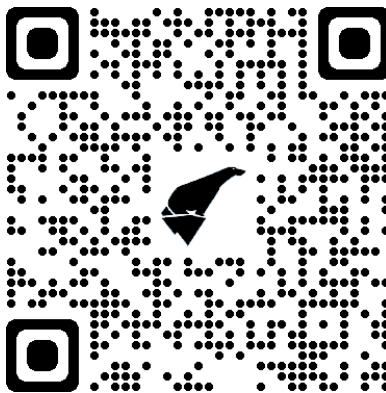




CHILLER INSTALLATION GUIDE & USER MANUAL

- GD-20H & GD-27H CHILLERS -



GD-20H & GD-27H CHILLER MANUAL
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CONTACT INFORMATION & AFTERHOURS SUPPORT

CONTACT INFORMATION

G&D Chillers, Inc.
760 Bailey Hill Rd.
Eugene, Oregon 97402
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/

gdchillers.com/installation-videos/how-to-install-a-chiller

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. Design test pressure 150 PSIG low side, 300 high side.

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 electronic expansion valve.

COMPRESSOR

Hermetically-sealed 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 or flanges 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 electronic 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

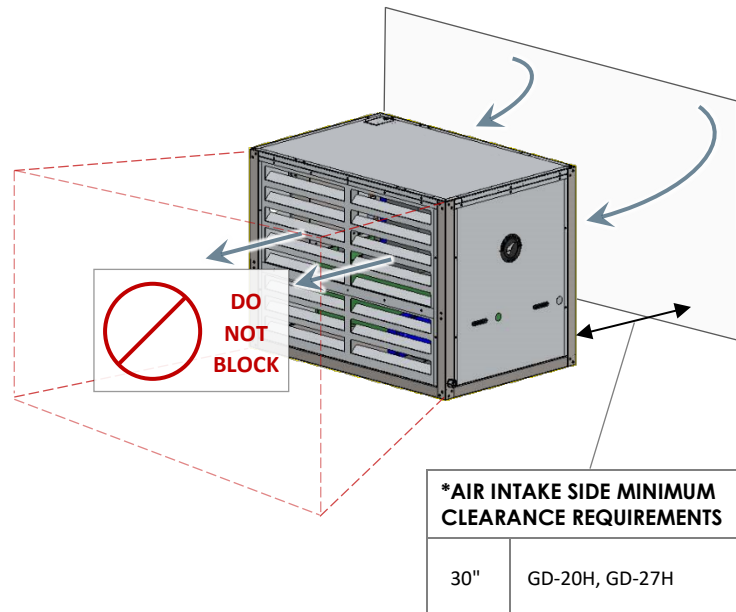
LOCATION

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
- Size strainer one pipe size larger than mainline piping size

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

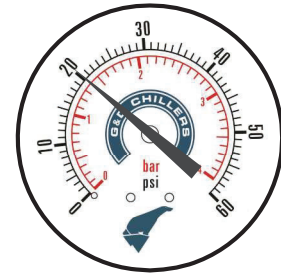
ADJUSTING GLYCOL SUPPLY PRESSURE

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

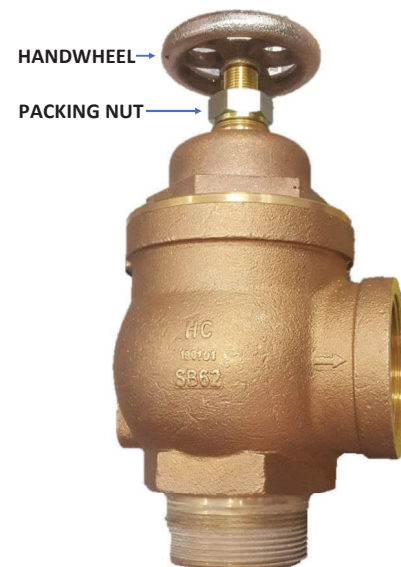
To adjust the pressure setting using the bypass valve:

- 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 rating. If your process pump is equipped with a VFD, set the control pressure set point to 100 psi then adjust the bypass valve to a pressure that is lower than the maximum rated pressure of your process loop. After adjustment is complete, reset the control pressure setpoint to your desired operating pressure.

