INVERTER TECHNOLOGY

Industrial Product Range

Single screw compressor technology
ACROSS THE COMPLETE RANGE

SINGLE SCREW COMPRESSORS, COMPRESSOR PACKS AND CHILLERS

J&E Hall International

Contents

MARKETS SERVED			
COLD ROOMS	PROCESS PLANTS	ICE RINKS	DISTRICT COOLING
BLAST FREEZERS	PETROCHEMICAL	BREWERIES	HEAT PUMPS

J & E Hall International...

For more than 200 years, J & E Hall International has pioneered the development and application of refrigeration technologies. Today the company is recognised as a leading manufacturer and after sales provider for refrigeration and air-conditioning products worldwide.

Single Screw Technology

Key to the success of the HallScrew single screw compressor is its outstanding reliability. Only three basic moving parts are involved, a main rotor which meshes with two diametrically opposed star wheels and results in balanced compression. Compressors are extremely robust and boasts long bearing life over 100,000 hours.

The HallScrew also features a high efficiency capacity control mechanism to regulate the capacity with corresponding reduction in power input. For ease of maintenance, the side casing can be removed to give access to all parts without removing the machine from its installation.

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Benefits

- Ease of installation and maintenance
- Superior efficiency
- Engineered for quiet operation
- Environmentally conscious refrigerants
- Reliability
- Wide ranging cooling capacities

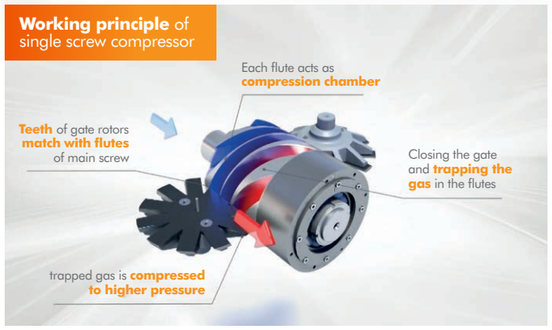
Star Wheel

J & E Hall use low friction composite material "HallPlas" in the compression process to ensure high efficiency and reliability. "HallPlas" material was developed using aerospace technology and can withstand the toughest operating conditions with all types of refrigerant.

Applications

J & E Hall manufactures screw compressors using state of the art production equipment for industrial refrigeration, air-conditioning and heat pump systems. HallScrew open and semi-hermetic compressors are used in the most varied applications from deep freezing through to standard refrigeration in retail, brewing, process plant, petrochemical and more.

How single screw technology works...



Single screw vs Twin screw

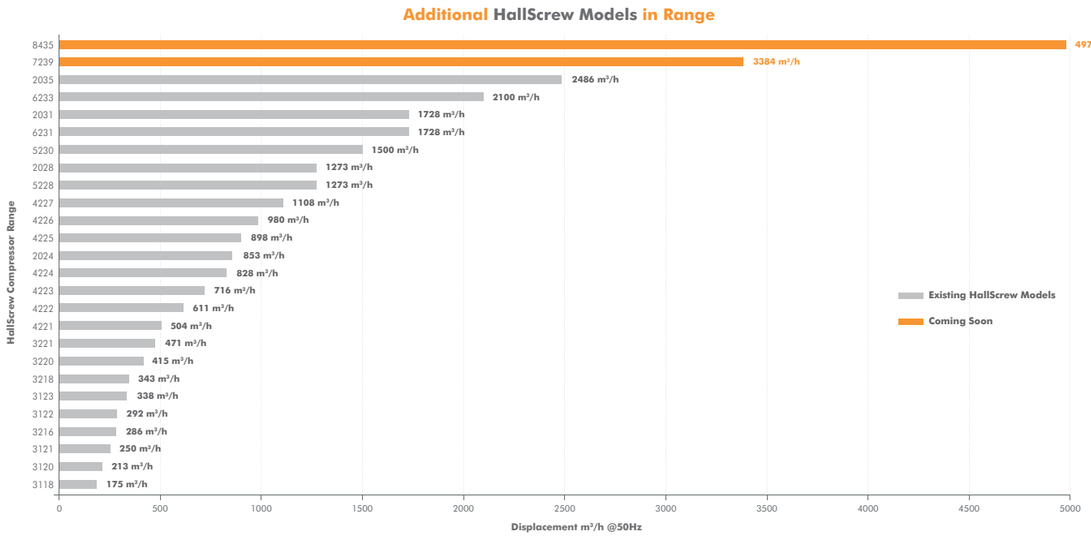
Single screw compressor

- Free movement of star and small inertia, therefore no power transferred between rotors
- Withstands marginal lubrication
- Low bearing loads

