



User Manual for KTS and TS Console with K-Series Cabinets

KEEP THIS SHEET SOMEWHERE SAFE

Every machine leaves our factory with two levels of password protection. We recommend that you change these as soon as possible to establish your own security.

System Password - linux

User Password - unix

K Series User Manual with KTS or TS Console

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This manual is intended for use with the KTS or TS Console and HRC K-Series Controller
(Serial No.....) with which it was supplied.
(Where fitted, this controller is supplied with Alarm Key Switch Number.....)

This manual is written and prepared for Software Version – 7th December 2007

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

Publications

Issue	Date	Changes	Author	Authorised
1.01	5/7/97	First formal Issue	BNM	AR
2.0	7/11/97	Revised to incorporate software developments	BNM	AR
2.1	15/3/99	Revised to incorporate software developments	DH	AR
3.0	11/6/99	Manual Revision. Includes recent minor software changes.	DH	AR
3.1	12/8/99	Switching On/Off and disconnecting console details added.	DH	AR
3.2	19/8/99	Error messages updated.	DH	AR
3.3	20/9/99	Changes to Chilled Water control and SPI devices added.	DH	AR
3.4	05/01/00	Special Limits - RTD & Water are made pro-active.	DH	AR
3.5	06/09/00	Changes to troubleshooting section because surface-mount control cards now have T/C input fuses.	DH	AR
3.6	21/09/00	Introduction of QwikFix Appendix	DH	AR
4.0	23/01/01	Introduction of EasyView Page to TouchScreen Console and separation of TS and TSi manuals	DH	AR
4.1	13/02/01	Graph page selection increased from six to twenty zones	DH	AR
4.2	21/01/02	Configure Controller Options changed for Boost Command and Display Option	DH	AR
4.3	11/02/02	Cable mis-wiring disclaimer added	DH	AR
4.4	15/02/02	Extra instructions for using Setup page to make group settings	DH	AWR
5.0	Mar 2002	<ul style="list-style-type: none"> * C and K manuals merged * Run controls moved to main Display page. * Display page has 40 -160 zone display options * EasyView mini-panel display controls changed. * Boost & Standby controls moved from Global to autonomous zones. * New Master Only Startup mode introduced * New remote option for Boost or Standby * Utilities-Mode sub page removed. * New Other Help in Troubleshooting * Network facility Introduced 	DH	AWR
5.1	July 2002	Password timer-override introduced	DH	SK
5.2	Aug 2002	Zero Power note added	DH	AWR
6.0	Jan 2003	New Setup page and Setting up procedure	DH	SK
6.1	Jan 2003	Communication Speed added	DH	SK
6.2	Feb 2003	Export Data has Zone Min-Max feature added	DH	SK
6.3	Mar 2003	Qwikfix repair no longer required - Append D removed	DH	SK
6.4	April 2003	KTS Console Function explained	DH	SK
6.5	April 2003	TC Offset and Zone-Grouping introduced	DH	AWR
6.6	May 2003	Individual Zone Boost	DH	SK
6.7	Sept 2003	Extra Boost Information	DH	SK
6.8	Dec 2003	Input Network Screens Introduced	DH	SK

7.0	Feb 2004	Stage Startup introduced and Configure Controller changed substantially for new Systems Options	DH	SK
8.0	Jun 2004	Introduction of Standby Delay facility Introduction of Shut-down timer Introduction of Spear Standby Zoom page and Calibrate Touch function added to MTS Introduction of T/C Fail option in Setup page and changes to Master Zone Selection Introduction of extra Display Data page on MTS console and withdrawal of Set, Actual and Power columns from Setup page. SPI Interface control added to MTS Console	DH	SK
8.1	Mar 2005	Extra connection information added to IO cards in Appendix B	DH	AWR
8.2	Apr 2005	New Appendix items A18 (Analogue Input Card) and WM0x (Water Manifolds) added to K-Series Appendix	DH	AWR
8.3	Apr 2005	New information added regarding the KM series case for Water Manifolds	DH	PK
8.4	May 2005	Extra information about "Allow ToolLoad" option greying out [Load] button on ToolStore Page	DH	AWR
8.5	July 2005	Display Page Changes – <ul style="list-style-type: none"> • Run and Stop button combined into the one position (i.e. Run OR Stop). • Second button configurable as BOOST or STANDBY for normal zones or fixed at BOOST for spear zones. • Display Data option also available Config Option changes - <ul style="list-style-type: none"> • New Autostandby timer function replaces Spear standby Time • Connections function removed 	DH	SK
8.6	July 2005	Extra information for K-LV controllers	DH	PK
8.7	Aug 2005	Shutdown Stages are introduced so that Staged Shutdown may switch off in a different order to Staged Startup	DH	IE
9.0	Oct 2005	"Demo" facility added for training or demonstration use.	DH	SK
9.1	Nov 2005	Console Startup option added	DH	IE
9.2	Nov 2005	Appendix D added for Water Manifold installation	DH	PK
9.3	Feb 2006	Button One mode allows Run button to become STARTUP button	DH	IE
9.4	May 2006	Controller Switch-On corrected to accommodate Console-StartUp option	DH	DH

8 Introduction

Publications

9.5	July 2006	WT4, a 12-channel J or K-Type monitor card is introduced and added to the appendix. DH SK 10.0 Aug 2006 New Configure options include: <ul style="list-style-type: none">• Allow Set Zone Off,• Auto Stop Mode• Flow Units• Limit Exceed,• Master IP Address,• User Password. Other Changes include new Utilities – Remote page	DH	IE
10.1	Aug 2006	Extra information about linked controller cabinets	DH	IE
10.2	Sept 2006	TSA can now use USB Memory sticks for Tool and Picture Load and Save	DH	SK
10.3	Oct 2006	C+E Variations dropped from Manual Changes to Setup and Config options include: <ul style="list-style-type: none">• Startup Mode introduced• Second Startup introduced• Shutdown Temp introduced• I/O Card Options (any 4 from 8) introduced• Master IP Address moved to the Utilities: Remote page	DH	IE
10.4	Jan 2007	Manual made generic	DH	DH
10.5	Mar 2007	New features include: <ul style="list-style-type: none">• Auto-Detect moved to “New Tool” procedure.• Display page zone headers have alternative colour scheme that is user configurable	DH	IE
10.6	Apr 2007	Quad IO card configuration moved to the Utilities page to allow selection of Inputs and Outputs Appendix A Wiring standard includes Dual Supply option	DH	IE
10.7	May 2007	More information added about the Auto-tune sequence and affecting factors	DH	SK
10.8	June 2007	Individual Setup information added to Setup and Config pages.	DH	IE
10.9	Oct 2007	New Printer Setup page	DH	SK
10.10	Nov 2007	Changes to accommodate larger KTS3 Console	DH	SK
11.0	Dec 2007	Input Signal changed to include Stop and AutoStop. Also Input Timer takes over from Autostandby Timer and Standby Delay	DH	IE
12.0	Feb 2008	New reduced manual version with more images and less text	DH	AWR

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Introduction

Specification

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

Supply Voltage	415 Volts 3 -phase 50/60 Hz with neutral. Other available include 240/380/400 and 480 volts in Star or Delta configuration.
Voltage Bandwidth	Stable within (20% supply voltage swing
Supply earth-leakage trip	300mA (note: this is for tool protection)
Overload protection	Miniature Circuit Breaker
Mains Voltage output pattern	Burst-fired with zero voltage crossover
Low Voltage output pattern	Typically 24 volts AC. User configurable between burst-fired or phase-angle.
Output overload protection	High-speed semiconductor fuse links
Temperature control method	Closed-loop (Auto) or open-loop (Manual) with HR Software
Control range □	0 – 472° Centigrade (Celsius), 32-881° Fahrenheit
Temperature Scale	Centigrade (Celsius) or Fahrenheit
Printer Output Connector	USB Port
Data Communications	RS-232 serial, DB9 male connector
Alarm Output	Closing Contact Relay 5 Amp max
T/C Tool Connector	Harting type Han A or equivalent
Heater Tool Connector	Harting type Han E or equivalent

Safety Instructions



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

Where a three-phase supply is used then this potential may be at 415 volts or higher.

Safety Notices - an explanation



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

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



A CAUTION warning identifies where there may be a hazardous situation which, if not avoided, may result in damage to property.

Caution warnings present no personal danger, but may cause the equipment to fail or lose its memory.

Where to use this equipment

The display console and controller cabinet together are designed for use in the plastic injection moulding industry as temperature controllers for third party hot runner systems as commonly used in mould 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 HRC cabinet and Touch Screen console should be installed in a clean dry environment where the ambient conditions do not exceed the following limits: -

- Temperature 0 to +35°C.
- Relative Humidity 90% (non-condensing)

Check your wiring

Before you energise the system, pay special attention to how the supply to your controller is wired and how it is connected to the mould.

Lack of attention to detail causes errors such as:

- incorrect wiring of mains supply phases into the controller
- crossing heater supply feeds with thermocouple detection (although this error can be eliminated by the adoption of PMS Standard connections)

In such cases wiring errors have caused equipment failure.

PMS Systems Ltd. cannot be responsible for damage caused to the controller by customer wiring and/or connection errors.

Isolate the Controller

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

Larger controllers may have multiple supplies with multiple isolators. For such controllers then all Isolators must be turned off for safe access into the cabinet.




Switching On

Switching ON the Main Isolator for the controller may, or may not, start to heat up the zones; it depends on how the Console-Startup option is configured. (see page 37).




If Console startup is set to “Stop” then the tool remains at zero power and at room temperature. If it set to any of the other three options (Startup, Standby, or Run) the controller applies power to the zones so that they heat up.

Switching Off (or Shutting Down)

We recommend that you use the console to shut down the heating load, and only use the main isolator to switch off a dormant controller.

<p>1. Shut down the heating. On the main page, select the [Stop] mode and reduce the heating to zero.</p>	
<p>2. Shut down the Console On the Utils page, touch the [Exit] button and this will shut down the Console Computer.</p>	
<p>3. Shut down the Controller Finally, use the main power switch to isolate all the power to the whole system.</p>	

Screen Layout and Navigation (Common to all pages)

<p>Navigation Top tabs to move from page to page</p>	
<p>Control Side command buttons that change from page to page</p>	
<p>Monitor & Information Bottom row shows : Current Run Mode, Current health status, miscellaneous information</p>	


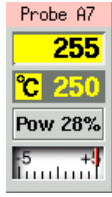
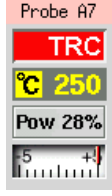

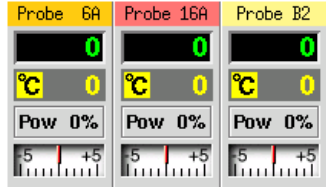
Eight Main Pages

1) The Display page






Can be used for

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


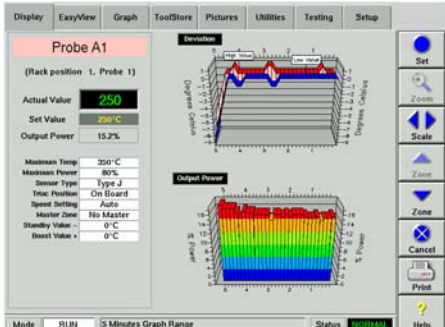
Monitor

<p>Healthy Zone - shows: Zone Name (Alias) Actual Temperature Scale + Set Temperature Applied Power Deviation between Actual and Set Temperature</p>		<p>Green text on Black background</p>
<p>Warning Zone Deviation exceeds 1st stage (Warning)</p>		<p>Black Text on Yellow Background</p>
<p>Alarm Zone Deviation exceeds 2nd stage (Alarm)</p>		<p>White text on Red Background</p>
<p>Fatal Zone Problem detected (see page 93 for details)</p>		<p>White text on Red Background</p>
<p>Zone Off Individual zone switched off</p>		
<p>Different header colours User-configurable colours</p>		

Display Page - Monitoring

<p>Use [Page Up] or [Page Down] to scroll up and down to see more zones Or Use [Display] button to show...</p>																																																																			
<p>70 Zones - each zone shows Title, Actual and Set</p>																																																																			
<p>110 Zones - each zone shows Title and Actual</p>																																																																			
<p>160 Zones - each zone shows Actual Temperature</p>																																																																			
<p>Data page which shows the setup and data for all the console zones.</p>	 <table border="1" data-bbox="949 1612 1348 1899"> <thead> <tr> <th>Set</th> <th>Actual</th> <th>Power</th> <th>Amps</th> <th>Leakage</th> <th>Deviation</th> </tr> </thead> <tbody> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.16A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.16A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.04A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.16A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.16A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.16A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.16A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.16A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>17%</td><td>2.12A</td><td>0mA</td><td>0°C</td></tr> <tr><td>230°C</td><td>230°C</td><td>15%</td><td>2.37A</td><td>0.17mA</td><td>-1°C</td></tr> </tbody> </table>	Set	Actual	Power	Amps	Leakage	Deviation	230°C	230°C	17%	2.16A	0mA	0°C	230°C	230°C	17%	2.16A	0mA	0°C	230°C	230°C	17%	2.04A	0mA	0°C	230°C	230°C	17%	2.16A	0mA	0°C	230°C	230°C	17%	2.16A	0mA	0°C	230°C	230°C	17%	2.16A	0mA	0°C	230°C	230°C	17%	2.16A	0mA	0°C	230°C	230°C	17%	2.16A	0mA	0°C	230°C	230°C	17%	2.12A	0mA	0°C	230°C	230°C	15%	2.37A	0.17mA	-1°C
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Display Page – Monitor (Zoom)

<p>Touch any zone and [Zoom]</p>	
<p>Zoom page shows:</p> <ul style="list-style-type: none"> * Zone Settings * Recent Temperature Deviation * Zone Power Levels (Historical) 	

Display Page – Start, Stop and more

Button 1

Can appear as **[Run/Stop]** or **[Startup/Shutdown]**



Button 2

Can appear as **[Boost]** or **[Standby]**








Button 3 – Mode


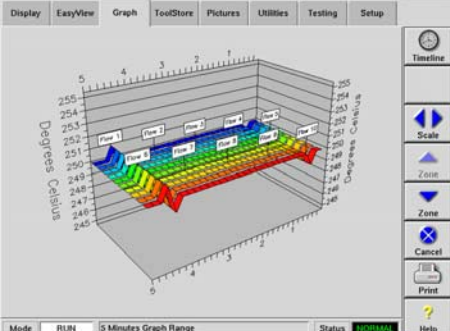

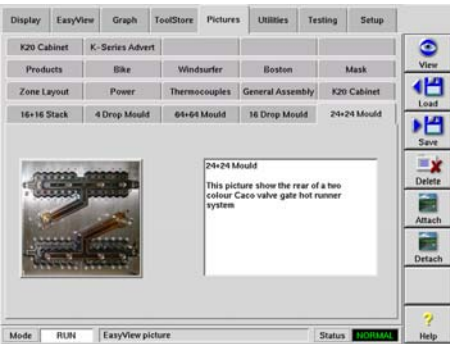
Reveals all run mode options



Display Page – Setting Temperature

<p>Touch one zone</p>	
<p>Touch another</p>	
<p>Touch [Range]</p>	
<p>Touch [Set]</p>	
<p>[Mode] bar to set zone as Closed (Auto Temperature) Open (Manual Power), or Slave (to another zone)</p> <p>[Value] bar to Set, Raise or Lower temperatures</p>	

More Pages

<p>2) EasyView Shows zone temperature and their position in the tool. Shows Zone Status Can be used to Set zone temperatures</p>																																													
<p>3) Graph Page Shows graphs, of temperature versus time, for up to twenty zones at a time.</p>																																													
<p>4) The ToolStore page is a tool bank in which you can store up to 200 tool configurations.</p>	 <table border="1" data-bbox="943 1070 1321 1317"> <thead> <tr> <th>Tool</th> <th>Tool Name</th> <th>Tool Notes</th> <th>Connection</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>16 Drop Example</td> <td></td> <td>hrcnet6856</td> </tr> <tr> <td>2</td> <td>K2004</td> <td></td> <td>Serial Port</td> </tr> <tr> <td>3</td> <td>Qualification</td> <td></td> <td>hrcnet50032</td> </tr> <tr> <td>4</td> <td>34S Top</td> <td>robes set fast, all manifolds set to</td> <td>Serial Port</td> </tr> <tr> <td>5</td> <td>160 Zone</td> <td></td> <td>Serial Port</td> </tr> <tr> <td>6</td> <td>temp</td> <td></td> <td>Serial Port</td> </tr> <tr> <td>7</td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>Bracket II</td> <td></td> <td>Serial Port</td> </tr> <tr> <td>9</td> <td>16 Cavity</td> <td></td> <td>hrcnet6888</td> </tr> <tr> <td>10</td> <td>24x24 Two Colour</td> <td></td> <td>hrcnet5726</td> </tr> </tbody> </table>	Tool	Tool Name	Tool Notes	Connection	1	16 Drop Example		hrcnet6856	2	K2004		Serial Port	3	Qualification		hrcnet50032	4	34S Top	robes set fast, all manifolds set to	Serial Port	5	160 Zone		Serial Port	6	temp		Serial Port	7				8	Bracket II		Serial Port	9	16 Cavity		hrcnet6888	10	24x24 Two Colour		hrcnet5726
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<p>5) The Picture page Save, and display, up to 20 drawings or pictures.</p>																																													

More Pages

6) The Utilities page

Contains several sub pages:

System - change the passwords and the system clock.

Printer - select a driver for your printer

Event Log - to find changes that have been made to the controller settings

Network - set up the Controller to communicate over a network

Export - obtain historical performance data for any zones over the last 24 hours.

Remote - view any other networked computer via a Virtual Networked Computer (VNC) protocol and set up a remote Master IP address.

Quad IO - set up Quad IO card Inputs and relay outputs.



7) The Testing page

Check the condition of a mould tool after commissioning or maintenance.






