

3.2.4.1 Check and Protect the Electrical Supply

Check the nameplate on the Polycold *Cool Solutions*® Fast Cycle Water Vapor Cryopump unit. If the nominal voltage does not exist, check the control voltage after connecting the electrical supply. (See [section 3.2.4.2 How to Check the Control Voltage and Change the Transformer Taps.](#))

The unit should have its' own electrical supply. (See [section Table 3-3: Electrical Supply and Protection Requirements.](#))

3.2.4.2 How to Check the Control Voltage and Change the Transformer Taps

3.2.4.2.1 How to Check the Control Voltage

Tools and materials needed:

Voltmeter that can measure 30 V(ac)

1. Turn off the refrigeration unit. Turn the power disconnect switch to the OFF position.
2. Loosen the two lower screws on the side of the low voltage box panel. Slide the panel straight up to remove it. (See [Figure 3-22.](#))
3. Locate the SYSTEM CONTROL printed circuit board that is behind the SYSTEM CONTROL panel.
4. Connect the voltmeter. (See [Figure 3-9.](#))
 - Connect one lead to a screw holding the heat sink. (The voltage regulator is inside the heat sink.)
 - Connect the other lead to a fuse terminal.
5. Make certain the refrigeration unit's ON/OFF switch is in the OFF position. Turn the power disconnect switch to the ON position.
6. The acceptable voltage range is 22.5–26.5 V. If the control voltage is not acceptable, see [section 3.2.4.2.2 How to Change the Transformer Taps.](#)

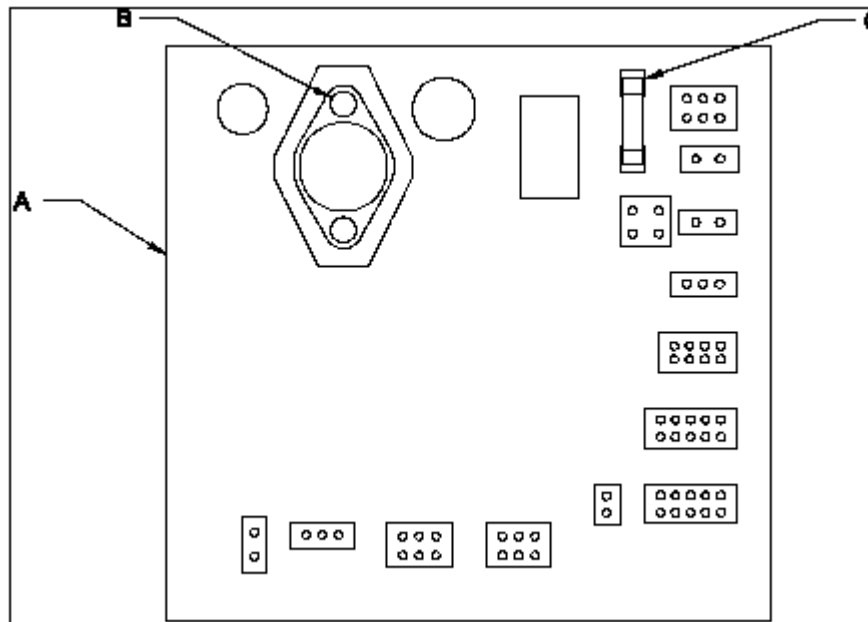


Figure 3-9: Control Voltage Check—Voltmeter Connections

- A. SYSTEM CONTROL printed circuit board
- B. Screw holding the heat sink
- C. Fuse terminal

3.2.4.2.2 How to Change the Transformer Taps

1. Make certain the refrigeration unit's ON / OFF switch is in the OFF position.
2. Turn the power disconnect switch to the OFF position. Remove the high voltage box panel.
3. Refer to the "Transformer Connections" table in [Figure 10-2](#).

NOTE: *Before changing taps, verify that the transformer connections are set for the proper line voltage.*

- If the control voltage is greater than 26.5 V, move power connection "B" to the next higher tap. (For example, if "B" is connected to tap 3, move it to tap 4.)