Twin screw compressor

- Up to 60% of the power is transferred through the rotors
- Marginal lubrication wears the rotors
- High axial thrust and high side load

The complete range



HallScrew design features...

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- Compact design and footprint
- Single piece casing
- Low noise and vibration
- Designed for easy service and maintenance
- Robust construction
- Reduced machine clearance for maximum efficiency
- Phase wiring and thermistor termination are easily accessible (semi-hermetic models)
- All models conform to international standards
- Inverter option - up to 25% less power consumption

Open Compressor Range

HSO 3200
- **4 sizes:** 3216, 3218, 3220 and 3221
- **Displacement at 50Hz:** 286/343/415/471 m³/h

HSO 4225/6/7
- **7 sizes:** 4221, 4222, 4223, 4224, 4225, 4226 & 4227
- **Displacement at 50Hz:** 504/611/716/828/898/980/1108 m³/h

HSO 5200
- **2 sizes:** 5228 & 5230
- **Displacement at 50Hz:** 1273/1500 m³/h

HSO 6200
- **2 sizes:** 6231 & 6233
- **Displacement at 50Hz:** 1728/2100 m³/h

HSO 2000
- **4 sizes:** 2024, 2028, 2031 and 2035
- **Displacement at 50Hz:** 853/1273/1728/2486 m³/h

Next generation compressors

The HSO 4225/6/7, 5200 and 6200 series are the next generation of open drive compressors, reflecting the latest innovation in single screw compressor technology. These models have fixed or variable volume ratio (Variable volume capability when variable frequency drive used).

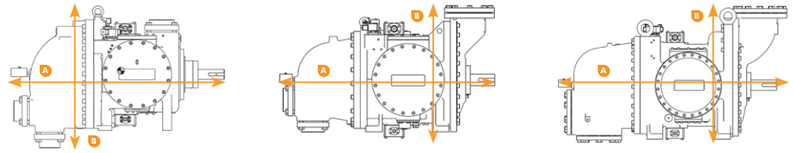
Features & Benefits

- **Higher effciency**
- **Cost effective and simple solution for pack build**
  Built in capacity control valves
  No start-up oil pump required for high stage operation
- **40 bar design**
  Higher design pressure for high temperature ammonia heat pump application
- **Only one main oil injection**
  No external oil feeds to bearings or shaft seal required
- **Spring return to minimum load**
  Allows for simplified control
- **Nodular iron casing as standard**
  Favoured by the oil and gas industry

General information for the range

- Open drive single screw design
- Suitable for all refrigerants including ammonia
- Built in capacity control (except 2000 series)
- Built in solenoid valves (3200, 4200, 5200 & 6200 series)
- Universal shaft seal
- Economiser connection
- External or liquid injection cooling
- Single piece casing

Specifications



		Length mm (A)	Height mm (B)	Width mm	Weight Kg
HSO 3200		803	505	634	475
HSI 3200		1,304	532	734	610
HSO 4200		745	547	655	460
HSO 4225/6/7		1,187	792	778	800
HSO 5200		1,314	754	920	1,270
HSO 6200		1,554	892	902	1,500
HSO 2000	**2024**	975	446	714	449
	2028	1130	500	780	564
	2031	1150	560	888	810
	2035	1305	640	1000	1194

Semi-Hermetic Compressor Range

HSM/HSL/HSH range

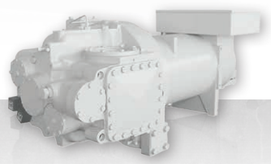
For incorporation into factory built chillers and compressor packs designed for high, medium and low temperature applications

HSM/L 3100

- **4 sizes:** 3118, 3120, 3121and 3122
- **Displacement at 50Hz:** 175/213/250/292 m^3/h

