A. Chapter 4 Addendum for Issue 4

- Issue 4 of the 2704 User Guide applies to controller software version 6. For the user this includes the operation of the **Asynchronous Programmer** and additional wiring for the **TDS (Total Dissolved Solids) Input Module** required primarily for the control of TDS levels in boiler systems.
- This addendum should be used together with issue 3 of the 2704 User Guide and describes these changes.

A.1. TDS TERMINAL CONNECTIONS

TDS Module	TDS Control in boilers

The diagrams show general wiring connections.

Connection terminals vary from supplier to supplier.

Particular attention must be made to grounding and screen connections as recommended by the supplier

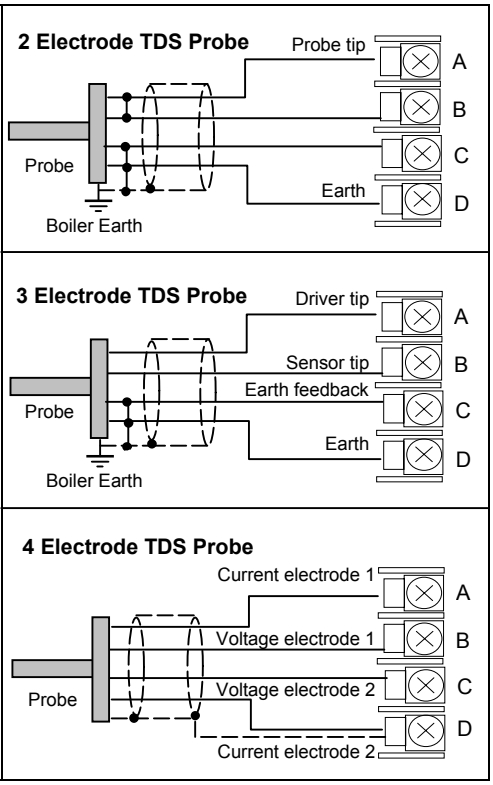


Figure A-1: Terminal Connection for the TDS Input Module

A.2. ASYNCHRONOUS PROGRAMMER

In an asynchronous programmer up to three PSPs can be run with a different number of segments, based on an independent time base. Each PSP can start at the same time or can be started individually.

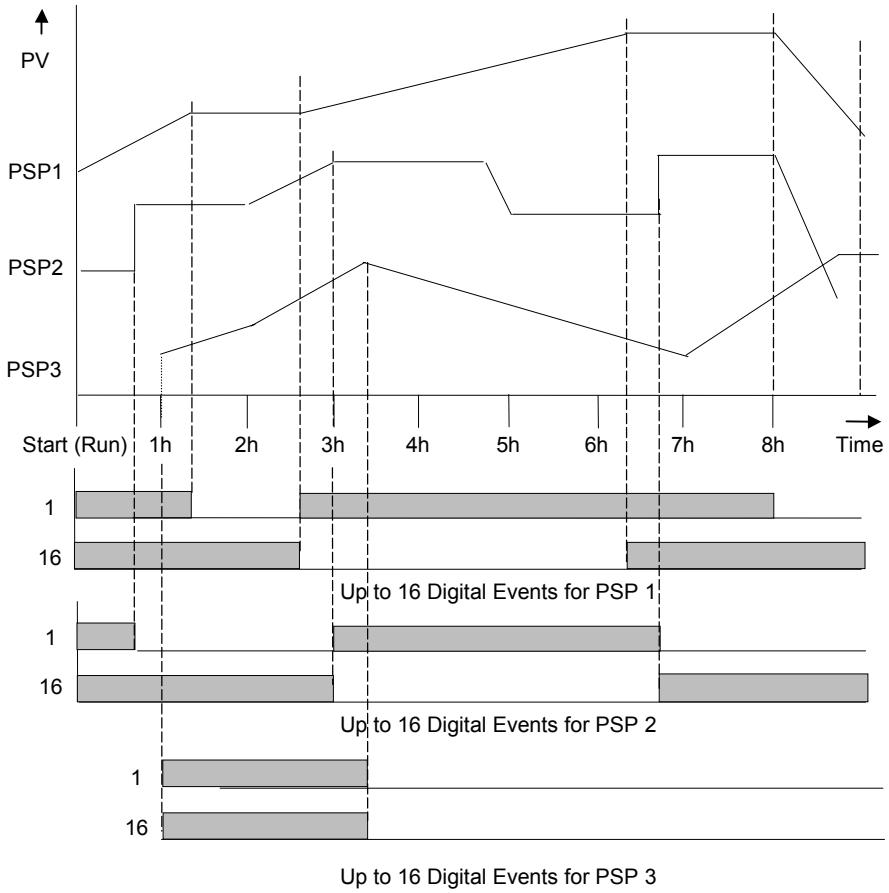


Figure A-2: An Example of an Asynchronous Setpoint Program

The operation of the asynchronous programmer is described where it differs from the synchronous programmer.

A.2.1. To Run, Hold or Reset a Synchronous Programmer

Press PROG .

