

Unparalleled Accuracy and Reproducibility

The following data are taken under the conditions shown below:

Common Conditions:

- 1) Solutions: Water : Methanol/ 7 : 3
- 2) Pulse input prior to the test: 40 pulses

1. Reproducibility/ TS-MP18SPAC2020:

Volume: 5.08 uL
 Additional pulse input: 400 pulses
 Plunger stroke: 2 mm
 Intake speed: 100 pps
 Dispensing speed: 100 pps
 PTFE Tubing: 0.3 mm ID, 10 mm L, 0.7065 uL

Run No.	Pump No.					
	1	2	3	4	5	6
1	5.135	5.119	5.119	5.095	5.111	5.111
2	5.127	5.111	5.111	5.103	5.103	5.103
3	5.127	5.119	5.119	5.088	5.088	5.088
4	5.127	5.119	5.119	5.072	5.095	5.095
5	5.119	5.103	5.119	5.088	5.095	5.095
6	5.119	5.119	5.119	5.080	5.095	5.095
7	5.119	5.111	5.111	5.072	5.080	5.080
8	5.119	5.111	5.111	5.080	5.080	5.080
9	5.103	5.103	5.111	5.088	5.080	5.080
10	5.103	5.103	5.111	5.080	5.080	5.080
M. V. (uL)	5.119	5.111	5.115	5.080	5.090	5.090
Run-out (uL)	0.01	0.006	0.004	0.009	0.011	0.011
C.V. (%)	0.19	0.13	0.08	0.19	0.22	0.22



2. Reproducibility/ TS-MP55SPAC2020:

Volume: 47.48 uL
 Additional pulse input: 400 pulses
 Plunger stroke: 2 mm
 Intake speed: 200 pps
 Dispensing speed: 200 pps
 PTFE Tubing: 0.6 mm ID, 10 mm L, 2.826 uL

Run No.	Pump No.									
	1	2	3	4	5	6	7	8	9	10
1	47.313	47.601	47.659	47.256	47.774	47.659	47.832	47.774	47.400	47.457
2	47.342	47.630	47.659	47.285	47.688	47.659	47.832	47.745	47.400	47.717
3	47.400	47.659	47.774	47.400	47.688	47.659	47.861	47.774	47.342	47.717
4	47.342	47.630	47.774	47.400	47.688	47.688	47.774	47.717	47.342	47.745
5	47.371	47.601	47.688	47.259	47.745	47.659	47.832	47.774	47.342	47.688
6	47.285	47.601	47.630	47.400	47.745	47.659	47.774	47.774	47.457	47.717
7	47.256	47.630	47.630	47.400	47.659	47.659	47.717	47.774	47.457	47.745
8	47.256	47.630	47.630	47.457	47.745	47.659	47.774	47.688	47.457	47.717
9	47.371	47.601	47.601	47.400	47.774	47.688	47.745	47.774	47.457	47.717
10	47.227	47.601	47.544	47.400	47.630	47.659	47.774	47.717	47.429	47.745
M.V. (uL)	47.316	47.619	47.659	47.382	47.714	47.665	47.791	47.751	47.429	47.725
Run-Out (uL)	0.058	0.020	0.071	0.062	0.049	0.012	0.045	0.032	0.050	0.019
C.V. (%)	0.123	0.042	0.150	0.131	0.104	0.025	0.095	0.068	0.107	0.040

3. Reproducibility/ TS-MP64SPAC2020:

Volume: 64.32 uL
 Additional pulse input: 400 pulses
 Plunger stroke: 2 mm
 Intake speed: 200 pps
 Dispensing speed: 200 pps
 PTFE Tubing: 0.6 mm ID, 10 mm L, 2.826 uL

