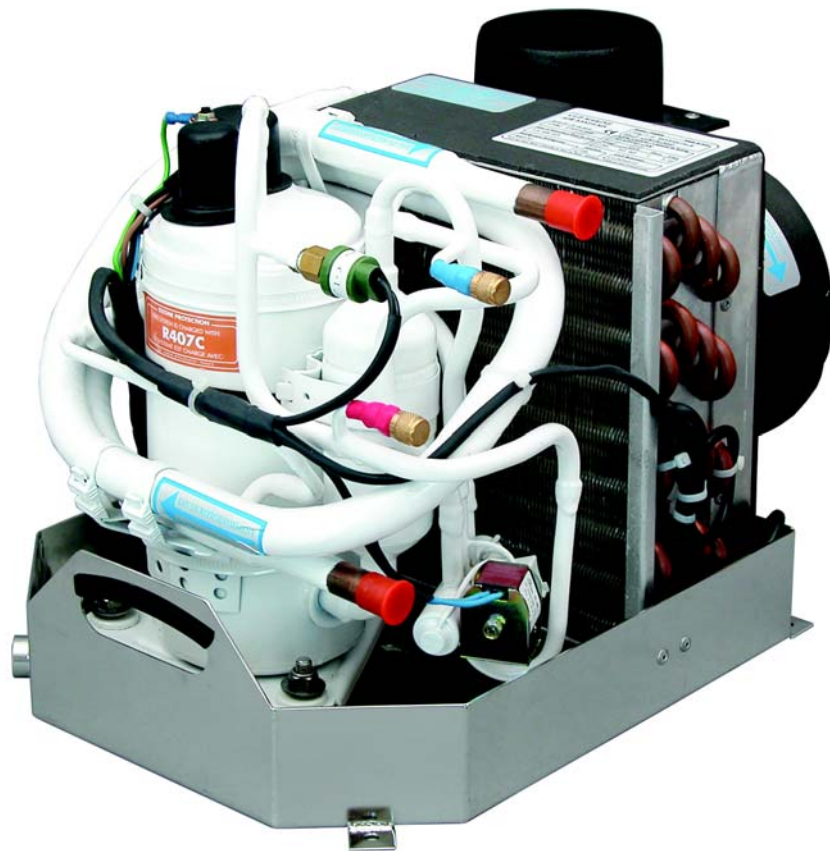




Webasto BlueCool Classic (WBCC) Series Self-Contained Marine Air Conditioning Systems Operation And Installation Instructions



To find an authorized Webasto marine installation center near you, please call (800) 860-7866 toll free or visit our web site at: www.webasto.us



- Diagnosis and repair of malfunctioning, non-functioning or damaged Webasto cooling systems requires special factory training, technical information, special tools and special equipment.
- ALWAYS carefully follow Webasto installation instructions and heed all WARNINGS.
- Improper installation voids all warranties on this product.

Contents	Page
Warranty	4
Foreword	5
General	5
Scope and Purpose	5
Safety and Important Information Symbols and their Meaning	5
Important Safety Information	6
Installation Overview	7
Typical Installation	7
Description and Operation	8
Self-Contained Air Conditioning Unit	8
Digital Display Panel	9
Installation	14
Installation and Positioning of Seawater Pump	14
Air Ducting - Ventilation	16
Standard Electrical Accessories	18
Programming	19
Programming Access	19
Re-initializing of Factory Default Setting	19
Description of Programming Codes - Setpoint at 84° F (29° C)	20
Description of Programming Codes - Setpoint at 59° F (15° C)	22
Blower Speed Setting Calibration	23
Troubleshooting	23
Routine Checks	23
Troubleshooting	23
Visual Error Codes - Digital Display	24
Schematics	26
Wiring Diagram - WBCC 5000 to 16000 BTU (Rotary Comp.) - Single-Phase	26
Wiring Diagram - WBCC 20000 to 30000 BTU (Scroll / Rotary) - Single-Phase	27
Wiring Schematic - Running Capacitors for Blower Motors - ECOFIT / EBM	28
Wiring Diagram - TCC Card Version 3. (5000 to 9000 BTU)	29
Wiring Diagram - TCC Card Version 3. (12000 to 30000 BTU)	30

**Webasto BlueCool® Classic Series AC Systems
LIMITED WARRANTY**

Webasto Product North America, Inc. (herein after referred to as Webasto) warrants BlueCool Marine® air conditioner kits against defects in material and workmanship for two (2) years or 3000 hours of operation, which ever comes first, effective at the time of purchase by the end user.

Replacement parts are covered for six (6) months or the remainder of the original warranty period, which ever is longer. Replacement air conditioners are considered a "Replacement Part".

The intent of the Webasto warranty is to remedy defects in material and workmanship in the manner provided herein. During the warranty period the exclusive remedy will be for Webasto, at its discretion, to repair or replace those parts which are demonstrated to be defective in material or workmanship.

While warranty is provided to the "end user", it is to be administered and serviced through a Webasto Authorized Dealer in accordance with the Webasto warranty policy.

To locate the nearest "Webasto Authorized Dealer" phone Webasto Product North America at 1-800-860-7866.

While this warranty covers parts and labor, if the air conditioner was self installed by the end user or someone other than a Webasto Authorized Dealer, the diagnosis and repair must be completed by a Webasto Authorized Dealer in order to receive compensation under the terms of this warranty.

Limitations and Exclusions:

Webasto specifically excludes and limits from warranty the following:

- Normal wear.
- Damage to product in transit: all claims must be filed with carrier.
- Improper installation, which is not in accordance with valid, supplied installation instructions.
- Deterioration due to normal wear, corrosion, abuse, neglect, damage, accident, improper storage or operation.
- Modification of product by alteration, use of non-genuine parts or repair by unauthorized personnel.
- Economic loss for expenses related to travel, vessel disability, personal injury or other incidental or consequential damages arising from any breach of this expressed warranty.

Owners Responsibilities:

- 1) Perform Webasto recommended maintenance procedures per Webasto Owners Manual.
- 2) A Warranty Registration Card is included with each BlueCool Marine® kit. It is the end users responsibility to complete this card and return it to Webasto for registration. Proof of purchase is required for all units that are not registered.

This warranty gives you specific rights and you may also have other rights which vary by State or Province.

THE WARRANTY DESCRIBED IN THIS POLICY SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Foreword**General**

The air conditioning units covered in this manual can be used to cool marine vessel cabins and cockpits. Installation accessories can be found in our accessories list for boats/ships.

Scope and Purpose

These installation instructions are intended to support the installation of self-contained air conditioners in marine vessels.

Acknowledged engineering conventions must be observed for the installation work.

Safety and Important Information Symbols and their Meaning**Warning**

This symbol is used to highlight that non-compliance with instructions or procedures can result in serious injuries or death to personnel.

**Caution**

This symbol is used to highlight that non-compliance with instructions or procedures may cause damage to equipment.

**Attention**

This symbol is used to highlight and draw specific attention to important information.

**Flammable or Combustible**

This symbol is used to highlight and draw specific attention to flammable or combustible materials or risks.

**IMPORTANT SAFETY INFORMATION – Read Before Proceeding with Installation!****WARNING!**

- **ALWAYS** switch air conditioning units off during refueling or when in a refueling area.

**CAUTION!**

- Location of wiring and control devices and installation of air ducting are important for proper operation. Failure to comply with the installation instructions provided may result in poor operation or damage to air conditioner and vessel components.
- For information concerning special marine applications or marine applications you are not sure of, contact an authorized Webasto marine dealer or Webasto Product N. A., Inc. directly at:
1-800-555-4518 (USA) or 1-800-667-8900 (Canada).

**ATTENTION**

It is the installer's responsibility that the installation complies with all applicable American Boat & Yacht Council and U.S. Coast Guard regulations. Also, all relevant state and provincial licensing regulations if any, governing the installation and use of auxiliary heating devices in watercraft must be observed.

Typical Installation

The illustration below shows a typical installation of a self-contained air conditioning unit.

