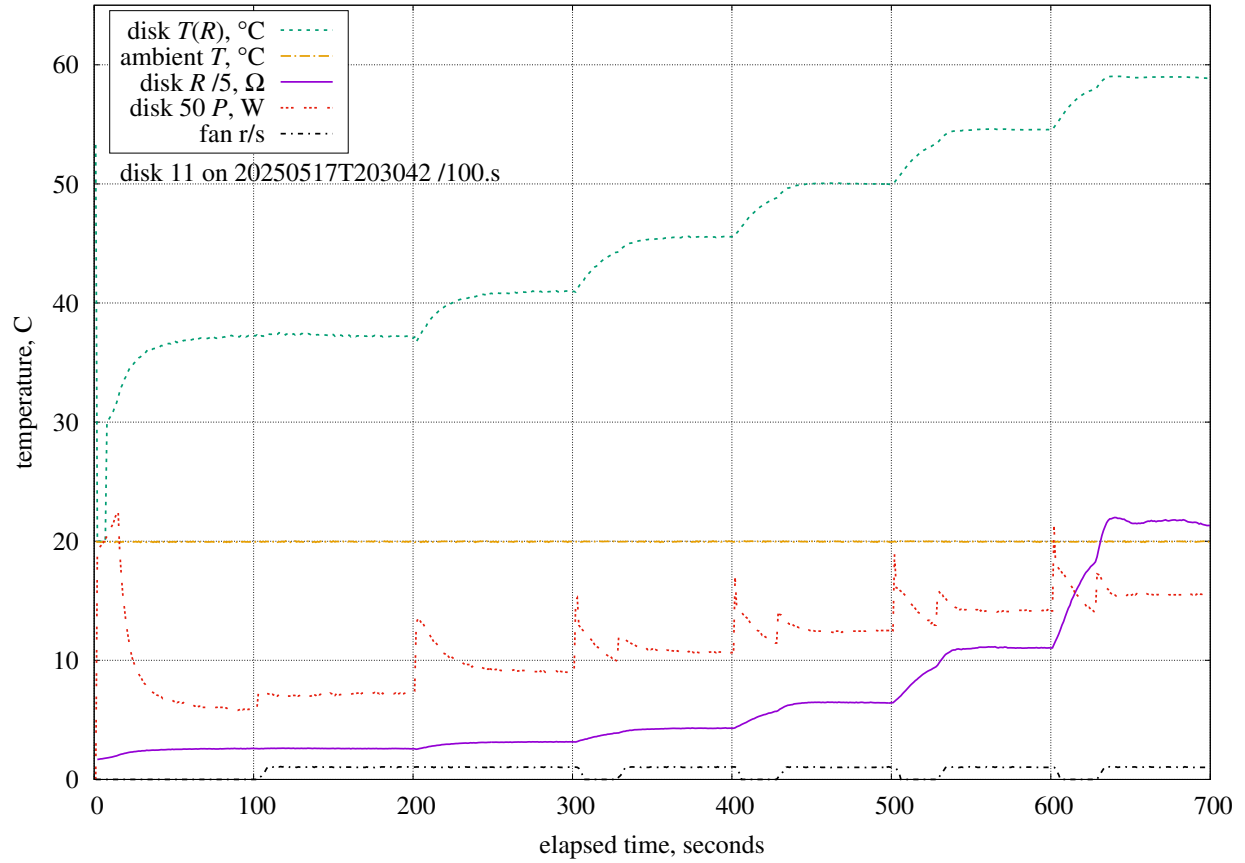


$\theta = 82.3^\circ$; $\psi = 82.3^\circ$; $V = 0.000$ m/s (0 r/min)

Estimated measurement uncertainties of natural convection at $\theta = 82.4$.

