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Introduction

The Series 800 or 850 LARC (Local Adjustable Relay Control) provides a single set point relay control for use with Data Industrial flow sensors. The LARC powers a flow sensor, monitors its output frequency, and opens and closes relay contacts when a preset flow rate limit is reached. The user can adjust the set point, a deadband, and a time delay. The LARC also allows you to choose whether the relay energizes above or below the set point and whether the relay automatically resets or latches on.

Installation

Figures 1 & 2 show the overall and mounting dimensions for the Model 800 housed unit and the Model 850 unboxed circuit board. Remove the cover of the Model 800 to gain access to the mounting holes. Mount the Model 850 circuit board on spacers that allow at least .15" clearance underneath for component leads.

Figure 1

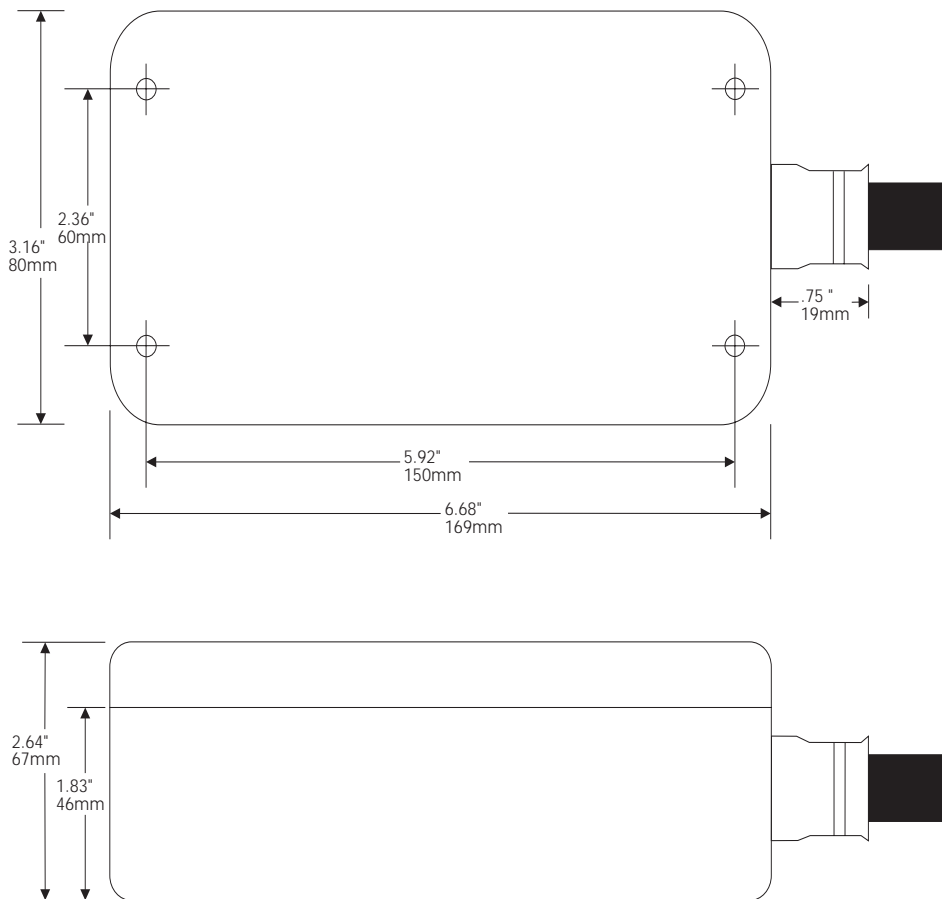
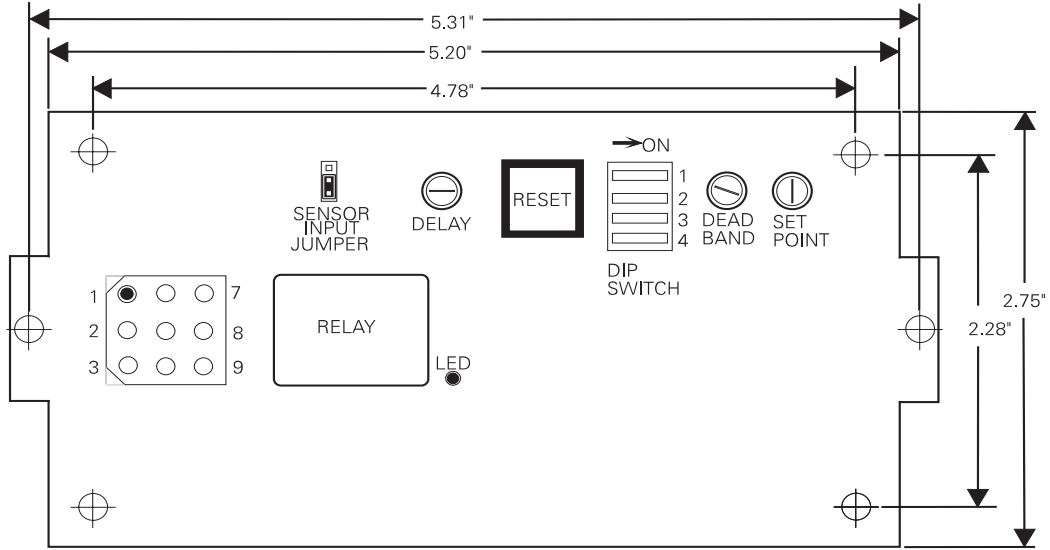


