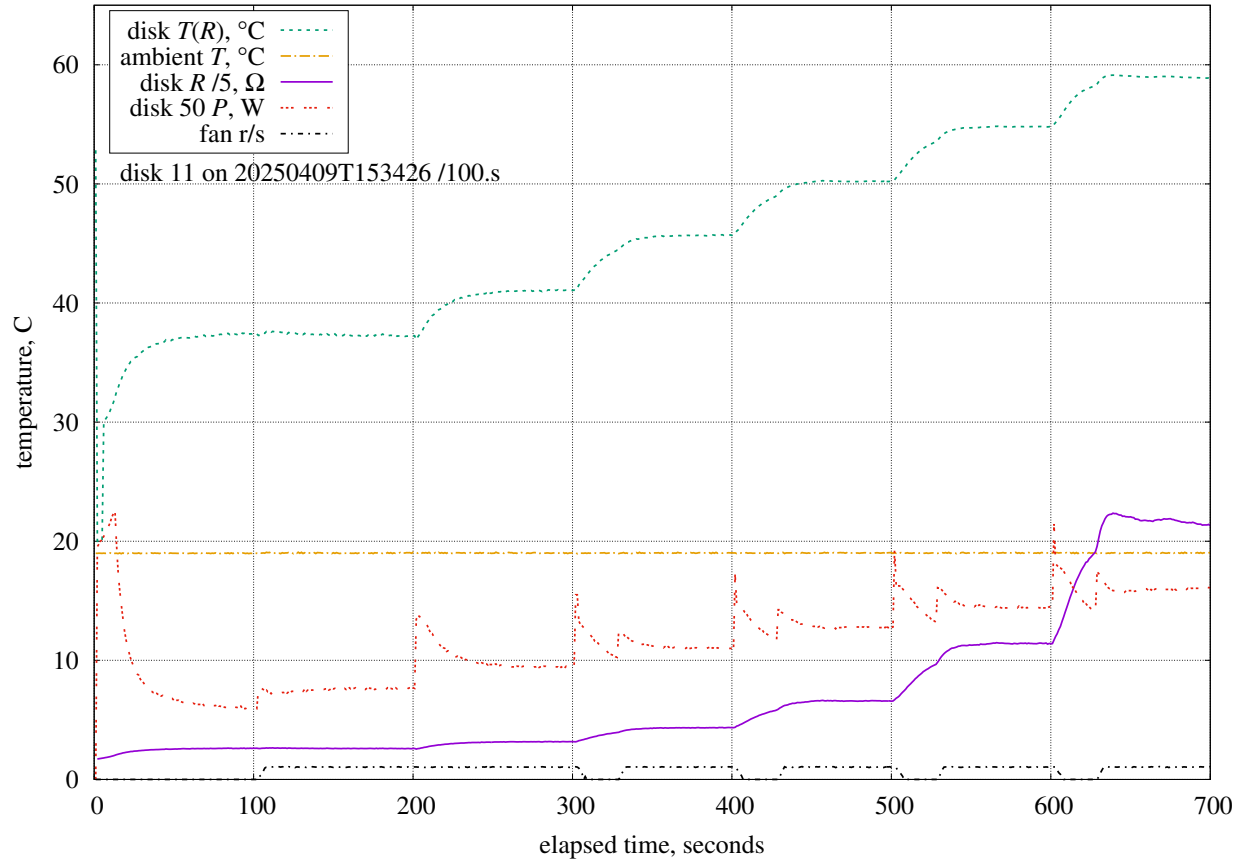


$\theta = 82.6^\circ$; $\psi = 90.0^\circ$; $V = 0.000$ m/s (0 r/min)

Estimated measurement uncertainties of natural convection at $\theta = 82.6$.

