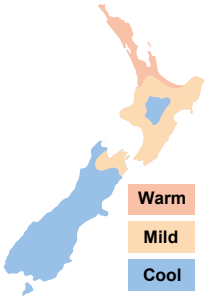
Appendix 1
water flow and gas usage



When determining the Rinnai INFINITY model it's important to know what the incoming water temperature will be—this is calculated using the worst case scenario (winter). This temperature is needed to work out the temperature rise to produce the hot water needed.

Approximate incoming water temperatures in winter

- Northland and Auckland — use 15 °C
- BOP, Gisborne, and Hawkes Bay — use 10 °C
- Waikato, and South Island (excl. Nelson & Marlborough) — use 5 °C

Degree temperature rise

In the specification pages for the Rinnai INFINITY models we express a parameter called 'nominal water capacity'. This means at a 25° rise, the unit will produce a certain number of litres per minute of hot water.

For example:

- The A26 external will produce 26 litres per minute at a 25° rise
- The A24 external will produce 24 litres per minute at a 25° rise

Using the above example, for incoming water at 10 °C and a required temperature of 55 °C, the A26 external will produce 14.4 litres per minute at a 45 ° rise (55-10), and the A24 external will produce 13.3 litres per minute at a 45 ° rise.

Water flow and gas usage table Rinnai INFINITY A-Series and EF26
temperature preset to 55 °C

		5 ° temperature rise				10 ° temperature rise			
Model	Approx. min. to max. gas input (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
A16	16.3-124	20.0	1200	100	31.0	20.0	1200	100	62.0
A20	19.9-156	24.0	1440	140	37.2	24.0	1440	140	74.4
A24	16.3-184	26.0	1560	180	40.3	26.0	1560	180	80.6
A26	16.3-199	26.0	1560	180	40.3	26.0	1560	180	80.6
EF26	16.3-175	26.0	1560	210	35.7	26.0	1560	210	71.4
A28i	11-210	28.6	1716	150	43.8	28.6	1716	150	87.6
		15 ° temperature rise				**20 ° temperature rise**			
A16	16.3-124	20.0	1200	100	93.0	20.0	1200	100	124.0
A20	19.9-156	24.0	1440	140	111.6	24.0	1440	140	148.8
A24	16.3-184	26.0	1560	180	120.9	26.0	1560	180	161.2
A26	16.3-199	26.0	1560	180	120.9	26.0	1560	180	161.2
EF26	16.3-175	26.0	1560	210	107.1	26.0	1560	210	142.7
A28i	11-210	28.6	1716	150	131.4	28.6	1716	150	175.2
		25 ° temperature rise				**30 ° temperature rise**			
A16	16.3-124	16.0	960	60	124.0	13.3	800	45	124.0
A20	19.9-156	20.0	1200	100	156.0	16.7	1000	70	156.0
A24	16.3-184	24.0	1440	145	184.0	20.0	1200	100	184.0
A26	16.3-199	26.0	1560	180	199.0	21.7	1300	110	199.0
EF26	16.3-175	26.0	1560	210	175.0	21.7	1300	150	175.0
A28i	11-210	28.0	1680	150	210.0	23.3	1400	120	210.0
		35 ° temperature rise				**40 ° temperature rise**			
A16	16.3-124	11.4	686	30	124.0	10.0	600	25	124.0
A20	19.9-156	14.3	857	45	156.0	12.5	750	42	156.0
A24	16.3-184	17.1	1029	70	184.0	15.0	900	45	184.0
A26	16.3-199	18.6	1114	90	199.0	16.3	975	70	199.0
EF26	16.3-175	18.6	1114	100	175.0	16.3	975	90	175.0
A28i	11-210	20.0	1200	80	210.0	17.5	1050	70	210.0
		45 ° temperature rise				**50 ° temperature rise**			
A16	16.3-124	8.9	533	20	124.0	8.0	480	18	124.0
A20	19.9-156	11.1	667	35	156.0	10.0	600	30	156.0
A24	16.3-184	13.3	800	45	184.0	12.0	720	40	184.0
A26	16.3-199	14.4	867	50	199.0	13.0	780	45	199.0
EF26	16.3-175	14.4	867	70	175.0	13.0	780	60	175.0
A28i	11-210	15.6	933	50	210	14.0	840	40	210.0

