

TempMaster™ **M₂** **PLUS** series

User Manual

version 3-1



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Section 1 - Introduction

The purpose of this manual is to assist users in the integration, operation and maintenance of the M2 Plus controller with a touchscreen console. 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 M2 Plus controller together with the 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 Document Release Details		
Document Number	Release Date	Version
M2P-UM-EN-00-02-4	July 2019	02-4
M2P--UM--EN--00--02-6	May 2021	02-6
M2P--UM--EN--00--02-7	January 2022	02-7
UM--M2P--ENG--03-1	October 2025	03-1

1.3 Warranty

For current warranty information please refer to the documents available from our website 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

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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 Figure 3-1 on page 3-2.

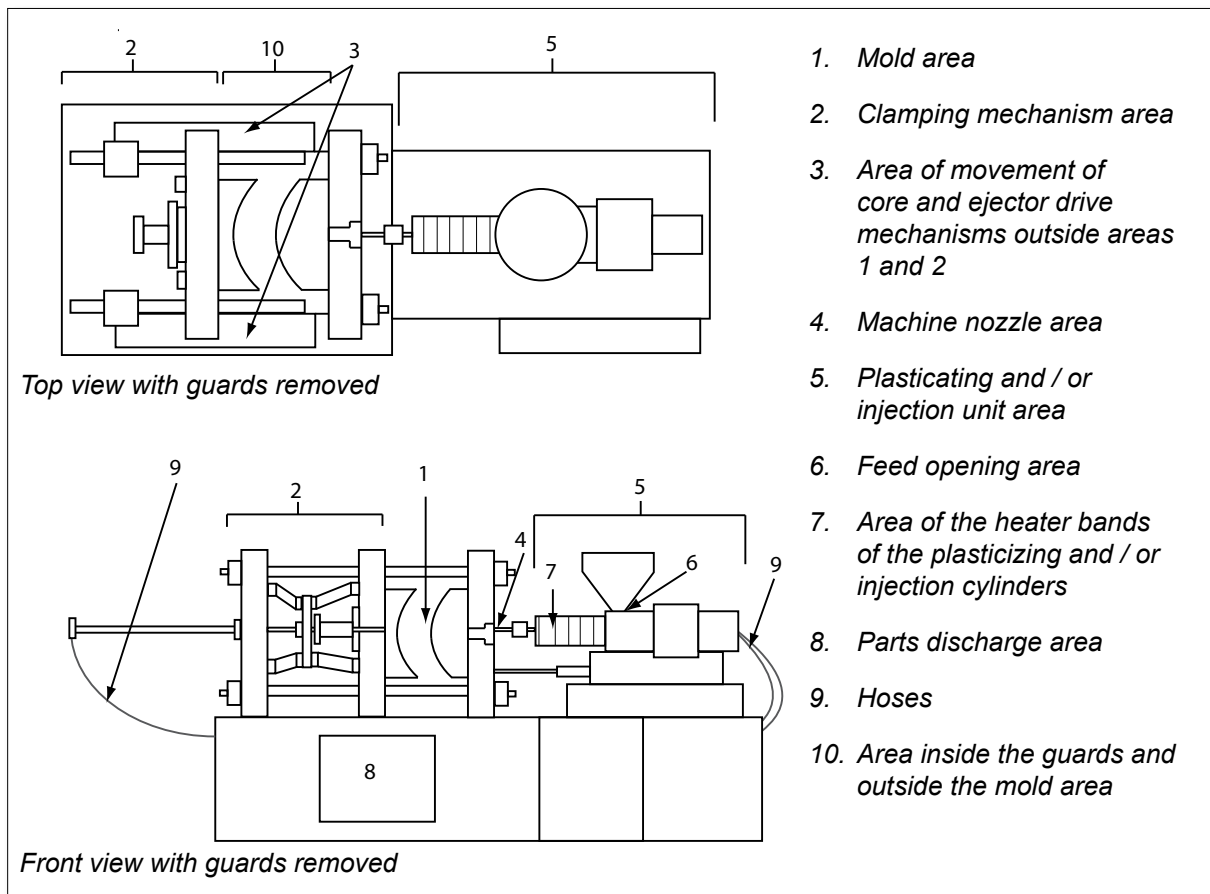


Figure 3-1 Injection molding machine hazard areas

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	Mechanical 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 3-2 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.



3.6 Lockout Safety

WARNING

DO NOT enter the cabinet without first ISOLATING the supplies.

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.

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 capacitive 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 Grounds Connections

Ground connections are located on the M5 self clinching studs attached to the metallic panels of the controller cabinet. See Figure 3-2.

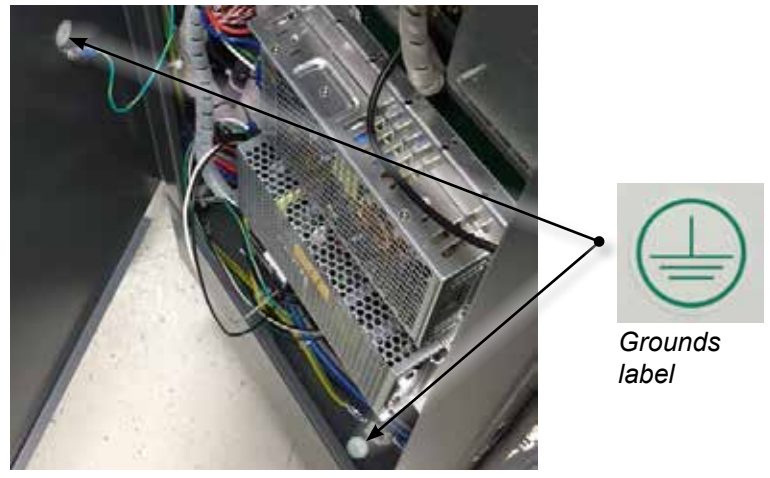


Figure 3-2 Example of ground connections

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 the materials occupies a forefront position during the disposal process.

3.10 M2 Plus Controller Safety 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 handle 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 molding 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)

3.10.2 Cabinet Push / Tip Forces

Table 3-4 Cabinet Push / Tip Forces		
	Small Cabinet	Medium Cabinet
Force required to move cabinet on castors	9lbs (4KG F)	13 lbs (6KG F)
Force required to tip cabinet if one castor is missing	20lbs (9KG F)	44 lbs (20KG F)

Section 4 - Overview

4.1 Specification

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 volt-free contacts - 5A max 230V
Case Details	Heavy duty metal cabinet Sizes in cm M2 Plus - Extra Small: 36w c 51d x 82h M2 Plus - Small : 36w × 51d × 95h M2 Plus - Medium: 45w × 63d × 101h M2 Plus - Large: 45w × 63d × 128h
Communication Protocol	VNC, RDP, SPI, Modbus RTU and Modbus T/CP
Control Accuracy	+/-1°F
Control Algorithm	Self tuning PID
Data Communications	RS-232 serial, DB9 male connector
Ground Fault Detection	40mA per zone
Interface	Full color LCD touchscreen [choice of sizes]
Operating Range	0 - 472°C [Celsius] or 32° - 842°F [Fahrenheit]
Output Overload Protection	15A super-quick acting [FF] fuse on both legs
Power Output	15A/3600W per zone
Printer Output Connector	USB port
Relative Humidity Limit	90% [non-condensing]
Remote Input	Voltage free signal Boost, Standby or Stop
Soft-Start with Auto Tune	Unique low voltage method for heater safety
Supply Earth-Leakage Trip	300mA Note: this is for tool protection
Supply Voltage	415Vac 3 phase 50/60Hz with neutral. Other available include 240/380/400 and 600 volts in Star or Delta configuration.
Temperature Scale	°C [Celsius] or °F [Fahrenheit]
Thermocouple Input	Type 'J' or type 'K' [regular and high temp]
Unit Overload Protection	Miniature circuit breaker
Voltage Bandwidth	Stable within [20% supply voltage swing]

4.2 Controller Front View

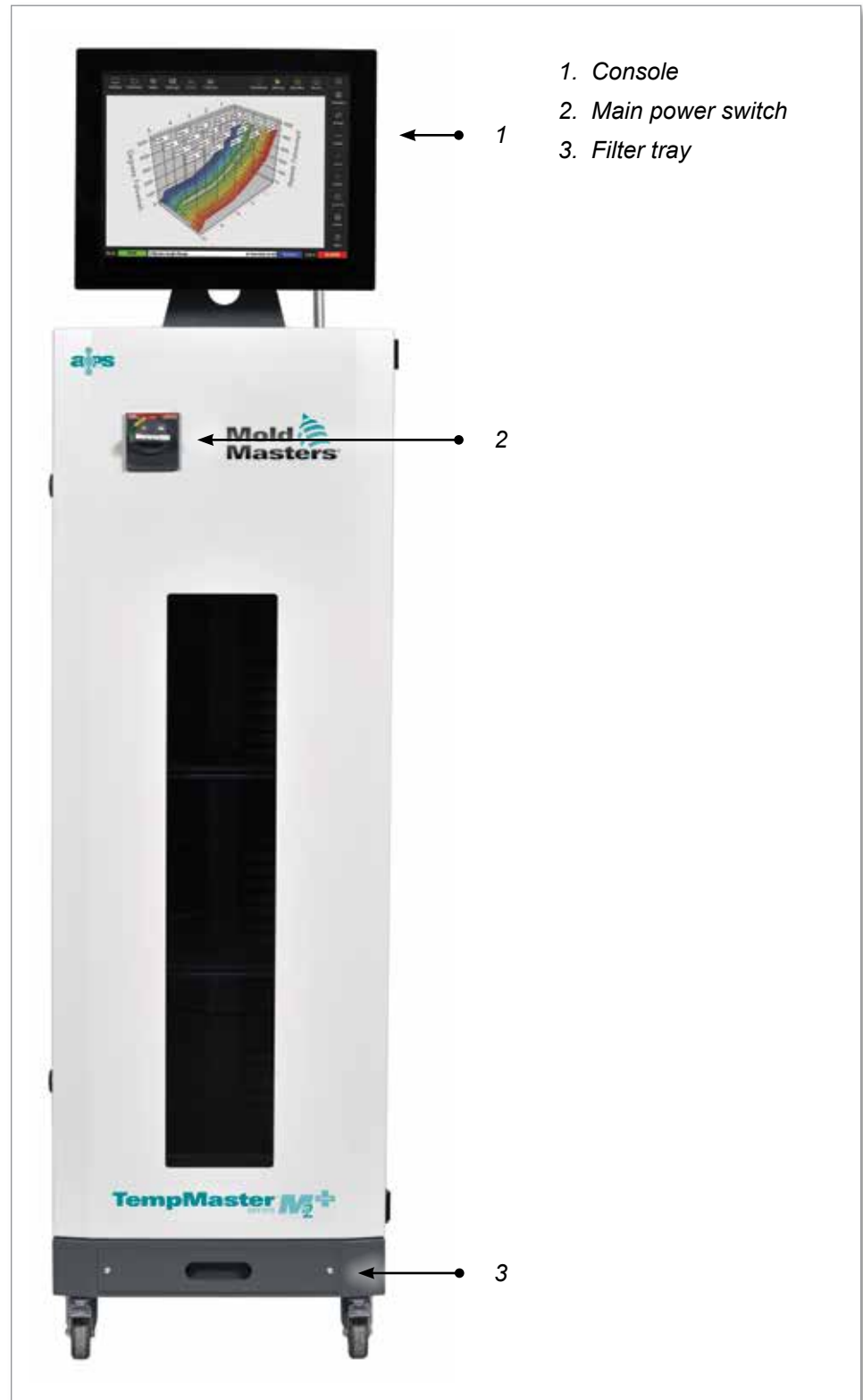


Figure 4-1 M2 Plus controller. Medium cabinet with TS17 console

4.3 Controller Back View

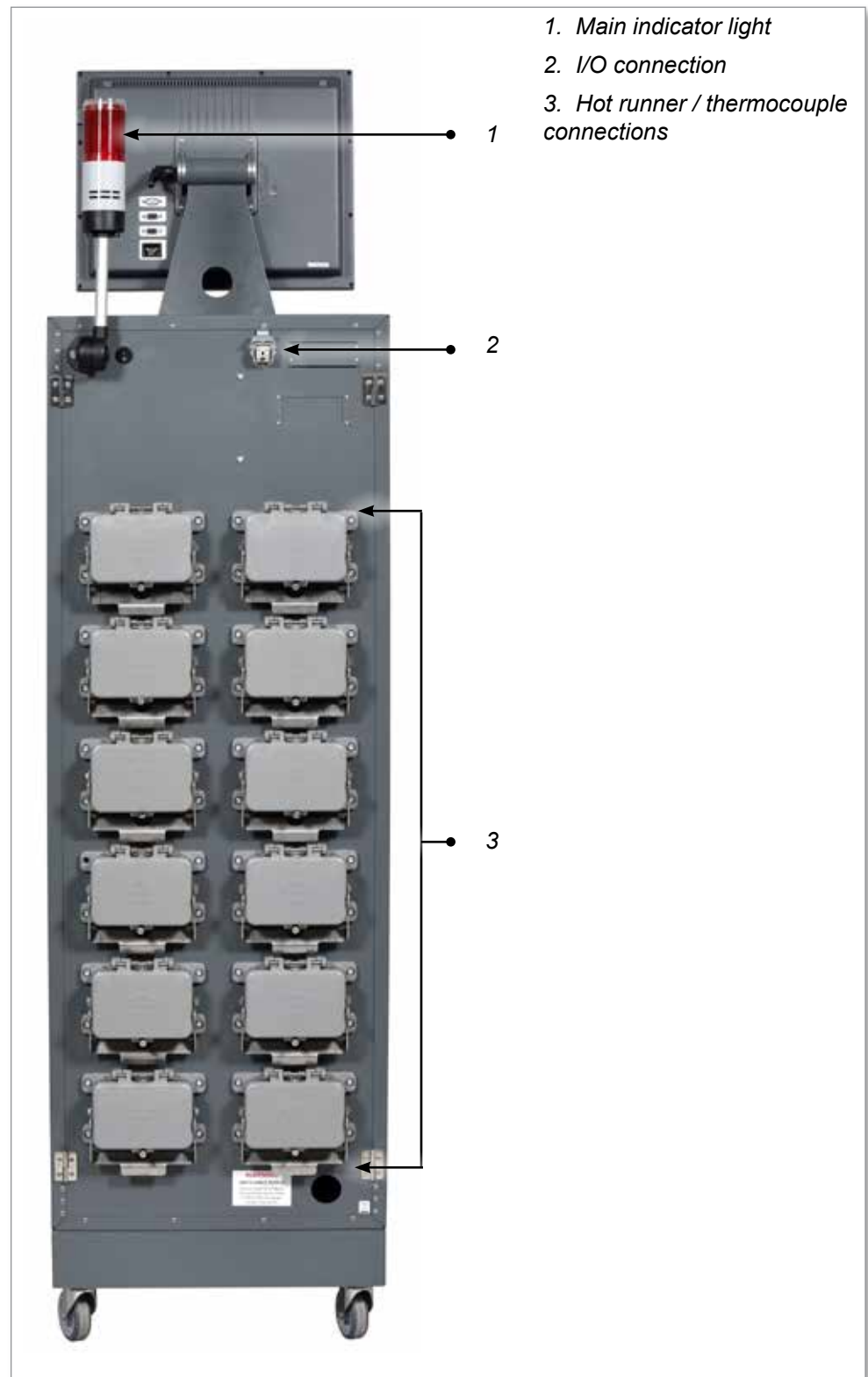


Figure 4-2 M2 Plus controller. Large cabinet with TS17 console

4.4 Screen Layout and Navigation

The M2 Plus controller uses a consistent layout on its screens for easy user navigation.

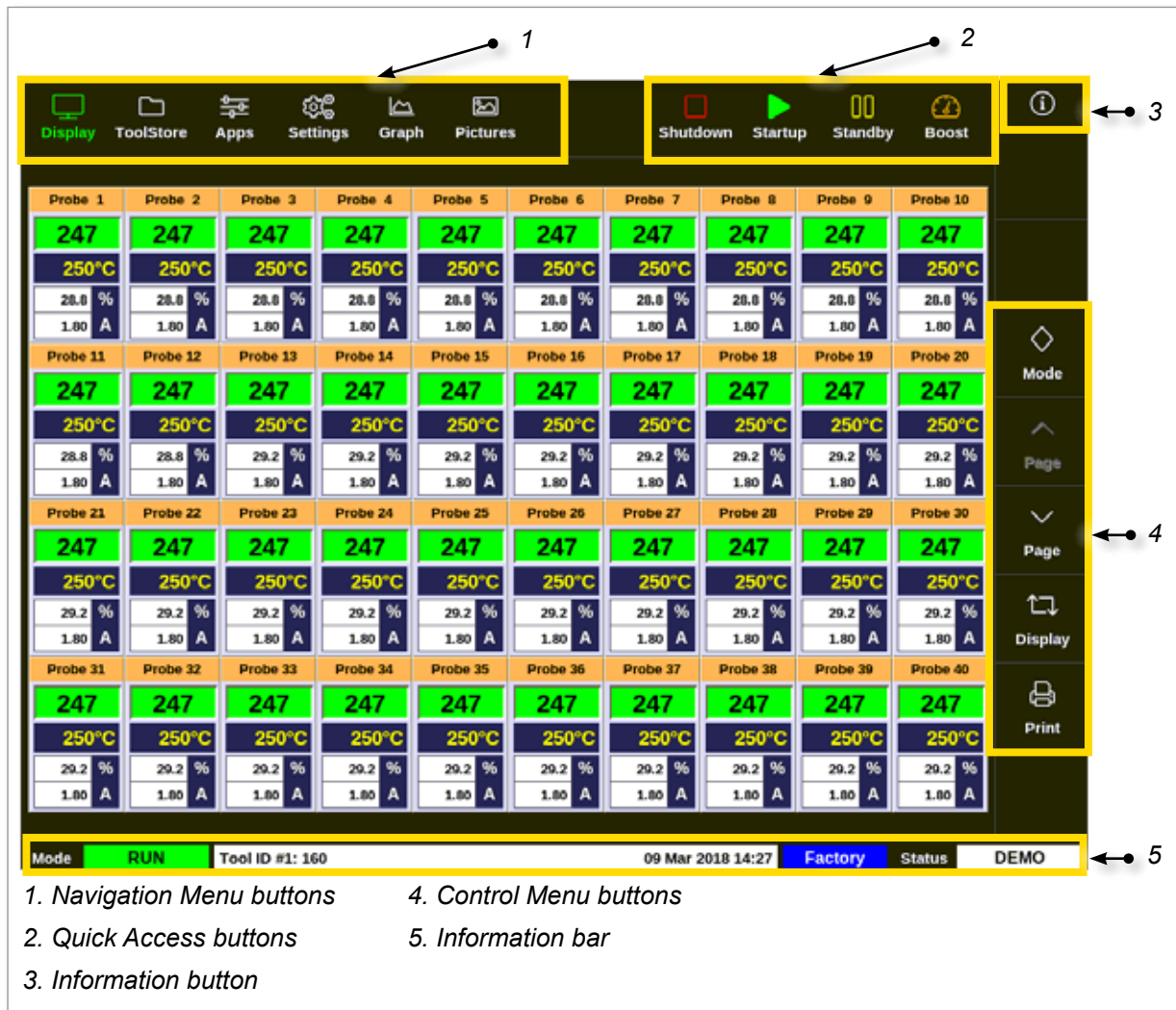


Figure 4-3 Screen layout



NOTE

Due to the compact size of the TS8 screen, the **[Pictures]** button is not available from the Navigation bar. The user can access the **[Pictures]** screen from the **[Apps]** button.

See "4.22.2 Access the Pictures Screen: TS8 Console" on page 4-37 for more information.

4.4.1 Navigation Menu Buttons

The buttons at the top left hand side of the Display screen give access to the following screens:

- Display
- ToolStore
- Apps
- Settings
- Graph
- Pictures

After the user chooses a button, it is enabled and it turns green.

See Figure 4-3.

The user can touch any of these buttons to return to the main page for that screen.

**NOTE**

The user has 8 screen choices from the [**Apps**] button. The [**Apps**] button changes to the corresponding icon and turns green after the user selects the icon.

4.4.2 Quick Access Buttons

The Quick Access buttons are located at the top right hand side of the Display screen:

- Button One can be configured as Shutdown or Stop
- Button Two can be configured as Run, Sequence or Startup
- Button Three and Button Four are not configurable

When these buttons are inactive, they show as an outline. When these buttons are enabled, they are solid. See Table 4-2.

Table 4-2 Quick Access Buttons		
	Disabled	Enabled
Button One (Shutdown)		
Button One (Stop)		
Button Two (Run)		
Button Two (Sequence)		
Button Two (Startup)		
Button Three		
Button Four		



NOTE

The **[Boost]** button is greyed out and unavailable if the controller is not in Run mode.

The **[Standby]** button is greyed out and unavailable if the system setting "Allow Standby" is set to disabled and the console is in Stop Mode.

The user can press and hold Button One and Button Two to cycle through the mode options:

Button One:

- Hold **[Shutdown]** and the controller enters Stop mode
- Hold **[Stop]** and the controller enters Shutdown mode

Button Two:

- Hold **[Run]** and the controller enters Startup mode
- Hold **[Startup]** and the controller enters Run mode
- Hold **[Sequence]** and the controller enters Startup mode

4.4.3 The Information Button

The [Information] button is located in the top right hand corner of the screen:



Use this button to access the following controller details:

- console model
- software version
- hostname
- IP address
- console uptime
- installed protocol
- current theme
- remote share status
- access to the quick guide

See Figure 4-4.

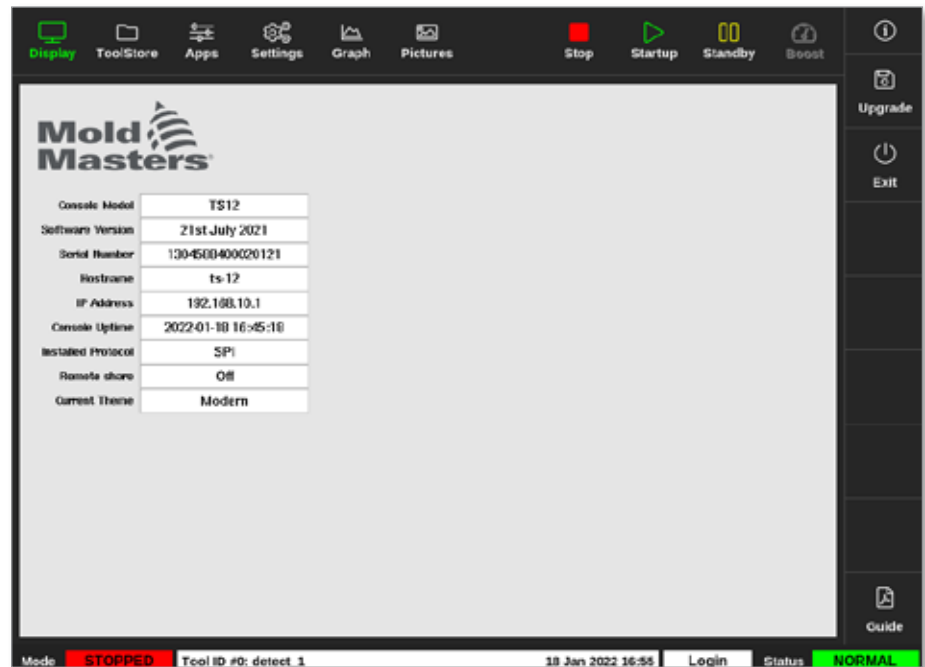


Figure 4-4 Information screen

The user can access a quick guide of operational instructions from this screen. For more information, see "6.4 Quick Start Guide" on page 6-6.

The user can change the theme from this screen. For more information on changing the screen theme, see "4.6 Modern Theme" on page 4-9.

This screen is also used to install software upgrades. For more information on upgrading the software, see "8.1 Upgrade Software" on page 8-1.

4.4.4 Control Action Buttons

The buttons on the right side of the zone display area change from screen to screen.

4.4.5 The Information Bar

The bottom information bar shows overall information. From left to right:

- Mode: use the mode window to change the mode, if you are on the display page
- Message bar, including date and time
- Shortened user name
- Status: select the status window to go to the alarms page

The user can also login and logout of the controller from the information bar. For more information about the Mode and Status windows, see "4.17.1 Mode Window" on page 4-27 and "4.17.2 Status Window" on page 4-27.

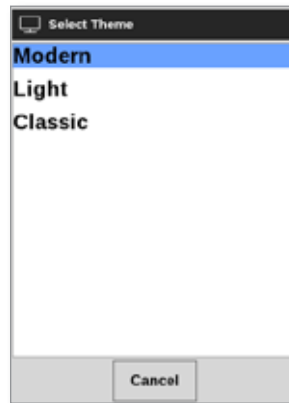
4.5 Choose a Screen Theme

There are three available themes for the console display. Buttons and menu items function in the same way regardless of the theme chosen.

1. Choose the **[Information]** button:

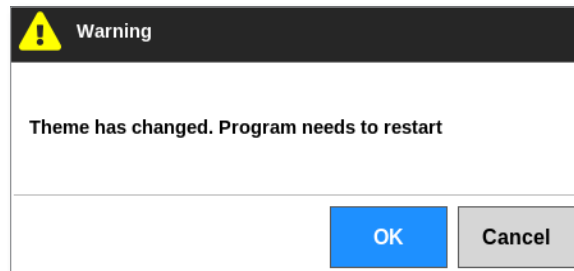


The Select Theme box opens:



2. Choose the required theme or choose **[Cancel]** to exit without changing the screen theme.

A message box opens:



3. Choose **[OK]** to restart the console or **[Cancel]** to return to the information screen without changing the theme.

4.6 Modern Theme

This is the default theme for the display, and it is the one used in this manual.



4.6.1 Light Theme



4.6.2 Classic Theme



4.7 Zone Display Options (TS8 Console)

The TS8 console can show up to 96 zones on a single screen. The amount of information shown decreases with an increased amount of zones.

The user can change the size of the zone panels with the **[Display]** button:



Alternatively, the user can choose to keep the default zone panel size and use the **[Page ▲]** and **[Page ▼]** buttons to scroll through the zones.



NOTE

Due to the compact size of the TS8 screen, the **[Pictures]** button is not available from the Navigation bar. The user can access the **[Pictures]** screen from the **[Apps]** button.

See "4.22.2 Access the Pictures Screen: TS8 Console" on page 4-37 for more information.

4.7.1 TS8 Console: 36 Zones on Screen

The default screen displays up to 36 zones and the following information:

- alias name
- actual temperature
- set temperature
- power
- current



Figure 4-5 TS8 console with 36 zones

4.7.2 TS8 Console: 54 Zones on Screen

Each zone shows alias name, actual temperature and set temperature.



Figure 4-6 TS8 console with 54 zones

4.7.3 TS8 Console: 96 Zones on Screen

Each zone shows alias name and actual temperature.



Figure 4-7 TS8 console with 96 zones

4.8 Zone Display Options (TS12 Console)

The TS12 console can show up to 144 zones on a single screen. The amount of information shown decreases with an increased amount of zones.

The user can change the size of the zone panels with the **[Display]** button:



Alternatively, the user can choose to keep the default zone panel size and use the **[Page ▲]** and **[Page ▼]** buttons to scroll through the zones:

4.8.1 TS12 Console: 40 Zones on Screen

The default screen displays up to 40 zones and the following information:

- alias name
- actual temperature
- set temperature
- power
- current



Figure 4-8 TS12 console with 40 zones

4.8.2 TS12 Console: 60 Zones on Screen

This screen shows the same information as the 40 zone screen.



Figure 4-9 TS12 console with 60 zones

4.8.3 TS12 Console: 96 Zones on Screen

Each zone shows alias name, actual temperature and set temperature.



Figure 4-10 TS12 console with 96 zones

4.8.4 TS12 Console: 144 Zones on Screen

Each zone shows alias name and actual temperature.



Figure 4-11 TS12 console with 144 zones

4.9 Zone Display Options (TS17 Console)

The TS17 console has a widescreen format and more zones can be seen on the Display screen. All other functionality is the same as the TS12 console. For the purposes of this user manual, images from a TS12 console are used.

4.9.1 TS17 Console: 78 Zones on Screen

The default screen displays up to 78 zones and the following information:

- alias name
- actual temperature
- set temperature
- power
- current



Figure 4-12 TS17 console with 78 zones

4.9.2 TS17 Console: 105 Zones on Screen

This screen shows the same information as the 78 zone screen.



Figure 4-13 TS17 console with 105 zones

4.9.3 TS17 Console: 165 Zones on Screen

Each zone shows alias name, actual temperature and set temperature.



Figure 4-14 TS17 console with 165 zones

4.10 Resize Zones

The user can resize panels in both the TS12 and TS17 consoles.

To resize the panels, use a “pinch and pull” movement with fingers.

4.11 Keypad

Users are presented with a keyboard or keypad for entering values.

Keyboard: for alphanumeric input



Keypad 1: for basic numeric input



Keypad 2: an extended keyboard which adds:

- **Value keys** - Set, Add, Subtract for temperature
- **Mode keys** - Auto, Manual and Slave for working modes



4.12 Screensaver

The screen light turns off the backlight after five minutes of inactivity.

Touch the screen anywhere to restore light to the screen.

4.13 Choose Zones

On the Display screen, users can choose zones individually. Users can also use the [Range] button to choose multiple zones simultaneously.

1. Choose the first zone.
2. Choose the last zone.
3. Choose [Range].



NOTE

The user can also choose the first zone and then choose the last zone twice to select the range.

The range of zones selected will be highlighted in blue. See Figure 4-15.



Figure 4-15 Range of zones highlighted

The user can now set or change parameters or settings for the range selected.

4.14 Set and Measured Parameters

To monitor the health of a zone, the controller uses set and measured parameters. See Table 4-3 and Table 4-4.

Table 4-3 Set Parameters		
Parameter	Metric Unit	Imperial Unit
Temperature	°C = degree Celsius	°F = degree Fahrenheit
Flow	L = liters per minute	G = gallons per minute
Pressure	B = bar	P = PSI
Other	% = percentage	% = percentage

Table 4-4 Measured and Displayed Parameters		
Parameter	Description	Symbol
Ampere	Current measurement of the heater circuit	A
Delta	Difference between two measurements	D
Ohms	Resistance of the heater circuit calculated from stated voltage and measured current.	Ω
Percentage	Power output for a zone %	%
Reynolds Number	Indication of the quality of coolant flow in a circuit	Re
Watts	Wattage of the heater circuit calculated from stated voltage and measured current	W

4.15 Display Screen

The Display screen is used to:

- **Monitor** – observe zone condition
- **Control** – users can run or stop the system, choose Standby or Boost mode, or shutdown the system
- **Set** – users can set or alter zone setpoints or run modes



Figure 4-16 Display screen

4.16 Display Screen Options

Four different displays are available to use as the main display. The top menu buttons do not change and these functions are available on all screens.

From the Display screen,

1. Choose **[Display]**:



The Display View box opens. See Figure 4-17.

Display Screen Options - continued

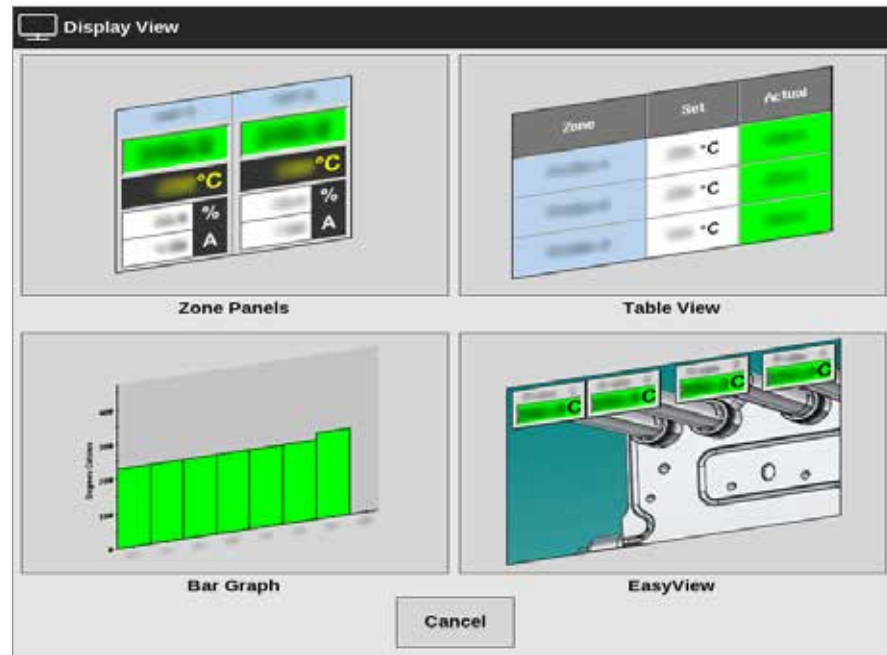


Figure 4-17 Display View box

- Choose the required view or choose [**Cancel**] to return to the default zone panel display.



NOTE

Users can also swipe through the four screen options. From the default zone panel screen, use two fingers to swipe right or left through the options.

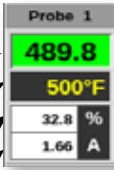
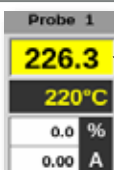
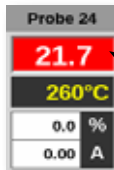
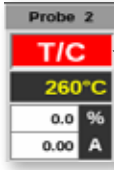
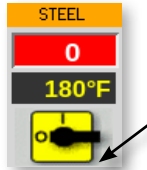
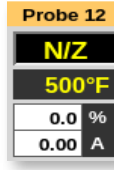
4.16.1 Zone Panel Display

The number of zones displayed in the Zone Panel screen is determined by the user. See "4.8 Zone Display Options (TS12 Console)" on page 4-13 and "4.9 Zone Display Options (TS17 Console)" on page 4-15.

A zone window shows information about the zone, including set and actual

Zone Panel Display - continued

temperatures, applied power and current, and the health status. See Table 4-5.

Table 4-5 Zone Status		
Zone	Display	Indicator
Healthy zone Zone name (user configurable) Actual temperature in whole degree or in tenth of a degree steps Scale and set temperature Applied power (%) Applied current (Amps)		Actual temperature is black text on green background.
Warning zone Deviation exceeds first stage [warning]		Actual temperature is black text on yellow background.
Alarm zone Deviation exceeds second stage [alarm]		Actual temperature is white text on red background.
Fatal error Problem detected. See Table 9-2 for a list of possible error messages explained.		Error message is white text on red background.
Zone off Individual zone switched off		This zone has the off switch indicator.
Lost communications Zone has lost communication with the console		Error message is yellow text on black background.

4.16.2 Table Display

Table view lists each zone and the following parameters:

- set temperature
- actual temperature
- power
- average power
- alarm baseline
- alarm power
- amps
- watts
- earth leakage
- heater baseline
- heater resistance

The **[Mode]** button and the **[Print]** buttons are available in the right hand menu. The user has a scrollbar on the right hand side to move through the zones.

The status of the zones is indicated by the color of the actual power column. Figure 4-18 shows the actual temperature in red, which indicates an alarm status.

Zone	Set	Actual	Power	Average Power	Alarm Power	Amps	Watts	Leakage	Heater Resistance
Probe 1	250 °C	80	8.8%			0.50A	120W	0ma	---
Probe 2	250 °C	80	8.8%			0.50A	120W	0ma	---
Probe 3	250 °C	80	8.8%			0.50A	120W	0ma	---
Probe 4	250 °C	80	8.8%			0.50A	120W	0ma	---
Probe 5	250 °C	80	8.8%			0.50A	120W	0ma	---
Probe 6	250 °C	80	8.8%			0.50A	120W	0ma	---
Probe 7	250 °C	80	8.8%			0.50A	120W	0ma	---
Probe 8	250 °C	80	8.8%			0.50A	120W	0ma	---
Probe 9	250 °C	80	8.8%			0.40A	96W	0ma	---
Probe 10	250 °C	80	8.8%			0.40A	96W	0ma	---
Probe 11	250 °C	80	8.8%			0.40A	96W	0ma	---
Probe 12	250 °C	80	8.8%			0.40A	96W	0ma	---
Probe 13	250 °C	80	8.8%			0.40A	96W	0ma	---

Total Power: 0.00A 0.00kW

Mode: Factory Tool ID #1: 160 09 Mar 2018 14:24 Status DEMO

Figure 4-18 Display screen - table view

4.16.3 Bar Graph Display

The bar graph display shows the zones in graph format against the variables of temperature, power and flow, depending on their configuration. The status of the zones is indicated by the color of the columns. Figure 4-19 shows zone 10 in yellow, which indicates a warning status.

The **[Mode]** button and the **[Print]** buttons are available in the right hand menu.

Use **[Page ▲]** or **[Page ▼]** to see the zone types in sequence.

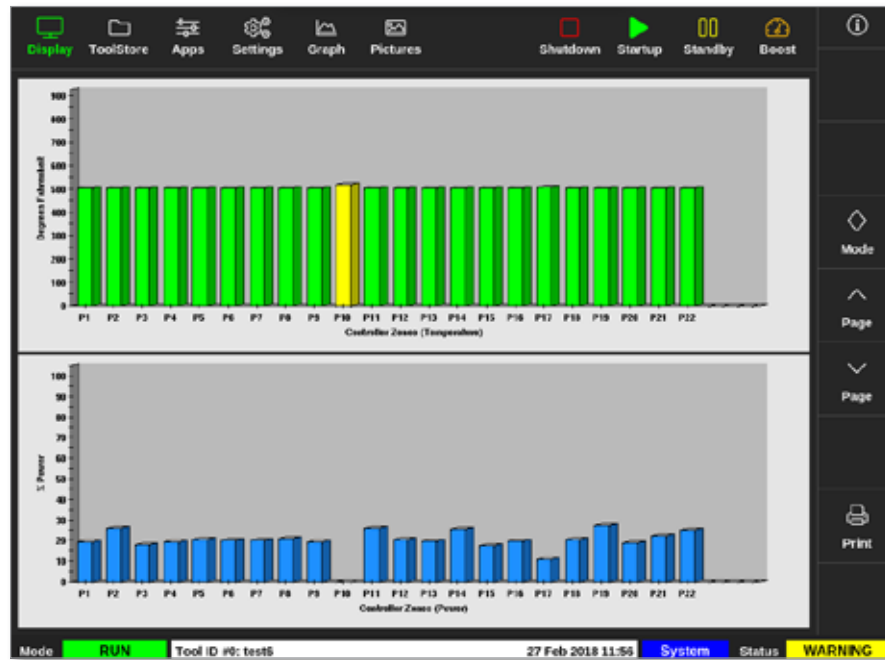


Figure 4-19 Display screen - bar graph view

4.16.4 EasyView Screen Display

The EasyView screen displays a picture of the tool loaded with zones labelled with information about zone condition. See Figure 4-20.

*Figure 4-20 Display screen - EasyView screen view*

The EasyView Screen must be setup from the Pictures screen before it will display.

See "5.12 Import a Picture" on page 5-40. and "5.13 Setup the EasyView Screen" on page 5-41 for more information on how to set up the EasyView screen.

4.17 Modes of Operation

The Quick Access buttons [**Shutdown**, **Startup**, **Standby** and **Boost**] are available from buttons at the top of the screen. See Figure 4-21.

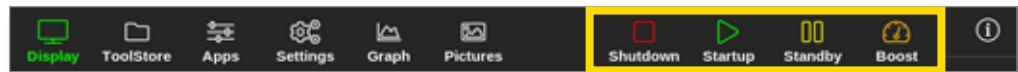
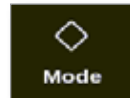


Figure 4-21 Quick Access buttons

The user can also choose the [**Mode**] button from the side menu:



A box opens on the right side of the Display screen. See Figure 4-22.

The user can access the following modes from this box:

- Run
- Standby
- Startup
- Shutdown
- Boost
- Stop

The user chooses [**Cancel**] to close the box and return to the Display screen.



Figure 4-22 Mode box

4.17.1 Mode Window

The Mode window at the bottom left hand corner displays the current chosen mode for the controller. The mode will flash on and off. If a mode that is time limited is chosen, for example, boost, then the window will alternately flash the mode and the time remaining.

See Table 4-6 for a list of Mode displays.

Table 4-6 Mode Window Display		
Mode	Display	Description
RUN	Black text in green box	All control zones are working normally.
STOP	Black text in red box	The system has been shut down and the heaters are at room temperature.
STANDBY	Black text in yellow box	Any zones with standby temperatures configured have been reduced in temperature until the next command is given.
STARTUP	Black text in green box	The system has been started in a homogeneous or staged heat rise. It will switch to "RUN" when working temperature has been reached.
SHUTDOWN	White text in blue box	The system has been shut down in a homogeneous or staged heat fall. It will switch to "STOPPED" when a temperature of 90°C (162°F) has been reached.
BOOST	Black text in yellow box	Any zones with boost temperatures configured are being temporarily raised. (manual request)

4.17.2 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 4-7.

Table 4-7 Status Window Display		
Mode	Display	Description
NORMAL	Black text in green 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 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.

See "Section 9 - Troubleshooting" for more information on alarms and error messages.

4.18 ToolStore Screen

The ToolStore screen has 10 different tool banks, each of which contains 20 tool slots, giving a total capacity of 200 different tool settings.



NOTE

The tools are numbered from 1–200 sequentially through the tabs to ensure that individual tools can be identified for remote tool loading.

See "13.6 Remote Tool Selection" for more information.

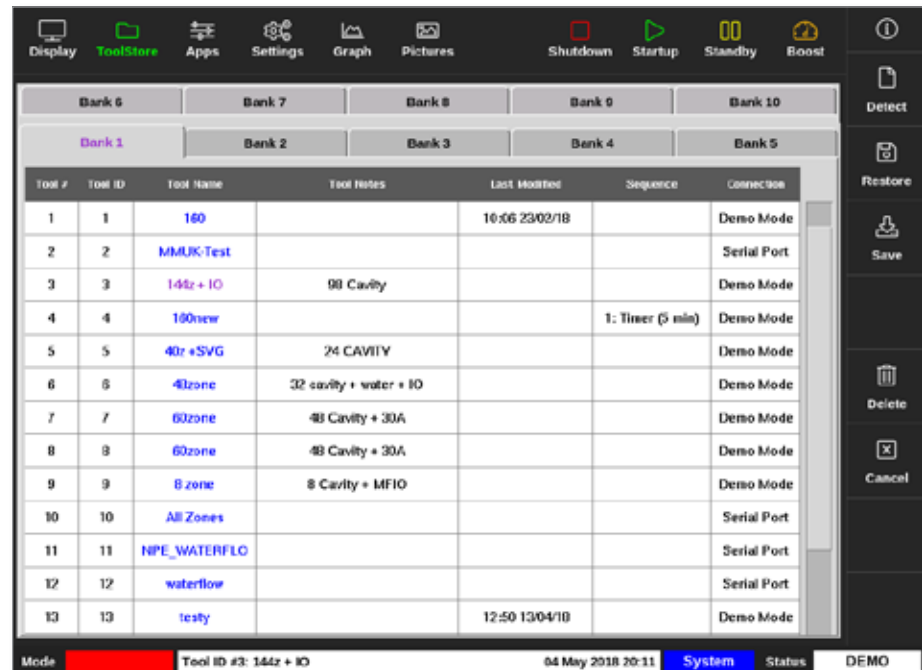


Figure 4-23 ToolStore screen - tool banks

The tool bank tabs show the following information:

- **Tool #** - the allocated tool number [not user configurable]
- **Tool ID** - used to identify tools for remote tool loading via an IO5 card
- **Tool 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** - the tool that is currently in use and that has no changes to any settings
- **red** - the tool that is in current use but which has been changed from its stored settings
- **Tool Notes** - a user configurable text field that may be used to hold an expanded description of the tool
- **Last Modified** - the date of the last saved change to the tool settings

- **Sequence** – allows the user to run a series of tools or tool settings in a pre-set sequence for a set time period. If tool sequencing is not used, this value defaults to 0. See "6.18 Sequence Tools and Settings" for more information.
- **Connection** - normally defaults to Serial Port, which indicates that the tool settings are stored locally within the console memory. The tool may also be in Demo mode. See "8.7 Training and Demonstration Mode" for more information.

If a tool is loaded, the tool bank tab where it is saved will be shown in purple. See "Figure 4-23 ToolStore screen - tool banks" on page 4-28.

4.18.1 ToolStore Screen Side Menu Buttons

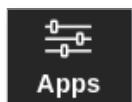
These buttons are shown to the right of the tool banks. See Table 4-8 for more information on their function.

Table 4-8 ToolStore Screen Side Menu Buttons	
Button	Function
 Backup	To backup a tool. See "Backup Tool Settings" on page 6-30.
 Load	To load a tool. See "Load a Tool Locally" on page 6-25.
 Sequence	To start a preprogrammed sequence for startup and / or shutdown. See "Sequence Tools and Settings" on page 6-34.
 Search	To search the tool bank for a tool. See "6.14 Search the Tool Bank" on page 6-26.

4.19 Apps Screen

The Apps screen displays nine options for the user.

Choose [Apps]:



The Apps screen opens. See Figure 4-24.



Figure 4-24 Apps screen

For more information on the icons shown on the Apps screen, see "Table 4-9 Apps Screen Icons" on page 4-31.



NOTE

The TS8 is not compatible with SmartMold, so only 8 icons are displayed.

4.19.1 Apps Screen Icons

Table 4-9 Apps Screen Icons	
Icon	Function
	To access self diagnostic tests for the controller. See "Self Diagnostic Tests" on page 8-7.
	To export tool data from the controller. See "6.21 Export Tool Data - Export Screen" on page 6-48.
	To access the Pictures screen. See "Pictures Screen" on page 4-29.
	To access the Actions screen. See "6.22 Monitor Controller Changes - Actions Screen" on page 6-50.
	To access the Alarms screen. See "6.23 Monitor Alarms - Alarms Screen" on page 6-54.
	To connect to a remote access point. See "6.24 Connect Remotely - Remote Screen" on page 6-58.
	To access the Energy screen. See "6.20 Monitor Energy Usage - Energy Screen" on page 6-45.
	To access the Purge function. See "Purge Function" on page 6-12.
	To connect to the SmartMold option, if installed.

4.20 Settings Screen

The Settings screen contains options for system settings and tool settings. Choose **[Settings]**:



The Settings screen opens. See Figure 4-25.

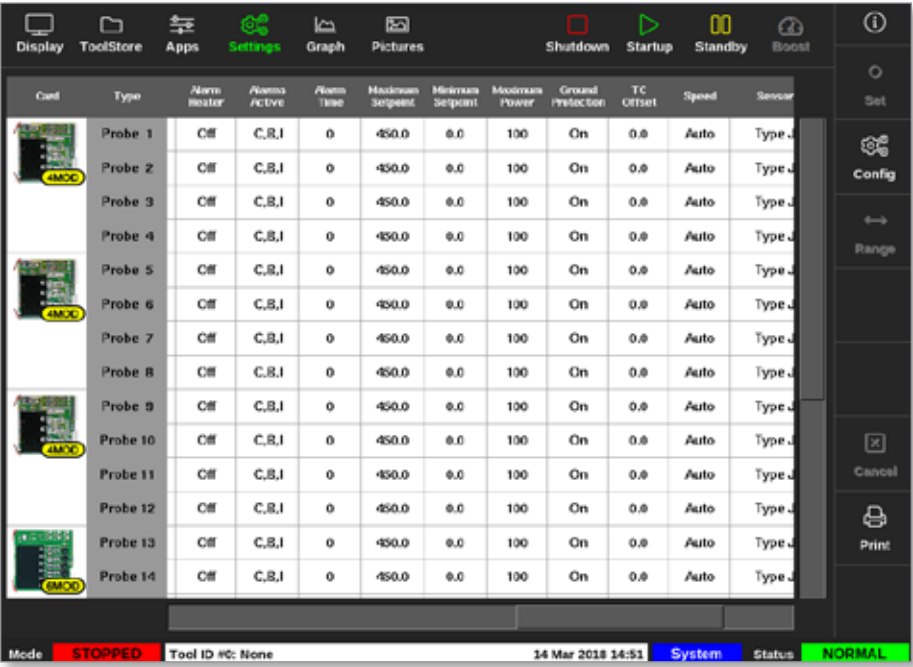


Figure 4-25 Settings screen

4.20.1 Settings Screen Side Menu Buttons

Table 4-10 Settings Screen Side Menu Buttons	
Button	Function
	To set parameters for tools or the system. See "5.5 Configure the Parameters and Settings" on page 5-10.
	To open the Settings box.
	To choose a range of zones. See "Choose Zones" on page 4-18.
	To cancel and return to the previous screen.
	To send information to printer or USB memory stick. See "Configure a Printer" on page 5-49.

4.20.2 System Settings Icons

Table 4-11 System Settings Icons	
Icon	Function
 User Admin	To configure user information. See "7.6 User Admin Settings" on page 7-11.
 User Access	To configure user access settings. See "7.1 User Access Screen" on page 7-1.
 Date/Time	To configure date and time settings. See "5.14 Set Date and Time" on page 5-47.
 Printers	To configure default printer settings. See "5.15 Configure a Printer" on page 5-49.
 Network	To configure a network connection. See "7.7 Configure a Network Connection" on page 7-13.
 Network Share	To share files remotely over a network. See "7.8 Share Files on a Network" on page 7-18.
 System Config	To access and configure system settings. See "5.5.3 Configure System Settings" on page 5-21.

4.20.3 Tool Settings Icons

Table 4-12 Tool Settings Icons	
Icon	Function
 QuadIO	To configure Quad I/O card for remote signalling. See "Section 13 - Quad I/O Options" on page 13-1.
 SVG	To configure SVG settings. See "Section 14 - Sequence Valve Gate Option" on page 14-1.
 Tool Config	To access and configure tool settings. See "5.5 Configure the Parameters and Settings" on page 5-10.

4.21 Graph Screen

The Graph screen shows graphs of temperature versus time or power versus time for up to 20 zones.

Choose **[Graph]**:



The Graph screen opens. See Figure 4-26.

