

NORTH SLOPE CHILLERS





Table of Contents

Applications	3
Cautions/Warnings.....	3
Specification sheet	4
Chiller Component Overview	5
Installation	6
User Interface.....	7
Modifying Parameters	8
Setting Temperature Units (F° or C°).....	8
Modifying Set Point (St1)	8
Modifying Temperature Differentials (P1)	8
Modifying Operating Parameters	8
LIMITED WARRANTY POLICY	10
EXPRESS DISCLAIMER	10
WARRANTY EXCLUSIONS	10
RETURNS.....	10
REFUSAL OF WARRANTY CLAIM.....	10

Applications

This owner's manual is to be used for the following North Slope Chillers:

TYPE	MODEL NUMBER	COOLING CAPACITY (BTU/HR)
Freeze	NSC0500	6,000 (1/2 ton)
Freeze	NSC1000	12,000 (1 ton)
Freeze	NSC2000	24,000 (2 ton)
Deep Freeze	NSC1000-LT	12,000 (1 ton)
Deep Freeze	NSC 2000-LT	24,000 (2 ton)

Cautions/Warnings

1. **Power** (ALWAYS check the Chiller Parameter tag and verify operational voltage before plugging in chiller)
 - a. Only connect North Slope Chillers to a properly grounded circuit
 - b. Never connect your North Slope Chiller to voltage that is outside the acceptable voltage range. Connecting your chiller to any voltage outside of these ranges will damage the compressor.
 - i. 110V model will operate on voltages between 100 ~ 130V
 - ii. 230V model will operate on voltages between 200 ~ 250V
 - c. Only use power sources that are 60Hz, running the chiller at 50Hz will void the warranty and will damage the compressor
2. **Never run the pump dry**, only turn on chiller after the fluid reservoir has been filled. Running the chiller without fluid will permanently damage the pump and void the warranty
3. **This chiller is air cooled and must have good ventilation.** For proper function there must be a minimum of 1 foot clearance on both sides and 2 foot clearance at the back of the chiller
4. **Flush chiller prior to use.** North Slope Chillers tests every chiller on site prior to shipping. During testing North Slope Chillers uses a water/glycol mix to test their chillers. There will always be a small amount of water/glycol remaining in the system. Since not all glycols are compatible with each other and vary by manufacture each chiller should be flushed with water for 10 minutes prior to use.

