

EX3 INSTALLATION IN SOUTH AFRICA

In March 2015, a state-of-the-art retail store opened its doors in Parys, with a state-of-the-art refrigeration solution from Emerson Climate Technologies to match.

Thanks to the wide range of products, Emerson Climate Technologies was selected to drive this plant; advanced digital controllers for cabinets/racks and supervising systems are made by Dixell.

In particular very important is the use of the new EX3 electronic expansion valve, developed in order to always provide to the market the best possible solution in terms of technology and energy efficiency. It combines the advantages of the high performances, due to a continuous regulation of the refrigerant flow in the evaporator, with the preservation of the system safety conditions.

Energy efficiency, system optimization and professional installing and service companies are the key factors to be considered as benchmarks in the market.

The following professionals were involved with the project:

Consultant	WSP Group
Contractor	Penguin Refrigeration Kroonstad
	Metraclark Bloemfontein
	Metraclark Engineering

Where
Parys

Johannesburg

South Africa

The Plant
Total required cooling capacity for the store: 260kW

Total of 55 cabinets and 12 cold and freezer rooms

Target
Energy saving thanks to the new EX3 electronic expansion valve

Complete and advanced Emerson solution

Monitoring and diagnostic

System Description

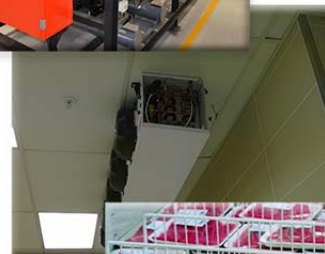
The medium temperature refrigeration system is composed of:

- 2 medium temperature racks. Each one supplies 19 users and every rack is composed of 3 Copeland Stream compressors managed by 1 unloader for each
- MT users:
 - 19 cabinets
 - 9 cold rooms



The low temperature refrigeration system is composed of:

- 12 different compressor lines that cool totally
 - 11 cabinets
 - 5 freezer rooms



Refrigeration Equipment

The selected equipment for the main refrigeration system is:

- Recam multi-compressor systems fitted with highly efficient Copeland Stream compressors, managed by Dixell controls
- Recam Simplex receiver units fitted with Copeland Discuss technology semi-hermetic compressors, managed by Dixell controls
- Recam air-cooled condensers managed by Dixell controls
- Recam blower coils for the cold room applications fitted with EX3 electronic valves and Dixell controls for precise superheat and temperature management
- Refrigerated cabinets fitted with EX2 and EX3 electronic expansion valves and Dixell controls for precise superheat and temperature management
- Recam electrical distribution boards
- XWEB Dixell monitoring system offering full information accessibility and alarm setup to the Copeland compressor CoreSense™ and Dixell control system

