BLUE STAR

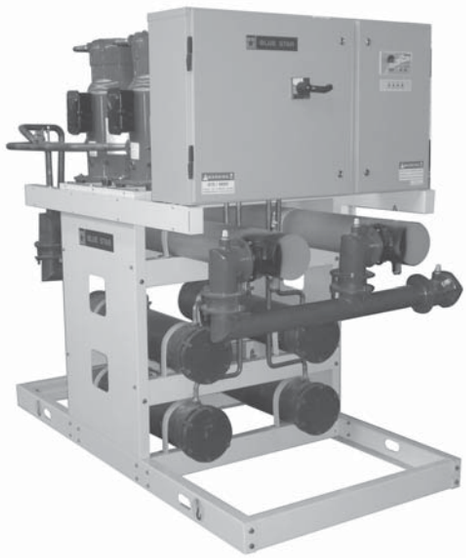
SCROLL CHILLER SYSTEMS

AIR-COOLED

XAC2S-010, XAC2S-024MA, XAC3S-036MA, XAC2YS-048A, XAC2YS-060, XAC2YS-080A

WATER-COOLED

XWC2S-011, XWC2S-026A, XWC3S-039A, XWC4S-052A, XWC4S-085A



User's Manual

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Designed for customer use.
One manual per site irrespective of number of Chillers installed.

CONTENTS

Basics

Liquid Chilling Systems

A liquid chilling system chills water, brine or other secondary coolant for airconditioning or refrigeration purposes. The system may be either factory assembled and wired, or shipped in sections for erection in the field.

The most frequent liquid chilling application for airconditioning is water chilling, although brine cooling for low temperature refrigeration and chilling of fluids in industrial processes are also common.

The basic components of a vapour compression liquid chilling system include a compressor, a liquid cooler (evaporator), a condenser, a compressor drive, a liquid refrigerant expansion or flow control device, and a control centre. The system may also include a receiver or accumulator, an economiser and other ancillary components as part of the operating system.

Principle of operation

Liquid (usually water) enters the cooler, where it is chilled by liquid refrigerant at a lower temperature. The refrigerant vapourises and is drawn into the compressor which increases the pressure and temperature of the gas so that it may be condensed at the higher temperature in the condenser.

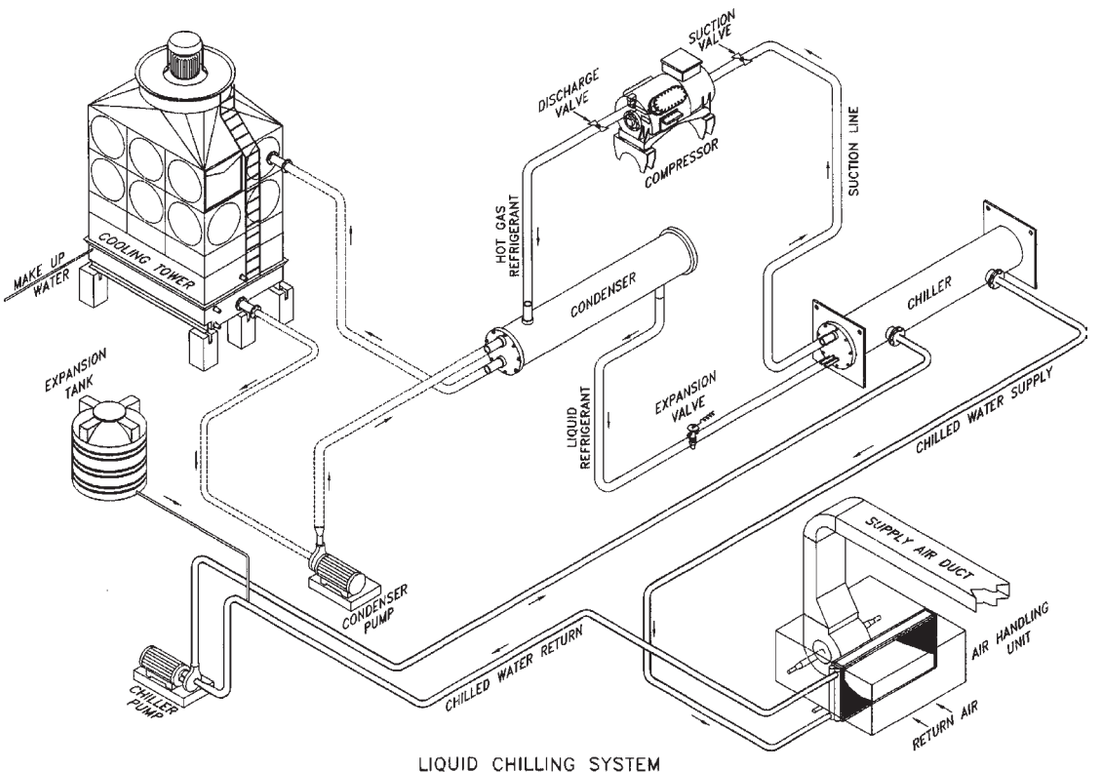
The condenser cooling medium is warmed in the process. The condensed liquid refrigerant then flows back to the evaporator through an expansion device.

Scroll Chiller Nomenclature

System	**X**	X Direct Expansion
Type	**WC** **AC**	Water-cooled Air-cooled
Number	**2**	2 = No. of Refrigeration circuit 3 = No. of Refrigeration circuit 4 = No. of Refrigeration circuit
Compressor Type	**S**	S = Scroll YS = Tandem Scroll
Capacity	**- 010**	010 = 10 TR 024 = 24 TR 036 = 36 TR 048 = 48 TR 060 = 60 TR 080 = 80 TR 011 = 11 TR 026 = 26 TR 039 = 39 TR 052 = 52 TR 085 = 85 TR
Chassis design	**M**	Modular
Revision	**A**	Revision / Version (if applicable)

Common Liquid Chilling Systems

The refrigeration cycle of a basic system is shown in the figure below:



Refrigeration Cycle

Chilled water enters the cooler at 12°C, for example, and leaves at 7°C. Condenser water leaves a cooling tower at 32°C, enters the condenser and returns to the cooling tower at 37°C. Condensers may also be cooled by air or through evaporation of water.

This system, with a single compressor and one refrigerant circuit with a water cooled condenser, is used extensively to chill water for airconditioning because it is relatively simple and compact. Multiple chilled water circuits can be connected to achieve higher capacity.

Control

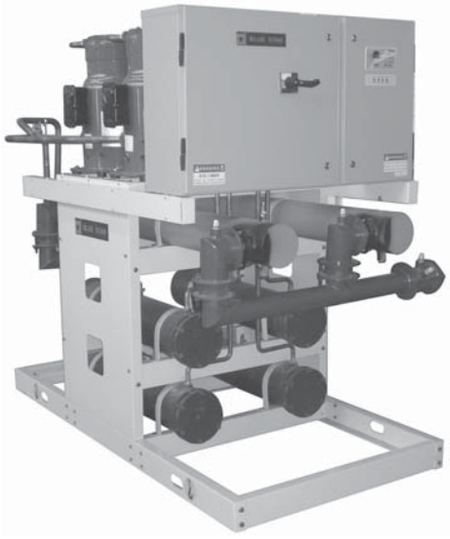
The chilled liquid temperature sensor sends an electrical signal (electronic control) to the control circuit, which then modulates compressor capacity in response to leaving or return chilled liquid temperature changes from its set point.

Compressor capacity adjustment is accomplished differently on the scroll chillers as below:

In a 4-compressor circuit chiller, the capacity of the output can be reduced in 4 steps: 75%, 50%, 25%, 0%. In a triple circuit, the capacity can be reduced in three steps: 66%, 33%, 0%. In a twin circuit, it can be reduced to 50% or 0%.

In a single circuit, the chiller sensor directly switches the compressor On or Off.

A typical air-cooled chiller



A typical water-cooled chiller

Air Handling Equipment

The basic secondary system is an all-air, single-zone, airconditioning system consisting of an air-handling unit and an air distribution system. The airconditioning units are normally designed to supply a constant air volume or a variable air volume for low, medium or high velocity air distribution.

Normally, the equipment is located outside the conditioned area. If the conditions permit, it can be located closer to the conditioned area.

The cooling equipment used for airconditioning in comfort applications are normally :

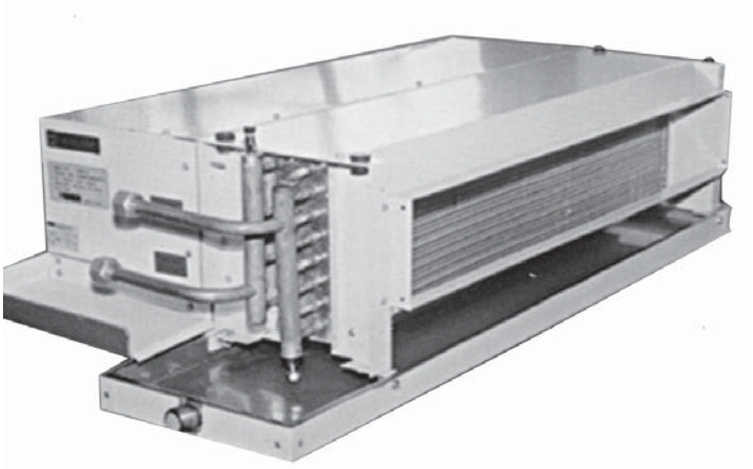
a) Direct expansion type — using refrigerant fluid.

b) Indirect cooling type — using chilled water.

As this manual discusses only chilling units using water, we will consider air handlers used with indirect cooling systems, which are classified as follows:

In-room Terminal Systems

Fan coil units fixed in individual rooms can be remotely controlled by the end user. Chiller water passes through the coils as the cooling media. The indoor air is continuously recirculated through the coil to cool the room. FCU capacities are normally limited to 1, 1.5, 2, 2.5, 3 or 3.5 TR.



Fan Coil Unit

Floor-standing Vertical Units

Larger areas such as halls, conference rooms and meeting rooms use medium capacity air handling units which could be floor-standing or ceiling-mounted.

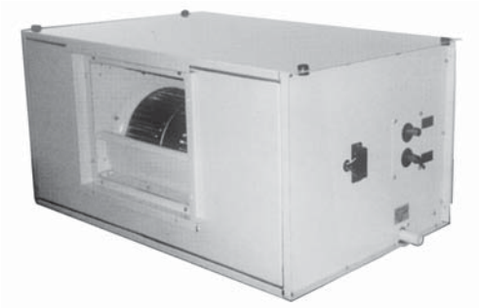
Floor standing units can be installed in an enclosed room. Such units circulate air through a duct above a false ceiling. Return air is normally collected from above the false ceiling into the enclosed room. Chilled water units are available in 5, 7.5 and 10 TR capacities.

Floor-standing AHU

Ceiling-suspended Horizontal Units

Ceiling-suspended units can be installed above the false ceiling to conserve floor space and ducted to supply air. Return air is collected directly via the plenum space above the false ceiling around the duct.

These models are available in 3, 5, 7.5 and 10 TR capacities.



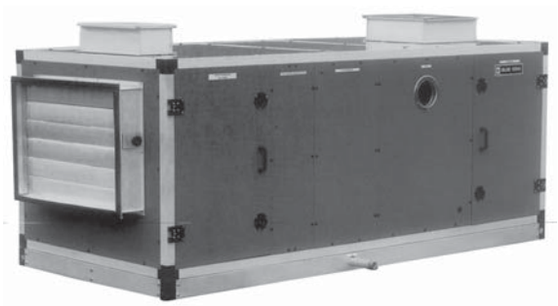
Ceiling-suspended AHU

Floor-mounted Air Handling Units

For cooling larger areas, stand-alone air handling units are installed in a separate plant room. Air is supplied through ducts and return air is collected through ducts or ceiling plenum.

These units are available in capacities ranging from 2000 cfm to 51000 cfm, and with single skin and double skin insulation.

Single Skin Air Handling Unit



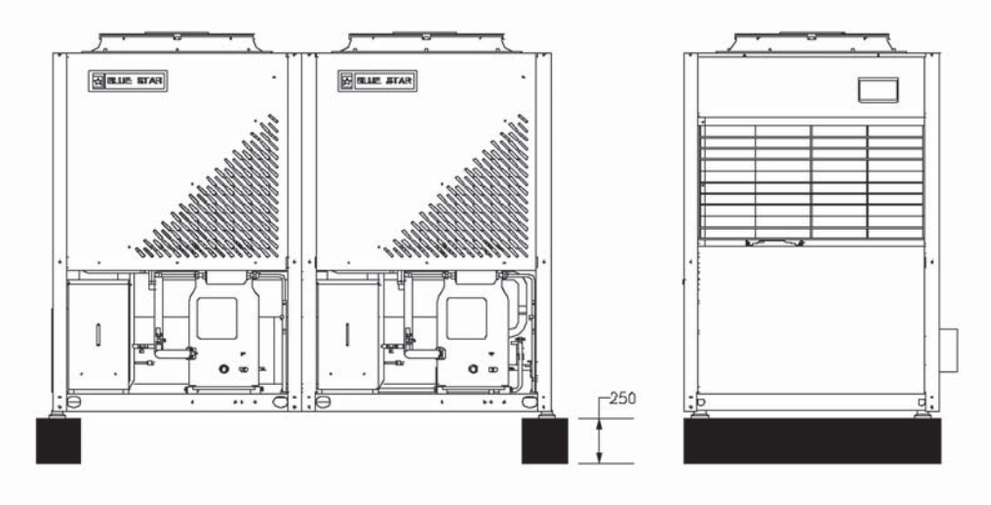
Double Skin Air Handling Unit

Note : Technical specifications for the above products are available in their respective catalogues.

Typical Foundation Details

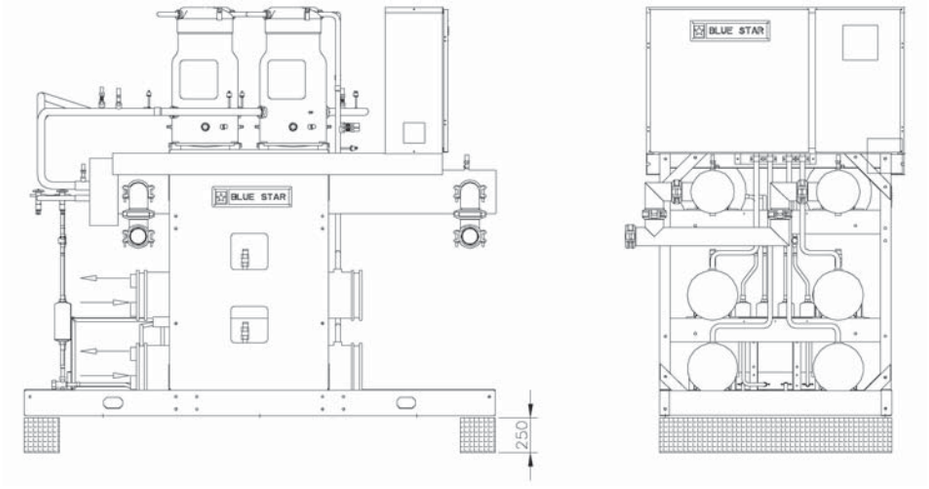
Air-cooled Chillers

- Provide R.C.C. pedestal of 250mm x 250mm height



- For installation on terrace, provide 250mm x 250mm high beam (minimum). Actual length of beam shall be as per span of beam.
- Alternately ISMB girder of suitable height can be provided.

Water-cooled Chillers



- Provide R.C.C. pedestal of 250mm x 250mm height
- For installation on terrace, provide 250mm x 250mm high beam (minimum). Actual length of beam shall be as per span of beam.

Operation — Entire System

Water-cooled Chiller Systems

Starting the system

Ensure that the crankcase heater is always 'ON' when the compressor is 'OFF'.

1. Ensure input voltage is within specified range (380 - 420 volts).
2. Ensure all valves on the water lines are in open condition.
3. Check water level in expansion tank.
4. Check water level in cooling tower and make-up tanks.
5. Ensure water quality is within recommended parameters.
6. Be certain all control sensor bulbs are inserted completely in their respective thermo wells.
7. Check that the recommended fuses are in the power circuit disconnect switch and then close the switch.
8. Ensure crankcase heater supply is connected before disconnect switch as shown in wiring diagram.
9. Start the cooling tower fan.
10. Start the condenser water pumps.
11. Start the chilled water pumps.
12. Start AHUs, or other air handling equipments.
13. Set chilled water thermostat to the desired water temperature.
14. Switch on the chiller from the micro computer panel. (Follow operational instructions provided in the following pages).
15. In case of scroll compressors, if an unusual noise is heard on starting, and there is no change in suction pressure and discharge pressure, the direction of rotation of compressor is wrong. Reverse the wiring terminals of the compressor and again check for noise, and suction & discharge pressures.

    This can be eliminated with the provision of a safety electrical device on the control panel, which provides the unit reverse polarity protection and single phase protection.
16. When compressor starts, a flow of liquid will be noted in the liquid indicator. After several minutes of operation, the bubbles disappear and full flow of liquid occurs when the unit is operating normally.

17. Check the operation of the safety control switches and indicating lights on the control panel to be sure that they function to stop compressor motor in case the settings are exceeded.
18. Check compressor suction superheat after steady operation and leaving chilled liquid has been pulled down to the required temperature. Compressor suction superheat is the difference between the actual temperature of the main refrigerant gas entering the compressor and the saturation temperature corresponding to the suction pressure as shown in a standard pressure-temperature table for R22. Compressor suction superheat is directly related to evaporator (cooler) superheat, which is controlled by thermal expansion valve adjustment. A low compressor suction superheat indicates a low cooler superheat (approaching flooding condition of the evaporator) and vice versa.
19. The thermal expansion valve is factory-set to control at 5.5°C superheat, which, in normal operation, produces a compressor suction superheat of approx. 6°C. It is not recommended to adjust thermostatic expansion valve in the field.
20. Check setting of controls as under (Fixed Preset Type)

    LP Cutout - set at 35 psig (Check with gauge)

    HP Cutout - set at 290 psig (Check with gauge)

    Antifreeze - set at 5°C (Check with thermometer)

    Thermostat - set as per requirement

Stopping procedure

1. Switch off the chiller by pressing ON/OFF key only.
2. Stop chilled water pump.
3. Stop condenser water pump.
4. Stop cooling tower fan.
5. Stop air handling equipments.

Note:

Please note that these units cannot be operated in manual mode. All alarms & faults are indicated only on the LCD control panel.

Air-cooled Chiller Systems

Starting the system

Ensure that the crankcase heater is always 'ON' when the compressor is 'OFF'.

1. Ensure input voltage is within specified range (380 - 420 volts).
2. Ensure all valves on the waterlines are in open condition.
3. Check water level in expansion tank.
4. Be certain all control sensor bulbs are inserted completely in their respective thermo wells.
5. Check that the recommended fuses are in the power circuit disconnect switch and then close the switch.
6. Ensure crankcase heater supply is connected before disconnect switch as shown in wiring diagram.
7. Start the chilled water pumps.
8. Start AHUs, or other airhandling equipments.
9. Set chilled water thermostat to the desired water temperature.
10. 'Switch on' the chiller from the micro computer panel located on the chiller. (Follow operational instructions provided in the following pages).
11. In case of scroll compressors, if an unusual noise is heard on starting, and there is no change in suction pressure and discharge pressure, the direction of rotation of compressor is wrong. Reverse the wiring terminals of the compressor and again check for noise, and suction & discharge pressures. This can be eliminated with the provision of a safety electrical device on the control panel, which provides the unit reverse polarity protection and single phase protection.
12. When compressor starts, a flow of liquid will be noted in the liquid indicator. After several minutes of operation, the bubbles disappear and full flow of liquid occurs when the unit is operating normally.
13. Check the operation of the safety control switches and indicating lights on the control panel to be sure that they function to stop compressor motor in case the settings are exceeded.
14. Check compressor suction superheat after steady operation has been established and leaving chilled liquid has been pulled down to the required temperature. Compressor suction superheat is the difference between the actual temperature of the main refrigerant gas entering the compressor and the saturation temperature corresponding to the suction pressure as shown in a standard pressure-temperature table for R22. Compressor suction superheat is directly related to evaporator (cooler) superheat, which is controlled by thermal expansion valve adjustment. A low compressor

suction superheat indicates a low cooler superheat (approaching flooding condition of the evaporator) and vice versa.

15. The thermal expansion valve is factory-set to control at 5.5°C superheat, which, in normal operation, produces a compressor suction superheat of approx. 6°C. It is not recommended to adjust thermostatic expansion valve in the field.

16. Check setting of controls as under (New Saginomia Preset Type)

    LP Cutout - set at 35 psig (Check with gauge)

    HP Cutout - set at 400 psig (Check with gauge)

    Antifreeze - set at 5°C (Check with thermometer)

    Thermostat - set as per requirement

Stopping procedure

1. Switch off the chiller by pressing ON/OFF key only.
2. Stop chilled water pump.
3. Stop air handling equipments.

Note:

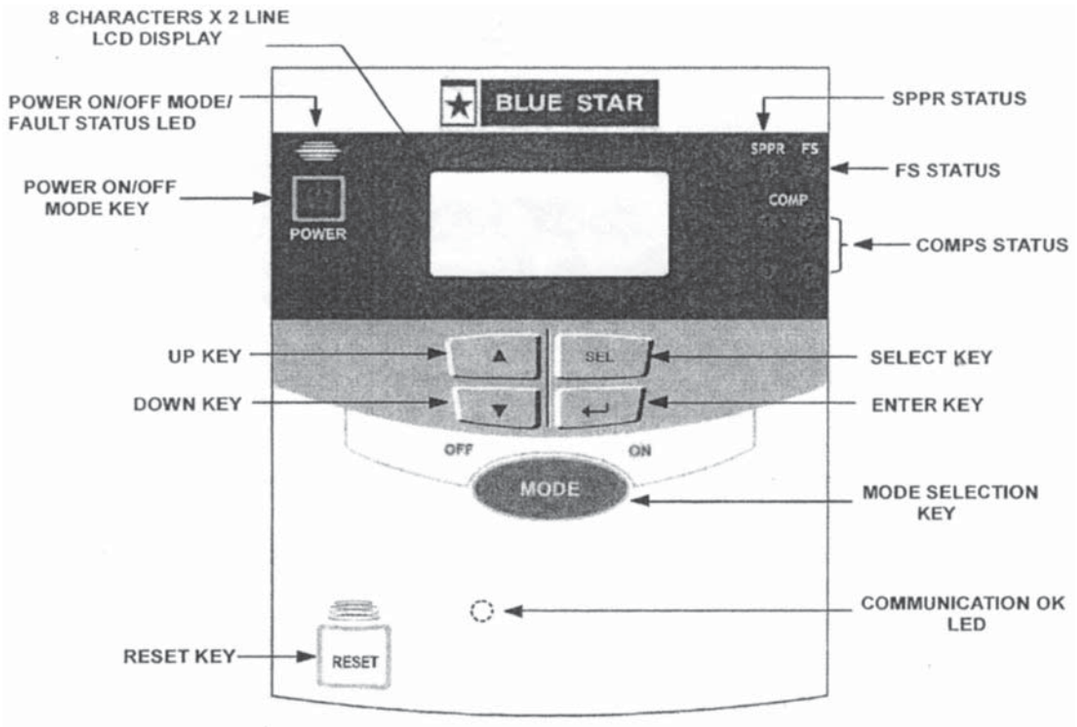
Please note that these units cannot be operated in manual mode. All alarms and faults are indicated only on the LCD control panel.