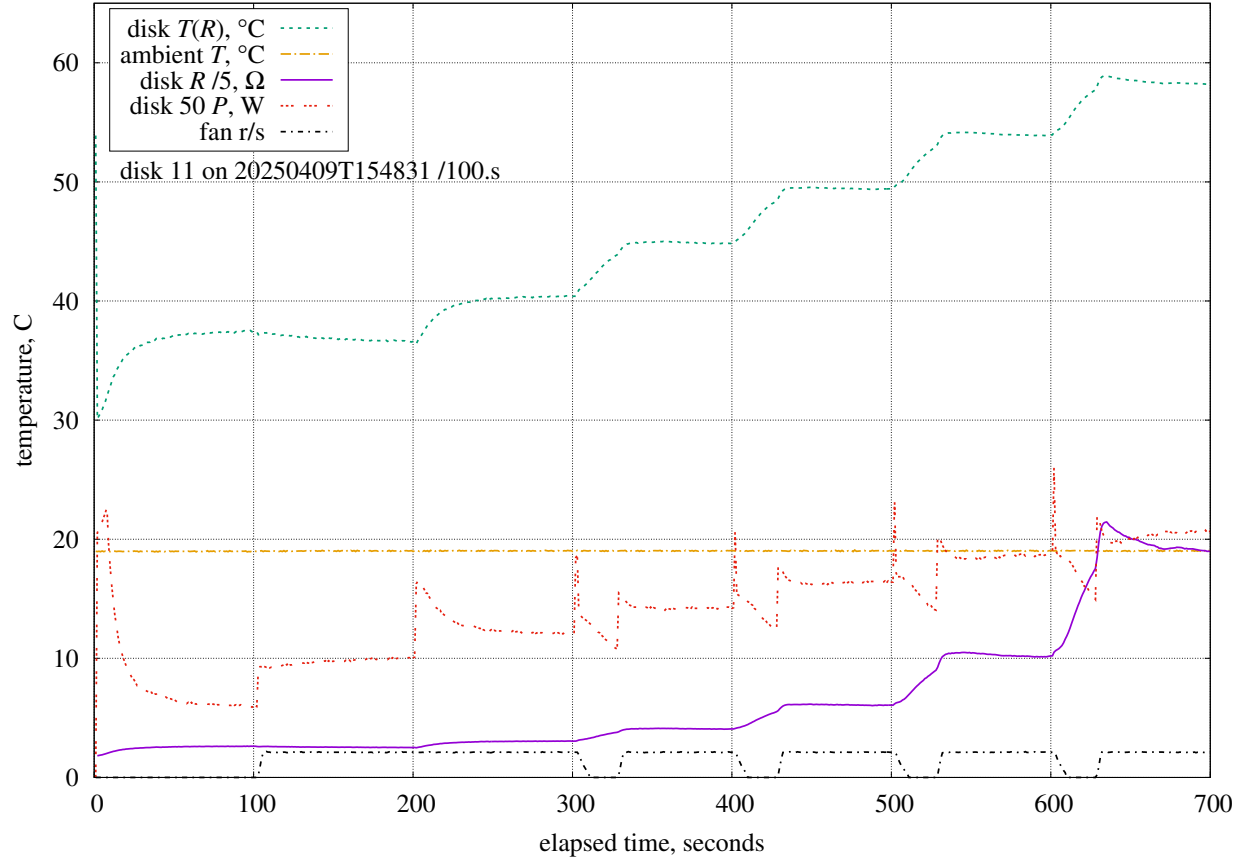
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+4.16%/K	0.10.K	0.42%	LM35C differential
C_S	0.420	-4.04%	0.050	0.20%	rim shape factor
D_o	2.81.mm	+1430%/m	500.um	0.72%	tube outer diameter
D_i	1.11.mm	+10769%/m	200.um	2.15%	tube inner diameter
D_g	166.um	-385%/m	750.um	0.29%	tube air gap
L_{wire}	38.0.mm	+1605%/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. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.68%	ABS thermal conductivity
d	12.0.mm	+2055%/m	100.um	0.21%	disk diameter
				3.00%	combined bias uncertainty



$\theta = 82.6^\circ$; $\psi = 90.0^\circ$; $V = 0.188$ m/s (63 r/min)

Estimated measurement uncertainties at $Re = 140$.