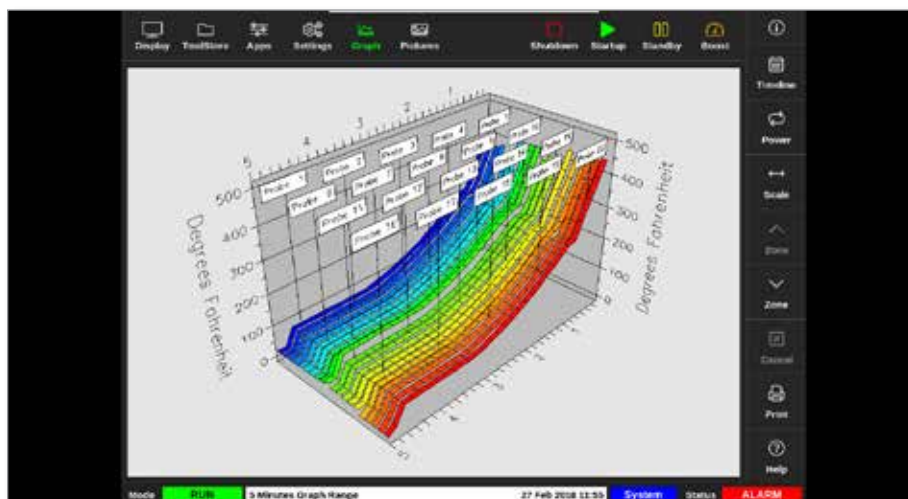


Figure 4-26 Graph screen

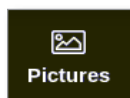
4.21.1 Graph Screen Side Menu Buttons

Table 4-13 Graph Screen Side Menu Buttons	
Button	Functions
 Timeline	To show history of operation for selected tool. Timeline is shown in bottom information bar. See "Figure 4-26 Graph screen" on page 4-34.
 Power	To show power on the bottom axis of the graph. Toggles to [Show] .
 Temp	To show temperature on the bottom axis of the graph. Toggles to [Power] .
 Scale	To choose scale of time period shown. Choices are 5 minutes, 30 minutes or 24 hours.
 Cancel	To cancel and return to the previous screen.
 Zone	To move up through the zones.
 Zone	To move down through the zones.
 Print	To send information to printer or USB memory stick. See "Configure a Printer" on page 5-49.

4.22 Pictures Screen

The Pictures screen allows the user to link zone temperatures to physical position on an uploaded image. The TS12 and TS17 consoles can store up to 120 pictures. The TS8 console can store up to 20 pictures. A scrollbar on the right hand side allows the user to scroll through multiple screens to find pictures, if necessary.

Choose **[Pictures]**:



The Pictures screen opens. See Figure 4-27.



Figure 4-27 Pictures screen



NOTE

The default Pictures screen is blank until the user saves pictures to it.

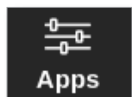
4.22.1 Pictures Screen Side Menu Buttons

Table 4-14 Pictures Screen Side Menu Buttons	
Button	Function
	To import pictures into the console memory. See "5.12 Import a Picture" on page 5-40.
	Displays links between pictures and the currently loaded tool. See "5.13.3 View Linked Pictures" on page 5-43.

4.22.2 Access the Pictures Screen: TS8 Console

The TS8 console does not have a **[Pictures]** button in the Navigation menu. To access the Pictures screen:

1. Choose **[Apps]**:



2. Choose **[Pictures]**:



The TS8 console can hold up to 20 images. The user is able to link only one image to each tool. See Figure 4-28.

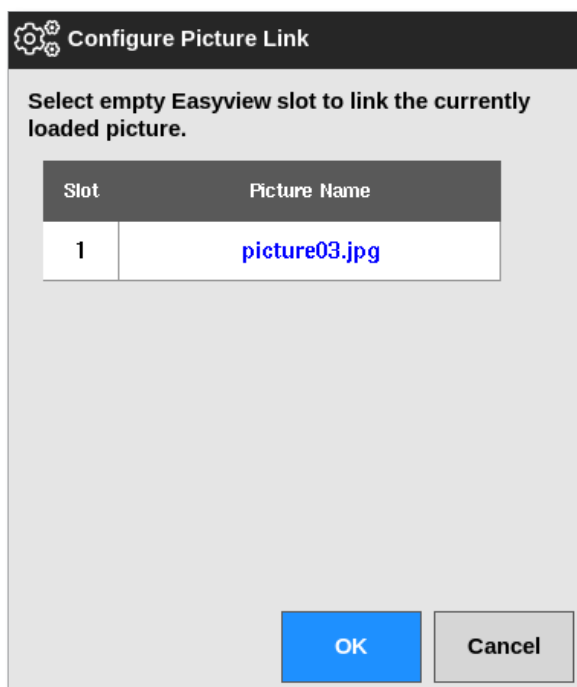


Figure 4-28 TS8 console - Configure Picture Link box

4.22.3 EasyView Screen

After a picture is saved to the Pictures screen, the user can load it to the EasyView screen. The EasyView screen links uploaded pictures of tools to specific zones for monitoring purposes.

See Figure 4-29.



Figure 4-29 Linked EasyView screen

The picture on the EasyView screen can be moved using the touchscreen.

Apart from the zone number (or alias name), the mini panels show one other piece of information, which may be:

- the actual temperature
- the setpoint temperature
- the power output percentage
- the current (or Amps) consumed by that zone



NOTE

The mini panel header is not color-coded as on the Display screen.

The lower half is color-coded to indicate the alarm status, as shown below:

Table 4-15 Alarm Status Colors	
Black on green	Normal working
Black on yellow	First stage warning status
White on red	Second stage alarm status or fatal error

4.22.4 EasyView Screen Top Menu Buttons

Table 4-16 EasyView Screen Top Menu Buttons	
Button	Function
	Backup a picture. See "5.13.1 Link a Picture in the EasyView Screen" on page 5-42.
	Delete a picture. See "5.13.6 Backup a Picture from the EasyView Screen" on page 5-45.
	See the previous picture saved.
	See the next picture saved.
	Link a picture. Toggles to [Unlink] . See "5.13.1 Link a Picture in the EasyView Screen" on page 5-42.
	Unlink a picture. Toggles to [Link] . See "5.13.2 Unlink a Picture in the EasyView Screen" on page 5-42.
	Hide the mini panels on a linked EasyView picture. Toggles to [Show] .
	Shows the mini panels on a linked EasyView picture. Toggles to [Hide] .
	Places a mini panel on the linked picture. See "5.13.4 Add a Mini Panel to the Tool Picture" on page 5-44.
	Remove a label from the EasyView picture. See "5.13.5 Remove a Mini Panel from the Tool Picture" on page 5-45.
	Exit the EasyView screen.

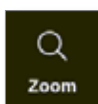
4.22.5 Zoom Screen

The Zoom screen displays the Deviation graph, the Output Power graph and a table with zone settings.

1. Choose any zone:



2. Choose [Zoom]:



The Zoom screen opens. See Figure 4-30.

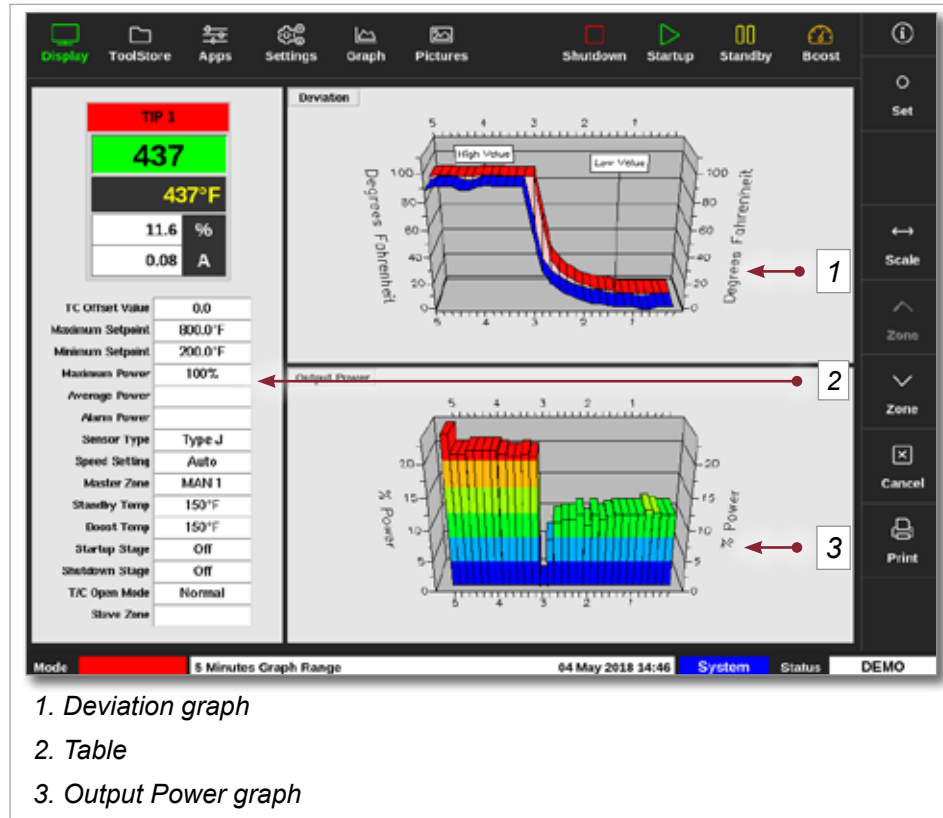


Figure 4-30 Zoom screen

The user can change the orientation of the graphs on the screen by touch.

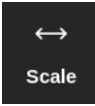
The time scale shown is displayed in the information bar at the bottom of the screen.

4.22.6 Interpret the Zoom Screen

Refer to the numbering on Figure 4-30 for this section.

1. In the Deviation graph, the red line indicates that the actual temperature has varied above the set temperature. The blue line indicates that the actual temperature has varied below the set temperature. If the two lines are close together, there is precise temperature control. A zone that deviates more noticeably than its neighbor zones could have a problem, such as a faulty thermocouple or an incorrect zone speed setting.
2. The table on the left shows the main settings for the zone and the current temperature value.
3. The Output Power graph shows the output power levels that have been measured. Power traces should be fairly similar for similar zones at similar temperatures.

4.22.7 Zoom Screen Side Menu Buttons

Table 4-17 Zoom Screen Side Menu Buttons	
Button	Function
 Set	To set zone temperatures, working modes, or turn zones on and off. See "5.6 Set Zone Temperature" on page 5-26 and "6.9 Turn Zones Off or On" on page 6-18.
 Scale	To toggle between a 5 minute graph and a 30 minute graph.
 Zone	To move up through the zones.
 Zone	To move down through the zones.
 Cancel	To cancel and return to the previous screen.
 Print	To send information to printer or USB memory stick. See "Configure a Printer" on page 5-49.

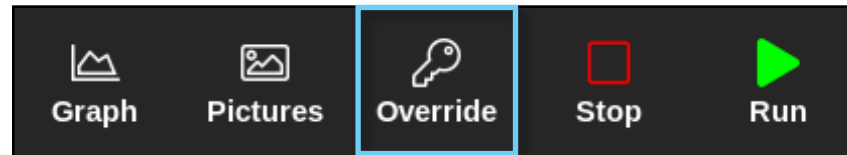


4.23 Override Button

NOTE

The override button is not shown nor used in the classic theme mode nor in the TS8 console.

When enabled, the Override button is located between the mode buttons and the function buttons on the top bar:



Setup

QuadIO

Quad IO Configuration

Input	Delay Time	Action
1	0	Machine OK
2	10	Automatic Mode (IMM)
3	0	Inactive
4	0	Inactive

Output	Action
1	Enable Mould Closure
2	Inactive
3	Inactive
4	Inactive

Accept
 Cancel

Input Signals	Output Signals
1. Machine OK	1. Enable Mould Closure
2. Automatic Mode (IMM)	2. Inactive
3. Inactive	3. Inactive
4. Inactive	4. Inactive

Override Times

- 0 minutes: Removes the Override button from the screen—Default setting.
- 1–15 minutes: The Override button is displayed on the top bar. When the Override button is pressed, the console will output the Enable Mould Closure signal for the entered length of time. Note: Only whole minutes can be entered.

Scenarios

- The Override button can be pressed when all of the following conditions are satisfied.
 - IMM is in manual mode; e.g., the Automatic Mode input signal is 0.
 - The Machine OK signal is 1.
 - The console is in Run, Standby, or Startup mode.
 - The alarm severity is less than a fault; i.e., none of T/C, Triac, Fuse, Power Limit, Ground errors.
- When the Override button is pressed, the Enable Mould Closure signal will stay active for the time entered in the Override Time setting.
- After the timer elapses, the Enable Mould Closure signal becomes inactive.
- If the Override button is pressed while an override is active, the override time remaining is set to the length of time in the Override Time setting.
- Override is canceled when any of the following conditions are satisfied.
 - The console mode is changed.
 - The Automatic Mode signal is received from the IMM.
 - The machine OK signal is lost.
- Override is not canceled when
 - switching from Run to Standby mode when it is done automatically from the delay of the automatic mode signal being switched to 0, or
 - there is a severe alarm; e.g., none of T/C, Triac, Fuse, Power Limit, Ground errors.

Section 5 - Setup



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 M2 Plus Series controller should be located in such a way that the main disconnect is easily accessible in case of emergency.

M2 Plus Series 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 M2 Plus Series 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 main 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 "8.3 Self Diagnostic Tests") to check that all zones are correctly sequenced and that there is no crosswiring between zones or between heater outputs and thermocouple inputs.

5.1 Introduction

M2 Plus controllers are shipped with a configured tool loaded. The user can copy this tool and alter the parameters to suit production requirements.

5.2 Create a New Tool

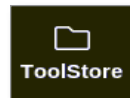


IMPORTANT

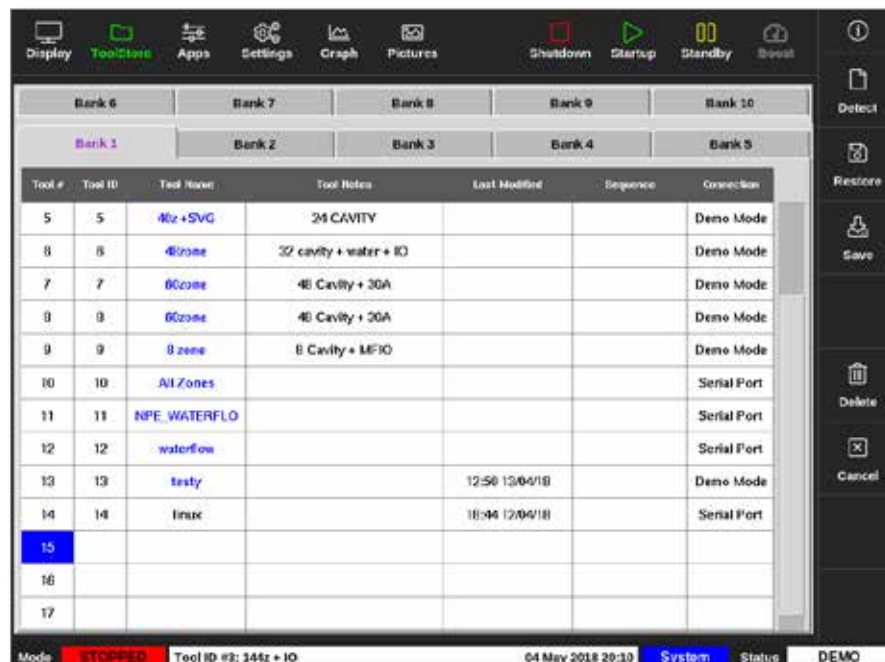
The controller must be in Serial Port mode.

The user cannot overwrite an existing tool to create a new tool.

1. Choose [ToolStore]:



2. Choose an empty tool slot.



3. Choose [Detect]:



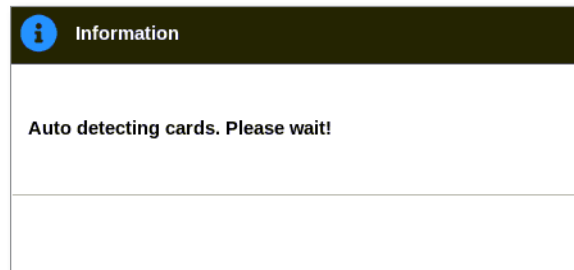
4. Enter password, if required.
5. Enter tool name:



Create a New Tool - continued

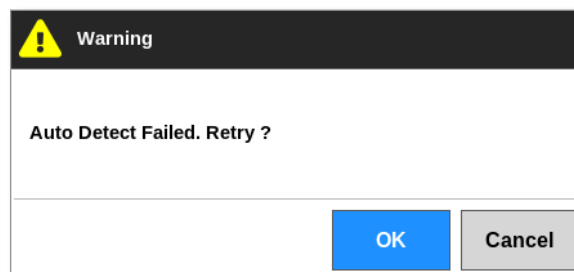
The console runs an automatic card detect routine to find out what type and how many cards are fitted in the selected controller. See "5.2.1 Cards That May Be Detected" on page 5-4 for more information.

The following message will show during the detection process:



NOTE

If the system has a problem running the detect sequence, it may report "Auto Detect Failed" and it will offer to retry the process. Choose **[OK]** to retry card detection. If the detection routine continues to fail, contact your supplier for advice.



After a tool has been created, the user must configure the zones, the tool settings and the system settings as required.

5.2.1 Cards That May Be Detected

Table 5-1 M2 Plus Controller Cards

Card	Symbol	Description
M2Z6MOD		6 zone card rated at 5 Amp rating for probes with current sensing and ground fault monitoring
M2QMOD		4 zone card rated at 15 Amp rating with current sensing and ground fault monitoring
20A-MOD		2 zone card rated at 20 Amp rating for manifolds with current sensing only
1Z-3Ph-30A		1 zone 3-phase card rated for 480 VAC, 30 Amps with current sensing
HRC-AI8		8 channel 4-20mA analogue input card typically used with analogue flow sensors to monitor coolant flow rates
HRC-DI2		16 channel digital input card typically used to accept external signals
HRC-WT3		12 channel RTD card used for temperature monitoring using resistive temperature devices
HRC-WT4		12 channel T/C card used for temperature monitoring using thermocouple sensors
HRC-IO3 or TMK-IO4		4 channel digital Input / Output card for remote signalling
HRC-IO5		4 channel digital Input / Output card for remote signalling and remote Tool Selection input
DO32		32 channel digital output Card used to signal external equipment
M2-SVG12		12 channel sequential valve gate card that can open and close valve gates at discrete preset point
30 Amp Card		2 Zone 30 Amp dual slot card that supports 30 Amps at 100% duty cycle
HRC-AIO4		4 channel Analog output card (PWM, 0-10V, 4-20mA)
20A-MOD		2 zone 20 Amp card with current sensing and ground fault monitoring

5.3 Configure the Control Cards

The ToolStore screen displays icons in the first column to show what cards have been detected.

All temperature control cards initially default to probe zones and use probe default values.

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.

5.3.1 Set Zone Types

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.

From the Display screen:

1. Choose **[Settings]**:



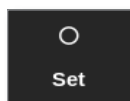
2. Choose a zone from the Type column. See Figure 5-1.



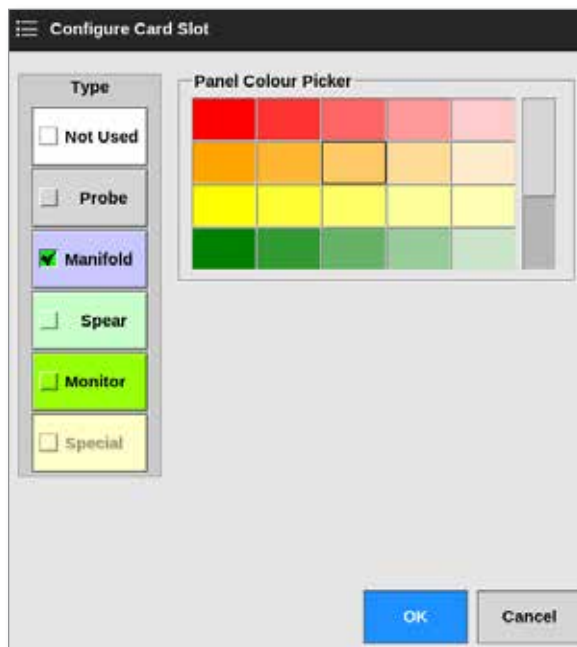
Figure 5-1 Choose zone from the Type column

Set Zone Types - Continued

3. Choose **[Set]**:



The Configure Card Slot box opens:



4. Choose zone type. Available options:

- **[Not Used]** - switches off unused card zones
- **[Probe]** - sets the zone to a faster response curve
- **[Manifold]** - sets the zone to a slower response curve or zone only with no control function
- **[Spear]** – for 4SMODC cards only
- **[Monitor]** – allows you to set any control zone from any card as a monitor
- **[Special]** – used for cards that do not control temperature. For example:
 - **RTD zone** - suits 12RTD (12 channel) temperature measuring cards for cooling water
 - **I/O zone** - suits QCI/O (four in / out channels) Input / Output cards
 - **Water** - suits AI8 (8 channel analogue) or 16DLI (16 channel) water flow measurement cards

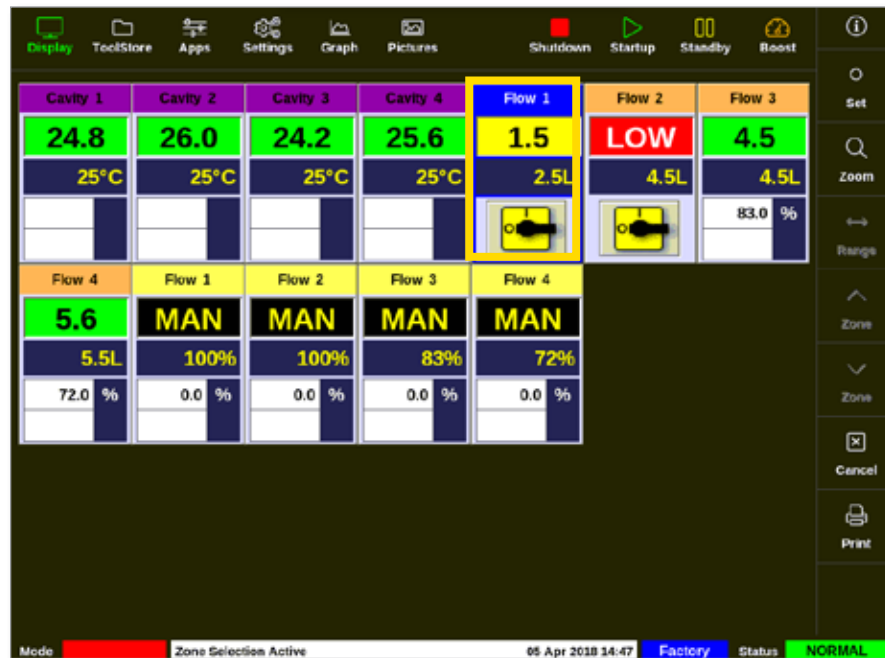
5. Change the color of the header, if required.

6. Choose **[OK]** to accept the user setting changes or **[Cancel]** to return to the Settings screen without saving any changes.

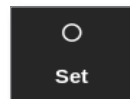
5.4 Set Chillers, Cavities and Water Flow Zones

The user can set or change a single zone's temperature or the user can use **[Range]** to change multiple zones simultaneously. See "4.13 Choose Zones" on page 4-18 for more information about the Range function.

1. Choose the required zone or zones:



2. Choose **[Set]**:



3. Enter password, if required.

A keypad opens:



4. Choose **[Manual]** for the mode.

Set Chillers, Cavities and Water Flow Zones - continued

5. Enter the required values using the keypad or choose:

- **[Add]** to increase the current temperature by a set amount
- **[Subtract]** to decrease the current temperature by a set amount

**NOTE**

The values set must fall within the limits set on the Settings screen. See "5.5.1 Configure Tool Parameters Zone by Zone" on page 5-10 for information on how to change these limits.

6. Choose **[Enter]** to accept the changes and return to the Display screen, or choose **[Esc]** to clear the input.

The user can return to the Display screen at any time by choosing **[Esc]** twice.

For more information on water flow control and monitoring, see "Section 11 - Water Manifolds" on page 11-1.

5.4.1 Preconfigured Zone Values

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

Table 5-2 Preconfigured Zone Values		
Parameter	Probe and Manifold Cards	Other Monitoring Cards
Alarms Active	C, B, I	C, B, I
Alarm Hi and Lo	25°C or 45°F	25°C or 45°F
Alarm Power	Off	Off
Alarm Time	10 seconds	10 seconds
Alias	blank	blank
Boost Time	0	blank
Display Group	1	blank
Master Zone	blank	blank
Max Power Setting	100%	blank
Max Setpoint Setting	450°C or 842°F	450°C or 842°F
Min Setpoint Setting	0°C or 32°F	blank
Rack Address	slot address	slot address
Reading Avg	0	0
Sensor	J-Type	blank
Shutdown Stage	off	off
Speed	Auto	blank
Standby and Boost Temp	0°C or 0°F	blank
Startup Stage	off	off
Offset Value	0°C or 0°F	blank
T/C Open Mode	Normal	blank
Warn Hi and Lo	5°C or 9°F	blank

5.5 Configure the Parameters and Settings

Card allocation provides preset parameters for the tool and the system, which function for general use. Many settings, such as warning and alarm levels, may require adjustment for each tool. Some parameters are configurable on a zone by zone basis for precision and other settings are configurable on a whole tool or whole system basis.

- For information on tool parameters configurable zone by zone, see "5.5.1 Configure Tool Parameters Zone by Zone" on page 5-10.
- For information on tool settings configurable for all zones, see "5.5.2 Configure Tool Settings for the Whole Tool" on page 5-15.
- For information on system settings configurable for all zones, see "5.5.3 Configure System Settings" on page 5-21.

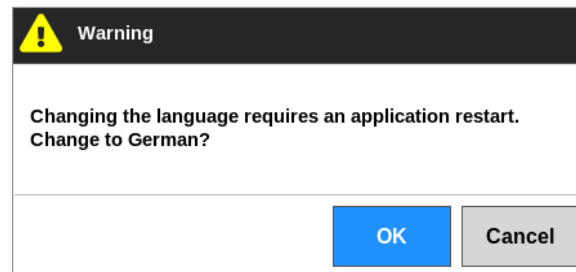


NOTE

Settings can be either values or options.

- For values, a keypad appears.
- For options, the user may need to choose from a list or use a checkbox.

Some settings require the console to restart and the user is asked to confirm the action. As an example:



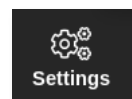
The values set for the settings belong to the tool that is currently loaded. If a new tool is loaded, then this new tool will bring its own settings into the ToolStore screen.

5.5.1 Configure Tool Parameters Zone by Zone

Zone by zone configuration is available for some parameters to allow for precision. The user can also configure more than a single zone at a time.

From the Display screen,

1. Choose **[Settings]**:



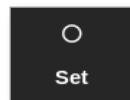
Configure Tool Parameters Zone by Zone - continued

- Choose the zone or zones to be configured and choose the column of the required parameter. See Figure 5-2.



Figure 5-2 Choose zones and required parameter

- Choose [Set]:



- Enter password, if required.
 - Set the required value.
 - Repeat steps 2 through 5 for each parameter that requires adjustment.
- See "Table 5-3 Tool Parameters - Zone by Zone" on page 5-12 for a list of configurable parameters.

Configure Tool Parameters Zone by Zone - continued

Table 5-3 Tool Parameters - Zone by Zone		
Function	Description	Setting Limits
Rack Address	Read only.	Not user configurable.
Alias	To change the current alias name, the user must use the backspace key on the keyboard first to delete the existing name.	Maximum characters = 11. Default = blank.
T/C Open Mode	Chooses a response for any zone that detects a failed thermocouple (T/C): Normal – No action corrective taken. The zone power sets to 0% and it shows a thermocouple 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.	
Setpoint	Temperature set by the user.	Maximum = 450°C / 800°F
Standby Temp	Sets the Standby temperature for any zone.	Maximum = 350°C / 660°F
Boost Temp	Sets the increase in temperature when Boost is selected.	Maximum = 250°C / 450°F
Boost Time	Sets how long the Boost temperature is applied.	Maximum = 5400 seconds.
Block Temp	Temperature the zone should control at during Block mode.	Maximum = 400°C / 800°F
Block Ramp	Rate of temperature drop while zone decreases to the block temp value while in Block mode.	Maximum = 20°C / 30°F per minute
Master Zone	Chooses a Master zone for any group of sub-zones.	
Warn High	Sets the temperature deviation above setpoint which will trigger the Warn indication.	Maximum = 99°C / 178°F
Warn Low	Sets the temperature deviation below setpoint which will trigger the Warn indication.	Maximum = 99°C / 178°F
Alarm High	Sets the temperature deviation above setpoint which will trigger the Alarm indication.	Maximum 99°C / 178°F
Alarm Low	Sets the temperature deviation below setpoint which will trigger the Alarm indication.	Maximum 99°C / 178°F
Alarm Pow High Alarm Pow Low	Sets the power percentage which if exceeded will trigger the Alarm indication.	Maximum = 100% [Off]
Alarm Heater	Generates an alarm if the heater resistance exceeds this setting compared to the heater reference value.	Maximum = 100% [Off]

Configure Tool Parameters Zone by Zone - continued

Table 5-3 Tool Parameters - Zone by Zone		
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	Option for alarm actions: Console – displays the alarm condition in the lower 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 I/O card, which may be externally configured to stop the molding machine.
Alarm Time (seconds)	Sets a brief delay between an alarm condition being detected and an external alarm being sent.	Maximum = 999 seconds.
Maximum Setpoint	Sets the highest permitted setpoint for the zone or zones.	Maximum = 450°C or 800°F.
Minimum Setpoint	Sets the lowest permitted setpoint for the zone or zones.	Minimum = 0°C or 0°F.
Maximum Power	Sets the highest permitted power level for the zone or zones. Works in open loop (Manual) or closed loop (Auto) configuration.	Maximum = 100%.
Ground Protection	Choose [On] to continuously monitor ground leakage. The controller may reduce output voltage, if required, to protect the system. If this parameter is set to [Off], ground leakage is not monitored. Note: if output is too high then the main output fuse will rupture.	
Offset Value	Sets a proportional value to compensate between displayed temperature and the Actual temperature.	Maximum = ±150°C or ±300°F.
Speed	Chooses or overrides the Auto-Speed setting to determine the control characteristic for the zone temperature. Note: The Ultra setting forces the controller to always stay in phase angle firing. This is used if a very small nozzle might show temperature instability in burst fired mode.	

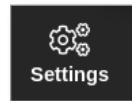
Configure Tool Parameters Zone by Zone - continued

Table 5-3 Tool Parameters - Zone by Zone		
Function	Description	Setting Limits
Sensor - Temperature	Chooses temperature sensor for the zone: Type J Type K Type K High	Type J / Type K thermocouples: Maximum = 472°C / 881°F. Type K High thermocouples: Maximum = 700°C / 1292°F.
Sensor - Analog	Chooses analogue sensors for AI cards.	Note: analogue sensors read 0-20mA and can be used for flow, pressure or other devices.
Display Group	Chooses groups of zones to display on separate Display screens. 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 Display screen can be set as display group 0.	Default = 1. Maximum = 6 groups.
Startup Stage	Configures groups of zones into separate startup groups.	Maximum = 16 groups. Default = 1.
Shutdown Stage	Configures groups of zones into separate shutdown groups.	Maximum = 16 groups. Default = 1.

5.5.2 Configure Tool Settings for the Whole Tool

The tool settings accessed from **[System Config]** on the Settings screen affect all zones of the tool. They cannot be configured on a zone by zone basis.

1. Choose **[Settings]**:

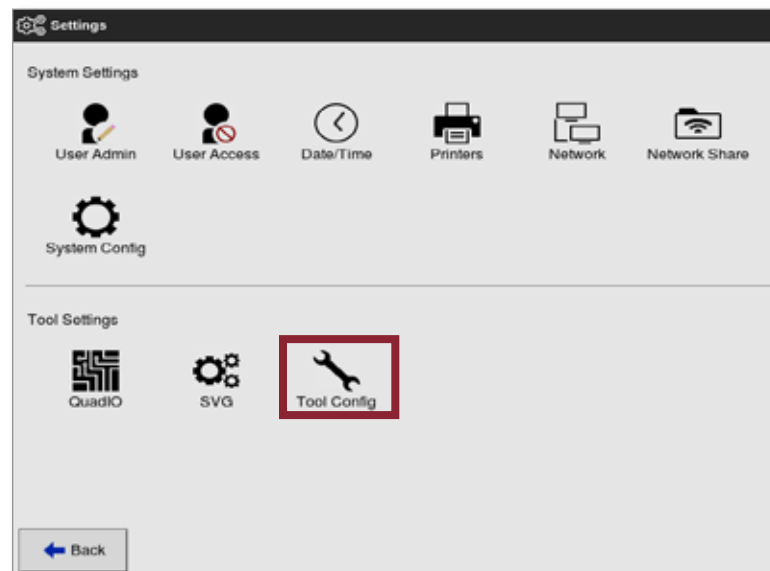


2. Choose **[Config]**:



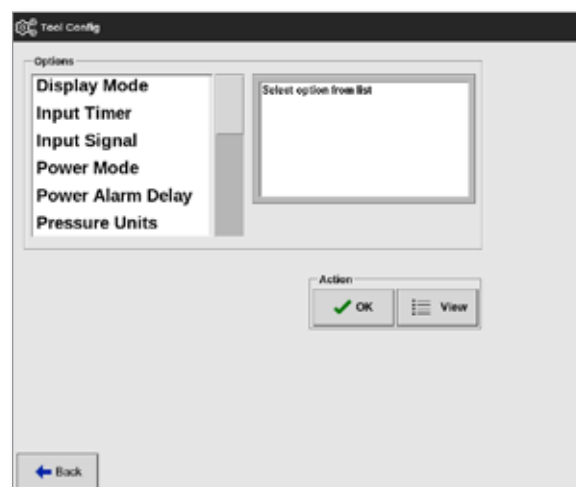
3. Enter password, if required.

The Settings box opens:



4. Choose **[Tool Config]** from Tool Settings.

The Tool Config box opens:



Configure Tool Settings for the Whole Tool - continued

5. Choose the required setting.
6. Enter the required value or option.
7. Choose **[OK]** to accept the new value or choose **[Back]** to return to the Tool Config screen without saving.

See "Table 5-4 Tool Settings - Whole Tool" on page 5-17 for a list of configurable tool settings.

**IMPORTANT**

The user must save the tool in the ToolStore to save these changes permanently. See "6.11 Save a Tool" on page 6-21 for more information.

Configure Tool Settings for the Whole Tool - continued

Table 5-4 Tool Settings - Whole Tool		
Function	Description	Limits
Button One	Allows user to choose which button is displayed as the first button in the top Mode buttons: [Shutdown] or [Stop] .	
Button Two	Allows user to choose which button is displayed as the second button in the top Mode buttons: [Run] , [Sequence] or [Startup] .	
Display Mode	Sets the Display screen and Settings screen to group the zones as: [Sorted]: all probe zones displayed first, followed by 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.	
Flow Units	Choose [Gallons] or [Liters] .	Note: this parameter only appears if a flow monitor (analogue input) card is detected in the rack.
Input Timer	Sets a delay between the time an input signal is received and the controller entering a new mode. The controller uses the delay to confirm that the it has received a proper input signal versus an input pulse.	Maximum = 99 minutes.
Input Signal	Sets how the console responds to a remote input, normally open pair, at the HAN4A connector on the rear panel: STANDBY if Closed - switches the controller into Standby mode when the remote input is closed and returns the controller to Run mode when the remote input signal is removed. Works in all modes. STANDBY if Opened - switches the controller into Standby mode when the remote input is opened and maintains the controller in Standby mode even if the remote input signal is restored. Works only in Run mode. BOOST if Closed - switches the controller into Boost mode when the remote line is closed and returns the controller to Run mode even if the remote input signal is removed. Works in all modes. STOP if Closed - switches the controller into Stop mode when the remote line is closed and maintains the controller in Stop mode even if the remote input signal is removed. Works in all modes. STOP if Opened - switches the controller into Stop mode when the remote line is opened and maintains the controller in Stop mode even if the remote input signal is removed. Works only in Run mode.	Note: Only those zones that have Boost or Standby temperatures configured in their setup will respond to the remote input signal.

Configure Tool Settings for the Whole Tool - continued

Table 5-3 Tool Settings - Whole Tool		
Function	Description	Limits
Power Mode	Chooses how power levels are shown on the Display screen. Percentage power is constantly displayed. If you have control cards with current measuring coils this option allows the lower window of each zone to show one of three possible parameters: - Choose [Amperes] to show the zone current. - Choose [Watts] to show the power in the zone. - Choose [Ohms] to show the calculated resistance value for that zone. If there are no current measuring coils, the lower window display will be blank.	Note: to choose [Watts] or [Ohms], the supply voltage must be set.
Power Alarm Display	Pauses the power alarm by a preset time (in minutes), so it does not instantly cause an alarm effect.	Maximum = 99 minutes. Default = 0 minutes.
Pressure Units	Choose [Bar] or [PSI].	
Quad I/O Reset Time	Sets all relay outputs to off [de-energized] if the I/O card fails to see communication with the console within a set time period. If set to 0, the I/O card will not look for incoming signals and it will operate normally.	Maximum = 90 seconds. Default = 0 minutes. Note: this parameter only appears if an I/O card is detected in the rack.
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.	
Stack Mold	Adds a extra warning during Startup / Shutdown when using a stack mold.	
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.	Maximum = 260°C or 500°F.

Configure Tool Settings for the Whole Tool - continued

Table 5-3 Tool Settings - Whole Tool		
Function	Description	Limits
Startup Mode	Chooses between the different startup modes: MASTER-FOLLOW - a default option that ties the faster-acting nozzles' set temperature to slower manifolds' actual temperature to produce a homogeneous 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 16 stage groups that will heat up in successive stages. - When staged startup is selected then the shutdown automatically follows a staged shutdown. - Shutdown pattern has a separate allocation, and this pattern does not have to match the Startup sequence. AUTOMATIC-FOLLOW - measures the heat gain of every zone and automatically holds back the faster (probe) zones to the same rise rate as the slowest rising zone. - Very similar to MASTER-FOLLOW but it is not necessary to nominate a Master zone.	If staged startup is selected then the option stage soak timer allows you to hold stages for a user configurable time.
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.	Maximum = 99 minutes.
Shutdown Temp	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.	Maximum = 260°C or 500°F. Default = 0. Note: 0 represents an extremely long shutdown interval.
Temp Scale	Chooses [Degree C] or [Degree F] as required.	

Configure Tool Settings for the Whole Tool - continued

Table 5-3 Tool Settings - Whole Tool		
Function	Description	Limits
Soak Timer	Sets a delay or period of temperature balancing before the console switches to Run. The status bar will display SOAK in the Mode box during this time.	Note: a Quad I/O output called “soaking” will be active during the soak time.
Soak Timer (Staged)	Sets a timer period for each stage to hold or soak before the next stage begins during a staged startup. A different time can be set for each stage. During the soak period, the Mode window display changes from STARTUP to SOAK and STAGE 1, 2, 3 etc. flashing alternatively until all stages reach working temperature. The Mode window will then display RUN.	Maximum = 60 minutes. Default = 0 minutes [no soak time].
Weight Unit	Chooses Metric [Kg] or Imperial [Lbs] as the unit for weight.	

5.5.3 Configure System Settings

The system settings accessed from **[System Config]** on the Settings screen are applied globally. They are not tool-specific, and they cannot be configured on a zone by zone basis.

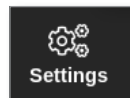


NOTE

Settings can be either values or options.

- For values, a keypad appears.
- For options, the user chooses from a list or uses a checkbox.

1. Choose **[Settings]**:

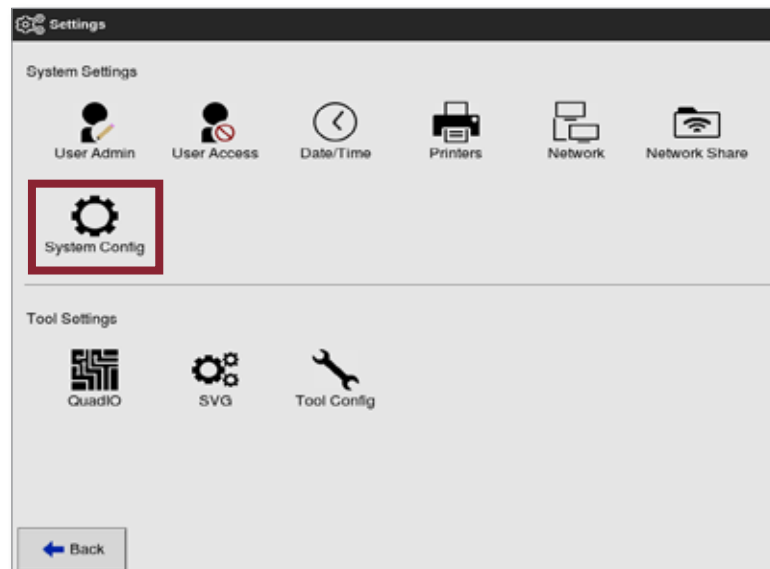


2. Choose **[Config]**:



3. Enter password if required.

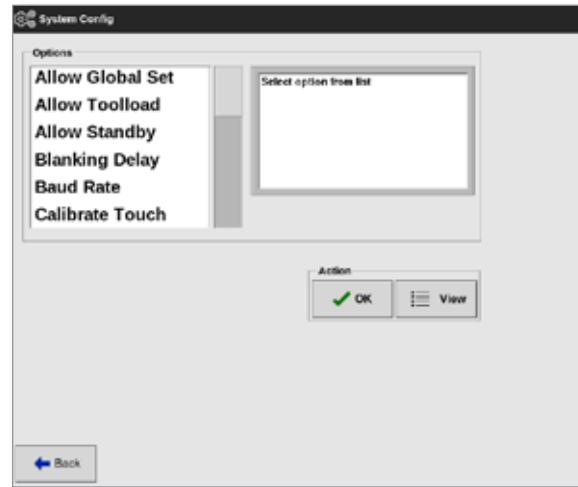
The Settings box opens:



Configure System Settings - continued

4. Choose [**System Config**] from System Settings.

The System Config box opens:



5. Choose the required setting.

6. Enter the required value or option.

7. Choose [**OK**] to accept the new value or choose [**Back**] to return to the System Config screen without saving.

See "Table 5-5 System Settings" on page 5-23 for a list of configurable tool settings.

Configure System Settings - continued

Table 5-5 System Settings		
Function	Description	Limits
Allow Global Set	[Enable]: probe and manifold zones to be set together. [Disable]: probe and manifold must be set as separate actions.	
Allow Toolload	[Enable]: able to change tools while in Run mode. [Disable]: force the operator to shutdown to change tools. If Toolload is disabled, the [Load] button on the ToolStore screen is grayed out when the system is in Run mode.	
Allow Standby	[Enable]: console can be switched to Standby mode from any other operating mode. [Disable]: console cannot switch from Stop mode to Standby mode. It must first be put into Run or Start mode before Standby mode is available.	
Blanking Delay	Sets the period of inactivity before the screensaver activates. Note: the blanking delay will remain permanently visible if set to 99 minutes.	Maximum = 98 minutes.
Baud Rate	Sets the communication rate between the console and the control cards. Newer control cards can work at faster speeds (38400) and units are always matched at the factory. If a new card is changed for an older card, a lower baud rate (19200 or 9600) may be required to make it work correctly.	If the baud rate is too high for an older card then the error message "N/Z" will be shown. See "Table 9-2 Fault and Warning Messages" for more information.
Calibrate Touch	Sets the screen response to align with point of touch. See "8.2 Check Touchscreen Alignment" for more information.	Note: the process stops the controller so be careful not to do this while the system is in use.
Console Startup	Chooses the operating mode that is used after initial switch on.	

Configure System Settings - continued

Table 5-5 System Settings		
Function	Description	Limits
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.
Leakage Mode	Three modes are available: Off - sets the leakage detection off Manual - sets a single absolute percentage level Auto - monitors zone power used and alerts if power consumption is greater than average. This is the default setting. Smart - monitors zone power used and generates an alert if power consumption exceeds the high limit or the low limit.	See "5.9 Melt Leakage Detection" on page 5-30 for more information.
Limit Exceeded	[Disable] – means that an attempt to set the temperature above the limit has not been effective and the set temperature will stay the same. [Enable] – means that an attempt to raise the set temperature above the limit will increase the set temperature to the limit.	
N/Z Alarm	[Disable] – leaves N/Z in its normal condition which does not raise a system alarm if it occurs. [Enable] – 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.	
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]	
Slave Address	This is where you can input the Slave address for the console when it needs to communicate via an external protocol.	Maximum = 25 characters.

Configure System Settings - continued

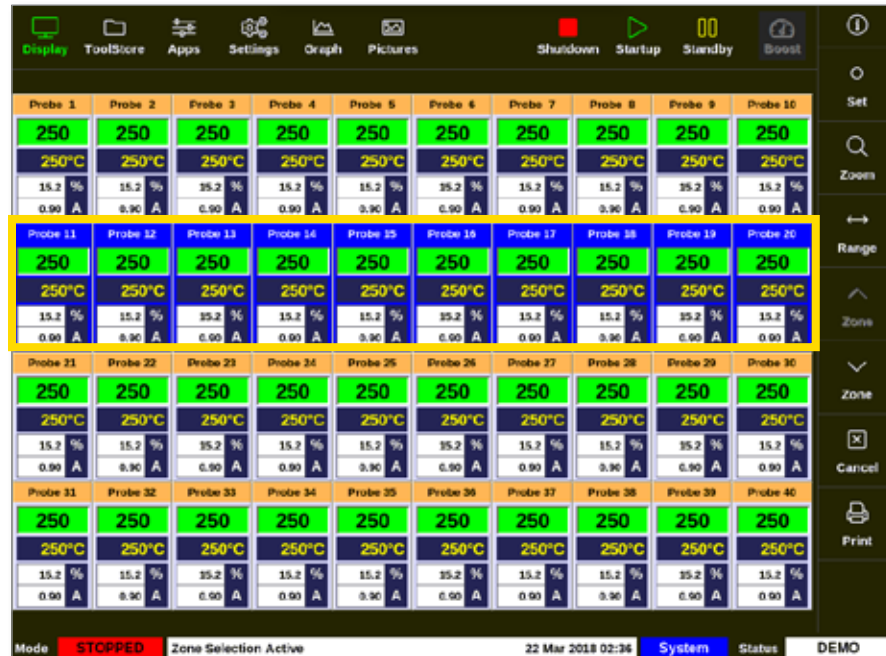
Table 5-5 System Settings		
Function	Description	Limits
Supply Voltage	Enter the system supply voltage. It is used to calculate the “Watts” display. This is normally the phase-neutral voltage on a Star supply and the phase-phase voltage on a Delta supply.	Maximum = 500V.
T/C Alarm	[Enable]: thermocouple break triggers an alarm when console is in Stop mode. [Disable]: no alarm will be triggered	
Temperature Precision	Allows you to set the resolution for the actual temperature seen on the Display screen to a floating point scale which displays temperature to within one tenth of a degree or an integer scale which rounds the displayed temperature to the nearest whole degree. Choose [Float] or [Integer] as appropriate.	

5.6 Set Zone Temperature

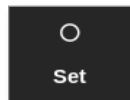
The user can set a single zone's temperature or the user can use **[Range]** to change the temperature of multiple zones simultaneously. See "4.13 Choose Zones" on page 4-18 for more information about the Range function.

This same procedure can be used with the Display screen or the Zoom screen.

1. Choose the required zone or zones:



2. Choose **[Set]**:



3. Enter password, if required.

A keypad opens:



4. Choose **[Auto]** for the mode.

Set Zone Temperature - continued



NOTE

For more information on Manual mode, see "5.7.1 Set Manual Mode" on page 5-27.

For more information on Slave mode, see "6.7 Slave Mode" on page 6-10.

5. Enter the required temperature using the keypad or choose:
 - **[Add]** to increase the current temperature by a set amount
 - **[Subtract]** to decrease the current temperature by a set amount



NOTE

The temperature set must fall in the limits configured in tool settings. See "5.5 Configure the Parameters and Settings" on page 5-10 for information on how to set and change these limits.

6. Choose **[Enter]** to accept the changes and return to the Display screen, or choose **[Esc]** to clear the input.

The user can return to the Display screen at any time by choosing **[Esc]** twice.

5.7 Manual Mode

Manual mode applies a set percentage of power to the zone or range of zones rather than using set temperatures.

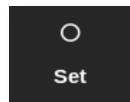
5.7.1 Set Manual Mode

1. Choose the required zone or zones:



Set Manual Mode - continued

2. Choose **[Set]**:



3. Enter password, if required.

A keypad opens:



4. Choose **[Manual]** for the mode.
5. Enter the percentage power required.
6. Choose **[Enter]** to accept the changes and return to the Display screen, or choose **[Esc]** to clear the input.

The user can return to the Display screen at any time by choosing **[Esc]** twice.

The zone or zones have a display that flashes "MAN" and the chosen power percentage alternately. See Figure 5-3.

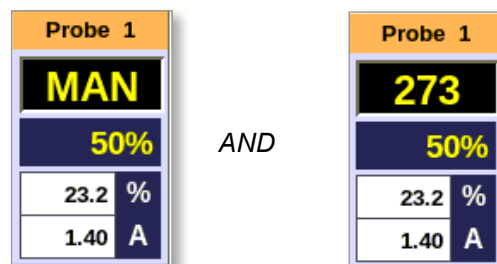
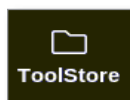


Figure 5-3 Alternate zone displays in Manual mode

5.8 Rename a Tool

1. Choose **[ToolStore]**:

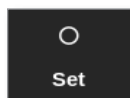


2. Choose tool to be renamed. See Figure 5-4.



Figure 5-4 Choose tool to be renamed

3. Choose **[Set]**:



4. Enter password, if required.
5. Use **[Esc]** or **[BackSpace]** to delete the existing tool name.
6. Enter the new tool name:



7. Choose **[Enter]** to accept the changes and return to the Display screen, or choose **[Esc]** twice to return to the Display screen without changing the tool name.

5.9 Melt Leakage Detection

A leakage detection system is available on the console. It monitors zone power levels to check for large changes in power usage over time.

