

# ROOFTOP PACKAGED UNITS



## PREMIUM RANGE INVERTER

**NATURAL REFRIGERANT** Non Toxic Sustainable Cooling

## AIR CONDITIONER

Highly efficient and reliable DC inverter scroll compressors  
Multiple options for supply and return air duct connections  
EMS compatible, Modbus RTU as a standard, BACnet as an option  
Wide capacity range from 34.0 ~ 105.0kW  
EC - Plug Fans



**Designed for Australian conditions**  
**Tested up to 60°C**



## INVERTER ROOFTOP PACKAGE UNITS

Premium Range Inverter Air Conditioners using Non-Toxic M60 Natural Refrigerant

Introducing our range of clean, smart rooftop packaged air conditioning units – Polaris GreenSmart PAC UNITS. These units are equipped with efficient DC compressors and fan motors, utilising advanced fuzzy control and DC Inverter technology to steplessly adjust the output capacity according to the space load and significantly reduce power consumption.

These HVAC units are the world's first to use a natural refrigerant, the Australian-developed Engas M60 hydrocarbon refrigerant, making them the most environmentally friendly option available with a GWP of 1 and no harm caused to the planet in the event of a refrigerant leak.



They outperform all other packaged HVAC units, manufactured by both local and multinational companies, with an efficient operation up to 60 degrees Celsius due to the exceptionally high critical temperature of M60 Hydrocarbon. This demonstrates extreme resilience in Australia's tough environment and showcases the expertise of specialist engineers who designed these units.

In contrast, chemical refrigerant units cause damage to the atmosphere and leave harmful PFAS forever chemicals in their wake, leading to impending EU bans. Engas M60 hydrocarbon refrigerant is also up to 34% more energy efficient than chemical refrigerants, with lower operating pressures resulting in less wear and tear on compressors, less vibration, and smoother operation. Furthermore, natural refrigerant units require only 50% of the refrigerant charge by weight compared to chemical refrigerant units.

As a result, sustainability managers of multinational companies, Federal and State Governments, and local councils in Australia are now advocating for natural refrigerants to play their part in addressing the climate crisis.



Designed with strong anti-grid fluctuation capabilities, Polaris GreenSmart PAC UNITS can perform stably in an ultra-wide voltage range from 342V to 456V. They also have strong anti-interference capabilities, with hosts able to directly connect to wired controllers with two-core unshielded cables up to 100 meters in length.

Polaris GreenSmart PAC UNITS are built with comprehensive protection, such as high/low pressure protection, over-current protection, high discharge temperature protection, and phase failure & sequence protection, greatly improving products' reliability in extreme environments. Additionally, they are equipped with highly anti-corrosive coatings for outdoor and indoor heat exchangers, triple-layer moisture-proof painting PCBs, and hermetically sealed indoor fan motors, ensuring durability in extreme conditions.

Electronic expansion valves (EXV) of Polaris GreenSmart PAC UNITS are controlled by the MCU, utilizing high/low pressure and compressor discharge temperature to optimize units' operation process. They also feature exclusive outdoor fan dead wind start-up functions, improving success rates of fan start-up in windy conditions and ensuring steady unit performance.

Above 45kW, Polaris GreenSmart PAC UNITS adopt



double compressors, with one able to start in an emergency if the other fails. During maintenance periods, units can continue to refrigerate, making them flexible and convenient.

Finally, Polaris GreenSmart PAC UNITS support centralised control and remote-control functions, with one centralized controller able to control up to 36 hosts. Hosts can be accessed and controlled through LAN and WAN with required gateway accessories.



