VT505

FOR MINI8 EC8 & FC8 APPLICATIONS

invensys
EUROTHERM

ENG **Operating guide**

VT505 for Mini8 EC8 & FC8 Applications

Operating Manual Contents

1 GENERAL

1.1 Before switching on....

The VT505 and the Mini8 both use the same physical 24v dc power connector, but the electrical connections are not compatible. Be sure the correct connector is plugged into the correct device. Plugging the VT505 supply connector into the Mini8 will short-circuit the 24v dc supply.

1.2 Before you start....

The unit is pre-configured but some local settings are required at the commissioning stage to suit the particular usage.

Entering text names for the loops (up to 8 characters)
Selecting Units °C/°F
For the EC8 only:
Enabling/disabling cooling on some loops as required
Setting all the conditions for the heater current monitoring and alarms.

1.2.1 Loop Names

The very first time the VT505 is powered up an error message 'Recipe Code does not exist' is displayed. (Touch the return arrow to continue.) This is because the start up recipe with the Loop Names has not been created and saved. This is the first task to be done.

Go to Loops, U1 setup and enter text loop names for loops 1 to 8. Also select units °C or °F.

Similarly, if fitted, go to U2, U3, and U4 and enter text names for the remaining loops. Also select units °C or °F.

Then (*very important*) Save. See Section 5.1

1.2.2 Loops with Cooling – EC8 only

Go to Loops, then each loop page in turn and set the cooling parameters: output power limit *OP* LL to enable (100%) / disable (0%) cooling and the minimum on time Cool MinON to select fan cooling (long) or water cooling (short). See Section 4.4

1.2.3 Current Monitoring - EC8 only

If the CT3 current monitoring option is fitted then this has to be commissioned.

Go to Loops, U1 (also U2, U3, U4 if fitted), enter the range of the current transformers and perform an auto or manual commissioning sequence. See Section 5.2

1.2.4 Thermocouple Type - FC8 only

The thermocouple type can be selected on the FC8 version. Default is type K. The Mini8 has to be put into configuration mode using the Run/Config button. Note the Mini8 does NOT control whilst in configuration mode.

Go to Loops, U1 (also U2, U3, U4 if fitted), and enter configuration mode and then, using the list on each loop, select from K, L, R, B, N, T, S, PL2, or C. To select type J press the J? button and this changes ALL the 8 loops in that unit to type J. See Section 5.1.2.

Also on each Loop page there is a Setpoint High and Setpoint Low limit. These should be set to appropriate values depending on the units °C/°F selected and the range of the furnace under control.

1.3 Whilst using the panel....

1.3.1 Password

Supervisory operation is protected by password. If the default password is changed then be sure to keep a safe record of the new password – recovering a lost password is not trivial and may involve returning the VT505 to the factory.

1.3.2 Service Page

Touching opposite corners of the VT505 panel in turn brings up the panel service page. This can sometimes happen inadvertently – just touch escape 'ESC' to return to normal operation.

2 LEVELS of OPERATION

2.1 Normal Operation

The panel shows an overview of all loops, including actual temperature, setpoint, output, and heater current. Setpoints may be adjusted within the setpoint limits. There are 8 loops on a page and up to 4 pages.

An alarm indictor is displayed when any alarm is present. All active alarms may then be viewed in a list.

Recipes may be selected from a prepared list and loaded to the Mini8s. There is only one recipe structure that will download to all Min8s in a single operation.

2.2 Supervisory Operation

Password protected.

Recipes may be created and saved for later use by an operator.

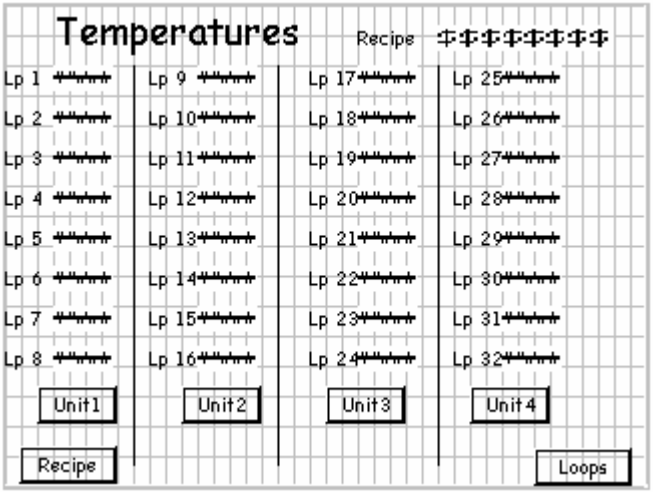
Each loop is displayed on a single page and includes all key parameters including setpoint limits, PID, self-tune and loop enable/inhibit, alarm setpoints and alarm enable/inhibit.