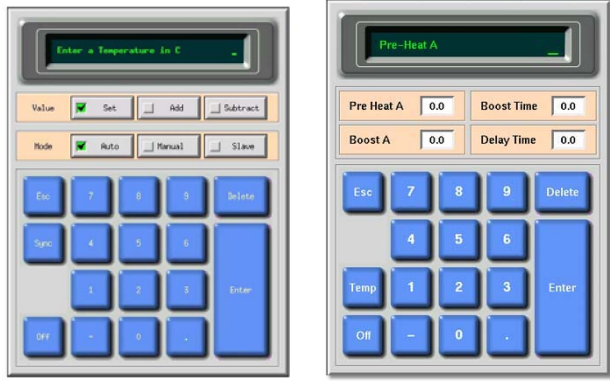
8) The Set-up page

For setting up the system.



The User Interface

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

<p>Keyboard for Alpha-numeric input</p>	
<p>Keypad 1 Basic numeric</p>	
<p>Keypad 2 Basic keypad PLUS Value – Set, Temp, Add and Subtract and Mode – Auto, Manual and Slave</p>	
<p>Keypads – 3 & 4 More buttons to select and configure synchro-tips</p>	

Setting up your controller

New Touch Screen consoles and controllers are provisionally configured at the factory and you may not need this section for a new system.

However, to set up a Touch Screen console for a new tool or environment then you can use this part of the manual.

Four Steps for Setting Up

1 - System Utilities

- basic criteria such as passwords, date and time settings, and printer settings.

2 - Console and Tool parameters

- global settings such as startup and boost and tool parameters such as alarms and limits, which are all configured on the Setup page.

3 - Operating parameters

- includes zone temperatures, coolant temperatures and flow levels.

4 - EasyView

- attach a picture to a mould then insert and position mini information panels.

Setting up - System Utilities

System Page

Software Date

The System page has a date to show which software version is loaded and it is automatically reconfigured if ever the software is upgraded. It is helpful if you make a note of the Software version date before you contact your supplier with any technical query.

Passwords Options

Three levels of Password control

If the User Password option (see page 40) is set to [**Enabled**] then there are three levels of control...

1. Open Level - includes various functions that need no password such as Start and Stop.
2. User (or Level 1) password which gives low level access to:
 - switch the tool on and off,
 - alter temperatures,
 - select different tools
3. System (or Level 2) password which gives high-level access to:
 - all user-level functions,
 - set the user password,
 - re-configure the settings for a new tool,
 - store and load new tool settings to/from the disc

Two Levels of Password Control

If the User Password option is set to [**Disabled**] then all functions that normally need a User (Level 1) Password become Open level.

Higher level functions that require a System (Level 2) password retain their Password protection.

About password active times

After you key in a password, access is possible while you continue to input data. Each key-touch resets the timer but, when no more input is detected, it times out and then denies unauthorised access. This is the same for both User (level 1) and System (level 2) passwords.

If, while the System password is active, you visit a lower level page that only requires User (Level 1) password level (eg Display) or none at all (eg Graph) then the System password will expire after 20 seconds but, on doing so, it becomes a User (Level 1) password which would allow you to continue setting lower level parameters.

Password Application Table

Here is a detailed list of what level of password is required for various functions on the different pages.

Page/Screen	No Password required to use	Level 1 (User) password required to use:	Level 2 (System) password required to use:
Display	Run/Stop/Change Modes. Change Display options. Go to Zoom page	Set (Alter temperatures or modes)	
EasyView	Change Display options	Set (Alter temperatures or modes)	
Zoom		Set (Alter temperatures or modes)	
Graph	All functions (including TimeLine) are basically read-only		
Picture	Load/Save/Delete Modify EasyView layouts		Attach/Detach pictures to Tools
ToolStore		Load, Save, Backup Restore, Delete	New (Create new tools)
Utilities – System	Set, Change Time		Change Passwords and Password Timer
Utilities – Printer	Select Printer type and paper sizes		
Utilities – Event Log	Any Searches		
Utilities – Network	Enable. Disable Obtain IP address		Change Network Names, Address, Mask
Utilities – Export	Any Export function		
Utilities – Remote	View VNC at Full or Part Window		Configure VNC Settings
Utilities – Quad IO			Configure any Input or Output channel
Test Page	Select zones to be tested	Start Test	Configure Test
Setup			Set, Config (Change any values)

Password Security

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

Setting Passwords

On the Utilities > System Page

System Password

1. In the System box touch [**Edit**] to display the Keyboard entry window.
2. First establish your authority by entering the System password.
3. Next, enter your new System password.
4. Finally, re-enter your new System password to confirm it.



User Password

1. In the User box touch [**Edit**] to display the Keyboard entry window.
2. First establish your authority by entering the System password.
3. Next enter your new User password.
4. Finally re-enter the new User password to confirm it.

Setting your password timer

1. In the Time Limit box touch [**Edit**] to display the Keyboard entry window.
2. First establish your authority by entering the System password.
3. At the Password Timer keyboard enter your preferred elapsed time in minutes and touch Enter.

Password Override

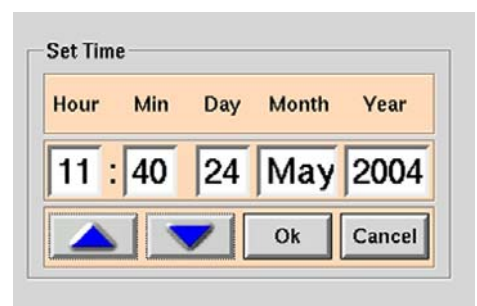
To override the User and System Password control, set the Password Timer to "99". This setting negates the need to enter a Password at any of the usual checkpoints such as Load Tool or Temperature Change.

However, you still need a Password input in order to Change a Password.

Setting the System Time and Date

We recommend that you set the correct time and time zone so that you may take full advantage of the software features that use the time function.

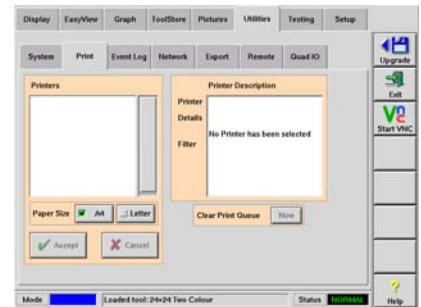
1. Enter the Set time area by touching the System tab.
2. In the Set Time box, touch the time element that you wish to change.
3. Use the [**up**] and [**down**] buttons to set the required value.
4. Select [**OK**] to save the new setting to the system.



Print Page

Using a locally connected Printer

1. Use the Printers list to select the printer that you intend to use. If a precise match is not available then select something similar since most similar printers share drivers.
2. Click on the Connection [**Edit**] button and select the Local USB option.
(NOTE: The Local/Remote option is not available on the TS console)
3. Select standard European [**A4**] or American [**Letter**] size.
4. Touch [**Accept**] to confirm your printer selection.



Using a remote Network Printer

1. Use the Printers list to select the printer that you intend to use.
2. Click on the Connection [**Edit**] button and select a network descriptor for your network.
Network TCP (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 favoured by Windows networks.
3. Click on the Printer Address [**Edit**] button and key in the Local Area address for a known network printer. Alternatively, supply a resource name if your system uses a name server.
4. If your network uses the Windows SMB option then you must provide a printer name - click on the Share Name [**Edit**] button and key in the printer name which identifies the remote network printer.
5. Select standard European [**A4**] or American [**Letter**] size.
6. Touch [**Accept**] to confirm your printer selection.

Should you have any difficulties then contact your own IT department for help with LAN printer configuration.

Other Utility Pages

Event Log and Export

Event Log is used to store and retrieve recent events and is explained more fully on page 62.

Export is used to collate running data and is explained more fully on page 84 .

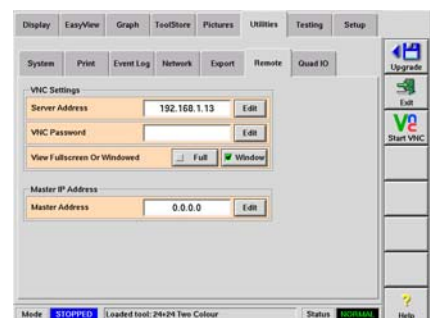


Networking, Remote and Quad IO pages

These three pages may be used to connect your controller into a wider system that allows remote interfacing.

They should only be configured by competent IT staff who are familiar with networking protocol or machine interface.

Should you need further information please contact your supplier.



Setting up - Global and Tool parameters

These parameters are all configured from the Setup Page. Those seen within the page grid are the tool parameters. In contrast, Global parameters are accessed via the [**Config**] button and these affect the behaviour of the console on all tools.

Setting-up a new tool starts with these three main stages:

1 - Create a new tool

- prepare a new tool bank slot ready to accept the first configuration.

2 - Configure Tool parameters

- detect the cards to configure the zones to match the probes, manifolds and any other special feature of your moulding tool.

3 - Configure Global parameters

- to set up console options such as Display Mode, Temperature scale and Screen Blanking times.

Create a new tool

1. Select the ToolStore page.
2. Select a blank sub-tab and touch [**Detect**].
3. Enter System password.
4. Type in a new name for the tool and press [**Enter**].
5. If the tool is connected via a Network to any other cabinet, the next step presents an option to select the local controller (labelled "Serial Port") or a remote controller (labelled hrcnetx).

If no network-connected controllers are detected, then it automatically passes this option and goes straight on to step 6.

6. The console runs an automatic "Card Detect" routine to find out what type and how many cards are fitted in the selected controller. Once it has gathered this information then the console opens the Setup page for you to start configuring the new tool.

If the system has any problem running the detect sequence it may report an "Auto

Detect Failed" and ask if you want to repeat the Detect routine. If the reason for failure is obvious, such as a loose network cable, or a mains glitch, during the Detect routine, then you may touch [**OK**] to re-try card detection.

If the detection routine continues to fail then contact PMS Systems Ltd. for advice.




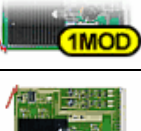

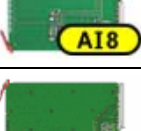
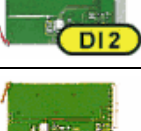
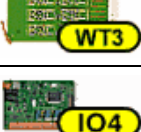



Create a New Tool

SetUp Page - cards that may be detected

Cards, initially detected by the New-Tool process, are shown in the left-hand column, while the rest of the grid remains blank.

The following is a list and description of the cards that may be detected by your console...

Symbol	Card and Description
	6-zone card at 5 Amp rating for Probes
	3-zone card at 15 Amp rating for large probes or manifolds
	2-zone card at 20 Amp rating for manifolds
	Single-zone card at 30 Amp rating for manifolds
	4-zone card designed to be used as 2-spear zones, each with one body and one tip.
	8-channel Analogue Input card used with analogue flow sensors to monitor coolant flow rates.
	16-channel logic input card used with flow sensors to monitor coolant flow rates.
	12-channel RTD card used for temperature monitoring without control but active alarms.
	4-channel digital Input/Output card for remote signalling.

Create a new tool

How to Configure the Control Cards

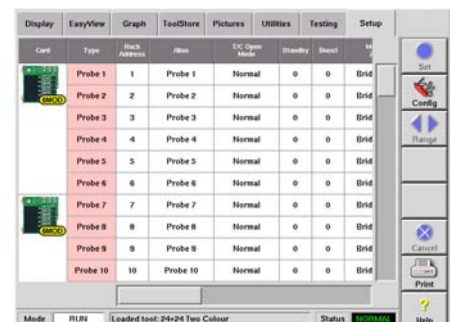
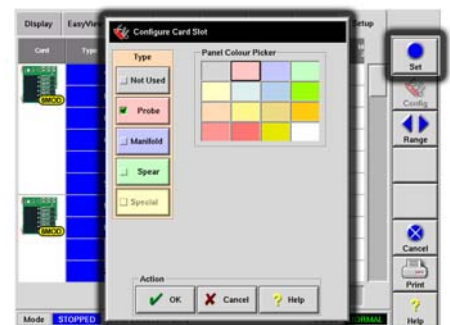
The Setup Grid displays Icons in the first column to show what cards have been detected.

However, none of the cards know their function so the rest of the grid is still blank. You must first configure the cards to be a Probe, Manifold or other special zone.

1. Touch first Probe zone
2. Touch last Probe zone
3. Touch [**Range**] to include all those in between.
4. Touch [**Set**]
5. Touch [**Probe**]
6. Choose Header colour if default pink is not required.
7. Touch [**OK**]
8. Repeat steps 1 to 7 for other types of zones.

The Setup page is now complete with Cards and Zone types and as part of this setting up, populated with standard default values. These Tool Parameters may be accepted or changed; they are described on the following four pages.

If they are accepted then go to page 37 to read about setting up the Global parameters.



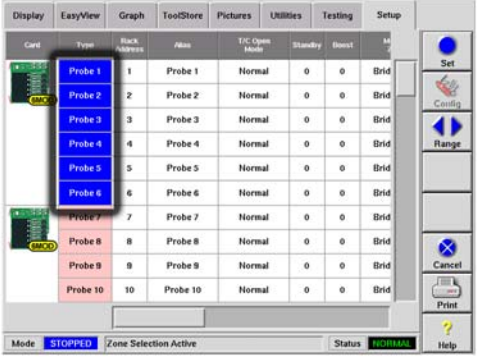



Pre-configured Set-Up values

The table below shows the whole SetUp chart and the differing values that are given to both Probe and manifold zones.

Parameter	Probe and Manifold Cards	Other Monitoring Cards	Synchro/ Spear
Rack Position	slot address*	slot address*	slot address*
Alias	<i>blank</i>	<i>blank</i>	<i>blank</i>
TC Open Mode	Normal	<i>blank</i>	Normal
Standby & Boost	0°C or 0°F	<i>blank</i>	0°C or 0°F
Master Zone	<i>blank</i>	<i>blank</i>	<i>blank</i>
Warn Hi & Lo	5°C or 9°F	<i>blank</i>	5°C or 9°F
Alarm Hi & Lo	25°C or 45°F	25°C or 45°F	25°C or 45°F
Max Setpoint Setting	350°C or 662°F	350°C or 662°F	350°C or 662°F
Min Setpoint Setting	0°C	<i>blank</i>	0°C
Max Power Setting	80%	<i>blank</i>	80%
T/C Offset Value	0°C or 0°F	<i>blank</i>	0°C or 0°F
Speed	Auto	<i>blank</i>	Auto
Triac	On-Board	<i>blank</i>	Both
Sensor	J-Type	<i>blank</i>	J-Type
Display Group	1	<i>blank</i>	1
Startup Stage	<i>off</i>	<i>off</i>	<i>off</i>
Shutdown Stage	<i>off</i>	<i>off</i>	<i>off</i>
Analogue Input	<i>blank</i>	20 lit/min Flow	<i>blank</i>
Pre-heat	<i>These Columns do not appear on the set-up page unless a control card is configured to be a Synchro/Tip type</i>		20%
Boost			40%
Delay			5.0 Secs
Time			5.0 Secs

If these preset figures are not suitable for the tool in question then you can simply change them to your preferred values by following the next pages.

Setting the Tool parameters

<p>1) Select the zones</p>	 <table border="1" data-bbox="879 309 1358 663"> <thead> <tr> <th>Card</th> <th>Type</th> <th>Rack Address</th> <th>Alias</th> <th>TIC Opn Mode</th> <th>Standby</th> <th>Boost</th> <th>M</th> </tr> </thead> <tbody> <tr><td>Probe 1</td><td>1</td><td>Probe 1</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 2</td><td>2</td><td>Probe 2</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 3</td><td>3</td><td>Probe 3</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 4</td><td>4</td><td>Probe 4</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 5</td><td>5</td><td>Probe 5</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 6</td><td>6</td><td>Probe 6</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 7</td><td>7</td><td>Probe 7</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 8</td><td>8</td><td>Probe 8</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 9</td><td>9</td><td>Probe 9</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> <tr><td>Probe 10</td><td>10</td><td>Probe 10</td><td>Normal</td><td>0</td><td>0</td><td>Brid</td></tr> </tbody> </table>	Card	Type	Rack Address	Alias	TIC Opn Mode	Standby	Boost	M	Probe 1	1	Probe 1	Normal	0	0	Brid	Probe 2	2	Probe 2	Normal	0	0	Brid	Probe 3	3	Probe 3	Normal	0	0	Brid	Probe 4	4	Probe 4	Normal	0	0	Brid	Probe 5	5	Probe 5	Normal	0	0	Brid	Probe 6	6	Probe 6	Normal	0	0	Brid	Probe 7	7	Probe 7	Normal	0	0	Brid	Probe 8	8	Probe 8	Normal	0	0	Brid	Probe 9	9	Probe 9	Normal	0	0	Brid	Probe 10	10	Probe 10	Normal	0	0	Brid
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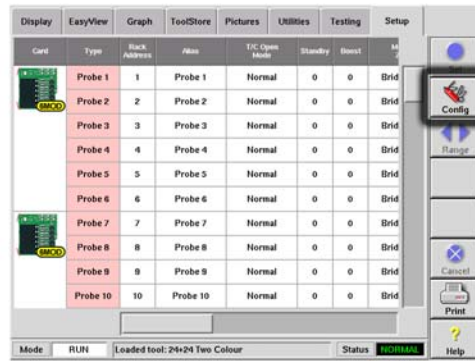
The Tool Parameters

