Radome Environmental Control Unit

Keep Your Equipment Cool

Self-contained
HSA16KCZ/1-417A shown

Safe navigation relies on your ship's radar and communications equipment, and as with all electronics, overheating leads to equipment failure. The Radome Environmental Control Unit (ECU) is specifically designed to work within the dome enclosure, ensuring optimum temperatures for the critical equipment inside.

As you would expect from the world leader in marine air conditioning technology, this air-cooled unit is built for at-sea conditions. Although small and lightweight to provide ease of installation and maintenance, the Radome ECU is designed to exceed the cooling requirements of pleasure boat, commercial vessel, and military ship applications. Rugged construction with corrosion-resistant materials allows the unit to be operated in the most extreme conditions at sea.

The Radome ECU's highly efficient yet powerful rotary compressor provides quieter operation, increased reliability, and reduced amperage. Its raised-lance fin and the rifled tubing design of the evaporator and condenser coils provide maximum capacity. Three configurations are offered: interior dome self-contained, remoted ducted self-contained, and split-gas.

The Radome ECU is not limited to marine applications. It can also control the temperature and humidity levels of on-land locations such as electronics enclosures, telecommunications shelters, vaults, buildings, trailers, vans, and cleanrooms.

Key Benefits

- 3 configurations: Self-contained interior dome, self-contained remote ducted, and split-gas.
- Compact, lightweight, and easy to install.
- Durable, corrosion-resistant coating.
- Available in R-417A environmentally-safe refrigerant.
- R-22 units are retrofittable to R-417A to meet global environmental regulations.
- Solid state digital control provides reliable monitoring and control.
- Control circuitry monitors and protects the unit.
- High-efficiency rotary compressors provide reduced amperage, quieter operation, lower weight, and increased reliability.
- Raised lance fin and rifled tubing for maximum capacity.
- Each unit is pre-charged and leak checked.
- Charge Guard® protection provides sealed access ports, ensuring environmental protection and system integrity.
- Meet or exceed applicable ABYC and U.S. Coast Guard regulations, CE directives, and general Air Conditioning and Refrigeration Industry (ARI) standards.

ISO 9001:2000

L–2132 Rev. 20090717

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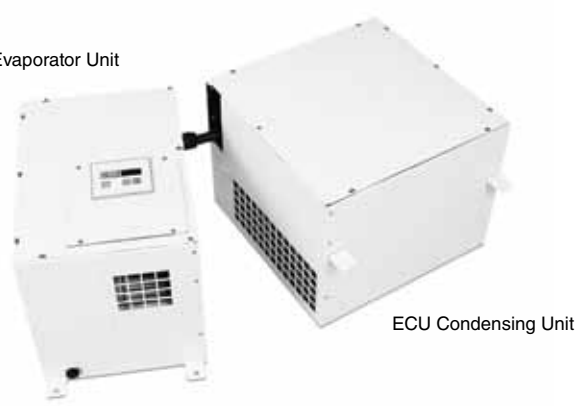
Technical Specifications for Radome Environmental Control Units

Model	Radome ECU Unit		
Capacity (BTU/hr)	16,000		
Voltage/Hz/Ph	115/50-60/1	230/60/1[1]	220/50/1
Locked Rotor Amps (Comp)	67.0	29.0	32.0
K.V.A. (Kilo-Volt-Amps)	1.3	1.3	1.3
Max. Circuit Breaker (Amps)	40.0	20.0	20.0
Min. Circuit Ampacity	25.0	14.0	12.0
Refrigerant R-22 or R-417A (oz/g)	26/737		
Net Weight (lbs/kg)	95.0/43.1		
Gross Weight (lbs/kg)	130.0/59.0		

