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Description:	Pressure Transducer Calibration Procedure	Date:	Sept 19, 2019
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REV	CHANGE DESCRIPTION	ECO #	INITIALS	DATE
B	Add note: Disregard this document for pumps without pressure monitoring.	10686	KK	06/30/15
C	Clarify scope of procedure. Change required equipment.	10897	JLF	04/05/16
D	Add NZ command.	11869	DEL	09/19/19

1.0 Overview

Disregard this document for pump or pump kits without pressure-monitoring capabilities. *Accessing pressure calibration commands on a unit without pressure monitoring may result in inaccurate flow rates and erratic pump behavior.*

This procedure describes the method for re-calibrating pressure-monitoring electronics of *Next Generation Pump and Pump Kits*. Standalone Next Generation pumps have a two-character class identifier prefix (i.e. **M1-**, **MX-**, **LS-**, **LD-**, **LU-**, **PR-**, & **CP-**Class). They can also be identified by their serial number “V” prefix (e.g. **V0123456**).

Next Generation printed circuit assemblies are constructed in 2-board or 3-board sets (below) and are identified with serial number labels starting with **TL** or **TM** (located on mounting bracket).



Pressure transducers and electronic component tolerances require the circuit board to be calibrated to the pressure sensor. Failure to calibrate may result in inaccurate pressure readings through the pump’s front display and through external serial communications.



This procedure is performed with voltage present, so caution is strongly advised.

2.0 Required Equipment

Computer:	Host Computer with ability to communicate with pump (including cabling)
Gauge:	Inline-Pressure Gauge (with ability to dead-head)
Backpressure:	During this procedure, the unit will be operated at its maximum rated pressure. All attached tubing and components must be capable of withstanding this pressure.

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3.0 Procedure

- 3.1 Before beginning, all appropriate electrical and fluidic connections should be in place, such that the instrument is operational and functional. This includes connecting the pump inlet line(s) to a suitable solvent, priming the system and ensuring adequate solvent flow, connecting the pump outlet line(s) to the pressure gauge, and purging all air from the solvent lines.
- 3.2 Apply power to the pump and verify that the lower pressure limit is 0 and that the upper pressure limit is set to the maximum pressure for the unit. Adjust as needed. Pressure limits may be set through the pump front display panel or through external serial communications. *Please consult the pump's Operators Manual or Serial Communication Guide for additional details.*
- 3.3 From the host computer, issue the command **QQ** to enable access to the factory debug command set, which is necessary to complete this procedure. If this step is not followed, the commands outlined below will return an error response of Er/.
- 3.4 Prime the pump and make sure the entire fluid path (including pressure gauge) is filled. *Failure to fully fill the fluid path may result in inaccurate pressure readings.*
- 3.5 Open the system to atmospheric pressure. *Carefully and slowly remove pressure from the system - a rapid release of pressure may damage the pulse damper, if present.*
- 3.6 Issue the command **AZ** on the host computer application (*AZ = Automatic Zero*). This command will assign the current output value of the analog-to-digital converter (ADC) to the zero offset value used in the pressure conversion algorithm. Alternatively, if the desired zero offset value is known, issue the command **SZxxxxx** where xxxxx represents the desired offset value (*SZ = Store Zero*). For example, to store an offset value of 170, issue the command **SZ170**. To store a negative value, use the command **NZxxxx**, e.g., **NZ500** to store a value of -500.
- 3.7 To allow pressure buildup, plug any loose connections to close the system. Set the pump flow rate to a low value, such as 1 ml/min. Start the pump. The external pressure gauge may take several moments to fill before it indicates pressure.
- 3.8 Once the pressure reaches the upper pressure limit, the pump should stop due to a high pressure fault. Allow several seconds for the pressure in the system to stabilize. If pressure does not stabilize after several seconds, recheck connections for leaks. *Failure to achieve stabilized pressure may result in inaccurate pressure readings.*
- 3.9 With the system at pressure, issue the command **AC** on the host computer application (*AC = Automatic Calibration*). This command will assign the current output value of the ADC to the calibration (gain) value used in the pressure conversion algorithm. Alternatively, if the desired calibration value is known, issue the command **SCxxxxx** where xxxxx represents the desired calibration value (*SC = Store Calibration*). For example, to store a calibration value of 41800, issue the command **SC41800**.

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- 3.10 With the system still at pressure, issue the command **SPxxxxx** on the host computer application, where xxxxx represents the pressure value *in PSI* displayed on the pressure gauge (*SP = Store Pressure*). This command will assign the written value to the pressure value used in the pressure conversion algorithm. For example, to store a pressure value of 10000 psi, issue the command SP10000. Similarly, issuing the command SP00500 will store a pressure of 500 psi.
- 3.11 Carefully and slowly remove pressure from the system - a rapid release of pressure may damage the pulse damper, if present.

PROCEDURE COMPLETE