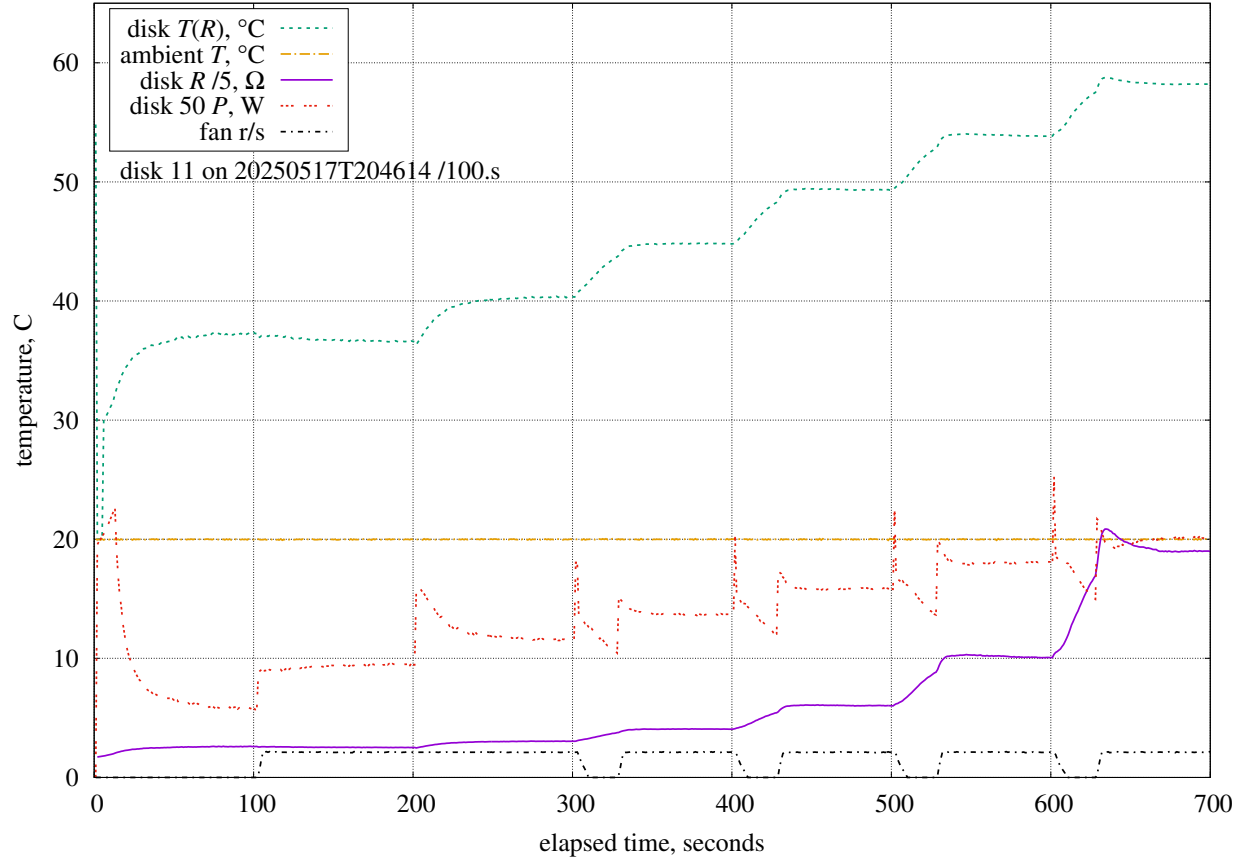
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+4.19%/K	0.10.K	0.42%	LM35C differential
P	98.9.kPa	+0.0001%/Pa	1.5.kPa	0.20%	MPXH6115A6U air pressure
C_S	0.420	-5.05%	0.050	0.25%	rim shape factor
D_o	2.81.mm	+1402%/m	500.um	0.70%	tube outer diameter
D_i	1.11.mm	+10268%/m	200.um	2.05%	tube inner diameter
D_g	166.um	-367%/m	750.um	0.28%	tube air gap
L_{wire}	38.0.mm	+1530%/m	500.um	0.77%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.179%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.60%	ABS thermal conductivity
d	12.0.mm	+2522%/m	100.um	0.25%	disk diameter
				2.88%	combined bias uncertainty



$\theta = 82.3^\circ$; $\psi = 82.3^\circ$; $V = 0.186$ m/s (62 r/min)

Estimated measurement uncertainties at $Re = 135$.

