Integration with Building Management Systems (BMS)

Most BMS systems control the various heating / cooling zones etc. by well tested and established methods, such as “weather compensation”, controlling 3 port mixing valves (Variable Temperature circuits). The building dynamics can also be taken into account by specifically controlling “optimization” of comfort levels in the various zones.

In some cases the BMS may sequence the boilers according to load requirements, this is normally done via a common system flow or return temperature sensor determining a set point and P.I action to ”cascade” the boilers as and when required.

GEM’s M2G system is fully compatible and complementary to all types of BMS/BEMS systems. The M2G is interlocked by fail safe (opto-isolated) relays, that are connected in series to the burner/boiler control or stat circuit, the BMS is also connected into this circuit via volt free contacts.

To further complement the operation of BMS with M2G, it is possible to interface the inputs/outputs of the unit, to volt free relays and in this way it would be possible for the BMS system to directly monitor the M2G operations if required.

Building Management System vs. M2G - expelling the myth

In a standard BMS the boilers are normally connected to the heating system via common flow and return headers; in this case the BMS will have temperature sensors installed to measure the combined common flow or return from all of the boilers.

Once M2G is installed the BMS still remains in control of all boiler functionality. The boiler-enable periods, set point temperature, weather compensation and duty rotation or sequencing of the boilers will still remain under BMS control.

M2G has two digital temperature sensors to measure and calculate the direct temperature profile of each boiler during the boiler rest periods, thereby establishing if the boiler thermostat is making a nuisance “call for heat” due to standing losses, inherent thermostat hysteresis or dilution losses.

The M2G now controls the cycle rate of the boiler within strict limits and has the ability to match the normal pre-M2G cycle rate during heavy load conditions. M2G will eliminate any attempt for the boilers to run as a result of standing losses (convection and radiation losses at rest) or short circuiting (temperature dilution/hydraulic losses from the lag boiler) both of which engage significant additional inefficiencies due to boiler oversize and the pre-purge element of boiler plant. M2G will also eliminate any boiler response to very low load conditions which appear on the boiler and which are below the minimum output of the boiler/burner configuration.

Modern boilers (condensing & modulating units) do not escape this phenomenon.. Most of these have low water content and steel alloy heat exchangers leading to significant temperature losses during rest cycles which can cause rapid cycling under low load conditions. In addition the absence of thermal jackets on these heat exchangers tends to heighten radiant heat loss when the boiler cycles off and this can create a localized predictable low load condition. In some cases the boiler manufacturers add a time delay in circuit to inhibit this nuisance activity however it is usually for a short period of time (1 - 2 min) and unfortunately it seems devoid of any temperature logic.

All normal Standard Operating Procedures (either BMS or Boiler related) remain completely unchanged post M2G instal. If a subsequent change is invoked by the user or maintenance personnel then there is no requirement to make any additional change to the M2G control. M2G will simply reference the new set point and rebuild its control logic around this new centre. In this way M2G is completely suited to BMS strategies which utilize direct compensation of boiler plant or floating/variable set point strategies.

Building Management System offer control of boiler operation from a blended system temperature and do not control the individual boilers based on individual boiler temperature logic.

Typically the BMS does not:

· Measure direct boiler flow/return temperature on each boiler.

· Measure the control temperature differential of each boiler.

· Measure and reference thermostat status for “call for heat” and set point “satisfied”.

· Directly control the firing stages for high/ low burners.

· The BMS can control the boilers and burners in the following ways, some of which are potentially troublesome to the boiler plant:

· The control circuit / stat of the boiler may be interrupted via the BMS relays; this will turn off the boiler/burner, irrespective of the burner firing position or direct boiler set point.

· Modulating burners can be turned off at high fire.

· It is not untypical for the BMS to isolate the mains electrical supply to the boiler to turn the boiler off. This can be completed devoid of any information with regard to the combustion safeguard control functions.

In summary, it is inaccurate to claim that a BMS is an alternative to the control features and benefits of M2G.

M2G is specifically designed to directly optimise and control boiler load and eliminate boiler response to nuisance cycling and is designed to complement BMS and boiler controls.

In addition to the considerable short term gain of reducing fuel consumption (expected savings are >10%), M2G also helps to increase boiler life-cycle through reduced firing which will inhibit the premature aging of boiler and burner controls which in turn will minifies call outs and maintenance costs.

M2G is approved for London's Green500 scheme.

M2G savings have been verified by the EU Environmental Technology Verification scheme.