Both types of programmer now include a delayed start facility. This is shown in the programmer status pop up window when the above button is pressed as shown:-

1. Press ▲ or ▼ to select the program to be run
2. Press ↻ to edit Delayed Start if it is required to run the program after a set period
3. Press ▲ or ▼ to set a time period for the delayed start
4. Press the PROG button again to select **'Run'**

The symbol in the top left of the display changes to 

A.2.2. To Hold a Program

A program can only be held from Run mode. Press the '**PROG'** button once. The pop up window is again displayed showing **'Run'.** Press the **'PROG'** button again. The message in the pop up window changes to **'Hold'**.

The symbol in the top left of the display changes to. 

A.2.3. To Reset A Program

Press the '**PROG'** button once. The pop up window is again displayed showing **'Run'** or **'Hold'.** Press the **'PROG'** button again and hold it pressed for 2 seconds. The message changes to **'Reset'**.

The symbol in the top left of the display changes to 

A.2.4. Asynchronous Programmer _ Summary of Features

The asynchronous programmer is described in section A.2.
A summary of the functions available in the asynchronous programmer is given below:-

- Creation of programs is the same as for the synchronous programmer, thus allowing for a different number of segments for each PSP.
- The number of available programs for each PSP is fixed at 20
- Twenty Program Groups are available. Program Groups are described in section A.2.5
- Up to three programs may be configured into each program group
- Programs in each Program group are executed asynchronously. They may all start at the same time although PSP1, PSP2 or PSP3 may be run, held or reset independently.
- Each program can have up to 16 event outputs and two user values per segment
- The first press of the PROG button allows the user to select the program group to run
- The user may select and modify programs in the selected group when the program is in Hold or Reset mode in the same way as a synchronous programmer
- Changes made to programs, other than Group 0, are permanent
- A delayed start parameter is available
- Changes made to Program Group 0 will be overwritten by stored program combinations for other groups when one of these is selected
- The Run/Hold button acts as a global Program Group control, i.e. all programs in the program group are put into the requested state
- Individual status parameters are available for each program in the group
- There is a Group Status parameter to control the state of the active run group
- Three programmer blocks are utilised to service each Program Group
- Programs not running as part of an active group may be run under independent control, provided the programmer block is not already in use by the active Program Group

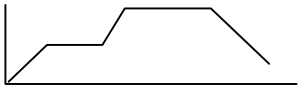
A.2.5. Program Groups

Up to three PSPs can be programmed into a single Program Group.

Example 1: Run Group 1

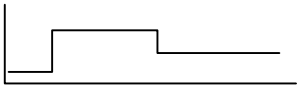
You may wish to run a Temperature program, a Pressure program and a Humidity program in a particular application. These are shown below as PSP1, PSP2 and PSP3 respectively. Each PSP program can store up to 20 profiles and each includes 16 event outputs. Any combination of these can be placed into a program group. Up to 20 program groups can be defined.

PSP1 - Temperature



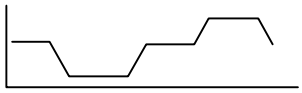
PSP1 is allocated to the first 20 program numbers - default names PSP1:01 to 20

PSP2 - Pressure



PSP2 to the next 20 - default names PSP2:01 to 20

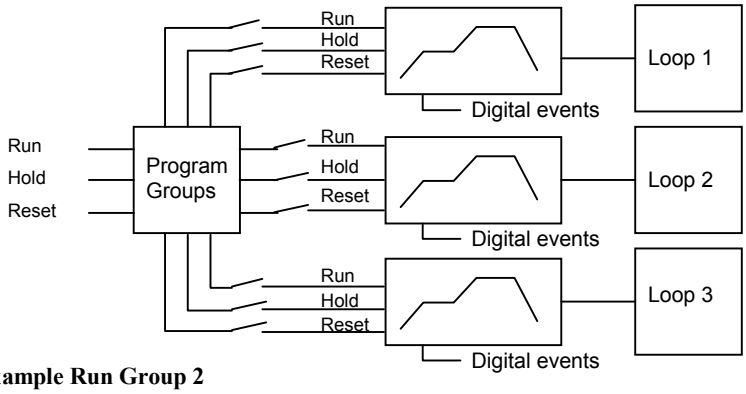
PSP3 - Humidity



PSP2 to the last 20 - default names PSP3:01 to 20

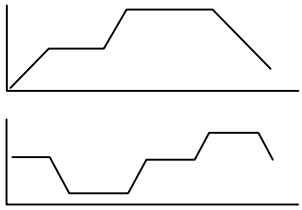
This is applicable over digital communications

Each program can be run, held or reset individually or together as a group.



Example Run Group 2

This might consist of a Temperature Profile and a Humidity profile



Up to 20 profiles can be stored in each PSP

A.2.6. PROGRAM GROUPS Group Edit Page

This page is available in operator and configuration level.

