

# HITACHI

## SCREW AND CENTRIFUGAL CHILLER SERIES

# HITACHI

Johnson Controls - Hitachi Air Conditioning India Limited (Formerly known as Hitachi Home & Life Solutions (India) Limited).  
Head Office: Hitachi Complex, Karan Nagar, Kadi, Distt. Mehsana – 382727, Gujarat, India. Tel: (02764) 277571.  
Website: [www.jci-hitachi.in](http://www.jci-hitachi.in) | Email: [sales@jci-hitachi.com](mailto:sales@jci-hitachi.com)

Join us at: <https://www.facebook.com/HitachiHJI> [https://twitter.com/Hitachi\\_home](https://twitter.com/Hitachi_home) <https://www.youtube.com/user/HitachiHome>  
<https://www.pinterest.com/hitachihome/> [Live Chat at www.jci-hitachi.in](https://www.jci-hitachi.in) [Download Hitachi Care App](#) [Google play](#)

\*T&C Apply; Products shown in catalogue are for representation purpose only. Due to continuous research and development process, product may vary without any prior notice.

**HITACHI**  
Dial-a-Care  
1860 258 4848  
3532 4848\*



This is an e-waste product and should not be mixed with general household waste at the end of its life.  
For more details, kindly visit our website or contact Hitachi Dial-a-Care.

\*Prefix local city/state capital STD code or 079. Available only in limited states.



OUR THOUGHTS,  
YOUR BELIEF,  
TOGETHER CREATING  
**EXPERTISE  
THAT  
DELIVERS!**



**VAST DEALER  
NETWORK**  
We are near you.



**TRAINING CENTRES**  
We train to  
serve you better.



**PROJECT EXECUTION  
SUPPORT**  
We are around you all  
the time.



**CUSTOMERS, OUR PRIORITY**  
We always put  
you first.



**INNOVATIVE  
TECHNOLOGY**  
We make your  
life easier.



**ADVANCE TESTING  
FACILITIES**  
We test, so you  
get the best.



**CUSTOM-BUILT  
PRODUCTS**  
We design  
around you.



**FAST DELIVERY**  
We manufacture our  
products in India.



We believe in your dreams and are always eager to go the extra mile to turn them into reality. From sharing our knowledge, technology, and expertise to creating customized solutions for your business, we do everything to help your business grow. We aim to set new benchmarks with our service standards, and this drive to delight you defines who we are.

## ABOUT HITACHI

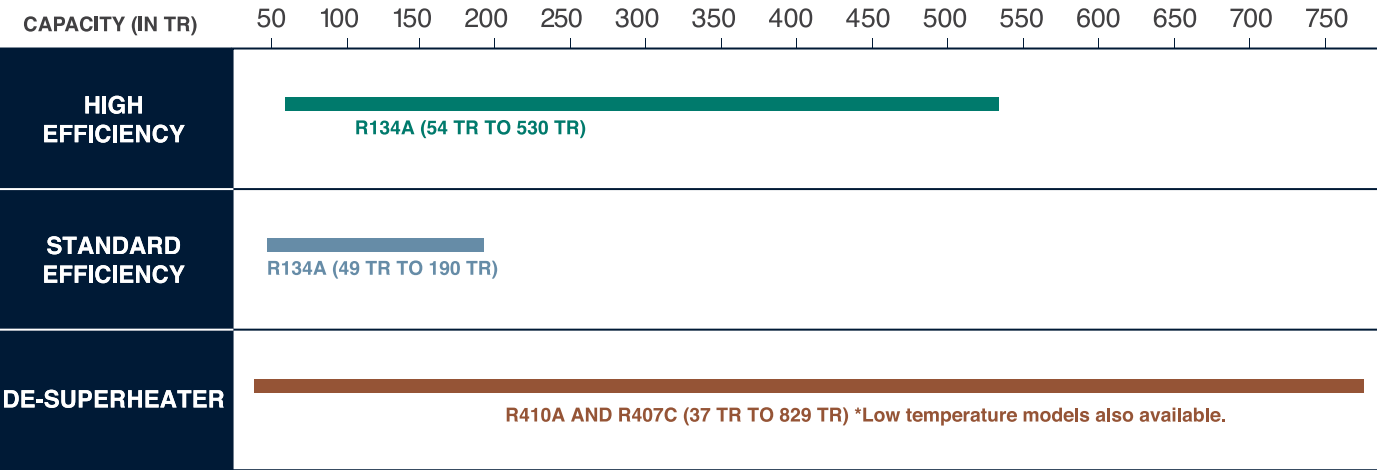
Johnson Controls-Hitachi Air Conditioning is a joint venture company of Johnson Controls (JCI) and Hitachi Appliances, Japan. Through this joint venture, we have combined the rich heritage and innovative technology of Hitachi with the industry-leading expertise and global network of Johnson Controls. It's India unit Johnson Controls Hitachi Air Conditioning India Ltd. (JCH-IN) headquarter is situated in Ahmedabad, Gujarat with manufacturing plant in Kadi, Gujarat. JCH-IN provides advanced air conditioning solutions to meet a wide variety of needs. We offer numerous models for commercial use including VRF air conditioning systems, packaged air conditioners, chillers and district cooling. Drawing on our extensive experience and advanced air conditioning and refrigerating technology, we are able to offer end-to-end solutions that can make a lot of difference to your business.