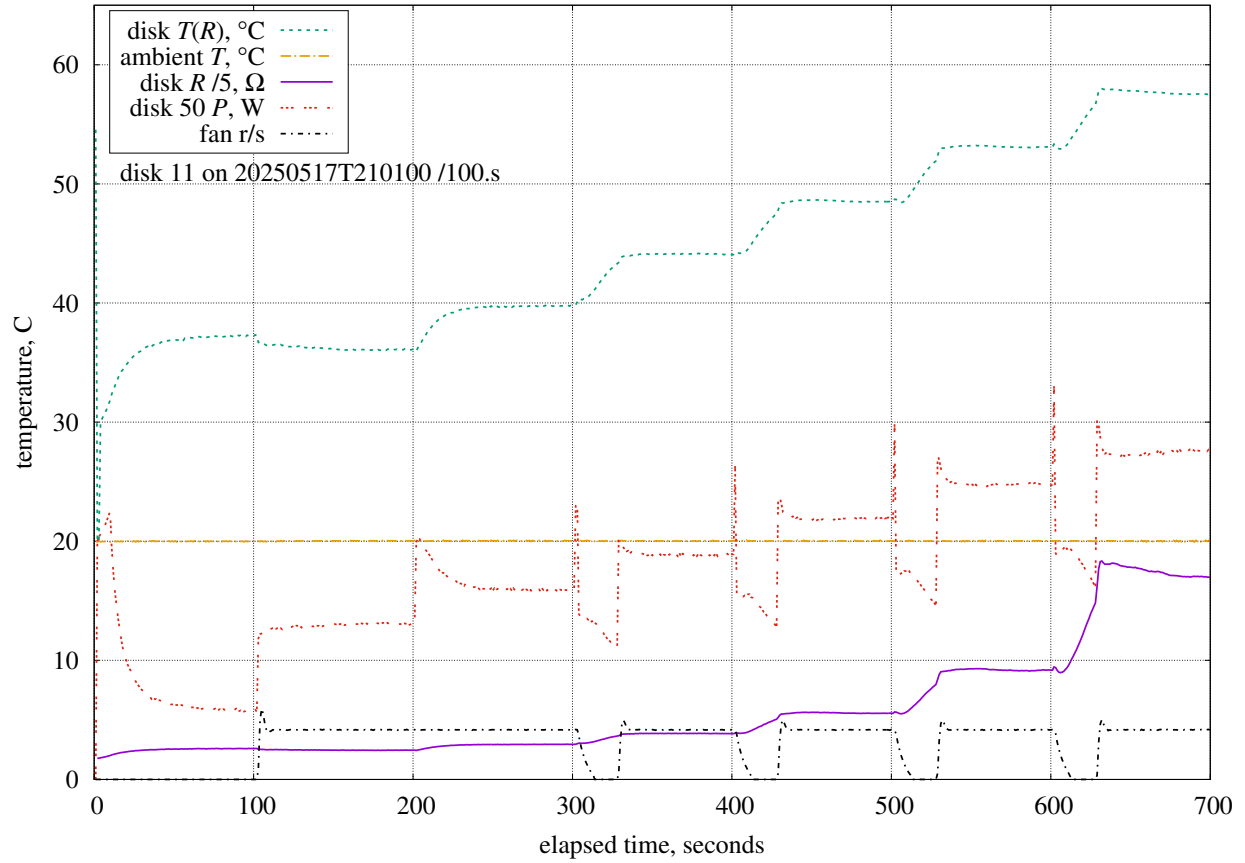
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+3.99%/K	0.10.K	0.40%	LM35C differential
P	98.6.kPa	+0.0004%/Pa	1.5.kPa	0.58%	MPXH6115A6U air pressure
η	0.340	+97.2%	0.007	0.66%	anemometer calibration
D_o	2.81.mm	−5561%/m	500.um	2.78%	tube outer diameter
D_i	1.11.mm	+11039%/m	200.um	2.21%	tube inner diameter
D_g	166.um	−416%/m	750.um	0.31%	tube air gap
L_{wire}	38.0.mm	+1734%/m	500.um	0.87%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.186%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.66%	ABS thermal conductivity
d	12.0.mm	+2862%/m	100.um	0.29%	disk diameter
ϵ_{ABS}	0.920	−35.7%	0.010	0.36%	ABS emissivity
ϵ_{wt}	0.900	−35.9%	0.025	0.90%	wind-tunnel emissivity
				4.27%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	61.9.r/min	+0.534%/(r/min)	1.0.r/min	0.54%	fan rotation rate
				4.41%	RSS combined uncertainty



