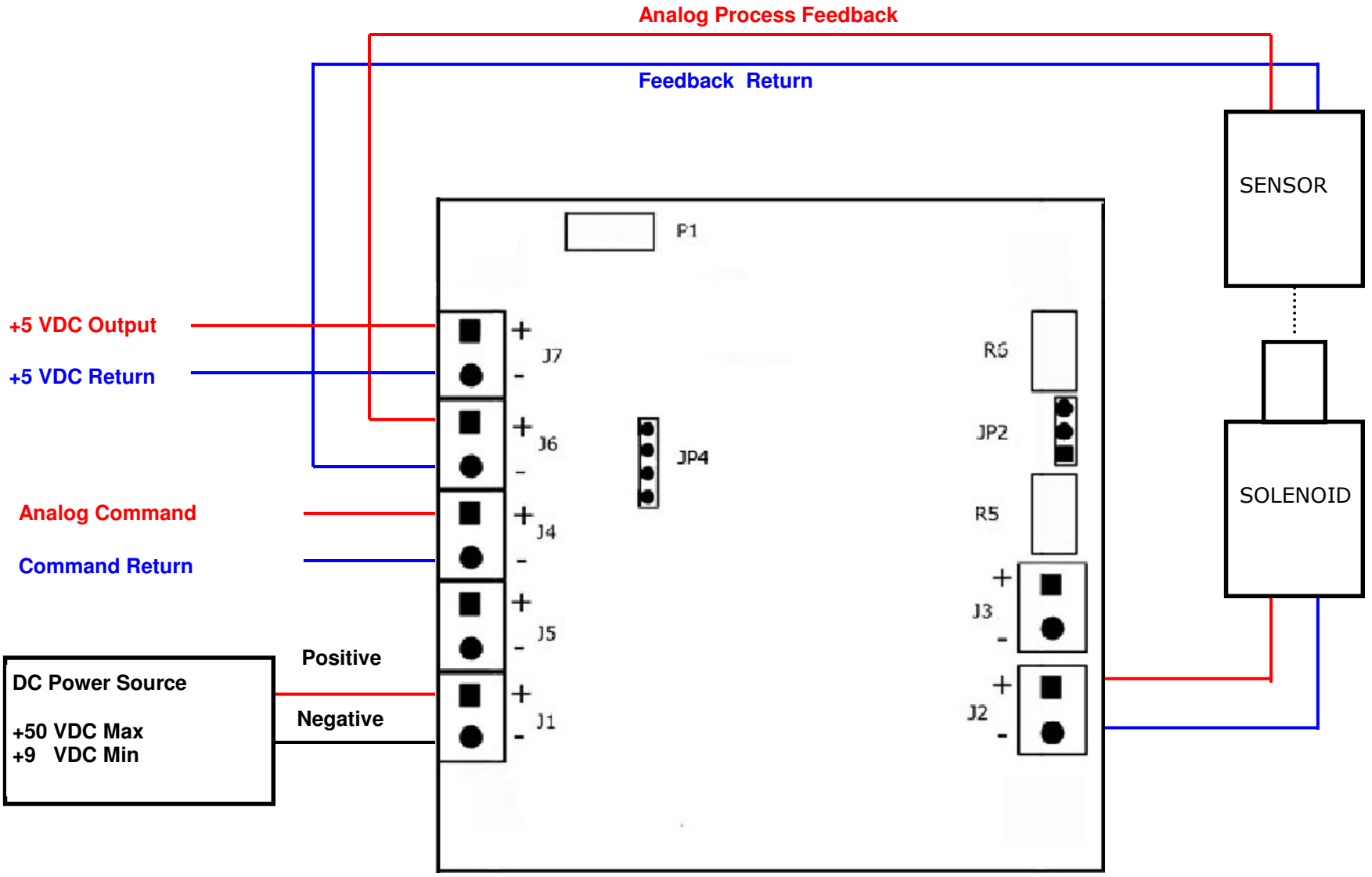
CONNECTION	DESCRIPTION
J1 +	This pin should be connected to the positive output of the power source. The maximum applied voltage should not exceed +50 VDC.
J1 -	This pin should be connected to the negative output of the power source.
J4 +	The analog command for solenoid –1 should be connected to this pin. The range of the input signal is 0 to +5 VDC. For signals with a range of 0 to +10 VDC a 5.6 KOhm resistor should be added to R15.
J4 -	This pin may be used as the return for command signal.
J6 +	The position feed back for solenoid – 1 should be connected to this pin. The range of the input signal is 0 to +5 VDC. For signals with a range of 0 to +10 VDC a 5.6 KOhm resistor should be added to R16.
J6 -	This pin may be used as the return for position feed back .
J2 +	This pin should be connected to one terminal of solenoid-1.
J2 -	This pin should be connected to the other terminal of solenoid-1
J3 +	Not Used
J3 -	Not Used
J7 +	+5 VDC Output. Maximum usable current should be limited to 250 mAmps.
J7 -	Return for +5 VDC.
JP4-2	Optical Encoder Position Feedback—Phase A
JP4-3	Optical Encoder Position Feedback—Phase B
J5 +	Not Used
J5 -	Not Used