Function	Description	Setting Limits
Rack Position	Identifies the position of the card within the rack	This is not user configurable
Alias	Input for alternative zone names	Has an auto-increment number facility
TC Open Mode	<p>Choose a response for any zone that detects a failed thermocouple.</p> <p>Normal – No action corrective taken- the zone power sets down to 0% and it shows a T/C fatal alarm.</p> <p>Auto Manual - The zone has sufficient data, after 10 minutes steady running, to switch to Manual mode at a power level that should hold the previous temperature.</p> <p>Auto Slave – The zone has sufficient data, after 10 minutes steady running, to slave the failed zone to another similar zone.</p> <p>Nominated Zone Slaving – allows you to specify a zone to act as a master to this zone if it were to fail at any time.</p>	
Standby (temperature)	Sets the Standby Temperature for any zone(s)	The maximum Standby temperature is 250°C or 450°F
Boost (temperature)	Sets the boost value for any zone(s)	The maximum Boost value is 250°C or 450°F above the normal set temperature
Master Zone	Select a Master Zone for any groups of sub-zones	Do not select until all zones have been appropriately configured to Probes and Manifolds etc.
Warning and Alarm Levels	Set the first (Warning) and second (Alarm) stage alarms.	The maximum Warning or Alarm value is 99°C or 178°F.
Maximum Setpoint Setting	Sets the highest permitted setpoint for the zone(s)	The highest Maximum Setpoint temperature that you can set is 450°C or 850°F.
Minimum Setpoint Setting	Sets the lowest permitted setpoint for the zone(s)	The lowest Minimum Setpoint temperature that you can set is 0°C or 0°F.
Maximum Power Setting	Sets the highest permitted power level for the zone(s)	The highest Maximum Power Setting that you can set is 100% power.
T/C Offset Value	Sets a proportional offset between measured and displayed temperature – to compensate for a probe where the T/C may not be sufficiently close to the tip.	The highest T/C Offset temperature is $\pm 75^{\circ}\text{C}$ or $\pm 135^{\circ}\text{F}$.
Speed	Select, or over-ride, the Auto-Speed setting to determine the control characteristic for the zone temperature.	
Sensor	Select temperature sensor for the zone(s) (J or K type)	

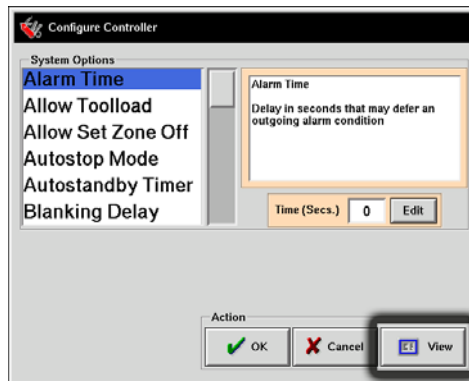
Display Group	Select groups of zones to display on separate Display Pages. By default all zones are in group 1 but selected zones can be allocated to subsequent groups. Zones that need not be shown on the Display page can be allocated to Display Group Zero.	There is a limit of 6 Display Groups.
Startup Stage	Configure groups of zones into discrete Startup Groups.	There is a limit of 6 Startup Groups.
Shutdown Stage	Configure groups of zones into discrete Shutdown Groups.	There is a limit of 6 Shutdown Groups.
Analogue Sensor Type	Configure Analogue Inputs to match Analogue flow sensors	
(The following 4 parameters appear only if a spear card is detected)		
Pre-Heat	Sets the power level for the spear body	
Boost	Sets the power level required to open the tip	
Delay	Sets a delay following the signal to inject until the Boost "opening" power is applied.	
Time	Sets the "Gate-open" period for applying tip power.	

Setting the Global Parameters

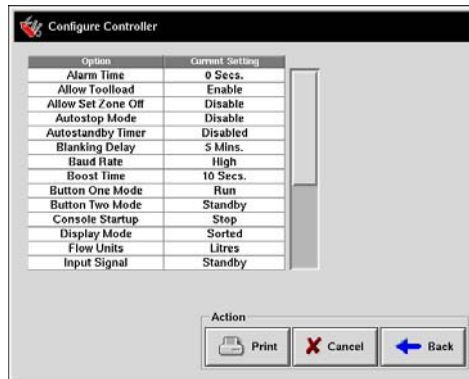
Touch **[Config]** to view the Global/Console parameters.



The Configure Controller panel lists the various global parameters with a brief description for each.



For an overview of all these parameters, and how they are currently set, touch the **[View]** button.



The Global Parameters

Function	Description	Limits
Alarm Time (seconds)	Configure a brief delay between an alarm condition being detected, and an external alarm being sent.	The maximum setting for Alarm Time is 999 seconds
Allow ToolLoad	Select [Enabled] if you want to be able to change tools while in Run mode, or [Disabled] if you wish to prevent such changes and force the operator to shut down to swap tools.	
Allow Set Zone Off	If set to [Enabled], then you need no password to switch a zone to off. If you set this to [Disabled] then you need a System (Level 2) password in order to switch a zone off.	
Auto Stop Mode	[Enable] allows a high RTD temperature to set the mode to STOP. [Disable] limits a high RTD temperature to raising an alarm only.	
Blanking Delay	Set how long the screen remains visible	The maximum period for Blanking Delay is 98 minutes. You can override the Blanking Delay so that it remains permanently visible by setting this time to "99 minutes".
Baud Rate	Set the communication rate between the Console and the control cards. Modern units can work at [High] speed while older cards might require [Low] speed.	
Boost Time	Set the "Boost-Temperature" period	The maximum period for Boost Time is 9999 seconds.
Button One Mode	Select [Run/Stop] or [Startup/Shutdown] as the first mode button on the Display page	
Button Two Mode	Select [Standby] or [Boost] as the second mode button on the Display page	If the controller has spear zones then the Standby option is greyed out and the second button option is fixed as [Boost].
Console Startup	Select the operating mode that is assumed after initial switch on.	
Display Mode	Set the display page and set-up page to group the zones as: [Sorted] with all Spear zones displayed first followed by Probes, then Manifolds, then Specials. [Mixed] which groups the probe and manifold zones as they are positioned within the card rack, (Manifolds may appear out of sequence order, but grouped with their corresponding probe zones.)	






Flow Units	Select whether to quantify the Flow Zones in Gallons or Litres.	
Input Signal	<p>Set how the console responds to a remote input (normally open pair):</p> <p>STANDBY - switches the controller into Standby mode when the remote input is closed; and returns to its previous state when the signal is removed. If this option is selected then you can also use the Input Timer option to defer the Standby condition for a preset time.</p> <p>AUTO-STANDBY – this option enables the Input Timer to hold off going to Standby. While a cycling is applied, it resets the timer on each cycle to keep the temperature at normal. If the cycling stops the Input Timer times out and sets the temperature down to its Standby level.</p> <p>STOP - switches the controller into Stop mode when the remote line is closed. If this option is selected then you can also use the Input Timer option to defer the Standby condition for a preset time.</p> <p>AUTO-STOP – this option enables the Input Timer to hold off going to Stop. While a cycling is applied, it resets the timer on each cycle to keep the temperature at normal. If the cycling stops the Input Timer times out then the console goes to STOP.</p> <p>BOOST - this switches the controller into boost mode.</p>	<p>NOTE:</p> <ol style="list-style-type: none"> 1. The remote input is only effective when the system is in RUN mode. 2. This function defaults to BOOST when the controller has Spear zones. 3. Only those zones that have Boost or Standby temperatures configured in their SetUp will respond to the remote input signal.
Input Timer (minutes) This option is dependant on the Input Signal option.	<p>As a Countdown Timer – If either the Auto Stop or Auto Standby options are chosen then the Input Timer works as a countdown counter which waits for the next cycling pulse. Each cycle-pulse resets the timer so that the console does not go into the Stop or Standby Mode.</p> <p>As a Delay Timer – If either the Stop or Standby options are chosen then this timer starts as soon as the input pulse is received and after this preset time period it switches the console into the selected Stop or Standby mode.</p>	The maximum period for Input Timer is 25 minutes.
Language	You may select a preferred language for the screen and online help. It is safe to select a different language while the system is running. Although the Console does shutdown and reopen, it does leave the system running safely during the changeover.	
Limit Exceeded	<p>[Disabled] – means that an attempt to set the temperature above the limit is non-effective and the Set temperature stays the same.</p> <p>[Enabled] – means that an attempt to raise the Set temperature above the limit will increase the set temperature to the limit and no more.</p>	

Power Mode	<p>Selects how power levels are shown on the Display Page</p> <p>for controllers with normal probes...</p> <p>If you have control cards with current measuring coils this option allows the main display page to show either [Current] or Percentage [Power]. If there are no current measuring coils then the option should be set to Percent otherwise the Power/Current display will show Zero.</p> <p>for controllers with Spear Probes.</p> <p>This decides whether you will see amps or percentage power while a boost signal is received.</p> <p>Selecting [Percent] will allow you to display the percentage power level that is being applied to the Tips during the Boost part of the mould cycle. Outside the boost period each zone displays the percentage power that is being applied to the body only.</p> <p>Selecting [Amps] allows you to see the pre-heat and boost current in the Tips.</p>	
Second Startup	<p>Select a final operating mode that the console assumes once it has completed a Startup Sequence and attained normal temperature.</p> <p>RUN is default condition</p> <p>BOOST will temporarily assume boost settings until it times out.</p> <p>STANDBY will reduce to Standby Temperature until it is manually or remotely changed</p>	
Startup Mode	<p>Select between three different Startup modes ...</p> <p>MASTER-FOLLOW - a default option that ties the faster-acting nozzles' set temperature to slower manifold's actual temperature. This produces a homogenous rise with all zone temperatures coming up together.</p> <p>MASTER-ONLY –heats only the nominated Master zones first - it does not apply any power to the subordinate nozzles until the Master zones have reached their set temperature.</p> <p>STAGED – allows you to nominate up to eight stage groups that will heat up in successive stages.</p> <p>When Staged Startup is selected then the shutdown automatically follows a staged shutdown. Note, however, that there is a separate allocation for shutdown groups – so a shutdown pattern need not be the same as the startup sequence.</p>	
Shutdown Timer	<p>Set a delay period to hold on successive groups during a Staged Shutdown. It sets, in minutes, the time that successive zone groups must wait before each switches off.</p> <p>Setting this option to zero makes the timer ineffective so that Staged shutdown is reliable solely on Shutdown temperature.</p>	The maximum period for Shutdown Timer is 99 minutes





Shutdown Temperature	Sets the temperature to which each Shutdown group must fall before the next group is switched off. Raising the shutdown Temperature means that zones do not have to cool down so much until subsequent stages are switched off which shortens the overall shutdown time. Lowering the Shutdown Temperature has the opposite effect and lengthens the shutdown time.	The Shutdown Temperature setting defaults to "0" which represents an extremely long shutdown interval. The highest shutdown temperature permitted is 260° C or 500°F and if this set value is equal to, or higher than, the normal temperature, then it has no effect and the shutdown interval becomes dependant on the Shutdown timer.
Temp(erature) Scale	Select [Degree C] or [Degree F] as required.	
User Password	If this is set to [Enabled] then all password-protected functions need either a User (Level 1) or System (Level 2) authorisation as shown by the Password Application table on page 38. If User Password is set to [Disabled] then all the lower functions become available without the need for any password. Only those higher functions that require a System (Level 2) password retain their Password protection.	
Finished Configuration?		
	Once you have completed all the necessary configuration boxes, and want to save them, as they have been set, touch the [OK] button. If you do not wish to accept the changes made, touch [Cancel]. The configure menu disappears, and the system reverts back to any previous selections that may have been made.	

Setting up - Operating Parameters






Selecting zones




<p>1. Select the First zone</p>	 <p>The screenshot shows a control panel with a grid of zone buttons. The first zone button (Probe 1) is highlighted with a blue border, indicating it is selected. The status bar at the bottom shows 'Node 1129113' and 'Zone Selection Active'.</p>
<p>2. Select the Last Zone</p>	 <p>The screenshot shows the same control panel. The last zone button (Probe 32) is now highlighted with a blue border, indicating it is selected. The status bar remains the same.</p>
<p>3. Touch [Range]</p>	 <p>The screenshot shows the control panel with the 'Range' button on the right-hand side highlighted with a blue border. The zone selection is still active.</p>
<p>4. Touch [Set]</p>	 <p>The screenshot shows the control panel with the 'Set' button on the right-hand side highlighted with a blue border. A numeric keypad overlay is visible in the center of the screen.</p>
<p>5. Set the Value</p>	 <p>The screenshot shows the control panel with the 'Set' button highlighted. The numeric keypad is still visible, and a value is being entered into the display area above it. The status bar remains the same.</p>

To set Probe and Manifold temperatures

1. Select [Set]	
2. Select [Auto]	
3. Set the Temperature Value (Touch [Delete] to undo any last entered figure)	
4. Touch [Enter] to confirm your settings (or [Esc] to return to the main page without accepting the new choice and values.)	

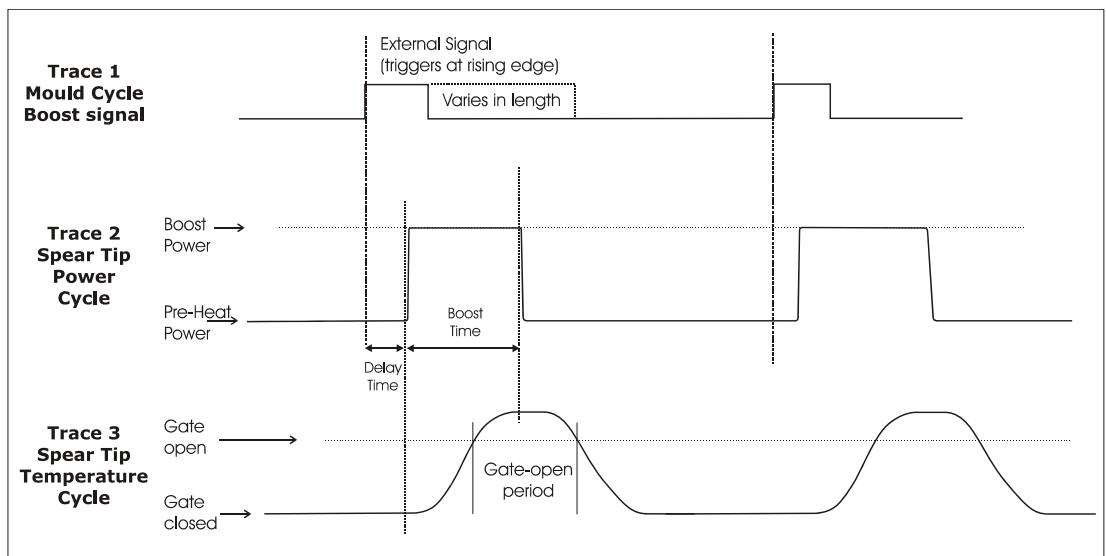
To set Spear (Body and Tip) temperatures

<p>1. Start with body temperature - select [Auto]</p>	
<p>2. Set the body temperature</p>	
<p>3. Touch [Synch] for Tip Control</p>	
<p>4. This changes the keyboard for the tip settings</p>	
<p>5. Set the first value (Pre-heat)</p>	





<p>6. Touch [Enter]</p>	
<p>7. Set the remaining three values (keypad automatically cycles through all four values then clears after the last value is set)</p>	
<p>8. The console view returns to just the Display page.</p>	

About the Spear/Tip Cycle Time

The following shows how a spear tip-temperature cycle relates to the mould cycle.



To set Cavities, Water Flows and Chillers

<p>1. Select the Cavity zones</p>	
<p>2. Touch [Set]</p>	
<p>2. Set the Values</p>	
<p>3. Touch [Enter]</p>	

Saving everything to a Tool Bank

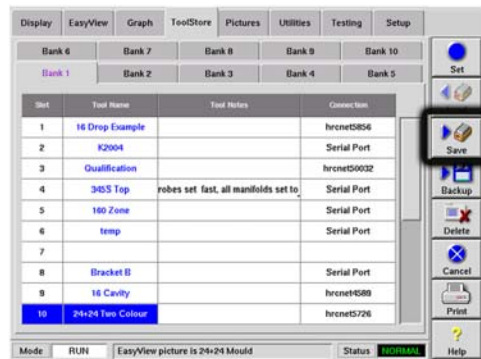
1. Select the Tool store page




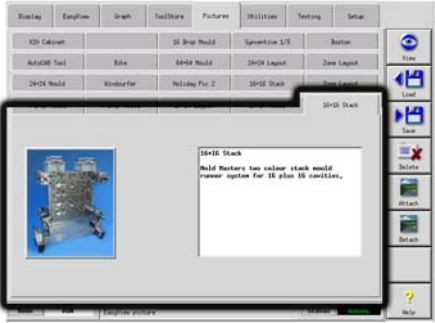
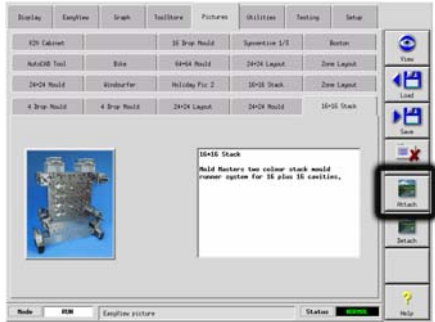
2. Select the new tool named earlier (see page 29)

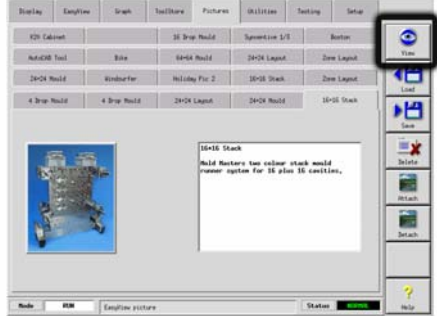


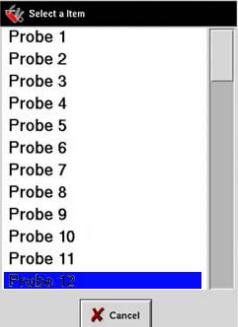


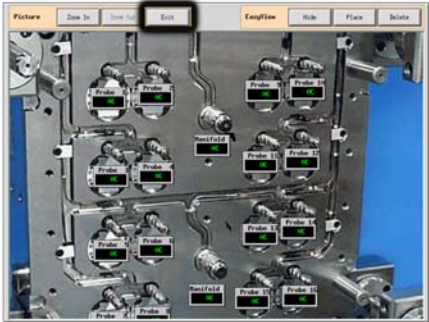

3. Touch [Save]



Setting up – EasyView Pages

Step	Process	More...
1. Prepare and load an image	Select a picture or drawing of the tool and save it to a memory card	Do this on a PC away from the Console.
2. Import the image	Get the picture into the picture page	See page 80 for details
3. Select the tool	Open ToolStore and load the appropriate tool	
3. Select the picture	Open picture page and select the tab for the new picture. <i>There are 20 picture slots and 200 tool slots – one picture can be used for more than one tool</i>	
4. Attach the image	Touch [Attach]	

<p>5. Configure the EasyView Image</p>	<p>Open the picture. (Touch [View] or the picture thumbnail)</p>	
	<p>Touch [Show].</p>	
	<p>Touch [Place]</p>	
	<p>Select a zone from the list</p>	
	<p>Touch the picture to place the minipanel Repeat these steps until you have placed all the required zones.</p>	<p>NOTE: To move a minipanel drag it to another location. To remove a minipanel touch [Delete] and select zone to remove.</p>

<p>5. Configure the EasyView Image (contd)</p>	<p>Touch [Exit] to finish</p>	
	<p>Open the EasyView Page to see results</p>	

Running your controller

This section of the manual is divided into four main areas that are concerned with:

- the basic Starting and Stopping along with Boost and Pause controls.
- changing temperature settings while the controller is running.
- inspecting historical graphs and event logs to trace back how the controller has behaved over the last 5 or 30 minutes, or even the last 24 hours.
- recognising what alarms may be generated, what they mean and what to do about them.

