



BLUE STAR



ENERGY-EFFICIENT COOLING SOLUTIONS WITH A CONSCIENCE.

**AIR-COOLED VFD SCREW CHILLER**





## AIR-COOLED VFD SCREW CHILLER SERIES

Blue Star, India's largest central air conditioning company has been providing expert cooling solutions for over seven decades now. As a leader in the industry Blue Star is proud to introduce an innovative new product - The Air-Cooled VFD Screw Chiller, the first of its kind, exceeding 4 Star efficiency norms. As the market leader, Blue Star has once again proven its expertise in HVAC solutions with this new innovative product that offers huge power savings and high return on investment.

Manufactured at the world-class ISO-9001 certified factory @ Wada, Maharashtra the new AHRI certified Air-Cooled VFD Screw Chillers provide application versatility, energy efficiency, low sound levels, control precision, reliability, ease of installation and operational cost effectiveness.





## VFD SCREW COMPRESSOR TECHNOLOGY

An inverter compressor is equipped with a variable frequency drive motor. The VFD drive controls the speed of the motor by varying the frequency. As the speed of compressor changes, the refrigerant flow rate also varies thereby modulating the compressor capacity.

When the cooling demand is more the compressor speed increases and during less demand the speed reduces automatically. Hence, the combination of compressor and VFD drive delivers continuous capacity modulation with proportionate power consumption.



# ADVANTAGES OF VFD SCREW COMPRESSORS

Traditionally the part load performance of conventional fixed speed screw chillers is modulated through a slide valve mechanism which controls the rate of compression of refrigerant in the compressor and thereby modulates the delivered capacity. This mechanism has the following limitations on the performance of chiller:

| Fixed Speed Screw Compressor  | VFD Screw Compressor  |
|---|---|
| <b>Lower efficiency due to:</b> <ul style="list-style-type: none"><li>• Absence of varying speed mechanism proportionate to cooling capacity</li><li>• Over/under compression due to fixed ratio of discharge to suction pressure</li></ul> | <b>Higher efficiency:</b> <ul style="list-style-type: none"><li>• VFD compressor frequency is modulated proportionate to cooling capacity</li><li>• Variable Vi ratio in VFD compressor enables achieving exact compression ratio and prevents over/under compression of refrigerant.</li></ul> |
| <b>High starting current:</b> <ul style="list-style-type: none"><li>• Needs higher electrical switch gear</li><li>• Needs larger DG back-up</li></ul>   | <b>Low starting current:</b> <ul style="list-style-type: none"><li>• Since chiller starts at unloaded current the starting current is significantly lower</li></ul>   |
| <b>Lesser reliability:</b> <ul style="list-style-type: none"><li>• More wear and tear on bearings of motor due to constant high speed of compressor</li></ul>   | <b>Higher reliability:</b> <ul style="list-style-type: none"><li>• As compressor speed is modulated continuously, there is lesser wear and tear on components.</li></ul>  |
| Ineffective chilled water temperature control due to frequent compressor cycling  | Precise chilled water temperature control as capacity modulation is more accurate   |

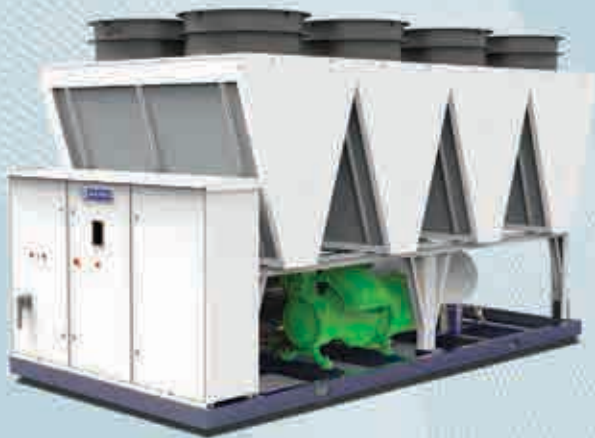
EXCLUSIVE FEATURES OF THE NEW BLUE STAR AIR-COOLED VFD CHILLERS

The first Air-Cooled Screw Chiller exceeding 4 Star efficiency norms in India:

Efficiencies of air-cooled chillers for Star Rating:

| COOLING CAPACITY (TR) | COP | ISEER COP |        |        |        |        |
|-----------------------|-----|-----------|--------|--------|--------|--------|
|                       |     | 1 Star    | 2 Star | 3 Star | 4 Star | 5 Star |
| < 75                  | 2.4 | 3.0       | 3.3    | 3.6    | 4.0    | 4.4    |
| 75 & Above            | 2.6 | 3.1       | 3.5    | 3.9    | 4.3    | 4.7    |

BLUE STAR’S AIR-COOLED VFD SCREW CHILLERS EXCEED THE NORMS FOR 4 STAR EFFICIENCY.



