

5 Setpoint Rate/Ramp/Program Operation

5.1 Setpoint Rate

Introduction

When you have configured a SETPOINT RATE, it will apply immediately to local setpoint change.

Configuration check

Make sure:

- SPRATE is enabled
- SPRAMP and SPPROG are disabled
- A Rate Up (EUHRUP) or Rate Down (EUHRDN) value has been configured in Engineering units per hour.

ATTENTION: A value of 0 will imply an immediate change in setpoint, that is, NO RATE applies. See Subsection 3.5– Configuration group “SPRAMP” for details.)

Operation

When a change to local setpoint is made, this controller will ramp from the original setpoint to the “target” setpoint at the rate specified.

The current setpoint value can be viewed at Sn on the lower display.

Power outages

If power is lost before the “target” setpoint is reached, upon power recovery, the controller powers up with Sn = Current PV value and it automatically “Restarts” from Sn = current PV value up to the original “target” setpoint.

5.2 Setpoint Ramp

Introduction

When you have configured a SETPOINT RAMP, the ramp will occur between the current local setpoint and a final local setpoint over a time interval of from 1 to 255 minutes. You can RUN or HOLD the ramp at any time.

Configuration Check

Make sure

- SPRAMP is enabled

- SP RATE and SPPROG are disabled
- A Ramp Time (TIMIN) in minutes has been configured
- A final setpoint value (FINLSP) has been configured. See Subsection 3.5 – Configuration group “SPRAMP” for details.

Operation

Running a Setpoint Ramp includes starting, holding, viewing the ramp, ending the ramp and disabling it. See Table 5-1 Running A Setpoint Ramp.

Table 5-1 Running A Setpoint Ramp

Step	Operation	Press	Result
1	Select Automatic Mode	MAN/AUTO	“A” indicator is on. <i>Upper Display</i> = Hold and PV value <i>Lower Display</i> = SP and Present value
2	Set Start Setpoint	DISPLAY	Until start SP value is in lower display <i>Upper Display</i> = Hold and PV value <i>Lower Display</i> = SP and start SP value
3	Start the Ramp	RUN/HOLD	You will see <i>Upper Display</i> = Run and a changing PV value <i>Lower Display</i> = SP and a changing SP value increasing or decreasing toward a final SP value
4	Hold/Run the Ramp	RUN/HOLD	This holds the ramp at the current setpoint value. Press again to continue.
5	View the remaining ramp time	DISPLAY	Until you see <i>Upper Display</i> = RUN or HOLD and the PV value <i>Lower Display</i> = RP xx HH.MM (time remaining)
6	End the Ramp		When the final setpoint is reached, “RUN” changes to “HOLD” in the upper display and the controller operates at the new final setpoint.
7	Disable SPRAMP		See Section 3.5– Configuration group “SPRAMP” for details.

Power Outage

If power is lost during a ramp, upon power-up the controller will be in HOLD and the setpoint value will be the setpoint value prior to the beginning of the setpoint ramp. The ramp is placed in hold at the beginning.

Configure the mode at Set up Group “CONTROL”, function prompt “PWRUP”. See Section 3.10– CONTRL GROUP FUNCTION Prompts.

5.3 Setpoint Ramp/Soak Programming

Introduction

Setpoint Ramp/Soak Programming lets you configure six ramp and six soak segments to be stored for use as one program or several small programs. You designate the beginning and end segments to determine where the program is to start and stop.

Review program data and configuration

While the procedure for programming is straightforward, and aided by prompts, we suggest you read "Program Contents". Table 5-2 lists the program contents and an explanation of each to aid you in configuration. Then refer to Subsection 3.5– Configuration to enable and configure the setpoint program.

NOTE: SPRATE and SPRAMP must be disabled to enable SP PROG (Set Point Programming).

Fill out the worksheet

Refer to the example in Figure 5-1 and draw a Ramp/Soak Profile on the worksheet provided in Figure 5-2 and fill in the information for each segment. This will give you a record of how the program was developed.

Operation

Refer to Table 5-3 Run/Monitor the program.

Program Contents

Table 5-2 lists all the program contents and a description of each.

Power outage

ATTENTION If power is lost during a program, upon power-up the controller will be in hold and the setpoint value will be the setpoint value prior to the beginning of the setpoint program. The program is placed in hold at the beginning. The mode will be as configured under "PWR UP" in the "CONTROL" group.