What is included in this section

Controlling Zones – Starting, Stopping and more

Using the Display Page to control and monitor temperatures

Using the Easy-View page to control and monitor temperatures

Looking at temperature history for the last 5 to 30 minutes

Looking at temperature history for the last 24 hours

Checking the log book for past events

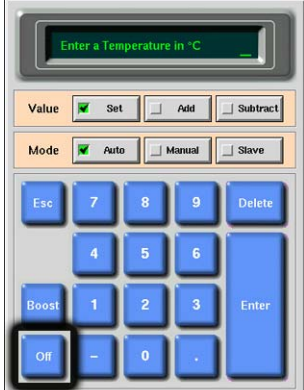
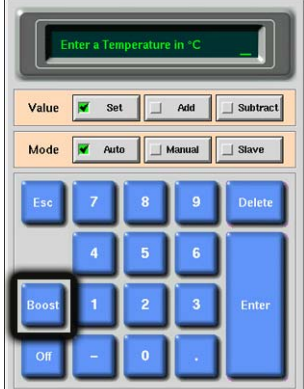
Alarms - what alarms may be seen on the controller.

Control Modes for all zones (from the Display Page)

Operation	Available by	Description
RUN	Button One or Mode Button	Switches on all zones
STOP	Button One or Mode Button	Switches off all zones NOTE: Selecting Stop does not remove voltage from the heaters; it switches off by setting all the target temperatures to Zero. Do NOT try to change fuses or disconnect units while in this mode.
STANDBY	Button Two or Mode Button	Reduces the temperature of all zones that have any Standby Temperature configured on the Setup page. Temperature remains reduced until RUN command is given.
STARTUP	Button One or Mode Button	FIRST STARTUP Initiates a starting sequence that is configured on the Setup Page. MASTER-FOLLOW – Applies power to Master zones then adjusts other zones' Set Temp 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 others. STAGED – applies power to nominated stage zones and then waits until they reach normal temperature before switching on next stage zones. This cascades the startup sequence 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 their Set Temperature BOOST – temporarily raise the temperature and then settle back to normal Set Temperature. STANDBY – lower zone temperatures until Run command is given.
SHUTDOWN	Button One 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 then 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 then the system goes to STOP mode
BOOST	Button Two or Mode Button	Temporarily raise the temperature of all zones that have any Boost Temperature configured on the Setup page. When the boost period expires then zone temperatures return to normal Set levels.



Control for individually selected zones

Operation	Available by		Description
<p>STOP</p>	<p>1) Select Zone 2) Touch [Set] 3) On keypad, touch [OFF]</p>	 <p>The screenshot shows a digital display at the top with the text 'Enter a Temperature in °C'. Below the display are three buttons: 'Set' (checked), 'Add', and 'Subtract'. Underneath are three mode buttons: 'Auto' (checked), 'Manual', and 'Slave'. The keypad features a numeric keypad (0-9), 'Esc', 'Delete', 'Enter', and 'Off' buttons. The 'Off' button is highlighted with a black box.</p>	<p>Switches off the one zone</p>
<p>BOOST</p>	<p>1) Select Zone 2) Touch [Set] 3) On keypad, touch [BOOST]</p>	 <p>The screenshot is identical to the one above, showing the same keypad layout. In this instance, the 'Boost' button is highlighted with a black box.</p>	<p>Temporarily raises the temperature of the selected zones until Boost Time expires.</p>

More about using Boost

- Boost mode is determined by two quantities that determine boost – the boost temperature and it's 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.

Manual Boost display

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






Remote Boost display

When a boost Command is received from an external source the Mode window shows M/C BOOST as black letters on a white background. The time that the message displays for is dependant on the external signal.






Brief Signal - If the external signal is brief for example, it lasts 1 second, and the Boost Time is set to something longer, perhaps 3 seconds, then the nozzles are boosted for 3 seconds after which they return to normal level. The M/C BOOST signal is also displayed for 3 seconds after which it returns to RUN.

Long Signal - If the Boost Time is set to 3 seconds and the external signal lasts for 4 seconds, then the nozzles are boosted for 3 seconds and then return to their nominal value. However the M/C BOOST message in the Mode window displays for 4 seconds (while the external signal is present) even though no boost current is being applied for the last second.

Using Display Page to change Temperatures

<p>1. Select the desired zones.</p>	
<p>2. Touch [Set].</p>	
<p>3. And then: To Set a new temperature - Touch [Set]. To Raise the overall temperature - Touch [Add]. To Lower the overall temperature - Touch [Subtract].</p>	
<p>4. Enter the Temperature setting or change</p>	
<p>5. Touch [Enter] to make the setting or [Esc] to defer the action.</p>	

Using the Display page to change Modes

<p>1. Select the desired zones, (this automatically changes the function keys from Global to Zone).</p>	
<p>2. Touch [Set] to display the keyboard.</p>	
<p>3. And then:</p> <ol style="list-style-type: none"> To change to Manual - Touch [Manual]. To Slave a zone - Touch [Slave]. To return to Auto - Touch [Auto]. 	
<p>4.</p> <ol style="list-style-type: none"> for Manual enter the Percentage power For Slaving select a similar master zone from the Zone list. For Auto enter the required zone temperature 	
<p>5. Touch [Enter] to make the setting or [Esc] to defer the action.</p>	

More about Slaving Zones

There are several points that you should remember when using zone slaving.

- 1. You can only slave like zones for like zones.** - You cannot slave a probe zone to a manifold zone.
- 2. You cannot nominate another zone that is already slaved to another.** - If, for example, zone 2 is currently slaved to zone 3, you cannot slave zone 1 to zone 2. The leading zone must already be a healthy zone.
- 3. You cannot nominate a zone that creates a loop.** - If, for example, zone 2 is slaved to zone 3, then you cannot slave zone 3 back to zone 2.
- 4. When selecting a lead zone to slave to you should find a similar zone type that is currently operating at the same temperature and at the same power level.** - If you nominate a lead zone that is working at the same temperature but outputting a noticeably different power level then the slaved zone may not regulate efficiently.

About EasyView page

The EasyView page allows you to relate zone temperatures to physical position.



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

- the Actual temperature,
- the Setpoint temperature,
- the current Applied power,
- the deviation between Set and Actual temperatures.






While no zone is selected, you can change the displayed value by touching one of the [**Actual**], [**Setpoint**], [**Power**] or [**Deviation**] buttons at the side of the page.

Touching any one mini-panel within the EasyView page causes the sidebar function buttons to switch to [**Set**] and [**Zoom**] in readiness for your next input.






The Mini-panel header is not colour-coded as on the Display page. However the lower half, while showing Temperature or Power is colour-coded to indicate the alarm status, i.e.

Green on Black	Normal working
Black on Yellow	1st stage Alarm status
White on Red	2nd stage Warning Status or Fatal Error

Using EasyView to change temperatures

<p>1. Select the desired zones.</p>	
<p>2. Touch [Set].</p>	
<p>3. And then:</p> <p>To Set a new temperature - Touch [Set].</p> <p>To Raise the overall temperature - Touch [Add].</p> <p>To Lower the overall temperature - Touch [Subtract].</p>	
<p>4. Enter the Temperature setting or change.</p>	
<p>5. Touch [Enter] to make the setting or [Esc] to defer the action.</p>	


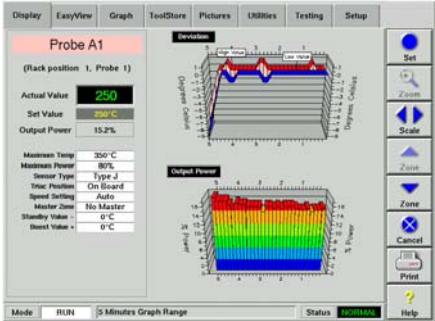
Using EasyView to change Modes

<p>1. Select the desired zones.</p>	
<p>2. Touch [Set].</p>	
<p>3. And then:</p> <ul style="list-style-type: none"> a) To change to Manual - Touch [Manual]. b) To Slave a zone - Touch [Slave]. c) To return to Auto - Touch [Auto]. 	
<p>4.</p> <ul style="list-style-type: none"> a) for Manual enter the Percentage power b) For Slaving select a similar master zone from the Zone list. c) For Auto enter the required zone temperature 	
<p>5. Touch [Enter] to make the setting or [Esc] to defer the action.</p>	


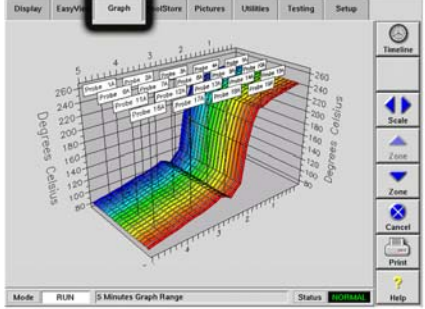
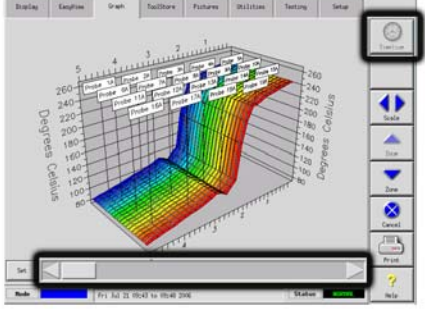
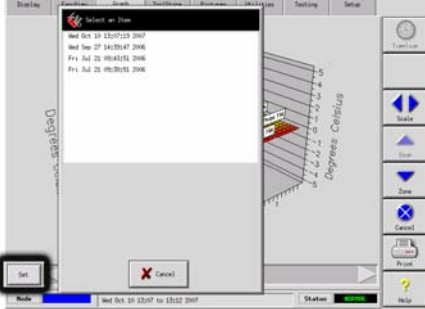
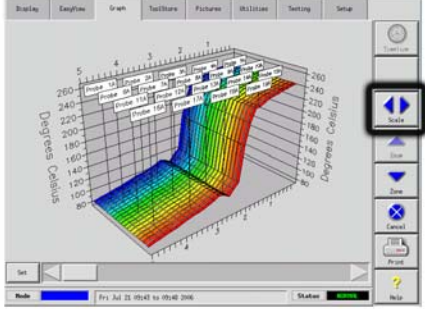
Check zone past performance (graph)

Your controller can record and display the temperature history for any zone over a period of time.

Inspecting the last 5 or 30 minutes


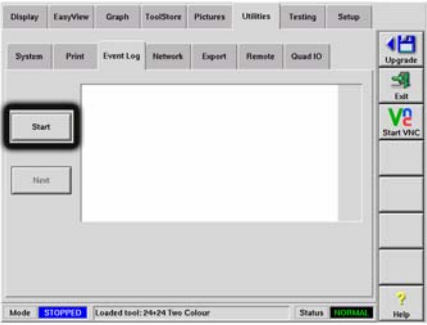

<p>Select any zone</p>	
<p>Touch [Zoom]</p>	
<p>The Zoom page shows</p>	<p>a) The table on the left shows the main settings for the zone and the current temperature value.</p> <p>b) The upper graph on the right shows how measured samples of the actual temperatures have varied above (red) and below (blue) the set point over a period of time. If the two lines are running close together, then you have precise temperature control. If, however, any zone shows a noticeably wider deviation than its neighbours, it could indicate potential problems. It could be a noisy thermocouple input that may be due to poor connections or a faulty thermocouple. Temperature control could also suffer if you manually select the wrong speed setting for a zone response rather than using the automatic choice.</p> <p>c) The lower of the two graphs shows the output power levels that have been measured over the same period of time. Power traces should be fairly similar for similar zones at similar temperatures.</p>
<p>Touch [Range]</p>	<p>To toggle the view from 5 minutes to 30 minutes</p>
<p>Touch [Up] or [Down]</p>	<p>To select adjacent zones</p>

Inspecting the last 24 hours

<p>Select up to 20 zones</p>	
<p>Open Graph page</p>	
<p>Touch the [Timeline] to activate the slider bar at the bottom of the page. Scroll to select time and date (which is displayed in Message bar).</p>	
<p>Touch [Set] to select a listed time period</p>	
<p>Touch [Range] to toggle the view from 5 minutes to 30 minutes</p>	

The Event Log Page

This page enables you to look-up what operational changes have been made to the controller, or its configuration, and when they were done. It is a permanent on-line diary and it logs the last 40 events or changes that have happened.

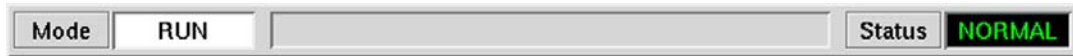
<p>1. Open the Utilities page and Event Log</p>	
<p>2. Open the Event Log sub-page and touch [Start]</p>	
<p>3. Select a search pattern</p>	

- Last Action** shows all past actions chronologically
- Zone** searches for past actions that have occurred within a specified zone
- Event** searches the past actions for occurrence of a specified event type
- Zone & Event** searches past actions for a particular combination of specified zone and specified event
- System Action** searches for occurrences of a specified global action.

All search results are displayed in the Events Log page window and the **[Next]** button shows more results if they are available.

Alarms

Whichever page may be active; there is a common Mode and Status window at the bottom of the page.



If your controller is switched on and running normally then the left hand Mode window will show RUN (as black text on white background) and the opposite Status window will show NORMAL (as green text on black background).

Mode Window

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

The table below lists the different displays:

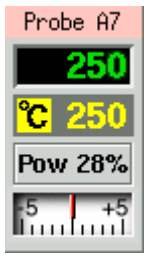
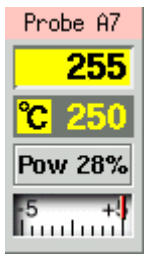
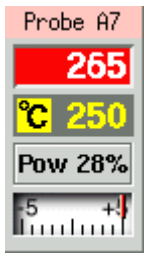
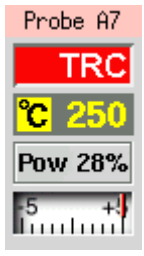
RUN	Black text in White box	All control zones are working normally
STOP	White text in Blue box	The System has been shut down and the heaters are at room temperature.
STANDBY	Yellow text in Black box	Any zones with Standby Temperatures configured have been reduced in temperature until the next command is given.
STARTUP		The system has been started in a homogenous or staged heat-rise. It will switch to RUN when working temperature has been reached.
SHUTDOWN		The system has been shut down in a homogenous or staged heat fall. It will switch to STOP when room temperature has been reached.
BOOST	Black text in Yellow box	Any zones with Boost Temperatures configured are being temporarily raised. (manual request)
M/C BOOST	Black text in White box	Any zones with Boost Temperatures configured are being temporarily raised. (machine request)

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 colour as detailed below:

NORMAL	Green text in Black box	Controller is running normally
WARNING	Yellow 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

Identifying Zone alarms

<p>Normal Zone This shows a healthy zone</p>		<p>Green text on Black background</p>
<p>Warning Zone This shows a first stage warning</p>		<p>Black Text on Yellow Background</p>
<p>Alarm Zone This shows a second stage alarm</p>		<p>White text on Red Background</p>
<p>Fatal Error an abbreviated Error message. (for a list of all Error messages see page 93)</p>		<p>White text on Red Background</p>

Beacon and Sounder extension

A Beacon and Sounder extends any second stage temperature alarm or fatal error alarm. Curing the alarm condition automatically extinguishes the beacon/sounder.

A key switch is also provided to mute the sounder at any time. Note however, that no reminder is given to show that the sounder is muted when the system is healthy. Re-occurrence of subsequent alarm conditions will cause the beacon to light but not create an accompanying audible alarm.

Card Indicators

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



SCAN - this LED flashes briefly as the controller interprets each card in sequence.

LOAD (L1 to L2/L6) - The Load LED(s) should also be normally lit, and a pulsing appearance shows that there is a regulated supply being delivered to the load.

FUSE - Should normally be extinguished. It lights to show that an output fuse has failed.

TC - Should be normally extinguished. It lights to show that the card has detected an open-circuit fault on the thermocouple circuit.