State-of-the-art factory at Kadi, Gujarat

WATER COOLED SCREW CHILLER RANGE

PRODUCT CAPACITY



Features That Make Us Unique

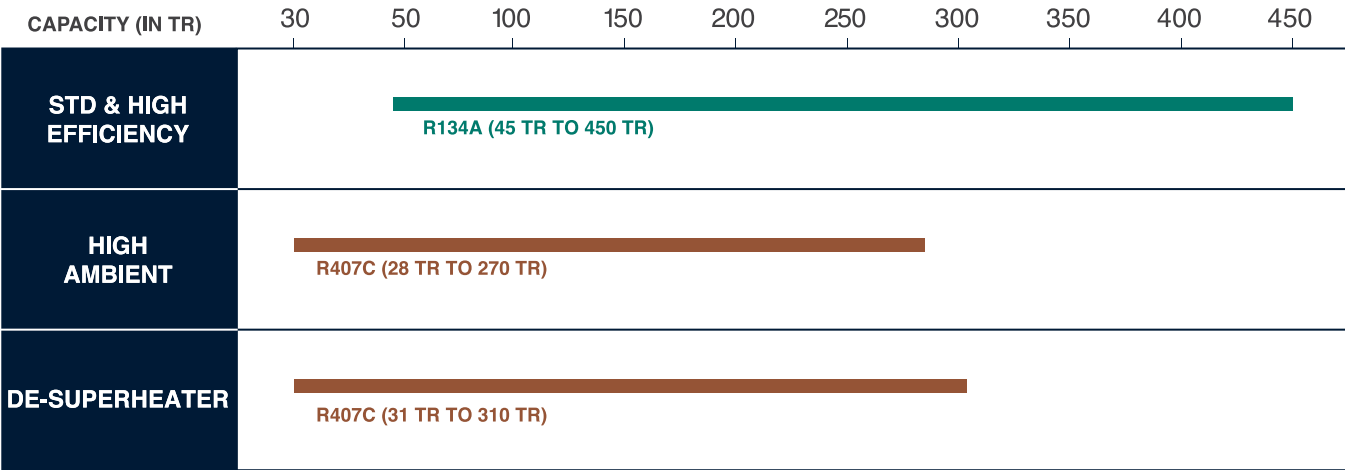
- Highly efficient Hitachi screw compressor
- Max. ARI COP 6.56 achieved
- High-performance twin screw compressor
- Semi-hermetic design compressor
- Increased oil separation efficiency due to cyclone type oil separator
- Available with eco-friendly R134a, R410a and R407c refrigerant
- Multiple compressors & refrigerant circuits design
- De-superheater & low temperature models (up to -20°C) are available.
- Advanced control panel
- Extremely low noise and vibration
- Factory fitted excellent protection controls
- Precise continous capacity control technology (25% to 100%)



\*Features may vary from model to model.

AIR COOLED SCREW CHILLER RANGE

PRODUCT CAPACITY



Features That Make Us Unique

- Highly efficient Hitachi screw compressor
- Max. COP 3.38 achieved
- High-performance twin screw compressor
- Semi-hermetic design compressor
- Increased oil separation efficiency due to cyclone type oil separator
- Available with eco-friendly R134a and R407c refrigerant
- Multiple compressors & refrigerant circuits design
- De-superheater & high ambient models (up to 52°C) are available.
- Advanced control panel
- Extremely low noise and vibration
- Factory fitted excellent protection controls
- Precise continous capacity control technology (25% to 100%)



\*Features may vary from model to model.

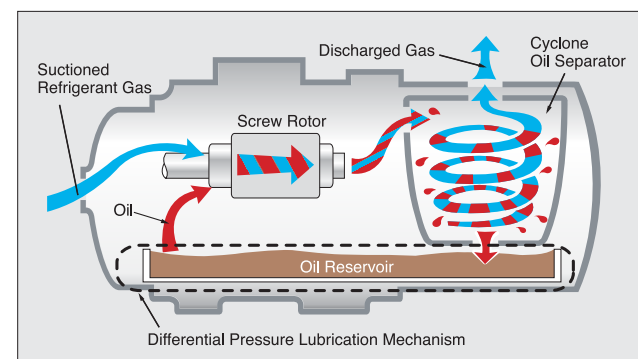
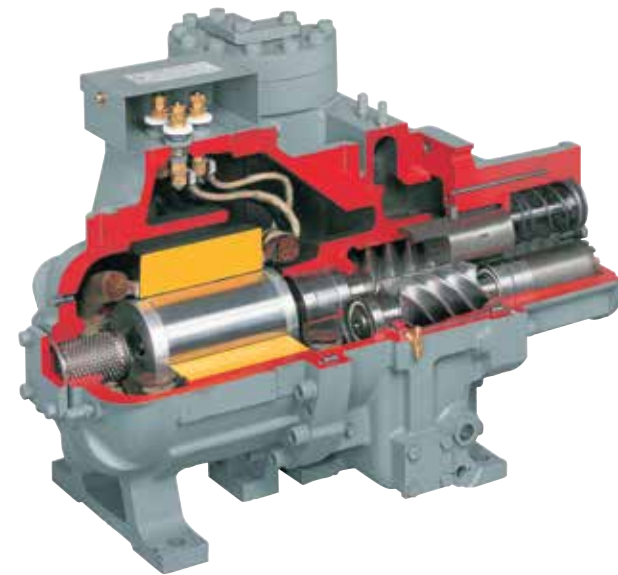
## TECHNOLOGIES OF SCREW CHILLERS

### HITACHI SCREW COMPRESSOR

Since we started manufacturing, we have delivered more than 200,000 Hitachi twin-screw compressors to countries around the world where they continue to meet essential air conditioning needs.

