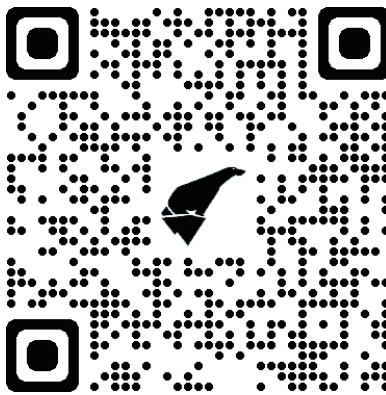




## CHILLER INSTALLATION GUIDE & USER MANUAL

- SINGLE & DUAL STAGE CHILLERS



SINGLE & DUAL STAGE CHILLER MANUAL  
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## CONTACT INFORMATION & AFTERHOURS SUPPORT

### CONTACT INFORMATION

G&D Chillers, Inc.  
130 E. 1st Ave.  
Junction City, Oregon 97448

1.800.555.0973  
info@gdchillers.com  
Office Hours: 8 AM – 5 PM PST

### AFTERHOURS TECHNICAL SUPPORT

G&D Chillers offers 24/7 technical support. For emergency assistance after normal business hours, call the main office at 1.800.555.0973. The voicemail recording will provide contact information for the emergency on-call service technician.

## INSTALLATION VIDEO LINKS

Visit the following pages for installation video walk-throughs and FAQs:

[gdchillers.com/installation-videos/](http://gdchillers.com/installation-videos/)

[gdchillers.com/installation-videos/how-to-install-a-chiller](http://gdchillers.com/installation-videos/how-to-install-a-chiller)

[gdchillers.com/faq](http://gdchillers.com/faq)

### **NOTICE: CHILLER WARRANTY REQUIRES ACTIVATION**

To activate the chiller parts and labor limited warranty, complete the Warranty Start-Up Checklist and return to G&D Chillers within 30 days.

## PACKAGE CHILLER DESCRIPTION

### CONDENSER

**AIR COOLED** – Standard configuration. Copper tube aluminum fin condenser coil or micro-channel condenser coil. Direct drive propeller type fans with DDP motors and built-in overload protection.

**LIQUID COOLED** – Optional configuration. Brazed plate counterflow condenser with water regulation valve. Shell and tube condensers available for custom units.

### EVAPORATOR

Brazed plate counterflow heat exchanger fed by externally-equalized thermostatic expansion valve.

### COMPRESSOR

Hermetically-sealed Danfoss/Maneurop compressor with oil level sight glass, rotalock service valves, and crankcase heater.

### CIRCULATION PUMP

End suction centrifugal pump with impeller trimmed for 35% propylene glycol mixture. Base mounted. Pump fitted with union, check valve, and supply and return shut off valves for service. Variable frequency drives available upon request.

### RESERVOIR TANK

Constructed of molded, seamless high-density cross-linked polyethylene or stainless steel. Insulated with ½" closed cell foam. Glycol level indicator. Auxiliary ports standard on most units.

### SUPPLY & RETURN PIPING

Constructed of type M copper. Ball valves provided for field connection of supply and return piping. Liquid-filled pressure gauge for setting discharge pressure.

### DYNAMIC FLUID BYPASS VALVE

Allows for balancing of discharge pressure. Over pressure design allows circuiting back to tank without damage to system or pump. Copper and bronze construction.

### REFRIGERANT PIPING

Type L ACR copper. Liquid line-filter drier, sight glass/moisture indicator, solenoid valve and thermal expansion valve with equalizer. Suction line fully insulated and designed for proper oil return with minimum friction loss. Discharge line formed of ACR tubing reformed radius fittings. All piping leak tested and evacuated. Ships with full operating charge of refrigerant, refer to data plate for refrigerant type and charge per circuit.

### FRAME & HOUSING

Fully powder coated steel frame. Durable powder coated aluminum housing rated for outdoor use. Louvered access panels for easy service and maintenance.

### POWER & CONTROLS

A single-point electrical connection is provided for terminating the chiller power wiring. All power starting controls and safety/operating controls are mounted in a weatherproof steel NEMA 3R enclosure.

Features include:

- Programmable logic controller (PLC)
- On / pump down / off door switch
- Compressor contactor and circuit breaker
- Pump contactor and circuit breaker
- Pressure-based mechanical safeties
- Flow switch interlock
- Freeze protection interlock
- High temperature alarm
- Low ambient control
- Compressor anti short cycle timer
- Fan cycling switches (air cooled units)
- Water regulating valve (water cooled units)

### FACTORY TESTING

All chillers are run tested at the factory and verified to be in perfect working order prior to shipment.