Water flow and gas usage table Rinnai INFINITY HD models
temperature preset to 55 °C

		5 ° temperature rise				10 ° temperature rise			
Model	Approx. min. to max. gas input (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
HD49kWe	11-210	28.6	1716	150	43.8	28.6	1716	150	87.6
HD49kWi	11-210	28.6	1716	150	43.8	28.6	1716	150	87.6
HD56kWe	20-250	37.0	2220	200	57.0	37.0	2220	200	113.0
		15 ° temperature rise				**20 ° temperature rise**			
HD49kWe	11-210	28.6	1716	150	131.4	28.6	1716	150	175.2
HD49kWi	11-210	28.6	1716	150	131.4	28.6	1716	150	175.2
HD56kWe	20-250	37.0	2220	200	170.0	37.0	2220	200	227.0
		25 ° temperature rise				**30 ° temperature rise**			
HD49kWe	11-210	28.0	1680	150	210.0	23.3	1400	120	210.0
HD49kWi	11-210	28.0	1680	150	210.0	23.3	1400	120	210.0
HD56kWe	20-250	32.5	1952	140	250.0	27.1	1626	100	250.0
		35 ° temperature rise				**40 ° temperature rise**			
HD49kWe	11-210	20.0	1200	80	210.0	17.5	1050	70	210.0
HD49kWi	11-210	20.0	1200	80	210.0	17.5	1050	70	210.0
HD56kWe	20-250	23.2	1394	125	250.0	20.3	1220	95	250.0
		45 ° temperature rise				**50 ° temperature rise**			
HD49kWe	11-210	15.6	933	50	210.0	14.0	840	40	210.0
HD49kWi	11-210	15.6	933	50	210.0	14.0	840	40	210.0
HD56kWe	20-250	18.1	1084	80	250.0	16.3	976	60	250.0

Notes

- HD56kWe maximum gas input of 250 MJ/h is for NG. Input of LPG model is 20.1-245 MJ/h
- HD56kWe pressure loss through unit:
  - Temperature rise 5-25°C assumes set temp. of 35°C → bypass fully open
  - Temperature rise 35-50°C assumes set temp. of 65°C → bypass fully closed, actual pressure loss will be lower

Water flow and gas usage table Rinnai INFINITY HD models
temperature preset to 75 °C

		5 ° temperature rise				10 ° temperature rise			
Model	Approx. min. to max. gas input (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
HD49kWe	11-210	25.0	1500	150	38.3	25.0	1500	150	76.6
HD49kWi	11-210	25.0	1500	150	38.3	25.0	1500	150	76.6
HD56kWe	20-250	24.8	1488	150	38.0	24.8	1488	150	76.0
		15 ° temperature rise				**20 ° temperature rise**			
HD49kWe	11-210	25.0	1500	150	114.9	25.0	1500	150	153.1
HD49kWi	11-210	25.0	1500	150	114.9	25.0	1500	150	153.1
HD56kWe	20-250	24.8	1488	150	114.0	24.8	1488	150	152.0
		25 ° temperature rise				**30 ° temperature rise**			
HD49kWe	11-210	25.0	1500	150	191.4	23.3	1400	130	210.0
HD49kWi	11-210	25.0	1500	150	191.4	23.3	1400	130	210.0
HD56kWe	20-250	24.8	1488	140	190.0	24.8	1488	100	228.0
		35 ° temperature rise				**40 ° temperature rise**			
HD49kWe	11-210	20.0	1200	90	210.0	17.5	1050	75	210.0
HD49kWi	11-210	20.0	1200	90	210.0	17.5	1050	75	210.0
HD56kWe	20-250	23.2	1394	125	250.0	20.3	1220	95	250.0
		45 ° temperature rise				**50 ° temperature rise**			
HD49kWe	11-210	15.6	933	60	210.0	14.0	840	50	210.0
HD49kWi	11-210	15.6	933	60	210.0	14.0	840	50	210.0
HD56kWe	20-250	18.1	1084	80	250.0	16.3	976	60	250.0
		55 ° temperature rise				**60 ° temperature rise**			
HD49kWe	11-210	12.7	764	40	210.0	11.7	700	35	210.0
HD49kWi	11-210	12.7	764	40	210.0	11.7	700	35	210.0
HD56kWe	20-250	14.8	887	55	250.0	13.6	813	50	250.0
		65 ° temperature rise				**70 ° temperature rise**			
HD49kWe	11-210	10.8	646	30	210.0	10.0	600	28	210.0
HD49kWi	11-210	10.8	646	30	210.0	10.0	600	28	210.0
HD56kWe	20-250	12.5	751	45	250.0	11.6	697	35	250.0
		75 ° temperature rise				**80 ° temperature rise**			
HD56kWe	20-250	10.8	651	32	250.0	10.2	610	30	250.0