ECU Evaporator Unit



ECU Condensing Unit

Radome ECU split-gas system shown above

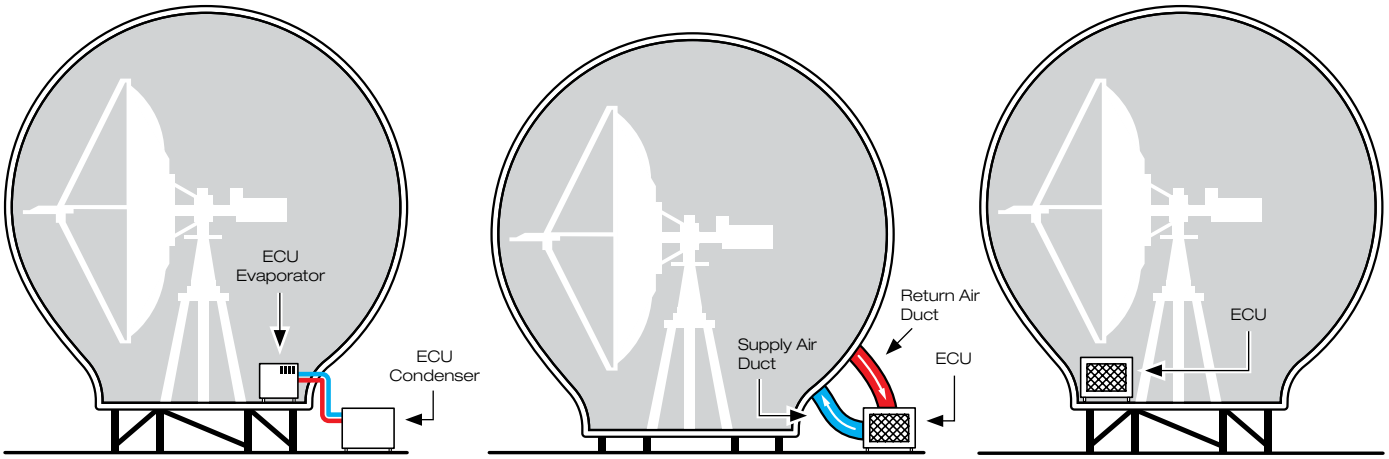
Dimensions

Self-Contained (LxWxH)[2]	Split (LxWxH)[3]	
	Condenser	Air Handler
30.0" X 18.0" X 14.5" 762mm X 457mm X 368mm	17.5" X 18.0" X 14.5" 445mm X 457mm X 368mm	12.7" X 18.0" X 14.5" 323mm X 457mm X 368mm

Notes:

[1] Can also be operated at 200-220V/50Hz.
[2] Allow 1.5" (38mm) for mounting brackets.
[3] Rotary compressors only.

The Radome ECU is available in three configurations:



Split-gas configuration

Remote ducted self-contained
(ideal for low pedestal applications)

Interior dome self-contained
(Exhaust kit is available for low pedestal applications to correct condenser air short cycling)

Dealer:

Environmentally Responsible

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MARITIME REPORTER AND ENGINEERING NEWS

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Military Might

Global Choke Points are Flash Point; the Case for a stronger U.S. Navy

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840-Ship Fleet, $24B in Revenue

Fuels of the Future

Chosing your fleet's future fuel wisely

WAJDI ABDMESSIH

The imposition of a global 0.5% sulfur cap may be less than four years away. This clearly will eliminate residual fuel from the available fuel options unless you have fitted your vessel with a scrubber or other exhaust gas treatment technology in order to comply with MARPOL Annex VI emission regulations.

At the start of 2015, permitted sulfur levels in emission control areas (ECA) dropped from 1% m/m to 0.10% m/m. Although this was a large reduction, the switch was relatively easy to make as suppliers were capable of creating new blends from residual and distillate fuels to meet the 0.10% limit and refineries also produced new ECA compliant hybrid fuels. Indeed, given the background of falling fuel prices, many vessels simply made a switch to low sulfur distillate fuel. All these options provided an alternative way for vessels to comply with the regulations without making large investments in scrubbers or in retrofitting to use liquefied natural gas.

Looking ahead to the maximum global sulfur limit of 0.50% m/m (outside ECA zones) by 2020 or 2025 (the date will be decided in 2018 following the results of an International Maritime Organization (IMO) study), there will be no residual fuel oil that can meet the MARPOL Annex VI regulation for SOx, PM and NOx without the use of scrubbers, and therefore alternative fuel options must be considered.

Biofuel

Biofuel has become part of the alternative fuel mix of the future due to its low carbon print, and the fact that it offers a considerable reduction in greenhouse gas (GHG) and sulfur (SOx) emissions, and has a higher cetane rating than some petro-diesels, which can also improve performance.