It takes about five minutes of settled operation until a steady average power is achieved. The console then samples actual power levels for the next 20 minutes to get a realistic algorithm to use as average power. During all this time the message in the Alarm Power column shows "Sampling".

If zone temperatures are changed or if the console is stopped, all average power calculations are reset. In each case there will be a delay until new average power levels are recalculated and the Leakage Detection function is restored.



NOTE

Leakage monitoring and average power calculations are disabled while the system is in Standby or Boost mode. The average calculation is stored until the controller re-enters Normal mode.

A melt leak will cause the zone to use abnormal amounts of power. An alarm is raised as soon as the average power level exceeds the limit.

Leakage detect function has three options:

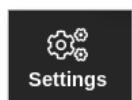
- **Auto** - this is the default setting. The warn level defaults to 10% above normal average power. The alarm level defaults to 20% above normal average power.
- **Manual** - the user sets a single power percentage level above which an alarm condition exists.
- **Off** - the leakage detection and alarm outputs are turned off.

Leakage detection events can always be seen in the zone windows on the Display screen. The % box normally displays in green when reading are normal or healthy but changes to amber if the measured power exceeds warning level and shows in red if it exceeds the alarm level.

Any other displays such as the status window and the alarm beacon are dependant on the settings in Alarm Active as described immediately above.

5.9.1 Enable Melt Leakage Detection

1. Choose [**Settings**]:



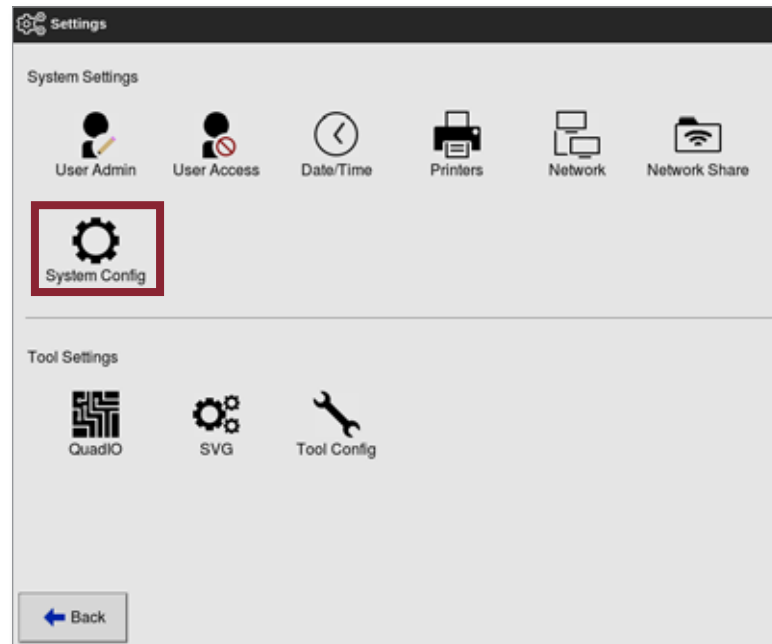
2. Choose [**Config**]:



3. Enter password, if required.

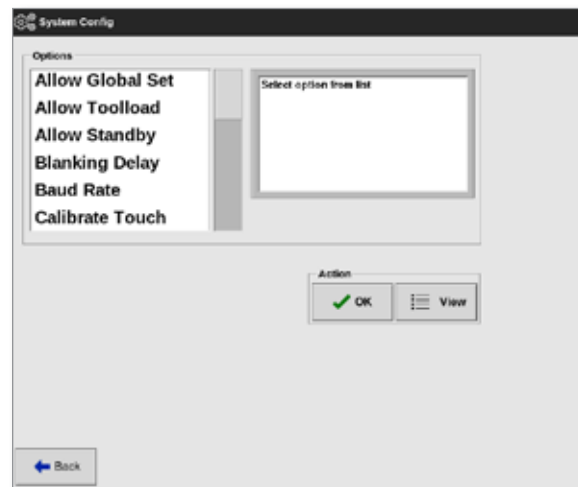
Enable Melt Leakage Detection - continued

The Settings box opens:



4. Choose **[System Config]** from System Settings.

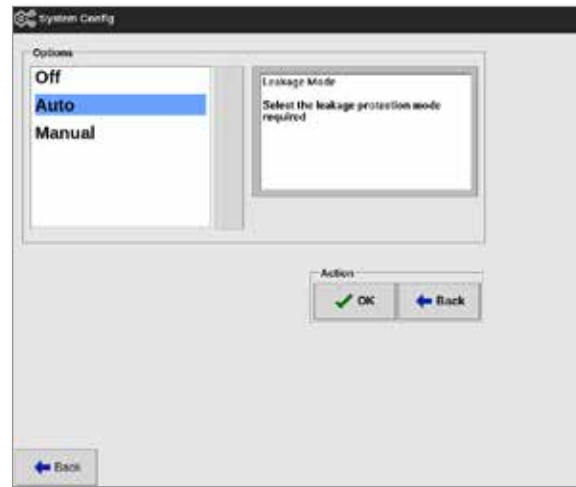
The System Config box opens:



Set Melt Leakage Detection - continued

5. Choose **[Leakage Mode]** from the menu.

A box with three options opens:



6. Choose one of the three options:

- Off
- Auto - see "5.9.2 Set Auto Leakage Detection" on page 5-32
- Manual - see "5.9.3 Set Manual Leakage Detection" on page 5-35

5.9.2 Set Auto Leakage Detection

The user must set a warn level default value and an alarm level default value for auto leakage detection.

The warn level defaults to 10% above normal average power. The Alarm level defaults to 20% above normal average power.

If leakage detection is set to **Auto**, any rise in zone power consumption that triggers the Leakage alarm can activate the console alarm with beacon. It can also send an Injection Disable output if the controller is fitted with a Quad I/O card.

Auto leak information can be found on the following screens:

Display screen [Table Format] and Zoom screen [Table]:

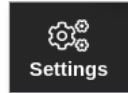
- **[Average Power]** shows the current average power being consumed
- **[Alarm Power]** shows "Sampling" during the initial checking time, after which it shows the calculated figures for warnings and alarms.

Settings screen:

- **[Alarm Pow]** shows "Auto"
- **[Alarms Active]** allows the user to set any actions associated with Alarm Pow. See "Table 5-3 Tool Parameters - Zone by Zone" on page 5-12.

1. Choose **[Settings]**:

Set Auto Leakage Detection - continued

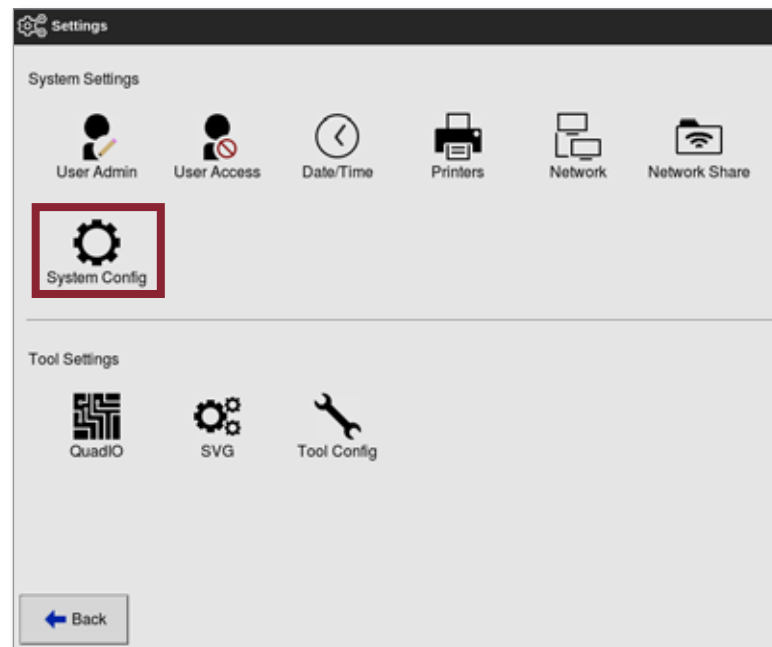


2. Choose [**Config**]:



3. Enter password, if required.

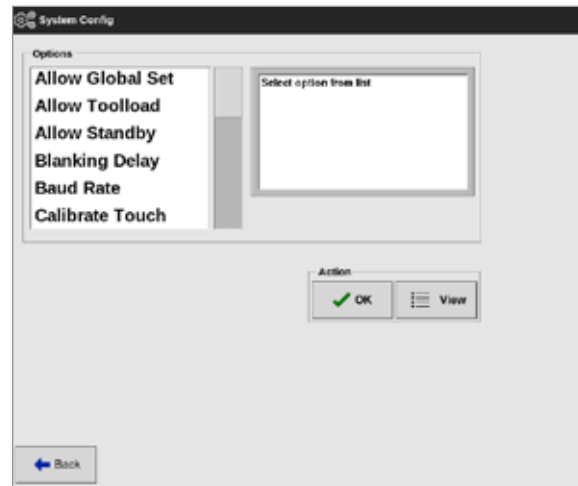
The Settings box opens:



4. Choose [**System Config**] from System Settings.

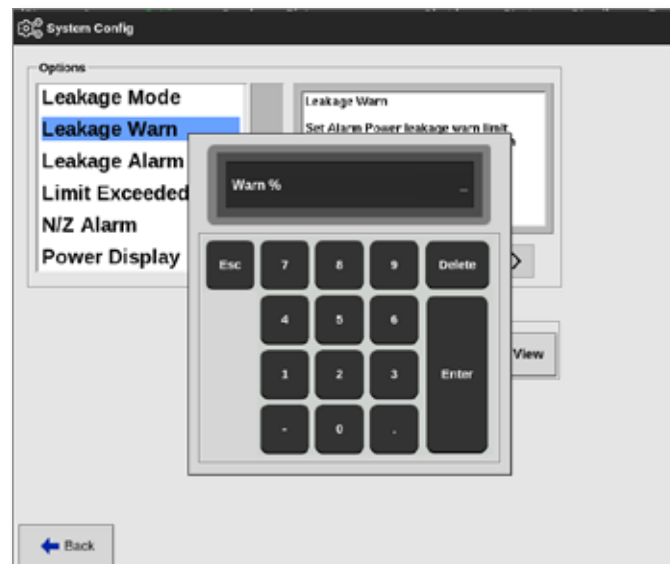
The System Config box opens:

Set Auto Leakage Detection - continued



5. Scroll through the parameters and choose [**Leakage Warn**].

A keypad opens:



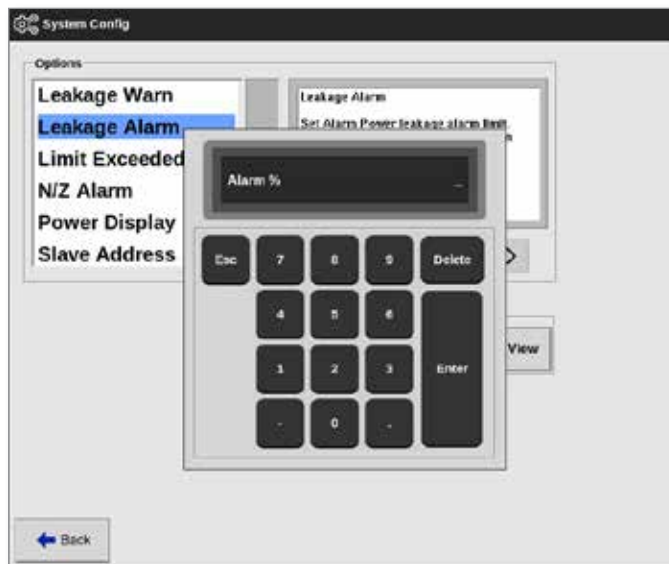
6. Enter the required value in percentage.

7. Choose [**Enter**] to accept the value or [**Esc**] to return to the options list.

Then set Alarm level.

8. From the options list, choose [**Leakage Alarm**].

A keypad opens:



9. Enter the required value in percentage.
10. Choose **[OK]** to accept the set value or choose **[Back]** to return to the Settings box without saving.

5.9.3 Set Manual Leakage Detection

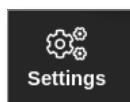
The user must enter a value in the **[Alarm Pow]** column on the Settings screen for the Manual Leakage Detection to function.

1. Choose **[Manual]**.
2. Choose **[OK]**.
3. Choose **[Back]** to return to the Options screen.

5.10 View or Print System Settings

The current system settings are available to view or print.

1. Choose **[Settings]**:

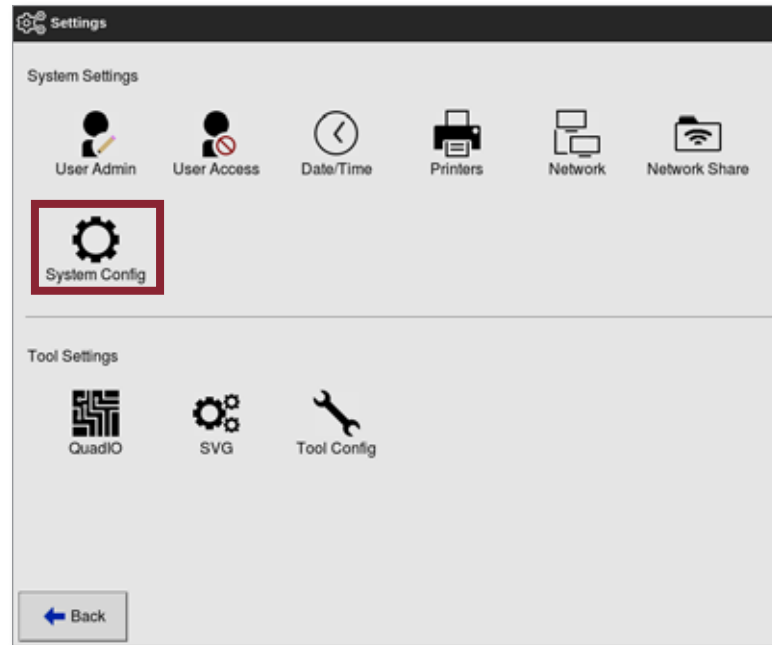


2. Choose **[Config]**:

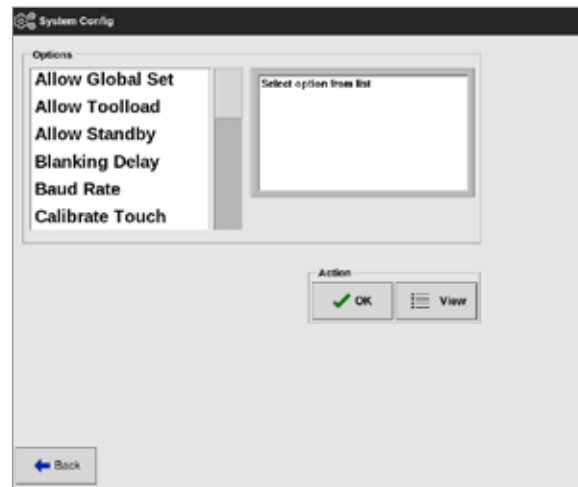


3. Enter password, if required.
The Settings box opens:

View or Print System Settings - continued



4. Choose **[System Config]** from System Settings.
The System Config box opens:



5. Choose **[View]** from the Options list screen:



The System Config view screen open:

View or Print System Settings - continued



The user can print the system settings from this screen.

6. Choose **[Print]**:



A message box opens:



NOTE

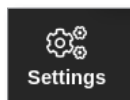
The user must choose the default print setting from the **[Printers]** screen. All output is sent directly to this default after the user chooses the **[Print]** button. No printer settings box will open.

See "5.15 Configure a Printer" on page 5-49 for more information.

5.11 View or Print Tool Settings

The current tool settings are available to view or print.

1. Choose **[Settings]**:

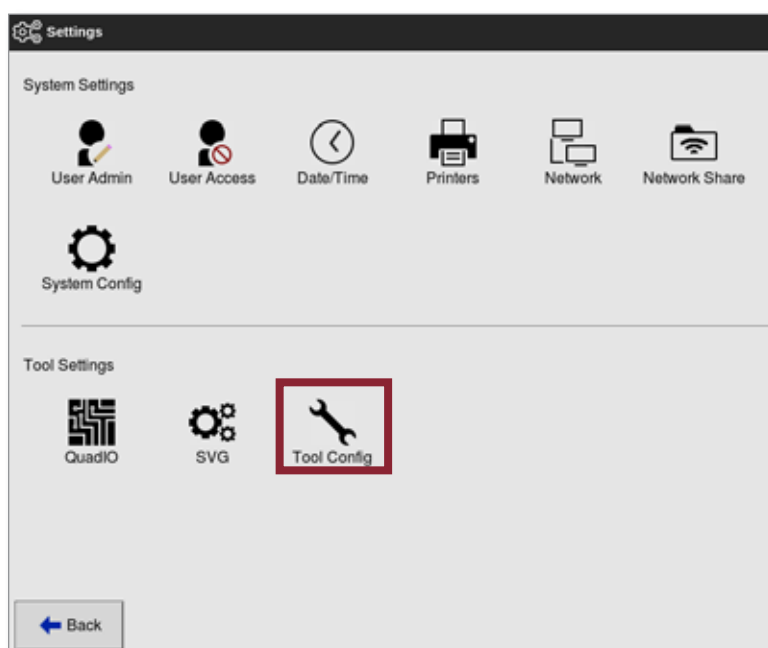


2. Choose **[Config]**:



3. Enter password, if required.

The Settings box opens:



The Tool Config view screen opens. See Figure 5-5.



Figure 5-5 Tool Config view screen

View or Print Tool Settings - continued

4. Choose **[Tool Config]** from Tool Settings.
5. Choose **[View]** from the Options list screen:

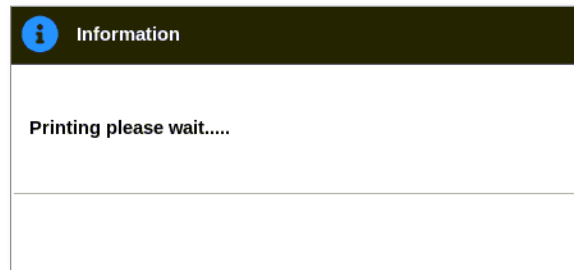


The user can print the tool settings from this screen.

6. Choose **[Print]**:



A message box opens:



NOTE

The user must choose the default print setting from the **[Printers]** screen. All output is sent directly to this default after the user chooses the **[Print]** button. No printer settings box will open.
See "5.15 Configure a Printer" on page 5-49 for more information.

5.12 Import a Picture

To use the EasyView screen, the user must first import at least one picture.

1. Save the picture onto the USB memory stick.
The console recognizes the most common raster image files such as JPG, GIF, TIF or PNG. See Figure 5-6.

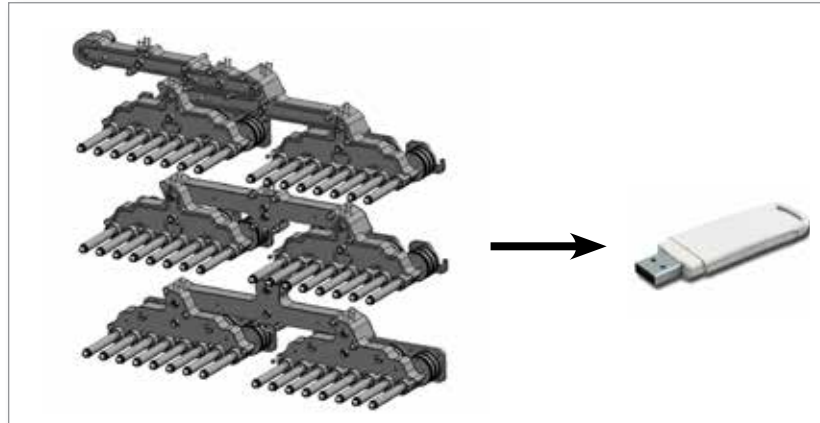
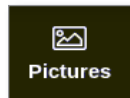


Figure 5-6 Save picture to USB memory stick

2. Insert the USB memory stick with the image into the console and wait about 10 seconds.
3. Choose **[Pictures]**:

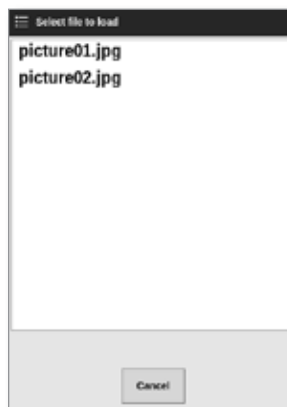


4. Choose **[Import]**:



5. Enter a password, if required.

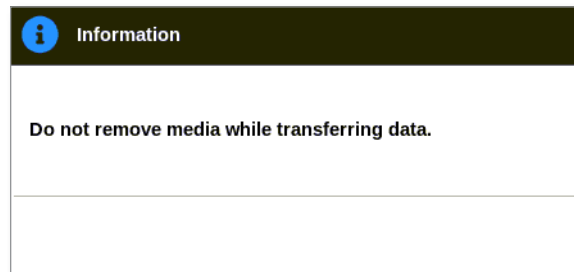
A picture selection box opens:



6. Choose the required picture or choose **[Cancel]** to exit without importing.

Import a Picture - continued

A message box opens:



The new picture appears on the Pictures screen.



NOTE

If the picture is already saved on the console, a copy is automatically saved with a numeric extension with the format: *picture01_01.jpg*.

5.13 Setup the EasyView Screen

The EasyView screen must be setup before it will display as an option for the main Display screen.

At least one picture must be loaded to the console.

See "5.12 Import a Picture" on page 5-40 for more information on importing a picture.

After the user chooses the required picture from the Pictures screen, the EasyView screen opens. See Figure 5-7.

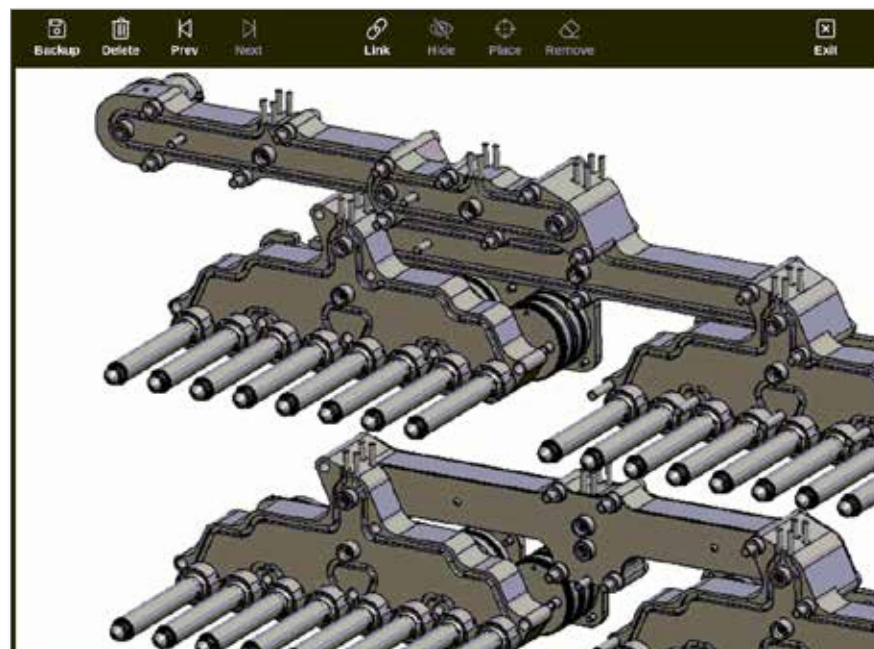


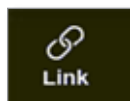
Figure 5-7 EasyView screen

The user must now link the picture with a tool. See "5.13.1 Link a Picture in the EasyView Screen" on page 5-42.

5.13.1 Link a Picture in the EasyView Screen

Pictures must be linked to tools to display properly.

1. Choose the required picture.
2. Choose **[Link]**:



3. Enter a password, if required.

The Configure Picture Link box opens:



4. Choose an empty slot and press **[OK]** to make the link or **[Cancel]** to return to the EasyView screen without linking the picture.



NOTE

After the link is made, the **[Show]** button becomes available.

A picture can be reused for more than one tool.



NOTE

The TS8 console only allows one picture to be linked at any time.

5.13.2 Unlink a Picture in the EasyView Screen

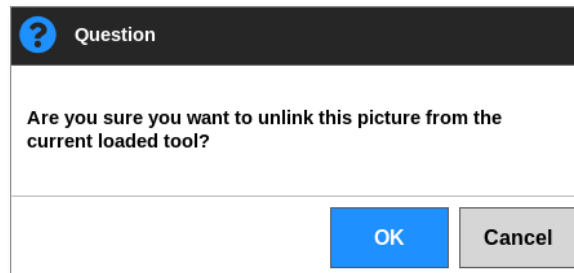
1. Choose the required picture.
2. Choose **[Unlink]**:



3. Enter a password, if required.

Unlink a Picture in the EasyView Screen - continued

A confirmation box opens:



4. Choose **[OK]** to unlink the tool or **[Cancel]** to return to the EasyView screen without unlinking the picture.



NOTE

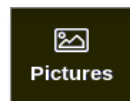
The **[Show]** button becomes unavailable if the picture is unlinked.

5.13.3 View Linked Pictures

The user can view the pictures linked to the currently loaded tool.

From the Display screen,

1. Choose **[Pictures]**:



2. Choose **[Links]**:



The Configure Picture Link box opens:



NOTE

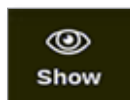
The picture names are greyed out and unavailable. The user must link or unlink pictures using the EasyView screen.

3. Choose **[OK]** or **[Cancel]** to return to the Pictures screen.

5.13.4 Add a Mini Panel to the Tool Picture

After the tool is linked, the user can place the zones on the corresponding areas of the picture. The default view for the EasyView screen has mini panels hidden. The user must choose **[Show]** to see the labels. To hide any placed labels from view, the user chooses **[Hide]**.

1. Choose the required picture.
2. Choose **[Show]**:



3. Enter a password, if required.
4. Choose **[Place]**:



A zone selection box opens:



5. Choose either **[Auto]** or a **[Zone number or alias]**:
 - **[Auto]**: the zones will be placed sequentially where the user touches the screen. There is no need for the user to press **[Place]** before every zone.
 - **[Zone number or alias]**: the user chooses a specific zone to place and must press the **[Place]** button each time a new zone is to be located.
6. Choose **[Cancel]** to return to the EasyView screen without adding a mini panel.

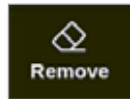


NOTE

The user can reposition the mini panels at any time on this screen by choosing **[Show]**. The mini panels can also be repositioned on the EasyView screen from the Display screen if the user has password access for this function.

5.13.5 Remove a Mini Panel from the Tool Picture

1. Choose **[Remove]**:



2. Choose the zone required from the zone selection box:



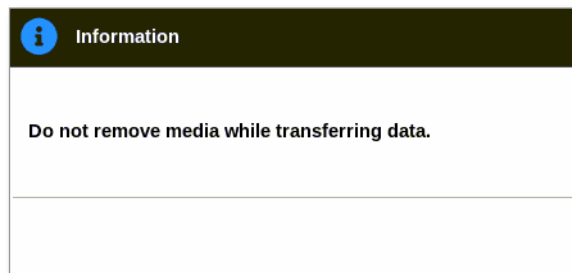
3. Press **[Cancel]** to return to the EasyView screen without removing a mini panel.

5.13.6 Backup a Picture from the EasyView Screen

1. Insert the USB memory stick with the data and wait about 10 seconds.
2. Choose the required picture and choose **[Backup]**:



A message box opens:



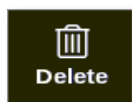
NOTE

If the picture is already saved on the media, the user must confirm whether or not to overwrite it.

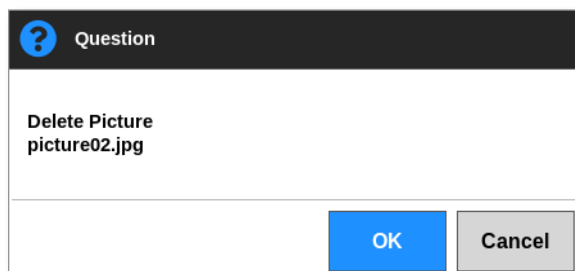
3. Remove the USB memory stick after the message disappears.

5.13.7 Delete a Picture Using the EasyView Screen

1. Choose the unwanted picture and choose **[Delete]**:



A confirmation box opens:



IMPORTANT

The picture is not only deleted from the EasyView screen but also from the Pictures screen. To use the picture again, the user must upload it again and relink it.

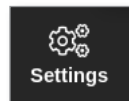
2. Choose **[OK]** to delete the picture or choose **[Cancel]** to return to the EasyView screen.

For more information on using the EasyView screen, see "6.19 Use EasyView Screen as the Display Screen" on page 6-38.

5.14 Set Date and Time

Mold-Masters recommends that the correct time and time zone are set to fully utilize the timing features of the M2 Plus controller.

1. Choose [**Settings**]:

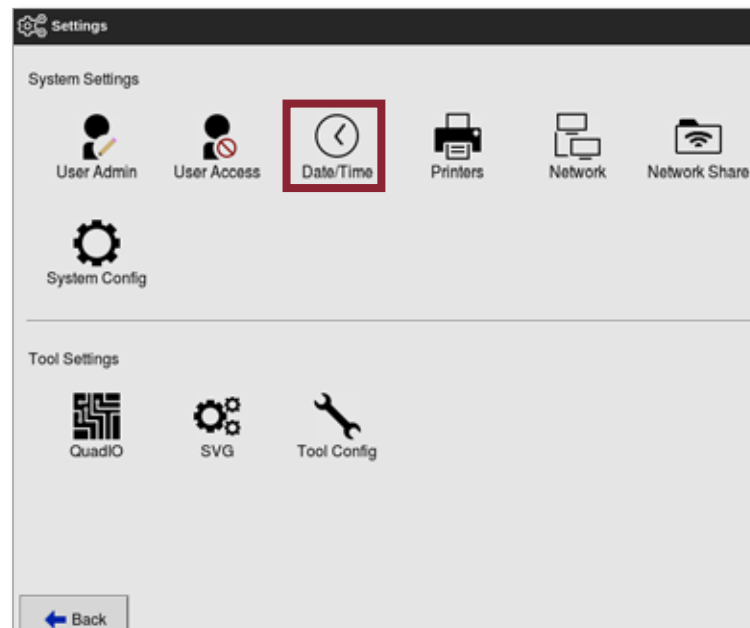


2. Choose [**Config**]:



3. Enter password, if required.

The Settings box opens:



4. Choose [**Date/Time**] from System Settings.

The Date/Time screen opens. See Figure 5-8.



Figure 5-8 Date/Time screen

Set Date and Time - continued

5. Choose the required box and use the [▲] and [▼] buttons to set the required value. See Figure 5-8.
6. Choose [OK] to save the new setting to the system or choose [Cancel] to return to the original values.
7. Choose [Time Zone] to set the time zone.

A dropdown menu opens:



8. Choose the correct time zone or choose [Cancel] to return to the Date/Time screen.
9. Choose [NTP Time Server] to synchronize many controllers to the same time.

A keyboard will open for the user to input the IP address:



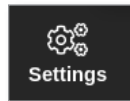
10. Choose [Enter] to accept the input or choose [Esc] twice to return to the Date/Time screen.

The time automatically updates without the requirement to restart the console.

5.15 Configure a Printer

The user can send information in different formats to a configured output point, whenever the screen displays a print icon. The print output can be in the form of a picture, a graph, a table or a .csv file.

1. Choose [**Settings**]:

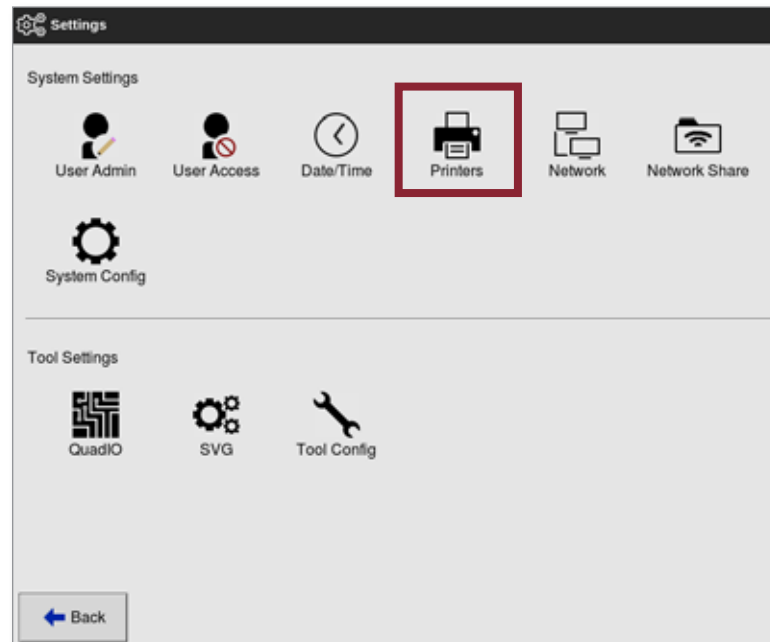


2. Choose [**Config**]:



3. Enter password, if required.

The Settings box opens:



4. Choose [**Printers**] from System Settings.

Configure a Printer - continued

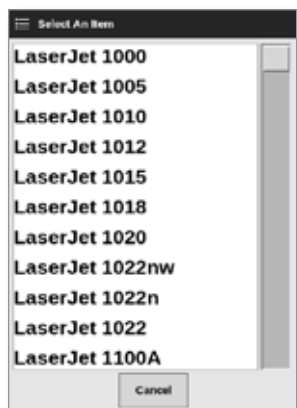
The Printers box opens:



5. Choose **[Make]**:



6. Choose **[Model]**:



Configure a Printer- continued

7. Choose **[Connection]**:



The connections include:

- **Local USB:** send output to USB printer
- **Network T/CP (Transmission Control Protocol):** a standard network communication protocol.
- **Network LPD (Line Printer Daemon):** for a UNIX / Linux network protocol.
- **Windows SMB (Server Message Block):** a communication protocol used by Windows networks.
- **Print to file:** output defaults to JPG format. PNG and PDF are also available.

8. Enter **[Printer Address]**, if required.

9. Enter **[Share Name]**, if required.

10. Choose **[Paper Size]**, A4 or Letter, if required.

11. Choose **[Accept]** to set the parameters.

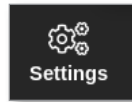
12. Choose **[Cancel]** to restore all boxes to their previous settings.

13. Choose **[Back]** to return to the Settings box.

5.16 Set the Storage Locations

The user can set where information is stored: Local or Share. The default values are Local.

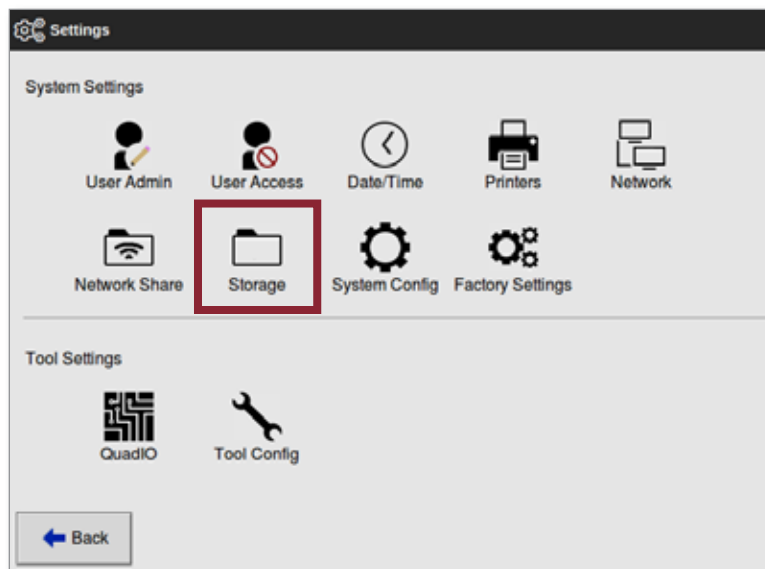
1. Choose **[Settings]**:



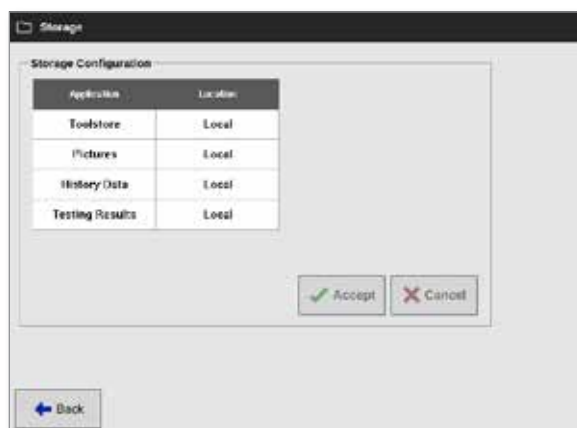
2. Choose **[Config]**:



3. Enter the password, if required.
4. Choose **[Storage]**.



The Storage Configuration box opens:



5. Choose a Location cell of an Application:
6. Choose **Local** or **Share**:

**NOTE**

You can select Share only if your controller is connected to a Share Server, which is set up on the "7.8 Share Files on a Network" on page 7-18.

7. Choose **Accept**.

Section 6 - Operation



WARNING

Ensure that you have fully read "Section 3 - Safety" before connecting or 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.

6.1 Switch On the Controller

The main isolator is a rotary switch located on the front of the M2 Plus controller. See "Figure 6-2 Turn the main power switch off" on page 6-3.

The main power switch is sufficiently rated to handle the total load current during switch on and switch off.

Use a suitably-sized padlock or similar device to lock the switch in the off position and prevent operation during maintenance.



NOTE

The M2 Plus controller consoles have their main on / off switch at the back of the console. See Figure 6-1.

1. Switch on the main switch to energize the main cabinet.
2. After the main cabinet is switched on, press the console switch until it lights up and then release it.

See Figure 6-1 for console switch location.

The console will start its normal bootup sequence.



Figure 6-1 Location of console on / off switch

The Display screen opens after the bootup sequence is completed. The user must login to access the functions. See "6.3 Login or Logout" on page 6-4.

6.1.1 Mold Heating

After the bootup process is completed, one of the following actions happens:

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

6.2 Switch Off the Controller



NOTE

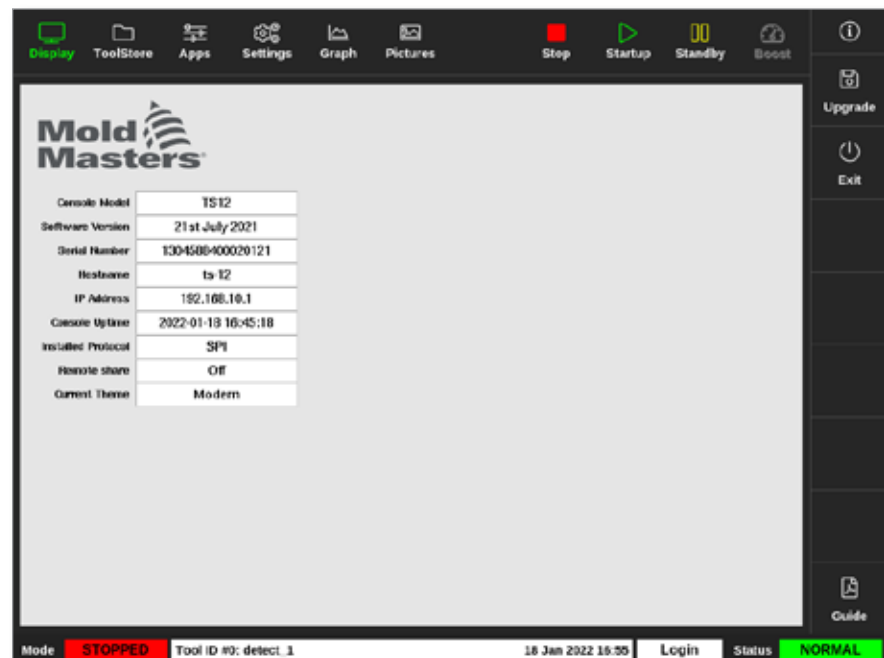
Mold-Masters recommends that the console is used to shutdown the heating load and that the main power switch of the controller is only used to switch off a dormant controller.

6.2.1 Shutdown the Console

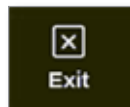
1. Choose [i]:



The Information screen opens:

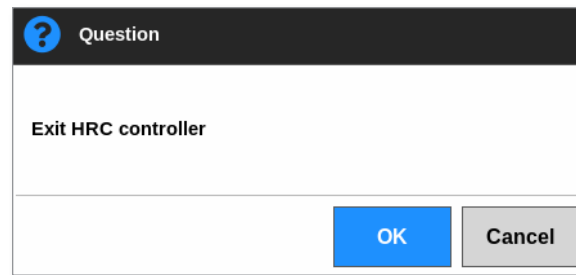


2. Choose [Exit]:



Switch Off the Controller - continued

A message box opens:



3. Choose **[OK]** to turn the console off or choose **[Cancel]** to return to the Information screen without turning the console off.



NOTE

The cards receive the message to stop outputting power after **[OK]** is pressed and the console begins the shutdown process.

6.2.2 Shutdown the Controller

Use the main power switch on the controller cabinet to isolate power to the whole system. See Figure 6-2.



Figure 6-2 Turn the main power switch off

6.3 Login or Logout

For the first time login, system and user level passwords are listed on the inside cover of this manual. For security purposes, *Mold-Masters* recommends that these passwords are changed as soon as possible.

6.3.1 Login

Choose the login button from the bottom information bar to login from any screen. See Figure 6-3.



Figure 6-3 Login button on the Display screen

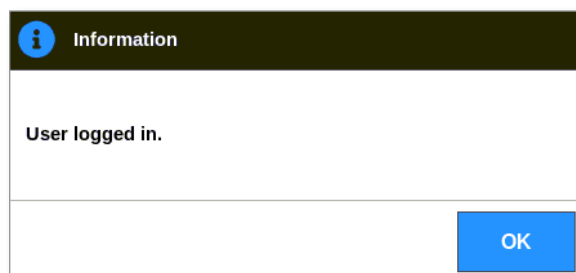
Based on configured settings, users require password or both user id and a password to login. For more information on passwords, see "7.1 User Access Screen" on page 7-1.

If the user is not logged in, a keyboard appears to prompt a login:



Login - continued

A confirmation box appears:



The user will stay logged in until the logout timer expires or the user logs out.

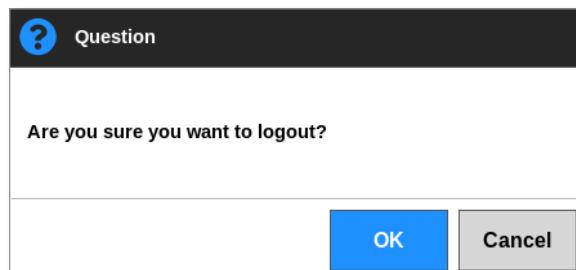
6.3.2 Logout

Each keytouch resets the timer. After a set time of inactivity, the screen will timeout and the user is logged out. The logout timer can be configured to remain logged in indefinitely. For more information on setting the timer, see "7.6 User Admin Settings" on page 7-11.

1. Choose the **[System]** or **[User]** button on the information bar:



A confirmation window opens:



2. Choose **[OK]** to logout or choose **[Cancel]** to stay logged in.

The **[System]** or **[User]** button changes to **[Login]**. See "Figure 6-3 Login button on the Display screen" on page 6-4.

6.4 Quick Start Guide

The M2 Plus console contains a quick start guide that covers the essential controller operational procedures. Access to the quick guide is found on the Information screen. See Figure 6-4.

1. Choose [i]:

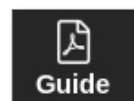


The Information screen opens:



Figure 6-4 Quick start guide button on the Information screen

2. Choose [Guide]:



The quick start guide opens on the console screen:



Quick Start Guide - continued**NOTE**

The user is able to scroll through the pages of the quick start guide on screen.

To save the quick guide as a PDF, insert a USB memory stick into the console and choose:



To return to the Information screen from the quick start guide, choose:



6.5 Control Modes for All Zones

Table 6-1 Control Modes for All Zones

Operation	Available by	Description
Run	Mode button	Switches on all zones.
Standby	Top menu button or Mode button	Reduces the temperature of all zones that have any standby temperature configured. Temperature remains reduced until Run command is given.
Startup	Top menu button or Mode button	STARTUP - Initiates a starting sequence that is configured on the Settings screen. MASTER-FOLLOW – Applies power to Master zones then adjusts other zones' set temperatures 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.
Shutdown	Top menu button or 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.
Boost	Top menu button or Mode button	Temporarily raises the temperature of all zones that have any boost temperature configured. When the boost period is over, the zone temperatures return to normal set levels.
Stop	Mode button	Switches off all zones.
Purge	Purge Wizard on Apps screen	This mode can only be initiated while in Run mode. • Guides the operator through a color change routine.

6.6 Boost Mode

- Boost mode is determined by two quantities that determine boost – the boost temperature and the boost time.
- Boost time that 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.
- Boost raises the temperatures of only zones that have any 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 I/O card.

6.6.1 Enter Boost Mode Manually

When the manual boost command is given, the Mode window on the Display screen flashes between the word "BOOST":

Mode **BOOST**

and the boost time (in seconds) remaining:

Mode **984 (Secs.)**

The boost message displays until boost time period expires, after which the zones returns to normal set temperature and the Mode window shows RUN.

The user can enter Boost mode in three ways:

1. Choose **[Boost]** from the top menu buttons
2. Choose **[Boost]** from the side menu popout box
3. Choose **[Boost]** from the keypad to boost the temperature of that zone individually

6.6.2 Enter Boost Mode Remotely

The boost command can be received from an external source. See "10.5 Alarm Output / Auxiliary Input" on page 10-6.

The display shown in the Mode window is the same as if Boost was chosen locally.

6.7 Slave Mode

A zone that is malfunctioning can be slaved to another zone that is working properly. There are several points to remember when using zone slaving:

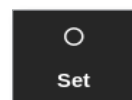
1. Only slave like zones for like zones.
 - A probe zone cannot be slaved to a manifold zone.
2. A zone that is already slaved to another zone can not be made a lead zone.
 - For example: if zone 2 is currently slaved to zone 3, then zone 1 cannot be slaved to zone 2. The leading zone must be a healthy zone.
3. A zone that creates a loop cannot be chosen.
 - For example: if zone 2 is slaved to zone 3, then zone 3 cannot be slaved back to zone 2.
4. When selecting a lead zone, choose a similar zone type that is currently operating at the same temperature and at the same power level.
 - If the lead zone is working at the same temperature but outputting a noticeably different power level, then the slaved zone may not regulate efficiently.

6.7.1 Enter Slave Mode

1. Choose the required zone or zones.



2. Choose [Set]:



3. Enter password, if required.

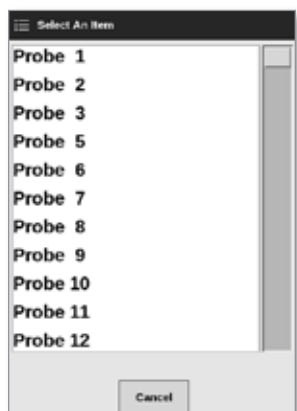
Enter Slave Mode - continued

A keypad opens:



4. Choose **[Slave]**.

A zone selection box opens:



5. Choose the lead zone or choose **[Cancel]** to return to the Display screen without choosing a lead zone.

Enter Slave Mode - continued

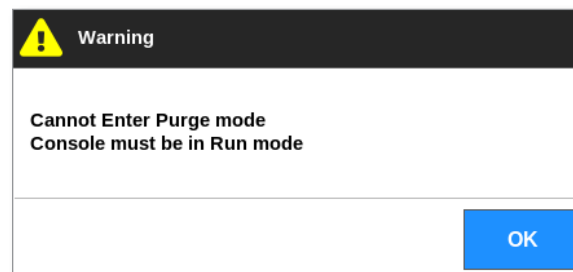
The zone shows as slaved on the Display screen. See Figure 6-5.



Figure 6-5 Display screen with slaved zone

6.8 Purge Function

The Purge function is only available while the tool is in Run mode. If the controller is not in Run mode, the user will be prompted to enter Run mode by this message:



6.8.1 The Purge Process

1. Choose [Apps]:



2. Choose [Purge Wizard]:



3. Enter password, if required.

The Purge Process - continued

The Purge screen opens:

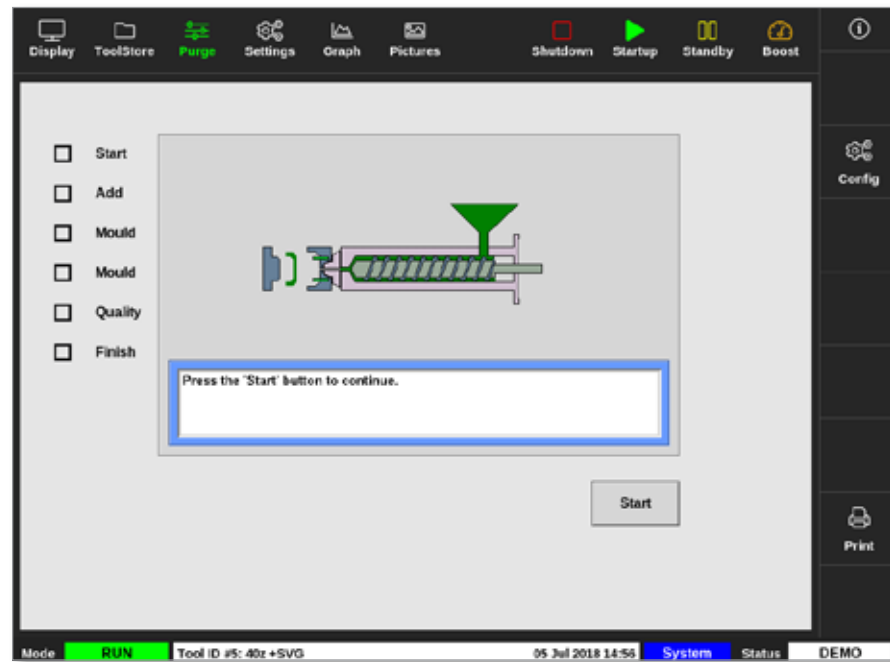


Figure 6-6 Purge screen

4. Choose **[Config]**:



5. Enter password, if required.

The Purge Wizard Settings box opens:



NOTE

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

The boxes of the Purge Wizard are pre-populated with values that the user can change, if required.

