

G.A.S. (Gas Allocation Systems)



Energy Metering & Monitoring Systems, Inc.

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FORCED HOT AIR FURNACE

Model: GAST-FHA-24V

Use: Timing of forced hot air furnace gas valve to allocate space heating. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry to verify correct device operation. For use on pilot light, or electronic ignition furnaces or unit heaters with 24 vac gas valves. Time data measured in 0.01 hour increments.

Note: Available as **GAST-FHA-24V-HEX** for use with Hexagram transmitter

Note: Available as **GAST-FHA-WC** with time data measured in 1 minute increments (direct replacement for Western Controls timing device)

Model: GAST-FHA-MV

Use: Timing of forced hot air furnace millivolt gas valve to allocate space heating. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry to verify correct device operation. For use on millivolt pilot light style furnaces or unit heaters with thermocouple or power pile millivolt generators. Time data measured in 0.01 hour increments.

Note: Available as **GAST-FHA-MV-HEX** for use with Hexagram transmitter

HYDRONIC BASE BOARD

Model: GASTT-BBR-AIR (GAS_{TTA})

Use: Measurement of time, temperature and air temperature on baseboard radiation heating systems to allocate space heating. Designed for use on 24V zone valve systems. Connection to the 24V wiring is not required. Insulated thermistor sensor measures radiation temperature when zone valve provides hot water flow. On board sensor takes room temperature data to provide a more accurate relative BTU output. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry and monitors. This eliminates under billing errors if the manual on/off lever on the zone valve is used to call for “free” heat and provides a simplified installation method. Time/temperature data provides relative BTUH heating measure in time-temperature units over 90^o – 200^oF temperature range.

Note: Available as GASTT-BBR-AIR-HEX for use with Hexagram transmitter

Model: GASTT-BBR-24V

Use: Measurement of time and temperature of baseboard radiation heating systems to allocate space heating. Designed for use on 24 vac zone valve systems. Insulated thermistor sensor measures radiation temperature when zone valve provides hot water flow. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry and monitors zone valve operation to verify correct device operation and zone valve malfunctions. Time/temperature data provides relative BTUH heating measure in time-temperature units over 90^o – 200^oF temperature range.

Note: Available as GASTT-BBR-24V-HEX for use with Hexagram transmitter

Model: GASTT-BBR-PN (GAS_{TTP})

Use: Measurement of time and temperature of baseboard radiation heating systems to allocate space heating. Designed for non-electric (and pneumatic) zone valve systems. Two insulated thermistor sensors installed to measure average radiation temperatures provide an accurate relative BTUH measure under all hot water flow conditions. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry to verify correct device operation. Time/temperature data provides relative BTUH heating measure in time-temperature units over 90° – 200°F temperature range.

Note: Available as **GASTT-BBR-PN-HEX** for use with Hexagram transmitter

Model: GASTT-BBR-24V(-)

Use: Measurement of time and temperature of baseboard radiation heating systems to allocate space heating. Designed for reverse acting 24 vac zone valve systems (i.e. 24 vac across zone valve closes valve). Insulated thermistor sensor measures radiation temperature when zone valve provides hot water flow. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry and monitors zone valve operation to verify correct device operation and zone valve malfunctions. Time/temperature data provides relative BTUH heating measure in time-temperature units over 90° – 200°F temperature range.

Note: Available as **GASTT-BBR-24V(-)-HEX** for use with Hexagram transmitter

Model: GASTT-FC-1SP

Use: Measurement of fan coil time and temperature to allocate space heating or heating and cooling. Intended for 2-pipe boiler/chiller systems with single speed blower motors but with constant or variable water flow to fan coil. Provides reliable measured data even for poorly maintained systems where trapped air restricts water flow to fan coils. Time/temperature data provides relative BTUH heating and cooling measured in time-temperature units over the range of $\pm 100^{\circ}\text{F}$ differential air temperature. Thermistor temperature sensors measure return air and supply air temperatures to determine relative BTUH fan coil output. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry and monitors zone valve operation to verify correct device operation and zone valve malfunctions.

Note 1: See "Fan Coil Calibration Note page 9."

Note 2: Available as **GASTT-FC-1SP(+)** which measures either heating or cooling **only** in a 2-pipe or 4-pipe system

Note 3: Available as **GASTT-FC-1SP-HEX** or **GASTT-FC-1SP(+)-HEX** for use with Hexagram transmitters.

Note 4: 120 vac blower motor may require a 120 vac to 24 vac step down transformer for boiler/chiller systems without zone valves.

Model: GASTT-FC

Use: Measurement of fan coil time and temperature to allocate space heating or heating and cooling. Intended for 2-pipe boiler/chiller systems with constant water flow to fan coils and single speed blower motors. Not recommended for poorly maintained systems where trapped air restricts water flow to fan coils. Time/temperature data provides relative BTUH heating and cooling measured in time-temperature units over the range of $38^{\circ} - 58^{\circ}\text{F}$ for cooling and $90^{\circ} - 200^{\circ}\text{F}$ for heating. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry and monitors zone valve operation to verify correct device operation and zone valve malfunctions.

Note 1: See "Fan Coil Calibration Note page 9."