## INSTALLATION REQUIREMENTS

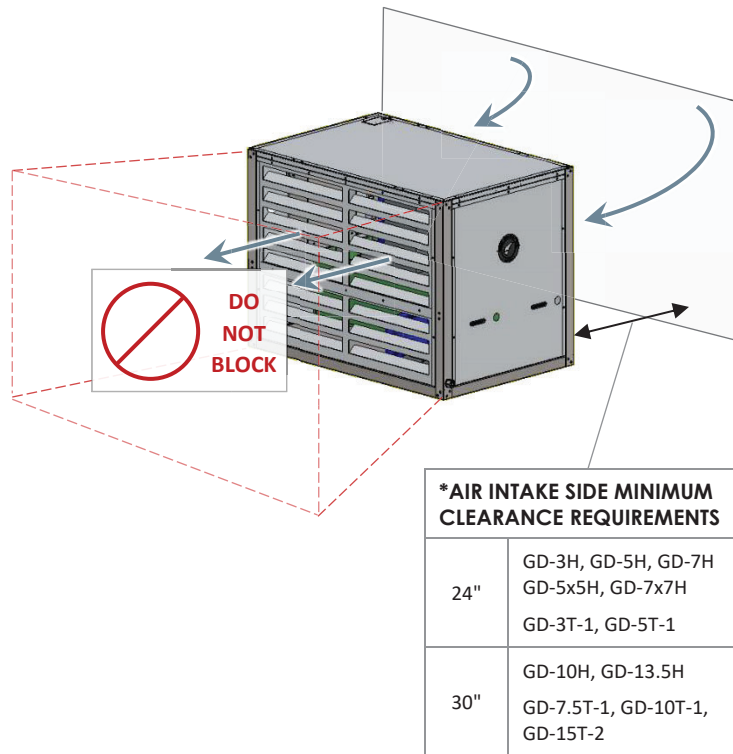
### LOCATION

**Air cooled** units must sit outside on a solid level surface. A concrete pad is recommended. Location should be free of grass and other debris that could plug condenser fins.

**Ensure minimum clearance\* between condenser intake side and any buildings, walls, etc.**

**No walls or obstructions in front of the unit: Louvered access side must be open to free air.**

**Liquid cooled** chillers may be installed on a concrete pad indoors or outdoors. A properly sized pump and liquid cooling system for the chiller condenser must be supplied by the end user. Contact G&D Chillers for additional information and assistance with sizing.



### ELECTRICAL

**WARNING: OBEY ALL APPLICABLE LOCAL AND NATIONAL ELECTRIC CODES WHEN INSTALLING THIS EQUIPMENT**

1. Supply unit with the proper voltage and protect against power spikes. Use only copper wire. Size wire and according to any/all applicable local and national codes. Refer to chart to the right for proper torque values. Refer to spec sticker on control panel for all electrical ratings.
2. Field-installed service disconnect required
3. Unit must be properly grounded at the provided grounding lug. If multiple ground wires are used, all wires must be twisted together prior to tightening ground lug.
4. Use only hubs or fittings that maintain the same environmental ratings as the enclosure.
5. When turning unit off for an extended length of time, leave power energized. (This will leave the crankcase heater on and keep the crankcase warm for the next start up.)

TORQUE CHART	
Gauge	lbf-in
1000-500	550
500-4	500
350-6	375
250-6	375
4/0-6	275
2/0-14	120
#2-#3	50
#4-#6	45
#8	40
#10-#14	35

## PIPING RECOMMENDATIONS

The drawing on the next page shows features that should be included in the piping system. Supplemental details and additional recommendations are listed here:

### Insulate supply and return piping

- Use closed-cell foam insulation
- Install protective cladding

### Materials: Schedule 80 PVC or ABS typical for cold glycol/water systems

- Verify operating temperatures
- High temp systems may require copper or stainless steel piping

### Install isolation ball valves externally at chiller supply and return ports

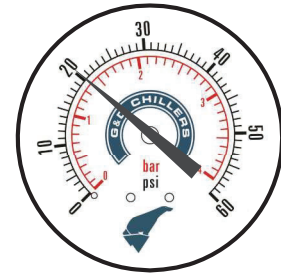
- True union or flanged valves for serviceability

### Y-strainer (20 mesh) on chiller return line

- Standard ball valve on purge line
- Additional ball valve upstream of Y-strainer for servicing

### Glycol backflow prevention measures:

- Check valve on chiller supply line
- Two options for return line:
  - (1) Inverted trap with air vent valve and vacuum breaker, or
  - (2) Electronic actuated valve, wired to process pump starter in chiller electrical enclosure



PRESSURE GAUGE

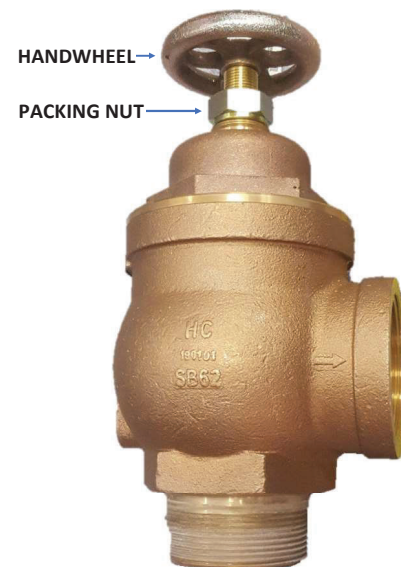
## ADJUSTING GLYCOL SUPPLY PRESSURE

The chiller contains a dynamic fluid bypass valve on the supply line. The supply pressure is factory set at 20 PSI.