The Purge Process - continued

6. Choose the required parameter.

A keypad opens:



7. Enter the required value.



NOTE

To reset the values to factory settings, choose [**Reset**].

8. Choose the type of purge [**Mechanical**] or [**Chemical**]:



NOTE

The Soak time box will be greyed out and unavailable if Mechanical purge is chosen.

9. Choose [**OK**] to accept the values entered or [**Cancel**] to return to the Purge screen without making changes.

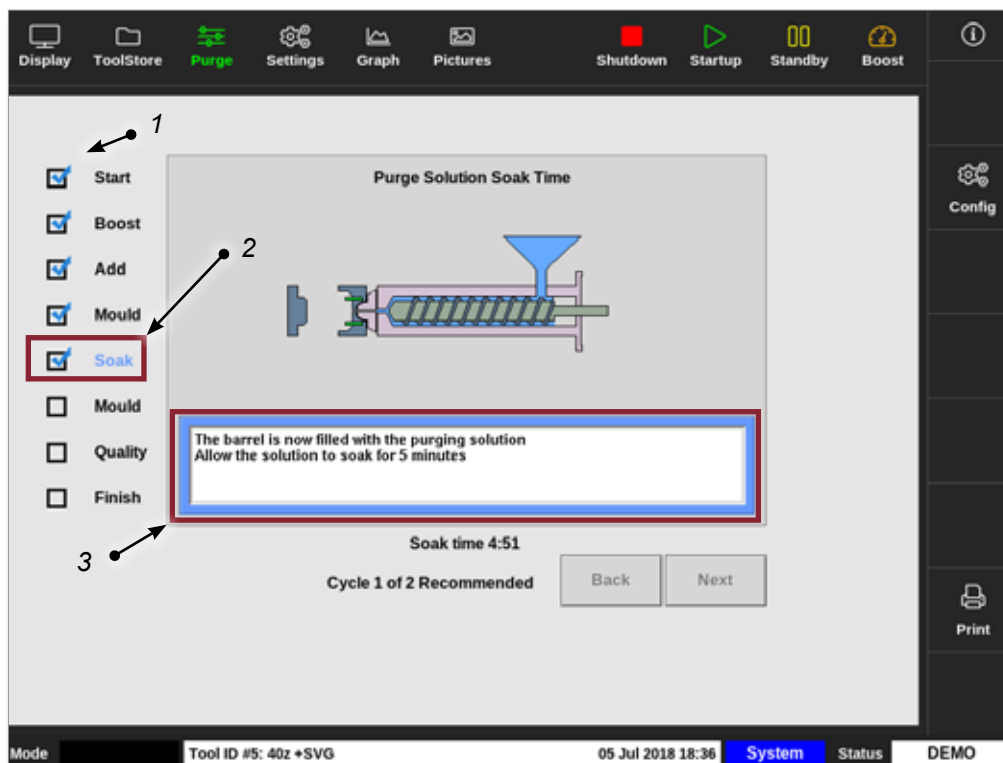
For more information on the different processes for mechanical and chemical purge processes, see "6.8.2 Chemical Purge" on page 6-15 and "6.8.3 Mechanical Purge" on page 6-16.

6.8.2 Chemical Purge

Mold-Masters recommends using the chemical purge option.

Chemical purge uses a proprietary purge agent. A soak step is used and the Soak Time box in the Purge Wizard Settings is enabled.

The user is guided through a series of steps listed on the left side of the screen. The current step is highlighted in blue. A completed step is shown with a blue checkmark.



1. A blue checkmark shows a completed step.
2. The current step is shown in blue.
3. The user is guided through the purge process.

Figure 6-7 Chemical purge screen

Steps in the Chemical Purge Process

1. Start: the user presses [**Start**] to begin the purge process.
2. Boost: the Boost function is initiated and the normal Boost time is overridden. Boost temperature will be held until the operator chooses [**Next**].
3. Add: the user is instructed to add purging material.
4. Mould: the programmed number of cycles is completed with the purging material.
5. Soak: the barrel is filled with purge agent material and soaks for at least the preset time. The [**Next**] and [**Back**] buttons are greyed out and unavailable during this step.
6. Mould: the programmed number of cycles is completed with the purging material.

Chemical Purge - continued

7. Quality: the user is asked if the color is acceptable.
 - Choose **[Yes]** to leave the purge process.
 - Choose **[No]** to start the process again.
8. Finish: the system displays a summary screen. See Figure 6-8.

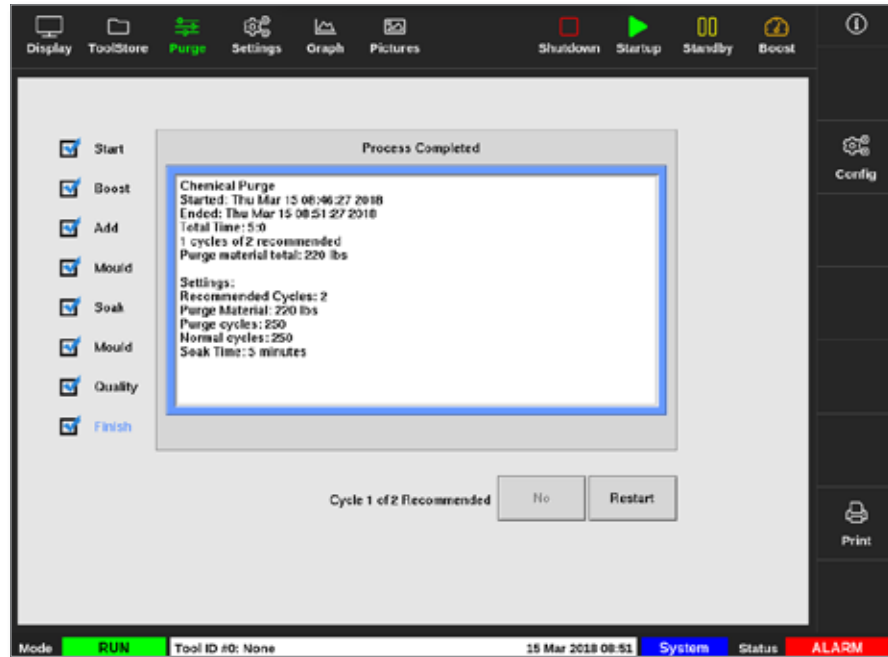


Figure 6-8 Chemical purge summary screen

9. Choose **[Restart]** to start the process again.
10. Choose **[Display]** to return to the Display screen.

6.8.3 Mechanical Purge

Mechanical purge does not use a purge agent and the process has fewer steps. The user is guided through the steps in the same way as with the chemical purge process.

Steps in the Mechanical Purge Process:

1. Start: the user presses **[Start]** to begin the purge process.
2. Add: the user is instructed to add purging material.
3. Mould: the programmed number of cycles is completed with the purging material.
4. Mould: the programmed number of cycles is completed with the purging material.
5. Quality: the user is asked if the color is acceptable.
 - Choose **[Yes]** to leave the purge process.
 - Choose **[No]** to start the process again.

Mechanical Purge - continued

6. Finish: the system displays a summary screen. See Figure 6-9.

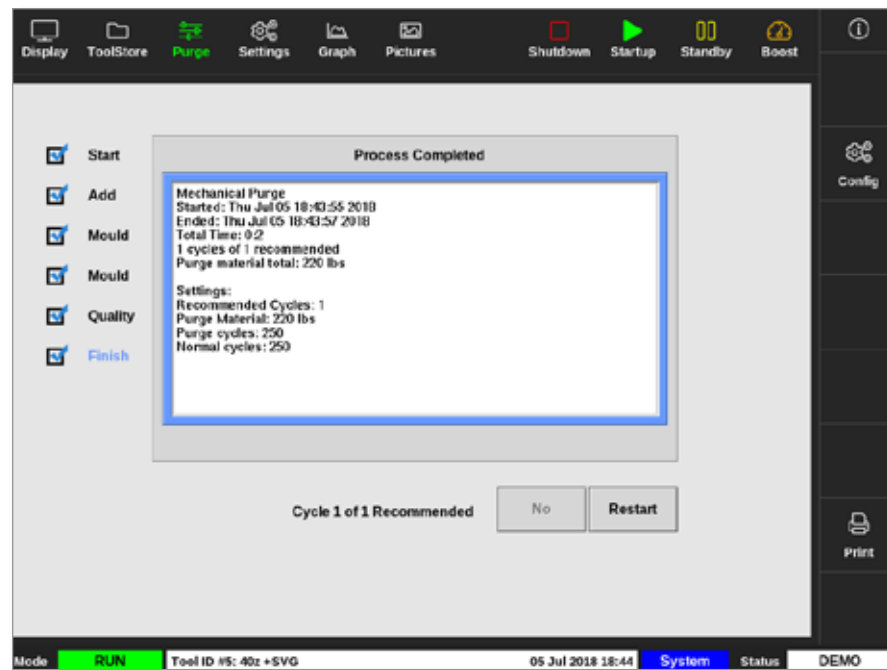
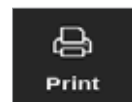


Figure 6-9 Mechanical purge summary screen

6.8.4 Print the Purge Results

The user can print the results of the purge process with the **[Print]** button:



A message box opens:



NOTE

The user must choose the default print setting from the **[Printers]** screen. All output is sent directly to this default after the user chooses the **[Print]** button. No printer settings box will open.

See "5.15 Configure a Printer" on page 5-49 for more information.

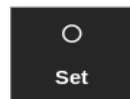
6.9 Turn Zones Off or On

The user can turn a single zone off or on, or turn multiple zones off or on with the **[Range]** button. See "4.13 Choose Zones" on page 4-18 for more information about the Range function.

1. Choose the required zone or zones:



2. Choose **[Set]**:



3. Enter password, if required.

A keypad opens.



Figure 6-10 Keypad - turn zone off

4. Choose **[Off]**. See Figure 6-10.

Turn Zones Off or On - continued

The screen returns to the Display screen and the zone or zones change their display. See Figure 6-11.

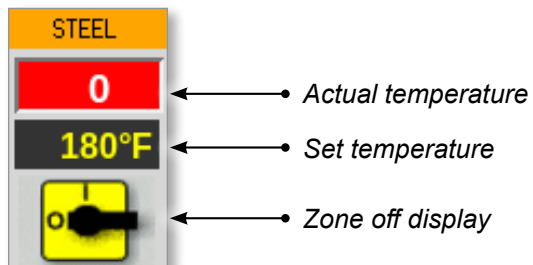


Figure 6-11 Zone off

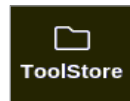
To turn the zone(s) back on, repeat steps 1 and 2, then choose [**On**].
The [**Off**] button on the keypad changes to [**On**]:



6.10 Rename an Existing Tool

A tool does not have to be loaded to be renamed.

1. Choose **[ToolStore]**:



2. Choose the tool to be renamed. See Figure 6-12.

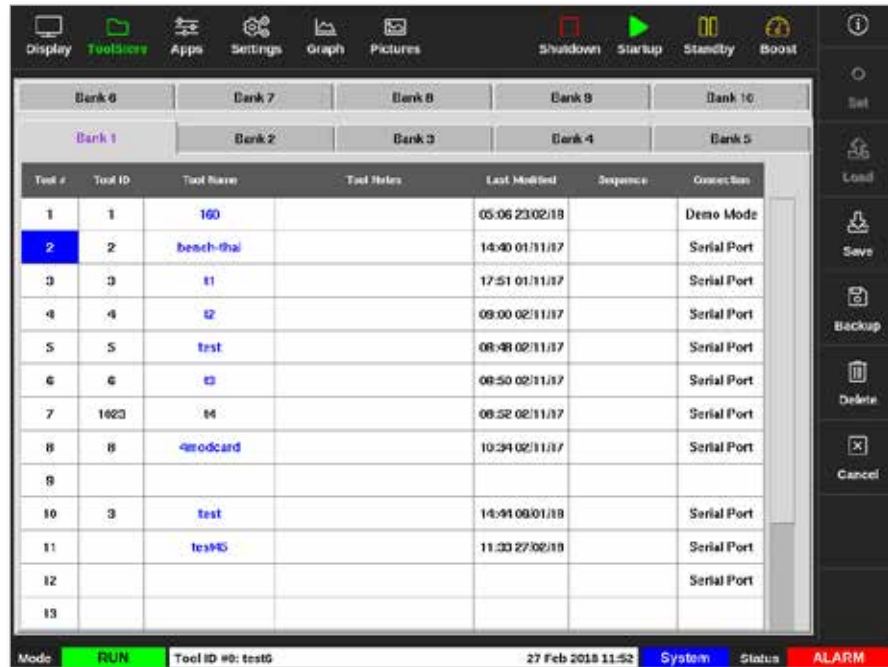
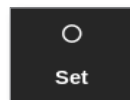


Figure 6-12 Choose the tool to rename

3. Choose **[Set]**:



4. Enter password, if required.

A keyboard opens:



5. Enter the new tool name.

6. Choose **[Enter]**.

The tool name changes in the tool bank.



6.11 Save a Tool

NOTE

The user must save the current tool in use before another tool can be loaded.

Tools that have not been saved are shown in red in the tool bank. See Figure 6-13.

Tool #	Tool ID	Tool Name	Tool Notes	Last Modified	Sequence	Connection
1	1	100		10:06 23/02/18		Demo Mode
2	2	MMUK-Test				Serial Port
3	3	144c + IO	58 Cavity			Demo Mode
4	4	160new			1: Timer (5 min)	Demo Mode
5	5	40z + SVG	24 CAVITY			Demo Mode
6	6	40zone	32 cavity + water + IO			Demo Mode
7	7	60zone	48 Cavity + 30A			Demo Mode
8	8	60zone	48 Cavity + 30A			Demo Mode
9	9	80 zone	8 Cavity + MFI/O			Demo Mode
10	10	All Zones				Serial Port
11	11	NPE_WATERFLO				Serial Port
12	12	waterflow				Serial Port
13	13	testy		12:50 13/04/18		Demo Mode

Figure 6-13 Unsaved tool in tool bank

The user can save a tool in two ways:

- overwrite the settings of the current tool
- save the changes as a new tool

6.11.1 Overwrite Tool Settings

The user can overwrite existing tool settings for the currently loaded tool if changes to the current tool are made.

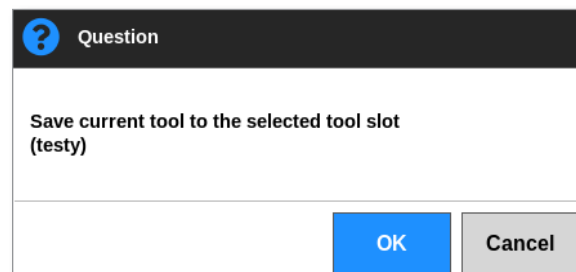
1. Choose the current tool:



2. Choose [Save]:



A message box opens:



3. Press [OK] to continue or [Cancel] to return to the previous screen without saving the new settings.

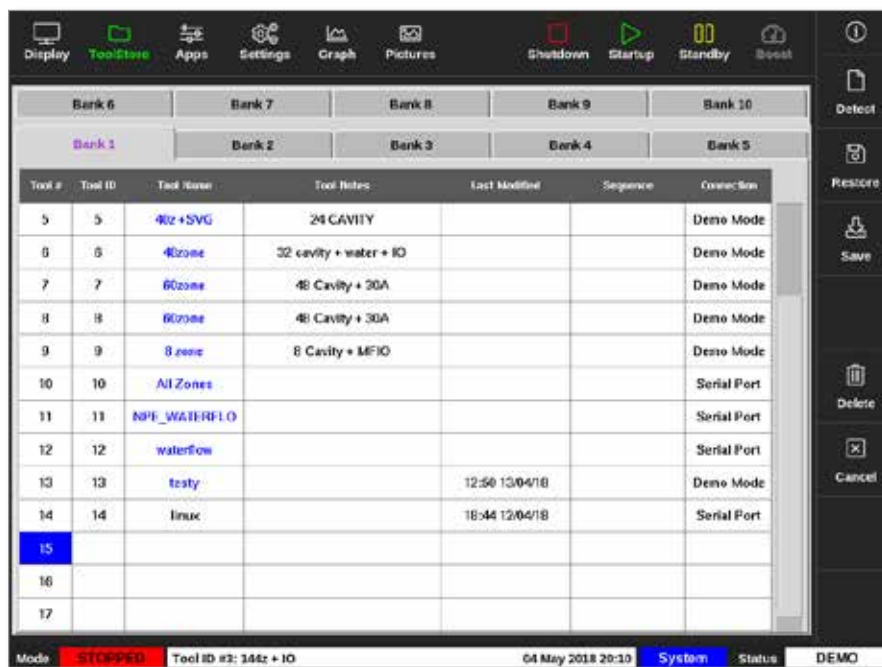
The tool name is now purple in color, as it is the current tool and it has been saved.

6.11.2 Save Changes as a New Tool

1. Choose the current tool:



2. Choose an empty tool slot in the tool bank:

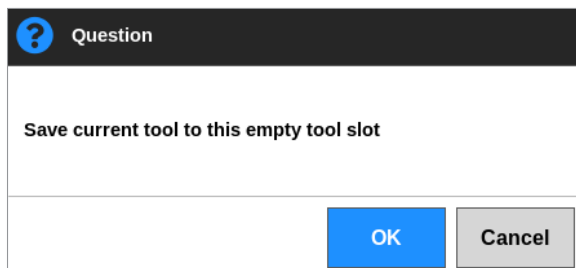


3. Choose [Save]:



Save Changes as a New Tool - continued

A message box opens:



A keyboard opens:



4. Enter the new tool name.
5. Choose **[Enter]** to save the new tool or choose **[Esc]** twice to return to the tool bank without saving the new tool name.

In the tool bank, the tool name is now blue in color.



IMPORTANT

This new tool has not been loaded. The original tool is still loaded. The user must load the new tool to use it. For more information, see "6.12 Load a Tool Locally" on page 6-25.

6.12 Load a Tool Locally

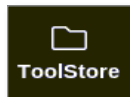
The controller must be in Stop mode to load a tool, unless the system setting [Allow Toolload] is enabled. See "4.20 Settings Screen" on page 4-32 on how to access system settings.



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 [ToolStore]:



2. Choose the required tool:

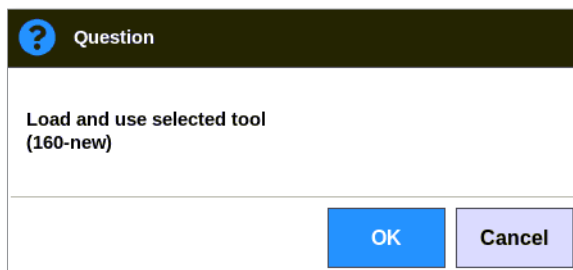


3. Press [Load]:



4. Enter password, if required.

A message box opens:



Load a Tool Locally - continued

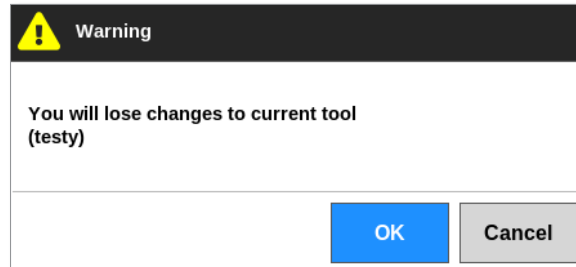
- Choose [OK] to load the new tool.



NOTE

The user can press [Cancel] to go back to the tool bank without loading the new tool.

A warning box opens:



- Choose [OK] to load the new tool or [Cancel] to return to the tool bank without loading the new tool.

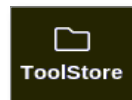
6.13 Load a Tool Remotely

If the controller is fitted with an IO5 card then it is possible to load tools from a remote location. See "13.7 Remote Tool Loading" on page 13-8.

6.14 Search the Tool Bank

Users can search for a tool in the tool bank.

- Choose [ToolStore]:



- Choose [Search]:



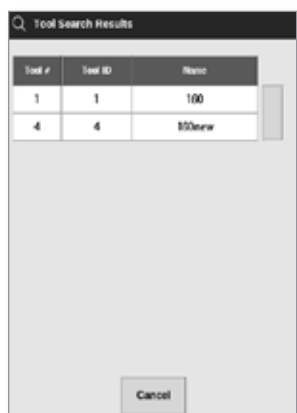
A keyboard opens:



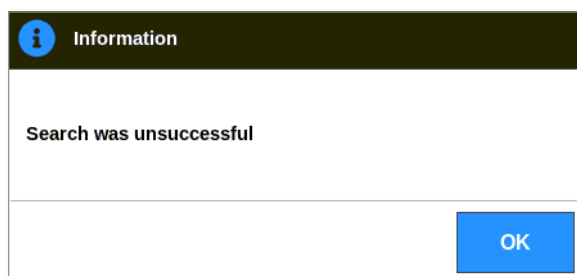
- Enter the tool name.
- Choose [Enter].

Search the Tool Bank - continued

The Tool Search Results box opens:



If the search is unsuccessful, this message box opens:



5. Choose the tool required from the list.

The user will automatically be taken to the tool bank screen with that tool.

6.15 Delete a Tool



CAUTION

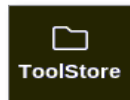
Once you have deleted a tool there is no way to recover its previous settings. Take care that you are deleting the correct tool.



NOTE

A tool that is loaded cannot be deleted.

1. Choose **[ToolStore]**:

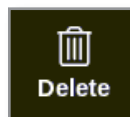


2. Choose the tool to be deleted. See Figure 6-14.

Tool #	Tool ID	Tool Name	Tool Name	Last Modified	Sequence	Connection
1	1	160		05:06 23/02/18		Demo Mode
2	2	bench test		14:00 01/11/17		Serial Port
3	3	11		17:51 01/11/17		Serial Port
4	4	12		06:00 02/11/17		Serial Port
5	5	test		06:08 02/11/17		Serial Port
6	6	13		06:50 02/11/17		Serial Port
7	1023	14		06:52 02/11/17		Serial Port
8	8	feed card		10:04 02/11/17		Serial Port
9						
10	3	test		14:04 09/01/18		Serial Port
11		test45		11:33 27/02/18		Serial Port
12						Serial Port
13						

Figure 6-14 Choose the tool to delete

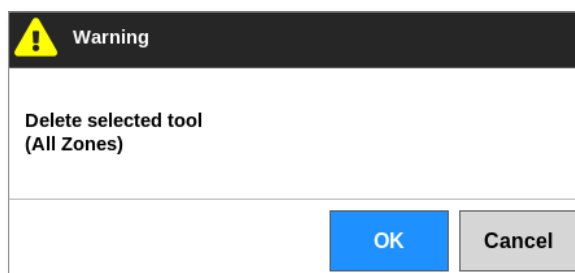
3. Choose **[Delete]**:



4. Enter password, if required.

Delete a Tool - continued

A message box opens:



5. Choose [**OK**] to confirm or choose [**Cancel**] to return to the ToolStore without deleting the tool.

6.16 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.



NOTE

If the particular tool has an EasyView image and EasyView screen associated with it, then the mini panel configuration is saved within this backup procedure.

The same picture should be saved, and the Picture and Tool files should be kept together.

6.16.1 Backup a Single Tool

1. Insert the USB memory stick and wait about 10 seconds.
2. Choose the tool to backup. See Figure 6-15.



Figure 6-15 Choose the tool to backup

3. Choose **[Backup]**:



4. Enter password, if required.

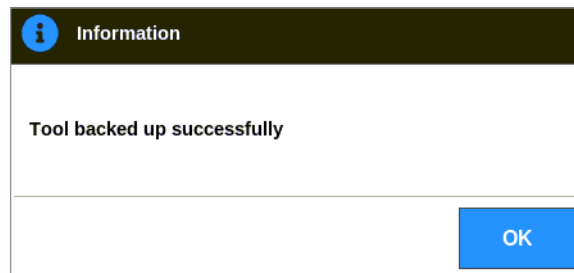


NOTE

If the picture associated with the tool has been saved previously, the user is asked if the file can be overwritten. Choose **[OK]** or **[Cancel]**.

Backup A Single Tool - continued

A message box opens:



5. Choose [OK] to continue to return to the ToolStore.
6. Wait about 10 seconds then remove the USB memory stick.

6.16.2 Backup All Tools

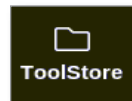
An entire tool bank can also be saved.



IMPORTANT

Only the visible tool bank will be backed up. To backup all tools, each tab in the ToolStore must be backed up individually.

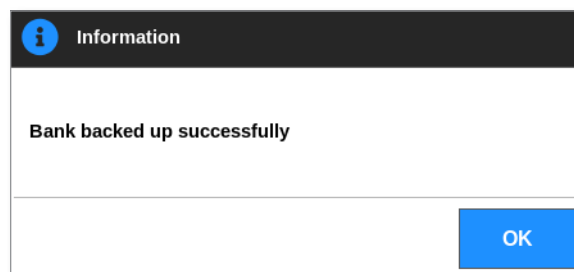
1. Insert the USB memory stick and wait about 10 seconds.
2. Choose [ToolStore]:



3. Enter password, if required.
4. Choose [Backup]:



After the backup is complete, a message box opens:

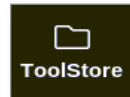


6.17 Restore Tool Settings

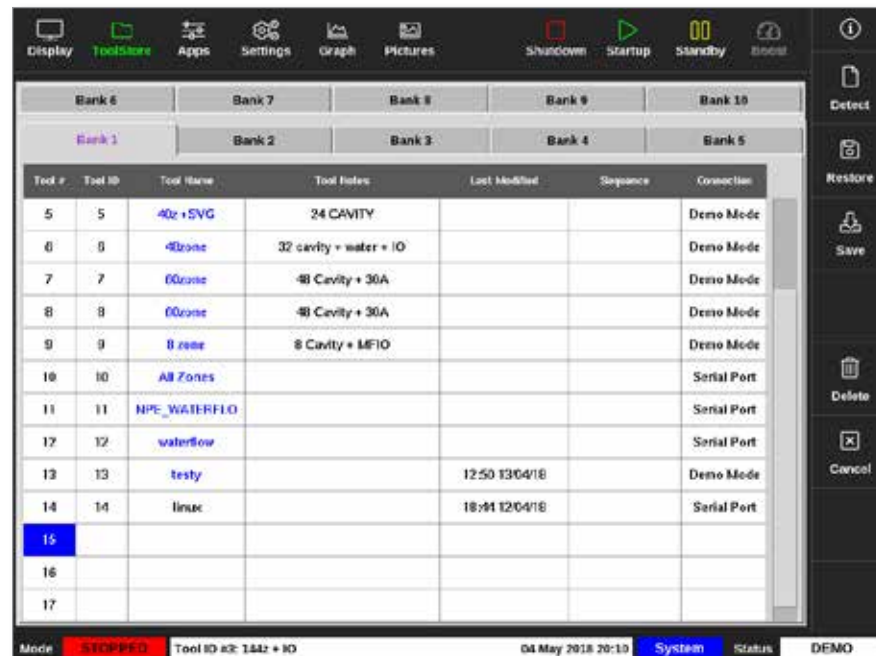
The user can choose to restore a single tool's settings or the entire tool bank's settings.

6.17.1 Restore a Single Tool

1. Insert the USB memory stick with the data and wait about 10 seconds.
2. Choose [ToolStore]:



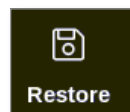
3. Choose an empty tool slot:



IMPORTANT

An empty tool slot must be chosen or the imported data will overwrite the currently loaded tool.

4. Choose [Restore]:



5. Enter password, if required.

Restore a Single Tool - continued

The tool selection box opens:



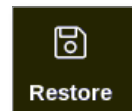
6. Choose the required tool.
7. Wait about 10 seconds then remove the USB memory stick.
8. Check the ToolStore tab [**Last Modified**] to see that the data imported.

6.17.2 Restore All Tools

1. Insert the USB memory stick with the data and wait about 10 seconds.
2. Choose [**ToolStore**]:



3. Choose [**Restore**]:



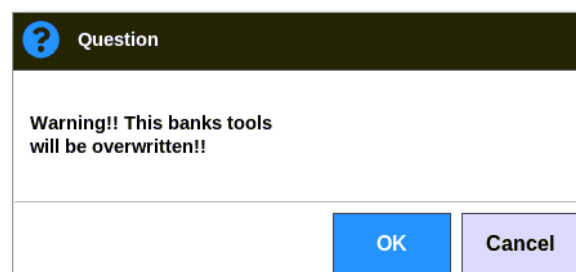
4. Enter password, if required.



IMPORTANT

The user must choose a blank ToolStore tab or the imported data will overwrite the existing tools on the visible tab.

A warning box opens:



5. Choose [**OK**] to restore all settings or [**Cancel**] to return to the tool bank without restoring settings.
6. Wait about 10 seconds then remove the USB memory stick.

6.18 Sequence Tools and Settings

The combination of sequence and time columns allows the user to run a preset sequence of actions.

6.18.1 Example of a Sequence

Step 1:

- Manifolds are heated to a lower start temperature and allowed to settle. Other zones are off. The sequence timer holds this condition for 60 minutes and then moves to the next step.

Step 2:

- Manifolds are then heated to normal temperature. Other zones are off. The sequence timer holds this condition for 10 minutes and then moves to the next step.

Step 3:

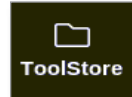
- All other zones are switched on and allowed to heat up to normal temperature. The sequence timer holds this condition for 15 minutes and then moves to the next step.

Step 4:

- All zones enter Run mode.

6.18.2 Program a Sequence

1. Choose [ToolStore]:



2. Choose the required tool and the corresponding box in the Sequence column:

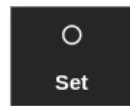
Display ToolStore Apps Settings Graph Pictures Shutdown Startup Standby Boost						
Bank 6 Bank 7 Bank 8 Bank 9 Bank 10						
Bank 1 Bank 2 Bank 3 Bank 4 Bank 5						
Tool #	Tool ID	Tool Name	Tool Notes	Last Modified	Sequence	Connector
1	1	100		10:06 23/02/18		Demo Mode
2	2	MMUS-Test				Serial Port
3	3	144c + 10	18 Cavity			Demo Mode
4	4	100new				Demo Mode
5	5	40r + SVG	24 CAVITY			Demo Mode
6	6	40zone	32 cavity + water + 10			Demo Mode
7	7	60zone	40 Cavity + 30A			Demo Mode
8	8	60zone	40 Cavity + 30A			Demo Mode
9	9	8 zone	8 Cavity + MFI0			Demo Mode
10	10	All Zones				Serial Port
11	11	NPE_WATER/FLO				Serial Port
12	12	waterflow				Serial Port
13	13	testy		12:50 13/04/18		Demo Mode

Mode
Tool ID #13: testy
02 May 2018 23:09
System
Status
DEMO

Set
Load
Save
Backup
Delete
Cancel

Program a Sequence - continued

3. Choose **[Set]**:



4. Enter password, if required.

A Settings keypad opens:



5. Choose **[Sequence Number]**.

A keypad opens:

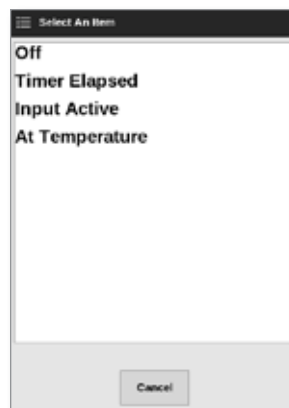


6. Enter the step number of the sequence [Step 1, Step 2, etc.].

7. Choose **[Enter]**.

8. Choose **[Trigger Next]**.

A selection box opens:



9. Choose the required action in the sequence or choose **[Cancel]** to return to the keypad.

Program a Sequence - continued

10. Choose [Time (Mins.)]:

A keypad opens:



11. Enter the required time.

The screen returns to the ToolStore. The sequence is shown in the Sequence column. See "Figure 6-16 Programmed sequence shown in ToolStore" on page 6-36.

Display ToolStore Apps Settings Graph Pictures Shutdown Startup Standby Boost						
Bank 6 Bank 7 Bank 8 Bank 9 Bank 10						
Bank 1 Bank 2 Bank 3 Bank 4 Bank 5						
Tool #	Tool ID	Tool Name	Tool Notes	Last Modified	Sequence	Connection
1	1	100		10:06 29/02/18		Demo Mode
2	2	MM100.Test				Serial Port
3	3	144z + 10	98 Cavity			Demo Mode
4	4	100new			1. Timer (5 min)	Demo Mode
5	5	40z + SVG	24 CAVITY			Demo Mode
6	6	40zone	32 cavity + water + 10			Demo Mode
7	7	60zone	40 Cavity + 30A			Demo Mode
8	8	60zone	40 Cavity + 30A			Demo Mode
9	9	8 zone	8 Cavity + MFI0			Demo Mode
10	10	All Zones				Serial Port
11	11	HPPE WATERFLO				Serial Port
12	12	waterflow				Serial Port
13	13	testy		12:50 13/04/18		Demo Mode

Mode: STOPPED Tool ID #13: testy 02 May 2018 23:14 System Status DEMO

Figure 6-16 Programmed sequence shown in ToolStore



6.18.3 Start a Sequence - Locally

NOTE

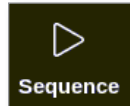
A tool with a sequence pattern loaded must be chosen.

From the Display screen:

1. Choose [**ToolStore**]:

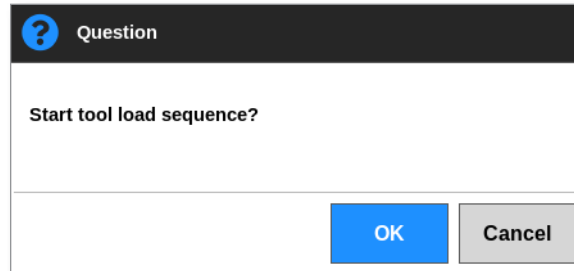


2. Choose [**Sequence**]:



3. Enter password, if required.

A message box opens:



4. Choose [**OK**] to start the sequence or choose [**Cancel**] to return to the ToolStore without starting the sequence.

6.18.4 Start a Sequence - Remotely



NOTE

A tool with a sequence pattern loaded must be chosen.

One input within the I/O card can be used to enable a sequence.

The sequence will run at its preset timed intervals with steady input.

The user can apply and release input to the I/O card, and this action will force the tool sequence to move on to the next step. This procedure can be used to reduce the overall time required for testing and initial settings.

6.19 Use EasyView Screen as the Display Screen

After the EasyView screen has been setup, the user can choose it as the main display screen. See "4.16 Display Screen Options" on page 4-20.

The mini panels show the zone number or alias, the chosen parameter and the condition of the zone, indicated by color.

The parameters available for display are shown on the right. They include:

- actual [temperature]
- setpoint
- power [in percent]
- amps

It is possible that more than one picture is associated with a single tool. The user can view each picture in sequence with the [Picture ▲] and [Picture ▼] buttons.

6.19.1 Lock and Unlock the Screen

If the EasyView screen is chosen as the main display, the zones are automatically locked. The user can unlock them, if necessary.



NOTE

The zones cannot be unlocked on the Display screen if any zone is chosen. Press [Cancel] to deselect zones before unlocking the screen.

1. Choose [Unlock]:



2. Move the required mini panel / mini panels.
3. Choose [Lock] to relock the screen:



The user can now move the entire image using the touchscreen. The zones stay locked in place.

6.19.2 Choose Zones with the EasyView Screen

The user can choose a zone or multiple zones on the EasyView Screen by touching them. The chosen zones are highlighted with a blue outline. See Figure 6-17.

Choose Zones with the EasyView Screen - continued

After a zone is chosen, the right hand menu buttons change to [Set], [Zoom] and [Cancel].

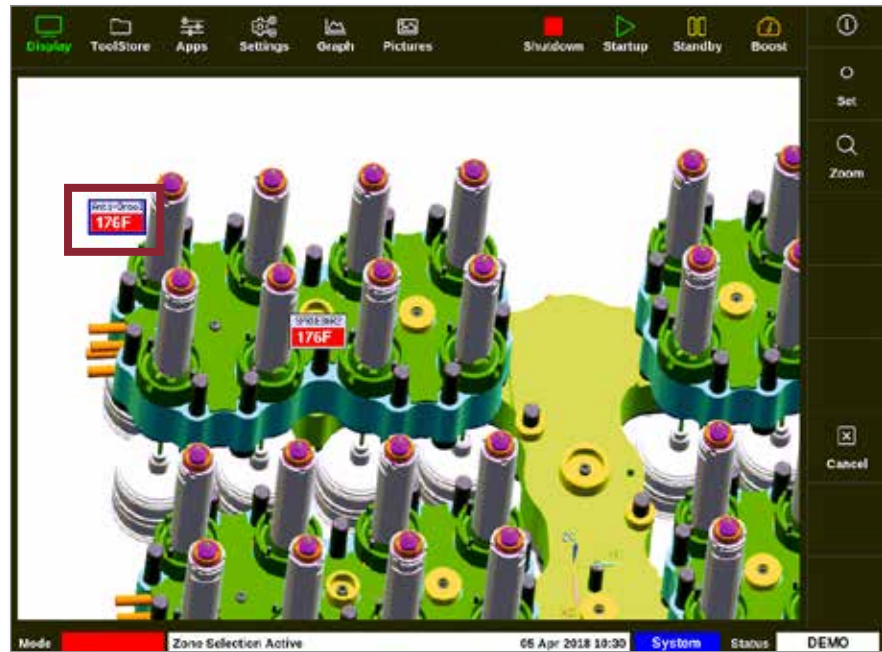


Figure 6-17 Choose zone on the EasyView screen

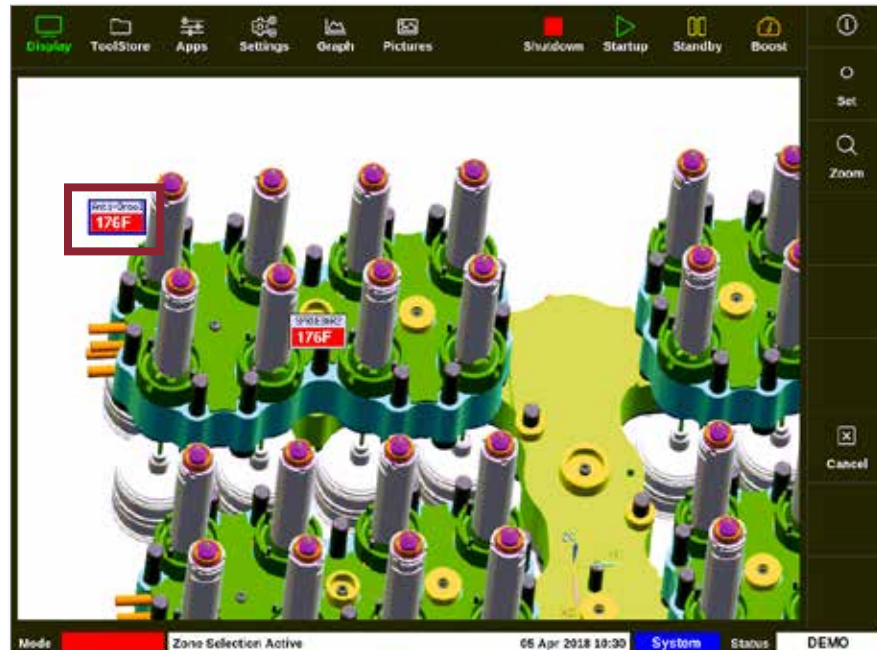
**NOTE**

The Range function is not available on this screen. To change multiple zones, the user must choose the zones one by one before choosing [Set].

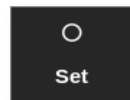
6.19.3 Set or Change Temperature with the EasyView Screen

The user can set temperature using the EasyView screen when it is the main display.

1. Choose the required zone or zones:



2. Choose [Set]:



3. Enter password, if required.

A keypad opens:



4. Choose [Auto] for the mode.



NOTE

For more information on Manual mode, see "5.7.1 Set Manual Mode" on page 5-27.

For more information on Slave mode, see "6.7 Slave Mode" on page 6-10.

Set or Change Temperature with the EasyView Screen - continued

5. Enter the required temperature using the keypad or choose:
 - **[Add]** to increase the current temperature by a set amount
 - **[Subtract]** to decrease the current temperature by a set amount



NOTE

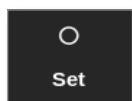
The temperature set must fall in the limits configured in tool settings. See "5.5 Configure the Parameters and Settings" on page 5-10 for information on how to set and change these limits.

6. Choose **[Enter]** to accept the changes and return to the EasyView screen, or choose **[Esc]** to clear the input.

The user can return to the EasyView screen at any time by choosing **[Esc]**.

6.19.4 Set Manual Mode with the EasyView Screen

1. Choose the required zone or zones.
2. Choose **[Set]**:



3. Enter password, if required.

A keypad opens:



4. Choose **[Manual]** for the mode.
5. Enter the percentage power required.
6. Choose **[Enter]** to accept the changes and return to the EasyView screen, or choose **[Esc]** to clear the input.

The user can return to the EasyView screen at any time by choosing **[Esc]** twice.

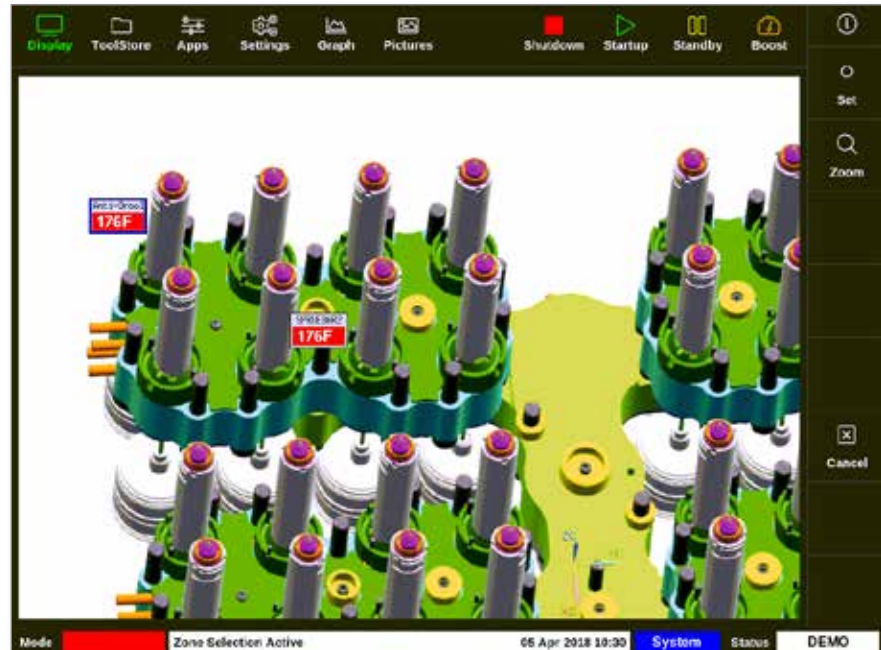
Set Manual Mode with the EasyView Screen - continued

The mini panel / panels now have a display that alternately flashes “MAN” and the temperature.

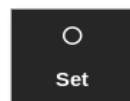


6.19.5 Set a Zone to Slave on the EasyView Screen

1. Choose the required zone or zones:



2. Choose [Set]:



3. Enter password, if required.

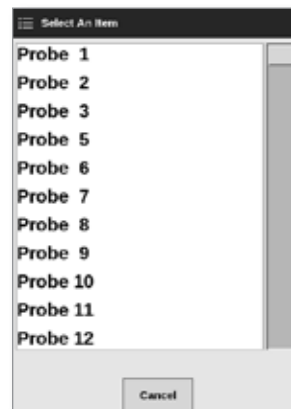
A keypad opens:



4. Choose [Slave] for the mode.

Set Zone to Slave on EasyView Screen - continued

A zone selection box opens:



5. Choose the lead zone or choose **[Esc]** to return to the EasyView screen without slaving.

The mini panel now displays the chosen zone as a slaved zone. See Figure 6-18.

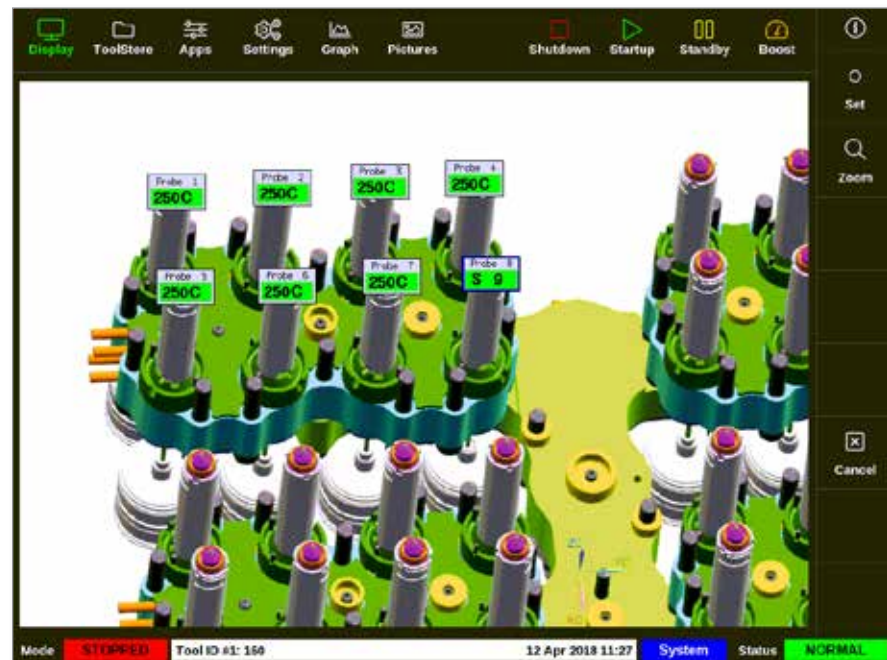
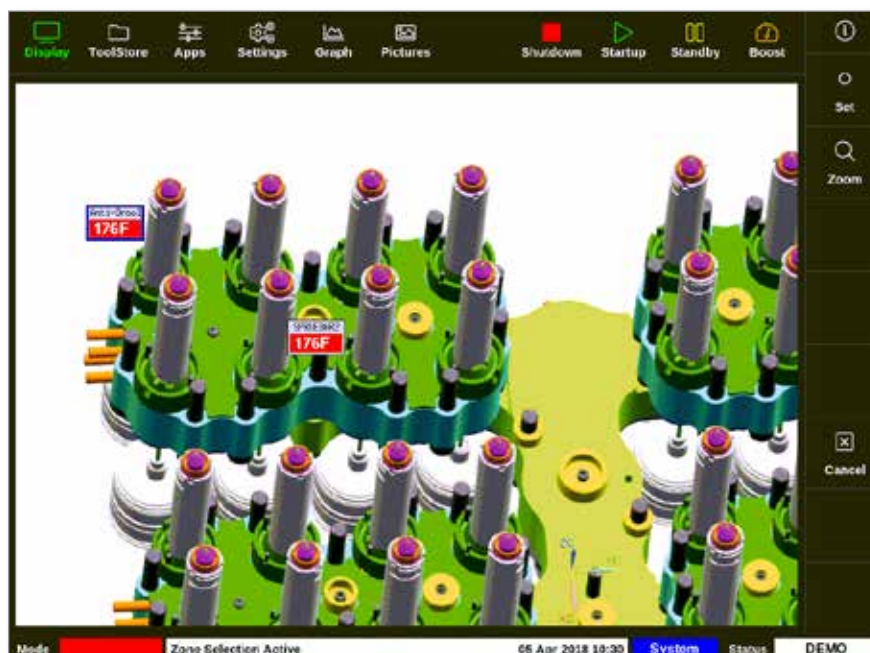


Figure 6-18 EasyView screen with a slaved zone

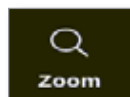
The user can return to the EasyView screen at any time by choosing **[Esc]** twice.

6.19.6 Open the Zoom Screen from the EasyView Screen

1. Choose the required zone or zones:



2. Choose [Zoom]:



The Zoom screen opens. See "4.22.5 Zoom Screen" on page 4-40 for more information on the Zoom screen.

6.20 Monitor Energy Usage - Energy Screen

The Energy screen reports energy and material consumption. The energy statistics are derived from:

- parameters that are manually input
- the actual current that the control cards measure

1. Choose **[Apps]**:



2. Choose **[Energy]**:



3. Enter password, if required.

The Energy screen opens. See Figure 6-19.

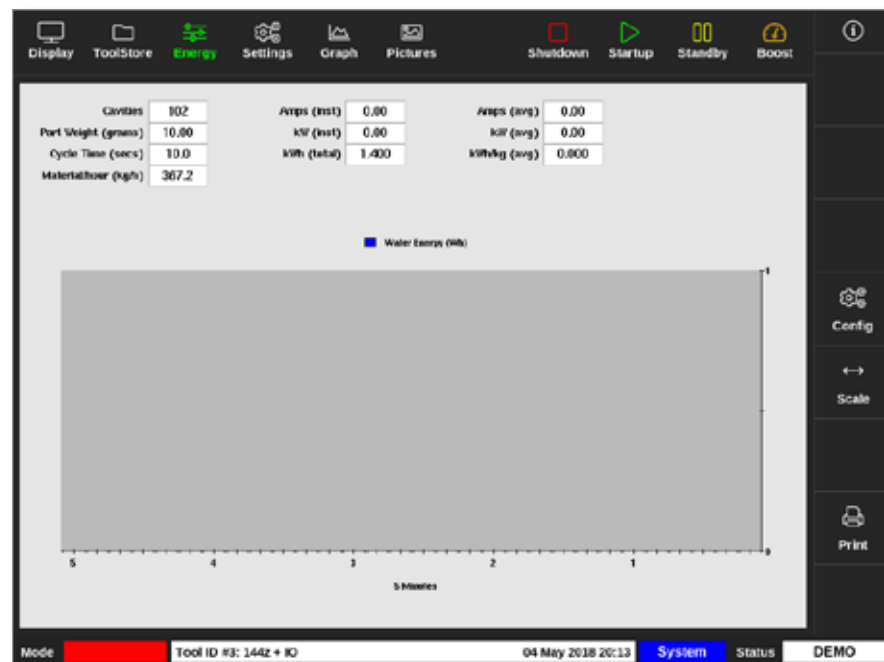


Figure 6-19 Energy screen - time scale 5 minutes

6.20.1 Configure the Energy Screen

The user can configure the Energy screen.