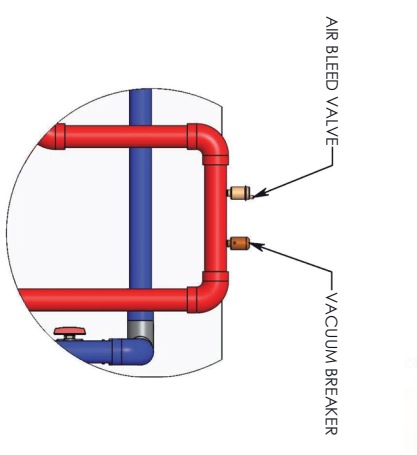
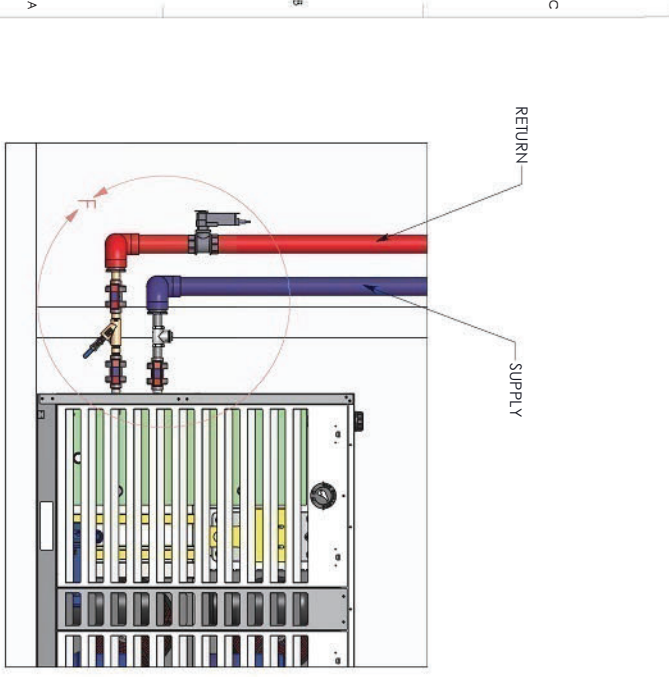
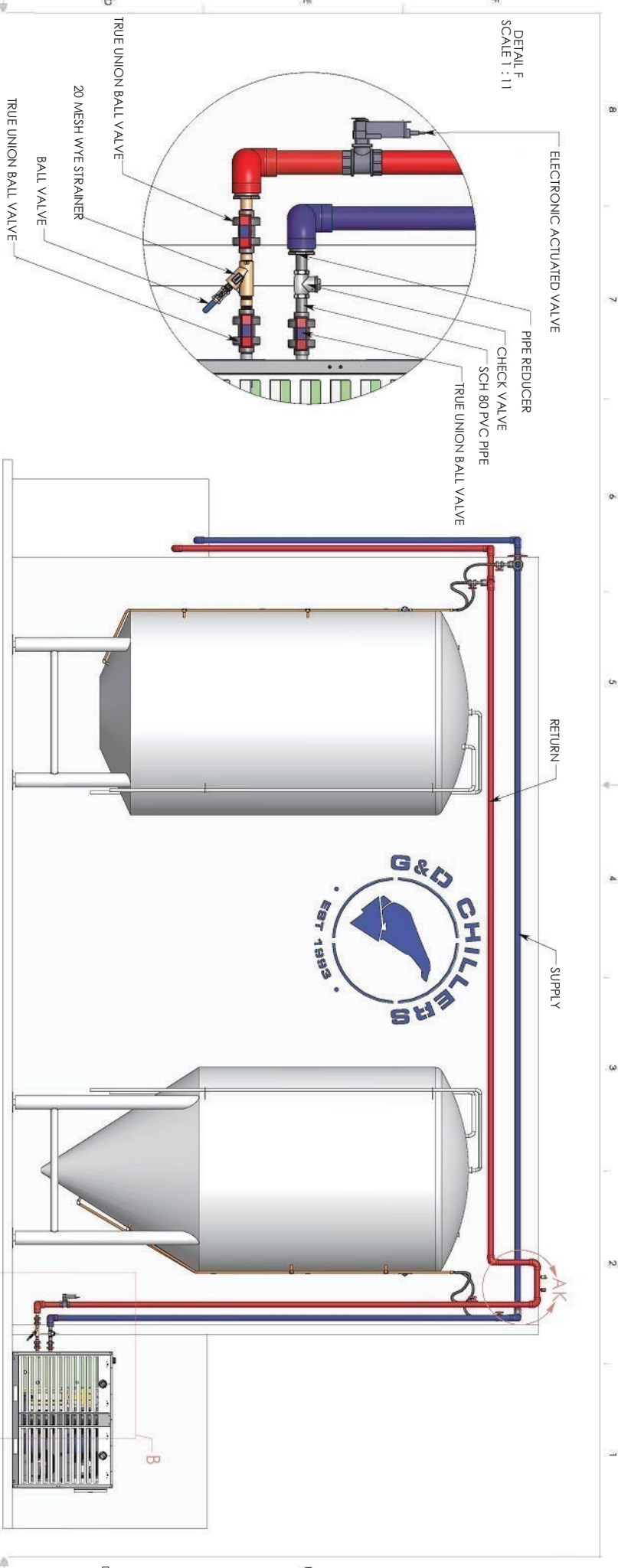