To adjust the pressure setting using the bypass valve:

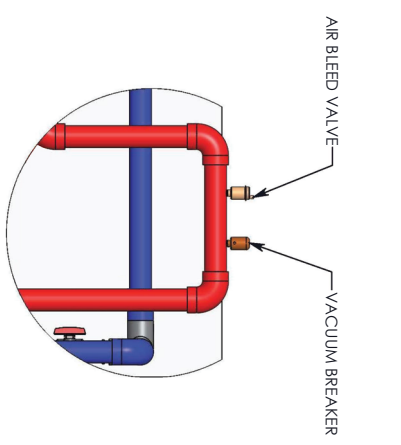
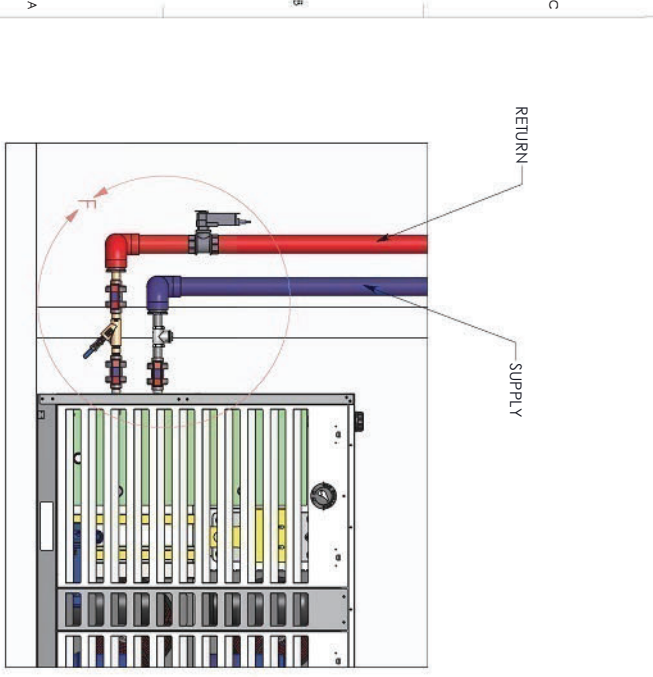
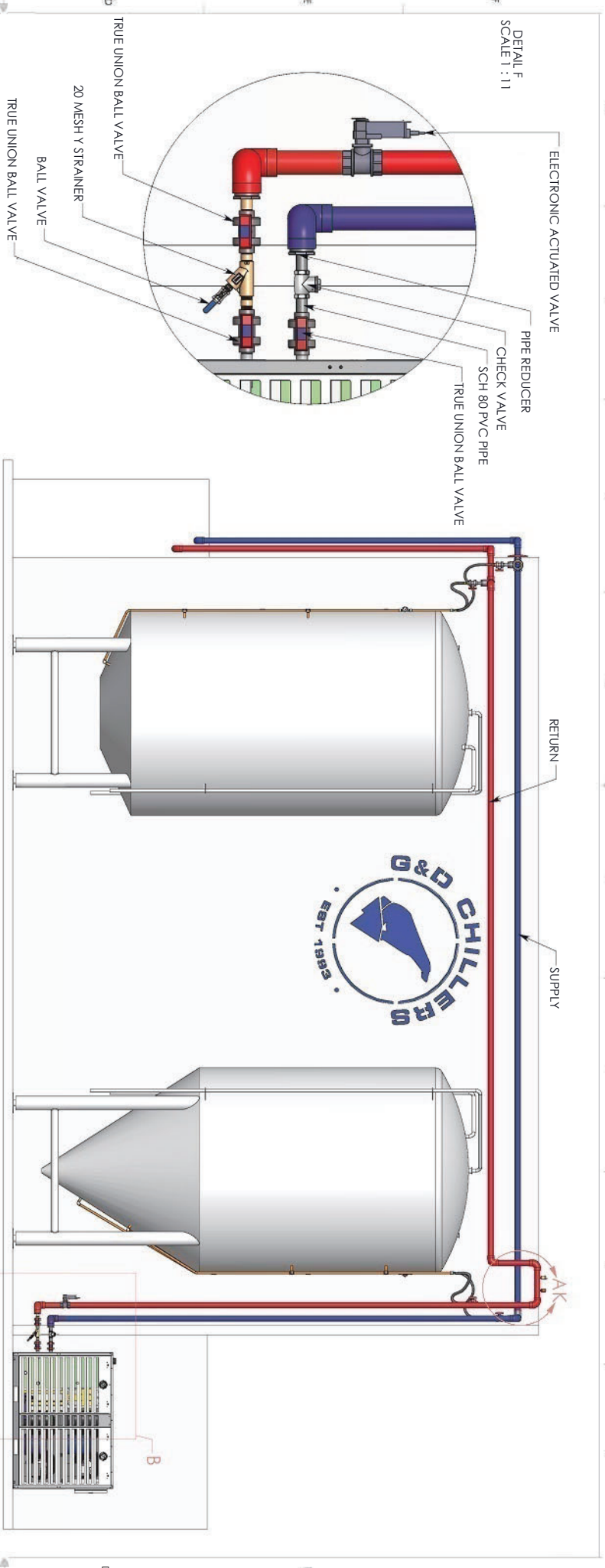
- Close ball valve on supply line (external to chiller)
- Loosen packing nut on bypass valve
- Turn handwheel to change pressure
- Monitor using pressure gauge in chiller
- Retighten packing nut once pressure is set

**NOTICE:** Do not open supply ball valve until gauge shows pressure within tank jacket ratings



FLUID BYPASS VALVE

**WARNING: VERIFY TANK JACKET RATINGS BEFORE PRESSURIZING PIPING**



# GENERAL PIPING LAYOUT



**G&D CHILLERS**

COMMITTED TO COLD

o EST 1993 o

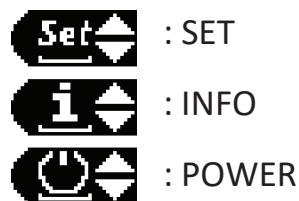
760 BAILEY HILL RD. EUGENE, OR 97402 • TEL (541) 346-3903 (800) 555-9973





## CONTROLLER AND NAVIGATION



The c.pCO Mini Carel controller will display one of three icons in the bottom-right corner of its screen. Navigate between these icons by pressing either the UP or DOWN button.



