1. X26 Temperature and Humidity Controller

1.1 INTRODUCTION

The X26 has been designed for the control of temperature and humidity in Environmental Chambers. The humidity measurement can be derived from wet and dry bulb inputs or taken directly from a humidity probe. The temperature and humidity can be programmed as functions of time using the in-built setpoint programmer. Program holdback is available to guarantee soak time at temperature and humidity. Six sets of PID parameters can be programmed to give accurate control under varying combinations of temperature and humidity. Two user programmable event outputs are also available to activate external devices - such as vibration test equipment. Up to 50 setpoint programs can be stored in the X26. Each can be assigned a customer defined name.

A real time clock can be set to start and stop programs at defined times of the day and week.

Boost heating and cooling outputs are provided. Cooling by-pass and compressor minimum on-time outputs are also provided.

Modbus digital communications is available for connection to supervisory computers or Programmable Logic Controllers.

1.1.1 Related Handbooks

For further details not described in this supplement please refer to the following handbooks where this symbol is shown ☞:-

- 2604 Engineering Handbook, part no. HA026761 issue 3.0.
- 2604 Installation and Operation Handbook Part No. HA026491

1.1.2 Identifying the Controller

The controller type is identified by a label fixed to the side of the case. This label contains the order code which may vary from controller to controller.

The order code for your controller can be checked from the explanation given at the end of this supplement.

1.2 INSTALLATION

The X26 controller should be installed as described in Chapter 2 of the Installation and Operation Handbook.

WARNING

You must ensure that the controller is correctly configured for your application. Incorrect configuration could result in damage to the process being controlled, and/or personal injury. It is your responsibility, as the installer, to ensure that the configuration is correct. See 2704 Engineering Handbook for details.

1.3 ELECTRICAL CONNECTIONS

☞ **Before proceeding further, please read Appendix B, Safety and EMC information, in the above handbooks.**

The X26 has one temperature and one humidity control loop with up to 50 programs and 500 segments in total.

The input and output slots will have been populated with modules in accordance with the ordering code.

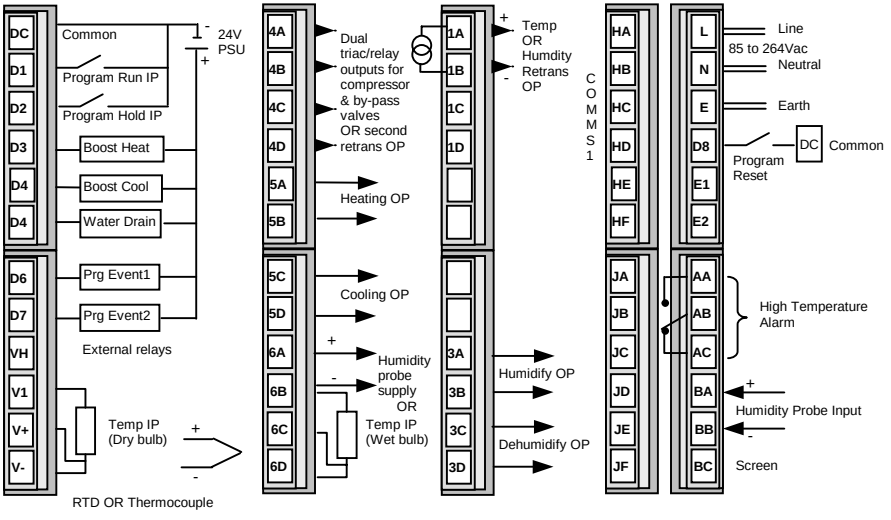
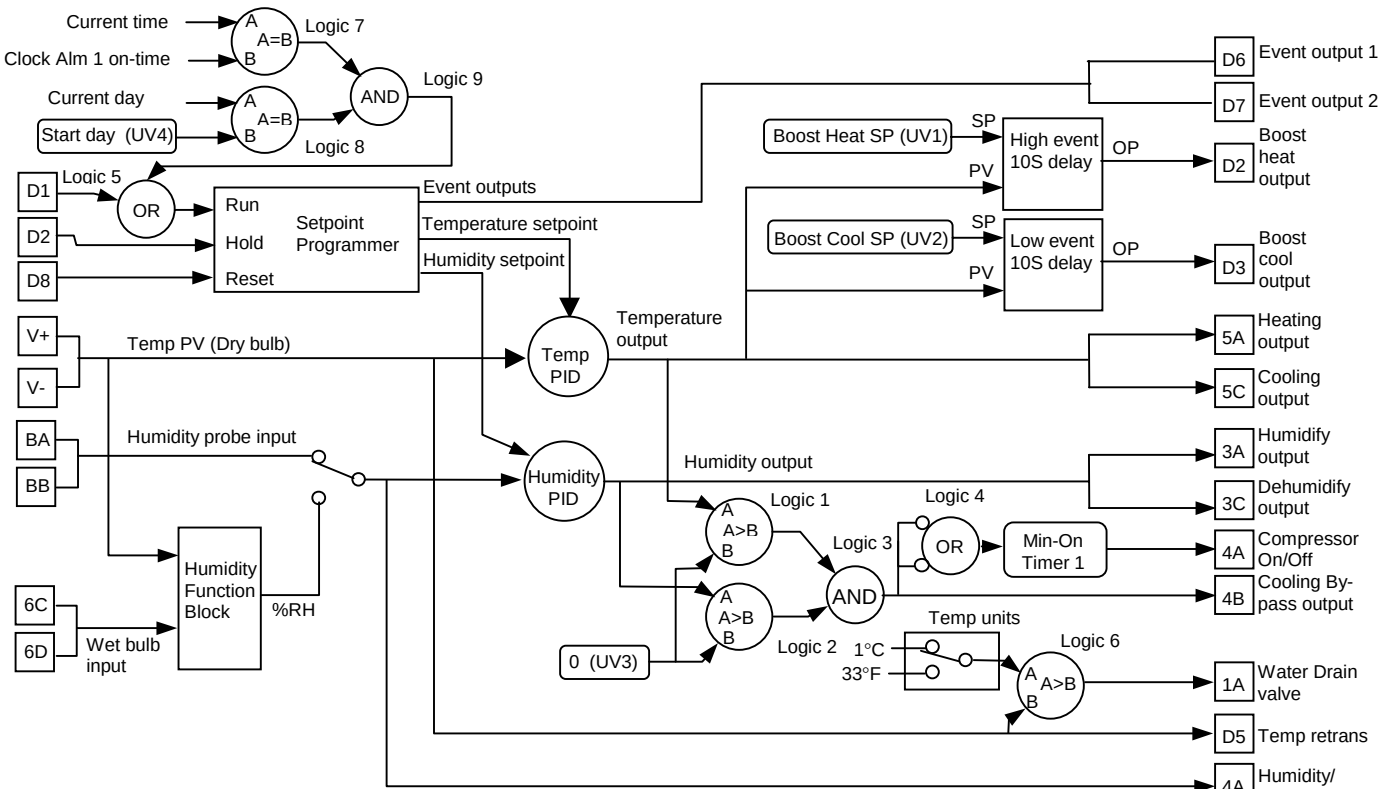