HIGHEST EFFICIENCY

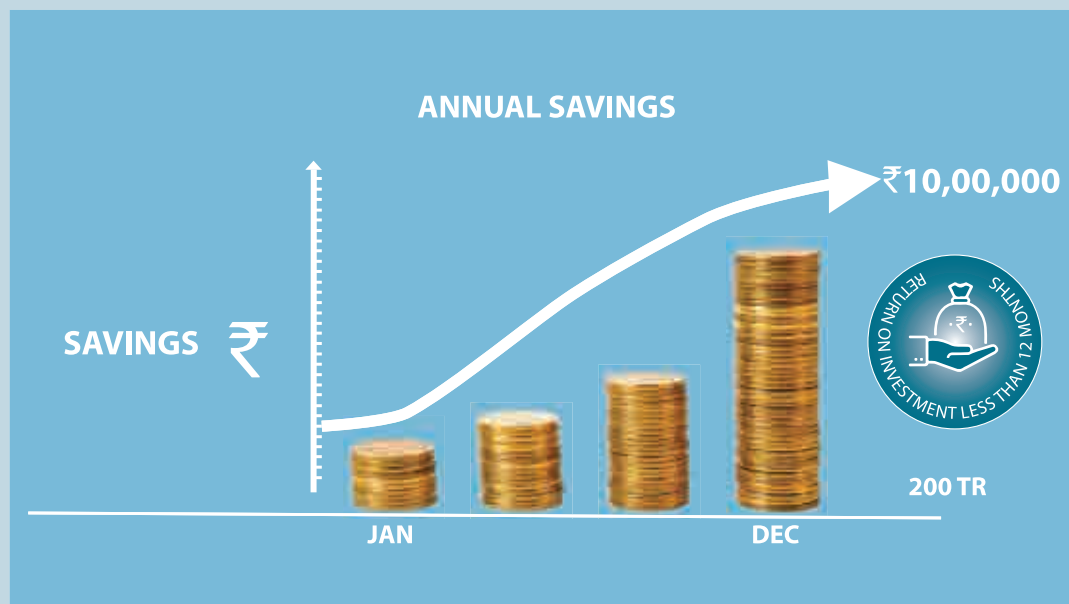




## RETURN ON INVESTMENT – IN LESS THAN ONE YEAR

The new Air-Cooled VFD Screw Chillers are designed with highly efficient screw compressors with variable Vi ratio (ratio of discharge to suction pressure), enhanced coil face area and advanced controllers providing excellent power savings compared to conventional fixed speed chillers. The return on investment is less than 1 year for applications with standard working hours of 10 hours a day.

The ROI will be even better for installations like industries, hotels and hospitals with higher working hours.



EXCEEDS INTERNATIONAL & DOMESTIC REGULATORY EFFICIENCY NORMS

Ashrae 90.1.2016 - Minimum Energy Efficiency Requirements

| Capacity TR   | Path A COP | Path A IPLV | Path B COP | Path B IPLV |
|---------------|------------|-------------|------------|-------------|
| Less than 150 | 2.96       | 4.02        | 2.84       | 4.63        |
| 150 and more  | 2.96       | 4.10        | 2.84       | 4.72        |

ECBC 2017 – Energy Efficiency Requirements

| Capacity Range (TR) | ECBC          |          | ECBC+         |          | Super ECBC    |          |
|---------------------|---------------|----------|---------------|----------|---------------|----------|
|                     | Full load COP | IPLV COP | Full load COP | IPLV COP | Full load COP | IPLV COP |
| 74 and less         | 2.8           | 3.50     | 3             | 4        | NA            | NA       |
| 75 and above        | 3             | 3.7      | 3.2           | 5        | NA            | NA       |