Figure 2



Range

The range selector switch allows the model 800/850 to be used with both the 4000 series, 3 wire, low frequency sensors, and the 200 Series, 2 wire, higher frequency sensors.

SWITCH NUMBER	FUNCTION NAME	POSITION		ADJUSTMENT RANGE
		OFF	ON	
1	LATCH	DISABLED	ENABLED	N/A
2	DELAY	DISABLED	ENABLED	10-100 SECONDS
3	LOGIC	TRIP HI	TRIP LOW	N/A
4	RANGE	HIGH	LOW	4-50HZ HIGH / 0.5-6HZ LOW

Wiring Connections

Figure 3 lists the circuit board connector pin numbers, the cable wire colors, and describes the wiring connections. The Model 850 comes with a connector kit containing the nine pins and connector shell required to mate to the on-board connector. A prefabricated 3-foot long cable with connector made up is available as P/N 07061. The pin numbers are labeled on the circuit board as well as on the connectors. Connect the LARC cable leads to the corresponding sensor leads and control unit. Then connect the LARC to either DC power in the range of 12V to 40V, or to AC power in the range of 12V to 30V.

Figure 3

PIN	LARC CABLE		DESCRIPTION	2-WIRE SENSOR	3-WIRE SENSOR (1/2" TO 1")
1	RED	SENSOR	POWER	UNUSED	RED
4	YEL		SIGNAL	RED (+)	WHITE
2	GRN		COMMON	BLK (-)	BLACK
5	BARE		SHIELD	BARE	BARE
6	BLK	POWER IN	AC LOAD/DC (+)		
3	WHT		AC COMMON/DC (-)		
7	BLU	RELAY	NORMALLY OPEN		WARNING: MAX POWER INPUT 40 VDC 30 VAC
8	ORG		NORMALLY CLOSED		
9	BRN		COMMON		

Note: We recommend that you cut the red LARC cable wire at the connector end when wiring the 2-wire sensors.

Calibration

The Series 800/850 (LARC) may be calibrated under actual flow conditions. A Data Industrial Model 1200 may be used to display flow during calibration.

1) To set the Series 800/850 (LARC) as a high flow alarm (relay energizes over set point), Proceed as follows:

Turn the deadband pot fully counterclockwise (minimum), the time delay pot fully counterclockwise (minimum), and set dip switches 1-3 to the “OFF” position. Begin with the set point in the full clockwise position (maximum). With the system running turn the set point pot counterclockwise slowly until red L.E.D. lights, then back clockwise until it goes out. The L.E.D. indicates that the relay is energized, and by adjusting the set point pot to a point where it just goes out sets the unit just above your actual flow condition. Refer to Table 1 for Minimum/Maximum range by pipe size. A time delay (ON) may be activated by pressing the delay dipswitch ON and adjusting the time delay pot.(See Figure 2) Minimum setting (full counterclockwise) is 10 seconds and maximum (full clockwise) is 100 seconds.