Figure 1-1: Electrical Connections

1.4 CONTROL BLOCK DIAGRAM



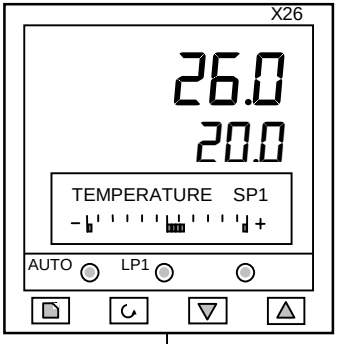
1.5 TEMPERATURE AND HUMIDITY SCREENS

Switch on the controller. After a brief self-test sequence, during which the controller displays the software version number, you will see an overview display for the Temperature loop.

Two overviews are available one for temperature and the second for humidity. Press the middle ⦿ button to step between the two screens.

LP1' will light when the temperature screen has been selected and 'LP2' when the humidity screen has been selected.

The top parameter is the measured temperature or humidity. The middle parameter is the target setpoint. The bottom 'text panel' shows an output bar graph. The bar graph is split with the centre representing zero output. A right-hand bar indicates heating/humidify demand, a left-hand bar cooling/dehumidify demand.



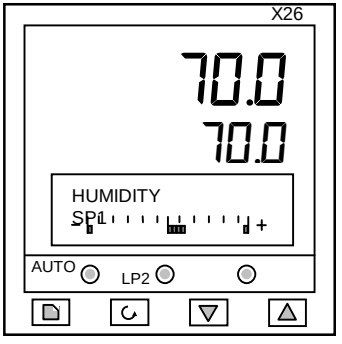
← Measured Temperature

← Temperature Setpoint
(or Target Output in Manual Mode)

← Heat/Cool output bar graph.

The bar graph is split with the centre representing zero output.
A right-hand bar indicates heating demand
A left-hand bar cooling demand.

Press ⦿ to step between Temperature and Humidity overviews



← Measured Humidity

← Humidity Setpoint
(or Target Output in Manual Mode)

← Hum/Dehum output bar graph.