3 OPERATION

The Panel is supplied pre-configured to be used with 1, 2, 3 or 4 Mini8s providing 8, 16, 24 or 32 loops. All the diagrams show the pages and navigation for the 32 loop version. The other versions are the same except that there will be fewer pages and the navigation will be abbreviated.

3.1 Overview page

This will be displayed on power up. It is the HOME page and the Home button shown on most other pages will return to this page.



This shows the name of the recipe and all the temperatures. All of these parameters are read only.

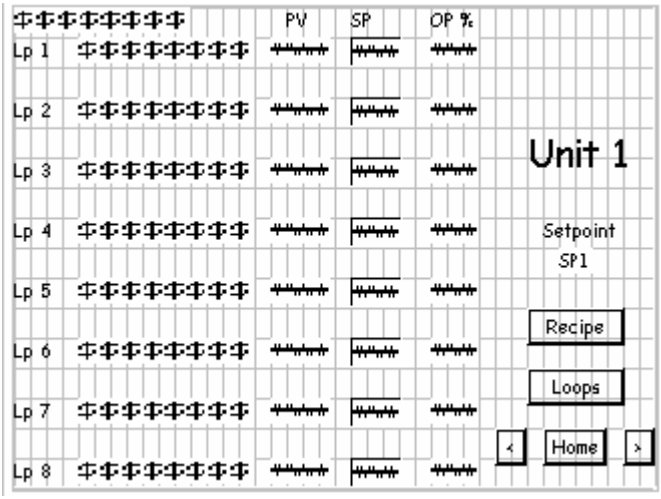
The Unit1, Unit2, Unit3, Unit4 buttons go to the more detailed pages for each of those 8 loops.

The Recipe button goes to the recipe selection and download page

The Loops button is for Supervisor operation and is password protected.

3.2 Unit Pages

Each group of 8 loops has 2 pages, one for the temperature parameters and (EC8 only) one for the heater currents.



The current Recipe Name is shown on the top. (This is the last recipe selected – see Section 3.5)

For each of the 8 loops the following parameters are shown

Loop Number	Lp1 (to Lp32)	
Loop Name	$$$$$$$$ as set up at commissioning	
PV	actual temperature	
SP	current setpoint shown indented. This indicates that it may be changed within limits.	
OP	PID demand in % where	–100 = full cooling, +100 = full heating.

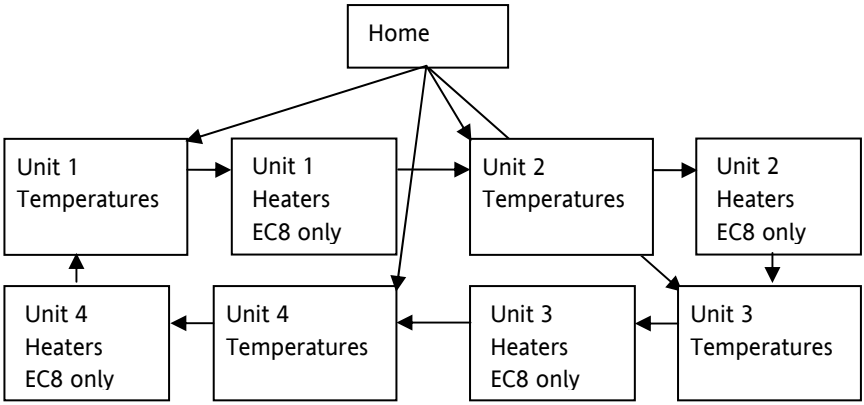
The loops normally use Setpoint SP1 but an external switch may select a standby setpoint SP2 (see Section 6.2). The currently selected SP is shown. This applies to all loops.

3.2.1 Navigation

The Recipe button goes to the recipe selection and download page

The Loops button is for Supervisor operation and is password protected.

The '<' (previous) and '>' (next) buttons move to the previous or next page.

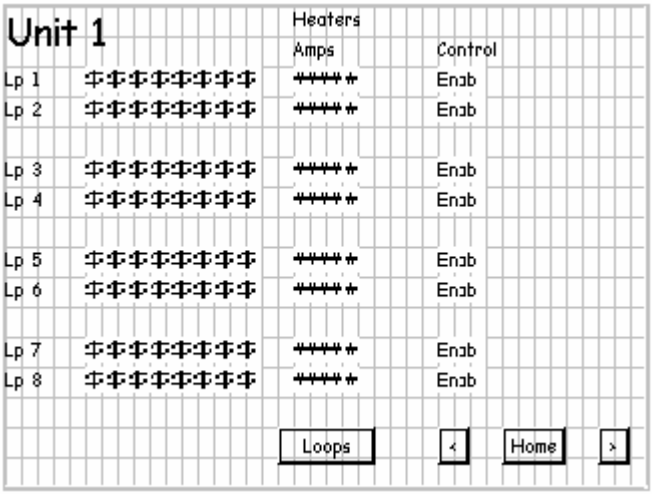


Arrows show the direction of the > (next) button

< (previous) goes in the opposite direction.

