ValveMate Controller Performance Validation

Instructions for 7100, 7140, 7160RA, and 7194

Introduction

These instructions provide the process for validating the timer accuracy and repeatability, pressure sensor accuracy, and mechanical gauge accuracy for the following ValveMate controllers:

- 7100, P/N 7015340
- 7140, P/N 7015341, 0–30 psi (0–2 bar)
- 7140, P/N 7015429, 0–100 psi (0–7 bar)
- 7160RA, P/N 7029739, 0–100 psi (0–7 bar)
- 7194, P/N 7360201, 0–30 psi (0–2 bar)
- 7194, P/N 7362374, 0–100 psi (0–7 bar)

NOTE: The ValveMate controller timer, pressure transducer, and gauges cannot be field calibrated. If these components do not meet the stated accuracy requirements, they must be returned to Nordson EFD for factory calibration or replacement.

Tools and Supplies

- 1K resistor
- Wire
- Digital storage oscilloscope
- Calibrated pressure standard that is at least four (4) times higher accuracy than the verification points being validated

ValveMate 7100 controller

ValveMate 7140 controller

ValveMate 7160RA controller

ValveMate 7194 controller

Timer Validation

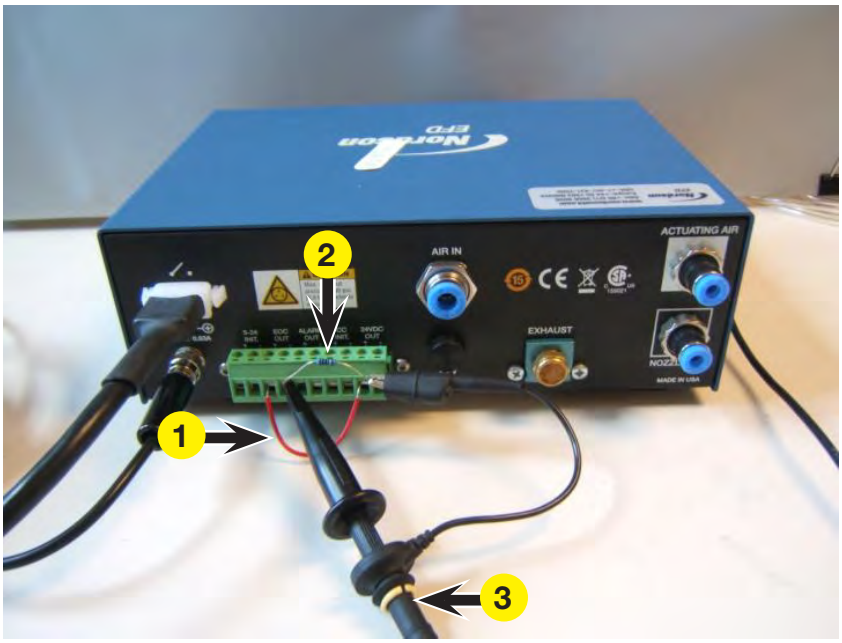
For all controllers, the measured pulse width requirement is ±0.05% of the dispense time setting and is repeatable to ±50 µsec. The measurements are taken using a 10.0 second dispense time setting.

NOTE: For 7100, 7140, and 7160RA, the accuracy and repeatability of the timer is validated by measuring the End-of-Cycle (EOC) signal pulse width on the 10 pin I/O connector. For 7194, measurements are made on the Motor output of the 10 pin I/O connector.

NOTES:

- For 7160RA, set the MOTOR mode to ON to achieve a constant 24 VDC on I/O connector pin 9.
- For 7194, begin this procedure at Step 4.

1. Connect a 1K resistor between pins 4 and 10 of the I/O connector.
2. Connect a wire between pins 3 and 9 of the I/O connector.
3. Connect a digital storage oscilloscope probe across the resistor:
   - Connect the probe ground to pin 10
   - Conntect the probe signal to pin 4



7100, 7140, or 7160RA timer accuracy oscilloscope connection

Timer Validation (continued)

4. **7194 only:**
   a. Connect a digital storage oscilloscope probe to pin 9 and pin 8 of the I/O connector.
   b. Connect the probe ground to pin 8 (not shown).

