

DR4200 EV Configuration

4.9 Total Parameters Set Up Group

Introduction

The functions listed in this group deal with the calculation and display of the total flow volume as measured by the input. The displayed value is six digits with a configurable scale factor. For a 2-pen recorder, the desired input channel is displayed on the left side of the operator interface. Press **[FUNC]** key to select channel. These prompts appear only if Model Table II includes Totalization option..

Totalizer group prompts

Table 4-6 lists all the function prompts in the "TOTAL" Set Up group. Press **[SETUP]** key until "TOTAL" appears in the display. Press **[FUNC]** to select the parameters.

Table 4-6 Totalizer Parameter Group Definitions

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
(Actual Current totalized value)	(Current scale factor) Example: E1	VIEW CURRENT TOTALIZED VALUE — this selection lets you view the current totalized value. <ul style="list-style-type: none"> In the example shown, E1 represents exponential value of total (total times 10¹). See "SCALER" function prompt in this group for selections.
RESET	YES NO	RESET TOTALIZER TO ZERO — this selection lets you reset the totalizer to zero. <ul style="list-style-type: none"> Selecting YES will reset the totalizer to zero. <p>ATTENTION Prompt "RSTABL" must = YES to reset.</p>
TOTAL	ENAB DIS	TOTALIZATION FOR INPUT — this selection allows you to enable or disable the totalizer function. The prompt appears first if "DIS" is selected. <ul style="list-style-type: none"> ENABLE allows selection of the rest of the prompts associated with totalization.
RATE	SEC MIN HOUR DAY MDAY	RATE OF INTEGRATION — This selection allows you to select the desired rate of integration. <p>SECOND - EU (Engineering Units) per second MINUTE - EU per minute HOUR - EU per hour DAY - EU per day MDAY - Millions of Units per day</p>
SCALER	1 10 100 1000 1E4 1E5 1E6 1E7 1E8	TOTALIZER SCALE FACTOR — The totalizer displays the current totalized flow value (up to 6 digits maximum). Seven scaling factors are available (from 1 to 1 Million). <ul style="list-style-type: none"> The desired scaling factor is applied to the calculated value to extend the maximum flow range that can be displayed. 1E4 equals 1 times 10.4 (10,000) 1E5 equals 1 times 10.5 (100,000) 1E6 equals 1 times 10.6 (1,000,000) 1E7 equals 1 times 10.7 (10,000,000) 1E8 equals 1 times 10.8 (100,000,000)
RSTABL	NO YES	TOTALIZER RESET — this selection (YES) allows the totalizer value to be reset. See "RESET" prompt.

4.10 Output Set Up Group

Introduction

This data deals with the output configuration. It allows you to enable the "OUTPUT" and "CONTRL" prompts for configuration and select the output type "ALRM" or "CTRL".

Function prompts

Table 4-7 lists all the function prompts in the "OUTPUT" set up group.

- Press the **SETUP** key until "OUTPUT" appears in the display.

For a 2-pen recorder, the desired input channel is displayed on the left side of the operator interface. Press **FUNC** to select channel.

Table 4-7 Output Group Function Prompts

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
OUTPUT	ENAB DIS	<p>OUTPUT SELECTION — this selection allows the "OUTPUT" or "CONTROL" prompts to appear if ENAB is selected.</p> <p>ENABLE - allows rest of prompts associated with output.</p> <p>DISABLE - no other "OUTPUT" or "CONTROL" prompts appear.</p>
OUTTYP	ALRM CTRL	<p>OUTPUT TYPE — select type of output</p> <p>ATTENTION Only applicable for Model Table 1 = 1X, X1, 2X, or X2. Do you want to use control or alarm output?</p> <p>ALARM - if you select alarm then "CONTRL", "TUNING", and "CYCLE" group prompts will not appear.</p> <p>CONTROL - you can have second alarm output with control, if function prompt "OUTALG" in set up group "CONTRL" = RLY or CUR.</p>

4.11 Control Parameters Set Up Group

Introduction The functions listed in this group deal with how the recorder will control the process.

