



UDC 2500 Application Note



Control Set Up Group

Introduction

The functions listed in this group deal with how the controller will control the process including: Number of Tuning Parameter Sets, Setpoint Source, Tracking, Power-up Recall, Setpoint Limits, Output Direction and Limits, Deadband, and Hysteresis.

Function Prompts

Table Error! No text of specified style in document.-1 Table Error! No text of specified style in document.-2 CONTRL Group (Numeric Code 800) Function Prompts

Function Prompt Lower Display		Selection or Range of Setting Upper Display		Parameter Definition
English	Numeric Code	English	Numeric Code	
PIDSET	801	ONE	0	<p>NUMBER OF TUNING PARAMETER SETS—This selection lets you choose one or two sets of tuning constants (gain, rate, and reset).</p> <p>ONE SET ONLY—Only one set of tuning parameters is available. Configure the values for: Gain (proportional band), Rate, Reset Time, and Cycle Time (if time proportional is used).</p>
		2KBD	1	<p>TWO SETS KEYBOARD SELECTABLE—Two sets of tuning parameters can be configured and can be selected at the operator interface or by using the Digital Inputs.</p> <p>Press LOWER DISPLAY key until you see PID SET1 or PID SET2 then press  or  to switch between sets. Configure the values for: Gain, Rate, Reset, Cycle Time Gain #2, Rate #2, Reset #2, Cycle #2 Time</p>
		2 PR	2	<p>TWO SETS PV AUTOMATIC SWITCHOVER—When the process variable is <i>GREATER</i> than the value set at prompt SW VALUE (Switchover Value), the controller will use Gain, Rate, Reset,</p>



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		2 SP	3	<p>and Cycle Time. The active PID SET can be read in the lower display.</p> <p>When the process variable is <i>LESS</i> than the value set at prompt SW VALUE, the controller will use Gain #2, Rate #2, Reset #2, and Cycle #2 Time. The active PID SET can be read in the lower display.</p> <p>ATTENTION <i>Other prompts affected: SW VALUE</i></p> <p>TWO SETS SP AUTOMATIC SWITCHOVER—When the setpoint is <i>GREATER</i> than the value set at prompt SW VALUE (Switchover Value), the controller will use Gain, Rate, Reset, and Cycle.</p> <p>When the setpoint is <i>LESS</i> than the value set at prompt SW VALUE, the controller will use Gain #2, Rate #2, Reset #2, and Cycle #2.</p> <p>ATTENTION <i>Other prompts affected: SW VALUE</i></p>
SW VAL	802	Value in engineering units within PV or SP range limits		<p>AUTOMATIC SWITCHOVER VALUE—This is the value of Process Variable or Setpoint at which the controller will switch from Tuning Constant Set #2 to Set #1.</p> <p>ATTENTION <i>Only appears when PID SETS selection is configured for either 2 PVSW or 2 SPSW.</i></p>
LSP'S	803	ONE TWO	0 1	<p>LOCAL SETPOINT SOURCE—This selection determines what your local setpoint source will be.</p> <p>LOCAL SETPOINT—The setpoint entered from the keyboard.</p> <p>TWO LOCAL SETPOINTS—This selection lets you switch between two local setpoints using the SETPOINT SELECT key.</p>



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RSPSR C	804	NONE INP2	0 1	<p>REMOTE SETPOINT SOURCE— This selection lets you switch between the local and remote setpoints using the SETPOINT SELECT key.</p> <p>NONE—No remote setpoint. INPUT 2—Remote Setpoint is Input 2.</p>
SP TRK	805	NONE PROC RSP	0 1 2	<p>SETPOINT TRACKING—The local setpoint can be configured to track either PV or RSP as listed below. Not configurable when Auto Bias is set.</p> <p>ATTENTION For selections other than NONE, LSP is stored in nonvolatile memory only when there is a mode change; i.e., when switching from RSP to LSP or from Manual to Automatic. If power is lost, then the current LSP value is also lost.</p> <p>NO TRACKING—If local setpoint tracking is not configured, the LSP will not be altered when transfer from RSP to LSP is made.</p> <p>PROCESS VARIABLE (PV)—Local setpoint tracks the PV when in manual.</p> <p>RSP—Local setpoint tracks remote setpoint when in automatic. When the controller transfers out of remote setpoint, the last value of the remote setpoint (RSP) is inserted into the local setpoint.</p>
PWR UP	806	MAN ALSP	0 1	<p>POWER UP CONTROLLER MODE RECALL—This selection determines which mode and setpoint the controller will use when the controller restarts after a power loss.</p> <p>MANUAL, LSP—At power-up, the controller will use manual mode with the local setpoint displayed.</p> <p>AUTOMATIC MODE, LAST LSP—At power-up, the controller will use automatic mode with the last local setpoint used before power down displayed.</p>