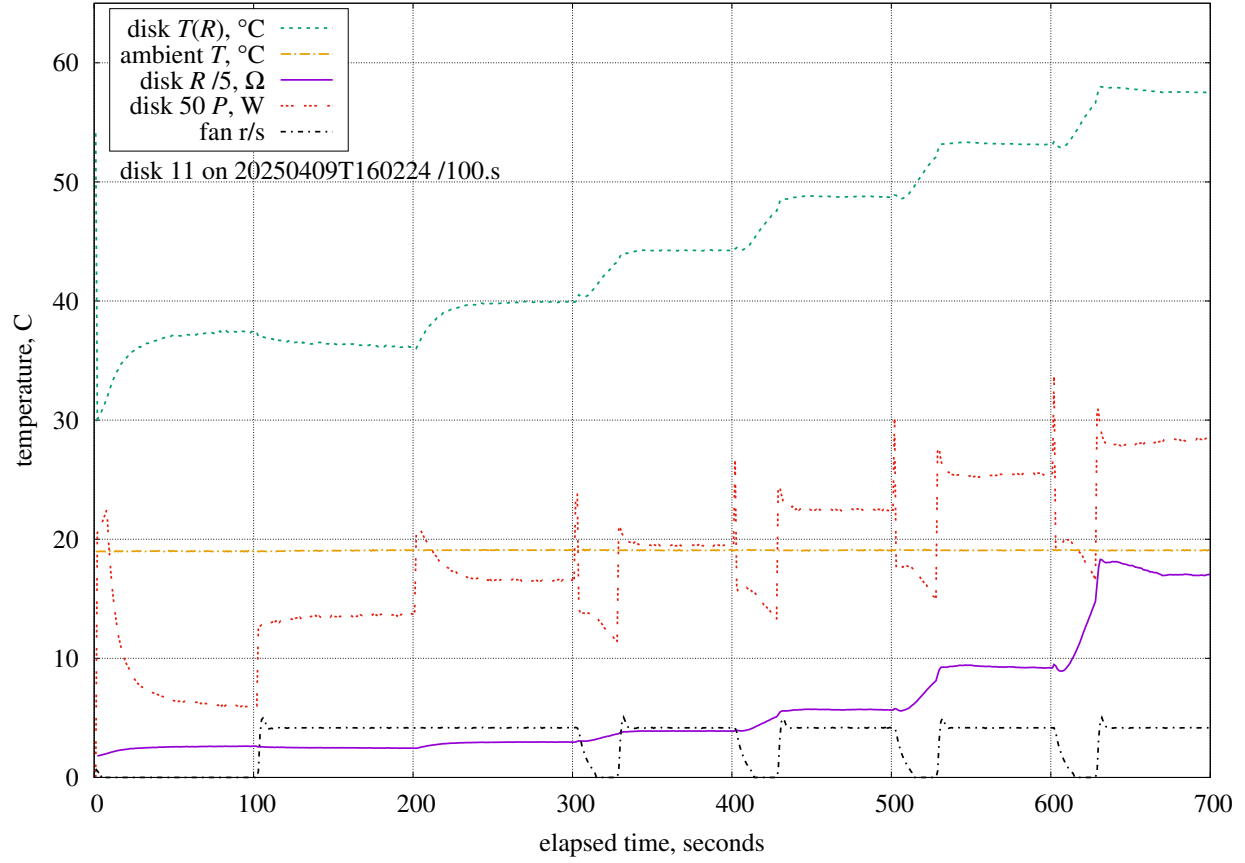
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
ΔT	25.0.K	+3.96%/K	0.10.K	0.40%	LM35C differential
P	101.kPa	+0.0004%/Pa	1.5.kPa	0.57%	MPXH6115A6U air pressure
η	0.340	+99.4%	0.007	0.68%	anemometer calibration
D_o	2.81.mm	-5828%/m	500.um	2.91%	tube outer diameter
D_i	1.11.mm	+11439%/m	200.um	2.29%	tube inner diameter
D_g	166.um	-429%/m	750.um	0.32%	tube air gap
L_{wire}	38.0.mm	+1789%/m	500.um	0.89%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.191%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	1.71%	ABS thermal conductivity
d	12.0.mm	+2601%/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
				4.43%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	62.5.r/min	+0.540%/(r/min)	1.2.r/min	0.64%	fan rotation rate
				4.61%	RSS combined uncertainty



$\theta = 82.6^\circ$; $\psi = 90.0^\circ$; $V = 0.382$ m/s (127 r/min)

Estimated measurement uncertainties at $Re = 284$.