The Micro Computer Panel Controller

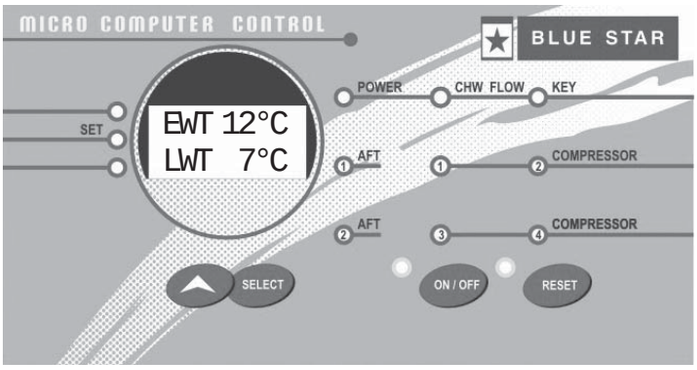
Air-cooled Chiller Systems

The micro-controller facia is shown below for different air-cooled chiller systems:

For 2 & 3 Compressors only



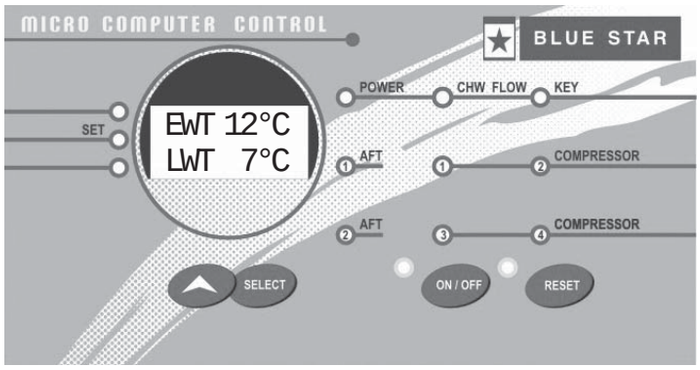
For 4 Compressors only



Water-cooled Chiller Systems

The micro-controller facia is shown below for water-cooled chiller systems:

For 2, 3 & 4 Compressors



Using Micro Controller – 2 and 3 Circuits
- Modular - 2 & 3 Compressors

Salient Features

- Modular hardware design with modular assembly & wiring for multi-compressor systems – maximum 4 Nos.
- Condensing Unit / Chiller option.
- Wall / panel mounted LCD display and keyboard Handset with 5 metre cable.
- Master Controller with 2 relay outputs (230V AC) for Compressor & Alarm, 4 Digital Inputs (+12V DC) & 2 Analog Inputs for Temp sensors.
- Slave controller with 1 relay output (230V AC) for compressor & 4 Digital Inputs (+12V DC).
- Built-in SPPR protection circuit.
- Fuse protection (0.5 Amps) for relay and transformer.
- Inbuilt Crankcase Heater circuit with 2 Amps fuse protection.
- Base mounting Current Transformer (100 Amps) for monitoring Compressor current. The following are the maximum and minimum current settings:

  Maximum Setting: 42 Amps

  Minimum Setting: 6 Amps
- 2 level password protection for parameter setting.
- Individual ON / OFF Switch on each controller base.
- Auto loading / unloading of compressor systems with runtime equalisation.
- In-built Anti-Freeze safety.
- Automatic starting of unit in case of power failure with preset values.

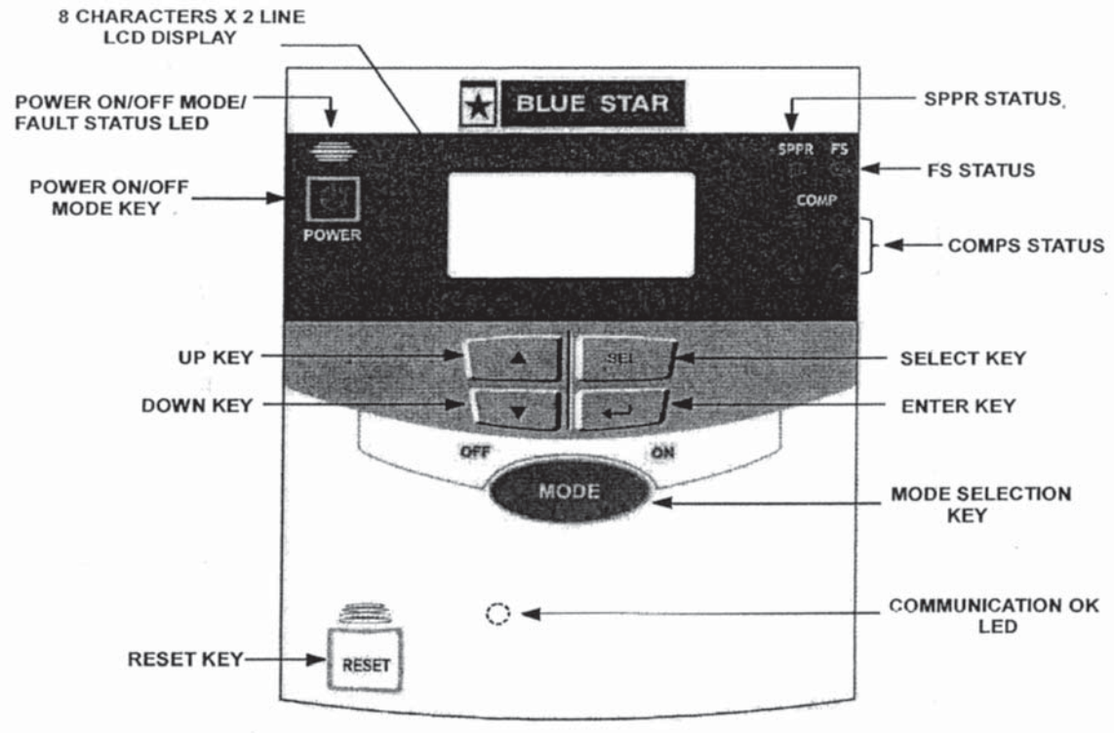
Optional

- Group Controller.
- 50 metre cable for Display.

Specifications

1. Controller power supply	:	Single phase, 180 to 260V AC, 50 Hz, ± 3%.
2. Operating temperature limit	:	0 - 65°C
3. Display & Keypad unit Wall mounting.	:	8x2 Character LCD Display, LED indications.
4. Temperature control accuracy	:	1°C.
5. Set temperature range	:	8 - 25°C (Normal chiller). -21 to 5°C (Brine Chiller). 19 - 32°C (Condensing unit).
6. Set current range	:	6 - 42 Amps.
7. Temperature sensors	:	NTC Thermistor with 5 metre cable.

Description of LED Indicators & Keypad



I. LED Indication:

- Power : Green = Unit is ON.
  RED = Unit is OFF.
- ON : Blue = Unit is ON.
- OFF : Blue = Unit is OFF.
- SPPR : Green = presence of Power.
  Blinking RED = SPPR fault.
- FS / AHU : Green = Flow switch / AHU input is OK.
  Blinking RED = Flow Switch / AHU fault.
- Compressor 1 / 2 / 3 / 4 : Green = Compressor 1 / 2 / 3 / 4 is ON.
  Red = Compressor 1 / 2 / 3 / 4 is OFF.
- RESET : Blinking Green = fault is cleared or any key is pressed.
- Communication OK : Blinking Green = communication is OK.

II. Keys

POWER	:	This key is used to switch ON / OFF the system. In OFF Mode display light goes OFF and the screen shows 'POWER DOWN'.
RESET	:	This key is used to reset Fault Alarm or to restart the system after clearing the fault.
INC (▲) Key	:	This key is used to scroll the display in upper direction as well as to increment any parameter value.
DEC (▼) Key	:	This key is used to scroll the display in lower direction as well as to decrement any parameter value.
SELECT	:	This key is used to select any parameter like EWT, SET, CR value etc.
Enter Key (↵)	:	This key is used to store any parameter value.
MODE	:	This key is used to change the ON Mode to OFF Mode and vice versa.

Display of Parameters

By default display will show Entering Water Temperature (EWT) and Leaving Water Temperature (LWT) in Chiller and Actual Room Temperature in Condensing Unit.

Other parameters can be viewed by pressing select key and Enter Key. If no key is pressed for 10 seconds, the display will show EWT, LWT in Chiller and Actual Room Temperature in Condensing Unit.

Note on Parameters (Illustrative Parameters)

Operation	LCD Display	Description	Screen Number
Power ON	**BLUE STAR Cond Unit.**	This is the welcome screen for the Controller of the Condensing Unit.	
	VERSION Kpd: 3.00	This screen displays the software version of the keypad.	
	VERSION Bs1:3.00	This screen displays the software version of the Base Unit 1.	
	VERSION Bs 2: 3.00	This screen displays the software version of the Base Unit 2.	
	VERSION Bs 3: 3.00	This screen displays the software version of the Base Unit 3.	
	VERSION Bs 4: 3.00	This screen displays the software version of the Base Unit 4.	
	SYSTEMS 2:	This screen displays the details of the number of systems in the Chiller / Condensing Unit. On the second line, the model type is scrolled.	
	Act Room	This is the default screen of the controller under healthy condition which displays the Actual Room Temperature.	1
	Act : 25	This is the screen of the controller under any faulty condition. It also displays the room temperature and the fault is scrolled on the second line.	1
Press **SEL** key once	**Set Temp:25**	This screen displays the value of the set temperature.	2
Press **SEL** key once	**System 1 On**	It shows the ON/OFF status of system 1	3
Press **SEL** key once after each screen.	**System 2/3/4 On**	It shows ON/OFF status of next systems (up to 4 systems / up to 4 compressors) in multicompressor system.	4/5/6
Press **SEL** key once	**Act Room Temp : 25**	After displaying the status of all the systems, the controller will return to the default screen.	1

Parameters Setting with Password

Sr.No.	Password	Parameters
1.	**0851**	Set Temperature, Local / Remote Option, Power On Delay
2.	**4321**	Set Temperature, Local / Remote Option, Power On Delay, Minimum & Maximum Current Setting, Address Setting.
3.		Programming mode for Chiller / Condensing Unit is factory set.

Password Entering Procedure

Operation	LCD Display	Description
Press **SEL** Key	**Set Temp:25**	This screen displays the value of the set temperature.
Press Key (↵)	**Password 0000**	This is the screen where you can enter the desired password.
Press Key (▲)	**Password 0001**	Press key (▲) till the desired value of last digit of password appears on the screen.
Press Key (▼)	**Password 0001**	Press key (▼) for shifting to the next digit to the left.
Press Key (▲)	**Password 0011**	Press key (▲) till the desired value of second last digit of password appears on the screen.

If the password is incorrect, following message appears:

Password Invalid

Following Parameters can be set after Entering Correct Password.

LCD Display	Description	Parameter Limits
Set Temp 19	To set the desired temperature Press INC key till the desired value appears & press key (↵) to confirm it.	Max: 32°C
Option Local	To set the parameters from local keypad, make the option option as 'LOCAL' and to set the parameters from remote keypad, change the option to 'REMOTE'.	
Power ON Delay: 30	To set the Power On Delay press key (▲) till the desired value appears & press key (↵) to confirm it.	Max: 120 sec. Min: 30 sec.
Set Amps Max:25	To set the Max Current value, press key (▲) till the desired value appears & press key (↵) to confirm it.	Max: 42 Amps Min: 6 Amps
Set Amps Max:6	To set the Min. Current value, press key (▼) till the desired value appears & press key (↵) to confirm it.	Max: 42 Amps Min: 6 Amps
Set Unit Addr: 1	The unit address can be set by using (▲) and (↵) key.	Max: 9 Min: 1
VERSION Bs 1 : 3.00	Displays the software version of the Controller Base.	
VERSION Kpd: 3.00	Displays the software version of the Keypad / Local Master.	

Description of Status Windows :

LCD Display	Description
Power ON Dely : 120	Displays the Power On Delay left for the system in seconds.
Syst1 TM Recy :180	Displays the Anti Recycle Time for the Compressor in seconds.
System 1TM Dely: 10	Displays the ON/OFF status of the complete system.
System 1 Off Mode	Displays the ON/OFF staus of the individual system.

To view the parameter of any particular system, press **SEL** key until the desired System appears on the screen and then press key (↵).

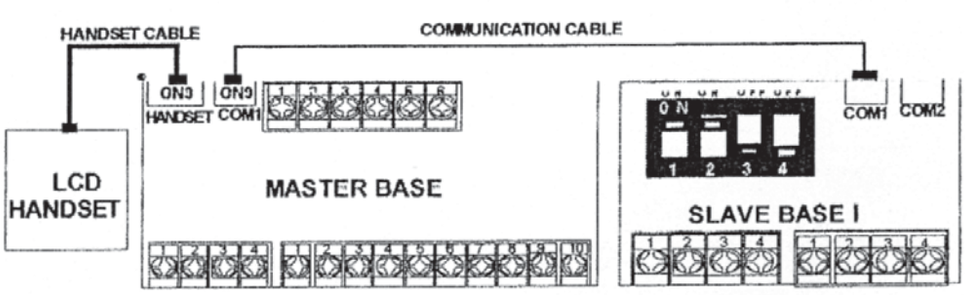
Following are the parameters that can be viewed for a system:

LCD Display	Description
Syst1 Hr 10:55	This window shows the Run hours of the system 1.
System 1 25 Amps	This window shows the current drawn by system 1.
System 1 HP : Ok	This window shows the status of the HP input of system 1.
	Ok = Healthy, Trip = fault
System 1 LP : Ok	This window shows the status of the LP input of system 1.
	Ok = Healthy, Trip = fault
System 1 MP : Ok	This window shows the status of the MP input of system 1. Ok = Healthy, Trip = fault
System 1 OFF : No	This window shows the ON/OFF status of the System 1. No = System is ON Yes = System is OFF

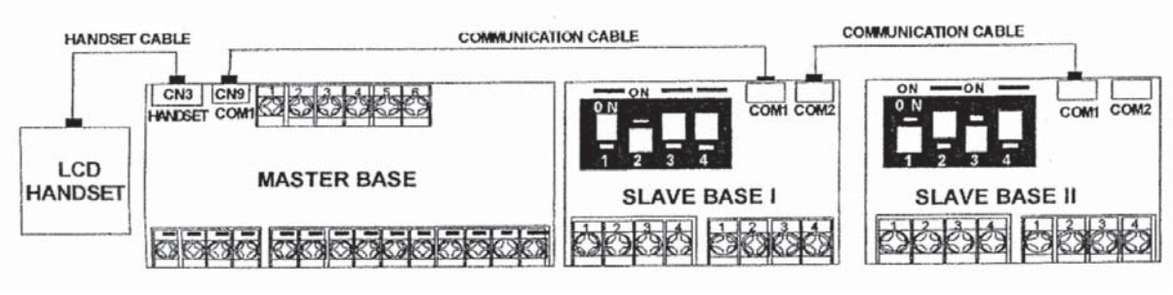
Configuration of Dip Switch Selection:

Dip switch no.1 for Termination Resistance must be ON in the last System.

1. Setting for 2 Compressor System :



2. Setting for 3 Compressor System :



Display of Alarms and Reset Procedure

LEDs on the display panel will indicate the faults. The alarm message indicating the fault type will be scrolled on the LCD. Various system fault alarms are as follows:

Fault	Scrolling LCD Message	LED Indication
SPPR	**SPPR Trip**	Both Power & SPPR LED indicators will blink Red if the fault exists. Press Reset key to restart the system after the fault is cleared and Reset LED blinks Green.
Flow Switch	**FS**	In case of Chiller, both FS/AHU & Power indicators will blink Red if the fault exists. Press Reset key to restart the system after the fault is cleared and Reset LED blinks Green.
AHU	**AHU Fault**	In case of Condensing Unit, both FS & Power indicators will flash Red if the fault exists. Press Reset key to restart the system after the fault is cleared and Reset LED blinks Green.
Compressor 1/2/3/4 Trip on Motor Protector	**MP1/2/3/4 Trip**	Compressor LED will blink Red if the fault exists in a particular compressor. This fault is Auto Reset.
Compressor 1/2/3/4 on High Pressure	**HP1/2/3/4 Trip**	Power & Compressor LEDs will blink Red if the fault exists. Press Reset key to restart the system after the fault is cleared and Reset LED blinks Green.
Compressor 1/2/3/4 Trip on Low Pressure	**LP1/2/3/4 Trip**	Power & Compressor 1 indicators will flash Red if the fault exists. Press Reset key to restart the system after the fault is cleared and Reset LED blinks Green.
Room Temperature sensor is open or bad.	**Room Thermister Open**	All compressors become OFF. This fault is Auto Reset.
System 1/2/3/4 overload on Current Fault.	**Act : 22 System 1 /2/3/4 overload**	Reset LED Indicator will flash Green. Press Reset key to restart the system.
System 1/2/3/4 Underload on Current Fault.	**Act : 22 System1/2/3/4 Underload**	Reset LED Indicator will flash Green. Press Reset key to restart the system.
System 1/2/3/4 Single Phasing on Current Fault	**Act : 22 System 1/2/3/4 Single Phasing**	Reset LED Indicator will flash Green. Press Reset key to restart the system
Communication between Master chiller base and Keypad failed.	**Communication Error**	When connection breaks or gets shorted then **'Communication Error'** fault will scroll on the Display.
Individual Switch of System 1/2/3/4 is Off.	**System 1/2/3/4 Switched OFF**	That particular system switches OFF immediately showing Red LED indication.

Functional Logic of Compressor Tripping ON Current Fault

1. 60A Current Transformer (C.T.) is placed in B-Phase of each compressor power wiring to measure actual compressor current.
2. **System Tripping on Single Phasing :** If R or Y phase to compressor is off, then current through B phase will go up. If it exceeds 125% of Set Max. Compressor current, then compressor will trip within 2 seconds and LCD will display **Single Phasing.** If B phase is off, then current through B phase will be zero, and compressor will trip within 2 seconds and LCD will display **System Single Phasing**
3. **System Tripping on Overload:** If B phase current exceeds 110% of Set Max. Compressor current, then compressor will trip within 10 seconds and LCD will display **System Overload**
4. **System Tripping on Underload :** If B Phase current is less than Set Min. compressor current, then compressor will trip within 2 seconds and LCD will display **System Underload**

Operating Instructions

1. Switching On Chiller

Switch on the chiller by pressing Power key on keypad unit. POWER LED glows Green. After chilled water pump is started, Flow Switch input will be ON. Then FS LED will start glowing Green.

If HP, LP, MP, FS and SPPR inputs are OK, then System will start depending on SET temperature, Cooling Range & Actual EWT after preset delay of 180 seconds for 1st Compressor, then 10 seconds delay after each compressor.

2. Switching ON Condensing Unit

Press Power key on keypad unit to switch on the Condensing Unit. Power LED glows Green. First AHU Blower will start, giving input signal to Controller. Then FS/AHU LED glows Green.

If HP, LP, MP, FS and SPPR inputs are OK, then System will start depending on SET temperature, Differential & Actual Room Temperature after preset delay of 180 seconds for 1st Compressor, then 10 seconds delay after each compressor.

Modular Chiller

Controller will Load / Unload compressors based on Actual Entering Water Temperature, Set Value and Cooling range.

For 2 Compressor System

I. If actual EWT =/> Set Value, all the compressors will be loaded.

II. If actual EWT = Set Value - (CR/2), one compressor will be unloaded.

III. If actual EWT = Set Value - (CR), both the Compressors will be unloaded.

For 3 Compressor System

I. If actual EWT = Set Value - (CR/3), one Compressor will be unloaded.

II. If actual EWT = Set Value - (2CR/3), two Compressors will be unloaded.

III. If actual EWT = Set Value - CR, 3rd Compressor will be unloaded in 3 compressor model.

IV. If actual EWT = Set Value - (3CR/4), three Compressors will be unloaded.

3. Switching OFF Chiller

i. Power Key : Press Power Key on keypad unit, it will show you “System Down” message and all Systems go OFF.

ii. Mode Key : You can switch OFF the Systems by pressing the MODE key to select OFF Mode; LCD indicates the System 1, System 2 and System 3 OFF Mode.

iii. You can also switch off the Systems by putting ON/OFF Toggle switch in OFF Mode. Units will be switched OFF and message on screen is System 1, 2, 3 S/W OFF.

Using the Micro-Controller - Non Modular Chiller - 2 ,3 & 4 Compressors Air-cooled & Water-cooled

Salient Features

- Digital control and setting of temperature values in 0.1°C steps
- Display of actual compressor current in Amps with underload & overload protection
- Auto loading / unloading of compressors with run time equalisation
- Non-volatile memory backup for all set value parameter
- Automatic starting of unit in case of power failure
- Built-in time delays for compressor and condenser fan
- Current sensing single phase / phase reversal protection
- 3 level data entry password protection (User, Supervisor & Factory)
- In-built anti-freeze safety

Optional

- Remote Control (Using Group Controller).

Specifications

1.	Power supply	Single phase, Voltage: 180 to 260V AC. Frequency: 50 Hz ±3%
2.	Operating temperature limit	0 - 65°C
3.	Display	8 (Character) X 2 (Lines) Backlit LCD, LED indicators and touch key pad
4.	Temperature control accuracy	± 1%
5.	Entering water temperature range	8 - 25°C
6.	Cooling range	2 - 10
7.	Antifreeze setting	5°C cut-out and 8°C cut-in
8.	Temperature sensors	NTC thermistor sensor (SS enclosure) with 5m long cable
9.	LCD Display & Keypad unit	Door mounting
10.	Micro Computer Base unit	Base mounting

LED Indicators

POWER: This LED indicator indicates the presence of power and flashes Red if SPPR fault occurs.

CHW FLOW: If flow switch input is OK this LED flashes Green, else flashes Red.

KEY: This LED indicator flashes Green if any key is pressed.

FAN: If Fan is ON, this LED indicator is Green, else Red.

FAN 1, 2: If Fan is ON, this LED indicator is Green, else Red. (only for 4-compressor Tandem model)

AFT 1, 2: If AFT is OK, this LED indicator is Green, else Red if the AFT trips. (only for 4-compressor water-cooled model)

COMPRESSOR1: If Compressor1 is ON, this LED indicator is Green, else Red.

COMPRESSOR2: If Compressor2 is ON, this LED indicator is Green, else Red.

COMPRESSOR3: If Compressor3 is ON, this LED indicator is Green, else Red.

COMPRESSOR4: If Compressor4 is ON, this LED indicator is Green, else Red. (only for 4-compressor model)

ON/OFF: This indicator is Green if the unit is ON and Red if the unit is OFF.

SET: When the user or supervisor enters into the program mode, this indicator becomes Green.

Operational Keys

INC (^) Key: This key is used to increment any value of the selected digit.
If you press this key continuously then selected digit value will increment from 0 to 9.

SELECT Key: This key is used to set any parameter like EWT or Cooling range. This acts like the Enter key.

ON/OFF Key: This key is used to switch the unit ON or OFF.

RESET Key: This key is used for resetting fault or for restarting the unit after removing an existing fault.

Display of Parameters

By default, the unit shows the **E**ntering **W**ater **T**emperature (**EWT**) and **L**eaving **W**ater **T**emperature (**LWT**). Other parameters can be viewed by pressing **INC (^)** key. At any time of operation, if no key is pressed for **10 seconds**, the display will return to show **EWT** & **LWT**.