Control group prompts Table 4-8 lists all the function prompts in the Control set up group. You can enable the control group in the "OUTPUT" set up group under function prompt "OUTTYP".

For a 2-pen recorder, the desired input channel is displayed on the left side of the operator interface. Press **FUNC** to select channel.

- Press **SETUP** key until "CONTRL" appears in the lower display.
- Press **FUNC** key to select the parameters.

Table 4-8 Control Parameter Group

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
OUT ALG		<p>The OUTPUT ALGORITHM lets you select the type of output you want. Do you want the OUTPUT algorithm for control to be relay simplex, relay duplex, or current simplex.</p> <p>ATTENTION Be sure that the hardware configuration is set to provide relay or current output. See <i>Section 2 - Setup Tasks</i>.</p>
	RLY	<p>RELAY SIMPLEX — type of output using one SPDT relay. Its normally open (NO) or normally closed (NC) contacts are selected by positioning an internal jumper.</p> <ul style="list-style-type: none"> • Other prompts affected: "HYST"
	CUR	<p>CURRENT SIMPLEX — type of output using one 4 to 20 mA signal that can be fed into a positive or negative grounded load of 0 to 600 ohms. The signal can be re-calibrated for any desired range from 4 to 20 mA for 0 to 100% output.</p>
	RLYD	<p>RELAY DUPLEX — type of output using two SPDT relays. Its normally open (NO) or normally closed (NC) contacts are selected by positioning an internal jumper (see <i>Section 2 - Setup Tasks</i>).</p> <ul style="list-style-type: none"> • Other prompts affected: "DEADBAND"

Table 4-8 is continued on next page

4.11 Control Parameters Set Up Group, Continued

Table 4-8 Control Parameter Group, continued

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
CONT ALG (continued)	PDMR	<p>PD WITH MANUAL RESET is used whenever integral action is not wanted for automatic control. The equation is computed with no integral contribution. The MANUAL RESET, which is operator adjustable, is then added to the present output to form the controller output. Switching between manual and automatic mode will not be bumpless.</p> <ul style="list-style-type: none"> • If you select PD with Manual Reset you can also configure the following variations: <ul style="list-style-type: none"> • PD (Two Mode) control, • P (Single Mode) control. <p>Set Rate T(D) and/or Reset Time(I) to 0. Other prompts affected: "MAN RSET" in "TUNING" set up group.</p>
PWR UP	MAN AUTO	<p>POWER UP CONTROLLER MODE RECALL — this selection determines which mode the recorder will use when the it restarts after a power loss. Select one from below:</p> <ul style="list-style-type: none"> • MANUAL, LSP — at power-up, the recorder will use <i>manual</i> mode with the output value displayed. • AUTOMATIC — at power-up, the recorder will return to the <i>automatic mode</i>.
SP HI	-999 to 9999	<p>SETPOINT HIGH LIMIT* — this selection prevents the local setpoint from going above the value selected here. The setting must be equal to or less than the upper range of the input.</p>
SP LO	-999 to 9999	<p>SET POINT LOW LIMIT* — this selection prevents the local setpoint from going below the value selected here. The setting must be equal to or greater than the lower range of the input.</p>
ACTION	DIR RE	<p>CONTROL OUTPUT DIRECTION — in what direction do you want the recorder output to go when the process variable increases.</p> <p>DIRECT ACTING CONTROL — the recorder's output <u>increases</u> as the process variable increases.</p> <p>REVERSE ACTING CONTROL — the recorder's output <u>decreases</u> as the process variable increases.</p>
OUTH**	0 to 100.0% of output -5 to 105% for current output	<p>HIGH OUTPUT LIMIT — this is the highest value of output beyond which you do not want the recorder automatic output to exceed. Use 0 to 100% for relay output type.</p>

* The Setpoint will automatically adjust itself to be within the setpoint limit range. For example, if SP = 1500 and the SP HI is changed to 1200, the new setpoint will be 1200.