Closed Loop Solenoid Process Control Module Pin Assignment and Description

Optimal Engineering Systems, Inc.
6901 Woodley Avenue
Van Nuys, California 91406 U.S.A.
www.oes-site.com

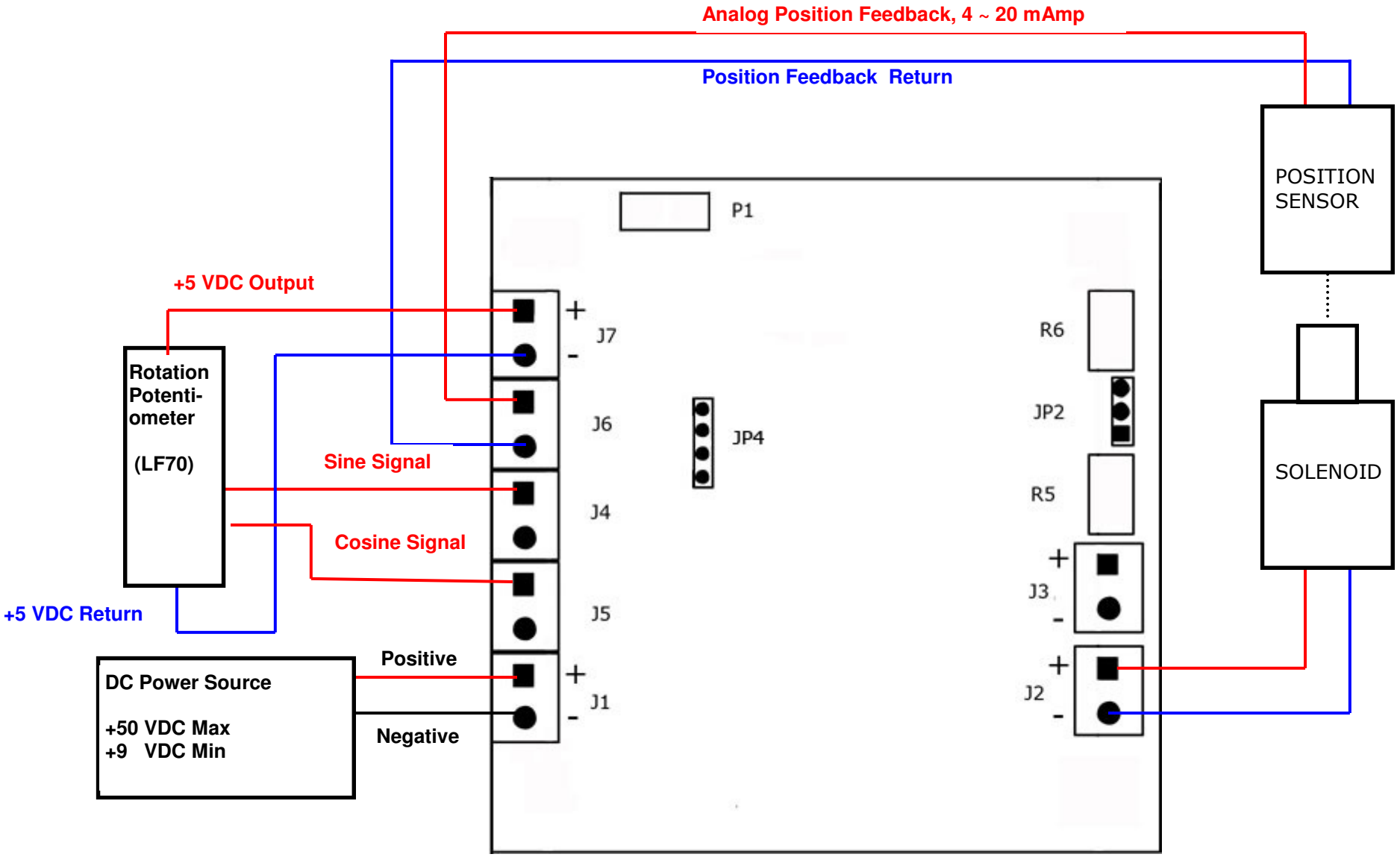
+1 (818) 222-9200
FAX +1 (818) 436-0446
E-mail oes@oes-site.com



