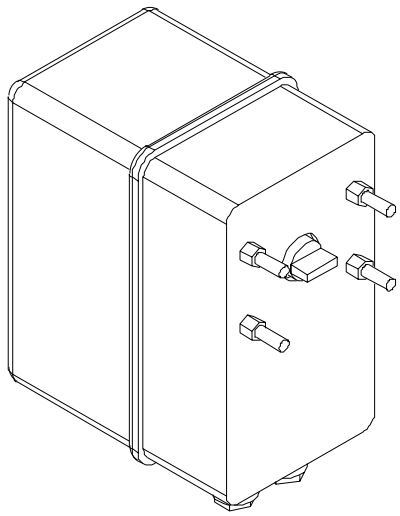
Operating Instructions

Stegmann Servomotor with mA Input



Read the operating instructions before installation and use. The warranty does not cover damages due to faulty operation. ***Keep for reference and replacement information.***

BA SER 02 11/00 NA **Order no. 7750085**

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SAFETY INSTRUCTIONS

General Safety Considerations

- Wear protective clothing and glasses when working with or near chemicals.
- Refer to the MSDS for all chemicals being used.
- Inspect tubing regularly for cracking or deterioration and replace as necessary.
- Make sure the voltage on the equipment matches the voltage at installation.
- Do NOT use with flammable liquids.
- Use only ProMinent® parts, use of other parts may result in injury or damage to the equipment.
- Flush all components that are in contact with chemicals prior to servicing.
- Secure all chemicals and equipment making them inaccessible to children and pets.
- Pumps must be accessible to facilitate operation and maintenance of the pumps.
- Dispose of all chemicals and waste according to all local, state/province and federal regulations.

Safety Operating Procedures

- **Caution** the liquid end may contain water from factory testing. If chemical will react with water, remove water from liquid end by turning pump 180° and discharging the liquid end. Flush an appropriate solvent through the intake valve prior to use.
- Consult a licensed plumber and electrician prior to installation; conform to local codes.
- Disconnect all power from equipment prior to repairing or moving the equipment.
- Stop the flow of sample to the system prior to working on the pump.
- Do not exceed the maximum operating pressure.
- Use a pressure relief valve to avoid excessive backpressure when conditions warrant it.
- Set the stroke length when the pump is running.
- Use a pulsation dampener on the discharge line when discharge lines are over 30 ft. (9 m) in length.
- Turn off the servomotor when the pump is not running.

UNPACKING

CHECK ALL EQUIPMENT FOR DAMAGE AND FOR COMPLETENESS AGAINST THE ORDER. REPORT INCORRECT ORDERS OR DAMAGE TO THE SELLER IMMEDIATELY.

INTRODUCTION

Servomotor

The servomotor is used to position the stroke length on the pump. There are two modes of operation MANUAL and AUTOMATIC.

INSTALLATION

Installing the Servomotor

For installation and use of an analog servomotor (actuator) to control stroke length you will need:

- 4-20 mA or 0-20 mA power source or powered 4-20 mA signal
- DC milliamp meter
- Voltmeter

Installing servomotor onto the pump

1. Apply power to the pump motor.
2. Turn the stroke adjustment shaft in (clockwise) with a screwdriver, until the diaphragm bolt stops moving. (This is the 0% stroke position)
3. Place the O-ring in the slot on the face of the servomotor flange.
4. Remove the cover from the servomotor.
5. Loosen both of the limit switch cams and the motor potentiometer drive gear. The potentiometer gear is the gear on the same shaft as the cams.
6. Line up the servomotor coupling shaft and stroke bolt. Set the Auto/Manual switch to the Manual mode.
7. If they do not line up, apply power to the servomotor and press the stroke switch in the + or - direction to move the coupling shaft the shortest distance to align**. DO NOT move the servomotor coupling shaft by hand**.
8. Align the 4 mounting screws on the servomotor with the flange on the pump.
9. Place the washers and nuts on the screws and tighten with a 5/16" wrench.
10. Attach the shorting header to the appropriate jumper connection, which is located to the left of the bank of potentiometers. Jumper 1, located directly to the left of the potentiometers selects the 4-20 mA input. Jumper 2, located to the left of Jumper 1, selects the 0-20 mA input.
11. Ensure the pump is still set at the 0% stroke length.
12. **Turn power off to the servomotor.**

Setting the minimum position

1. Adjust the front cam so that it activates the switch from the *clockwise* position. (This is the cam closest to the gear on the potentiometer.)
2. Tighten the set screw, using a 1.5 mm Allen wrench.
3. Use the other set screw on the cam to make the fine zero adjustment. The pointer on the white knob should be approximately at the 12 or 4 o'clock position depending on the model.
4. Turn the gear on the potentiometer full counterclockwise (viewing from the potentiometer side).
5. Engage the two gears and tighten the set screw, taking care not to turn the potentiometer. The two gears should be flush with one another.

