



ValveMate™ Controllers, Models 7100, 7140, 7160RA, 7194 Performance Validation Procedure

Ref: Procedure for validating Nordson EFD ValveMate Controllers for timer accuracy and repeatability, pressure sensor accuracy and mechanical gage accuracy for Models 7140, 7160RA and 7194. Model part numbers are 7015340, 7015341, 7015429, 7029739 and 7360201.

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

Timer Accuracy and Repeatability, All Models

The ValveMate Controller timer accuracy is $\pm 0.05\%$ of the selected time setting with a repeatability of $\pm 50\mu\text{sec}$ at any time setting.

Procedure: The accuracy and repeatability of the ValveMate Controller timer is validated by measuring the End-of-Cycle (EOC) signals pulse width on the 10-pin I/O connector for all models except the 7194. Measurements on the 7194 are made on the 'Motor' output on the 10-pin I/O connector. The measured pulse width requirement is $\pm 0.05\%$ of the dispense time setting and is repeatable to $\pm 50\mu\text{sec}$. The measurements are taken using a 10.0 second dispense time setting.

Notes: 7160RA: Set 'MOTOR' mode to 'On' for constant 24VDC on I/O pin 9.

7194: Begin procedure for a 7194 at step 4.

1. Connect a 1K resistor between pins 4 and 10 of the I/O connector. (Fig 1)
2. Connect a wire between pins 3 and 9 of the I/O connector. (Fig 1)
3. Connect a digital storage oscilloscope probe across the resistor. The probe ground connects to pin 10, probe signal to pin 4. (Fig 1)
4. 7194 only: Connect a digital storage oscilloscope probe to pin 9 and pin 8 of the I/O connector. The probe ground connects to pin 8. (Fig 4)
5. Select a dispense time of 10.0 seconds on the ValveMate product.
6. Configure the oscilloscope to perform a delayed trigger measurement as shown in Fig 2 or 5. Delayed trigger is set to 10.0 seconds with 2 mS per division resolution. Set the trigger slope to falling (negative), or rising (positive) for a 7194. Set the trigger level to 12 volts, 6 volts for a 7194.
7. Activate the foot pedal in RUN mode. The rising edge of the 10 second EOC signal or the falling edge of the motor output on 7194 is displayed at a 2 mS per division resolution. The timer pulse width must be 10.0 ± 0.005 seconds to meet the $\pm 0.05\%$ accuracy requirement.
8. Increase the oscilloscope resolution to 100 μsec per division. Maintain the 10.0 second delayed trigger. Adjust the delay setting to center the pulses rising edge or falling edge for the 7194.
9. Make multiple measurements and verify that all pulses are repeatable to within a 100 μsec ($\pm 50\mu\text{sec}$) zone. See Fig 3 or 6.



Figure 1: Timer Accuracy Oscilloscope Connection

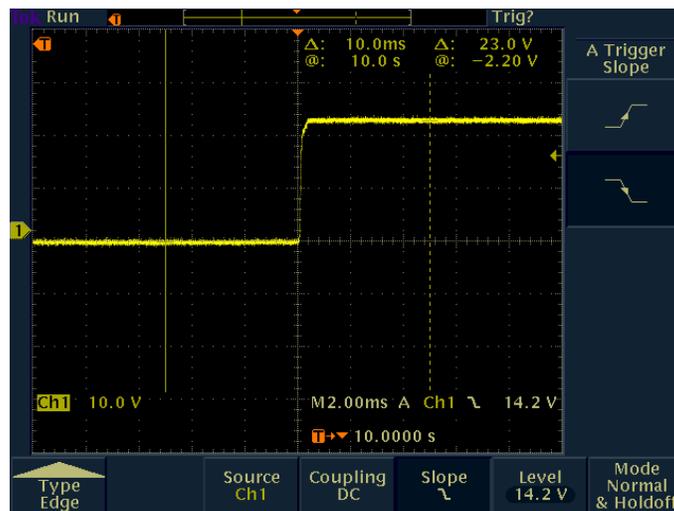


Figure 2: Timer Accuracy Oscilloscope Trace (± 5 msec)

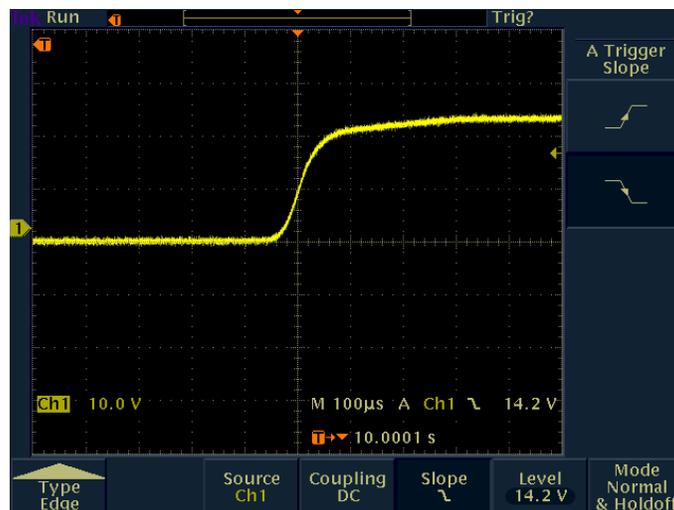


Figure 3: Timer Repeatability Oscilloscope Trace (± 50 μsec)