Note 2: Available as **GASTT-FC-HEX** for use with Hexagram transmitters

Model: GAST-FC

Use: Measurement of fan coil blower motor operating time to allocate space heating or heating and cooling. Intended only for 2-pipe boiler/chiller systems with constant water temperature and constant fan coil water flow with single speed blower motors. (i.e. no boiler set-back controls) Only recommended when other Gas_{TT} devices cannot be installed due to limited hot/chilled water pipe access. Time/temperature data provides relative BTUH heating and cooling measured in TTU over 38^o – 58^oF and 90^o – 200^oF temperature range. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry to verify correct device operation. Designed for use with 24 vac zone valve system or 120 vac blower motor.

Note 1: See “Fan Coil Calibration Note page 9.”

Note 2: Available as **GAST-FC-HEX** for use with Hexagram transmitters.

Note 3: 120 vac blower motor may require a 120 vac to 24 vac step down transformer for boiler/chiller systems without zone valves.

HYDRONIC BOILER and BOILER/CHILLER WITH FAN COIL (2 or 3 Speed Blower Motor)

Model: GASTT-FC-2SP for 2 Speed Blower Motor

Model: GASTT-FC-2SP for 3 Speed Blower Motor

Use: Measurement of fan coil time and temperature to allocate space heating or heating and cooling. Intended for 2-pipe boiler/chiller systems with 2 or 3 speed blower motors but with constant or variable water flow to fan coil. Provides reliable measured data even for poorly maintained systems where trapped air restricts water flow to fan coils. Time/temperature data provides relative BTUH heating and cooling measured in time-temperature units over the range of $\pm 100^{\circ}\text{F}$ differential air temperature. Thermistor temperature sensors measure return air and supply air temperature to determine relative BTUH fan coil output. A separate blower speed module interfaces to 120 vac 2 or 3 speed control to determine blower speed. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry and monitors zone valve operation to verify correct device operation, zone valve malfunctions and correct operation of the blower speed interface module.

Note 1: See "Fan Coil Calibration Note page 9."

Note 2: Available as **GASTT-FC-2SP-HEX** or **GASTT-FC-3SP-HEX** for use with Hexagram transmitters.

Note 3: 120 vac blower motor may require a 120 vac to 24 vac step down transformer for boiler/chiller systems without zone valves.

FAN COIL CALIBRATION NOTE

Fan coil heating or cooling output is dependent upon source water temperature, water and air flow rate and (to a lesser degree) room air temperature. Two identical fan coils may differ by $\pm 20\%$ to $\pm 30\%$ in output BTUH when water flow rates differ by a factor of 2.

Calibration of fan coils when measured by Gas_{TT} type allocation devices is essential to minimize error. The Gas_{TT} type devices:

Type Gas_{TT} – FC – 1SP
Gas_{TT} – FC – 2SP
Gas_{TT} – FC – 3SP

Operate with the following formula:

$$\text{BTUH} = 1.07 \times \text{CFM}_{\text{AIR}} \times \Delta T_{\text{AIR}}^{\circ\text{F}}$$

Where CFM is the air flow in cubic feet/minute and ΔT_{AIR} is the air temperature rise (or fall) thru the fan coil.

The Gas_{TT} devices do not measure air flow directly – this must be measured (preferably with a hood-velometer) or an air flow meter on high speed and used in the above equation to determine BTUH output.

For Gas_{TT} type devices : Type Gas_{TT} – FC

This device also does not measure air flow directly. Again, a hood-velometer is recommended to accurately measure air flow in CFM. This type device does not measure $\Delta T_{\text{AIR}}^{\circ\text{F}}$ but rather the source water temperature. Fan coil BTUH is then determined by measuring source water temperature and time. Manufacturer's data sheets are then used to scale calculated BTUH to 200^oF (maximum upper limit of Gas_{TT}).

For Gas_T type devices : Type Gas_T – FC

This device also does not measure air flow directly – again, a hood-velometer is recommended to accurately measure air flow in CFM. Fan coil BTUH is determined by measuring source water temperature and time. Manufacturer's data sheets are then used to scale calculated BTUH to 200^oF (reference temperature). Since water flow rate and source water temperature must remain constant for this device type, only relative BTUH measurements should be used for allocation of system heating or cooling energy.

DOMESTIC HOT WATER HEATERS

Model: GAST-DHW-24V

Use: Measurement of hot water heater gas valve to determine hot water energy use. Times 24 vac gas valve and provides data in 0.01 hour increments. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry to verify correct device operation. For use with 24 vac gas valve type DHW heaters only.

Note 1: Available as GAST-DHW-24V-WC with time measured in 1 minute increments (direct replacement for western controls timing device)

Note 2: Available as GAST-DHW-24V-HEX for use with Hexagram transmitters.

Model: GAST-DHW-T

Use: Times the “on” condition of the DHW heater by sensing the flue gas temperature rise and fall associated with the main boiler firing using attached UL listed Thermistor to determine hot water energy use. Provides data in 0.01 hour increments. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. Incorporates disconnect/tamper circuitry to verify correct device operations. For use with non-24v or millivolt type DHW heaters.

Gas_T – IN DHW PS –OBSOLETE

GAS FIREPLACES (SWITCH CONTROL ONLY)

Model: GAST-FP

Use: Timing of fireplace operation to allocate heat output. Designed to incorporate Inovonics FA5201EXT or EN1501EXT transmitter for remote reading. For use on switch controlled gas fireplaces with millivolt or 24 vac gas valves. Time data measured in 0.01 hour increments.

Note 1: Available as **GAST-FP-RR** for recessed mounting in retrofit applications

Note 2: Available as **GAST-FP-NC** for recessed mounting in new construction applications

Note 3: Available as **GAST-FP-HEX** for use with Hexagram transmitters.