## FOR ALL YOUR COMMERCIAL APPLICATIONS:

> Shopping Centres > Restaurants > Warehouses

### OPTIONS

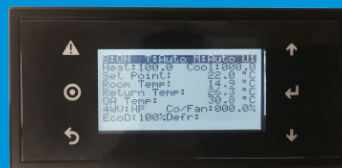
- Economy cycle
- Electric heating
- Emergency power supply
- Fire Alarm Cut-Off Switch
- Highly Flexible Control Ability
- CO2 controller Fresh Air Option
- Supply Air Variable Speed Drive
- Left or Right-Hand Supply/Return Air Connections

### STANDARD INCLUSION

- EC Condenser Fan
- Electronic Expansion Valve
- High/Low Pressure Transducer
- EC-Plug Fan

## CONTROL OPTIONS

### ECO i



#### STANDARD

- Panel Mounted Controller
- Full Diagnostic Function

### ECO iQ



#### OPTIONAL

- Hand Held or Wall Mount

### ECO iQ TOUCH



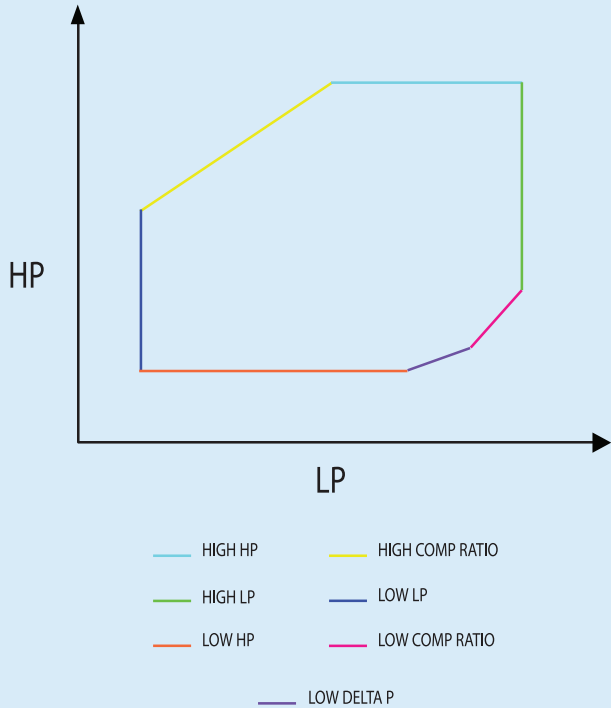
#### INTUITIVE MENU

Menu screens enable even novice users to operate and monitor the system like an expert.

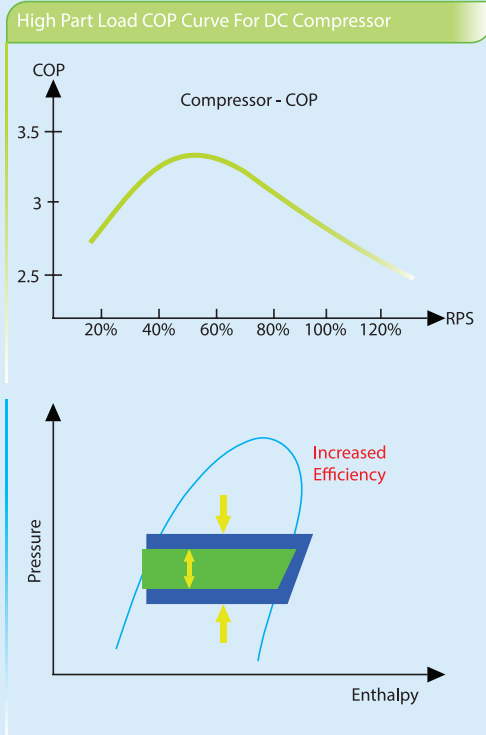
#### FEATURES

- Pre-Commissioning Tool
- Time Saving Commissioning Tool
- Simplify Troubleshooting
- Alarm History Monitoring
- Easy Servicing