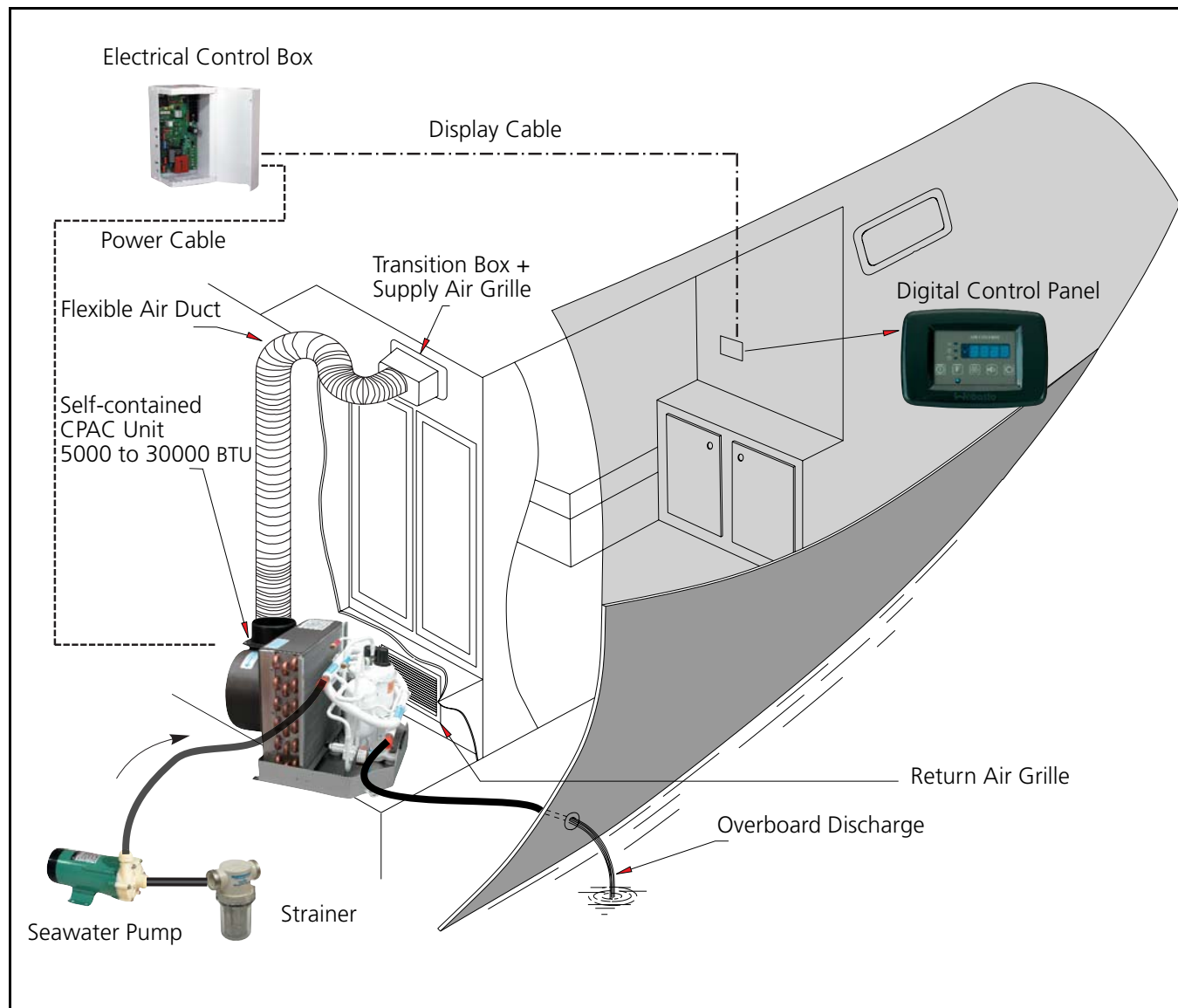


Figure 1. Typical Installation

DESCRIPTION AND OPERATION

Self-Contained Air Conditioning Unit



ATTENTION

All Webasto air conditioning units pump seawater around the condenser to aid in the cooling process.

Cooling Cycle

The compressor compresses the refrigerant gas which is then condensed to liquid as it passes through the seawater cooled condenser. The liquid refrigerant is injected through a small nozzle and evaporates. This evaporation process produces the refrigeration effect. The evaporation takes place in a tubular finned coil (also called: evaporator coil). A blower forces the air through the evaporator coil. While passing through the evaporator the temperature of the air is lowered by approximately 59° F (15° C).

Heating Cycle

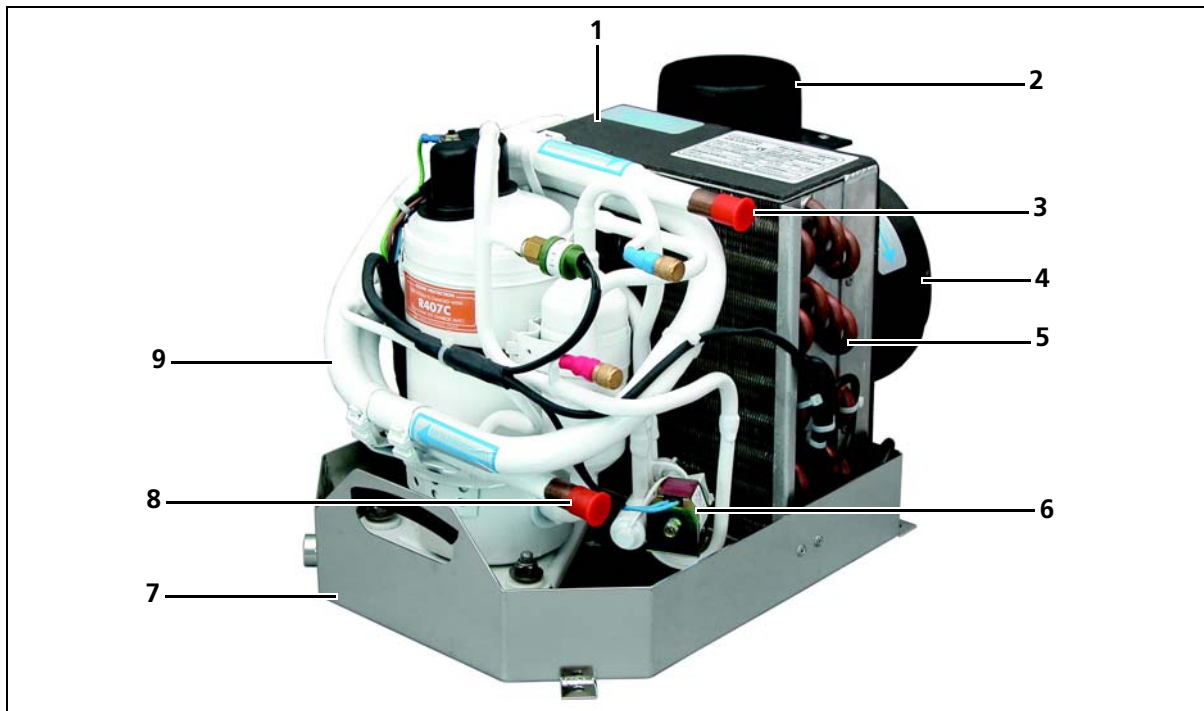


ATTENTION

The heat cycle becomes inefficient when the outside water temperature drops below 56° F (13° C) approx.

It is quite possible to produce heat with an air conditioning unit. For this purpose a 4-way reversed cycle valve is added. During the heat cycle the condenser effectively becomes the evaporator. It removes any available heat from the seawater and transfers it to the refrigerant. The finned evaporator becomes the condenser and produces heat to approx. 113/122° F (45/50° C).

Figure 2. CPAC Unit



Legend for CPAC Unit:

- | | | | |
|---|------------------------------------|---|------------------------------------|
| 1 | Finned Tubular Evaporator Coil | 6 | Reversed Cycle Valve (Cool / Heat) |
| 2 | Blower Exit | 7 | Stainless Steel Drain Pan |
| 3 | Condenser Exit | 8 | Condenser Entry |
| 4 | Blower | 9 | Cupro-nickel Condenser |
| 5 | Copper Tubing of Finned Evaporator | | |

Digital Display Panel

All Webasto air conditioning units are controlled by a Digital Display <AIR CONTROL> which gives access to all functions necessary for the normal operation of the unit and attached accessories (blowers, pumps, etc.).

In order to start the system you only need to press the <On/Off> key on the digital display. From there on the electronic control unit takes care of the progressive starting up of the air conditioning unit as well as its normal functioning.

The digital display will show the present air temperature of the cabin in which the digital display is situated or where the main temperature sensor is located (incase the optional secondary temperature sensor is used). After a delay of approx. 20 seconds the display will indicate the cycle in which operation will start i.e. <COOL> or <HEAT>. The choice will depend upon the setpoint temperature and the air temperature as measured by the display panel.

After a further delay of approx. 50 seconds the compressor(s) will start up and the normal operation cycle will begin.

Figure 3. Digital Display



Legend for Digital Display Unit:

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Temperature or Function Readout 2 Set Point Modification Key (Sun Key) - Press to read setpoint temperature - Hold to raise setpoint temperature. 3 Dedicated Blower Speed Key 4 Set Point Modification Key (Snow Key) - Press to read setpoint temperature - Hold to lower setpoint temperature. | <ul style="list-style-type: none"> 5 Function Key - Allows access to secondary functions and programming 6 On/Off Key - Press to turn on - Press again to turn off. 7 Led indicating system working in heat mode 8 Led indicating automatic cycle-switching is active 9 Led indicating system working in cool mode |
|--|---|

2004 Series Digital Display

The WEBASTO <AIR CONTROL> digital display gives access to information and controls at three distinct levels:

Immediate Access - Level 1

1. Room temperature readout in the main 4 LED display window
2. 3 small LED's to the left indicating the operating cycle presently active: cool cycle only operation; automatic cycle (switching governed by the end users entered setpoint temperature); heat cycle only operation.
3. 2 setpoint keys give immediate access to the thermostatic setpoints for blower control ("Sun" and "Snow" keys). These keys are also used to alter programming values.

Secondary commands and info -Level 2

The F/Blower key gives immediate access to a number of secondary commands which need to be accessed frequently for day to day operation. First access is to the blower speed control, then evaporator temperature readout, etc.

Programming Commands - Level 3

A number of programming commands that do not need to be accessed for day-to-day operation are hidden and require a special procedure to enable access and modification (See **Programming Access**). An access code can be enforced to avoid accidental modification of programming values.

Startup delay

After pushing the On/Off key the LED's will display <On> while initializing the system. Push again to stop operation; the display will briefly show <Off> before extinction. The appropriate LED to the left (heat, cool, etc.) will come on after approx.15 seconds and compressor operation will start after approx.50 seconds. The seawater circulation pump will come on approx. 9 seconds before compressor startup.