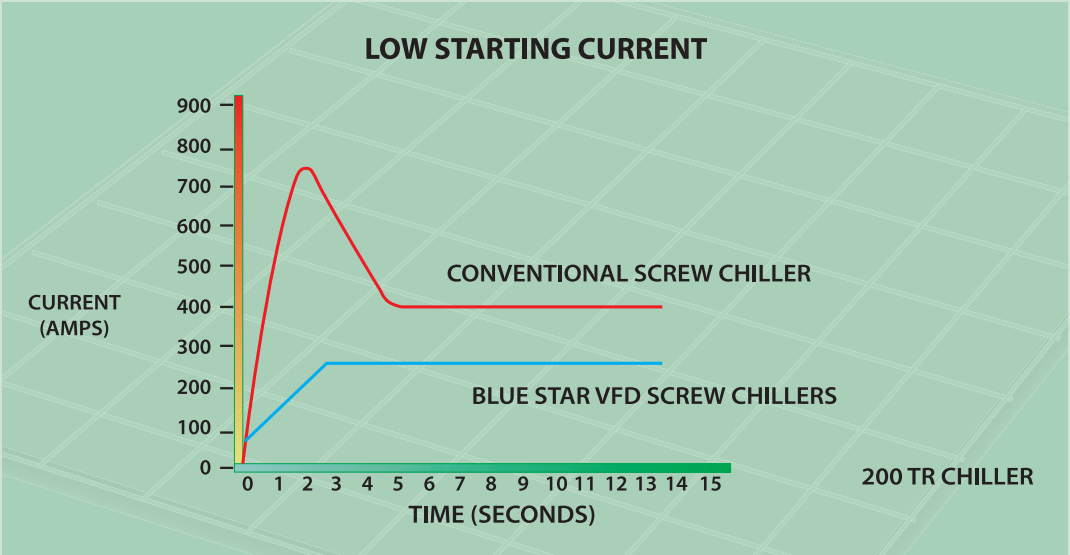
The Blue Star Air-Cooled VFD Screw Chillers exceed above International (Ashrae 90.1) & Domestic (ECBC 2017) efficiency norms.



LOWEST STARTING CURRENT

As the new range of Air-Cooled VFD Screw Chillers start with zero rpm the starting current of these chillers is significantly lower than fixed speed conventional chillers, for example, the starting current of the new 200TR VFD chiller is only 70 amps compared to 750 amps of conventional air-cooled screw chillers.

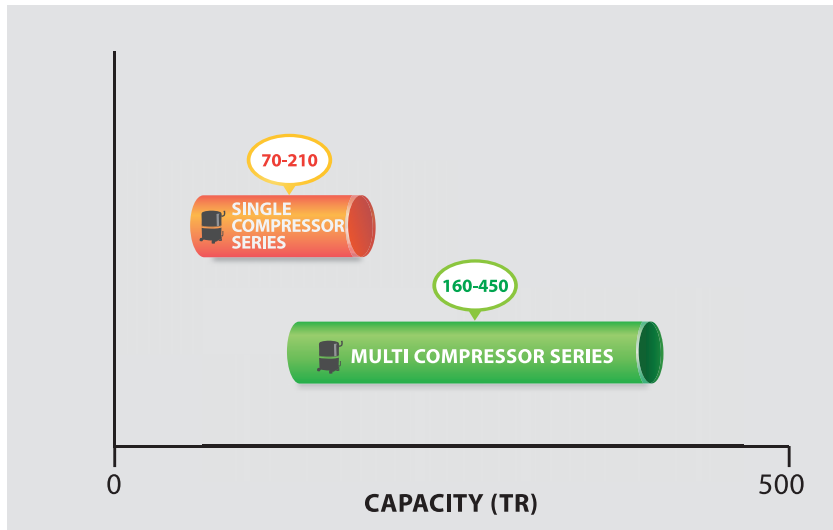
The low starting current aids in substantial downsizing of electrical switchgear and DG sets used for power backup.





## WIDE RANGE

The Blue Star Air-Cooled VFD Screw Chillers are available in a wide range from 70–440TR with both single and twin compressors.



## AHRI & ISEER CERTIFIED TESTING FACILITY

The Air-Cooled VFD Screw Chillers are not only MADE IN INDIA but, are also exhibited at a sophisticated testing facility certified by AHRI & NABL, wherein clients may opt to witness performance testing of the chillers. Also the chillers may be tested for performance verification under both AHRI & ISEER (Indian Seasonal Energy Efficiency Ratio as per Indian Chiller Labelling Standards) testing conditions.