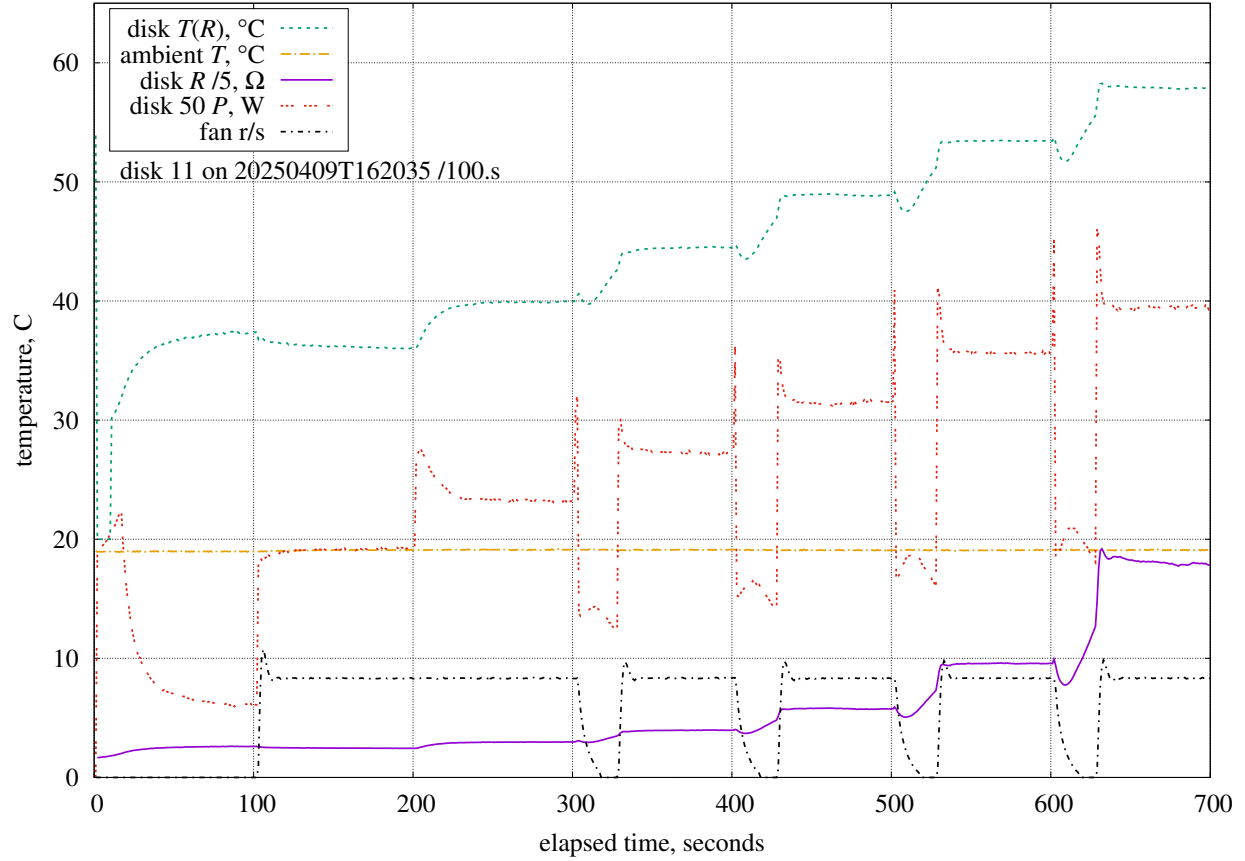
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	305.K	$-0.433\%/K$	0.50.K	0.22%	LM35C temperature sensor
ΔT	25.0.K	$+3.84\%/K$	0.10.K	0.38%	LM35C differential
P	101.kPa	$+0.0004\%/Pa$	1.5.kPa	0.64%	MPXH6115A6U air pressure
η	0.340	$+122\%$	0.007	0.83%	anemometer calibration
Re_0	600	-0.0066%	60	0.40%	integration lower-bound
D_o	2.81.mm	$-9422\%/m$	500.um	4.71%	tube outer diameter
D_i	1.11.mm	$+15327\%/m$	200.um	3.07%	tube inner diameter
D_g	166.um	$-556\%/m$	750.um	0.42%	tube air gap
L_{wire}	38.0.mm	$+2319\%/m$	500.um	1.16%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.212\%/ \frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	1.89%	ABS thermal conductivity
d	12.0.mm	$+2868\%/m$	100.um	0.29%	disk diameter
ϵ_{ABS}	0.920	-42.8%	0.010	0.43%	ABS emissivity
ϵ_{wt}	0.900	-43.3%	0.025	1.08%	wind-tunnel emissivity
				6.29%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	127.r/min	$+0.328\%/(r/min)$	1.1.r/min	0.35%	fan rotation rate
				6.33%	RSS combined uncertainty



$\theta = 82.6^\circ$; $\psi = 90.0^\circ$; $V = 0.748$ m/s (250 r/min)

Estimated measurement uncertainties at $Re = 555$.

