

PROGRAMMING PLANT AIR LINE PRESSURE CONTROL ON THE GC35 INDICATING PRESSURE TRANSMITTER

PIP #: TR-PI-105

Applicable to:
GC35

The GC35 Digital Pressure Transmitter is compact and flexible with many usages. It can be easily programmed to monitor and control plant air line pressure. The GC 35 can be acquired with many different ranges but for this application a transmitter with 0 to 150 psi range shall be selected, 4-20 mA analog output, and one switch PNP.



Figure 1 - GC35 Pressure Transmitter

Plant Line Compressor Pressure Control Example:

This example demonstrates the control of a plant air line compressor application with a full load discharge pressure of 100 psi and an unload discharge pressure of 110 psig by controlling the 4-20 mA output signal with a programmable regulator. Also, to shut down the compressor and activate an audible warning alarm if line pressure exceeds 115 psi by using an external relay normally opened to turn on the audible alarm and normally closed to shut down the compressor.



Figure 2 – GC35 Pressure Transducer Installation Example

Installation:

Connect transmitter, analog output, compressor shutdown and audible warning buzzer switches per application, diagrams below and manual instructions.

WIRING PIN OUT	TERMINAL NUMBER		Pin 611C175 Cable Wiring Color
	2 Switch (No 4-20mA)	1 Switch Analog Output	
	1 Power (+)	Power (+)	RED
	2 OUT2	Analog (+) Output	WHITE
	3 Power (-)	Power (-)	GREEN
	4 OUT1	OUT1	BLACK

Figure 3 – GC35 Pressure Transducer Wiring

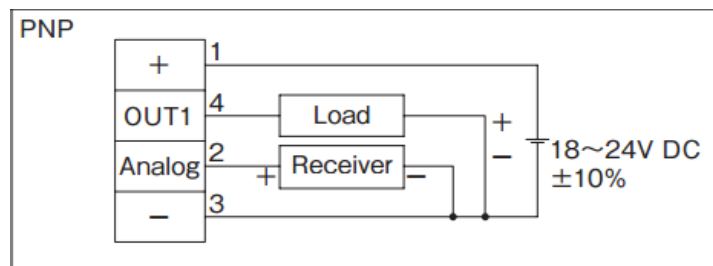










Figure 4 – GC35 Pressure Transducer Switch and Analog Output Wiring


Plant Line Compressor Pressure Control Settings Method:

Procedure to program the GC35 transmitter to control plant air line pressure. Offset analog output from 0 psi to 100 psi. That, is 66.7 % of full range corresponding to 100 psi (4 mA). Scale down the upper range from 150 psi to 110 psi. 73.3% of full scale is equivalent to 110 psi (20 mA). Subsequently, set switches set point and dead bands.



GC35 Transmitter Function Setting Method:






	<ul style="list-style-type: none"> Press and hold MODE button for more than three seconds to get into program mode. Press UP or Down arrow to make changes. Press and release MODE button to select changes and to walk through the menu. Continue to step-1 after power-on message. Press and hold MODE button for more than three seconds to return to measuring mode. 		
Step 1	<ul style="list-style-type: none"> CAP To select hysteresis (HYS) or Window comparator (yin). Select HYS to control analog output. Press UP or Down arrow to display HYS. Press and release MODE button to select and move to the next step. 		
Step 2	<ul style="list-style-type: none"> oPC To select switch type (NPN or PNP). It is a matter of preference. PNP switch shall be used for this application. Press UP or Down arrow to display PNP. Press and release MODE button to select and move to the next step. 		
Step 3	<ul style="list-style-type: none"> FiL To enter filter selection. Filter selection, there are five filter selections (F1 to F5). Use the filter function to improve analog output and difficult to read display if pressure oscillates. Press UP or Down arrow until F1 is displayed (pressure fluctuation is not anticipated). Press and release MODE button to select and move to the next step. 		



Step 4	<ul style="list-style-type: none"> • ECo To turn ON or OFF power saver. • Press Up or Down arrow until EoF is displayed (power saver off). • Press and release MODE button to select and move to the next step. 	
Step 5	<ul style="list-style-type: none"> • LrG To select ring LED light. There are two options Lr0 to turn off ring light or Lr1 to turn on ring light. • Press Up or Down arrow until Lr1 is display. • Press and release MODE button to select and move to the next step. 	
Step 6	<ul style="list-style-type: none"> • Uni To select units (arbitrary or psi). • Press Up or Down arrow until PSI is displayed. • Press and release MODE button to select and move to the next step. 	
Step 7	<ul style="list-style-type: none"> • A-L To enter analog output zero reference corresponding to 4 mA. • The operational range is from 100 to 110 psi. Therefore, set 100 psi as the zero reference 4 mA analog output (66.7% of full range). • Press Up or Down arrow until 66.7 is displayed. • Press and release MODE button to select and move to the next step. 	