- If the control voltage is less than 22.5 V, move power connection “B” to the next lower tap, with tap 3 being the lowest selection. (For example, if “B” is connected to tap 6, move it to tap 5.)
4. Reinstall the high voltage box panel.
 5. Check the control voltage with the new transformer setting following the instructions in [section 3.2.4.2.1 How to Check the Control Voltage](#).
 6. If the control voltage is within the acceptable range, record the new transformer connections in the manual.
 7. If the control voltage is still not within the acceptable range, repeat the procedure above, moving power connection “B” to the next available tap.
 8. If none of the available tap settings yield a control voltage within the acceptable range, contact Polycold Service for assistance.

Table 3-3: Electrical Supply and Protection Requirements

Model Characteristics				Electrical Characteristics					
Unit	Nominal Compressor Voltage	Common Worldwide Voltage-Phase-Frequency	Transformer Tap Setting and ID Label	Acceptable Voltage Range Low-High	RLA Amps	MCC Amps	LRA Amps	Fuse Size Amps	Power Input kVA
550 HC	230V	200-3-50 200-3-60 208/230-3-60	200-3-50/60	180-220@50Hz 187-220@60Hz	21.9	44	160	60	7.6
		208/230-3-60 220-3-50 230-3-60	230-3-50/60	207-230@50Hz 207-253@60Hz	19.0				
	460V	380-3-50	380-3-50	342-418@50Hz	11.0	22	80	25	7.3
		400-3-50 415-3-50	400-3-50	360-440@50Hz	10.5				
		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz	9.1				
		480-3-60	480-3-60	432-528@60Hz	8.7				
	575V	575-3-60	575-3-60	518-632@60Hz	7.4	17.6	64	20	7.4

Table 3-3: Electrical Supply and Protection Requirements

Model Characteristics				Electrical Characteristics					
Unit	Nominal Compressor Voltage	Common Worldwide Voltage-Phase-Frequency	Transformer Tap Setting and ID Label	Acceptable Voltage Range Low-High	RLA Amps	MCC Amps	LRA Amps	Fuse Size Amps	Power Input kVA
550 LT	230V	200-3-50 200-3-60 208/230-3-60	200-3-50/60	180-220@50Hz 187-220@60Hz	23.7	44	160	60	8.2
		208/230-3-60 220-3-50 230-3-60	230-3-50/60	207-230@50Hz 207-253@60Hz	20.6				
	460V	380-3-50	380-3-50	342-418@50Hz	14.6	22	80	25	9.6
		400-3-50 415-3-50	400-3-50	360-440@50Hz	13.9				
		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz	12.1				
480-3-60	480-3-60	432-528@60Hz	11.6						
575V	575-3-60	575-3-60	518-632@60Hz	9.4	17.6	64	20	9.4	
660 HC	230V	200-3-50 200-3-60 208/230-3-60	200-3-50/60	180-220@50Hz 187-220@60Hz	29.0	44	160	60	10.0
		208/230-3-60 220-3-50 230-3-60	230-3-50/60	207-230@50Hz 207-253@60Hz	25.2				
670 HC	460V	380-3-50	380-3-50	342-418@50Hz	14.3	22	80	25	9.4
		400-3-50 415-3-50	400-3-50	360-440@50Hz	13.6				
		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz	11.8				
		480-3-60	480-3-60	432-528@60Hz	11.3				
	575V	575-3-60	575-3-60	518-632@60Hz	9.8	17.6	64	20	9.8

Table 3-3: Electrical Supply and Protection Requirements

Model Characteristics				Electrical Characteristics					
Unit	Nominal Compressor Voltage	Common Worldwide Voltage-Phase-Frequency	Transformer Tap Setting and ID Label	Acceptable Voltage Range Low-High	RLA Amps	MCC Amps	LRA Amps	Fuse Size Amps	Power Input kVA
1100 HC	230V	200-3-50 200-3-60 208/230-3-60	200-3-50/60	180-220@50Hz 187-220@60Hz	60.0	62	228	80	20.8
		208/230-3-60 220-3-50 230-3-60	230-3-50/60	207-230@50Hz 207-253@60Hz	52.2				
	460V	380-3-50	380-3-50	342-418@50Hz	28.1	31	114	35	18.5
		400-3-50 415-3-50	400-3-50	360-440@50Hz	26.7				
		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz	23.2				
480-3-60	480-3-60	432-528@60Hz	22.2						
575V	575-3-60	575-3-60	518-632@60Hz	15.4	25	90	30	15.3	
1100 LT	230V	200-3-50 200-3-60 208/230-3-60	200-3-50/60	180-220@50Hz 187-220@60Hz	50.7	62	228	80	17.6
		208/230-3-60 220-3-50 230-3-60	230-3-50/60	207-230@50Hz 207-253@60Hz	44.1				
	460V	380-3-50	380-3-50	342-418@50Hz	22.9	31	114	35	15.1
		400-3-50 415-3-50	400-3-50	360-440@50Hz	21.7				
		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz	18.9				
480-3-60	480-3-60	432-528@60Hz	18.1						
575V	575-3-60	575-3-60	518-632@60Hz	16.4	25	90	30	16.3	