Training and Demonstration Mode



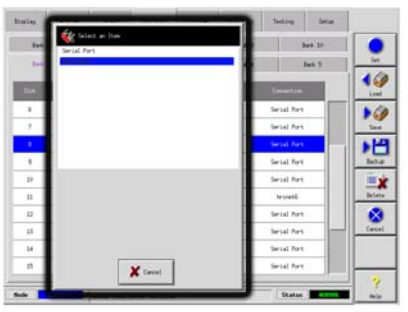

Your controller has a “Demo Mode” that can be used for training or demonstration purposes.

While this mode is engaged, the controller will not communicate with the associated Controller Cabinet therefore we recommend that you ensure that the system is idle before using the Demo Mode Facility.

About Demo Mode


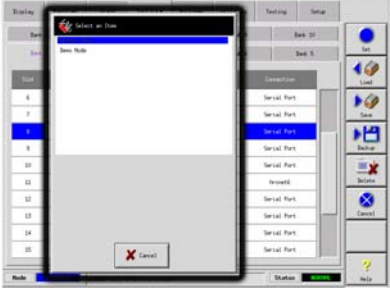
Demo mode feeds every zone, within the selected tool, with a stream of pre-recorded temperature data. The Console appears to be working and it gives a real trace when Graph page is selected.

Selecting Demo Mode

<p>Open the Tool Page to select and load any tool. (Note it's current Connection setting)</p>	
<p>Touch [Connection] and then [Set]</p>	
<p>In the Select-Item option touch [Demo Mode].</p>	
<p>Accept the warning that this option will disable the Console.</p>	

De-selecting Demo Mode

Taking the console out of Demo mode is a simple reverse of the Selection routine.

<p>Select the current tool. Touch [Connection], and [Set].</p>	 <p>The screenshot shows the 'Connection' menu with various tool names listed. The 'Set' button in the top right corner is highlighted with a red box. The 'Connection' menu item is also highlighted with a red box.</p>
<p>Select the original setting that was noted at Step 2 while selecting Demo Mode above).</p>	 <p>The screenshot shows a 'Select an Item' dialog box with 'Serial Port' selected. The 'Set' button in the top right corner is highlighted with a red box. The 'Serial Port' item in the list is also highlighted with a red box.</p>

Customising your controller

Your controller has a dedicated Tool Bank which enables you adapt it quickly to different circumstances. It has two hundred available positions that can be individually configured, named, saved and recalled whenever the tool or job changes.

There is also a Picture page that can hold up to twenty various images that may be useful for operation or maintenance. One image may be dedicated to EasyView, while others may be reserved for photographs, diagrams or even tabulated data.

What is included in this section

Using the ToolStore Page

Renaming an Existing Tool

Loading Tool settings

Saving Tool settings

Deleting a Tool

Backing-up Tool Settings

Restoring tool settings

The Picture Page

Using the Tool Store page

Two rows of Tool Bank buttons allow you select 10 different tool banks, each of which contains twenty tool slots; this gives a capacity for up to 200 different tool settings.

The lower window shows the following details for the tools.

Tool - the tool number (not user-configurable)

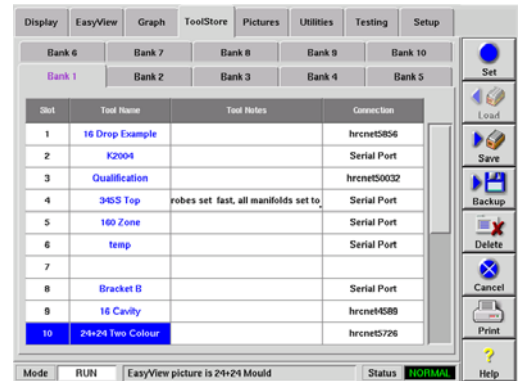
Name - a user configurable text field for tool name.

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

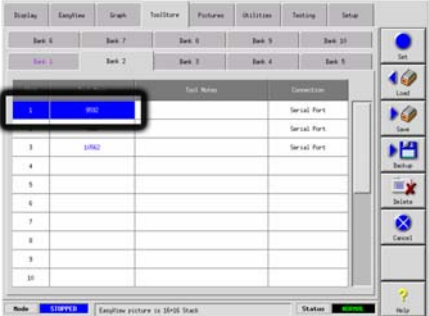
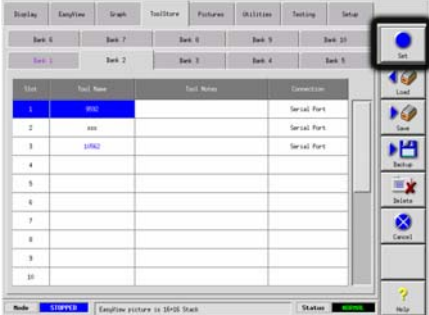


- black** - a tool store that has been named, but holds no settings.
- blue** - a tool that has been saved and named, but is not in current use.
- purple** - the tool that is currently in use and that has no changes to any settings.
- red** - the tool that is in current use but which has been changed from its stored settings.

Description - a user-configurable text field that may be used to hold an expanded description of the tool.

Connection - this normally defaults to Local Serial which indicates that the tool settings are stored locally within the console memory. However, if the console is networked, and thus connected to two or more controller cabinets, this may show the name of one or more remote HRC-NET cards. The Connection column also provides a demo facility as described on page 66.

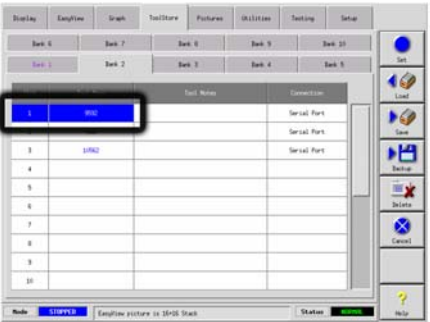
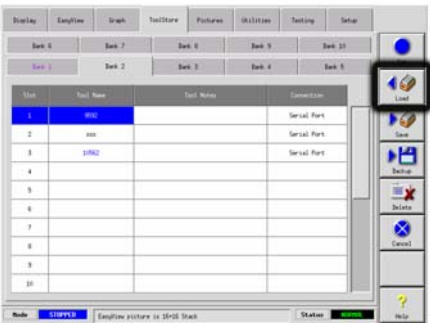
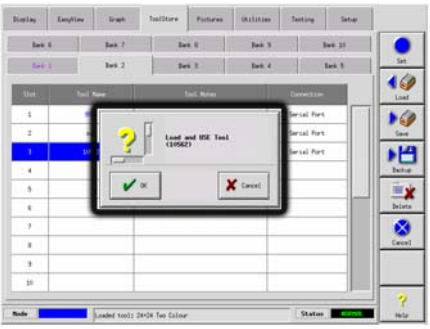


Renaming an existing tool

<p>Touch the relevant tool tab.</p>	 <table border="1"><thead><tr><th>Tool</th><th>Tool Name</th><th>Tool Notes</th><th>Connection</th></tr></thead><tbody><tr><td>1</td><td>WPC</td><td></td><td>Serial Port</td></tr><tr><td>2</td><td>WPC</td><td></td><td>Serial Port</td></tr><tr><td>3</td><td>WPC</td><td></td><td>Serial Port</td></tr><tr><td>4</td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td></tr></tbody></table>	Tool	Tool Name	Tool Notes	Connection	1	WPC		Serial Port	2	WPC		Serial Port	3	WPC		Serial Port	4				5				6				7				8				9				10			
Tool	Tool Name	Tool Notes	Connection																																										
1	WPC		Serial Port																																										
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9																																													
10																																													
<p>Touch the [Set] button</p>																																													
<p>Edit the name</p>																																													
<p>Touch [Enter]</p>																																													

Loading tool settings

Note that the operating mode for the controller cabinet remains unchanged by loading a tool. So, if your controller is in Run mode and another tool setting with different temperatures is selected, and loaded, then the tool will immediately change to run at the different temperature settings.

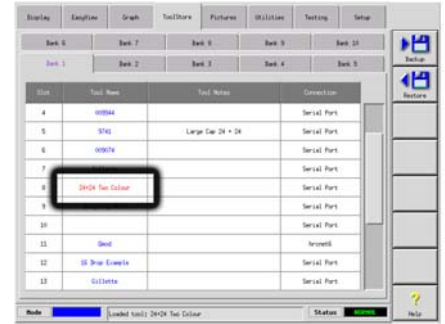
<p>Select the desired tool.</p>	
<p>Touch [Load]. (If the [Load] button is greyed out then swapping Tools on-the-fly has been Disabled - See "Allow ToolLoad" page 37)</p>	
<p>Touch [OK] (or [Cancel] to exit)</p>	

Saving tool settings

If you change tool settings and want to save them, then you have two choices.

1. Over-writing the last settings with new saved settings

If you know that the new settings are satisfactory, then you can save them back into the same tool store.






<p>Select the tool</p>	
<p>Touch [Save] and [OK]</p>	

Saving tool settings

2. Saving modified settings, without losing existing ones

If you have changed some tool settings and want to keep them but at the same time you wish to retain the old unmodified settings then you must create and save into a new store as follows:

<p>Select a spare blank tool tab</p>	
<p>Touch [Save] and [OK]</p>	
<p>Enter a new tool name and touch [Enter].</p>	

Deleting a tool



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


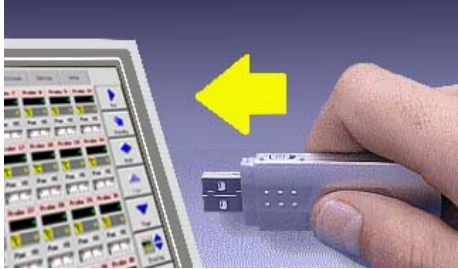

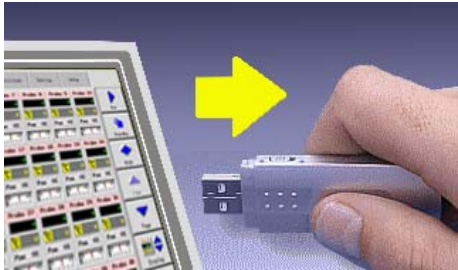
<p>Select the unwanted tool</p>	
<p>Touch Delete.</p>	
<p>Touch OK</p>	

Backing up tool settings

Backing up tools is a means of saving tool settings to an external media which may be kept in a safe place for secure recovery or transferred to another controller for use elsewhere.





NOTE: If the particular tool has an EasyView image and EasyView page associated with it, then the Minipanel configuration is saved within this Backup procedure. However, you should save the same picture and keep the Picture and Tool files together if you wish to reuse them at a later date.

1. To save (backup) all the tools:

Open the ToolStore page	
Insert storage media	
Touch [Backup]	
When done remove storage media	

Backing up tool settings

2. To save (backup) one selected tool setting:

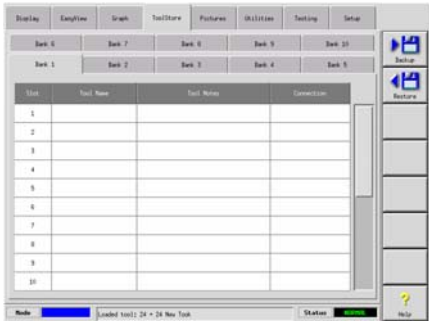
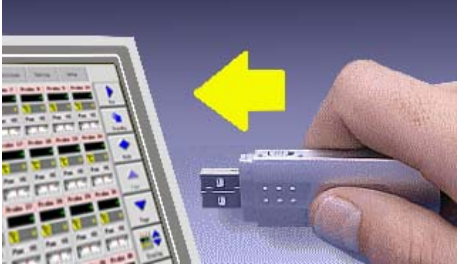
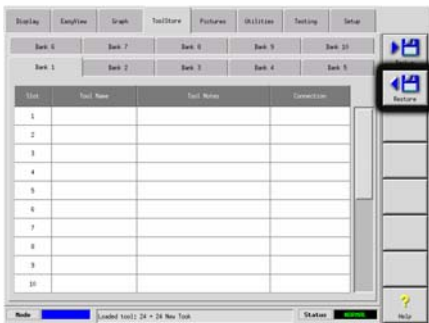
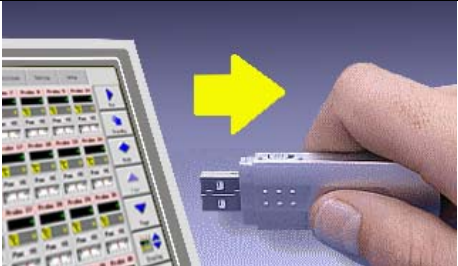
<p>Insert storage media</p>																																													
<p>Select the tool to Backup</p>	 <table border="1"> <thead> <tr> <th>Slot</th> <th>Tool Name</th> <th>Tool Model</th> <th>Connection</th> </tr> </thead> <tbody> <tr><td>5</td><td>SPX</td><td>Large Cap 24 + 24</td><td>Serial Port</td></tr> <tr><td>6</td><td>40074</td><td></td><td>Serial Port</td></tr> <tr><td>7</td><td>511076</td><td></td><td>Serial Port</td></tr> <tr><td>8</td><td>2404 Fac Colbar</td><td></td><td>Serial Port</td></tr> <tr><td>9</td><td>2404 Fac Colbar</td><td></td><td>Serial Port</td></tr> <tr><td>10</td><td>24 + 24 New Tool</td><td></td><td>Serial Port</td></tr> <tr><td>11</td><td>Dead</td><td></td><td>Serial Port</td></tr> <tr><td>12</td><td>51 Strip Escalator</td><td></td><td>Serial Port</td></tr> <tr><td>13</td><td>511076</td><td></td><td>Serial Port</td></tr> <tr><td>14</td><td>40070-2</td><td>Phillips Model</td><td>Serial Port</td></tr> </tbody> </table>	Slot	Tool Name	Tool Model	Connection	5	SPX	Large Cap 24 + 24	Serial Port	6	40074		Serial Port	7	511076		Serial Port	8	2404 Fac Colbar		Serial Port	9	2404 Fac Colbar		Serial Port	10	24 + 24 New Tool		Serial Port	11	Dead		Serial Port	12	51 Strip Escalator		Serial Port	13	511076		Serial Port	14	40070-2	Phillips Model	Serial Port
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<p>Touch [Backup]</p>																																													
<p>When done remove storage media</p>																																													

Restoring tool settings

If there is any information stored in a selected tool bank or slot then this process over-writes new information into that position.

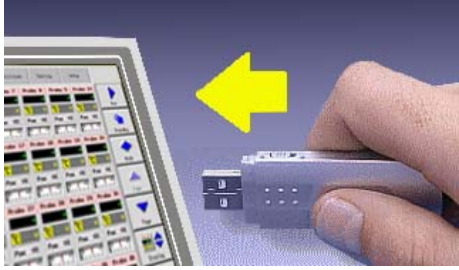
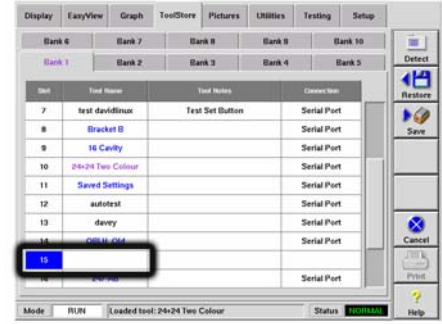
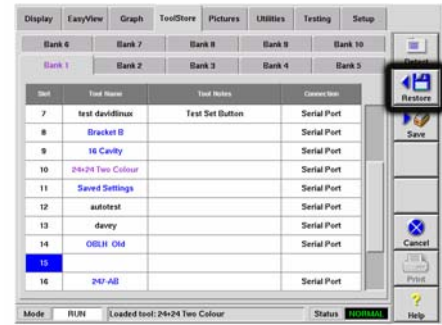

There is an option within this sequence to restore either all of the stored tools or just one selected tool.

1. To Restore all the Tools

<p>Open the ToolStore page.</p>	
<p>Insert the storage media with the data</p>	
<p>Touch [Restore],</p>	
<p>Remove the memory stick.</p>	

Restoring tool settings

2. To Restore a single Tool


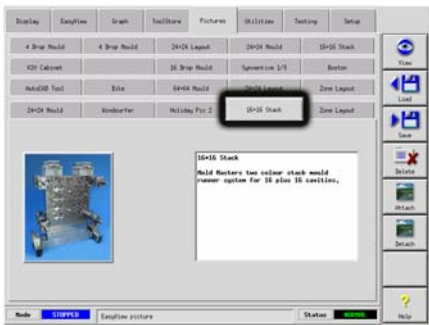

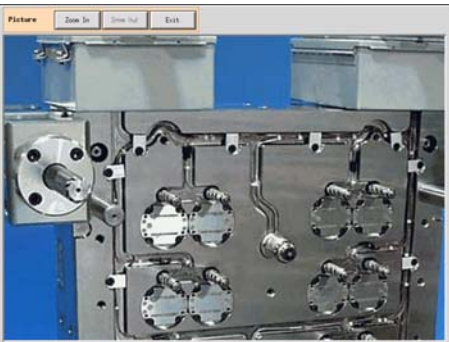
Insert the storage media																																									
Select the tool tab	 <table border="1"><thead><tr><th>Tool</th><th>Tool Name</th><th>Tool Notes</th><th>Connection</th></tr></thead><tbody><tr><td>7</td><td>test davidlinux</td><td>Test Set Button</td><td>Serial Port</td></tr><tr><td>8</td><td>Bracket B</td><td></td><td>Serial Port</td></tr><tr><td>9</td><td>16 Cavity</td><td></td><td>Serial Port</td></tr><tr><td>10</td><td>24x24 Two Colour</td><td></td><td>Serial Port</td></tr><tr><td>11</td><td>Saved Settings</td><td></td><td>Serial Port</td></tr><tr><td>12</td><td>autotest</td><td></td><td>Serial Port</td></tr><tr><td>13</td><td>davy</td><td></td><td>Serial Port</td></tr><tr><td>14</td><td>OBH OH</td><td></td><td>Serial Port</td></tr><tr><td>15</td><td>247 AB</td><td></td><td>Serial Port</td></tr></tbody></table>	Tool	Tool Name	Tool Notes	Connection	7	test davidlinux	Test Set Button	Serial Port	8	Bracket B		Serial Port	9	16 Cavity		Serial Port	10	24x24 Two Colour		Serial Port	11	Saved Settings		Serial Port	12	autotest		Serial Port	13	davy		Serial Port	14	OBH OH		Serial Port	15	247 AB		Serial Port
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14	OBH OH		Serial Port																																						
15	247 AB		Serial Port																																						
Touch [Restore]																																									
Remove the media																																									

The Picture Page

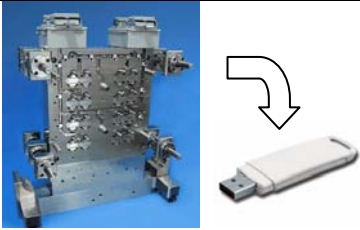
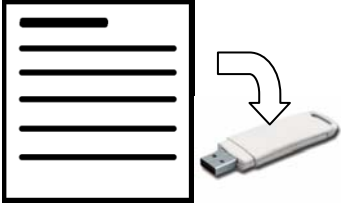
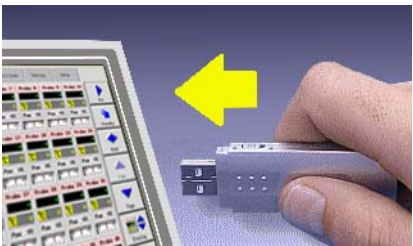

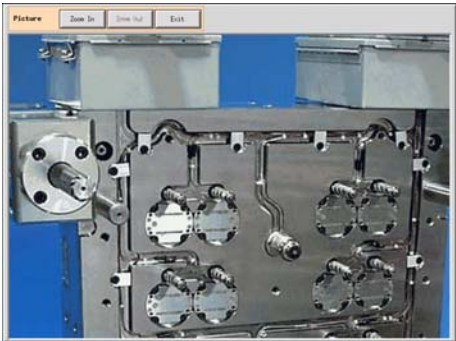
The picture gallery has the ability to store up to 20 images that can be displayed at full screen size. Explanatory notes may accompany each picture; if so they are displayed alongside the thumbnail view of the image.

