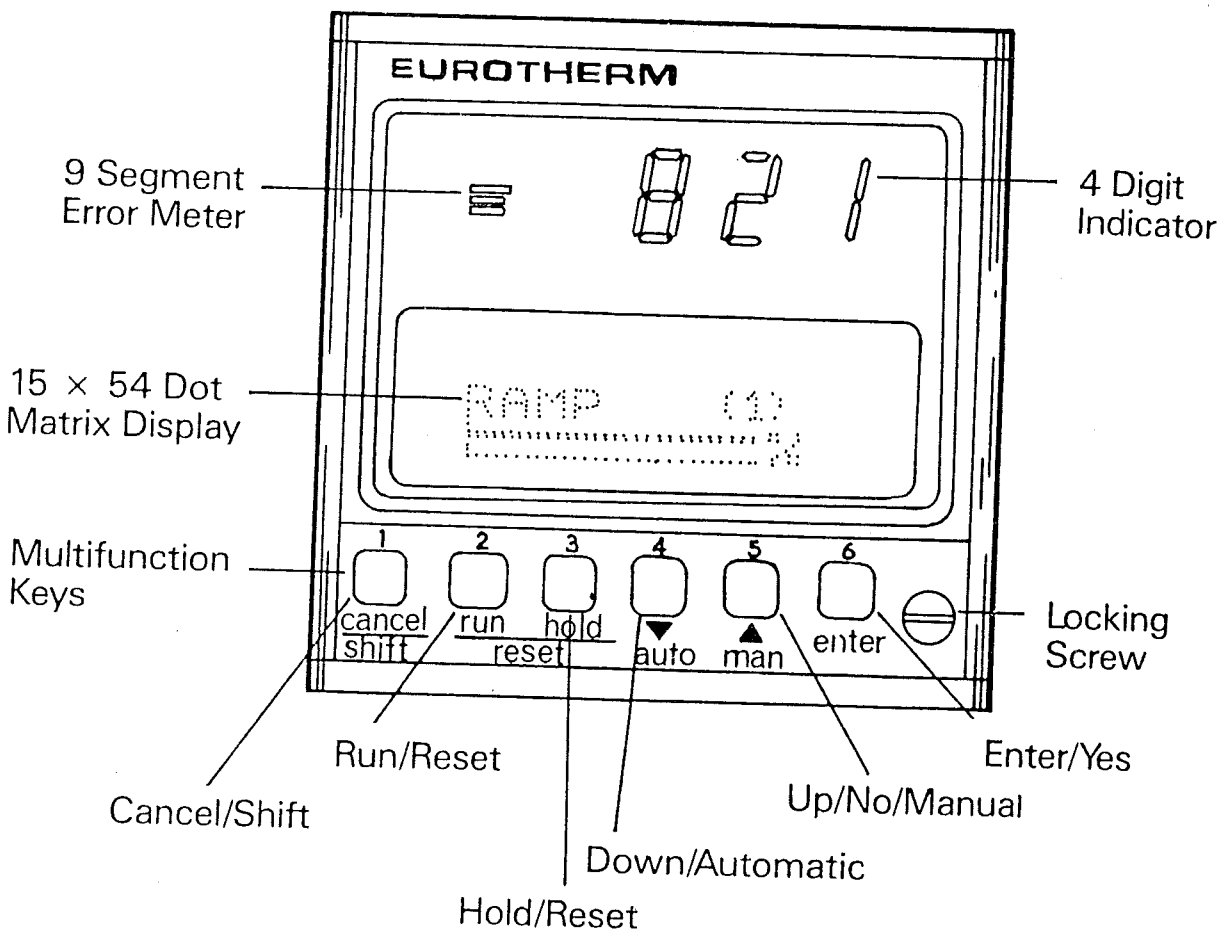
EUROTHERM

CONTROLLER/PROGRAMMER
TYPE 821

OPERATING INSTRUCTIONS



Part No. HA020143

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1.0 OPERATION

The 821 instrument is a version of the Eurotherm type 820 Controller with the added functions of a programmer. It is therefore essential that the controller parameters are set up first before any programming functions are carried out.

1.1 Indications

1.1.1 Measured Value

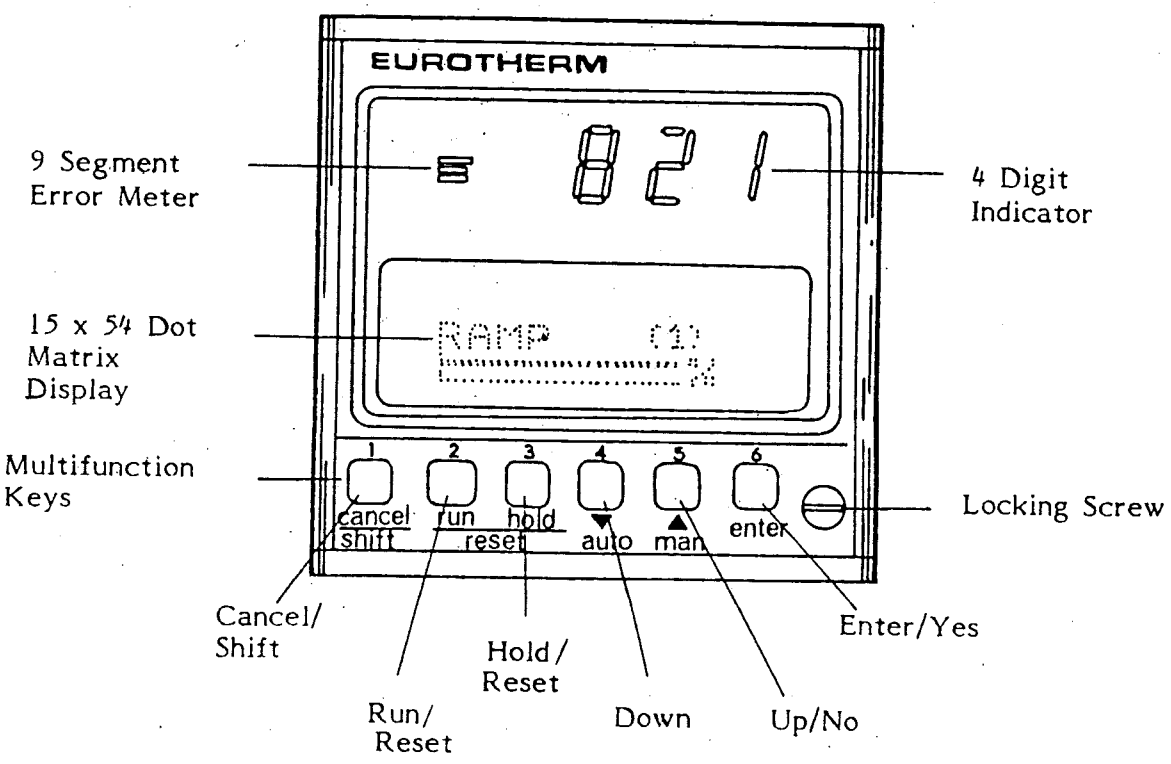
When power is connected, the instrument will be in the Operating mode and the upper fluorescent indicator panel will display the measured value in digital form with the associated analogue error indicator bars. The lower display indicates that the instrument is in automatic operation giving a continous indication of the mean output power.
Note: When switching off, or a power failure occurs, the selected lower display will be retained on power-up.

1.1.2 Setpoint

To access the setpoint press the ENTER key (6) and the setpoint will appear on the lower display. To change the setpoint, press the respective $\Delta\nabla$ keys and enter the new setpoint by pressing the ENTER key (6). To return to the normal display press key 6 again.