PRESSURE GAUGE

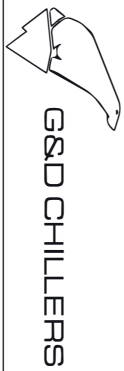


FLUID BYPASS VALVE

WARNING: VERIFY TANK JACKET RATINGS BEFORE PRESSURIZING PIPING



GENERAL PIPING LAYOUT

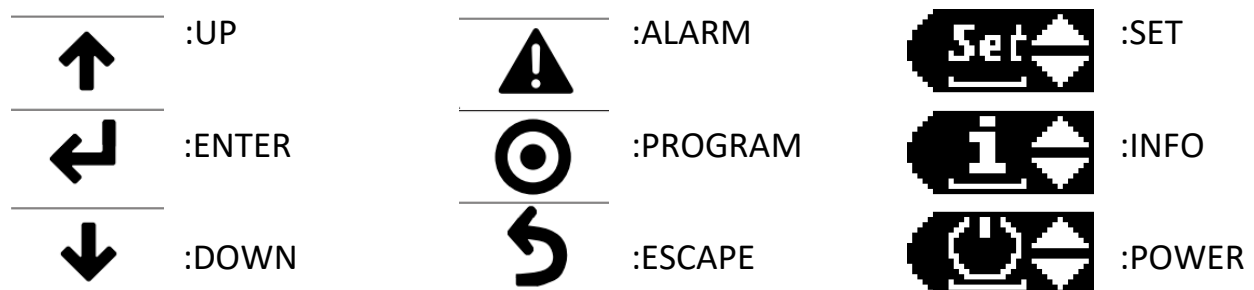


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CONTROLLER AND NAVIGATION



Set Screens:

1. Glycol set point: Ensure you see SET in the display screen.
 - a. You can change options from SET, INFO and POWER by using the UP and DOWN buttons.
 - b. Press ENTER to navigate to the glycol temperature set screen.
 - c. Press ENTER again to navigate to the numerical readout. Use UP and DOWN buttons to adjust to desired setpoint.
2. Pump pressure set point: Ensure you see SET in the display screen.
 - a. Press DOWN until you see pump pressure set point.
 - b. Press ENTER button to navigate to numerical readout and adjust with UP and DOWN to set pump pressure. Please note that pressure setpoints are often preset.

Info screens:

1. Ensure you see INFO in the bottom right portion of the display screen.
2. Press ENTER to navigate to the first of nine information screens.
3. Use DOWN to scroll through the information screens.