The draft version of ISO/DIS 8217 has introduced to the distillate fuel specification new grades called DF Grades (DFA, DFZ and DFB) which include biofuel in the form of fatty acid methyl ester (FAME) with up to 7.0 % volume. It has also increased the limit for the "de minimis" definition level to 0.50% v/v instead of the previous volume of 0.10% v/v.

This is a smart way of increasing the distillate fuel supply volume by up to 7% in the market without major investment.

While adding biofuel to the mix is a positive step for the marine fuel industry, it also introduces some new quality challenges. Biofuel is known for its increased lubricity, Cetane number, and the excellent reduction in emissions of various pollutants and global warming gasses, such as CO1, CO2, hydrocarbons and particulate matter.

However, it also has some less beneficial properties.

Biofuel is hydrophilic, which means it has a great ability to absorb water. Therefore water and excessive moisture must be eliminated when using biofuel and this can be very difficult to achieve in the marine environment.

Biofuel will absorb the water if present, and this can lead to wax dropping from the fuel as well as filter plugging.

Besides the hydrophilic characteristic of the FAME, there are other major parameters in relation to biofuel that could be problematic for a marine diesel engine.

To safeguard the end user, the ISO/DSI 8217 draft has stated that the FAME used in the biofuel blending must be in compliance with the requirement of EN 14214 or ASTM D6751. The major reason for this is to ensure that some of the properties of the FAME remains within the specification, as a high level of these properties if blended with distillate may cause major problems.

These parameters are tested under the ASTM D6751 but it is not required under the ISO/DSI 8217 distillate marine fuel table (1). The parameters are detailed below (with accompanying effects):

- **Free Glycerin, which has maximum of 0.02% m/m:** High levels of free glycerin can cause injector deposits, as well as clogged fueling systems, and result in a buildup of free glycerin in the bottom of storage and pipe systems.
- **Total Glycerin, with a maximum of 0.240 % m/m:** To determine the level of glycerin in the fuel and includes the free Glycerin and the Glycerin portion of any unreacted or partially reacted oil or fat. High levels of total Glycerin (mono-, di-, and triglycerides) can cause injector deposits and may adversely affect cold weather operation and filter plugging.
- **Sulfated Ash, 0.020 max % mass:** Ash-forming materials may be present in biodiesel in three forms:

(1) Abrasive solids, and (2) Unremoved catalysts, these two can contribute to injector, fuel pump, piston and ring wear, and also to engine deposits.

(3) Soluble metallic soaps, which have little effect on wear but may contribute to filter plugging and engine deposits.

To safeguard your investment it is recommended to test the DF grades for these parameters to ensure the safe handling of the fuel onboard the vessel.

As we can see, the fuel quality issue

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Certificate Of Analysis

Summary:

Specification met.

Specification compared to the ISO 8217:2010 RMG 380 grade, table 2

Micro Carbon Residue elevated.

1= Normal
2= Caution
3= Critical

2

Bunker Delivery Information:

Bunker Port:	Singapore	Sample Number:	A15344003
Bunker Date:	5-Dec-15	Seal No.:	131547
Product Grade:	ISO 8217:2010 RMG380	Retain Seal No.:	131548
Sampling Point:	Vessel Manifold	Sample sent on:	8-Dec-15
Sampling Method:	Continuous drip	Sample received on:	10-Dec-15
Sulfur, % m/m:	2.77	Report Date:	10-Dec-15
Density @ 15C, kg/m3:	984.3	AWB No.:	806740786898
Viscosity @ 50 C, mm2/s:	358.0	Courier:	FedEx
Quantity, MT	392.299	Information Source:	BDN