Table Number: A.2.6	These parameters allow you to set up individual Program Groups		PROGRAM GROUPS (Group Edit Page)	
Parameter Name	**Parameter Description**	**Value**	**Default**	**Access Level**
Group Number	To select the Group number Load Programs allows a program to be entered and run directly	'Load Programs' or select from 1 to 20	Load Programs	L1
Delayed Start	To set a time delay before the program will run	h:mm:ss	0:00:00	L3
Group Status	The program group can be controlled from this parameter The status of the program is also shown by text and symbols at the top of this display	Reset Run Hold Complete		L1
PSP1	To select the profile to be run in the group. Not Used means PSP1 is not part of the group 01:PSP1:P1 means PSP1 is selected from program 1 to 20	Not Used 01:PSP1:P1 to 20:PSP1;P20		L1
PSP2	As above			L1
PSP3	As above			L1
Group Name	A user configurable name By default if Group Number = Load Programs then Group Name = USER SELECT. To customise the name press △ or ▽ to change the digit with the flashing cursor. Press ↻ to advance the cursor	USER SELECT Group 1 to 20	GROUP NAME	L1
Group Run	Group Run	Off On	R/O	L3 R/O
Group Hold	Group Hold	Off On	R/O	L3 R/O
Group Reset	Group Reset	Off On	R/O	L3 R/O
Group End	Group End	Off On	R/O	L3 R/O

A.2.7. PROFILE SETPOINT PAGES

These pages are similar to the PROGRAM EDIT page available in the synchronous programmer. They allow you to set up each PSP.

There are four pages:-

1. The Run General page available in Operator Level 1. Provides running information of the PSP
2. The Run Segment page available in Operator Level 1. Provides running information of each segment of the PSP
3. The Program Edit page available in Operator Level 1. Allows editing of the overall PSP
4. The Segment Edit page available in Operator Level 1. Allows editing of each segment in the PSP

A.2.8. PSP1 (2 OR 3) PROFILE Run General Pages

This page is similar to the 'PROGRAM RUN' page for the synchronous programmer and provides information on the running program.

Table Number: A.2.8	**These parameters p**rovide running information of the PSP This page is available in operator and configuration level		**PSP1 (2 or 3) PROFILE (Run General)**	
Parameter Name	**Parameter Description**	**Value**	**Default**	**Access Level**
Program	Number of the running program	*PSP1:01* to *PSP1:20* Or name from user text	PSP1:01	L3
Prog DOs	Digital outputs summary (Up to 16) These are shown in this format if 'Named Dos' = 'No'	□□■□ ■ = Off □ = On		L3
Prog DO 1 (to 16)	If programmer event outputs have been configured, then, as an alternative to the previous presentation the event can be given a name. [PROGRAM EDIT (Options) – Named Dos? = Yes]	The name of the event is shown with its state On or Off	Off	L3
Time Remaining	Time remaining to end of program (up to 24 hrs)	Not Running or h:mm:ss		L3
Days Remaining	Number of days left for the programmer to run	0 to 255		L3

Fast Run	Allows the program to fast run	No Yes	No	L3. Alterable in reset or complete
Delayed Start	Delay before the start of the program	h:mm:ss	0:00:00.0	L3
Program Status	Controls the program when not part of a group	Reset Run Hold Complete		L1
Prog Time Elap	Program time elapsed (up to 24 Hrs)	h: mm: ss		L3 R/O
Prog Cycle Rem	Remaining number of cycles	1 to 999		L1 R/O Alterable in Hold (only shown if 'Prog Cycles' > 0)
Total Segments	Number of segments in the running program	0 to 100		L1 Alterable in Hold
Segment Number	The currently running segment number	1 to 100		L1 R/O
Segment Type	Running program segment type Profile = normal segment End Segment = End of prog Go Back =repeat part of prog	Profile End Segment Go Back	Profile	L1 R/O
Segment Name	A user defined name for the segment		Default Text	L1 R/O
Seg Time Rem	Time remaining in the current segment	d: h: m: s		L1 R/O Alterable if Time To Target prog and in Hold
Wait Status	Wait Status	No Wait Event A Event B Event C	No Wait	L1 R/O
Wait Condition	Wait condition for the running segment	No Wait Event A Event B Event C	No Wait	L1 Alterable in Hold

Prog User Val 1	Active Programmer User Val 1. Name is user configurable			L1
Prog User Val 2	Active Programmer User Val 2. Name is user configurable			L1
GoBack Rem	Number of repeat cycles remaining	1 to 999		L1 Alterable in Hold
End Action	The state required in the end segment	Dwell Reset		L1 R/O
Prog Reset DO	These are the digital events in Reset and are shown in this format if 'Named Dos' = 'No' The number of DO values is set by 'Num of Prog DOs' PROGRAM EDIT (Options) Not shown if Num of Prog Dos = 'None'	□□■□ (up to 16) ■ = Off □ = On		Only shown if configured. Alterable in Reset
Prog DO 1 (to 16)	If programmer event outputs have been configured, then, as an alternative to the previous presentation, the event can be given a name. [PROGRAM EDIT (Options) – Named Dos? = Yes]	The name of the event is shown with its state On or Off	Off	L1
Reset *UsrVal1*	Reset prog user 1 values. Name is user configurable			L1
Reset *UsrVal1*	Reset prog user 1 values. Name is user configurable			L1