The relays may be “latched” in the energized position by pressing the latch dipswitch ON.(See Figure 2) Once tripped, the relay will hold until manually reset, using the reset button or turning off power, which remotely resets the Series 800/850. Be sure to interrupt power for a minimum of 5 seconds to reset the 800/850. The deadband adjustment is not used with the latch feature.

2) To set the Series 800/850 (LARC) as a low flow alarm (relay energizes on below set point), Proceed as follows:

Turn the deadband pot fully counterclockwise (minimum); turn the time delay pot fully counterclockwise (minimum) and set the time delay dipswitch and the latch dipswitch to the OFF position. Leave the logic switch in the ON position.

Begin calibration with the set point pot in the full counterclockwise position (minimum). With the system running, turn the set point pot clockwise slowly until L.E.D. lights, then back counterclockwise until L.E.D. goes out. This will indicate that the trip point is just below the operating flow rate. Refer to Table 1 for Minimum/Maximum range by pipe size.

A time delay (ON) may be activated by pressing the delay dipswitch ON and adjusting the time delay pot. (See Figure 2) Minimum setting (full counterclockwise) is 10 seconds and maximum (full clockwise) is 100 seconds.

The relay may be “latched” in the energized position by pressing the latch dipswitch ON. (See Figure 2) Once tripped, the relay will hold until manually reset, using the reset button or turning off power, which remotely resets the Series 800/850. Be sure to interrupt power for a minimum of 5 seconds to reset the 800/850. The deadband adjustment is not used with the latch feature.

3) To set the Series 800/850 LARC to start a pump on increasing flow (relay energizes above set point and de-energizes below set point), proceed as follows:

Turn the deadband pot fully counterclockwise (minimum); turn the time delay pot fully counterclockwise (minimum) and set all three dipswitch settings to the OFF position. Begin with the set point pot in the full clockwise position (maximum). With the system running, turn the set point pot counterclockwise slowly until the red L.E.D. lights, then back clockwise until it goes out. The L.E.D. indicates the relay is energized, and by adjusting the set point to a point where it just goes out sets the unit just above your actual flow condition. Refer to Table 1 for Minimum/Maximum range by pipe size.

A time delay (ON) may be activated by pressing the delay dipswitch ON and adjusting the time delay pot. (See Figure 2) Minimum setting (full counterclockwise) is 10 seconds and maximum (full clockwise) is 100 seconds.

The latch is not used in this application because the relay must be de-energized on falling flow to shut off the pump. Leave the latch dipswitch OFF.

The deadband is a minimum of 5% of the set point value to prevent the pump from cycling. The deadband may be increased by turning the deadband pot clockwise to a maximum of 50% of the set point. This may also be used as an “OFF” delay to increase the time that the pump remains ON.

For example, if the set point is 100 GPM to energize, the flow must drop to 95 GPM (deadband pot set at minimum) to de-energize the relay. With the deadband pot at the maximum, the flow rate would drop to 50 GPM before the relay would de-energize.

Note: While making adjustments to the Series 800/850 set point, or time delay, it might be helpful to run the pump in the manual mode to prevent rapid cycling. Once coarse adjustments are made, fine adjustment may be made with pump control in automatic.

4) To calibrate the Series 800/850 on the test bench:

The Series 800/850 LARC may also be precalibrated on a test bench using an electronic frequency source rather than a sensor for the signal input. The frequency source must produce a square waveform with a peak from 7-9VDC, a low of 0 to 2VDC and an adjustment range of 0-5Hz for calibrating in the low range and 4-50Hz for calibrating in the high range.

Connect the frequency source to the sensor input of the LARC. Connect the positive of frequency source to the yellow wire or pin 4 and connect the negative to the green wire or pin 2.