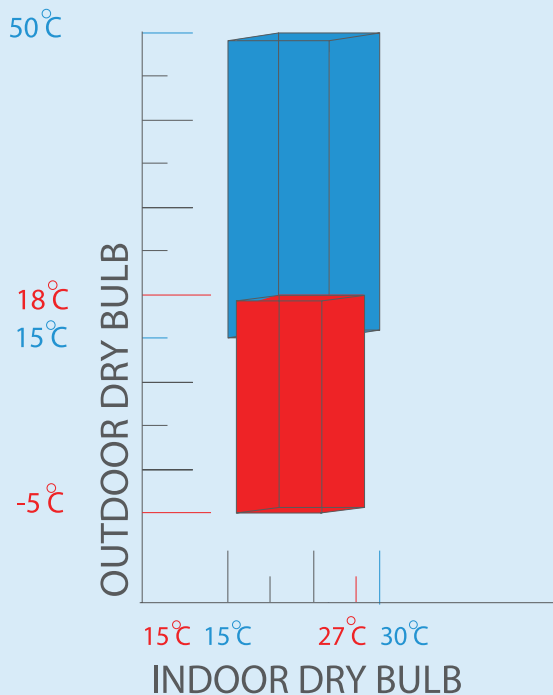
UNIQUE COMPRESSOR ENVELOPE CONTROL FUNCTION



WHY WE USE DC INVERTER COMPRESSORS



WIDE OPERATION RANGE



CONNECTIVITIES:

ASHRAE **BACnet**™

**Modbus** RTU

## INVERTER ROOFTOP PACKAGE UNITS

Polaris Technologies Inverter Rooftop Package units have been designed specifically for the harsh Australian Climate and are guaranteed to perform optimally within a large range of design conditions.

They may be used for cooling only or heat pump application, or with an option of electric heating. Polaris Technologies Inverter Rooftop range of equipment are ideal for residential, commercial and industrial applications and are available in normal cooling capacity from 25 to 150kW. Quality design and construction (with easy installation and maintenance) make Polaris Technologies Rooftop Inverter Series (with hermetic scroll compressors) the preferred option for applications.

### Applications:

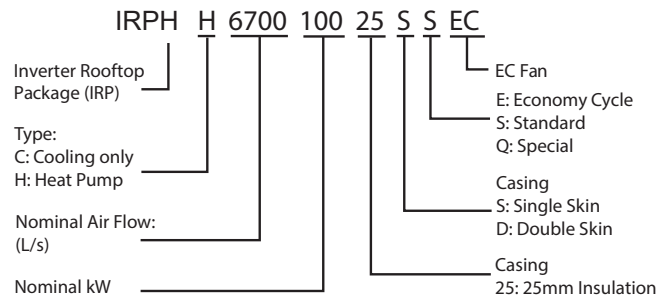
Rooftop Packaged units are unobtrusive, quiet and designed to provide year round comfort – warming in winter and cooling in summer. Polaris Technologies' wide product range offers a unit to suit small to large package air conditioner applications, e.g. offices, shops, hotels, fast food outlets, restaurants, petrol stations, open plan office and work spaces, supermarket, shopping malls and auditoriums.

Units are suited to high static pressure applications where large volume spaces are to be air conditioned. Long duct runs are possible enabling greater installation flexibility. This range of units has been developed to meet the needs of typical applications.

Should you have special requirements, such as higher air flows or greater sensible duty units, please contact your nearest Polaris Technologies representative. Polaris Technologies engineers have extensive experience in designing air conditioning equipment for specific applications.

The Polaris units come in 2 main casing designs for the evaporator section:

- A. 25mm Double skin with polyurethane foam injected panel insulation.
- B. Single skin high grade sheet steel casing with 25mm closed cell fan insulation. The compressor section is manufactured from a high grade sheet steel casting and frame with a weather proof electrostatic, baked polyester



epoxy powder coated external finish, designed for outdoor installation.

