sources before the wiring is changed.

1. Connect the neutral (indicated by the blue conductor) into the lower-right terminal. Refer to Figure 9-1.

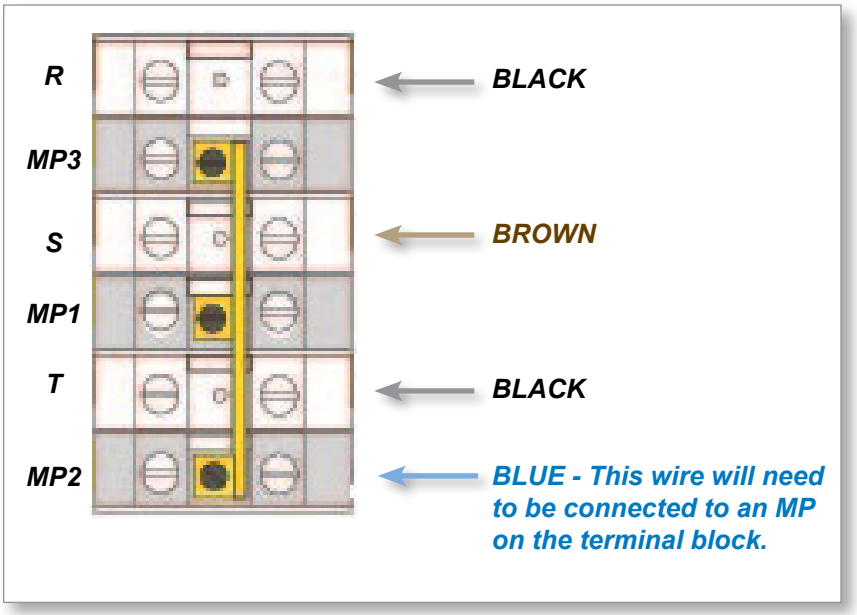


Figure 9-1 Connect the neutral - position shown by blue arrow

2. Install the one 3-way link. Refer to Figure 9-2.

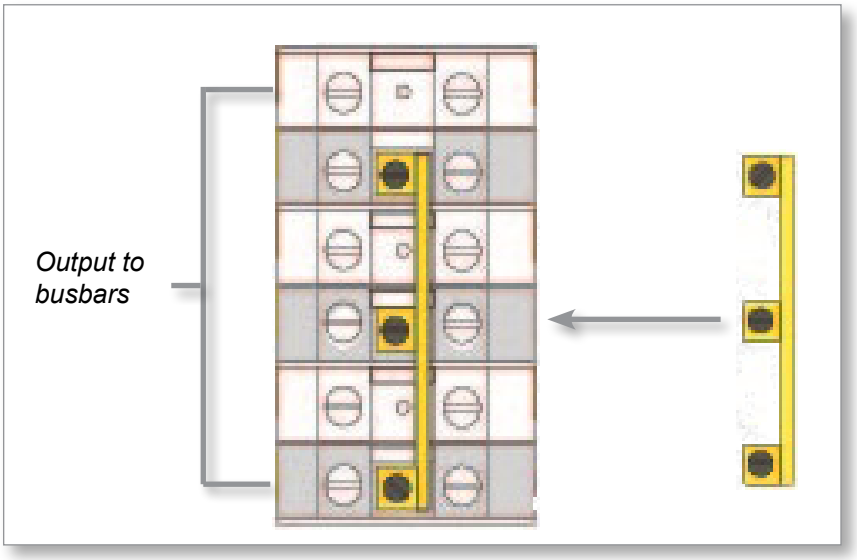


Figure 9-2 Install the 3-way link

9.1.2 Set Power Rail to Delta Configuration

WARNING

Ensure that the controller has been isolated from all power sources before the wiring is changed.