Equipment advantages

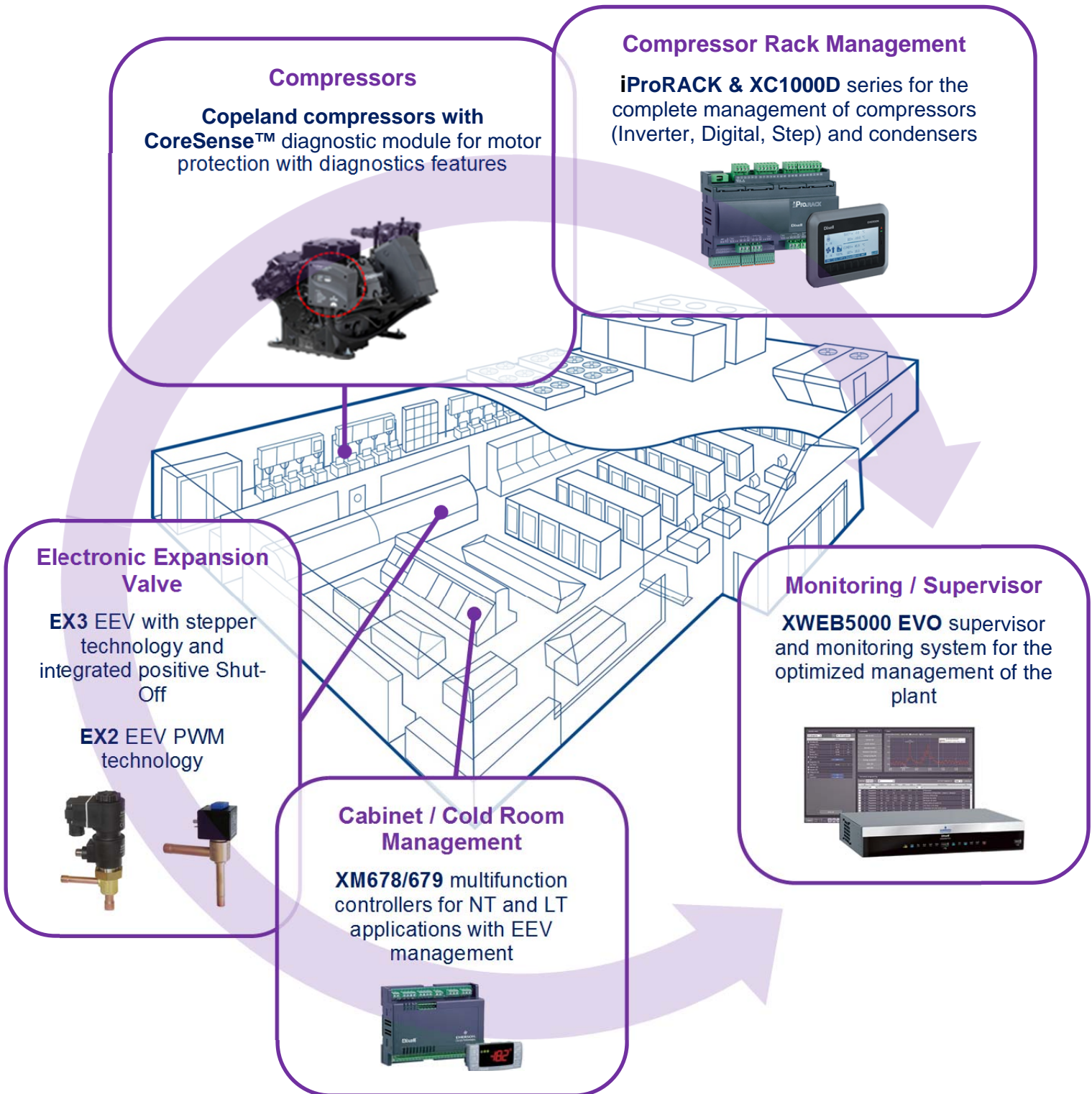
- The Copeland stream compressor was selected for its efficiency and high coefficient of performance compared to other models. It has a unique discuss valve technology, built-in CoreSense™ diagnostics and lower sound emissions. The CoreSense™ diagnostics offers advanced protection and diagnostic benefits for exceptional system reliability, reduced service costs and decreased equipment downtime.
- The EX3 electronic expansion valve in the cold rooms offers complete control over the gas-flow, in one positive shut-off valve. It can also shut off the refrigerant flow automatically in case of power interruption. The valve can also easily be modified due to the different exchangeable pins and orifices. This valve is ideal when combined with a Dixell XM678D multiplexed case controller.
- The Dixell XWEB5000 monitoring system offers the possibility of managing all the devices installed on site, making use of all the device variables to create a special connection and algorithm between them. The XWEB5000 is easy to program and one can create programs to save energy, manage particular cycles and drive some of the devices in a certain way. This monitoring system has complete connectivity and is capable of displaying all the alarms from the many different devices connected focused in a single computer, with all the graphical outputs required to monitor the performance of the store.

The retail outlet makes use of a complete Emerson solution, with value added by the fact that the compressor racks performance data can be accessed through the monitoring system.

System Control and Management

The refrigeration system is managed by Dixell controllers.

