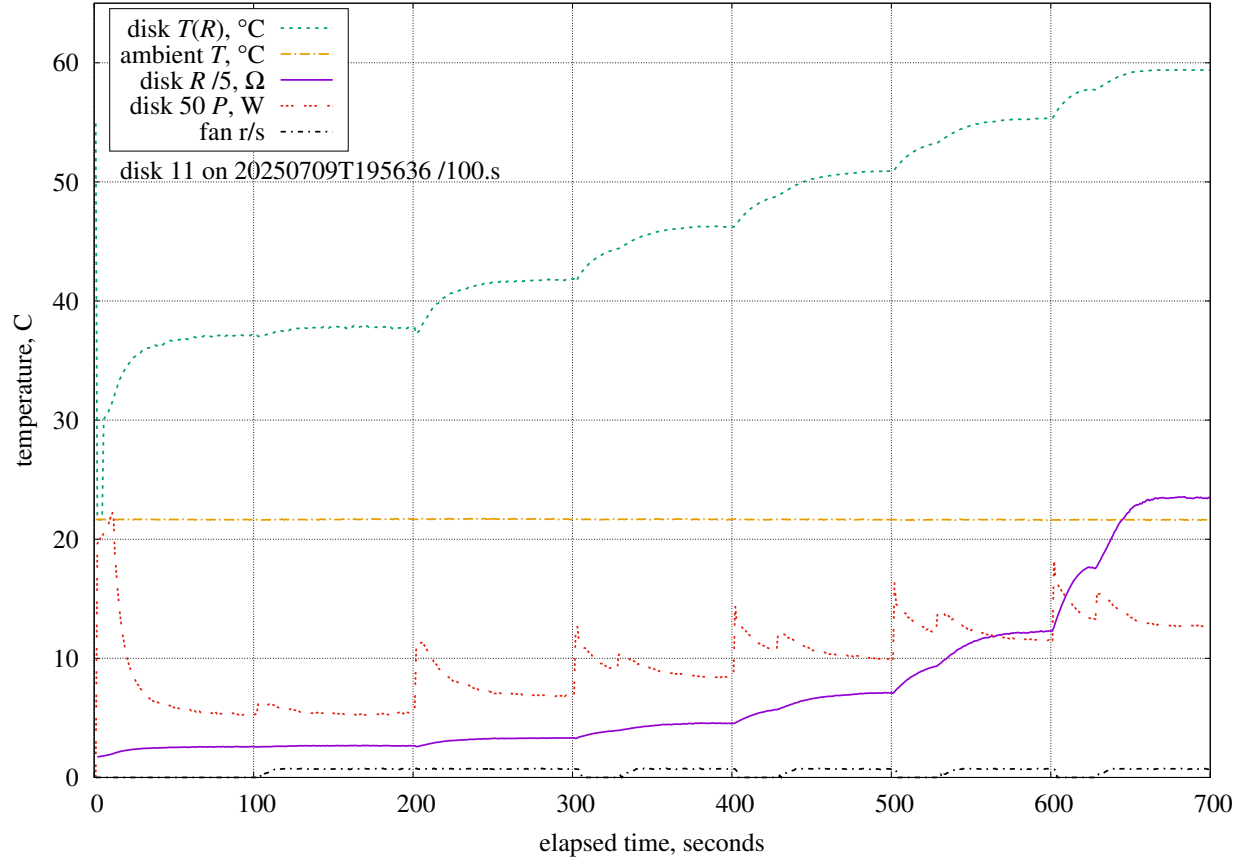


$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 0.000$ m/s (0 r/min)

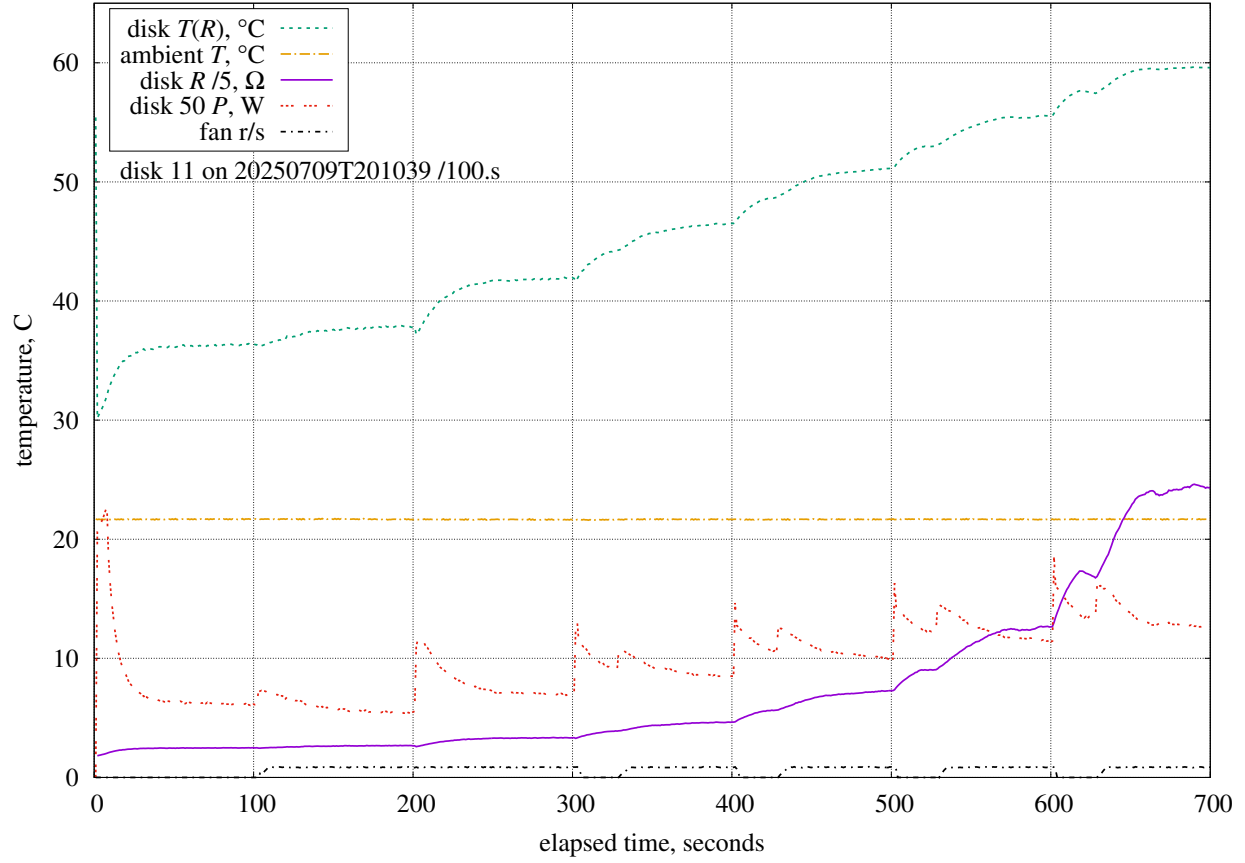
Estimated measurement uncertainties of natural convection at $\theta = 0.0$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+4.33%/K	0.10.K	0.43%	LM35C differential
P	101.kPa	+0.0002%/Pa	1.5.kPa	0.27%	MPXH6115A6U air pressure
D_o	2.81.mm	+3281%/m	500.um	1.64%	tube outer diameter
D_i	1.11.mm	+5363%/m	200.um	1.07%	tube inner diameter
L_{wire}	38.0.mm	+1007%/m	500.um	0.50%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.126%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.13%	ABS thermal conductivity
d	12.0.mm	+4707%/m	100.um	0.47%	disk diameter
θ	50.0.m°	+21.5%/°	0.20.°	4.29%	plate angle
				4.93%	combined bias uncertainty