- **Set Screen:** To navigate to the set screen press either the UP or DOWN button until  is displayed on the screen. Select this option by pressing the ENTER button. Here you can see the current numerical set point. Press the ENTER button again and the icon will begin to blink. Now you can adjust the set point using the UP or DOWN buttons. Press the ENTER button until the icon at the top of the screen begins to blink. Press the ESCAPE button to return to the home screen.
- **Info Screens:** To navigate to the info screens press either the UP or DOWN button until  is displayed on the screen. Select this option by pressing the ENTER button. Switch between the various info screens using the UP or DOWN buttons. Press the ESCAPE button to return to the home screen.
- **Alarm Menu:** To navigate to the alarm screens press the ALARM button. Switch between alarms by pressing either the UP or DOWN buttons. Press the ESCAPE button to return to the home screen.

## c.pCO Carel Mini Alarms

Alarm Code	Displayed Text	Description	Type		Response
AL22	Gly. Pres. Prb Ain Err	Glycol pressure sensor failure	Counter	3x/10Sec	Check for loose connections at both sensor and controller. Replace sensor.
AL23	Gly Out T. Prb Ain Err	Glycol outlet temperature sensor failure	Counter	3x/10Sec	Check for loose connections at both sensor and controller. Replace sensor.
AL24	Tank Temp Prb Ain Err	Glycol reservoir temperature sensor failure	Counter	3x/10Sec	Check for loose connections at both sensor and controller. Replace sensor.
AL25	No flow detected	Glycol flow not detected	Manual		Verify proper glycol mixture and reservoir level. Check for tripped/off pump breaker. Confirm proper operation of flow sensor.
AL26	Hi Dchr9 P Circ A	High discharge pressure circuit A	Manual		Ensure condenser is clean, proper clearances are adhered to, no air recirculation, and proper fan operation.
AL27	Lo Suction P Circ A	Low suction pressure circuit A	Counter	3x/30min	Check glycol concentration and reservoir level. Check refrigerant charge/inspect for signs of refrigerant leaks.
AL28	Lo Suction P Circ B	Low suction pressure circuit B	Counter	3x/30min	Check glycol concentration and reservoir level. Check refrigerant charge/inspect for signs of refrigerant leaks.
AL29	Hi Dchr9 P Circ B	High discharge pressure circuit B	Manual		Ensure condenser is clean, proper clearances are adhered to, no air recirculation, and proper fan operation.
AL30	Hi Chill Water Temp	Glycol over temperature	Auto		Ensure that chiller is not overloaded and that no other alarms are present.
AL39	Chillr Pmp Maint. Sched	Scheduled chiller pump maintenance recommended	Manual		Confirm that the chiller pump is operating properly, check amperage, inspect/replace contactor, check flow sensor for proper operation. Schedule technician to perform full chiller preventive maintenance.
AL40	Comp1Circ1 Maint. Sched	Scheduled compressor A maintenance recommended	Manual		Confirm that the compressor A is operating properly, clean condenser, inspect/replace contactor, check amperage of fans and compressor. Schedule technician to perform full compressor preventive maintenance.
AL42	Proc. Pmp Maint. Sched	Scheduled process pump maintenance recommended	Manual		Confirm that the process pump is operating properly, check amperage, inspect/replace contactor, confirm proper calibration of glycol pressure transducer. Schedule technician to perform full chiller preventive maintenance.
AL43	Low level Sensor	Reservoir level too low	Manual		Check reservoir level and glycol concentration, correct as necessary. Calibrate level sensor.
AL44	Anti-freeze Alarm	Glycol temperature too low	Manual		Ensure that glycol temperature setpoint is in the allowed temperature range of the chiller. Check for failed liquid line solenoid valves and welded compressor contactors. Extremely cold weather may also cause this alarm if there is very low load against the chiller.
AL45	Comp1Circ2 Maint. Sched	Scheduled compressor B maintenance recommended	Manual		Confirm that the compressor B is operating properly, clean condenser, inspect/replace contactor, check amperage of fans and compressor. Schedule technician to perform full compressor preventive maintenance.
AL47	Phase Monitor	Voltage high, low, or imbalanced	Auto		Check incoming voltage for proper leg-to-leg and leg-to-ground voltage both with chiller off and with chiller running.
AL50	Process Pmp Off Hi Temp	Glycol temperature too high	Auto		Ensure that chiller is not overloaded and that no other alarms are present.