Our screw chillers have highly efficient semi-hermetic twin-screw compressors that run on green refrigerant R134a, R410a & R407c.

The cyclone oil separator they employ has been designed with extensive use of computer simulation. Thanks to these efforts, oil separation efficiency is greatly increased.

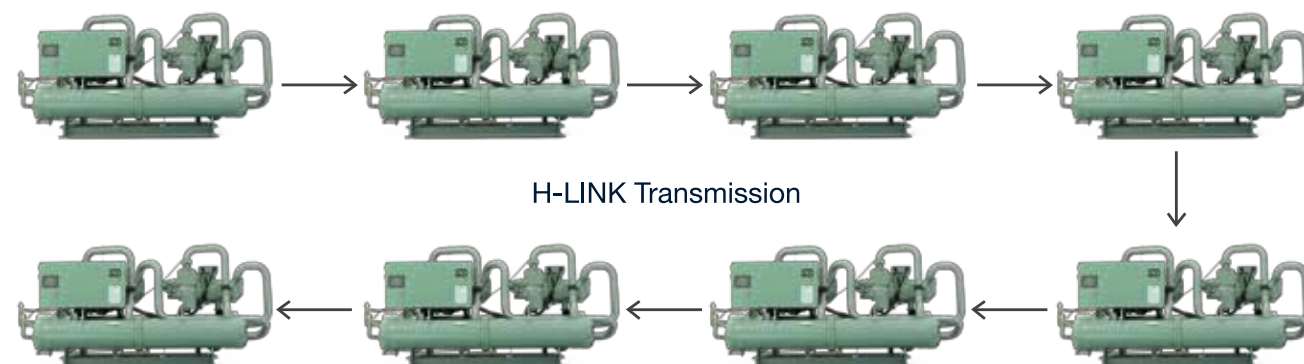


### MODULAR TECHNOLOGY

Hitachi chiller units feature a modular technology.

8 units with the same model can be connected via H-LINK transmission.

So each module can be packed and transported individually for more convenient local installation and displacement. Further, the refrigerant system of each module can be operated independently, which makes maintenance easier. If unexpected trouble occurs in one module, the remaining modules are operated as a backup.



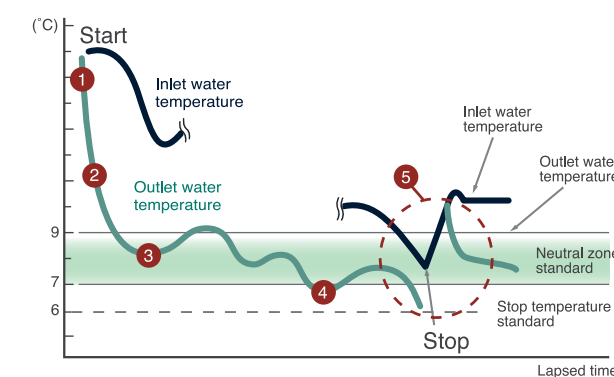
## CONTINUOUS CAPACITY CONTROL

Continuous Capacity Control is based on the precise control of the chilled water outlet temperature, depending on the temperature requirement of the cooling load.

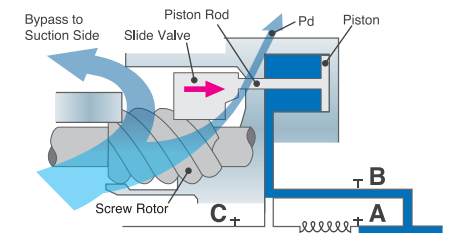
- A slide valve within the screw compressor to change the refrigerant circuit variables according to the requested load.
- An optimized electronic system based on the control band to maintain a constant outlet temperature.

Continuous Capacity Control is performed by adjusting the position of the slide valve. The position of the slide valve can be changed freely between 25% to 100%.

#### ● Capacity Controller Structural Outline

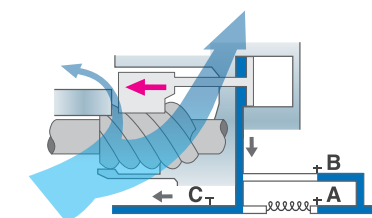


- 1 Starting**  
A: Close  
B: Open  
C: Close



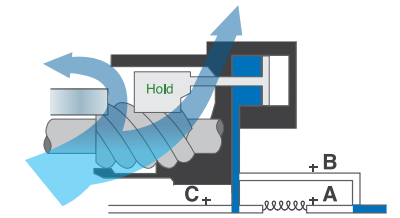
Starting with minimum capacity, solenoid valve B is opened. Oil is discharged to the cylinder, and its discharge pressure moves the piston to the right. The suction pressure moves the slide valve to the right completely opening the refrigerant bypass. The advantage is quick response with minimum capacity (25%).

- 2 Load Up**  
A: Close  
B: Close  
C: Open



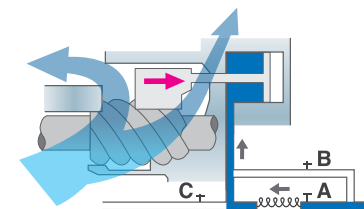
If the chilled water outlet temperature is higher than the set point, the compressor increases its capacity to achieve it by opening solenoid valve C. As the slide valve is moved to the left, the refrigerant bypass is closed and the quantity of compressed refrigerant is increased. This results in an increased capacity.