Alarms:

1. Press ALARM.
 2. Navigate with UP and DOWN to see current alarms.
 - a. To clear the alarms, press UP or DOWN through alarm screen until you see a prompt saying "press Alarm button for 3 seconds."
-

Carel Alarms

CODE	DESCRIPTION	RESET	ACTION	DELAY
AL004	Unit – User inlet water temperature probe	A	Switch the unit off	10s
AL005	Unit – User outlet water temperature probe	A	Switch the unit off	10s
AL008	Unit – User pump 1 overload	M	None	No
AL009	Unit – User pump 2 overload	M	None	No
AL018	Unit – User 1 pump maintenance	A	None	Parameter A00
AL019	Unit – User 2 pump maintenance	A	None	Parameter A02
AL022	Unit – High chilled water temperature	A	None	Parameter A021/A022
AL100	Circuit 1 – Alarm discharge probe pressure	A	Stop circuit 1	10s
AL101	Circuit 1 – Alarm suction probe pressure	A	Stop circuit 1	10s
AL102	Circuit 1 – Alarm discharge probe temperature	A	Stop circuit 1	10s
AL103	Circuit 1 – Alarm suction probe temperature	A	Stop circuit 1	10s
AL105	Circuit 1 Envelope – High compression ratio	A	Stop circuit 1	Parameter Cb17
AL106	Circuit 1 Envelope – High discharge pressure	M	Stop circuit 1	Parameter Cb17
AL108	Circuit 1 Envelope – High suction pressure	A	Stop circuit 1	Parameter Cb17
AL109	Circuit 1 Envelope – Low compression ratio	A	Stop circuit 1	Parameter Cb17
AL110	Circuit 1 Envelope – Low differential pressure	A	Stop circuit 1	Parameter Cb18
AL111	Circuit 1 Envelope – Low discharge pressure	A	Stop circuit 1	Parameter Cb17
AL112	Circuit 1 Envelope – Low suction pressure	A	Stop circuit 1	Parameter Cb17
AL113	Circuit 1 Envelope – High discharge temperature	A	Stop circuit 1	Parameter Cb17
AL123	Circuit 1 EVD – Offline	A	Stop circuit 1	No
AL165	Circuit 1 – Alarm freeze evaporation temperature	M	Stop circuit 1	Parameter A041
AL166	Circuit 1 – Compressor 1 maintenance	A	None	Parameter Ca00
AL167	Circuit 1 – Compressor 2 maintenance	A	None	Parameter Ca02
AL173	Circuit 1 – High pressure alarm by pressure switch	M	Stop circuit 1	No
AL174	Circuit 1 – Low pressure alarm by pressure switch	R	Stop circuit 1	Parameter Ca19/Ca20
AL175	Circuit 1 – Overload compressor 1	M	Stop compr.1 Circ.1	No

AL176	Circuit 1 – Overload compressor 2	M	Stop compr.2 Circ.1	No
AL178	Circuit 1 – Pump-Down end for maximum time	A	Stop circuit 1	Parameter B035
AL200	Circuit 2 – Alarm discharge probe pressure	A	Stop circuit 2	10s
AL201	Circuit 2 – Alarm suction probe pressure	A	Stop circuit 2	10s
AL202	Circuit 2 – Alarm discharge probe temperature	A	Stop circuit 2	10s
AL203	Circuit 2 – Alarm suction probe temperature	A	Stop circuit 2	10s
AL205	Circuit 2 Envelope – High compression ratio	A	Stop circuit 2	Parameter Cb17
AL206	Circuit 2 Envelope – High discharge pressure	M	Stop circuit 2	Parameter Cb17
AL208	Circuit 2 Envelope – High suction pressure	A	Stop circuit 2	Parameter Cb17
AL209	Circuit 2 Envelope – Low compression ratio	A	Stop circuit 2	Parameter Cb17
AL210	Circuit 2 Envelope – Low differential pressure	A	Stop circuit 2	Parameter Cb18
AL211	Circuit 2 Envelope – Low discharge pressure	A	Stop circuit 2	Parameter Cb17
AL212	Circuit 2 Envelope – Low suction pressure	A	Stop circuit 2	Parameter Cb17
AL213	Circuit 2 Envelope – High discharge temperature	A	Stop circuit 2	Parameter Cb17
AL223	Circuit 2 EVD – Offline	A	Stop circuit 2	No
AL265	Circuit 2 – Alarm freeze evaporation temperature	M	Stop circuit 2	Parameter A041
AL266	Circuit 2 – Compressor 1 maintenance	A	None	Parameter Ca00
AL267	Circuit 2 – Compressor 2 maintenance	A	None	Parameter Ca02
AL273	Circuit 2 – High pressure alarm by pressure switch	M	Stop circuit 2	No
AL274	Circuit 2 – Low pressure alarm by pressure switch	R	Stop circuit 2	Parameter Ca19/Ca20
AL275	Circuit 2 – Overload compressor 1	M	Stop compr.1 Circ.2	No
AL276	Circuit 2 – Overload compressor 2	M	Stop compr.2 Circ.2	No
AL278	Circuit 2 – Pump-Down end for maximum time	A	Stop circuit 2	Parameter B035