The FC8 version does not have the 'Heaters' pages.

3.3 Unit Heater Page (EC8 only)

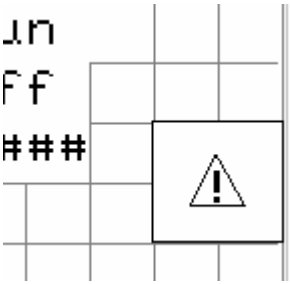


For each of the 8 loops the following parameters are shown

Loop Number	Lp1 (to Lp32)
Loop Name	$$$$$$$$ as set up at commissioning
Heaters Amps	Heater current when fully on
Control	'Enab' – loop is operating
	'Inhib' – loop is inhibited (Off).

3.4 Alarms

If an alarm is active an explanation mark ! in a warning triangle is displayed near the top right corner.



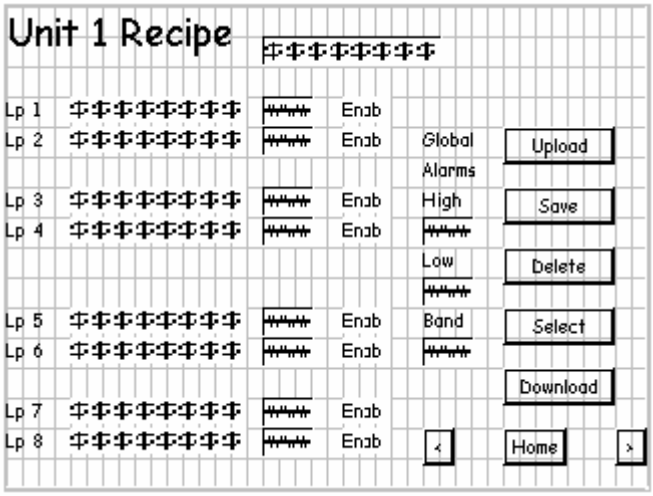
This is a touch button which displays a message page with one or two alarm messages shown. If there are more alarms up/down buttons allow all the active alarms to be viewed.
The following alarms are configured for each loop. Each user alarm may be inhibited.

Alarm	Inhibit applies to
High Alarm	Loop
Low Alarm	Loop
Deviation Band Alarm	Loop
Sensor Break Alarm	Not available
For the EC8:	
Partial Load Failure Alarm	Unit
Over Current Alarm	Unit
Solid State Relay Failure Alarm	Unit

3.5 Recipe

The recipe button on the home page displays the Unit 1 recipe page. The other unit recipe pages can be viewed using the '<' (previous) and '>' (next) buttons.

The Upload, Save, and Delete buttons are for Supervisor use and are password protected.



For each Loop the following parameters are displayed

Loop Number	Lp1 (to Lp32)
Loop Name	$$$$$$$$ as set up at commissioning
Setpoint	Setpoint in MEMORY – (not in the device)
Control	Loop Inhibit in MEMORY – (not in the device).
	where 'Enab' – loop is operating
	'Inhib' – loop is inhibited (Off).

Also, applying to all loops in the unit

High Alarm Sepoint	in MEMORY – (not in the device).
Low Alarm Setpoint	in MEMORY – (not in the device).
Dev Band Alarm Setpoint	in MEMORY – (not in the device).

Each of the 32 loops has an individual setpoint and inhibit

Each Unit has its own unit wide alarm setpoints

3.5.1 To select and download a recipe:

1. Use the Select button to show a list of all saved recipes.
2. Choose the one required by highlighting (touching) it.
   The values and the recipe name will now be displayed on this page (and on the recipe pages of the other units).
3. If they are correct press the Download button to send the values to all the units.

Job done! Note that this will send the recipe to ALL the Mini8 units in the system – not just Unit 1.

This means that the Select and Download buttons on ANY of the 4 recipe pages have the same effect – the recipe is downloaded to ALL units.

On power up the current recipe name in the VT505 will not have been retained so the recipe name will be blank, displayed as !!!!!!!!. Reselect the current recipe to retrieve the name, but it will not be necessary to download again as all the setpoints etc. will have been retained in the Mini8s.

The remaining Recipe buttons are for supervisor operations.

4 SUPERVISOR OPERATIONS

All the other pages in the panel are for the supervisor and are password protected.

4.1 Recipe Management

The Upload, Save and Delete buttons on the recipe pages allow recipes to be created, saved and deleted. Remember the values displayed on the recipe pages are parameters in memory NOT current values from the Mini8 units.

4.1.1 To create a new recipe

Enter the required values on the recipe pages. Enter a new name, Press Save.

4.1.2 To delete a recipe

The Delete button deletes the selected recipes. Use Select to choose the recipe and then use Delete to delete it. Confirmation is required before deletion takes place.

