



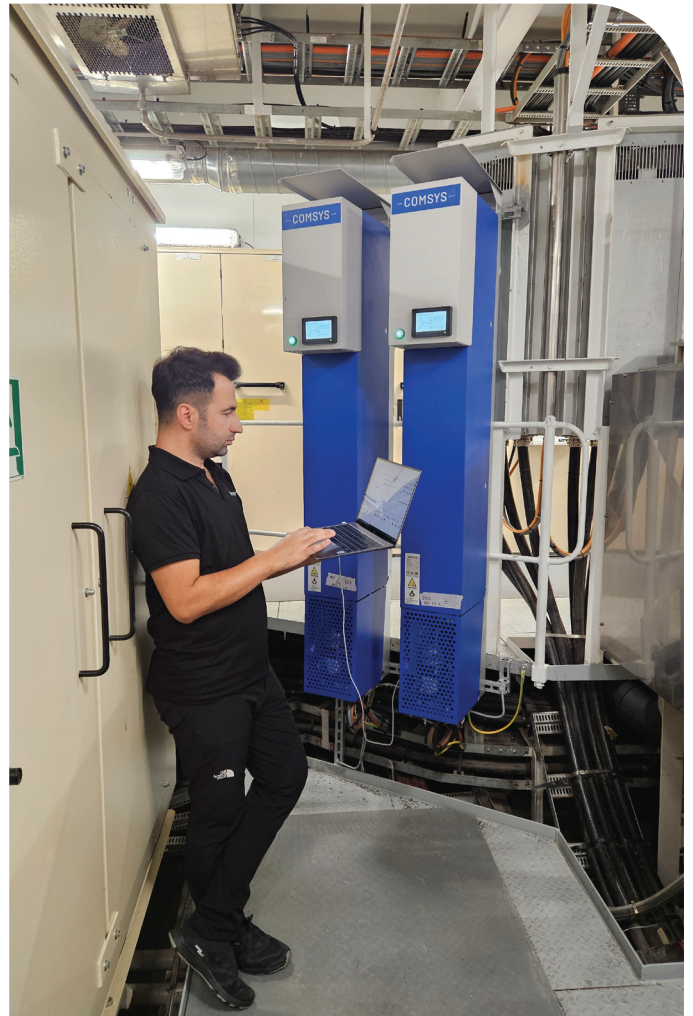
CASE STORY

Comsys ADF harmonic filters enable smooth sailing aboard luxury super yacht

- » **CUSTOMER:**
Wömner Power Quality Solutions
- » **LOCATION:**
Italy & Caribbean Islands
- » **INDUSTRY:**
Luxury Yachts
- » **INSTALLATION DATE:**
2023-24

BACKGROUND

The specially designed superyachts that make up The Ritz-Carlton Yacht Collection offer luxury voyages in the Mediterranean, the Caribbean and Central America. The first yacht built for the collection, the Evrima, measures 190 meters in length, has 149 suites with a private terrace, and accommodates nearly 300 guests. Comsys' partner in Turkey, Wömner Power Quality Solutions was contracted to provide power quality measurements and harmonic filtration according to the DNV standard.



CHALLENGE

Power quality measurements were performed in Italy in July 2023. The superyacht has 4 distribution transformers and was facing issues of voltage distortion around 9.5%. In addition, there was overheating of the Direct On Line (DOL) motors, a number of power supply malfunctions and some inverter trips.

SOLUTION

Harmonic filtering requirement was the main idea for eliminating failures and for obtaining DNV certification, which is a must for the maritime industry. The solution provided involved four P100 units sized and selected using the sizing tool. Since none of the transformers were equipped with current transformers, harmonic mitigation method was applied in advance as impedance control. The supply and commissioning of the ADF units was carried out in the Caribbean Islands in February of 2024.

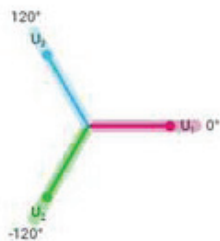
RESULTS

The solution has been up and running since February 2024. By applying the impedance controlled ADF units the DNV targets were achieved and the THDU levels dropped dramatically from 10% down to 4-4.5%.

The customer was impressed by Wömnner for its approach to the case and for providing a state-of-the-art solution. Not having to cut power to install the filters, as well as the sensorless control feature, also made the customer more comfortable.