** These prompts will only appear when function prompt OUTALG in the "OUTPUT" set up group = PIDA or PDMR

Table 4-8 is continued on next page

4.11 Control Parameters Set Up Group, *Continued*

Table 4-8 Control Parameter Group, continued

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
OUTLO**	0 to 100.0% of output -5 to 105% for current output	LOW OUTPUT LIMIT — this is the lowest value of output below which you do not want the recorder automatic output to exceed. Use 0 to 100% for relay output type.
DBAND	-5.0 to 25.0% 0 to 25.0%	DEADBAND is an adjustable gap between the operating ranges of relay 1 and relay 2 in which neither relay operates (positive value) or both relays operate (negative value). It is the difference between the nominal trip points of relay 1 and relay 2. This prompts appears only if function prompt "OUTALG" is "RLY D." Time Duplex On-Off Duplex
HYST	0.0 to 5.0% of PV span	HYSTERESIS (OUTPUT RELAY ONLY) is an adjustable overlap of the ON/OFF states of each control relay. This is the difference between the value of the process variable at which the control relays energize and the value at which they de-energize. Only applicable for ON-OFF control.
FAILSF	0 to 100%	FAILSAFE OUTPUT VALUE — select the value you want the output to be when power is returned after a power down. The value used here will also be the output level when NO BURNOUT is configured and the input circuit fails.
PBorGN	PB	PROPORTIONAL BAND UNITS — select one of the following for the Proportional (P) term of the PID or PDMR algorithm: • PROPORTIONAL BAND — selects units of percent proportional band for the P term of the PID or PDMR algorithm, where: $PB\% = \frac{100\%ES}{GAIN}$
	GAIN	• GAIN selects the unitless term of gain for the P term of the PID algorithm, where: $GAIN = \frac{100\%ES}{PB\%}$
MINRPM	RPM	RESET UNITS — selects units of minutes or repeat per minutes for the I term of the PID algorithm. 20 Repeats per Minute = 0.05 Minutes per Repeat. REPEATS PER MINUTE — the number of times per minute that the proportional action is repeated by reset.
	MIN	MINUTES PER REPEAT — the time between each repeat of the proportional action by reset.

** These prompts will only appear when function prompt OUTALG in the "OUTPUT" set up group = PIDA or PDMR

4.12 Tuning Parameters Set Up Group

Introduction

Tuning consists of establishing the appropriate values for the tuning constants you are using so that your recorder responds correctly to changes in process variable and setpoint. You can start with predetermined values but you will have to watch the system to see how to modify them. There are two Tuning groups available.

These prompts are available of Model Table I = 1X or X1 and function prompt "CTRALG" under setup group "CONTL" = PIDA or PDMR.

Tuning group prompts

Table 4-9 lists all the function prompts in the Tuning set up group.

For a 2-pen recorder, the desired input channel is displayed on the left side of the operator interface. Press **FUNC** key to display channel.

- Press **SETUP** key until "TUNING" appears in the lower display.
- Press **FUNC** key to select the parameters.

Table 4-9 Tuning Parameters Group

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
Pb or GAIN	0.1 to 999.9% or 0.1 to 999.9	<p>PROPORTIONAL BAND is the percent of the range of the measured variable for which a proportional recorder will produce a 100% change in its output.</p> <p>GAIN is the ratio of output change (%) over the measured variable change (%) that caused it.</p> $G = \frac{100\%}{PB\%}$ <p>where PB is the proportional band (in %)</p> <p>if the PB is 20%, then the Gain is 5. Likewise, a 3% change in the error signal (SP-PV) will result in a 15% change in the recorder's output due to proportional action. If the gain is 2, then the PB is 50%.</p> <ul style="list-style-type: none"> • Used with control algorithm PID-A or PDMR. Defined as "HEAT" Gain on Duplex models for variations of Heat/Cool applications. • The selection of Proportional Band or Gain is made in the "Contrl" parameter group under prompt "PBorGN."
RATE T	0.08 to 10.00 minutes 0.08 or less = OFF	<p>RATE action affects the recorder's output whenever the deviation is changing; and affects it more when the deviation is changing faster.</p> <ul style="list-style-type: none"> • Used with control algorithm PID-A. Defined as "HEAT" Rate on Duplex models for variations of Heat/Cool applications.