HSM/L 3200

- **4 sizes:** 3216, 3218, 3220 and 3221
- **Displacement at 50Hz:** 286/343/415/471 m^3/h
- Developed for parallel multi compressor systems



HSM/L 4200

- **7 sizes:** 4221, 4222, 4223, 4224, 4225, 4226 and 4227
- **Displacement at 50Hz:** 504/611/716/828/898 /980/1108 m^3/h

HSH/M/V5200/6200

5200 2 sizes: 5228 and 5230
Displacement at 50Hz: 1273 and 1500 m^3/h
Variable speed option HSV5228: 229-1528 and HSV5230: 270-1800 m^3/h
6200 2 sizes: 6231 & 6233
Displacement at 50Hz: 1728 and 2100 m^3/h
Variable speed option HSV6231: 311-2074 and HSV6233: 378-2520 m^3/h

Extended Semi-Hermetic Range

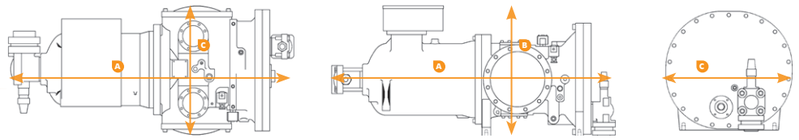
Reflecting the latest innovation in single screw technology the extended range of semi-hermetic HSH/M/V 4225/6/7, 5200, 6200 series are designed for incorporation into factory built air-conditioning chillers and heat pumps.

- Reduces the number of compressors required for larger capacity applications
- Saves overall installation cost compared to open drive compressors for HFC and HFO applications
- Useful for low pressure refrigerants R1234ze and R515B which require higher swept volume compressors

General information for the range

- Semi-hermetic single screw design
- Optimised for R404A, R507 and R134a
- High efficiency built in 3 phase, 2 pole motor 50/60Hz
- Motor designed for star/delta or direct on-line
- Suction strainer
- Discharge stop valve
- Internal relief valve
- Suction flange with tail and joint
- Liquid injection adapter
- Oil drain connection
- Oil line fittngs
- Oil injection for maximum reliability
- Built in stepless capacity control
- Electronic protection (INT 69TM)
- Economiser facility

Specifications



	Length mm (A)	Height mm (B)	Width mm (C)	Weight Kg
HSH/M/L 3100	1126	643	357	545 - 585*
HSH/M/L 3200	1298	584	566	720
HSH/M/L 4221/2/3/4	1432 - 1451*	547	629	730
HSH/M 4225/6/7	1579 - 1624*	758	774	1160
HSH/M/V 5200	1853	883	934	1600
HSH/M/V 6200	2240	1053	900	2176

* Dependent on motor type/suction cover option. See application manual for details

Semi-Hermetic Compressor Range

HSS range

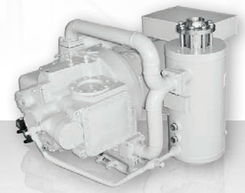
Design for high temperature application for incorporation into factory built chillers and compressor packs

HSS 3100

- **4 sizes:** 3118, 3120, 3121 and 3122
- **Displacement at 50Hz:** 175/213/250/292 m^3/h

HSS 3200

- **4 sizes:** 3216, 3218, 3220 and 3221
- **Displacement at 50Hz:** 286/343/415/471 m^3/h
- Fitted stainless steel mesh type integral oil separator



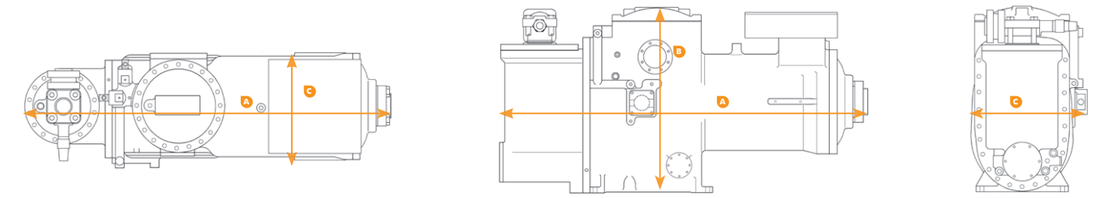
HSS 4200

- **4 sizes:** 4221, 4222, 4223 and 4224
- **Displacement at 50Hz:** 504/611/716/828 m^3/h
- Required external oil separator and oil support system for maximum efficiency