4.1.3 To create a new recipe of current running values

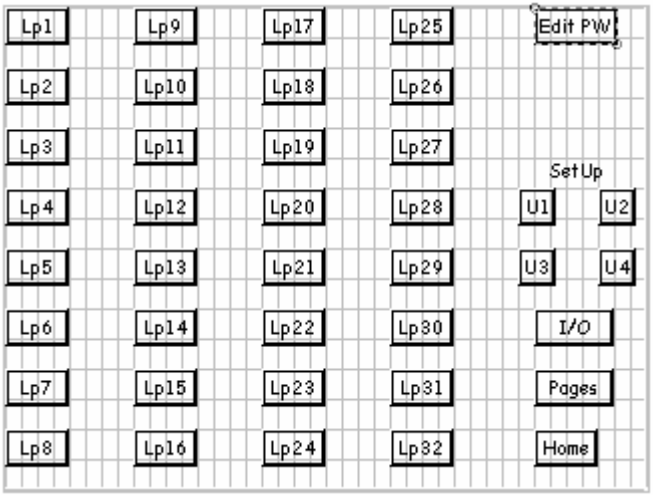
Upload - use with care! This will upload parameters from the Units to make a new recipe. Do not upload after a power up until at least one recipe has been downloaded. The consequence is that the Loop Names will be lost and will have to be re-entered. These can only be re-entered immediately after a power up. See Section 5.1

The Upload button will retrieve the current values of the recipe parameters from the units and display them on the panel. Use the Save button to save these values under a new name or over an existing one.

4.2 Loop Navigation Page

There is a page for every loop in the system. The Loops button will request a password first. After the password has been entered the Loops button will have to be pressed again. The password expires after 10 minutes.

The Loops button displays a navigation page allowing one key access to any loop in the system.



Lp1 to Lp32	Navigation to individual loop page
Edit PW	To change the default supervisor password
U1 to U4	Set up pages – to enter text names for each loop, units and to configure the heater current monitoring
I/O	Diagnostics – shows the state of all the I/O
Pages	Lists all the pages
Home	back to the Home page

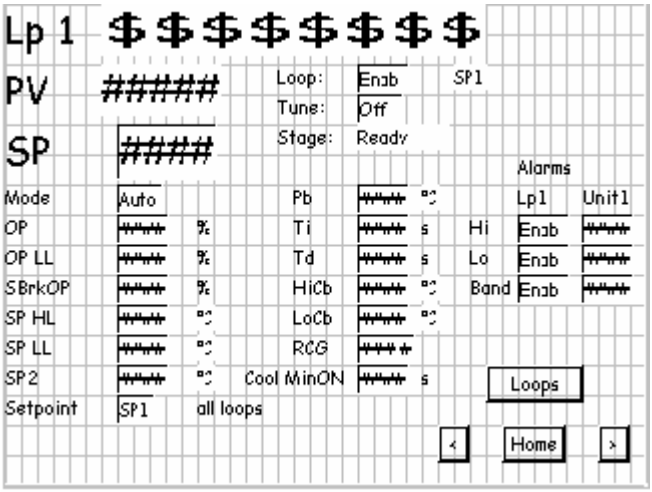
4.3 Password

WARNING

The default password is 123456. If this is changed then be sure to keep a record of the new password securely as there is no quick recovery for lost passwords.

4.4 Individual Loop Page – EC8 version

Each button goes to the loop required. On each loop page the '<' (previous) and '>' (next) buttons allow the loop pages to be displayed one by one.



Parameters in an indented box may be written to.
Parameters shown are listed below.

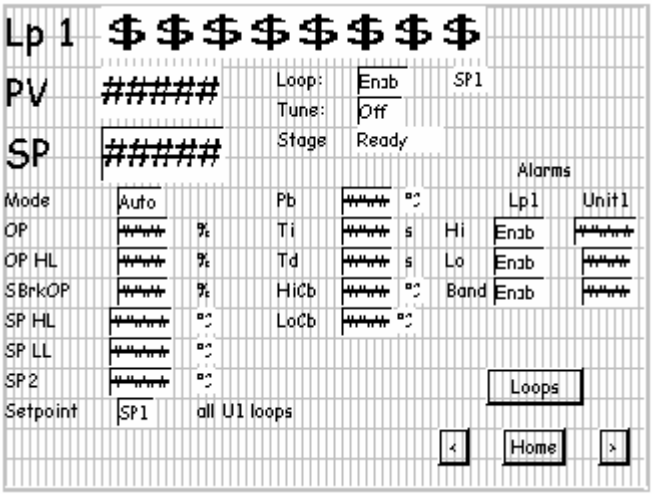
Loop Number	Lp1 (to Lp32)
Loop Name	$$$$$$$$ as set up at commissioning
PV	Current temperature
SP	Current setpoint
Mode	Auto / Manual
OP	PID demand in % –100 = full cooling, +100 = full heating.
OP LL	Output Low Limit – set to 0% inhibits cooling.
SbrkOP	Output level adopted if the thermocouple breaks
SP HL	Setpoint high limit (limits operator adjustment)
SP LL	Setpoint low limit "
SP2	Setpoint 2 – setpoint if SP2 is selected

Setpoint Setpoint selection – all 8 loops in the unit use the setpoint selected. Note that SP2 can also be selected by hardware. See section 6.3.