Table 5-2 Program Contents

Contents	Definition
Ramp Segments	<p>A ramp segment is the time or rate of change it takes to change the setpoint to the next setpoint value in the program.</p> <ul style="list-style-type: none"> • Ramps are odd number segments. • Ramps are configured in either Time or Engineering Units per Minute or EU per Hour (See Ramp Unit below). <p>ATTENTION Entering “0” will imply an immediate step change in setpoint to the next soak.</p>
Ramp Unit	<p>The Ramp Unit selection determines the engineering units for the ramp segments.</p> <p>The selections are:</p> <ul style="list-style-type: none"> • TIME = Hours:Minutes (XX:XX) Range: 0-99 hrs: 0-59 min • EU-H = Degrees/Hour OR EU-M = Degrees/Minute (Range – 0-999)
Soak Segments	<p>A Soak Segment is a combination of Soak Setpoint (value) and a Soak Time (duration)</p> <ul style="list-style-type: none"> • Soaks are even number segments. • The Soak Setpoint value must be within the setpoint high and low range limits in engineering units. • Soak Time is the duration of the soak and is determined in: TIME - Hours:Minutes Range = 0-99 hrs:59 min.
Start Segment	<p>The Start Segment number designates the first Ramp segment. <i>Range = 1 to 11</i></p>
End Segment	<p>The End Segment number designates the number of the last Soak segment. <i>Range = 2 to 12</i></p>
Recycle number	<p>The Recycle number allows the program to recycle a specified number of times from beginning to end. <i>Range = 0 to 99</i></p>
Guaranteed soak	<p>All soak segments can have a deviation value of from 0 to ± 99 (specified by SOK DEV) which guarantees that value for that segment time.</p> <p>The soak deviation value is the number in engineering units, above or below the setpoint, outside of which the timer halts. The range is 0 to ± 99.</p> <p>Soak deviation values >0 guarantee that the soak segment’s process variable is within the \pm deviation for the configured soak time. Whenever the \pm deviation is exceeded, soak timing is frozen.</p> <p>The guaranteed soaks feature is disabled whenever the deviation value is configured to 0.</p>
Program state	<p>The Program State selection determines whether the program is in the HOLD state or Disabled (DIS) after completion of the program.</p>
Program termination state	<p>The program termination state function determines the status of the controller upon completion of the program. The selections are:</p> <ul style="list-style-type: none"> • LAST = controls to last setpoint • FSAF = manual mode and Failsafe output.
Reset Program to Beginning	<p>When enabled, this selection allows you to reset the program to the beginning from the keyboard.</p>