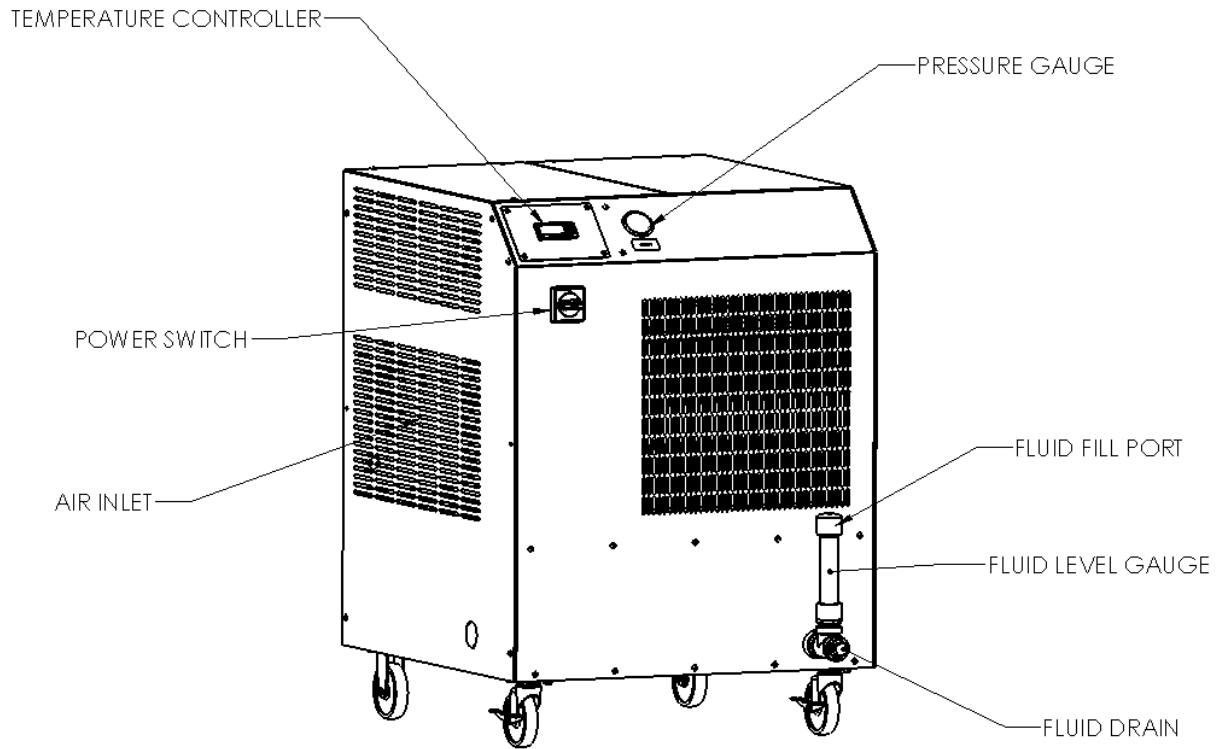
Specification sheet

Model	NSC0500-110/1	NSC1000-230/1	NSC1000-LT-230/1	NSC2000-230/1	NSC2000-LT-230/1
Voltage	110 VAC, SINGLE PHASE, 60 Hz	230VAC, SINGLE PHASE, 60 Hz			
Compressor Power	½ HP	1 HP		2 HP	
Cooling Capacity (BTU/hr)	6,000 BTU/hr 90F ambient 65F Fluid Temp	12,000 BTU/hr 90F Ambient 65F Fluid Temp	12,000 BTU/hr 90F Ambient 40F Fluid Temp	24,000 BTU/hr 90F Ambient 65F Fluid Temp	24,000 BTU/hr 90F Ambient 40F Fluid Temp
Fluid Temp Range	40F – 80F	40F – 80F	10F – 60F	40F – 80F	10F – 60F
Refrigerant	R-134a	R-134a	R-404a	R-134a	R-404a
Metering Device	TXV				
Pump Power	1/3 HP			3/4 HP	
Pump Specs	4 GPM up to 50 PSI, Fixed Displacement			10GPM @ 28 PSI (Centrifugal)	
Acceptable Fluids	Water/Glycol at 70/30 (50/50 maximum)* Ethylene Glycol or Propylene Glycol North Slope Chillers recommends using distilled water to maximize life and performance of chiller Consult North Slope Chillers prior to using other fluids in the chiller				
Tank Capacity	3.5 Gallons	12 Gallons			
Inlet and Outlet	1/2" NPT			3/4" NPT	
Dry Weight (lbs)	150 lbs	260 lbs		390 lbs	
Dimensions	28¼"L x 22½"W x 32½"H	34½"L x 28¼"W x 39"H		34¾"L x 43¼"W x 40"H	

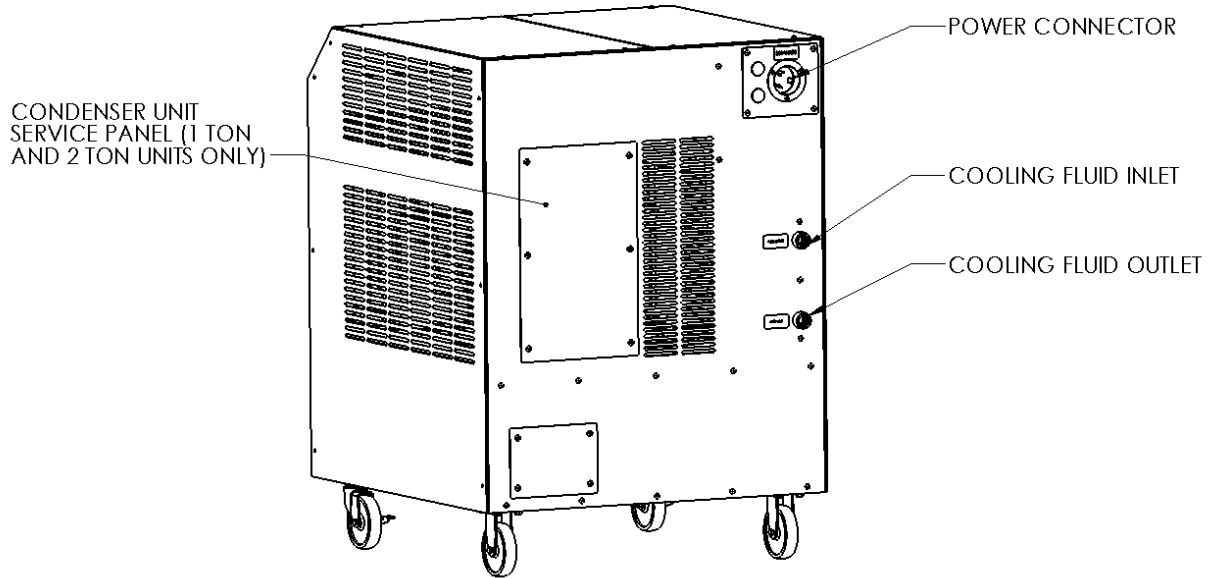
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Chiller Component Overview