Loop	'Enab' – loop is operating, 'Inhib' – loop is inhibited (Off).
Tune	'On' – loop is tuning 'Off' - normal control
Stage	Tuning stage – will show 'Running' during tuning and 'Complete' at the end. If the tuning fails it will display 'Timeout', 'TI_Limit' or 'R2G_Limit'.
Pb	Proportional Band in units
Ti	Integral time
Td	Derivative time
HiCB	High Cutback
LoCB	Low cutback
RCG	Relative cool gain
CoolMinOn	Minimum ON time for the cool output – long for fan, short for water cooling.
Alarms	
Hi	Enable/Inhibit for this individual alarm
Setpoint	High alarm setpoint for the 8 loops in this unit
Lo	Enable/Inhibit for this individual alarm
Setpoint	Low alarm setpoint for the 8 loops in this unit
Band	Enable/Inhibit for this individual alarm
Setpoint	Deviation Band alarm setpoint for the 8 loops in this unit.

4.5 Individual Loop Page – FC8 version

Each button goes to the loop required. On each loop page the '<' (previous) and '>' (next) buttons allow the loop pages to be displayed one by one.



Parameters in an indented box may be written to.
Parameters shown are listed below.

Loop Number	Lp1 (to Lp32)
Loop Name	$$$$$$$$ as set up at commissioning
PV	Current temperature
SP	Current setpoint
Mode	Auto / Manual
OP	PID demand in % 0 = no heat, +100 = full heating.
OP HL	Output High Limit.
SbrkOP	Output level adopted if the thermocouple breaks
SP HL	Setpoint high limit (limits operator adjustment)
SP LL	Setpoint low limit "
SP2	Setpoint 2 – setpoint if SP2 is selected
Setpoint	Setpoint selection – all 8 loops in the unit use the setpoint selected. Note that SP2 can also be selected by hardware. See 6.3.

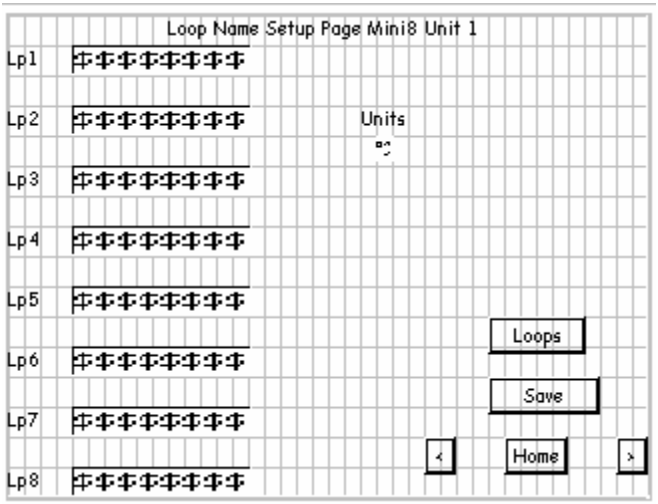
Loop	'Enab' – loop is operating, 'Inhib' – loop is inhibited (Off).
Tune	'On' – loop is tuning 'Off' - normal control
Stage	Tuning stage – will show 'Running' during tuning and 'Complete' at the end. If the tuning fails it will display 'Timeout', 'TI_Limit' or 'R2G_Limit'.
Pb	Proportional Band in units
Ti	Integral time
Td	Derivative time
HiCB	High Cutback
LoCB	Low cutback
Alarms	
Hi	Enable/Inhibit for this individual alarm
Setpoint	High alarm setpoint for the 8 loops in this unit
Lo	Enable/Inhibit for this individual alarm
Setpoint	Low alarm setpoint for the 8 loops in this unit
Band	Enable/Inhibit for this individual alarm
Setpoint	Deviation Band alarm setpoint for the 8 loops in this unit.

5 CONFIGURATION

These set-up pages will normally only be used when the VT505/Mini8 system is first commissioned.

5.1 Loop Names

An 8 character text name can be given to each loop.



EC8 shown above, FC8 shown on the following page – the procedure is the same.

The names are entered using an alphanumeric keypad shown on the screen. Remember there is a 'Names' page for each Mini8 unit.

The names must be entered and saved immediately after first power up without setting a recipe name.

The actual recipe name will be empty, shown as !!!!!!!!. This is the recipe automatically loaded on power up and it is essential that the names be saved under that name. Enter the name for each of the 32 loops on all 4 names pages before saving.