1. Remove the neutral (indicated by the blue conductor) into the lower-right terminal. Refer to Figure 9-3.

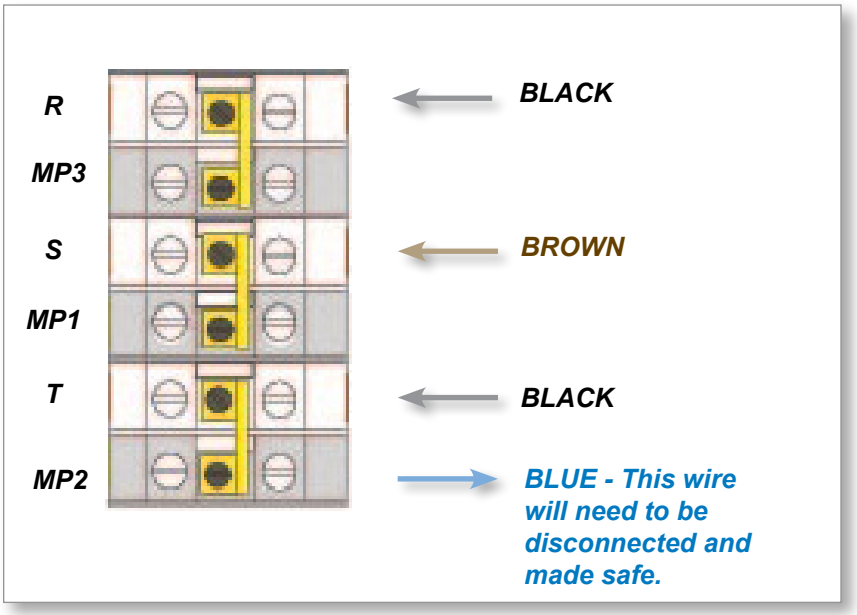


Figure 9-3 Remove the neutral - position shown by blue arrow

2. Install the three 2-way links. Refer to Figure 9-4.

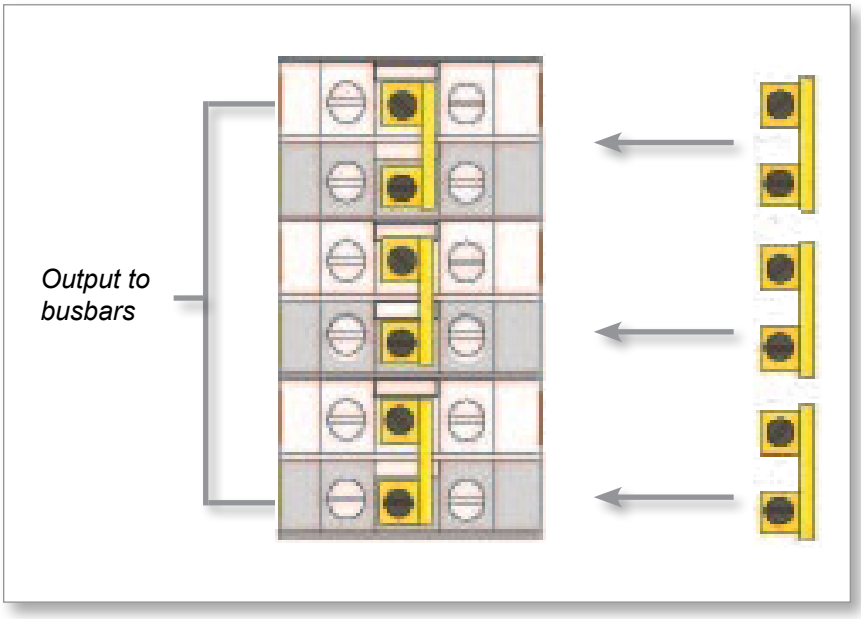


Figure 9-4 Install the three 2-way links

9.2 Noise Filter Option

In countries where noise across power lines is a concern, *Mold-Masters* recommends that an inline filter is fitted. Please contact *Mold-Masters* for details.

9.3 Alarm Output / Auxiliary Input

An optional 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 molding machine. In order to capture fleeting alarm conditions, the relay is held on for about 15 seconds after the alarm condition is cleared. The contacts are rated for 5A at 240V.

Table 9-1 Alarm Output / Auxiliary Input

Pin	Connection	Input / Output
1	Auxiliary Input signal	Standby
2	Auxiliary Input ground	
3	Alarm 240v contact 1	Normally Open Contacts
4	Alarm 240v contact 2	

An optional input can be accepted through the same connector. It may be used for Cycle Synch spear tips, Inhibit mode, remote Boost / Standby or any other user-definable function. For exact details, consult the specification for your particular model.