The Picture page is also used to configure Images for the EasyView page, though that process is fully described on page 47.

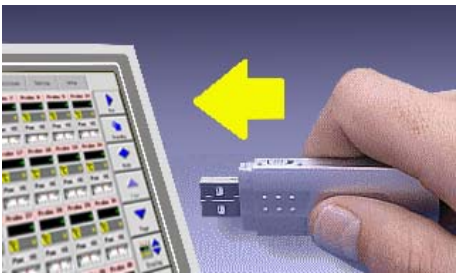
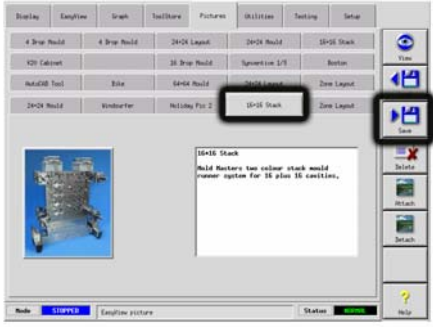
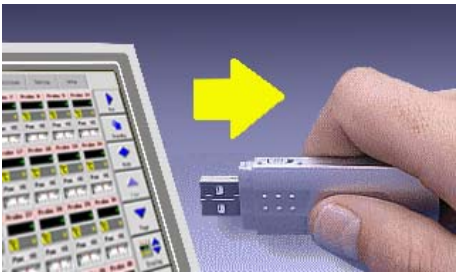
To view an image

<p>Open Pictures page</p>	
<p>Select a picture tab</p>	
<p>Touch either the picture or [View]</p>	
<p>View picture</p>	

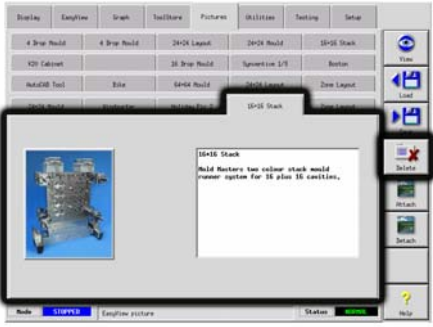

To load a new image

<p>Save a picture as “picture.jpg” or “picture.gif”</p>	
<p>Save picture title and description text as “picture.txt”</p>	
<p>Insert Media</p>	
<p>Select an empty table and touch [Load]</p>	
<p>View new picture</p>	

To save an image

<p>Insert storage media</p>	
<p>Select the required picture and touch [Save]</p>	
<p>Remove the media</p>	

To delete an image

<p>Select the unwanted image and touch [Delete]</p>	
<p>Touch [OK]</p>	

Maintaining your controller

Maintaining your controller is all about keeping it in order, checking records and settings and running self-diagnostic checks.

There are no user serviceable parts inside the Touch Screen controller and, in the unlikely event of equipment failure, you should return the unit for attention.

What is included in this section

Print Out Facility

Export Facility


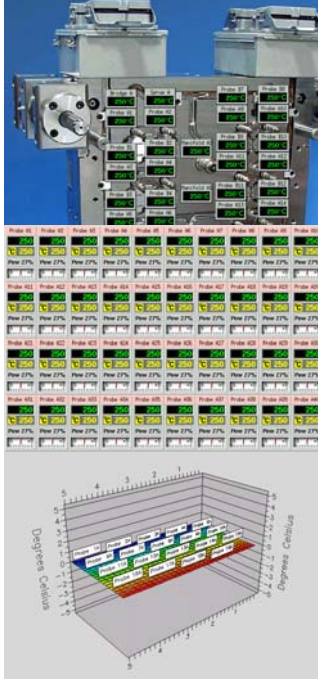
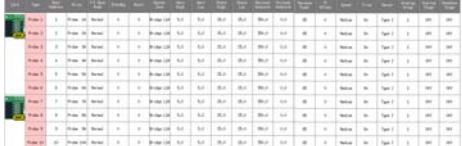
Self Diagnostic Tests

System diagnosis results

Upgrading

Servicing and Repairing your controller

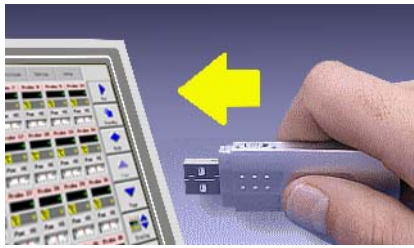
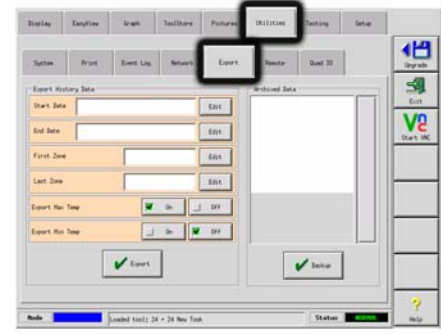
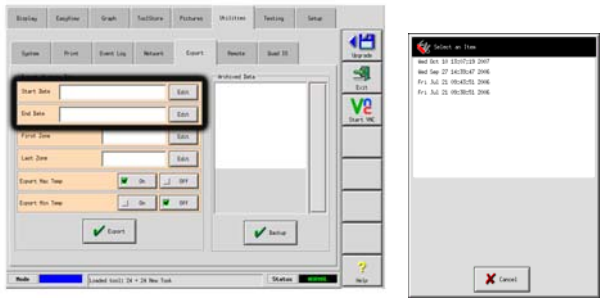
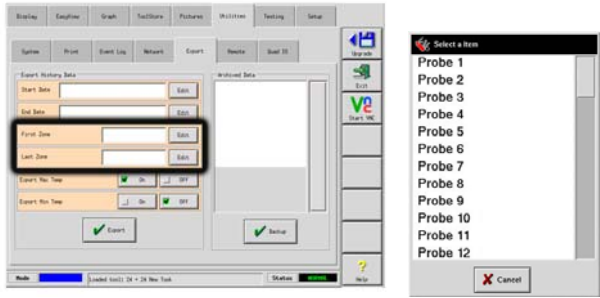
Print Out Facility

<p>Touch [Print] for a page record gives either:</p>	
<p>A Screen Picture if you print from DISPLAY page (including Zoom view) EASYVIEW page GRAPH page</p> <p>Or...</p>	
<p>A Table Print-out if you print from SETUP page TOOLSTORE page TESTING page</p>	

Export Facility

You can extract the last 24 hours of zone performance data as a zipped spreadsheet. This data is written in a CSV (comma separated value) form, and then compressed into a zip file before exporting.

To extract the data:

<p>Insert storage media</p>	
<p>Select Utilities and Export page.</p>	
<p>Select the period by touching [Edit] in the Start and End boxes</p>	
<p>Select the zones by touching [Edit] in the First and Last boxes,</p>	

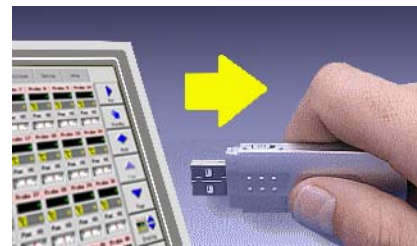
If the **[Max Temp]** and **[Min Temp]** options are enabled then the result sheet shows the Maximum and Minimum temperatures that have been recorded for the particular zones rather than the current temperature at the time of printing.



Touch **[Export]**



When done remove the media and take it to a Personal Computer



Decompress the exported data-file into a standard CSV (comma separated value) format.



Import Data to a spreadsheet



Self Diagnostic Tests

The Controller has a diagnostic testing tool, which has two main options within its test profile.

1. Power Test

Power Test is a facility that can only be used on Current Measuring cards (6MODC, 3MODC etc). It performs a quick check to see that just the heater zones are functioning correctly and that the feedback from current sense coils are consistent with tools history file. It does not check for zone wiring errors or similar and it is designed as a maintenance aid only. Its operation is described on page 138.

2. Full System Test

The Diagnostic test allows you to check that every zone is functioning correctly. It is the correct routine that you should use:

- 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 following describes the test sequence to show how it works.

1. It cools the whole tool	...during which time, all zones are checked to see that none experience a significant temperature rise.
2. It heats the first zone and checks to see that	<p>a) the first zone rises sufficiently to qualify as a “Good Rise” – if not it increases the applied power and looks for the “Good Rise”. It continues to raise the power and look for a Good Rise until the configured “Heat Time” expires. If it does not see a good rise within that time then the zone has failed.</p> <p>b) the temperature of the zone under test does not reduce further – which would indicate a reversed thermocouple on that zone.</p> <p>c) no other zone rises enough to become a “Bad Rise” which would indicate excessive thermal conduction between adjacent zones.</p> <p>d) no other zone rises by as much as the “Good Rise” which would indicate cross-wiring between the zone under test and another thermocouple.</p>
3. After completing the test on the first zone, the routine then moves on to subsequent zones until all have been tested.	

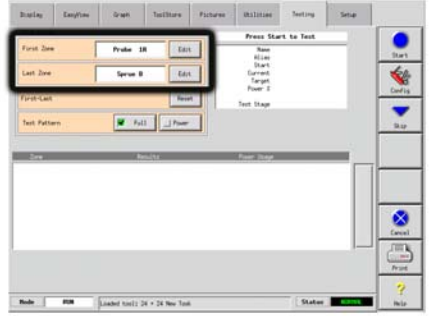
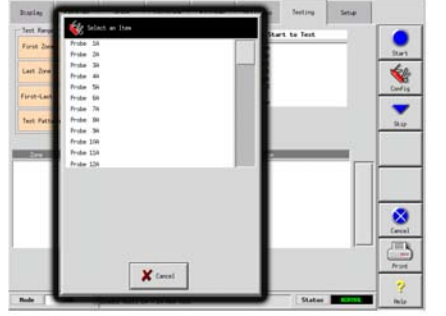
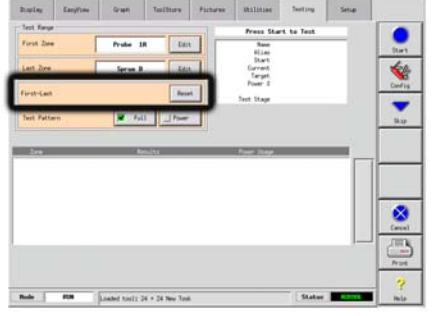
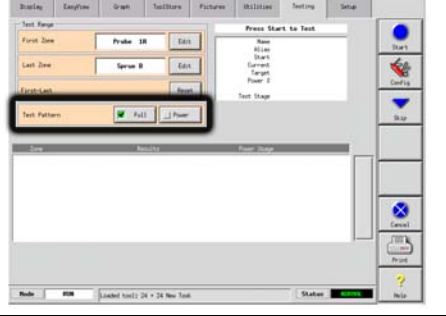
Why you may need to change your test parameters

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

Running a Self Diagnosis test

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

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

<h3>To select some zones for testing</h3>	
<p>Touch [Edit] in the First Zone box</p>	
<p>Select the first zone Repeat for the Last Zone</p>	
<h3>To select every zone for testing</h3>	
<p>Touch the First-Last [reset]</p>	
<p>For a full Self-diagnosis – Check that the Test Pattern is set to [Full] For the reduced Power Test select [Power]</p>	

Touch **[Start]**

Test progress for any one zone is shown in the upper right panel.

Test history fall all zones is shown in the lower panel.



To pass by or skip any zones touch the **[Skip]**



To stop the test and omit remaining zones, touch **[Cancel]**.



System diagnosis results

The Test page retains information about any test that is run. You can scroll the screen to view all the results or touch [**Print**] for a hard copy.

Interpreting the test results

Satisfactory Test

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

Unsatisfactory Test

If the test detects any problems then it displays an error messages against the particular zone. Below is a complete list of the various messages along with further detail and possible causes.

User skipped Test - You skipped the test for this zone by pressing [**Skip**] while it was being tested.

User Aborted Test - You aborted out of the test by pressing [**Cancel**].

Open Circuit T/C - Thermocouple detected as being open circuit. Check thermocouple wiring for displayed zone.

Blown Fuse - Check card fuse. This message is also displayed if the zone was set to use an off board triac that was not installed. N.B. Off board triacs have their own fuse.

No Mains Sync. Pulse - This is probably due to an error in the supply wiring.

No Card Present - No card was detected in the rack at the slot identified with the displayed zone.

Cooling Test Failed - All zone temperatures had to be stable or falling before the heating test begins. If any zones continued to rise with power set to zero within the cooling period, this error is raised.

Heating Test Failed - Temperature did not rise by the set number of degrees within the heating period. This may be caused by an open circuit heater, a pinched, shorted or dislodged thermocouple, or the zone was set to on board triac when the cabinet was wired for off board triacs.

Check for Reversed T/C - Temperature appeared to be decreasing when power was applied.

Below 0 or Reversed T/C - May be caused by a reversed thermocouple. Also, in the unlikely event that 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.

T/C Interaction with zone NN? - A different zone(s) to the one being tested had an unacceptable rise in temperature (greater than Bad Rise set in Test Values). Indicates faulty T/C positioning or close zone proximity.

Heater/TC Common with zone NN? - Cross-wiring fault between displayed zones. Could be either Heater or thermocouple wiring at fault.

Message Overflow - There is a limited amount of memory available to store test results. If this message is seen, too many errors have occurred to store them all.

Servicing and repairing your controller



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

Only use Ceramic Body Fuses on Control Cards, NEVER use glass bodied fuses.



Replacement parts

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

Cleaning and Inspection

Inspect the fan filters at regular intervals. The filters are removable and a light tapping action removes loose dirt and dust. Failure to do this reduces the flow of cooling air and may cause overheating. If filters do become clogged, they need to be replaced and these can be obtained from your supplier, quoting the serial number of the cabinet.

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

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

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

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

Upgrading

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

It may be possible to apply system upgrades to your own controller; however, this would depend on the type and age of your equipment. Contact your supplier with the serial number of your console and he can tell you about whether your console will accommodate and upgrade and what may be available.

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

These following instructions will guide you through the upgrade procedure.

Preparation

1. Download the upgrade from the internet onto your PC.
2. Copy the upgrade program/data onto suitable storage media (CF card for KTS2 or USB Flash for TS and KTS3)
3. Before you start any upgrade, shutdown your machine to leave your console free

Procedure for a KTS2 Console.

1. Put the CF card into a PCMCIA adapter.
2. Insert the CF and adapter into the KTS.
3. Reboot the KTS Console (or switch it on).
4. As the Console boots up it will read and apply the upgrade and then show the Display Page ready for normal use.
5. Remove the CF card and adapter.

Procedure for a TS and KTS3 Console

1. Select the Utilities page.
2. Insert the USB Flash Memory
3. Touch the [**Upgrade**] button
4. When the upgrade is complete remove the USB stick and restore the console.

Troubleshooting

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

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

If the system detects any abnormal condition it displays a warning message in the Main menu

Fault and warning messages

Any of the following messages may be displayed on the Fault Indication line:

Error Message	Cause	Action
AMPS	The controller is unable to supply the current requested. (Note: This error message is most likely to be seen if the particular zone is set as a Spear type)	Isolate system supply, check loom and heater wiring continuity. Also, 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 elsewhere in the tool or cable then it cannot see the full heat rise that occurs at the tip. If left uncorrected then there is a danger that the zone could overheat and damage the tip. Instead the circuit maintains the output at whatever level it reached when the monitor circuit detected the fault and the error message was displayed.	Check thermocouple wiring, it may be reversed. Heater wiring may be faulty or element may be open circuit.
FUSE	The fuse for that zone has failed. Please Note: A fuse can only fail due to a fault external to the controller. Identify and rectify the fault before replacing the fuse. Note: 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. 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, i.e. High Rupture Current load fuse. The blown fuse is located either on the control card or on the off-board triac module (If fitted).
GND	The system has detected an earth fault. (Note: this can only be detected by controllers fitted with EM Cards or MD240 diagnostics)	Check your heater wiring for a low impedance path to earth.