The units may also be selected on this page °C or °F. This has to be set on each names page, one for each Mini8 unit.

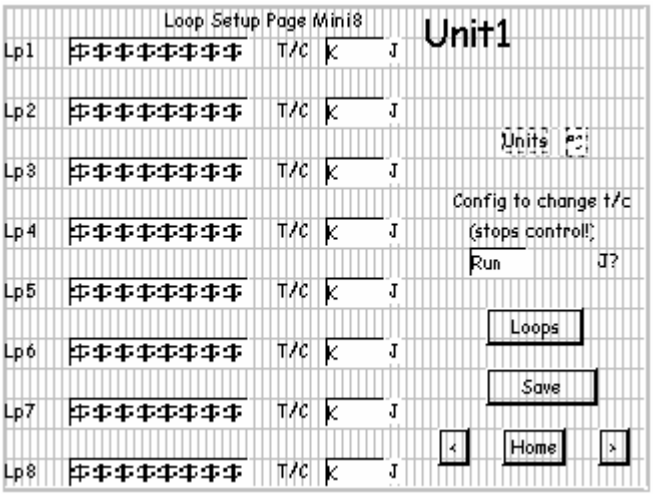
5.1.1 Changing Loop Names

The loop names are saved within each recipe. That is why it is important to enter the loop names first, as they will be resaved within every recipe in the VT505.
To change the loop names later, therefore, involves editing the names and resaving each and every recipe in the panel.

On a Recipe page Select a recipe, then on the names page(s) edit the names and Save. Remember to select and save the !!!!!!!! start up recipe.

5.1.2 Thermocouple Type – FC8 only.

On the FC8 the thermocouple type can be selected. To change the type the Mini8 has to be put into configuration mode. In this situation the Mini8 no longer controls the load – be sure the system is safe before putting the Mini8 into configuration mode.



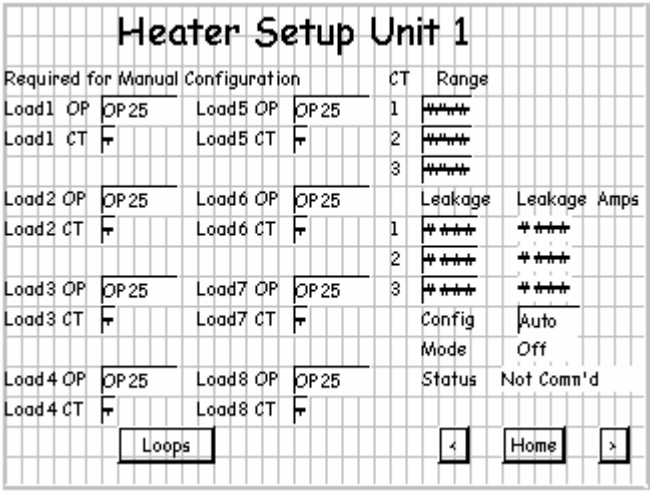
Use the Run/Config button to enter configuration mode.
Select the thermocouple type K,L,R,B,N,T,S,PL2,or C for each input or press J? to select J on all inputs. Inputs can then individually set to other types.

Be sure to re-enter run mode once thermocouple types have been selected.

5.2 Heaters – EC8 only.

This applies only if the CT3 current monitoring module is fitted. Refer to the Mini8 Engineering Manual HA028581

Two pages are provided for each Mini8 unit to enable current monitoring to be configured. One contains the setup parameters that have to be set and the auto/manual configuration selection. The other contains the current alarm setpoints, the sampling interval and an alarm enable/inhibit.
Set Up page

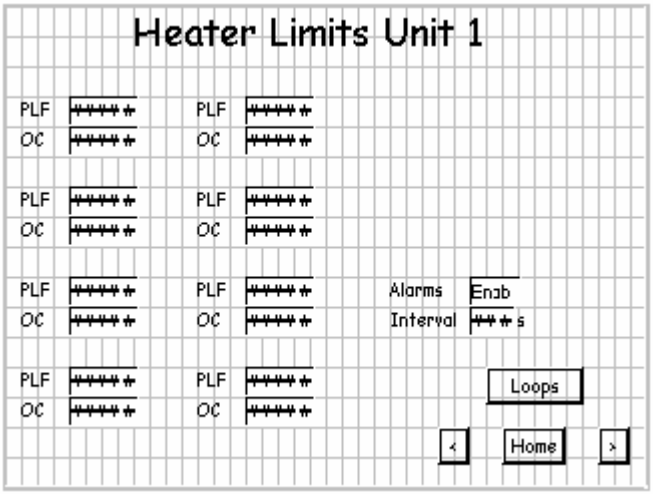


The Current Transformer ranges *CT Range* MUST be entered correctly; the range may be between 10 and 1000 amps.