		SPECIFICATION		
PARAMETER	RESULT	RMG380	UNIT	METHOD
Density @ 15 degC	985.1	991.0	kg/m^3	ISO 12185
Viscosity @ 50 degC	379.2	380	mm^2/s	ISO 3104
Flash point	86.7	60	degC	ISO 2719
Pour point	3	30	degC	ISO 3016
Sulfur content	2.41	3.5	% m/m	ISO 8754
Micro Carbon Residue	14.99	18	% m/m	ISO 10370
Ash content	0.03	0.1	% m/m	ISO 6245
Total Sediment, potential	0.03	0.1	% m/m	ISO 10307-2
Water content	0.10	0.5	% v/v	ISO 3733
Vanadium (V)	81	350	mg/kg	IP 501
Sodium (Na)	23	100	mg/kg	IP 501
Aluminum (Al)	6	---	mg/kg	IP 501
Silicon (Si)	8	---	mg/kg	IP 501
Zinc (Zn)	0	15	mg/kg	IP 501
Phosphorous (P)	0	15	mg/kg	IP 501
Calcium (Ca)	6	30	mg/kg	IP 501
Acid Number	0.45	2.5	mg KOH/g	ASTM D664
Calculated values				
Aluminum + Silicon	14	60	mg/kg	Calculated
Net Specific Energy	40.458	---	MJ/kg	Calculated
CCAI	846	970		Calculated
Injection Temp to obtain 10 mm^2/s	146	---	degC	Calculated
Injection Temp to obtain 15 mm^2/s	128	---	degC	Calculated
Injection Temp to obtain 20 mm^2/s	118	---	degC	Calculated
Injection Temp to obtain 25 mm^2/s	110	---	degC	Calculated
Quantity Difference*	0.319		MT	Calculated
Other Parameters				
Iron (Fe)	20	---	mg/kg	IP 501
Nickel (Ni)	23	---	mg/kg	IP 501
Magnesium (Mg)	0	---	mg/kg	IP 501
Lead (Pb)	0	---	mg/kg	IP 501
Potassium (K)	0	---	mg/kg	IP 501

* Quantity difference based on quantity and density provided on BDN

Report Date: 10-Dec-2015 End of report No. A15344003 info@SeahawkServices.com

is becoming increasingly important as more 'problematic' fuels enter the supply chain. This is not the result of deliberate actions but because many new fuels types are coming onto the market without a new infrastructure in place to handle and segregate what in some cases can be incompatible products or biofuel free products.

While the distillate fuel sector is experiencing many changes – and many more are to come - residual fuel is still the major element of the market, and is dependent on new developments in scrubber technology in order to survive as a key marine fuel in the next few years.

One of the most problematic parameters in residual fuel is catalytic (Cat) fines.

Cat Fines

Cat fine levels have increased in recent years across all residual fuel grades and have become the major contributors to engine damage. Other old problems still exist, but to a less extent, such as polymer contamination and poor ignition fuel. More than 60% of the high sulfur fuel has been found to contain cat fines higher than 30 mg/kg, and 12% contains more than 61 mg/kg, which exceeds the maximum specification limit for the ISO 8217:2010 RMG and RMK grades. Some 74% of the high sulfur fuels tested have cat fines level greater than 20 mg/kg. Some of the cat fines damage has been blamed on poor filtration, purification and fuel management on board the vessel. Therefore vessel managers must assess the efficiency of the fuel treatment plant in order to mitigate the risk of high cat fines by taking samples before and after purification or at the engine inlet in order to ensure that it is under the recommended level as well as taking note of cat fines particle count distribution.

You must know your vessel purifier efficiency rate as it can vary from 25% to 70%. Unless you check this, you may unintentionally introduce a high level of cat fines to the engine, thereby increasing the potential for engine wear.

Polymer contamination, although it is a relatively rare occurrence, can cause severe operational and mechanical problems. This can be avoided by testing for polymers as part of your fuel quality monitoring, which should consist of simple filtration and FTIR/microscopic analysis.

For safe operation and fuel optimization you need to know what is in your fuel, and the supplier fuel quality certificate may not actually represent what you have taken onboard the vessel.

In today's market you cannot afford not to test your fuel.

I would also say know your engine, be open to all types of fuels, and work with your engine manufacturer, your fuel supplier and your fuel testing provider to set the parameters that will work for your specific engine and operating conditions.

Use the ISO specifications as a guideline and add what is needed to safe guard your investment. You will be surprised how much you can save, and protect the environment, by doing so.

The Author

Wajdi Abdmessih, Founder & Owner of Seahawk Services, a new name (but a long history) in the fuel testing and inspection business.