A.2.9. PSP1 (2 OR 3) PROFILE Run Segment Pages

Table Number: A.2.9	These parameters show the running conditions in each segment of the running program		PSP1 (2 or 3) PROFILE (Run Segment Page)	
Parameter Name	**Parameter Description**	**Value**	**Default**	**Access Level**
Seg Time Rem	Segment time remaining	h: m: s		L1
PSP1 Type	PSP1 type Name is user configurable	Step Dwell Ramp		L1
PSP1	Working setpoint for profiled setpoint 1. Name is user configurable	Display range Note 1		L1. Alterable in Hold
PSP1 Target	Running segment target for profiled setpoint 1. Name is user configurable	Display range Note 1		L1. Alterable in Hold
PSP1 Dwell Time	Remaining dwell time for PSP1	h: m: s		L1. Alterable in Hold
PSP1 Rate	PSP1 ramp rate			L1
PSP1 HBk Appl	PSP1 holdback applied	No Yes		L1

Note 1:- Range limited by user defined upper and lower limits. If HHHHH or LLLLL appear this indicates out of range high or low respectively.

A.2.10.PSP1 (2 OR 3) PROFILE Program Edit Parameters

This page is similar to the PROGRAM EDIT (Program Page) in the synchronous programmer

Table Number: A.2.10	**These parameters set up the overall program.**		**PSP1 (2 or 3) PROFILE (Program Edit)**	
Parameter Name	**Parameter Description**	**Value**	**Default**	**Access Level**
Program Number	Selects the program number to be edited. If 'Profile Lock' ≠ 'Unlocked', only those programs which were created prior to setting the 'Profile Lock' parameter can be selected.	*PSP1:01* to *PSP20:20* Or name from user text	PSP1:01	L1
Edit Function	Allows a program to be copied and pasted. The example in section A.2.13 describes how this feature is used	None Copy Program Paste Program	None	L1
Hbk Mode	Holdback mode None = no holdback Per prog = applied over the whole program Per seg = active in every segment	None Per Program Per Segment	None	L1
PSP1 HBk Type	Holdback type for *PSP1* (per program) These are deviations between SP and PV Fine and course holdback allows two levels of holdback to be applied to different segments.	Off Fine Lo Fine Hi Fine Band Course Lo Course Hi Course Band	Off	L1 Only displayed if Per Program configured
PSP1 FineHBk	Fine holdback value for *PSP1*	Display Range	0	L1. Only shown if HBk Type ≠ Off
PSP1 CourseHBk	Course holdback value for *PSP1*	Display Range	0	
Rate Units	Rate units Only if program Type = Ramp Rate	Per Second Per Minute Per Hour		L1

	(PROGRAM GROUPS 0ptions Page)			
Hot Start	Allows hot start to be applied. Only appears if Hot Start = Yes (PROFILE SP1 Options Page)	Disabled Enabled	None	L1
Program Cycles	The number of times a program repeats.	Cont. to 999	Cont.	L1
End Action	Defines the action in the end segment. Dwell - the program will dwell indefinitely at the conditions set in the end segment. Reset - the program will reset to the start conditions.	 Dwell Reset		L1
Program Name	Allows a user defined name to be given to the program number	User string Each character can be set in turn		L1

A.2.11. PSP1 (2 or 3) PROFILE Segment Parameters

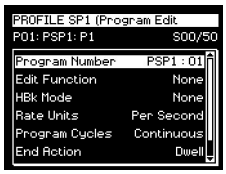
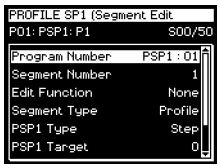
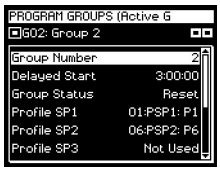
This page is similar to the PROGRAM EDIT (Segment Page) in the synchronous programmer

Table Number: A.2.11.	These parameters allow you to set up each segment in the program		PSP1 (2 or 3) PROFILE (Segment Edit)	
Parameter Name	**Parameter Description**	**Value**	**Default**	**Access Level**
Program	Selects the program number to be edited	*PSP1:01* to *PSP1:20* Or from user text	PSP1:01	L1
Segment Number	Selects the segment number to be edited	1 to 100		L1
Edit Function	Allows a segment to be inserted The example in section A.2.14. describes how this feature is used	None Insert Segment Delete Segment	None	L1
Segment Type	Segment type	Profile End Segment Go Back	Profile	L1
Profile = a normal segment End Segment = the last segment in the program (press ↵ to confirm) Go Back = repeat part of program. Not shown for segment 1.				
PSP1 Type	Profile setpoint 1 type	Step Dwell Ramp		L1
Only shown if Program Type = Ramp Rate and program not in End				
PSP1 Target	Profile setpoint 1 target value	SP1 lo limit to SP1 hi limit	0	L1
PSP1 Dwell Tm	Profile setpoint 1 dwell time	d : h : m : s	0:00:00.0	L1
Only shown if Program Type =Ramp Rate; Segment Type = Dwell and program not in End				
PSP1 Rate	Profile setpoint 1 rate			L1
Only shown if Program Type =Ramp Rate; Segment Type = Dwell and program not in End				
PSP1 Hbk Type	Profile setpoint 1 holdback type Only shown if holdback is configured per segment	Off Fine Lo Fine Hi Fine Band Course Lo Course Hi Course Band	Off	L1