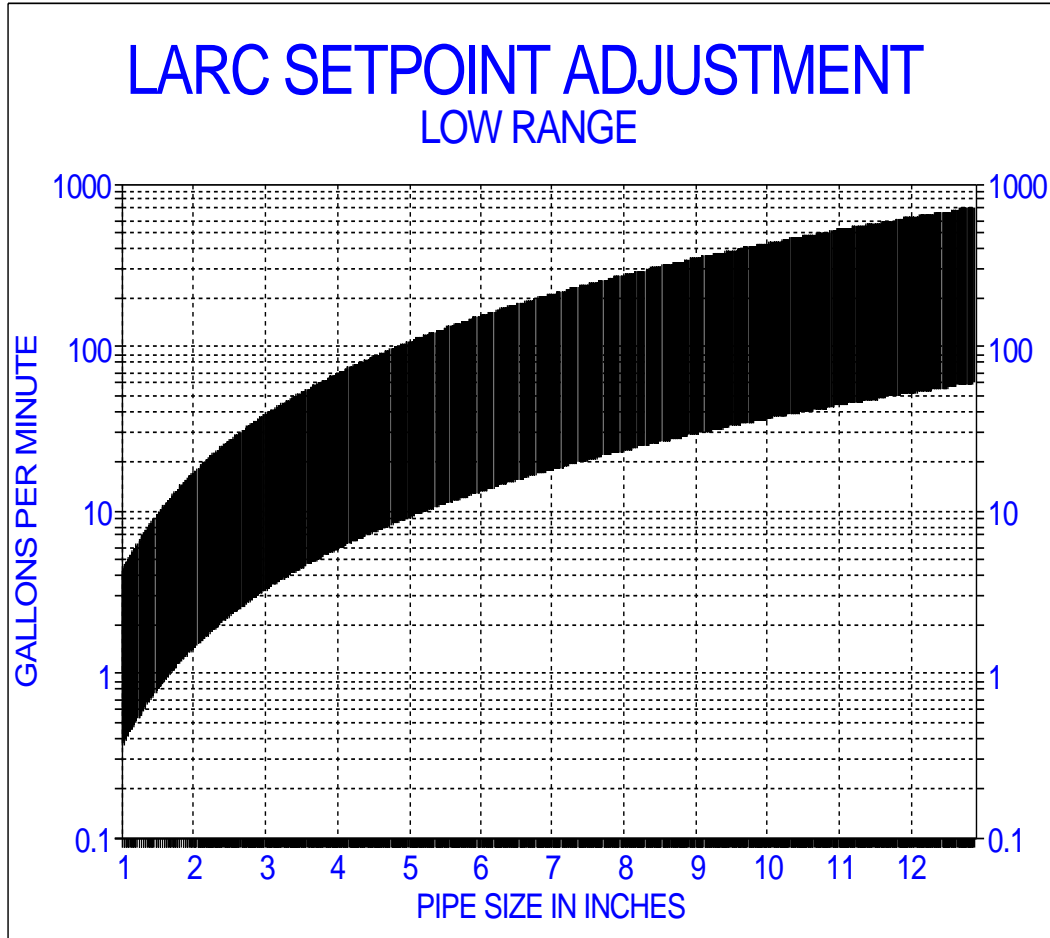
Connect the positive or load of the power source to the black wire or pin 3 and the negative of power source to the white wire or pin 6.

Determine the set point GPM and convert to a frequency using the formula:

$$\mathbf{FREQ = \frac{GPM}{K} - OFFSET}$$

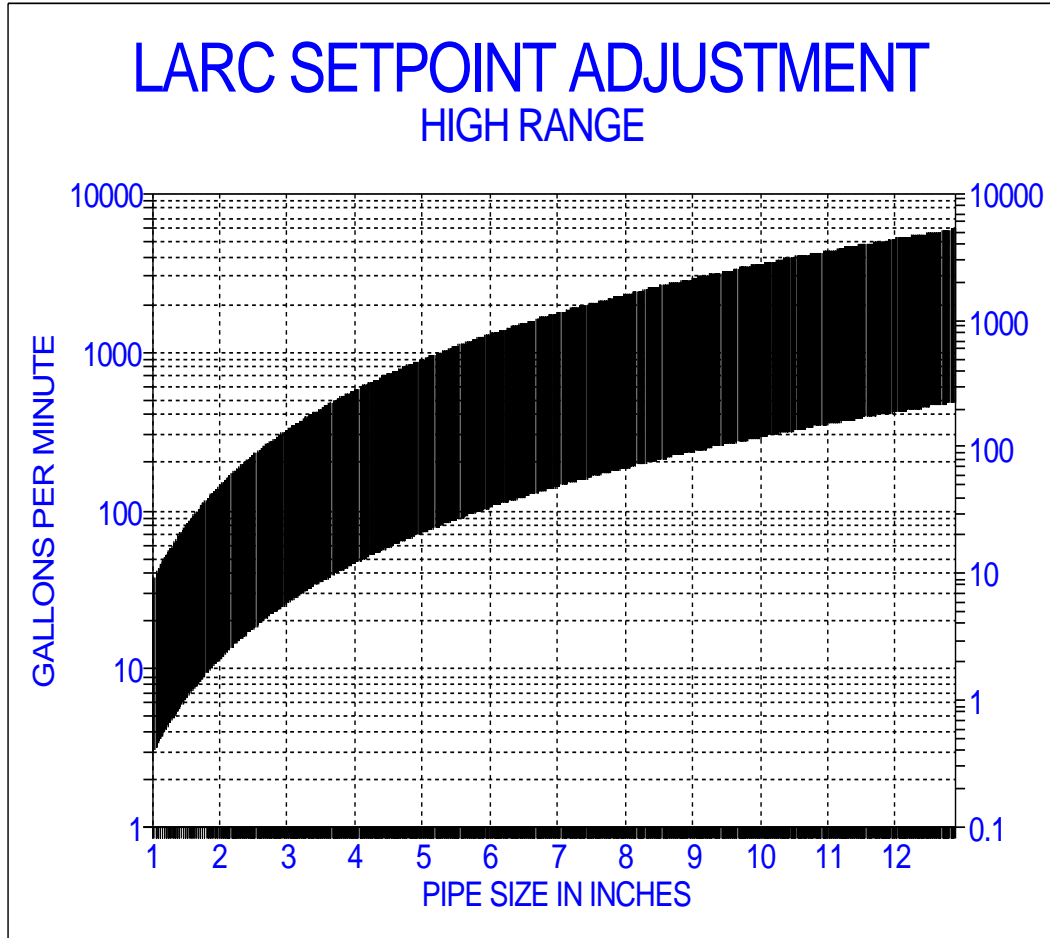
The value of "K" and offset are specific for each size pipe or sensor type and may be selected from the tables in the sensor manuals.

Set the frequency source to the selected value and set the LARC as above in part 1, 2 or 3

**NOTE:**

The minimum set point shown on this chart refers to the input frequency of the LARC circuit, and may be less than the minimum flow rate detected by the sensor.

Check sensor specifications before setting LARC.

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LARC MINIMUM/MAXIMUM SET POINTS

Series 4000 and TEE TYPE Sensors

Table 1

Pipe Size	Flow Sensor	Low Range		High Range	
		Min GPM	Max GPM	Min GPM	Max GPM
1/2"	400200	0.4	2.6	1.8	20.8
1/2"	410200	0.4	3.6	2.4	28.8
1/2"	400300	0.3	3.6	2.4	29.9
1/2"	410300	0.1	0.9	0.6	7.3
3/4"	401200	0.4	3.6	2.4	28.8
3/4"	411200	0.2	2.0	1.4	16.5
3/4"	401300	0.1	0.9	0.6	7.3
3/4"	411300	0.3	2.1	1.4	16.1
1"	402200	0.4	3.8	2.6	30.8
1"	402300	0.3	3.8	2.5	31.3
1"	250B-1	0.4	2.7	1.8	20.9
1.25"	250B-1.25	0.9	5.1	3.6	38.7
1.5"	250B-1.5	0.6	6.5	4.4	53.4
1.5"	220P-1.5;228PD-1.5	1.3	11.5	7.8	92.8
1.5"	228PF-1.5	2.1	13.6	9.4	105.2
2"	228B-2	1.4	16.5	11.0	137.4
2"	228CB-2	2.2	17.6	12.0	141.2
2"	220P-2;228PD-2	2.4	17.4	12.0	137.3
2"	228PF-2	2.7	24.3	16.5	197.5
2.5"	228B-2.5	3.3	23.9	16.4	188.5
2.5"	228C-2.5	2.9	23.5	16.0	188.0
3"	220P-3	6.0	51.7	35.1	417.3
3"	228PF-3	6.1	36.5	25.4	280.1
4"	220P-4	11.5	95.9	65.2	771.3
4"	220PF-4	12.6	69.3	48.7	522.7
6"	220P-6B	21.7	130.2	90.7	998.1
6"	220PF-6A	13.8	115.2	78.3	926.6

NOTE:

The minimum set point shown in the low range column relate to the input frequency of the LARC circuit and may be less than the minimum flow rate detected by the sensor.

