



ENGINEERING CASE STUDY

Link Engineering



1. INTRODUCTION

Since its foundation IN 1935, Link Engineering Company – USA - has focused on the design and manufacture of state-of-the-art test systems for the automotive, aerospace, railway and general industries.

Link Engineering places a special emphasis on brake testing solutions, and is a global leader that delivers complete turnkey projects to many of the world's major automotive manufacturers and their suppliers.

In 2006 Heuch Pty Ltd was contracted by Link to supply an Environmental Control Unit (ECU) for the Link model 3900 Brake Noise Dynamometer to be delivered to a premier Australian Brake component manufacturer, PBR International.



Typical Link Engineering NVH Dynamometer

PBR International is a subsidiary of Pacifica Group Ltd and is Australia's leading supplier of brake system technologies. PBR specialises in the development of braking systems for OEMs in Australia, North America, Europe and Asia and the supply of replacement brake components and innovative brake service solutions to the global Aftermarket.

PBR have global manufacturing facilities in Australia, Thailand, Malaysia, North America and Europe; and products incorporating PBR technology are manufactured under licence in North America, Japan, Korea, China, Turkey and Brazil.

PBR's global business is built on technological innovation, intellectual property and manufacturing excellence.

2. PROCESS DESCRIPTION

The Link Engineering specification called for -30°C (minus 30) to +50°C temperature control with exceptional stability and repeatability regardless of the external environment conditions.

Humidity control with 10% to 90% was also required whenever the control temperature was above +5°C.

The ECU utilises a twin evaporator heat exchanger system to maintain a positive refrigeration potential at all times during operational testing without interruption from defrost when running a low temperature cycle.



Heuch ECU – Rear View



It is a characteristic of refrigeration compressors that in order to provide low temperature cooling a much larger compressor is required for the same cooling duty (kW) at a higher temperature and hence an effective refrigeration capacity control system is essential.

To meet the fairly broad requirement for this application, a constant torque, speed controller is fitted to the compressor motor starter controls. This allows for the compressor to be operated at 60 Hz during the low temperature phase when cooling capacity is at a premium and 18 Hz when cooling capacity is excess to requirements.

Other features included refrigerant condenser pressure controls and electronic regulation of all other refrigeration parameters on both the high and low side systems.

The ECU is controlled by a Heuch DDC system which provides all system functions as well as independent data logging of systems set-points and operational parameters. The DDC system manages the voltage and no-volt contact commands from the Link Engineering Master system and provides retransmission in return for the monitoring by the Link system.



Typical Link Engineering NVH Dynamometer

The project was a three-way collaboration between Link Engineering, PBR and Heuch with each company bringing its own particular expertise to the table to ensure the successful outcome.

A direct link between the ECU and the Heuch Service offices during commissioning to assist with control loop tuning and diagnostics during commissioning.

3. PLANT FEATURES

The RECU is mounted on a Hot Dipped, Galvanised Steel Channel Frame. The RECU is installed within an insulated panel enclosure with double access doors for the Heat Exchanger section. The control panel is mounted on the external surface. The access panels are provided for servicing and maintaining the humidification header and the electric reheat elements.

To minimise the effects of noise and heat rejection the ECU was installed with a remote, air-cooled condenser located on the external roof above the dynamometer.

The main components of the system were located on a mezzanine floor above the dynamometer chamber. The Interconnecting ductwork routing was designed by Heuch and then manufactured, insulated and vapour sealed by PBR to meet the exacting requirements their own engineering standards required.

The end product provides PBR with the most advanced NVH Brake Testing Facility in the southern hemisphere and is used to ensure quality and repeatability during manufacturing as well as leading edge research and development for Australian and export markets.



-30°C Compressor Operation during commissioning

4. Links

Link Engineering USA - <http://www.linkeng.com/>

PBR Brakes - <http://www.pbr.com.au/>

HEUCH PTY LTD A.B.N. 92 085 200 380
17 Friars Road, Moorabbin Victoria Australia 3189
email : cool@heuch.com.au www.heuch.com.au
Phone : 61-3-9555 7755 Fax : 61-3-9555 5451