FRONT



BACK



Installation

1. Position chiller for use

- Place unit on a flat level surface in a well-ventilated area

2. Connect inlet and outlet fluid hoses

- Confirm hoses are connected to proper inlet and outlet ports

3. Fill the reservoir

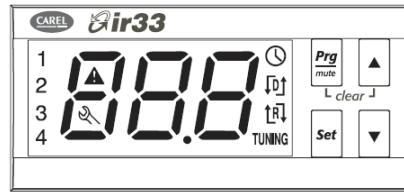
4. Connect to power

- Ensure you have the correct power supply before plugging in chiller

5. Turn on chiller and adjust temperature controller

- See page 8 for instructions on how to adjust temperature controller

User Interface



3.1 Display

The display shows the temperature in the range -50°C to +150°C in the models with temperature inputs only and in the range -199 to +800°C in the models with universal inputs. The temperature is displayed with resolution to tenths between -19.9°C & +99.9°C. Alternatively, it can show the value of one of the analogue or digital inputs, or the set point (see parameter c52). During programming, it shows the codes and values of the parameters.

Icon	Function	Normal operation			Start up	Notes
		ON	OFF	BLINK		
1	Output 1	Output 1 active	Output 1 not active	Output 1 request		Flashes when activation is delayed or inhibited by protection times, external disabling or other procedures in progress.
2	Output 2	Output 2 active	Output 2 not active	Output 2 request		See note for output 1
3	Output 3	Output 3 active	Output 3 not active	Output 3 request		See note for output 1
4	Output 4	Output 4 active	Output 4 not active	Output 4 request		See note for output 1
	ALARM		No alarm present	Alarms in progress		Flashes when alarms are active during normal operation or when an alarm is active from external digital input, immediate or delayed.
	CLOCK			Clock alarm Operating cycle active	ON if Real Time Clock present	
	REVERSE	Reverse operation active	Reverse operation not active	PWM /0 to 10 Vdc outputs		Signals operation of the unit in "reverse" mode, when at least one relay with "reverse" operation is active. Flashes if PWM/0 to 10 Vdc outputs.
	SERVICE		No malfunction	Malfunction (e.g. E2PROM error or probes faulty). Contact service		
TUNING	TUNING		AUTO-Tuning function not enabled	AUTO-Tuning function enabled		On if the AUTO-Tuning function is active
	DIRECT	Direct operation active	Direct operation not active	PWM /0 to 10 Vdc outputs		Signals operation of the unit in "direct" mode, when at least one relay with "direct" operation is active. Flashes if PWM/0 to 10 Vdc outputs.