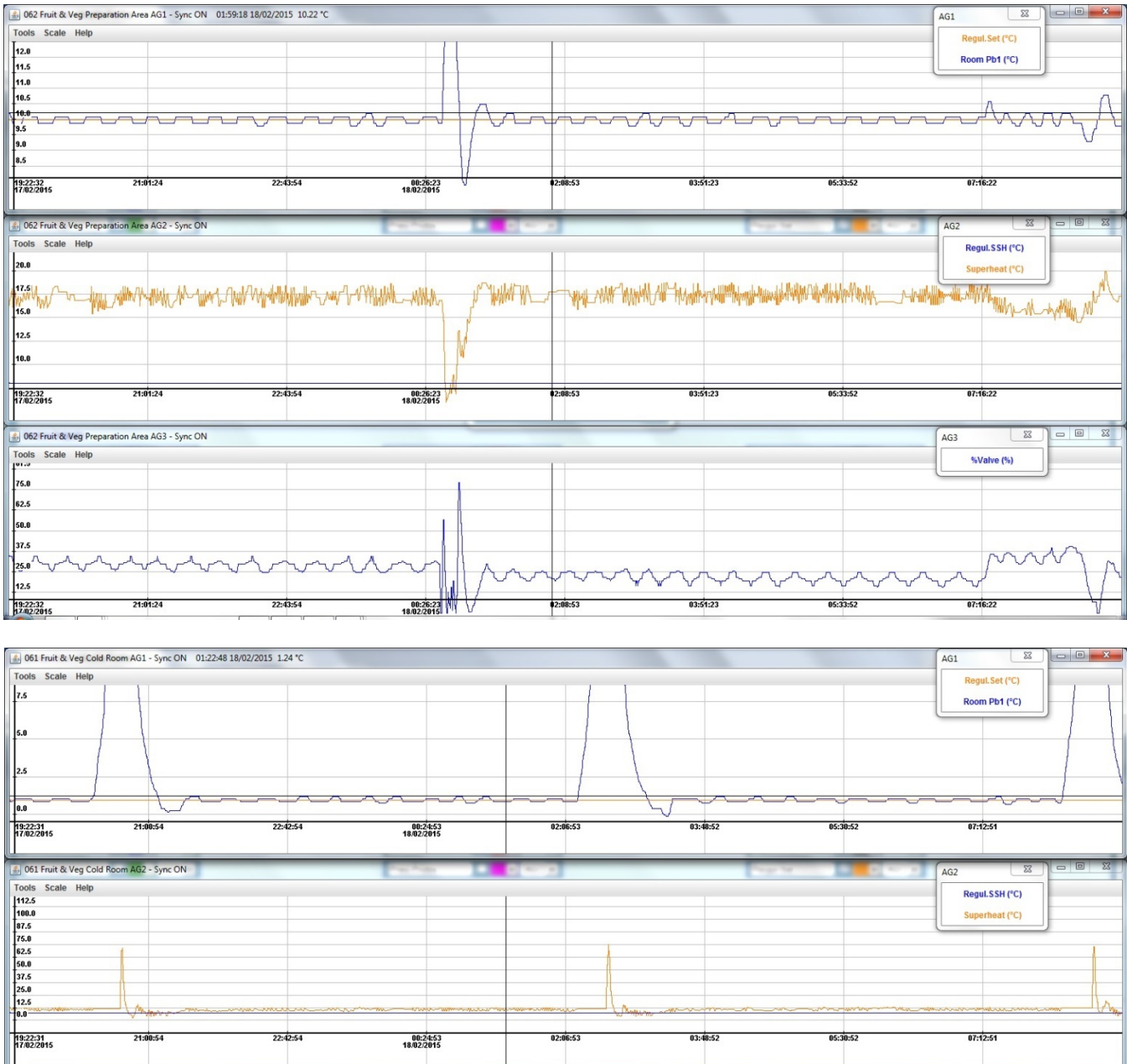
The optimum design, installation and commissioning of the system is fundamental to reach the best results in terms of optimization and efficiency.



Results/Conclusions

The good systems design, the selection of all the mechanical components together with the good commissioning have been essential to obtain the best performance from the algorithms that work on the Dixell Retail controllers.

In particular the good management of the Stream Copeland compressors and the algorithms that manage the EX3 valves have allowed reaching a great stability of the cabinet temperatures together with the optimization of various loads in the field and consequently the cooling capacity request from the plant.



The air temperature is at setpoint in a band of 0,5K ($\pm 0,25$) and the EX3 works continuously following the cooling request and maintaining always the best superheating for the evaporator.

Dixell™

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