Notes

- HD56kWe maximum gas input of 250 MJ/h is for NG. Input of LPG model is 20.1-245 MJ/h.

Water flow and gas usage table Rinnai INFINITY NB-Series
temperature preset to 55 °C

		5 ° temperature rise				10 ° temperature rise			
Model	Approx. min. to max. gas input (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
NB56kWi	16-209	42.0	2520	200	54	42.0	2520	200	109
NB56kWe	16-209	42.0	2520	200	54	42.0	2520	200	109
		15 ° temperature rise				**20 ° temperature rise**			
NB56kWi	16-209	42.0	2520	300	163	40.3	2415	300	209
NB56kWe	16-209	42.0	2520	300	163	40.3	2415	300	209
		25 ° temperature rise				**30 ° temperature rise**			
NB56kWi	16-209	32.2	1932	300	209	26.8	1610	300	209
NB56kWe	16-209	32.2	1932	300	209	26.8	1610	300	209
		35 ° temperature rise				**40 ° temperature rise**			
NB56kWi	16-209	23.0	1380	250	209	20.1	1208	200	209
NB56kWe	16-209	23.0	1380	250	209	20.1	1208	200	209
		45 ° temperature rise				**50 ° temperature rise**			
NB56kWi	16-209	17.9	1073	170	209	16.1	966	110	209
NB56kWe	16-209	17.9	1073	170	209	16.1	966	110	209

Approximate gas consumption
Thermal efficiency calculation based on 97% from star rating test.

Pressure loss through unit
- Temperature rise 5-30 °C assumes set temp. of 35 °C → bypass fully open
- Temperature rise 35-50 °C assumes set temp. of 65 °C → bypass fully closed, actual pressure loss will be lower

Water flow and gas usage table Rinnai INFINITY NB-Series
temperature preset to 75 °C

		5 ° temperature rise				10 ° temperature rise			
Model	Approx. min. to max. gas input (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)	L/min	L/h	Pressure loss through unit (kPa)	Approx. gas consumption (MJ/h)
NB56kWi	16-209	23.0	1380	300	30	23.0	1380	300	60
NB56kWe	16-209	23.0	1380	300	30	23.0	1380	300	60
		15 ° temperature rise				**20 ° temperature rise**			
NB56kWi	16-209	23.0	1380	300	89	23.0	1380	300	119
NB56kWe	16-209	23.0	1380	300	89	23.0	1380	300	119
		25 ° temperature rise				**30 ° temperature rise**			
NB56kWi	16-209	23.0	1380	300	149	23.0	1380	300	179
NB56kWe	16-209	23.0	1380	300	149	23.0	1380	300	179
		35 ° temperature rise				**40 ° temperature rise**			
NB56kWi	16-209	22.9	1371	270	209	20.0	1200	170	209
NB56kWe	16-209	22.9	1371	270	209	20.0	1200	170	209
		45 ° temperature rise				**50 ° temperature rise**			
NB56kWi	16-209	17.9	1073	170	209	16.1	966	110	209
NB56kWe	16-209	17.9	1073	170	209	16.1	966	110	209
		55 ° temperature rise				**60 ° temperature rise**			
NB56kWi	16-209	14.6	878	100	209	13.4	805	90	209
NB56kWe	16-209	14.6	878	100	209	13.4	805	90	209
		65 ° temperature rise				**70 ° temperature rise**			
NB56kWi	16-209	12.4	743	80	209	11.5	690	75	209
NB56kWe	16-209	12.4	743	80	209	11.5	690	75	209
		75 ° temperature rise				**80 ° temperature rise**			
NB56kWi	16-209	10.7	644	55	209	10.1	604	50	209
NB56kWe	16-209	10.7	644	55	209	10.1	604	50	209