Tab. 3.a

3.2 Keypad

Prg mute	<p>Pressing the button alone:</p> <ul style="list-style-type: none"> • If pressed for more than 5 seconds, accesses the menu for setting the type P parameters (frequent); • Mutes the audible alarm (buzzer) and deactivates the alarm relay; • When editing the parameters, pressed for 5 s, permanently saves the new values of the parameters; • When setting the time and the on/off times returns to the complete list of parameters. <p>Pressing together with other buttons</p> <ul style="list-style-type: none"> • If pressed for more than 5 seconds together with Set, accesses the menu for setting the type C parameters (configuration); • If pressed for more than 5 seconds together with UP, resets any alarms with manual reset (the message 'RES' indicates the alarms have been reset); any alarm delays are reactivated; <p>Start up</p> <ul style="list-style-type: none"> • If pressed for more than 5 seconds at start up, activates the procedure for loading the default parameter values.
	<p>(UP) Pressing the button alone:</p> <ul style="list-style-type: none"> • Increases the value of the set point or any other selected parameter <p>Pressing together with other buttons</p> <ul style="list-style-type: none"> • If pressed for more than 5 seconds together with Prg/mute, resets any alarms with manual reset (the message 'RES' indicates the alarms have been reset); any alarm delays are reactivated.
	<p>(DOWN) Pressing the button alone:</p> <ul style="list-style-type: none"> • Decreases the value of the set point or any other selected parameter. • In normal operation accesses the display of the second probe, digital inputs and set point.
Set	<p>Pressing the button alone:</p> <ul style="list-style-type: none"> • If pressed for more than 1 second displays and/or sets the set point • Pressing together with other buttons • If pressed for more than 5 seconds together with Prg/mute, accesses the menu for setting the type C parameters (configuration).

Tab. 3.b

**The above tables are from the ir33 Universale Carel Controller Manual*

Modifying Parameters

Setting Temperature Units (F° or C°)

1. Press and hold down the **Prg** and **Set** keys at the same time for 5 seconds. The display will then flash “0” asking for password. Use the up and down arrow keys to select “77” for password. Press the **set** key to continue.
2. Press the up and down arrow keys to move to parameter “c18”. Press the **set** key.
3. Use the arrow keys to select “0” for Celsius or “1” for Fahrenheit. Press the **set** key to continue.
4. Press and hold down the **Prg** key for 5 seconds to save programming changes.

Modifying Set Point (St1)

1. Press and hold down the **Prg** and **Set** keys at the same time for 5 seconds. The display will then flash “0” asking for password. Use the up and down arrow keys to select “77” for password. Press the **set** key to continue.
2. Press the up and down arrow keys to move to the “St1” parameter. Press the **set** key.
 - **Warning: Adjusting “St2” will damage chiller.**
3. Press the up and down arrow keys to reach the desired temperature. Press the **set** key to continue.
4. Press and hold down the **Prg** key for 5 seconds to save programming changes.

Modifying Temperature Differentials (P1)

1. Press and hold down the **Prg** and **Set** keys at the same time for 5 seconds. The display will then flash “0” asking for password. Use the up and down arrow keys to select “77” for password. Press the **set** key to continue.
2. Press the up and down arrow keys to move to the “P1” parameter. Press the **set** key.
 - **Warning: Adjusting “P2” will damage chiller.**
3. Press the up and down arrow keys to reach the desired differential temperature. Press the **set** key.
 - North Slope Chillers recommends a differential of 3° Fahrenheit. Anything less than that will void the warranty.
4. Press and hold down the **Prg** key for 5 seconds to save programming changes.

Modifying Operating Parameters

1. Press and hold down the **Prg** and **Set** keys at the same time for 5 seconds. The display will then flash “0” asking for password. Use the up and down arrow keys to select “77” for password. Press the **set** key to continue.
 2. Press the up and down arrow keys to move to the desired parameter. Press **set** to continue.
 3. Press the up and down arrow keys to reach the desired value. Press **set** to continue.
 4. Press and hold down the **Prg** key for 5 seconds to save programming changes.
- **Follow the above steps to change the following parameters for standard operation**