### Evaporator and Condenser Coils

The evaporator and condenser coils are designed to deliver their respective duties at optimum performance at all design conditions. Coils are manufactured from seamless copper tubes mechanically expanded into aluminium fins. All coils are tested (underwater to avoid leakage) at 30kg/cm<sup>2</sup> (450 Psi) Air pressure. The coils also undergo vigorous cleaning procedures after the manufacturing process for optimal performance and reliability.

### Condensate tray

The condensate tray is manufactured from stainless steel and insulated on the underside to prevent condensation. All units are provided with a drain pan having the drain connection from one side.

### Compressor

Polaris Technologies utilises DC inverter refrigerant gas-cooled scroll compressors with internal thermal protection and soft starters as standard. This combination of features guarantees optimal efficiency performance and robustness with minimal noise.

### Direct Driven Condenser EC Axial Fans

All condenser fan blades are of the axial type, which are directly mounted on the motor shaft. All fans are selected for optimum efficiency and for maximum sound power reduction. Fan blades are designed for maximum corrosion resistance and are statically and dynamically balanced before installation. All condenser fans are equipped with wire guards. All fan motors are air cooled with internal thermal protection, with class "IP56" electrical insulation.

### Evaporator Fan Motors

Backward curved EC direct driven plug fans provided for highly efficient and flexible operation.

**CALL 1300 782 761**

[www.polaristechnologies.com.au](http://www.polaristechnologies.com.au)

## Evaporator Fan Motors

Backward curved EC direct driven plug fans provided for highly efficient and flexible operation.

## STANDARD FEATURES

- Heat pump packaged units come standard with 4- way reversing valve, suction accumulator, oil separator and liquid receiver.
- Easily accessible system components.
- Ample space for easy access to power and control panels.
- Heavy duty mounting chassis for the whole unit with lifting holes.
- Anti-vibration mounted compressor.
- Weatherproof, polyester epoxy powder electrostatic paint oven-baked finish for sheet metal and base frame.
- Aluminium mesh on condenser section.
- All units are shipped pre-tested with protection devices pre-set from the factory.
- Quick release fasteners are provided on all electrical and compressor compartment cabinets.

## ELECTRICAL FEATURES

- Control and power panels include the direct-on-line starting contractors for the compressor and condenser fan motor.
- Internal thermal motor protection for condenser fan motors.
- Compressor internal thermal protection and discharge temperature.
- Anti-recycling protection (time delay) for compressors through microprocessor.
- Compressor motor protection device.
- Microprocessor controller with the following main functions:
  - External remote ON/OFF button for remote operation of the unit using external ON/OFF switch or connection to building management system.
  - Volt-free terminals available for general alarm indication signal to remote monitoring station.
- High and low pressure transducers as well as safety switches (capsule type, factor pre-set) for all models.
- Voltage monitor controller (phase sequence relay) for monitoring the main incoming power supply for the unit which provides protection from single phasing, under-voltage, phase-voltage imbalance and phase-non-sequence of the supply power.

## LOW AMBIENT CONTROL:

The refrigeration system in all units are inherently designed to operate efficiently, without extra controls or modifications. To permit the unit to operate in low ambient

conditions an inverter fan speed head pressure control is included as standard.

MODbus RTU compatible (BACnet available as option)  
High efficiency hermetic DC inverter scroll compressor.

## REFRIGERATION FEATURES

- High efficiency hermetic DC inverter scroll compressor
- Filter drier
- Chasing points pin valve
- Electronic expansion valve
- Factory pre-charge with refrigerant
- Suction Accumulator
- Liquid receiver
- Oil Separator

## OPTIONAL FEATURES & CONSTRUCTION OPTIONS

- Economiser option with fresh, return and exhaust airdamper. With the economiser installer, the unit gains the ability to provide free cooling or free heating, allowing it to exploit the external environmental conditions and operate without the use of compressors or heaters. This function is achieved by measurement of outdoor and indoor temperature, coupled with the operation of the integrated dampers.
- High static condenser fan optional.
- Upgraded evaporator fan.