7194 timer accuracy oscilloscope connection

5. On the ValveMate controller, set a dispense time of 10.0 seconds.
6. Configure the oscilloscope to perform a delayed trigger measurement as shown in Figure A (for 7100, 7140, or 7160RA) or Figure B (for 7194):
   - For the 7100, 7140, or 7160RA, set the delayed trigger to 10.0 seconds with a 2 ms per division resolution and set the trigger level to 12 V.
   - For the 7194, set the trigger slope to falling (negative) or rising (positive) and set the trigger level to 6 V.

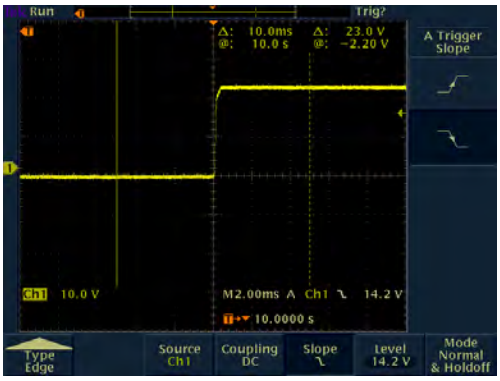


Figure A: 7100, 7140, or 7160RA timer accuracy oscilloscope trace (±5 msec)

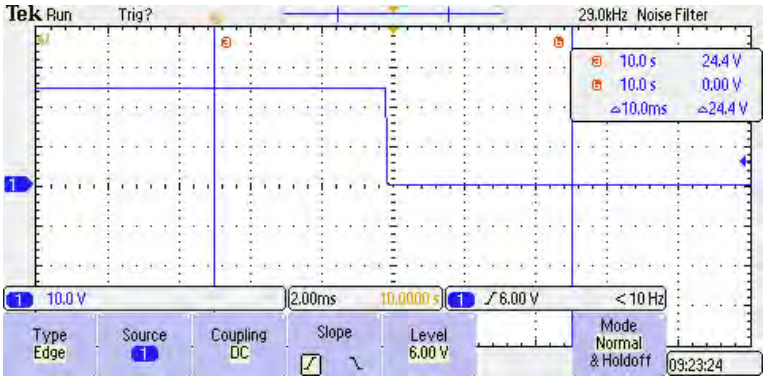


Figure B: 7194 timer accuracy oscilloscope trace (±5 msec)

Timer Validation (continued)

7. In the RUN mode, actuate the foot pedal. The rising edge of the 10 second EOC signal or the falling edge of the motor output on a 7194 is displayed at a 2 ms per division resolution.

   The timer pulse width must be 10.0 seconds (±0.005 seconds) to meet the ±0.05% accuracy requirement.

8. Increase the oscilloscope resolution to 100 µsec per division. Maintain the 10.0 second delayed trigger. For 7194, adjust the delay setting to center the pulse rising edge or falling edge.

9. Take multiple measurements and verify that all pulses are repeatable to within a 100 µsec (±50 µsec) zone. Figure C (for 7100, 7140, or 7160RA) or Figure D (for 7194).

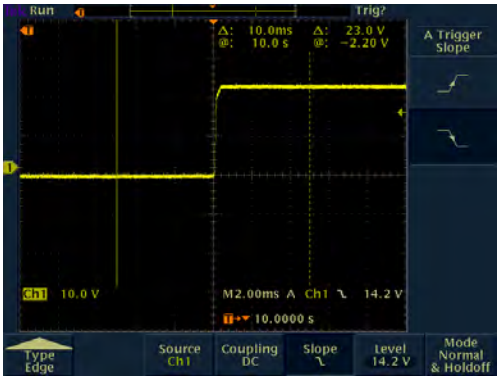


Figure C: 7100, 7140, or 7160RA timer repeatability oscilloscope trace (±50 µsec)