CLSP-01 Wiring Diagram for a Solenoid with External Return Force

Optimal Engineering Systems, Inc.
6901 Woodley Avenue
Van Nuys, California 91406 U.S.A.
www.oes-site.com

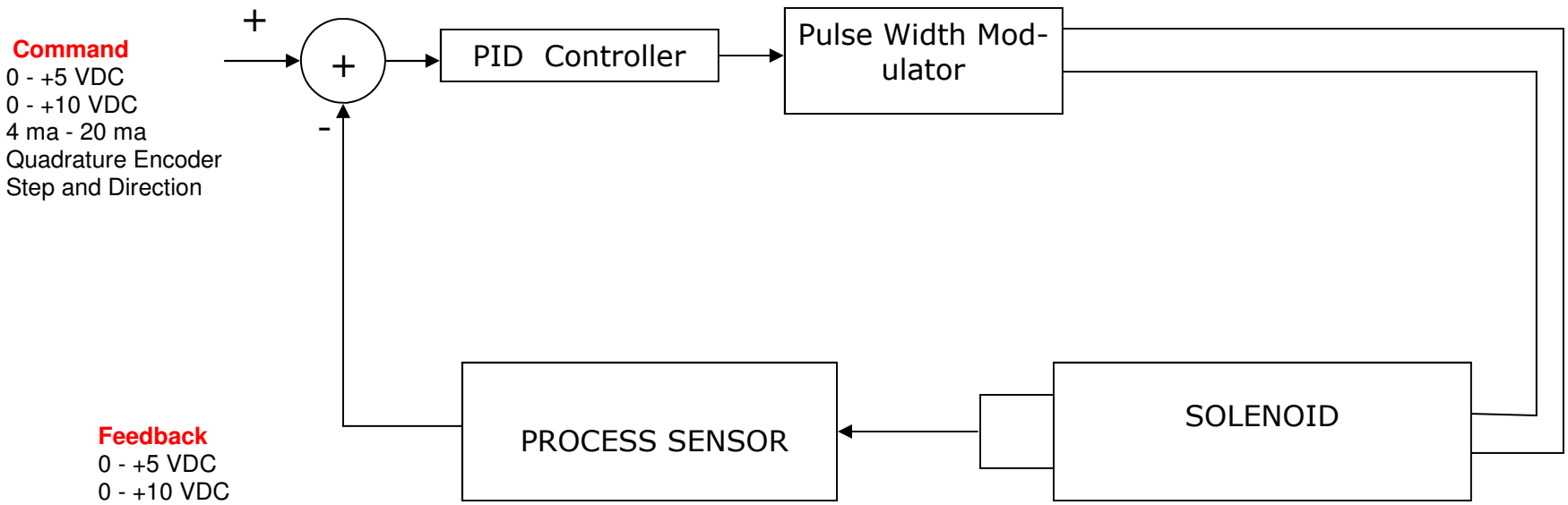
+1 (818) 222-9200
FAX +1 (818) 436-0446
E-mail oes@oes-site.com