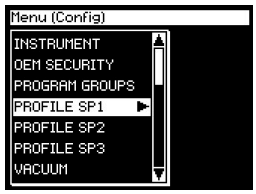
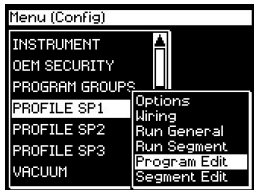
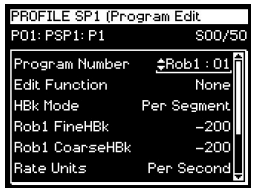
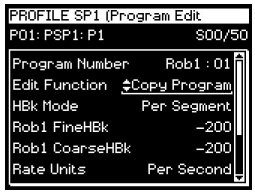
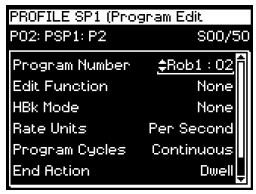
Seg Duration	Segment duration for Time to Target programmer only	d : h : m : s	0:00:00.0	L1
Wait Event	Wait if selected event is true Only shown if wait events configured	No wait Event A Event B Event C	No Wait	L1
Prog User Val 1	Allows a Programmer User Val to be chosen. User Values are described in the Engineering Handbook. Only shown if Prog User Val 1 is configured	0 to 100	0	L1
Prog User Val 2	Allows a Programmer User Val to be chosen. User Values are described in the Engineering Handbook. Only shown if Prog User Val 2 is configured	0 to 100	0	L1
Prog DO Values	Digital outputs summary These are shown in this format if 'Named Dos' = 'No' The number of DO values is set by 'Num of Prog DOs' PROFILE SP1 (Options) Not shown if Num of Prog Dos = 'None'	□□■□ (Up to 16) ■ = Off □ = On		L1
Seg Edit 1 (to 16)	If programmer event outputs have been configured, then, as an alternative to the previous presentation the event can be given a name. [PROGRAM EDIT (Options) – Named Dos? = Yes]	The name of the event is shown with its state On or Off	Off	L1
GoBack to Seg	Allows repeat segments to be set up within a profile. Go back defines the point in the program where the repeat segments are entered.	1 to no. of segments		L1
Go Back Cycles	Sets up the number of times the segments are repeated	1 to 999	1	L1
The above two parameters are only shown if segment type is Go Back				
Segment Name	Allows a user defined name to be chosen	Default Text to 50:Usr 50	Default Text	L1

A.2.12.EXAMPLE: To Set Up and Run Program Groups

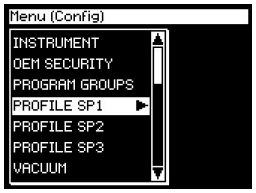
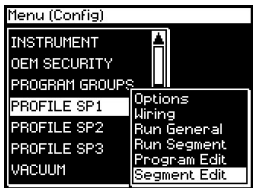
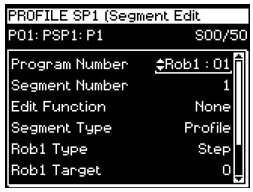
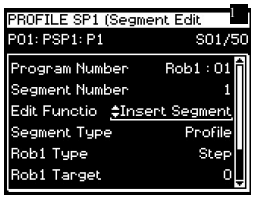
Using the two examples from section A.2.5 and the general navigation procedures:-

Do This	This Is The Display You Should See	Additional Notes
1. Set up a temperature program in PSP1:01		See section A.2.10 for the full list of parameters Set each parameter to suit your application
2. Set up each segment in the program		See Table A.2.10 for the full list of parameters Set each parameter to suit your application
3. Set up a pressure and Humidity program in PSP2:01 and PSP3:01		These are the same as Example 1 shown in section A.2.5.
4. Set up further programs as required in PSP1:02 (to 20), PSP2:02 (to 20), and PSP3:02 (to 20)		These are the same as Example 2 shown in section A.2.5.
5. When all PSPs have been set up, place them in Groups		
6. Repeat for futher groups		In this example a delayed start of 3 hours has been placed on Group 2 which will run two profiles PSP1:P1 and PSP2:P6
7. To run the program press PROG This is also described in section A.3.3		Select the group to run. Press PROG again to run the selected group

A.2.13.EXAMPLE: To Copy a Program

Do This	This Is The Display You Should See	Additional Notes
1. From any display press [D] to access the page header menu. 2. Press [▲] or [▼] to select '**PROFILE SP1'**		
3. Press [↵] to select sub-headers 4. Press [▲] or [▼] to select **'Program Edit'**		
5. Press [↵] to select parameters and again to edit **'Program Number'** 6. Press [▲] or [▼] to select the program number to be copied		In this case the program has been given a name by the user
7. Press [↵] to scroll to **'Edit Function'** 8. Press [▲] or [▼] to **'Copy Program**		When the program is copied the display returns to 'None'
9. Press [↵] and [▲] to scroll back to **'Program Number'** 10. Press [▲] or [▼] to select the program to paste to – in this case program 2		
11. Press [▲] or [▼] to **'Paste Program**		Press [↵] or [D] to confirm or cancel. If no button is pressed for 10 seconds the display reverts to previous and Paste is cancelled.