KEY PRESSED	DISPLAY ON LCD	DESCRIPTION
No Key Pressed for 10 sec.	**EWT: 25.7** **LWT: 25.5**	Display of actual Entering & Leaving Water Temp.This is a default display of the controller.
Press **INC (^)** Key once	**SET: 12.7** **CR: 5.5**	Display of only Set value of Entering Water Temp. & Cooling Range. You can not change value.
Press **INC (^)** Key once	**Comp1:** **24 Amps**	Display of actual value of **Compressor 1 current** in Amps.
Press **INC (^)** Key once	**Comp2:** **23 Amps**	Display of actual value of **Compressor 2 current** in Amps.
Press **INC (^)** Key once	**Comp3:** **25 Amps**	Display of actual value of **Compressor 3 current** in Amps.
Press **INC (^)** Key once	**Comp4:** **24 Amps**	Display of actual value of **Compressor 4 current** in Amps. (only for 4 compressors model)
Press **INC (^)** Key once	**Comp1:** **021 Hrs**	Display of actual value of **Compressor 1 run time** in hours.
Press **INC (^)** Key once	**Comp2:** **023 Hrs**	Display of actual value of **Compressor 2 run time** in hours.
Press **INC (^)** Key once	**Comp3:** **025 Hrs**	Display of actual value of **Compressor 3 run time** in hours.
Press **INC (^)** Key once	**Comp4:** **022 Hrs**	Display of actual value of **Compressor 4 run time** in hours. (only for 4 compressors model)
Press **INC (^)** Key once	**Fan1:** **034 Hrs**	Display of actual value of **Condenser Fan 1 run time** in hours.
Press **INC (^)** Key once	**Fan2:** **036 Hrs**	Display of actual value of **Condenser Fan 2 run time** in hours(only for 4 compr. Tandem model)

Setting of Parameters

The user or supervisor can enter into the **PROGRAMME MODE** to set various parameters by pressing the **SELECT** key, *when the display is showing the Set Temperature and Cooling Range.* The user Password is **0851.**

KEY PRESSED	DISPLAY ON LCD	DESCRIPTION
Press **SELECT** Key once	**Password 0000**	For changing set parameter, Entry of Password can be made by pressing '**SELECT'** key.
Press **INC** Key	**Password 0001**	For changing last digit of password go on pressing **'INC'** key till you get the desired value.
Press **RESET** Key once	**Password 0021**	Now by pressing '**Reset**' key you can go to the 2nd digit of your Password to change it.
Press **INC** Key	**Password 0051**	Now go on pressing **'INC'** key till you get the desired value of 2nd digit of your Password.
Press **RESET** Key once	**Password 0451**	Now by pressing '**Reset**' key you can go to the 3rd digit of your Password to change it.
Press **INC** Key	**Password 0851**	Now go on pressing **'INC'** key till you get the desired value. *0851 is correct Password (0BSL)*
Press **SELECT** Key.	**Password Invalid** .	After pressing **'SELECT'** key for correct Password it will show '**Set Temp**' otherwise **Invalid**
Press **INC** Key	**Set Temp 12.5**	Now go on pressing **'INC'** key till you get the desired value of '**Set Temp**'.
Press **SELECT** Key	**Set CR 3.4**	Press **'SELECT'** key to store setting of Set Temp. & go to next parameter setting i.e. '**Set CR**'.
Press **INC** Key	**Set CR 5.4**	Now go on pressing **'INC'** key till you get the desired value of '**Set CR**'.
Press **SELECT** Key	**OPTION LOCAL**	Press **'SELECT'** key to store setting & go to next parameter setting i.e. '**Local**' or '**Remote**' mode,
Press **INC** Key	**OPTION REMOTE**	Press **'INC'** key to change the mode from Local to Remote & then press '**SELECT**' Key to store it.

By using same procedure, as above, you can set the maximum / minimum current limit of compressor for overload & underload protection by entering the supervisor password. Similarly, you can set the type of unit (air-cooled or water-cooled, brine or standard AFT) by entering the factory password.

Fault & Alarms Display

Both LCD and LED indicators display various faults that may occur in the unit. The second line of the LCD displays the faults. The LCD shows faults as follows. It also displays multiple faults if they exist.

Nature of Fault	LCD DISPLAY	LED indication on Keypad.
Phase Reversal Fault, if RYB phase sequence is not correct	**EWT: 25.7** **SPPR Trip**	**Reset** & **Power** LED will flash **Red** if the fault exists. After the fault is cleared **Power** LED flashes **Green** but unit to be restarted by pressing **Reset** key.
Flow Switch Sensor Fault If no water flow	**EWT: 25.7** **FS Trip**.	**Reset** & **CHW Flow** LED will flash **Red** if the fault exists. After fault is cleared **CHW Flow** LED flashes **Green** but unit to be restarted by pressing **Reset** key.
Fan Overload (Relay) Fault	**EWT: 25.7** **CF Trip**.	**FAN** LED indicator will flash **Red** if the fault exists. FAN overload fault is Auto reset.
Comp1 Trips on MP (Relay)	**EWT: 25.7** **OC1 Trip**.	**COMPRESSOR 1** LED indicator will flash **Red** if the fault exists. This fault is Auto reset
Comp2 Trips on MP (Relay)	**EWT: 25.7** **OC2 Trip**.	**COMPRESSOR 2** LED indicator will flash **Red** if the fault exists. This fault is Auto reset
Comp3 Trips on MP (Relay)	**EWT: 25.7** **OC3 Trip**.	**COMPRESSOR 3** LED indicator will flash **Red** if the fault exists. This fault is Auto reset.
Comp4 Trips on MP (Relay)	**EWT: 25.7** **OC4 Trip**.	**COMPRESSOR 4** LED indicator will flash **Red** if the fault exists.This fault is Auto reset. (only for 4compressor model)
Comp1 Trips on High Press. Sw.	**EWT: 25.7** **HP1 Trip**.	**Reset** & **COMPRESSOR 1** LED indicators will flash **Red** if the fault exists. After the fault is cleared **Reset** LED indicator flashes **Green** but to be restarted by the user by pressing **Reset** key.
Comp1 Trips on Low Press. Sw.	**EWT: 25.7** **LP1 Trip**.	
Comp2 Trips on High Press. Sw.	**EWT: 25.7** **HP2 Trip**.	**Reset** & **COMPRESSOR 2** LED indicators will flash **Red** if the fault exists. After the fault is cleared **Reset** LED indicator flashes **Green** but to be restarted by the user by pressing **Reset** key.
Comp2 Trips on Low Press. Sw.	**EWT: 25.7** **LP2 Trip**.	
Comp3 Trips on High Press. Sw.	**EWT: 25.7** **HP3 Trip**.	**Reset** & **COMPRESSOR 3** LED indicators will flash **Red** if the fault exists. After the fault is cleared **Reset** LED indicator flashes **Green** but to be restarted by the user by pressing **Reset** key.
Comp3 Trips on Low Press. Sw.	**EWT: 25.7** **LP3 Trip**.	
Comp4 Trips on High Press. Sw.	**EWT: 25.7** **HP4 Trip**.	**Reset** & **COMPRESSOR 4** LED indicators will flash **Red** if the fault exists. After the fault is cleared **Reset** LED flashes **Green** but to be restarted by the user by pressing **Reset** key. (only for 4 compressors model)
Comp4 Trips on Low Press. Sw.	**EWT: 25.7** **LP4 Trip**.	

Anti **F**reeze **T**emp **AFT** fault (LWT<Set AFT)	**EWT: 25.7 AFT Trip**.	If **LWT** goes below AFT limit (5.0°C) then Compressors will Trip and LCD will display fault **'AFT Trip**'. Compressors will restart when **LWT** goes above 8.0°C.
EWT sensor is open or bad.	**EWT: —.- EWT Ther Open**	After reconnecting good sensor unit will Auto restart. (Only LCD will display Fault)
LWT sensor is open or bad.	**EWT: 25.7 LWT Ther Open**	After reconnecting good sensor unit will Auto restart. (Only LCD will display Fault)
Comp1 Overload on Current Fault	**EWT: 25.7 Comp1Overload**	**COMPRESSOR 1** LED Indicator will flash Red & **Reset** LED Indicator will flash Green. Press **Reset** key to restart the unit.
Comp1Underload on Current Fault	**EWT: 25.7 Comp1 Underload**	
Comp1 Single Phasing on Current	**EWT: 25.7Comp1 Single Ph**	
Comp2 Overload on Current Fault	**EWT: 25.7 Comp2Overload**	**COMPRESSOR 2** LED Indicator will flash Red & **Reset** LED Indicator will flash Green. Press **Reset** key to restart the unit.
Comp2Underload on Current Fault	**EWT: 25.7 Comp2Underload**	
Comp2 Single Ph asing on Current	**EWT: 25.7 Comp2Single Ph**	
Comp3 Overload on Current Fault	**EWT: 25.7 Comp3Overload**	**COMPRESSOR 3** LED Indicator will flash Red & **Reset** LED Indicator will flash Green. Press **Reset** key to restart the unit.
Comp3 Underload on Current Fault	**EWT: 25.7 Comp3Underload**	
Comp3 Single Phasing on Current	**EWT: 25.7 Comp3Single Ph**	
Comp4 Overload on Current Fault	**EWT: 25.7 Comp4Overload**	**COMPRESSOR 4** LED Indicator will flash Red & **Reset** LED Indicator will flash Green. Press **Reset** key to restart the unit (only for 4 compressors model)
Comp4 Underload on Current Fault	**EWT: 25.7 Comp4Underload**	
Comp4 Single Phasing on Current	**EWT: 25.7 Comp4Single Ph**	
Communication Error Fault	**EWT: 25.7 Communic Error**	If the communication between Chiller Base Unit & Keypad is broken then LCD will display Fault.

Functional Logic of Compressor Tripping on Current Fault

1. A 100A Current Transformer (C.T.) is placed in line on the B-Phase of each compressor power wiring to measure actual compressor current.
2. **Compressor Tripping on Single Phasing:** If R or Y phase to compressor is off, then current through B phase will go up. If it exceeds 125% of set max. compressor current, then compressor will trip within 2 seconds and LCD will display **Single Phasing.** If B phase is off, then current through B phase will be zero, and compressor will trip within 2 seconds LCD will display **Single Phasing.**
3. **Compressor Tripping on Overload:** If B phase current exceeds 110% of set max. compressor current, then compressor will trip within 10 seconds and LCD will display **Compr Overload.**
4. **Compressor Tripping on Underload:** If B phase current is less than Set Min. compressor current, then compressor will trip within 2 seconds and LCD will display **Compr Underload.**

Operating Instructions - 1

These operating instructions pertain to :

- **4 Compressor Water-cooled Scroll Chillers**
- **3 Compressor Air-cooled Scroll Chillers**
- **2 Compressor Air-cooled Scroll Chillers**

Switching ON Chiller

Switch ON the unit by pressing ON/OFF key on keypad unit. The ON/OFF LED should glow Green. After chilled water pump is running **,** Flow Switch input will be on, then CHW FLOW LED will glow Green. After preset delay of 10 seconds, fans will start & FAN LED will glow Green.

If HP, LP, MP, FS, SPPR, AFT & CF inputs are OK, then compressors will start depending on set temp., cooling range & actual EWT after preset 180 sec delay for 1st compressor, then 10 seconds delay for 2nd compressor, and another 10 seconds delay for 3rd compressor and 10 seconds incase of 4th compressor.

Functional Logic of Compressor switching

Controllers will Load / Unload number of compressors based on Actual Entering Water Temp., set temp. and cooling range.

a. **If Actual EWT =/> Set Value, all the compressors will be ON.**

b. **For 4 Compressor Tandem Systems**

If actual EWT = Set Value - (CR/4), three comp. - ON, any one Comp.- OFF.

If actual EWT = Set Value - (3CR/4), two comp. – ON (one from each Group).

If actual EWT = Set Value - (2CR/4), any one compressor will be ON.

For 4 Compressor Systems

If actual EWT = Set Value - (CR/4), only three compressors will be ON.

If actual EWT = Set Value - (3CR/4), only two compressors will be ON.

If actual EWT = Set Value - (2CR/4), only one compressor will be ON.

For 3 Compressor Systems

If actual EWT = Set Value - (CR/3), only two compressors will be ON.

If actual EWT = Set Value - (2CR/3), only one compressor will be ON.

For 2 Compressor Systems

If actual EWT = Set Value - (CR/2), only one compressor will be ON.

c. **If actual EWT =/< Set Value - CR, all the compressors will be OFF.**

Switching OFF Chiller

1. Press ON/OFF key on keypad unit. Unit will go into **OFF Mode**, if it is in ON mode. All the compressors will be switched OFF. Compressor 1, 2, 3 & 4 and Fan LED indicators will glow Red.
2. You can also switch off the unit by putting ON/OFF toggle switch on “OFF mode”. Unit will be switched off. The control phase (i.e. R-Phase) will be cut-off, hence LCD display & all LED indicators will go blank.

Operating Instructions - 2

These operating instructions pertain to :

Tandem Chiller (Twin Circuit Air-Cooled)

Viewing the Parameters

By default the unit will show the entering water temperature and leaving water temperature. Other parameters can be viewed by pressing **INC (^)** key. At any time of the operation, if no key is pressed for **10 seconds**, the display will return to showing the entering water temperature and leaving water temperature.

EWT:25.7

LWT:25.5

1. Press **INC** key once, display will show the Set Temperature and Cooling Range. The display will be as follows.

SET: 24.0
CR : 4.0

2. When the **INC** key is pressed again, the display will show the current through the first compressor.

Comp 1
24 Amps

3. When the **INC** key is pressed again, the display will show the current through the second compressor.

Comp 2
23 Amps

4. When the **INC** key is pressed again, the display will show the current through the third compressor.

Comp 3
24 Amps

5. When the **INC** key is pressed again, the display will show the current through the fourth compressor.

Comp 4
25 Amps

6. When the **INC** key is pressed again, the display will show the total run time of the first compressor.

Comp 1
Hr : 00024

7. When the **INC** key is pressed again, the display will show the total run time of the second compressor.

Comp 2
Hr : 00023

8. When the **INC** key is pressed again, the display will show the total run time of the third compressor.

Comp 3
Hr : 00024

9. When the **INC** key is pressed again, the display will show the total run time of the fourth compressor.

Comp 4
Hr : 00024

10. When the **INC** key is pressed again, the display will show the total run time of the first fan.

Fan 1
Hr : 00025

11. When the **INC** key is pressed again, the display will show the total run time of the second fan.

Fan 2
Hr : 00024

12. When the **INC** key is pressed again, the display will show the total run time of the chill water pump.

ChilPump
Hr : 00024

Setting the Parameters

The user or supervisor can enter into the program mode to set the various parameters by pressing the '**SELECT**' key while the display is showing the set temperature and cooling range. The user password is **0851** and the supervisor password is **4321**. When the '**SELECT**' key is pressed the display will show the following:

Password
0000

The user has to press '**INC**' key to scroll the digit and '**RESET**' key to shift the digit. By using these two keys, the password can be selected. '**SELECT**' key is used to confirm the password. If the entered password is correct, the unit will go to the program mode. If the password is wrong the display will show an error message and return to main menu after **2 seconds**.

The error message is

Password
Invalid

When the user successfully enters into the program mode the display will be

Set Temp
25.0

By pressing '**INC**' key, the required Set Temperature can be set and can be confirmed by pressing the '**SELECT**' key. Then the display will show the Cooling Range as follows

Set CR
5.0

By pressing '**INC**' key, the required Cooling Range can be set and can be confirmed by pressing the '**SELECT**' key. If the unit is in user mode, the display will return to the default window. If the unit is in supervisor mode, the display will show the maximum current limit of each compressor.

Set Amps
Max: 036

By pressing '**INC**' key, the Maximum current limit can be set and can be confirmed by pressing the '**SELECT**' key. Then the display will show the following

Set Amps
Min: 012

By pressing '**INC**' key, the Minimum current limit can be set and can be confirmed by pressing the '**SELECT**' key. Then the display will return to the default window.

Also please note that the 'Set' indicator will be ON throughout the program mode.

Fault Alarms Display

Both LCD and LED indicators display the various faults occurring in the unit. The second line of the LCD is used to display the faults. The LCD will show all the faults which have occurred as follows. It also displays multiple faults if they exist. The messages for the various faults are as follows.

Fault	**Scrolling LCD Message**	**LED Indication**
SPPR Fault	***SPPR Trip***	Both **Power & Reset** indicators will flash **Red** if the fault exists and flash **Green** after the fault is cleared but not reset by the user through keypad.
FS Fault	***FS Trip***	Both **CHW FLOW & Reset** indicators will flash **Red** if the fault exists and **Reset** indicator flashes **Green** after the fault is cleared but not reset by the user through keypad.
Fan1 Overload	***OF1 Trip***	**FAN1** indicator will flash **Red** if the fault exists.
Fan2 Overload	***OF2 Trip***	**FAN2** indicator will flash **Red** if the fault exists.
Compressor 1 Overload	***OC1 Trip***	**COMPRESSOR1** indicator will flash **Red** if the fault exists.
Compressor 2 Overload	***OC2 Trip***	**COMPRESSOR2** indicator will flash **Red** if the fault exists.
Compressor 3 Overload	***OC3 Trip***	**COMPRESSOR3** indicator will flash **Red** if the fault exists.
Compressor 4 Overload	***OC4 Trip***	**COMPRESSOR4** indicator will flash **Red** if the fault exists.
Compressor 1 or 2 High Pressure	***HP1 Trip***	**Reset, COMPRESSOR1 and COMPRESSOR2** indicators will flash **Red** if the fault exists and **Reset** indicator flashes **Green** after the fault is cleared but not reset by the user through keypad.

Compressor 1 or 2 Low Pressure	***LP1 Trip***	**Reset, COMPRESSOR1** and **COMPRESSOR2** indicators will flash **Red** if the fault exists and **Reset** indicator flashes **Green** after the fault is cleared but not reset by the user through keypad.
Compressor 3 or 4 High Pressure	***HP2 Trip***	**Reset, COMPRESSOR3** and **COMPRESSOR4** indicators will flash **Red** if the fault exists and **Reset** indicator flashes **Green** after the fault is cleared but not reset by the user through keypad.
Compressor 3 or 4 Low Pressure	***LP2 Trip***	**Reset, COMPRESSOR3** and **COMPRESSOR4** indicators will flash **Red** if the fault exists and **Reset** indicator flashes **Green** after the fault is cleared but not reset by the user through keypad.
If the Leaving Water Temperature goes below AFT limit (5.0°C)	***AFT Trip***	————————-
Entering Water Temperature sensor is open or bad.	***EWT Thermister Open***	————————-
Leaving Water Temperature sensor is open or bad.	***LWT Thermister Open***	————————-
Current through Compressor 1 is out of range.	***SPPR1 Trip***	**COMPRESSOR1** indicator flashes **Red** and **Reset** indicator flashes **Green**.
Current through Compressor 2 is out of range.	***SPPR2 Trip***	**COMPRESSOR2** indicator flashes **Red** and **Reset** indicator flashes **Green.**
Current through Compressor 3 is out of range.	***SPPR3 Trip***	**COMPRESSOR3** indicator flashes **Red** and **Reset** indicator flashes **Green**.
Current through Compressor 4 is out of range.	***SPPR4 Trip***	**COMPRESSOR4** indicator flashes **Red** and **Reset** indicator flashes **Green**.
If the communication between chiller base and keypad is broken.	***Communication Error***	————————-

Description of Indicators

The various indicators available in the display of the chiller denote the following:

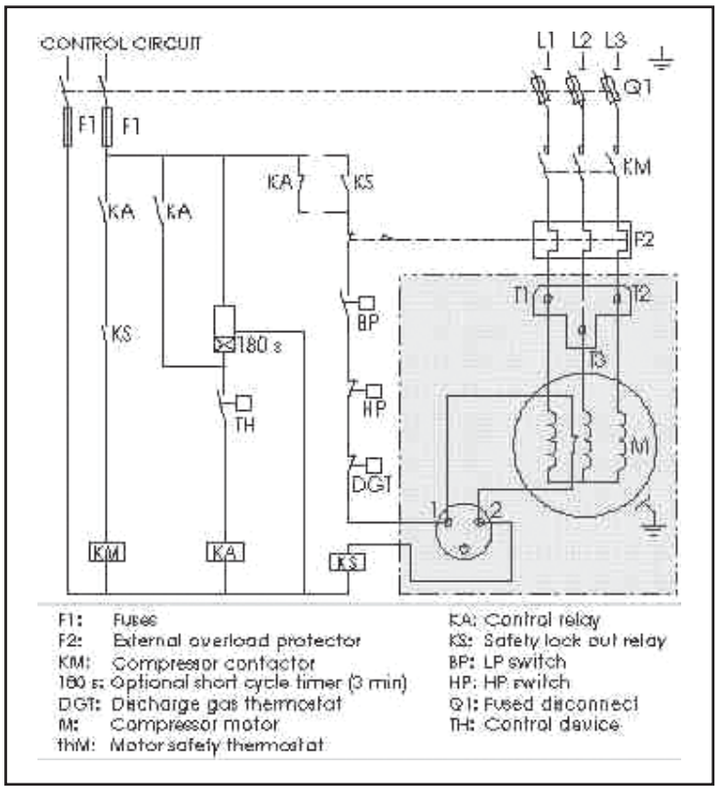
POWER:	This indicator indicates the presence of power and flashes Red if SPPR fault occurs.
CHW FLOW:	If there is no FS fault this LED is Green and Red if the FS fault is present.
KEY:	This indicator flashes green if any key is pressed.
FAN1:	If Fan1 is ON, this indicator is Green and Red if the Fan1 is OFF.
FAN2:	If Fan2 is ON, this indicator is Green and Red if the Fan2 is OFF.
COMPRESSOR1:	If Compressor1 is ON, this indicator is Green and Red if it is OFF.
COMPRESSOR2:	If Compressor2 is ON, this indicator is Green and Red if it is OFF.
COMPRESSOR3:	If Compressor3 is ON, this indicator is Green and Red if it is OFF.
COMPRESSOR4:	If Compressor4 is ON, this indicator is Green and Red if it is OFF.
ON/OFF:	This indicator is Green if the unit is in ON mode and Red if the unit is in OFF mode.
SET:	When the user or supervisor enters into the program mode, this indicator becomes Green.

Note :

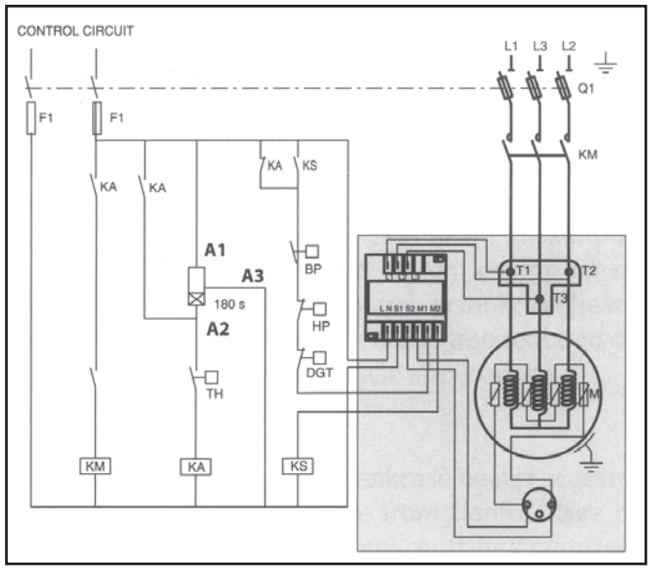
All preset programs on the controller should not to be disturbed or changed for site convenience, as it may result in total operational failure of the chillers. Please contact authorised “Blue Star” Executive only for changes / faults on the controller performance.

Compressor Protection Module

SM Series



Maneurop Compressor



Wiring Diagram without Pump-down Cycle

SY Series

Inspection & Routine Maintenance

Regular inspection of all the chilling unit equipments reduces failures and ensures continuous operation.

A 'healthy' supply

CHECK IF INCOMING POWER IS AS PER THE RATED POWER SUPPLY:

VOLTS 380-420V

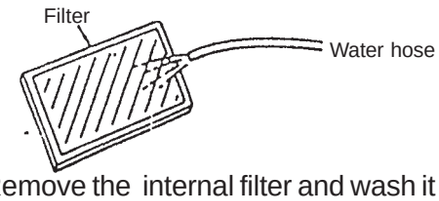
PHASE THREE PHASE

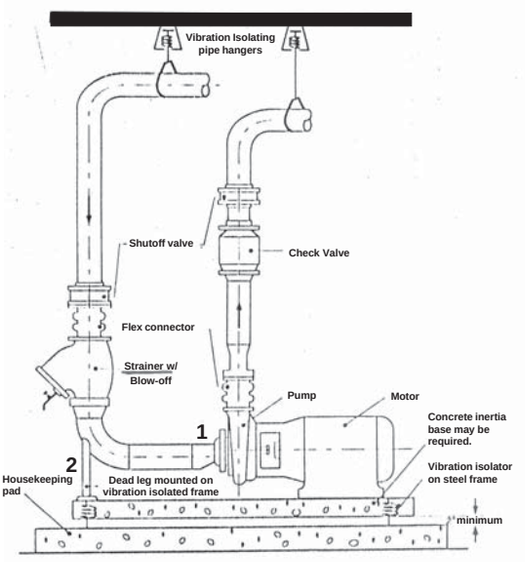
CYCLES 50 Hz

TYPE AC ONLY

Regular Inspection

Regular inspection must be carried out as follows:

Item	Period	Inspection Procedure
Filter cleaning (Air Handling Equipment)	Once a week	 Remove the internal filter and wash it with water. Dry the filter in the shade and re-install it.
General compressor checks	Once a week	Crankcase heater: Touch the heater body to verify that it is warm.
	Twice a year	Oil leaks: Verify that there are no oil leaks.
	Twice a year	Vibration isolation rubber: Inspect the vibration isolation rubber for wear.

