

## Historic UAE monument stays cool & saves money thanks to Inverter variable frequency drives

### Case Study



UAE

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**Inverter Drives Ltd**  
Offa's Dyke Business Park  
Welshpool  
SY21 8JF  
United Kingdom

**Tel:** +44 (0)1938 556868  
**Fax:** +44 (0)1938 556869  
**Email:** sales@inverterdrives.com

[www.inverterdrives.com](http://www.inverterdrives.com)



### Optidrive E2 Single Phase ensures comfortable visits to fort

An installation of Inverter Drives variable frequency drives (VFDs) has delivered significant energy and cost savings, as well as an ambient temperature all year round, at the Al Jahili Fort in the United Arab Emirates (UAE).

Al Jahili Fort is one of the country's most impressive, oldest landmarks and the largest mud brick fort in UAE. Built in 1891, it was a symbol of power and control as well as a royal summer residence, and is now a national monument.

GI Tech, Inverter's sales partner in the UAE, was asked to install a series of eight Optidrive E2 Single Phase AC drives to control chilled water pumps in the Fort's air conditioning system as part of an ambitious renovation project overseen by the Abu Dhabi Authority for Culture and Heritage.

**Ali Akhavan, Director at GI Tech,** says, "The Al Jahili fort is constructed of mud; installing a HVAC duct cooling system with this type of construction is a huge task, so it was decided that cooling coils would be the best option.

"Small water pumps which are operated by Optidrive E2 Single Phase Output drives under the control of the Building Management System (BMS), ensure chilled water is continuously pumped through coils installed throughout the fort to provide a comfortable environment for both workers and visitors."



With temperatures reaching as high as 50° in the UAE in summer, providing an effective air conditioning system is vital for visitor attractions and places of work such as Al Jahili.

A total of eight Optidrive variable frequency drives were installed along with a small PLC used to provide a cascading sequence control. A sensor is used to measure the temperature in the area where the system is installed, connected to the BMS system.

The BMS system then relays this temperature information to the drives as an analog signal. All drives operate in PI mode, adjusting the

pump speed automatically to maintain the required temperature setpoint according to the cooling requirements.

This system helps to maintain a comfortable ambient temperature throughout the entire fort and is far more cost effective solution than using fans.

Energy Saving Calculations for the Al Jahili installation show a predicted cost saving of AED 12385 a year compared to an equivalent system using fans and AHUs.

This figure means the Fort's operator can expect payback for the outlay of the VFDs within nine months.



Optidrive E2 single phase output is designed for use with PSC (permanent split capacitor) or shaded-pole single phase induction motors with IP 20, IP 55 and IP 66 enclosures.

It can be used to provide energy efficient, accurate speed control of single phase motors in a variety of applications, especially fans and pumps which typically do not require high starting torque. The control method used provides significant energy savings compared to alternative methods.

**Ali** concludes, "The Al Jahili Fort Project was completed well within the stipulated time frame with complete satisfaction of customer requirements."