A.2.14.EXAMPLE: To Insert a Segment into a Program

Do This	This Is The Display You Should See	Additional Notes
1. From any display press [D] to access the page header menu. 2. Press [▲] or [▼] to select '**PROFILE SP1'**		
3. Press [↻] to select sub-headers 4. Press [▲] or [▼] to select **'Segment Edit'**		
5. Press [↻] to select parameters and press again to edit **'Program Number'** 6. Press [▲] or [▼] to select the program number to be edited		In this case the program has been given a name by the user
7. Press [▲] or [▼] to scroll to **'Edit Function'** 8. Press [▲] or [▼] to **'Insert Segment'** 9. Press [↻] to confirm or [D] to cancel	 	In this case segment 1 is inserted and the total segment count increases by one If no button is pressed for 10 seconds the display reverts to previous.
		If all segments in the program are already configured the message 'Program Full' is shown

A.2.15.Running an Asynchronous Programmer

As with the synchronous programmer the group of programs can be run using:-

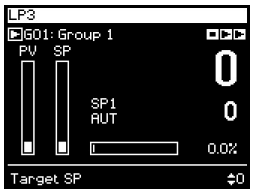
1. The ‘PROG’ button.
2. A digital input configured to activate all configured PSPs
3. Digital inputs configured to run each PSP separately
4. Via a command from digital communications

If the PROG button is used (as described in the following section), a pop-up window is shown which allows you to choose the format of the program. The other methods listed above are designed for remote or fixed operation in which case the pop-up window is not displayed.

The program may also be controlled using the relevant parameters in the lists. These are:-

5. ‘Group Status’ in the PROGRAM GROUPS Active Group list. This allows all configured PSPs to be started together
6. ‘Program Status’ in the PSP1 (2 or 3) PROFILE Run General list. This allows each PSP to be run separately.

A.2.16.Example: To Run a Program Using the PROG Button

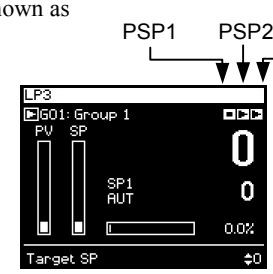
Do This	This Is The Display You Should See	Additional Notes
1. From any display Press PROG		The Run Group Status pop-up will be shown. The following conditions may be selected:- Group to run: Group 1 to Group 20 or USER SELECT (Press △ or ▽ to choose) Group 1 to 20 selects pre-set profiles as set up in PROGRAM GROUPS Active Group page. If the user changes the profiles in this pop-up display the changes become permanent. (Press ↻ to scroll down the list) USER SELECT will choose the last selected Program Group but if the profiles are changed they are only applicable to the current run
2. Press PROG again to **Run** the program		
3. Press PROG again to **Hold** the program 4. Press PROG and hold for 3 seconds to **Reset** the program		Profile SP1: Not Used or 01:*PSP1:P1* to 20:*PSP1:20* Not Used means that the profile will not be run in this program 01:PSP1:P1 will select PSP1 Program 1 to PSP1 Program 20 Profile SP2: Not Used or 01:*PSP2:P1* to 20:*PSP2:20* Profile SP3: Not Used or 01:*PSP3:P1* to 20:*PSP3:20*
This is an example of an Overview display Note the symbols shown on each of these displays as described in the following section		Delayed Start: This can be set between 0:00:00 and 500:00:0 hrs. This value counts down when Run is selected. In the event of a power fail, delayed start retains its value prior to the power fail, but the request to run is cancelled.

A running program may be interrogated and changes made to segments in the same way as a synchronous programmer.
The programmer mimic can also be displayed in the same way as a synchronous programmer

A.2.17.Asynchronous Programmer Status Bar

The programmer status bar is shown in the top right hand corner of the loop overview displays (as selected by the LOOP button).

They are shown as



The view shown here is applicable when Groups are used. The number of displayed status symbols depends on the number of programmer blocks used, but the order of display is always left to right – with no gaps.
When Groups are not used the program status is associated with the individual loop pages.

Symbols Used


Reset


Run


Hold


The current status is shown in inverse, e.g. PSP is in Hold

These symbols are also used on other views, for example, the Run Group Status pop-up shown in the previous section.