Notes

Approximate gas consumption

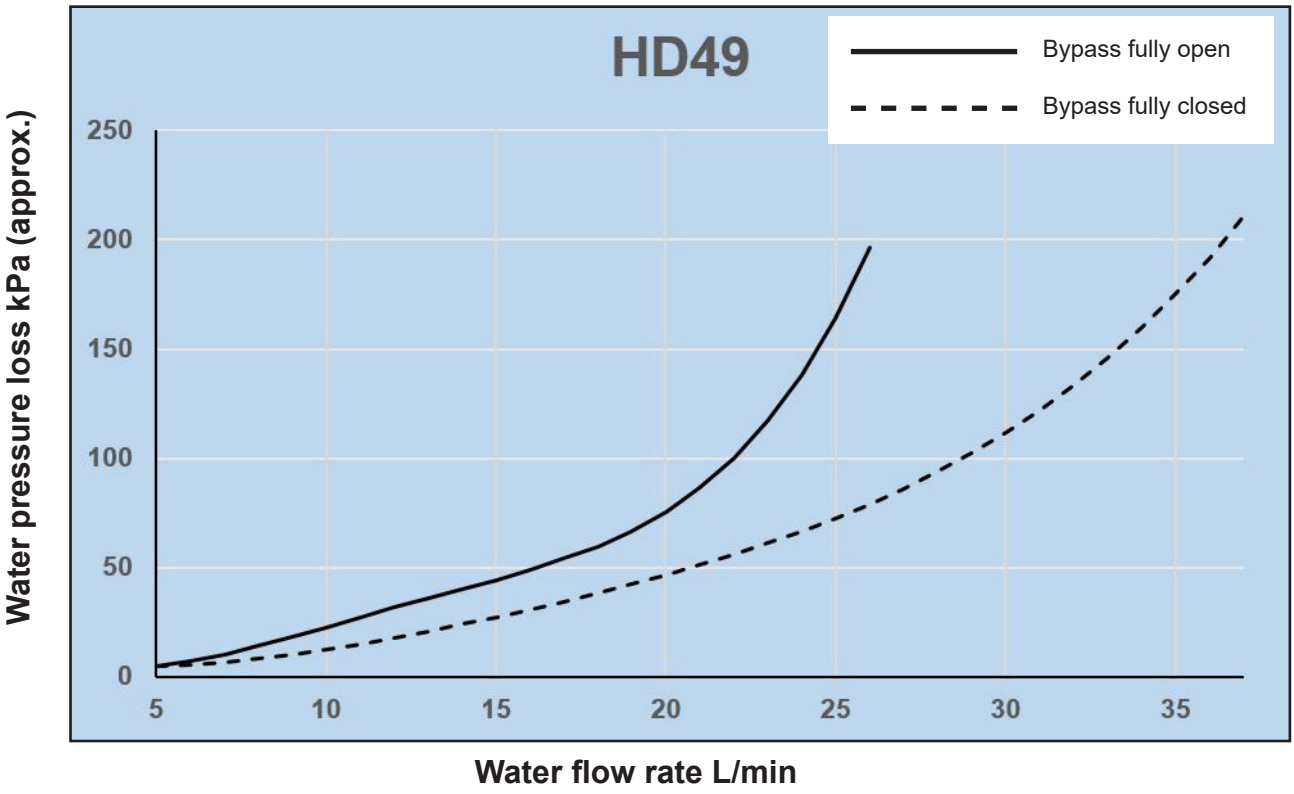
Thermal efficiency calculation based on 97% from star rating test.