Table 4-9 is continued on next page

4.12 Tuning Parameters Set Up Group, Continued

Table 4-9 Tuning Parameters Group , continued

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
<p>I MIN or I RPM</p>	<p>0.02 to 50.00</p>	<p>RSET MIN = RESET IN MINUTES / REPEAT RSET RPM = RESET IN REPEATS / MINUTE</p> <p>RESET adjusts the recorder's output in accordance with both the size of the deviation (SP-PV) and the time it lasts. The amount of the corrective action depends on the value of Gain. The Reset adjustment is measured as how many times proportional action is repeated/minute.</p> <ul style="list-style-type: none"> • Used with control algorithm PID-A or PID-B. Defined as "HEAT" Reset on Duplex models for variations of Heat/Cool applications. • The selection of minutes per repeat or repeats per minute is made in the "CONTRL" parameters group under prompt "MINRPM."
<p>MAN RST</p>	<p>-100 to +100 (in % output)</p>	<p>MANUAL RESET is only applicable if you have control algorithm PD WITH MANUAL RESET (PDMR). Because a proportional recorder will not necessarily line out at setpoint, there will be a deviation (offset) from setpoint. This eliminates the offset and lets the PV line out at setpoint.</p>
<p>Pb2 or GAIN 2</p>	<p>0.1 to 1000% or 0.1 to 1000</p>	<p>PROPORTIONAL BAND 2 or GAIN 2, RATE 2T, and I2. RPM or MIN parameters are the same as previously described for "Heat" except that they refer to the cool zone tuning constants on duplex models or the second set of PID constants, whichever is pertinent.</p>
<p>RATE2T</p>	<p>0.08 to 10.00 minutes 0.08 or less = OFF</p>	
<p>I2MIN I2RPM</p>	<p>0.02 to 50.00</p>	

4.13 Cycle Parameters Set Up Group

Introduction

This data with the output relay cycle time for time proportional output and "Heat" relay in duplex application. These prompts only appear if function prompt "OUTALG" in set up group. "CONTRL" = RLY or RLYD and function prompt "CTRALG" in set up group "CONTRL" = PIDA or PDMR.

Cycle group prompts

Table 4-10 lists all the function prompts in the "Cycle" set up group. For a 2-pen recorder, the desired input channel is displayed on the left side of the operator interface. Press **FUNC** key to display channel.

- Press **SETUP** key until "CYCLE" appears in the lower display.
- Press **FUNC** key to select the parameters.

Table 4-10 Cycle Parameters Group

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
CYC TI	0 to 120 seconds	CYCLE TIME for RELAY 1 - This sets the output relay cycle time for time proportional output. Use for heat relay in duplex applications.
CYC2TI	0 to 120 seconds	CYCLE TIME FOR RELAY 2 - This selection is used when function prompt "OUTALG" in "CONTRL" set up group = RLYD. It sets the output relay cycle time for cool relay in duplex application.

4.14 Alarms Set Up Group

Introduction

An alarm is an indication that an event that you have configured (for example—Process Variable) has exceeded one or more alarm limits. There are two alarms available. Each alarm has two setpoints. You can configure each of these two setpoints to alarm on the input PV. There are two alarm output selections, high and low. You can configure each setpoint to alarm either high or low. These are called single alarms. You can also configure the two setpoints to alarm on the PV and to alarm both high and low. A single adjustable hysteresis of 0.0% to 5.0% is configurable for the alarm setpoint.

Alarms group prompts

Table 4-11 lists all the function prompts in the Alarms set up group and their definitions.

For a 2-pen recorder, the desired input channel is displayed on the left side of the operator interface. Press **FUNC** to select channel.

- Press **SETUP** key until "ALARMS" appears in the lower display.
- Press **FUNC** key to select the parameters.