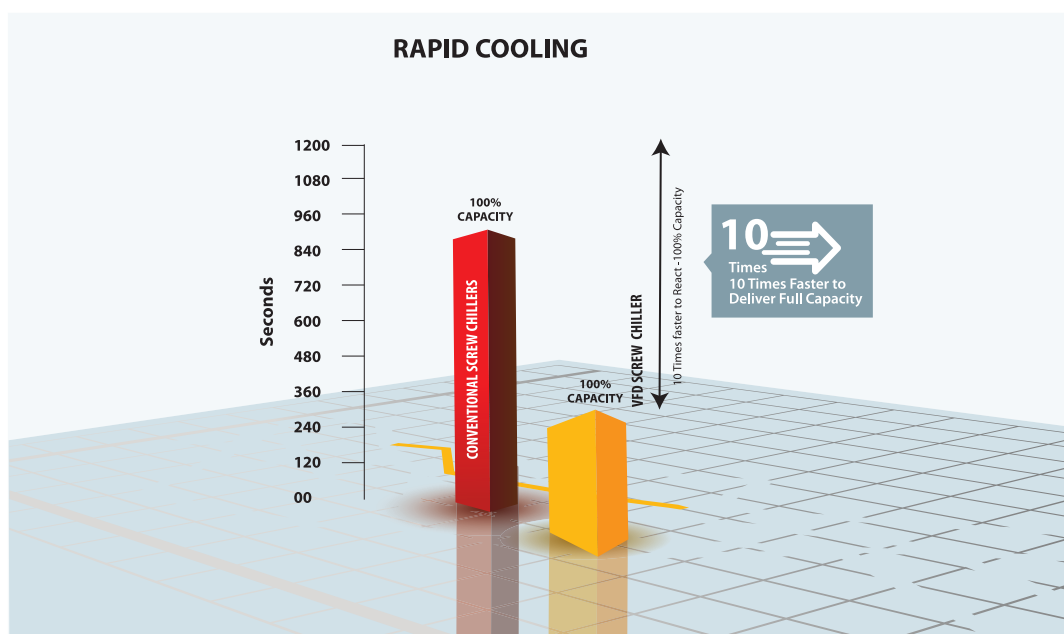




## RAPID COOLING

The Air-Cooled Screw Chillers are widely used for industrial, pharmaceutical and process cooling applications. The load variation in these applications can vary significantly and to reach full 100% capacity, conventional chillers would take approximately 15 minutes. This can significantly impact process cooling requirements.

The new inverter screw series are designed with a unique rapid cooling mode. This feature enables the chiller to achieve 100% capacity within 5 minutes, maintaining the required chilled water temperature in short span of time.





## QUICK RESTART

The Air-Cooled Chillers are used in applications like data centres which require continuous maintenance of cooling conditions inside the premises. Conventional chillers will take approximately 15-20 minutes of time to restart after a power outage. This can significantly impact the performance of such data centres.

The new VFD range is equipped with a controller with a quick restart mode option. This feature enables the chiller to restart within 5 minutes of power resumption and thereby support the necessary conditions inside data centres and other similar critical applications.



Conventional Screw Chillers

Blue Star's Air-Cooled  
VFD Screw Chiller

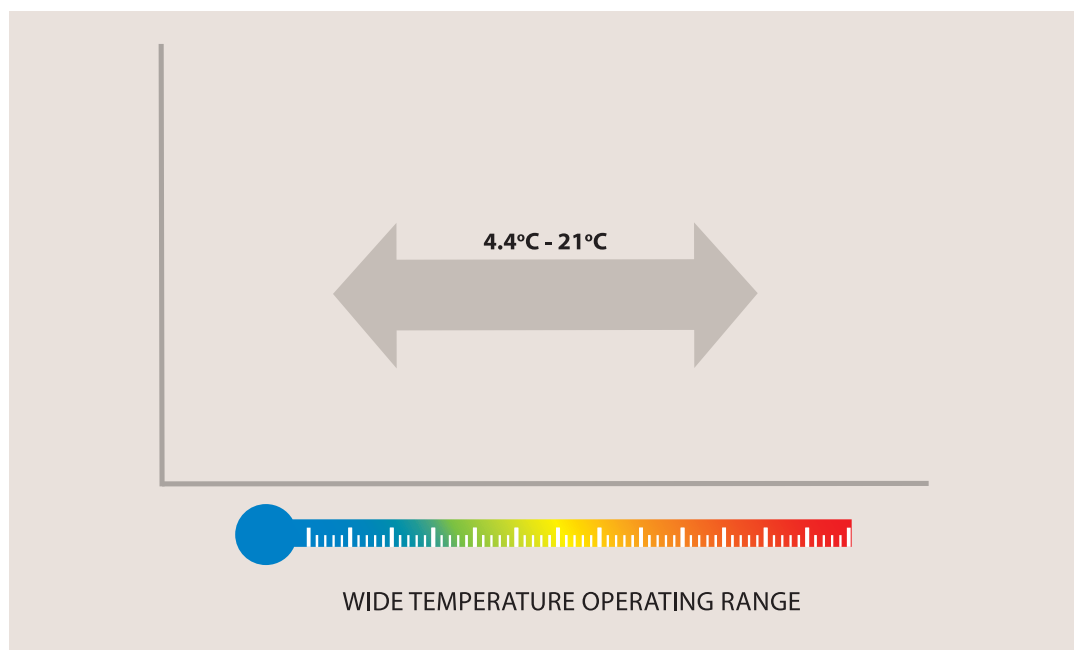






## WIDE OPERATING RANGE

The Blue Star Air-Cooled VFD Chillers can be operated on a wide range, from 4.4°C to 21°C. This unique feature offers the flexibility to install these chillers for varied applications like commercial spaces, data centres, pharmaceutical and other industrial applications.