1.1.3 Error Indications

The nine segment bars, situated to the left of the upper digital readout provide error indications of measued value with respect to the setpoint as a percentage of the full range. Illumination of the centre bar alone indicates that the controlled value is within 0.5% of full scale setpoint.

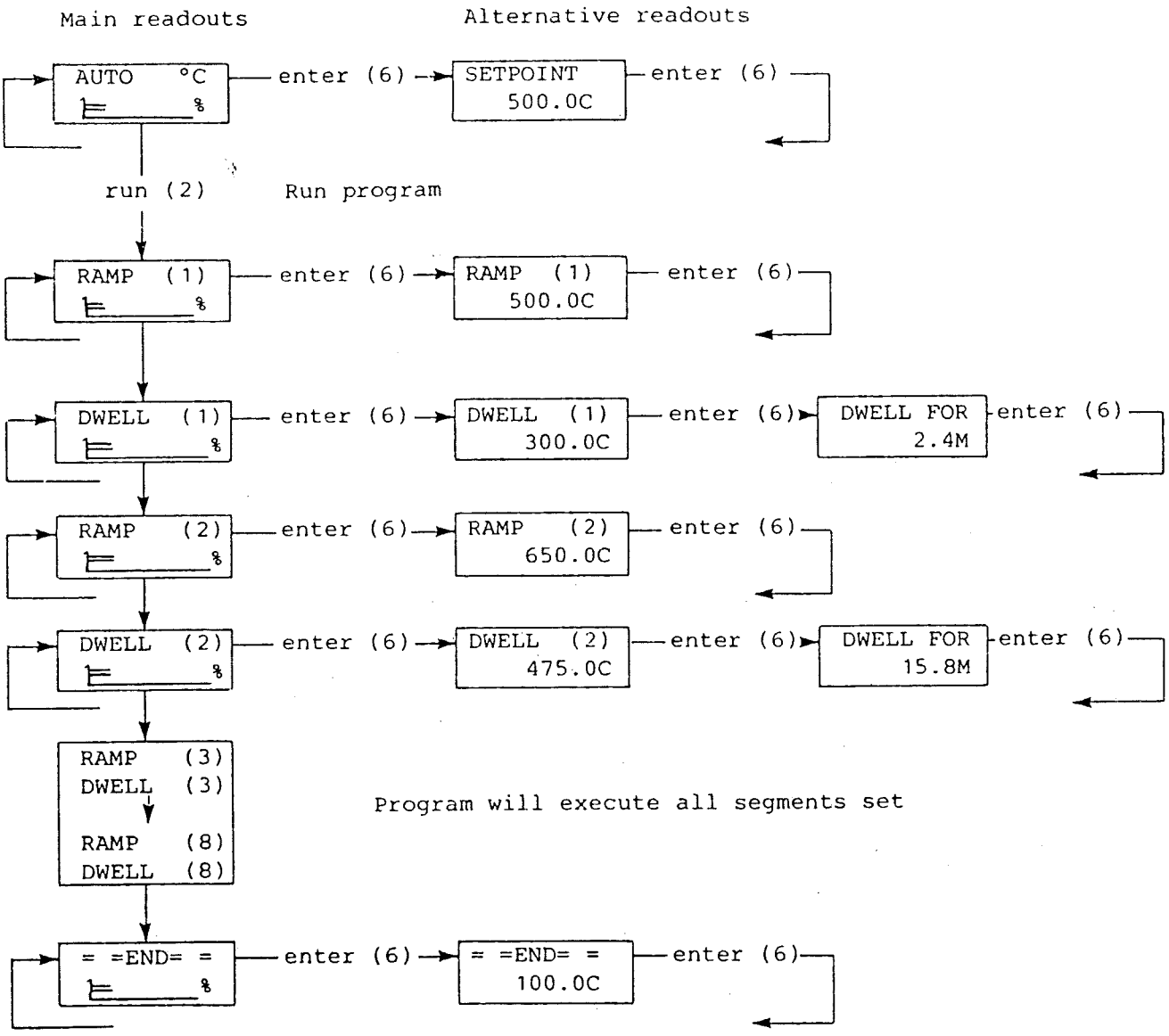


2.0 PROGRAM OPERATION

The operator can RUN, HOLD or RESET a program. [( ) key to press]

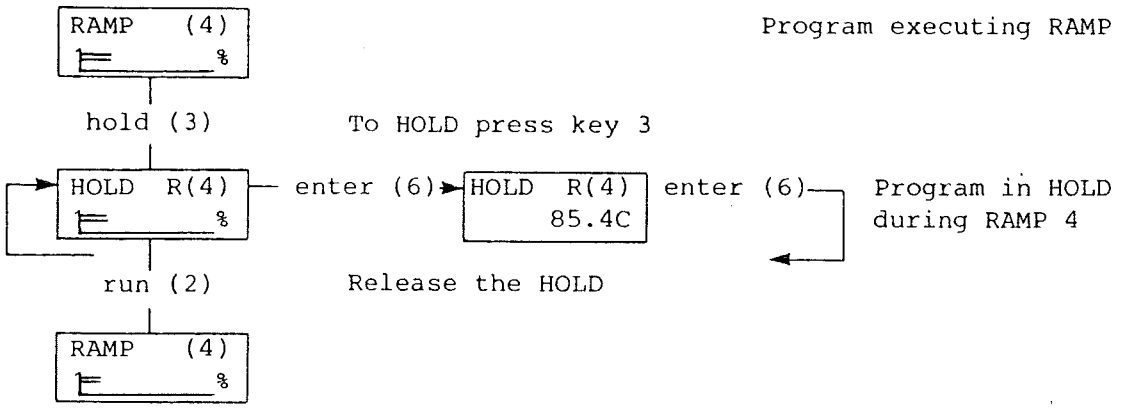
The following pages show a pictorial view of the actions to take at each stage of the procedure being carried out. All the boxes show what is being indicated on the lower display with key actions to take to proceed through the sequence.

2.1 RUN a Program Press 'RUN' key (2)



2.2 HOLD a Program

At any time, when a program is running, a HOLD can be placed on that program.

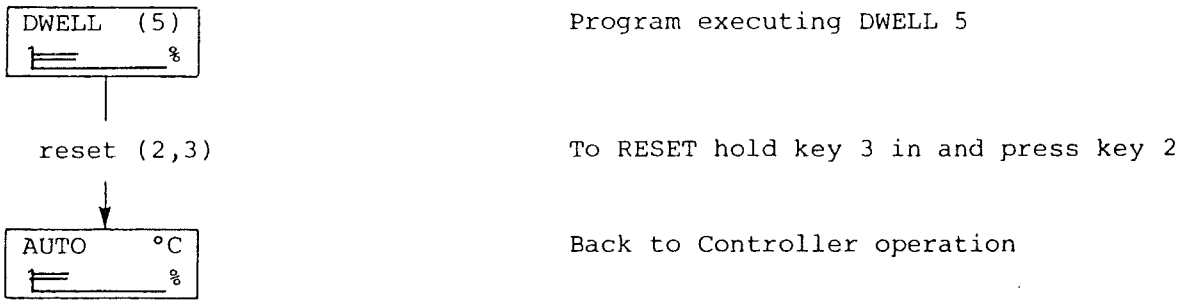


Notes 1. During a HOLD the setpoint can be altered by operation of the ▽△ keys and entered by pressing key 6.

