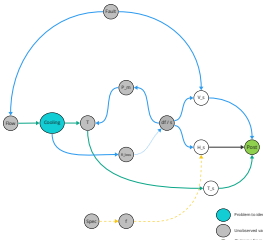
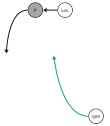
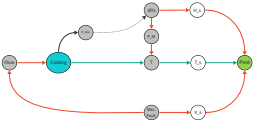




dF = Differenz zw. magnetischer und elektrischer Frequenz
r_loss = inner losses (temperatuer depended)
fault = Fehlerfall am Schaufelrad / Fanplates
F_m = Mech. Power (or electrical due to high efficiency)

Variable	Meaning	Observed (Run-Time)	Annotated (Training)
Flow	Airflow (m3/s)	no	yes
H_s	Magnetic Field measured	yes	yes
Loc	Location of oscillation (height)	yes	yes
F	Air Pressure outside	no	no
Post	Classification (Flow OK / NOK)	no	yes
rpm	Rotations per minute	yes	yes
s	Slip	no	no
Spec	Motor Specification	yes	yes
T	Temperature	no	no
T_s	Temperature measured	yes	yes
Mo	Torque	no	no
U1, U2, U3	Sensor-noises	no	no
V_s	Vibrations measured	yes	yes
vib	Vibrations	no	no
Φ	Magnetic Flux	no	no

- Motor Condition



Minimal sufficient adjustment sets for estimating the total effect of Cooling on Post:
1. Flow
2. H_s, Rec.Fault
3. Rec.Fault
4. Rec.Fault, rpm
5. V_s, rpm

The model implies the following conditional independencies:
1. Cooling ⊥ Post | H_s, T_s, V_s
2. Cooling ⊥ Rec.Fault | H_s, rpm
3. Cooling ⊥ H_s | rpm
4. T_s ⊥ H_s | rpm
5. T_s ⊥ Rec.Fault | Cooling
6. T_s ⊥ rpm | Cooling
7. Post ⊥ rpm | Cooling
8. Post ⊥ rpm | Cooling, H_s, V_s
9. Post ⊥ rpm | H_s, T_s, V_s
10. H_s ⊥ V_s
11. rpm ⊥ V_s

Testable independence criteria:
1. Typ ⊥ Post | I_s
2. Arc ⊥ Post | I_s
3. Post ⊥ Load | I_s

Minimal sufficient adjustment sets for estimating the total effect of Arc on Post:
1. Load, HF_noise

- Arc Detection

Variable	Meaning	Observed (Run-Time)	Annotated (Training)
Arc	Arc Occurance	no	yes
I_sens	Sensed current	yes	yes
Load	Load Profile (incl. fixed or flexible connect. loads)	no	yes
Post	Classification (Arc occurred / not occurred)	no	yes
Pro	Property of fault (Serial or Parallel arc) => we only care about serial arcs right now.	no	yes
Typ	Type of installation (material, classifaction fix or flexible)	yes (constant)	yes
U1	Sensor Noise (statistical)	no	yes
U2	Unmodelled aspect of load	no	no

Switch between two models:
- With and without HF noise from inverter