## DEMAND CONTROL MODE

The new range of VFD chillers are fitted with advanced controllers which can precisely fix the frequency such that the chillers do not run beyond the set capacity. This exclusive feature provides following benefits:

- Optimises the chiller operation to run always at high efficiency
- Helps in projects where there is restriction on the maximum power drawn by the chillers





## SILENT OPERATION

In major cities the Air-Cooled Chillers are generally located in buildings, hospitals and residences. The conventional Air-Cooled Chillers will have more than 87dBA sound levels at 1metre distance which may cause inconvenience to residents nearby.

The new VFD range of Air-Cooled Screw Chillers is designed to deliver noise levels as low as 78dBA. Hence, VFD Air-Cooled Screw Chillers can be installed near critical/sensitive applications.





## BMS COMPATIBILITY

The new VFD Air-Cooled Screw Chillers come with a BMS compatible microprocessor control which allows the chiller to be operated through central Building Management Systems.



## TOUCH SCREEN OPTION

The new controller has an elegant touch screen with back-lit display. It helps in easy operation of the unit and also provides a user-friendly graphical interface to access various parameters.





## EASY AND QUICK INSTALLATION

The new Air-Cooled VFD Screw Chillers are fully charged, pre-wired and tested completely at our factory, prior to dispatch. Also, the new chillers are provided with Victaulic coupling as a standard feature. These enable customers to install the chillers immediately and reduces the installation time. It also avoids, an impact in performance when refrigerant charging is done manually on-site in case of most conventional chillers.



## ASME STAMP OPTION

The new Air-Cooled VFD range of screw chillers is available with the option of ASME stamping on the evaporator for additional mechanical safety.



## ECO-FRIENDLY

The new VFD Air-Cooled Screw Chillers are filled with environment friendly R-134a refrigerant.



## Technical Details

| SR.NO. | DESCRIPTION                     | UNITS | Single Compressor Series                    | Twin Compressor Series |
|--------|---------------------------------|-------|---|------------------------|
| (A)    | <b>Nominal Cooling Capacity</b> | TR    | Refer Software Selection                    |                        |
| (B)    | <b>Compressor Data:</b>         |       |   |                        |
| 1      | Quantity                        | No.'s | 1   | 2                      |
| 2      | Type                            |       | Semi Hermetic Screw                         |                        |
| 3      | Motor Type                      |       | Refrigerant Cooled, 3Ph, Asynchronous Motor |                        |
| (C)    | <b>Electrical Power Supply:</b> |       | 415V , 3 Ph. , 50Hz                         |                        |
| (D)    | <b>Condenser :</b>              |       |   |                        |
| 1      | Tube Material                   |       | Inner Grooved Copper                        |                        |
| 2      | Fin Material                    |       | Aluminium                                   |                        |
| 3      | Type of AI Fin                  |       | Super Slit                                  |                        |
| (E)    | <b>Condenser Fan Details:</b>   |       |   |                        |
| 1      | Fan Diameter                    | mm    | 800   |                        |
| 2      | Quantity of Fan                 | No.'s | Refer Software Selection                    |                        |
| 3      | Air-Flow Quantity               | CFM   | Refer Software Selection                    |                        |
| 4      | Type                            |       | Totally Enclosed Grill Mounted              |                        |
| (F)    | <b>Cooler</b>                   |       |   |                        |
| 1      | Type                            |       | Flooded                                     |                        |
| 2      | Tube Type & Material            |       | Both Side Finned Copper                     |                        |
| 3      | Tube Outer Diameter             | mm    | 19  |                        |
| 4      | No. of Refrigerant Circuit      | No.'s | 1   | 2                      |
| (G)    | <b>Expansion Valve</b>          |       | Electronic Type                             |                        |
| (H)    | <b>Overall Dimensions:</b>      |       |   |                        |
| 1      | Length                          |       | As per G.A. Drawing                         |                        |
| 2      | Width                           |       |   |                        |
| 3      | Height                          |       |   |                        |



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Blue Star products comply with RoHS regulations as per E-Waste (Management & Handling) Rules, 2016. For disposal of E-Waste, kindly visit our website [www.bluestarindia.com](http://www.bluestarindia.com) or call our customer care 1800 209 1177 (Toll Free) or 1860 266 6666.