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		ARSP	2	AUTOMATIC MODE, LAST RSP —At power-up, the controller will use automatic mode with the last remote setpoint used before power down displayed.
		AMSP	3	LAST MODE/LAST SETPOINT used before power down.
		AMLS	4	LAST MODE/LAST LOCAL SETPOINT on power down.
PWROU T	807			THREE POSITION CONTROL STEP OUTPUT START-UP MODE —This selection determines what position the motor will be in when powered up or in the failsafe position.
		LAST	0	LAST OUTPUT —At power-up in automatic mode, the motor position will be the last one prior to power down. When the unit goes into FAILSAFE, it will stay in automatic mode; motor will not be driven to the configured failsafe position.
		FSAF	1	FAILSAFE OUTPUT —At power-up in manual mode, the motor will be driven to either the 0 % or 100 % output position, whichever is selected at prompt FAILSAFE. For Burnout/None, when the unit goes into FAILSAFE, it will go to manual mode; motor will be driven to the configured failsafe position.
SP Hi	808	0 to 100 % of the PV range		SETPOINT HIGH LIMIT —This selection prevents the local and remote setpoints from going above the value selected here. The setting must be equal or less than the upper range of the inputs.
SP Lo	809	0 to 100 % of the PV range		SET POINT LOW LIMIT —This selection prevents the local and remote setpoints from going below the value selected here. The setting must be equal or greater than the lower range of the inputs.
ACTION	810			CONTROL OUTPUT DIRECTION — Select direct or reverse output action.
		DIR	0	DIRECT ACTING CONTROL —The controller's output <i>increases</i> as the process variable increases.



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		REV	1	REVERSE ACTING CONTROL —The controller's output <i>decreases</i> as the process variable increases.
OUT Hi	811	–5.0 to 105 % of output		HIGH OUTPUT LIMIT —This is the highest value of output beyond which you do not want the controller automatic output to exceed. Use 0 % to 100 % for relay output type. Use –5 % to 105 % for current output type.
OUT Lo	812	–5.0 to 105 % of output		LOW OUTPUT LIMIT —This is the lowest value of output below which you do not want the controller automatic output to exceed. Use 0 % to 100 % for relay output type. Use –5 % to 105 % for current output type.
D BAND	813	–5.0 to 25.0 % 0.0 to 25.0 % 0.5 to 5.0 %		DEADBAND is an adjustable gap between the operating ranges of output 1 and output 2 in which neither output operates (positive value) or both outputs operate (negative value). Time Duplex On-Off Duplex Three Position Step
HYST	814	0.0 to 100.0 % of PV		HYSTERESIS (OUTPUT RELAY) is an adjustable overlap of the ON/OFF states of each control output. This is the difference between the value of the process variable at which the control outputs energize and the value at which they de-energize. ATTENTION Only applicable for ON/OFF control.
FAILSF	815	0 to 100 %		FAILSAFE OUTPUT VALUE —The value used here will also be the output level when you have Communications SHED set to failsafe or when NO BURNOUT is configured and Input 1 fails. ATTENTION Applies for all output types



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				except Three Position Step Control.
FAILSF	816			THREE POSITION STEP FAILSAFE OUTPUT 0 PCT —Motor goes to closed position. 100 PCT —Motor goes to open position.
		0 100		
FSMODE	817			FAILSAFE MODE
		No L	0	NON LATCHING —Controller stays in last mode that was being used (automatic or manual); output goes to failsafe value. (NOTE 1, NOTE 2)
		LACH	1	LATCHING —Controller goes to manual mode; output goes to failsafe value. (NOTE 2)
PBorGN	818			PROPORTIONAL BAND UNITS —Select one of the following for the Proportional (P) term of the PID algorithm:
		GAIN	0	GAIN selects the unitless term of gain for the P term of the PID algorithm. <i>Where: $GAIN = \frac{100 \% FS}{PB\%}$</i>
		PB	1	PROPORTIONAL BAND selects units of percent proportional band for the P term of the PID algorithm. <i>Where: $PB \% = \frac{100 \% FS}{GAIN}$</i>
MINRPM	819			RESET UNITS —Selects units of minutes per repeat or repeats per minute for the I term of the PID algorithm. 20 Repeats per Minute = 0.05 Minutes per Repeat.
		MIN	0	MINUTES PER REPEAT —The time between each repeat of the proportional action by reset.
		RPM	1	REPEATS PER MINUTE —The number of times per minute that the proportional



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				action is repeated by reset.

NOTE 1: Does not apply to Three Position Step Control.

NOTE 2: If controller is in Manual upon failure, output will maintain its value at time of failure.

NOTE 3: These selections appear when the Control Algorithm is selected for 3PSTEP.

NOTE 4: The local setpoint will automatically adjust itself to be within the setpoint limit range. For example, if SP = 1500 and the SP HiLIM is changed to 1200, the new local setpoint will be 1200.

NOTE 5: Reset limits and Dropoff are not displayed when Three Position Step Control is configured.