Estimated measurement uncertainties at $Re = 95$.

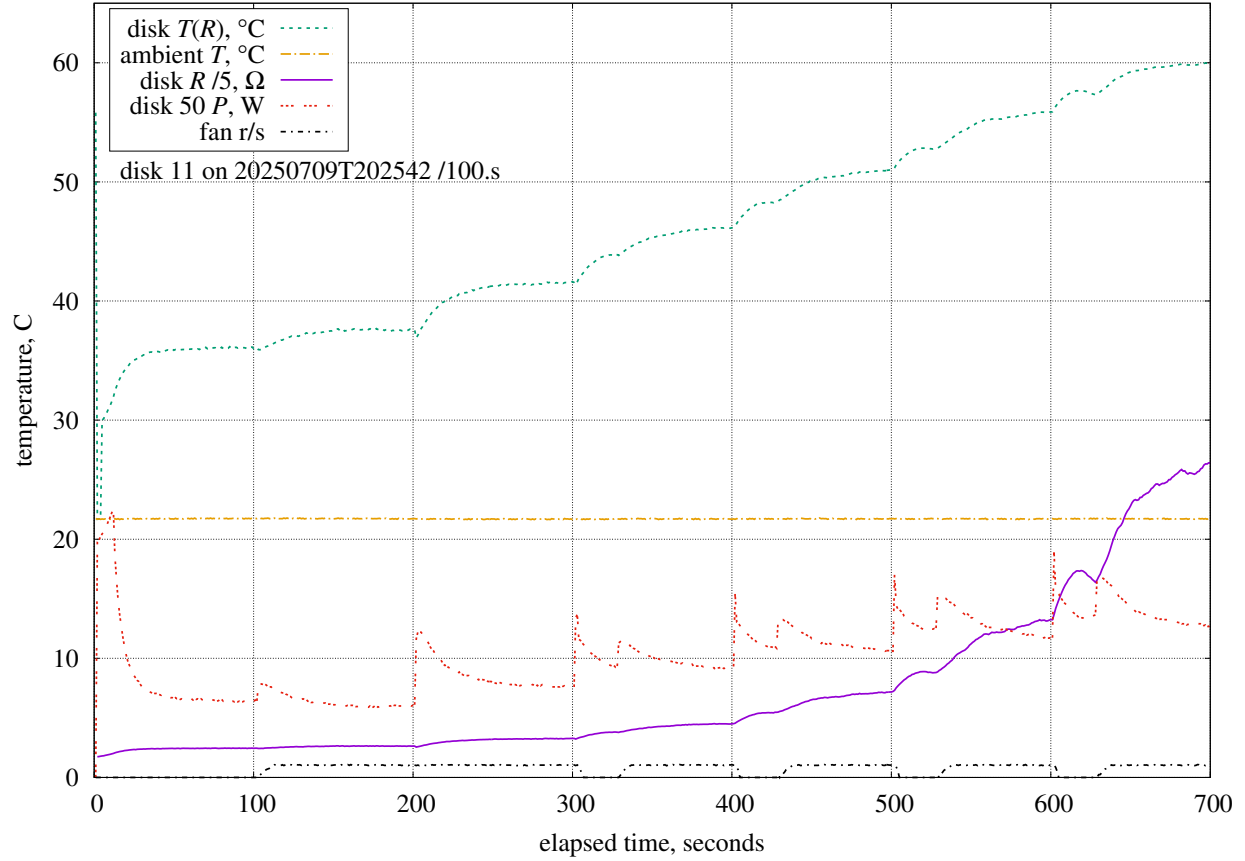
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+4.30%/K	0.10.K	0.43%	LM35C differential
P	101.kPa	+0.0004%/Pa	1.5.kPa	0.57%	MPXH6115A6U air pressure
η	0.340	+60.8%	0.007	0.41%	anemometer calibration
Re_0	600	+0.011%	60	0.67%	integration lower-bound
D_o	2.81.mm	-6655%/m	500.um	3.33%	tube outer diameter
D_i	1.11.mm	+8571%/m	200.um	1.71%	tube inner diameter
L_{wire}	38.0.mm	+768%/m	500.um	0.38%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.150%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.35%	ABS thermal conductivity
d	12.0.mm	+4503%/m	100.um	0.45%	disk diameter
ϵ_{ABS}	0.920	-43.6%	0.010	0.44%	ABS emissivity
ϵ_{wt}	0.900	-43.7%	0.025	1.09%	wind-tunnel emissivity
θ	50.0.m $^\circ$	-7.66%/m $^\circ$	0.20.m $^\circ$	1.53%	plate angle
ψ	50.0.m $^\circ$	+564768%/m $^\circ$	0.25.m $^\circ$	141191.96%	flow angle
				141191.96%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	43.3.r/min	+0.478%/(r/min)	1.2.r/min	0.59%	fan rotation rate
				141191.96%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 0.155 \text{ m/s}$ (51 r/min)

Estimated measurement uncertainties at $Re = 113$.