Setting the maximum position

1. Plug in the servomotor.
2. Hold the left switch toward the front in the + position until the drive is in the 100% position (full counterclockwise). This will take 100–110 seconds.
3. **Turn power off to the servomotor.**
4. Adjust the rear cam to activate the switch from the *counterclockwise* position.
5. Tighten the set screw, using a 1.5-mm Allen wrench.
6. Use the other set screw on the cam to make the fine adjustment to 100%.
7. Plug in the servomotor.
8. Recheck the 0% and the 100% positions in the Manual switch position.

DESCRIPTION OF CONTROLS AND OPERATION

Manual

Manual Operation

The stroke length can be decreased or increased by the push button integrated in the positioning control system. This can be set from 0-100%. The stroke length can be conducted outside as a signal via the feedback potentiometer.

Automatic

Automatic Operation

The stroke length is set proportionally to an input signal 0-20 mA or 4-20 mA. The feedback potentiometer can be used as an actual value output. A manual intervention in this mode is not possible.

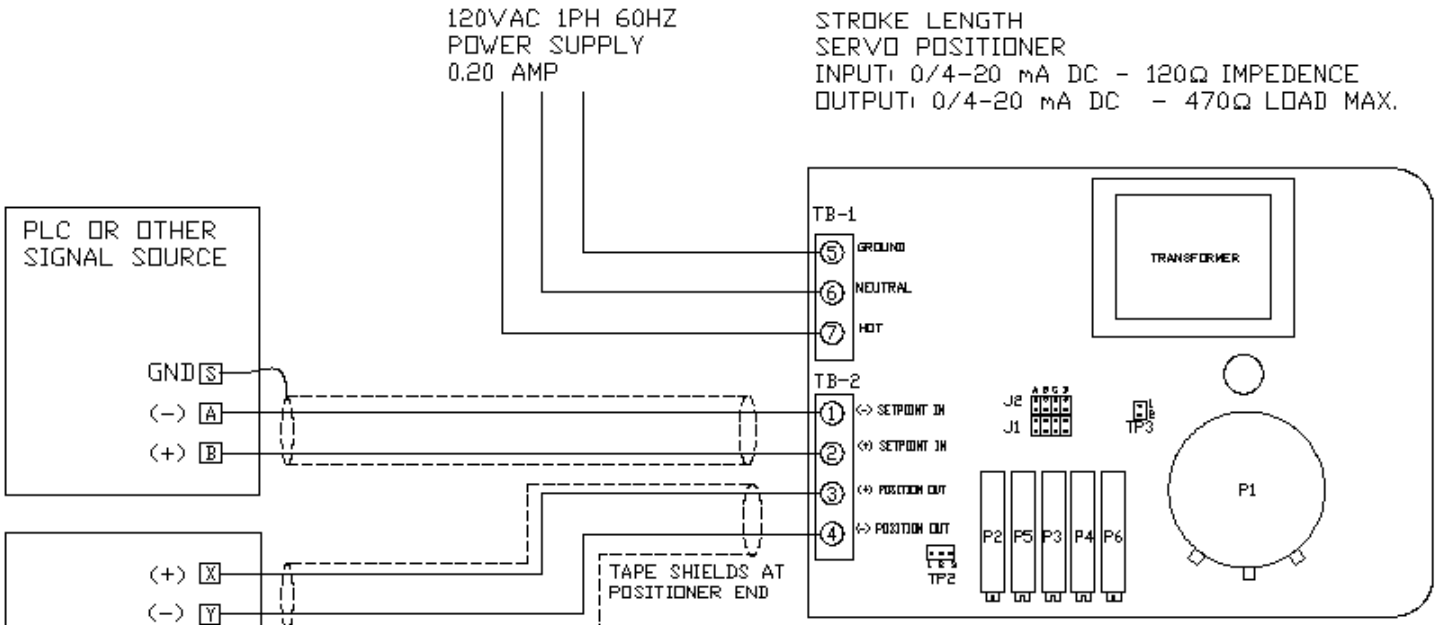
Note: The power on the servomotor must be in such a way that the servomotor does not have power when the drive motor is stopped.

Refer to Wiring Diagram

Testing the servomotor:

1. Connect the 4-20 mA cord of the DC milliampere meter to the power source.
2. Connect a lead to the + (red) post on the power source. (TP 2 Terminal 2)
3. Connect a lead to the positive lead of the DC mA meter. (TP 2 Terminal 1)
4. Connect the black meter lead to the negative post of the power source.
5. Make sure the power is off and the control is set to zero.
6. Turn the power on and set the source to 4 mA. The white pointer should be in the 0 position.
7. Monitor the current on the DC mA meter.
8. Set the power source to read 20 mA. The white pointer should be in the 100% position.
9. Apply 12 mA (10 mA if using the 0-20 mA range) to the servomotor. The arrow on the white knob should point to the 12 o'clock position. If not in the proper position, remove the knob and adjust to the correct position.
10. Reduce the mA by 0.15 mA; the servomotor should briefly start up in the opposite direction.

