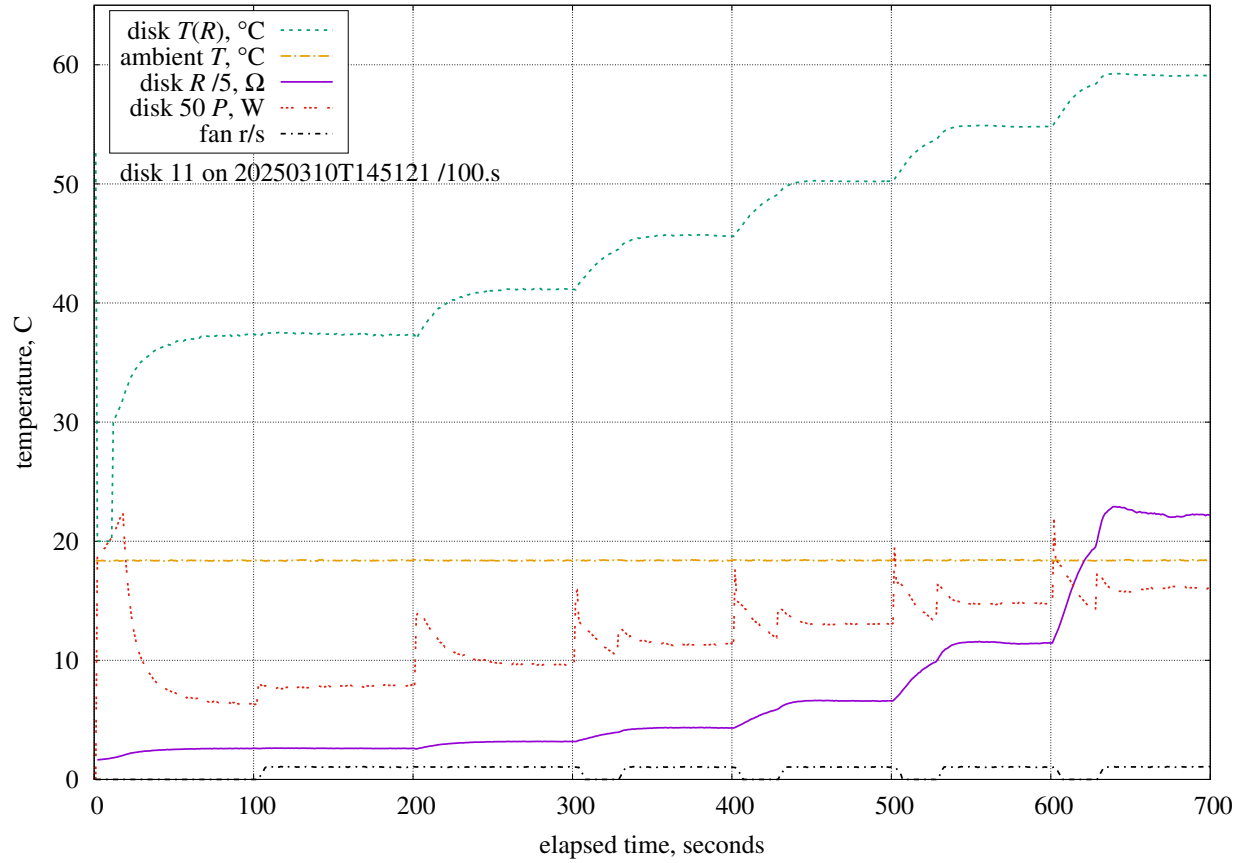


$\theta = 90.0^\circ$; $\psi = 90.0^\circ$; $V = 0.000$ m/s (0 r/min)

Estimated measurement uncertainties of natural convection at $\theta = 90.0$.