Modification of setpoint temperature

The setpoint temperature, i.e. the temperature desired by the operator for blower operation can be modified as following:

1. Press and hold one of the setpoint selector keys and wait until the new desired setpoint temperature is obtained.
2. Release the setpoint key. The display will return to normal room temperature readout after approx. 5 seconds. Non-volatile memory keeps last settings.

Special New Features - 2004 Series

A) New dedicated Blower speed key: The 2004 Digital Display provides for a dedicated blower speed key which allows you to cycle through the speed settings. The <F> key from 2004 onwards is only used for programming and setting purposes

B) New self-priming pumps: WEBASTO Marine has developed in partnership with one of the major pump manufacturers a new variable flow ultra-silent self-priming pump. This pump will automatically adjust its flow rate to the real required capacity, i.e. during a hot sunny afternoon the pump will run at full speed, during the night it will slow down to minimum speed. This new pump is referenced: WEBASTO 200; it is basically a DC pump with a special control unit between the TCC controller card and the pump allowing to adjust the pump speed as needed. The use of standard 115V/230VAC pumps is still possible without any restriction. Installation of these pumps can be above the waterline to 250mm approx. Flow rate varies between 6 and 12L/min.approx.

C) Automatic blank/sleep mode programmable time delay: Factory default:15minutes. While in blank/sleep mode the cycle LED flashes discretely every 20 seconds. To go back to normal operation push any key.

D) Calibrate all blower speed settings in real time mode: It is now possible to calibrate all speed settings (1 to 5) before actually putting the system into service (See **Blower Speed Setting Calibration**).

CAUTION!

Never program speeds so low that the blower is in danger of stopping or will not restart at that setting. This will inevitably entail motor winding burnout and will not be covered by the WEBASTO warranty.

E) Automatic Deicing Control: During intermediate seasons (spring, autumn) when moderate temperature conditions prevail, there is a definite risk of icing the evaporator coil in cool mode and pressure safety cutouts in heat mode. To allow maximum blower speed variation and still function within a normal operating window, the TCC card is equipped with a second temperature sensor which reads the exact evaporator coil temperature. Whenever coil temperature approaches the danger zone, blower speed is increased to half speed; if that is not sufficient the micro-processor will stop compressor operation for pre-determined intervals and will resume normal operation when coil temperature has moved back to within normal operating values. This feature is completely transparent to the end user without an error code display.



Figure 4. Digital Display



Legend for Digital Display Unit:

- | | |
|--|---|
| <ul style="list-style-type: none"> 1 Temperature or Function Readout 2 Set Point Modification Key (Sun Key) - Press to read setpoint temperature - Hold to raise setpoint temperature. 3 Dedicated Blower Speed Key 4 Set Point Modification Key (Snow Key) - Press to read setpoint temperature - Hold to lower setpoint temperature. | <ul style="list-style-type: none"> 5 Function Key - Allows access to secondary functions and programming 6 On/Off Key - Press to turn on - Press again to turn off. 7 Led indicating system working in heat mode 8 Led indicating automatic cycle-switching is active 9 Led indicating system working in cool mode |
|--|---|

F) Infrared Remote Control: Infrared remote control can be obtained as an option. This remote control is based on the standard protocols also used by TV and other appliances. Although the WEBASTO controls have been chosen so as to avoid interference with most TV models, the end user should be aware that in certain cases interference may occur with TV sets or other appliances.

In general, it is therefore advisable to avoid locating a WEBASTO Air Control panel next to other appliances using infrared control units.

G) Access Code: The end user can deny access to all program settings by introducing an access code (see **Programming Access** - code). Blower speed and setpoints always remain accessible. Once an access code is validated, the digital panel will show <Code> if the end user tries to access functions other than blower speed or setpoint. To gain full access push the sun key to reach the code value as programmed and push the F/Blower key again to gain access to full program settings.

Secondary Commands

The <F> key gives immediate access to commands and displays necessary for day-to-day operation. When pushing the <F> key you will see a code which indicates the type of command or display and the present value.

The following is a list of commands / displays In order of appearance:

Table 1: Secondary Commands

Command	Display Readout	Setting(s)
Blower speed control	< b A> (0,1,2,3,4,5)	A = automatic blower speed adjusted to temperature differential. 1 to 5 = manual speed control Note: Speed control is in real time mode i.e.changes are effected immediately without any validation procedure.
<p>ATTENTION <i>The following functions need validation before a new value is accepted. Press the <F> key and go to the next function line. Validation will occur automatically when the display goes back to room temperature readout. Validation can be forced by pushing the On/Off key while in F mode. and confirmed by the message <memo>.</i></p>		
Evaporator coil temperature	<E10.2> (10.2 ° C) <E38.4> (38.4° F)	Example
Cycle mode choice	<F 3> (1 to 4)	The following cycle modes can be chosen manually: 1 = cool cycle only 2 = heat cycle only 3 = automatic cycle switching with reversible compressor 4 = automatic cycle switching without reversible compressor
AC Voltage readout	< U232> (232 Volts)	Example
Manual on/off Compressor 1	<1C01>	<1C01> = Compressor 1 on <1C00> = Compressor 1 off



Table 1: Secondary Commands

Command	Display Readout	Setting(s)
Startup Priority Compressors 1 to 4	<P123>	<P123> = 1,2,3,4; <P341>=3,4,1,2 <P A> = automatic priority rotation; when in this priority mode, the starting order will be changed every restart after a thermostatic cutout.
Time delay between compressor startup	<L 9> (9 seconds)	programmable from 1 to 9 seconds
Automatic dehumidification while absent	<d 0>	0 = non active - factory default 1 = 1 cycle per 24H 2 = 2 cycles per 24H 3 = 3 cycles per 24H
Display time of secondary functions (F/Blower key) by periods of 20 seconds	<t 1>	factory default setting = 20 seconds

Central Blower Control

The central <AIR CONTROL> digital display also directly controls the blower(s) of the evaporator(s). For all WBCC systems, there are two modes of blower control and operation: thermostatic interruption of blower operation as soon as the desired setpoint temperature has been reached; un-interrupted blower operation regardless of thermostatic compressor control. The choice between these two functioning modes can be programmed directly by the end user. The digital control is initially programmed by the manufacturer in second - i.e. un-interrupted blower operation. Blower control can be manual with 5 different speed levels or automatic; in this case blower speed will be governed by the temperature differential with the setpoint temperature.

INSTALLATION

Installation and Positioning of Seawater Pump

1) Seawater cooling: Install the pump/strainer assembly in such a manner that a natural gentle upwards slope exists from the sea-cock to the pump itself. See Figure 5.



ATTENTION

It is strongly recommended to install an air-bleeder system both in the suction line as well as immediately after the discharge outlet of the pump. The advice is especially valid for pumps 250/35 1000. The 1500/2000 and Calpeda pumps 0.5HP to 1HP generally will not require a bleeder system to ensure proper operation.

It is strongly recommended to install a water scoop at the entry of the sea-cock and directed towards the bow of the boat so that at speed positive pressure builds up in the supply line to the seawater pump.

