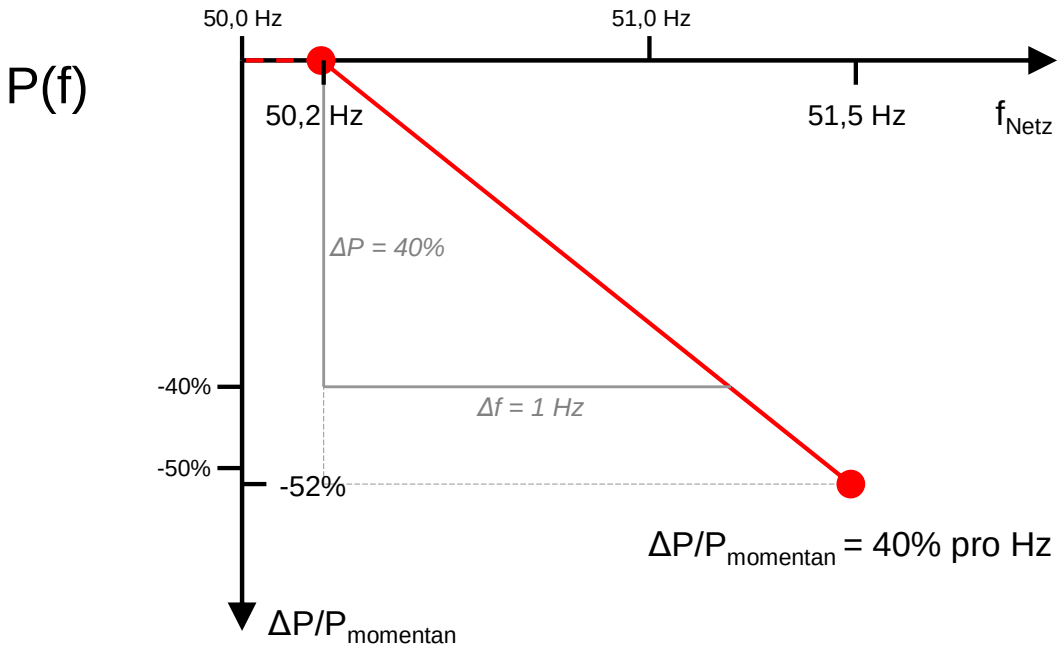
INVERTER CONTROL MODES

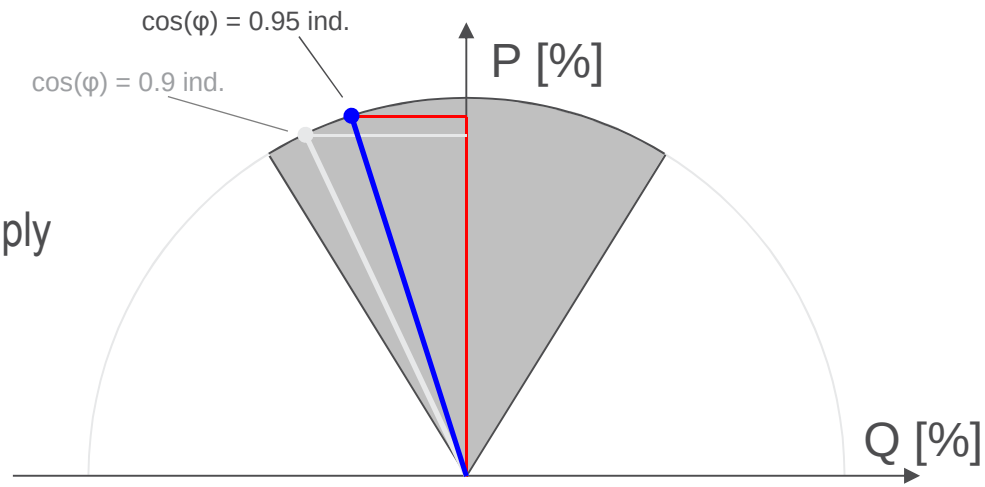
SET CURVE P(f)

- Static setting (permanently stored by the inverter)
- Gradient $\Delta P/P_{momentan}$ in % per Hz
- End of P(f) mode: Return gradient in % of nominal power per minute can be set (like softstart)



