OVAL INSTRUCTIONS

Ins. No. E-224PS-1-E

Explosionproof Batch Controller MODEL : EL7210

Parameter SET Mode Setup Manual

This manual explains how to change the parameters and switch between PID and instant flow rate analog output setting.

For further information regarding general specifications, batch measuring operation, etc., please refer to EL7210 Batch Controller instruction manual.

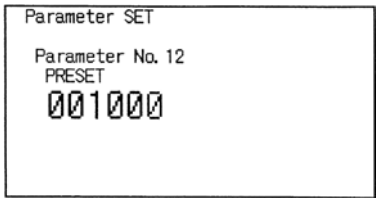
CONTENTS

➡ NOTE: Normally, instant flow rate analog output function is not used.

1. Parameter SET Mode

To enable Parameter SET mode, press the ROT. button for 3 seconds to bring up the screen shown below. This procedure is only effective when the controller is in RUN mode and its status is either standby, STOP, or END.

➡ NOTE: Parameter SET mode has a two-layer structure. Only PRESET can be modified at Layer 1. Further parameter settings are available at Layer 2 by button operation.



Parameter SET Mode Setting Screen

In the Parameter SET mode, pressing the ROT. Button switches the parameter setting screen.
Refer to the following chart for resettable parameters by setting analog output function (parameter No. 201).

Parameter No.	Layer	Parameter Name		
		No Analog Output Function (No.201 : Analog Out = 0)	PID Analog Output (No.201 : Analog Out = 1)	Instant Flow Rate Analog Output (No.201 : Analog Out = 2)
12	1	Batch Setting Value (PRESET)		
1	2	Initial Step Value (Initial Step Value)		
2		Final Step Value (Final Step Value)		
3		Anticipated Overshoot (Anticipated Overshoot)		
4		Overshoot (Overshoot Setting)		
6		Missing Pulse Intervals (Missing Pulse)		
201		Analog Output Function (Analog Out)		
208			P Value Setting (P Set Value)	
209			I Value Setting (I Set Value)	Time Constant (Smoothing)
211			D Value Setting (D Set Value)	
213				20mA Flow Rate (Span Flow Rate)
215				4mA Flow Rate (Zero Flow Rate)
217				Analog Out Upper Limit
218				Analog Out Lower Limit

Shown below are the operational buttons and their functions:

ROT.	Selects the setting parameter. In Layer 1, pressing this button for 3 seconds will save the new setting in the EEPROM and return to the normal standby screen. In Layer 2, the screen returns to the PRESET setting status.
◄	In Layer 1, pressing this button and the ROT. button together for 3 seconds allows you to enter Layer 2. In the parameter setting, you can move the cursor to the left.
▲	Changes the cursor location.
START	Finalizes the setting changes. The indicated value will not be saved if the ROT button is pressed without finalizing the value.

➡ NOTE: In the Parameter SET mode, only four buttons shown above are used.