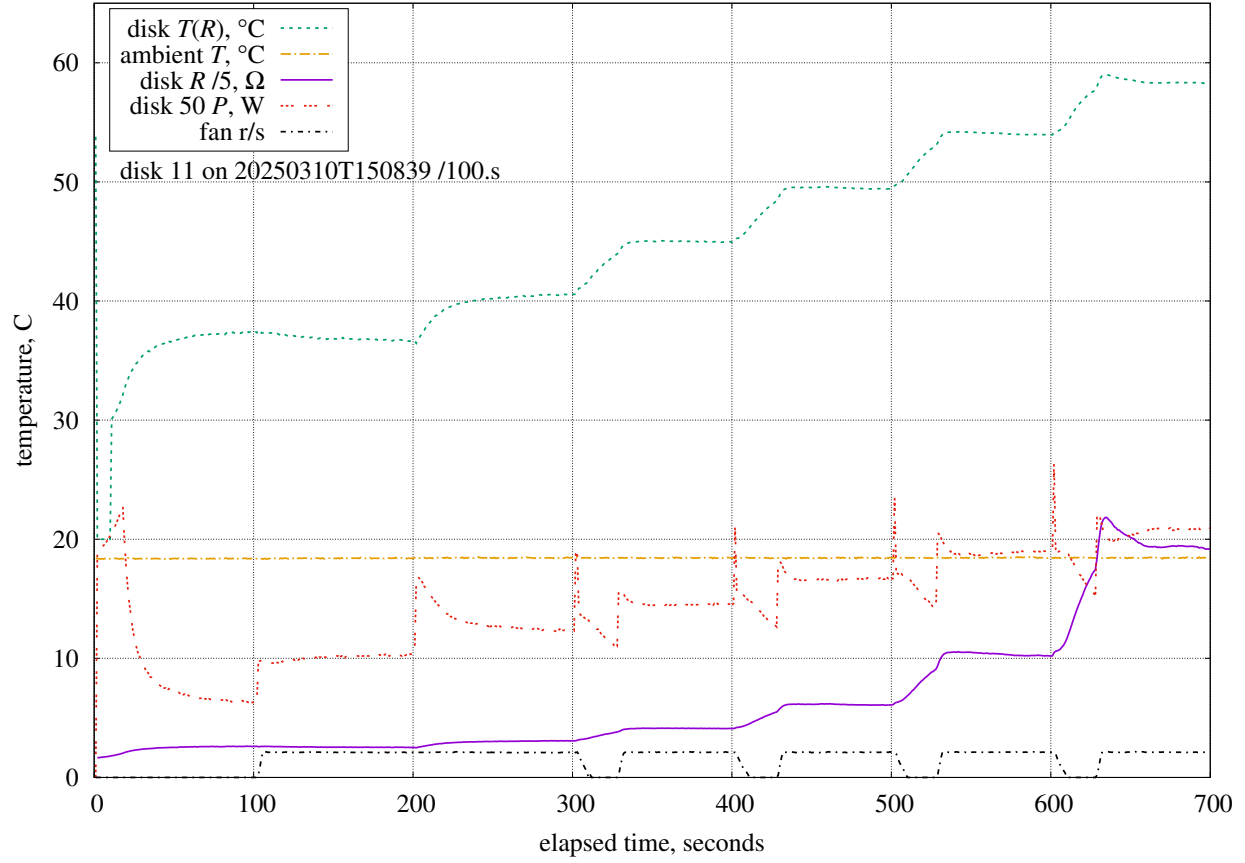
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+4.16%/K	0.10.K	0.42%	LM35C differential
D_o	2.81.mm	+1209%/m	500.um	0.60%	tube outer diameter
D_i	1.11.mm	+10508%/m	200.um	2.10%	tube inner diameter
D_g	166.um	-384%/m	750.um	0.29%	tube air gap
L_{wire}	38.0.mm	+1601%/m	500.um	0.80%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.187%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.67%	ABS thermal conductivity
d	12.0.mm	+2065%/m	100.um	0.21%	disk diameter
θ	90.0.°	+1.29%/°	0.20.°	0.26%	plate angle
				2.94%	combined bias uncertainty



$\theta = 90.0^\circ$; $\psi = 90.0^\circ$; $V = 0.189$ m/s (63 r/min)

Estimated measurement uncertainties at $Re = 139$.