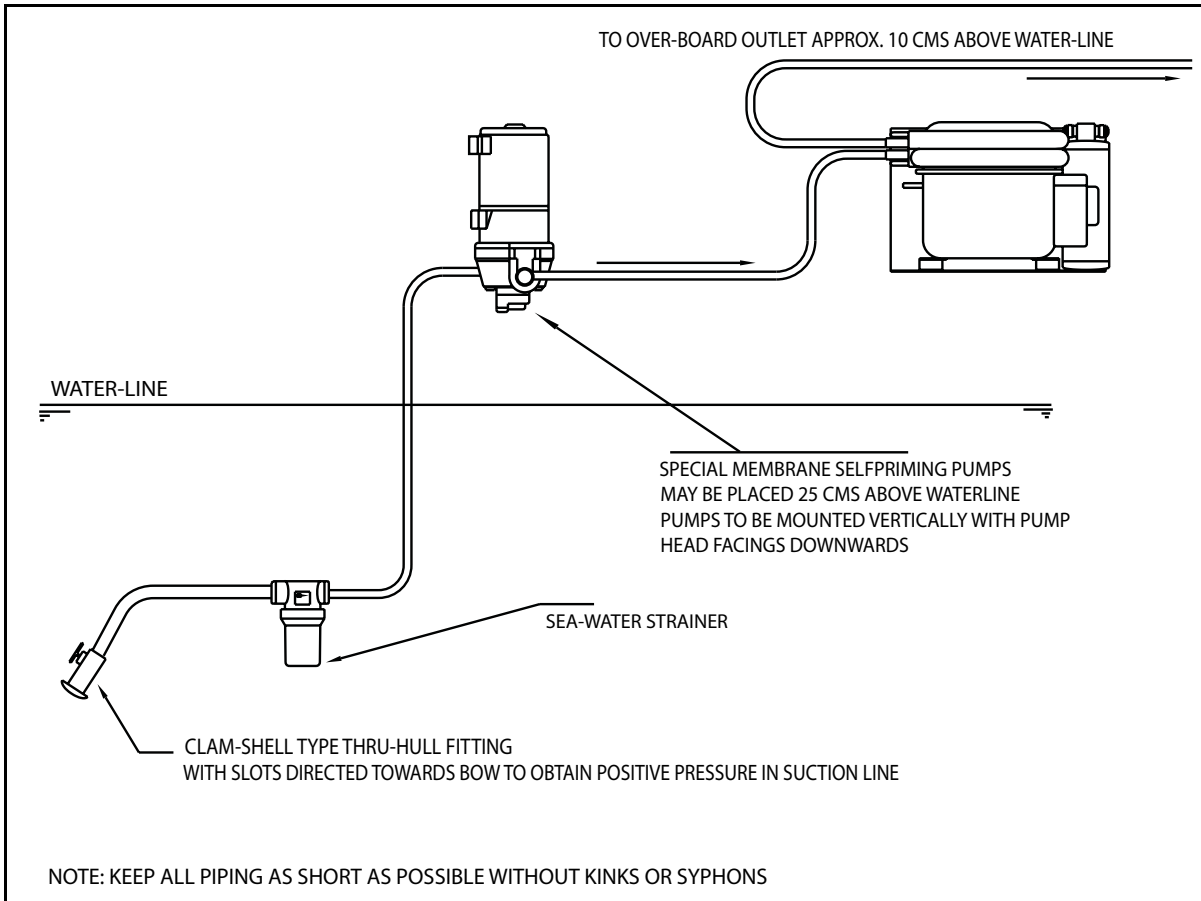


Figure 5. New Self-priming Seawater Pump WB200

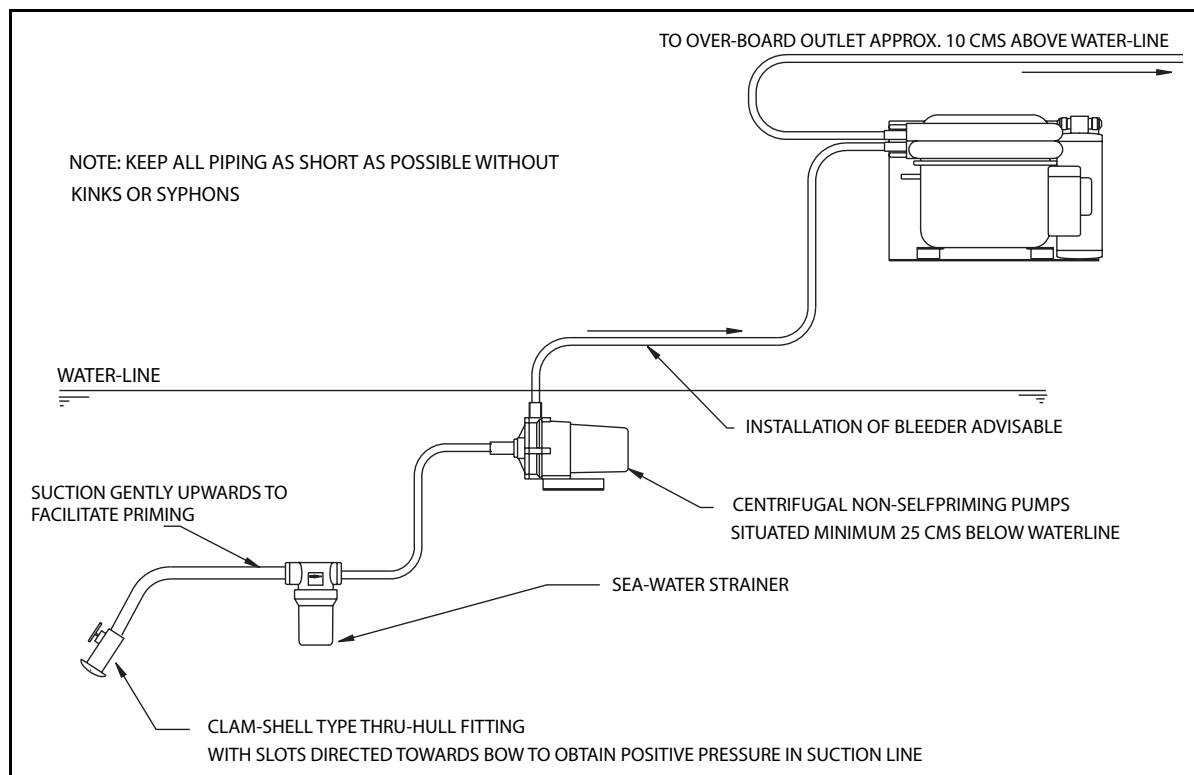


Figure 6. Centrifugal Seawater Pump

2) Seawater cooling exits: Provide for a separate seawater exit for each air conditioning unit installed even if only one pump provides cooling for all units. Introduce shut-off valves for each unit if 1 pump provides cooling for more than 1 air conditioning unit. This will allow easy priming of the circuit and also calibration of the seawater flow for each air conditioning unit in case of imbalance in the water tubing lengths.

3) Evaporator coils: The finned coils of the evaporators and/or air-handlers are fragile. If the fins are damaged during installation, take care to re-align them to ensure proper air-flow.

4) Air-ducts: Flexible air-ducts need to be of good quality with sufficiently strong steel or plastic reinforcement. Do not restrict air flow by bending the air-ducts too tightly or by accidental local deformation. Do not install air ducts of excessive lengths (+ 2.5 ml); the pressure loss and consequent reduction of air-flow will seriously diminish the efficiency of the installation.

Air Ducting - Ventilation

1) Minimum Air Grill Sections: In order to obtain an acceptable noise level at max. blower speed certain requirements regarding grill and duct sections should be observed. Also, the size of the transition box behind the supply air grill is important. See table 2. to select correct grill sections according to BTU rating.

2) Duct Type: To avoid accidental crushing, flexible air-ducts should be of high quality with sufficiently strong steel spiral reinforcement. Spiral type ducts should be extended to their maximum possible length to obtain max. interior smoothness. For very long duct sections preference should be given to rigid ducts (in PVC for example) which offer a far greater smoothness than flexible spiral type ducting and therefore will greatly reduce internal friction. For very short lengths non-insulated ducts may be used. Over greater lengths it is advisable to use insulated type ducts to avoid condensation on the outside of the air-ducts.

Table 2: Air Duct Requirements

AIR HANDLER- WBCC MODEL	SUPPLY AIR GRILL MODEL/SECTION	RETURN AIR GRILL MODEL/SECTION	DUCT DIAM. <1.8 M (6 ft.) DUCT Length	DUCT DIAM. >1.8 M (6 ft.) DUCT Length
4000/ BTU 4500	1 x 8x4" 150 cm ²	1 x 12x5" 325 cm ²	80 mm (3 in.)	100 mm (4 in.)
6000 BTU	1 x 10x4" 190 cm ²	1 x 11x8" 490 cm ²	100 mm (4 in.)	125 mm (5 in.)
9000 BTU	1 x 12x4" 235 cm ²	1 x 11x8" 490 cm ²	100 mm (4 in.)	125 mm 5 in.)
12000 BTU	1 x 10x5" 250 cm ²	1 x 14x7" 550 cm ²	125 mm (5 in.)	150 mm (6 in.)
16000 BTU or	1 x 12x6" 390 cm ²	1 x 14x10" 800 cm ²	125 mm (5 in.)	150 mm (6 in.)
16000 BTU	2 x 10x4" 380 cm ²		125 mm (5 in.)	150 mm (6 in.)
24000 BTU	2 x 10x5" 500 cm ²	1 x 14x12" 1000 cm ²	2 x 125 mm (5 in.)	2 x 150 mm (6 in.)
32000 BTU	2 x 12x5" 650 cm ²	2 x 14x10" 1600 cm ²	2 x 125 mm (5 in.)	2 x 150 mm (6 in.)

NOTE: For duct lengths over 1.80 ml, it may be possible to use the nominal duct diameter (for example 100 mm - 6000 BTU model), if instead of spiral type flexible ducts, rigid perfectly smooth interior ducts are used.

3) Blower Outlets: 90° turns with flexible ducts directly from blower outlets should be avoided at all costs as they introduce severe restrictions in the air flow. All WEBASTO blowers (except on 24000 BTU models) can be rotated through 45° steps so as to obtain a straight-line outlet from the blower. See Figure 7 for approved installation.

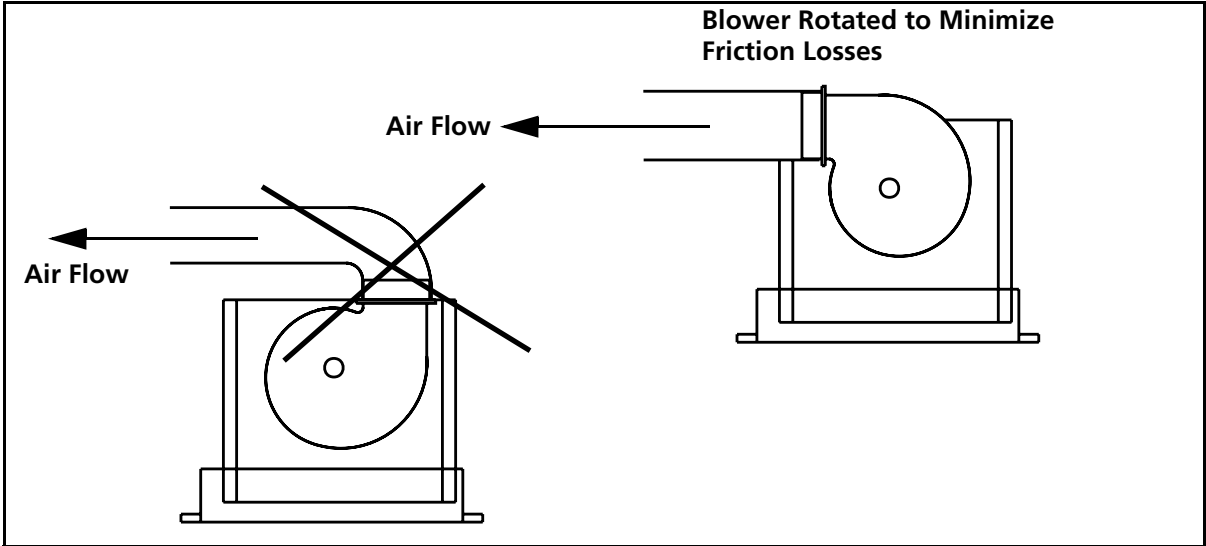


Figure 7. Rotating Blower Outlet

4) Transition Boxes: Transition boxes behind supply air grills essentially serve the following purpose: Serve as an expansion volume for the air-flow to be reduced in velocity and therefore reduce air noise when crossing the outlet louvres. It follows therefore that the depth of the transition box is an important factor to allow dispersion of the air flow. The table to the right gives the necessary information as to the minimum dimensions advisable for such transition boxes.