DWG No 000553-300 | REV B



JUMPER HEADERS:
J1 - A-D SHORTED = 4-20 MA SIGNALS
J2 - A-D SHORTED = 0-20 MA SIGNALS

TEST POINTS:
(ALL VALUES ARE 0 TO 100mV RANGE)
TP2-1 - SIGNAL COMMON
TP2-2 - POSITION SIGNAL
TP2-3 - POSITION BALANCE

TP3-1 - SETPOINT SIGNAL
TP3-2 - POSITION SIGNAL

POTENTIOMETERS:
P1 - POSITON POT
P2 - GAIN - POSITION POT
P3 - GAIN - 4-20 MA ACTUAL
P4 - GAIN - 0-20 MA ACTUAL
P5 - BALANCE - POSITION POT
P6 - OFFSET - 4 MA ACTUAL

REV	DATE	DESCRIPTION	BY	APPD	REVD
B	10/07/00	CORRECTED OUTPUT MAX. RESISTANCE	DH		
A	07/25/00	REV TB-2, ADD TP2, 3 PIN NOS.	AGH		
D	04/12/00	INITIAL RELEASE	AGH		

REVISIONS

ENGINEERS SEAL

CUSTOMER: SIGMA, META & VARIO PRODUCTS

JOB No | PURCHASE ORDER No

TITLE: ELECTRONIC STROKE POSITIONER
TYPICAL WIRING & ADJUSTMENT LOCATION

SHEET SIZE: A

ProMinent®
THE PROMINENT GROUP OF COMPANIES
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DESIGNED
DRAWN AGH
CHECKED DH
APPROVED
SCALE NTS
DATE 04/12/00

DWG No 000553-300 | REV B

Testing Wire Breakage

11. Disconnect the milliampere meter. The servomotor should go to the minimum position without actuating the end switch.
12. Reconnect the milliampere meter
13. **Turn power off to the servomotor.**
14. Put the cover on the servomotor.
15. Plug in the servomotor.
16. Apply 4 mA then 20 mA to the servomotor.
17. Verify the alignment of the arrow through the window cover.
16. Disconnect the milliampere meter.

Calibration is done at the factory and does not normally need checked when installing the servomotor.

Calibration:

Setting minimum position

1. Connect a voltmeter to test strip 2, pins 1 and 2 (pin 1 ground, pin 2 positive)
2. Rotated the position potentiometer P1 on the drive shaft until 40-80 mV are set.
3. Push in the gearwheel for the potentiometer to lock.
4. Connect a voltmeter to test strip 2, pins 2 and 3 (pin 2 ground, pin 3 positive).
5. Rotate the potentiometer P5 until the circuit is at 0 volt.

Setting the actual value output

6. Connect an amp meter in series with a resistor of 240 Ohms to terminal strip 2, terminals 3 and 4 (terminal 3 positive, terminal 4 ground)
7. If the 0-20 mA range is selected 0.0X mA should be measured. If the 4-20 mA range is selected rotate potentiometer P6 to set 4 mA.
8. If the 0-20 mA range is selected rotate potentiometer P4 to set 20 mA. If the 4-20 mA range is selected rotate potentiometer P3 to set 20 mA.

Setting maximum position

9. Apply a 20 mA signal to terminal strip 2, terminals 1 and 2 (terminal 1 ground, terminal 2 positive). Connect a voltmeter to test strip 3, pins 1 and 2 (pin 1 ground, pin 2 positive).
10. Rotate potentiometer P2 until the circuit is at 0 volt.

MAINTENANCE

Perform a visual inspection semiannually to check the gears and screws are tight and free from corrosion. Keep servomotor clean and free of chemical exposure.

REPAIR SERVICE

Repairs must be done by ProMinent Fluid Controls. Call your distributor or ProMinent at (412) 787-2484 in the US and (519) 836-5692 in Canada for a return goods authorization.

DO NOT return any goods without authorization. All returned items must be free of hazardous chemicals and clean when returned.

SPECIFICATIONS

Power Supply:	207-253 V 50-60 Hz
	100-127 V 50-60 Hz
Power Consumption:	36.5 mA (220V)
	73.0 mA (110 V)
Control Signal:	0-20 mA/4-20 Ma
Actual Value:	0/4-20 mA can be set in the device
Enclosure Rating:	IP 65
Current Consumption:	> 15 mA position reached
	100 mA when regulating
Setpoint input:	0/4-20 mA DC
input resistance:	120 Ohm
input capacitance:	100 nF
Actual Value Output:	0/4-20 mA DC
internal resistance:	49.9 Ohm
load resistance:	100-470 Ohm
Reversal hysteresis:	> 0.15 mA range 0-20 mA
	> 0.12 mA range 4-20 mA
Linearity:	> +/- 1.5% from setpoint max.
Resolution:	0.2% from setpoint max.
Position potentiometer:	Mechanical rotation angle 275° +/- 5%
	Electrical rotation angle 275° +/- 5%

DIMENSIONS