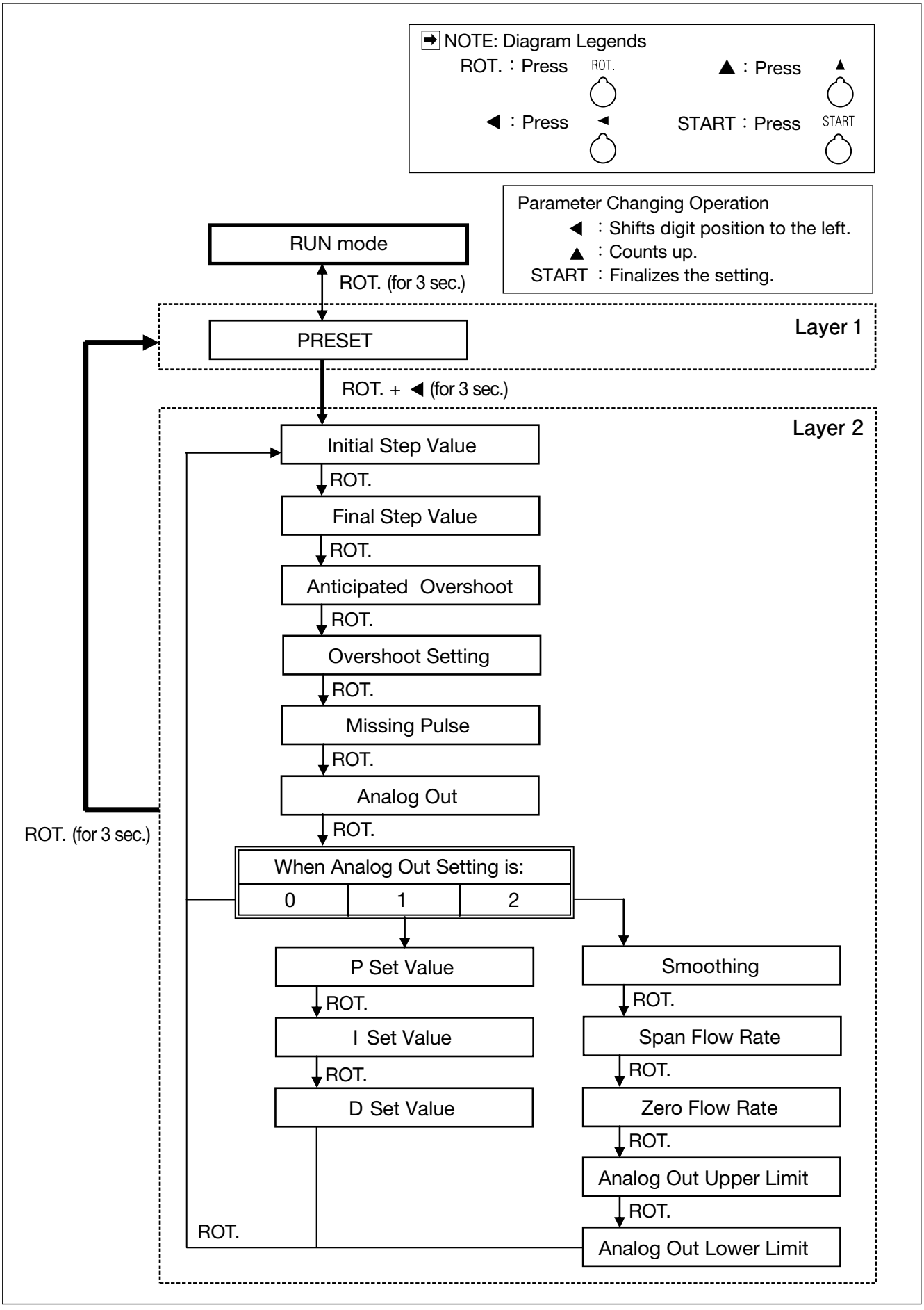
Switching Operation:

At the desired parameter setting screen, adjust the numerical value with buttons ◄ and ▲.

Then finalize the setting by pressing START button.

After changing the parameters, press ROT. button for 3 seconds to return to the RUN mode.

Table 1 Operation Flowchart



2. Programming PID Flow Control

Instruction

By setting up the initial step value, final step value, batch setting value, and anticipated overshoot (programmable in the same way) similar to valve actuating signals, PID flow control can be programmed to perform any of the following five control patterns.

The controller produces valve actuating signals whenever PID flow control is enabled.

① **Two-stage open, two-stage closure**

1. SV is ON.
   Adjust PID output such that the instant rate matches "PID Initial Flow Rate (Parameter No. 202)".
2. MV is ON.
   Adjust PID output such that the instant rate matches "PID Flow Upper Rate (Parameter No. 206)".
3. MV is OFF.
   Adjust PID output such that the instant rate matches "PID Final Flow Rate (Parameter No. 204)".
4. Adjust PID output to 4mA with SV turned OFF.

② **Two-stage open, single-stage closure**

1. SV is ON.
   Adjust PID output such that the instant rate matches "PID Initial Flow Rate (Parameter No. 202)".
2. MV is ON.
   Adjust PID output such that the instant rate matches "PID Flow Upper Rate (Parameter No. 206)".
3. Adjust PID output to 4mA with SV and MV both turned OFF.