DIMENSIONING

- With reactive power maximum active power is lower than at cos(φ) = 1
- $P_{MAX} = S_{Nom} * \cos(\varphi)$
- Customer should order a bigger inverter if he needs reactive power supply
- $S_{Nom} = P_{MAX} / \cos(\varphi)$
- Implemented in Solar.configurator



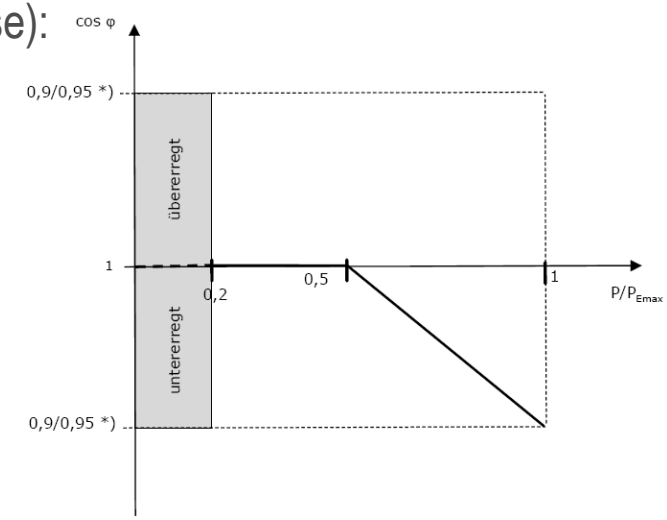
DISADVANTAGES OF Q

- Higher losses in the grid
- Higher inverter costs ($/W)
- Optimal Q(U) control is still topic of research.
- ➔ Use reactive power control only if necessary.

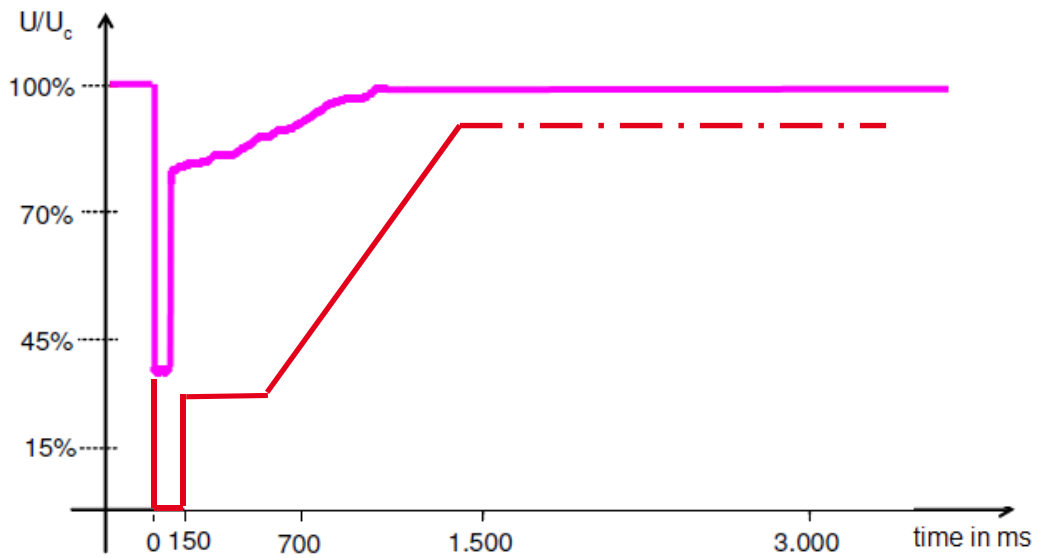
EXAMPLE OF A REACTIVE POWER REQUIREMENT

German Low Voltage Guideline

- Installation ≤ 3.68 kW (16A):
  - No requirement
- 3,68 kVA < Installation ≤ 13.8 kVA (4.6 kVA / phase):
  - cos φ = 0.95 (cos φ (P) or fixed cos φ)
  - Standard function (configurable)
- Installation > 13,8 kVA:
  - cos φ = 0.9 (cos φ (P) or fixed cos φ)
  - Standard function (configurable)



LOW VOLTAGE RIDE THROUGH

- / Faults in the upper voltage levels can cause a voltage drop in a big area
- / Inverters shall not turn off in that case …
- / …to avoid large losses in generation and further problems

- / e.g. FRT is implemented in German Medium Voltage Guideline