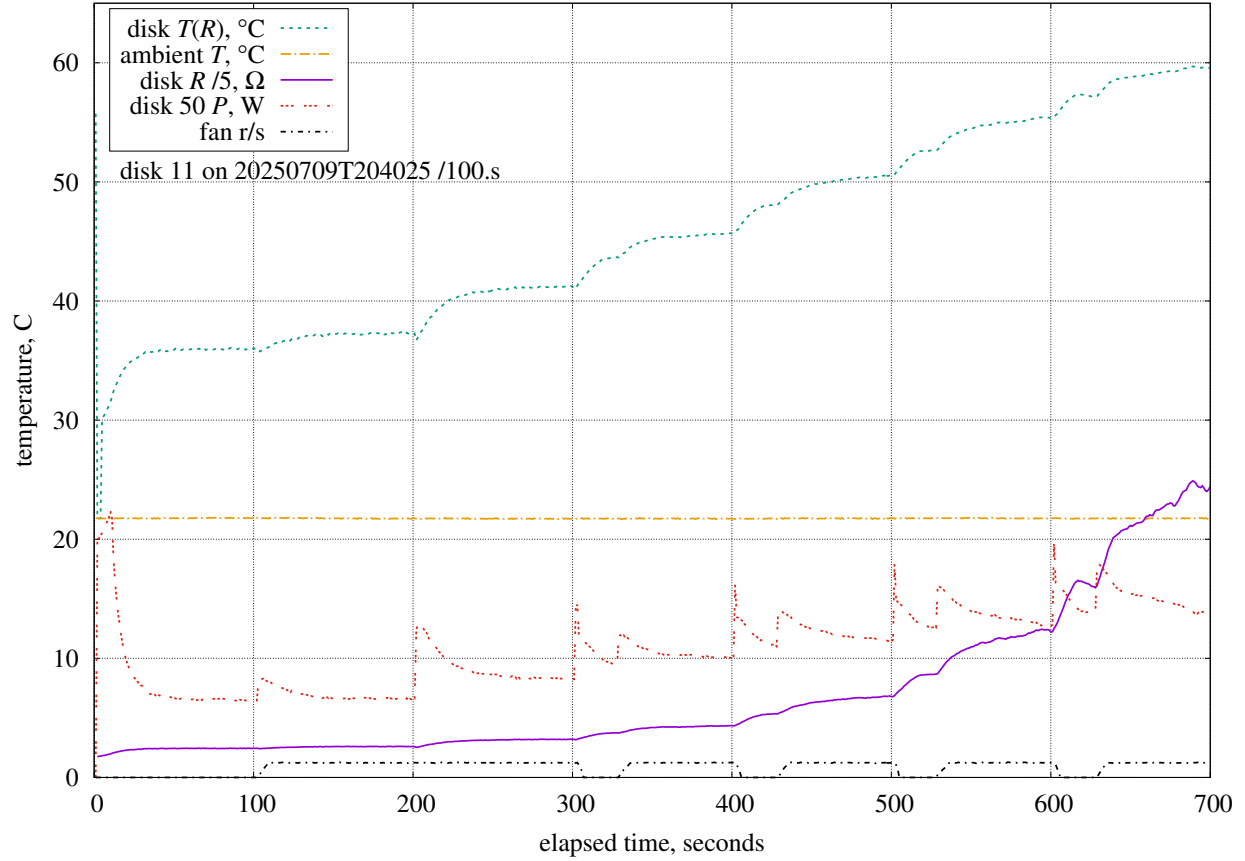
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+4.29%/K	0.10.K	0.43%	LM35C differential
P	101.kPa	+0.0004%/Pa	1.5.kPa	0.55%	MPXH6115A6U air pressure
η	0.340	+56.3%	0.007	0.38%	anemometer calibration
Re_0	600	+0.014%	60	0.82%	integration lower-bound
D_o	2.81.mm	-7576%/m	500.um	3.79%	tube outer diameter
D_i	1.11.mm	+9940%/m	200.um	1.99%	tube inner diameter
L_{wire}	38.0.mm	+894%/m	500.um	0.45%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.164%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.47%	ABS thermal conductivity
d	12.0.mm	+3900%/m	100.um	0.39%	disk diameter
ϵ_{ABS}	0.920	-46.4%	0.010	0.46%	ABS emissivity
ϵ_{wt}	0.900	-46.6%	0.025	1.16%	wind-tunnel emissivity
θ	50.0.m°	-7.99%/°	0.20.°	1.60%	plate angle
ψ	50.0.m°	+521679%/°	0.25.°	130419.86%	flow angle
				130419.86%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	51.4.r/min	+0.372%/(r/min)	1.3.r/min	0.47%	fan rotation rate
				130419.86%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 0.187 \text{ m/s}$ (62 r/min)

Estimated measurement uncertainties at $Re = 136$.