Deflection curve for longitudinal entry transition boxes

DUCT DIAM.	MINIMUM VALUE OF "H"
80 mm (3 in.)	100 mm (4 in.)
100 mm (4 in.)	120 mm (4.75 in.)
125 mm (5 in.)	140 mm (5.5 in.)
150 mm (6 in.)	165 mm (6.5 in.)

Figure 8. Transition Box Information

5) Return Grill Offset: It is best to avoid placing a return air grill directly opposite the finned coil surface of an air-handler. This will inevitably allow propagation of direct blower motor noise through the grill. Always try to offset the grill so the return air does not flow directly to the coil inlet. This will lower direct noise propagation significantly.

Standard Electrical Accessories

Figure 9 contains the minimum standard control elements delivered with all WBCC- self-contained units. Electrical contents: control box; display cable; digital control panel (external air sensor is optional).

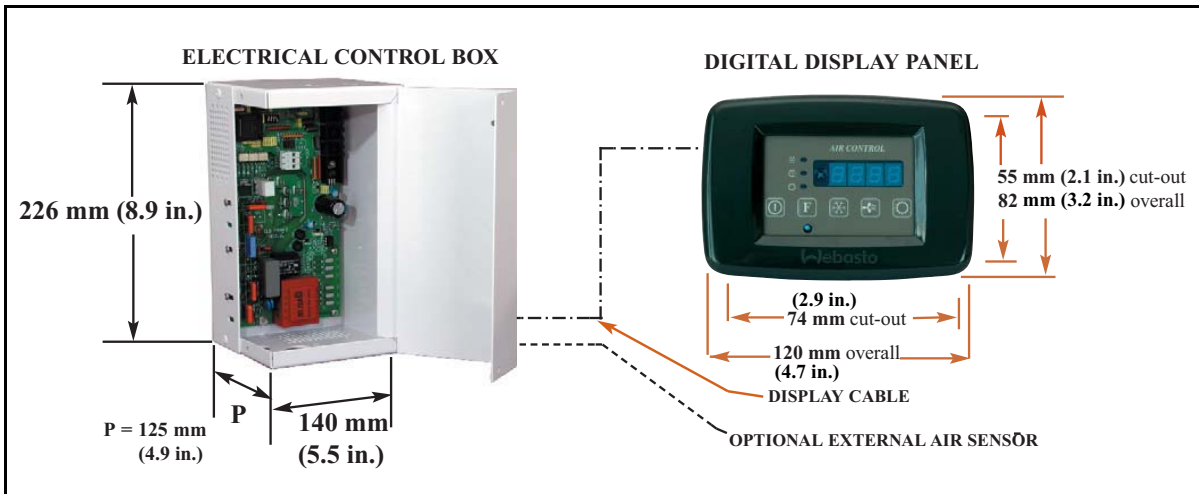


Figure 9. Minimum Standard Control Elements

DIP Switches

The TCC controller card has a dip switch arrangement which should be set and maintained according to the number of compressors on line.



ATTENTION

- If DIP SWITCHES are not set according to the number of compressors effectively on line, the TCC controller card may behave in unpredictable manner
- The initialization <init> can not be completed
- Card remains locked on startup.
- HP/BP alarms for non-existing compressors

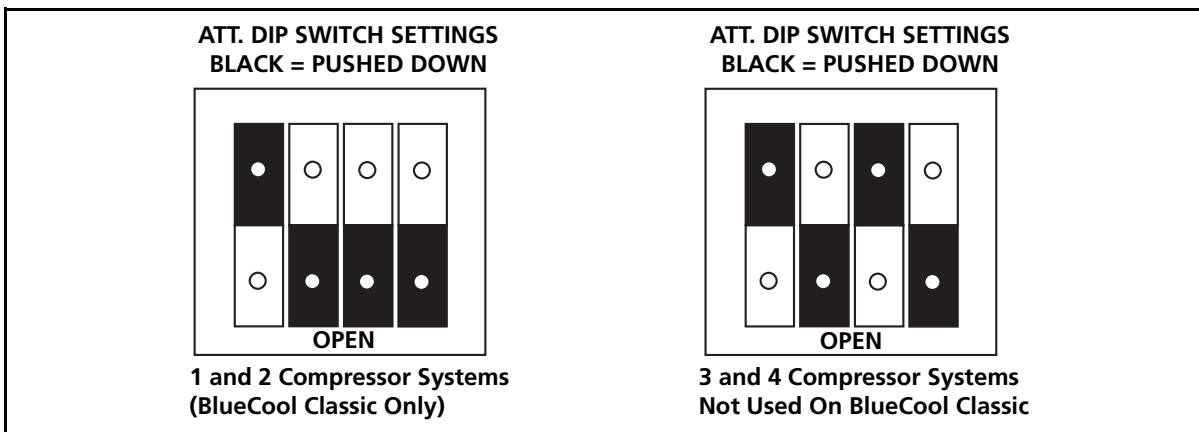


Figure 10. DIP Switches

Programming Access

Entering Programming Mode

To enter programming mode:

1. Turn on the unit by pressing the <On / Off> key (5).
2. Raise or lower the setpoint temperature to 29° C (84° F) or 15° C (59° F).
3. Turn off system by pressing the <On / Off> key (5).

ATTENTION

The first time you press the On / Off key after raising or lowering the setpoint the display may read "NENO", if so press the On / Off key again and the unit will turn off.

4. Press <snow> and <sun> keys (2 & 3) simultaneously and hold them until the word "CODE" is visible on the display (1).
5. Press and hold the <sun> key (2) until 64 appears on the display (1) and then press the <F> key (4). Now you are in the deep programming mode. To validate and memorize modified parameters press the <F> key (4) and proceed to the following programming line.



Figure 11. Using Digital Display to Access Programming

Accessing Hidden Programming

To gain access to the hidden programming functions proceed as following:

1. Raise setpoint to max. value, i.e. 84° F (29°C) (or alternatively to lowest value i.e. 59° F (15°C) - push Off key (5) to extinguish digital display.
2. Press <snow> and <sun> keys (3) simultaneously for approx. 3 seconds until you see to the left of the display window a single number code indicating the programming line presently valid and to the right the programming value.
3. To go to the next programming line, push the <F> key (4).

ATTENTION

If you modify the programming value of any line, you need to validate this new value by pushing the <F> key again to move to the next line. This step will validate and memorize the changes made.

Re-initializing of Factory Default Settings

It is possible to force the program to reinitialize all program values to factory default settings by the following procedure:

1. When reading the line as above (through the 84° F (29° C) setpoint), push the <sun> key until the program version starts to flash. Keep the <sun> key pushed down until the display shows <init>.
2. Leave programming mode by pushing On/Off key - you are now back to the factory default settings.

Table 3: Description of Programming Codes - setpoint at 84° F (29° C)

Code #	Factory Setting	Description	Optional Settings
Functions accessible by raising the setpoint to 84° F (29° C)			
Code <0>	37° F (+3° C)	Lower setpoint temperature of the evaporator coil when in cool cycle. This value gives the compressor a cutout point when the deicing mode is activated (in cool cycle).	Adjustment range: between 25 and 59° F(-4°C and +15° C)
Code <1>	46° F (+8° C)	Higher setpoint temperature of deicing procedure. This value gives the restart point of the compressor after a thermostatic interruption when in deicing mode.	Adjustment range: between 36 and 64° F(2 and +18° C).
Code <2>	104° F (40° C)	Higher setpoint temperature of the “deicing” procedure in relation to the evap. coil temperature when in heat cycle (to avoid HP cutouts). Gives the cutout point of the compressor(s) when functioning in heat cycle. Setpoint temperature	Adjustment range: between 86° and 122° F (30° and 50° C).
Code <3>	95° F (35° C)	Lower setpoint temperature of coil temperature cut in when in heat cycle. Gives the cut in point of the compressor after an interruption (“deicing” procedure) when functioning in heat cycle. Setpoint temperature	Adjustment range: between 81° and 126° F (27° and 52° C)
Code <4>	0	Calibration of the evaporator coil temperature readout.	Adjustment range: between 16° to 48° F (-9° to +9° C)
Code <5>	15	Time delay in minutes before the digital display goes into blank/sleep mode. Cycle LED flashes discretely to indicate system is operational.	
Code <6>	1	First start up delay in seconds after connecting AC supply. To stage starting of several WBCC units when switching on AC supply after an interruption.	
Code <7>	0 Correction	Calibration of room temperature readout.	Adjustment range: between 48° and 16° F (+9° and -9° C).
Code <8>	0	Factory calibration of AC voltage 50 Hz as displayed on the digital panel when accessing the secondary commands - F/Blower key.	Adjustment range: between -20 and +20 Volt.
Code <9>	2	Time delay before restart in minutes after a compressor stop when in “deicing” procedure. (both for cool and heat cycle).	