③ **Single-stage open, two-stage closure**

1. SV and MV are both ON.
   Adjust PID output such that the instant rate matches "PID Flow Upper Rate (Parameter No. 206)".
2. MV is OFF.
   Adjust PID output such that the instant rate matches "PID Final Flow Rate (Parameter No. 204)".
3. Adjust PID output to 4mA with SV turned OFF.

④ **Single-stage open, single-stage closure**

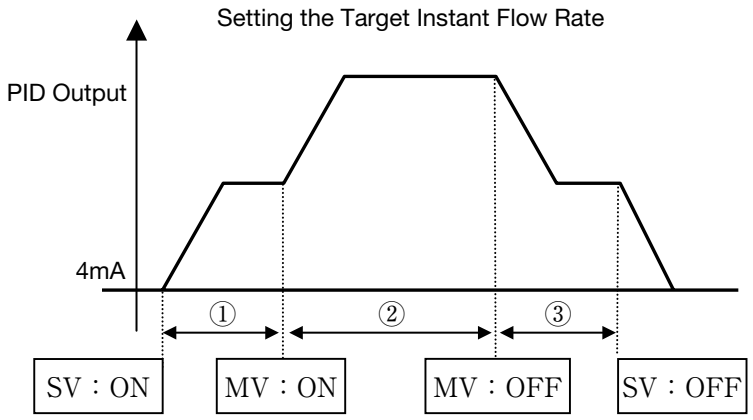
1. SV and MV are both ON.
   Adjust PID output such that the instant rate matches "PID Flow Upper Rate (Parameter No. 206)".
2. Adjust PID output to 4mA with SV and MV both turned OFF.

⑤ **Single-stage open, single-stage closure (SV only)**

1. SV is ON.
   Adjust PID output such that the instant rate matches "PID Initial Flow Rate (Parameter No. 202)".
2. Adjust PID output to 4mA with SV turned OFF.

Parameter No.	Parameter Name	Description
201	Analog Output Function	0: No function 1: PID output function 2: Instant flow rate analog output function
202	∗PID Initial Flow Rate	Target instant rate across segment ① (graph below)
204	∗PID Final Flow Rate	Target instant rate across segment ③ (graph below)
206	∗PID Max. Flow Rate	Target instant rate across segment ② (graph below)
208	P Set Value	Proportional band (%)
209	I Set Value	Integral time
211	D Set Value	Derivative time
213	∗20mA Flow Rate	Instant rate at full-open valve position (PID output at 20mA)
217	Analog Output Upper Limit	Upper limit (%) of PID output 0%→4mA 100%→20mA (0.16mA per 1%)
218	Analog Output Lower Limit	Lower limit (%) of PID output 0%→ 4mA 100%→20mA (0.16mA per 1%)

➡NOTE: Instant rate marked with ∗ reads in the unit set at Flow Rate Unit (Parameter No. 401).