$\theta = 82.3^\circ$; $\psi = 82.3^\circ$; $V = 0.382$ m/s (127 r/min)

Estimated measurement uncertainties at $Re = 276$.

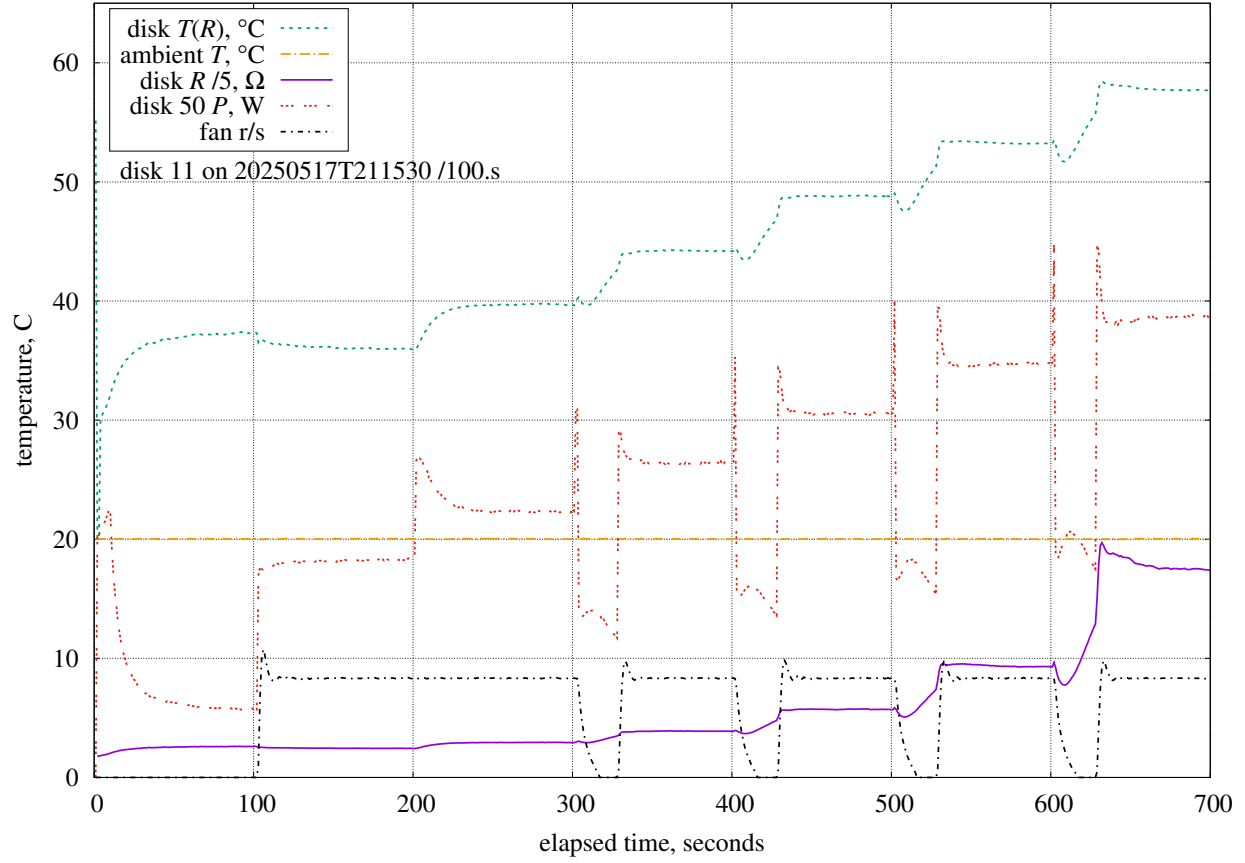
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	306.K	$-0.414\%/K$	0.50.K	0.21%	LM35C temperature sensor
ΔT	25.0.K	$+3.88\%/K$	0.10.K	0.39%	LM35C differential
P	98.6.kPa	$+0.0004\%/Pa$	1.5.kPa	0.64%	MPXH6115A6U air pressure
η	0.340	$+118\%$	0.007	0.80%	anemometer calibration
Re_0	600	-0.0063%	60	0.38%	integration lower-bound
D_o	2.81.mm	$-8842\%/m$	500.um	4.42%	tube outer diameter
D_i	1.11.mm	$+14790\%/m$	200.um	2.96%	tube inner diameter
D_g	166.um	$-543\%/m$	750.um	0.41%	tube air gap
L_{wire}	38.0.mm	$+2264\%/m$	500.um	1.13%	wire length
k_{ABS}	$179. \frac{mW}{K \cdot m}$	$+0.206\% / \frac{mW}{K \cdot m}$	$9.0. \frac{mW}{K \cdot m}$	1.84%	ABS thermal conductivity
d	12.0.mm	$+3053\%/m$	100.um	0.31%	disk diameter
ϵ_{ABS}	0.920	-40.8%	0.010	0.41%	ABS emissivity
ϵ_{wt}	0.900	-41.3%	0.025	1.03%	wind-tunnel emissivity
				5.99%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	127.r/min	$+0.316\%/(r/min)$	1.1.r/min	0.35%	fan rotation rate
				6.03%	RSS combined uncertainty