General information for the range

- Semi-hermetic single screw design
- Optimised for R134a and R407C
- High efficiency built in 3 phase, 2 pole motor 50/60Hz
- Suction strainer
- Built in stepless capacity control
- Discharge check valve
- Internal relief valve
- Integral oil separator (HSS 3100/3200)
- Flanged oil separator (HSS 4200)
- Discharge check valve
- Suction flange with tail and joint
- Liquid injection adapter
- Sight glass (x2)
- Oil charge
- Electronic protection (INT 69TM)
- Economiser facility

Specifications

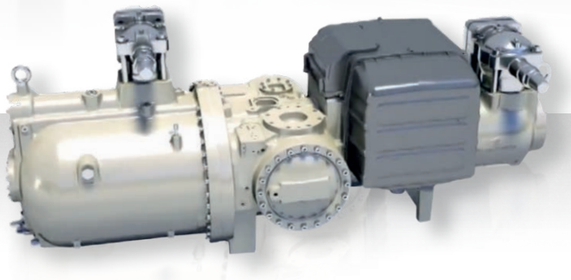


	Length mm (A)	Height mm (B)	Width mm (C)	Weight Kg
HSS 3100	1274	643	389	569 - 603*
HSS 3200	1661 - 1820*	647	567	719 - 840*
HSS 4200	1555 - 1574*	849	919	1100

Built in VFD Compressor Range

Variable Frequency Drive and Variable Volume Ratio range

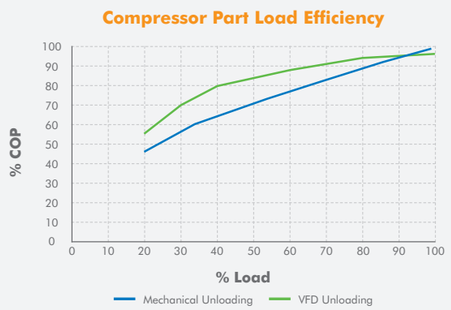
For medium to high temperature cooling applications



HallScrew VFD and VVR compressors are easy to install and maintain, are highly efficient and are available for a wide range of applications. They offer the most efficient way of adapting the capacity of the compressor to the requirements of the load.

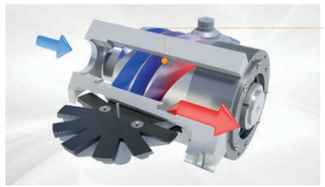
Variable Frequency Drive (VFD)

The new HallScrew compressor offers the most efficient way of adapting the capacity of the compressor to the requirements of the load. Inverter technology allows the compressor motor speed to vary and optimise power to create a precisely controlled temperature. This proves to be significantly more efficient than operating the compressor at fixed speed with slide control and can save up to 23% in energy consumption.



Variable Volume Ratio (VVR)

VVR allows the volume ratio to be adapted by moving the loading valves. In essence, the VVR adapts the point at which the refrigerant leaves the compressor which changes the pressures at discharge. By doing this the volume ratio of the compressor is optimised for any running condition. Hence, reducing energy consumption further.



- Moving slide valve
- Adjusts geometry of discharge port
- Optimising compression efficiency
- Senses the lift needed
- Optimal efficiency at any condition
- No over compression resulting in energy saving
- Only modulates compression ratio
- Inverter modulates cpacity

Specifications

COMPRESSOR MODEL	F120	F122	F3AL	F3BL	F4AL	F120	F122	F3AL	F3BL	F4AL
	With integrated oil separator					Without integrated oil separator				
Overall dimensions (LxWxHmm) with VFD	1335 x 640 x 690	1335 x 640 x 690	1927 x 693 x 759	1956 x 803 x 796	-	1131 x 640 x 690	1131 x 640 x 690	1494 x 693 x 759	1533 x 803 x 796	-
Overall dimensions (LxWxHmm) without VFD	1335 x 430 x 666	1335 x 430 x 666	1927 x 666 x 759	1956 x 710 x 776	2003 x 774 x 831	1131 x 430 x 666	1131 x 430 x 666	1494 x 666 x 615	1533 x 710 x 642	1635 x 911 x 700
Weight with/without VFD (Kg)	710 / 680	710 / 680	910 / 885	1110 / 1000	1395	640 / 610	640 / 610	800 / 765	1000 / 960	1280