A.3. ORDER CODE

A.3.1. Hardware Code

The 2704 has a modular hardware construction, which accepts up to six plug-in modules and two comms modules. Eight digital IO and a relay form part of the fixed hardware build.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

1	Controller Type
2704	Standard
2704f	Profibus

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

3	Loops/Programs
First Digit	
1_ _	One Loop
2_ _	Two Loop
3_ _	Three Loop
Second Digit	
_XX	No Programs
_2_	20 Programs (1)
_5_	50 Programs
Third Digit	
_ XX	No Programs
_ _1	1 Profile
_ _2	2 Profile
_ _3	3 Profile

4	Application
XX	Standard
ZC	Zirconia
V1	1 Gauge Vacuum
V3	3 Gauge Vacuum

5 - 9	I/O Slots 1 3 4 5 6
XX	None Fitted
R4	Change Over Relay
R2	2 Pin Relay
RR	Dual Relay
T2	Triac
TT	Dual Triac
D4	DC Control
D6	DC Retransmission
PV	PV Input (slots 3 & 6)
TL	Triple Logic Input
TK	Triple Contact Input
TP	Triple Logic Output
MS	24Vdc Transmitter PSU
VU	Potentiometer Input
G3	5Vdc transducer PSU
G5	10Vdc transducer PSU
AM	Analogue input (not in slot 5)
DP	Dual DC (porbe) input (slots 3 & 6)
LO	Isolated single logic OP
DO	Dual 4-20mA OP/24Vdc PSU (slots 1, 4, 5)
HR	Hi resloution DC retrans & 24Vdc PSU (slots 1, 4, 5)
TD	TDS input (7)

10	Memory Module
XX	Not Fitted

11 -	Comms H
XX	None Fitted
A2	232 Modbus
Y2	2 wire EIA-485
F2	4 wire EIA-485
AE	232 Bisynch
YE	2 Wire 485 Bisync
FE	4 Wire 485 Bisync
PB	Profibus
DN	DeviceNet

12	Comms J
XX	None Fitted
A2	232 Modbus
Y2	2 wire EIA-485
F2	4 wire EIA-485
M1	232 Master
M2	2-wire 485 Master
M3	4-wire 485 Master

13	Manual
ENG	English
FRA	French
GER	German
NED	Dutch
SPA	Spain
SWE	Sweden
ITA	Italian

14	Toolkit Blocks
XX	Standard
U1	16 An & 16 Dig
U2	24 An & 32 Dig

15	Config Tools
XX	None
IT	iTools

Hardware notes:

1. *Basic controller includes 8 digital registers, 4 timers, 4 totalisers*
2. *Toolkit 1 includes 16 analogue, 16 digital, pattern generator, pulse programmer & 4 user values*
3. *Toolkit 2 includes Toolkit 1 plus extra 8 analogue, 16 digital operations and 8 user values*
4. *Dual analogue input suitable for carbon probes.(iputs not isolated from each other)*
5. *EI-Bisynch includes only a subset of parameters*
6. *The HR module has one high resolution DC output and one 24Vdc power supply*
7. *Only available on 2704*

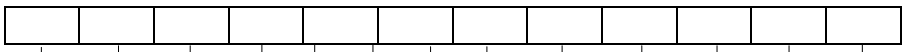
Hardware Code Example

2704/VH/323/XX/RR/PV/D4/TP/PV/XX/A2/XX/ENG/U1/IT

Three loop controller with capability to store 20 three profile programs. Supply voltage 85 - 264 Vac.
Modules: 2 x PV input, 1 x Dual relay, 1 x DC control, 1 x Triple logic output, EIA-232 Comms.
16 analogue and 32 digital operations and iTools supplied with controller.

A.3.2. Configuration Coding (optional)

The controller supplied in accordance with the hardware code on the previous page requires to be configured. Configuration is carried out using iTools. Alternatively, for simple applications the controller may be supplied pre-configured using the following code:-



1 - 3	Loop function
First Digit	
XXXX	None
S___	Standard PID
C___	Cascade
R___	Ratio
O___	Override (7)
Other Digits	
_PID	PID control
_ONF	On/Off control
_PIF	PID/OnOff control
_VP1	VP w/o feedback
_VP2	VP with feedback

4 - 6	PV Inputs
X	None
J	J Thermocouple
K	K Thermocouple
T	T Thermocouple
L	L Thermocouple
N	N Thermocouple
R	R Thermocouple
S	S Thermocouple
B	B Thermocouple
P	P Thermocouple
C	C Thermocouple
Z	RTD/PT100
A	4-20mA linear
Y	0-20mA linear
V	0-10Vdc linear
W	0-5Vdc linear
G	1-5Vdc linear
Custom (Replace C)	
C	Custom curve
D	D Thermocouple
E	E Thermocouple
1	Ni/Ni18%Mo
2	Pt20%Rh/Pt40%Rh
3	W/W26%Re(Eng)
4	W/W26%Re(Hos)
5	W5%Re/W26%Re(Eng)
6	W5%Re/W26%Re(Hos)
7	Pt10%Rh/Pt40%Rh
8	Exergen K80 IR Pyro