To change the time period shown on the x axis, choose [**Scale**]:



The time scale choices available are 5 minutes, 30 minutes and 24 hours.



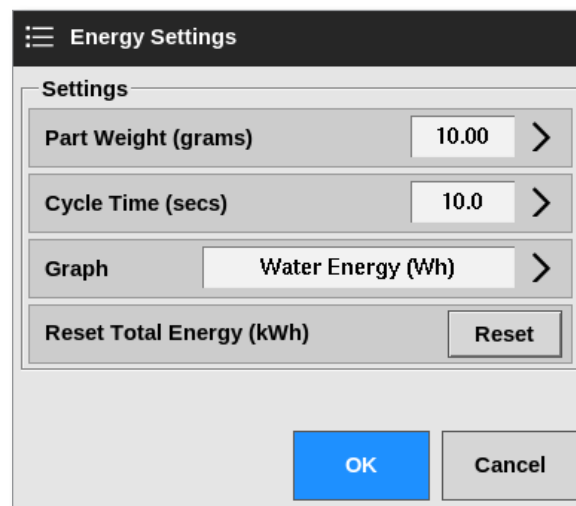
NOTE

The 5 and 30 minute graphs display as line graphs. The 24 hour graph displays as a bar graph.

1. Choose [**Config**]:



The Energy Settings box opens:



The Energy Settings dialog box contains the following fields and buttons:

- Settings** (header)
- Part Weight (grams)**: Input field with value 10.00 and a right arrow button.
- Cycle Time (secs)**: Input field with value 10.0 and a right arrow button.
- Graph**: Dropdown menu showing 'Water Energy (Wh)' and a right arrow button.
- Reset Total Energy (kWh)**: Input field with a 'Reset' button.
- OK** and **Cancel** buttons at the bottom right.

2. Choose [**Part Weight (grams)**]:



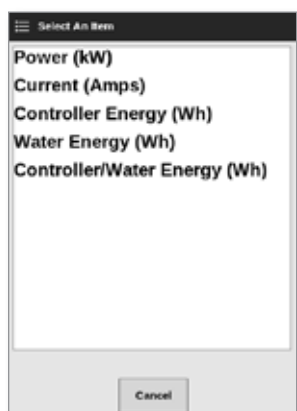
3. Enter part weight or choose [**Esc**] to return to the Energy Settings box.

Configure the Energy Screen - continued

4. Choose [Cycle Time (secs)]:



5. Choose [Graph]:



6. Press [OK] to accept or [Cancel] to return to the Energy screen.
The user can reset the total energy used back to 0 with the [Reset] button.

6.20.2 Print the Graphs from the Energy Screen

The user can print the graphs from the Energy screen.

1. Choose [Print]:



A message box opens:



NOTE

The user must choose the default print setting from the [Printers] screen. All output is sent directly to this default after the user chooses the [Print] button. No printer settings box will open.

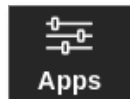
See "5.15 Configure a Printer" on page 5-49 for more information.

6.21 Export Tool Data - Export Screen

The console auto-archives data to a .csv file every 12 hours if it is operational. The Auto Archived History Data box on the Export screen displays these archived files, which are available for backup.

The user can also export historical data from the controller at any time with the Export screen.

1. Insert a USB memory stick into one of the USB ports on the console.
2. Choose **[Apps]**:



3. Choose **[Export]**:



4. Enter password, if required.

The Export screen opens. See Figure 6-20.

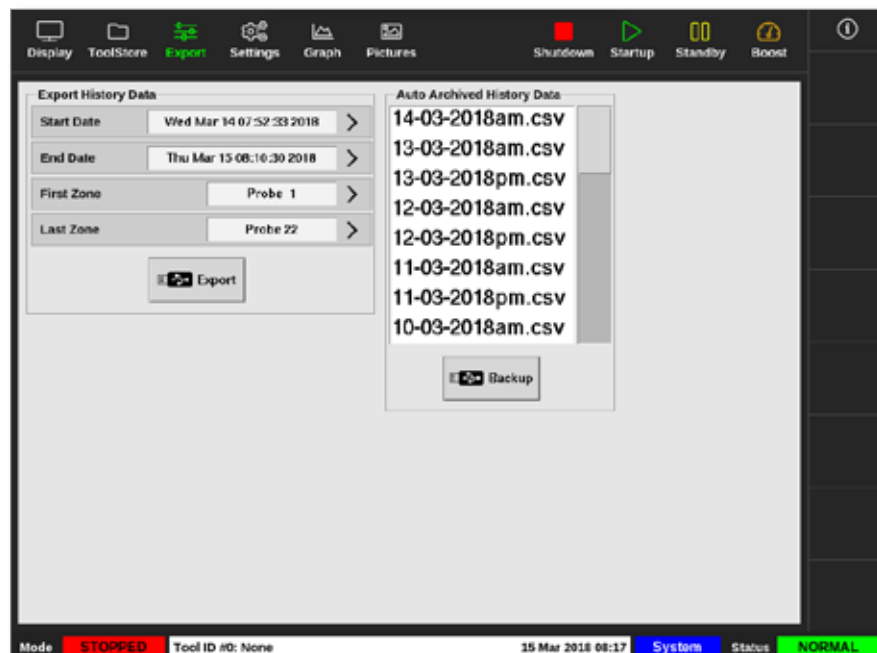


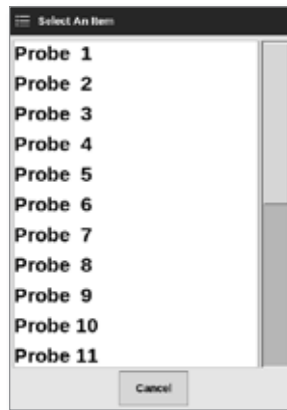
Figure 6-20 Export screen

Export Tool Data - Export Screen - continued

5. Choose **[Start Date]** and **[End Date]** from the dropdown menus:



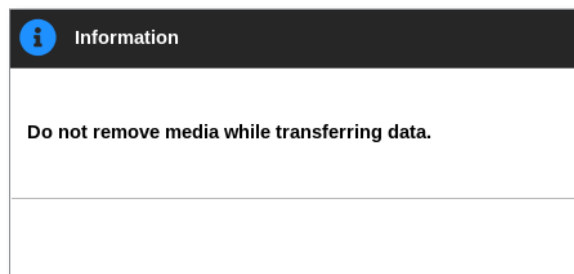
6. Choose **[First Zone]** and **[Last Zone]** from the dropdown menus:



7. Choose **[Export]**:



This message appears when data is transferring:



8. Remove the USB memory stick after the message disappears.

In the event that the controller is not working properly and cannot be fixed with the manual, then it is necessary to contact *Mold-Masters* for additional assistance.

Mold-Masters recommends that a copy of the controller's configuration is exported and sent to help@moldmasters.com.

6.22 Monitor Controller Changes - Actions Screen

This screen is a dated list of all operational changes made to the controller or its configuration. Its size is limited to available disk space but it can usually hold 12 months' worth of information.

If the record of operations is required for a longer time period, the history should be exported weekly or monthly and stored externally.

1. Choose **[Apps]**:



2. Choose **[Actions]**:



3. Enter password, if required.

The Actions screen opens. See Figure 6-21.

Time	User	Action	Zone	Value	Old Value	Tool #
2018-03-09 14:41:09	System	Tool Loaded		Tool ID 1		1
2018-03-09 14:36:25	System	Tool Loaded		Tool ID 3		3
2018-03-09 14:36:11	System	Controller Mode		Stopped	Run	1
2018-03-09 14:35:47	System	Tool Saved		Tool ID 1		1
2018-03-09 14:35:31	System	User Login				1
2018-03-09 14:35:25	System	User Logout				1
2018-03-09 14:34:19	System	User Login				1
2018-03-09 14:34:11	Factory	User Logout				1
2018-03-09 14:32:04	Factory	Tool Saved		Tool ID 1		1
2018-03-09 14:29:09	Factory	Tool Name		nyu7		1
2018-03-09 14:28:50	Factory	Tool Saved		Tool ID 2		1
2018-03-09 14:27:52	Factory	Controller Mode		Run	Stopped	1
2018-03-09 14:23:59	Factory	User Login				1
2018-03-09 14:23:50	System	User Logout				1
2018-03-09 14:22:02	System	Setpoint	Probe 40	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 39	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 38	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 37	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 36	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 35	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 34	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 33	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 32	40.0	250.0	1
2018-03-09 14:22:02	System	Setpoint	Probe 31	40.0	250.0	1

Mode: STOPPED Tool ID #1: 169 09 Mar 2018 14:47 System Status DEMO

Figure 6-21 Actions screen



NOTE

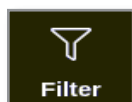
If the user does not have access to the Actions screen or if the user is logged out, the screen will appear blank. After a user logs in, the screen must be refreshed by exiting to the Apps screen and then choosing the **[Actions]** icon again.

The user can move through the list of actions on a particular screen with the scrollbar on the right hand side of the screen.

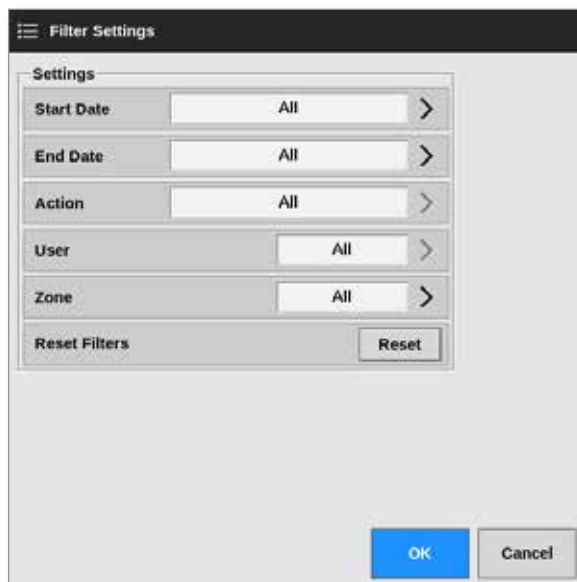
The user can move through the pages of actions with the **[Page ▲]** or **[Page ▼]** buttons.

Monitor Controller Changes - Actions Screen - continued

4. Choose **[Filter]**:

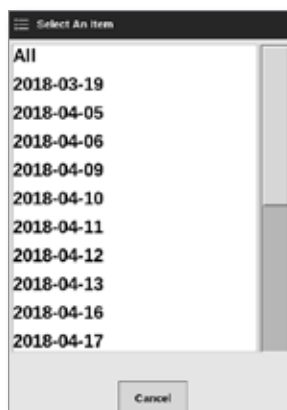


The Filter Settings box opens:



The Filter Settings dialog box is shown. It has a title bar "Filter Settings" with a menu icon. Inside, there's a "Settings" section with five rows, each with a label and a dropdown menu: "Start Date" (All), "End Date" (All), "Action" (All), "User" (All), and "Zone" (All). Each dropdown has a right arrow. Below these is a "Reset Filters" button and a "Reset" button. At the bottom right are "OK" and "Cancel" buttons.

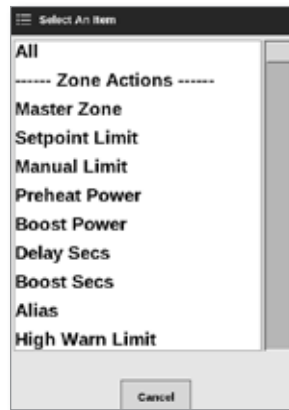
5. Choose **[Start Date]** and **[End Date]** to filter by date:



The Select An Item dialog box is shown. It has a title bar "Select An Item" with a menu icon. Inside is a list of dates: "All", "2018-03-19", "2018-04-05", "2018-04-06", "2018-04-09", "2018-04-10", "2018-04-11", "2018-04-12", "2018-04-13", "2018-04-16", and "2018-04-17". At the bottom right is a "Cancel" button.

Monitor Controller Changes - Actions Screen - continued

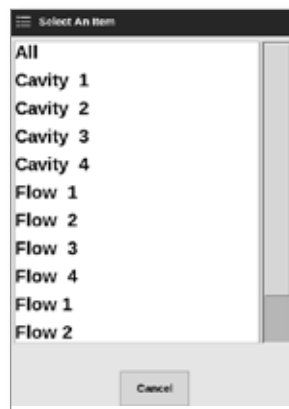
6. Choose **[Action]** to filter by action:



7. Choose **[User]** to filter by user:



8. Choose **[Zone]** to filter by zone:



NOTE

Choose **[Reset Filters]** to return all filter options to “All” if required.

Monitor Controller Changes - Actions Screen - continued

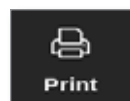
9. Choose **[OK]** to display results or choose **[Cancel]** to return to the Actions screen. See Figure 6-22.

Time	User	Action	Zone	Value	Old Value	Tool #
2018-04-18 15:54:33	System	User Login				10
2018-04-18 15:53:12	System	User Logout				10
2018-04-18 15:52:54	System	Tool Saved		Tool ID 21		10
2018-04-18 15:50:51	System	User Login				10
2018-04-18 15:33:09	System	User Logout				8
2018-04-18 15:21:55	System	User Login				8
2018-04-17 18:53:14	System	User Auto-Logout				8
2018-04-17 18:48:43	System	Group	Cavity 16	Group 1	Group 255	8
2018-04-17 18:48:43	System	Group	Cavity 15	Group 1	Group 255	8
2018-04-17 18:48:43	System	Group	Cavity 14	Group 1	Group 255	8
2018-04-17 18:48:43	System	Group	Cavity 13	Group 1	Group 255	8
2018-04-17 18:48:43	System	Group	Flow 12	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 11	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 10	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 9	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 8	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 7	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 6	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 5	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 4	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 3	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 2	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Flow 1	Group 1	Group 0	8
2018-04-17 18:48:43	System	Group	Cavity 12	Group 1	Group 0	8

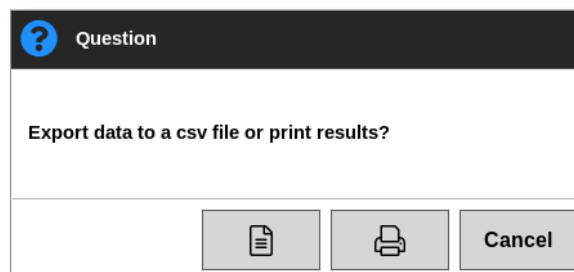
Mode: STOPPED Tool ID #10: 60zone 18 Apr 2018 15:58 System Status DEMO

Figure 6-22 Actions screen - results shown

10. Choose **[Print]** to export or print the filtered results:



A message box appears:



11. Choose **[Export]** or **[Print]** as required, or choose **[Cancel]** to return to the filtered results screen.



NOTE

The user must choose the default print setting from the **[Printers]** screen. All output is sent directly to this default after the user chooses the **[Print]** button. No printer settings box will open.

See "5.15 Configure a Printer" on page 5-49 for more information.

6.23 Monitor Alarms - Alarms Screen

1. Choose [Apps]:

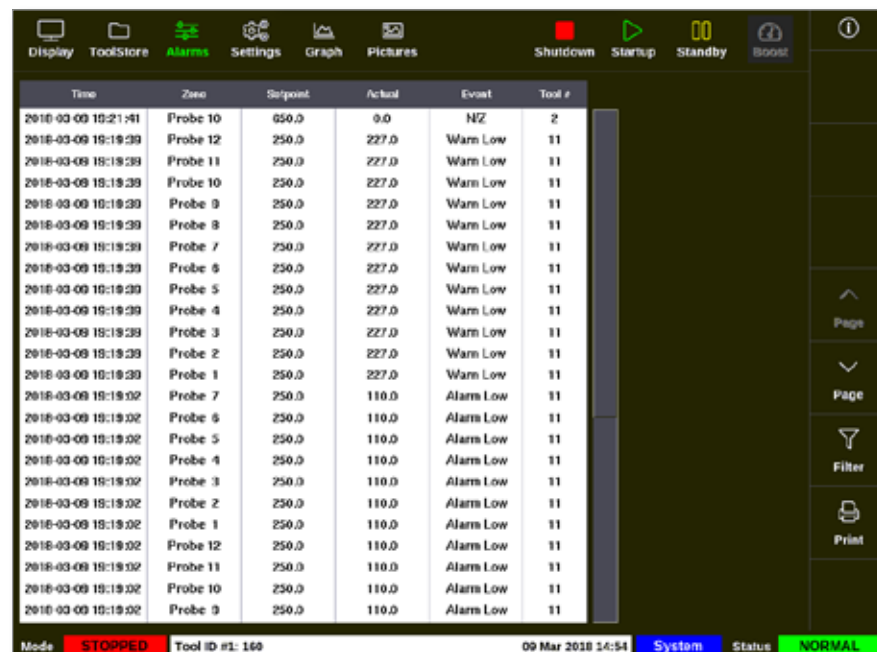


2. Choose [Alarms]:



3. Enter password, if required.

The Alarms screen opens. See Figure 6-20.



Time	Zone	Setpoint	Actual	Event	Tool #
2018-03-09 18:21:41	Probe 10	650.0	0.0	NZ	2
2018-03-09 18:19:39	Probe 12	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 11	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 10	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 9	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 8	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 7	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 6	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 5	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 4	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 3	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 2	250.0	227.0	Warn Low	11
2018-03-09 18:18:39	Probe 1	250.0	227.0	Warn Low	11
2018-03-09 18:19:02	Probe 7	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 6	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 5	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 4	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 3	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 2	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 1	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 12	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 11	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 10	250.0	110.0	Alarm Low	11
2018-03-09 18:19:02	Probe 9	250.0	110.0	Alarm Low	11

Mode: STOPPED Tool ID #1: 160 09 Mar 2018 14:54 System Status: NORMAL

Figure 6-23 Alarms screen



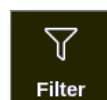
NOTE

If the user does not have access to the Alarms screen or if the user is logged out, the screen will appear blank. After a user logs in, the screen must be refreshed by exiting to the Apps screen and choosing the [Alarms] icon again.

The user can move through the list of actions on a particular screen with the scrollbar on the right hand side of the screen.

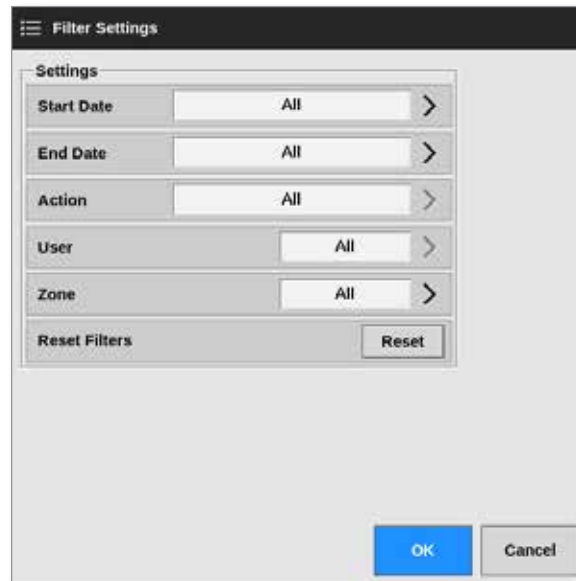
The user can move through the pages of actions with the [Page ▲] or [Page ▼] buttons.

4. Choose [Filter]:



Monitor Alarms - Alarms Screen - continued

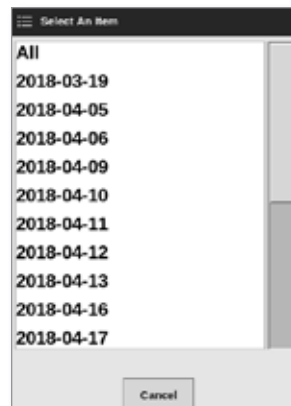
The Filter Settings box opens:



The Filter Settings dialog box contains the following elements:

- Settings** section with dropdown menus for:
 - Start Date: All
 - End Date: All
 - Action: All
 - User: All
 - Zone: All
- Reset Filters** button with a **Reset** sub-button.
- OK** and **Cancel** buttons at the bottom right.

- Choose **[Start Date]** and **[End Date]** to filter by date:

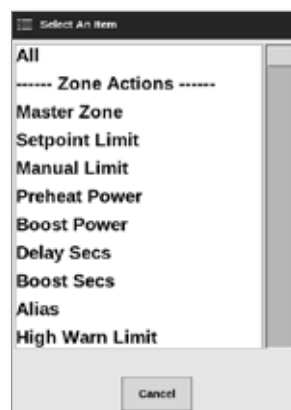


The Select An Item dialog box displays a list of dates for selection:

- All
- 2018-03-19
- 2018-04-05
- 2018-04-06
- 2018-04-09
- 2018-04-10
- 2018-04-11
- 2018-04-12
- 2018-04-13
- 2018-04-16
- 2018-04-17

A **Cancel** button is located at the bottom right.

- Choose **[Action]** to filter by action:



The Select An Item dialog box displays a list of actions for selection:

- All
- Zone Actions -----
- Master Zone
- Setpoint Limit
- Manual Limit
- Preheat Power
- Boost Power
- Delay Secs
- Boost Secs
- Alias
- High Warn Limit

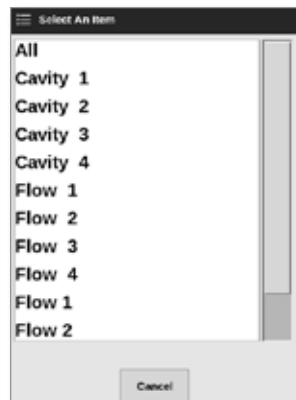
A **Cancel** button is located at the bottom right.

Monitor Alarms - Alarms Screen - continued

7. Choose **[User]** to filter by user:



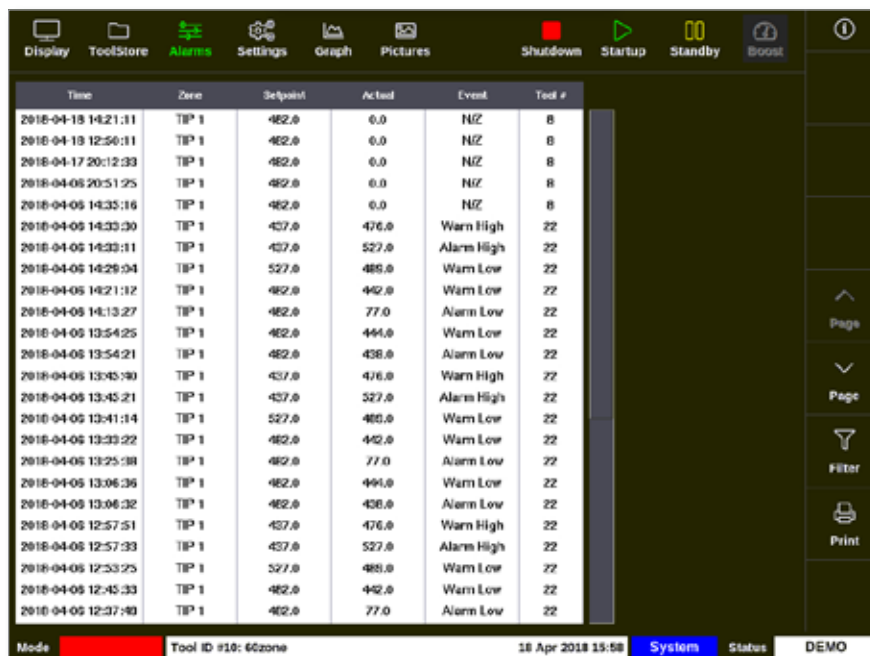
8. Choose **[Zone]** to filter by zone:



9. Choose **[Reset Filters]** to return all filter options to "All".

Monitor Alarms - Alarms Screen - continued

10. Choose [OK] to display results or choose [Cancel] to return to the Alarms screen. See Figure 6-24.



Time	Zone	Setpoint	Actual	Event	Tool #
2018-04-18 14:21:11	TIP 1	462.0	0.0	NZ	8
2018-04-18 12:56:11	TIP 1	462.0	0.0	NZ	8
2018-04-17 20:12:33	TIP 1	462.0	0.0	NZ	8
2018-04-05 20:51:25	TIP 1	462.0	0.0	NZ	8
2018-04-05 14:35:16	TIP 1	462.0	0.0	NZ	8
2018-04-05 14:35:30	TIP 1	457.0	476.0	Warn High	22
2018-04-05 14:33:11	TIP 1	457.0	527.0	Alarm High	22
2018-04-05 14:26:04	TIP 1	527.0	486.0	Warn Low	22
2018-04-05 14:21:12	TIP 1	462.0	442.0	Warn Low	22
2018-04-05 14:13:27	TIP 1	462.0	77.0	Alarm Low	22
2018-04-05 13:54:25	TIP 1	462.0	444.0	Warn Low	22
2018-04-05 13:54:21	TIP 1	462.0	436.0	Alarm Low	22
2018-04-05 13:45:30	TIP 1	457.0	476.0	Warn High	22
2018-04-05 13:45:21	TIP 1	457.0	527.0	Alarm High	22
2018-04-05 13:41:14	TIP 1	527.0	486.0	Warn Low	22
2018-04-05 13:33:22	TIP 1	462.0	442.0	Warn Low	22
2018-04-05 13:25:38	TIP 1	462.0	77.0	Alarm Low	22
2018-04-05 13:06:36	TIP 1	462.0	444.0	Warn Low	22
2018-04-05 13:06:32	TIP 1	462.0	436.0	Alarm Low	22
2018-04-05 12:57:51	TIP 1	457.0	476.0	Warn High	22
2018-04-05 12:57:33	TIP 1	457.0	527.0	Alarm High	22
2018-04-05 12:53:25	TIP 1	527.0	486.0	Warn Low	22
2018-04-05 12:45:33	TIP 1	462.0	442.0	Warn Low	22
2018-04-05 12:37:40	TIP 1	462.0	77.0	Alarm Low	22

Figure 6-24 Alarms screen - results shown

The user can print these results with the [Print] button:



A message box opens:



NOTE

The user must choose the default print setting from the [Printers] screen. All output is sent directly to this default after the user chooses the [Print] button. No printer settings box will open.

See "5.15 Configure a Printer" on page 5-49 for more information.



6.24 Connect Remotely - Remote Screen

IMPORTANT

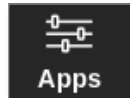
The user must configure a wired or wireless network before the VNC application can be configured. See "7.7 Configure a Network Connection" on page 7-13.

A VNC application is available to connect to, monitor and control an external application that is hosted on a remote networked computer. The user can utilize either the whole screen, or just part of it, to view the remote application.

The TS12 and TS17 consoles are VNC compatible and can be linked to another VNC application on an outside computer. Control can be interchanged in either direction, and operation can be centralized from a single point.

Users can operate the touchscreen application from a connected terminal in a distant location or from a mobile phone, if the phone has the correct VNC program installed.

1. Choose **[Apps]**:



2. Choose **[Remote]**:



3. Enter password, if required.

The Remote screen with the VNC settings box opens. See Figure 6-25.



Figure 6-25 Remote screen with VNC Settings box

Connect Remotely - Remote Screen - continued

4. Enter [Server Address]:



5. Enter [VNC Password]:



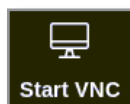
6. Choose [Fullscreen or Windowed]:



NOTE

In windowed mode, the user is able to view different parts of the screen using the scroll bars. In fullscreen mode, the user can only see the VNC screen.

7. Choose [Start VNC] to connected to the remote desktop:



6.24.1 Stop the VNC

If windowed mode is selected: choose [Stop VNC] to return to the Remote screen with VNC Settings box.

If fullscreen mode is selected: the user must wait for the VNC timeout to complete. See "5.5.3 Configure System Settings" on page 5-21 for more information.

6.25 SmartMold Screen

SmartMold is an application that will be available from *Mold-Masters* in the future. Currently, if the user chooses the SmartMold icon:



the following message opens:



Figure 6-26 SmartMold screen

To exit the application, choose the menu icon in the top left hand corner. See Figure 6-27.



Figure 6-27 SmartMold menu

Section 7 - User Access and Networking



WARNING

Ensure that you have fully read "Section 3 - Safety" before changing or configuring user access or a network.

7.1 User Access Screen

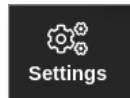


NOTE

The job titles, such as Operator 1 or Operator 2 are not user definable.

Only users who have Supervisor level access are able to access this screen.

1. Choose **[Settings]**:

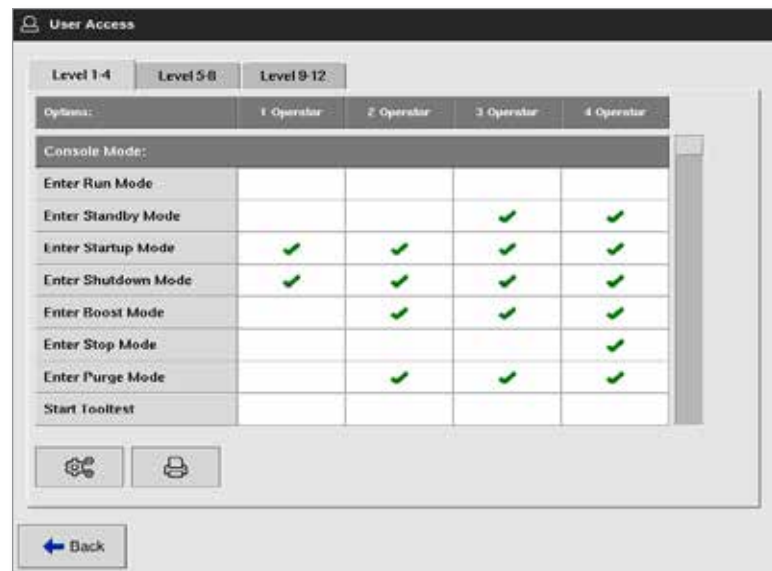


2. Choose **[User Access]**:



3. Enter password, if required.

The User Access screen opens. See Figure 7-1.



The screenshot shows the 'User Access' screen with a title bar and a 'Back' button at the bottom. The screen is divided into sections for 'Level 1-4', 'Level 5-8', and 'Level 9-12'. Below these are tabs for 'Operator 1', 'Operator 2', 'Operator 3', and 'Operator 4'. The main section is 'Console Mode:' which contains a table with the following rows and columns:

Console Mode:	1 Operator	2 Operator	3 Operator	4 Operator
Enter Run Mode				
Enter Standby Mode			✓	✓
Enter Startup Mode	✓	✓	✓	✓
Enter Shutdown Mode	✓	✓	✓	✓
Enter Boost Mode		✓	✓	✓
Enter Stop Mode				✓
Enter Purge Mode		✓	✓	✓
Start Tooltest				

At the bottom of the screen, there are icons for 'Settings' (gear) and 'Print' (printer), and a 'Back' button with a left arrow.

Figure 7-1 User Access screen

User Access - continued

There are 12 levels of user access for the controller:

- Levels 1 to 4 - Operator Level
- Levels 5 to 8 - Maintenance Level
- Levels 9 to 12 - Supervisor Level

Choose the access level tabs to see or configure user access. Use the scrollbar on the right side is used to move through the list of options. Choose **[Back]** to return to the Settings box at any time.

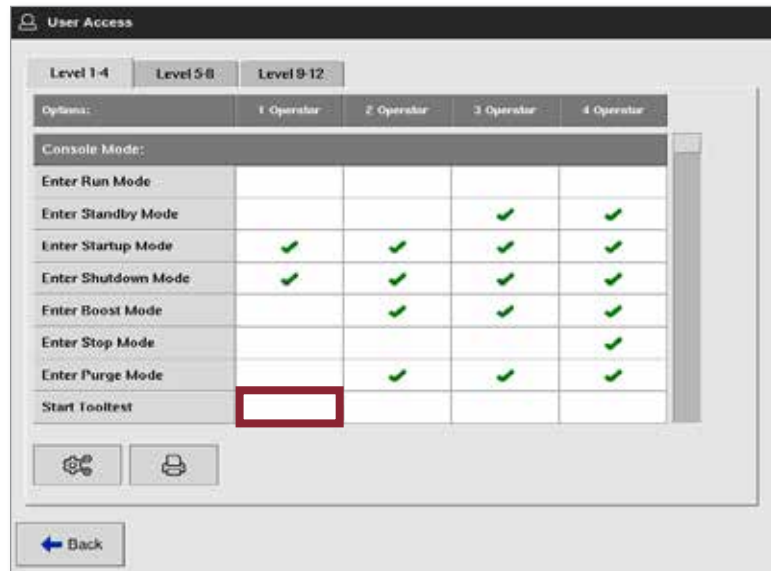
Actions available to a user in a particular level are indicated by a green checkmark.

7.2 Configure User Limitations

Many functions are restricted according to their job title. A user with Supervisor level access can add or remove functions from other users.

7.2.1 Add a Function for a User

Choose the box where the function intersects with the required user:



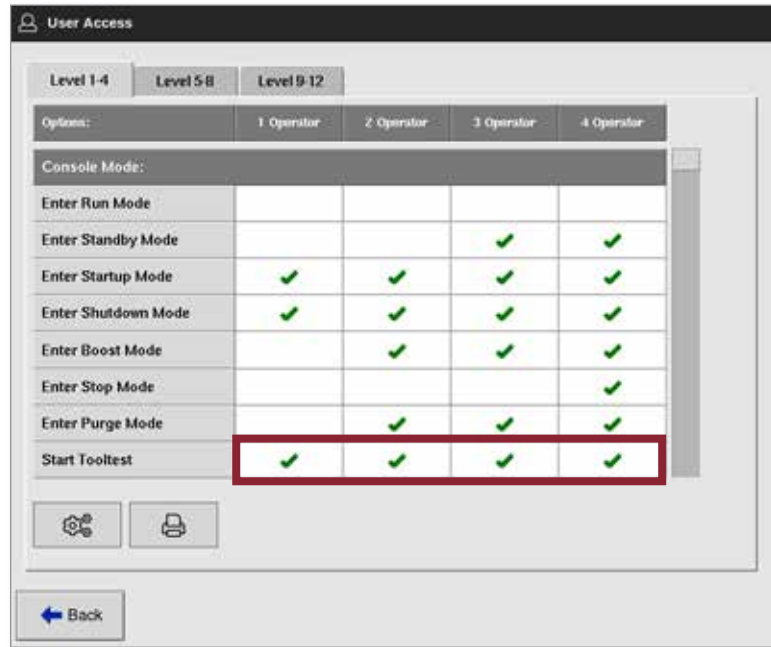
The screenshot shows the 'User Access' configuration window. At the top, there are tabs for 'Level 1-4', 'Level 5-8', and 'Level 9-12'. Below the tabs, there are columns for 'Options:', '1 Operator', '2 Operator', '3 Operator', and '4 Operator'. The main table lists various functions with green checkmarks indicating access for different user levels. A red box highlights the 'Start Tooltest' function for Level 1-4.

Options:	1 Operator	2 Operator	3 Operator	4 Operator
Console Mode:				
Enter Run Mode			✓	✓
Enter Standby Mode			✓	✓
Enter Startup Mode	✓	✓	✓	✓
Enter Shutdown Mode	✓	✓	✓	✓
Enter Boost Mode		✓	✓	✓
Enter Stop Mode				✓
Enter Purge Mode		✓	✓	✓
Start Tooltest				

At the bottom of the screen, there are buttons for 'Back' and 'Print'.

Add a Function for a User - continued

A green checkmark appears:



The screenshot shows the 'User Access' configuration window. The 'Level 1-4' tab is selected. The 'Options' section shows '1 Operator', '2 Operator', '3 Operator', and '4 Operator'. The 'Console Mode' section lists various functions. The 'Start Tooltest' row has green checkmarks in all four operator columns, which are highlighted by a red rectangle.

Options:	1 Operator	2 Operator	3 Operator	4 Operator
Console Mode:				
Enter Run Mode				
Enter Standby Mode			✓	✓
Enter Startup Mode	✓	✓	✓	✓
Enter Shutdown Mode	✓	✓	✓	✓
Enter Boost Mode		✓	✓	✓
Enter Stop Mode				✓
Enter Purge Mode		✓	✓	✓
Start Tooltest	✓	✓	✓	✓

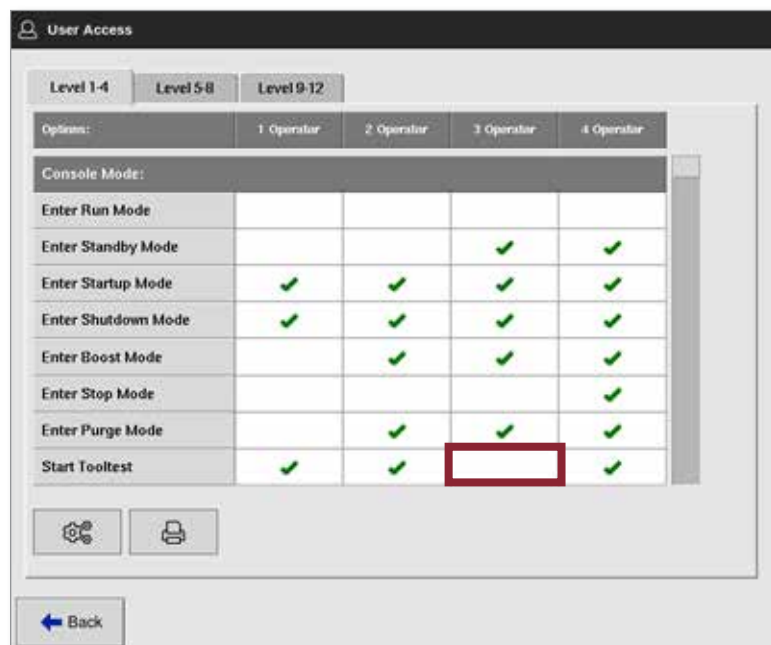


NOTE

Allowing an action for a particular user level also allows any user with a higher level of access to also perform that function. In the example, all users above Operator level 1 now have access to Tooltest.

7.2.2 Remove a Function from a User

To remove a function from a user, choose the box with the green checkmark, where the function intersects with the required user:



The screenshot shows the 'User Access' configuration window. The 'Level 1-4' tab is selected. The 'Options' section shows '1 Operator', '2 Operator', '3 Operator', and '4 Operator'. The 'Console Mode' section lists various functions. The 'Start Tooltest' row has green checkmarks in the 1 Operator, 2 Operator, and 4 Operator columns. The 3 Operator column has a red rectangle around the empty box, indicating the location to click to remove the function.

Options:	1 Operator	2 Operator	3 Operator	4 Operator
Console Mode:				
Enter Run Mode				
Enter Standby Mode			✓	✓
Enter Startup Mode	✓	✓	✓	✓
Enter Shutdown Mode	✓	✓	✓	✓
Enter Boost Mode		✓	✓	✓
Enter Stop Mode				✓
Enter Purge Mode		✓	✓	✓
Start Tooltest	✓	✓		✓

Remove a Function from a User - continued



NOTE

Removing a function from a particular user level does not remove it from any other user.

7.2.3 Import System Security Settings

Security settings can be imported to the M2 Plus controller with a USB memory stick.

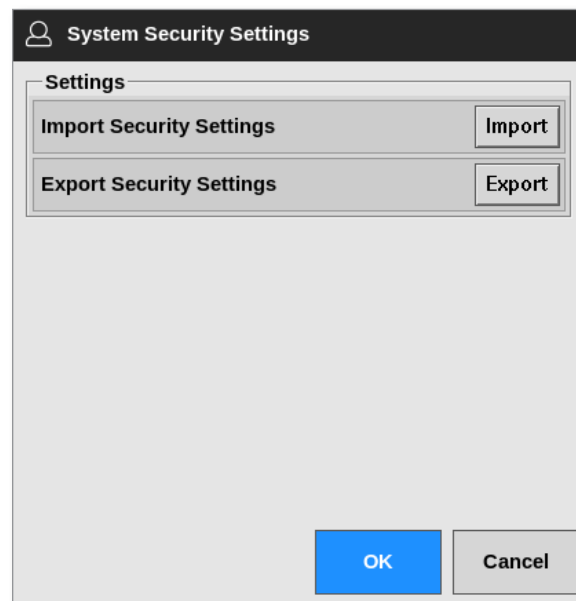
1. Insert the USB memory stick with the security settings data into the console and wait about 10 seconds.

From the User Access screen,

2. Choose **[Config]**:

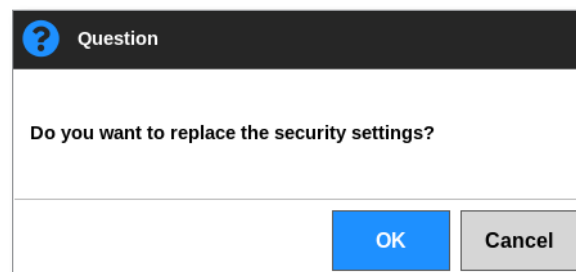


The System Security Settings box opens:



3. Choose **[Import]** to import user security settings.

A message box opens:



4. Choose **[OK]** to import settings or choose **[Cancel]** to return to the System Security Settings box.



7.2.4 Export System Security Settings

IMPORTANT

The 12 user levels share over 100 different functions.

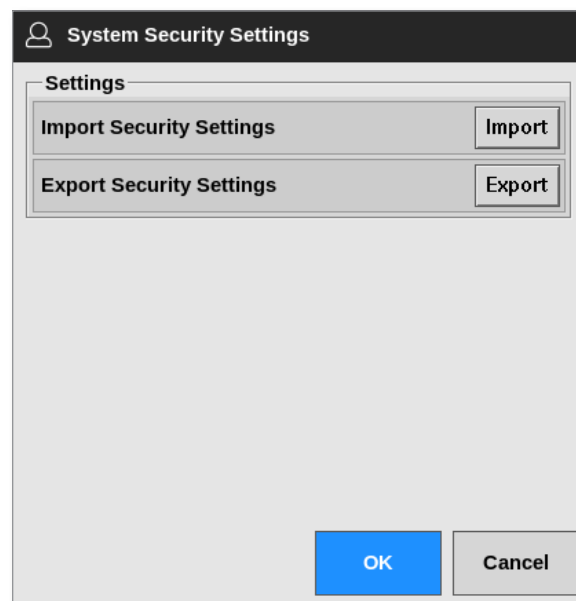
Mold-Masters recommends that any changes made to the default settings are exported and saved for backup purposes.

Security settings can be exported from the M2 Plus controller onto a USB memory stick.

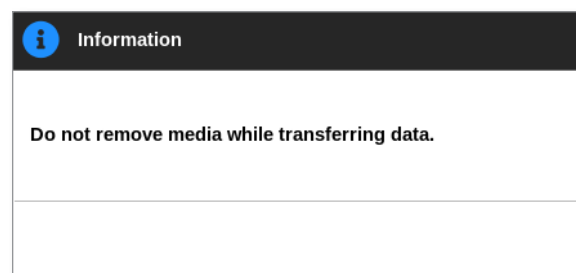
1. Insert the USB memory stick into the console and wait about 10 seconds.
- From the User Access screen,
2. Choose **[Config]**:



The System Security Settings box opens:



3. Choose **[Export]** to import user security settings.
- A message box opens:

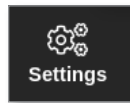


4. Remove the USB memory stick after the message disappears.

7.3 User Admin Screen

Only users who have Supervisor level access are able to access this screen to change user details, add or delete users or configure user admin settings.

1. Choose [**Settings**]:



2. Choose [**User Admin**]:



3. Enter password, if required.

The User Admin screen opens. See Figure 7-2.

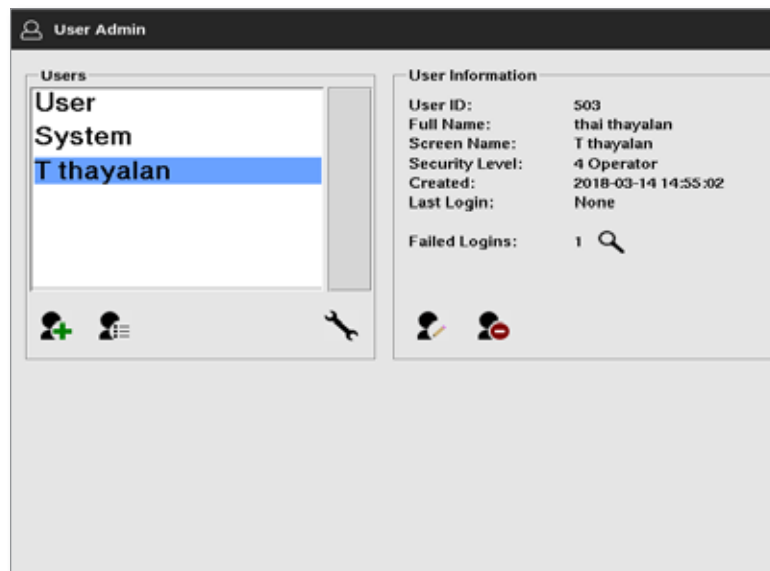


Figure 7-2 User Admin screen

7.3.1 View User Details

Choose the user name. See Figure 7-3.

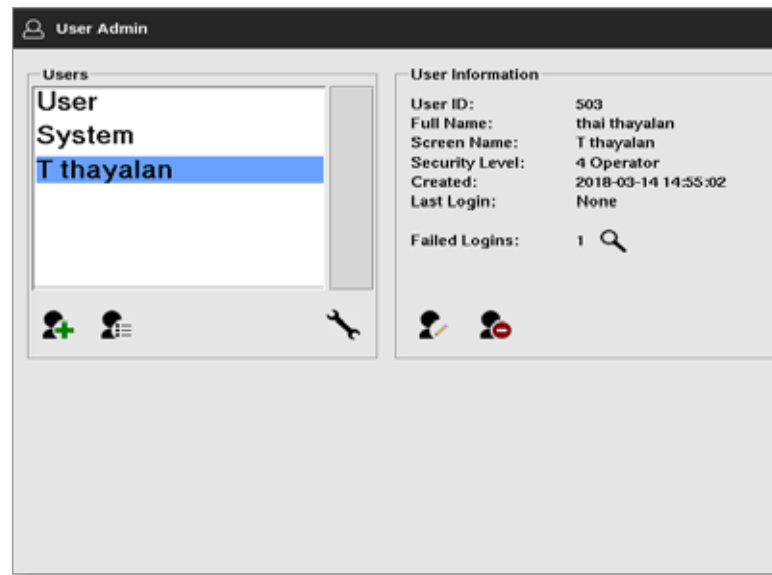


Figure 7-3 User Admin screen - user details

The user information box on the right side displays the user's details.

7.3.2 Edit User Details

1. Choose the required user. The user will be highlighted in blue. See Figure 7-3.
2. Choose the Edit User icon:



The Edit User box opens:



The 'Edit User' dialog box displays the following fields for user 'S03':

User ID	S03
First Name	thai
Middle Name	
Last Name	thayalan
Security Level	4 Operator
New Password	

At the bottom, there are 'OK' and 'Cancel' buttons.

3. Edit the required details.
4. Choose **[OK]** to accept the user setting changes or **[Cancel]** to return to the User Admin screen without saving any changes.
5. Choose **[Back]** at any point to return to the previous screen.

7.4 Add New User

1. Choose **[Add New User]**:



The Add User box opens:



2. Choose **[User ID]** and use the keypad to enter a value:



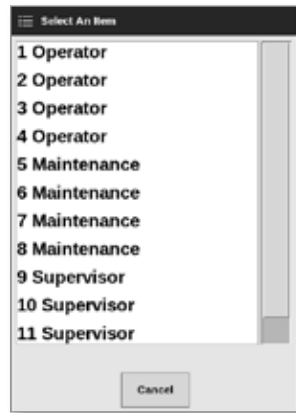
3. Enter the user's name:

[First Name - Middle Name (not required) - Last name]



Add New User - continued

4. Choose **[Security Level]** from the dropdown menu:



5. Choose **[New Password]** and use the keyboard to enter a new password:



The user will be asked to confirm the new password:



6. Choose **[OK]** to create the new user or **[Cancel]** to return to the User Admin screen without creating the user.



NOTE

Choose **[Esc]** twice at any point to return to the previous screen.



7.5 Delete User

NOTE

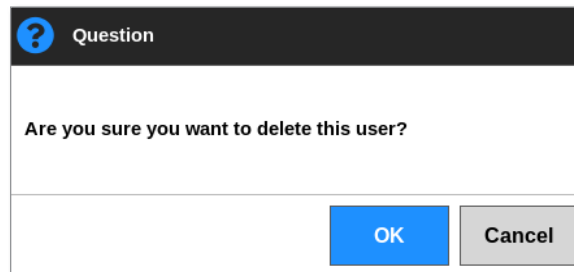
A user's records are maintained in the data files even if that user has been deleted and is no longer visible.

1. Choose [**Delete User**]:



2. Choose the user to be deleted from the list.

A message box opens:



3. Choose [**OK**] to delete the user or [**Cancel**] to return to the User Admin screen without deleting the user.

7.6 User Admin Settings

Login settings and user lists are managed in this section.

1. Choose **[User Admin Settings]**:



The User Admin Settings box opens:



7.6.1 Auto Login User

The console can be started with a named user logged in automatically. No password is required.

1. Choose **[Auto Login User]**.

A selection box opens:



2. Choose the required user or choose **[System]** for unrestricted use.
3. Choose **[Off]** to turn the Auto Login User function off.

7.6.2 Login Mode

Login mode can be customized to permit login with either:

[Password] or **[Password]** and **[User ID]**

Choose the required option with a checkmark.

7.6.3 Logout Time

Set the amount of time (in minutes) that a login is effective if no input is entered. The range is from 1 to 99.

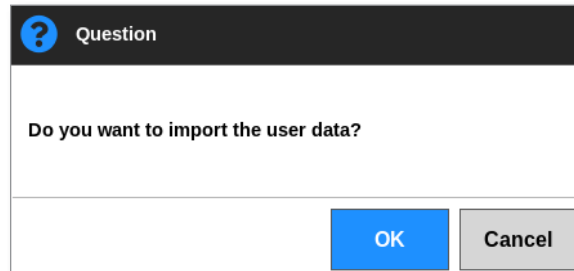
Choose 99 to allow users to stay logged into the system indefinitely.

7.6.4 Import User List

User details can be imported into the console from other consoles.