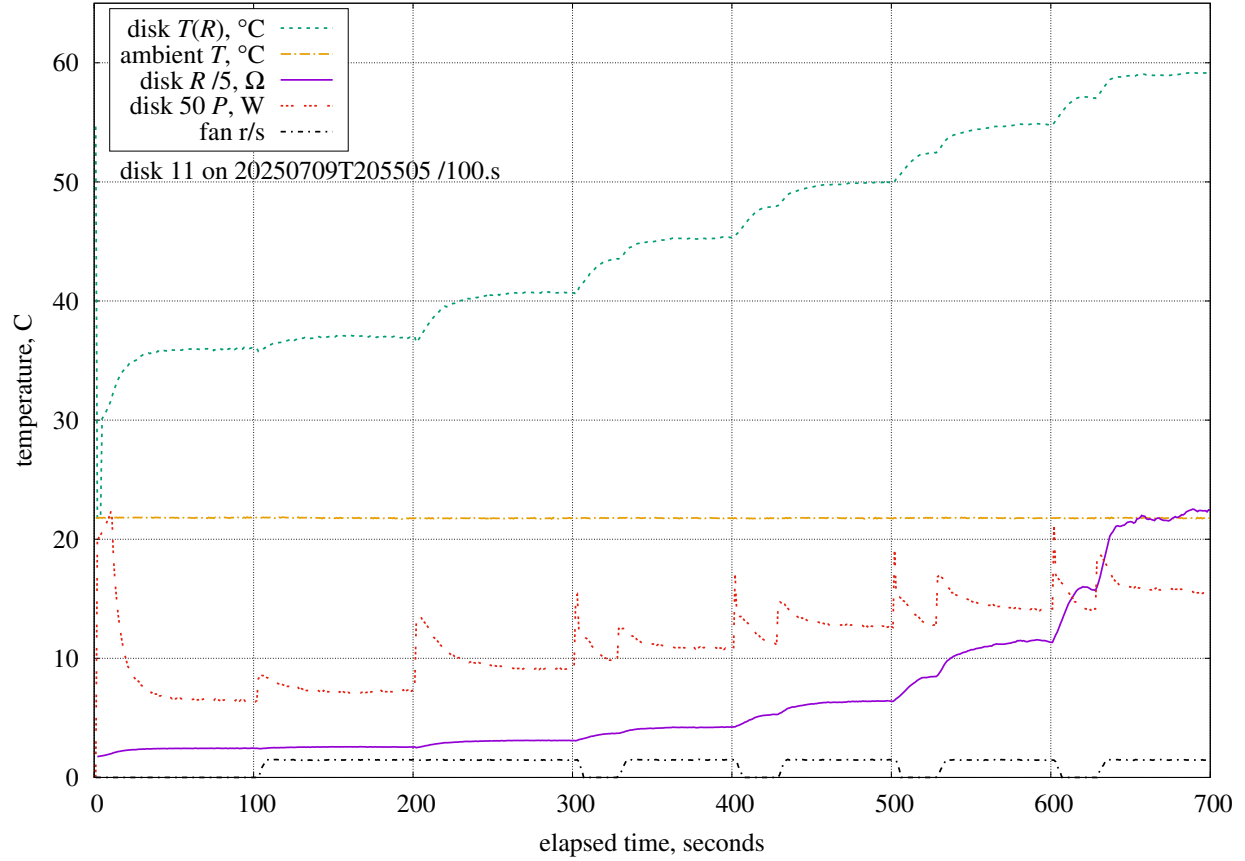
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	307.K	$-0.514\%/K$	0.50.K	0.26%	LM35C temperature sensor
ΔT	25.0.K	$+3.89\%/K$	0.10.K	0.39%	LM35C differential
P	100.kPa	$+0.0006\%/Pa$	1.5.kPa	0.89%	MPXH6115A6U air pressure
η	0.340	$+179\%$	0.007	1.22%	anemometer calibration
Re_0	600	-0.015%	60	0.90%	integration lower-bound
D_o	2.81.mm	$-8408\%/m$	500.um	4.20%	tube outer diameter
D_i	1.11.mm	$+11221\%/m$	200.um	2.24%	tube inner diameter
L_{wire}	38.0.mm	$+1015\%/m$	500.um	0.51%	wire length
k_{ABS}	$179. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$+0.174\%/ \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$9.0. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.56%	ABS thermal conductivity
d	12.0.mm	$+4885\%/m$	100.um	0.49%	disk diameter
ϵ_{ABS}	0.920	-47.7%	0.010	0.48%	ABS emissivity
ϵ_{wt}	0.900	-48.0%	0.025	1.20%	wind-tunnel emissivity
θ	$50.0.m^\circ$	$-7.98\%/^\circ$	$0.20.^\circ$	1.60%	plate angle
ψ	$50.0.m^\circ$	$+471876\%/^\circ$	$0.25.^\circ$	117968.90%	flow angle
				117968.90%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	62.2.r/min	$+0.981\%/(r/min)$	1.4.r/min	1.33%	fan rotation rate
				117968.90%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 0.223 \text{ m/s}$ (74 r/min)

Estimated measurement uncertainties at $Re = 162$.

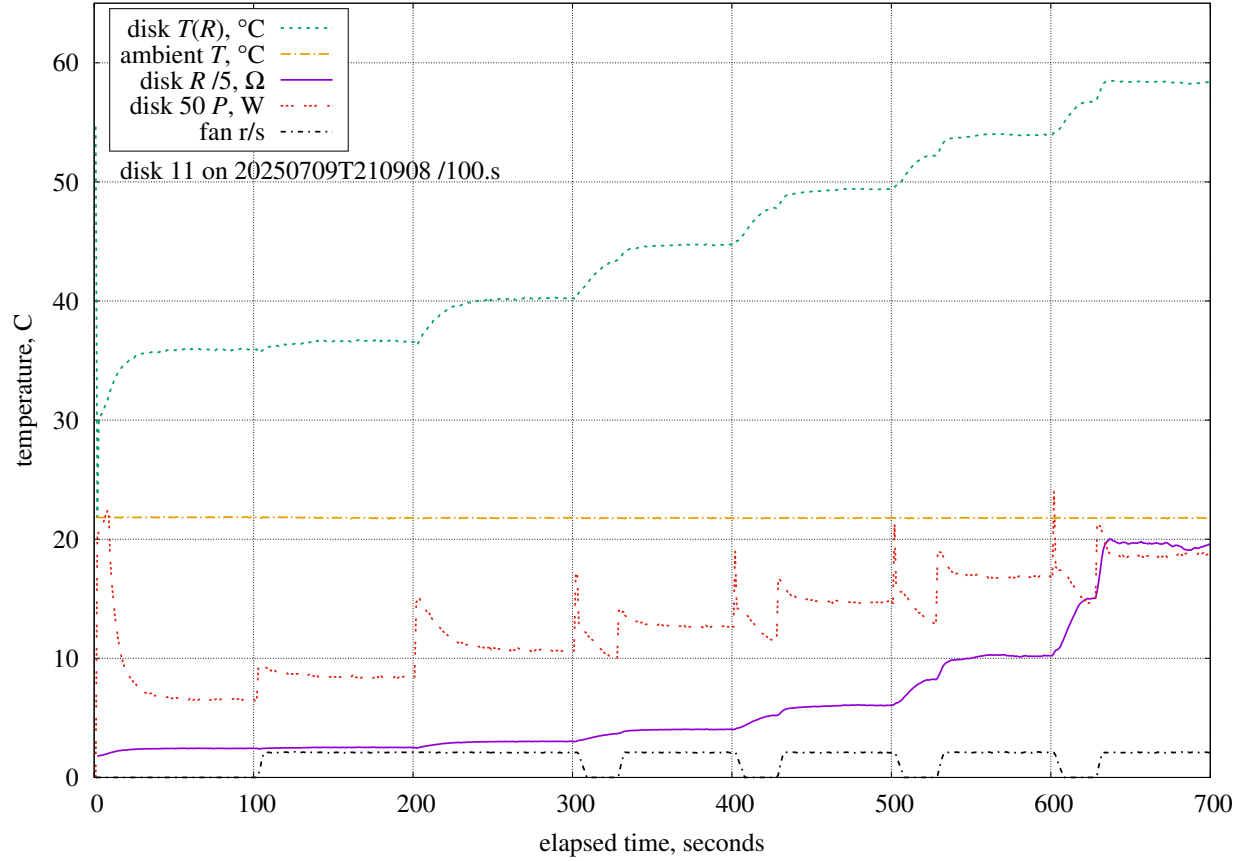
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	307.K	$-0.505\%/K$	0.50.K	0.25%	LM35C temperature sensor
ΔT	25.0.K	$+3.91\%/K$	0.10.K	0.39%	LM35C differential
P	100.kPa	$+0.0006\%/Pa$	1.5.kPa	0.87%	MPXH6115A6U air pressure
η	0.340	$+170\%$	0.007	1.16%	anemometer calibration
Re_0	600	-0.014%	60	0.82%	integration lower-bound
D_o	2.81.mm	$-8900\%/m$	500.um	4.45%	tube outer diameter
D_i	1.11.mm	$+12053\%/m$	200.um	2.41%	tube inner diameter
L_{wire}	38.0.mm	$+1100\%/m$	500.um	0.55%	wire length
k_{ABS}	$179. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$+0.177\%/ \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$9.0. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.59%	ABS thermal conductivity
d	12.0.mm	$+4928\%/m$	100.um	0.49%	disk diameter
ϵ_{ABS}	0.920	-47.2%	0.010	0.47%	ABS emissivity
ϵ_{wt}	0.900	-47.6%	0.025	1.19%	wind-tunnel emissivity
θ	$50.0.\text{m}^\circ$	$-7.64\%/^\circ$	$0.20.^\circ$	1.53%	plate angle
ψ	$50.0.\text{m}^\circ$	$+420903\%/^\circ$	$0.25.^\circ$	105225.70%	flow angle
				105225.70%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	74.0.r/min	$+0.782\%/(r/min)$	1.0.r/min	0.81%	fan rotation rate
				105225.70%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 0.267$ m/s (88 r/min)