CLSP-01 Wiring Diagram for a Solenoid with External Return Force

Optimal Engineering Systems, Inc.
6901 Woodley Avenue
Van Nuys, California 91406 U.S.A.
www.oes-site.com

+1 (818) 222-9200
FAX +1 (818) 436-0446
E-mail oes@oes-site.com



Closed Loop Solenoid Process Control Module Block Diagram

Optimal Engineering Systems, Inc.
6901 Woodley Avenue
Van Nuys, California 91406 U.S.A.
www.oes-site.com

+1 (818) 222-9200
FAX +1 (818) 436-0446
E-mail oes@oes-site.com

Warning:

Handling this electronic module shall be performed in a static safe environment while a ground strap is used. Damages arising due to not observing the static pre-cautions shall void the limited ninety-day warranty.

Closed Loop Solenoid Process Control Module Adjustment Procedure:

The R5 potentiometer adjusts the proportional (P) term of the PID filter.
The R6 potentiometer adjusts the derivative (D) term of the PID filter.
The P1 potentiometer adjusts the integral (I) term of the PID filter.

The operation must be equipped with a safety switch to shut down the system in the case of an erratic behavior. The following tuning must be done by a qualified technical personnel.

1. Turn off the power to the solenoid control module.
2. Make all the necessary connections.
3. Turn the R5 potentiometer fully CCW. This position sets the proportional gain to minimum value.
4. Set the R6 potentiometer in the middle position.
5. Turn the P1 potentiometer fully CCW. This position sets the integral gain to minimum value.
6. Monitor the voltage between J6+ and J4+ using a DC voltmeter. This is the error signal between the command and the process.
7. Turn on the power to the solenoid control module.
8. Increase the command signal slightly and adjust the R5 potentiometer slightly to minimize the voltage between J6+ and J4+. Make sure the system is stable.
9. R6 potentiometer may need to be adjusted to increase the stability of the system.
10. Repeat the above two steps for optimum performance.
11. The P1 is used to decrease the error. Turning the P1 CW may decrease the stability of the system.

Optimal Engineering Systems, Inc.
6901 Woodley Avenue
Van Nuys, California 91406 U.S.A.
www.oes-site.com

+1 (818) 222-9200
FAX +1 (818) 436-0446
E-mail oes@oes-site.com

Limitation of Liability

Optimal Engineering Systems, Inc. (OES) hardware and software are not intended for use in any manner where human life or safety is at risk. OES' products are not intended for life support equipment.

In no event shall Optimal Engineering Systems, Inc. be liable to any customer for costs or damages, including lost profits, lost savings or other incidental or consequential damages arising out of the use or inability to use such products even if Optimal Engineering Systems, Inc. or an authorized Optimal Engineering Systems, Inc. representative has been advised of the possibility of such damages, or for any claim by any other party. In any event, Optimal Engineering Systems liability arising in any manner in connection with the products, whether based in contract, product liability or tort, shall not exceed the purchase price of the product.

Limited Ninety-Day Warranty

Optimal Engineering Systems, Inc. warrants to the original purchaser that this product to be free from defects in material or workmanship for a period of ninety days from date of purchase. Optimal Engineering Systems, Inc. agrees to repair any such defect or exchange the product with a new or equal replacement. Defective product must be returned to Optimal Engineering Systems, Inc. postpaid. This warranty is void for any product that has been modified by the customer in any way. If failure of the Product has resulted from accident, abuse, or miss-application, Optimal Engineering Systems, Inc. shall have no responsibility under this Ninety-day Warranty.

Optimal Engineering Systems, Inc.
6901 Woodley Avenue
Van Nuys, California 91406 U.S.A.
www.oes-site.com

+1 (818) 222-9200
FAX +1 (818) 436-0446
E-mail oes@oes-site.com