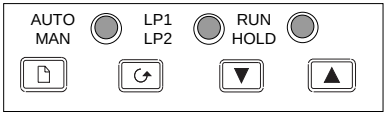
The bar graph is split with the centre representing zero output.
A right-hand bar indicates humidify demand
A left-hand bar dehumidify demand.

Figure 1-2: Temperature and Humidity Overview Displays

Note: When the controller is first switched on, it will be in Operator Level 1. To select different levels of operation refer to section 1.6.

1.5.1 Operator Buttons

This is a summary of the Operator Buttons



AUTO MAN	Auto/Manual button	When pressed, this toggles between automatic and manual mode: ▪ If the controller is in automatic mode 'AUTO' is displayed ▪ If the controller is in manual mode, 'MAN' is displayed
LP1 LP2	Loop select button	Each press selects a different overview display
RUN HOLD	Programmer button	• Press once to RUN a program. 'RUN' will be displayed • Press again to HOLD a program. 'HOLD' will be displayed • Press again to toggle between RUN & HOLD • Press and hold for two seconds to reset. Neither RUN or HOLD indicators are on.
	Page button	Press to select the Page Header 'Menu'.
	Scroll button	Press to select a new parameter from the page heading. If held down it will continuously scroll through the parameters.
	Down button	Press to decrease an analogue value, or to change the state of a digital value
	Up button	Press to increase an analogue value, or to change the state of a digital value

1.5.2 To Change the Temperature/Humidity Setpoint

From the TEMPERATURE overview, press ▲ or ▼. The lower bar graph display changes to

Target SP
20.0

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Press ▲ or ▼. to raise or lower the value. The value is accepted after a 2second delay.

The humidity setpoint is changed in the same way from the Humidity overview.

1.5.3 To Select AUTO or MANUAL Mode

Press ◉ AUTO / MAN to switch between AUTO and MANUAL

The 'MAN' beacon will light in manual mode and the 'AUTO' beacon in automatic mode.

In manual mode press the ▲ or ▼ buttons to adjust the output demand.

The physical output is updated as the value is changed in the display.

1.5.4 To Access Temperature Parameters

From the TEMPERATURE overview press ↻. The following list of parameters is shown after each press of ↻.

↻: Temperature SP ⇕20.0	To change the temperature setpoint press ▲ or ▼. ⇕ signifies that the parameter value may be altered
↻: Temperature OP [%] 18.0	To change the temperature output press ▲ or ▼. ⇕ will only be displayed in Manual mode
↻: Boost Heat SP [%] ⇕45	Boost Heat allows additional power to be applied. It is switched on when the % output value exceeds the Boost Heat SP for more than 10 seconds.
↻: Boost Heat Sta Off	Read only display showing the status of the boost heat – On or Off
↻: Boost Cool SP ⇕-30.0	Boost Cool allows additional cooling to be applied. It is switched on when the % output value exceeds the Boost Cool SP for more than 10 seconds.
↻: Boost Cool Sta OFF	Read only display showing the status of the boost cool – On or Off
↻: Temp PID set ⇕Temp PID 1	Temperature PID parameter set 1 to 6

In Access Level 2* the following three parameters are available:-

↻: Low SP Limit ⇕ -100.0	Temperature low setpoint limit
↻: High SP Limit ⇕ 200.0	Temperature high setpoint limit
↻: High Temp Alarm ⇕ 100.0	Temperature high alarm setpoint

Press middle ⦿ button to return to the TEMPERATURE overview

1.5.5 To Access Humidity Parameters

Press ↻. The following list of parameters is shown after each press of ↻.

↻: Humidity SP ⇕ 70.0	To change the humidity setpoint press ▲ or ▼. ⇕ signifies that the parameter value may be altered
↻: Humidity OP [%] 14.0	To change the humidity output press ▲ or ▼. ⇕ will only be displayed in Manual mode
↻: Hum'ty PID set ⇕ Hum'tv PID 1	Humidity PID parameter set 1 to 6
↻: Cool By-pass On	The cooling by-pass turns on when neither cooling or dehumidification is demanded
↻: Compressor OP Off	Compressor output status
↻: Comp min time ⇕ 0:00:30.0	Compressor minimum time sets the minimum time that the compressor will remain on. This parameter is only available in Access level 2*

Press middle ⦿ button to return to the HUMIDITY overview

* To select Access level 2 see section 1.6.1.

1.6 OPERATOR MENUS

Three levels of access are provided.

Level 1 is for normal running of the process and provides menu's to run a program and to edit a program.

Level 2 provides access to the high and low temperature setpoint limits, the high temperature alarm setpoint and the compressor minimum on-time.

Level 3 is for commissioning the controller. It provides additional menu's to set-up the temperature and humidity control parameters and to automatically tune the loops.