1. Insert the USB memory stick into the console and wait about 10 seconds.
2. Choose [**Import**].

A warning box opens:



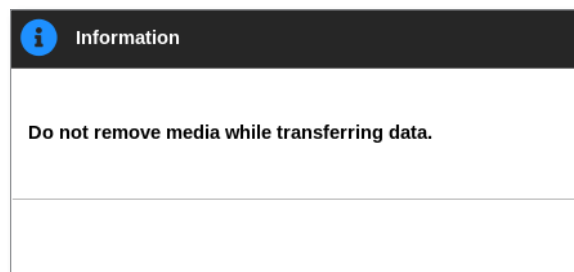
3. Choose [**OK**] to continue or [**Cancel**] to return to the User Admin Settings screen.

7.6.5 Export User List

User data can be exported to a USB memory stick.

1. Insert the USB memory stick into the console and wait about 10 seconds.
2. Choose [**Export**].

A message box opens:



3. Remove the USB memory stick after the message disappears.

7.7 Configure a Network Connection



CAUTION

Networking configuration depends on the system and should only be carried out by competent IT staff.

The M2 Plus controller with TS12 or TS17 console can communicate over wired or wireless networks to pass information to and from the console.

The TS8 console is available with or without wireless functionality configured. See Figure 7-4.

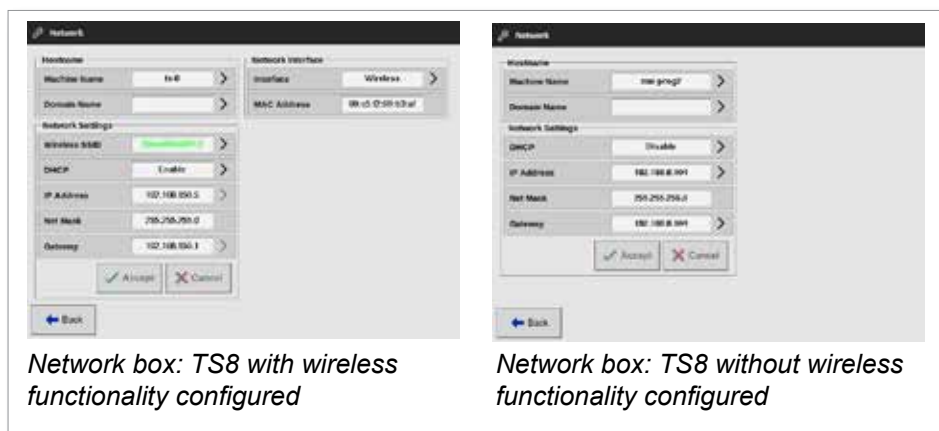
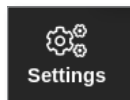


Figure 7-4 TS8 console Network boxes

7.7.1 Configure a Wired Connection

For connection using an Ethernet cable.

1. Choose **[Settings]**:



2. Choose **[Config]**:



3. Enter password, if required.

4. Choose **[Network]**:



Configure a Wired Connection - continued

The Network box opens:



5. Enter **[Machine Name]**:



6. Enter **[Domain Name]**:




NOTE

The controller may not be linked to a network. In that case the controller is identified as "Local."

Configure a Wired Connection - continued

7. Choose the Interface [**Wired**]:

**NOTE**

The MAC Address box is autofilled and cannot be configured.

8. Choose [**Accept**] to connect or [**Cancel**] to return to the network box.

7.7.2 Configure a Wireless Network



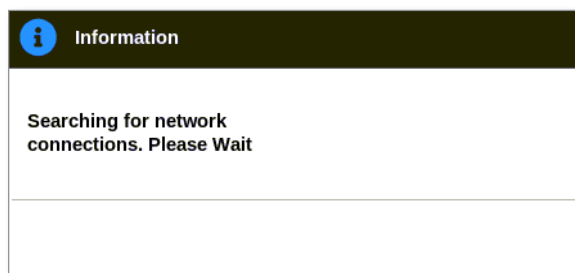
NOTE

This section applies to TS12 and TS17 consoles. It also applies to TS8 consoles that are configured for wireless functionality.

In addition to entering the information in to the Hostname and Network Interface boxes, the user must configure the required wireless parameters in the Network Settings boxes.

1. Choose the Interface **[Wireless]**.
2. Choose **[Wireless SSID]**.

A message box opens:



A Wireless Network Connections box opens, which lists the available networks:



3. Choose the required network.



NOTE

The option "Add Hidden SSID" requires further setup. See "7.7.3 Add Hidden Wireless SSID" on page 7-17.

4. Choose **[OK]** to select or **[Cancel]** to return to the Network box.

Configure a Wireless Network - continued

5. Enter the wireless password, if required:



6. Choose **[Cancel]** to return to the Network screen.
7. Choose **[Accept]** to connect or **[Cancel]** to return to the network box.



NOTE

If the network is connected, the address in the Wireless SSID box is green.
If the network is not connected, the address is red.



7.7.3 Add Hidden Wireless SSID

If the user chooses the “Add Hidden SSID” option, the connection must be manually configured.

1. Choose **[Add Hidden SSID]**.
The Wireless Manual Setup box opens.
2. Enter the SSID.
3. Enter the password.
4. Choose **[OK]** or **[Cancel]** to return to Network box.
5. Choose **[Accept]** to connect or **[Cancel]** to return to the network box.



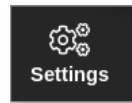
NOTE

If the network is connected, the address in the Wireless SSID box is green.
If the network is not connected, the address is red.

7.8 Share Files on a Network

The user can share files or tools between linked controllers or through the SmartMold option, if it is installed.

1. Choose **[Settings]**:

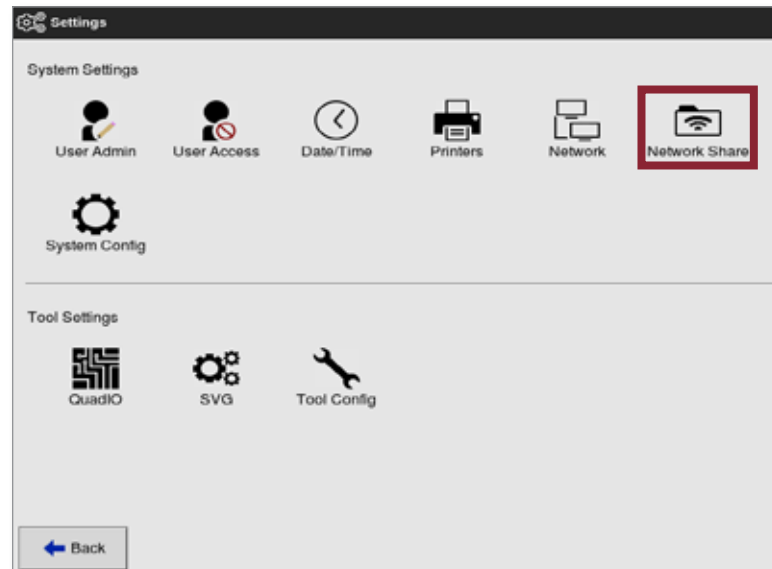


2. Choose **[Config]**:



3. Enter password, if required.

The Settings box opens:



4. Choose **[Network Share]** from System Settings.

The Network Share box opens:



Share Files on a Network - continued

5. Choose **[Host Name]** and enter the host name:



NOTE

If this box is already filled, choose **[Esc]** to delete the content.

6. Choose **[Share Name]** and enter the share name:



7. Choose **[Username]** and enter the username:



8. Choose **[Password]** and enter the password:



9. Choose **[Accept]** to connect.

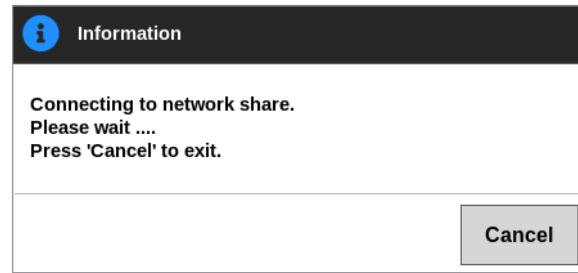


NOTE

The user can choose **[Cancel]** to clear all the information from the boxes and can choose **[Back]** to return to the Settings box.

Share Files on a Network - continued

A message box opens:



7.9 Linked Controllers

Multiple controller cabinets can be linked to work together as a single controller. To connect the controllers, a data link is used between the controller cabinets and the DIP switch on the backplane board. This link must be configured sequentially through the multiple controller cabinets.

Example:

A 60 zone cabinet and 30 zone cabinet can be configured to work as a single 90 zone controller. A single console can be connected to either controller, and it would display all 90 zones.

The first console connects directly to the cabinet via its data link.

- This is the Master console, and its IP address is printed on the console case.

The second console connects to the first console via an Ethernet link.



IMPORTANT

The first console must be designated as the Master at the second console.

7.10 Multiple Consoles Using Master IP Address

Two or more consoles may work together to control a single device if they are all interconnected on a Local Area Network.

Enter the IP address of a remote Master console which is already linked to a controller cabinet.

- The local console will search the LAN for that console and establish a connection.
- Once this has been done then both consoles command and monitor a single controller cabinet.

Commands may be entered on either console. The command will be carried out and both consoles will see the appropriate changes.

Section 8 - Maintenance



WARNING

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

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

8.1 Upgrade Software



CAUTION

Put controller into Stop mode before any updates are installed.

Mold-Masters has a policy of continuous improvement. A notification to existing customers is sent out in the instance of software upgrades available.

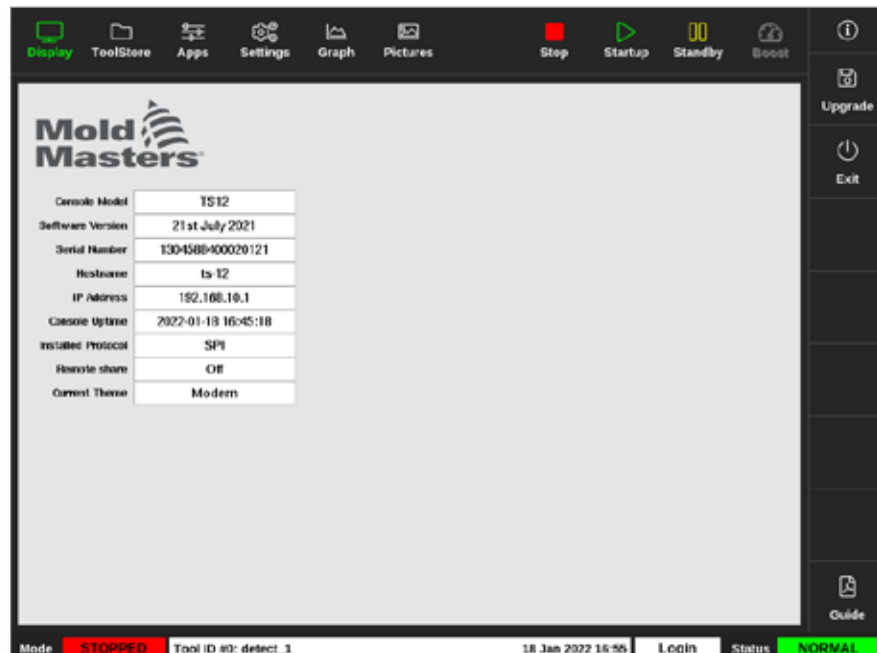
It may be possible to apply system upgrades to your own controller depending on the type and age of your equipment. Please contact your supplier and provide the serial number for your model to find out if your particular console can be upgraded.

There is usually no need to return the control system to the supplier for any upgrades. The user can download the update onto a USB memory stick.

1. Release the controller from any production working.
2. Choose the Information button:



The Information screen opens:



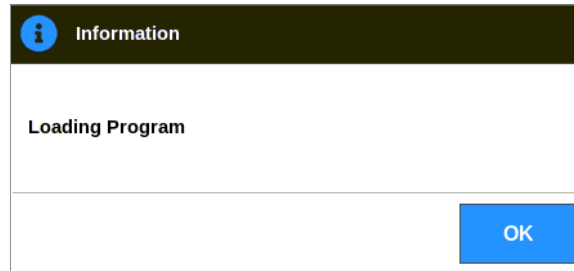
Upgrade Software - continued

3. Insert the USB memory stick with the upgrade data and wait about 10 seconds.
4. Choose **[Upgrade]**:

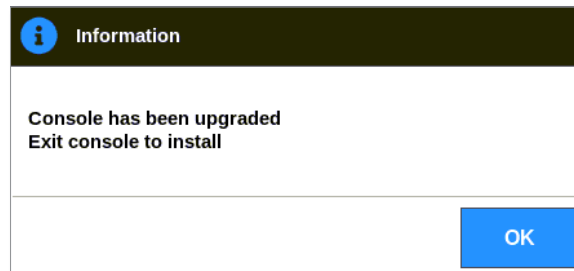


5. Enter password, if required.

An information box will open:



After the upgrade is installed, the user is prompted to restart the console to complete the upgrade:



6. Choose the information button once the console has restarted:



Upgrade Software - continued

7. Check the screen to see that the latest version has been installed. See Figure 8-1.

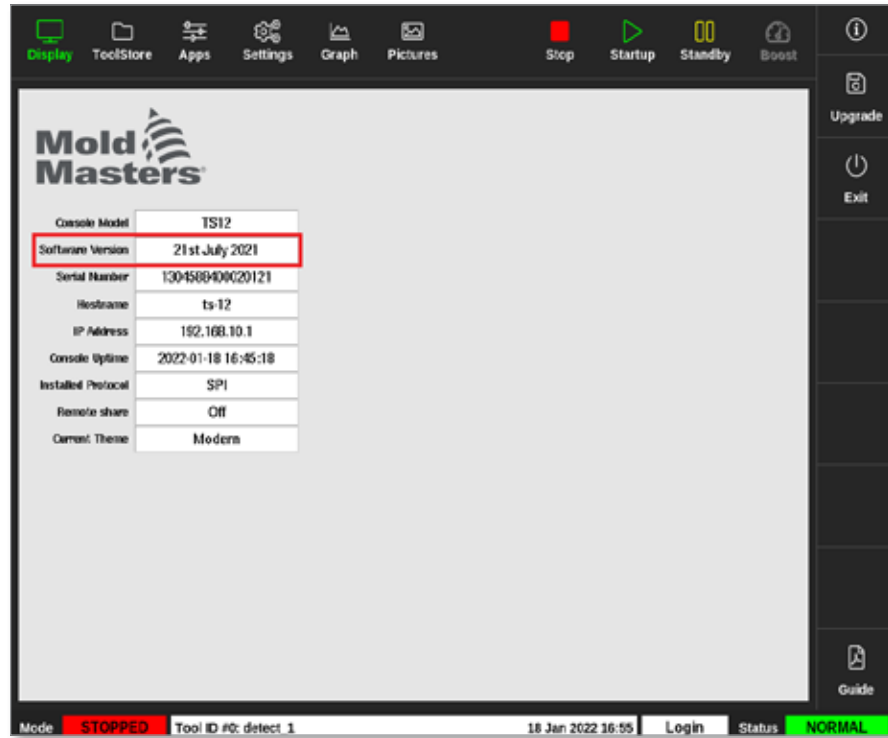


Figure 8-1 Check software version



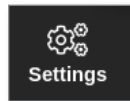
8.2 Check Touchscreen Alignment

CAUTION

Ensure that the calibration process is done with precision. Miscalibration will compromise the the touchscreen functionality, and it will then be necessary to contact *Mold-Masters* for assistance.

The Calibration routine places a crosshair target at four different positions on the screen. The use of a stylus increases the precision of the alignment.

1. Choose [**Settings**]:

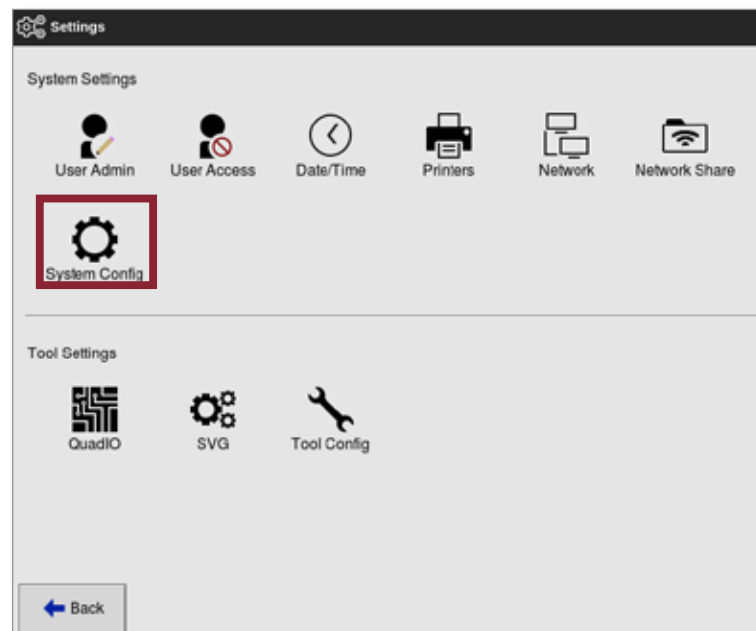


2. Choose [**Config**]:



3. Enter password, if required.

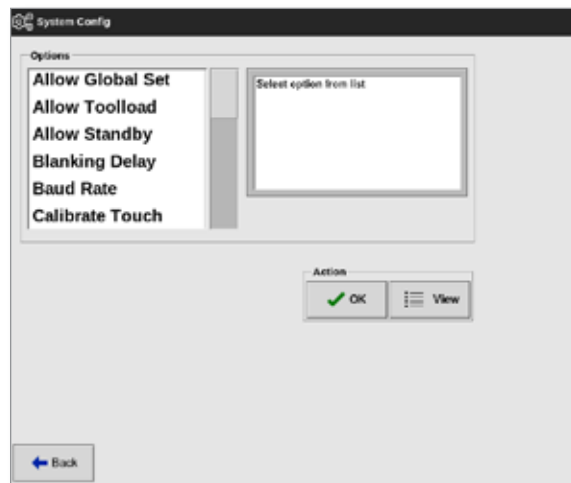
The Settings box opens:



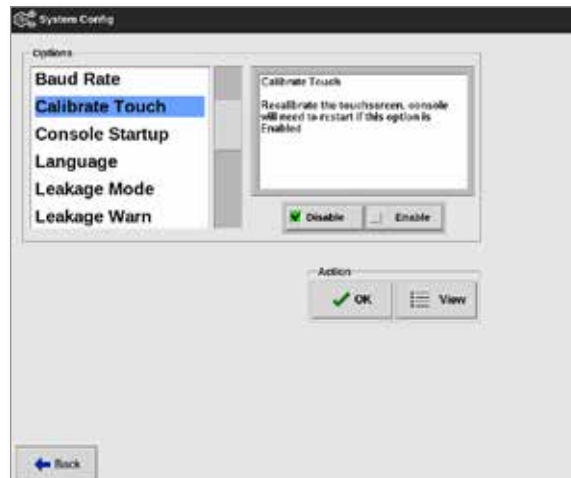
4. Choose [**System Config**] from System Settings.

Check Touchscreen Alignment - continued

The System Config box opens:

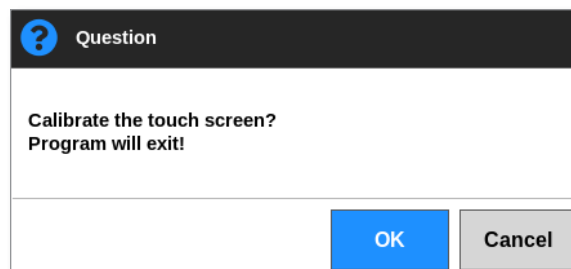


5. Choose **[Calibrate Touch]** from the Options list:



6. Choose **[Enable]**.

A warning box opens:



7. Choose **[OK]** to continue with the calibration routine or **[Cancel]** to return to the Options list without calibrating.

Check Touchscreen Alignment - continued

8. Choose the device for calibration, if on a networked system.
The calibration screen will open. See Figure 8-2.



Figure 8-2 Calibration screen



IMPORTANT

Mold-Masters recommends the use of a stylus pen for precision.

9. Touch the center point of the crosshairs.
 - When you stop touching the screen, the crosshair target will move to another position.
10. Repeat until all four locations have been tested.



NOTE

The console will automatically restart.

11. Choose **[Cancel]** if the console is not networked and the Display screen opens automatically.

8.3 Self Diagnostic Tests

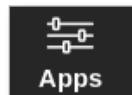
The diagnostic routine may be performed at any time that the controller is connected to the tool, provided that it is not in use for production. It can be performed on some of the zones or all of the zones.

The controller can perform three types of diagnostic tests:

- fast test
- full test
- power only test

From the Display screen,

1. Choose [**Apps**]:



The Apps screen opens:



2. Choose [**Testing**]:



Self Diagnostic Tests - continued

The Testing screen opens:

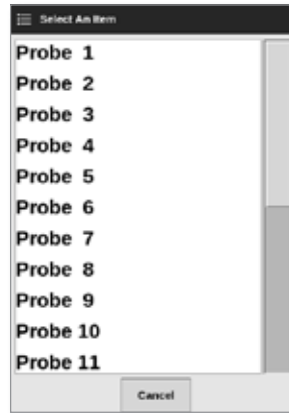


The user enters the required data into the Test Range box.

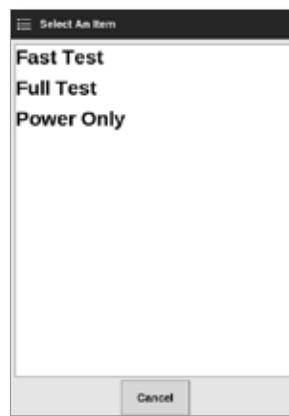
The status box in the right upper corner displays information during the testing process:

- **Name** - the number of the zone currently being tested
 - **Alias** - the name of the tested zone if it has an Alias set
 - **Start** - displays the initial temperature of the tested zone
 - **Current** - displays the current temperature of the tested zone
 - **Target** - displays the temperature the zone must reach during the test
 - **Max Zone** - displays the zone with the highest temperature reading at that time
 - **Power** - displays the current output of power of tested zone during its test
 - **Test Stage** - the point at which the test is at during its operation
3. Choose [**First Zone**] and [**Last Zone**] to open a dropdown menu, and choose the first zone and the last zone:

Self Diagnostic Tests - continued



4. Choose the Test Pattern box to open the test selection box:

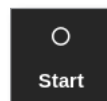


NOTE

The user can also choose the **[First-Last]** button to automatically choose to test all zones.

The **[Reset]** button sets the zone selection back to its previous setting.

5. Choose **[Start]** to begin the test:



- a) Choose **[Cancel]** to end the test at any point.

b) Choose [**Skip**] to skip the test for any zone.

During testing, the zone display or displays show test. See Figure 8-3.

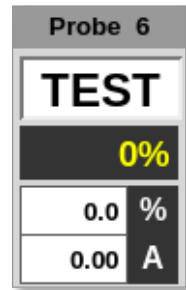


Figure 8-3 Zone display - Testing mode

8.3.1 Fast Test

Fast test checks current and power levels. The zone currently being tested is shown in the right hand box. This box will also show the start temperature and current temperature and the test stage. See Figure 8-4.

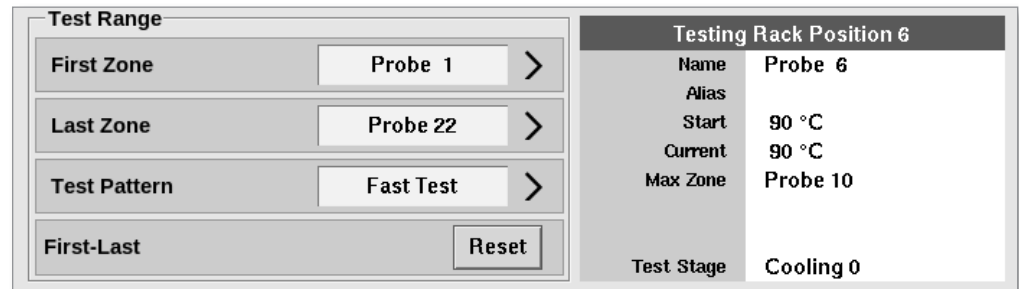


Figure 8-4 Fast test - information boxes

8.3.2 Full Test

The Full 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

The Full test will cool the whole tool. The first zone to be tested is heated to see if it will achieve the correct temperature. If the temperature is not reached, increasing amounts of power are applied to try to achieve the required level of temperature for the test.

The Full test information boxes show the same data as the fast test.

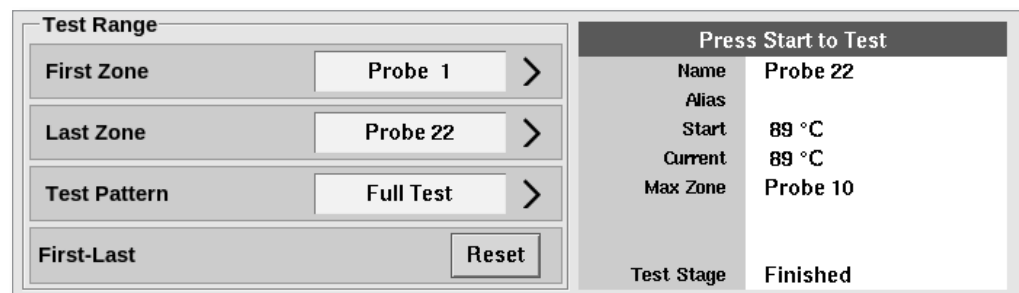


Figure 8-5 Full test - information boxes

Power Test - continued

8.3.3 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 issues such as zone wiring errors.

The Power test criteria boxes also show Target and Power %.

Test Range		Testing Rack Position 18	
First Zone	Probe 1 >	Name	Probe 16
Last Zone	Probe 22 >	Alias	
Test Pattern	Power Only >	Start	
First-Last	Reset	Current	
		Target	
		Power %	
		Test Stage	Power Test

Figure 8-6 Power Test - information boxes

8.4 Interpret the Test Results

8.4.1 Satisfactory Test

If the diagnostic test finds no fault with any zone then the message "OK" is displayed. See Figure 8-7.

Probe 4	
OK	
0%	
0.0	%
0.00	A

Figure 8-7 Zone display - satisfactory test

8.4.2 Unsatisfactory Test

If a problem is detected, an error message shows against the affected zone on the Testing screen. See Figure 8-8.



Figure 8-8 Results on the Testing screen

A zone in green has passed the test successfully. A zone in yellow has a warning. A zone in red has failed the test.

Seven columns are displayed with the following information:

- **Zone** - shows the zone number
- **Results** – displays either “Zone Test OK” or an error message
- **Amps** – shows how much current was measured as a result of applying a set voltage
- **Watts** – derived from measured current and the given system voltage
- **Ohms** – derived from measured current and the given system voltage
- **Deviation** – shows the difference between the current readings and readings that have been saved
- **Leakage** – shows if any leakage current to ground was measured

The user can scroll through the zones with the scrollbar to the right of the error messages.

For more information about error messages on the Testing screen, see "Table 8-1 System Diagnosis Error Messages" on page 8-13.

Results can also be seen on the Display screen. See Figure 8-9.

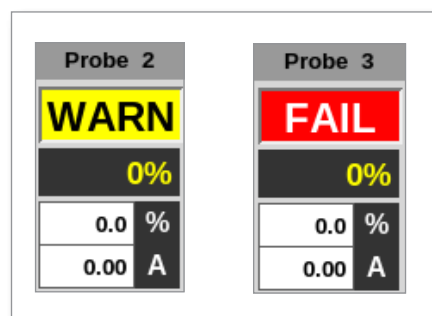


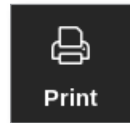
Figure 8-9 Zone error messages during testing

8.5 System Diagnosis Error Messages

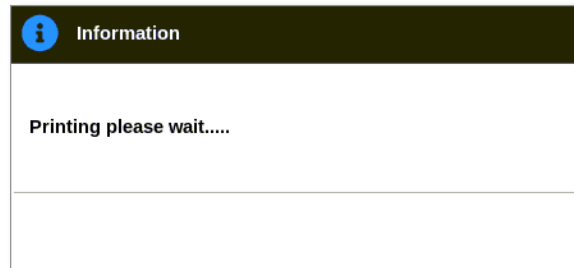
Table 8-1 System Diagnosis Error Messages	
Error Message	Description
Below 0 or Reversed T/C	May be caused by a reversed thermocouple. Note: if the test was carried out at an ambient temperature below 0°C, the controller would not work with the resulting negative temperature readings.
Failed to React Correctly	Unexpected results. This message is followed by further error messages.
FUSE	Check card fuse.
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.
No Mains Sync. Pulse	Likely due to an error in the supply wiring.
N/Z	No card was detected in the rack at the slot identified with the displayed zone.
REV	Temperature appeared to be decreasing when power was applied.
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 thermocouple positioning or close zone proximity.
User Skipped Test	The test for this zone was skipped while it was being tested.
User Stopped Test	The test was aborted.

8.6 Print the Test Results

The user can print the results of the Testing process with the **[Print]** button:



A message box opens:



The output will be sent to the designated printer or to a USB memory stick.



NOTE

The user must choose the default print setting from the **[Printers]** screen. All output is sent directly to this default after the user chooses the **[Print]** button. No printer settings box will open.

See "5.15 Configure a Printer" on page 5-49 for more information.

8.7 Training and Demonstration Mode

The controller has the Demo mode to use for training or demonstration purposes. Demo mode feeds every zone within the selected tool with a stream of prerecorded temperature data. The console appears to be working, and it gives a real trace when the Graph screen is selected.

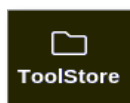


NOTE

The controller will not communicate with the associated controller cabinet when in Demo mode. *Mold-Masters* recommends that the system is idle when Demo mode is in use.

8.7.1 Enter or Leave Demo Mode

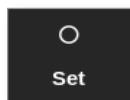
1. Choose [ToolStore]:



2. Choose the required tool:



3. Choose the corresponding box in the Connection column.
4. Choose [Set]:



5. Enter password, if required.

Enter or Leave Demo Mode - continued

A selection box opens:

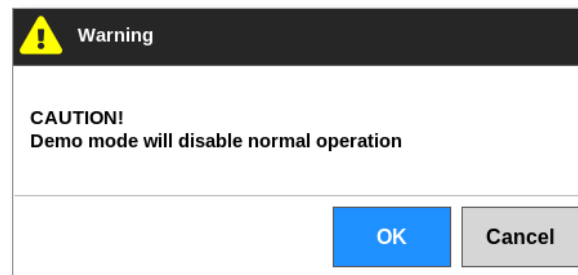


NOTE

The tool must be loaded before its connection can be changed. A message box appears to warn the user if the selected tool is not loaded.

6. Choose [**Demo Mode**].

A warning box opens:



To leave Demo mode, repeat steps 1 to 4 then choose [**Serial Port**].

8.8 Remove or Reconnect the Console



CAUTION

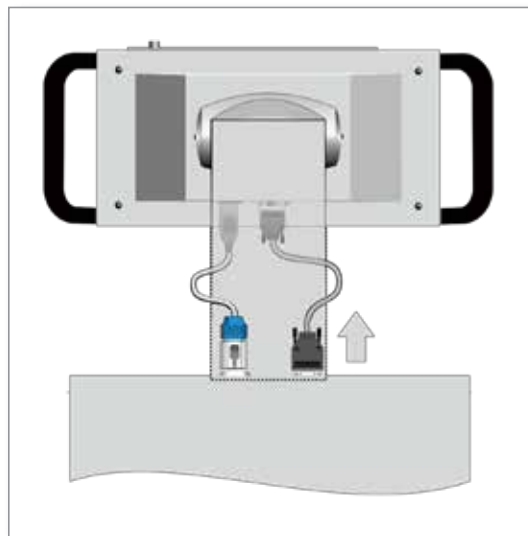
Do not disconnect the console if your system is using cycle-synchronized probes.

It is not recommended to run the system without a console unless it is an emergency situation. If the console must be disconnected, ensure that is disconnected for the shortest possible amount of time.

The following procedure shows how to change the console with the controller in Run mode, although it is preferable to shut down the controller first.

8.8.1 Remove the Console

1. Disconnect the data lead.

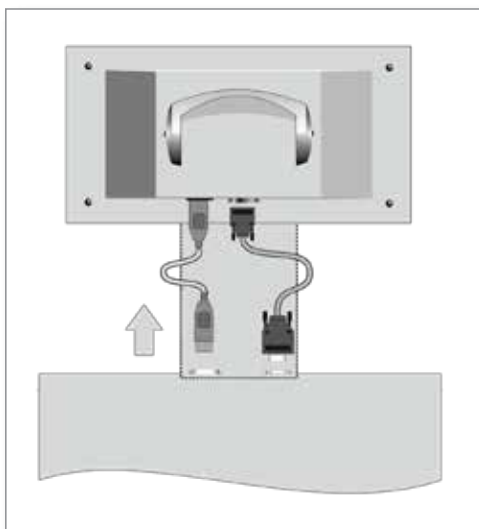


2. Choose **[Stop]** to stop the console.

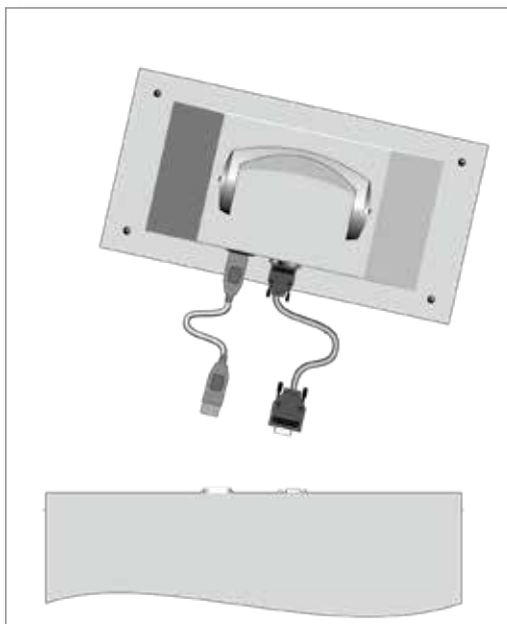


Remove the Console - continued

3. Disconnect the power connector.

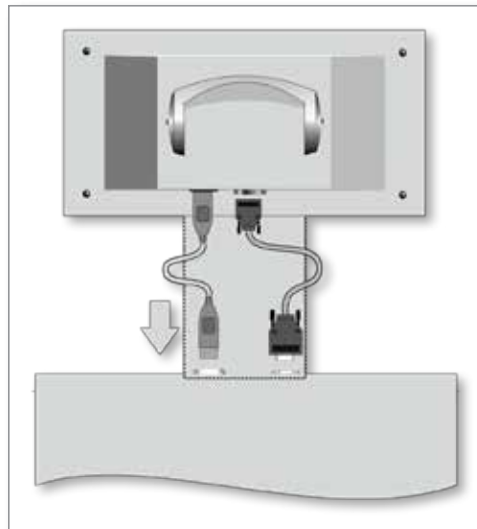


4. Remove the console.

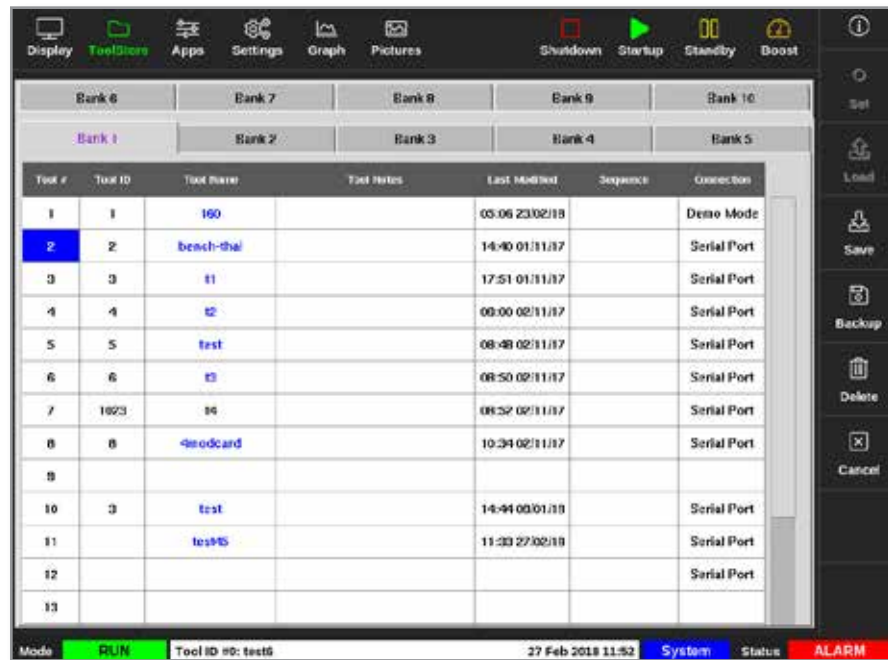


8.8.2 Reconnect the Console

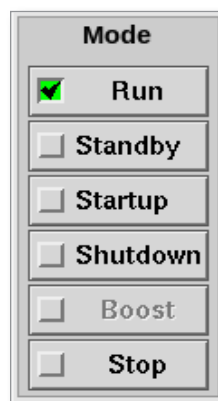
1. Connect the power connector.



2. Check that the correct tool is selected.

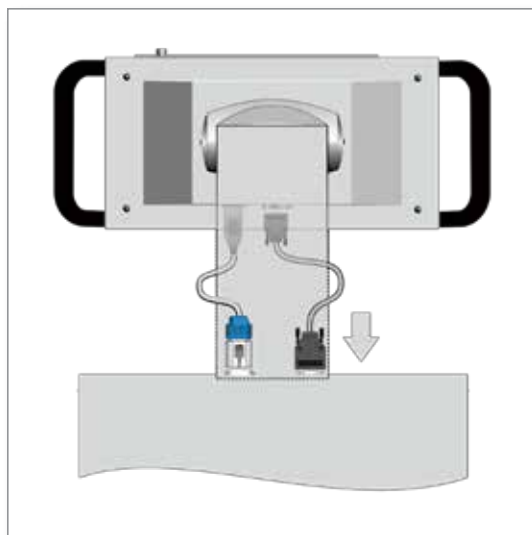


3. Choose [Run]:



Reconnect the Console - continued

4. Connect the data cable.



8.9 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.

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

8.9.1 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.

8.9.2 Cleaning and Inspection



CAUTION

If the fan filters become clogged, the flow of cooling air is reduced and overheating of the unit may result.

Every environment suffers some degree of contamination, and it is necessary to inspect the fan filters at regular intervals. *Mold-Masters* recommends monthly inspection. Clogged filters must be replaced. Replacement filters can be obtained from *Mold-Masters*.

In some models the filter is located in the fan tray, which is accessed from the front of the controller at the very bottom. Remove the two retaining screws and slide the tray out. See Figure 8-10.



Figure 8-10 Fan tray with filter

Cleaning and Inspection - continued

In other models, the filter accessed from a side panel. See Figure 8-11.



Figure 8-11 Side filter locations

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, we recommend you use an insulated screwdriver to check that no terminals have become loose.

8.10 Fuses and Overcurrent Protection



WARNING - HIGH VOLTAGE

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

There are supply fuses for four separate functions, and a miniature circuit breaker mounted on the front panel offers general overcurrent protection for the complete unit.

8.10.1 Replacement Fuses

If any fuse has ruptured, it must be replaced with a new fuse that has identical characteristics. See Table 8-2, Table 8-3 and Table 8-4 for the correct fuse types.

8.10.2 Console Fuse

The console is supplied via a separate fuse used in an in-line fuse holder which will be found close to the main busbars.

Table 8-2 Console Fuse Specifications

Fuse	20mm Anti-surge
Rating	2 A

8.10.3 Power Supply Unit Fuse

The power supply unit is mounted on top of the upper chassis plate behind the termination rail. It has an integral supply fuse.

Table 8-3 Power Supply Unit Fuse Specifications

Fuse	20mm Anti-surge
Rating	6.3 A

8.10.4 Fan Fuse

The M2 Plus controller has a single fan to assist cooling. The fan has a separate supply fuse.

Table 8-4 Fan Fuse Specifications

Fuse	20mm Anti-surge
Rating	6.3 A

8.10.5 Controller Card Fuses



CAUTION

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



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

If the fuse LED indicator shows that the output fuse has ruptured, the card may be easily removed and the fuse changed.

Table 8-5 Output Fuse Specifications

Output Fuse Type	32mm Ceramic FF Ultra Fast			
Card Type	Z6	Z4	Z2	Z1
Rating	5A	15A	20A or 32A	40A

If the thermocouple [T/C] LED indicator shows an open thermocouple circuit, then the input fuse may have ruptured.

Table 8-6 Input Fuse Specifications

Input Fuse Type	Surface mount
Fuse	Nano Ceramic Very Fast
Rating	62mA

Section 9 - 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 Display screen.
- 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 Display screen in place of a temperature value.

9.1 Controller Card Indicators



WARNING

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

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.

FUSE – Should normally be unlit. It lights up to show that an output fuse has failed.

GF – Should be normally be unlit. It lights up to show that the card has detected a ground fault on one of the zones controlled by this card.

LOAD (L1 to L2/L6) - The Load LED(s) should normally be lit. They pulse to show that there is a regulated supply begin delivered to the load.

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

T/C – Should be normally be unlit. It lights up to show that the card has detected an open-circuit fault on the thermocouple circuit.

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.

9.3 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 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.

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

9.2 System Warning Messages

These messages also warn of an abnormal condition.

Table 9-1 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 Display screen, 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.

9.4 Fault and Warning Messages

Table 9-2 Fault and Warning Messages

Error Message	Cause	Action
AMPS	The controller is unable to supply the current request. 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 on the control card.
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 Information screen. - Contact your supplier with this information.
HTR!	The heater resistance is not what is expected or the heater is open circuit.	Check heater resistance is correct with a meter.

Fault and Warning Messages - continued

Table 8-1 Fault and Warning Messages		
Error Message	Cause	Action
HIGH / LOW	The waterflow sensor has detected a high flow rate. The waterflow sensor has detected a low flow rate.	- Waterflow is a monitored condition only. These messages will not cause a pause or shutdown of the system. - The coolant water system should be checked for blockages and leaks to ensure that overheating does not occur.
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	In a Normal System The zone detects a potentially higher current draw than its maximum specification.	Isolate the system power supply, and check the resistance of the tool.
	In a Spear-Seki System No load on that zone. Only occurs when in the manual closed loop mode where the current is preset. The current sensing circuit has not detected a current flow. The zone is flagged as not having a load.	- Isolate the system power supply, and check the connections between the controller and the tool heaters. - Also check the heater for continuity.
OVER	The RTD zone has detected a temperature above 99°C. RTD circuits can only read from 0-99°C so a fault is likely and needs to be investigated. Note: no control zones are affected.	Check that a different RTD has not been fitted.

Fault and Warning Messages - continued

Table 8-1 Fault and Warning Messages		
Error Message	Cause	Action
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.
REV	The card has detected an abnormal input at the thermocouple termination that indicates a shorted or reversed thermocouple.	- If the REV alarm persists then you should switch off the controller and investigate the malfunctioning zone. - Alternatively you could slave the malfunctioning zone to a good zone until you have time to clear the fault.
RTD	The RTD monitor cannot see an input. (RTD is open circuit)	Check the RTD and its wiring for a broken connection.
T/C	An open circuit thermocouple (T/C) has been detected and no auto response has been selected in the T/C Open Error column on the Settings screen.	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.

Section 10 - Hot Runner Controller Wiring Details

10.1 Three Phase Designation - Star/Delta Option



WARNING

Ensure 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

Incorrect connection to a Star / Delta configuration can damage 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.

The controller is normally supplied in either a Star or Delta supply. Some models may have a dual supply option which accepts either Star or Delta 3-phase supply.



IMPORTANT

The Delta supply cable does not have a neutral wire.

Cable colors may vary. Always wire up according to the cable markings. See Table 10-1.

Table 10-1 Cable Markings	
Cable Marking	Supply Description
L1	Phase 1
L2	Phase 2
L3	Phase 3
N	Neutral*
Earth Symbol	Earth

*The Delta supply does not have a neutral wire.

10.2 Connect the Star / Delta Option

If the cabinet has the dual supply option, there are two places in the cabinet that must be altered to switch between Star and Delta supply.

At the upper connection blocks, change the Star / Delta crosslinks using a single 3-way link for Star supplies or three 2-way links for Delta supplies. The upper connection blocks are accessed from the front of the cabinet, and they are located just below the top of the cabinet. At the base of the cabinet is the mains connector strip that will accept a Star or Delta supply cable.

Update the supply-voltage rating label on the back of the controller after changing the connection of the supply input voltage.

See "10.2.1 Set Power Rail to Star Configuration" and "10.2.3 Set Power Rail to Delta Configuration" for further information.

10.2.1 Set Power Rail to Star Configuration



WARNING

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

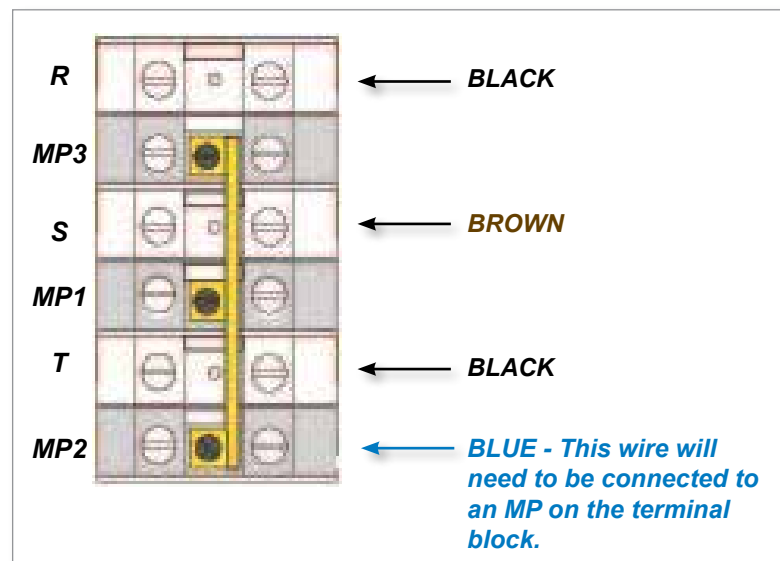


Figure 10-1 Connect the neutral - position shown by blue arrow

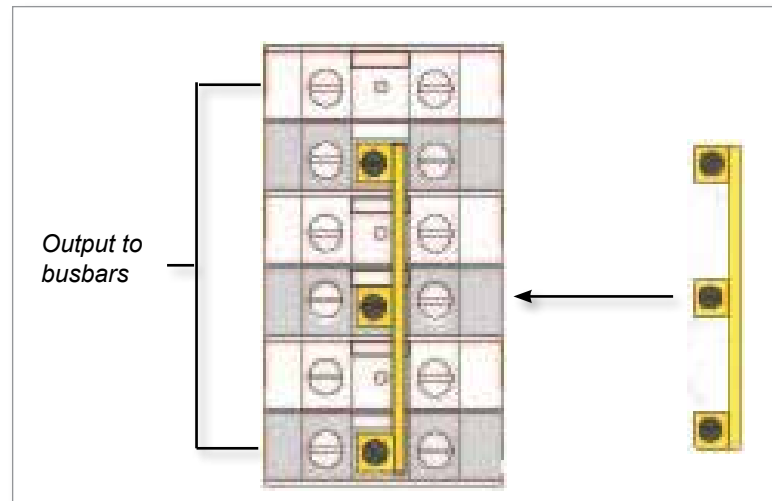


Figure 10-2 Install the 3-way link

10.2.2 Star Supply Wiring



WARNING

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



IMPORTANT

Use only a 5 core supply cable for Star connection.

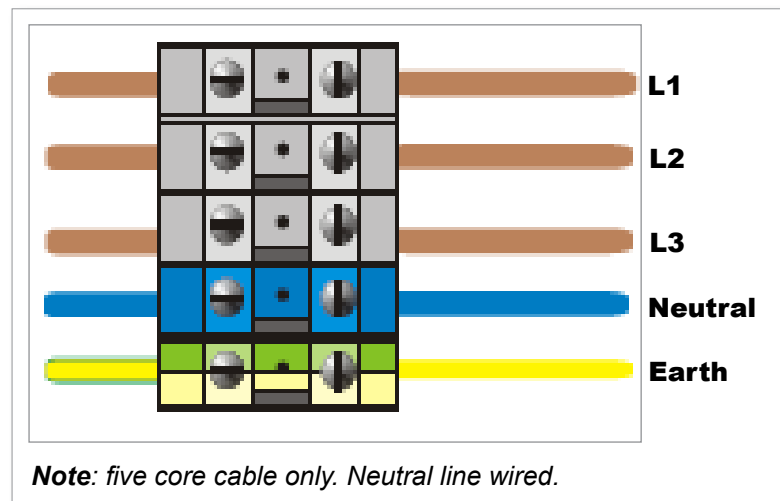


Figure 10-3 Star supply wiring

10.2.3 Set Power Rail to Delta Configuration



WARNING

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

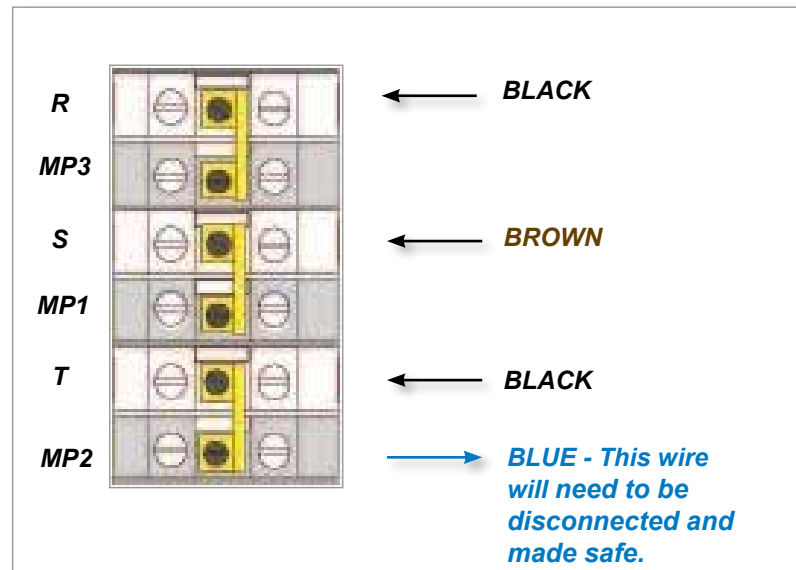


Figure 10-4 Remove the neutral - position shown by blue arrow

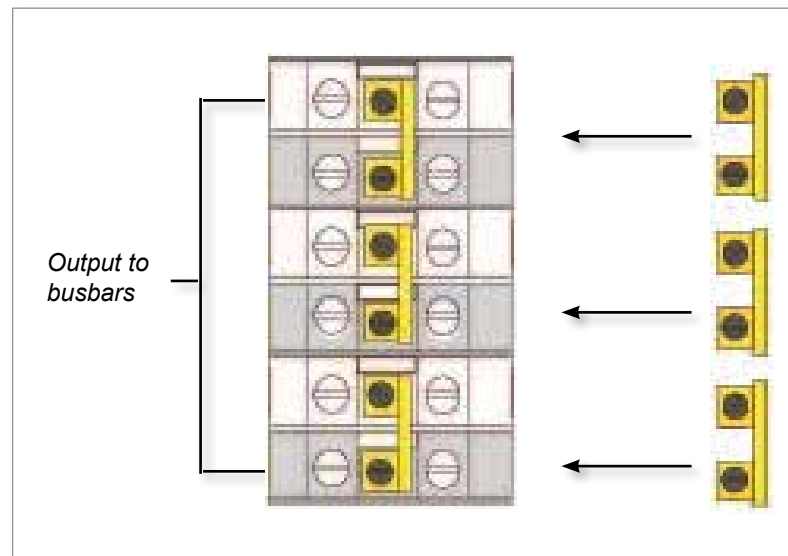


Figure 10-5 Install the three 2-way links

10.2.4 Delta Supply Wiring



WARNING

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



IMPORTANT

Use only a 4 core supply cable for Delta connection.