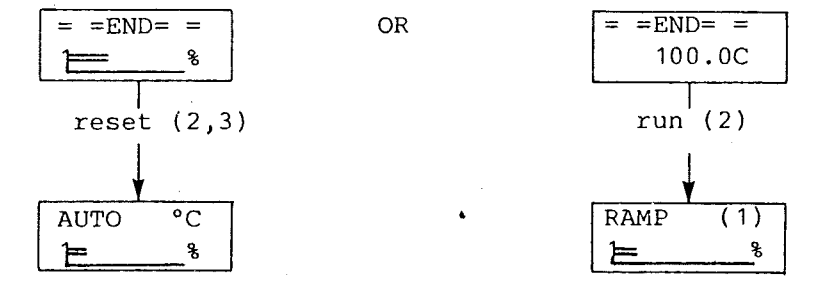
2. During a HOLD the program entry mode can be accessed allowing changes to be carried out on the running program.

2.3 RESET a Program

A program can be RESET at any time.

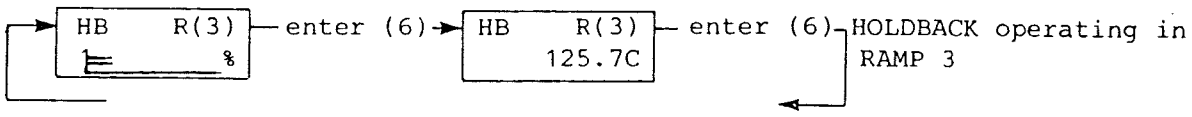


2.4 END of Program



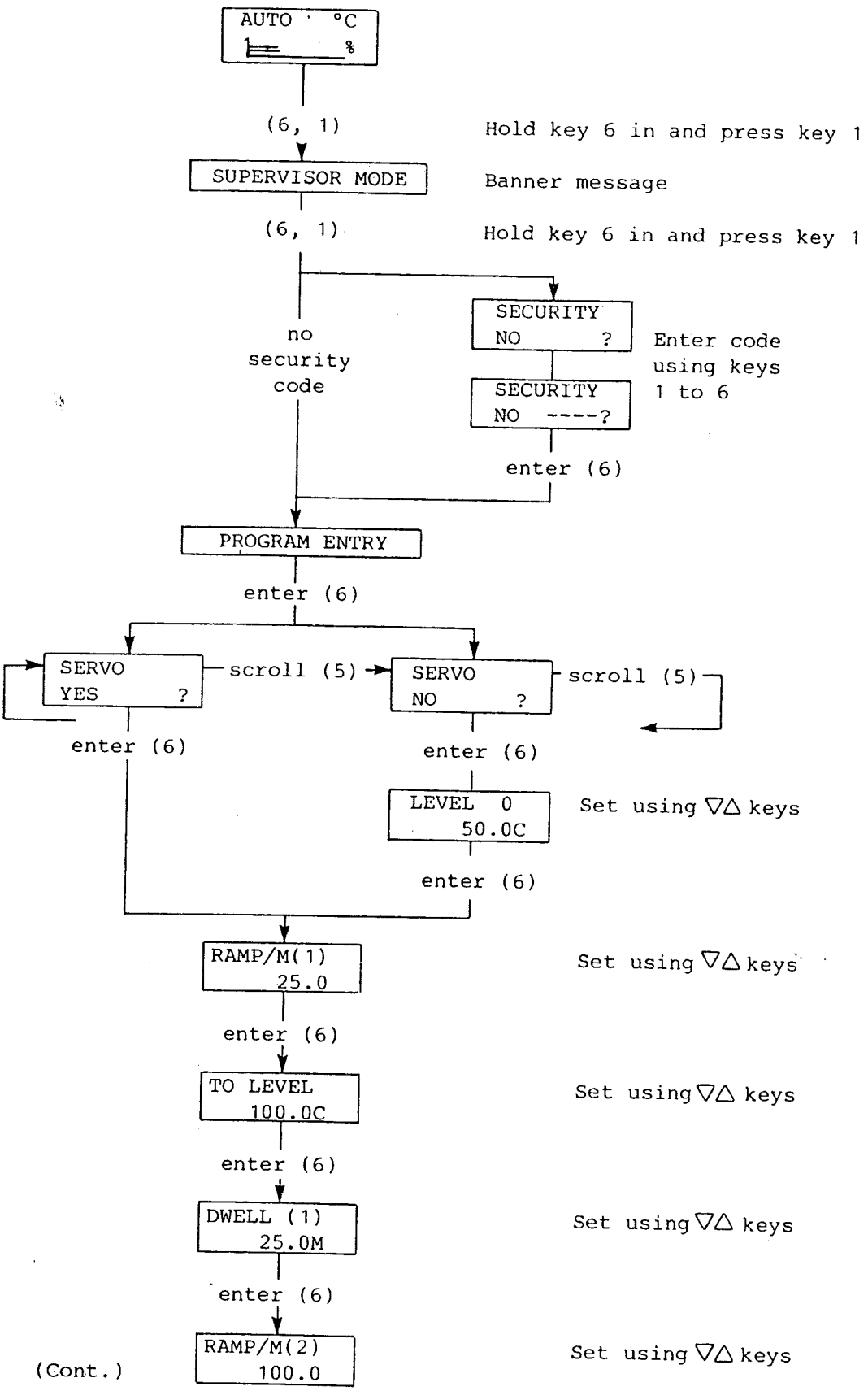
2.5 Holdback

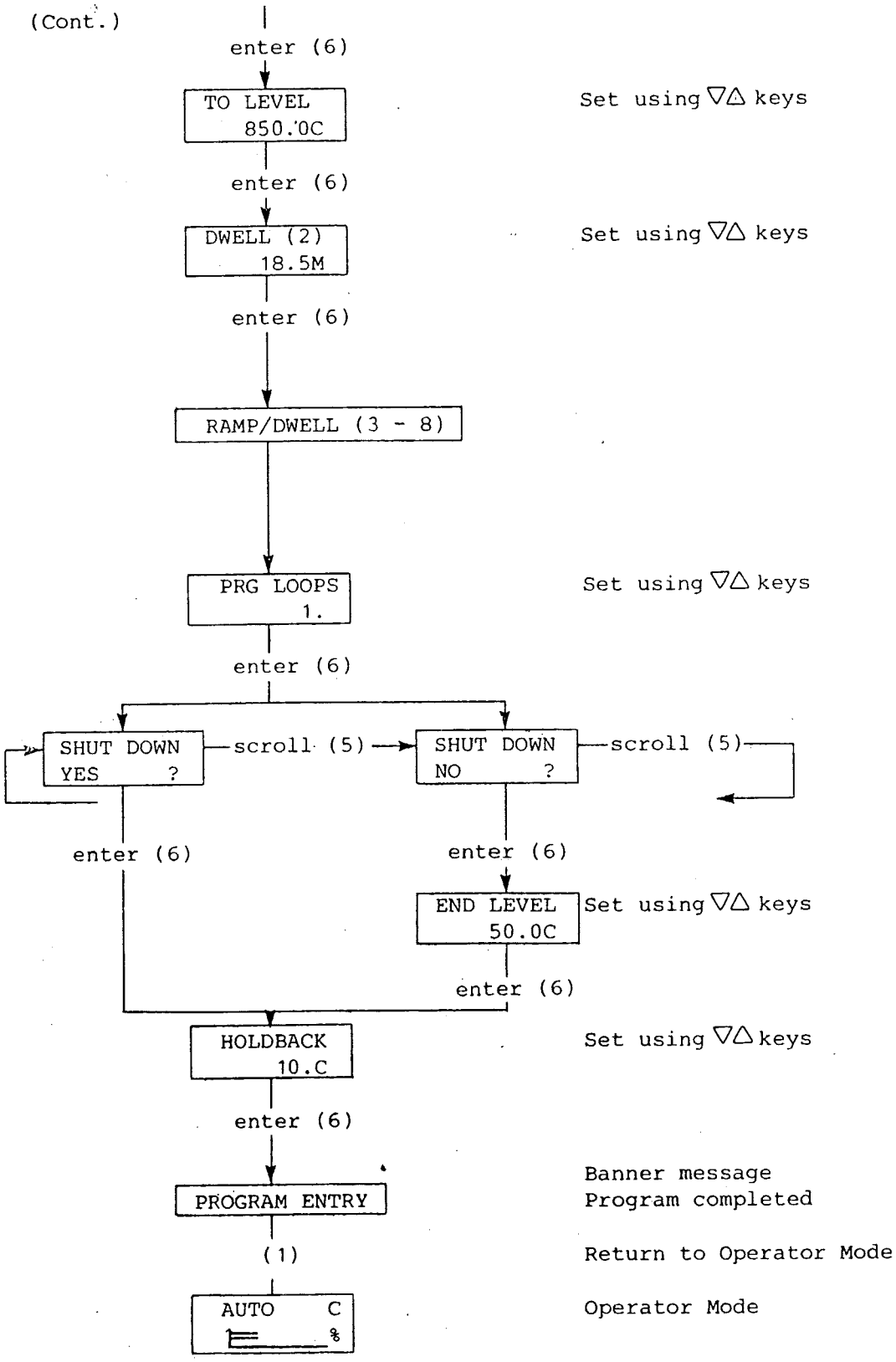
If a HOLDBACK on the program has been configured this will be displayed on each segment being executed.