- 3 Load Constant**  
A: Close  
B: Close  
C: Close



If the chilled water outlet temperature is close to the set point, all solenoid valves are closed. The slide valve remains in the same position, and the capacity is maintained.

- 4 Load Down**  
A: Open  
B: Close  
C: Close



- 5**

If the chilled water outlet temperature is lower than the band for stop, its thermo turns off and the compressor is stopped. When the thermo is turned off, it memorizes the chiller water inlet temperature. If the chilled water inlet temperature reaches 2°C higher than the thermo-off point, the compressor is restarted.

The electric control system compares the value measured by the thermistors with the set value. Depending on the measured value, the control signal instructs the position of the slide valve. When a quick response is

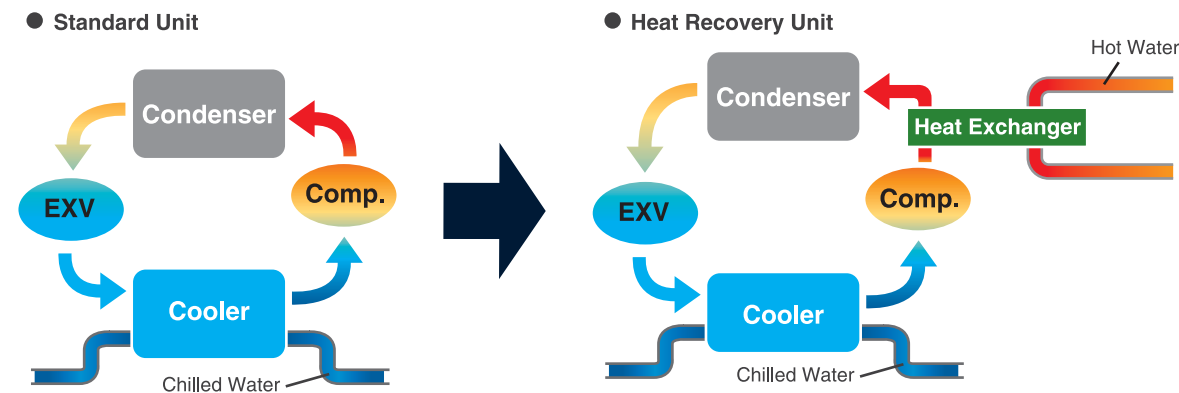
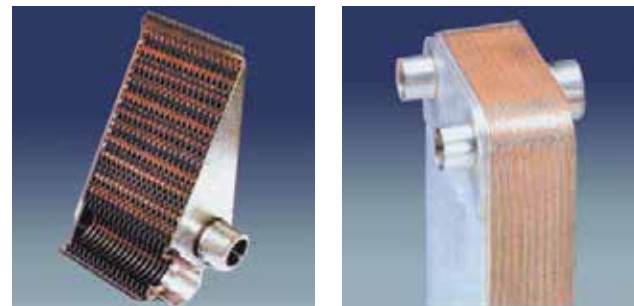


needed and the measured temperature is very far from the set point, the system can be programmed to provide quick control. When precise control is required, the measured temperature is close to the set point, and it can be programmed to give a more precise response  $\pm 1^{\circ}\text{C}$ .

Thanks to Hitachi's technical expertise in the Twin Screw Compressor, it is possible to achieve precise water temperature control that is ideal for industrial processes and air conditioning applications.

## COMPACT HEAT RECOVERY SYSTEM BY USING A PLATE-TYPE HEAT EXCHANGER (OPTIONAL FEATURE)

Hitachi's heat recovery unit consists of a small heat exchanger and is compactly designed. This recovery unit utilizes the energy of making chilled water to supply hot water. Therefore, hot water is supplied for free, and the capacity of the boiler can be reduced. It can supply  $60^{\circ}\text{C}$  hot water (at 100% operation), and its COP is improved.



This Heat Recovery chiller is suitable for various uses such as Hospital, Restaurant and Hotel.



## EASY-TO-VIEW, USER-FRIENDLY TOUCH PANEL TYPE LIQUID CRYSTAL SCREEN DISPLAY

The display makes it easy to view the current operating state and simplify the setting procedure. Various parameters can be confirmed at a glance.

Regardless of the operating state, the interface keyboard allows you to set a variety of operation modes.

A warning log function makes it possible to recall the ten most recent warning events.

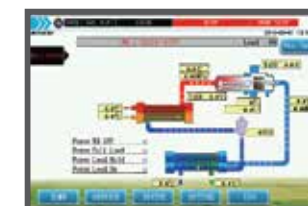
The user interface is provided in both English and Chinese.