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Model Characteristics				Electrical Characteristics					
Unit	Nominal Compressor Voltage	Common Worldwide Voltage-Phase-Frequency	Transformer Tap Setting and ID Label	Acceptable Voltage Range Low-High	RLA Amps	MCC Amps	LRA Amps	Fuse Size Amps	Power Input kVA
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		208/230-3-60 220-3-50 230-3-60	230-3-50/60	207-230@50Hz 207-253@60Hz	20.4				8.1
552 HC	460V	380-3-50	380-3-50	342-418@50Hz	11.9	22	80	25	7.8
		400-3-50 415-3-50	400-3-50	360-440@50Hz	11.3				
		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz	9.8				
		480-3-60	480-3-60	432-528@60Hz	9.4				
	575V	575-3-60	575-3-60	518-632@60Hz	7.8	17.6	64	20	7.8
661 HC	460V	380-3-50	380-3-50	342-418@50Hz	14.5	22	80	25	9.6
		400-3-50 415-3-50	400-3-50	360-440@50Hz	13.8				
662 HC		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz	12.0				
672 HC		480-3-60	480-3-60	432-528@60Hz	11.5				
	575V	575-3-60	575-3-60	518-632@60Hz	9.6	17.6	64	20	9.6
1101 HC	460V	380-3-50	380-3-50	342-418@50Hz	25.8	31	114	35	17.0
		400-3-50 415-3-50	400-3-50	360-440@50Hz	24.5				
1102 HC		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz	21.3				
		480-3-60	480-3-60	432-528@60Hz	20.4				
	575V	575-3-60	575-3-60	518-632@60Hz	14.1	25	90	30	14.0

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Model Characteristics				Electrical Characteristics					
Unit	Nominal Compressor Voltage	Common Worldwide Voltage-Phase-Frequency	Transformer Tap Setting and ID Label	Acceptable Voltage Range Low-High	RLA Amps	MCC Amps	LRA Amps	Fuse Size Amps	Power Input kVA
1101L T	460V	380-3-50	380-3-50	342-418@50Hz		31	114	35	
		400-3-50 415-3-50	400-3-50	360-440@50Hz					
		440-3-50 460-3-60	460-3-50/60	414-460@50Hz 414-506@60Hz					
		480-3-60	480-3-60	432-528@60Hz					
	575V	575-3-60	575-3-60	518-632@60Hz		25	90	30	

Leg to Leg voltages must be balanced to within 2% of each other.

NOTE: *RLA is the current drawn by the compressor at rated load. It may also be referred to as the maximum full load amps. Maximum recommended fuse size. A Bussman FRS-R dual element, current limiting fuse or equivalent is recommended to protect the branch circuit. Actual protection must comply with local codes. "Worse Case low Volts" refers to the lowest amount of voltage available. Typically power fluctuates by 10% within a given area, so the lowest voltage amount would be 90% of the nominal voltage.*

Gould TRS, Littlefuse FLSR.

MCA=minimum Circuit Ampacity = should be at least 125% RLA

NOTE: *This value is to assist the customer electrician to determine the dimensions of the electrical system.*

LRA=Locked Rotor Amps. This refers to the current that the compressor motor uses when the compressor is not able to rotate because the rotors are locked.

NOTE: *Compressors are provided with over current and over temperature protection which comply with UL and NEC definitions of inherent thermal protection.*

$$\text{kVA} = \text{Test Volts} * \text{RLA} * 1.732 / 1000$$

$$\text{kW} = \text{kVA} * \text{Power Factor (Power Factor is 90% in this case.)}$$