Table 3: Description of Programming Codes - setpoint at 84° F (29° C)

Code #	Factory Setting	Description	Optional Settings
Code <A>	0	Factory calibration of AC voltage 60 Hz as displayed on the digital panel when accessing the secondary commands by the F key.	Adjustment range: between -30 and +20 Volt
Code 	Program version		
Code <c>	0	Pump 1 outlets on the TCC controller card non-regulated for standard 115V / 230V seawater pump. For the use of the new WEBASTO200 self-priming variable speed pump this code should be set to <1>. In that case the AC outlet is pulse hashed to enable variable pump speed.	
Code <d>	12(V)	Lower adjustment ceiling DC output for special self-priming pump.	Can be adjusted to higher ceiling (18V) - see also Code <E> hereafter.
Code <E>	18 (V)	Higher adjustment ceiling DC output for special self-priming pump.	Can be adjusted downward to lower ceiling - see also Code <d> here-above.

Table 4: Description of Programming Codes - setpoint at 59° F (15°C)

Code #	Factory Setting	Description	Optional Settings
Functions accessible when lowering the setpoint temperature to 59° F (15°C)			
Code <0>	195V AC for 230V units 90V AC for 115V units	Low voltage cutout value. Time delay is 5 seconds approx. i.e. the low voltage situation will have to persist during more than 5 seconds before cutout occurs. After cutout the electronic controller resets and will start a new cycle. So a renewed attempt to start the compressor will occur after approx. 90 seconds. During low voltage cutout the display panel will show the 3 letters <AAA>.	Note: Compressor manufacturers decline all responsibility for defects resulting from operating the compressors below recommended voltage levels. Do not lower factory settings.
Code <1>	0	Infrared remote control 0 = Infrared remote control disabled (in this mode no interference is possible with other Infrared commands)	1 = Infrared remote control active
Code <2>	1	Blower type: Centrifugal or Crossflow. 1 = centrifugal blowers only.	1 = centrifugal + crossflow. 2 = for use with OND800 inverter only. Special AC/DC self-contained units.
Code <3>	1	Blower Settings: 1 = Uninterrupted blower operation regardless of the thermostatic control.	0 = Thermostatic control of blower operation, i.e. blower operation will be interrupted thermostatically when reaching the appropriate setpoint.
Code <4>	1	Choice between integrated air sensor and external air sensor: 1 = air sensor integrated in digital display.	0 = external air sensor
Code <5>	0	Celsius or Fahrenheit display 0 = Celsius	1 = Fahrenheit
Code <6>	Modification speed No. 5 (max)		
Code <7>	Modification speed No. 4		
Code <8>	Modification speed No. 3		
Code <9>	Modification speed No. 2		

Table 4: Description of Programming Codes - setpoint at 59° F (15°C)

Code #	Factory Setting	Description	Optional Settings
Code <A>	Modification speed No. 1		
Code 	64	Access code for programming mode. Note: If the system is locked and the access code cannot be found, you can access the programming line by using the factory code number:64	0 = No access code required. 1 to 99 = access code/number activated.
Code <c>	1	Duration in minutes of heat cycle operation under the dehumidifying cycle.	
Code <d>	1	Duration in minutes of cool cycle operation under the dehumidifying cycle.	

Blower Speed Setting Calibration

Enter programming mode with setpoint at 59° F (15°C).; proceed to following line, i.e. line <6> = speed 5 (max). The blower will start to function as soon as you access code <6>. Alter value to the right of code <6> and blower speed will immediately change in real time. When satisfied go to following line <7> = speed 4 and do the same. Proceed until lowest speed No. 1 and go back again to speed No. 5 if not satisfied. When all speeds are programmed according to need, validate by pushing On/Off key (<memo > will be displayed briefly).

Routine Checks

When starting up an air conditioning unit it is advisable to carry out a certain number of routine checks to ensure proper functioning of the unit:

1. Always check (especially after a long absence) the functioning of the seawater cooling system. Immediately stop the system if no seawater comes out of the pump exit after compressor start up.
2. Periodically check the air filter in the return air grills. Clean if necessary.
3. Check condensation drain from the evaporator drain pan, take care to not damage the air-ducts. A damaged air-duct may stop air flow through the evaporator, freeze up the evaporator and subsequently damage the compressor.
4. When preparing for winter lay-up take care to rinse all seawater circuits with a fresh-water/glycol solution (25% or more depending on local winter conditions).

Troubleshooting

CAUTION!

Always use genuine Webasto service and replacement parts to ensure trouble-free operation of the heater.

ATTENTION

Advanced troubleshooting requires comprehensive knowledge about structure and theory of operation of the air conditioning components and should only be performed by authorized Webasto trained specialists.

1. No sign of life: check main electrical supply, fuses, etc.
2. The digital display shows 3 letters <AAA>. This means a persistent state of low voltage (less than 195 V AC for 230V units and 90V AC for 115V units). The system will restart as soon as the voltage level climbs above cutout level and the system will then restart after a time-delay of 1 minute approx.



3. The compressor will start but no seawater circulation can be observed:
 - Check sea-cock to seawater pump.
 - Check seawater strainer.
 - Check if pump rotates. If the pump does not turn with the compressor working, check power supply from the main control unit box to the pump.
4. Compressor and pump work but no correct operation in either cool or heat cycle:
 - Check for proper air ventilation, blowers. If air flow completely stops with the compressor working, the evaporator coils may freeze up completely, obstructing all air circulation.
 - During the heat cycle with too slow a seawater circulation you may actually freeze up the seawater in the cupro-nickel condenser and completely block the system.
 - Check voltage level. Do not operate a system with a persistent voltage level below 195V AC for 230V units and 90V AC for 115V units.
 - Check refrigerant charge if operation is still not satisfactory, after having checked all the above points.
5. The compressor works but is subject to intermittent stops without having attained the desired setpoint temperature. The HP and BP (if present) pressure safety switches stop the compressor because of abnormal working pressures either on the high or on the low side.
 - Check for proper functioning of the cooling circuit.
 - Check ventilator/blower system for obstructions.
 - Check refrigerant charge (over-charge or insufficient charge level).
 - Check for Error codes / interrupted system operation.
6. The heat cycle takes very long to get started. Normal if the seawater temperature is very low. If seawater temperature drops below approx. 56° F (13° C) the heat cycle becomes much less effective and takes long to get properly started.

Visual Error Codes - Digital Display

The following malfunctions will be displayed directly on the digital display by a code and will be followed by a system halt. Whenever any of these codes appear the system is stopped for approx. 60 seconds and then a restart is attempted. If for more than 30 minutes the same malfunction occurs, the system will be stopped completely and the error code will become steady. No more restarts will be attempted and the user will have to re-set the system by pushing the On/Off switch or by temporarily cutting out the AC supply to the system

Code A01 to A08 *: Pressure safety cutout of compressors 1 to 4. The HP and BP (if present) safety controls are directly controlled by the micro-processor including the time-delays for restart, etc. *) Standard TCC controller cards have only 1 outlet for 1 single compressor. However the embedded micro-processor program can operate up to 4WBCC units from 1 single controller card. This special controller card can be obtained on special request but is not standard delivery.



ATTENTION

Models WBCC5 to 16 do not have a low pressure safety switch (BP); therefore if you see a A01 warning on such model, it can only be an electrical connection problem on the grey 3 pole HPIBP connector on the TCC controller card. Check that the connector is properly seated and that the BP strap is properly tightened.

If any of these error codes appear too frequently and no appropriate action can be taken with the available means on board, it is necessary to call a specialist.

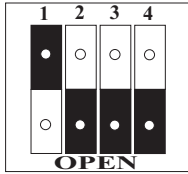
Do not insist with manual restarts in such case as this may cause major damage to the principal components (compressors, pumps, etc.)