$\theta = 82.3^\circ$; $\psi = 82.3^\circ$; $V = 0.748$ m/s (250 r/min)

Estimated measurement uncertainties at $Re = 540$.

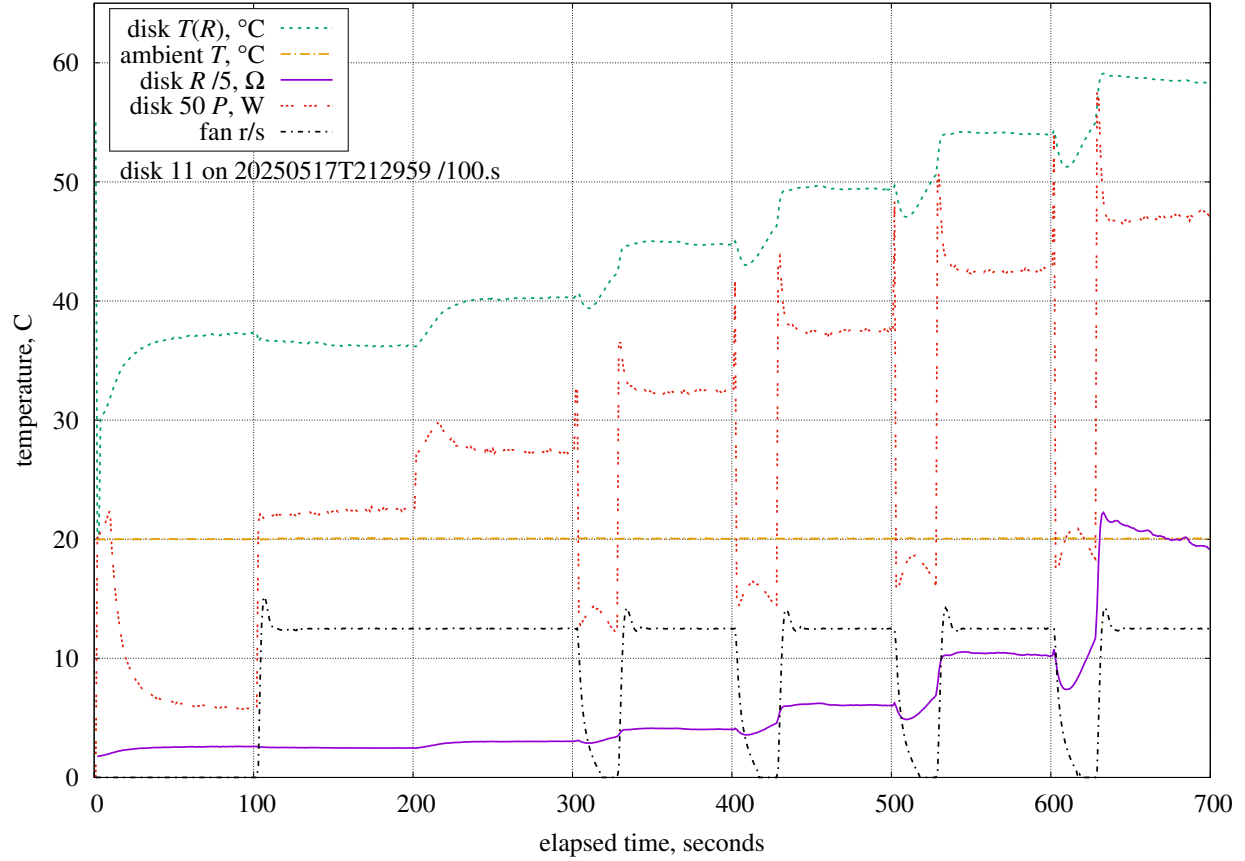
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	306.K	$-0.441\%/K$	0.50.K	0.22%	LM35C temperature sensor
ΔT	25.0.K	$+3.75\%/K$	0.10.K	0.37%	LM35C differential
P	98.6.kPa	$+0.0005\%/Pa$	1.5.kPa	0.68%	MPXH6115A6U air pressure
η	0.340	$+130\%$	0.007	0.88%	anemometer calibration
Re_0	600	-0.010%	60	0.60%	integration lower-bound
D_o	2.81.mm	$-11768\%/m$	500.um	5.88%	tube outer diameter
D_i	1.11.mm	$+18215\%/m$	200.um	3.64%	tube inner diameter
D_g	166.um	$-670\%/m$	750.um	0.50%	tube air gap
L_{wire}	38.0.mm	$+2792\%/m$	500.um	1.40%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.218\%/ \frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	1.96%	ABS thermal conductivity
d	12.0.mm	$+3687\%/m$	100.um	0.37%	disk diameter
ϵ_{ABS}	0.920	-42.0%	0.010	0.42%	ABS emissivity
ϵ_{wt}	0.900	-42.6%	0.025	1.07%	wind-tunnel emissivity
				7.56%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	250.r/min	$+0.177\%/(r/min)$	1.2.r/min	0.21%	fan rotation rate
				7.57%	RSS combined uncertainty



$\theta = 82.3^\circ$; $\psi = 82.3^\circ$; $V = 1.466 \text{ m/s}$ (500 r/min)

Estimated measurement uncertainties at $Re = 1058$.