3.0 ENTERING PROGRAMS

Power on:




(Cont.)
enter (6)
TO LEVEL
850.0C
Set using ▽△ keys
enter (6)
DWELL (2)
18.5M
Set using ▽△ keys
enter (6)
RAMP/DWELL (3 - 8)
PRG LOOPS
1.
Set using ▽△ keys
enter (6)
SHUT DOWN
YES ?
scroll (5)
SHUT DOWN
NO ?
scroll (5)
enter (6)
enter (6)
END LEVEL
50.0C
Set using ▽△ keys
enter (6)
HOLDBACK
10.C
Set using ▽△ keys
enter (6)
PROGRAM ENTRY
Banner message
Program completed
(1)
Return to Operator Mode
AUTO C
%
Operator Mode

3.1 Program Options

Program options are set in the Configuration mode. They are only displayed in the PROGRAM ENTRY mode if previously set in the configuration of the instrument.

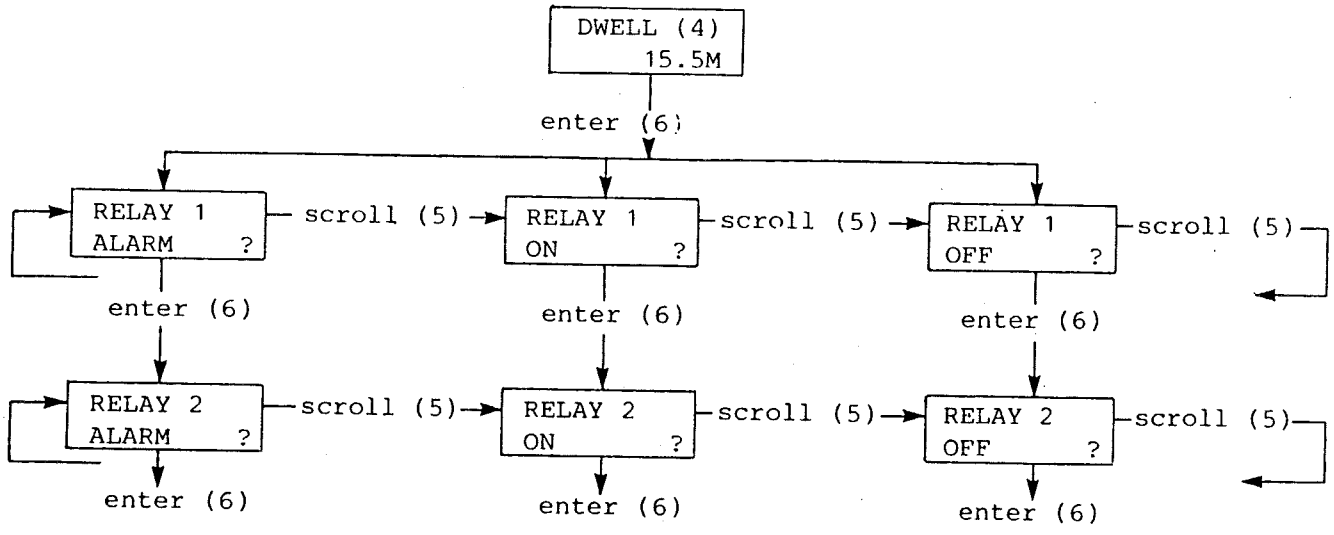
3.1.1 Ramps/Dwells

Ramp rate can be /HOUR or /MINUTE, and dwell times HOURS or MINUTES. The range of RAMP rates available is determined by the decimal point position on the measured value display, and whether /HOUR or /MIN has been selected in configuration.

Decimal Point Position	/HOUR	/MIN
XXXX.	0.1 to 999.9	1. to 9999.
XXX.X	0.01 to 99.99	0.1 to 999.9
XX.XX	0.001 to 9.999	0.01 to 99.99
X.XXX	0.001 to 9.999	0.001 to 9.999