## ELECTRICAL OPTIONS

- Building automation system interface. Interfacing with other building management systems. (eg. BACnet)
- Dual power supply input.
- Remote control panel.

## OPTIONS

- Economy cycle
- Electric heating
- Emergency power supply
- Fire Alarm Cut-Off Switch
- Highly Flexible Control Ability
- CO2 controller Fresh Air Option
- Supply Air Variable Speed Drive
- Left or Right-Hand Supply/ Return Air Connections




## STANDARD INCLUSION

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- Electronic Expansion Valve
- High/Low Pressure Transducer
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## PAC UNIT - MODELS

Nominal Capacity (Kw)	Model			Power Supply (V, Ph, Hz)	Appearance
	Refrigerant	Model Name	Product Type		
20	M60	PRIH-20-D1	RTP	380-415V 3N~, 50 /60Hz	
22	M60	PRIH-22-D1	RTP	380-415V 3N~, 50 /60Hz	
26	M60	PRIH-26-D1	RTP	380-415V 3N~, 50 /60Hz	
30	M60	PRIH-30-D1	RTP	380-415V 3N~, 50 /60Hz	
45	M60	PRIH-45-D1	RTP	380-415V 3N~, 50 Hz	

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Nominal Capacity (Kw)	Model			Power Supply (V, Ph, Hz)	Appearance
	Refrigerant	Model Name	Product Type		
58	M60	PRIH-58-D1	RTP	380-415V 3N~, 50 Hz	
80	M60	PRIH-80-D1	RTP	380-415V 3N~, 50 Hz	
95	M60	PRIH-95-D1	RTP	380-415V 3N~, 50 Hz	

**NOTES:**

① Above pictures may be different from actual model.

## FEATURES

Feature	Description
DC Inverter technology	Polaris GreenSmart PAC UNITS are equipped with efficient DC compressors and fan motors fusing advanced fuzzy control, which can stepless adjust the output capacity according to the space load and significantly reduce power consumption.
Excellent grid adaptability	Polaris GreenSmart PAC UNITS are strong anti-grid fluctuations design, performance stably in ultra wide voltage range from 342V to 456V.
Non-polarity communication design	Polaris GreenSmart PAC UNITS are strong anti-interference design, host directly connected to wired controller with two-core unshielded cable, which length can be up to 100 meters.
Anti-corrosive and dustproof design	Polaris GreenSmart PAC UNITS are equipped with high anti-corrosive coating of outdoor and indoor heat exchanger, triple layer moisture proof painting PCB, hermetically sealed indoor fan motor, which greatly improve the durability of product in the extreme environment.
Multi-protection design	Polaris GreenSmart PAC UNITS have built-in comprehensive protection such as high/low pressure protection, over current protection, high discharge temperature protection, phase failure&sequence protection, which greatly improve the reliability of product in the extreme environment.
Multi parameter throttling control design	Polaris GreenSmart PAC UNITS EXV control by the MCU fusing high/low pressure, compressor discharge temperature, etc. Maximum optimize the unit operation process.
Emergency operation design	Polaris GreenSmart PAC UNITS above 45Kw adopt double compressors. when one compressor fails, the other compressor without failure can be started in an emergency. during the maintenance period, the unit does not stop and continues to refrigerate, which is more flexible and convenient.
Dead wind start-up design	Polaris GreenSmart PAC UNITS integrates exclusive outdoor fan dead wind start-up fuction, which greatly improve the success rates of fan start-up in the windy circumstances and ensure the unit performance steadily.
Centralized Control	Polaris GreenSmart PAC UNITS support centralised control functions. One centralised controller can control up to 36 hosts.
Remote control function	Polaris GreenSmart PAC UNITS support remote control functions, host can be access and control through LAN and WAN(Gateway accessory are required).



zero harm



**POL**  
**ARIS** Technologies  
*Air-conditioning reinvented*



**GreenSmart**  
**PAC**  
**UNITS**

natural series zero harm

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