

WHAT IS VRF/GHP?

YANMAR's Gas Heat Pump operates utilizing the Variable Refrigerant Flow (VRF) technology that has been in service globally since the 1980's.

GHP's, also referred to as "VRF's", are highly advanced mechanical units, concurrently producing thermal energy that provide heating and cooling. The natural gas heat pumps provided an electrical load reduction of **approximately 30% and an 80% carbon emission reduction** as compared to electric heat pumps powered by the grid.

VRF, technology provides the ability for multiple indoor units and/or zones. These systems only run as often as needed and can be used as a heat pump or heat recovery system.

The benefit of a heat recovery system is that it allows for simultaneous heating and cooling by absorbing excess heat energy in one zone and transferring it to heat another. This helps provide comfort while operating at maximum efficiency. VRF is flexible and can be integrated with CHP and other renewables for additional benefits and savings. VRF/GHP can work with retro fitting older buildings or new construction.



APPLICATIONS

Offices • Hotels • Pharmaceutical • Recreational Facilities
Hospitals • Industrial & Manufacturing • Nursing Homes
Indoor Agriculture • Real Estate Developers • Colleges
Schools • Housing Authorities • Municipals Buildings

BENEFITS

VRF Systems are 20%-25% more efficient than conventional systems. VRF systems have additional upfront costs, but are offset by lower energy bills, repair costs over time, and increased comfort for occupants.

Individual Zone Control: This customizable solution allows you to control different comfort needs independently. This leads to a reduction in complaints that offices are either too hot or too cold, since offices can have individualized controls. Unoccupied rooms' climate controls can be switched off, lowering your energy bill by not having to pay to heat and cool, unoccupied spaces.

Quiet: In a VRF system, the noisier condensing unit is typically outside, and the indoor air handlers are smaller and quieter than a traditional systems.

Consistent Comfort: The VRF HVAC system can detect the precise requirements of each zone, and send the precise amount of refrigerant needed to do the job. As a result, each area of your space is consistently comfortable with well-controlled humidity and no hot or cold spots.

Space: VRF systems take up much less space than forced-air systems, which is a benefit for upgrades in existing structures.

Long-term Operation: Yanmar offers lowered system lifecycle costs. Yanmar maintenance intervals are 10,000-hours. Average is 2.5-5 years between scheduled maintenance. Yearly maintenance is a minimal requirement of visual inspections, filter changes inside, cleaning of the condensing unit coils with water only (no chemicals).

Remote monitoring is utilized to protect our customer's asset. YANMAR offers a monitoring service at no extra charge to the customer in order to protect the asset for the customer. All that is need to accomplish this is a connection to the internet provided by the customer. This is a 24-7 monitoring service that sends e-mail notifications in the event of an error. Generally, this allows YANMAR to respond to any issues quickly and accurately to reduce down time.

MIDDLETOWN REC CENTER

The customer had strong emission reduction goals. They wanted to save energy and save money. Furthermore, the customer needed a refuge for local inhabitants during severe weather occurrences. Due to budget constraints, a defunct school building needed to be repurposed rather than new construction. The existing system was in poor shape, oversized for the new application, at the end of useful life and had a massive carbon footprint. Our solution was innovative. The system now has the capability to operate in conjunction with the grid or operate in Island mode in the event of an outage.

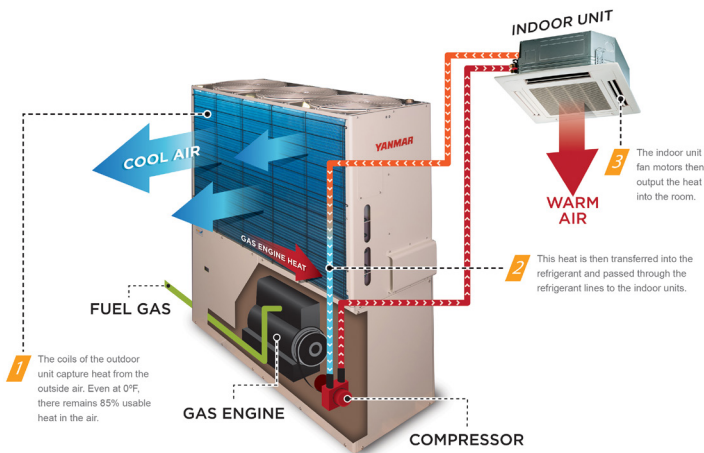
Additionally, the excess heat produced by the system can be used to heat the pool. Use of GHP's provided a load reduction of 30% and reduced emissions by 80%.

PROVIDES: Electricity, Heat, Hot Water and Cooling.

SIZE: Backup Generation 100KW, CHP 35KW, Battery 25KW, solar 108KW, (7) 14-ton GHPs, and 20 kW Battery.

COMPONENTS: Yanmar GHPs, YAMAR CHP, AHU, Solar, Controls, Boilers, Pumps, Heat Wheel, RTU, Duct Sox, Unit Heaters, and VFDs.

AREA SERVED: Full Middletown Rec Center.



**REDUCE YOUR
CARBON FOOTPRINT
UP TO 50%***

**when compared to emissions at the source, number can be higher or lower dependent on the cleanliness of the grid.*