Main Screen



Compressor Screen



Status Screen



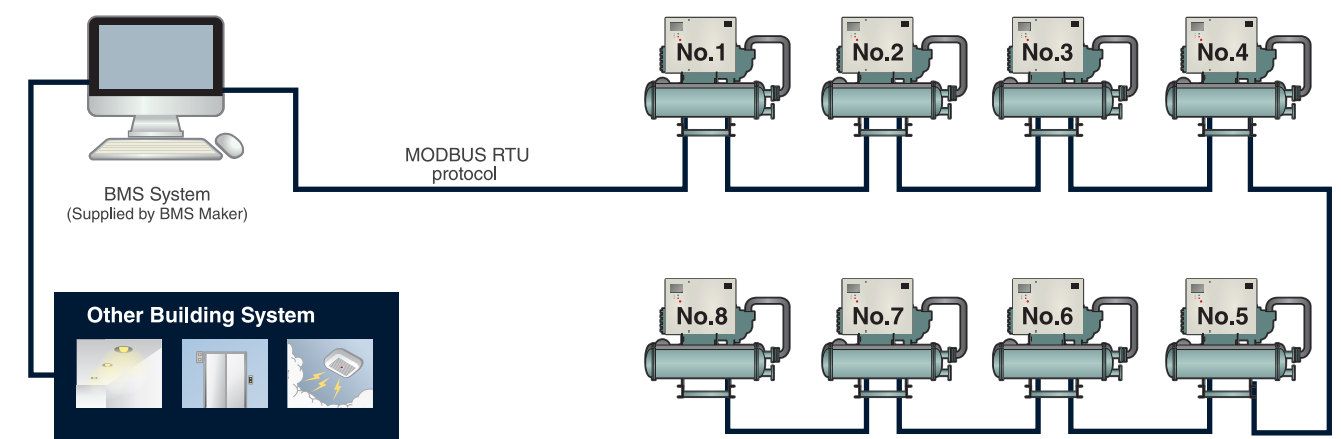
Parameter setting Screen



Setting Screen

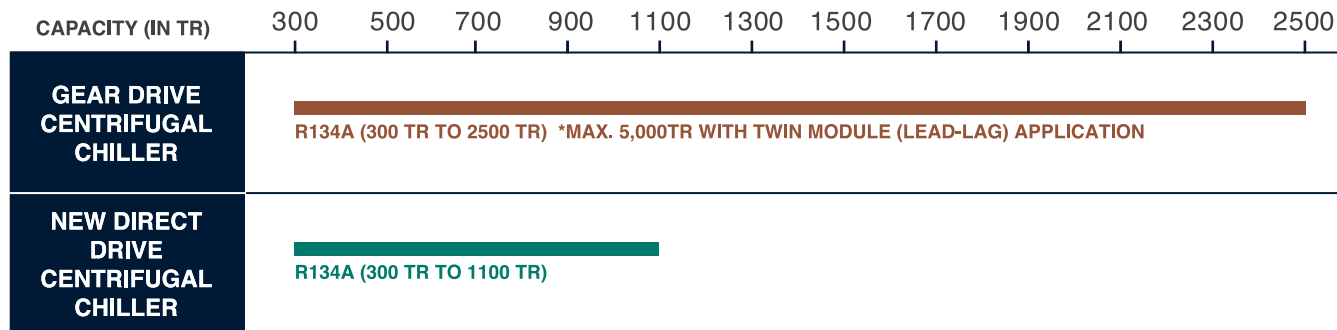
## BUILDING MANAGEMENT SYSTEM (BMS)

A BMS-connecting interface can be supplied.



## CENTRIFUGAL CHILLER RANGE

### PRODUCT CAPACITY



### Features That Make Us Unique

- Highly efficient Hitachi Centrifugal Compressor
- 3 dimensional blade impeller with 2 stage compression
- Max. COP 7.0 & IPLV 11.5 achieved
- Available with eco-friendly R134a refrigerant
- Available with Start Delta Starter, Soft Starter and Invertor Starter options.
- Highly reliable Advance Surge Protection technology
- Continuous operation under high ambient temperature
- Eco mode operation for drastic improvement in COP during off season
- Quick auto-restart within 10 sec after power failure
- Energy Saving mode operation (optional feature)
- 10.4 Inch Advance Touch LCD Panel
- Precise Continuos Capacity Control technology (10% to 100%)
- Compact and light weight design
- Saving in maintenance cost due to reduction in rotating parts in direct drive centrifugal chiller
- Zero mechanical loss in direct drive centrifugal chiller



\*Features may vary from model to model.

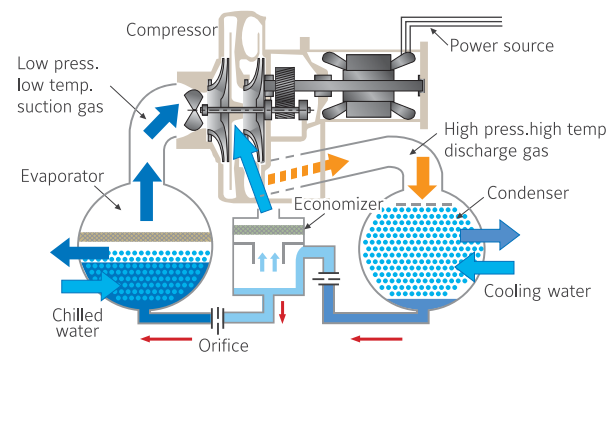
## TECHNOLOGIES OF CENTRIFUGAL CHILLERS

### 2-STAGE COMPRESSION CYCLE

To improve compressor efficiency, refrigerant economizer is added with 2 stage compressor equipped with 2 impellers, as shown in the drawing below. In this case, the refrigerant goes through two expansion devices. When the refrigerant goes through the first device, some of the refrigerant flashes, or becomes a gas.

The flashed refrigerant is introduced to the compressor between the two stages. In one stage compressor cycle without the economizer, all refrigerant flows in the cycle. Comparatively, in the 2 stage compressor cycle part of the refrigerant is bypassed from the economizer to the 2 stage impeller.