Item	Period	Inspection Procedure
Gas leak check	Four times a year	 Conduct test for gas leaks in all refrigerant pipe joints.
Control panel inspection	Four times a year	 Inspect the circuits in the control panel and tighten loose wires.
Water line strainers **Cond. water circuit** **Chilled water circuit**	Four times a year Once a year	

Troubleshooting

Faults and complaints in chilled water AC systems can be broadly classified under three areas. The first step in troubleshooting is to identify the area and diagnose the fault.

Diagnosing faults

Malfunctions can be classified under any of the following:

A. THE ELECTRICAL CIRCUIT

The malfuntioning of electrical circuit is due to LOW or HIGH voltage variations, frequent power failures, loose electrical contacts, defective electrical components, etc..

Problems due to power supply quality must be sorted out with concerned electricity board.

B. THE REFRIGERATION CIRCUIT

Improper cooling usually indicates poor performance of the refrigeration circuit. Reasons may be poor servicing, low / high gas in the system, non-condensible gases, and lower efficiency of the compressor.

C. THE CONDITIONED AIR CIRCUIT

Less air flow, poor cooling, uneven temperature, excessive airleaks are complaints that come under this classification.

Most of the above faults can be eliminated by periodical servicing. The troubleshooting chart that follows will help isolate the exact fault and suggest remedies.

Quick-check Troubleshooting Chart

SYMPTOMS	CAUSE	REMEDY
1. COMPRESSOR		
High discharge pressure	Non condensible gases	Purge the system
	Over charged refrigerant	Remove excess
	Choked condenser fins	Clean the ODU coil
	Less ODU airflow	Reverse fan direction
Low discharge pressure	Low refrigerant charge and recharge	Check for leaks, repair
Low compression efficiency	Replace compressor	
High suction pressure	Excessive load	Reduce fresh air & load
	Defective suction valves	Replace compressor
Anti freeze thermostat	Faulty freeze protection control or improper adjustment	Readjust control or replace (follow setting standards)

SYMPTOMS	CAUSE	REMEDY
Low suction pressure	Clogged suction strainer / dryer dryer	Clean / replace strainer /
	No cooling load	Check thermostat
	Choked air filter	Clean air filter
Compressor short cycles on low pressure	Thermostat erratic	Check thermostat
Compressor trips on high pressure	Air in the system	Purge the system
	Overcharged gas	Remove excess charge
	Condenser fan not working	Check ODU performance
Compressor noisy	Liquid knock	Check return air filter /
	Check for coil chokeup	
	Defective valve reeds	Replace compressor
Scroll compressor		
Compressor pressure does not build up to high pressure	Compressor motor working in reverse rotation	Interchange any two phases of polarity for changing direction
Compressor pressure does not go down on low pressure	— Do—	—Do—
Compressor noisy	— Do—	—Do—
2. BLOWER		
Fan motor not starting	Check power supply / fuses	Restore power supply
Tripping on over load	Check overload relay	Reset relay
Fuse blown	Check electrical circuit	and replace
3. OVERALL UNIT		
Noisy operation	Blower touching scroll	Realign blower
	Bearing noise	Lubricate bearings
	Belt loose	Tighten the belt
	Loose panels	Check & tighten screws
Unit operates continuously	Shortage of refrigerant	Charge gas
	Defective thermostat	Replace thermostat
	Unit undersized	Recheck heatload

SYMPTOMS	CAUSE	REMEDY
4. CONDITIONED AREA		
Discomfort in the conditioned area	Less air flow	Check air filter / belt
	High humidity	Regulate fresh air
	Poor cooling	Check refrigeration circuit
Too warm in conditioned space	Excess heat load	Check & regulate heat load
	Inadequate cooling	Check compressor 'ON'/ Check filter choke up
	Less airflow	Check reversal of blower fan
	Compressor trips soon after start	Change incoming supply phase polarity on any two phases (for scroll compressor)
Too cold in conditioned space	Defective thermostat Contactor stuck up	Replace thermostat Replace contactor

Troubleshooting the water circuit

SYMPTOMS	CAUSE	REMEDY
(A) COOLING TOWER		
Excessive water drift	Faulty drift elimination	Check to be sure all louvers eliminator sections or slats and splash retainers are in place. Top deck assemblies and wood fill splash bars must be intact and level. There must be no tendency to channel water. Fill packs must be intact and in place with no sagging or gaps between packs.
	Over-pumping	Reduce water flow to tower to design conditions or use larger metering orifices.
Unusual fan drive vibration	Loose bolts & cap screws	Tighten all bolts and cap screws on all mechanical equipment and support Fan. Be sure blades are properly positioned in correct sockets. Check match numbers. Make certain all blades are as far from centre of fan as safety devices permit. All blades must be pitchedthe same. Clean-off deposit build up on blades.
	Motor	Disconnect load and operate motor. If motor still vibrates, check for bent shaft or unbalanced rotor. Replace shaft or rebalance rotor.
Fan noise	Loose fan hub cover	Tighten fan hub cover fasteners
Scale or foreign Substance in Water system	Insufficient blow down Water treatment	Check water quality Install water treatment system
(B) CHILLED WATER & CONDENSER WATER PUMPS		
Noisy operation on pumps	Defective bearings	Replace bearings
Heavy leakage on pumps	Gland packing damaged	Replace gland pack.
Insufficient water flow	Pressure doesn't rise on supply gauges	Check expansion tank level Check pump direction Check suction strainer

Technical specifications

Air-Cooled Scroll Chillers

Description	Units	XAC2S-010	XAC2S-024MA	XAC3S-036MA	XAC2YS-048A	XAC2YS-060	XAC2YS-080A
Nominal Cooling Capacity	kW (TR)	35.16 (10)	84.40 (24)	126.57 (36)	168.8 (48)	211 (60)	281.28 (80)
Electrical Power Supply							
(A) Power Supply	V / Ph. / Hz	380/420V , 3 Ph. , 50Hz , AC					
(B) Total Current at Rated Load	Amp	25.5	49.2	73.8	101	122	162
(C) Power Consumption at Rated Load	kW	11	26.5	39.8	54.0	69.8	92.0
Overall Dimensions							
(A) Length	mm	1775	2234	3355	2980	2980	2980
(B) Width	mm	935	1147	1147	2040	2040	2040
(C) Height	mm	1505	1696	1696	2460	2460	2460
Refrigerant Charge (R22)	kg	9	18	27	42	50	70
Unit Weight (Approx.)	kg	625	925	1375	2090	2200	2400
Compressor							
(A) Quantity	No.	2	2	3	4	3	4
Condenser							
No of coils	No.	2	4	6	4	4	4
(A) Total Face Area	sq.m (sq.ft)	2.23 (24)	3.75 (40)	5.57 (60)	8.24 (88.7)	8.24 (88.7)	8.24 (88.7)
(B) Tube Material	Material	Inner Grooved Copper Tubes					
(C) OD x Thickness	mm x mm	9.5 x 0.28	9.5 x 0.28	9.5 x 0.28	9.5 x 0.28	9.5 x 0.28	9.5 x 0.28
(D) Type of Fin		SLIT					
(E) Fin Material	Material	ALUMINIUM					
(F) Rows Deep	No.	2	3	3	2	2+4	3
Condenser Fan Motor							
(A) Quantity	No.	2	2	3	2	3	4
(B) Power Supply	V / Ph. / Hz	400-415 / 3 / 50					
(C) Speed	RPM	910	910	910	910	910	910
(D) Power	kW/HP	0.37 / 0.5	0.56 / 0.75	0.56 / 0.75	1.9 / 2.5	1.9 / 2.5	1.9 / 2.5
Fan for Condenser Unit							
(A) Quantity	No.	2	2	3	2	3	4
(B) Fan Dia	mm	610	660	660	915		
(C) Material		Aluminium			Galvanised Steel		
(D) Hub Bore Dia	mm	15.87			25.4 (With One Keyway)		
DX-Cooler							
(A) Model		YCH-10 (2 IN 1)	BCH-024U (Twin Circuit)	BCH-036U (Three Circuit)	BCH-048U (Twin Circuit)	BCH-075U	BCH-080U (Twin Circuit)
(B) Water Connection Size IN/OUT.	inch	1 1/2" NB	3" NB	3" NB	4" NB	4" NB	4" NB
(C) No of Refrig Circuit	No.	2	2	3	2	2	2

Remarks :

Rating of Units

The ratings are based on 6.7^{0}C (44^{0}F) chilled water outlet temperature and 2.4 USGPM/TR water flow for cooler with 0.0001^{0}F.ft^2.hr/ Btu fouling factor and 35^{0}C (95^{0}F) ambient air temperature.

Note : *Specifications subject to change due to continuous product development*

Water-Cooled Hermetic Scroll Chiller

Description	UNITS	XWC2S-011	XWC2S-026A	XWC3S-039A	XWC4S-052A	XWC4S-085A
Nominal Cooling Capacity	kW	38.7	91.4	137.1	182.8	298.9
	TR	11	26	39	52	85
Electrical Power Supply						
(A) Power Supply	V / Ph. / Hz	380/420V , 3 Ph. , 50Hz , AC				
(B) Total Current At Rated Load	Amp	20	42	63	84	128
(C) Power Consumption At Rated Load	kW	9	22	33	44	70.4
Overall Dimensions						
(A) Length	mm	1700	2250	2250	2250	2496
(B) Width	mm	550	1234	1234	1234	1234
(C) Height	mm	1415	1607	1956	1956	2087
Refrigerant Charge (R22)	kg	9	18	27	36	76
Unit Weight (Approx.)	kg	650	960	1350	1780	2510
Compressor						
(A) Quantity	No.	2	2	3	4	4
Condenser						
(A) Model /Qty	No.	YCD-10 / 1#	YCD-14 / 2#	YCD-14 / 3#	YCD-14 / 4#	YCD-21 / 4#
(B) No. of Pass (Water Side)	No.	8	8	8	8	8
(C) No of Pass (Refrig Side)	No.	1	1	1	1	1
(D) Water Connection Size IN/OUT.	inch	1 1/4" BSP				
DX-Cooler						
(A) Model / Qty	No.	YCH-10 (2 IN 1)/1#	BCH-024U (2 IN 1)/1#	BCH-036U (3 IN 1)/1#	BCH-024U (2 IN 1)/2#	BCH-048U (2 IN 1) / 2#
(B) No. of Pass / Each Crt	No.	4 Pass	2 Pass	2Pass	2 Pass	2 Pass
(C) Water Connection Size IN/OUT.		1 EACH 1 1/2" NB	1 EACH 3" NB	1 EACH 3" NB	1 EACH 3" NB	1 EACH 4" NB
(D) No. of Refrig Circuit	No++.	2	2	3	4	4

Remarks :

Rating of Units

The ratings are based on 6.7^{0}C (44^{0}F) chilled water outlet temperature and 2.4 USGPM/TR water flow for cooler with 0.0001^{0}F.ft^2.hr/ Btu fouling factor and 29.4^{0}C (85^{0}F) entering water temperature and 3.0 USGPM/ TR water flow for condensor with 0.00025 ^{0}F.ft^2.hr/ Btu fouling factor.

Note : *Specifications subject to change due to continuous product development*

SFU Rating & Cable Size for Hermetic Scroll Chillers

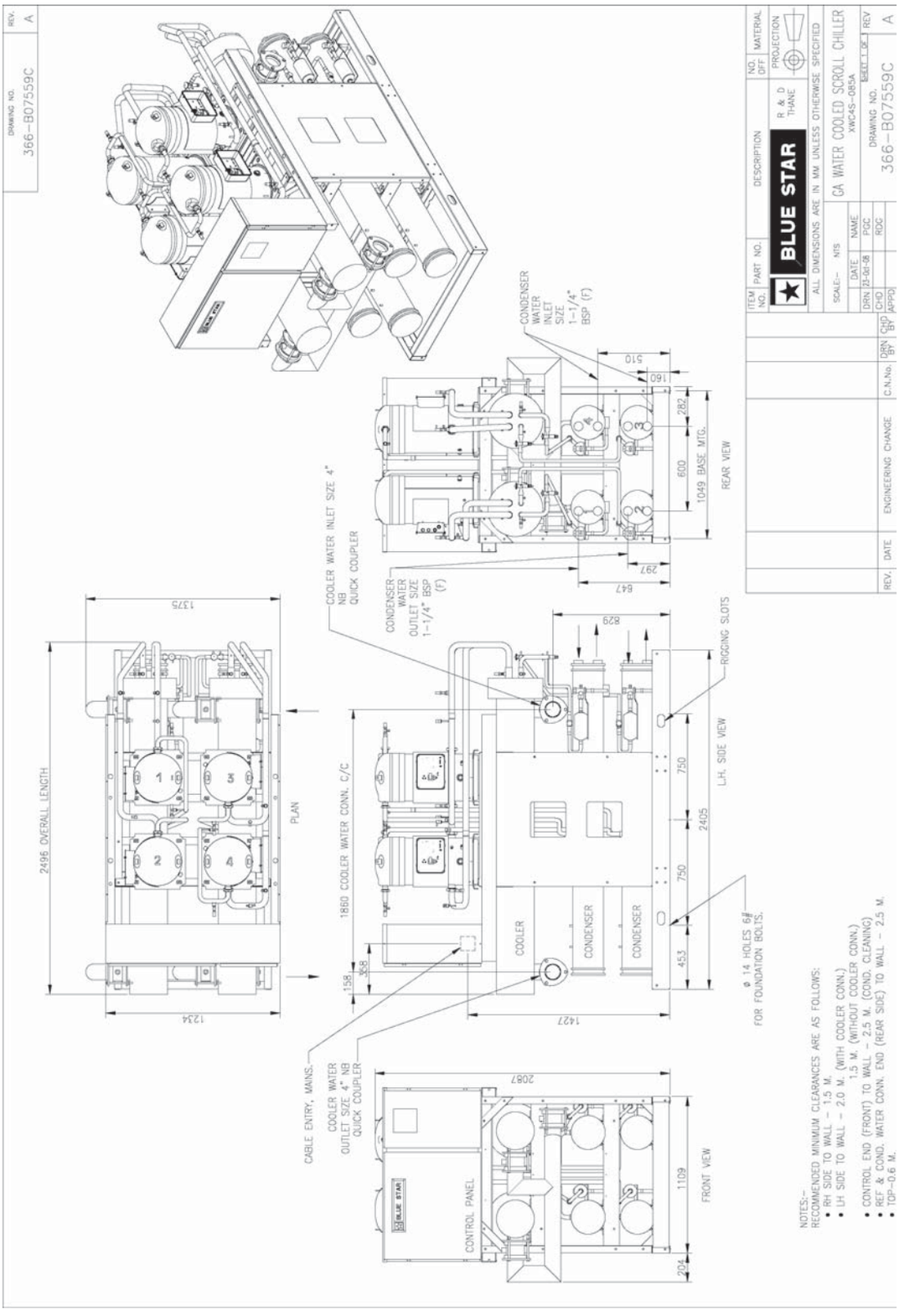
S.No.	Unit Model	Rating of SFU	Cable Size
1.	XAC2S-010	40A	4C x 16 sq. mm AL
2.	XAC2S-024MA	100A	$3^1/_2$ C x 35 sq. mm AL
3.	XAC3S-036MA	125A	$3^1/_2$ C x 50 sq. mm AL
4.	XAC2YS-048A	160A	$3^1/_2$ C x 95 sq. mm AL
5.	XAC2YS-060	200A	$3^1/_2$ C x 120 sq. mm AL
6.	XAC2YS-080A	250A	$3^1/_2$ C x 185 sq. mm AL
7.	XWC2S-011	40A	4C x 16 sq. mm AL
8.	XWC2S-026A	80A	$3^1/_2$ C x 35 sq. mm AL
9.	XWC3S-039A	100A	$3^1/_2$ C x 50 sq. mm AL
10.	XWC4S-052A	125A	$3^1/_2$ C x 95 sq. mm AL
11.	XWC4S-085A	200A	$3^1/_2$ C x 185 sq. mm AL

G.A. DRAWINGS

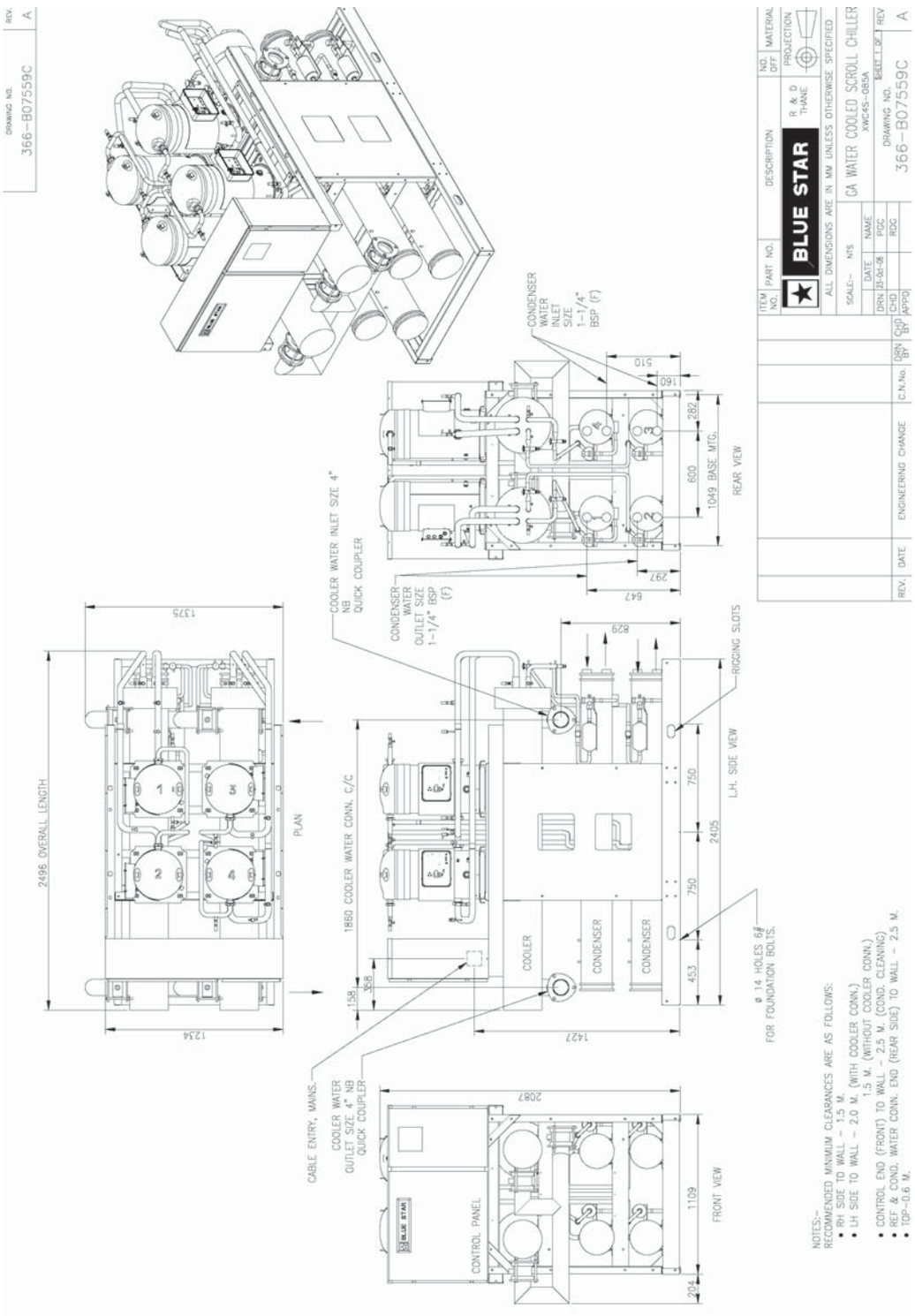
&

WIRING DIAGRAMS

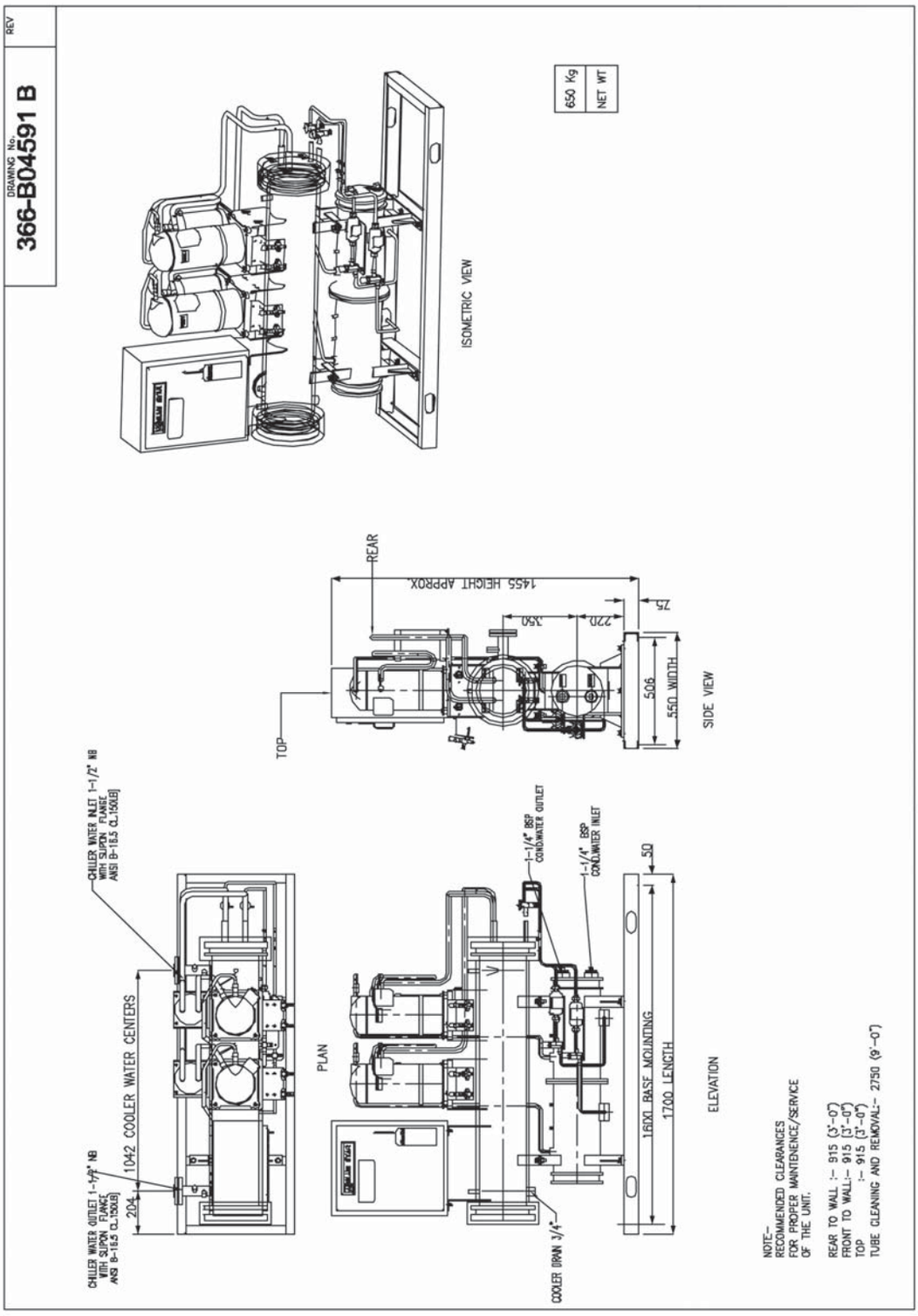
G.A. Drawing: Water-cooled Chiller
Model: XWC4S-085A