# 10 Easy Steps to Start-up Your New G&D Chiller

**Standard Chillers:** GD-1.5H, 2H, 3H, 5H, 7H, 10H, 13.5H, 5x5H, 7x7H

**Scroll Chillers:** GD-7.5T-1HA, 10T-1HA, 15T-2HA

Please view install videos online at [www.gdchillers.com/installation-videos](http://www.gdchillers.com/installation-videos)

1. **Your chiller includes one (1) free year of Tera service for remote control and monitoring.** Internet access is needed. Run an ethernet cable from facility LAN router to electrical enclosure of chiller before proceeding.
2. Chiller must be positioned **with at least 24-30 inches of clearance on air intake side** (opposite louvered access panels) and **open to free air on exhaust side** (louvered panel side) with no obstructions. Adequate airflow is critical. Refer to CHILLER CLEARANCE REQUIREMENTS for more details. Securely anchor chiller to pad.
3. Install Wye-strainer (required) one size larger than mainline and purge valve on return line at chiller.
4. With the door switch in the OFF position, ensure all breakers are in the ON position. **The chiller must then be supplied with power for at least 4 hours. Verify there is a visible oil level in the compressor sight glass before proceeding.**
5. Flush all piping lines with water, then fill reservoir and piping with a 35% glycol to water mixture. **All compressor breakers must remain OFF during this step:**
  - a. Open supply valve, close return valve, and open purge valve on return line. **Ensure all glycol pump isolation valves are open.**
  - b. Fill reservoir with water. Turn the door switch to RUN and **verify correct pump rotation.**
  - c. Flush facility piping loop. Add water while flushing system (keep chiller reservoir topped-up). Once all debris has been flushed out, remove as much water from system as possible.
  - d. Open return valve and close purge valve on return line.
  - e. Fill reservoir/piping loop with 35% propylene glycol mixture. **Inhibited glycol is required** to prevent rust and corrosion in the piping system.
6. Temporarily close supply valve and **confirm glycol pressure is at 20 PSI.** Open supply valve and circulate glycol through entire piping loop for at least 30 minutes. Re-verify glycol mixture using a refractometer. The glycol mixture MUST be 35 to 40 %. Correct as needed before proceeding.
7. Turn the door switch back OFF and the compressor breaker(s) back ON. **Re-verify oil level in compressor sight glass before proceeding.**
8. **Open all service valves in chiller marked with tags.** Remove black plastic cap, use wrench on squared-off end of valve stem that protrudes furthest, and rotate until valve is fully open. See demonstration video on website or contact Tech Support for more details: 800-555-0973
9. Turn door switch to the RUN position. Scroll chiller models only: **Verify correct scroll compressor rotation.** When compressor turns on, refrigerant suction pressure should decrease and discharge pressure should increase.
10. Press arrow button until you see "Set" in the bottom right corner of the Mini Carel Display.
  - a. Press enter button twice
  - b. Use arrows to adjust set point to desired temperature
  - c. Press enter button
  - d. Press escape button
  - e. Verify the correct temperature is now shown after "Set:" on the home screen

**PLEASE VISIT GDCHILLERS.COM TO VIEW OUR INSTALLATION VIDEOS & FAQs**

\*G&D Chillers welcomes any questions or concerns. We can be reached at **800-555-0973** or **541-345-3903**

# WARRANTY START-UP CHECKLIST

Jobsite:				Tech Company:
Chiller Model:				Technician:
Chiller Serial #:				Start-Up Date:
<b>FOLLOWING START-UP OF CHILLER, PLEASE SEND A COPY OF COMPLETED FORM TO G&amp;D TECH SUPPORT</b>				
CLEARANCE AROUND CHILLER <small>(Include picture if necessary)</small>	FRONT:	BACK:	LEFT:	RIGHT:
GLYCOL MIXTURE (35%)				
GLYCOL LEVEL <small>(Reservoir % Full)</small>				
PHASE/VOLTAGE				
VOLTAGE TO GROUND <small>(Note: High Leg to L2)</small>	L1:	L2:	L3:	
PUMP ROTATION				
GLYCOL PRESSURE				
	COMPRESSOR A	COMPRESSOR B	COMPRESSOR C	COMPRESSOR D
CRANK CASE HEATER ENERGIZED 4 HOURS				
COMPRESSOR OIL LEVEL				
MOTOR AMPS:	L1:	L1:	L1:	L1:
	L2:	L2:	L2:	L2:
	L3:	L3:	L3:	L3:
SUPERHEAT (°F)				
SUBCOOLING (°F)				
SUCTION PRESSURE @ 30 °F GLYCOL TEMP.				
DISCHARGE PRESSURE @ 30°F GLYCOL TEMP.				
	PUMP #1	PUMP #2	PUMP #3	PUMP #4
MOTOR AMPS:	L1:	L1:	L1:	L1:
	L2:	L2:	L2:	L2:
	L3:	L3:	L3:	L3:
	FAN MOTOR #1	FAN MOTOR #2	FAN MOTOR #3	FAN MOTOR #4
MOTOR AMPS:	L1:	L1:	L1:	L1:
	L2:	L2:	L2:	L2:
	L3:	L3:	L3:	L3:
	FAN MOTOR #5	FAN MOTOR #6	FAN MOTOR #7	FAN MOTOR #8
MOTOR AMPS:	L1:	L1:	L1:	L1:
	L2:	L2:	L2:	L2:
	L3:	L3:	L3:	L3:
AMBIENT TEMP @ STARTUP				