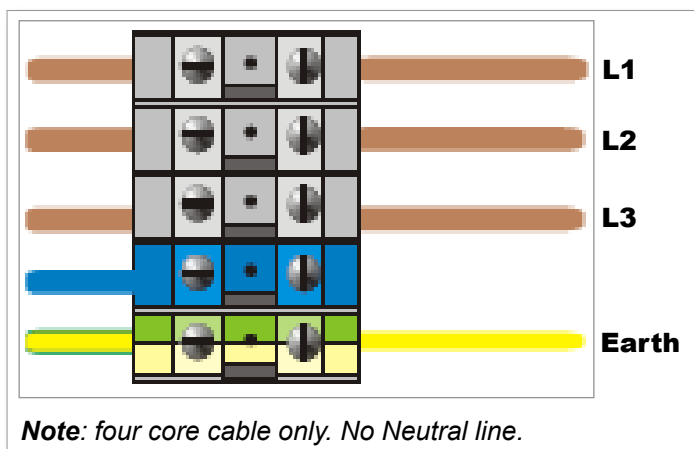


Figure 10-6 Delta supply wiring

10.3 Loom Thermocouple Cables



CAUTION

Ensure the correct rating of cable is used.

The thermocouple cable can use a multicore cable or a conduit with individual conductors. Refer to Table 10-2 for color information.

Table 10-2 Thermocouple Conductor Colors		
Type	Positive	Negative
J	White	Red
K	Yellow	Red

10.4 Loom Power Cables



CAUTION

Ensure the correct rating of cable is used.

A power cable can use a multicore cable or a conduit with individual conductors. Refer to Table 10-3 for more color information.

Table 10-3 Power Cable Conductor Colors		
Three Phase Type	Supply	Return
Star or Delta	Brown	Yellow

10.5 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.

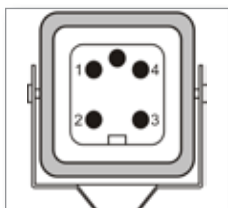


Figure 10-7 HAN4A connector

Table 10-4 Alarm / Auxiliary Pin Connections		
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 or Standby or any other user definable function. For exact details, consult the specification for your particular model.

10.6 Serial Port

A male 9-way D-panel connector can be provided for an RS-232 serial port, which is used to communicate with a remote computer for data collection.

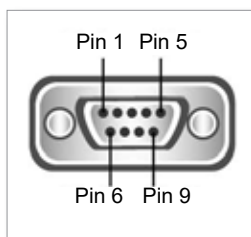


Figure 10-8 RS-232 serial port (9 pin male)

The pin outs can be found in Table 10-5:

Serial Port - continued

Table 10-5 Serial Port Pin Connections	
Pin	Connection
1	-
2	Transmit
3	Receive
4	-
5	Ground
6	-
7	Handshake
8	-
9	-

10.7 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 10-6 USB-A Port Pin Connections	
Pin	Connection
1	VCC (+5 V)
2	Data- (D-)
3	Data+ (D+)
4	GND



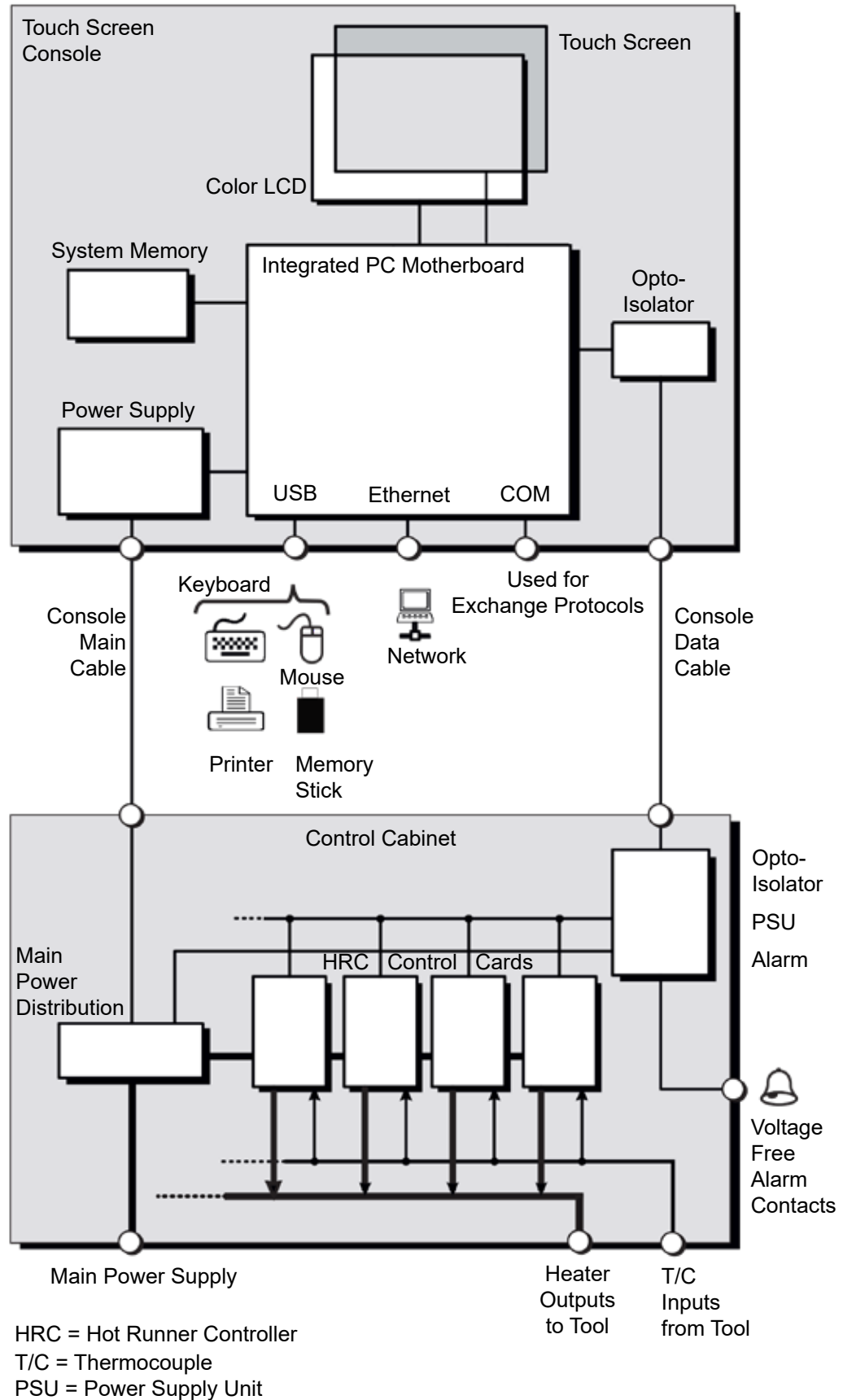
Figure 10-9 USB-A port

10.8 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.

10.9 Wiring Schematic

Figure 10-10 Wiring schematic



Section 11 - Water Manifolds

**WARNING**

Ensure you have fully read "Section 3 - Safety" before installing or connecting systems to the controller.

11.1 Introduction

The M2 Plus controller provides a compact system for monitoring the coolant system within a mold.

The standard system includes a controller cabinet with the following:

- analogue input cards
- other control cards as required
- one or more water manifolds with flow sensors and / or pressure sensors
- sufficient data cable to link the manifolds to the cabinet

11.2 Installation

**CAUTION**

The coolant system should be plumbed in by a qualified fitter ensuring that the flexible coolant pipes are not trapped by moving parts or kinked by being stretched around corners or similar obstructions.

There should be a main flow and return shutoff valve provided so that the water manifolds may be easily isolated for repair or maintenance.

Do not use any liquid sealant that may contaminate the coolant circuits.

The water manifolds should be firmly mounted in a position that will not be subjected to excess heat, vibration or other undue stress.

The cables that connect the water manifold to the controller are marked for identification and should be connected to the appropriately marked sockets on the sensors and the controller.

The cables should be adequately supported using suitable cable tray or individual cable cleats in accordance with the current IEEE Regulations for Electrical Installations.

11.3 Monitor Coolant Properties

Three different coolant properties can be monitored:

1. Temperature

- there is a choice of two main cards to monitor water temperature
- the WT4 card has 12 thermocouple inputs
- the 12RTD has 12 resistive temperature device inputs and is often the preferred device for this application

2. Flow

- many analogue devices give a standard 0-20 mA output that is proportional to the measured water flow
- any one of these devices may be connected to one or more of the eight channels available on the AI8 analogue card

3. Pressure

- many sensors that give a 0-20 mA output
- they can be connected independently to an AI8 card

11.4 Display for Water Flow Zones

Figure 11-1 shows a Display screen with water flow zones and cavity zones.

The Display screen and the Graph screen work the same way for water flow zones as for other types of zones.

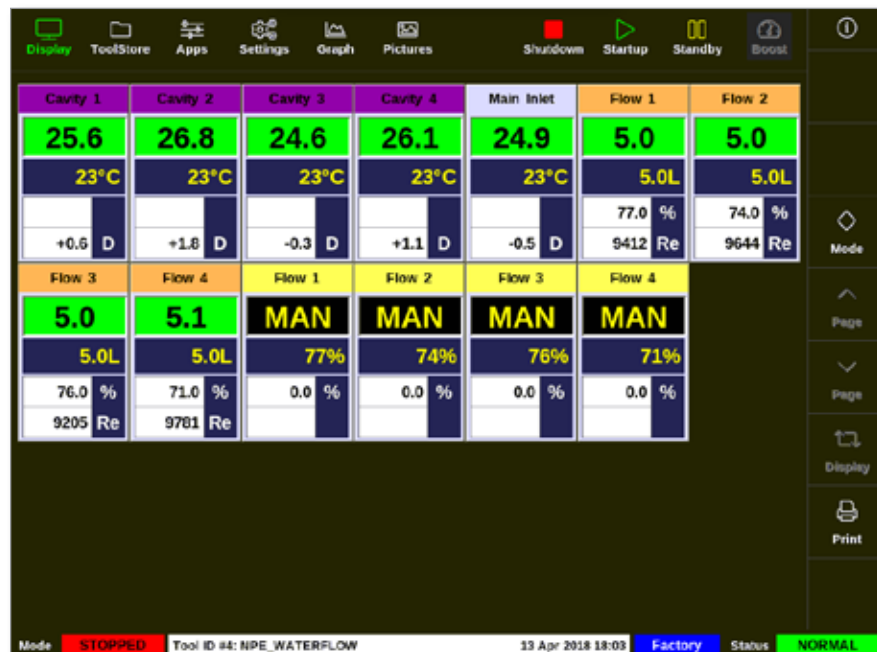
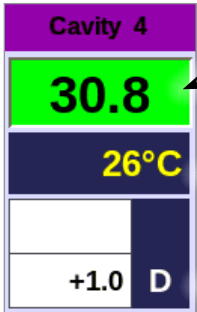
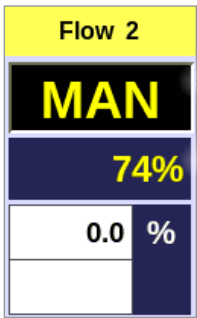


Figure 11-1 Display screen with water flow zones

For a description of the information displayed on water flow zones, see "Flow Zone Panel Display" on page 11-3.

For more information on how to detect and configure these zones, see "11.6 Detect and Configure Water Flow Zones" on page 11-4.

Display for Water Flow Zones - continued

Table 11-1 Flow Zone Panel Display		
Display	Description	Notes
	Green on black display indicates healthy zone.	Will display "N/Z" if communications fail. Will display warning or alarm conditions with color and message.
	The cavity card is being used to monitor temperature.	
	The Delta difference in temperature.	
	The flow card has healthy communications with the console.	Will display "N/Z" if communications fail. Will display warning or alarm conditions with color and message.
	The set flow rate.	In liters or gallons, as set.
	The actual level of valve openness, in percent.	100% = fully closed valve.
	The Reynolds alarm number.	
	This zone shows "MAN" as it is a closed loop system.	
	The set level of valve openness, in percent.	



11.5 Configuration

IMPORTANT

Probe and manifold heater zones need to be setup before the user can start coolant monitoring.

Once the manifold has been installed, the controller may be switched on and setup.

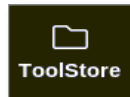
To detect and setup the cards for flow and sensor channels and the control zones see "11.6 Detect and Configure Water Flow Zones" on page 11-4.

To configure the flow zones, see "11.7 Configure Water Flow Zones" on page 11-7.

11.6 Detect and Configure Water Flow Zones

The console will detect the analogue cards in the system.

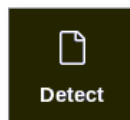
1. Choose [ToolStore]:



2. Choose a blank tool slot:



3. Choose [Detect]:



4. Enter password, if required.

5. Enter tool name:



The Analogue Input cards are detected and presented as a number of flow or pressure sense channels.



Card	Type	Rack Address	Maximum Power	Ground Protection	TC Offset	Speed	Sensor	Display Group	Startup Stage	Shutdown Stage
IO 1		25						1		
	Cavity 1	#125			0.0			1		
	Cavity 2	#125			0.0			1		
	Cavity 3	#125			0.0			1		
	Cavity 4	#125			0.0			1		
	Cavity 5	#125			0.0			1		
	Cavity 6	#125			0.0			1		
	Cavity 7	#125			0.0			1		
	Cavity 8	#125			0.0			1		
	Cavity 9	#125			0.0			1		
	Cavity 10	#125			0.0			1		
	Cavity 11	#125			0.0			1		
	Cavity 12	#125			0.0			1		
	Flow 1	#125				Auto	1-15 km	1		

Figure 11-2 Analogue input cards and manifold in ToolStore

The system will automatically detect 12 manifold zones.

6. If the number of actual zones is less than 12, set any extra zones to unused.

If the water manifold is like any of the following 4-port, 8-port or 12-port versions, the controller will show 16 cavities and 12 flow channels even though the manifold has only 4, 8 or 12 ports.



All unused zones must be set as follows.

- 7. To configure a 4-port water manifold, set the Type of cavities 5 to 12 to "Not Used", and set the Type of flows 5 to 12 to "Not Used".

Card	Type	Rock Address	Maximum Setpoint	Minimum Setpoint	Maximum Power	Ground Protection	Offset Value	Speed	Sensor	Display Group	Startup Stage	Shutdown Stage	Readings Avg
	Cavity 1	# 150	200.0	120.0			0.0			1			
	Cavity 2	# 150	200.0	120.0			0.0			1			
	Cavity 3	# 150	200.0	120.0			0.0			1			
	Cavity 4	# 150	200.0	120.0			0.0			1			
	# 150												
	# 150												
	# 150												
	# 150												
	# 150												
	# 150												
	# 150												
	# 150												

- To configure an 8-port water manifold, set the Type of cavities 9 to 12 to "Not Used", and set the Type of flows 9 to 12 to "Not Used".

Card	Type	Rock Address	Maximum Setpoint	Minimum Setpoint	Maximum Power	Ground Protection	Offset Value	Speed	Sensor	Display Group	Startup Stage	Shutdown Stage	Readings Avg
	Cavity 1	# 150	200.0	120.0			0.0			1			
	Cavity 2	# 150	200.0	120.0			0.0			1			
	Cavity 3	# 150	200.0	120.0			0.0			1			
	Cavity 4	# 150	200.0	120.0			0.0			1			
	Cavity 5	# 150	200.0	120.0			0.0			1			
	Cavity 6	# 150	200.0	120.0			0.0			1			
	Cavity 7	# 150	200.0	120.0			0.0			1			
	Cavity 8	# 150	200.0	120.0			0.0			1			
		# 150											
		# 150											
		# 150											
		# 150											

A 12 port water manifold has all the correct cavities enabled upon detection.

Card	Type	Rock Address	Maximum Setpoint	Minimum Setpoint	Maximum Power	Ground Protection	Offset Value	Speed	Sensor	Display Group	Startup Stage	Shutdown Stage	Readings Avg
	Cavity 1	# 150	200.0	120.0			0.0			1			
	Cavity 2	# 150	200.0	120.0			0.0			1			
	Cavity 3	# 150	200.0	120.0			0.0			1			
	Cavity 4	# 150	200.0	120.0			0.0			1			
	Cavity 5	# 150	200.0	120.0			0.0			1			
	Cavity 6	# 150	200.0	120.0			0.0			1			
	Cavity 7	# 150	200.0	120.0			0.0			1			
	Cavity 8	# 150	200.0	120.0			0.0			1			
	Cavity 9	# 150	200.0	120.0			0.0			1			
	Cavity 10	# 150	200.0	120.0			0.0			1			
	Cavity 11	# 150	200.0	120.0			0.0			1			
	Cavity 12	# 150	200.0	120.0			0.0			1			

For more information on setting zone types, see "5.3.1 Set Zone Types" on page 5-5.



NOTE

You can set the flow zones to **[Monitor]** to monitor the temperature of the flow zones.

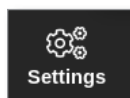
You can set the flow zones to **[Special]** if the flow control option is available.

11.7 Configure Water Flow Zones

Flow zones can have some parameters that are set individually. Other settings are configured for all flow zones.

11.7.1 Configure Water Flow Parameters - Zone by Zone

- Choose **[Settings]**:



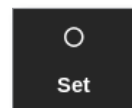
2. Choose the required zone or zones:



3. Choose the parameter column:



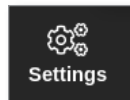
4. Choose [Set]:



5. Enter the required value or choose the required option.
6. Repeat for each parameter that requires adjustment.

11.7.2 Configure System Settings for Flow Zones

1. Choose [**Settings**]:

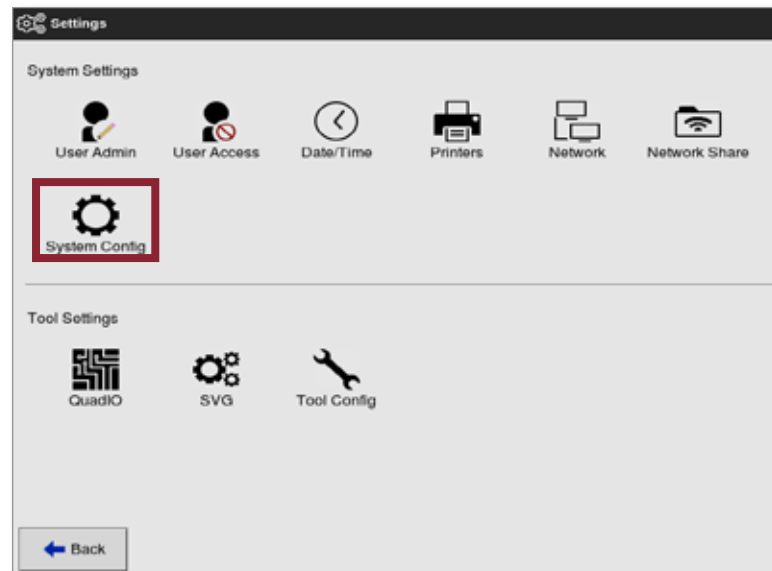


2. Choose [**Config**]:



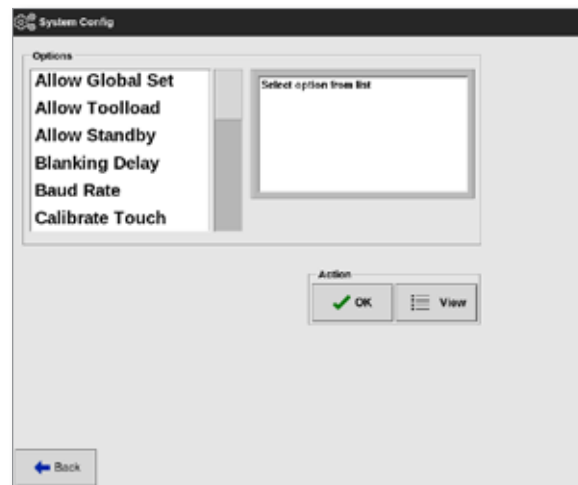
3. Enter password, if required.

The Settings box opens:



4. Choose [**System Config**] from System Settings.

The System Config box opens:

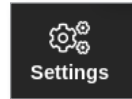


5. Choose the required settings.
6. Enter the required values or options.

7. Choose **[OK]** to accept the new value or choose **[Back]** to return to the System Config screen without saving.

11.7.3 Configure Tool Settings for Flow Zones

1. Choose **[Settings]**:

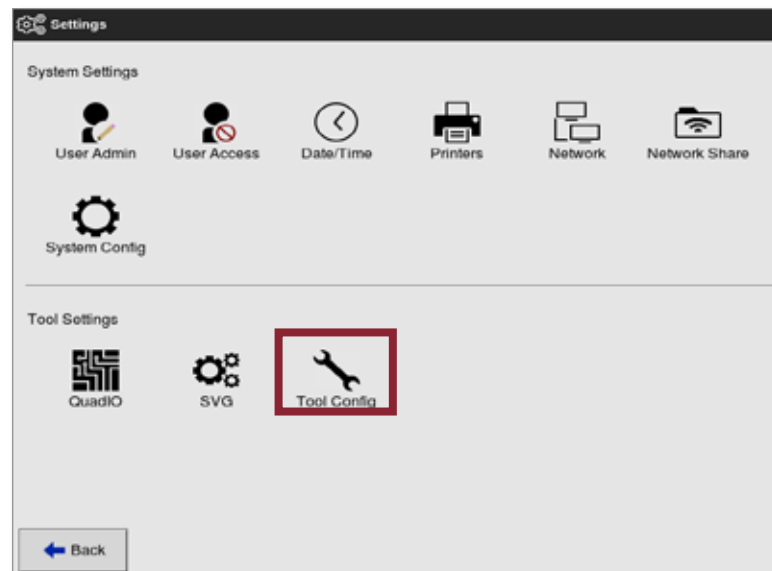


2. Choose **[Config]**:



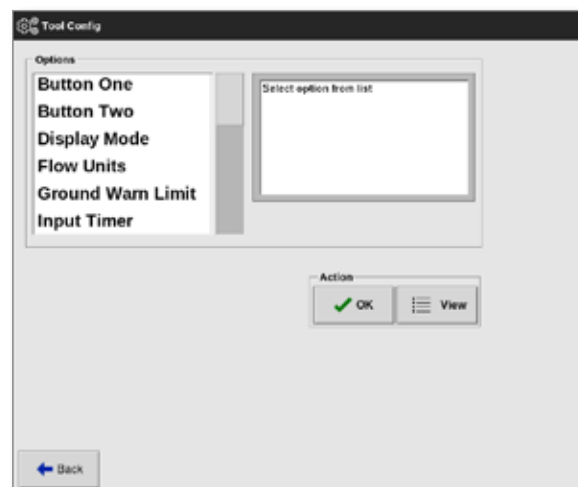
3. Enter password if required.

The Settings box opens:

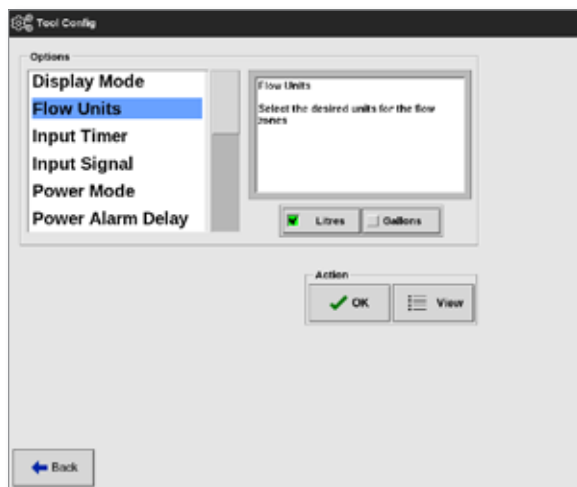


4. Choose **[Tool Config]** from Tool Settings.

The Tool Config box opens:



5. Choose [Flow Units]:



6. Enter the required value or option.
7. Choose [OK] to accept the new value or choose [Back] to return to the Tool Config screen without saving.



IMPORTANT

The user must save the tool in the ToolStore to save these changes permanently. See "6.11 Save a Tool" on page 6-21 for more information.

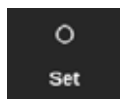
11.7.4 Configure the Delta-T Values for the Flow Zones

The Delta-T values are calculated by measuring the temperature of the incoming water and comparing it to the temperature of the water for each cavity (flow channel) when the water returns from the mold. For each water manifold, cavity 13 measures the temperature of the incoming water.

1. Select the cavity zones. (Cavities 1 to 4 are selected in the following image.)

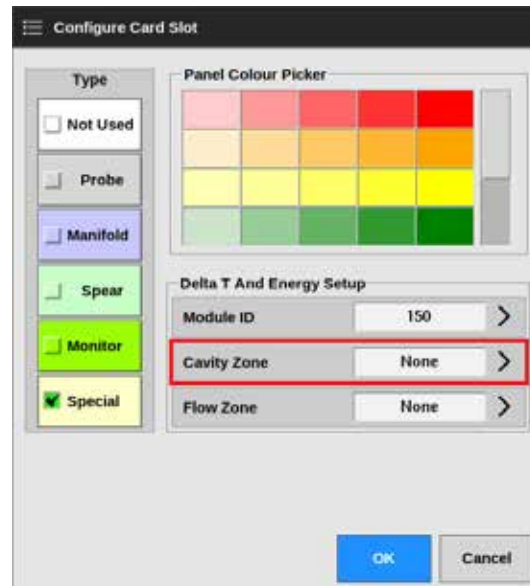
Card	Type	Rock Address	Maximum Setpoint	Minimum Setpoint	Maximum Power	Ground Protection	Offset Value	Speed	Decay	Display Group	Startup Stage	Shutdown Stage	Readings Avg
	Cavity 1	# 150	200.0	120.0			0.0			1			
	Cavity 2	# 150	200.0	120.0			0.0			1			
	Cavity 3	# 150	200.0	120.0			0.0			1			
	Cavity 4	# 150	200.0	120.0			0.0			1			
		# 150											
		# 150											
		# 150											
		# 150											

2. Select the Set button.



3. Enter the password, if required.

The Configure Card Slot dialog box opens:



4. Select [Cavity Zone]

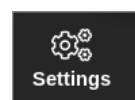
A zone selection box opens:



5. Select the name of the incoming water cavity zone (for example, "Inlet 1", and select the OK button.
6. Repeat the previous steps to link the remaining flow zones.

11.7.5 Set the Flow Zone Parameters

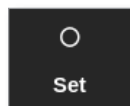
1. Choose [Settings]:



2. Choose the flow zone(s):

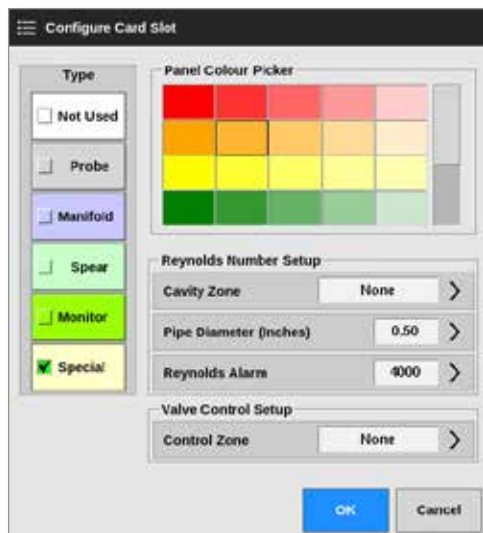


3. Choose [Set]:



4. Enter password, if required.

The Configure Card Slot box opens:



5. Choose [Cavity Zone].

6. Choose an associated cavity zone (for example, Cavity 2).



7. Choose [**Pipe Diameter (Inches)**]:



8. Enter the pipe diameter, in inches.
9. Choose [**Reynolds Alarm**].

A keypad opens:



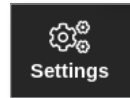
10. Enter the Reynolds number alarm value.
11. Repeat the previous steps for each flow zone.

11.8 Flow Control Option (for AI04 only)

11.8.1 Configure Flow Zone Output

Flow zone output must be set properly for closed loop operation.

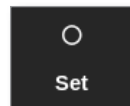
1. Choose [Settings]:



2. Choose flow zones and choose the column [Output]:



3. Choose [Set]:



An output selection box opens:





NOTE

The default value is set as PWM [pulse width modulation].

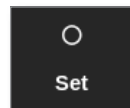
- Choose the system's valve type or choose **[Cancel]** to return to the Settings screen.

11.9 Set the Flow Rate

- On the Display screen, choose the required zone or zones:



- Choose **[Set]**:



A keypad opens:



- Enter the required flow rate.
- Choose **[Enter]** to accept the new rate or choose **[Esc]** twice to return to the previous screen without changing the flow rate.

11.10 Turn Flow Zones Off and On

The user can also choose to turn flow zones off or on with the process from Section 11.9.

Choose [**Off**] or [**On**] from the keypad, as applicable.

Section 12 - Optional Cards

Extra facilities that can be fitted to the M2 Plus controller.

12.1 16DLI - 16 Channel Digital Logic Input Card

- The Digital Logic Input card can be supplied wherever there is need to accept a digital input.
- The input logic values are determined by software programming and they are not a user available function.

12.2 WT3 12 Channel RTD Input Card

- This card is used for cooling water measurement and display.
- The 12RTD is set up as a Special in the Configure Card Slot box.
- The measured temperature is displayed on the Display screen with a range of 0 to 99°C and resolution of 0.1°C.
- The RTD card has a proactive function which switches the operating mode to off if the detected temperature reaches the high level alarm point.

12.3 WT4 12 Channel Thermocouple Card

- This card can accept up to 12 zones for either J or K-type thermocouples.
- It provides channel monitoring with warnings and alarms.
- Monitored zones display as a normal cavity zone with actual temperature constantly displayed.
- The set temperature in the second box displays the nominal expected temperature.
- The lower and upper alarm levels are set around the set temperature.

12.4 AI8 - Analogue Input Cards

- The analogue input card has eight inputs that are used to read analogue output devices with an output range between 4 – 20mA.
- These inputs are usually associated with coolant flow detector devices that are calibrated for particular flow rates.
- If an analogue input card is detected by the auto detect procedure, the Settings screen displays an Analogue Input column.
- After selecting the flow zones and the Analogue Input column, choosing [Set] displays a range of devices that are known to match the analogue input.

12.5 AI04 - 4 Channel Analog Control Card

- 4 channel analog output card (PWM, 0-10V, 4-20mA).

Section 13 - Quad I/O Options



WARNING

Ensure that you have fully read "Section 3 - Safety" before setting up or using this feature with the controller.

13.1 Quad I/O Screen

The M2 Plus controller has the capability to accept Quad I/O cards. If this option is available to the user, the parameters can be configured from the Settings screen.

1. Choose **[Quad IO]**:



The Quad I/O Configuration box opens:



Input	Delay Time	Action	Output	Action
1	0	Run	1	log Disable
2	0	Standby	2	Temp Dist.
3	0	Startup	3	Boost
4	0	Stop	4	Inactive

Buttons:

Back button:

Four inputs and four outputs are listed. The delay time and action columns are user configurable.



NOTE

The **[Accept]** and **[Cancel]** boxes stay greyed out and unavailable until the user changes a configurable parameter.

The user can also set a delay time for Quad I/O inputs. The delay time is the time taken to start an action **[Run]**, **[Standby]**, **[Startup]** or **[Stop]** when a trigger is applied via the I/O card. The delay time is set in minutes.

Quad I/O Screen - continued

2. Choose the [Delay time], if required.

A keypad opens:



3. Enter the required delay time.
4. Choose an action box from the input column.

A selection box opens:



5. Choose the corresponding action box from the output column.

A selection box opens:

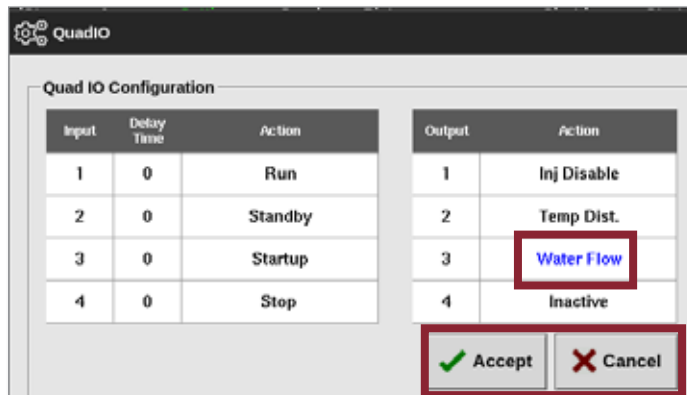


Quad I/O Screen - continued



NOTE

The **[Accept]** and **[Cancel]** boxes become available and the parameter(s) turn blue in color after any change is made by the user. See Figure 13-1.



Input	Delay Time	Action	Output	Action
1	0	Run	1	Inj Disable
2	0	Standby	2	Temp Dist.
3	0	Startup	3	Water Flow
4	0	Stop	4	Inactive

Accept Cancel

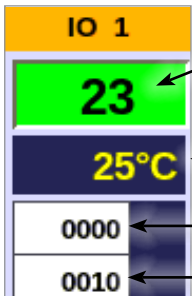
Figure 13-1 Quad I/O Configuration box - parameter changed

- Choose **[Accept]** to confirm the setting or **[Cancel]** to return to the original setting.

The changed parameters turn black in color to indicate they are saved.

- Choose **[Back]** to return to the Settings screen.

For more information about Quad I/O inputs and outputs, connections and remote access see "Section 13 - Quad I/O Options" on page 13-1.

Table 13-1 I/O Card Display Screen Panel		
Display	Description	Notes
	The I/O card has healthy communications with the console.	Will display "N/Z" if communications fail. Will display warning or alarm conditions with color and message.
	The I/O card is being used to monitor temperature.	Set temperature used as a monitor point only. Warning settings are above and below set temperature.
	State of inputs.	Read left to right.
	State of outputs.	Read left to right.

13.2 Quad I/O Card Reset Timer

13.2.1 Set the Quad I/O Reset Timer

The Quad I/O card has an internal reset mechanism which de-energizes all output relays if it loses communication with the console. The timer can be set according to operation requirements.

1. Choose [**Settings**]:



2. Choose [**Tool Config**]:



3. Enter password, if required.
4. Choose Quad I/O Reset Timer from the options list. See Figure 13-2.

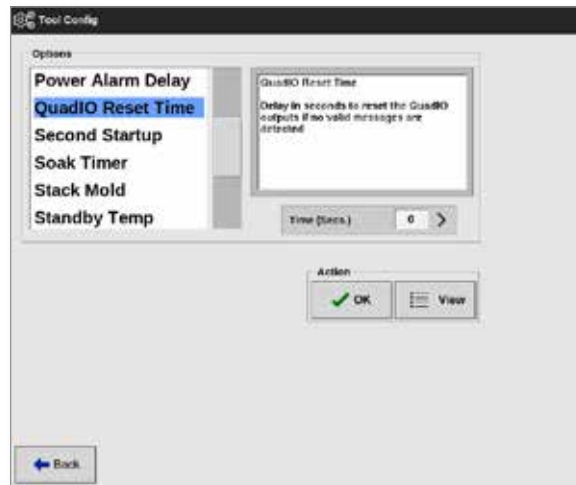


Figure 13-2 Choose Quad I/O Reset Timer

5. Choose [**Time (Secs.)**].

A keypad opens:



6. Choose [**OK**] to accept the new value or choose [**Back**] to return to the System Config screen without saving.

13.3 Quad I/O - 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.

See Table 13-2 for a list of the optional inputs.

Table 13-2 Quad I/O Inputs	
Option	Description
Boost	Puts the controller into Boost mode.
Inactive	This input will not be used and remains inactive.
Inj Confirm	This input is used to confirm that Inj Disable is functioning correctly. If input is detected and no Inj Disable signal is given, the system enters a safe mode until the fault is fixed. A manual reset is then needed to unlock the controller.
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.
Sequence	This input can be used to initiate a sequenced startup, if one has been configured and is currently selected. The input can last for a few seconds to initiate a start sequence and then removed. The sequence can be forced through its stages in a reduced time if the user applies and removes input in quick succession.
Shutdown	Puts the controller into Shutdown mode.

13.4 Quad I/O - Outputs

Each output group is a single-pole changeover relay element that is rated at 240 volts, 1 Amp maximum. It comprises a common or moving contact (MC) that is connected to a normally closed (NC) contact when de-energized. When the controller activates any output channel 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.

See Table 13-3 for a list of optional outputs.

Table 13-3 Quad I/O Outputs	
Option	Description
Boost	Output is given if the controller is put (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. Mimics the secondary output alarm / beacon.

Controller Heating	Output is given if the controller is delivering heat in any mode. Output is lost when the controller is put to Stop.
Controller Ready	Output is given if the controller is ready to start. There must not be an alarm condition that stops the machine from operation for this output to be given.
Controller Soaking	Output is given if the controller is held in Soak mode.
Hot Runner	Output is given if any probe (nozzle) or manifold deviates from its setpoint 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 ONLY. No other alarm will cause output to be given.
Inj Disable Ext	Output mimics Injection Disable in order to provide two identical outputs.
IO5 Tool Confirm	Output is given if the tool requested by the IO5 is the currently loaded tool.
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 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 Alarm	Output is given if the controller is in Warning Alarm status.
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.

13.5 Quad I/O - Default Connections

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

Input / output channels can be individually configured to assume different functions.

See the following table for a list of default I/O connections.

Table 13-4 Default I/O Connections					
Description	STA 20 Pin No.	Circuit	Default Input Function	Default Output Function	Wire Color
Input 1	1	Input 1	Go to Run Mode		Black
Input 1	2				White
NO Contact 1	3	Output 1		Injection Disable	Red
MC Contact 1	4				Green
NC Contact 1	5				Orange

Table 13-4 Default I/O Connections					
Description	STA 20 Pin No.	Circuit	Default Input Function	Default Output Function	Wire Color
Input 2	6	Input 2	Go to Standby Mode		Blue
Input 2	7				White/Black
NO Contact 2	8	Output 2		Temperature Disturbance	Red/Black
MC Contact 2	9				Green/Black
NC Contact 2	10				Orange/Black
Input 3	11	Input 3	Go to Startup mode		Blue/Black
Input 3	12				Black/White
NO Contact 3	13	Output 3		Boost	Red/White
MC Contact 3	14				Green/White
NC Contact 3	15				Blue/White
Input 4	16	Input 4	Go to Stop Mode		Black/Red
Input 4	17				White/Red
NO Contact 4	18	Output 4		Spare / Inactive	Orange/Red
MC Contact 4	19				Blue/Red
NC Contact 4	20				Red/Green

13.6 Remote Tool Selection

The IO5 card can enable remote tool loading. These extra functions connect to the remote machine using either a HAN16A connector or an AMP 183040 circular connector. See Figure 13-3.

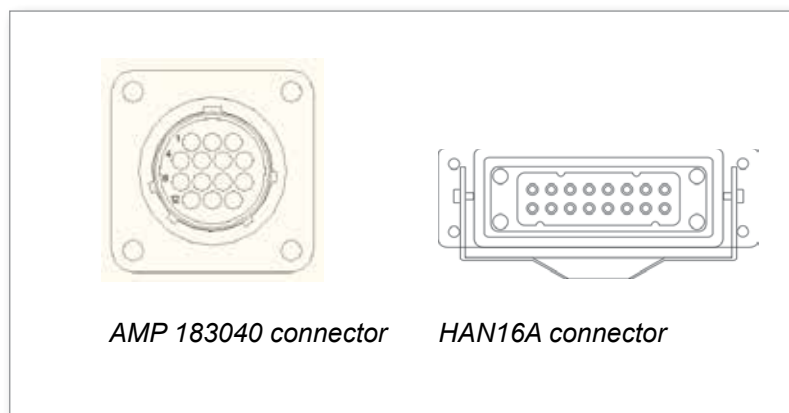


Figure 13-3 Connectors

See Table 13-5 for pin connections.

Table 13-5 Pin Connections	
Pin	Function
1	“Tool Load” signal from molding machine to ask console to load tool
2	address 1
3	address 2
4	address 4
5	address 8

Table 13-5 Pin Connections		
Pin	Function	
6	address 16	
7	address 32	
8	address 64	
9	address 128	
10	spare	
11	"Tool Loaded" signal from console to molding machine	Normally Open
12		Common
13		Normally Closed
14	GND	

13.7 Remote Tool Loading

The IO5 can be used in two ways to enable remote tool loading.

13.7.1 Static Remote Tool Load

The static method is enacted by simply connecting appropriate "load" and "tool ID" pins to ground. The tool is loaded and feedback is ignored.

Load Tool 10 – connect, "load pin", and "tool id pins" to ground - connect pins 1, 3, and 5 to 14

Load tool 19 – connect pins 1, 2, 3 and 6 to 14

13.7.2 Dynamic Remote Tool Load

This sequence allows a degree of control and feedback.

The dynamic method sends a change tool command by connecting the “load” and “tool ID” pins to ground.

It then watches for a successful tool load before it ends the tool load process. The process can be repeated to load another tool, if required.

Table 13-6 shows an example of this process.

Table 13-6 Dynamic Remote Tool Load Process				
Step	Action	Remote Machine	Local Console	
1	Selects a tool and initiates tool load.	Connects pin 14 (ground) to pins 3 and 5 (address $2+8 = 10$) and pin 1 (“tool load”).	Console checks to see that it has valid tool settings in that tool bank. If “no” then there is no change in “Tool Loaded” signal. 	If “yes” then it disables “Tool Loaded” signal. (pins 11 and 12 go “Closed” while pins 12 and 13 go “Open”)
2	Console cannot find any config settings for selected tool.	Machine sees that no tool change has occurred. It may flag an error to await operator intervention. Process ends.	The console displays an error message - “No Tool Found”.	Process skips step 2 and goes to step 3. 
3	Console can find a tool and loads it.	Waits for “Tool Loaded” signal.	Loads Tool 10 and indicates process is finished by enabling “Tool Loaded” signal. (pins 11 and 12 go “Open” and pins 12 and 13 go “Closed”)	
4	Process ends.	Sees “Tool Loaded” signal from console and disconnects pins 1, 3 and 5 from ground (pin 14).	Console loses the “Change Tool” command.	

Section 14 - Sequence Valve Gate Option



WARNING

Ensure that you have fully read "Section 3 - Safety" before setting up or using this feature with the controller.

14.1 Introduction

The Sequence Valve Gate (SVG) card operates in a cyclic manner. It can open and close any of 12 remote gates up to four times during each cycle.

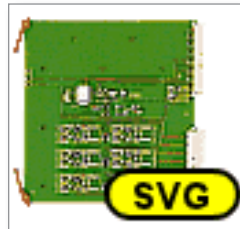


Figure 14-1 SVG card

Each zone is individually configurable to open and close in response to:

- Time to the nearest 1/100th second from receiving a cycle-start signal
- Position of the main barrel screw feed
- Pressure from a remote sensor located within the mold cavity
- A combination of these three triggers

Each zone has one digital output to activate a valve gate and two digital inputs to accept feedback signals, one to confirm that the associated gate is closed and another to confirm it is open.

14.2 Further Inputs

The card also has further inputs that affect the overall control.

There are four digital inputs which comprise

- the Cycle Start input
- an Enable input which is closed while all systems are ready to continue molding
- two user definable inputs for other functions

There are three analogue inputs:

- two inputs are primarily used to receive a signal which is proportional to the physical position of two different screw feeds
- the third input is reserved for future development

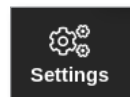
14.3 Setup

The user must set up the number of open / close operations and the triggers for these actions to enable SVG functionality. The required parameters are:

- the number of zones under control
- the number of times the gates need to open and close during a complete cycle
- the configuration of the screw sensor to use barrel position for gate control

14.3.1 Configure SVG Card Type

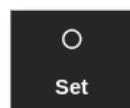
1. Choose **[Settings]**:



2. Choose the zone or zones to be configured:



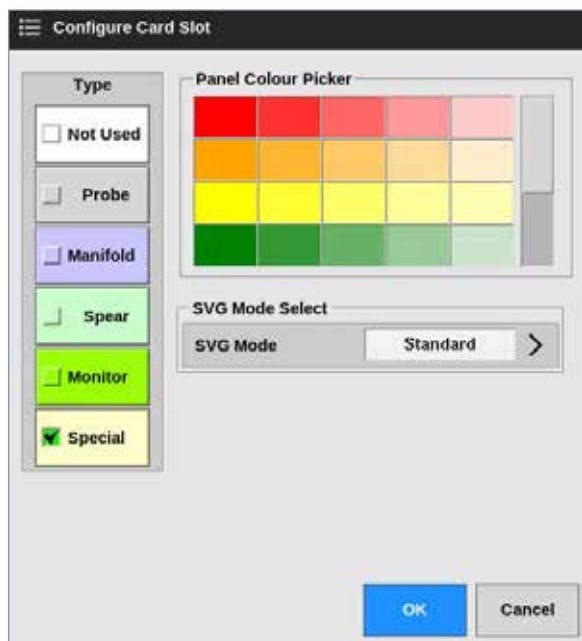
3. Choose **[Set]**:



4. Enter password, if required.

Configure SVG Card type - continued

The Configure Card Slot box opens:



5. Choose [**Special**] as the card type.
6. Choose [**OK**] to accept the change and return to the Settings screen.

14.4 Configure SVG Mode

The SVG option of the M2 Plus controller can be used in two different modes:

- **Standard mode** - user can configure motion control for gates. See "14.5 Standard Mode" on page 14-3 for more information.
- **Relay Output mode** - a high temperature alarm from zones linked to specific gates produces a digital output, which can be sent to an external device. See "14.9 Relay Output Mode" on page 14-30 for more information.

14.5 Standard Mode

14.5.1 Global Settings

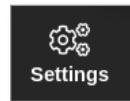
The user can configure settings that apply to all the gates. See Table 14-1.

Table 14-1 SVG Global Settings	
Setting	Description
Graph Mode	Choose type of graph based on time or position.
Max Cycle Time	Set how long the cycle lasts. Used to display the graph.
Monitor Time	Set timeout value for the LS sensor to detect an error.
Number of Steps	Set number of steps [between 1 and 4].
Valve Disable	Enable to only allow the pins to open if console is in Run mode and zones are in limits.
Valve Type	Choose the valve type being used: single or dual.

Global Settings - continued

After the card has been configured as **[Special]**,

1. Choose **[Settings]**:

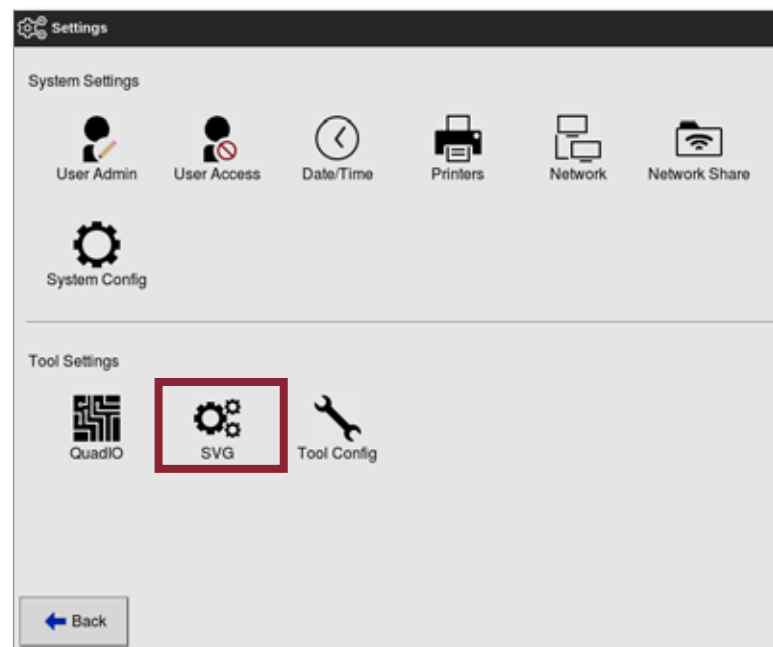


2. Choose **[Config]**:



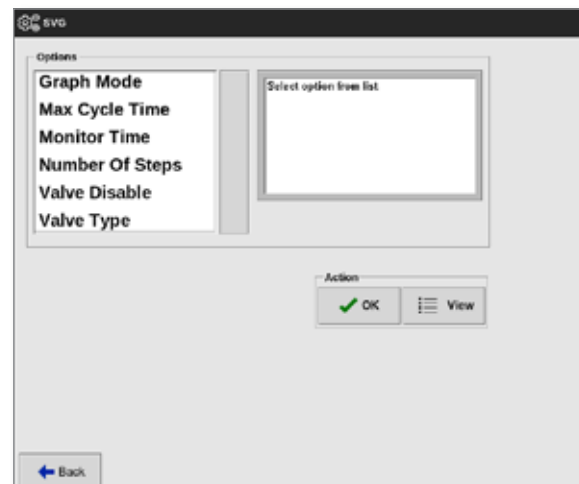
3. Enter password, if required.