Run No.	Pump No.									
	1	2	3	4	5	6	7	8	9	10
1	64.534	64.649	64.304	64.534	64.736	64.793	63.444	64.592	64.764	64.505
2	64.563	64.620	64.304	64.563	64.620	64.649	63.500	64.620	64.764	64.476
3	64.534	64.592	64.246	64.534	64.620	64.764	63.444	64.563	64.707	64.505
4	64.534	64.534	64.304	64.592	64.736	64.678	63.387	64.563	64.620	64.505
5	64.505	64.592	64.275	64.534	64.649	64.620	63.415	64.534	64.707	64.534
6	64.534	64.534	64.246	64.505	64.649	64.707	63.444	64.534	64.620	64.534
7	64.620	64.620	64.246	64.534	64.678	64.649	63.387	64.505	64.707	64.534
8	64.534	64.563	64.275	64.534	64.678	64.678	63.387	64.534	64.649	64.476
9	64.534	64.534	64.246	64.534	64.649	64.678	63.331	64.505	64.736	64.476
10	64.534	64.563	64.246	64.563	64.678	64.678	63.359	64.534	64.736	64.505
M.V. (uL)	64.542	64.580	64.269	64.540	64.660	64.680	63.400	64.500	64.700	64.500
Run-Out (uL)	0.03	0.04	0.02	0.02	0.04	0.05	0.04	0.03	0.05	0.02
C.V. (%)	0.047	0.063	0.041	0.036	0.063	0.081	0.078	0.056	0.083	0.036

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4. Reproducibility/ TS-MP78SPAC2020:

Volume: 95.56 uL
 Additional pulse input: 200 pulses
 Plunger stroke: 1 mm
 Intake speed: 200 pps
 Dispensing speed: 200 pps
 PTFE Tubing: 0.6 mm ID, 10 mm L, 2.826 uL

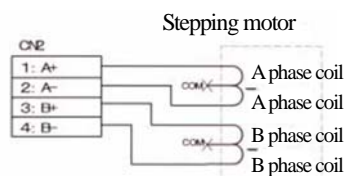
Pump No.	M. V. (uL)
1	95.658
2	95.617
3	95.640
4	95.321
5	95.085
6	95.545
7	95.663
8	95.301
9	95.663
10	95.603
M.V. (uL)	95.510
Run-Out (uL)	0.2019
C.V. (%)	0.2114

Run No.	Pump No.									
	1	2	3	4	5	6	7	8	9	10
1	95.692	95.663	95.663	95.318	95.087	95.548	95.606	95.347	95.692	95.635
2	95.721	95.577	95.577	95.318	95.116	95.548	95.606	95.318	95.635	95.577
3	95.606	95.606	95.663	95.318	95.116	95.577	95.663	95.289	95.663	95.606
4	95.663	95.606	95.663	95.318	95.059	95.519	95.663	95.347	95.692	95.606
5	95.663	95.606	95.663	95.318	95.059	95.519	95.692	95.318	95.721	95.606
6	95.663	95.606	95.635	95.318	95.087	95.548	95.721	95.289	95.663	95.635
7	95.663	95.663	95.663	95.318	95.087	95.548	95.635	95.289	95.635	95.606
8	95.663	95.635	95.635	95.318	95.087	95.548	95.692	95.260	95.663	95.606
9	95.635	95.606	95.635	95.318	95.087	95.577	95.721	95.260	95.635	95.577
10	95.606	95.606	95.606	95.347	95.059	95.519	95.635	95.289	95.635	95.577
M.V. (uL)	95.658	95.617	95.640	95.321	95.085	95.545	95.663	95.301	95.663	95.603
Run-Out (uL)	0.035	0.028	0.030	0.009	0.021	0.021	0.043	0.031	0.030	0.021
C.V. (%)	0.037	0.029	0.031	0.010	0.022	0.022	0.045	0.032	0.032	0.022

5. Dispensing speed data/ TS-MP78SPAC2020P0.5:

Result: 300 uL dispensing has been effected within 0.5 second
 (Linear travel: 6.278 mm/ 0.5 second)
 Driver: TS-2A-SDB-220B at 0.8 A
 Motor wiring: Wiring No.1*
 Thread pitch: 0.5 mm
 Applied pressure: 1 MPa
 Micro step: 1/2
 Initial speed: 20 pps
 Acceleration: 100,000 pps/ second
 Speed: 16,000 pps

*Wiring No.1 with a unipolar motor



NB: The maximum current of the driver to be kept at 70 percent or lower of the motor rated current in use with unipolar motors.



(01.12.08)