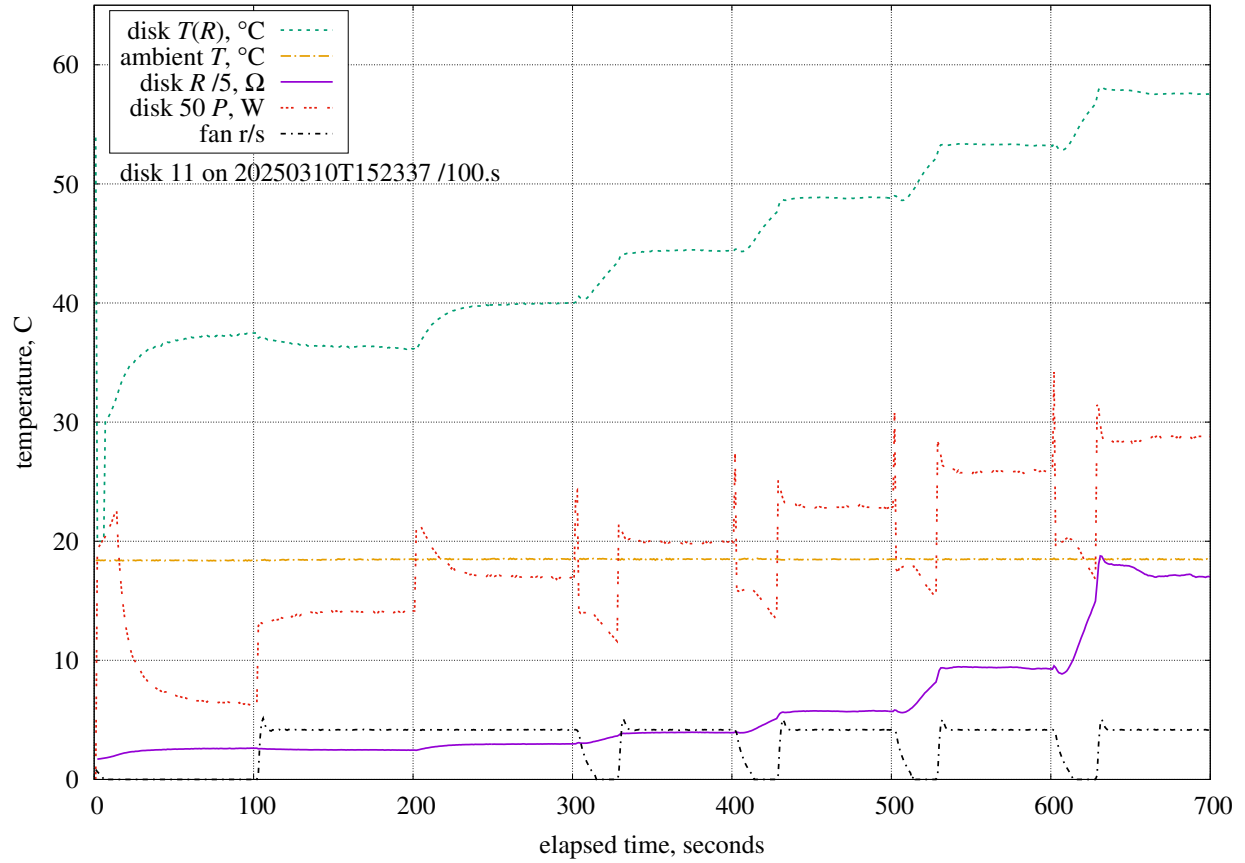
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+3.95%/K	0.10.K	0.40%	LM35C differential
P	99.7.kPa	+0.0004%/Pa	1.5.kPa	0.57%	MPXH6115A6U air pressure
η	0.340	+98.3%	0.007	0.67%	anemometer calibration
D_o	2.81.mm	−5861%/m	500.um	2.93%	tube outer diameter
D_i	1.11.mm	+11391%/m	200.um	2.28%	tube inner diameter
D_g	166.um	−443%/m	750.um	0.33%	tube air gap
L_{wire}	38.0.mm	+1844%/m	500.um	0.92%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.192%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.71%	ABS thermal conductivity
d	12.0.mm	+2550%/m	100.um	0.26%	disk diameter
ϵ_{ABS}	0.920	−36.5%	0.010	0.37%	ABS emissivity
ϵ_{wt}	0.900	−36.7%	0.025	0.92%	wind-tunnel emissivity
				4.44%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	62.7.r/min	+0.533%/(r/min)	1.1.r/min	0.61%	fan rotation rate
				4.61%	RSS combined uncertainty