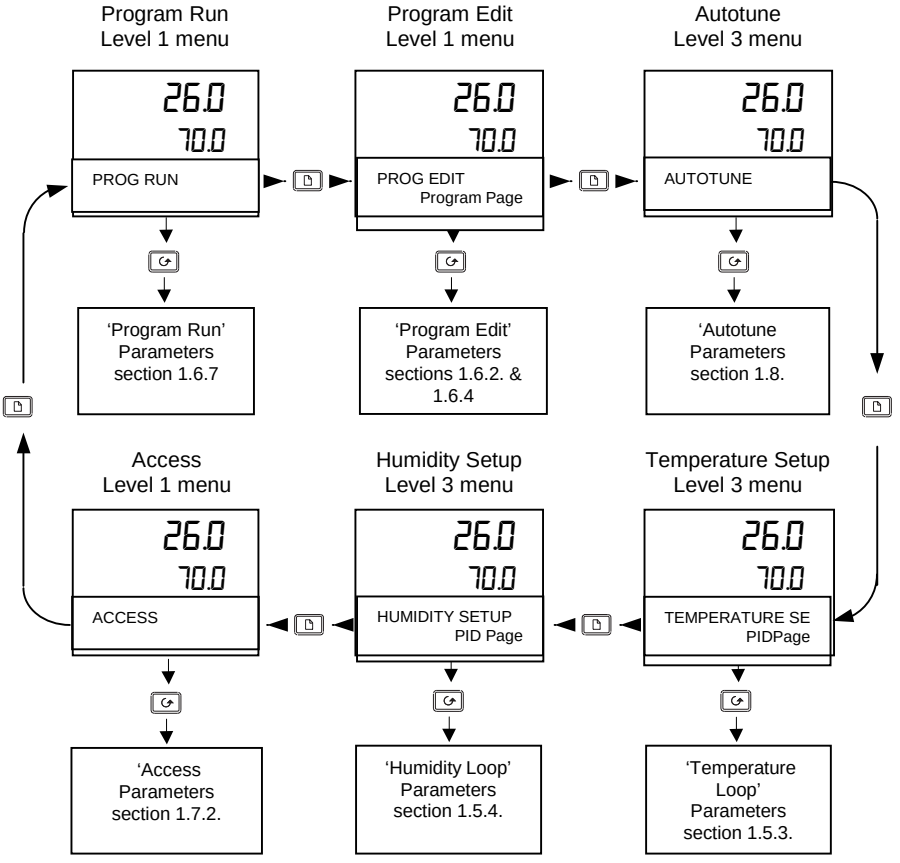
1.6.1 To Select Different Access Levels

From the **'ACCESS'** menu header

1. Press ↻ to display **'Access Level'**
2. Press ▲ or ▼ to select the level required
3. Press ↻ to display **'Enter Passcode'**. The defaults are 2 for Level 2; 3 for Level 3 and 4 for configuration level
4. Press ▲ or ▼ to enter the passcode. If the correct passcode is entered the controller will now operate in that level.

Further information is available in the Engineering Handbook.

1.6.2 Navigation Diagram



1.7 TEMPERATURE/HUMIDITY SETPOINT PROGRAMMER

The programmer has two setpoint profiles for temperature and humidity. Digital inputs are available for Run, Reset and Hold. Two digital event outputs are configured which may be wired to operate external devices.

Up to 50 programs can be stored.