5.2.1 Auto Commissioning

Once the wiring is all in place and the loops are controlling correctly set the Config to 'Auto'

If the auto commissioning is successful then all the other parameters will have been set. The heater alarm limits are shown on the second heater set up page.

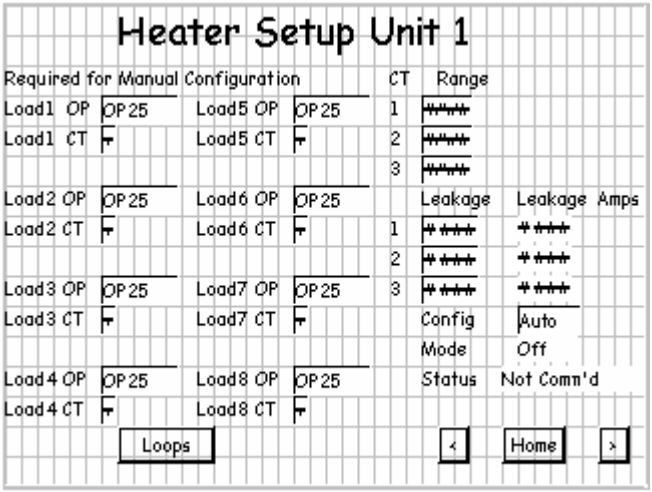


Heater alarms can all be enabled Enab or all inhibited Inhib

The Interval is the time between each measurement of the heater current.

5.2.2 Manual Commissioning

Do not consider manual configuration unless you are confident that of the set up requirements.



For all the loads the Load OP and Load CT have to be set. These must be done in order from 1 to 8.
The Mini8 output used for each loop has to be entered. For the VT505 EC8 application this will be Load 1 from OP25, Load 2 from OP26 ... Load 8 from OP32.

If any load is not used then the Load OP should be set to Not Used. These MUST be at the end.

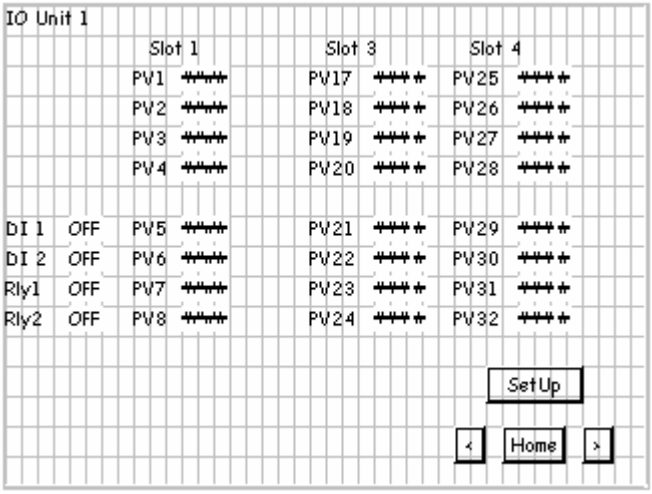
The current transformer used (1, 2 or 3) has to be entered, based on how the heater loads have been wired. 0 = not used.

Then set **Config** to **Man**. Once this has completed and all is OK set **Config** to '**Accept**' and the **Status** will change to '**Commissioned**'.

5.3 I/O

A simple I/O page shows the I/O value on each of the Mini8 I/O cards. This will quickly indicate if there is a hardware fault.

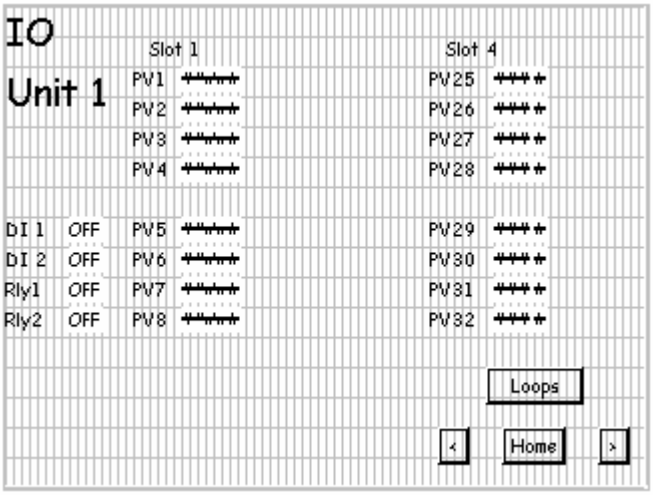
5.3.1 EC8 version

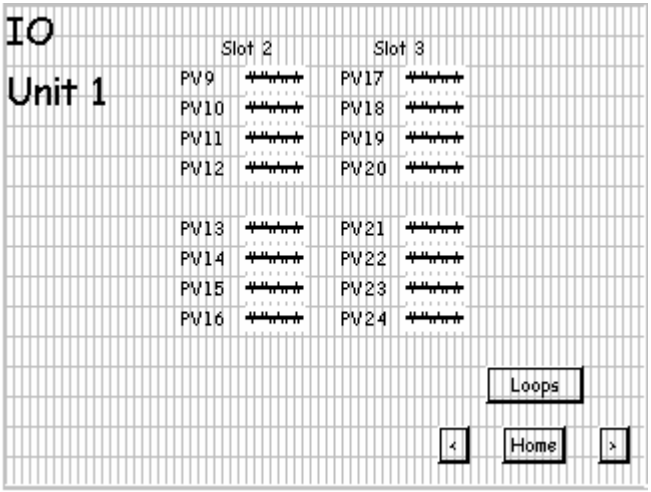


The CT3 module in slot 2 does not have the normal PV values.