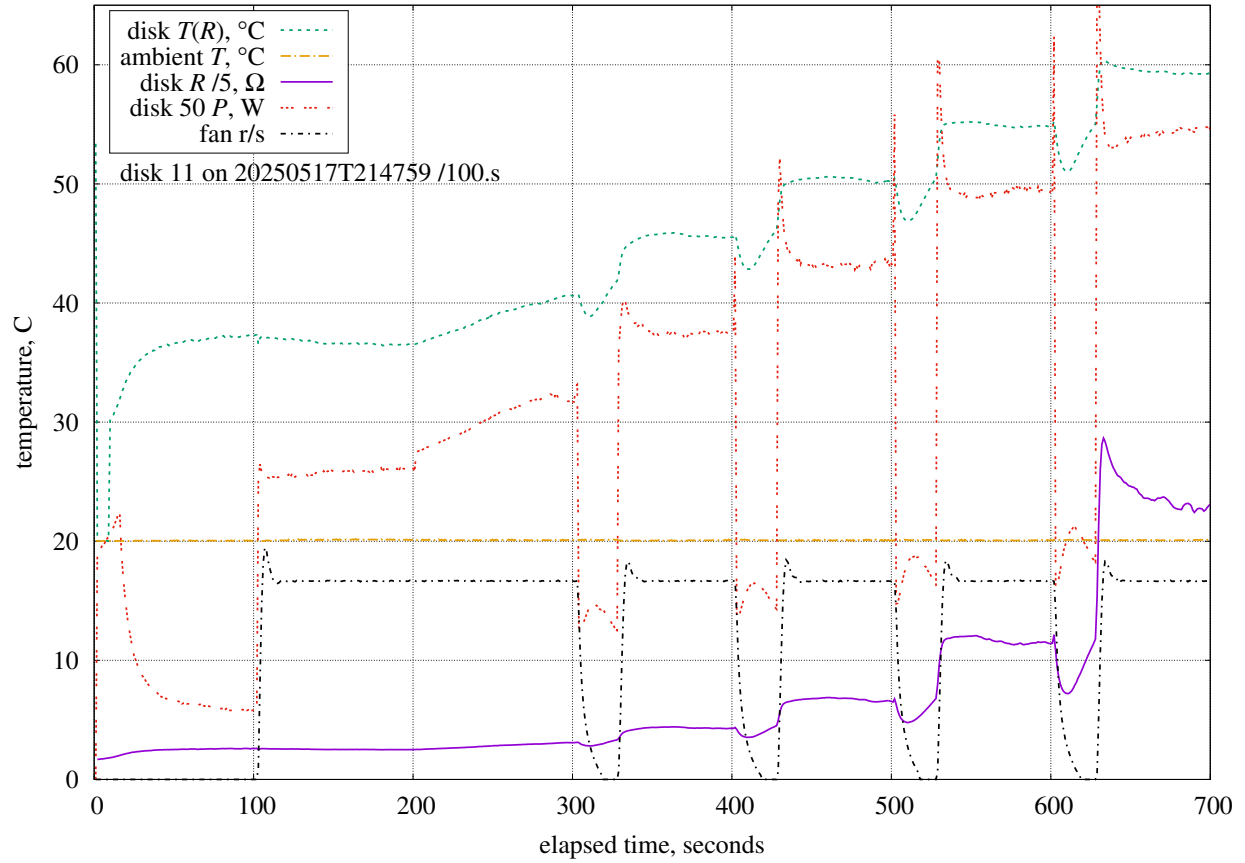
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	306.K	$-0.450\%/K$	0.50.K	0.22%	LM35C temperature sensor
ΔT	25.0.K	$+3.62\%/K$	0.10.K	0.36%	LM35C differential
P	98.6.kPa	$+0.0004\%/Pa$	1.5.kPa	0.67%	MPXH6115A6U air pressure
η	0.340	$+125\%$	0.007	0.85%	anemometer calibration
Re_0	600	-0.011%	60	0.67%	integration lower-bound
D_o	2.81.mm	$-14687\%/m$	500.um	7.34%	tube outer diameter
D_i	1.11.mm	$+21193\%/m$	200.um	4.24%	tube inner diameter
D_g	166.um	$-799\%/m$	750.um	0.60%	tube air gap
L_{wire}	38.0.mm	$+3331\%/m$	500.um	1.67%	wire length
k_{ABS}	$179. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$+0.225\%/ \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$9.0. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	2.01%	ABS thermal conductivity
d	12.0.mm	$+4420\%/m$	100.um	0.44%	disk diameter
ϵ_{ABS}	0.920	-42.6%	0.010	0.43%	ABS emissivity
ϵ_{wt}	0.900	-43.3%	0.025	1.08%	wind-tunnel emissivity
				9.08%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	500.r/min	$+0.085\%/(r/min)$	1.2.r/min	0.10%	fan rotation rate
				9.08%	RSS combined uncertainty