Error Message	Cause	Action
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 recognise an alarm that has been generated by a later generation 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.	Please make a note of the serial numbers for both the controller and console. Also note the console software date on the Utilities page. Contact your supplier with this information to hand.
HIGH	The water-flow sensor has detected a high flow rate.	These are only monitored conditions, and neither will cause any shutdown, or pause, action. However, you should check that the coolant water system is not blocked, or leaking, to ensure that no overheating occurs.
LOW	The water-flow sensor has detected a low flow rate.	
LINE	No mains supply synchronisation pulses being received. The three-phase supply is used in a cross-over 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. Meanwhile, all circuits on the healthy phases will continue to work normally.	There is a phase detection circuit on each K-Series 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 re-wired incorrectly, a swapped phase and neutral. If a LINE error message occurs then switch off and isolate the controller then check supply wiring for presence of all three phases.
LINK	This will occur if the console is switched to a remote controller with a network link but it cannot establish any communication with the remote unit. The console can display the appropriate zones for the particular tool but it cannot relay any temperature information. It shows a LINK fatal error in place of the actual temperature.	Check that the network link is good and/or the remote controller is still switched on and available.
LOAD	No load on that zone. Only occurs when in manual closed loop mode where the current is pre-set. The current sensing circuit has not detected a current flow; therefore, the zone is flagged as not having a load.	Isolate the system supply and check the connections between the controller and the tool heaters. Also, check the heater for continuity
OVER	The RTD zone has detected a temperature in excess of 99°C. This is an abnormal alarm because RTD circuits can only read from 0-99 deg so a fault must be suspected and investigated. Meanwhile, no control zones are affected.	Check that a different RTD has not been fitted.

Error Message	Cause	Action
N/Z	All the control cards are interrogated in sequence, on a working controller you can see the SCAN LEDs flashing in a sequence as each card is briefly checked for satisfactory communication. If any card fails to respond to the console then an N/Z error message is displayed for the offending zone.	<p>If every zone shows N/Z and no cards show or flash their SCAN LEDs then check the communication lead between the console and the controller cabinet.</p> <p>If only one or two zones are displaying N/Z then check the card for faults. If you have recently changed any cards and put any older discrete-component cards into a new controller that has surface-mount cards then it is possible that the console's modern scan speed is too fast for the older control cards. In such a condition, check the console baud rate and try setting it to Low.</p> <p>If this cures the problem and you later replace the older card for a newer surface mount version then remember to reset the Baud rate back to high for optimum working.</p>
NONE	The console has detected a control card that has no settings.	<p>This Error message may be seen fleetingly during switch on, it should disappear after the initial card scan.</p> <p>If the message persists then you may need to re-apply the correct card settings on the Setup page.</p>
REV	The card has detected an abnormal input at the T/C termination that indicates a shorted or Reversed thermocouple.	<p>If the REV alarm persists then you should switch off the controller and investigate the offending zone.</p> <p>Alternatively you could slave the offending zone to a good zone until you have time to clear the fault.</p>
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 has been detected and no auto-response has been selected in the T/C Open Error column of the Setup page.	<p>For immediate recovery you can either slave that control zone to an adjacent zone or change to open loop control.</p> <p>Make a note of the above action so that when the controller is free you can check to see whether the input fuse on the control card has ruptured. If the fuse is good then you may need to check the wiring for faults or even replace the thermocouple.</p>
TRC	<p>If a triac fails it goes short circuit and passes full load current.</p> <p>In such a condition you have lost control of the load and cannot switch it off from the console. The TRC alarm flags up the fault state which relies on operator intervention to manually shut the system down.</p> <p>Note: the triac monitor does not function in auto mode. If the triac were to fail while the zone is run in auto then the only indication will be an abnormally high zone temperature because the triac is passing high, uncontrolled current. The TRC alarm is only seen if a triac fails on a zone that is running in closed-loop manual condition.</p>	If the triac has failed, return to your supplier for repair.

Warning Message	Abnormal Condition
MAN	The control zone is in manual mode.
S #	The zone is slaved to another control zone, where # represents the number of that zone, i.e. S 2 means the zone is slaved to Zone 2. The same power is being sent to both zones. In the Display page, the set point 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	If during the test procedure a temperature interaction is found between zones, this message is displayed.
FAIL	The zone under test has failed.

Individual Card Diagnostics

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

From top to bottom they are: -

SCAN The LED flashes during normal operation to indicate data bus activity.

TC LED is lit when the thermocouple is open circuit.

LOAD LED indicates a supply to the heater.

FUSE LED lit when the load fuse fails.

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



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

TouchScreen - removal and reconnection

Provided you are not using cycle-synchronised probes, the display console can be unplugged while the system is running without causing immediate problems. However, we recommend that you only do this to recover from an emergency situation and that you run the system without a console for as short a period as possible.

The task is easier if it can be done after shutting down the whole system.

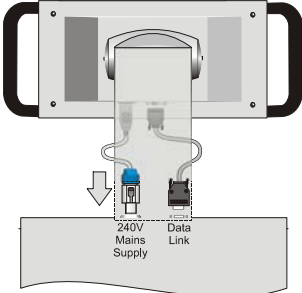


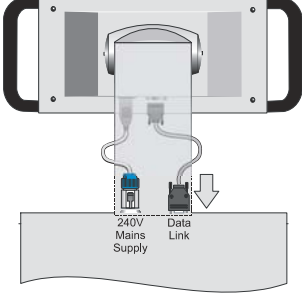


NOTE: KTS Consoles work at different d.c. supply voltages. Early models used a 12v power supply while later models used a 19v power. To change the internal computer within the console then check the supply voltage and, if necessary, change the power supply as well.

Removing a console





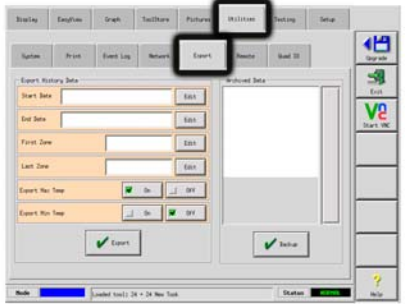
<p>Unplug the data lead</p>	
<p>Stop the console by touching [Exit]</p>	
<p>Unplug the power lead</p>	
<p>Remove the console</p>	

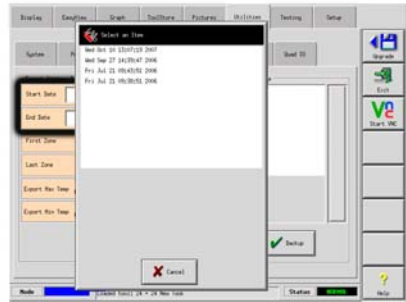
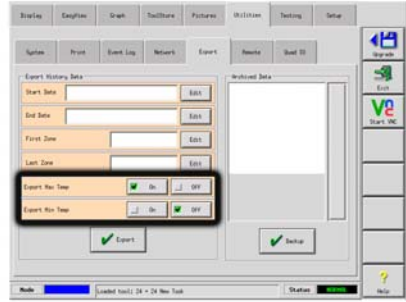

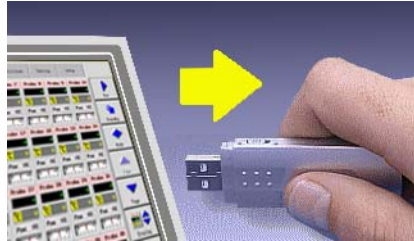

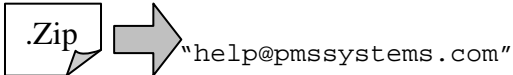
Reconnecting a console

<p>Connect the power cable first</p>																																													
<p>Check that the correct tool is selected</p>	 <table border="1"> <thead> <tr> <th>Test</th> <th>Test Name</th> <th>Test Notes</th> <th>Connection</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>16 Drop Example</td> <td></td> <td>Inconet5856</td> </tr> <tr> <td>2</td> <td>K2004</td> <td></td> <td>Serial Port</td> </tr> <tr> <td>3</td> <td>Qualification</td> <td></td> <td>Inconet50032</td> </tr> <tr> <td>4</td> <td>3455 Top</td> <td>robots set fast, all manifolds set to</td> <td>Serial Port</td> </tr> <tr> <td>5</td> <td>140 Zone</td> <td></td> <td>Serial Port</td> </tr> <tr> <td>6</td> <td>temp</td> <td></td> <td>Serial Port</td> </tr> <tr> <td>7</td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td>Bracket B</td> <td></td> <td>Serial Port</td> </tr> <tr> <td>9</td> <td></td> <td></td> <td>Inconet4588</td> </tr> <tr> <td>10</td> <td>24x24 Two Colour</td> <td></td> <td>Inconet3726</td> </tr> </tbody> </table>	Test	Test Name	Test Notes	Connection	1	16 Drop Example		Inconet5856	2	K2004		Serial Port	3	Qualification		Inconet50032	4	3455 Top	robots set fast, all manifolds set to	Serial Port	5	140 Zone		Serial Port	6	temp		Serial Port	7				8	Bracket B		Serial Port	9			Inconet4588	10	24x24 Two Colour		Inconet3726
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<p>Touch [Run]</p>																																													
<p>Reconnect the data cable</p>																																													

Other problems with the Tool

If you find that the Controller is not running correctly and cannot resolve the problem with either the manual or on-line help then it may help if we can see exactly how your system is configured.

<p>Insert Media</p>	
<p>Open the ToolStore page</p>	
<p>Select the tool</p>	
<p>Touch [Backup]</p>	
<p>Select Export on the Utilities page</p>	

<p>Set the Start and Finish time to cover the problem period.</p>	
<p>Set the Max and Min Temperatures to on</p>	
<p>Touch [Export]</p>	
<p>Remove Media</p>	
<p>Download both files to PC</p>	
<p>Email files</p>	

On receipt of your mail and attachment files, we can load your files into one of our own controllers and will try to analyse the problem.

K-Series Fuses

There are supply fuses for four separate functions and a front panel-mounted Miniature Circuit Breaker for the whole unit. In the unlikely event of a fuse failure always isolate the incoming supply before opening any cabinet door to investigate.

Replacement Fuses

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

Console

The console is supplied via a discrete fuse on the terminal rail.

Class	20mm Glass Fuse Antisurge
Rating	2 A

Power Supply Units (PSUs)

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

Class	20mm Glass Fuse Antisurge
Rating	6.3 A

Fans

The K-Series Controller has a single fan to assist cooling. The fan has a discrete supply fuse, of the following characteristics:

Class	20mm Glass Fuse Antisurge
Rating	6.3 A

If the fan has stopped working then first inspect the unit to see if there are any blockages or objects fouling the impellers. Once you are certain that the fan is free to rotate then proceed to check its supply fuse. The fan fuse is located on the termination rail behind the top cover plate.

Controller Cards

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

If the Fuse LED indicator shows that the output fuse has ruptured then the card may be easily removed and the fuse changed. Only use Ceramic Body Fuses on Control Cards, NEVER use glass bodied fuses.



If the T/C LED indicator shows an open circuit T/C circuit then this may indicate that the input fuse has ruptured.

Output Fuse Type: HRC High Speed

Card type	6MOD	4MODS	3MOD	2MOD	1MOD
Fuse Rating	5A	15A	15A	20A	30A

Input Fuse Type: Surface-mount quick-blow

Part Code	62MAQB5M
Fuse Rating	62mA

APPENDIX A

HRC Wiring Details

1.1 Three phase Designation

Please take extreme care when connecting the controller to the three-phase supply. Incorrect connection may result in damage to the controller.

The controller is normally supplied according to your requirements in either a star or delta supply. However, some models may have a dual supply option which accepts either Star or Delta 3-phase supply.

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

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

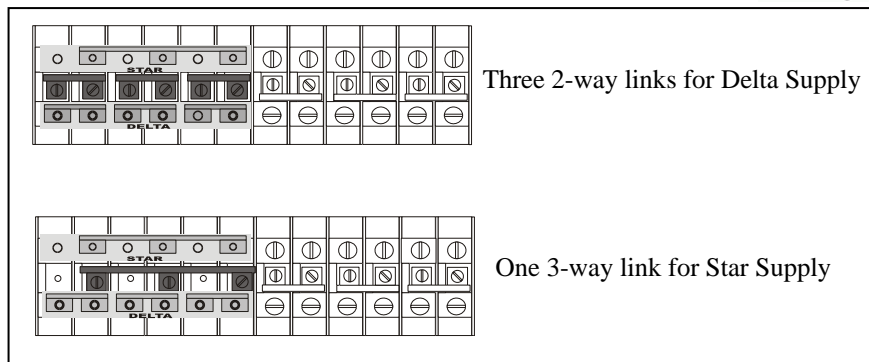
1.1a Star /Delta option

Where a cabinet is fitted with a dual supply option then there are two places within the rear of the cabinet that you must alter to change between Star and Delta supply.



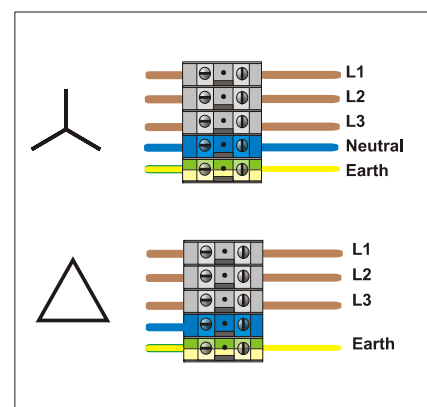
Do not change the supply wiring until the controller has been disconnected from all electrical supplies.

At the upper connection blocks, change the Star/Delta cross-links using a single 3-way link for Star supplies or three 2-way links for Delta supplies. The connector strip shows the appropriate cross-links to use and looks similar to this diagram.



At the base of the cabinet is the mains connector strip that will accept a Star or Delta supply cable.

Use only 4-core supply cable for Delta connection and 5-core supply cable for Star connection. Wire this cable into the lower terminal blocks to match the particular supply; as shown in the adjacent diagram.



1.2 Loom Thermocouple cables

Where a thermocouple cable uses conduit with individual conductors, rather than multi-core cable, then the colour of the thermocouple conductors are as shown below.

Type	Positive	Negative
J	Black	White
K	Green	White

RTD thermocouple cable colours and number may vary. Refer to controller documentation for details.

1.3 Loom Power cables

Where a power cable uses conduit with individual conductors, rather than multi-core cable, then the colour of the power cable conductors are as shown below.

Three phase type	Supply	Return
Star or Delta	Brown	Yellow

1.4 Alarm Output / Auxiliary Input

An option cabinet connector provides an alarm output from an internal set of relay contacts. Using an external power source the cabinet can initiate a number of warning devices whenever any zone goes into an alarm state. This is commonly used for beacons, audible alarms or informing the

moulding machine. 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.

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

Pin	Connection	Input / output
1	Auxiliary Input signal	*Dependent on Spec
2	Auxiliary Input Ground	
3	Alarm 240v contact 1	Normally Open Contacts
4	Alarm 240v contact 2	

1.5 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. The pin outs are as follows.

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

1.6 USB Port

A USB port is standard on all Touch Screen Consoles for connection to a printer.

APPENDIX B

Extra facilities that can be fitted to the K-Series Controller,

B1. 16DLI - 16-channel DL 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 are not a user available function.

B2. 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 Set-up page, and the measured temperature is displayed on the Display page with a range of 0 to 99°C and resolution of 0.1°C.

Normally the RTD card has a proactive function which switches the operating mode to off if the detected temperature reaches the high level 2nd stage alarm point. This output however may be overridden using the Auto Stop Mode switch in the Configure Options on the Setup screen (see page 37).

B3. WT4 12-Channel T/C Card

This card can accept up to 12 zones for either J or K-Type thermocouples. It provides channel monitoring with 1st and 2nd stage alarms. Monitored zones display as a normal cavity zone with actual temperature constantly displayed while the "Set" temperature in the second box refers to the nominal expected temperature, either side of which the lower and upper alarm levels are set.

B4. AI8 - Analogue Input Cards

The analogue input card has eight inputs that are used to read analogue output devices with an output range of 4 – 20mA. These are usually associated with coolant flow detector devices that are calibrated for particular flow rates.

When the auto-detect procedure sees one or more of these cards within the controller cabinet then the Setup page displays an Analogue Input column. After selecting the flow zones and the Analogue Input column, touching [**Set**] displays a range of devices that are known to match the Analogue Input.

B5. QCIO - 4-channel Input/Output Card:

This is a digital Input/Output card that offers up to four separate inputs and outputs to facilitate remote operation of the HRC.

The 4 Input and Output may be individually configured. However they do have default conditions that are selected for any new tool.

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.

Outputs

Each Output group is a single-pole changeover relay element that is rated at 240 volts, 1Amp maximum. It comprises a common or moving contact (MC) that is connected to a normally-closed (NC) contact when de-energised. When the controller activates Output 1 or 2 the normally closed (NC) and moving contact (MC) go to open circuit while the normally open (NO) and moving contact (MC) go to short circuit.

Input/Output Selection

The input/outputs channels may be individually configured to assume any four of eight different functions. These options are available on the Utilities/Quad IO page and the default options areas shown in the following table.

