

DAIKIN DELIVERS FLEXIBILITY AND COMFORT TO A LIGHTHOUSE HOME ON THE MARYLAND SHORE

The Challenge

Homeowners wanted a new house with all the charm of a 142-year-old historic lighthouse but with none of the worries about high energy bills.

Daikin's Solution

Daikin's VRV-S system, which provided both heating and cooling, fit so well into his unique home design and saved dramatically on energy too.

APPLICATION:

RESIDENTIAL
New
Construction

LOCATION:

**Princess Anne,
Maryland**

The original Hooper Strait Lighthouse on Maryland's Eastern Shore – which was first erected in 1867 in the Chesapeake Bay and later washed out to sea – seems to have mysteriously reappeared in the very area it once occupied. Today, however, the lighthouse is a dream of energy efficiency thanks in large part to an advanced heating and cooling (heat pump) system giving the homeowner individual room

temperature control and the architect the freedom to design an amazing replica of the lighthouse.

A lighthouse that is really a home? That was the idea of homeowner Steve Townsend,

who first visited the current Hooper Strait Lighthouse several years ago. The lighthouse, initially built in Tangier Sound in the bay, now sits in the town of St. Michaels. Townsend was thrilled to discover the plans for the lighthouse were available and soon brought them to John M. Hilliard, a Maryland architect, to draw up blueprints for a home with more modern conveniences. Understanding the importance of retaining the integrity of the historic design eventually led Townsend and his design and construction team to choose a Daikin Variable Refrigerant Volume[®] system that has a built-in intelligence enabling the homeowner to maintain



Daikin's flexible heating and air conditioning system gave the architect the freedom to design this amazing replica of the original Hooper Strait Lighthouse.

Daikin's wall-mounted FXAQ units installed upstairs provided a solution for a space with no space for ductwork.



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John Maguire
All Seasons HVAC

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Since the home is built on pilings, the Daikin VRV[®]-S heat pump was installed on a specially designed structure below the home.

precise zoning control over every square inch of his new home. Serving as general contractor on the job, Townsend brought in John Maguire of All Seasons HVAC in Eden, MD, to recommend the right system for the unusual home. “There were a number of features of the Daikin system that made it perfect for Steve’s home,” said Maguire. “First, although it was a two-story home, Steve and his wife Sandy were going to primarily live on the first floor, so they wanted a system that could be easily zoned for their lifestyle. Second, living in an area with a lot of heat and moisture, they needed a system that excelled at removing humidity from the living space. Third, they required a system that required minimal duct-

work, which gave them much more flexibility in the design.”

NO WASTE OF ENERGY

Maguire recommended the Daikin VRV-S heat pump, with one 48,000 Btu/h outdoor unit that connects to five wall-mounted FXAQ fan coil units and three slim-ducted concealed FXDQ duct units. Maguire explained that the VRV-S system is the Daikin model with a small capacity and would be more than adequate for the home. “The genius of an inverter system is that the home will only use the energy it needs at any one time. Since the Townsends are zoning the house, they may never use more than 24,000 Btu/h at a time,” he said. “The way the

system operates, it will only deliver enough refrigerant to feed whichever units are calling for it. So they will not be paying for the energy in unused rooms.” Using a Daikin inverter system is a guarantee to provide adequate heating and cooling to the home; the Daikin compressor will act as a true variable speed drive to the system making it run continuously at the minimum speed that matches the capacity of the current load. By doing so, the compressor is typically operating at part load, which is ideal for high efficiency operation. Furthermore, by running the compressor continuously, the room experiences better dehumidification which is

perfect due to the location of the lighthouse.

The five wall-mounted units, measuring 31" x 11" x 9", serve the living room, first-floor bedroom, two second-floor bedrooms, and the kitchen. The concealed ducted units serve the second-floor bathroom, the first-floor bathroom, and foyer. All 8 indoor units connected to one outdoor unit are individually controlled by a simplified wired controller.

Each indoor unit incorporates an electronic expansion valve that continually controls the flow rate of refrigerant. In this way, the VRV system maintains a nearly constant room temperature without the typical fluctuations that occur with a conventional ON/OFF system. The refined PID control delivers very effective temperature control & minimizes temperature swings. And with spray foam insulation incorporated into its energy-efficient design and high-quality, double-paned windows facing out over the water, it looks like the cost of energy will be very low for the family.

John Maguire and Steve Townsend decided to take advantage of the fact of the shore home is built

on pilings by installing the condenser on a specially designed structure below the home. They created a small deck for the slim 310 lb., 35" x 53" x 12" (WxHxD) outdoor unit, secured it with col-



umns, placing it approximately three feet off of the ground. "Although we site on a flood plain here, the water level has never approached three feet in modern times," noted Townsend. To address the coastal application, the Daikin VRV-S was a simple choice as the outdoor unit coil includes anti corrosion coating and all the metal parts are enamel coated. These features give the outdoor unit longer life in salt/corrosion risk applications. The overall design of the system was completed by Maguire and Daikin AC sales engineer Michael Panopoulos. Equipment was supplied by Andrew Mohr of Thos. Somerville Co., the local Daikin distributor.

Standing in front of the home of the Townsend family are (from left) John Webster of Parks & Webster, Inc., John Maguire of All Seasons HVAC, Sandy Townsend, Steve Townsend, and Michael Panopoulos of Daikin AC.