Estimated measurement uncertainties at $Re = 194$.

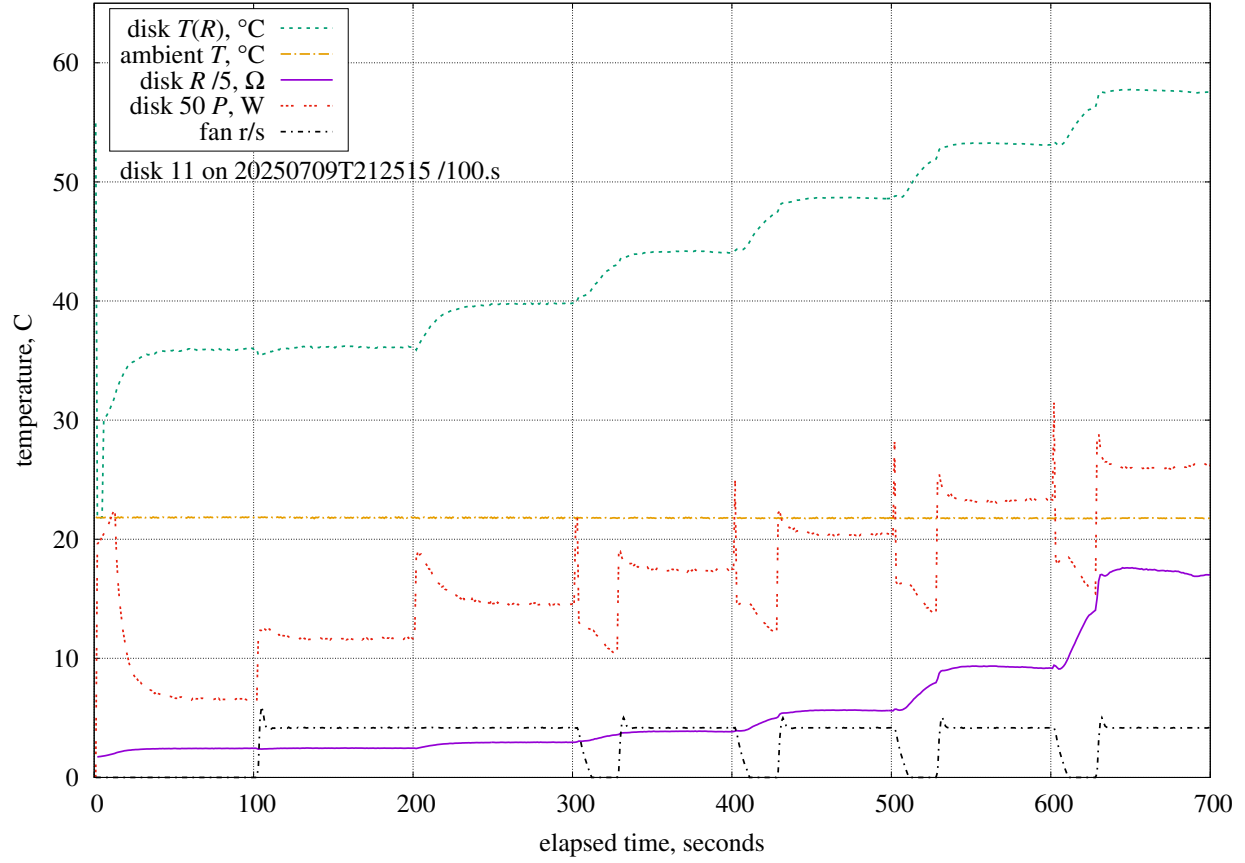
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	307.K	−0.497%/K	0.50.K	0.25%	LM35C temperature sensor
ΔT	25.0.K	+3.92%/K	0.10.K	0.39%	LM35C differential
P	100.kPa	+0.0006%/Pa	1.5.kPa	0.84%	MPXH6115A6U air pressure
η	0.340	+163%	0.007	1.11%	anemometer calibration
Re_0	600	−0.013%	60	0.77%	integration lower-bound
D_o	2.81.mm	−9426%/m	500.um	4.71%	tube outer diameter
D_i	1.11.mm	+12959%/m	200.um	2.59%	tube inner diameter
D_g	166.um	−287%/m	750.um	0.22%	tube air gap
L_{wire}	38.0.mm	+1195%/m	500.um	0.60%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.181%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.62%	ABS thermal conductivity
d	12.0.mm	+4961%/m	100.um	0.50%	disk diameter
ϵ_{ABS}	0.920	−46.7%	0.010	0.47%	ABS emissivity
ϵ_{wt}	0.900	−47.2%	0.025	1.18%	wind-tunnel emissivity
θ	50.0.m°	−7.31%/°	0.20.°	1.46%	plate angle
ψ	50.0.m°	+378942%/°	0.25.°	94735.50%	flow angle
				94735.50%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	88.5.r/min	+0.627%/(r/min)	0.85.r/min	0.53%	fan rotation rate
				94735.50%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 0.378$ m/s (126 r/min)

Estimated measurement uncertainties at $Re = 275$.