$\theta = 82.3^\circ$; $\psi = 82.3^\circ$; $V = 2.130$ m/s (750 r/min)

Estimated measurement uncertainties at $Re = 1536$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	306.K	−0.460%/K	0.50.K	0.23%	LM35C temperature sensor
ΔT	25.0.K	+3.51%/K	0.10.K	0.35%	LM35C differential
P	98.6.kPa	+0.0004%/Pa	1.5.kPa	0.66%	MPXH6115A6U air pressure
η	0.340	+116%	0.007	0.79%	anemometer calibration
Re_0	600	−0.011%	60	0.68%	integration lower-bound
D_o	2.81.mm	−16472%/m	500.um	8.24%	tube outer diameter
D_i	1.11.mm	+22571%/m	200.um	4.51%	tube inner diameter
D_g	166.um	−877%/m	750.um	0.66%	tube air gap
L_{wire}	38.0.mm	+3657%/m	500.um	1.83%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.227%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	2.03%	ABS thermal conductivity
d	12.0.mm	+4824%/m	100.um	0.48%	disk diameter
ϵ_{ABS}	0.920	−43.6%	0.010	0.44%	ABS emissivity
ϵ_{wt}	0.900	−44.4%	0.025	1.11%	wind-tunnel emissivity
				9.97%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	750.r/min	+0.052%/(r/min)	0.90.r/min	0.05%	fan rotation rate
				9.97%	RSS combined uncertainty



$\theta = 82.3^\circ$; $\psi = 82.3^\circ$; $V = 2.725$ m/s (1000 r/min)

Estimated measurement uncertainties at $Re = 1964$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	306.K	$-0.469\%/K$	0.50.K	0.23%	LM35C temperature sensor
ΔT	25.0.K	$+3.42\%/K$	0.10.K	0.34%	LM35C differential
P	98.5.kPa	$+0.0004\%/Pa$	1.5.kPa	0.65%	MPXH6115A6U air pressure
η	0.340	$+105\%$	0.007	0.71%	anemometer calibration
Re_0	600	-0.011%	60	0.67%	integration lower-bound
D_o	2.81.mm	$-17731\%/m$	500.um	8.87%	tube outer diameter
D_i	1.11.mm	$+23343\%/m$	200.um	4.67%	tube inner diameter
D_g	166.um	$-932\%/m$	750.um	0.70%	tube air gap
L_{wire}	38.0.mm	$+3885\%/m$	500.um	1.94%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.227\%/ \frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	2.03%	ABS thermal conductivity
d	12.0.mm	$+5087\%/m$	100.um	0.51%	disk diameter
ϵ_{ABS}	0.920	-44.8%	0.010	0.45%	ABS emissivity
ϵ_{wt}	0.900	-45.6%	0.025	1.14%	wind-tunnel emissivity
				10.59%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	1000.r/min	$+0.036\%/(r/min)$	1.6.r/min	0.06%	fan rotation rate
				10.59%	RSS combined uncertainty