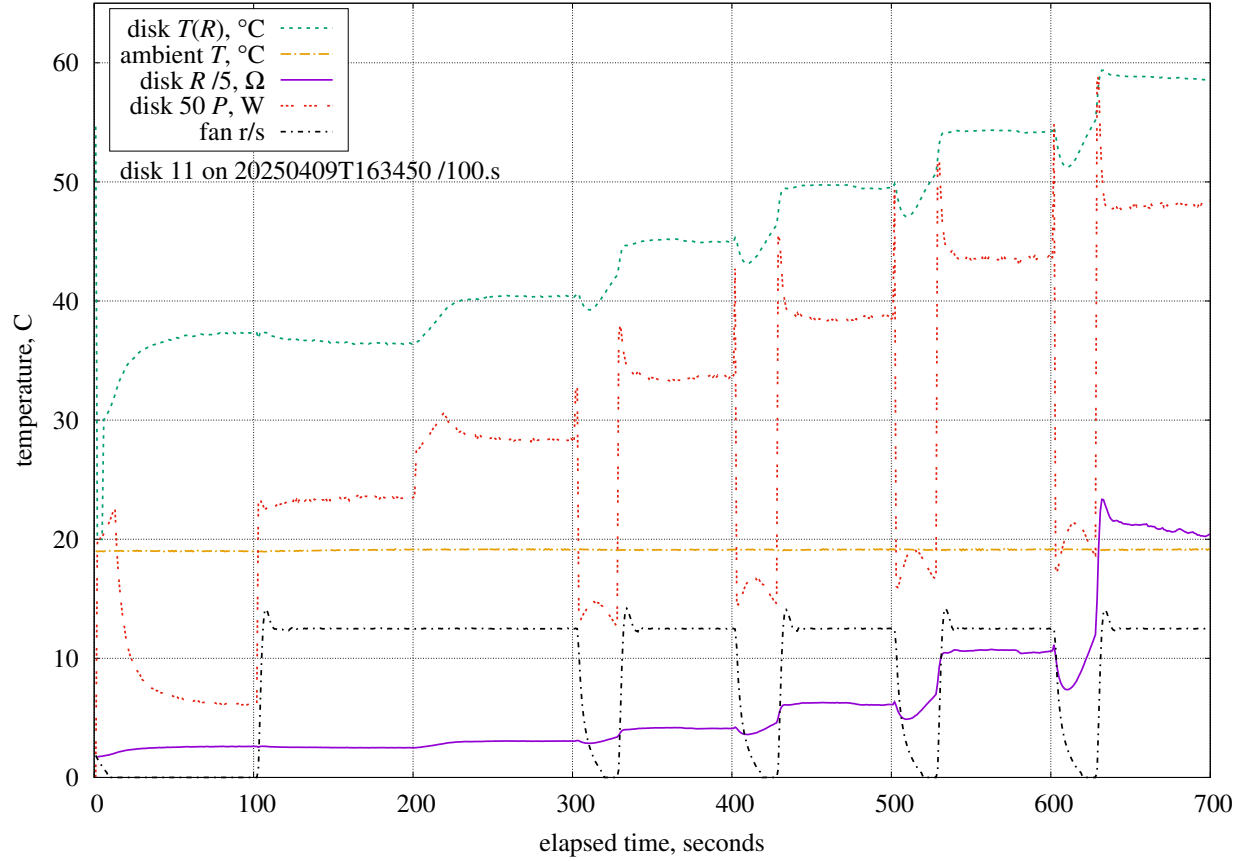
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	305.K	$-0.459\%/K$	0.50.K	0.23%	LM35C temperature sensor
ΔT	25.0.K	$+3.70\%/K$	0.10.K	0.37%	LM35C differential
P	101.kPa	$+0.0004\%/Pa$	1.5.kPa	0.67%	MPXH6115A6U air pressure
η	0.340	$+133\%$	0.007	0.90%	anemometer calibration
Re_0	600	-0.010%	60	0.62%	integration lower-bound
D_o	2.81.mm	$-12456\%/m$	500.um	6.23%	tube outer diameter
D_i	1.11.mm	$+18785\%/m$	200.um	3.76%	tube inner diameter
D_g	166.um	$-686\%/m$	750.um	0.51%	tube air gap
L_{wire}	38.0.mm	$+2858\%/m$	500.um	1.43%	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	$+3561\%/m$	100.um	0.36%	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
				7.91%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	250.r/min	$+0.181\%/(r/min)$	0.85.r/min	0.15%	fan rotation rate
				7.92%	RSS combined uncertainty



$\theta = 82.6^\circ$; $\psi = 90.0^\circ$; $V = 1.467$ m/s (500 r/min)

Estimated measurement uncertainties at $Re = 1088$.