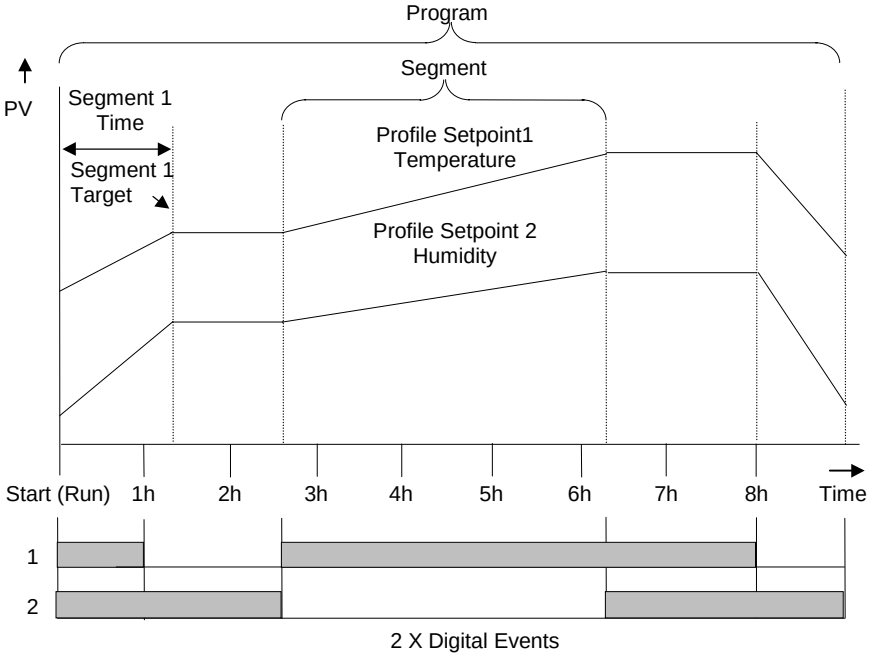


Figure 1-3: Temperature/Humidity Program

1.7.1 To Create or Edit a Program

- A running program cannot be edited, it must first be Reset. Temporary changes may, however, be made if the program is put into Hold. These changes only apply to the current execution of the program and will not be stored as permanent changes
- Any non-running program can be edited or created while another program is running.
- It is first necessary to set up the parameters which are common to the whole program, as follows:-

Do This	This Is The Display You Should See	Additional Notes
1. From any display press [🗋] as many times as necessary to access **'PROGRAM EDIT'**	🗋:PROGRAM EDIT ▲▼ Program Page	In the notes below, text shown in *italics* is the factory default
2. Press [↻] to select the program to edit 3. Press [▲] or [▼] to select the program number	Edit Prg: ▲▼ 3 Program 3	Up to 50 programs can be stored. The name of the program may also be set up by the user in this page. The text 'Program 3' ,shown here will then display the program name
4. Press [↻] to display **'HBk Mode'** and press [▲] or [▼] to select	↻:HBk Mode ▲▼ None	Choices are:- *None* - No holdback Per Prog – applied over the whole program Per Seg – selectable in every segment
5. Press [↻] to display **'TEMP HBk Type'** and press [▲] or [▼] to select	↻: TEMP HBk Type ▲▼ Off	Holdback type for the temperature loop This parameter only appears if HBk Mode = Per Prog Fine and course holdback allows two levels of holdback to be applied to different segments. They are set as deviations between SP and PV Choices are:- *Off* Fine Lo Fine Hi Fine Band Course Lo Course Hi Course Band Note 1 on page 1-14 describes Holdback

7. Press ↻ to display **'HUMIDITY HBk Type'** and press ▲ or ▼ to select

↻: HUMID HBk Type
⇕ Off

Holdback type for the humidity loop.
Values are the same as for the TEMPERATURE Loop

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8. Press ↻ to display **'Program Cycles'** and press ▲ or ▼ to select the number of times the program is to repeat

↻: Program Cycles
⇕ Cont

Cont	The program repeats continuously
1-999	To set the number of repeat cycles

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9. Press ↻ to display **'End Action'** and press ▲ or ▼ to select

↻: End Action
⇕ Dwell

Defines the action in the end segment.

Choices are:-

Dwell	- the program will dwell indefinitely at the conditions set in the end segment
Reset	- the program will reset to the start conditions

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10. Press ↻ to display **'Program Name'**

↻: Program Name
⇕ Program 1

Program 1 is the default name

Up to 16 alpha-numeric characters can be entered

1. Press ▲ or ▼ to change the text of the flashing character
2. Press ↻ to select the next and subsequent characters and
11. press ▲ or ▼ until the customised name is entered

Note 1 Holdback freezes the program if the process value does not track the setpoint by an amount which can be set by the user.

It may apply when:

- The PV is below the SP by a pre-set value (Fine/Coarse Lo),
- The PV is above the SP by a pre-set value(Fine/Coarse Hi)
- The PV is below or above the SP by a pre-set value (Fine/Coarse Band).

Fine and Coarse Holdback values allow you to apply one value of holdback to selected segments and another value to other segments. For example, you could apply 'Fine Holdback' to one or more Dwell segments and 'Coarse Holback' to one or more Ramp segments

In a '**Ramp'** it indicates that the process value is lagging the setpoint by more than a pre-set amount and that the program is waiting for the process to catch up.

In a '**Dwell'** it will freeze the segment time if the difference between SP and PV exceeds pre-set limits.

In both cases it guarantees the correct soak period for the product.

Holdback (PROGRAM EDIT Program page) may be configured in three modes:

- OFF - holdback does not operate
- Applied to the complete program. Holdback operates the same way in every segment
- To each individual segment. A different holdback type can be applied to each segment

Example:

Holdback, operating in each segment, is often used in a temperature control application as detailed below:-

During a ramp up period the holdback type may be set to deviation low. If the Process Value lags the programmed rate of rise, holdback will stop the program until the PV catches up. This prevents the set program from entering the next segment until the PV has attained the correct temperature.