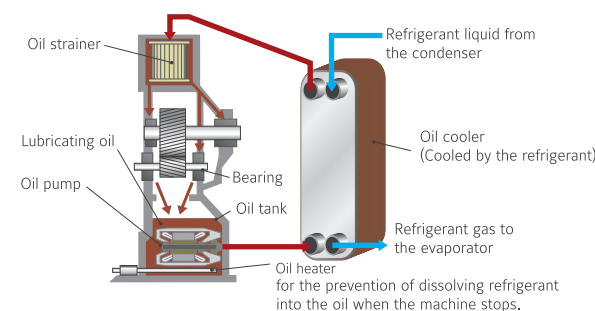
#### • 2-stage Centrifugal Chiller Cycle



### HIGH RELIABILITY LUBRICATION SYSTEM

Direct refrigerant cooling of lubrication oil in oil cooler without cooling water piping increases reliability.

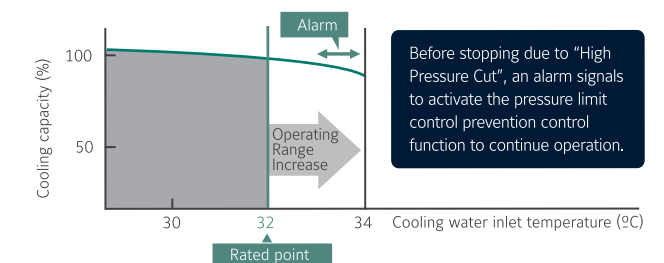
#### • Lubrication Oil Supplying System



### WIDER OPERATION RANGE

Stable operation continues even after the rise of condenser pressure due to cooling water temperature in hot summer and/or producing of tube fouling.

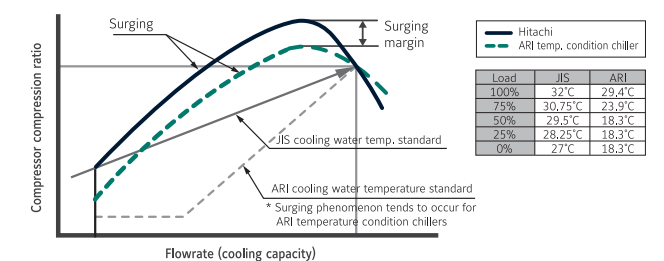
- Example of rising cooling water temperature due to rising ambient temperature.



### SURGE PROTECTION

Adopting strict criteria in JIS for stable operation under high cooling water temperature. 3D 2 stage impeller enables stable operation even at low cooling load or high cooling water inlet temp. which prevents occurrence of surge.

#### • Compressor characteristic comparison



\* This figure shows general characteristics and does not provide any guarantees as to the performance.

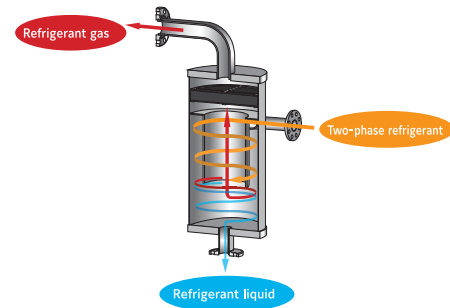
### OTHER UNIQUE FEATURES TO ENHANCE RELIABILITY

- Key-free impeller coupling system
- Accurate chiller water temperature control within +0.2c
- Low noise & longer bearing life due to lower rotation speed of 2 stage compression cycle.
- Continuous oil recovery with automatic refrigerant cleaner.
- Prevention of oil degradation by removing residual water with filter dryer.



## NEW TYPE ECONOMIZER

Improvement of vapor-liquid separation performance and significant downsizing are realized by the use of newly developed economizer. (Cyclonic system)

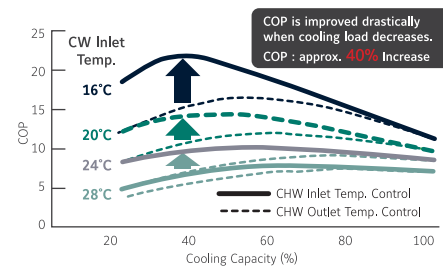


## ENERGY AND POWER SAVING OPERATION FUNCTIONS

### “ECO MODE” OPERATION (CHILLED WATER INLET TEMP. CONTROL)

The chiller is usually controlled so the chiller water outlet temperature remains constant. This ‘eco-mode’ operation introduces the inlet temperature control, where the chilled water inlet temperature is controlled to be constant. The outlet temperature rises a bit but this is enough for the off-peak season air conditioning.

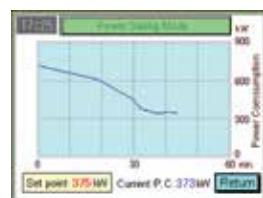
- Comparison of Characteristics between CHW Outlet/Inlet Temp. Control



### ENERGY SAVING MODE OPERATION (OPTIONAL FEATURE)

Once the target motor power consumption is set, the chiller is automatically controlled by the motor speed, the inlet guide vane opening and the chiller water outlet temperature rise. This control is extremely useful for the energy saving especially in the off-peak season when the motor speed is easily decreased.