Table 1: Error Codes

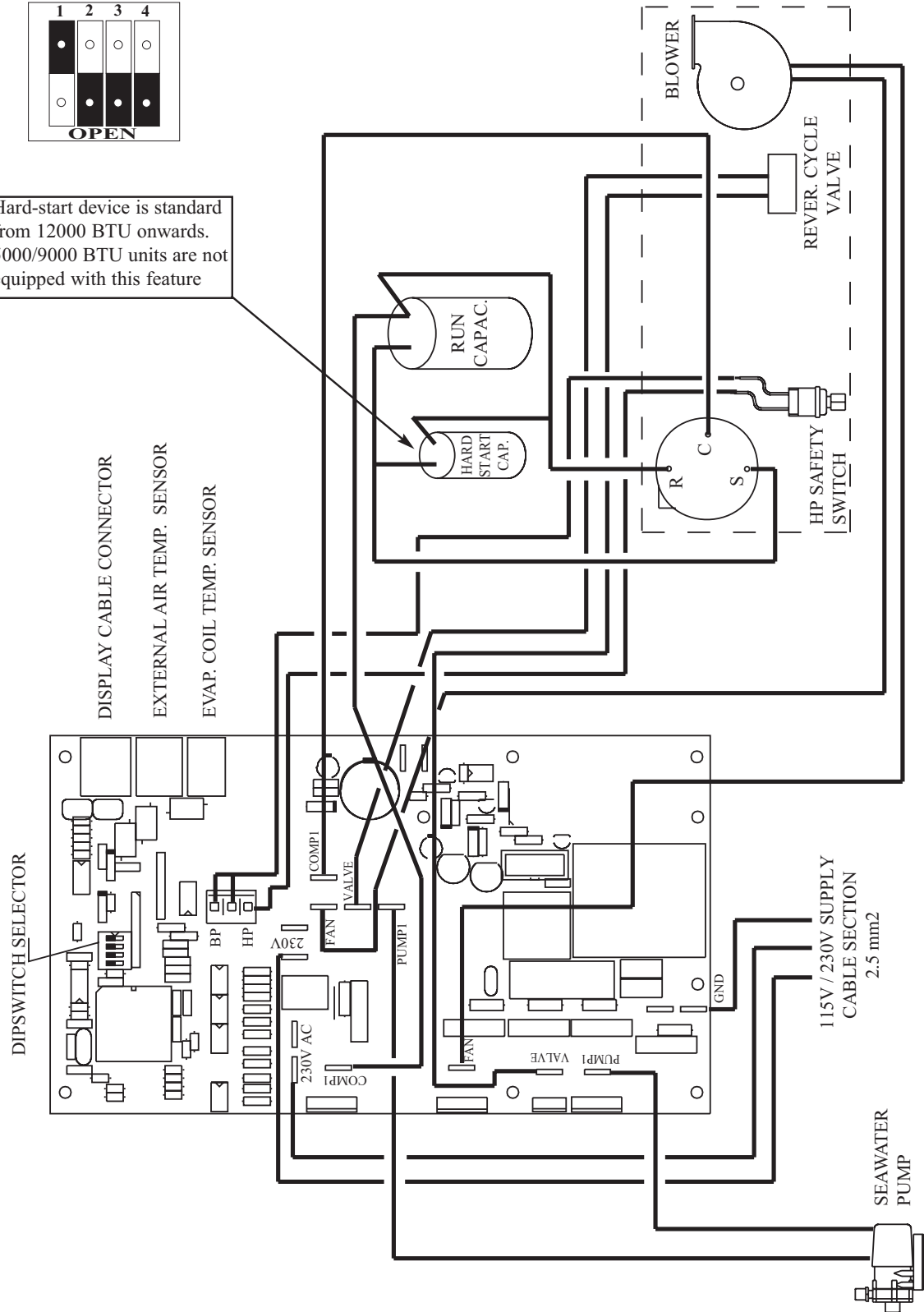
Code	Description
Code <AAA>	Persistent low voltage (voltage below 195V AC for 230V units and 90V AC for 115V units) for more than 5 seconds.
<A01>	BP (low pressure) cut out - compressor 1 <ul style="list-style-type: none"> • Insufficient refrigerant charging level. • Abnormal seawater temperature conditions in heat cycle (seawater temperatures under 43° F (6° C).approx.) • First startup in heat cycle with very low chilled water circuit temperatures (below 46° F (8°C) approx.).
<A02>	HP (high pressure) cut out - compressor 1 <ul style="list-style-type: none"> • Insufficient or non-existent seawater cooling, check seawater pump. • Too much refrigerant in system. • Abnormal sea water temperature conditions in heat cycle (seawater temperatures above 63° F (17° C) approx.).
<A03>	BP cut out - compressor 2 <ul style="list-style-type: none"> • Insufficient refrigerant charging level. • Abnormal seawater temperature conditions in heat cycle (seawater temperatures under 43° F (6° C).approx.). • First startup in heat cycle with very low chilled water circuit temperatures (below 46° F (8°C) approx.).
<A04>	BP cut out - compressor 2 <ul style="list-style-type: none"> • Insufficient or non-existent seawater cooling, check seawater pump. • Too much refrigerant in system. • Abnormal sea water temperature conditions in heat cycle (seawater temperatures above 63° F (17° C) approx.).
<A05> to <A08>	Same as above for compressors 3 and 4 (if present). NOTE: Not used for BlueCool Classic units.
<A09>	Absent or defective external or internal (Display Face) air sensor.
<A10>	Absent or defective evaporator temperature coil sensor.
<CA11>	All compressor(s) have been deactivated by soft <F> procedure: <1C00>,<2C00>, etc. To re-activate, reprogram as follows: <1C01>,etc.
<EA11>	Compressor stopped by deicing control. - Automatic restart. This code does not entail a complete system halt and will only be visible when in the evaporator temperature readout (F key - line E).

WIRING DIAGRAM - WBCC 5000 TO 16000 BTU (ROTARY COMP.) - SINGLE PHASE

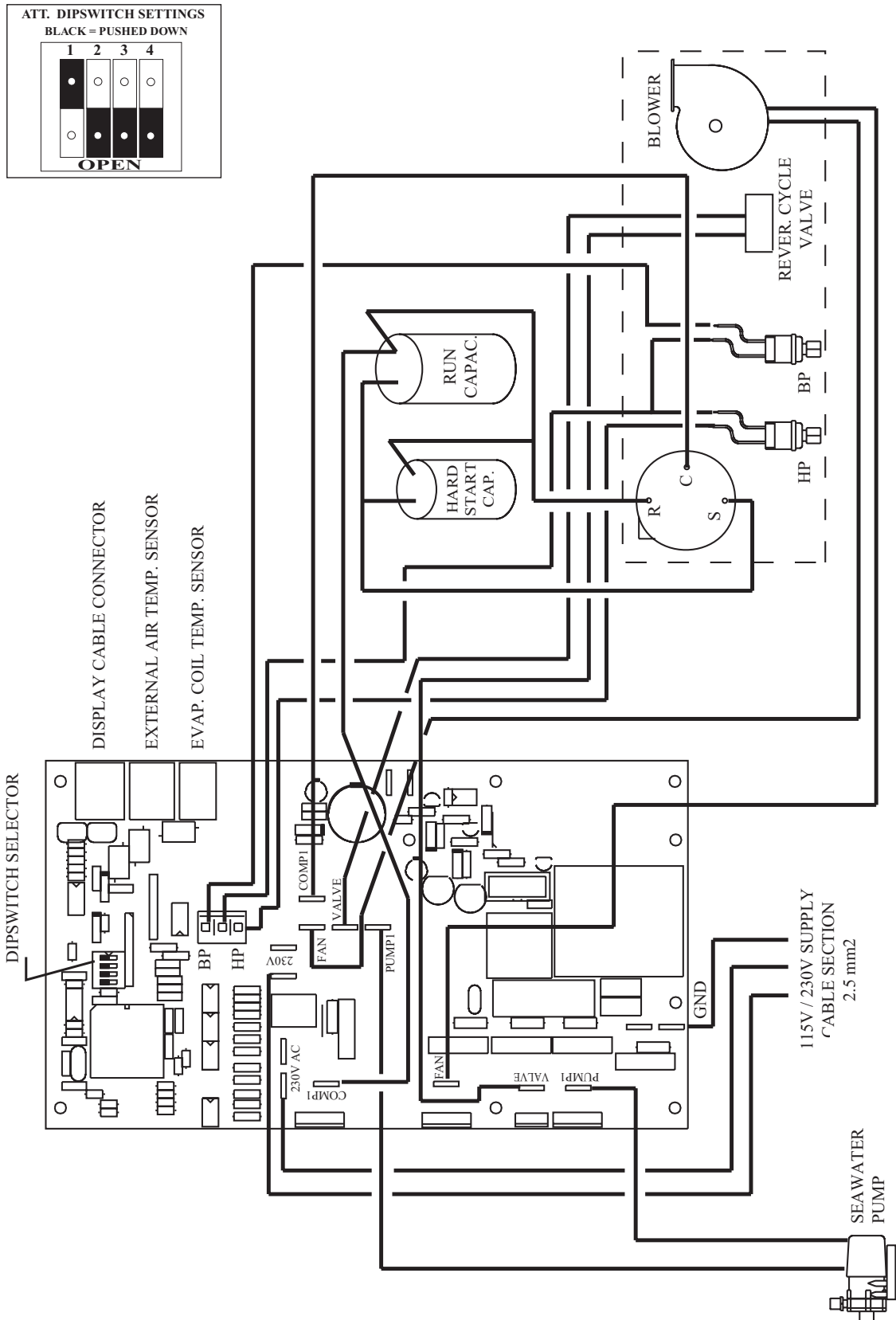
ATT. DIPSWITCH SETTINGS
BLACK = PUSHED DOWN