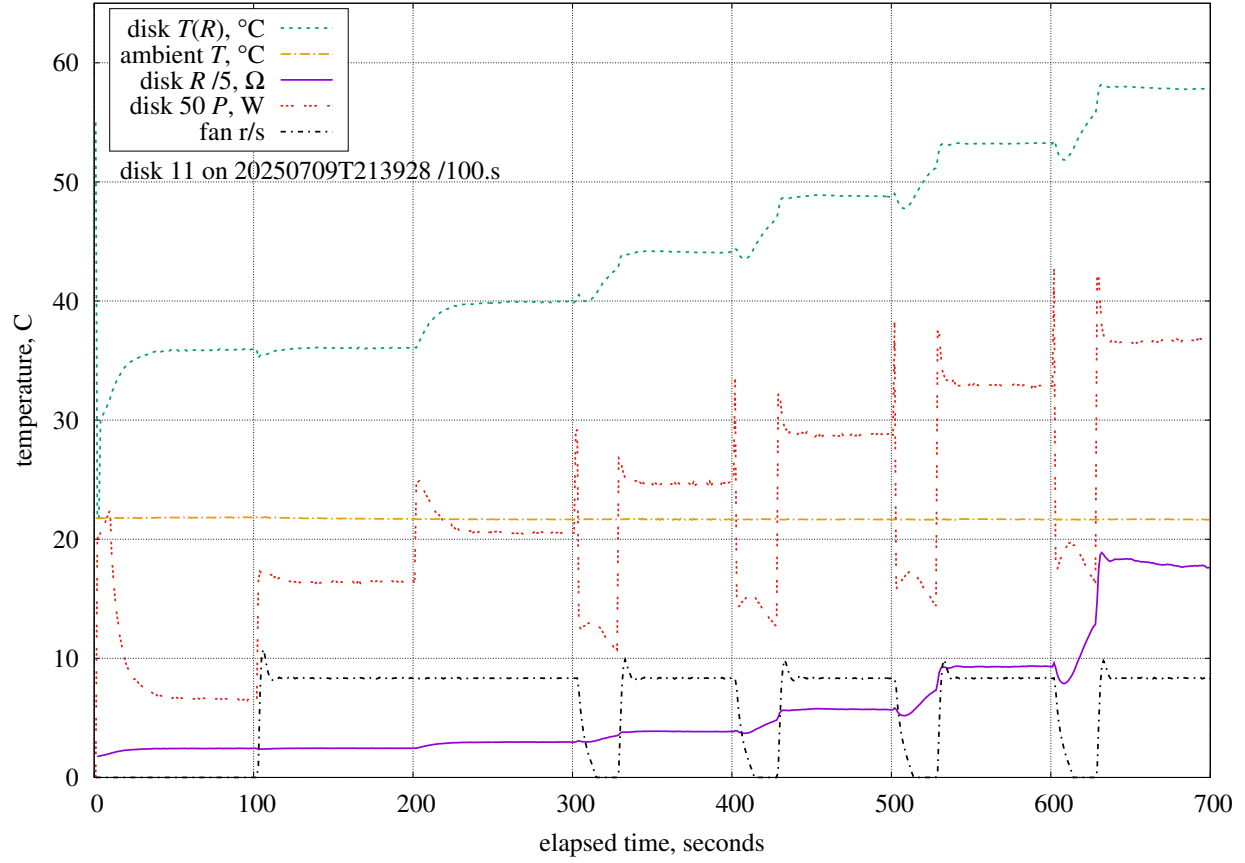
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	307.K	$-0.484\%/K$	0.50.K	0.24%	LM35C temperature sensor
ΔT	25.0.K	$+3.92\%/K$	0.10.K	0.39%	LM35C differential
P	100.kPa	$+0.0005\%/Pa$	1.5.kPa	0.80%	MPXH6115A6U air pressure
η	0.340	$+152\%$	0.007	1.03%	anemometer calibration
Re_0	600	-0.011%	60	0.68%	integration lower-bound
D_o	2.81.mm	$-10555\%/m$	500.um	5.28%	tube outer diameter
D_i	1.11.mm	$+14867\%/m$	200.um	2.97%	tube inner diameter
D_g	166.um	$-338\%/m$	750.um	0.25%	tube air gap
L_{wire}	38.0.mm	$+1407\%/m$	500.um	0.70%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.190\%/ \frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	1.70%	ABS thermal conductivity
d	12.0.mm	$+5000\%/m$	100.um	0.50%	disk diameter
ϵ_{ABS}	0.920	-46.0%	0.010	0.46%	ABS emissivity
ϵ_{wt}	0.900	-46.5%	0.025	1.16%	wind-tunnel emissivity
θ	50.0.m°	$-6.66\%/^\circ$	0.20.°	1.33%	plate angle
ψ	50.0.m°	$+320477\%/^\circ$	0.25.°	80119.13%	flow angle
				80119.13%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	126.r/min	$+0.411\%/(r/min)$	1.2.r/min	0.50%	fan rotation rate
				80119.13%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 0.748$ m/s (250 r/min)

Estimated measurement uncertainties at $Re = 545$.