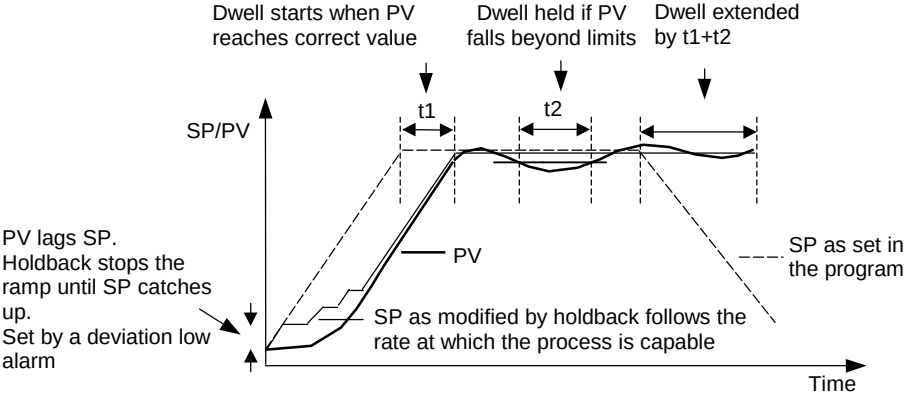

Figure 1-4: Effect of Holdback to Produce Guaranteed soak

1.7.2 To Set Up Each Segment of a Program

Having set up the parameters which are common to the selected program, it is now necessary to set up every segment, as follows:-

Do This	This Is The Display You Should See	Additional Notes
1. From the **'PROGRAM EDIT'** header, press ▲ or ▼ to select **'Segment Page'**	:PROGRAM EDIT Segment Page	In the notes below, text shown in *italics* is the factory default
2. Press ↻ to select the program to edit	Edit Prg: 3 Program 3	This selects the program to be edited *Program x'* is the default text. It will show the *name* of the program if this has been set up in the 'Program Page'
3. Press ↻ to select **'Segment Number'** 4. Press ▲ or ▼ to change the segment number if required	:Segment Number 1	This selects the segment number to be edited Up to 100 segments can be set up
5. Press ↻ to select **'Segment Type'** 6. Press ▲ or ▼ to select the segment type	: Segment Type Profile	This selects the type of segment The choices are:- *Profile* - A temperature/humidity time segment End Segment - The last segment in the program (press ↻ to confirm) Go Back - Repeat part of program Not shown for segment 1.
7. For a profile segment, press ↻ to select **'TEMPERATURE Target'** 8. Press ▲ or ▼ to edit the value	:TEMPERATURE Ta [°C] 200.0	This is the value which the temperature will aim for in the segment It is adjustable between Temp lo and Temp hi limits set in configuration level

9. For a profile segment, press ↻ to select **'TEMP HBk Type'** 10. Press ▲ or ▼ to edit the value	↻:TEMP HBk Type ◆ Off	Holdback type for the temperature loop This parameter only appears if 'HBk Mode = Per Segment This has the same settings as for the whole program
11. Press ↻ to select **'HUMIDITY Target'** 12. Press ▲ or ▼ to edit the value	↻:HUMIDITY Targe [%RH] ◆ 40.0	This is the value which the humidity will aim for in the segment It is adjustable between Hum lo and Hum hi limits set in configuration level
12. For a profile segment, press ↻ to select **'HUM HBk Type'** 13. Press ▲ or ▼ to edit the value	↻:HUM HBk Type ◆ Off	Holdback type for the humidity loop This parameter only appears if 'HBk Mode = Per Segment This has the same settings as for the whole program
14. Press ↻ to select **'Segment Duration'** 15. Press ▲ or ▼ to change the time	↻: Seg Duration ◆ 0:01:00	The time for which the temperature/humidity takes to reach its target value (ramp) or remains at its set value (dwell) Set in h:m:s
16. Press ↻ to select the **'Temperature PID Set'** 17. Press ▲ or ▼ to select a set	↻:Temp PID set ◆ Temp PID 1 ↻:Hum PID set ◆ Hum PID 1	This selects the PID set (I to 6) which will operate in this segment. The next parameter selects the PID set which will operate for the humidity loop
18. Press ↻ to select **'Programmer Digital Outputs'** 19. Press ▲ or ▼ to turn the output on or off in the segment	↻:Prog DO Values ◆ ■□	Two events are available ■ indicates that the event output will be on □ indicates that the event output will be off. This is the factory default