$\theta = 90.0^\circ$; $\psi = 90.0^\circ$; $V = 0.381 \text{ m/s}$ (127 r/min)

Estimated measurement uncertainties at $Re = 280$.

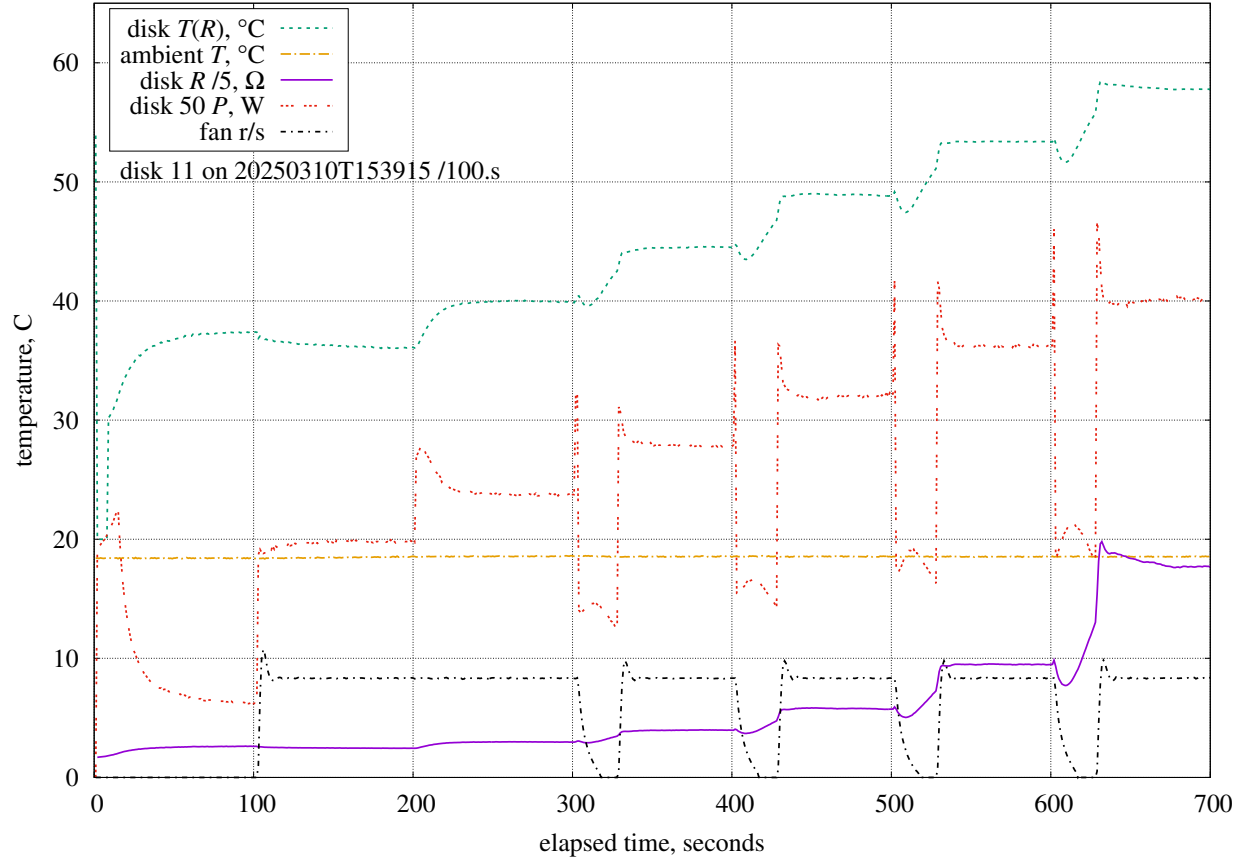
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	304.K	$-0.429\%/K$	0.50.K	0.21%	LM35C temperature sensor
ΔT	25.0.K	$+3.83\%/K$	0.10.K	0.38%	LM35C differential
P	99.7.kPa	$+0.0004\%/Pa$	1.5.kPa	0.63%	MPXH6115A6U air pressure
η	0.340	$+120\%$	0.007	0.81%	anemometer calibration
Re_0	600	-0.0062%	60	0.37%	integration lower-bound
D_o	2.81.mm	$-9347\%/m$	500.um	4.67%	tube outer diameter
D_i	1.11.mm	$+15201\%/m$	200.um	3.04%	tube inner diameter
D_g	166.um	$-571\%/m$	750.um	0.43%	tube air gap
L_{wire}	38.0.mm	$+2380\%/m$	500.um	1.19%	wire length
k_{ABS}	$179. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$+0.211\%/ \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$9.0. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.89%	ABS thermal conductivity
d	12.0.mm	$+2796\%/m$	100.um	0.28%	disk diameter
ϵ_{ABS}	0.920	-42.6%	0.010	0.43%	ABS emissivity
ϵ_{wt}	0.900	-43.1%	0.025	1.08%	wind-tunnel emissivity
				6.25%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	127.r/min	$+0.322\%/(r/min)$	0.93.r/min	0.30%	fan rotation rate
				6.28%	RSS combined uncertainty