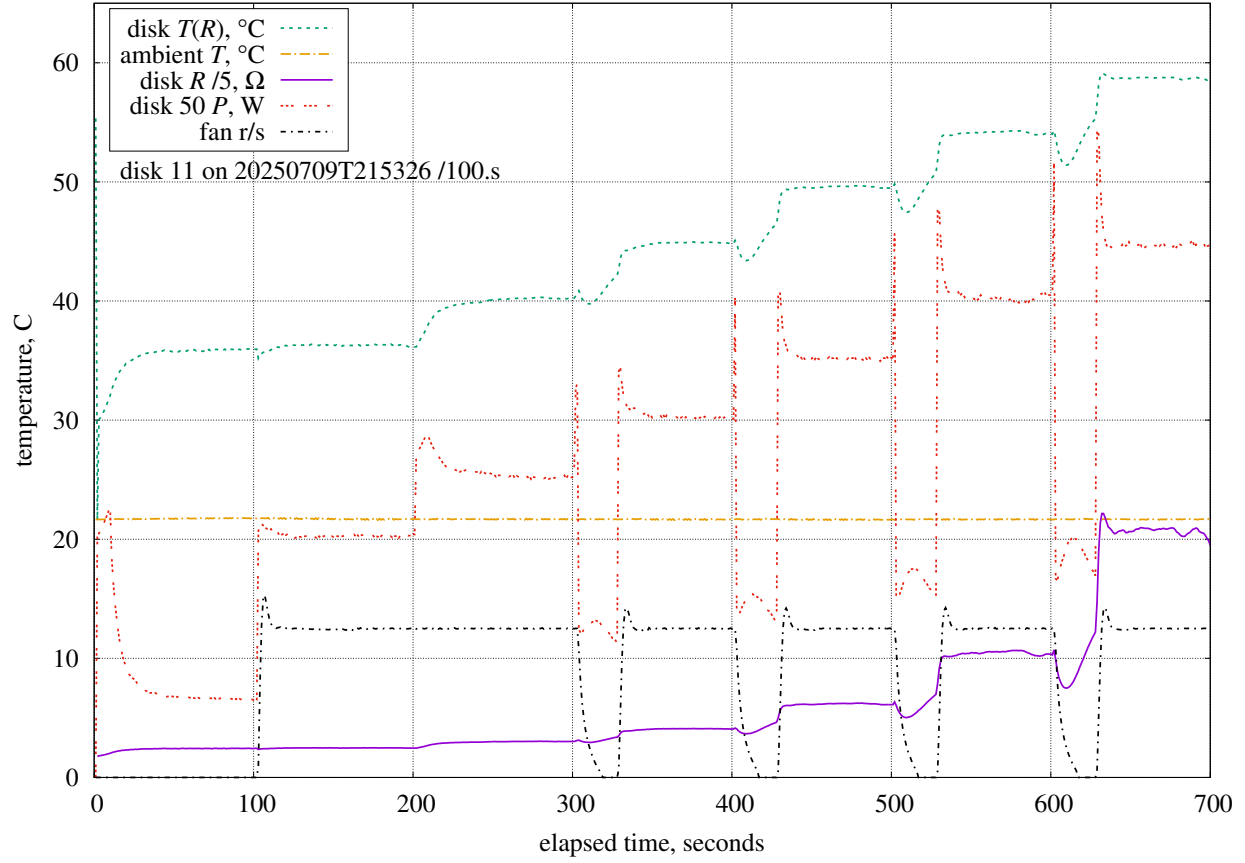
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+3.93%/K	0.10.K	0.39%	LM35C differential
P	100.kPa	+0.0005%/Pa	1.5.kPa	0.68%	MPXH6115A6U air pressure
η	0.340	+119%	0.007	0.81%	anemometer calibration
Re_0	600	-0.0099%	60	0.60%	integration lower-bound
D_o	2.81.mm	-11576%/m	500.um	5.79%	tube outer diameter
D_i	1.11.mm	+18025%/m	200.um	3.61%	tube inner diameter
D_g	166.um	-436%/m	750.um	0.33%	tube air gap
L_{wire}	38.0.mm	+1815%/m	500.um	0.91%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.200%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.79%	ABS thermal conductivity
d	12.0.mm	+5403%/m	100.um	0.54%	disk diameter
ϵ_{ABS}	0.920	-37.3%	0.010	0.37%	ABS emissivity
ϵ_{wt}	0.900	-37.7%	0.025	0.94%	wind-tunnel emissivity
θ	50.0.m°	-2.27%/°	0.20.°	0.45%	plate angle
ψ	50.0.m°	+257891%/°	0.25.°	64472.85%	flow angle
				64472.85%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	250.r/min	+0.162%/(r/min)	0.98.r/min	0.16%	fan rotation rate
				64472.85%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 1.467$ m/s (500 r/min)

Estimated measurement uncertainties at $Re = 1068$.

