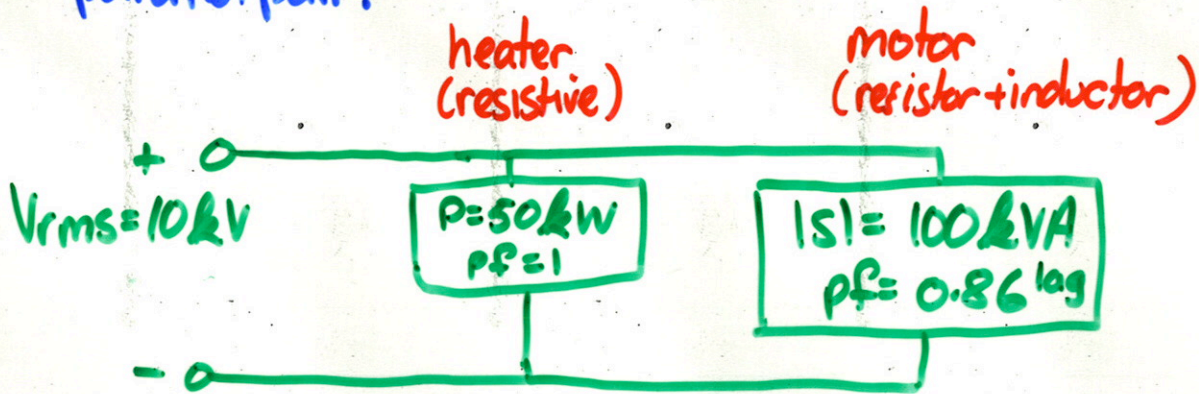


## Example.

Determine the equivalent power load of the following parallel pair.



For the heater  $\underline{S}_1 = P_{av,1} = 50 \text{ kW}$

For the motor  $\angle S_2 = \cos^{-1}(pf_2) = \cos^{-1}(0.86)$   
 $= 30.7^\circ$  (because of lag)

Hence  $S_2 = 100 e^{j30.7^\circ} \text{ kVA}$

Obtain total power by converting to rectangular form.

$$\underline{S} = \underline{S}_1 + \underline{S}_2 = 50 + 100 \cos(30.7^\circ) + j 100 \sin(30.7^\circ)$$

$$= 136 + j 51 \text{ kVA}$$

$$\Rightarrow \underline{S} = 142.5 e^{j20.6}$$