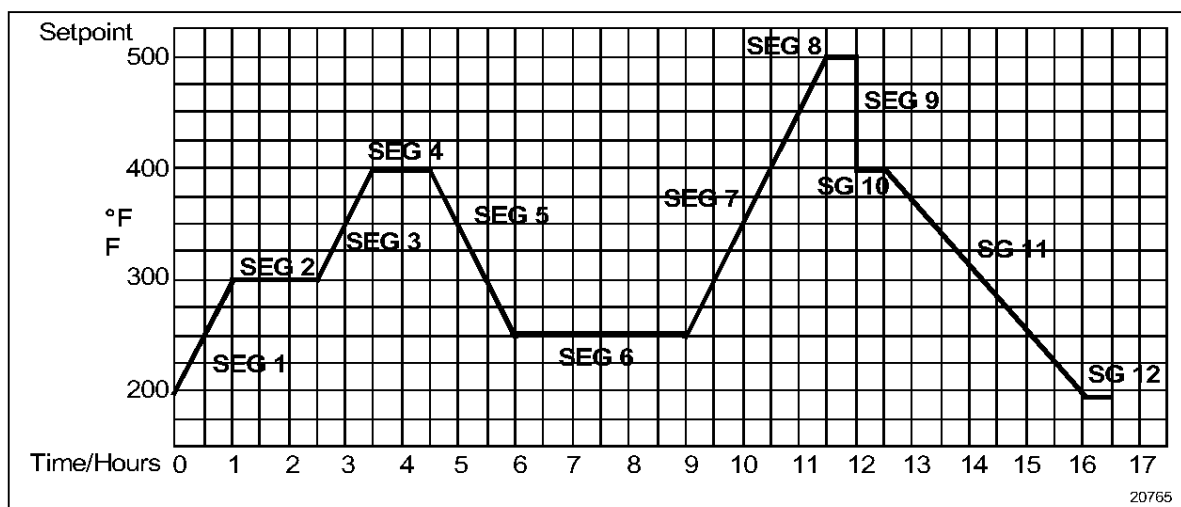


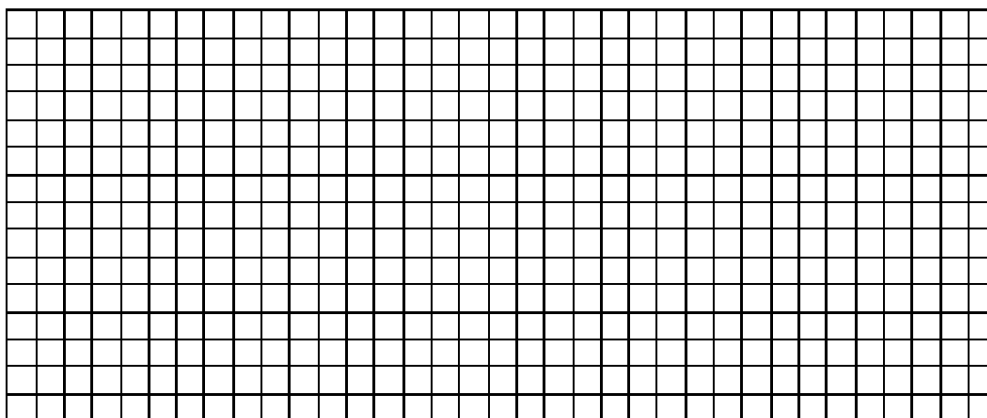
Figure 5-1 Ramp/Soak Profile Example

Ramp/Soak Profile Example

Prompt	Function	Segment	Value	Prompt	Function	Segment	Value
STRSEG	Start Seg.		1	SG4 TI	Soak Time	4	1 hr.
ENDSEG	End Seg.		12	SG5 RP	Ramp Time	5	1hr.:30 min.
RP UNIT	Engr. Unit for Ramp		TIME	SG6 SP	Soak SP	6	250
PG END	Controller Status		LAST SP	SG6 TI	Soak Time	6	3hrs.:0min.
STATE	Controller State at end		HOLD	SG7 RP	Ramp Time	7	2hrs:30min.
TO BEGIN	Reset SP Program		DIS	SG8 SP	Soak SP	8	500
RECYCL	Number of Recycles		2	SG8 TI	Soak Time	8	0hr.:30 min.
SOKDEV	Deviation Value		0	SG9 RP	Ramp Time	9	0
SG1 RP	Ramp Time	1	1 hr.	SG10 SP	Soak SP	10	400
SG2 SP	Soak SP	2	300	SG10 TI	Soak Time	10	0hr.:30 min.
SG2 TI	Soak Time	2	1hr.:30 min.	SG11 RP	Ramp Time	11	3hrs:30min.
SG3 RP	Ramp Time	3	1hr.	SG12 SP	Soak SP	12	200
SG4 SP	Soak SP	4	400	SG12TI	Soak Time	12	0hr.:30 min.

Program record sheet

Draw your ramp/soak profile on the record sheet shown in Figure 5-2 and fill in the associated information in the blocks provided. This will give you a permanent record of your program and will assist you when entering the Setpoint data.



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Figure 5-2 Program Record Sheet

Prompt	Function	Segment	Value	Prompt	Function	Segment	Value
STRSEG	Start Seg.			SG4 TI	Soak Time	4	
ENDSEG	End Seg.			SG5 RP	Ramp Time	5	
RP UNIT	Engr. Unit for Ramp			SG6 SP	Soak SP	6	
RECYCL	Number of Recycles			SEG6 TI	Soak Time	6	
SOKDEV	Deviation Value			SG7 RP	Ramp Time	7	
PG END	Controller Status			SG8 SP	Soak SP	8	
STATE	Program Controller State			SG8 TI	Soak Time	8	
TO BEGIN	Reset SP Program			SG9 RP	Ramp Time	9	
SG1 RP	Ramp Time	1		SG10 SP	Soak SP	10	
SG2 RP	Soak SP	2		SG10 TI	Soak Time	10	
SG2 TI	Soak Time	2		SG11RP	Ramp Time	11	
SG3 RP	Ramp Time	3		SG12SP	Soak SP	12	
SG4 SP	Soak SP	4		SG12TI	Soak Time	12	

Run/Monitor functions

Table 5-3 lists all the functions required to run and monitor the program.

Table 5-3 Run/Monitor Functions

Function	Press	Result
Set the Local Setpoint	DISPLAY [▲] [▼]	<i>Upper Display</i> = PV value <i>Lower Display</i> = SP To set the Local Setpoint value to where you want the program to start out.
Run State	RUN/HOLD	Initiates the setpoint program. “ RUN ” appears in the upper display indicating that the program is running.
Hold State	RUN/HOLD	Holds the setpoint program. “ HOLD ” appears in the upper display indicating that the program is in the HOLD state. The setpoint holds at the current setpoint.
External Hold		If Remote Switching (Digital Input Option) is present on your controller, contact closure places the controller in the HOLD state, if the setpoint program is running. The “ HOLD ” in the upper display will be displayed periodically in lower case. ATTENTION The keyboard takes priority over the external switch for the RUN/HOLD function. Contact reopening runs program.
Viewing the present ramp or soak segment number and time	DISPLAY until you see	<i>Upper Display</i> = PV value <i>Lower Display</i> = XXHH.MM Time remaining in the SEGMENT in hours and minutes. XX = 1 to 12
Viewing the number of cycles left in the program	DISPLAY until you see	<i>Upper Display</i> = PV value <i>Lower Display</i> = REC_XX Number of cycles remaining in the setpoint program. X = 0 to 99
End Program		When the final segment is completed, the “ RUN ” in the upper display either changes to “ HOLD ” (if configured for HOLD state), or disappears (if configured for disable of setpoint programming). The controller either operates at the last setpoint in the program or goes into manual mode/Failsafe output.
Disable Program		See Section 3.5 – Configuration Group “SPPROG” for details.