Compressor Pack Range

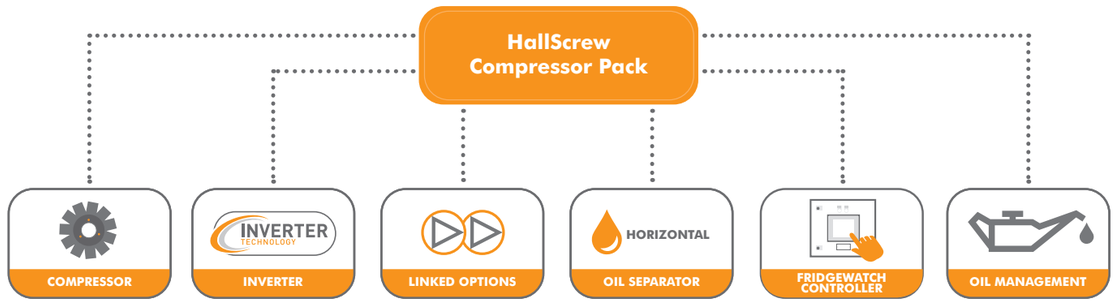
Standard compressor packs

J & E Hall supply the HallScrew compressor as a complete package with oil management system and controller for installing into a refrigeration, air-conditioning or heat pump system.

HSP 3200
- **Displacement at 50Hz:** 286 - 471 m³/h

HSP 4200
- **Displacement at 50Hz:** 504 - 1108 m³/h

HSP 5200, 6200 & 2000
- **Displacement at 50Hz:** 1273 - 2486 m³/h



General information for the range

- HallScrew single screw compressor
- IP23 2 pole electric drive motor
- Control voltage 110V
- Spacer coupling with guard
- Electronic controller
- Suction strainer and non-return valve
- Horizontal oil separator (includes mesh pads, coalescing elements, sight glasses, heaters, low oil level switch, dual-relief valve with three way changeover valve)

OPTIONAL EXTRAS: Inverter drive (or standard Y/D motor starter), Gauge board, alternative motor requirements, 240V control voltage, no electronic controller, ATEX approved design, electro mechanical cut outs, suction and/or discharge valve(s) and head pressure control valve, dual oil filters, economiser, anti-vibration mounts, oil fill pump (HSP 3200 & 4200), demand or no oil pump (HSP2000)

	Length mm	Height mm	Width mm	Weight Kg
HSP 3216, 3218, 3220, 3221	2489	1680	1109	1515
HSP 4221, 4222, 4223, 4224	3030	1785	1510	2000
HSP 4225	3190	2160	1210	2075
HSP 4226, 4227	*	*	*	*
HSP 5228	3210	2310	1250	2460
HSP 5230	*	*	*	*
HSP 6231	3670	2680	1380	3420
HSP 6223	*	*	*	*
HSP 2035	3980	2870	1510	4600

Aquachill Packaged Air Cooled Chillers

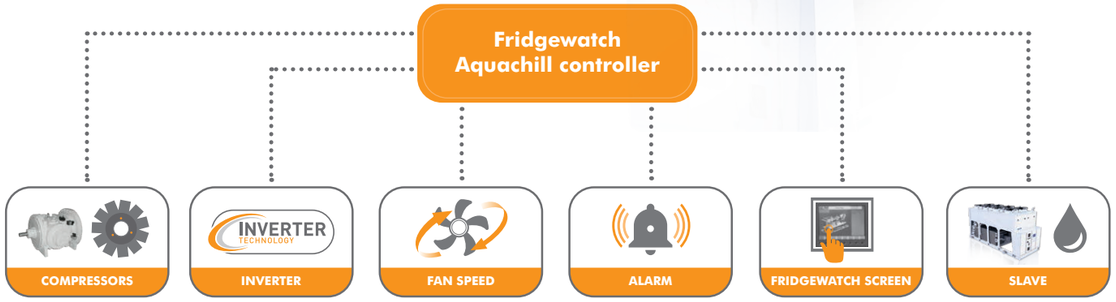
Aquachill is a standard chiller range which offers superior efficiency with high COPs under extreme operating conditions.