- Energy Saving Mode Setting Screen

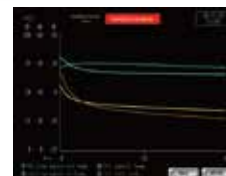


## EASY OPERATION WITH TOUCH PANEL TYPE CONTROL PANEL

- 10.4 inch color touch panel screen
- Monitor various operating data
- Indicate trend graph during operation
- Trend data for max. 40 hours. (Updated every 1 hour)
- Indicate and store operation history for past 12 hours(updated every hour)
- Indicate and store failure and alarm history (latest 6 times each)
- Show handling guide in case of failure
- Automatic restart function after instantaneous power failure(option)
- Multiple language indication
- Download 3-month operation data to USB memory



Operation screen



Failure screen



Trend data screen



Handling guide screen

## COMPATIBLE WITH BMS

Chiller control panel is equipped with RS485 communication port and compatible with building Management system through MODBUS RTU protocol.

## QUICK AUTOMATIC RESTART AFTER POWER FAILURE

Chiller automatically starts up after instantaneous power failure (less than 10 sec) and reverts to normal operation in shortest period.

## EXCLUSIVE TECHNOLOGY OF NEW DIRECT DRIVE CENTRIFUGAL CHILLERS

Presenting the new Direct-drive VSD Centrifugal Chiller. This top of the line chiller comes with environment friendly refrigerant and high-performance heat exchanger tubes that give it excellent cooling potential while being eco-friendly, thus making it one of the best of its kind.



It is also a joy to control, thanks to its touch control panel with 10.4 inch graphic display. Direct-drive two stage compressor improves its efficiency drastically to give it an extra edge by greatly reducing mechanical loss as well as cost of maintenance.

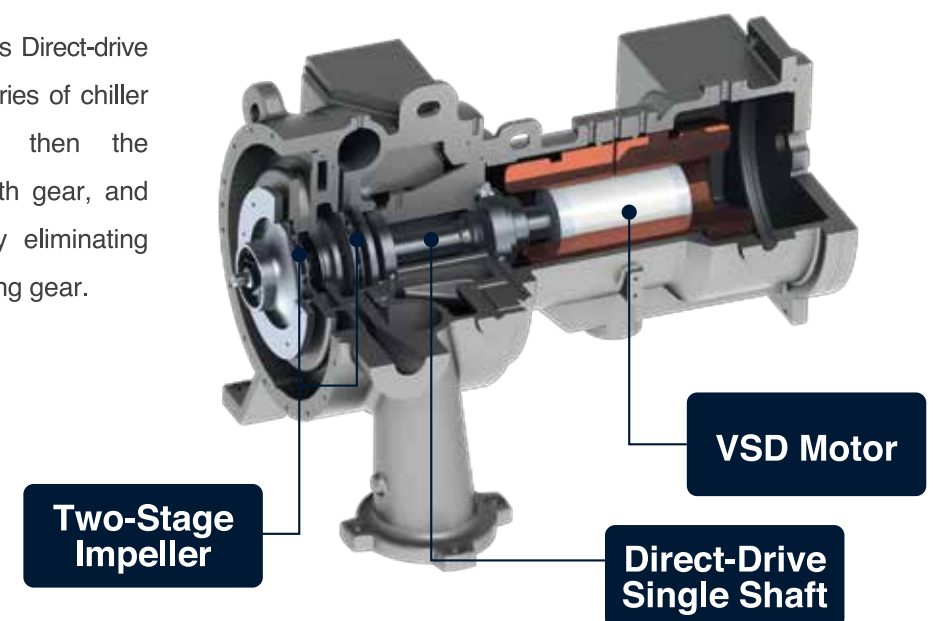
## GEARLESS DIRECT-DRIVE TWO-STAGE COMPRESSOR

Higher efficiency compared to conventional compressor because of no mechanical loss of speed increasing gear.

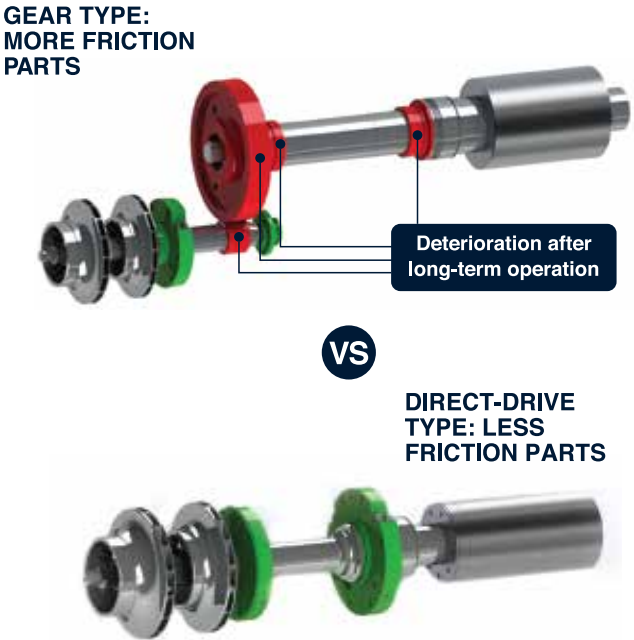
## FOCUSING ON TOTAL EFFICIENCY ALL THROUGH THE YEAR

Adopting VSD Motor and Gearless Direct-drive two-stage compressor, the new series of chiller can realize higher efficiency than the conventional type compressor with gear, and achieve maximum IPLV 11.5 by eliminating mechanical loss of speed-increasing gear.