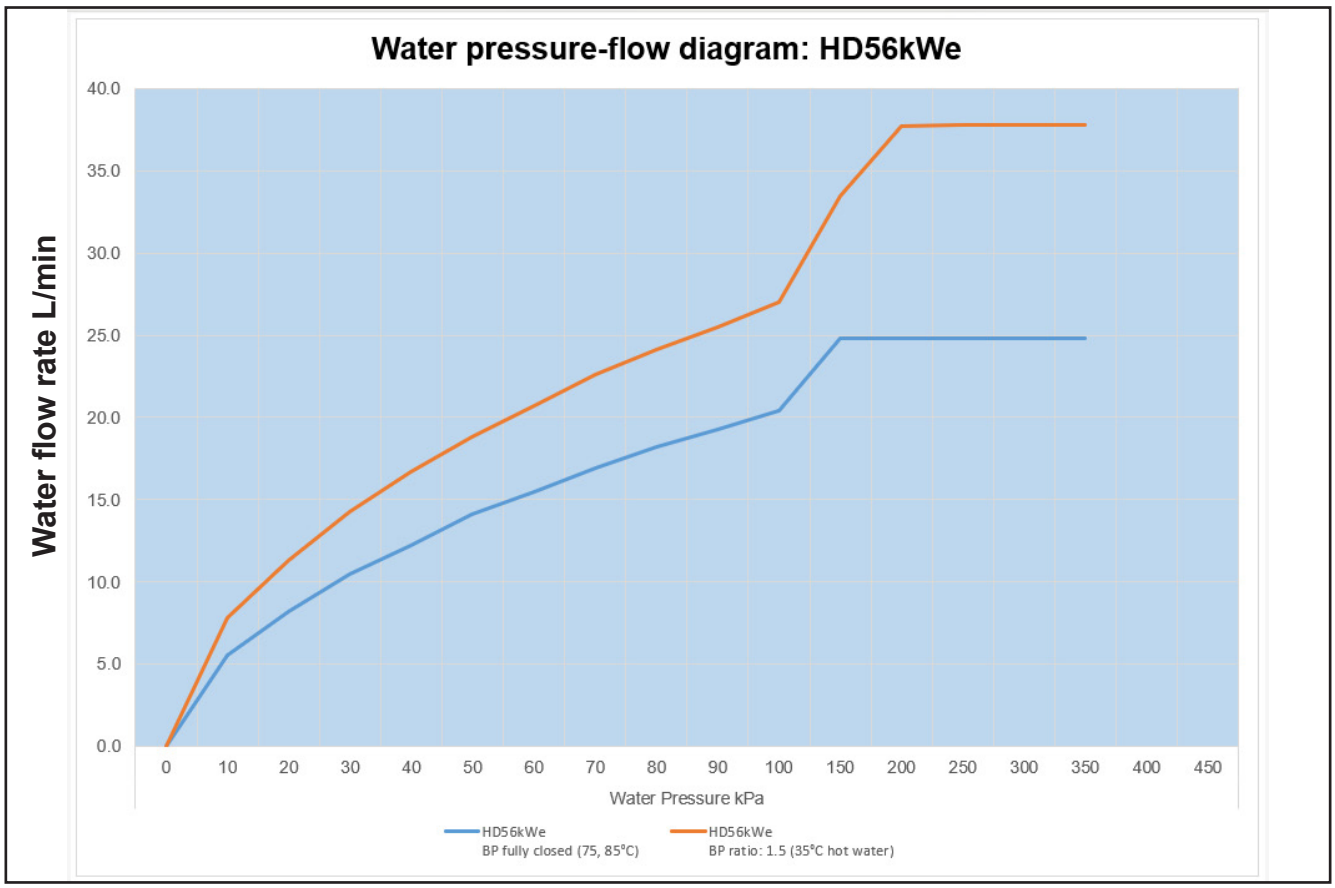
Commercial unit water pressure and flow rate graphs