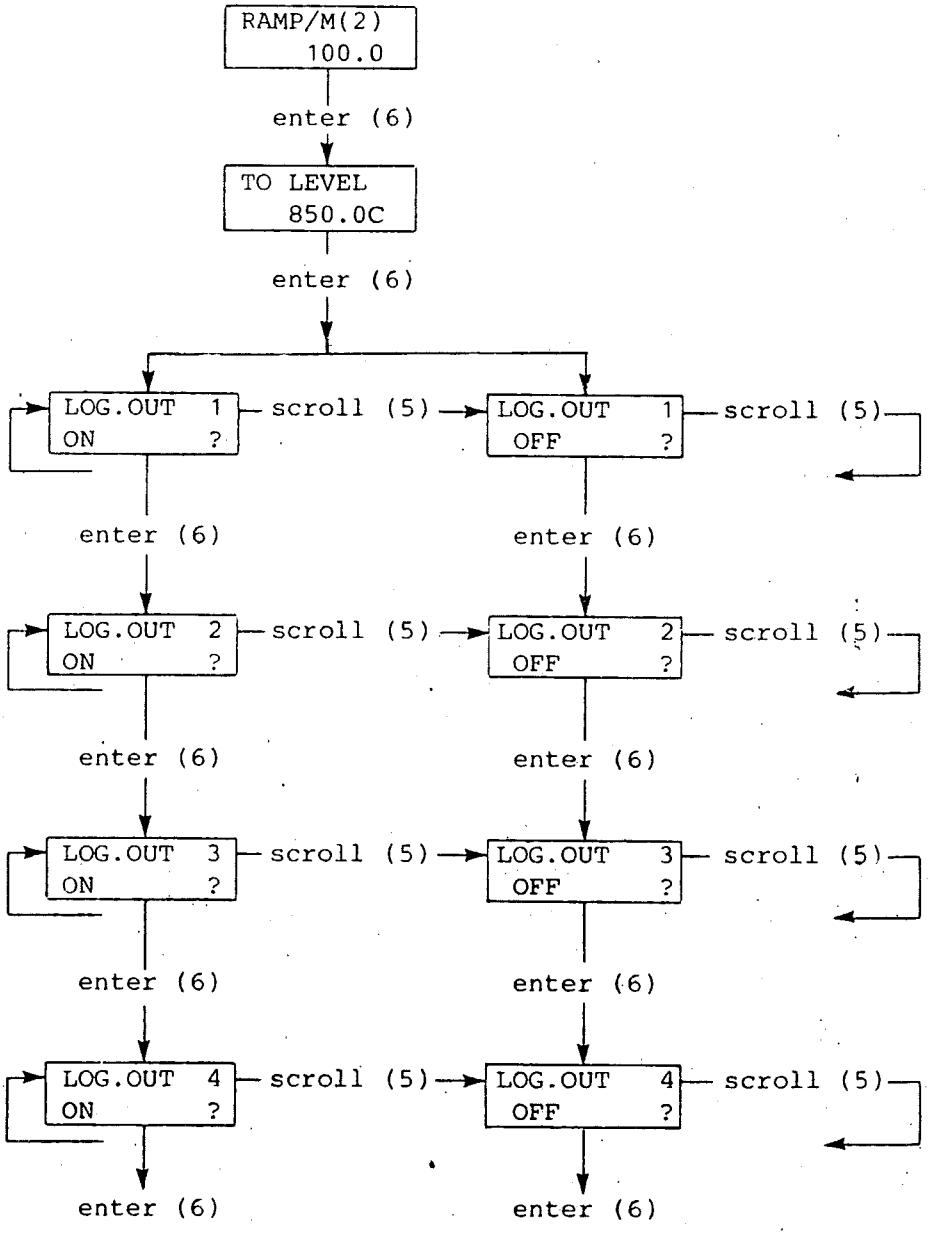
3.1.2 Relays

The states of the two relays, if set to be program controlled in the configuration mode, are selectable after each segment parameter has been entered. If a segment parameter is zero the relay states are not requested. A relay state can be set to be an alarm, be on or off.



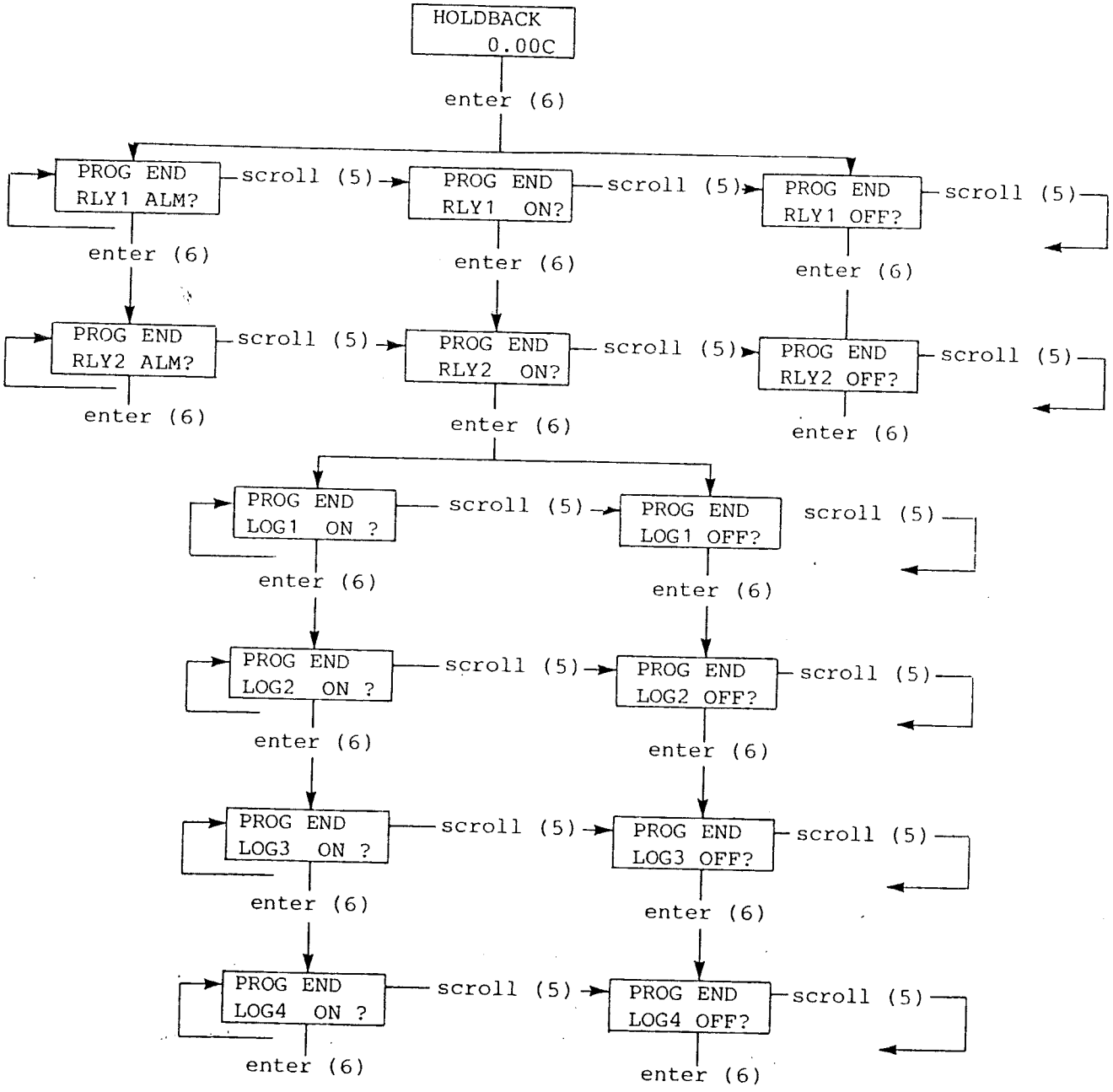
3.1.3 Logic Outputs

If configured logic outputs can be set to be on or off after each segment parameter has been entered. If relays have been configured the logic outputs follow the relays after each segment.
Only the number of logic outputs configured will be displayed.