Repeat the above stages for each segment required in the program

1.7.3 To Select, Run, Hold or Reset a Program

Assuming programs have been created:-

Do This	This Is The Display You Should See	Additional Notes
	Select the program number	
1. From any display press [PROG] as many times as necessary to **'PROGRAM RUN'**	:PROGRAM RUN	The last selected program number is displayed. This may be 1 to 50.
2. Press [ENTER] to display **'Prg1: ⇕ 1'**		The program number can only be changed when the program is showing Reset.
3. Press [▲] or [▼] to select the program number/name	Prg: ⇕ 1 Seg: 1 Program 1	*Program x'* is the default text. It will show the *name* of the program if this has been set up in the 'Program Page'
	Run, Hold or Reset the program	
4. Press the right hand button to **Run** the program.	Prg: ⇕ 1 Seg: 1 Program 1	This display shows the actual segment number. It will progress to further segments while the program is running.
5. Press the right hand button again to **Hold** the program		Other displays can be viewed while the program is running using the appropriate buttons.
6. Press and hold the right hand button for at least 2 seconds to **Reset** the program		

Notes:-

1. If the digital inputs have been wired to external buttons, the programmer may be run, held or reset from these.
2. In 'Hold' the programmer is frozen at its current point. In this state you can make temporary changes to program parameters such as a target setpoint, ramp rates and dwells. Such changes can only be made in the current or subsequent segments and will only remain effective until the end of the currently running segment, when they will be overwritten by the stored program values.
3. In 'Reset' the programmer is inactive and the controller behaves as a standard controller, with the setpoint determined by the raise/lower buttons.
4. A list of parameters available for a running program is available under the menu PROGRAM RUN.

It is possible to set the program to run at a fixed time and day of the week. See Example 1.6.6.2.

1.7.4 To View and Edit A Running Program

From time to time it may be necessary to make temporary changes to the currently running program, for example, to change the target setpoint or to add time to a segment. The current running program can only be edited under the following conditions:-

- The program must be put into **'Hold'** or **'Reset'**
- Changes to the currently running segment are temporary and apply only to the current run
- Permanent changes should be made in the 'PROGRAM EDIT' pages, see previous section.
- Other programs can be created or edited when another program is running

1.7.4.1 Example: To Change the Target Setpoint or Time

Place the program in **'Hold'**. Then:-

Do This	This Is The Display You Should See	Additional Notes
1. From any display press [🗋] as many times as necessary to access '**PROGRAM RUN** page	🗋:PROGRAM RUN	
2. Press [↻] to select **'Seg Time Rem'** 3. Press [▲] or [▼] to increase a decrease the time remaining	↻:Seg Time Rem ⇕ 0:34:57	
4. Press [↻] to scroll to **'Prog Temp SP'** **5.** Press [▲] or [▼] to change the value	↻:Prog Temp SP [°C] ⇕ 112.0	

Now place the programmer in Run

1.7.5 Programmer Run Parameters

This table lists all the parameters which are available when a program is running.

Table Number: 1.6.5.			PROGRAM RUN
Parameter Name	**Parameter Description**	**Notes**	**Default**
↻:Prg: 1 Seg: 1 Program 1	Program number Segment number Program name	Read only	
Seg Time Rem 60.0	Time remaining to end of segment	In 'Hold' mode these parameters can be adjusted. The changes will only be valid for the current run of the program. The stored program values will not be changed	
Prog Temp SP 78.0	Current temperature program setpoint		
Prog Hum'ty SP 70.0	Current humidity program setpoint		
Prg: 1 Seg: 1 ■□	Current program event outputs		
Prog Start Day Never	Program start day Never Monday to Friday	Press ▲ or ▼ to set the start day and time. Set the start day to never to inhibit this function. The program will automatically start at the set time	Never
Prog Start Time 0:06:00	Program start time hrs:mins:secs		
Current Day Monday	Current day		
Current Time 0:11:58	Current time hrs:mins:secs		

1.7.5.1 Example: To Set Program Start Day and Start Time

With the programmer in **Reset**:-

Do This	This Is The Display You Should See	Additional Notes
1. Form the '**Prog Run'** menu press ⟳ to select **'Prog Start Day'** 2. Press ▲ or ▼ to select the day of the week	⟳:Prog Start Day ⬍ Monday	The program will start every Monday. Once the program has started set the day back to 'Never' so that the program does not restart on the following Monday
3. Press ⟳ to scroll to **'Prog Start Time'** **4.** Press ▲ or ▼ to set the start time	⟳:Prog Start Time ⬍ 06:30:00	The program will start every Monday at 06:30

1.8 AUTOTUNE

In most cases it will only be necessary to carry out the Autotune procedure when commissioning your controller.

A full description of tuning is given in the Engineering Handbook.

The description below shows how to adjust the parameters for autotuning a loop.