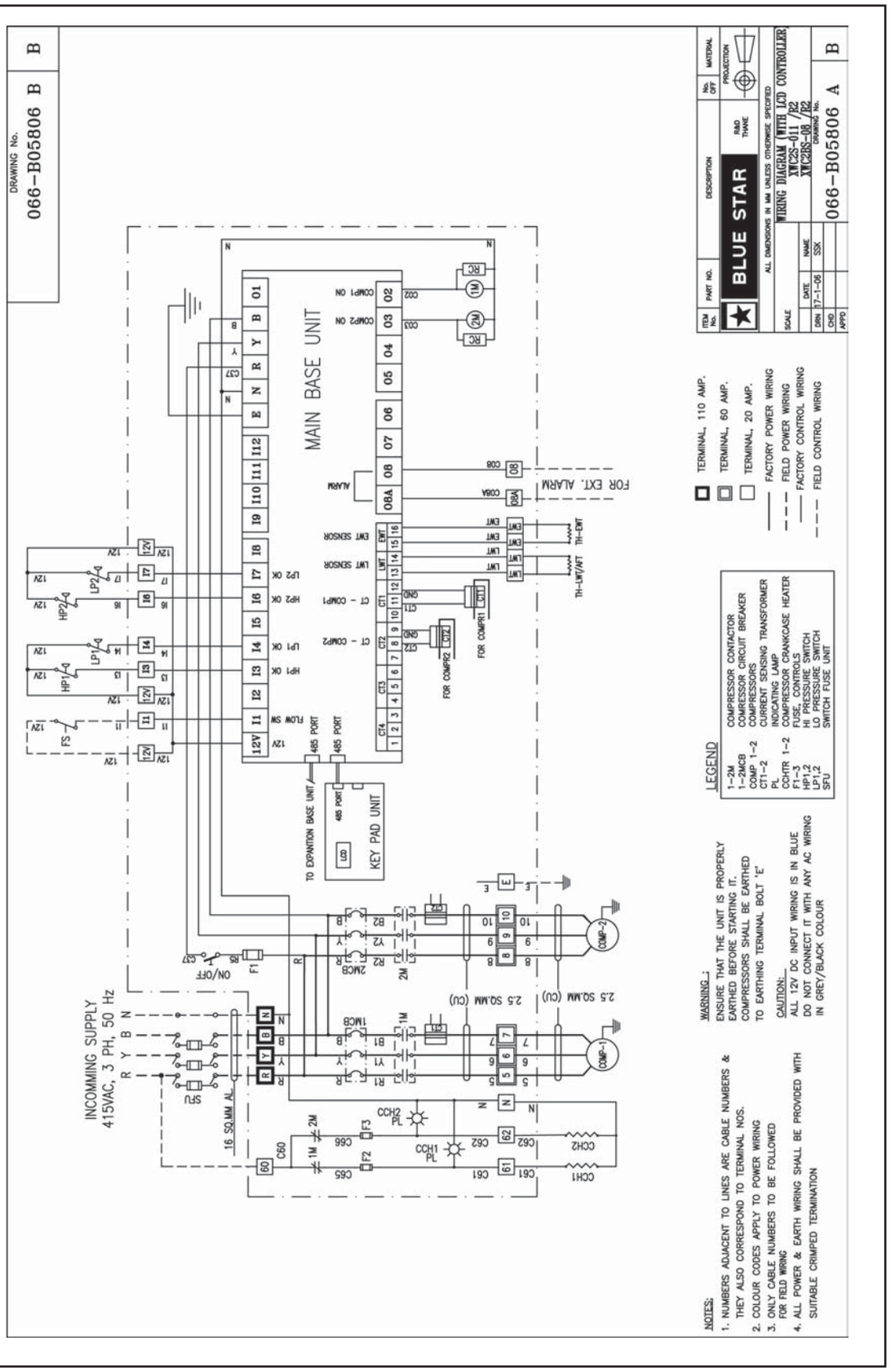
Wiring Diagram: Water-cooled Chiller
Model: XWC4S-085A



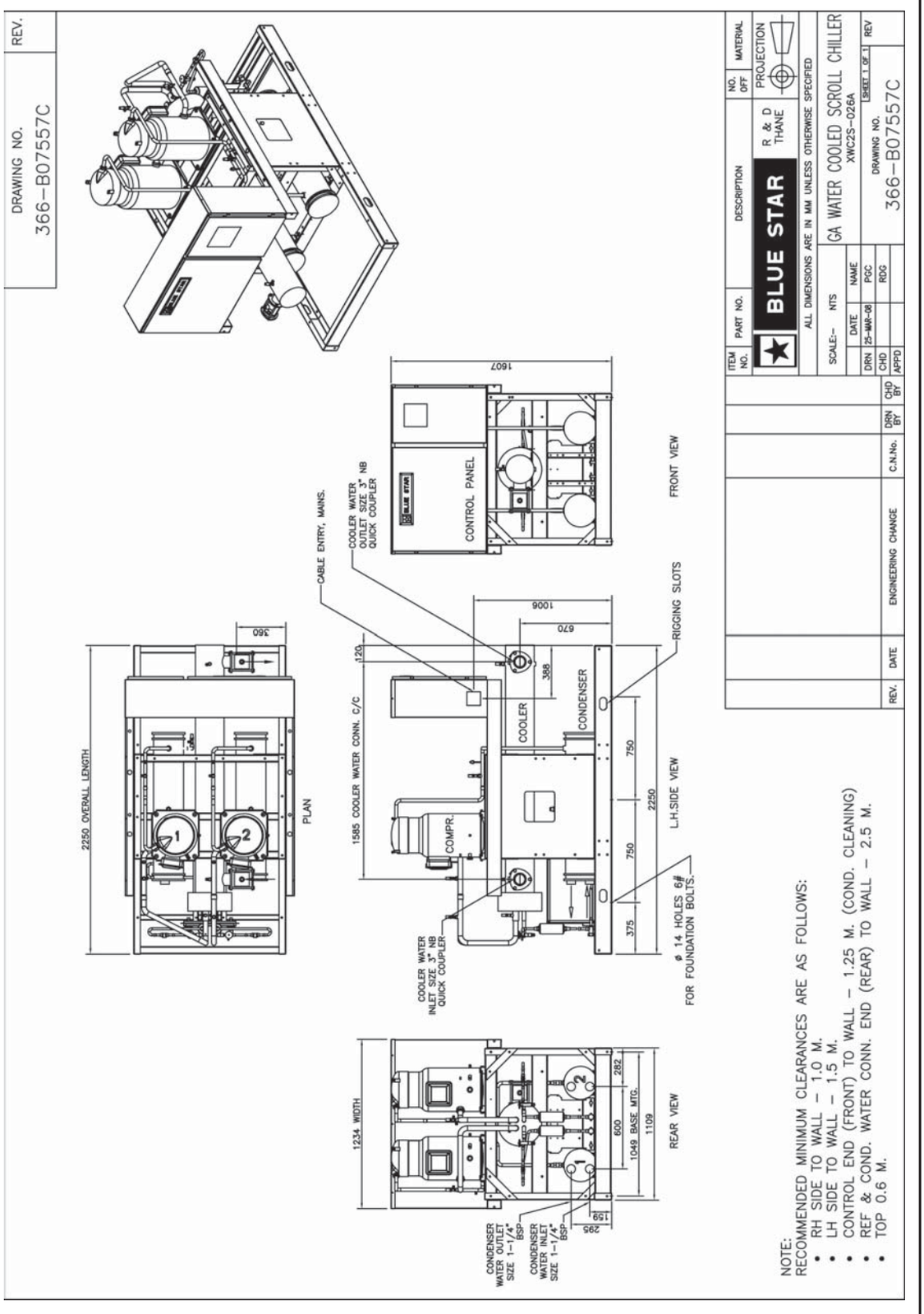
G.A. Drawing: Water-cooled Chiller
Model: XWC2S-011



Wiring Diagram: Water-cooled Chiller
Model: XWC2S-011



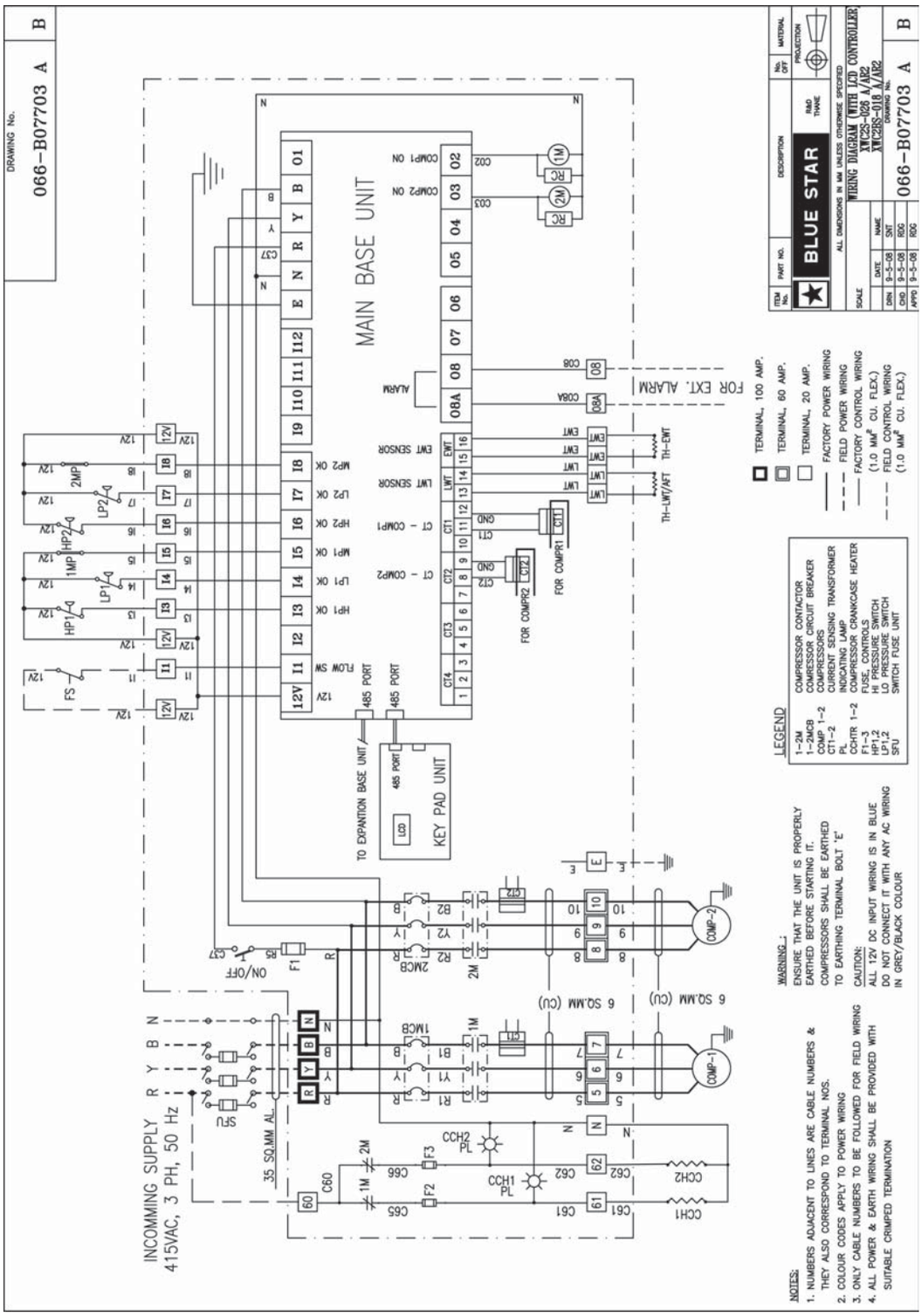
G.A. Drawing: Water-cooled Chiller
Model: XWC2S-026A



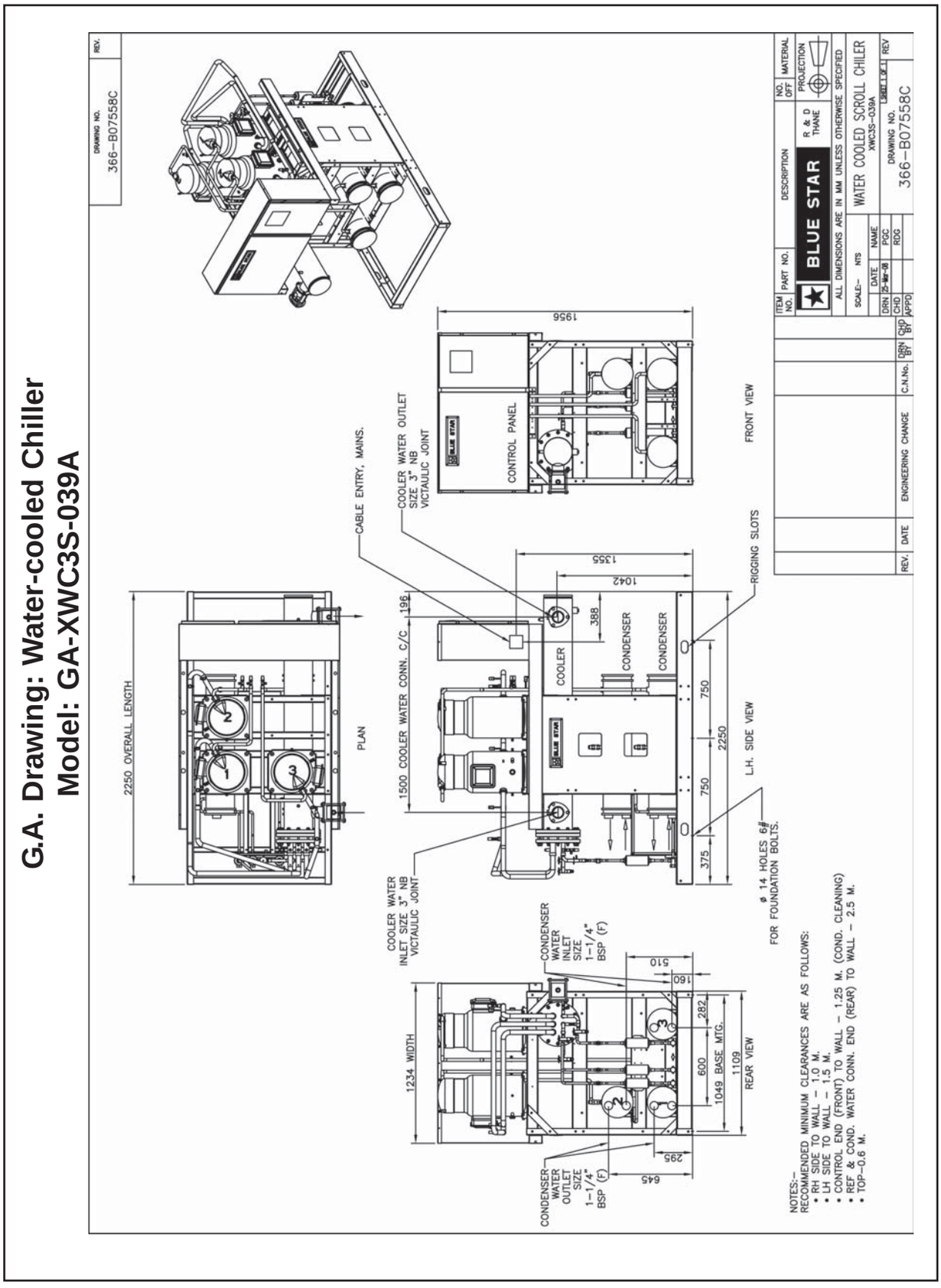
NOTE:
RECOMMENDED MINIMUM CLEARANCES ARE AS FOLLOWS:

- RH SIDE TO WALL – 1.0 M.
- LH SIDE TO WALL – 1.5 M.
- CONTROL END (FRONT) TO WALL – 1.25 M. (COND. CLEANING)
- REF & COND. WATER CONN. END (REAR) TO WALL – 2.5 M.
- TOP 0.6 M.

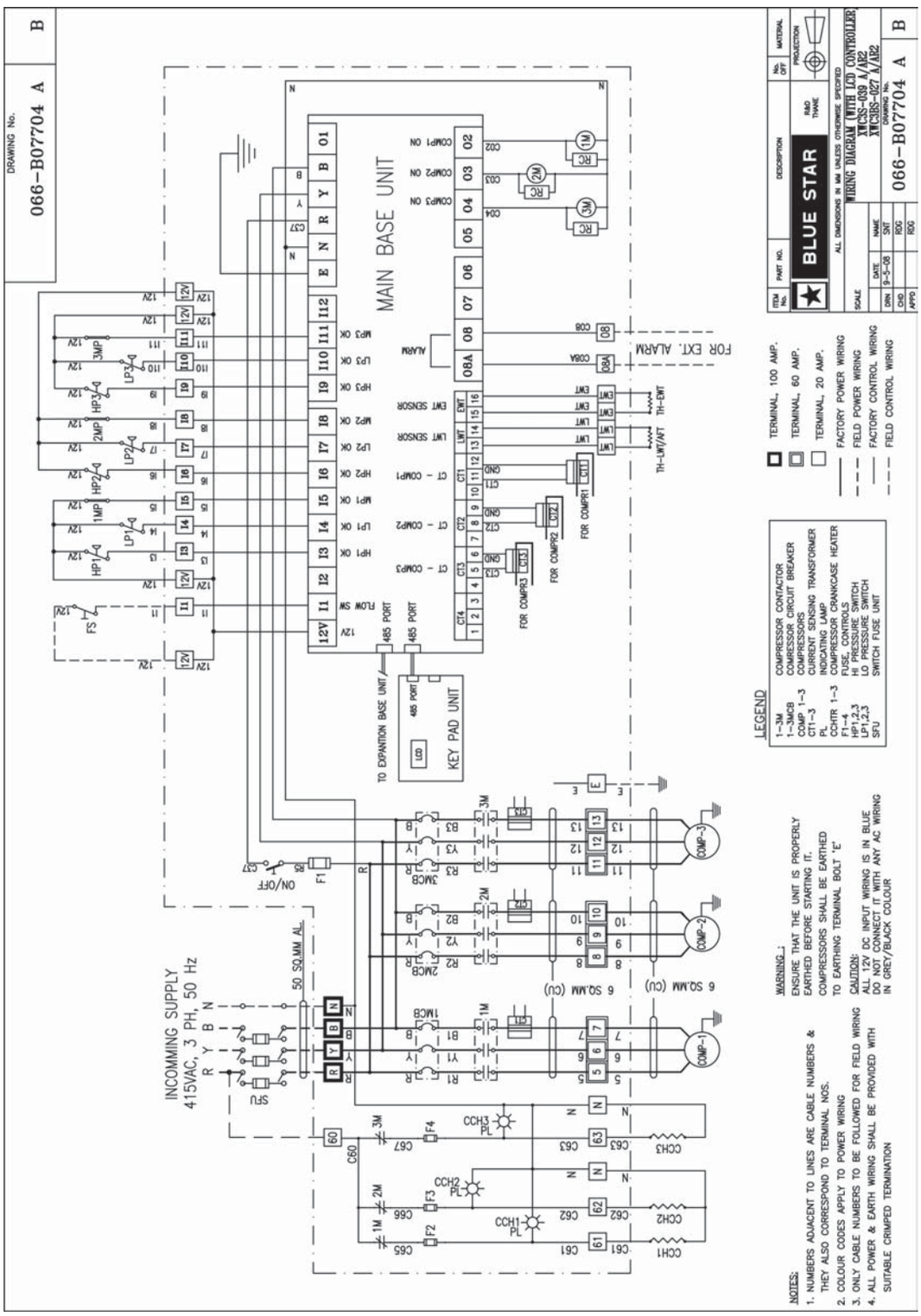
Wiring Diagram: Water-cooled Chiller
Model: XWC2S-026A



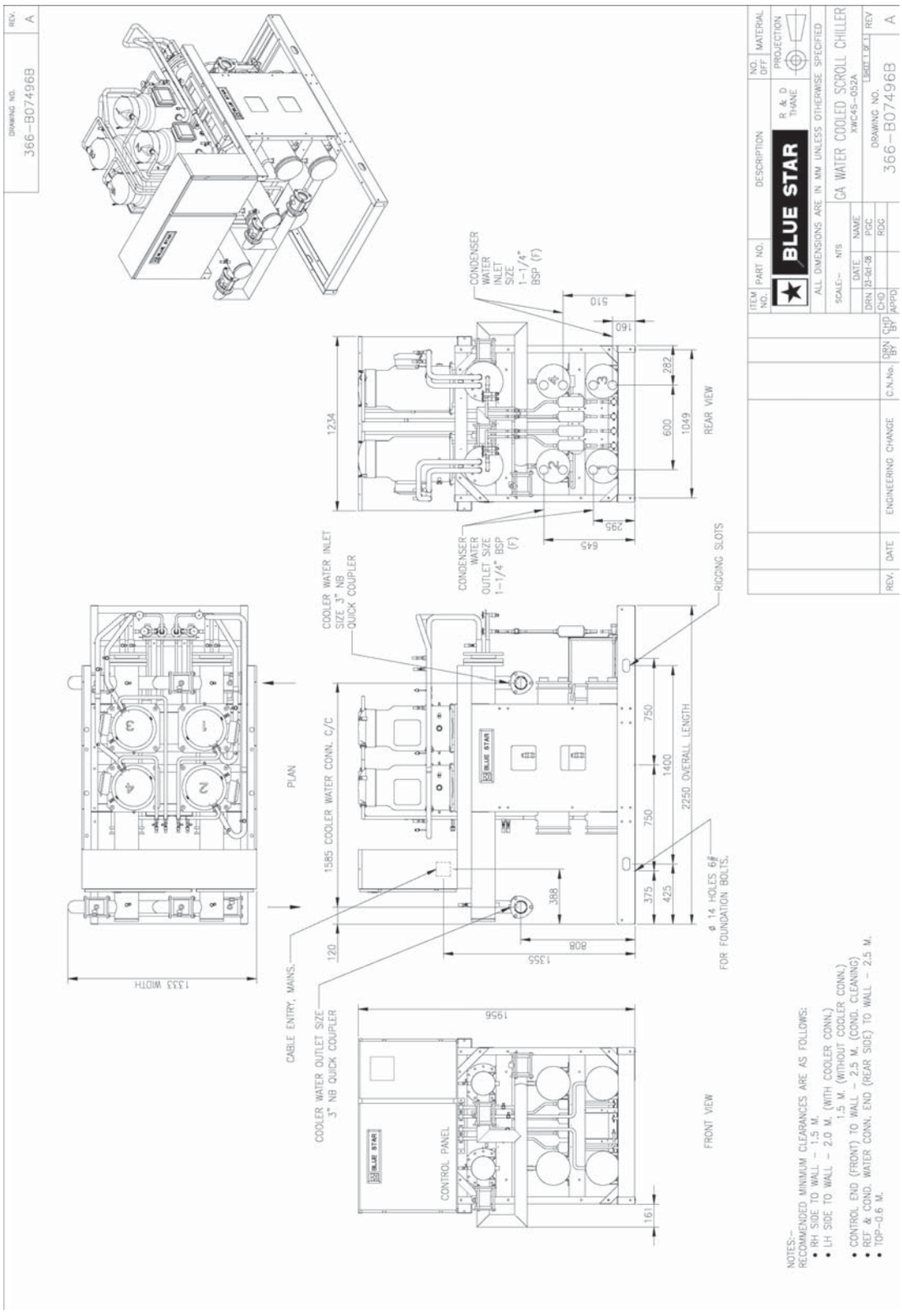
G.A. Drawing: Water-cooled Chiller
Model: GA-XWC3S-039A