9.4 USB Port

A USB port is provided which enables certain functions such as:

- backup and restore tool settings
- save tool test results
- printer output

Table 9-2 Pin Connections

Pin	Connection
1	VCC
2	D-
3	D+
4	GND

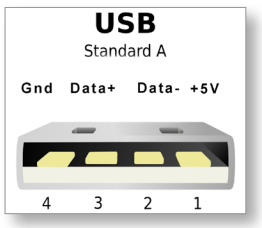
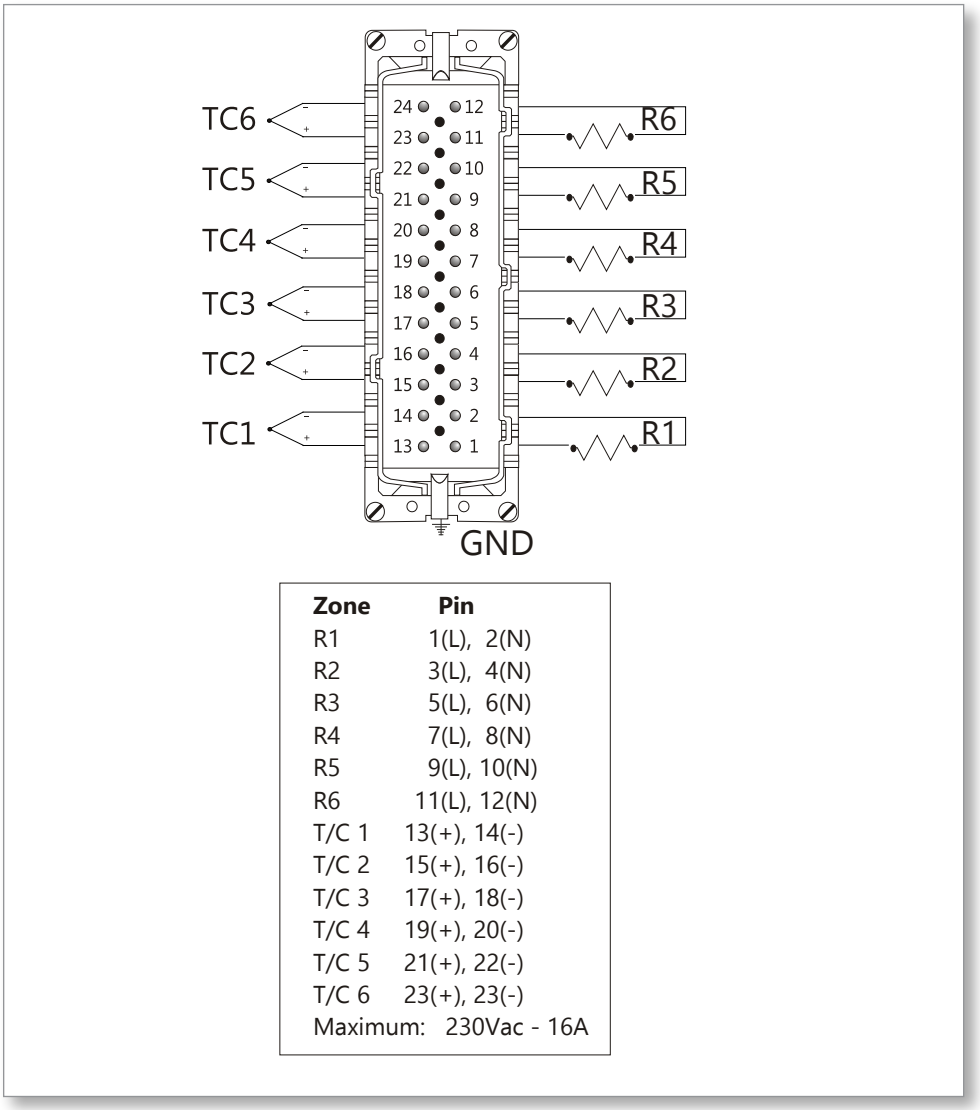


Figure 9-5 USB port

9.5 Standard Tool Connections

The diagrams below show the preferred standard for power and thermocouple connection cables. Custom controllers may differ and a custom wiring datasheet will be provided.