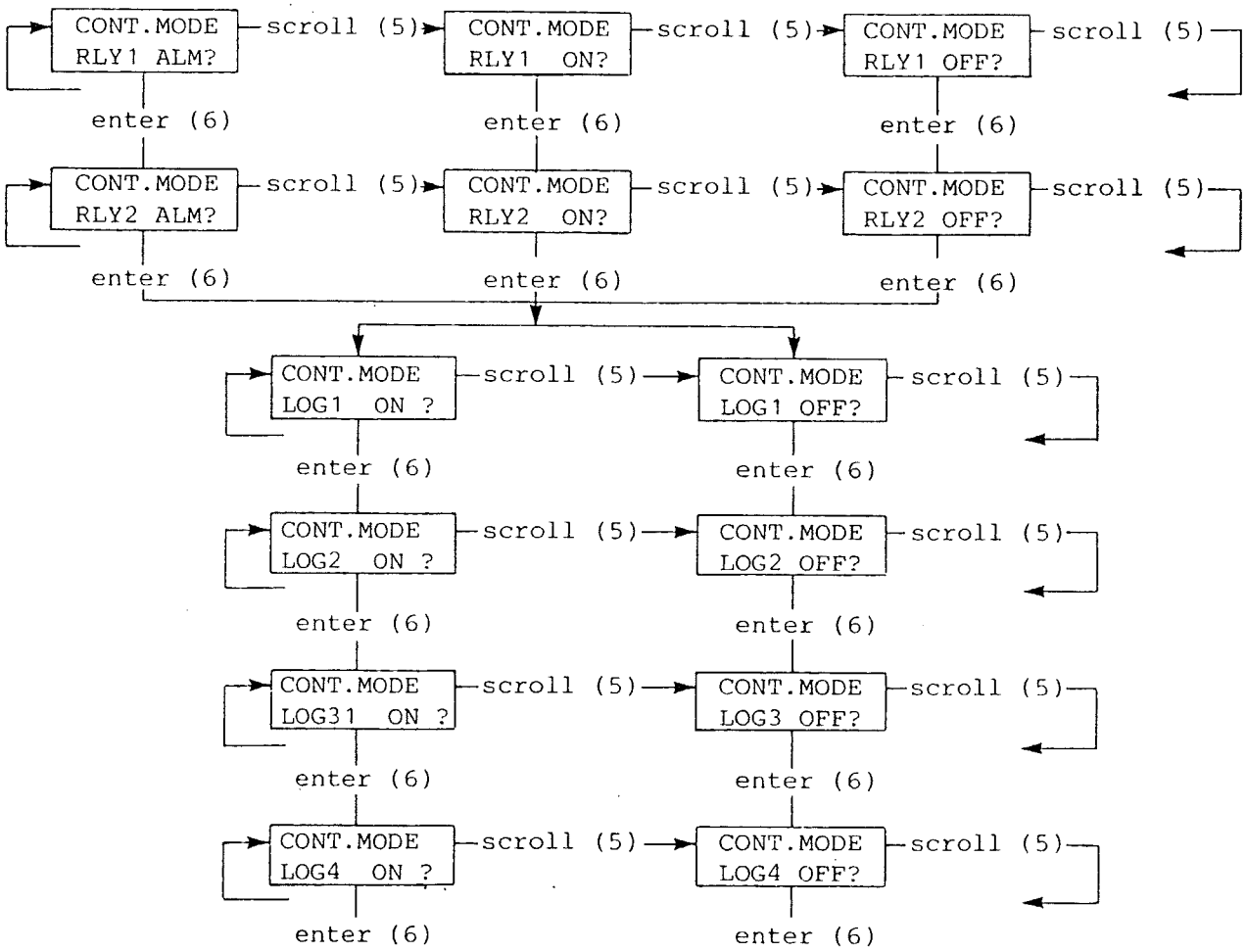
3.1.4 End of Program States

The selection of relay states and logic outputs, if configured, is also given at the end of the program, after the HOLDBACK entry. This allows the relays and logic states to be defined in the program END state.



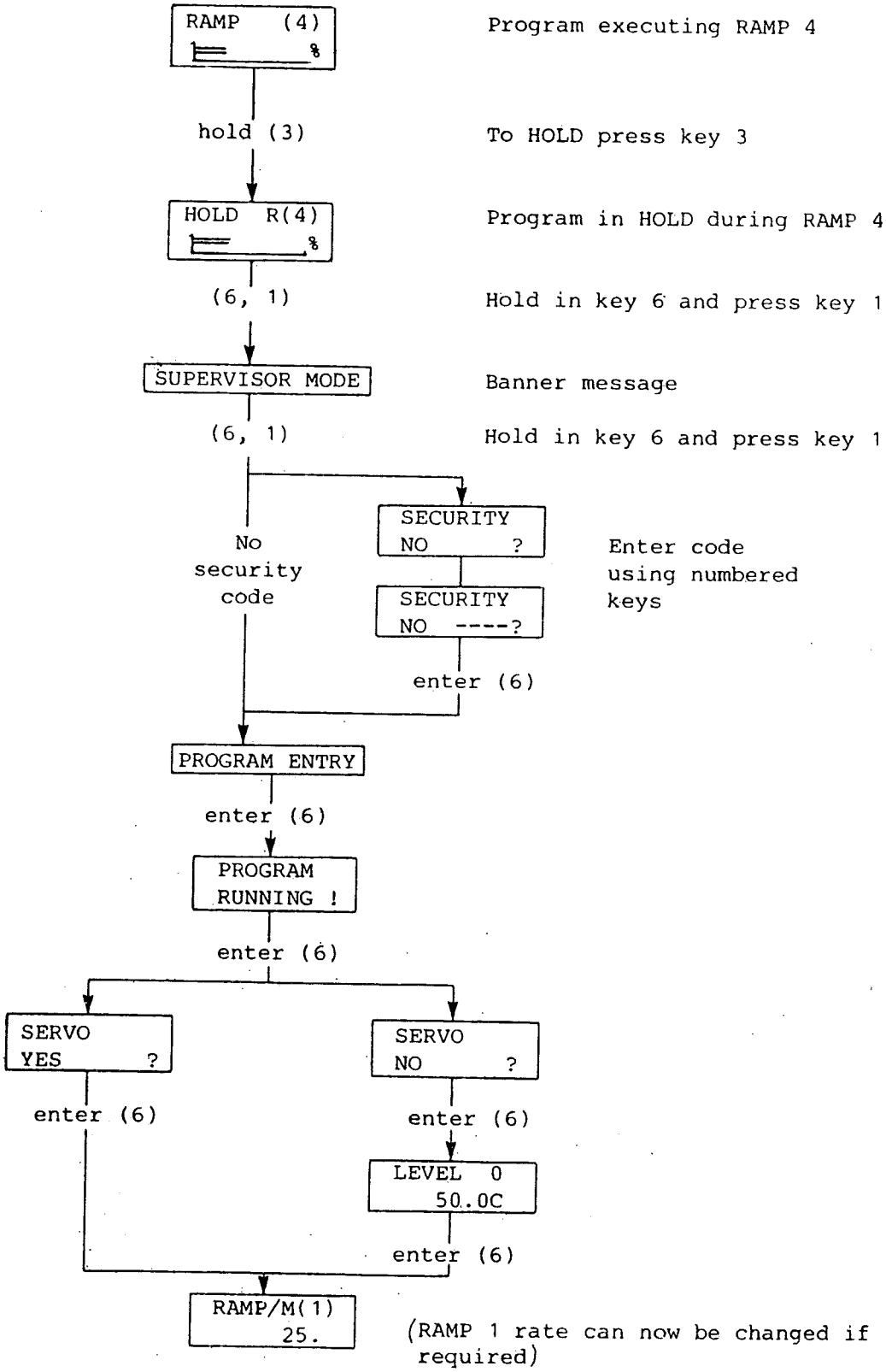
3.1.5 Controller Mode States

After the END option selections the states of the relays and logic outputs can be defined with the instrument in the controller mode (reset).



3.2 Changing a Running Program

Ramp rates and dwell times can be altered when a program is already running.



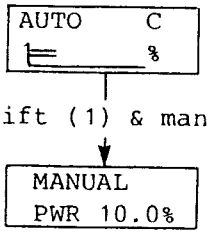
Scroll through the parameters pressing key 6 and action any changes using the ▽△ keys. Press key 1 to return to the HOLD segment at any time.

4.0 CONTROLLER OPERATION

All applicable parameters and their values are displayed on the lower display. Only alarms and maximum power levels can be changed in the Supervisor mode. In order to change control parameters it is necessary to put the instrument into the commissioning mode. All changes are only accepted by operation of the ENTER key.

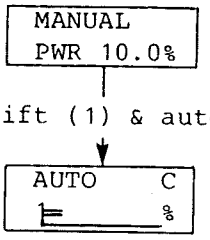
4.1 Operator Mode

Auto to Manual Operation



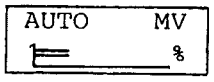
Hold in key 1 and press 'man' key

Manual to Auto Operation

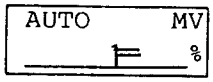


Hold in key 1 and press 'auto' key

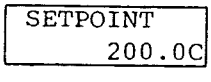
Below are listed all the possible indications which can be displayed in the lower display for each mode of operation. Only those parameters applicable to the instrument configuration are displayed.
E.g. Output 2 parameters are not displayed for instruments configured with only output 1.



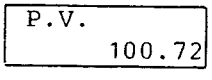
Single output units: bargraph indicates mean output power. Engineering units for the measured input value are shown. When in the automatic mode the display is being updated continuously, which causes the display to blink on each update.