5.3.2 FC8 Version

The FC8 has 2 IO pages, one for the standard FC8 IO and a second one for the normally spare slots, in case extra modules should be added.





6 INSTALLATION

Warning:
The VT505 and the Mini8 both use the same physical 24v dc power connector, but the electrical connections are not compatible. Be sure the correct connector is plugged into the correct device. Plugging the VT505 supply connector into the Mini8 will short-circuit the 24v dc supply.

Refer to the standard Mini8 installation sheet HA028497

6.1 Clone files

In 8, 16, 24 and 32 loop applications the clone file in the Mini8s is the same. The VT505 files however are different for each size.
VT505 EC versions:
Mini8_EC8_V1xx.VTS, Mini8_EC16_V1xx.VTS, Mini8_EC24_V1xx.VTS, Mini8_EC32_V1xx.VTS.
VT505 FC versions:
Mini8_FC8_V1xx.VTS, Mini8_FC16_V1xx.VTS, Mini8_FC24_V1xx.VTS, Mini8_FC32_V1xx.VTS.

There are 2 files for the Mini8 EC8 application, one with current monitoring and a separate one without current monitoring, and one for the FC8 version.
Mini8_EC8a_V1xx.UIC with current monitoring
Mini8_EC8b_V1xx.UIC without current monitoring
Mini8_FC8_V1xx.UIC for furnace applications

The same file is used in each Mini8 in multi-unit systems; the only difference is the communications address.

6.2 Address Switch

The top switch 8 must always be set.

Unit	Address	Switches to be set
1	1	1 and 8
2	2	2 and 8
3	3	1, 2 and 8
4	4	3 and 8

6.3 Fixed IO

Digital Input A (logic input) selects second setpoint on all loops.
Digital input B (logic input) clears the new alarm relay, relay B ('silence' action).
Relay A is energised if any alarm is active
Relay B is energised if any new alarm occurs (cleared by digital input B).

6.4 Slot 1

8 thermocouple inputs, type J inputs 1 to 8 for loops 1 to 8.
Thermocouple type for EC8 is type J
Thermocouple type for FC8 can be configured – see section 5.1.2.

6.5 Slot 2 – EC8 option

3 Current transformer input (for current monitoring units). Refer to the Mini8 Engineering Handbook HA028581.

6.6 Slot 3 – EC8 only

8 Cool Outputs, logic outputs 17 to 24. Loops requiring cooling control must use the corresponding output:
i.e. if loops 2, 3, 4 require cooling then use outputs 18, 19. 20.

6.7 Slot 4 –EC8

8 Heat Outputs, logic outputs 25 to 32 for loops 1 to 8.

6.8 Slot 4 –FC8

8 Heat Outputs, 4 to 20mA via outputs 25 to 32 for loops 1 to 8.

6.9 Communications

Use Eurotherm cable SUBVT505/Cable/485/3.0 from the VT505 to the Mini8. The Mini8 connector is an RJ45 socket and the cable may be extended using standard Cat5e patch cables.

For a single Mini8 the 'CC' port can be used with cable SUBVT505/Cable/232/3.0.

6.10 Order Code

1	2	3	4	5	6
VT505	Product	Applications	Cables	Manual	Config SW

1	Type
VT505	Monochrome touchscreen, 320 x 240 pixels
2	Product
Std	Supplied without any configuration
Mini8	Standard Configurations for Mini8
3	Applications
None	Blank
EC8	8 loop extrusion controller
EC16	16 loop extrusion controller
EC24	24 loop extrusion controller
EC32	32 loop extrusion controller
FC8	8 loop controller with 4-20mA o/ps
FC16	16 loop controller with 4-20mA o/ps
FC24	24 loop controller with 4-20mA o/ps
FC32	32 loop controller with 4-20mA o/ps
4	Field Cables
NONE	No cable supplies
F485	Modbus RS485
F232	Modbus RS232 (to single Mini8 only)
5	Manual
XXX	No Manual
ENG	English
GER	German
FRA	French
6	Configuration Software
NONE	No configuration software
VTWIN	VTWIN configuration software + cable & documentation

INTERNATIONAL SALES AND SERVICE

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