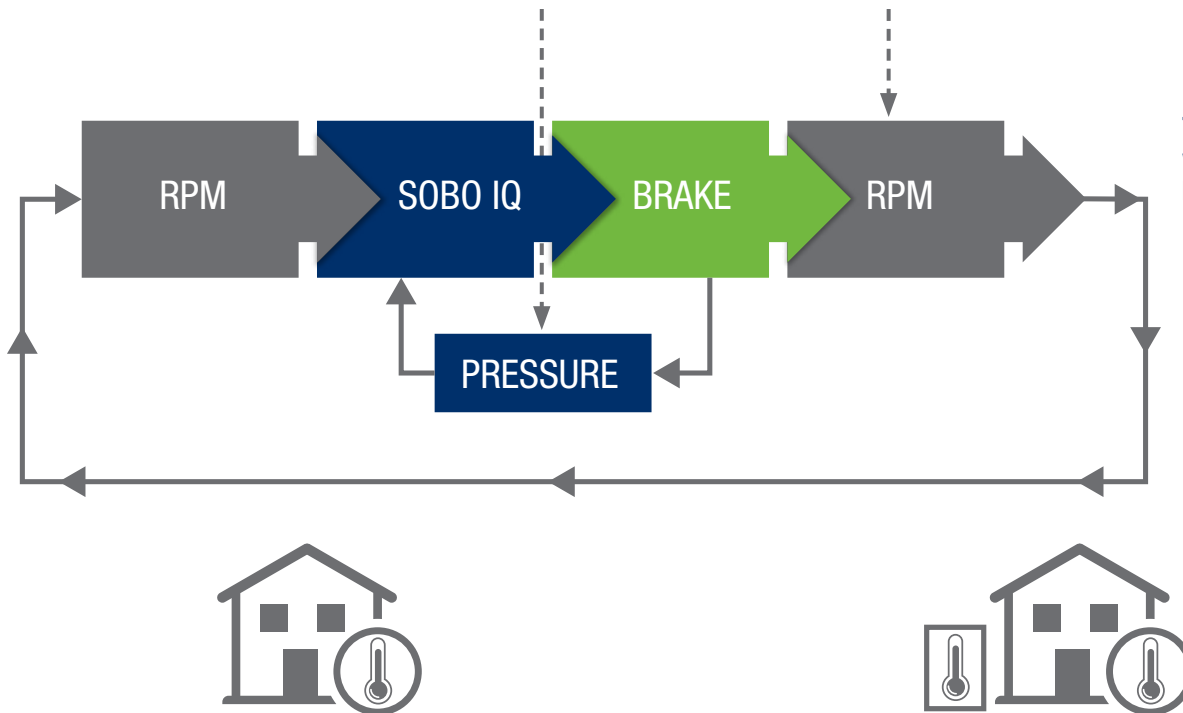


SOBO[®] iQ: Action Before Reaction



Technical ability of values changes in a brake system

- SOBO iQ checks the braking status every 5ms
- Pressure typically changes in the order of tenths of a second
- RPM (speed) change is matter of seconds
- iQ predicts RPM change and changes pressure in advance

SITUATION 1: Thermometer is placed indoors with a constant power boiler (SOBO[®] PLC).

- Requested room temperature = 20°C
- Outside temperature = 10°C
- The boiler uses 10 kW constant power to compensate for heat losses in the house and increases the indoor temperature to at least 20°C
- As soon as the internal temperature reaches 20°C, the room thermostat will switch the boiler OFF
- Because of energy losses in the house, room temperature will go down, room thermostat will detect it and will switch the boiler ON again
- The process repeats
- Outside temperature then drops to 5°C
- Because of energy losses in the house, room temperature will go down, room thermostat will detect it and will switch the boiler ON again
- The boiler will be ON longer, because of higher thermal losses, but will switch off when the room temperature will reach 20°C again
- Signal to boiler is sent by room thermostat only
- The temperature in the house is controlled by the boiler ON time to boiler OFF time ratio in a given timeframe.

SITUATION 2: Two thermometers and variable power boiler. Thermometers are placed both, outside and inside the house (SOBO[®] iQ).

- Requested room temperature = 20°C
- Outside temperature = 10°C
- Boiler uses 10 kW to compensate for heat losses in the house and maintains the indoor temperature at 20°C, but has an option for variable heating power
- The boiler power level can change during time and decrease to a level that fully compensates for all losses and keeps constant inside temperature
- Outside temperature then drops to 5°C
- Thermometer placed outside the house will sense such a drop and will "tell" the boiler to increase the power to 12 kW to prevent the temperature drop in the room. The power of the boiler is increased via its own internal control loop.
- Room thermometer will still "guard" the correct room temperature
- The boiler power depends on inside-outside temperature difference and is controlled via the internal control loop
- Stability of room temperature is a result of well adjusted dual loop regulation. Correct "portion" of energy is preventing unwanted changes.
- Boiler learns and adjusts the right power to prevent the room temperature from dropping based on outside-inside temperature difference
- The adjustment of boiler power is much faster than temperature change in the house
- The system uses two control loops – house temperature (slow) and boiler power (fast) to achieve ideal and constant temperature in the house