3. Setting Instant Flow Rate Analog Output

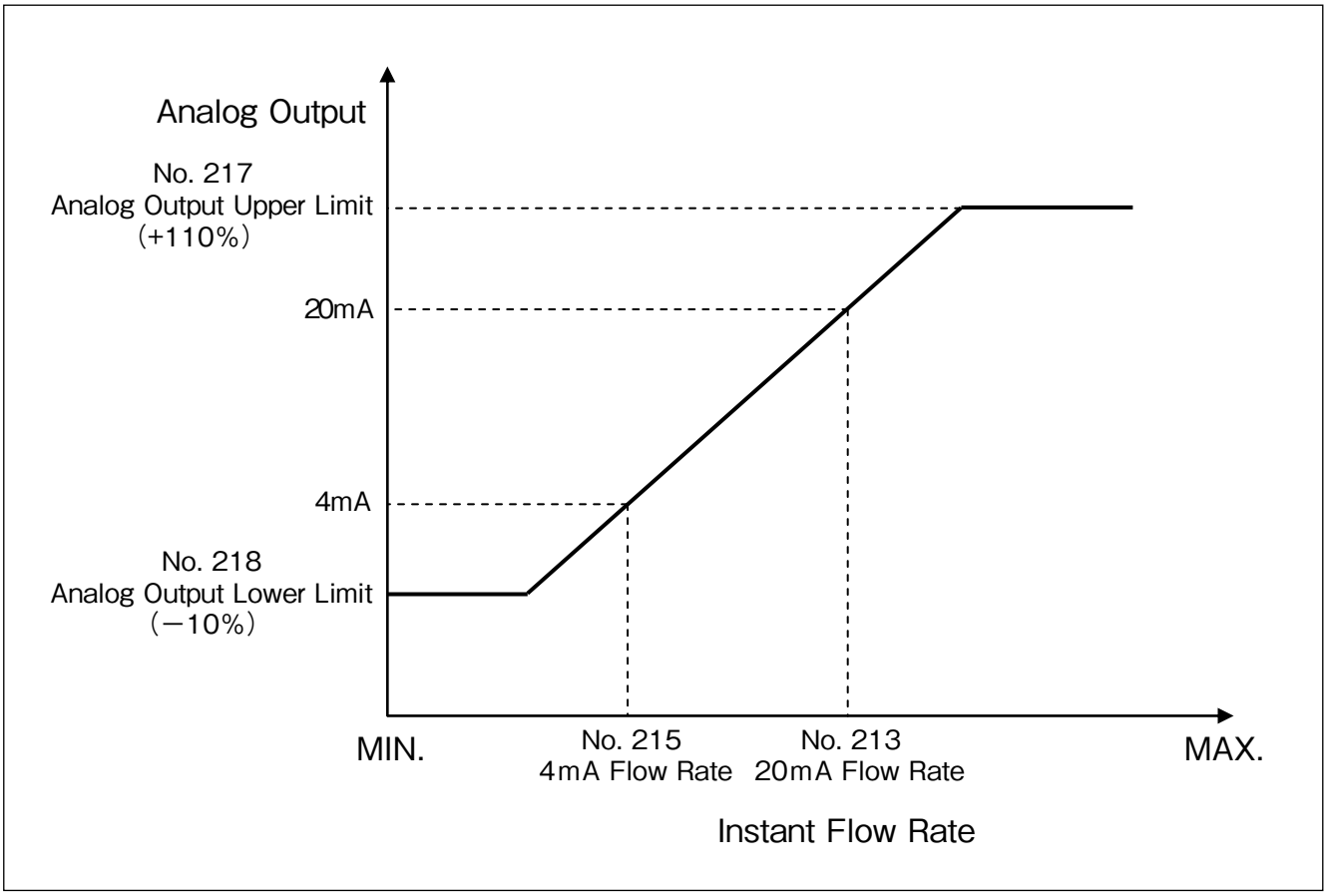
Description of operation

Instant flow rate analog output function is a function to output the current signal (4 to 20mA) corresponding to the instant flow rate.

Setting instant flow rate analog output is available with the parameters given in the following table.

Parameter No.	Parameter Name	Description
201	Analog Output Function	0: No Function 1: PID output function 2: Instant flow rate analog output function
209	Time constant	Sets response time constant (sec) of analog output signal
213	＊20mA Flow Rate	Instant flow rate with 20mA analog output (See figure below)
215	＊4mA Flow Rate	Instant flow rate with 4mA analog output (See figure below)
217	Analog Output Upper Limit	Upper limit (%) of PID output 0%→4mA 100%→20mA (0.16mA per 1%)
218	Analog Output Lower Limit	Lower limit (%) of PID output 0%→ 4mA 100%→20mA (0.16mA per 1%)

➡NOTE: Instant rate marked with ＊ reads in the unit set at Flow Rate Unit (Parameter No. 401).
Set the parameter so that following conditions: "4mA flow velocity < 20mA flow velocity" and "Analog output lower limit < Analog output upper limit" are satisfied.



➡NOTE: Normally, instant flow rate analog output function is not used.

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