Check sensor specifications before setting larc.

Specifications

Model 800

Waterproof, housed version with 36" exit cable

Model 850

Unhoused circuit board only (no cable)

P/N 07061: Cable for Model 850

Operating Range

.4 to 5 Hz with range switch in the "low" position

4 to 50Hz with range switch in the "high" position

Time Delay

10-100 second "ON" delay between flow point and relay actuation

Relay Rating

SPDT Contact Ratings:

5A@30VDC

5A@125VAC

3A@250VAC

Power

12-30 VAC

12-40 VDC

Reverse overvoltage protected to 40VDC

Power consumption including sensor:

10 mA relay de-energized

60 mA relay energized

Transient Suppression

Designed to withstand a 5000 volt 1/2 microsecond, 100KHz ring wave

Temperature Range

Operating Temperature: -20° to 150° Fahrenheit (-29° to 65° Celsius)

Conformal Coating

All circuits are coated with a clear colorless coating meeting Mil-spec Mil-I-46058c, type AR, for humidity, moisture resistance and fungus resistance.

Cable

Eight-conductor 22 AWG tinned copper with foil shield, .250" diameter, 80°C temperature rating, UL/CSA listed.

Dimensions

Model 800 Case: 3.14" X 6.29" X 2.15" with cover

Model 850 bare board: 2.75" X 5.20" X 1.87" (for Molex® connector clearance)

Weight

Model 800: 12.5 oz (355 gm)

Case

Polycarbonate With tongue and groove polyurethane sealed cover for waterproof integrity. Meets NEMA 1,2,3,3r,4,4x,6,12, and 13 specifications.

Warranty

Data Industrial Corporation (“Seller”) of 11 Industrial Drive, Mattapoisett, Massachusetts 02739, U.S.A., warrants to the original purchaser of its product that such product manufactured by Data Industrial Corporation shall be free from defects in materials or workmanship when installed, serviced and operated according to Data Industrial corporation instructions or in other such normal use. This warranty is effective for a period of 12 months from the date of installation by the Purchaser or 18 months from the date of shipment by the “Seller” whichever occurs or terminates first. This limited warranty does not cover damage or loss resulting from corrosion or erosion caused by acids or other chemicals or negligent installation improper operation, misuse, accident, unauthorized repair or substitution of components other than those provided by the “Seller”, and does not cover limited life components such as bearings, shafts, impellers where wear rate is a function of application. Any component not manufactured by the “Seller” but included in its products shall not be covered by this warranty and is sold only sunder such warranty as the manufacturer may provide.

If Buyer or Purchaser wishes to make a claim hereunder, he shall send written notice of any defect within the warranty period, to “Seller” at the above address. “Seller” may at its sole option instruct Buyer to ship subject part, postage prepaid, to the “Seller” at above address or authorize a representative to inspect the part on site. “Seller” will at its sole option repair or replace any effective product covered by this warranty. If Buyer makes repairs or alterations to any product or part covered by this warranty without “Sellers” prior written approval, this warranty shall be null and void.

The foregoing shall constitute Buyers or Purchasers sole and exclusive remedy against “Seller”, and no other remedy, including but not limited to, incidental or consequential damages for personal injury, loss of fluids, gases or other substances or for loss of profits or injury to property or person shall be available to the Buyer or Purchaser. The warranty extended herein shall be in lieu of any other implied warranty of merchantability or fitness for a particular purpose, and seller shall bear no liability for representatives or retail sellers. In no event shall Data Industrial Corporation be liable for any contingent, incidental, or consequential damage or expenses due to partial or complete inoperability of its product.