The Settings box opens:



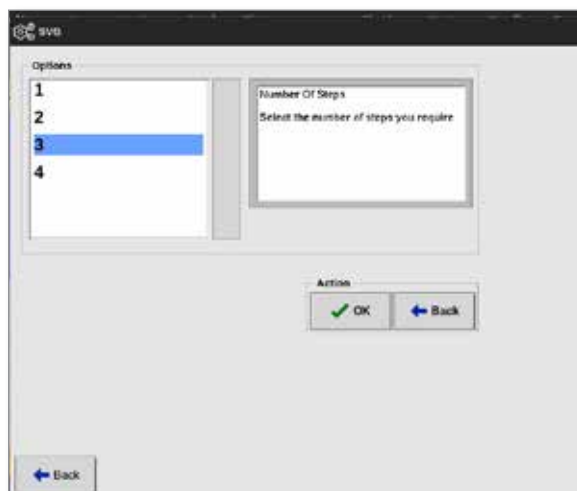
4. Choose **[SVG]** from Tool Settings.

The SVG options box opens:



Global Settings - continued

5. Choose the required setting:

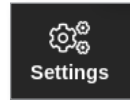


6. Choose the required value or option.
7. Choose **[OK]**.
8. Choose **[Back]** to return to the Settings screen after all the required parameters have been set.

14.5.2 View or Print the SVG Settings

The current SVG settings are available to view or print.

1. Choose [**Settings**]:

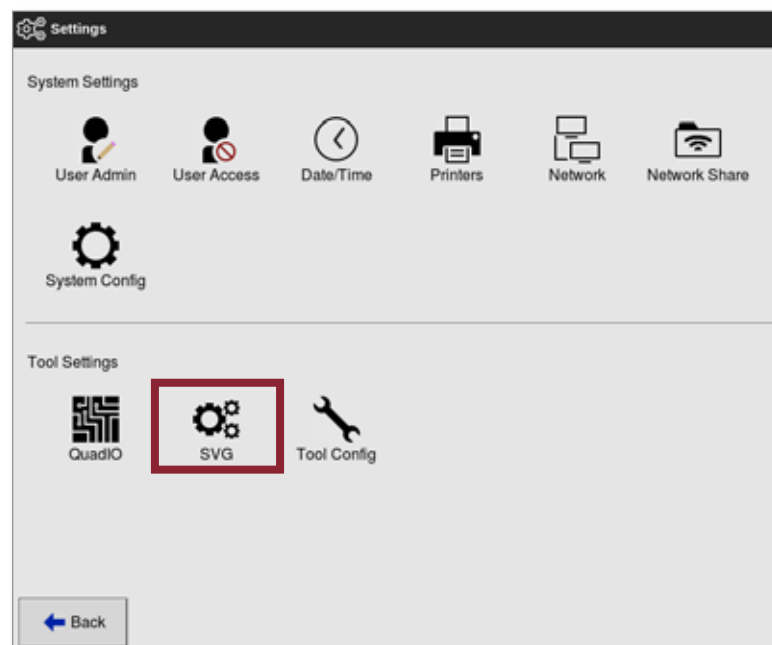


2. Choose [**Config**]:



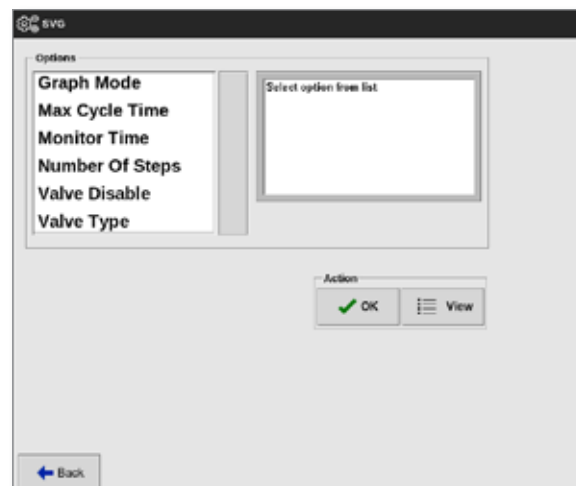
3. Enter password, if required.

The Settings box opens:



4. Choose [**SVG**] from Tool Settings.

The SVG options box opens:



View or Print the SVG Settings - continued

5. Choose **[View]** from the Options list screen.



The SVG view screen opens:



The user can print the SVG settings from this screen.

6. Choose **[Print]**.

A message box opens:



NOTE

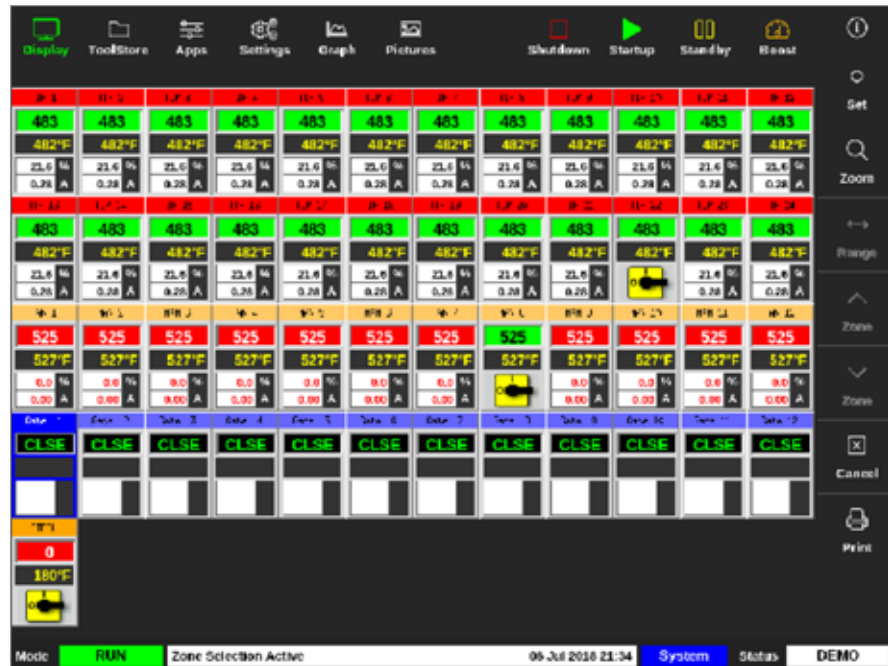
The user must choose the default print setting from the **[Printers]** screen. All output is sent directly to this default after the user chooses the **[Print]** button. No printer settings box will open.

See "5.15 Configure a Printer" on page 5-49 for more information.

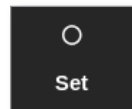
14.6 Configure SVG Input - Digital

From the Display screen:

1. Choose any one of the SVG gates:



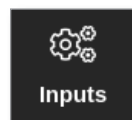
2. Choose Set:



3. Enter password, if required.

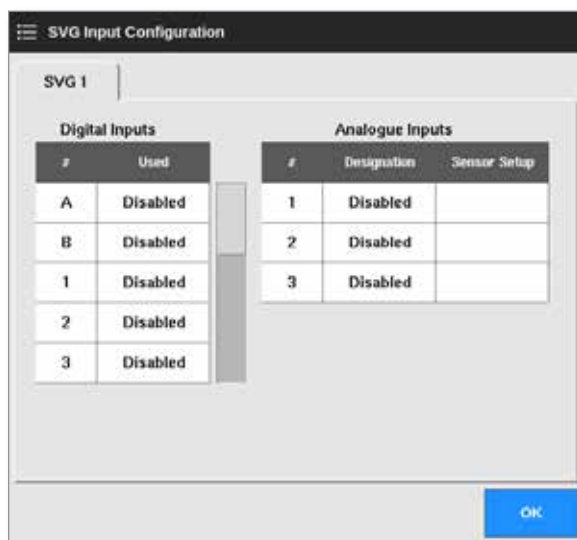
The gate trigger box opens. It lists the open / close steps for all of the SVG gates detected.

4. Choose [Inputs]:



Configure SVG Input - Digital - continued

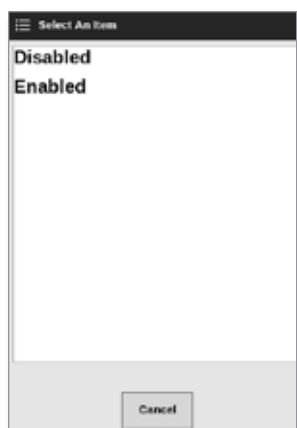
The SVG Input Configuration box opens:



Digital Inputs		Analogue Inputs		
#	Used	#	Designation	Sensor Setup
A	Disabled	1	Disabled	
B	Disabled	2	Disabled	
1	Disabled	3	Disabled	
2	Disabled			
3	Disabled			

5. Choose **[Used]** from the Digital Inputs table.

A selection box opens:



6. Choose **[Enabled]** or **[Disabled]** as required, or choose **[Cancel]** to return to the SVG Input Configuration box.

7. Repeat step 6 for all gates.

8. Choose **[OK]** to return to the open / close list.

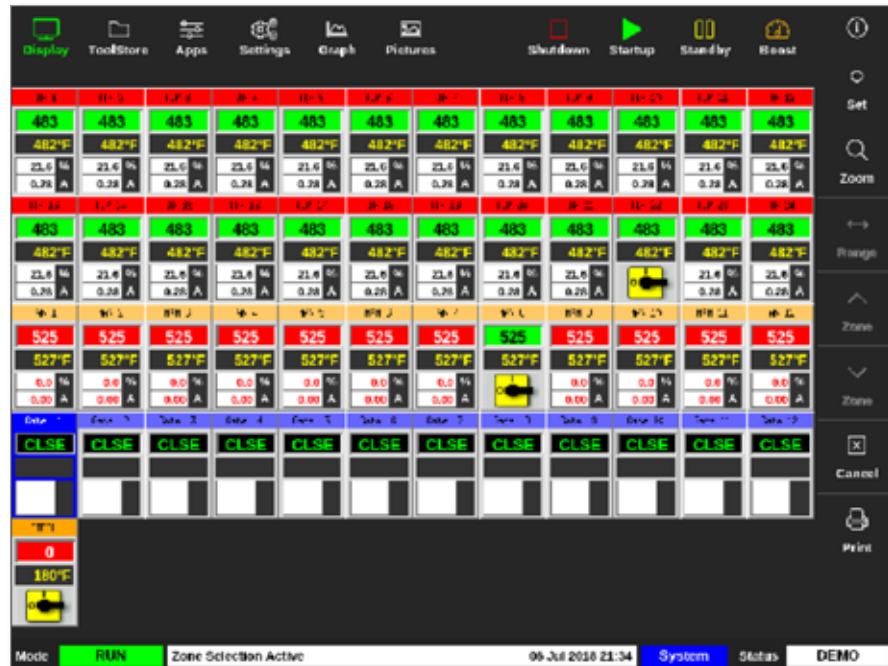
14.7 Configure SVG Input - Analogue

IMPORTANT

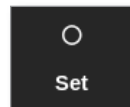
Ensure that the wiring is correctly configured or the screw input cannot be calibrated. See "Figure 14-7 AMP04 connector 1" on page 14-35.

From the Display screen,

1. Choose any one of the SVG gates:



2. Choose Set:



3. Enter password, if required.

Configure SVG Input - Analogue - continued

The Gate Trigger box opens:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 2	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 3	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 4	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 5	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 6	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 7	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 8	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 9	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 10	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 11	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 12	Time (abs)	0.00 secs	Time (abs)	0.00 secs

The Gate Trigger box lists the open and close steps for all of the SVG gates detected.

4. Choose **[Inputs]**:



The SVG Input Configuration box opens:

SVG Input Configuration

SVG 1

Digital Inputs

#	Used
A	Disabled
B	Disabled
1	Disabled
2	Disabled
3	Disabled

Analogue Inputs

#	Designation	Sensor Setup
1	Disabled	
2	Disabled	
3	Disabled	

OK

5. Choose **[Designation]** from the Analogue Inputs table.

Configure SVG Input - Analogue - continued

A selection box opens:



6. Choose **[Enabled]** or **[Disabled]**, as required.
7. Repeat step 6 for all analog inputs.
8. Choose **[Sensor Setup]** from the Analogue Inputs table.

The SVG Screw Calibration box opens:

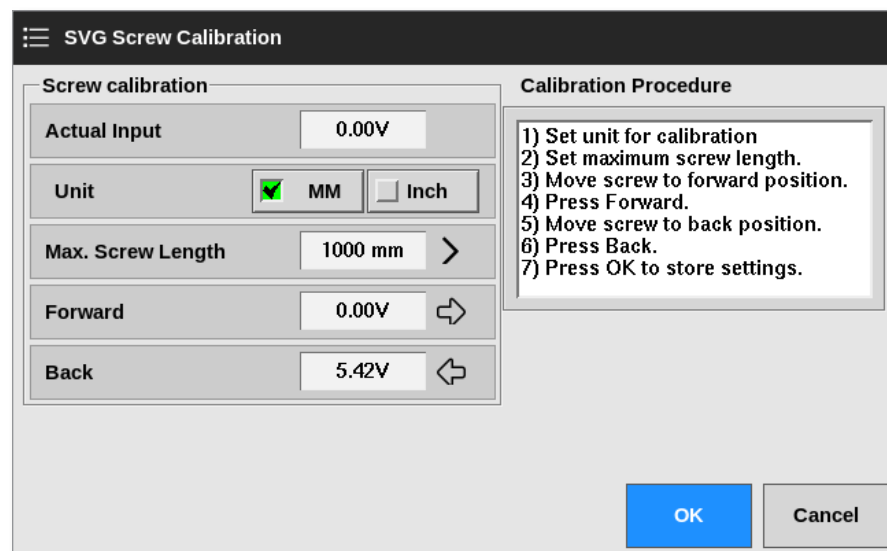


Figure 14-2 SVG Screw Calibration box

9. Choose **[Max. Screw Length]**.

Configure SVG Input - Analogue - continued

A keypad opens:



10. Enter the value for your system.
11. Follow the calibration procedure as shown on the Calibration Procedure box. See Figure 14-2.
12. Choose **[OK]** after calibration procedure is complete or choose **[Cancel]** to return to the SVG Input Configuration screen.



NOTE

A warning message appears if the screw calibration settings are invalid. Check sensors and retry calibration.

14.8 Gate Timing Options

Each valve gate can be programmed to have up to four steps. The valve will act according to these step settings.



NOTE

A step = the number of times the gate must open and close in one complete cycle.

Time (abs) = time absolute (time is relative to the start of cycle start input)

Time (inc) = time incremental (time is relative to the when the valve was opened)

14.8.1 Use Time Values Alone

Open the valve on an Absolute Time (relative to the start of the cycle) and close it on an Absolute Time value (relative to the start of the cycle):

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (abs)	1.10 secs

Open the valve on an Absolute Time (relative to the start of cycle) and close it on at incremental time (relative to the when the valve was opened):

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.50 secs	Time (inc)	2.25 secs

14.8.2 Use Screw Position Alone

Open the valve on screw position and close it on the screw position:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Screw	2.0 mm	Screw	5.5 mm



14.8.3 Use a Combination of Time and Position

NOTE

The two parameters move in opposite directions. A time trigger starts at zero and counts **up** as the screw closes. A screw position triggers starts at full length and counts **down** while the screw closes.

Open the valve on an Absolute Time (relative to the start of cycle) and close it on screw position:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.50 secs	Screw	5.0 mm

Open the valve on position of the screw and close it on an Absolute Time (relative to the start of cycle):

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Screw	0.6 mm	Time (abs)	2.00 secs

Open the valve on screw position and close it on an incremental time (relative to the when the valve was opened):

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Screw	3.0 mm	Time (inc)	5.00 secs

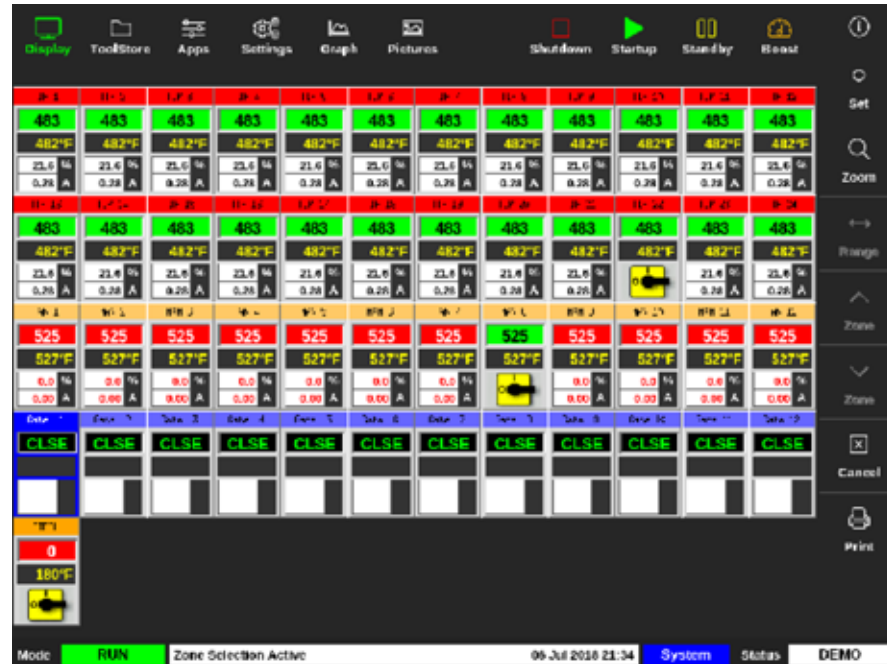
14.8.4 Set Gate Open Points

Gate close points can be chosen from these two parameters:

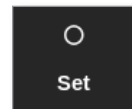
- a fixed point in time or
- a nominated screw position

From the Display screen,

1. Choose one zone:



2. Choose [Set]:



3. Enter password, if required.

Set Gate Open Points - continued

The Gate Trigger box opens:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 2	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 3	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 4	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 5	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 6	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 7	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 8	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 9	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 10	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 11	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 12	Time (abs)	0.00 secs	Time (abs)	0.00 secs



NOTE

This box defaults to absolute time [Time (abs)] at 0 seconds.

4. Choose all of the gates:

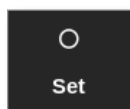
Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 2	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 3	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 4	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 5	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 6	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 7	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 8	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 9	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 10	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 11	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 12	Time (abs)	0.00 secs	Time (abs)	0.00 secs

Set Gate Open Points - continued

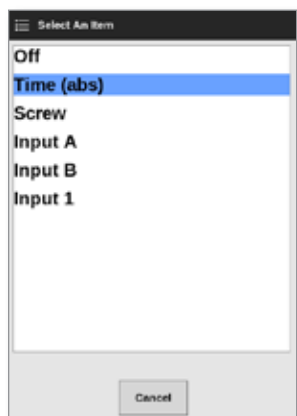
5. Touch anywhere in the Open Trigger column:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 2	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 3	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 4	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 5	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 6	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 7	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 8	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 9	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 10	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 11	Time (abs)	0.00 secs	Time (inc)	0.00 secs
Gate 12	Time (abs)	0.00 secs	Time (inc)	0.00 secs

6. Choose [Set]:



A selection box opens:



7. Choose the open trigger. In this example, [Time (abs)] is chosen.



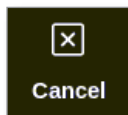
NOTE

The user can also set single zones or all zones to [Off], if required.

Set Gate Open Points - continued

The screen returns to the Gate Trigger box.

8. Choose **[Cancel]** to deselect all gates:



9. Choose the first gate:

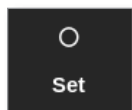
Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 2	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 3	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 4	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 5	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 6	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 7	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 8	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 9	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 10	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 11	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 12	Time (abs)	0.00 secs	Time (abs)	0.00 secs

10. Choose the corresponding box in the **[Open Value]** column:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 2	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 3	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 4	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 5	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 6	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 7	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 8	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 9	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 10	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 11	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 12	Time (abs)	0.00 secs	Time (abs)	0.00 secs

Set Gate Open Points - continued

11. Choose [**Set**]:



A keypad opens:



12. Enter the open time for the first gate. In this example, 0.5 seconds is entered.

13. Repeat steps 8 to 11 until all gate opening times are set.



NOTE

If screw position is chosen as the trigger, a keypad opens and the user enters the distance (in mm).

14.8.5 Set Gate Close Points

Gate close points can be chosen from these three parameters:

- a fixed point in time
- a period of time after opening
- a nominated screw position

One simple option is to select **[Time (inc)]**, which allows all gates to be set in a single step. All gates stay open for the same amount of time.

1. Choose all of the gates:

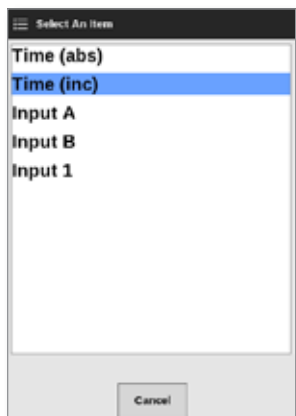
Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 2	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 3	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 4	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 5	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 6	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 7	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 8	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 9	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 10	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 11	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 12	Time (abs)	0.00 secs	Time (abs)	0.00 secs

2. Touch anywhere in the Close Trigger column:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.50 secs	Time (abs)	0.00 secs
Gate 2	Time (abs)	1.50 secs	Time (abs)	0.00 secs
Gate 3	Time (abs)	2.50 secs	Time (abs)	0.00 secs
Gate 4	Time (abs)	3.50 secs	Time (abs)	0.00 secs
Gate 5	Time (abs)	4.50 secs	Time (abs)	0.00 secs
Gate 6	Time (abs)	5.50 secs	Time (abs)	0.00 secs
Gate 7	Time (abs)	6.50 secs	Time (abs)	0.00 secs
Gate 8	Time (abs)	7.50 secs	Time (abs)	0.00 secs
Gate 9	Time (abs)	8.50 secs	Time (abs)	0.00 secs
Gate 10	Time (abs)	9.50 secs	Time (abs)	0.00 secs
Gate 11	Time (abs)	10.50 secs	Time (abs)	0.00 secs
Gate 12	Time (abs)	11.50 secs	Time (abs)	0.00 secs

Set Gate Close Points - continued

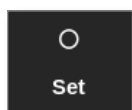
A selection box opens:



3. Choose the close trigger. In this example, [**Time (inc)**] is chosen.
4. Choose all the gates and touch anywhere in the Close Value column:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.50 secs	Time (inc)	1.10 secs
Gate 2	Time (abs)	1.50 secs	Time (inc)	1.10 secs
Gate 3	Time (abs)	2.50 secs	Time (inc)	1.10 secs
Gate 4	Time (abs)	3.50 secs	Time (inc)	1.10 secs
Gate 5	Time (abs)	4.50 secs	Time (inc)	1.10 secs
Gate 6	Time (abs)	5.50 secs	Time (inc)	1.10 secs
Gate 7	Time (abs)	6.50 secs	Time (inc)	1.10 secs
Gate 8	Time (abs)	7.50 secs	Time (inc)	1.10 secs
Gate 9	Time (abs)	8.50 secs	Time (inc)	1.10 secs
Gate 10	Time (abs)	9.50 secs	Time (inc)	1.10 secs
Gate 11	Time (abs)	10.50 secs	Time (inc)	1.10 secs
Gate 12	Time (abs)	11.50 secs	Time (inc)	1.10 secs

5. Choose [**Set**]:



Set Gate Close Points - continued

A keypad opens:



6. Enter the required time value. In this example, 1.1 seconds is entered.



NOTE

If screw position is chosen as the trigger, a keypad opens and the user enters the distance (in mm).

The screen returns to the Gate Settings box and the user can view the SVG sequence. See Figure 14-3.

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.50 secs	Time (inc)	1.10 secs
Gate 2	Time (abs)	1.50 secs	Time (inc)	1.10 secs
Gate 3	Time (abs)	2.50 secs	Time (inc)	1.10 secs
Gate 4	Time (abs)	3.50 secs	Time (inc)	1.10 secs
Gate 5	Time (abs)	4.50 secs	Time (inc)	1.10 secs
Gate 6	Time (abs)	5.50 secs	Time (inc)	1.10 secs
Gate 7	Time (abs)	6.50 secs	Time (inc)	1.10 secs
Gate 8	Time (abs)	7.50 secs	Time (inc)	1.10 secs
Gate 9	Time (abs)	8.50 secs	Time (inc)	1.10 secs
Gate 10	Time (abs)	9.50 secs	Time (inc)	1.10 secs
Gate 11	Time (abs)	10.50 secs	Time (inc)	1.10 secs
Gate 12	Time (abs)	11.50 secs	Time (inc)	1.10 secs

Figure 14-3 Programmed SVG sequence

For this SVG sequence, the six gates are set to operate sequentially at 1 second intervals, and they stay open for 1.1 seconds.

Set Gate Close Points - continued

The user can print the Gate Settings box settings from this screen.

7. Choose **[Print]**.

A message box opens:



NOTE

The user must choose the default print setting from the **[Printers]** screen. All output is sent directly to this default after the user chooses the **[Print]** button. No printer settings box will open.

See "5.15 Configure a Printer" on page 5-49 for more information.

14.8.6 View or Test the SVG Sequence

The user can preview a graph of the programmed sequence with the **[Preview]** button.

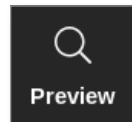


IMPORTANT

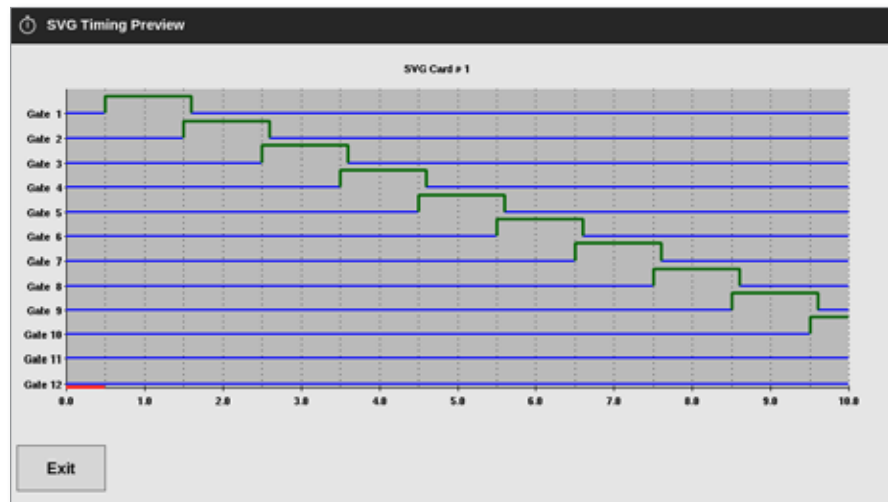
The Preview option is only available if all gate settings are based on time.

There is no simulation to show opening and closing relationships when Screw (position) is a set option for open and / or close.

1. Choose **[Preview]**:



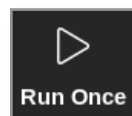
2. The Preview graph opens:



3. Choose **[Exit]** to close the screen and return to the Gate Settings box.

The user can also test the open and close sequence through a single cycle with the **[Run Once]** button.

4. Choose **[Run Once]**:

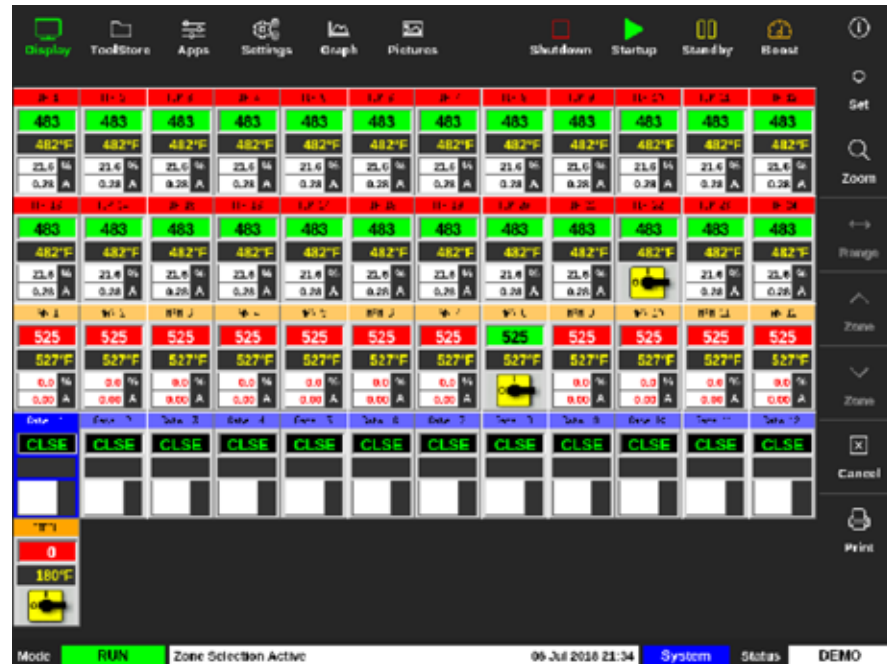


14.8.7 Troubleshooting

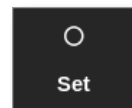
The user can open or close a single gate or specific gates for testing or troubleshooting purposes when in Manual mode.

From the Display screen,

1. Choose one zone:



2. Choose [Set]:

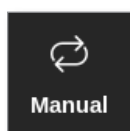


The Gate Trigger box opens:

Gate	Step 1 Open Trigger	Step 1 Open Value	Step 1 Close Trigger	Step 1 Close Value
Gate 1	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 2	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 3	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 4	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 5	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 6	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 7	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 8	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 9	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 10	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 11	Time (abs)	0.00 secs	Time (abs)	0.00 secs
Gate 12	Time (abs)	0.00 secs	Time (abs)	0.00 secs

Troubleshooting - continued

3. Choose **[Manual]**:



The Manual mode screen opens. See Figure 14-4.

Gate	Pin State	Open Sensor	Close Sensor
Gate 1	Closed	Inactive	Inactive
Gate 2	Closed	Inactive	Inactive
Gate 3	Closed	Inactive	Inactive
Gate 4	Closed	Inactive	Inactive
Gate 5	Closed	Inactive	Inactive
Gate 6	Closed	Inactive	Inactive
Gate 7	Closed	Inactive	Inactive
Gate 8	Closed	Inactive	Inactive
Gate 9	Closed	Inactive	Inactive
Gate 10	Closed	Inactive	Inactive
Gate 11	Closed	Inactive	Inactive
Gate 12	Closed	Inactive	Inactive

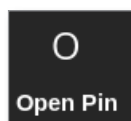
Figure 14-4 SVG Manual mode screen

Troubleshooting - continued

4. Choose the required gate or gates:

Gate	Pin State	Open Sensor	Close Sensor
Gate 1	Closed	Inactive	Inactive
Gate 2	Closed	Inactive	Inactive
Gate 3	Closed	Inactive	Inactive
Gate 4	Closed	Inactive	Inactive
Gate 5	Closed	Inactive	Inactive
Gate 6	Closed	Inactive	Inactive
Gate 7	Closed	Inactive	Inactive
Gate 8	Closed	Inactive	Inactive
Gate 9	Closed	Inactive	Inactive
Gate 10	Closed	Inactive	Inactive
Gate 11	Closed	Inactive	Inactive
Gate 12	Closed	Inactive	Inactive

5. Choose **[Open Pin]** to move the pin to the open position:

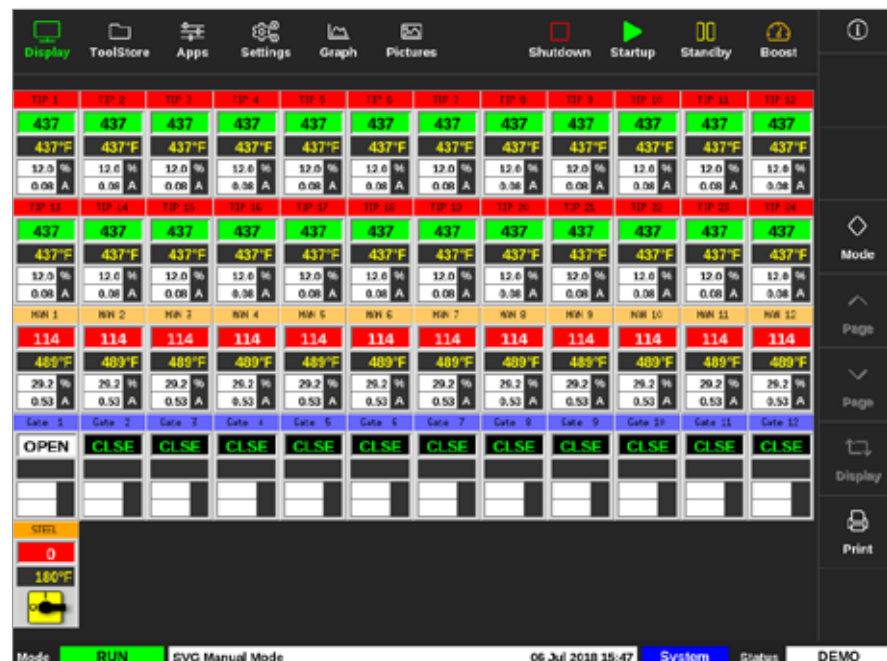


Troubleshooting - continued

The Manual mode screen changes:

Gate	Pin State	Open Sensor	Close Sensor
Gate 1	Open	Inactive	Inactive
Gate 2	Closed	Inactive	Inactive
Gate 3	Closed	Inactive	Inactive
Gate 4	Closed	Inactive	Inactive
Gate 5	Closed	Inactive	Inactive
Gate 6	Closed	Inactive	Inactive
Gate 7	Closed	Inactive	Inactive
Gate 8	Closed	Inactive	Inactive
Gate 9	Closed	Inactive	Inactive
Gate 10	Closed	Inactive	Inactive
Gate 11	Closed	Inactive	Inactive
Gate 12	Closed	Inactive	Inactive

This change is also shown on the Display screen:



- Choose [Close Pin] to return pin to the closed position:



14.9 Relay Output Mode

In Relay Output mode, a high temperature alarm will trigger the gate to send a 24V DC signal to a connected external destination.

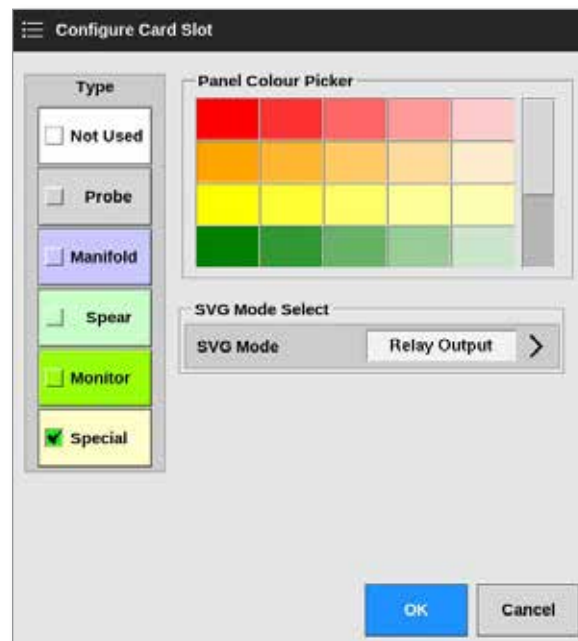
After the card has been configured as **[Special]**:

1. Choose **[SVG Mode]**.

A selection box opens:



2. Choose **[Relay Output]** or choose **[Cancel]** to return to the Settings screen:



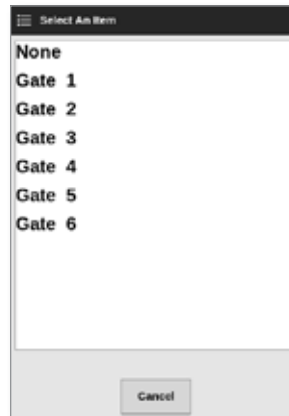
Relay Output Mode - continued

5. Choose **[Set]**:



6. Enter password, if required.

A selection box opens:



7. Link the zone or zones with the required gate or choose **[Cancel]** to return to the Settings screen without linking the zones to a gate.

The Relay Output Zone column populates with the chosen gate number. See Figure 14-6.

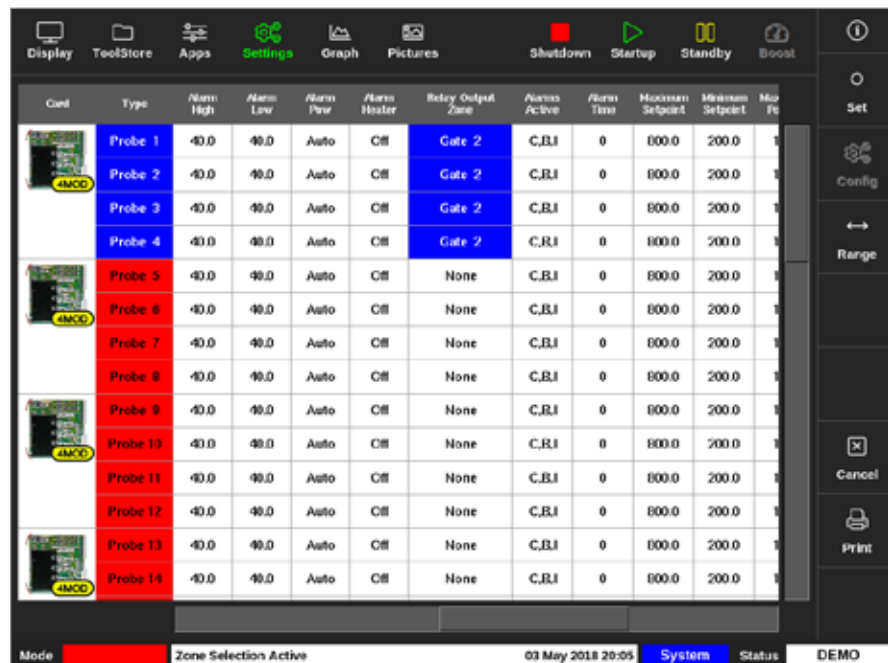


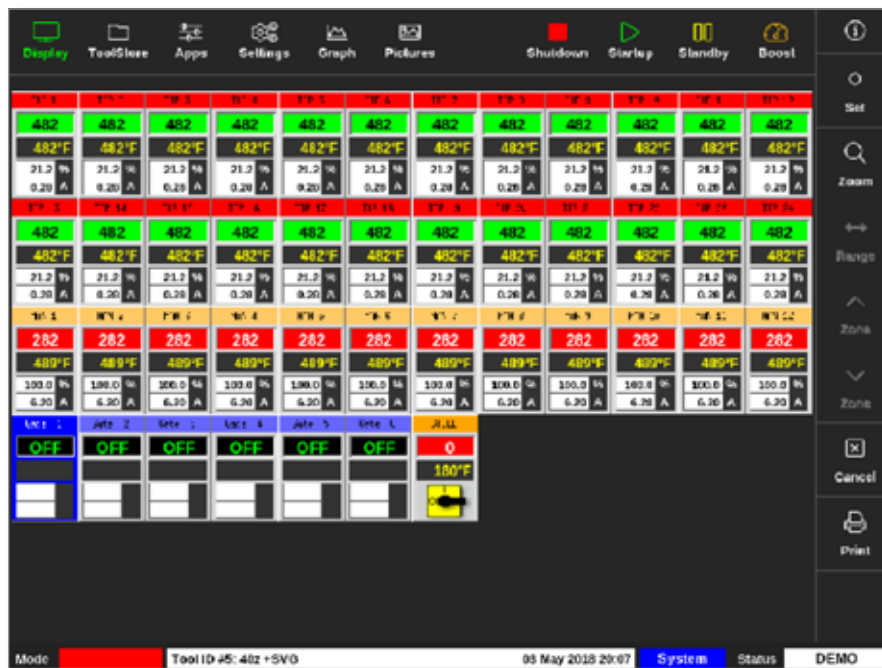
Figure 14-6 Gate shown in Relay Output column

Relay Output Mode - continued

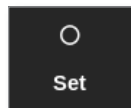
The action of the Relay Output zone can now be set by the user.

From the Display page,

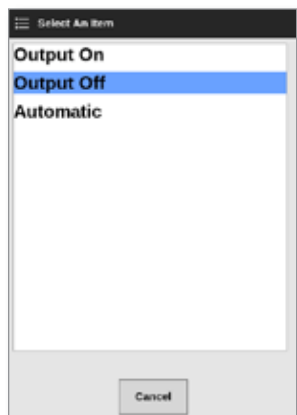
8. Choose the required zone or zones:



9. Choose [Set]:



A selection box opens:



10. Choose one of the following options:

- **Output On** - the output is manually set to ON
- **Output Off** - the output is manually set to OFF
- **Automatic** - the system decides when to set the output to ON or OFF based on the setpoint and the threshold

14.10 External Wiring Connections

14.10.1 Outputs

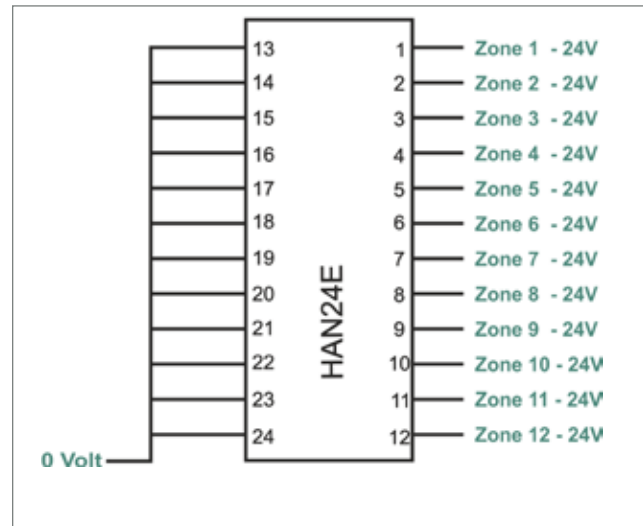
There is one HAN24E female connector for every 12 zones.

For each pair the higher numbered pin is at ground the lowered numbered side will energize at 24V DC when the controller calls for that valve to open.

14.10.2 Output Rating

Each output is rated at 5A 24V DC.

SVG Output—12 Zones



14.10.3 Inputs (North American Version)

Connector 1

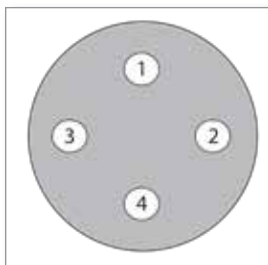


Figure 14-7 AMP04 connector 1

Table 14-2 Connector 1 Inputs			
Circuit	Pins	Description	Format
Screw Position	3 (-) and 4 (+)	Accepts a voltage source input that relates to the main screw position. A calibration routine within the controller adjusts actual input to actual screw position.	0 to 10 Volts
Start Trigger	1 and 2	Sees a closed condition as a signal to start the timer on the valve sequence.	Normally open pair (dry contact)

Connector 2

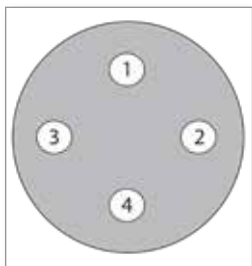


Figure 14-8 AMP04 connector 2

Table 14-3 Connector 2 Inputs			
Circuit	Pins	Description	Format
Input A	1 and 2	Accepts a closing signal that can be used as a trigger for one or more gates.	Normally open pair (dry contact)
Input B	3 and 4	Accepts a closing signal that can be used as a trigger for one or more gates.	Normally open pair (dry contact)

14.10.4 Inputs - European Version

A HAN16 connector provides interconnection for the control inputs. See Table 14-4 for more information.

Table 14-4 HAN16 Connector Inputs			
Circuit	Pins	Description	Format
Alarm Output	5 and 13	Goes to closed when an alarm condition is generated.	Normally open pair
Analogue Input 1	6+ and 14-	Accepts a current source input that relates to a main screw position. A calibration routine within the controller adjusts actual input to actual screw position.	4 to 20 mA
Analogue Input 2	7+ and 15-	Accepts a voltage source input that relates to the main screw position. A calibration routine within the controller adjusts actual input to actual screw position.	0 to 10 volts
Analogue Input 3	8+ and 16-	Accepts a voltage source input that relates to the secondary screw position. A calibration routine within the controller adjusts actual input to actual screw position.	0 to 10 volts
Start Trigger	1 and 9	Sees a closed condition as a signal to start the timer on the valve sequence.	Normally open pair
Trigger A	2 and 10	Not normally used – reserved for future use.	Digital Input A
Trigger B	3 and 11	Not normally used – reserved for future use	Digital Input B
Enable	4 and 12	Sees a closed condition as a signal that the injection machine is ready to start working. Any other signals present are ignored until the [Enable] is present.	Normally open pair

14.11 Handshake Inputs (Optional)

The SVG controller can use handshake inputs from sensors in the actuator.

The SVG cabinet is large enough to be fitted with a high density connector, such as the HAN72D, that could be used to accept feedback signals.

This is an optional feature available upon request.

Section 15 - Fitlet2* Option



WARNING

Ensure that you have fully read "Section 3 - Safety" before setting up or using this feature with the controller.



IMPORTANT

The Fitlet2 option is specifically configured for each customer's system. Always contact your *Mold-Masters* representative for technical support or in the event of breakdown.

15.11.1 Fitlet2 - Introduction

The Fitlet2 option provides M2 Plus software functionality and options, and it allows the customer to access the software interface via a remote display. No console is provided with this option.

15.11.2 Fitlet2 - External Connections

The Fitlet2 system has the following ports:

- USB
- HDMI
- compact USB
- power connection
- Ethernet (2 ports)
- Com port

See Figure 15-1.

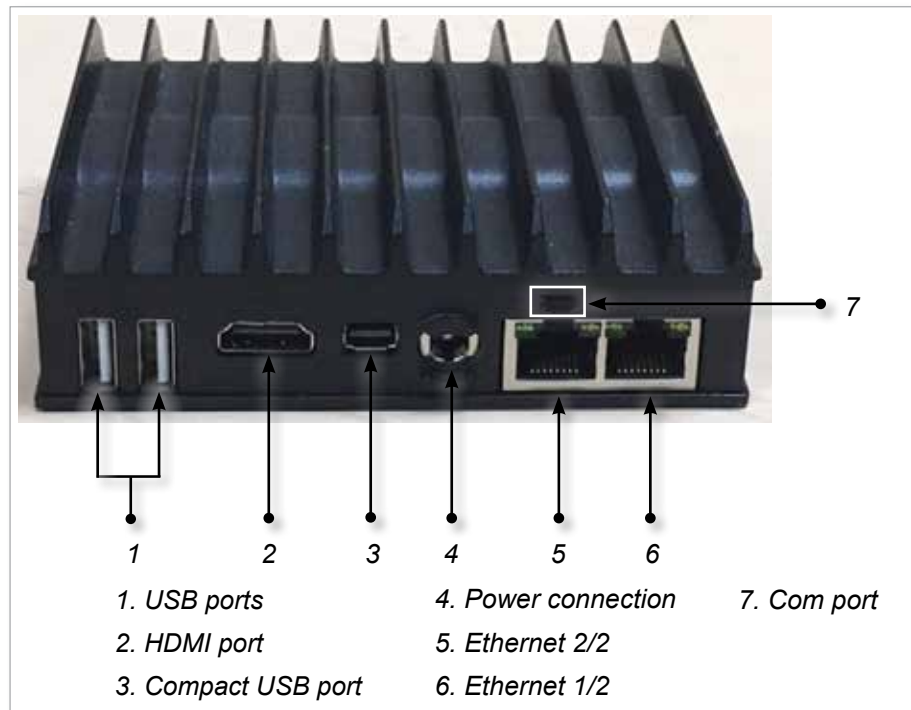


Figure 15-1 Fitlet2 ports

15.11.3 Fitlet2 - Screen Layout

The screen layout used for this option is identical to the TS12 console, but the Fitlet2 option has the capability to show up to 498 zones. See "4.8 Zone Display Options (TS12 Console)" on page 4-13 to view the screen layout.



NOTE

The Fitlet2 option allows users to store up to 120 images. Multiple images can be associated with a single tool.

15.11.4 Fitlet2 - Upgrade Software

Software for the Fitlet2 option can be upgraded with the same procedure that is used to upgrade M2 Plus controller software. See "8.1 Upgrade Software" on page 8-1.



NOTE

For the Fitlet2 option, insert the USB memory stick with the software upgrade into the USB port on the controller cabinet.

15.11.5 Fitlet2 - Connection

The Fitlet2 is connected to the user's external device via an Ethernet cable. Ethernet port 1/2 on the Fitlet2 is specifically configured for the customer. See "Figure 15-1 Fitlet2 ports" on page 15-1.

1. Insert an Ethernet cable into the preconfigured Ethernet port.
2. Connect the Fitlet2 to the display device.
 - Ensure the Fitlet2 is powered up. A green light at the front of the device indicates that the Fitlet2 is on. See Figure 15-2.
 - Ensure the display device is also on.

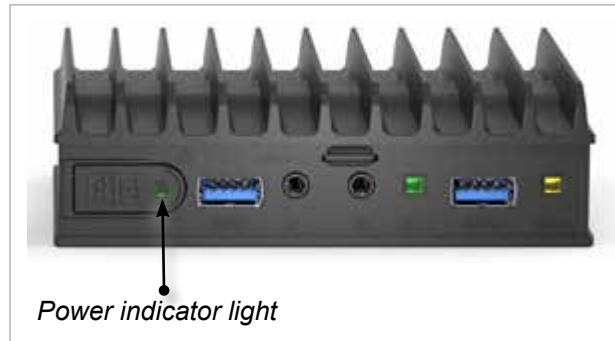


Figure 15-2 Fitlet2 power indicator light

Fitlet2 - Connection - continued

1. Use your chosen VNC application to locate the Fitlet2 within your network, as in the example below:



2. Choose **[Connect]**.



NOTE

In the event that the *Mold-Masters* screen does not automatically display after a VNC connection is established, insert the Ethernet cable into the static port and consult the troubleshooting guide supplied with your system. If further assistance is required, please contact your *Mold-Masters* representative.

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