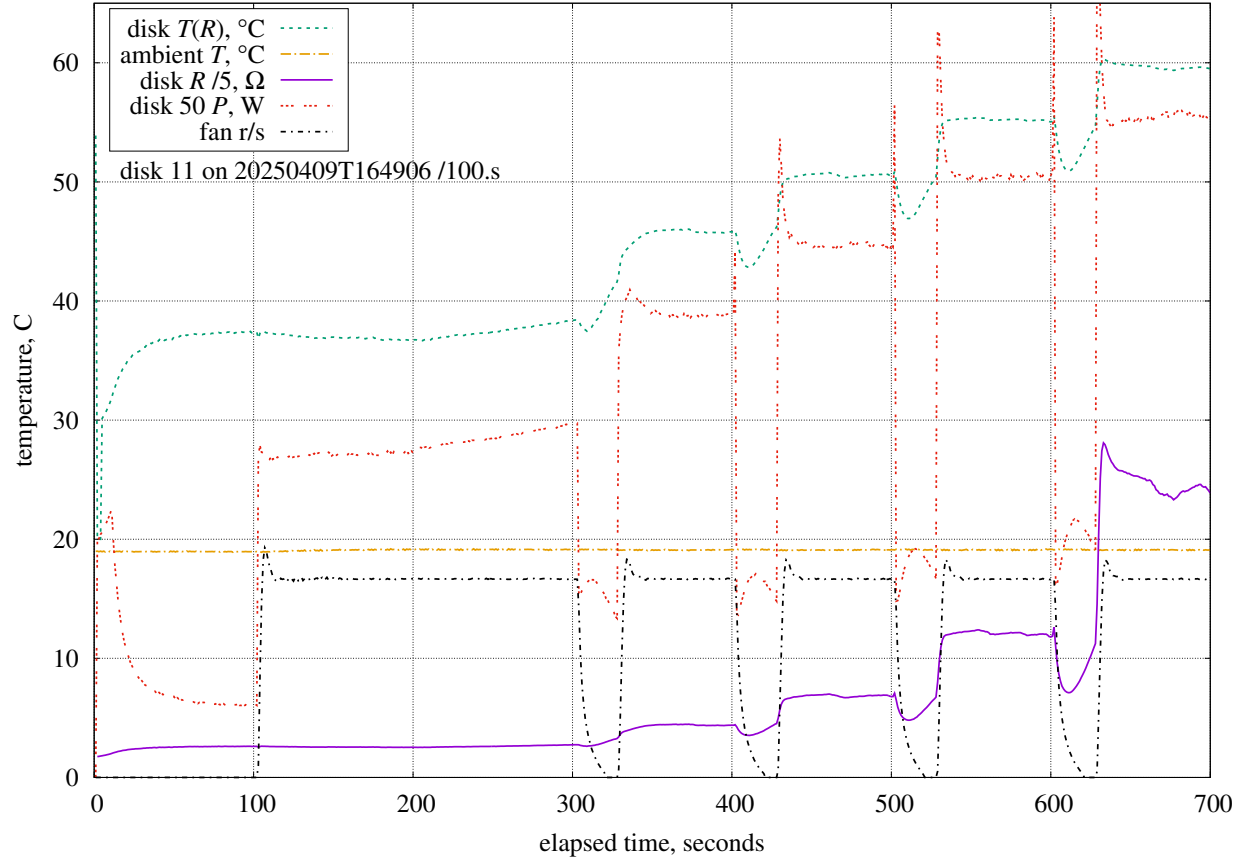
Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	305.K	−0.469%/K	0.50.K	0.23%	LM35C temperature sensor
ΔT	25.0.K	+3.56%/K	0.10.K	0.36%	LM35C differential
P	101.kPa	+0.0004%/Pa	1.5.kPa	0.65%	MPXH6115A6U air pressure
η	0.340	+127%	0.007	0.86%	anemometer calibration
Re_0	600	−0.011%	60	0.68%	integration lower-bound
D_o	2.81.mm	−15497%/m	500.um	7.75%	tube outer diameter
D_i	1.11.mm	+21741%/m	200.um	4.35%	tube inner diameter
D_g	166.um	−820%/m	750.um	0.61%	tube air gap
L_{wire}	38.0.mm	+3416%/m	500.um	1.71%	wire length
k_{ABS}	179. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	+0.229%/ $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	9.0. $\frac{\text{mW}}{\text{K}\cdot\text{m}}$	2.05%	ABS thermal conductivity
d	12.0.mm	+4328%/m	100.um	0.43%	disk diameter
ϵ_{ABS}	0.920	−44.7%	0.010	0.45%	ABS emissivity
ϵ_{wt}	0.900	−45.4%	0.025	1.14%	wind-tunnel emissivity
				9.48%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	500.r/min	+0.086%/(r/min)	1.9.r/min	0.17%	fan rotation rate
				9.49%	RSS combined uncertainty