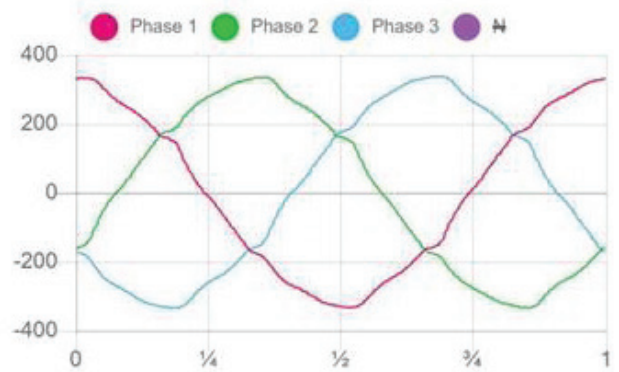
Measurement

	RMS	θ	THDU
U ₁	227.6 V	0°	4.2%
U ₂	227.9 V	-120°	4.4%
U ₃	229.7 V	120°	4.2%
	RMS	θ	THDI
I _{CT1}	-	-	-
I _{CT2}	-	-	-
I _{CT3}	-	-	-



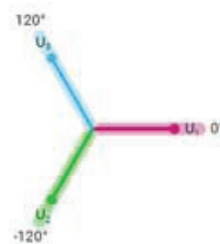
P	-	kW	PF	-	Freq	50 Hz	I _{OUT}	82 A
Q	-	kvar	cos ϕ	-	T _{amb}	23.5 °C	Util	68 %
S	-	kVA	Crest	1.47	T _{ppm}	65.4 °C	U _{DC}	771 V

AC voltage - U [V]

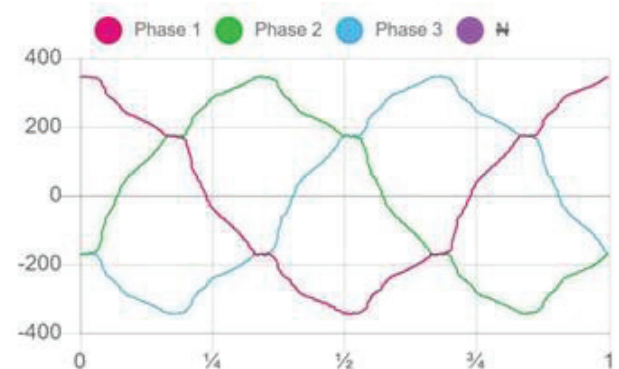


Measurements with ADF ON

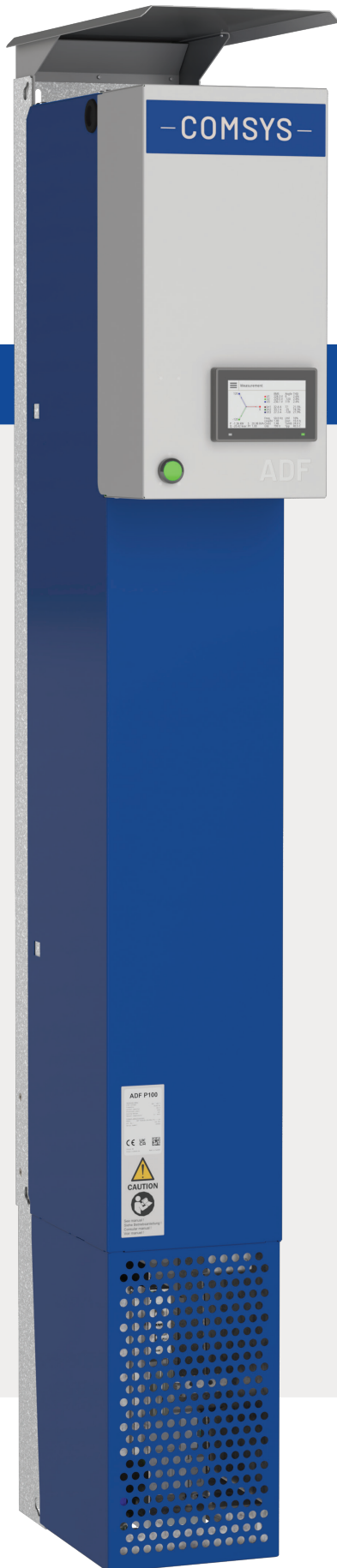
	RMS	θ	THDU
U ₁	229.2 V	0°	9.5%
U ₂	228.3 V	-120°	9.7%
U ₃	228.8 V	120°	9.6%
	RMS	θ	THDI
I _{CT1}	-	-	-
I _{CT2}	-	-	-
I _{CT3}	-	-	-



P	-	kW	PF	-	Freq	50 Hz	I _{OUT}	0 A
Q	-	kvar	cos ϕ	-	T _{amb}	25.5 °C	Util	0 %
S	-	kVA	Crest	1.52	T _{ppm}	71.7 °C	U _{DC}	771 V



Measurements with ADF OFF



PRODUCT USED IN THIS CASE

ADF P100

- » HARMONIC ELIMINATION
- » LOAD BALANCING
- » DYNAMIC VAR COMPENSATION
- » MODULAR & SCALABLE DESIGN
- » LOW RESPONSE TIME
- » 208-415V NOMINAL VOLTAGE
- » SEVERAL ADF P100S CAN BE COMBINED FOR HIGHER POWER