Zone	Pin
R1	1(L), 2(N)
R2	3(L), 4(N)
R3	5(L), 6(N)
R4	7(L), 8(N)
R5	9(L), 10(N)
R6	11(L), 12(N)
T/C 1	13(+), 14(-)
T/C 2	15(+), 16(-)
T/C 3	17(+), 18(-)
T/C 4	19(+), 20(-)
T/C 5	21(+), 22(-)
T/C 6	23(+), 23(-)
Maximum:	230Vac - 16A

Figure 9-6 6-zone only – single HAN24E to HASCO Standard

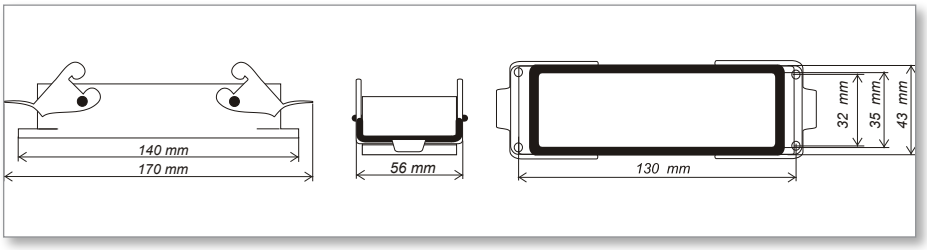


Figure 9-7 Harting 24B housing with double lever