---

## SEQUENCE OF OPERATION

1. Chiller supply and return ball valves should always be open during normal operation.
2. Fluid bypass valve is factory set at 20 PSI valve design to allow minimum flow across heat exchanger when process is not calling for cooling.
3. Pump circulates at all times when panel door switch is in the Run position.
4. Compressor control circuit is energized when pump is running.
5. If pump fails or flow fails compressor control circuit will de-energize.
6. Programmable logic controller (PLC) energizes refrigerant line solenoid valves based on leaving fluid temperature.
7. Refrigerant pressure will build and close the low pressure control contact. Time delay will time out and energize compressor contactor. Compressor will start.
8. High pressure control will cut power to the compressor contact disabling the compressor if conditions cause high head pressure.
9. PLC will disable the control power to compressor if leaving glycol temperature falls below low temperature alarm set point.
10. Door switch will pump down compressor then turn off pump if switch is shut off during compressor run cycle.
11. Line voltage power should be left on to main terminal block at all times to keep crank case heater energized during extended off cycles.

## MAINTENANCE

**Please contact G&D Technical Support** if you have any questions or concerns regarding the performance, operation, or maintenance of your chiller: **800-555-0973**

- Refer to the separate G&D Chillers Preventive Maintenance Checklist for a complete list of maintenance tasks.
- Contract a licensed refrigeration technician to evaluate the chiller refrigeration circuit(s) regularly. These checkups should occur annually at a minimum. Every 3-6 months is recommended.

**The following tasks can be performed without the need for specialized equipment or training:**

- Check glycol level and glycol/water ratio monthly. Use glycol refractometer to confirm 35% glycol mixture.
- Check compressor oil in sight glass at bottom of compressor monthly. Inspect for any oil leaks.
- Verify pump function quarterly. Confirm glycol supply pressure. Listen for abnormal sounds from the pump.
- Verify thermostat function quarterly. Check displayed temperature against a thermometer measurement.
- Condenser should be cleaned at least every 6 months for proper operation and efficiency. Use a garden hose and spray at an angle downward.
- Lubricate fan motors every 12 months.
- See warning below. With the service disconnect in the OFF position (no power to the chiller), inspect control panel contacts on compressor and pump contactors. Contact an electrician if replacements are needed.

**WARNING: DO NOT ATTEMPT TO SERVICE ELECTRICAL COMPONENTS OR MAKE ADJUSTMENTS IN ELECTRICAL PANEL WITHOUT PROPER TRAINING AND IMPLEMENTATION OF LOCKOUT/TAG-OUT SAFETY PROCEDURES**

## TROUBLESHOOTING

	COMPLAINT	SYMPTOMS	CAUSE	SOLUTION
1	System short of capacity	Lower than expected suction and discharge pressures	Low refrigerant charge	Check for leaks, repair, and recharge. See item 5
		Higher than expected head pressure	Dirty condenser	Clean. See item 2
		Lower than normal suction pressure	Incorrect superheat - too high	Adjust superheat
2	Head pressure too high	Tripping high pressure switch, or compressor trips on internal overload	Dirty condenser	Clean condenser
			Condenser air short circuiting or location too hot	Remove obstructions, causes for air short circuiting
			Defective condenser fan motor or blade	Replace
			Air or non-condensable gases in the system	Purge the system
			Refrigerant over charge	Remove excess refrigerant
3	Head pressure too low	Sight glass with bubbles	Refrigerant leak or system undercharged	Check for leaks, repair and recharge
			Plugged filter drier	Replace filter drier
			Insufficient subcooling	Check condenser subcooling circuit
4	Suction pressure too high	Glycol temperature will not reach set point	Excessive load on the system	Check load and improve conditions
		Incorrect superheat	TEV stuck open due to ice or defect	Check, repair, or replace TEV
			Incorrect superheat setting of the expansion valve	Adjust superheat
5	Suction pressure too low	Sight glass with bubbles	See item 3	See item 3
		Warm suction line, signs of frost on the TEV and low system capacity	Plugged TEV or strainer	Clean TEV and strainer
		Compressor cycling due to low pressure cutout	See item 12	See item 12
6	Noisy compressor	Oil level below midpoint of the compressor sight glass during operation	Lack of oil	Avoid compressor short cycling or run compressor enough to return oil to crankcase, correct low load conditions. Add oil.
		Noticeable knock in compressor	Worn or scored bearings	Replace the compressor
		Frosted suction line and compressor shell	Liquid flood back	Check superheat and TEV operation