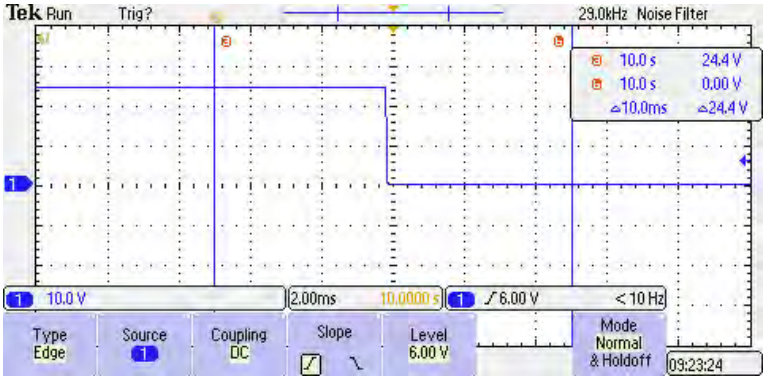


Figure D: 7194 timer repeatability oscilloscope trace (±50 µsec)

Low Air Pressure Sensor Accuracy Validation

For all controllers, the low air pressure sensor accuracy is ±2% of the 100 psi sensor range and is validated at 60 psi. The valid reading when 60 psi is applied is 58–62 psi.

NOTE: The low air pressure sensor is validated against a calibrated pressure standard. The standard must have at least four (4) times higher accuracy than the verification point of the sensor being evaluated.

1. On the controller, go to the PSI BAR unit select screen. Select PSI and observe the pressure reading.
2. Adjust the input air pressure to 60 psi as observed on the calibrated gauge.
3. Verify that the pressure reading is 58–62 psi.

Pressure Gauge Accuracy Validation (7140, 7160RA, and 7194)

The 7140, 7160RA, and 7194 mechanical pressure gauge accuracy is ±2% for the central 50% of gauge travel and ±3% for the first and last 25% of gauge travel.

NOTE: The mechanical pressure gauge readings are validated against a calibrated pressure standard. The standard must have at least four (4) times higher accuracy than the verification points of the pressure gauge being validated.

1. Connect the appropriate calibrated reference gauge to the nozzle air output port on the 7140 / 7160RA or to the fluid pressure output port on the 7194.
2. Place the 7140, 7160RA, or 7194 into STEADY mode. For the 7194, select the “Pul” air output mode.
3. Actuate the foot pedal and observe the air pressure reading on the calibrated reference gauge. Adjust the air pressure regulator to one of the verification points listed in the table.
4. Actuate the foot pedal several times and readjust the air pressure regulator so the reference gauge reading exactly matches the verification point. Maintain foot pedal actuation.
5. Read the 7140, 7160RA, or 7194 panel gauge and verify that the indicated reading is within the tolerance range listed for the verification point in the table. Repeat for the three verification points.

Model	Verification Points	Tolerance ± (3, 2, 3) % FS
• 7140, 0–30 psi (0–2 bar), P/N 7015341 • 7194, 0–30 psi (0–2 bar), P/N 7360201	6, 15, 24 psi	(±) 0.9, 0.6, 0.9 psi
• 7140, 0–100 psi (0–7 bar), P/N 7015429 • 7160RA, 0–100 psi (0–7 bar), P/N 7029739 • 7194, 0–100 psi (0–7 bar), P/N 7362374	20, 50, 80 psi	(±) 3, 2, 3 psi

Nordson EFD

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Global
800-556-3484; +1-401-431-7000
info@nordsonefd.com

Europe
00800 7001 7001
infoefd.europe@nordsonefd.com

Asia
China: +86 (21) 3866 9006; china@nordsonefd.com
India: +91 80 4021 3600; india@nordsonefd.com
Japan: +81 03 5762 2760; japan@nordsonefd.com
Korea: +82-31-736-8321; korea@nordsonefd.com
SEAsia: +65 6796 9522; sin-mal@nordsonefd.com

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