$\theta = 90.0^\circ$; $\psi = 90.0^\circ$; $V = 0.748$ m/s (250 r/min)

Estimated measurement uncertainties at $Re = 550$.

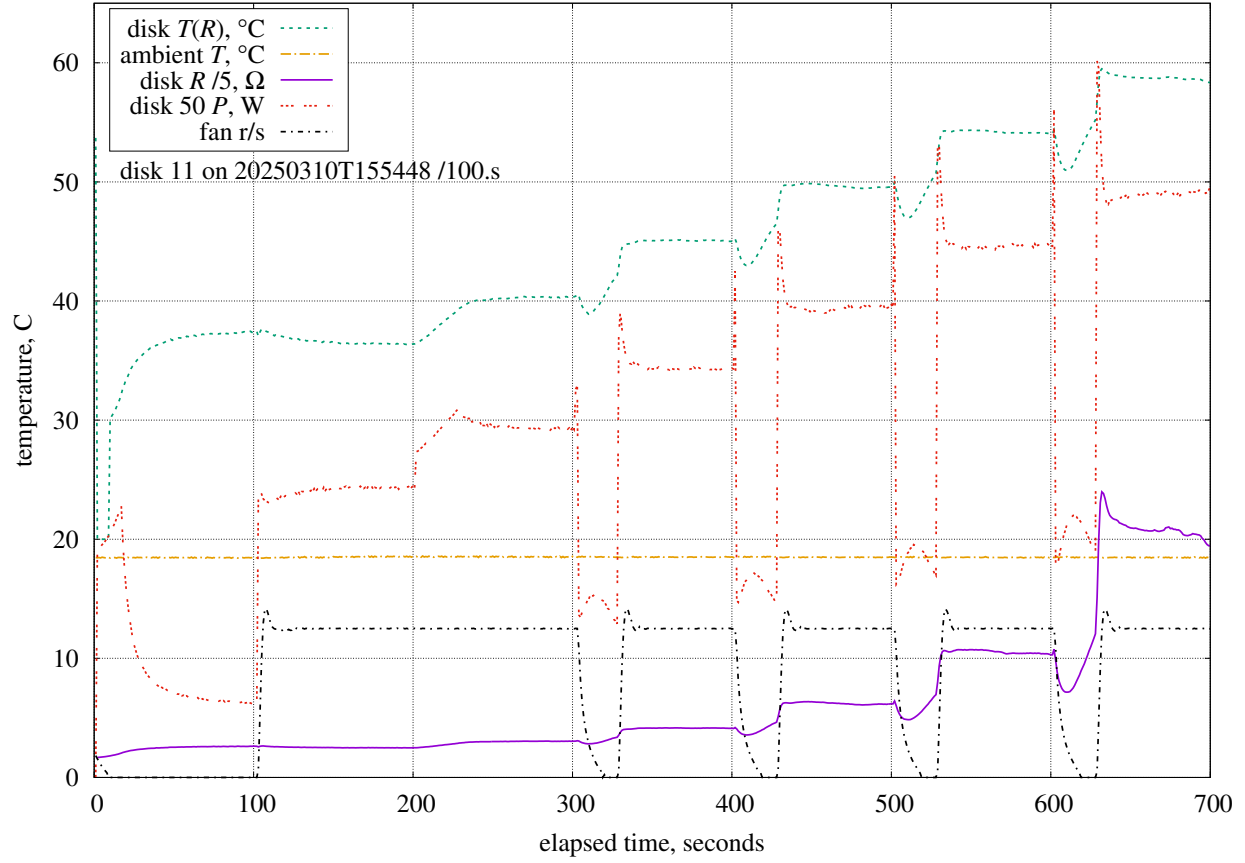
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	304.K	$-0.458\%/K$	0.50.K	0.23%	LM35C temperature sensor
ΔT	25.0.K	$+3.69\%/K$	0.10.K	0.37%	LM35C differential
P	99.7.kPa	$+0.0004\%/Pa$	1.5.kPa	0.67%	MPXH6115A6U air pressure
η	0.340	$+131\%$	0.007	0.89%	anemometer calibration
Re_0	600	-0.010%	60	0.60%	integration lower-bound
D_o	2.81.mm	$-12419\%/m$	500.um	6.21%	tube outer diameter
D_i	1.11.mm	$+18652\%/m$	200.um	3.73%	tube inner diameter
D_g	166.um	$-705\%/m$	750.um	0.53%	tube air gap
L_{wire}	38.0.mm	$+2938\%/m$	500.um	1.47%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.223\%/ \frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	2.00%	ABS thermal conductivity
d	12.0.mm	$+3483\%/m$	100.um	0.35%	disk diameter
ϵ_{ABS}	0.920	-43.9%	0.010	0.44%	ABS emissivity
ϵ_{wt}	0.900	-44.6%	0.025	1.11%	wind-tunnel emissivity
				7.89%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	250.r/min	$+0.178\%/(r/min)$	1.1.r/min	0.20%	fan rotation rate
				7.90%	RSS combined uncertainty



$\theta = 90.0^\circ$; $\psi = 90.0^\circ$; $V = 1.467$ m/s (500 r/min)

Estimated measurement uncertainties at $Re = 1078$.