A unit with two outputs: bargraph indicates mean output power for each output. Output 1 indicates 0 to +100% and output 2 indicates 0 to -99.8%.
Engineering units for the measured input value are shown.



Setpoint is selected by pressing key 6 and is adjustable between the setpoint high and low settings which are preset in the Commissioning Mode.



Only displayed if 5 digits selected in configuration.
Allows operator to select AUTO, SETPOINT or PV on lower display.

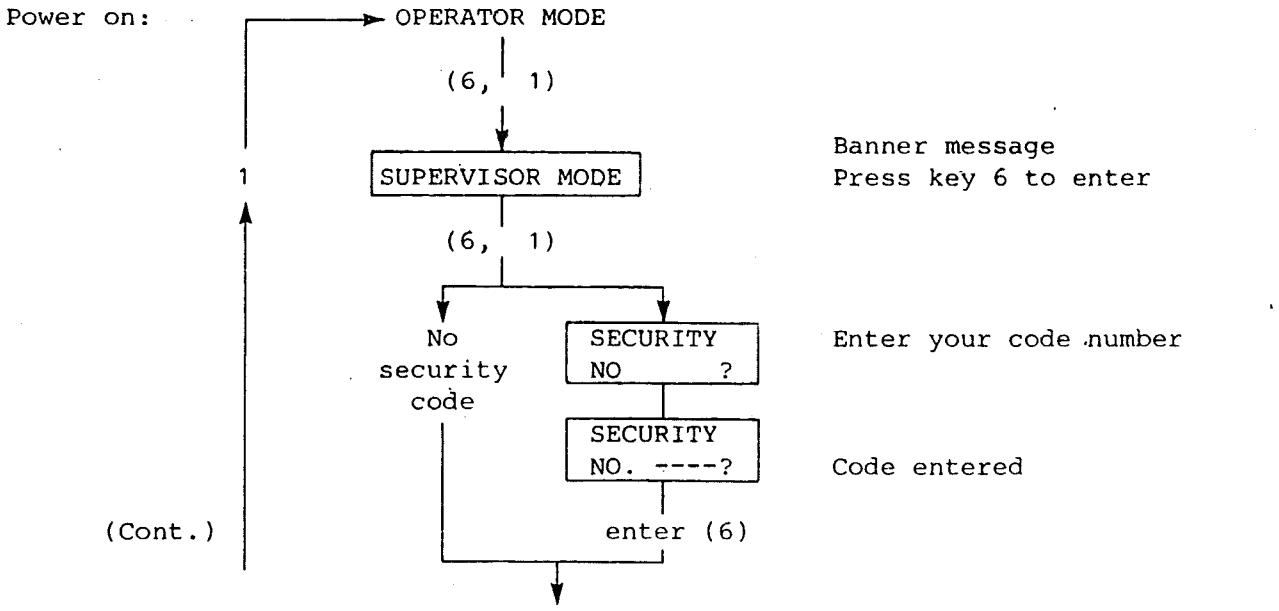
MANUAL PWR 90.0%	Select by pressing keys 1 and 5 together. Manual power when output 1 on. Auto-manual-auto changeover is bumpless.
MANUAL PWR -99.2%	Manual power when output 2 on. If ON/OFF control configured for output 2, only non zero setting will give -100% power (ON).
ALARM 1* DVL 1.25	Indicates alarm 1 triggered. Type of alarm is shown and its setting.
ALARM 2* DVH 15.80	Indicates alarm 2 triggered. Type of alarm is shown and its setting.

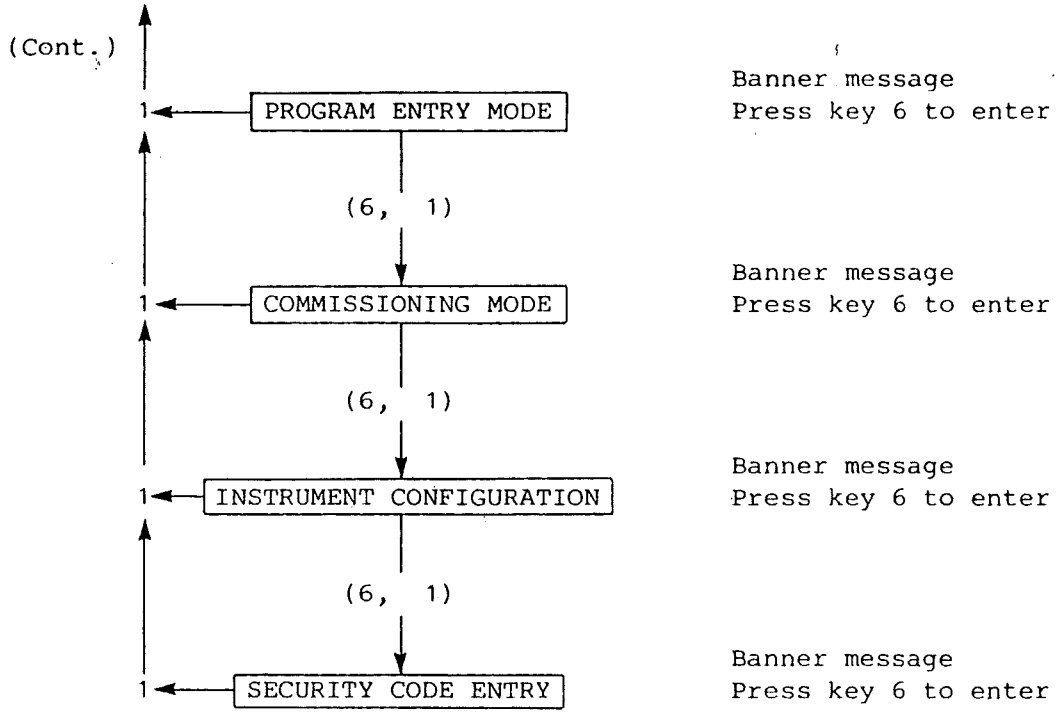
Note: The symbol * refers to a triggered alarm. If both alarms are triggered, then the last alarm activated is displayed. Acknowledge an alarm by pressing key 1. This is indicated by the display reverting to the AUTO mode and the error bars flash, signifying that tha alarm has been acknowledged but not cleared.

NO SENSOR PWR 50.0%	When an open circuit sensor is detected the preset power setting is indicated. This occurs when the measured value exceeds the display max limit by 5% or is more than 5% below the display minimum. The upper display will indicate 9999 and the error bars flash once per second. This power is output until the fault is rectified.
CHECK CONFIG.	This is a fault message stating that the CONFIGURATION has been incorrectly set and requires checking. Contact your nearest Eurotherm Engineer if this message is displayed.
CHECK CALIB.	This is a fault message stating that the CALIBRATION has been incorrectly actioned or not carried out. Contact your nearest Eurotherm Engineer if this message is displayed.

4.2 Access To Lower Levels

Press and hold in key 6 and press key 1 to access each level. A banner message will be displayed for each mode, press the enter key (6) to enter the required mode.





4.3 Supervisor Mode

The supervisor has access to alarms and power settings.
Enter the Supervisor Mode as detailed in para. 4.2 and press key 6 to scroll through all the displays. (Use either multiple single presses or continuous pressure on key 6).

N.B. All alarms can be set within the span of the instrument but note that a deviation band alarm is limited to above 1% of the span.