I/O Connections

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

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

APPENDIX C

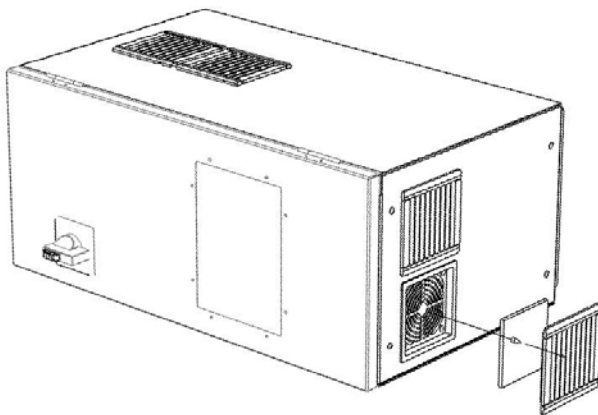
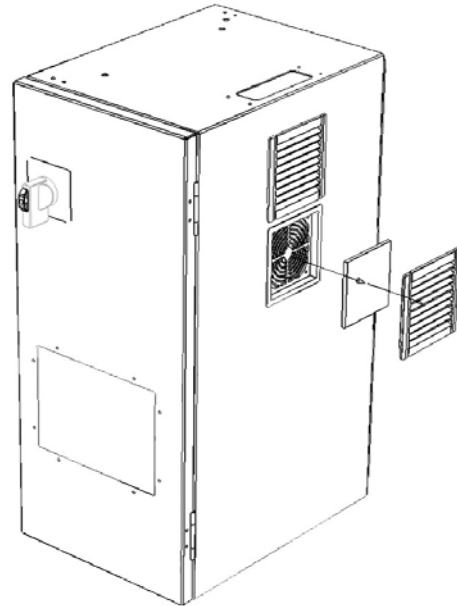
Drawings for K-Series Controllers

1. K10 Case - Filter Access
2. K20/30 Case - Filter Access
3. TS System Schematic
4. KTS System Schematic
5. Cabinet Connections

1. K10 Case - Filter Access

Both the rear and lower filters covers can be removed by the inserting a wide-flat screwdriver blade and carefully twisting them off.

K10 Side Filters
(Located at rear of case)



K10 Lower Filters are located in the case bottom-plate.

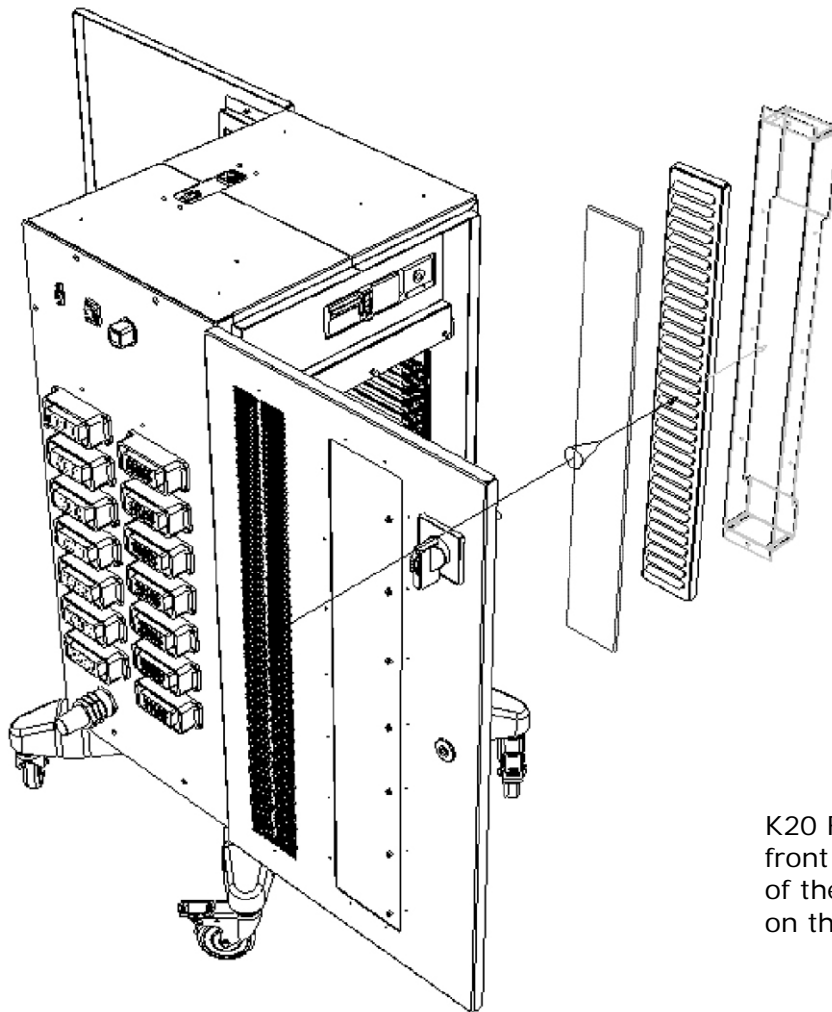
You may need to remove the lower base complete with castors to access these filters.

2. K20/30 Case - Filter Access

Both the front and rear filters are held within cases that are located immediately behind the front and rear doors. (Only the front door is shown here for clarity.)

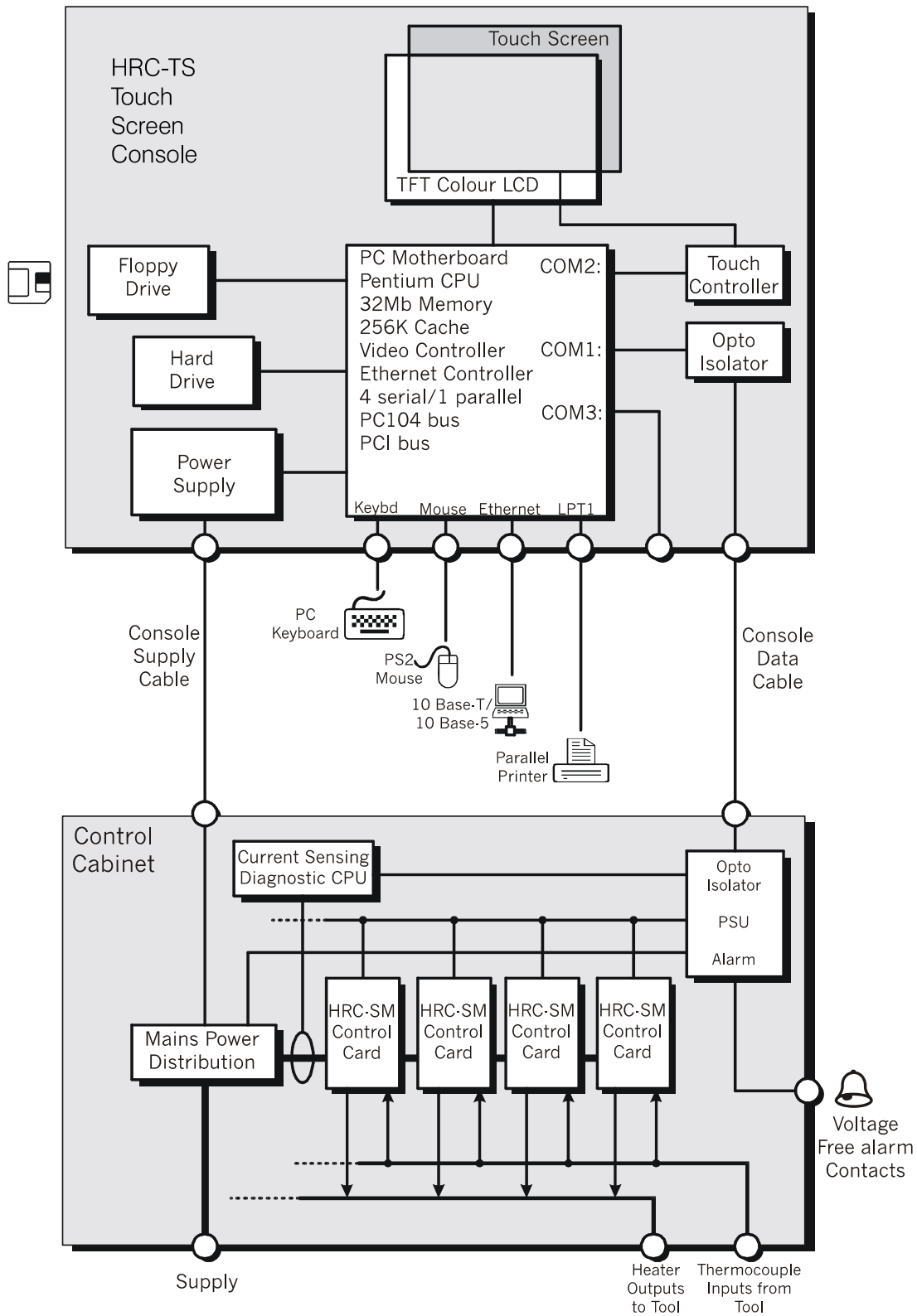
After isolating the supply and opening the door, the filter case may easily be removed by undoing the upper and lower retaining nuts. Take off both the case and cover in order to remove and clean or replace the filter.

Installation is a reverse of the removal.

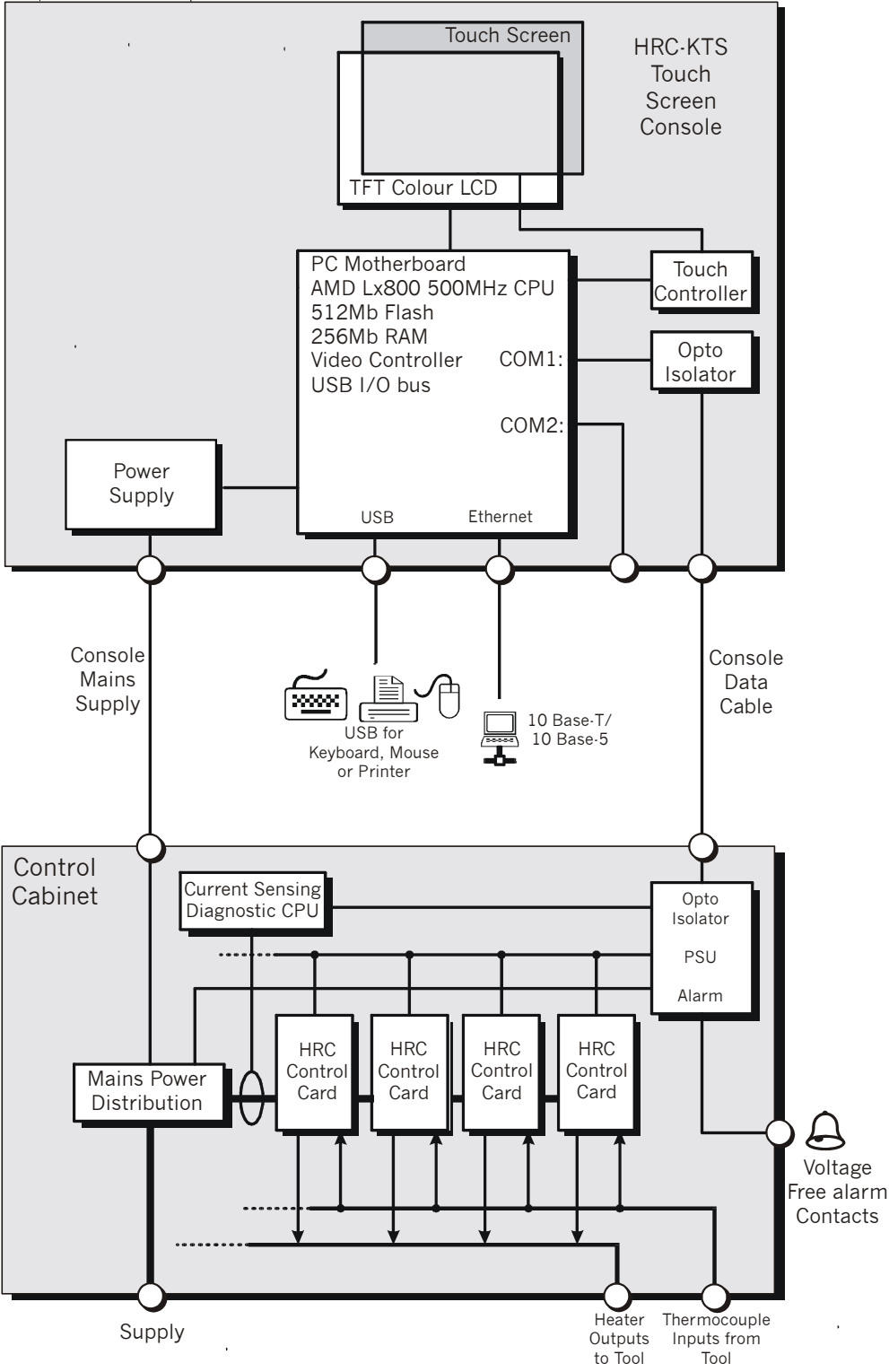


K20 Filter shown inside the front door - rear filters are of the same arrangement on the rear door.

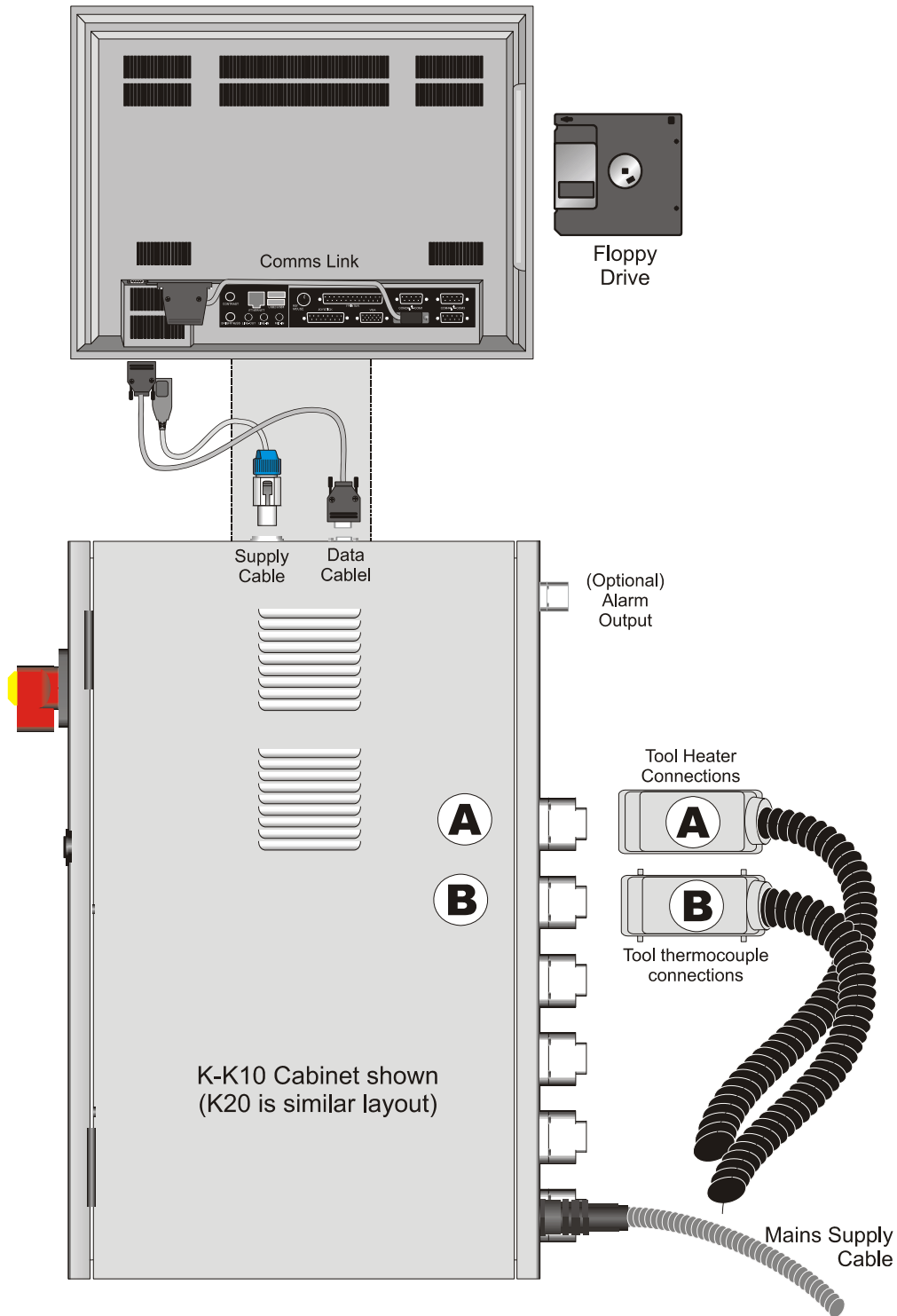
3. TS System Schematic



3. KTS System Schematic



4. Cabinet Connections



APPENDIX D

Installing and configuring a Water Manifold

The K-Series controller provides a compact system for monitoring the coolant system within a mould. Each controller may vary slightly in its make-up but, generally, it comprises:

- a Controller Cabinet with
 - an extra power supply
 - analogue input cards
 - other control cards as required
- one or more water manifolds with flow sensors and amplifiers
- Sufficient data-cable to link the manifolds to the cabinet.

Installation

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

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 shut-off valve provided so that the water manifolds may be easily isolated for repair or maintenance. You should not use any liquid sealant that may contaminate the coolant circuits.

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 manifold 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.

Setting up

Once the manifold has been installed, the controller may be switched on and setup. The individual stages of setting up Water flow have been brought together in the following steps.

1. Switch on the controller.
2. Check the Display page to see whether the unit has already been configured with the correct number on Flow detection channels and other control zones if required. If the Analogue flow-zones are already configured then you may miss steps 3 and 4 and start at step 5 by setting the alarm limits.
3. Open the SetUp page and touch **[Config]**
4. Select Auto-Detect and touch **[Yes]** – this should detect the Analogue Input cards and present them as a number of flow sense channels. It may also reveal other cards according to what other features are included with the complete package.
5. To Set the Flow channels monitoring limits, stay on the SetUp page, touch the analogue flow-zones and then touch any of the Alarms and Warning columns and then **[Set]** to setup 1st and 2nd stage alarms. Repeat for all High and Low levels.
6. To set the flow rate to a normal expected value, open the **[Display Page]**. Select the flow-zones and then touch **[Set]** in order to type in a value (in litres/min) that meets the expected flow for those zones.

Set any other zones types that may be available according to the normal Setting Up procedure.7.

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