7	Analogue Input
XXX	None
P2_	PV Loop 2
P3_	PV Loop 3
S1_	SP Loop 1
S2_	SP Loop 2
S3_	SP Loop 3
A1_	Aux PV Loop 1
A2_	Aux PV Loop 2
A3_	Aux PV Loop 3
L1_	Ratio lead PV Loop 1
L2_	Ratio lead PV Loop 2
L3_	Ratio lead PV Loop 3
Input range	
Select third digit from table 1	

Table 1	
A	4-20mA linear
Y	0-20mA linear
V	0-10Vdc linear
W	0-5Vdc linear
G	1-5Vdc linear

Dual 4-20mA/24Vdc Tx OP	
HHX	Heat OP Lps 1 & 2
_HC	Heat Cool
_HT	Ch 1 Heat, Ch 2 Tx
TTX	Both chs Txmtr
Changeover Relay	
_HX	Heat
_CX	Cool
Potentiometer input	
_VF	VP Heat Feedback
_RS	Remote SP
Analogue Input *	
_R_	Setpoint
Aux & lead PV inputs *	
_L_	Ratio lead input
_B_	Aux PV input
* For input range select third digit from table 1	
High Res DC Output	
-TA	4-20mA PV retran
-TV	0-10V PV retran
-SA	4-20mA SP retran
-SV	0-10V SP retran

8 - 12	Slot function
Loop number	
XXX	Unconfigured
1__	Loop No 1
2__	Loop No 2
3__	Loop No 3
Single relay or triac	
_HX	Heat
_CX	Cool
Dual relay or triac	
_HC	PID Heat & Cool
_VH	VP Heat
_AA	FSH & FSH
_AB	FSH & FSL
_AC	DH & DL
_AD	FSH & DH
_AE	FSL & DL
_AF	FSH & FSL
_AG	FSH & DB
_AH	FSL & DB
_AJ	DB & DB
HHX	Heat O/P lps 1 & 2
CCX	Cool O/P lps 1 & 2
P12	Prog events 1 & 2
P34	Prog events 3 & 4
P56	Prog events 5 & 6
P78	Prog events 7 & 8
Triple logic output	
_HX	Ch1 Heat
_CX	Ch1 Cool
_HC	Ch1 Heat, Ch2 Cool
HHX	Heat O/P lps 1 & 2
HHH	Heat O/P lps 1,2 & 3
Single DC outputs	
_H_	PID Heat
_C_	PID Cool
_T_	PV Retransmission
_S_	SP Retransmission
For output range select third digit from table 1	
Precision PV input	
_PV	PV input Module
_PA	Aux PV Input (8)
_PL	Ratio lead input

General Notes

1. Loop 1 PV defaults to main input on microboard. Loop 2 and 3 PV inputs must be fitted in I/O slots 3 or 6 or be assigned to the analogue input.
2. This alarm configuration refers to loop alarms only. One selection per loop is allowed. Additional alarms are available for the user to configure.
3. Thermocouple and RTD inputs assume sensor min and max values with no decimal point.
4. Linear inputs are ranged 0-100%, no decimal point.
5. Temperature inputs will be C unless ordered by USA where F will be supplied.
6. Remote setpoints assume loop min & max ranges.
7. VP1 or VP2 not available with override function.
8. For cascade and override inputs only.
9. HR module should be used in feedback mode.

A.3.3. Quick Start Code Example:

SVP1/SPID/SPID/K/Z/A/S1A/1VH/2PV/2HV/3HC/3PV

This code configures the hardware specified on page A2 to be:

Loop1: Valve position control, Type K input, Ch1 VP output in slot 1, 4-20mA remote setpoint input.
Loop 2: PID control, RTD input in slot 3, 0-10Vdc Ch1 output in slot 4.
Loop 3: PID control, 4-20mA input in slot 6, Logic Ch1/Ch2 output in slot 5.

A.4. TECHNICAL SPECIFICATION

Changes

A.4.1. Digital input modules

Logic inputs	Current sinking : inactive 10.8Vdc to 30Vdc at 2.5mA active -3 to 5Vdc at <-0.4mA

A.5. SETPOiNT PROGRAMMER

Programmer modes	Synchronous or asynchronous
Programmer types	Time to Target or Ramp Rate
No of programs	A maximum of 60 programs assignable over 600 segments for a time to target programmer and 480 segments for a ramp rate programmer. A program can consist of up to 3 variables. Programs can be given user defined 16 character names
Event outputs	Up to 16, can be assigned individually to segments or called as part of an event group

A.5.1. Advanced functions

Application blocks	32 digital operations 32 patch wiring operators 24 analogue calculations 3 multiple operators
Timers	4, On Pulse, Off delay, one shot and min-On
Totalisers	4, trigger level & reset input
Real time clock	Day of week and time
Pattern generators	16 x 16, 2 off

A.5.2. TDS module

Measurement frequency	1KHz
Conductivity range	40 to 500 000 µS (equivalent resistance 20 to 250 000Ω)
Maximum cable length	100m