## TROUBLESHOOTING

	COMPLAINT	SYMPTOMS	CAUSE	SOLUTION
7	Compressor does not pump	Minimal difference in pressure between high side and low side of system, when compressor motor has power	Broken suction valves	Change compressor
			Broken discharge line	Change compressor
			Internal pressure safety valve stuck open	Check item 13 and change compressor if necessary
8	Compressor will not start	Blown fuse or open disconnect	Short circuit or other electrical failure	Check electrical circuit and wiring
		Tripped or damaged overload	Overheating or overcurrent	Wait 2-3 hours for overload to reset and check refrigerant charge or power quality to the compressor
		Open pressure switch	Loss of refrigerant charge	Check for leaks, repair and recharge
		Loose wires	Vibration, bad crimping or under-torque	Check terminals at compressor, contactor and wiring in general
		Motor seized	Low oil level or phase reversal	Check oil level. Restart 3-ph compressor by switching 2 phases; replace if it does not restart
9	Compressor starts but start relay does not drop out	High running current, overload trips	Incorrect wiring of start components	Check wiring
			Incorrect or defective start relay	Confirm operation, model and make
			Incorrect or defective start capacitor	Confirm integrity and specs, check if fitted with discharge resistance
			Incorrect or defective run capacitor	Confirm integrity and specs
			Low voltage	Fix undervoltage protection
10	Compressor runs but cuts out on overload	Internal overload tripping  MUST WAIT 2-3 HOURS TO CHECK IF IT WILL RESET	Excessive head pressure due to dirty condenser or lack of condenser air or water flow	See item 2 above
			Low voltage or unbalanced	Fix undervoltage protection
			Faulty electrical connections causing single phasing or high current surges	Remake the connections
			Sticking start relay on single phase machines leaving start cap on circuit	Replace relay and ensure start cap is fitted with a discharge resistance

**TROUBLESHOOTING**

	<b>COMPLAINT</b>	<b>SYMPTOMS</b>	<b>CAUSE</b>	<b>SOLUTION</b>
11	Compressor starts but cycles on overload	Internal overload tripping  MUST WAIT 2-3 HOURS TO CHECK IF IT WILL RESET	Loss of charge causing insufficient motor cooling	Check for leaks, repair, and recharge
			Voltage is low or unbalanced if 3-ph	1-ph fix undervoltage protection, 3-ph correct phase imbalance
			Defective or wrong run cap	Check and replace
			Defective overload	Check current and replace compressor if necessary
12	Compressor runs but cycles on...	...overload	See items 10 and 11	See items 10 and 11
		...thermostat	Thermostat differential set too close	Check and widen differential
		...high pressure switch	See item 2	See item 2
		---low pressure switch	See items 3 and 5	See items 3 and 5
		Leaking liquid line solenoid valve (LLSV)	Replace LLSV	
		Leaking compressor valves	Replace compressor	
		Undercharged system	Check for leaks and recharge	
13	Internal pressure safety valve (IPRV) opens	Refrigerant trapped in compressor	Discharge service valve closed	Open discharge service valve
		Discharge pressure exceeds high pressure setting	High pressure switch malfunction	Reset or replace high pressure switch, see item 2
14	Will not start, trips on overload	Start relay damaged or burned out	Too low or too high line voltage	Correct and replace relay
			Incorrect wiring	Replace relay and rewire per compressor wiring diagram
			Excessive cycling	See item 11
15	Start Capacitor damaged or burned out	Single phase compressor will not start	Incorrect relay	Check w/ manufacturer and replace
			Too high or too low line voltage	Correct and replace
			Excessive short cycling	See item 11
			Incorrect wiring	Replace and rewire per compressor manufacturer wiring diagram
			Wrong start or run capacitor	Correct and replace



## PROPYLENE GLYCOL CHART

Percent by volume	Percent by weight	Freezing point °F	Degrees Brix °Bx
32.4	33.0	5.3	24.4
32.8	33.4	4.8	24.8
33.1	33.7	4.4	25.0
33.5	34.0	3.9	25.3
34.0	34.6	3.1	25.8
34.4	35.0	2.4	26.1
<b>35.0</b>	<b>35.6</b>	<b>1.5</b>	<b>26.5</b>
35.5	36.0	0.8	26.9
36.5	37.0	-0.8	27.5
37.5	38.0	-2.4	28.0
38.2	38.7	-3.7	28.4
38.5	39.0	-4.2	28.5

*For most applications, G&D Chillers recommends no less than and no more than 35% propylene mixture.*

*The volume percentages in this table apply for pure propylene glycol; however, inhibited propylene glycol solutions will require higher volume percentages. For example, a solution of 36.6%vol DOWFROST contains 35%vol pure propylene glycol. Use the refractometer included with the chiller to verify proper glycol concentration.*

**\*\*TO ACTIVATE WARRANTY, FILL OUT STARTUP CHECKLIST AND RETURN WITHIN 30 DAYS\*\***

## WARRANTY STATEMENT

### TWO-YEAR LIMITED WARRANTY ON PARTS, ONE-YEAR LIMITED WARRANTY ON LABOR

G&D CHILLERS, INC. provides a limited warranty to the original purchaser of new products against defects in materials and workmanship for a period of one (1) year of normal commercial usage. For the subsequent period of one (1) year of normal commercial usage immediately following the first, this warranty is extended to cover parts only. This warranty is not transferable. If a product covered by this warranty is determined to be defective within the applicable warranty periods, G&D CHILLERS, INC. will, unless otherwise required by applicable law, either repair or exchange the product at its sole option and discretion.

### EXCHANGE

Should G&D CHILLERS, INC. elect to exchange a product due to a covered defect during the warranty period, the replacement unit may, at G&D CHILLERS, INC.'s sole option and discretion, be new or one which has been recertified, reconditioned, refurbished or otherwise remanufactured from new or used parts and is functionally equivalent to the original product.

### REPAIR: PARTS AND LABOR

There will be no charge for parts or labor to repair a product for a covered defect during the applicable warranty periods. Replacement parts may, at G&D CHILLERS, INC.'s sole option and discretion, be new, used, reconditioned, refurbished or otherwise remanufactured or recertified as functionally equivalent replacement parts.