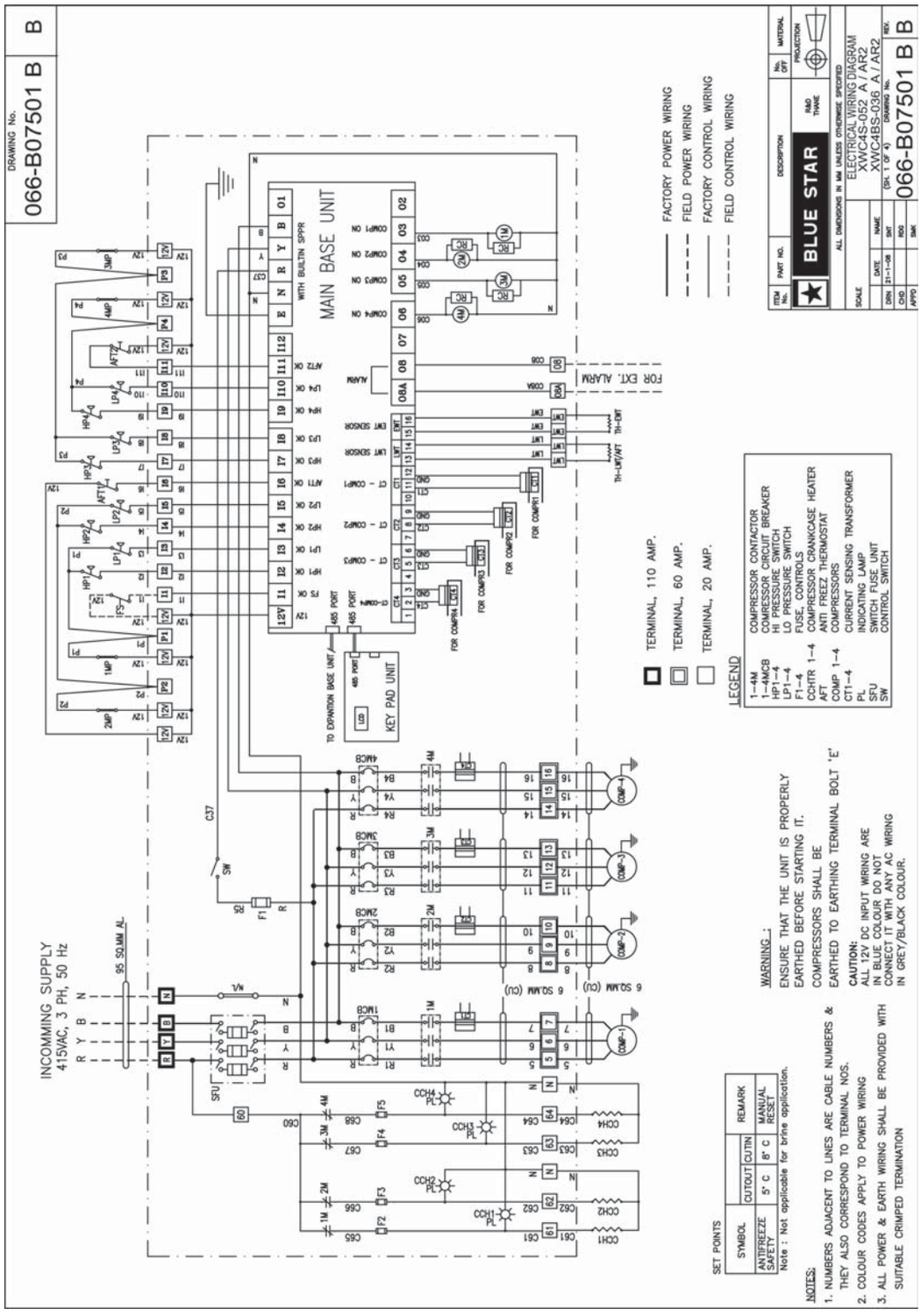
Wiring Diagram: Water-cooled Chillers
Model: XWC3S-039A



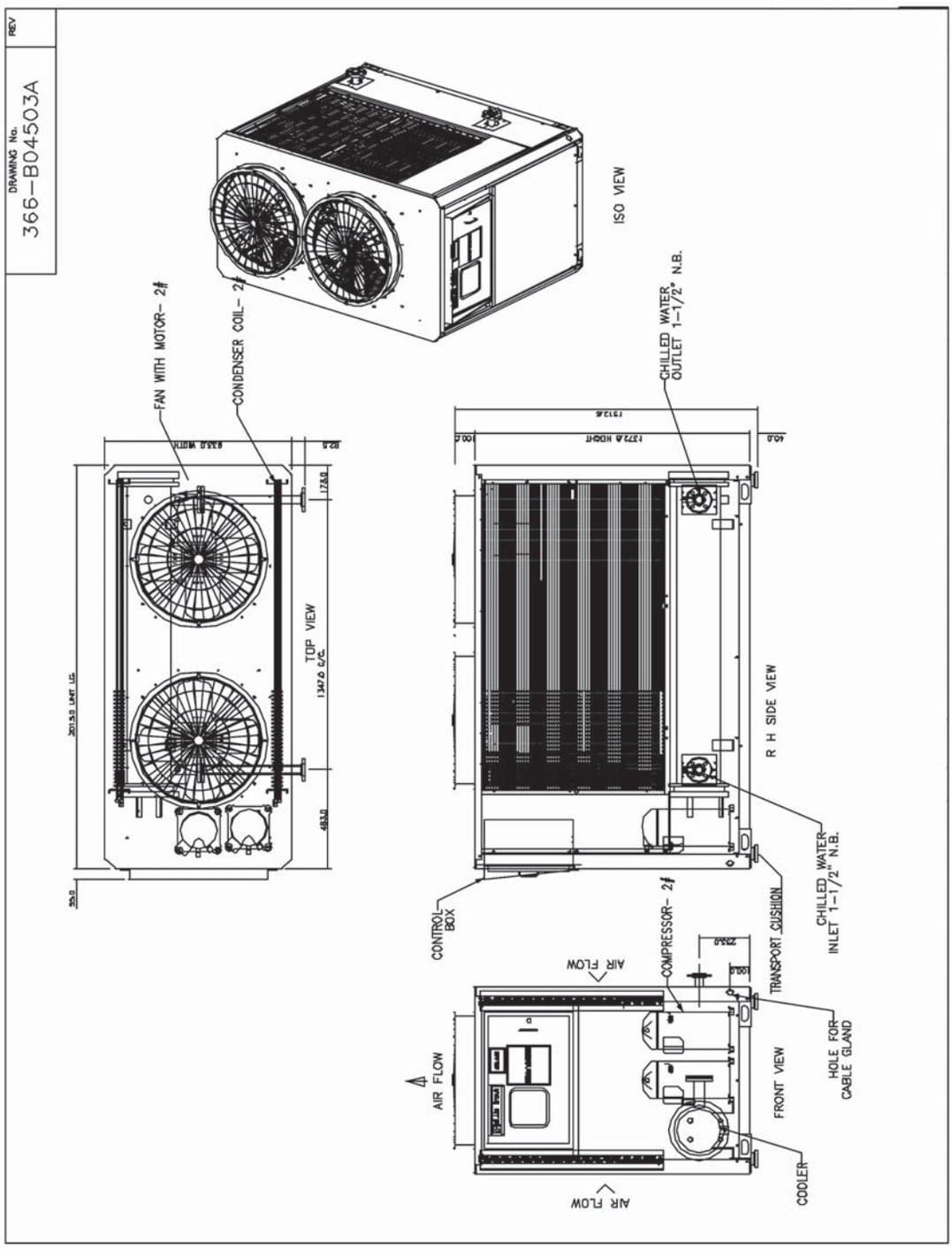
G.A. Drawing: Water-cooled Chiller
Model: XWC4S-052A



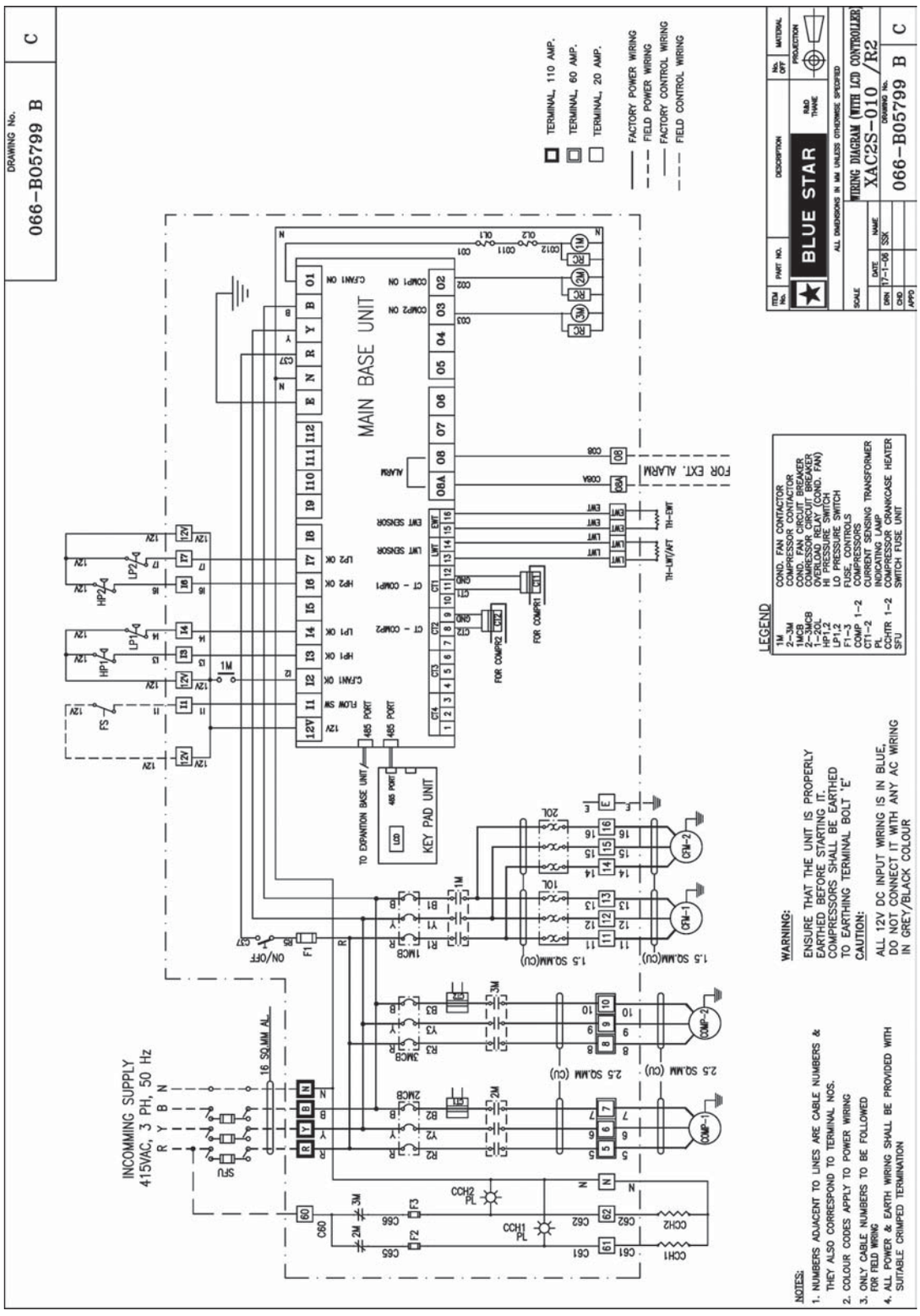
Wiring Diagram: Water-cooled Chiller
Model: XWC4S-052A



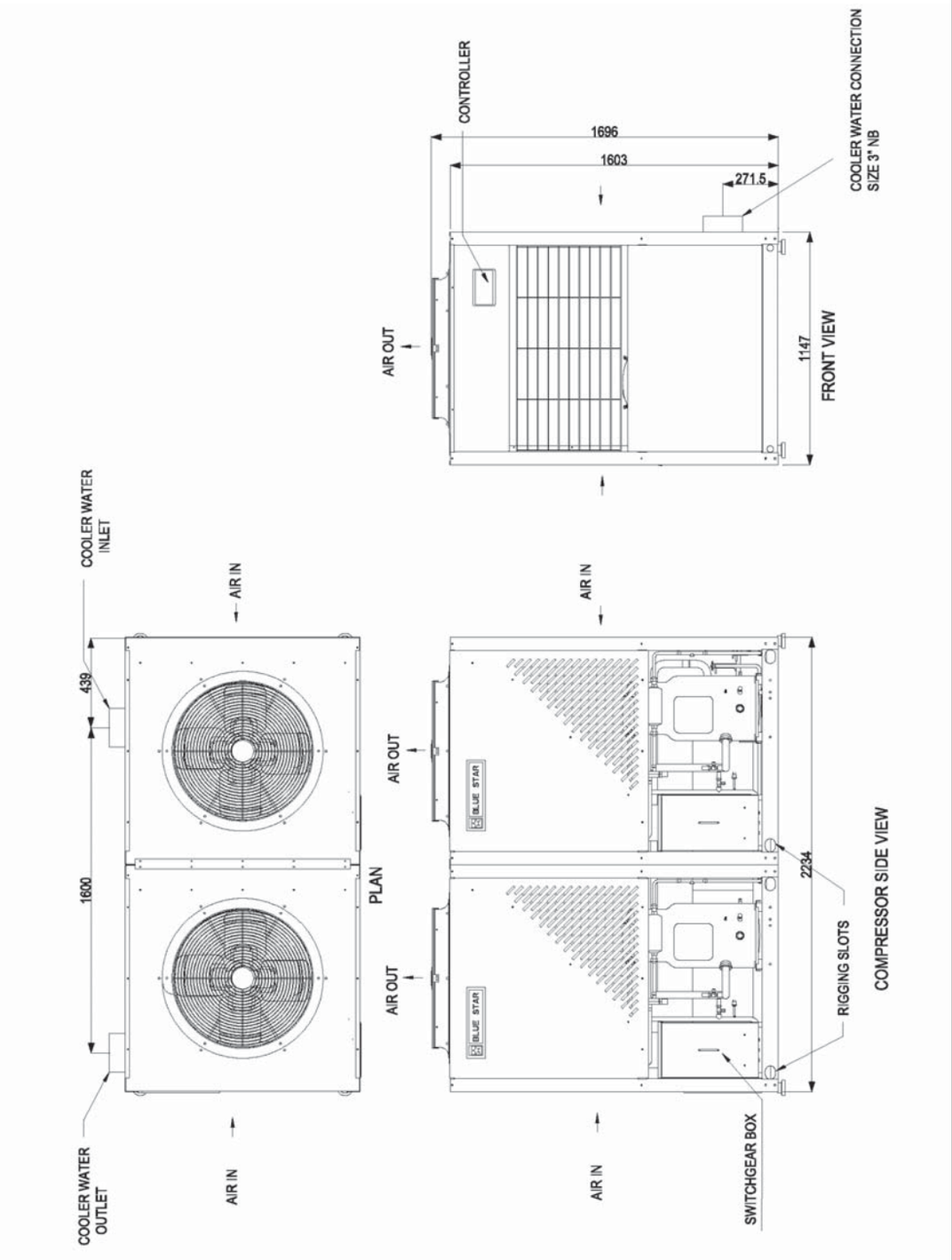
G.A. Drawing - Air-cooled Chiller
Model : XAC2S-010



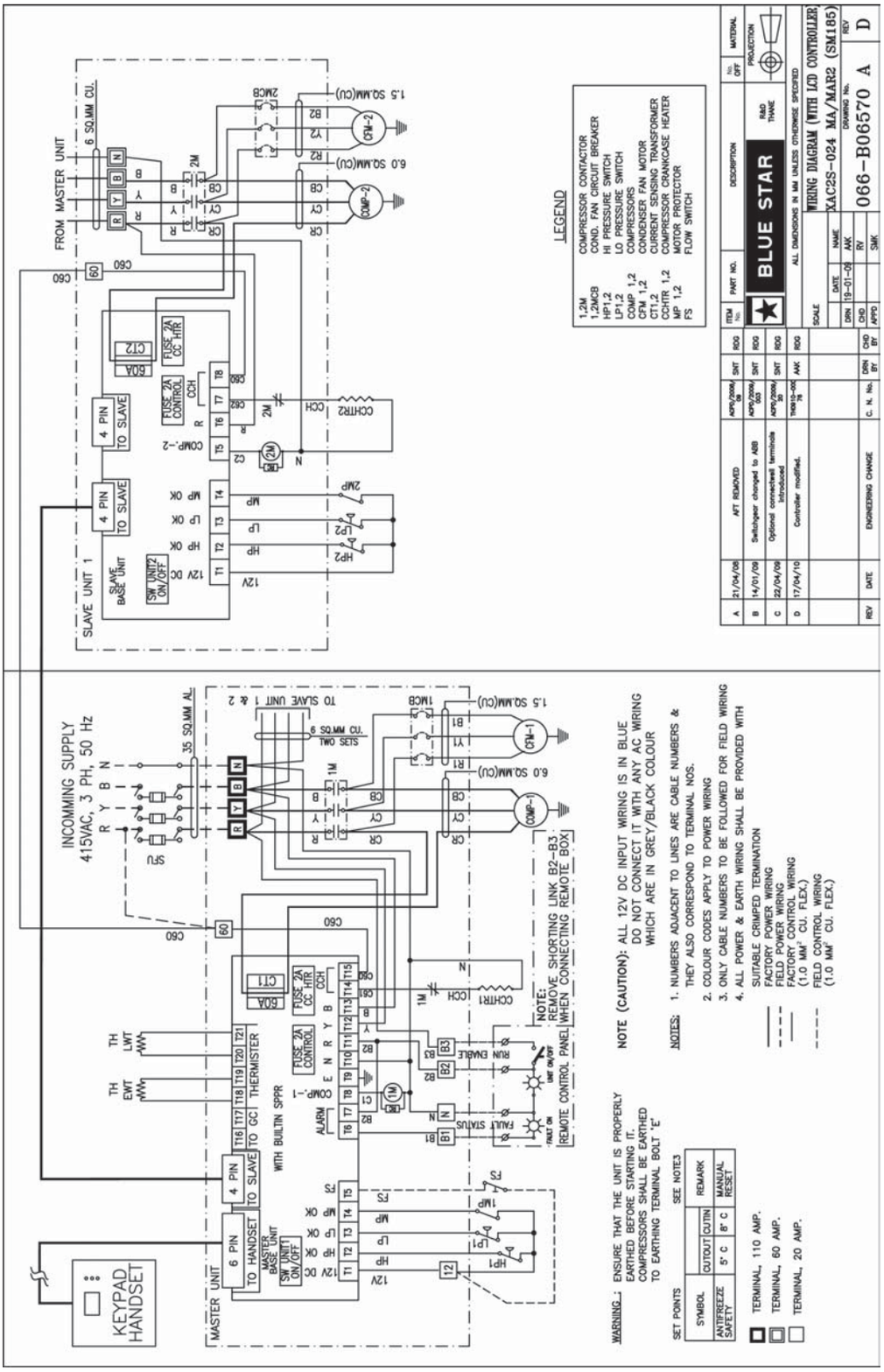
Wiring Diagram - Air-cooled Chiller
Model: XAC2S-010



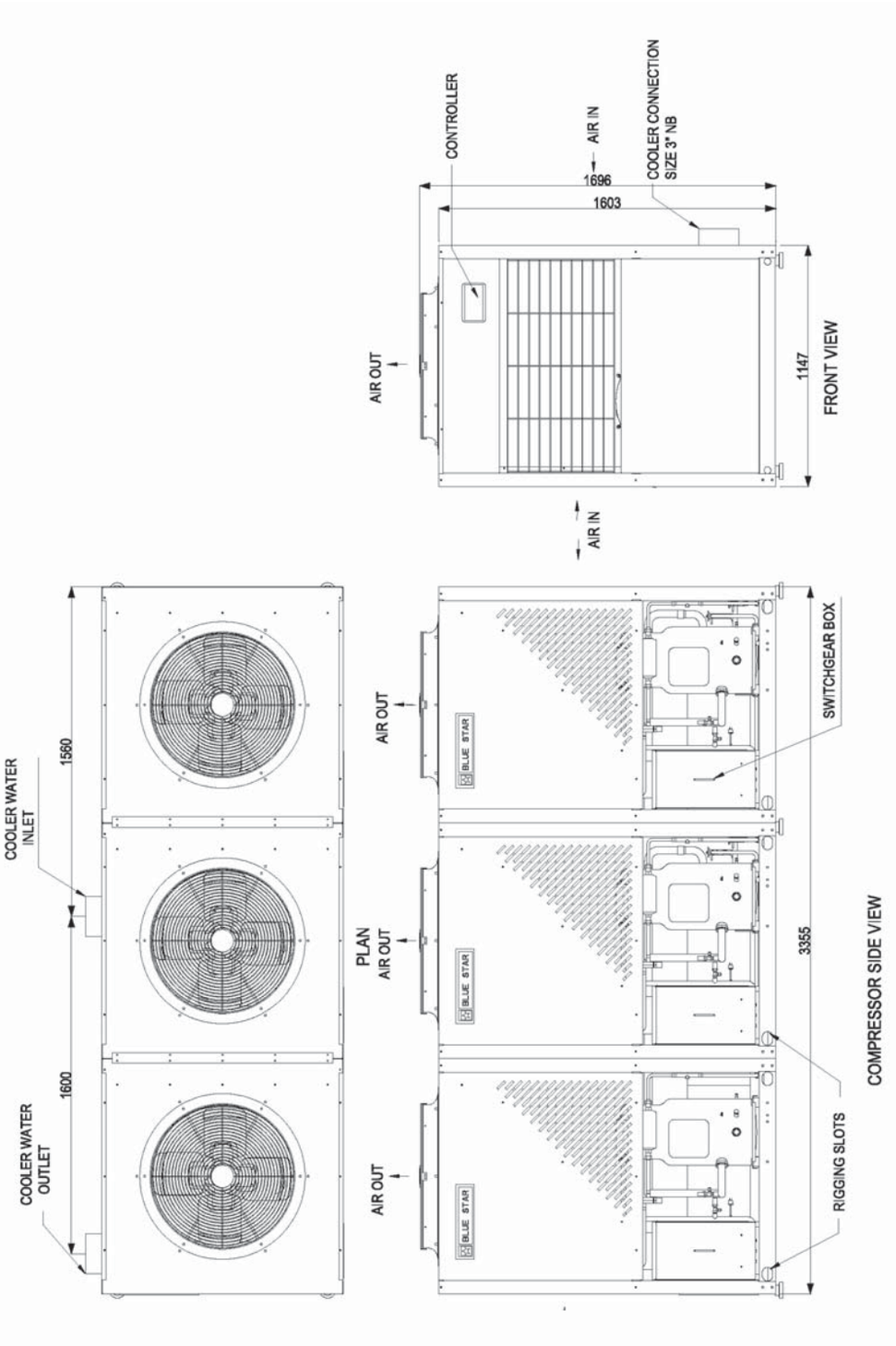
G.A. Drawing - Air-cooled Chiller
Model : XAC2S-024MA