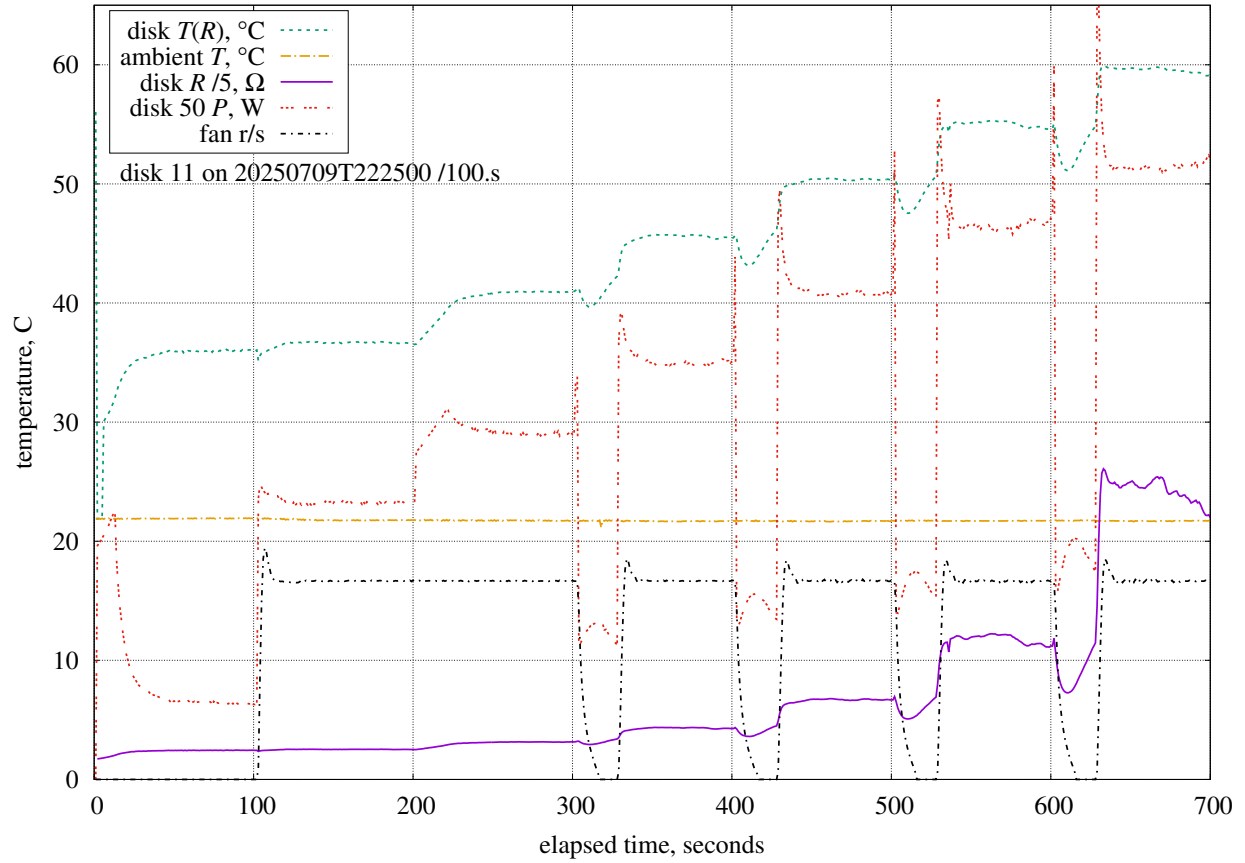
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	307.K	$-0.474\%/K$	0.50.K	0.24%	LM35C temperature sensor
ΔT	25.0.K	$+3.73\%/K$	0.10.K	0.37%	LM35C differential
P	100.kPa	$+0.0005\%/Pa$	1.5.kPa	0.73%	MPXH6115A6U air pressure
η	0.340	$+135\%$	0.007	0.92%	anemometer calibration
Re_0	600	-0.013%	60	0.76%	integration lower-bound
D_o	2.81.mm	$-15827\%/m$	500.um	7.91%	tube outer diameter
D_i	1.11.mm	$+22602\%/m$	200.um	4.52%	tube inner diameter
D_g	166.um	$-591\%/m$	750.um	0.44%	tube air gap
L_{wire}	38.0.mm	$+2465\%/m$	500.um	1.23%	wire length
k_{ABS}	$179. \frac{mW}{K \cdot m}$	$+0.225\% / \frac{mW}{K \cdot m}$	$9.0. \frac{mW}{K \cdot m}$	2.01%	ABS thermal conductivity
d	12.0.mm	$+5436\%/m$	100.um	0.54%	disk diameter
ϵ_{ABS}	0.920	-44.6%	0.010	0.45%	ABS emissivity
ϵ_{wt}	0.900	-45.3%	0.025	1.13%	wind-tunnel emissivity
θ	$50.0.m^\circ$	$-4.37\%/^\circ$	$0.20.^\circ$	0.87%	plate angle
ψ	$50.0.m^\circ$	$+213673\%/^\circ$	$0.25.^\circ$	53418.37%	flow angle
				53418.37%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	500.r/min	$+0.092\%/(r/min)$	2.1.r/min	0.19%	fan rotation rate
				53418.37%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 2.131$ m/s (750 r/min)

Estimated measurement uncertainties at $Re = 1552$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	307.K	$-0.469\%/K$	0.50.K	0.23%	LM35C temperature sensor
ΔT	25.0.K	$+3.66\%/K$	0.10.K	0.37%	LM35C differential
P	100.kPa	$+0.0005\%/Pa$	1.5.kPa	0.71%	MPXH6115A6U air pressure
η	0.340	$+123\%$	0.007	0.84%	anemometer calibration
Re_0	600	-0.013%	60	0.76%	integration lower-bound
D_o	2.81.mm	$-17167\%/m$	500.um	8.58%	tube outer diameter
D_i	1.11.mm	$+24076\%/m$	200.um	4.82%	tube inner diameter
D_g	166.um	$-662\%/m$	750.um	0.50%	tube air gap
L_{wire}	38.0.mm	$+2758\%/m$	500.um	1.38%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.229\%/ \frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	2.05%	ABS thermal conductivity
d	12.0.mm	$+5728\%/m$	100.um	0.57%	disk diameter
ϵ_{ABS}	0.920	-44.0%	0.010	0.44%	ABS emissivity
ϵ_{wt}	0.900	-44.8%	0.025	1.12%	wind-tunnel emissivity
θ	50.0.m°	$-3.77\%/^\circ$	0.20.°	0.75%	plate angle
ψ	50.0.m°	$+191791\%/^\circ$	0.25.°	47947.65%	flow angle
				47947.66%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	750.r/min	$+0.056\%/(r/min)$	0.67.r/min	0.04%	fan rotation rate
				47947.66%	RSS combined uncertainty



$\theta = 0.0^\circ$; $\psi = 180.0^\circ$; $V = 2.726$ m/s (1000 r/min)

Estimated measurement uncertainties at $Re = 1984$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	307.K	-0.468%/K	0.50.K	0.23%	LM35C temperature sensor
ΔT	25.0.K	+3.59%/K	0.10.K	0.36%	LM35C differential
P	100.kPa	+0.0005%/Pa	1.5.kPa	0.69%	MPXH6115A6U air pressure
η	0.340	+111%	0.007	0.75%	anemometer calibration
Re_0	600	-0.012%	60	0.74%	integration lower-bound
D_o	2.81.mm	-18122%/m	500.um	9.06%	tube outer diameter
D_i	1.11.mm	+24899%/m	200.um	4.98%	tube inner diameter
D_g	166.um	-710%/m	750.um	0.53%	tube air gap
L_{wire}	38.0.mm	+2960%/m	500.um	1.48%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.230%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	2.06%	ABS thermal conductivity
d	12.0.mm	+5912%/m	100.um	0.59%	disk diameter
ϵ_{ABS}	0.920	-44.2%	0.010	0.44%	ABS emissivity
ϵ_{wt}	0.900	-45.0%	0.025	1.12%	wind-tunnel emissivity
θ	50.0.m°	-3.42%/°	0.20.°	0.68%	plate angle
ψ	50.0.m°	+178749%/°	0.25.°	44687.33%	flow angle
				44687.33%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	1000.r/min	+0.038%/(r/min)	3.9.r/min	0.15%	fan rotation rate
				44687.33%	RSS combined uncertainty