Reset:

A: automatic reset

M: manual reset

R: Automatic reset with retries



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

Please view install videos online at www.gdchillers.com/installation-videos


Chiller Models 20H, 27H, 20H-MS, & 27H-MS

1. Chiller must be positioned with **at least 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 clearance for airflow must be provided for the chiller to operate reliably. Refer to the figure **CHILLER CLEARANCE REQUIREMENTS** for more details.
2. Install Y-strainer (required) or purge valve on return line at chiller.
3. With the door switches 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 compressor sight glasses before proceeding.**
4. Flush all piping lines:
 - a. Ensure chiller start/stop door switch remains in the OFF position.
 - b. Turn control power door switch ON, then process pump door switch ON and **verify correct pump rotation**. Proceed with flushing the system. Once all debris has been flushed from the system, remove as much water from system as possible.
5. Fill reservoir/ loop with 35% propylene glycol. Temporarily close the supply valve. **Confirm glycol pressure shows 20 PSI** using both the Carel controller and the manual pressure gauge located on the process pump discharge line.
6. Open the supply valve, and circulate glycol through the entire 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. Re-verify oil level in compressor sight glasses before proceeding. Do not proceed unless there is a visible oil level in the compressor sight glass.**
7. Open all service valves in chiller marked with tags. **To prevent irreversible damage, bottom valve on compressor must be cracked back in ½ to 1 full turn after being fully opened.** Contact us for more details as needed: 800-555-0973.
8. Turn chiller start/stop door switch to the RUN position. Compressors should start to run. Fans to follow shortly.
9. Adjusting set points on Carel controller: Press the up/down arrows until SET displays in bottom right corner. Press enter and change the temperature to desired set point. If process pump is equipped with VFD, pressure settings for the VFD can be adjusted here as well.

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

*G&D Chillers welcomes any and all 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:
FOLLOWING START-UP OF CHILLER, PLEASE SEND A COPY OF COMPELTED FORM TO G&D TECH SUPPORT				
CLEARANCE AROUND CHILLER (Include picture if necessary)	FRONT:	BACK:	LEFT:	RIGHT:
GLYCOL MIXTURE (35%)				
GLYCOL LEVEL (Reservoir % Full)				
PHASE/VOLTAGE				
VOLTAGE TO GROUND (Note: High Leg to L2)	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 Electronic Expansion Valve (EEV) based on leaving fluid temperature.
7. The controller will energize the compressor starter while monitoring system pressures and flow.
8. If all parameters remain in a safe range, the compressor will continue to run until the thermostatic logic detects that it is no longer needed.
9. The EEV will close, the compressor will pump down and stop.
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. If in a dirty environment, cleaning may be needed more often.
- 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

	COMPLAINT	SYMPTOMS	CAUSE	SOLUTION
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

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
35.0	35.6	1.5	26.5
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.

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 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
2. Phone: (800) 555-0973 from 9:00AM to 5:00PM Monday through Friday Pacific Time.
3. By mail: G&D Chillers, Inc.
760 Bailey Hill Rd
Eugene, OR 97402



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