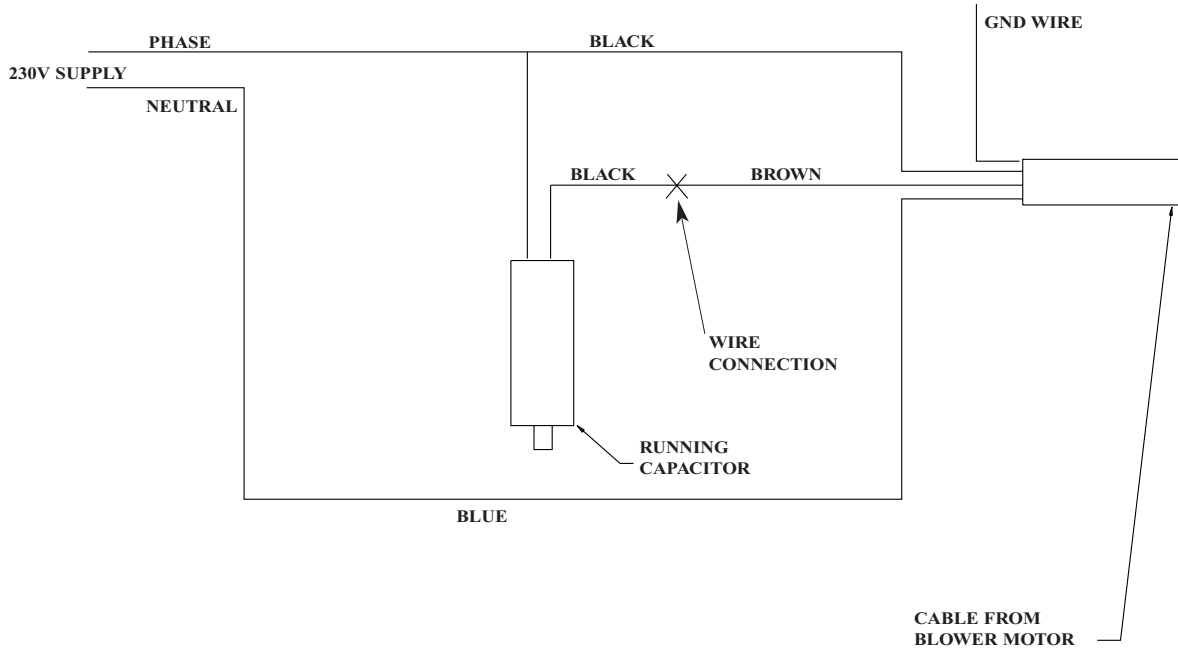
Hard-start device is standard from 12000 BTU onwards. 5000/9000 BTU units are not equipped with this feature



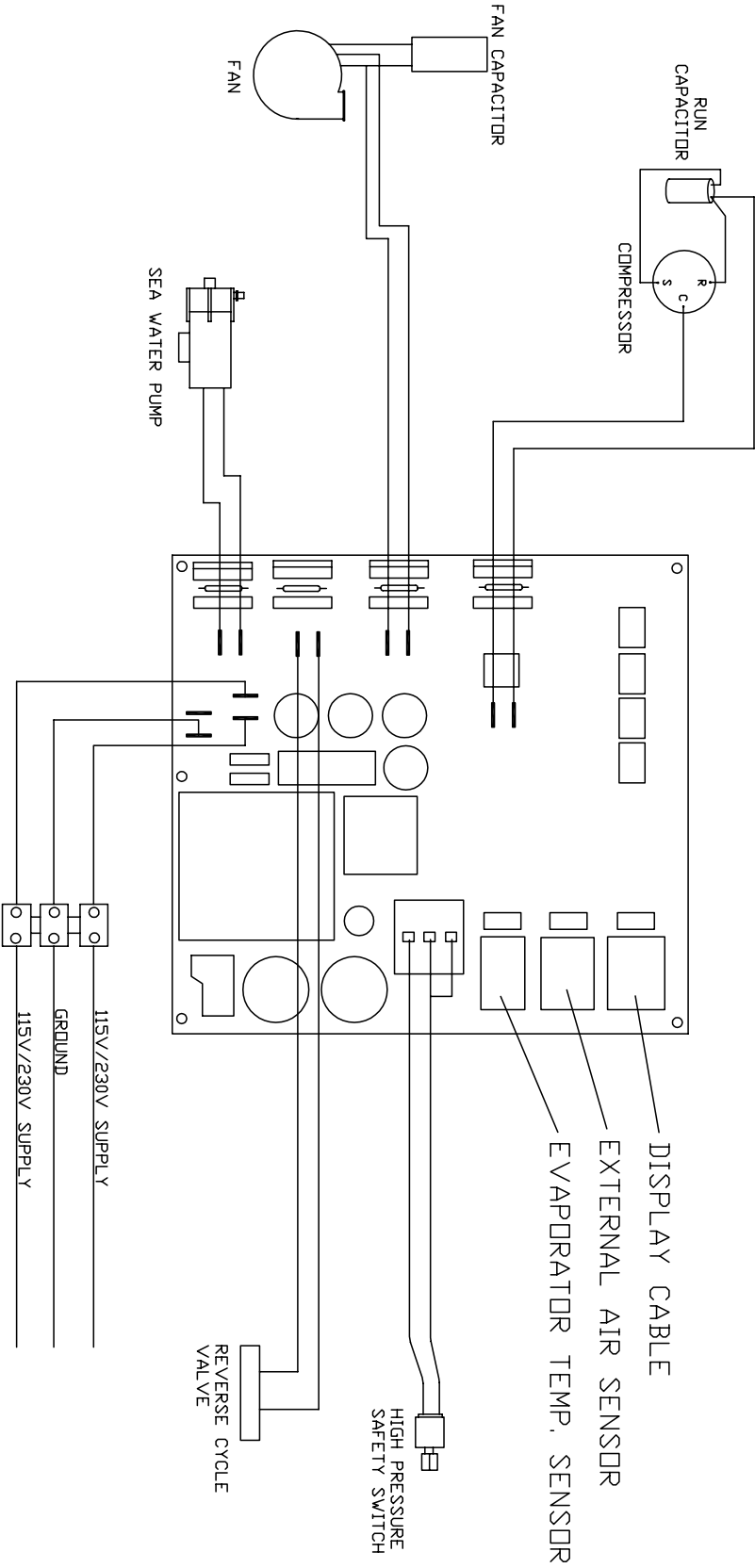
WIRING DIAGRAM - WBCC 20000 TO 30000 BTU (SCROLL/ROTARY) - SINGLE PHASE



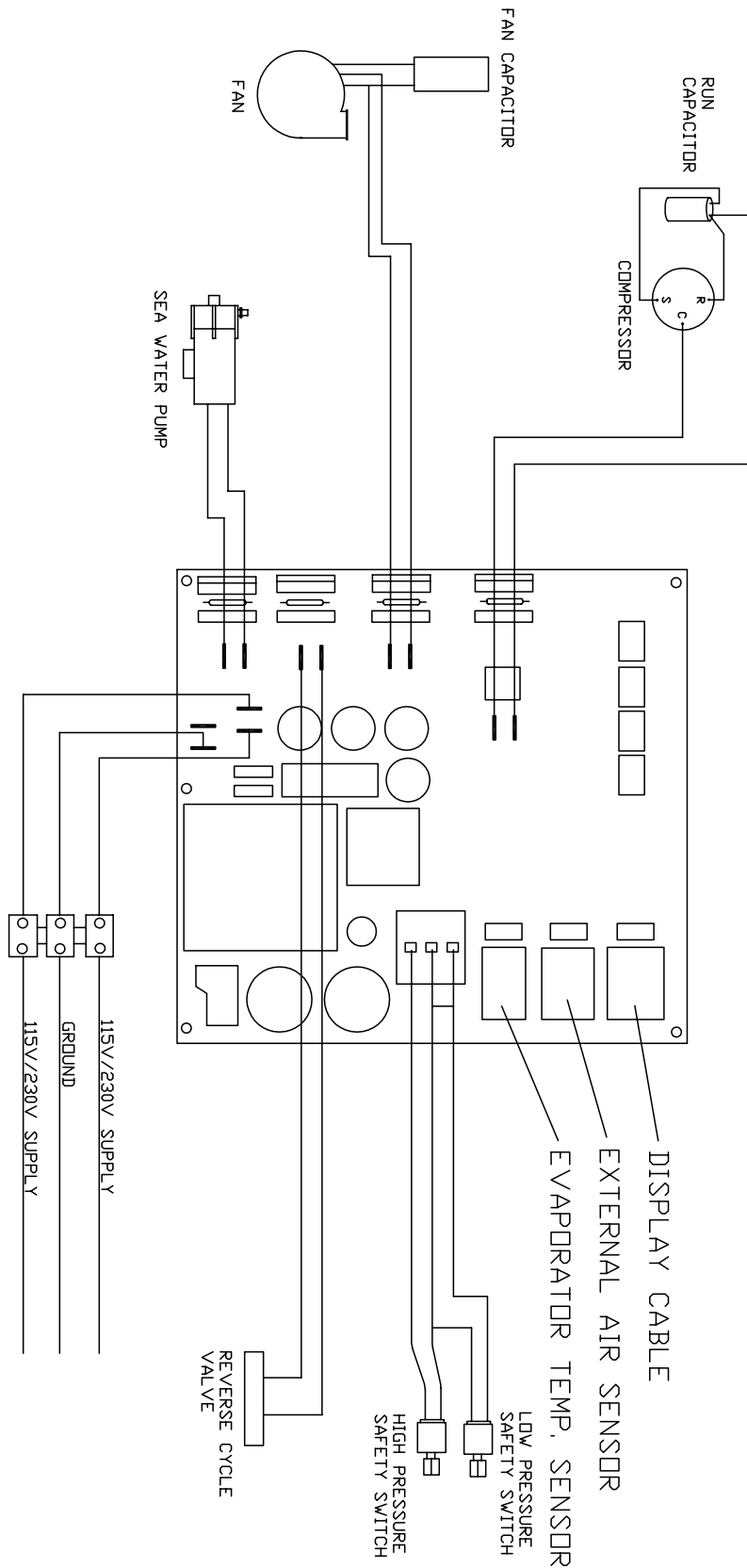
WIRING SCHEMATIC - RUNNING CAPACITORS FOR BLOWER MOTORS - ECOFIT/EBM



WIRING DIAGRAM - TCC CARD VERSION 3. (5000 to 9000 BTU)



WIRING DIAGRAM - TCC CARD VERSION 3. (12000 to 30000 BTU)





Webasto Product N.A., Inc.

15083 North Road
Fenton, MI 48430

Technical Assistance Hotline

USA: (800) 555-4518

Canada: (800) 667-8900

www.webasto.us

www.techwebasto.com