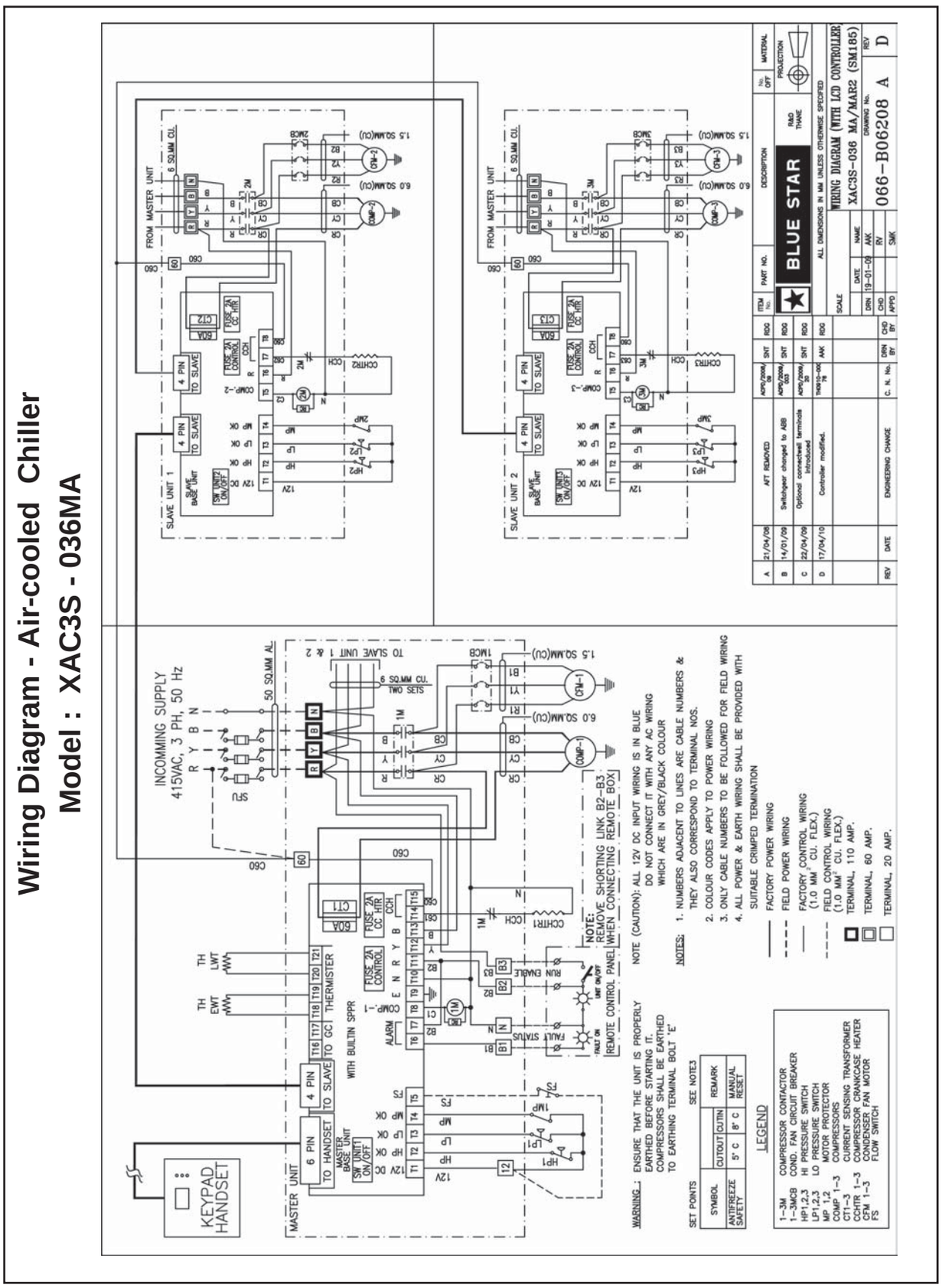
Wiring Diagram -Air-cooled Chiller
Model : XAC2S-024MA



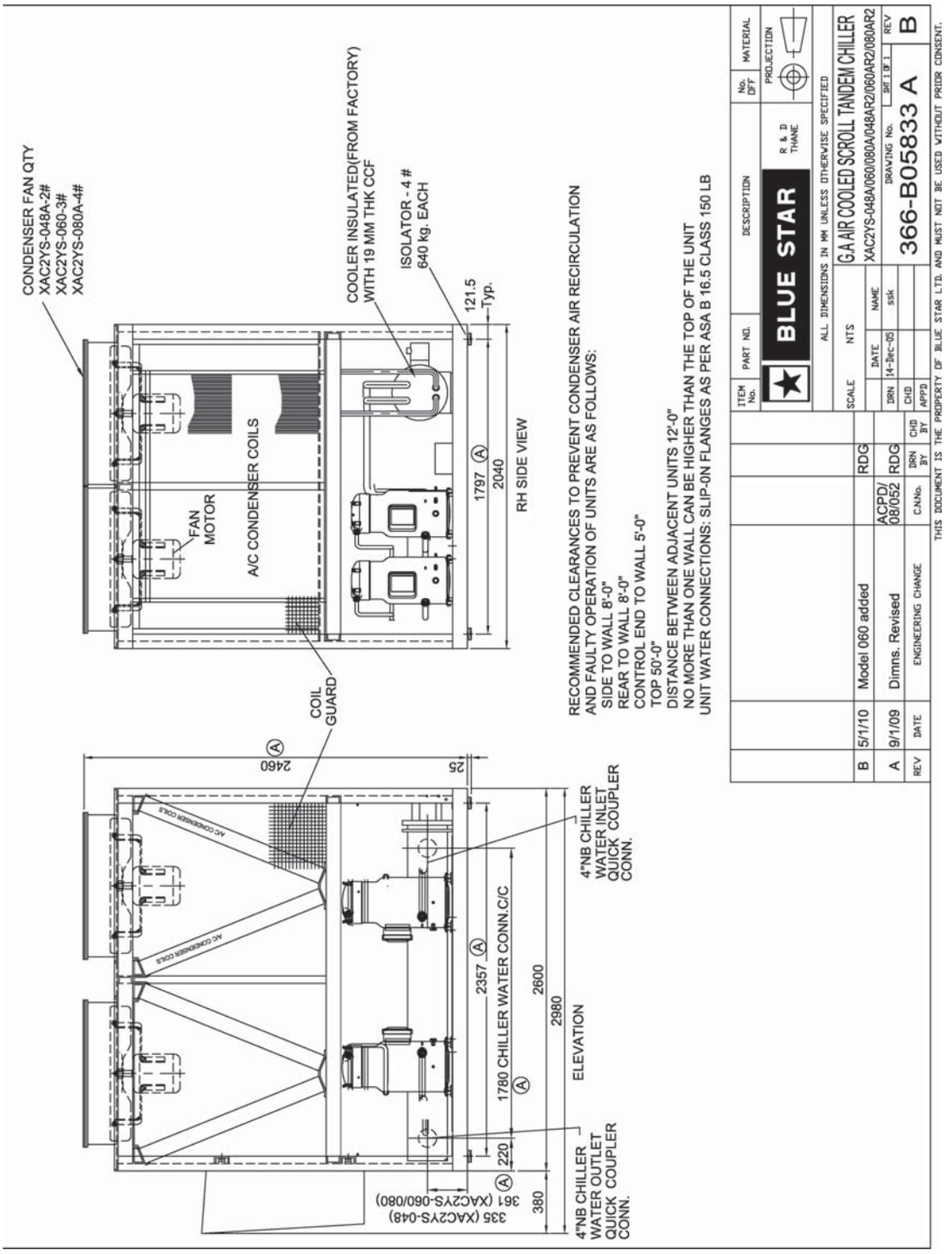
G.A. Drawing - Air-cooled Chiller
Model : XAC3S-036MA



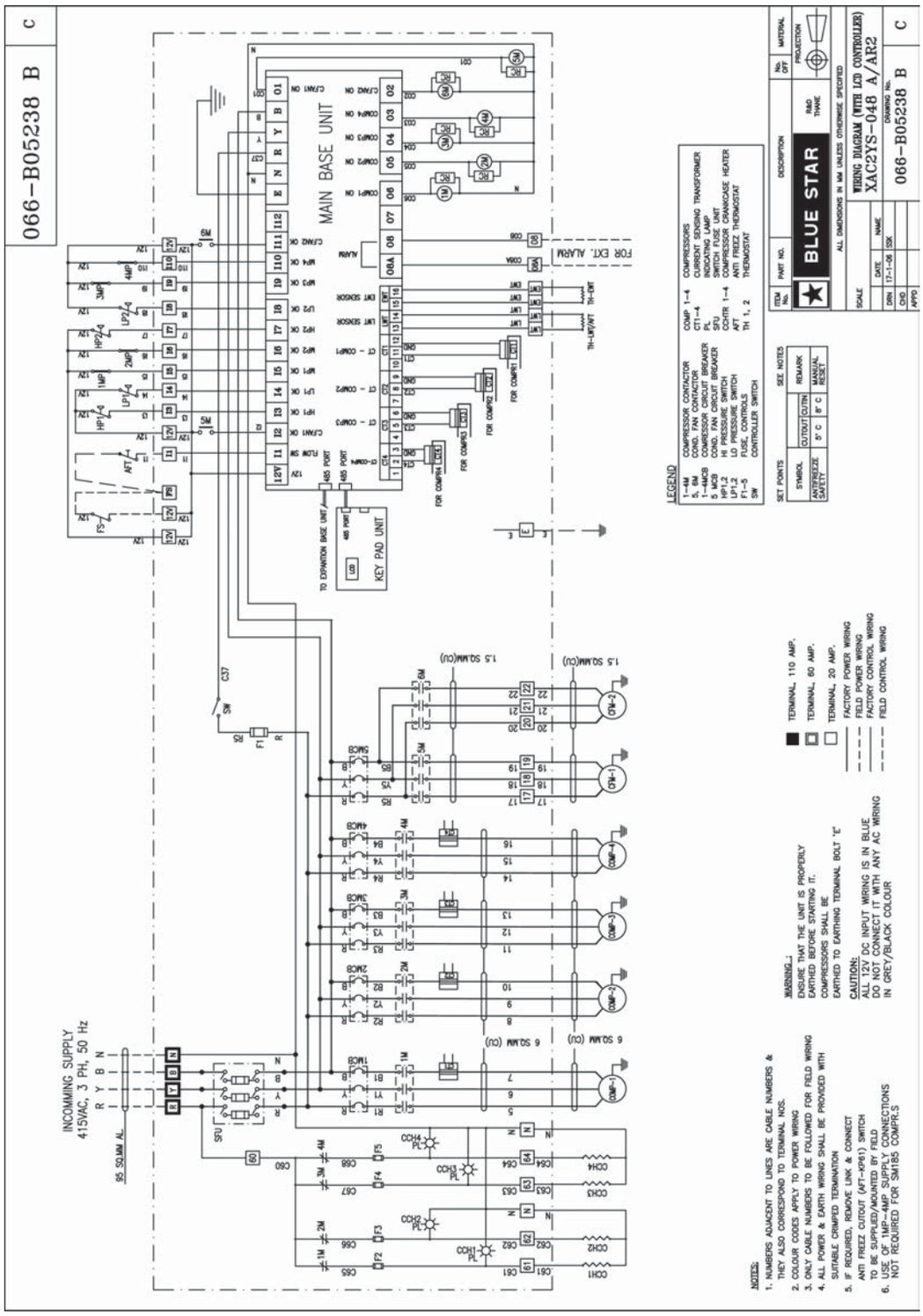
Wiring Diagram - Air-cooled Chiller
Model : XAC3S - 036MA



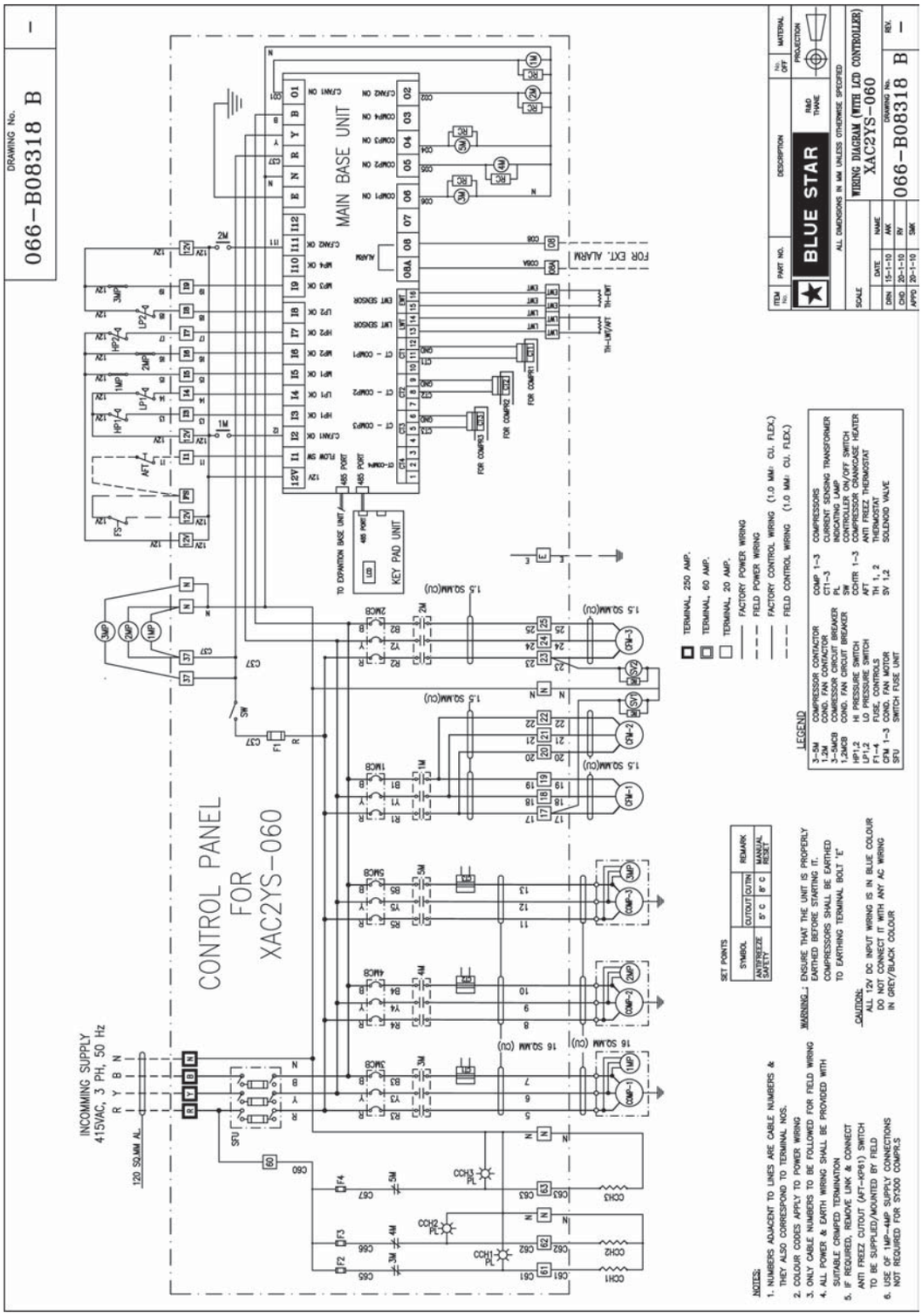
G.A. Drawing - Air-cooled Chiller
Model: XAC2YS-048A, XAC2YS-060, XAC2YS-080A



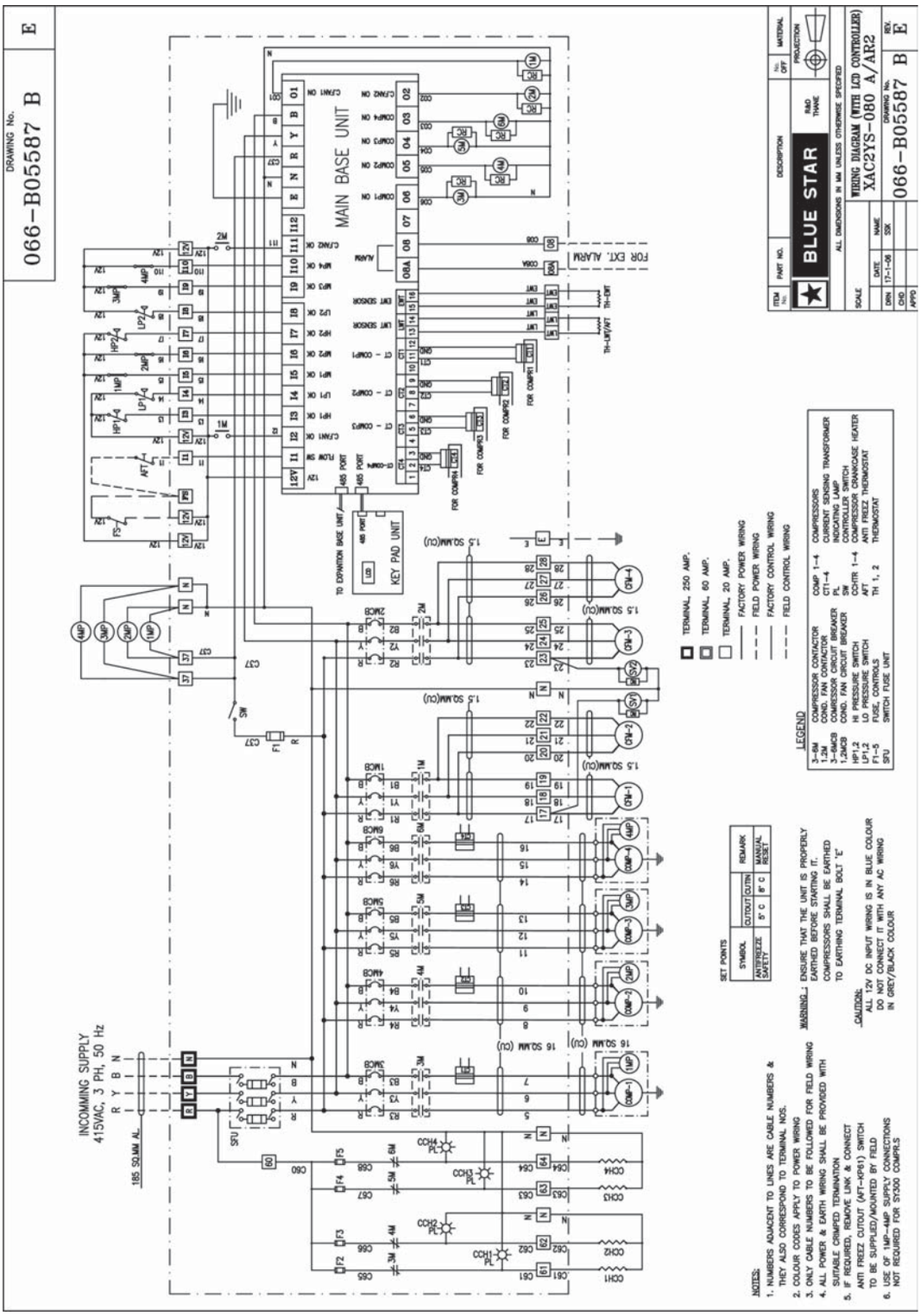
Wiring Diagram - Air-cooled Chiller
Model: XAC2YS-048A



Wiring Diagram - Air-cooled Chiller
Model: XAC2YS-060



Wiring Diagram - Air-cooled Chiller
Model: XAC2YS-080A



List of Spares

Aircooled Chiller Model : XAC2S-010

SAPCODE	DESCRIPTION	Net Oty
COCD1021336004	CONDENSER-COIL(RH) XAC2S-010	1
COCD1021336005	CONDENSER-COIL(LH) XAC2S-010	1
HEDX-BCH006-00	YCH 10 SHELL & TUBE CLR (2 IN 1)	1
VASE-04T001-00	VALVE SERVICE BRASS 1/4 IN	4
HANU-12FL05-01	BRASS FLARE NUT-DIA1/2 INCH	4
VASF-01T001-00	VALVE SHUT-OFF 1/2 INCH	2
CMSCA675K3100	COMPRESSOR - SCROLL- ZR 81-KC-TFD	2
HTFL-BL070004-00	CRANKCASE HEATER ZR 81 70W	2
RCEXV-0000020-00	THERM EXP VALVE TDEX4, BBIVE4	2
RCDR-048F002-00	FILTER DRIER-UDK/ EK / DCL-164	2
RCMI-12001-00	SIGHT GLASS & MOISTURE INDICATOR-1/2 IN	2
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	2
RCPR-ACB-DB138-00	PRESSURE CONTROL YK-01H 400-400P340X	2
MOAC-F00102-02	MOTOR-1/2 HP-910 RPM	2
BFAX-ALF001-00	AL.FAN 4 BLADE 24 IN DIA	2
FBGU-GT001-00	GP-COIL GUARD XAC2S-010	2
HAPRRB020-00	RUBBER-CUSHION PACKING	4
FTCN-WBB006-00	WELL BULB SCROLL CHILLER	2
–	CONTACTOR FOR COMPRESSOR-AV1-18, 18AMPS	2
–	CONTACTOR COND.MOTOR AV1-09, 9A	1
–	O/L RELAY - 1.0 TO 1.4 AMPS	2
–	MCB - C60H3P20AC - 20 AMPS	2
–	MCB - C60H3P6AC - 6 AMPS	1
–	FUSE CARTRIDGE - 2 AMPS	3
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	2
EACOZ0010	DX CNTRLR (LCD)- XAC2S-010	1
–	PILOT LAMP	2

Aircooled Chiller Model : XAC2S-024MA

SAPCODE	DESCRIPTION	Net Qty
HEDX-BCH016-00	DX-COOLER BCH-024U (3/8 IN 2 IN 1)	1
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	4
RCTXV-TDEX11-00	EXPAN.VALVE TDEX-11	2
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	2
FTCN-WBB006-00	WELL BULB SCROLL CHILLER	2
GUFA-GIR001-00	WIRE GUARD MODULAR CHL/COND.	1
GUFA-GIR002-00	COIL GUARD-MODULAR CHILLER	1
HAPRRB020-00	RUBBER-CUSHION PACKING	4
COCD1031436001	COND COIL-1-14FPI-3R MODULAR	2
COCD1031436002	COND COIL-2-14FPI-3R MODULAR	2
HANU-16FL05-01	BRASS FLARE NUT-DIA 5/8 INCH	4
VASF-12T001-00	VALVE SHUTOFF 5/8 IN (RATCHET OP)	2
CMSCB154L31201	COMP-SCROLL-SM 185-4	2
HTFL-BL100005-00	CRANKCASE HEATER SM185 100W	2
RCDR-058F001-00	FILTER DRIER-UDK/EK/DCL-305	2
RCMI-16001-00	SIGHT GLASS & MOISTURE INDICATOR-(5/8 IN)	2
RCPR-ACB-DB138-00	PRESSURE CONTROL YK-01H 400-400P340X	2
BFAX-ALF002-00	AL.FAN 4 BLADE 26 IN DIA	2
MOAC-F00902-00	MOTOR-3/4 HP-910 RPM	2
GUFA-GIS001-00	FAN GUARD SPIRAL 26 INCH	2
FBBR-GT021-00	GP-BRKT.3/4HP MOTOR 26 IN DIA. FAN	6
FTCN-FCM15001-00	SLEEVE COUPLING 3 IN	2
ELCN-040001-00	CONTACTOR.COMPRESSOR 40AMP 3P+1NC	2
–	MCB - C60H3P6AC - 6 AMPS	2
–	FUSE CARTRIDGE - 2 AMPS	3
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
CBCL-RT167-00	2 COMPR. MODULAR CONTROLLER-SET	1
ELTR-060T001-00	CT-60 AMPS, MODULAR CONTROLLER	2
ELOT-T016-01	PCB FOR MODULAR CONTROLLER	2