Parameter	c0	c13	c18
Value	1	0	1

Trouble Shooting

Symptoms	Possible Cause(s)
Compressor does not start. The temperature rises but the pump runs fine.	<ol style="list-style-type: none"> 1. Compressor is not being powered 2. Flow switch is not activated
Compressor hums but doesn't start	<ol style="list-style-type: none"> 1. Low line voltage 2. Incorrect wiring 3. Internal compressor damage
Compressor does not run or try to start (doesn't hum)	<ol style="list-style-type: none"> 1. Open circuit due to blown fuse or open disconnects 2. Shorted motor windings 3. Compressor motor protector open 4. Open thermostat 5. Loss of refrigerant 6. Refrigerant solenoid valve not working
Compressor starts but trips on overload protector	<ol style="list-style-type: none"> 1. Suction or discharge pressure is too high 2. Low line voltage 3. Broken overload protector 4. Mechanical damage to compressor 5. Shorted motor windings
Chiller short cycles	<ol style="list-style-type: none"> 1. Insufficient refrigerant 2. Leaking refrigerant solenoid valve 3. Leaking discharge valve 4. Malfunctioning expansion valve
High refrigerant pressure fault	<ol style="list-style-type: none"> 1. Excessive refrigerant 2. Clogged condenser 3. Condenser fan malfunction 4. Air entering condenser is too hot
Low refrigerant pressure fault	<ol style="list-style-type: none"> 1. Refrigerant leak 2. Coolant not flowing through heat exchanger 3. Liquid line solenoid valve stuck closed 4. Stuck expansion valve or bulb well not charged 5. Low ambient air temperatures
Lube protector fault	<ol style="list-style-type: none"> 1. Low compressor oil level due to: <ul style="list-style-type: none"> • Oil trapped in system • Compressor short cycling • Not enough oil in system • Suction pressure too low 2. Excessive refrigerant 3. Broke oil pump
Fluid temperature too cold	<ol style="list-style-type: none"> 1. Set point temperature is too low 2. Malfunctioning temperature controller 3. Malfunctioning temperature sensor 4. Leaking refrigerant solenoid valve
Fluid flow fault	<ol style="list-style-type: none"> 1. Fluid pump not working 2. Insufficient refrigerant 3. Air trapped inside system 4. Malfunctioning flow switch

LIMITED WARRANTY POLICY

Manufacturer warrants Ready to Ship products sold as “new” to be free from defects in material and workmanship under normal and proper use and servicing for a period of the shorter of one (1) year from the date of purchase by a retail customer. MANUFACTURER MAKES NO OTHER WARRANTY OR REPRESENTATION OF ANY KIND, EXPRESSED OR IMPLIED, IN FACT OR IN LAW, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE OTHER THAN THE LIMITED WARRANTY SET FORTH ABOVE.

EXPRESS DISCLAIMER

Manufacturer MAKES NO WARRANTIES OR REPRESENTATIONS AS TO THE Products, EXCEPT AS SET FORTH ABOVE. ALL IMPLIED WARRANTIES AND CONDITIONS, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT, ARE HEREBY DISCLAIMED.

WARRANTY EXCLUSIONS

Exclusions from warranty consideration include, but are not limited to: normal wear and tear; abuse, misuse, or non-standard application; act of nature; lack of proper maintenance; unauthorized repair; unauthorized product modification. The user of the Manufacturer's Products is expected to follow all operating instructions and make periodic checks and inspections to ensure the physical condition and performance of the Product(s). Neither Manufacturer, nor its representatives, assumes any responsibility for results of the use of the Products beyond the operation and performance of the Products themselves. Only the Manufacturer is authorized to make any warranty or representation and the customer may not rely on any other warranty or representation. All implied warranties are hereby disclaimed.

RETURNS

- a. When any of Manufacturer's Products have been authorized to return for any inspection, or replacement, it must be returned as specified in the Return Merchandise Authorization Form.
- b. A Manufacturer-issued Returned Material Authorization (RMA) number authorizing a product return must be acquired prior to sending any return. In addition, documentation of model, product serial number, dealer invoice number, dated proof of resale, and description of failure shall accompany all returns.
- c. All returns must come freight prepaid and in its original container, or in a manner conducive to proper shipping and handling procedures. Product(s) replaced, or shipped in accordance with manufacturers' warranty policy for doing so will be returned freight prepaid.
- d. Manufacturer reserves the right to postpone, delay, or refuse warranty claim consideration for either unauthorized returns or returns made by dealers or distributors whose open and active accounts are past due or delinquent. The dealer or distributor agrees that no warranties or other guarantees on any products shall be made in excess of those made by Manufacturer. This agreement excludes Manufacturer or its representatives from all liability not covered in this Warranty.

REFUSAL OF WARRANTY CLAIM

Manufacturer reserves the right to postpone, delay, or refuse warranty claim consideration for either unauthorized returns or returns made by a Distributor whose open and active accounts are past due or delinquent with respect this Agreement.