Step 8	<ul style="list-style-type: none"> • A-H To enter span analog output reference corresponding to 20 mA. • The operational range is from 100 to 110 psi. Therefore, set 110 psi as the span 20 mA analog output (73.3% of full range). • Press UP or Down arrow until 73.3 is displayed. • Press and release MODE button to select and move to the next step. 	
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GC35 Transmitter Switch Set Point and Dead Band Settings Method:

	<ul style="list-style-type: none"> • Press and hold MODE button less than three seconds to get into program mode. • Press UP or Down arrow to make changes. • Press and release MODE button to select changes and to move to the next step. • Continue to step-1 after once in program mode. • Press and hold MODE button for more than three seconds to return to measuring mode. 	
Step 1	<ul style="list-style-type: none"> • US1 To select in use (USE) or not in use (noU). • Press UP or Down until USE is displayed to configure output switch. • Press and release MODE button to select and move to the next step. 	

Step 2	<ul style="list-style-type: none"> • A1 To enter output 1 switch set point. • Set switch to change state at 115 psi. • Press UP or Down until 115.0 is displayed. • Press and release MODE button to select and move to the next step. 	
Step 3	<ul style="list-style-type: none"> • B1 To enter dead band. • Set 5 psi dead band to deactivate at 110 psi. • Press UP or Down until 5.0 is displayed. • Press and release MODE button to select and move to the next step. 	
Step 4	<ul style="list-style-type: none"> • On1 To delay switch turn on. • Delay switch turn on shall not be used for this application. • Press Up or Down arrow until 0.00 is displayed. • Press and release MODE button to select and move to the next step. 	
Step 5	<ul style="list-style-type: none"> • OF1 To delay switch turn off. • Delay switch turn off shall not be used for this application. • Press Up or Down arrow until 0.00 is displayed. • Press and release MODE button to select and move to the next step. 	
Step 6	<ul style="list-style-type: none"> • SAv To save set point, dead band, and on/off time delay. • Set point, dead band, and on/off time delay can be stored on storage S-1 or S-2 (save set point, dead band, and on/off time delay on S1). • Press UP or Down arrow until S-1 is displayed. • Press and release MODE button to select and move to the next step. 	



Step 7	<ul style="list-style-type: none"> • Lod To load set point, dead band, and on/off time delay. • Load set point, dead band, and on/off time delay can store on storage L-1 or L-2 (load set point, dead band, and on/off time delay on L1). • Press UP or Down arrow until L-1 is displayed. • Press and release MODE button to select and move to the next step. 	
Step 8	<ul style="list-style-type: none"> • LoP Loop check mode allows program and analog output verification with the transmitter pressurized or non-pressurized. It simulates the process and allows for troubleshooting. • Press Up or Down arrow to simulate pressure values. • After verification press and hold MODE button for more than three seconds to return to measuring mode. 	





Function Verification:

The GC35 **loop-check** allows program, switch and analog output verification with the transmitter pressurized or non-pressurized.

Analog Output Test:



Confirm analog output wiring per figure 3 and 4 diagrams or installation and maintenance instructions. Analog output can be tested during loop check mode or measurement mode. Change loop check value or apply equivalent pressure to test the analog output (see results below for reference).



<ul style="list-style-type: none"> • Connect amp-meter per manual instructions or diagram above. • Press the Up or Down arrow until 100.0 is displayed or apply 100 psi. • Verify amp meter reading (4.00 mA). • 100 psi corresponds to 0% FS analog signal (4 mA at 100 psi). 		
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<ul style="list-style-type: none"> Press the Up or Down arrow until 105.0 is displayed or apply 105 psi. Verify amp meter reading (12.00 mA). 105 psi corresponds to 50% FS analog signal (12 mA at 105 psi). 		
<ul style="list-style-type: none"> Press the Up arrow until 110.0 is displayed or apply 110 psi. Verify amp meter reading (20.0 mA). 110 psi corresponds to 100% FS analog signal (20 mA at 110 psi). 		

Switching Verification:

Ensure switch wiring per figure 3 and 4 diagrams or installation & maintenance instructions. Switch verification can be tested during measurement mode or loop check. Change loop check value or apply equivalent pressures (see results below for reference).

<ul style="list-style-type: none"> A 290 ohms resistor shall be use as the switch load to verify switch. Wire switch per manual instructions or figure above. Press the Up or Down arrow until 100.0 is displayed or apply 100 psi. Switch is in normal state (OFF) 		
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<ul style="list-style-type: none"> Place voltmeter leads across resistor and verify voltage reading (0 V dc). 		
<ul style="list-style-type: none"> Press the Up arrow until 115.0 is displayed or increase pressure up to 115 psi. Switch turns ON. Verify voltmeter reading (28 VDC). External relay energizes. Relay normally closed switch opens - compressor shuts down. Relay normally open closes - audible alarm turns ON. 		
<ul style="list-style-type: none"> Press the Down arrow until 110.0 is displayed or decrease pressure to 110 psi. Verify voltage reading (0 V dc). Switch changes to normal state (OFF). 	