### REMAINING WARRANTY

Repaired or exchanged products are warranted for the remaining portion of the product's original warranty or for ninety (90) days from warranty service or exchange, whichever is longer. Any upgrade to the original product will be covered only for the duration of the original warranty period.

### EXCLUSIONS

This warranty does not cover, for example: abuse, accident, acts of God, consumable parts such as batteries, cosmetic damage (e.g. scratches, dents, cracks), damage caused by use with non-G&D CHILLERS, INC. products (e.g. accessories, housing, parts, etc.), damages from shipping, improper installation or operation, improper voltage supply or power surges, lack of reasonable use, misuse, modifications or alterations, normal wear and tear or aging, as well as installation and set-up issues or any tampering or repairs attempted by anyone other than by a G&D CHILLERS, INC. authorized repair technician. This limited warranty does not cover products sold "AS IS", "FACTORY RECERTIFIED", or by a non-authorized reseller.

### ASSIGNMENT OF WARRANTIES

G&D CHILLERS, INC. assigns to product purchasers any and all warranties of manufacturers and suppliers of component parts that are assignable, but G&D CHILLERS, INC. makes no representations as to the effectiveness or extent of such warranties and assumes no liability or responsibility for any third-party manufacturer or supplier's products or component parts that are sold by G&D CHILLERS, INC.

### DISCLAIMER OF WARRANTY

THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE LISTED OR DESCRIBED ABOVE. EXCEPT AS SPECIFIED IN THIS WARRANTY SECTION, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS, AND WARRANTIES INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING FROM A COURSE OF DEALING, LAW, USAGE, OR TRADE PRACTICE, ARE HEREBY EXCLUDED TO THE EXTENT ALLOWED BY APPLICABLE LAW AND ARE EXPRESSLY DISCLAIMED BY G&D CHILLERS, INC.

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TO THE EXTENT THAT ANY OF THE SAME CANNOT BE EXCLUDED, SUCH IMPLIED CONDITION, REPRESENTATION AND/OR WARRANTY IS LIMITED IN DURATION TO THE EXPRESS WARRANTY PERIOD REFERRED TO IN THE "LIMITED WARRANTY" SECTION ABOVE. BECAUSE SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, THE ABOVE LIMITATION MAY NOT APPLY IN SUCH STATES. THIS WARRANTY GIVES THE CUSTOMER SPECIFIC LEGAL RIGHTS, AND THE CUSTOMER MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION.

### **DISCLAIMER OF LIABILITY**

G&D CHILLERS, INC.'S TOTAL LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES RESULTING FROM ANY CAUSE WHATSOEVER INCLUDING G&D CHILLERS, INC.'S NEGLIGENCE, ALLEGED DAMAGE, OR DEFECTIVE GOODS, WHETHER SUCH DEFECTS ARE DISCOVERABLE OR LATENT, SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE PRODUCT. G&D CHILLERS, INC. SHALL NOT BE RESPONSIBLE FOR LOSS OF USE, WORK STOPPAGE, FAILURE OF OTHER EQUIPMENT TO WHICH THE PRODUCT IS CONNECTED, COMMERCIAL LOSS, LOST REVENUE OR LOST PROFITS, LOSS OF GOODWILL, LOSS OF REPUTATION, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. NO ORAL OR WRITTEN REPRESENTATIONS MADE BY G&D CHILLERS, INC. SHALL CREATE ANY ADDITIONAL WARRANTY OBLIGATIONS, INCREASE THE SCOPE, OR OTHERWISE MODIFY IN ANY MANNER THE TERMS OF THIS LIMITED WARRANTY. TO THE EXTENT PERMITTED BY APPLICABLE LAW, G&D CHILLERS, INC. DOES NOT WARRANT THAT THE OPERATION OF ANY PRODUCTS COVERED UNDER THIS LIMITED WARRANTY WILL MEET YOUR REQUIREMENTS, OR THIRD PARTY SERVICES, BE UNINTERRUPTED, ERROR-FREE, OR THAT DEFECTS IN THE PRODUCTS WILL BE CORRECTED. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE. THIS LIMITED WARRANTY IS SUBJECT TO CHANGE WITHOUT NOTICE. CHECK [www.gdchillers.com](http://www.gdchillers.com) FOR THE MOST CURRENT VERSION OF THIS WARRANTY.

### **SEVERABILITY**

In the event that any term or provision contained in this limited warranty is found to be invalid, illegal or unenforceable by a court of competent jurisdiction, then such provision shall be deemed modified to the extent necessary to make such provision enforceable by such court, taking into account the intent of the parties. The invalidity in whole or in part of any portion of this limited warranty shall not impair or affect the validity or enforceability of the remaining provisions of this limited warranty.

### **HOW TO OBTAIN WARRANTY SERVICE (PRE-AUTHORIZATION REQUIRED)**

To obtain warranty service, contact G&D CHILLERS, INC.:

1. Email: [info@gdchillers.com](mailto:info@gdchillers.com)
2. Phone: (800) 555-0973 from 8:00AM to 5:00PM Monday through Friday Pacific Time.
3. By mail: G&D Chillers, Inc.  
130 E. 1st Ave.  
Junction City, OR 97448



G&D Chillers welcomes any and all questions or concerns  
We can be reached at 800-555-0973 or 541-345-3903