### HITACHI'S LATEST DEVELOPMENT



SAVING OF  
MAINTENANCE COST



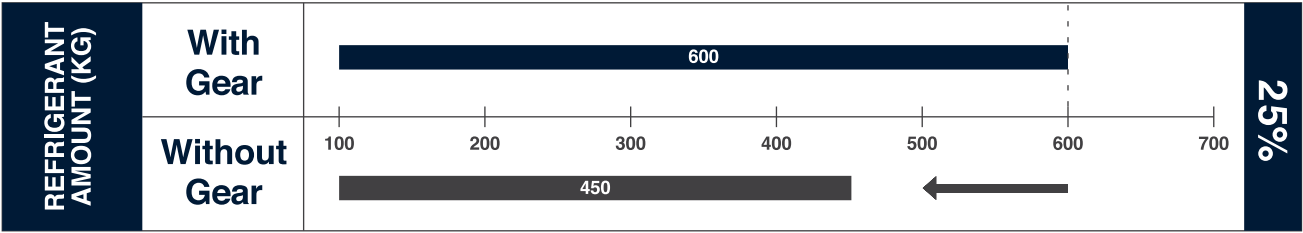
Reduction of  
Consumable Parts

Adopting VSD direct-drive single-shaft impeller, speed increasing gear is removed and power transmission system is simplified. By reduction of moving parts, the compressor structure is simplified and its dimensions was reduced.

Major rotating parts are reduced from 6 items to 2 items (66% reduction), and contributes customer's service cost saving.

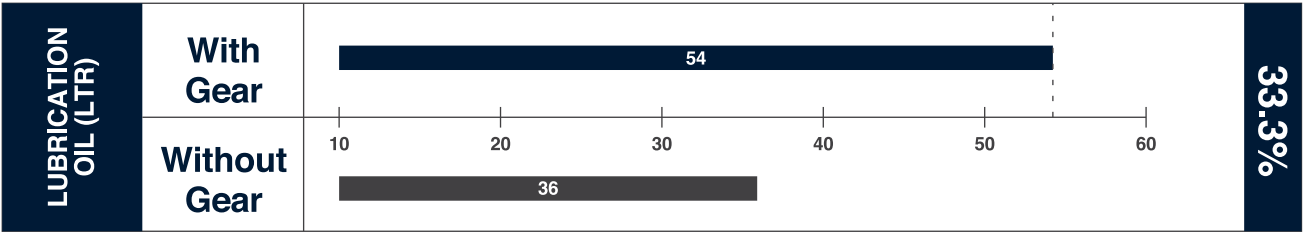
Reduction of Refrigerant

In comparison of 600TR chiller, refrigerant amount of direct-drive model can be reduced by approx. 25% compared with geared model.



Reduction of Lubrication Oil

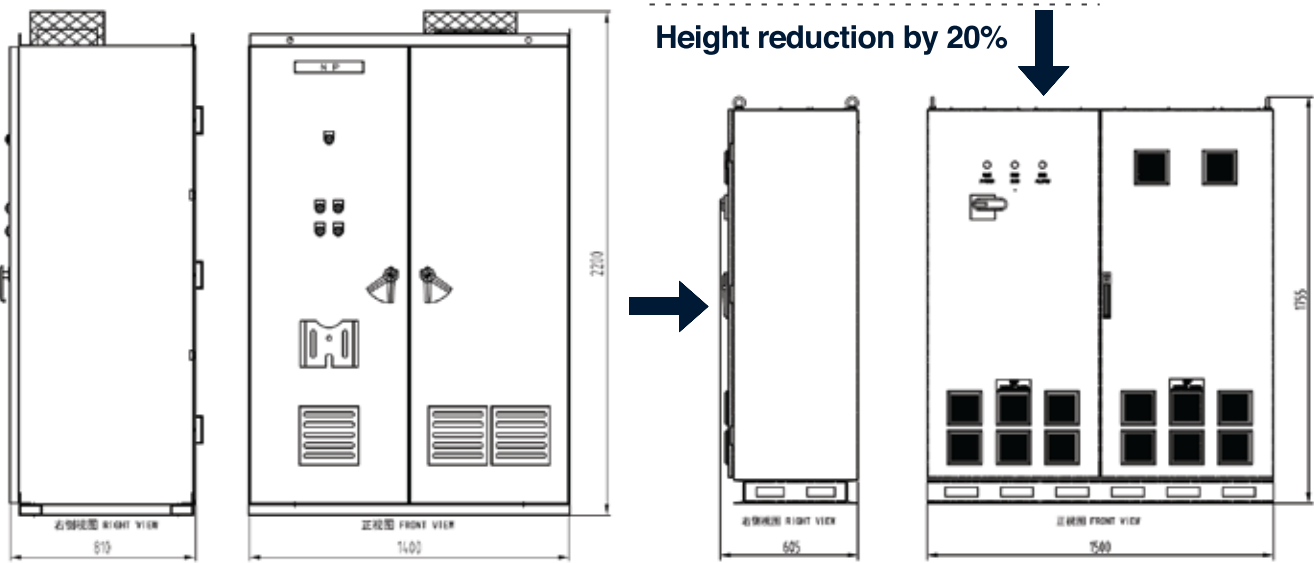
In comparison of 600TR compressor, number of bearing is reduced from 4 sets to 2 sets. Accordingly amount of lubrication oil can be reduced by approx. 33.3%



EXCELLENT DOWNSIZING

Downsizing of Inverter Panel  
– Saving Installation Space

New inverter panel also has compact feature. In comparison of 600TR chiller, size of the panel is approx. 64% of the conventional model, and the height is reduced by approx.20%



Installation Space and Operating Weight

Comparison of 600TR Chiller