1.8.1 To Autotune the Temperature Loop

Do This	This Is The Display You Should See	Additional Notes
Set the temperature setpoint to the value at which you will normally operate the process.		
1. From any display press [Page] as many times as necessary until the '**AUTOTUNE'** page header is displayed	:AUTOTUNE	Autotune page is at Level 3 by default but may have been promoted to L1 or L2.
2. Press [Scroll] to display **'Tune OL'** 3. Press [▲] or [▼] to set the tune low limit 4. Repeat for **'Tune OH'**	:Tune OL [%[◆ 0	This sets the low and high output power limits which will apply only during the tuning process.
5. Press [Scroll] to display **'Autotune Loop'**	:Autotune Loop ◆ Off	
6. Press [▲] or [▼] to select the '**TEMPERATURE**' loop	:Autotune Loop ◆ TEMPERATURE	
7. Press [Scroll] to display the state of Autotuning	:Autotune State Tuning at SP	For further information on tuning, refer to the Installation and Operation Manual

1.9 CONFIGURATION EXAMPLE

The example given here shows how to re-configure the sensor input type. This is typical of the type of parameter which may need to be changed on site and is used to illustrate the principle of configuration.

WARNING
Configuration level gives access to a wide range of parameters which match the controller to the process. Incorrect configuration could result in damage to the process being controlled and/or personal injury. It is the responsibility of the person commissioning the process to ensure that the configuration is correct.

1.9.1 To Configure The Temperature Input Type

To change thermocouple, RTD or process input type:-

Do This	This Is The Display You Should See	Additional Notes
Enter configuration mode as described in section 1.6.1.		
1. Press [Page] as many times as necessary until the '**STANDARD IO'** page header is displayed	:STANDARD IO PV Input Page	
2. Press [Scroll] to display **'Channel Type'** 3. Press [▲] or [▼] to select the type of input	:Channel Type RTD	Choices most applicable to this application are: RTD, Thermocouple, 40mV, 80mV, mA, Volts,
4. Press [Scroll] to display **'Linearisation'** 5. Press [▲] or [▼] to select linearisation type	:Linearisation PT100	Choices most applicable to this application are: PT100, Linear, J-type, K-type, T-type, L-type, N-type

Further parameters are available in the same way. Refer to the Engineering Handbook for further details

1.10 ORDERING CODE

1 X26	2	3	4	5	6	7	8	9

2. Supply Voltage	
VH	85-264Vac
VL	20-29Vac/dc

3. Module 1 Retransmission output	
XX	Not fitted
First character	
T-	Temperature
H-	Humidity
Second character	
-Y	0-20mA
-A	4-20mA
-W	0-5Vdc
-G	1-5Vdc
-V	0-10Vdc

4. Module 3 Humidify + Dehumidify outputs	
XX	Not fitted
TP	Dual logic
RR	Dual relay
TT	Dual triac
DO	Dual 4-20mA

5. Module 4	
XX	Not fitted
Compressor on/off & by-pass outputs	
TT	Dual triac
RR	Dual relay
2nd retransmission output	
-Y	4-20mA
-A	0-20mA
-W	0-5Vdc
-G	1-5Vdc
-V	0-10Vdc

6. Module 5 Heating and cooling outputs	
XX	Not fitted
TP	Dual logic
RR	Dual relay
TT	Dual triac
DO	Dual 4-20mA

7. Module 6 Wet bulb input or transmitter supply	
XX	Not fitted
PV	Wet bulb input
MS	24Vdc humidity transducer supply

8. Digital Communications	
XX	Not Fitted
Modbus	
A2	RS232
F2	4-wire RS485/422
Y2	2-wire RS485

9. Manual	
XXX	None
ENG	English
FRA	French
GER	German
SPA	Spanish

Configuration (Optional)

1	2	3	4

1 & 2. wet & dry bulb inputs			
X	Not used		
Resistance thermometer		°C Range	°F
Z	PT100	-200 to 850	-325 to 1562
Thermocouples			
J	Type J	-210 to 1200	-340 to 2192
K	Type K	-200 to 1372	-325 to 2500
T	Type T	-200 to 400	-325 to 750
L	Type L	-200 to 900	-325 to 1650
N	Type N	-200 to 1300	-325 to 2370
Process inputs (linear)			
M	±100mV	Scaleable –1999 to 9999	
Y	0-20mA	Scaleable –1999 to 9999	
A	4-20mA	Scaleable –1999 to 9999	
W	0-5Vdc	Scaleable –1999 to 9999	
G	1-5Vdc	Scaleable –1999 to 9999	
V	0-10Vdc	Scaleable –1999 to 9999	

3. Units	
C	°C
F	°F

4. Humidity input	
X	NOT FITTED
N	0-1Vdc
V	0-10Vdc
Y	0-20mA
A	4-20mA
W	0-5Vdc