Figure 4: 7194 Timer Accuracy Oscilloscope Connection

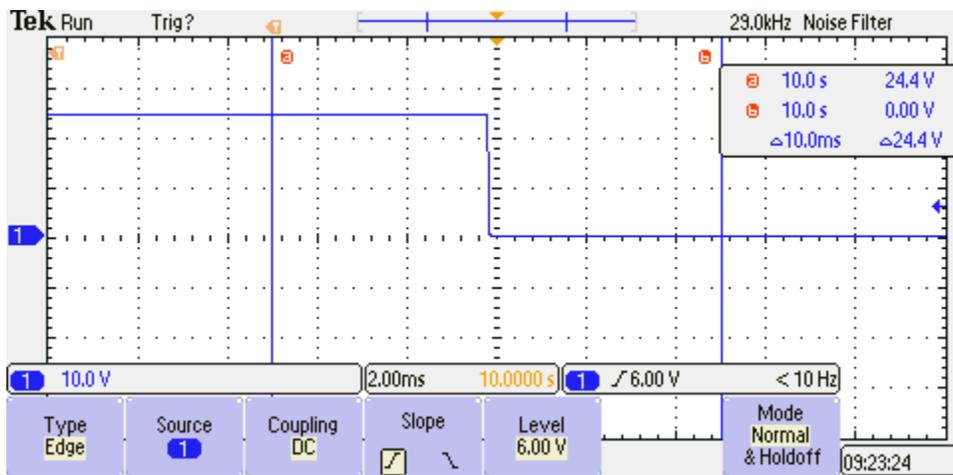


Figure 5: 7194 Timer Accuracy Oscilloscope Trace (± 5 msec)

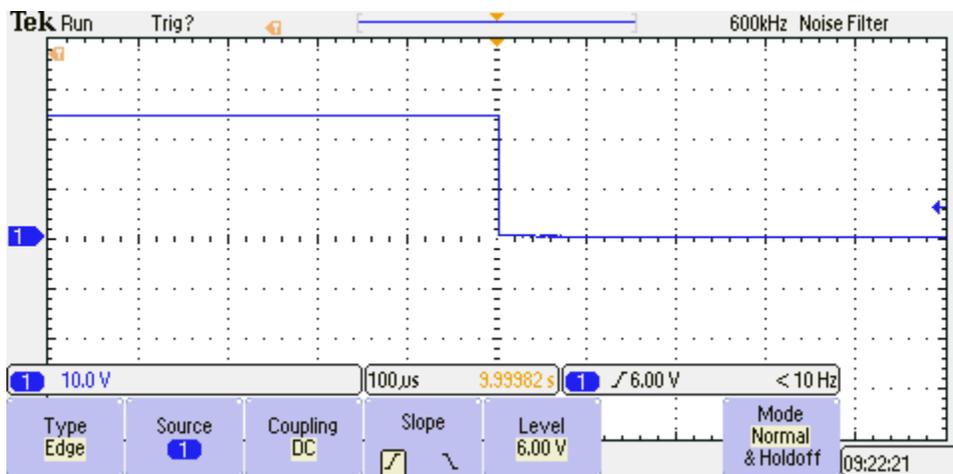


Figure 6: 7194 Timer Repeatability Oscilloscope Trace ($\pm 50\mu\text{sec}$)

Low Air Pressure Sensor Accuracy, 7100, 7140, 7160RA and 7194 Models

The ValveMate low air pressure sensor accuracy is $\pm 2\%$ of the 100PSI sensor range and is validated at 60 PSI. The valid reading when 60PSI is applied is 58 to 62 PSI.

Procedure: The ValveMate 7100, 7140, 7160RA and 7194 low air pressure sensor is validated against a calibrated pressure standard. The standard must have at least 4 times higher accuracy than the verification point of the sensor being evaluated.

1. Select the PSI BAR unit select screen. Select PSI, observe pressure reading.
2. Adjust the input air pressure to 60 PSI as observed on the calibrated gage.
3. Verify that the 7100/7140/7160RA pressure reading is 58 to 62 PSI.

Pressure Gage Accuracy of 7140, 7160RA and 7194 Models

The ValveMate 7140, 7160RA and 7194 mechanical pressure gage accuracy is $\pm 2\%$ for the central 50% of gage travel and $\pm 3\%$ for the first and last 25% of gage travel.

Procedure: The ValveMate 7140 Controllers (30 and 100 PSI Models), 7160RA (100 PSI) and 7194 (30 PSI) mechanical pressure gage readings are validated against a calibrated pressure standard. The standard must have at least 4 times higher accuracy than the verification points of the pressure gage being validated.

1. Connect the appropriate calibrated reference gage to the nozzle air output port or fluid pressure output port on the 7194.
2. Place the 7140, 7160RA or 7194 into steady mode. Select 'Pul' air output mode for the 7194.
3. Actuate the foot pedal and observe the air pressure reading on the calibrated reference gage. 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 gage reading exactly matches the verification point. Maintain foot pedal actuation.
5. Read the 7140, 7160RA or the 7194 panel gage and verify that the indicated reading is within the tolerance range listed for the verification point in the table. Repeat for the 3 verification points.

Model	Verification Points	Tolerance $\pm(3, 2, 3)\%$ FS
7140 30 PSI (7015341) 7194 30 PSI (7360201)	6, 15, 24 PSI	(\pm) 0.9, 0.6, 0.9 PSI
7140 100 PSI (7015429) 7160RA 100 PSI (7029739)	20, 50, 80 PSI	(\pm) 3, 2, 3 PSI