Table 4-11 Alarms Group Definitions

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
A1S1TY	NONE INP	ALARM 1 SETPOINT 1 TYPE — select what you want Setpoint 1 of Alarm 1 to represent. It will represent the Input. NO ALARM INPUT PV
A1S2TY	Same as A1S1 TY	ALARM 1 SETPOINT 2 TYPE — select what you want Setpoint 2 of Alarm 1 to represent. The selections are the same as A1S1TY.
A1S1 VA	-999 to 9999	ALARM 1 SETPOINT 1 VALUE — this is the value at which you want the alarm type chosen in prompt "A1S1TY" to actuate. The value depends on what the setpoint has been configured to represent.

Table 4-11 is continued on next page

4.14 Alarms Set Up Group, Continued

Table 4-11 Alarms Group Definitions, continued

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
A1S2 VA	-999 to 9999	ALARM 1 SETPOINT 2 VALUE — this is the value at which you want the alarm type chosen in prompt "A1S2TY" to actuate. • The details are the same as "A1S1 VA".
A1S1 H L	HI LO	ALARM 1 SETPOINT 1 STATE — select whether you want the alarm type chosen in prompt "A1S1TY" to alarm high or low. HI ALARM - Relay coil is de-energized when the PV is above the Setpoint. LO ALARM - Relay coil is de-energized when the PV is below the Setpoint.
A1S2 H L	HI LO	ALARM 1 SETPOINT 2 STATE — select whether you want the alarm type chosen in prompt "A1S2TY" to alarm high or low. HI ALARM - Relay coil is de-energized when the PV is above the Setpoint. LO ALARM - Relay coil is de-energized when the PV is below the Setpoint.
A2S1TY	Same as A1S1 TY	ALARM 2 SETPOINT 1 TYPE — select what you want Setpoint 1 of Alarm 2 to represent. The selections are the same as A1S1TY. NOTE: Not applicable with Relay Duplex outputs.
A2S2TY	Same as A1S1 TY	ALARM 2 SETPOINT 2 TYPE — select what you want Setpoint 2 of Alarm 2 to represent. The selections are the same as A1S1TY. NOTE: Not applicable with Relay Duplex outputs.
A2S1 VA	-999 to 9999	ALARM 2 SETPOINT 1 VALUE — this is the value at which you want the alarm type chosen in prompt "A2S1TY" to actuate. • The details are the same as "A1S1 VA".
A2S2 VA	-999 to 9999	ALARM 2 SETPOINT 2 VALUE — this is the value at which you want the alarm type chosen in prompt "A2S2TY" to actuate. • The details are the same as "A1S1 VA".

Table 4-11 is continued on next page

4.14 Alarms Set Up Group, Continued

Table 4-11 Alarms Group Definitions, continued

Lower Display Prompt	Upper Display Range of Setting or Selection	Parameter Definition
A2S1 H L	HI LO	<p>ALARM 2 SETPOINT 1 STATE — select whether you want the alarm type chosen in prompt "A2S1TY" to alarm high or low.</p> <p>HI ALARM - Relay coil is de-energized when the PV is above the Setpoint.</p> <p>LO ALARM - Relay coil is de-energized when the PV is below the Setpoint.</p>
A2S2 H L	HI LO	<p>ALARM 2 SET POINT 2 STATE — select whether you want the alarm type chosen in prompt "A2S2TY" to alarm high or low.</p> <p>HI ALARM - Relay coil is de-energized when the PV is above the Setpoint.</p> <p>LO ALARM - Relay coil is de-energized when the PV is below the Setpoint.</p>
AL HYS	0.0 to 5.0% of span or full output as appropriate	<p>ALARM HYSTERESIS — a single adjustable hysteresis is provided on alarms such that when the alarm is OFF it activates at exactly the alarm setpoint; when the alarm is ON, it will not deactivate until the variable is 0.0% to 5.0% away from the alarm setpoint.</p> <ul style="list-style-type: none"> • Configure the hysteresis of the alarms based on INPUT signals as a % of input range span. • Configure the hysteresis of the alarm based on OUTPUT signals as a % of the full scale output range.