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*John Maguire
All Seasons HVAC*

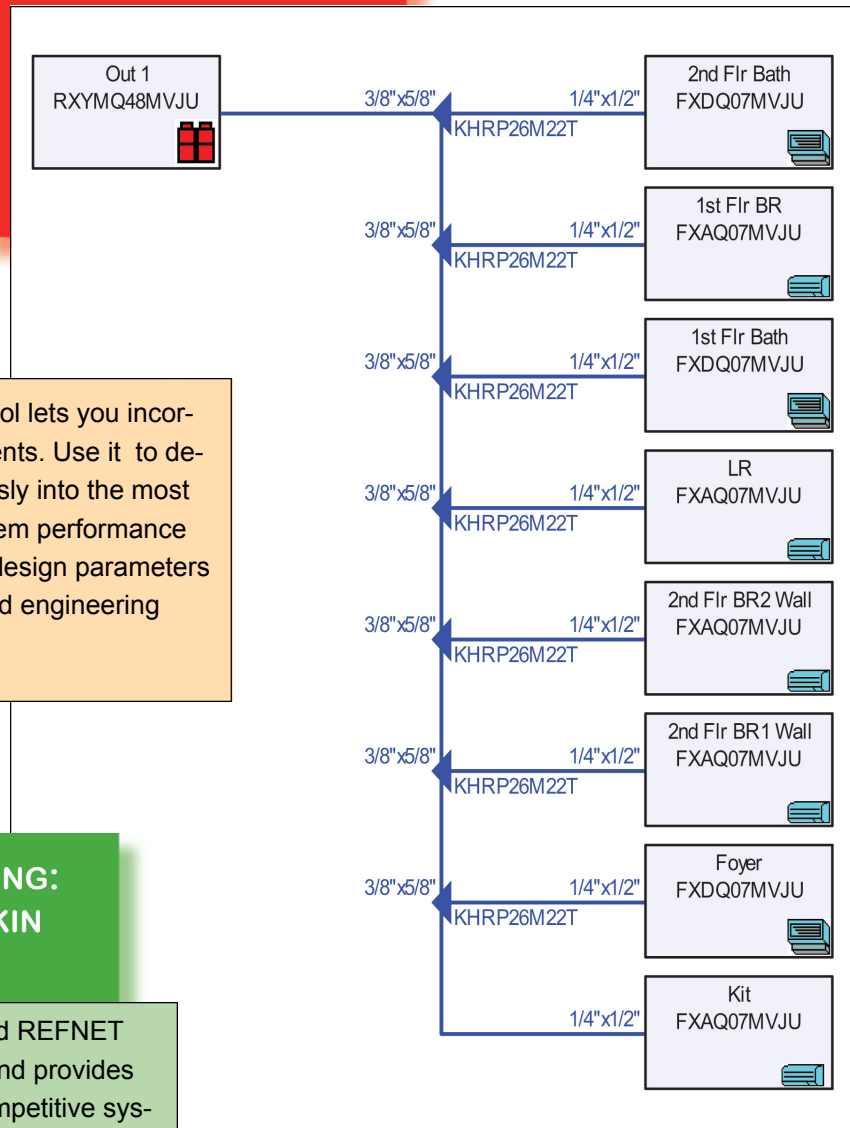
**TOWNSEND
LIGHTHOUSE HOME**
PRINCESS ANNE, MARYLAND
PIPING DIAGRAM

**DAIKIN AC
VRV EXPRESS**

Daikin's proprietary software tool lets you incorporate specific client requirements. Use it to design a system that fits seamlessly into the most awkward space, calculate system performance and ensure that all necessary design parameters are included in specification and engineering drawings.

**REFNET™ PIPING:
ANOTHER DAIKIN
FIRST**

Invented by Daikin, the advanced REFNET piping system is easy to install and provides greater design flexibility than competitive systems. Compared to regular T-joints and headers, the unique REFNET design increases system reliability and optimizes refrigerant



Daikin's REFNET piping system helped ease the HVAC installation in the Townsend's uniquely designed home.

A New Home with a History

The six-sided Townsend lighthouse home sits on Tangier Sound, which is the site where the



first Hooper Strait Lighthouse was built and stood for less than a decade.

Harsh winter weather and the pressure of mounting ice against the pilings caused the lighthouse to be separated from its base and drift out into the bay. Rebuilt a few years later, the lighthouse operated until it was decommissioned in 1966. The Chesapeake Bay Maritime Museum saved the structure from being demolished and relocated it to its on-air museum site.

Today, lighthouse lovers from around the world give it a top rating in its category. "Since we plan to retire in our new lighthouse home, you could say we give it a top rating, too," said Townsend.

Additional Information

Location

Property of
Steve and Sandy Townsend
Princess Anne, Maryland

Product Profile Daikin Equipment

1 RXYMQ48MVJU VRV-S R410A	7 KHRP26N22T REFNET branch piping kits
5 FXAQ07MVJU Wall-mounted units	8 BRC2A71 Simplified wired controllers
3 FXDQ07MVJU Concealed ceiling slim ducts	

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About Daikin AC

Daikin AC offers North America intelligent heating and cooling solutions with superior energy performance and sophisticated design. These advanced systems fall under the VRV®, VRV-S®, SkyAir, and Quaternity product names.

The company, based in Carrollton, Texas, is a subsidiary of Daikin Holdings (USA), Inc., which is owned by the Japanese-based Daikin Industries, Ltd. For more information, call 866-4DAIKIN or visit www.daikinac.com.