Highly Reliable
Single rotor HallScrew compressor renowned for its reliability, minimal moving parts and a design life of 100,000 hours

Energy Efficiency
All compressor motors are inverter driven for accurate load matching and each refrigerant circuit is complete with economizer for optimum efficiency

The Environment
The chiller range uses NH3 refrigerant which is a natural gas with zero GWP

Controllability
Aquachill is designed to match the system load accurately and efficiently through the use of the latest control



Application range: -14°C to +10°C	Low temperature Medium temperature High temperature	(fluid -10°C to -15°C) (fluid -5°C to -10°C) (fluid +12°C to +7°C)	255kW to 491kW 292kW to 584kW 600kW to 1,119kW	Three efficiency levels per application	Standard High Premium	Two acoustic levels (unit dependant)	73 – 75 dB(A) 62 – 66 dB(A)
Partial and full heat recovery options available							

	Length mm	Height mm	Width mm	Dry Weight Kg*
6S	6490	3168	2539	10330 - 10640
6H	7790	3168	2539	11200 - 11510
6P	9090	3168	2539	12060 - 12370
8S	7790	3168	2539	11310 - 11620
8H	9090	3168	2539	12170 - 12480
8P	10390	3168	2539	13040 - 13350
0H	9090	3168	2539	12720 - 12780
0P	10390	3168	2539	13580 - 13640
1H	9090	3168	2539	12720 -12980
1P	10390	3168	2539	13580 - 13880

* Dependent on evaporating temperature

Installations

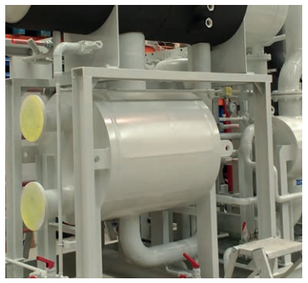
- Over 10,000 installations worldwide
- Installed for nuclear, energy, chemical, petrochemical, pharmaceutical, food processing, beverage, brewing and naval applications
- Hazard area installations
- Projects with operating temperatures down to -90°C
- Multi refrigerant applications including ammonia, CO_2 and propylene
- Installed capacities up to 4,436kW

Case Studies

District heating application for energy producer - Switzerland

The new HSO5228V compressor is a key part of an inverter driven ammonia-based heat pump system producing water at 70°C. The new compressor can condense vapour to water at much higher temperatures than before and has been installed to help supply low-cost hot water to homes and businesses.

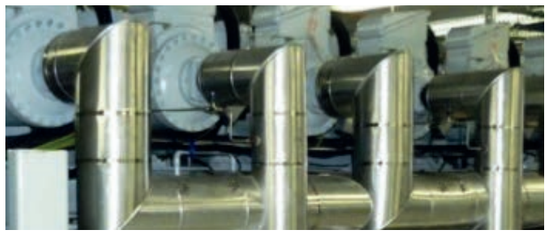
- 2.4MW of heat output
- COPs of 4.2
- Highly efficient and low lifecycle costs
- Future proof natural refrigerants



Pharmaceutical Case Study

Bespoke chillers using HallScrew compressors play a key role in drugs manufacture at a large pharmaceutical plant.

- 6 HallScrew 3100 series compressors
- Controls temperatures ranging from 50°C to -60°C



Food Processing Case Study

HallScrew compressors reduce cold store energy bills by more than 20%.

- 100,000 sqft cold store
- Meat kept at -21°C
- 2 HallScrew compressors plus one standby

HallScrew Compressor Selection Software

Developed to quickly and easily identify the perfect HallScrew compressor products for any given industrial application.

Follow the QR code to sign up or login

For enquiries please contact us:

Hansard Gate, West Meadows, Derby, DE21 6JN

T: +44 (0)1332 253400 **E**: marketing@jehall.co.uk @jehallfridge

www.jehall.co.uk

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