Standard Tool Connections - continued

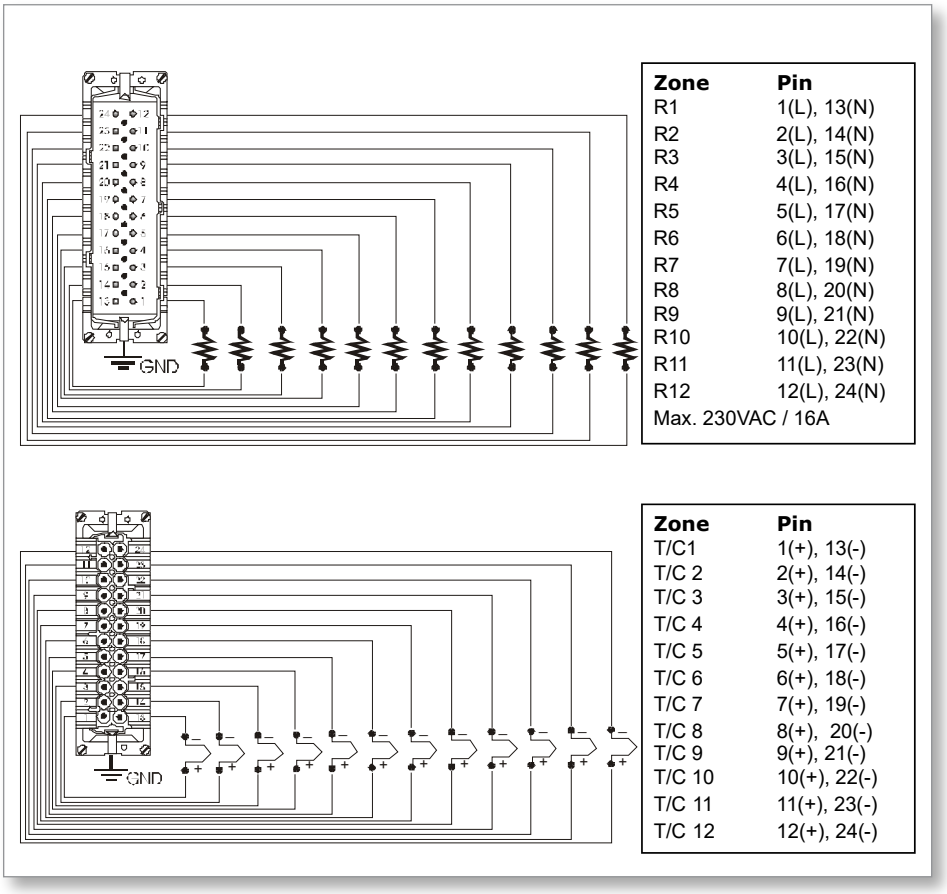


Figure 9-8 12-48 zones - pairs of HAN24E wired to Mold-Masters Standard

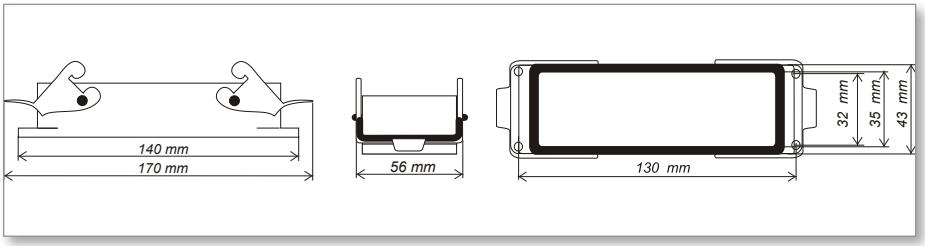


Figure 9-9 Harting 24B housing with double lever

9.6 Touchscreen Schematic

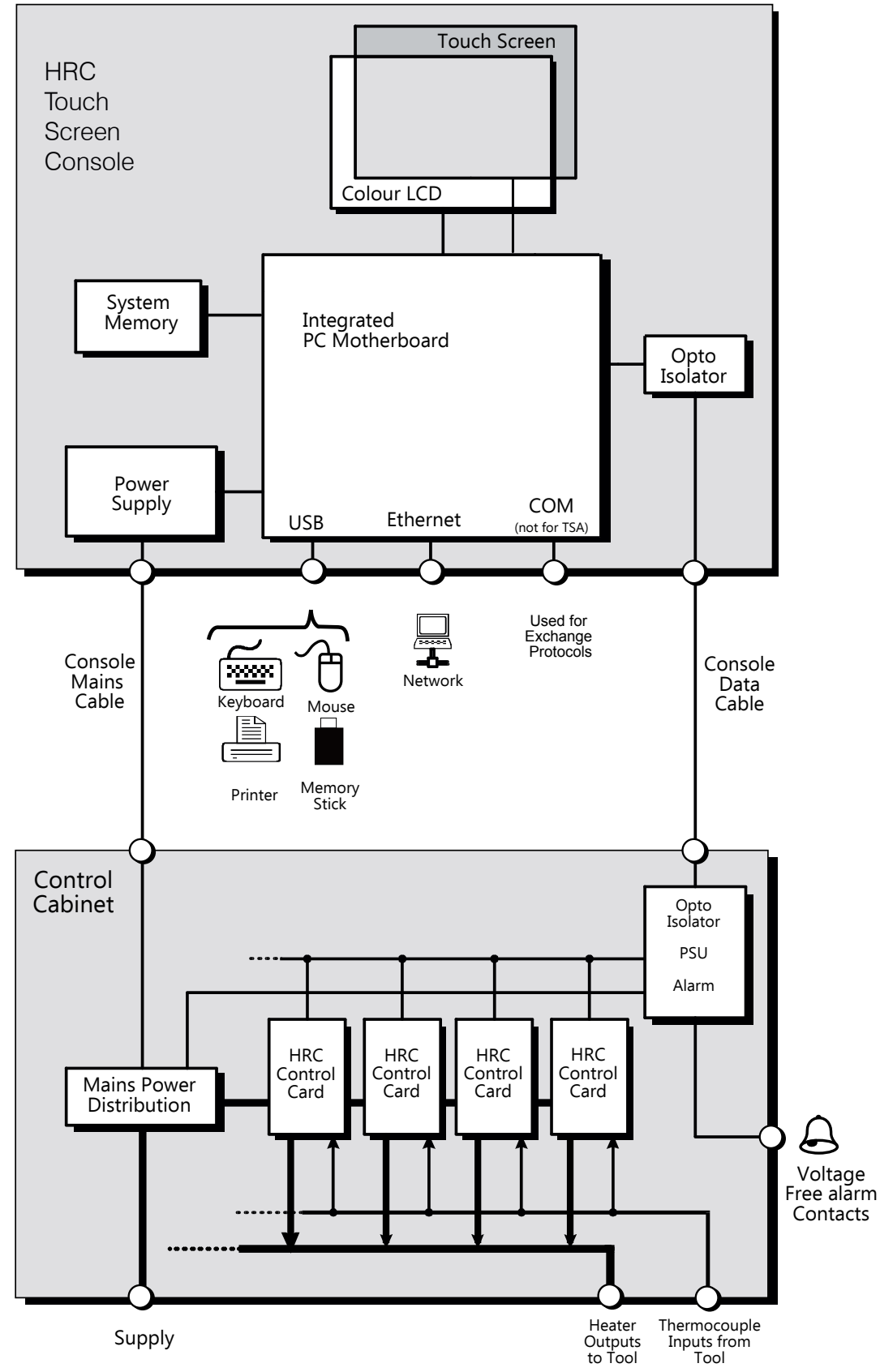


Figure 9-10 Touchscreen schematic

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