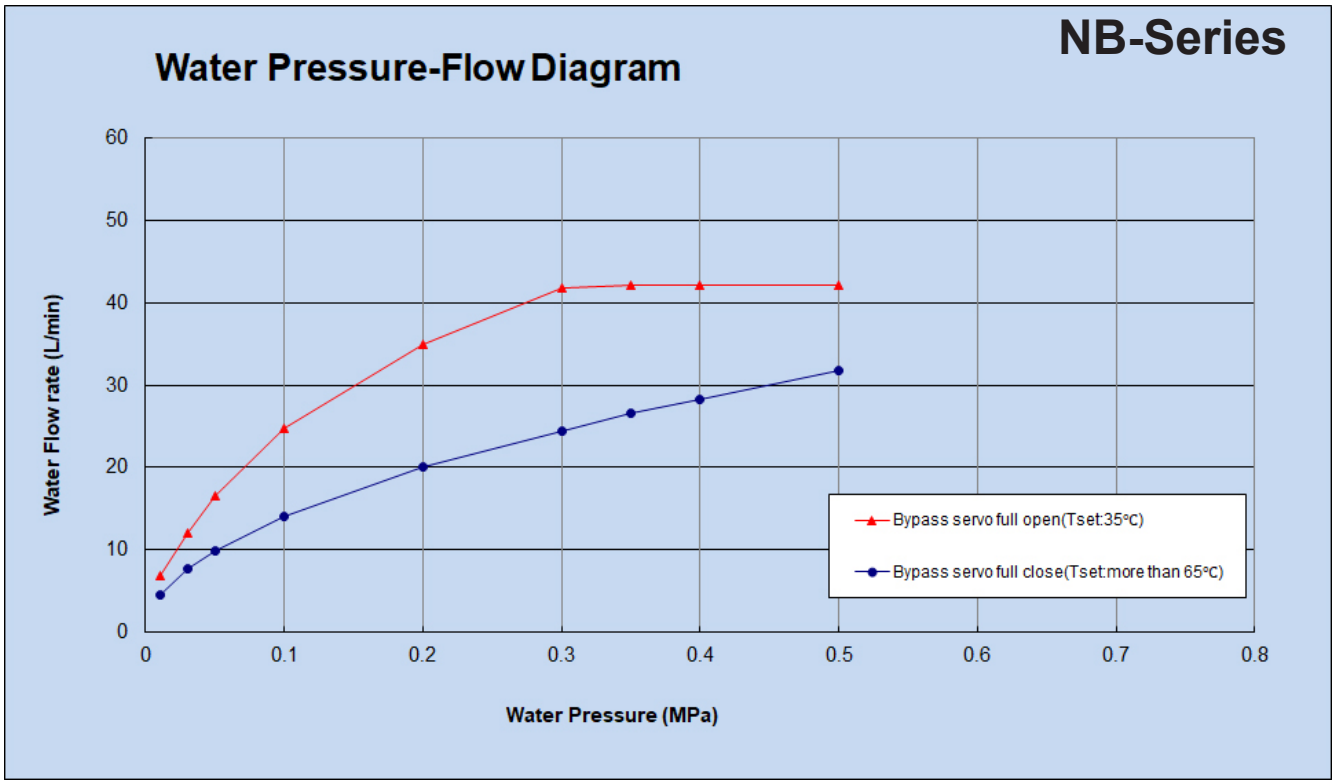
Rinnai commercial INFINITY water heaters have a water flow pathway which bypasses the main heat exchanger. The flow through the bypass is electronically controlled by an actuator/water flow valve.

At lower set temperatures, generally 55 °C or less, the bypass will often be in the fully open position which reduces the overall pressure loss through the water heater. At higher set temperatures, generally 75 °C or higher, the bypass is fully closed. All water flow passes through the heat exchanger which increases the pressure loss through the appliance at any given flow rate when compared to lower set temperatures.

When sizing pumps for Demand Duo-type systems, the bypass fully closed pressure losses should be used as the Rinnai INFINITY units in these systems are commonly set to 75 °C.




Water pressure-flow diagram: HD56kWe
Water flow rate L/min
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0
10
20
30
40
50
60
70
80
90
100
150
200
250
300
350
400
450
Water Pressure kPa
HD56kWe
BP fully closed (75, 85°C)
HD56kWe
BP ratio: 1.5 (35°C hot water)


NB-Series
Water Pressure-Flow Diagram
Water Flow rate (L/min)
60
50
40
30
20
10
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Water Pressure (MPa)
Bypass servo full open(Tset:35°C)
Bypass servo full close(Tset:more than 65°C)