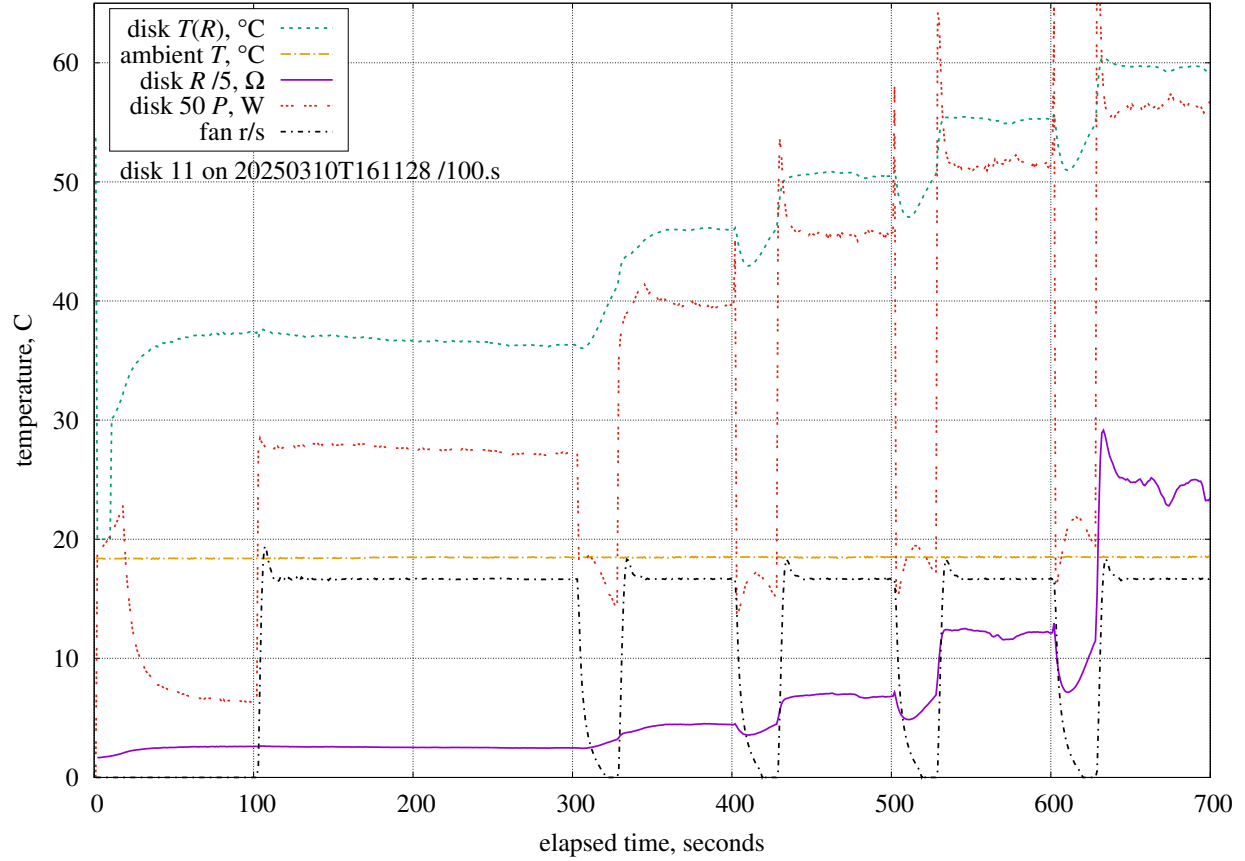
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	304.K	$-0.473\%/K$	0.50.K	0.24%	LM35C temperature sensor
ΔT	25.0.K	$+3.53\%/K$	0.10.K	0.35%	LM35C differential
P	99.7.kPa	$+0.0004\%/Pa$	1.5.kPa	0.65%	MPXH6115A6U air pressure
η	0.340	$+125\%$	0.007	0.85%	anemometer calibration
Re_0	600	-0.011%	60	0.66%	integration lower-bound
D_o	2.81.mm	$-15611\%/m$	500.um	7.81%	tube outer diameter
D_i	1.11.mm	$+21605\%/m$	200.um	4.32%	tube inner diameter
D_g	166.um	$-845\%/m$	750.um	0.63%	tube air gap
L_{wire}	38.0.mm	$+3522\%/m$	500.um	1.76%	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	$+4238\%/m$	100.um	0.42%	disk diameter
ϵ_{ABS}	0.920	-45.2%	0.010	0.45%	ABS emissivity
ϵ_{wt}	0.900	-46.0%	0.025	1.15%	wind-tunnel emissivity
				9.53%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	500.r/min	$+0.085\%/(r/min)$	1.7.r/min	0.14%	fan rotation rate
				9.53%	RSS combined uncertainty