ALARM 1 DVL 2.50	The alarm 1 parameter can be changed by pressing the ▽△ keys. For deviation low/high alarms, setting adjustable from 0% to 100% below/above S/P. Deviation band alarm, adjustable from +1% to +100% of S/P. Full scale low/high, adjustable from display min to display max.
ALARM 2 DVL 1.25	The alarm 2 parameter can be changed by pressing the ▽△ keys.
MAX.O/P1 PWR100.0%	The maximum output 1 power limit can be changed by pressing the ▽△ keys. Adjustable from 0 to 100%. Note: This parameter is not displayed if ON/OFF control has been selected.
MAX.O/P2 PWR 80.0%	The output 2 power limit can be changed by pressing the ▽△ keys. Adjustable from 0 to -99.8%. Note: This parameter is not displayed if ON/OFF control is selected or if output-2 is not selected.

4.4 Security Code

A security code can be inserted in this instrument so inhibiting access to the lower levels unless the code is known.
Access to the security level is achieved by pressing and holding in key 6 and pressing key 1 when in the Intrument Configuration Read Mode. A banner will run across the lower display:

"SECURITY CODE ENTRY NONE = 6666"

Press key 6 and "NEW CODE NO. ?" is displayed.

If no security code is required on the instrument, enter 6666 by pressing key 6 four times. To enter this code press key 6 again and the display will revert back to the Operator mode. Access to the lower levels is now entered by pressing and holding the in key 6 and pressing key 1 in the Supervisory mode.

* If a security code is required enter the code, which must be four digits, using the 1 to 6 keys. (If after entering the fourth digit you wish to alter what you have selected press any of the keys 1 to 5 and the display will revert to "NEW CODE NO. ?". Now enter your required code). After the fourth digit, press key 6 to enter the code. The display will now revert back to the Operator mode. Access to the lower levels is now by using this new code number which must be entered when the display indicates:

"SECURITY NO. ?"

The security code can be changed at any time by following the above procedure.

* N.B. It will be seen that access to the security level requires knowledge of the current security code. In order to avoid problems requiring a visit by the Eurotherm servive engineer, we recommend that a note is made of any security number used and that this is stored in a place on the plant.

SECURITY NO. ?	When the security number is requested enter the number by pressing the appropriately numbered keys 1 to 6.
SECURITY NO---- ?	Each figure entered is acknowledged by the symbol "-". When all four figures have been entered, press key 6 to enter the code. An invalid entry will return the user to the Operating Mode.

If no security code is requested or one has been entered, PROGRAM ENTRY MODE(See para 3.0) will be displayed. Press and hold in key 6 and press key 1 to enter the COMMISSIONING MODE then press key 6 to enter.

4.5 Commissioning Mode

The Commissioning mode provides access to all the relevant controller parameters, PID settings, setpoint stops, etc.
Access the Commissioning mode as detailed in para 4.2. Press key 6 to scroll through the parameters. All changes are affected by pressing the ▽△ keys to alter the setting and key 6 to enter the new value. Press key 6 to scroll to the next parameter. For access back to the Operating Mode at any time press key 1.

SETPOINT HI 100	The setpoint high stop. Adjustable beteen setpoint low and the maximum display range.
SETPOINT LO 0	The setpoint low stop. Adjustable between display minimum and setpoint high.
CYCLE T 1 5.0S	Cycle time for output 1. adjustable between 0.1 and 65 seconds at half power, and for slow cycle between 5 and 65 seconds. Note: Not displayed if ON/OFF control or analogue output configured.
PROPBAND 1 0.1%	Proportional band for output 1. Adjustable between 0.1% and 999.5%. Note: Not displayed if ON/OFF control configured.
INTEG. T 1 60.S	Integral time adjustable between 0 and 9995 seconds. Zero setting = no integral. Note: Not displayed if ON/OFF control configured.
MAN. RESET 1 20%	Manual reset for output 1. Adjustable between 0 and 100%. Note: Only displayed when integral time is set to zero.
DERIV. T 1 5.7S	Derivative time adjustable between 0 and 999.5 seconds. Zero setting = derivative off. Note: Not displayed if ON/OFF control configured.
CUTBACK HI 20.50	High cutback point. Adjustable between 0 and display range. Zero setting = cutback off. Note: Not displayed if ON/OFF control configured.
CUTBACK LO 5.00	Low cutback point. Adjustable between 0 and display range. Zero setting = cutback off. Note: Not displayed if ON/OFF control configured.
DEADBAND 1.0%	Deadband for ON/OFF control. Adjustable between 0.1 and 10.0%.
REL.COOL 1 1.0	Cool gain for output relative to output 1. Adjustable between 0.1 and 10. Only displayed if output 2 configured.

H:C DBAND 5.0%	Heat/Cool deadband. Adjustable between -5% and +5% of the proportional band selected. Only displayed if output 2 configured. Negative deadbands are equivalent to overlap of the two output channels by the specified negative deadband setting.
O/P BIAS 5.0%	Provides rapid changes of output. Adjustable between -99.8% and 100.0%. Note: Not displayed if ON/OFF control configured.
NO SENSOR PWR 50.0%	The percentage power that is input when a sensor is open circuit or the input 5% greater than display max. or 5% less than display min.
E. SCALER 0.50	The emmissivity scaler parameter is adjusted to the target emmissivity. Adjustable between 0.50 and 1.00. Note: Only displayed with pyrometers.
LOG RATE 10	Rate at which data is logged when acting as a data logger. Adjustable between 0 and 20 minutes, with one minute resolution, where 0 = off.

4.6 Configuration Read Mode

The level below the commissioning mode is a CONFIGURATION READ mode which allows the user to monitor the current instrument configuration.

Note: No changes can be effected, it is an inspection mode only.

To read the configuration press and hold in key 6 and press key 1 when in the Commissioning mode. A banner will run across the lower display:

'INSTRUMENT CONFIGURATION - READ ONLY'

Scroll through the parameters by pressing key 6.
Press key 1 at any time to return to the Operator Mode.
The parameters listed vary according to how the instrument is configured.
Below are listed the range of displays applicable:

I/P TYPE -	indicating what input is being used.
O/P 1 -	indicating what type of output is being used on channel 1 followed by how it functions.
O/P 2 -	indicating what type of output, if any is being used on channel 2 followed by how it functions.
SETPOINT HOLD -	indicates if selected that the setpoint will stay at the value last set in the auto mode.
SETPOINT TRACK-	indicates if selected that the setpoint will equal the process value last achieved in manual mode.
CONT.SPT HOLD -	indicates if selected that the controller setpoint will stay at the value last set.
CONT.SPT TRACK-	indicates if selected that the controller setpoint will track the program setpoint.
COMMS -	indicates what type and functions of communications.
ALARM HYS -	indicates the alarm hysteresis setting.
ALARM 1 -	indicates the type of alarm on channel 1 followed by how it functions.
ALARM 2 -	indicates the type of alarm on channel 2 followed by how it functions.
HOLDBACK -	controls the setpoint ramp rate if process operating at a slower rate.
DWELL TIME -	indicates time is in hours or minutes.
RAMP RATE -	Indicates rate is in units/hour or units/minute.
RELAY -	indicates setting of program relay.
D.P POS -	indicates the decimal point position on the displays.
5 DIGIT -	indicates if 4 or 5 digit to be displayed on the lower display in controller operation.
INV.P.BAR -	indicates that the sense of the power bar has reversed if selected, so that a full power bar will indicate 0% power.
UNITS -	indicates what sensor input units are being used.
MAX MV IN -	indicates maximum millivolts input - linear inputs only.
MIN MV IN -	indicates minimum millivolts inputs - linear inputs only.
DISP MAX -	indicates the maximum display range set.
DISP MIN -	indicates the mimnimum display range set.
S/W VERS 1.0-5-7	indicates the microprocessor software versions in the order: Main - Display - Communications

Every effort has been taken to ensure the accuracy of this specification. However in order to maintain our technological lead we are continuously improving our products which could, without notice, result in amendments, and omissions to this specification. We cannot accept responsibility for damage, injury, loss or expenses resulting therein.

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