Aircooled Chiller Model : XAC3S-036MA

SAPCODE	DESCRIPTION	Net Qty
HEDX-BCH008-00	DX-COOLER BCH-036U (3/8 IN 3 IN 1)	1
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	6
RCTXV-TDEX11-00	EXPAN.VALVE TDEX-11	3
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	3
FTCN-WBB006-00	WELL BULB SCROLL CHILLER	2
GUFA-GIR001-00	WIRE GUARD MODULAR CHL/COND.	1
GUFA-GIR002-00	COIL GUARD-MODULAR CHILLER	1
HAPRRB020-00	RUBBER-CUSHION PACKING	6
COCD1031436001	COND COIL-1-14FPI-3R MODULAR	3
COCD1031436002	COND COIL-2-14FPI-3R MODULAR	3
HANU-16FL05-01	BRASS FLARE NUT-DIA 5/8 INCH	6
VASF-12T001-00	VALVE SHUTOFF 5/8 IN (RATCHET OP)	3
CMSCB154L31201	COMP-SCROLL-SM 185-4	3
HTFL-BL100005-00	CRANKCASE HEATER SM185 100W	3
RCDR-058F001-00	FILTER DRIER-UDK/EK/DCL-305	3
RCMI-16001-00	SIGHT GLASS & MOISTURE INDICATOR-(5/8 IN)	3
RCPR-ACB-DB138-00	PRESSURE CONTROL YK-01H 400-400P340X	3
BFAX-ALF002-00	AL.FAN 4 BLADE 26 IN DIA	3
MOAC-F00902-00	MOTOR-3/4 HP-910 RPM	3
GUFA-GIS001-00	FAN GUARD SPIRAL 26 INCH	3
FBBR-GT021-00	GP-BRKT.3/4HP MOTOR 26 IN DIA. FAN	9
FTCN-FCM15001-00	SLEEVE COUPLING 3 IN	2
ELCN-040001-00	CONTACTOR.COMPRESSOR 40AMP 3P+1NC	3
–	MCB - C60H3P6AC - 6 AMPS	3
–	FUSE CARTRIDGE - 2 AMPS	4
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
CBCL-RT168-00	3 COMPR. MODULAR CONTROLLER-SET	1
ELTR-060T001-00	CT-60 AMPS, MODULAR CONTROLLER	3
ELOT-T016-01	PCB FOR MODULAR CONTROLLER	3
ELOT-T015-01	KEY PAD FOR MODULAR CONTROLLER	1

Aircooled Chiller Model : XAC2YS-048A

SAPCODE	DESCRIPTION	Net Qty
COCD1021648001	COND COIL LH 48 TH66.5FL2R16 FPI	2
COCD1021648002	COND COIL RH 48TH66.5FL2R16 FPI	2
HEDX-BCH009-00	DX-COOLER BCH-048U (3/8 IN2 IN 1)	1
CMSCB154L31201	COMP-SCROLL-SM 185-4RM	4
HTFL-BL100005-00	CRANKCASE HEATER SM185 100W	4
VABA-13T001-00	7/8 IN BALL VALVE ABV7A	2
RCDR-078F001-00	FILTER DRIER-UDK 417 S	2
RCTXV-TDEBX19-00	EXP VALVE-TDEBX19	2
RCEXV-22002-00	INDICATOR MOIST 7/8 ODF	2
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	2
RCPR-ACB-DB138-00	PRESSURE CONTROL YK-01H 400-400P340X	2
GUFA-GIS002-00	GUARD FOR ICF FAN	2
HAPRRB004-00	RUBBERPADMOTOR ARMS	8
FBCL-GT006-00	GP-CLAMP FOR 36 IN MOTOR ARMS	8
BFAX-ALF003-00	36 IN FAN BIRD WING 5 BLADE	2
MOAC-02502-00	MOTOR-2.5 HP-900RPM4.5AHIND	2
FBAR-MT001-00	MS-PIPE ARM- FAN MOTOR1.6HP	8
GUFA-GIR003-00	GUARD HEADER 40/75 066 3585B	4
GUFA-GIR004-00	GUARD HEADER 40/200 066 3584B	2
FTCN-WBB005-00	WELL BULB 4 IN CONN CHILLER	2
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	4
HASI-CS8264000	SPRING ISOLATORSCS82-640BLUE	4
FTCN-PNA00002-00	ALUMINIUM CONNECTOR FOR SCREW	2
ELCN-040001-00	CONTACTOR. HARTLAND 40AMP3P+1NC	4
–	CONTACTOR COND. MOTOR AV1-09, 9A	2
–	INCOMER SWITCH, 175 AMPS	1

Aircooled Chiller Model : XAC2YS-048A

SAPCODE	DESCRIPTION	Net Qty
–	MCB - C60H3P10AC - 10 AMPS	1
–	MCB - C60H3P50AC - 50 AMPS	4
–	FUSE CARTRIDGE - 2 AMPS	5
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	4
EACOZ0070	CONTROLLER TANDEM-SCROLL-48TR/80TR	1
–	PILOT LAMP	4
FTCN-FCM14001-00	SLEEVE COUPLING 4 IN	2

Aircooled Chiller Model : XAC2YS-060

SAPCODE	DESCRIPTION	Net Qty
COCD1021648001	COND COIL LH 48 TH66.5FL2R16 FPI	1
COCD1021648002	COND COIL RH 48TH66.5FL2R16 FPI	1
COCD1041448001	COND COIL 4R-48TH-14FPI LH	1
COCD1041448002	COND COIL 4R-48TH-14FPI RH	1
HEDX-BCH101-00	DX-COOLER BCH-075U	1
CMSCB250L31201	COMP-SCROLL-SY 300	3
HTFL-BL130007-00	CRANKCASE HEATER-130W-SY-300	3
RCSL-EVR25-00	SOLENOID VALVE-EVR25	2
RCSC-EVR3-00	SOLENOID COIL-EVR3/EVR6	2
RCDR-098F001-00	FILTER DRIER-EK/UDK 759 S / DML 609 S	2
RCTXV-TDEBX19-00	EXP VALVE-TDEBX19	1
RCTXV-TDEBX 30-00	EXP VALVE-TDEBX30(1 3/8*1 1/8)	1
RCMI-28001-00	MOISTURE INDICATOR-SA19S 1-1/8 IN	2
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	2
SPPC-T011-00	HI PR SWITCH(SAGINO.)450 AUTO	2
GUFA-GIS002-00	GUARD FOR ICF FAN	3
HAPRRB004-00	RUBBERPADMOTOR ARMS	12
FBCL-GT006-00	GP-CLAMP FOR 36 IN MOTOR ARMS	12
BFAX-ALF003-00	36 IN FAN BIRD WING 5 BLADE	3
MOAC-02502-00	MOTOR-2.0 HP-910RPM 3.5A HIND	3
FBAR-MT001-00	MS-PIPE ARM- FAN MOTOR1.6HP	12
GUFA-GIR003-00	GUARD HEADER 40/75 066 3585B	4
GUFA-GIR004-00	GUARD HEADER 40/200 066 3584B	2
FTCN-WBB005-00	WELL BULB 4 IN CONN CHILLER	2
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	4
HASI-CS8264000	SPRING ISOLATORSCS82-640BLUE	4
FTCN-PNA00002-00	ALUMINIUM CONNECTOR FOR SCREW	3
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	3
FTCN-FCM14001-00	SLEEVE COUPLING 4 IN	2
-	CONTACTOR FOR COMPR. AV1-65-63 A	0
-	CONTACTOR COND.MOTOR AV1-09, 9A	2
-	CONTACTOR COND.MOTOR AV1-18, 18A	0
-	INCOMER SWITCH, 200 AMPS	1
-	MCB - C60H3P63AC- 63 AMPS	3
-	FUSE CARTRIDGE - 2 AMPS	4
-	CONTROLLER TANDEM-SCROLL-60TR	1

Aircooled Chiller Model : XAC2YS-080A

SAPCODE	DESCRIPTION	Net Qty
COCD1031348013	COND COIL LH 48TH66.5FL3R16 FPI	2
COCD1031348014	COND COIL RH 48TH66.5FL3R16 FPI	2
HEDX-BCH010-00	DX-COOLER BCH-080U (3/8 IN2 IN 1)	1
CMSCB250L31201	COMP-SCROLL-SY 300	4
HTFL-BL130007-00	CRANKCASE HEATER-130W-SY-300	4
RCSL-EVR25-00	SOLENOID VALVE-EVR25	2
RCSC-EVR3-00	SOLENOID COIL-EVR3/EVR6	2
RCDR-098F001-00	FILTER DRIER-EK/UDK 759 S	2
RCTXV-TDEBX 30-00	EXP VALVE-TDEBX30(1 3/8*1 1/	2
RCMI-28001-00	MOISTURE INDICATOR-SA19S 1-1/8 IN	2
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	2
RCPR-ACB-DB138-00	PRESSURE CONTROL YK-01H 400-400P340X	2
GUFA-GIS002-00	GUARD FOR ICF FAN	4
HAPRRB004-00	RUBBERPADMOTOR ARMS	16
FBCL-GT006-00	GP-CLAMP FOR 36 IN MOTOR ARMS	16
BFAX-ALF003-00	36 IN FAN BIRD WING 5 BLADE	4
MOAC-02502-00	MOTOR-2.5 HP-900RPM4.5AHIND	4
FBAR-MT001-00	MS-PIPE ARM- FAN MOTOR1.6HP	16
GUFA-GIR003-00	GUARD HEADER 40/75 066 3585B	4
GUFA-GIR004-00	GUARD HEADER 40/200 066 3584B	2
FTCN-WBB005-00	WELL BULB 4 IN CONN CHILLER	2
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	4
HASI-CS8264000	SPRING ISOLATORSCS82-640BLUE	4
FTCN-PNA00002-00	ALUMINIUM CONNECTOR FOR SCREW	4
–	CONTACTOR FOR COMPR. AV1-65-63 A	4
–	CONTACTOR COND.MOTOR AV1-18, 18A	2
–	INCOMER SWITCH, 250 AMPS	1
–	MCB - C60H3P10AC - 10 AMPS	2

Aircooled Chiller Model : XAC2YS-080A

SAPCODE	DESCRIPTION	Net Qty
–	MCB - C60H3P63AC- 63 AMPS	4
–	FUSE CARTRIDGE - 2 AMPS	5
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	4
EACOZ0070	CONTROLLER TANDEM-SCROLL-48TR/80TR	1
–	PILOT LAMP	4
FTCN-FCM14001-00	SLEEVE COUPLING 4 IN	2

Water-cooled Chiller Model : XWCS2011

SAPCODE	DESCRIPTION	Net Qty
HANU-12FL05-01	NUT-DIA1/2-FLAREBRASS	4
VASE-04T001-00	VALVE SERVICE BRASS 1/4 IN	4
CMSCA675K3100	COMP-SCROLL-ZR 81 KC-TFD 522	2
HTFL-BL070004-00	CRANKCASE HEATER ZR 81 70W	2
RCEXV-0000020-00	THERM EXP VALVE TDEX4(DANFOSS)	2
RCMI-12001-00	MOISTURE INDICATOR-1/2 IN	2
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	2
RCPR-ACB-DB162-00	PRE CONTROL -W/C (YK-01H 400-290P230X)	2
RCDR-048F002-00	FILTER DRIER-EK164/DCL164	2
RCAC-HC00001-00	SUCTION ACCUMULATOR: 2/3 HP	2
RCPR-00001-00	PRE CONTROL-VALVE RELIEF 022-01887-000	2
FTCN-WBB006-00	WELL BULB SCROLL CHILLER	2
HEDX-BCH006-00	YCH 10 SHELL&TUBE CLR (2 IN 1)	1
HECD-BCH010-00	10 TR SHELL & TUBE CONDENSER	1
–	CONTACTOR FOR COMPR.AV1-18, 18A.	2
–	MCB - C60H3P20AC - 20 AMPS	2
–	FUSE CARTRIDGE - 2 AMPS	3
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	2
EACOZ0020	DX CNTRLR (LCD)- XWC2S-011	1
–	PILOT LAMP	2

Water-cooled Chiller Model : XWC2S-026A

SAPCODE	DESCRIPTION	Net Qty
HECD-BCH011-00	YCD14 S & T CONDENSER	2
HEDX-BCH013-00	BCH-26 COOLER FOR XWC2S-026A	1
VAPK-13D002-00	5/8 IN PACKED VALVE-BRAZED	2
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	4
CMSCB154L31201	COMP-SCROLL-SM 185-4RM	**2**
HTFL-BL100005-00	CRANKCASE HEATER SM185 100W	2
RCDR-00	FILTER DRIER-DN/DCL305	2
RCMI-15001-00	MOISTURE INDICATOR-SA15S	2
RCTXV-TDEX11-00	EXPAN.VALVE TDEX-11	2
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	2
RCPR-ACB-DB162-00	PRE CONTROL -W/C (YK-01H 400-290P230X)	2
RCPR-00001-00	PRE CONTROL-VALVE RELIEF 022-01887-000	2
ELCN-040001-00	CONTACTOR.HARTLAND 40AMP3P+1NC	2
FTCN-WBB006-00	WELL BULB SCROLL CHILLER	2
HANU-16FL05-01	NUT-DIA5/8 IN-FLAREBRASS	4
FTCN-FCM15001-00	SLEEVECOUPLING-3"	2
–	MCB - C60H3P50AC - 50 AMPS	2
–	FUSE CARTRIDGE - 2 AMPS	3
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	2
EACOZ0050	DX CNTRLR (LCD)- XWC2S-026	1
–	PILOT LAMP	2

Water-cooled Chiller Model : XWC3S-039A

SAPCODE	DESCRIPTION	Net Qty
HECD-BCH011-00	YCD14 S & T CONDENSER	3
HEDX-BCH014-00	DX-COOLER BCH-39 FOR W/C SCR	1
VAPK-13D002-00	5/8 IN PACKED VALVE-BRAZED	3
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	6
CMSCB154L31201	COMP-SCROLL-SM 185-4RM	**3**
HTFL-BL100005-00	CRANKCASE HEATER SM185 100W	3
RCDR-00	FILTER DRIER-DN/DCL305	3
RCMI-15001-00	MOISTURE INDICATOR-SA15S	3
RCTXV-TDEX11-00	EXPAN.VALVE TDEX-11	3
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	3
RCPR-ACB-DB162-00	PRE CONTROL -W/C (YK-01H 400-290P230X)	3
RCPR-00001-00	PRE CONTROL-VALVE RELIEF 022-01887-000	3
ELCN-040001-00	CONTACTOR.HARTLAND 40AMP3P+1NC	3
FTCN-WBB006-00	WELL BULB SCROLL CHILLER	2
HANU-16FL05-01	NUT-DIA5/8 IN-FLAREBRASS	6
FTCN-FCM15001-00	SLEEVECOUPLING-3"	2
–	MCB - C60H3P50AC - 50 AMPS	3
–	FUSE CARTRIDGE - 2 AMPS	4
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	3
EACOZ0060	DX CNTRLR (LCD)- XWC3S-039	1
–	PILOT LAMP	3

Water-cooled Chiller Model : XWC4S-052A

SAPCODE	DESCRIPTION	Net Qty
HECD-BCH011-00	YCD14 S & T CONDENSER	4
HEDX-BCH013-00	BCH-26 COOLER FOR XWC2S-026A	2
VAPK-13D002-00	5/8 IN PACKED VALVE-BRAZED	4
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	8
CMSCB154L31201	COMP-SCROLL-SM 185-4RM	**4**
HTFL-BL100005-00	CRANKCASE HEATER SM185 100W	4
RCDR-00	FILTER DRIER-DN/DCL305	4
RCMI-15001-00	MOISTURE INDICATOR-SA15S	4
RCTXV-TDEX11-00	EXPAN.VALVE TDEX-11	4
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	4
RCPR-ACB-DB162-00	PRE CONTROL -W/C (YK-01H 400-290P230X)	4
RCPR-00001-00	PRE CONTROL-VALVE RELIEF 022-01887-000	4
ELCN-040001-00	CONTACTOR.HARTLAND 40AMP3P+1NC	4
FTCN-WBB006-00	WELL BULB SCROLL CHILLER	2
HANU-16FL05-01	NUT-DIA5/8 IN-FLAREBRASS	8
STTS-T005-00	THERMOSTAT KP61 060L1105	2
FTCN-FCM15001-00	SLEEVECOUPLING-3"	4
–	MCB - C60H3P50AC - 50 AMPS	4
–	FUSE CARTRIDGE - 2 AMPS	5
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	4
EACOZ0080	DX CNTRLR(LCD)- XWC4S-052/085	1
–	PILOT LAMP	4
–	INCOMER SWITCH, 125 A	1

Water-cooled Chiller Model : XWC4S-085A

SAPCODE	DESCRIPTION	Net Qty
HECD-BCH012-00	YCD 21 SHELL AND TUBE CONDEN	4
HEDX-BCH024-00	DX-COOLER BCH-50 FOR W/C SCR	2
RCSE-7801-00	SER VALVE-7/8 IN SSV-JA7HFKZ-1	4
FBAN-GT004-00	GP-VALVE ANGLE 1/4 IN X 1/4 IN	8
STTS-T005-00	THERMOSTAT KP61 060L1105	2
CMSCB250L31201	COMP-SCROLL-SY 300	4
HTFL-BL130007-00	CRANKCASE HEATER-130W-SY-300	4
RCDR-078F001-00	FILTER DRIER-UDK 417 S	4
RCEXV-22002-00	INDICATOR MOIST 7/8 ODF	4
RCTXV-HFES-15-00	EXP VALVE-HFES15	4
RCPR-LCB-DA80-00	PRESSURE CONTROL YK-01L 400-035G050G	4
RCPR-ACB-DB162-00	PRE CONTROL -W/C (YK-01H 400-290P230X)	**4**
RCPR-00001-00	PRE CONTROL-VALVE RELIEF 022-01887-000	4
FTCN-WBB005-00	WELL BULB 4 IN CONN CHILLER	4
FTCN-FCM14001-00	SLEEVE COUPLING 4 IN	4
–	CONTACTOR FOR COMPR.AV1-65	4
–	INCOMER SWITCH, 200 A	1
–	MCB - C60H3P63AC-63 AMPS	4
–	FUSE CARTRIDGE - 2 AMP	5
–	TOGGLE SWITCH SPST, 10A KAYCEE	1
EATFZ0040	CUR TRANSFORMER CT100-SCROLL	4
EACOZ0080	DX CNTRLR(LCD)- XWC4S-052/085	1
–	PILOT LAMP	4

Purchase Details

The following purchase information will be required by Blue Star / Dealer in case of any warranty claims or service requests. Hence kindly ensure the following details are filled in.

1. Customer's Name & Address:

   .....

   .....

   .....

   .....

2. BSL Office / Dealer address from whom purchased:

   .....

   .....

   Phone : .....

3. Model Nomenclature : ..... Sl. No.: .....

4. Invoice No. : ..... Date: .....

5. Date of Despatch :..... Date of Commissioning: .....

6. Warranty Commencement Date :..... Warranty Expiry Date: .....

Signature & Seal of Customer	Signature & Seal of BSL Engineer or Dealer

Date of Filling :

Terms of Warranty

Blue Star extends a comprehensive warranty on its Packaged Airconditioners, PCPA, VRF and Chiller Systems, which entitles the customer to the following:

1. Repair/reconditioning, by BSL/BSL Dealer, through whom the machine has been purchased, of any part of the equipment found defective within 12 months from the date of commissioning or 15 months from the date of despatch whichever is earlier.

2. Free after sales service during the above mentioned period, as and when necessary within the Municipal limits of the city or town where the Blue Star dealer/office is situated.

   Note: For units installed beyond the Municipal Limits of the juridiction of the authorised Service Agent/ Dealer of Blue Star, all expenses incurred in collection of the unit or parts thereof from the company's authorised service station or the service personnel/technicians towards to and fro travel, conveyance and other incidentals, etc., will be borne by the customer.

3. The warranty is valid only if:

   3.1 The equipment operates on AC power supply of 400V +/- 5% and in accordance with the Company's operating instructions.

   3.2 Service / repair or shifting of the airconditioner is carried out only by Blue Star's authorised dealer or by the Company.

4. The above said warranty does not cover the following:

   4.1 Consumables such as refrigerant, oil, V belts, air filters etc.

   4.2 Scaling/Deterioration of condenser water pipes and connected water piping.

   4.3 Deterioration or failure of equipment & controls, piping due to corrosive atmosphere.

5. This warranty is null and void if repair and/or modification are carried out by the customer himself or his representative or if non-Blue Star products/accessories are included in the installation without written concurrence from Blue Star or its dealers.

6. This warranty is not valid in case the serial number is defaced or altered.

7. The guarantee extended herein is in lieu of all implied conditions/warranties under the law and is confined to the repairs or replacements of defective parts and does not cover any consequential or resulting liability damage or loss arising from such defect. Furthermore, the guarantee in no case, shall extend to the payment or any monetary consideration whatsoever of the replacement or return of the airconditioner as a whole.

8. Any repair/replacement shall not extend the overall warranty period as specified above.

9. During the warranty period, BSL/BSL Dealer will render free of cost service as follows:

   9.1 4 Quarterly Preventive Maintenance Checks

   9.2 Attend to all breakdown calls or performance related to complaints promptly and diligently

   9.3 Repair/replace components when necessary within the overall Warranty Policy explained as above.

24x7 Customer Care

Phone : 1800 209 1177
SMS : "Service" to 57007
Email : customerservice@bluestarindia.com

EAST

BHUBANESHWAR
3A, Satya Nagar,
2nd Floor,
Bhubaneshwar 751 007.
Tel: (0674) 2572403 / 2573670

GUWAHATI
13, K C Patowari Road,
Ulubari,
Guwahati 781 007.
Tel: (0361) 2468496

KOLKATA
7, Hare Street
Kolkata 700 001.
Tel: (033) 22134200 / 22106609

NORTH

CHANDIGARH
Adarsh Mall, 4th Floor, Plot No 50,
Industrial & Business Park,
Phase - II, Chandigarh 160 002.
Tel: (0172) 2790482 / 5024000

JAIPUR
A-19, Main Sahakar Path,
Near Sahakar Bhawan,
Jaipur 302 001.
Tel: (0141) 2744033 / 35

LUCKNOW
177/4, Faizabad Road
Lucknow 226 007. (U.P.)
Tel: (0522) 4034000

NEW DELHI
E-44/12, Okhla Ind. Area
Phase II, Okhla
New Delhi 110 020.
Tel: (011) 41494200 / 41494000

SOUTH

BANGALORE
Ozone Manay Technology Park
Sy. No. 56/18 & 55/9
Hongasandra Village
Begur Hobli, Garvebhavipalya
Bangalore 560 068.
Tel : 41854000

CHENNAI
104, 'Garuda Building',
Cathedral Road,
Chennai 600 086.
Tel: (044) 28124000 / 42444200

KOCHI
2nd Floor,
Millennium Plaza,
MKK Nair Road,
Alinchuvadu Junction,
Kochi 682 024.
Tel: (0484) 4499000 / 4499043

SECUNDERABAD
207, Sikh Road,
Bantia Estate,
Secunderabad 500 003.
Tel: (040) 44004000

TRIVANDRUM
T.C. IX/1490
'Chandrika', Sasthamangalam
Trivandrum 695 010.
Tel: (0471) 2720025 / 2720065

VISAKHAPATNAM
D. No. 49-24-65/1,
Near Sankarmattam Road,
Madhura Nagar,
Visakhapatnam 530 016.
Tel: (0891) 2748405 / 2748433

WEST

AHMEDABAD
2nd Floor, Shivalik - II,
Near Shivranjani Cross Roads,
132 Feet Ring Road, Satellite,
Ahmedabad 380 015.
Tel: (079) 40224000

BHOPAL
"Star Arcade", 2nd Floor
Plot No.165A & 166, Zone-I
Maharana Pratap Nagar
Bhopal 462 011.
Tel: (0755) 2553378 / 4273378 / 79

GOA
1st Floor, Buddhaseth Apartments,
Tonca, Caranzalem, Goa 403 002.
Tel: (0832) 2461671 / 2462087

MUMBAI
Blue Star House
9A, Ghatkopar Link Road
Saki Naka, Mumbai 400 072.
Tel: (022) 66684200 / 66684000

NAGPUR
219, Bajaj Nagar, 1st Floor,
South Ambazari Road,
Nagpur 440 010.
Tel: (0712) 6624000 / 2249000

PUNE
201/A, Nityanand Complex
1st Floor, 247/A, Bund Garden Road
Pune 411 011. Tel: (020)
41044000 / 26169332

VADODARA
Ramakrishna Chambers
7th Floor, Productivity Road
Alkapuri, Vadodara 390 005.
Tel: (0265) 2332021 / 22 /
2330334 / 6614000

For any assistance, CALL:

Blue Star Service:

Ph: .....

Cell: .....

Blue Star Dealer:

Ph: .....

Cell: .....

Blue Star Regional Manager:

Ph: .....

Fax: .....

Blue Star's/Dealer's Engineer to fill above details before handing over this manual to Customer.

December 2010 /.5k