$\theta = 82.6^\circ$; $\psi = 90.0^\circ$; $V = 2.130$ m/s (750 r/min)

Estimated measurement uncertainties at $Re = 1581$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	305.K	$-0.482\%/K$	0.50.K	0.24%	LM35C temperature sensor
ΔT	25.0.K	$+3.43\%/K$	0.10.K	0.34%	LM35C differential
P	101.kPa	$+0.0004\%/Pa$	1.5.kPa	0.64%	MPXH6115A6U air pressure
η	0.340	$+117\%$	0.007	0.79%	anemometer calibration
Re_0	600	-0.011%	60	0.68%	integration lower-bound
D_o	2.81.mm	$-17416\%/m$	500.um	8.71%	tube outer diameter
D_i	1.11.mm	$+23102\%/m$	200.um	4.62%	tube inner diameter
D_g	166.um	$-903\%/m$	750.um	0.68%	tube air gap
L_{wire}	38.0.mm	$+3761\%/m$	500.um	1.88%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.231\%/\frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	2.06%	ABS thermal conductivity
d	12.0.mm	$+4741\%/m$	100.um	0.47%	disk diameter
ϵ_{ABS}	0.920	-46.1%	0.010	0.46%	ABS emissivity
ϵ_{wt}	0.900	-46.9%	0.025	1.17%	wind-tunnel emissivity
				10.44%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	750.r/min	$+0.053\%/(r/min)$	0.86.r/min	0.05%	fan rotation rate
				10.44%	RSS combined uncertainty



$\theta = 82.6^\circ$; $\psi = 90.0^\circ$; $V = 2.726$ m/s (1000 r/min)

Estimated measurement uncertainties at $Re = 2023$.

Symbol	Nominal	Sensitivity	Bias	Uncertainty	Component
T	305.K	$-0.492\%/K$	0.50.K	0.25%	LM35C temperature sensor
ΔT	25.0.K	$+3.34\%/K$	0.10.K	0.33%	LM35C differential
P	101.kPa	$+0.0004\%/Pa$	1.5.kPa	0.63%	MPXH6115A6U air pressure
η	0.340	$+106\%$	0.007	0.72%	anemometer calibration
Re_0	600	-0.011%	60	0.67%	integration lower-bound
D_o	2.81.mm	$-18709\%/m$	500.um	9.35%	tube outer diameter
D_i	1.11.mm	$+23850\%/m$	200.um	4.77%	tube inner diameter
D_g	166.um	$-959\%/m$	750.um	0.72%	tube air gap
L_{wire}	38.0.mm	$+3997\%/m$	500.um	2.00%	wire length
k_{ABS}	179. $\frac{mW}{K \cdot m}$	$+0.231\%/\frac{mW}{K \cdot m}$	9.0. $\frac{mW}{K \cdot m}$	2.06%	ABS thermal conductivity
d	12.0.mm	$+5010\%/m$	100.um	0.50%	disk diameter
ϵ_{ABS}	0.920	-47.3%	0.010	0.47%	ABS emissivity
ϵ_{wt}	0.900	-48.2%	0.025	1.20%	wind-tunnel emissivity
				11.07%	combined bias uncertainty
Symbol	Nominal	Sensitivity	Variability	Uncertainty	Component
ω	1.00.kr/min	$+0.036\%/(r/min)$	1.3.r/min	0.05%	fan rotation rate
				11.07%	RSS combined uncertainty