$\theta = 90.0^\circ$; $\psi = 90.0^\circ$; $V = 2.130 \text{ m/s}$ (750 r/min)

Estimated measurement uncertainties at $Re = 1567$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	304.K	$-0.493\%/K$	0.50.K	0.25%	LM35C temperature sensor
ΔT	25.0.K	$+3.38\%/K$	0.10.K	0.34%	LM35C differential
P	99.7.kPa	$+0.0004\%/Pa$	1.5.kPa	0.64%	MPXH6115A6U air pressure
η	0.340	$+115\%$	0.007	0.78%	anemometer calibration
Re_0	600	-0.011%	60	0.67%	integration lower-bound
D_o	2.81.mm	$-17787\%/m$	500.um	8.89%	tube outer diameter
D_i	1.11.mm	$+22987\%/m$	200.um	4.60%	tube inner diameter
D_g	166.um	$-937\%/m$	750.um	0.70%	tube air gap
L_{wire}	38.0.mm	$+3904\%/m$	500.um	1.95%	wire length
k_{ABS}	$179. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$+0.231\%/ \frac{\text{mW}}{\text{K}\cdot\text{m}}$	$9.0. \frac{\text{mW}}{\text{K}\cdot\text{m}}$	2.06%	ABS thermal conductivity
d	12.0.mm	$+4635\%/m$	100.um	0.46%	disk diameter
ϵ_{ABS}	0.920	-47.4%	0.010	0.47%	ABS emissivity
ϵ_{wt}	0.900	-48.3%	0.025	1.21%	wind-tunnel emissivity
				10.60%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	750.r/min	$+0.052\%/(r/min)$	0.82.r/min	0.04%	fan rotation rate
				10.60%	RSS combined uncertainty



$\theta = 90.0^\circ$; $\psi = 90.0^\circ$; $V = 2.725$ m/s (1000 r/min)

Estimated measurement uncertainties at $Re = 2004$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	304.K	$-0.529\%/K$	0.50.K	0.26%	LM35C temperature sensor
ΔT	25.0.K	$+3.18\%/K$	0.10.K	0.32%	LM35C differential
P	99.7.kPa	$+0.0004\%/Pa$	1.5.kPa	0.63%	MPXH6115A6U air pressure
η	0.340	$+104\%$	0.007	0.71%	anemometer calibration
Re_0	600	-0.011%	60	0.65%	integration lower-bound
D_o	2.81.mm	$-20029\%/m$	500.um	10.01%	tube outer diameter
D_i	1.11.mm	$+23803\%/m$	200.um	4.76%	tube inner diameter
D_g	166.um	$-1021\%/m$	750.um	0.77%	tube air gap
L_{wire}	38.0.mm	$+4255\%/m$	500.um	2.13%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.231\%/ \frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	2.07%	ABS thermal conductivity
d	12.0.mm	$+4851\%/m$	100.um	0.49%	disk diameter
ϵ_{ABS}	0.920	-51.5%	0.010	0.52%	ABS emissivity
ϵ_{wt}	0.900	-52.5%	0.025	1.31%	wind-tunnel emissivity
				11.67%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	1000.r/min	$+0.035\%/(r/min)$	1.7.r/min	0.06%	fan rotation rate
				11.67%	RSS combined uncertainty