

Installation and Commissioning of Control Panel

1. **Product Introduction:**

Blue Cold control system is used to control refrigeration equipment installed in cold room and cold storage which can have temperature range from 20° C to -45° C vary according to product and application.

2. **Safety Instructions:**



A requirement of fault-free operation and fulfillment of any rights to claim under warranty is that these instructions and notes are followed. Therefore read these instructions before working with the installation.



These instructions also contain important information concerning service. They are therefore to be kept near the installation. If certain sections of operating instruction are not clear or missing in your opinion, then report this immediately to Blue Cold Refrigeration. Damage due to false interpretation or false acceptance of operating instruction does not fall under the warranty.



If the installation not being installed immediately, store in a dry, dust-free and almost vibration-free room.



These operating instructions contain fundamental information and precautionary notes. Please read the manual thoroughly prior to installation of unit, electrical connection and commissioning. It's essential to read all other addition operation manuals.



In order to prevent damage to the equipment or personnel, only authorized trained staff who are specialists for electronics is allowed to operate the system. The relevant local safety regulations as well as special conditions of authorities in charge are to be respected.



In order to spot the possible malfunction of the system in a quick and reliable way, the system always has to be under supervision while in operation.



Always turn off main switch (the power) for repair or maintenance work and out or secure the system against unintentional start up.



Always close ball valves and turn off the pressure before repair and maintenance work.



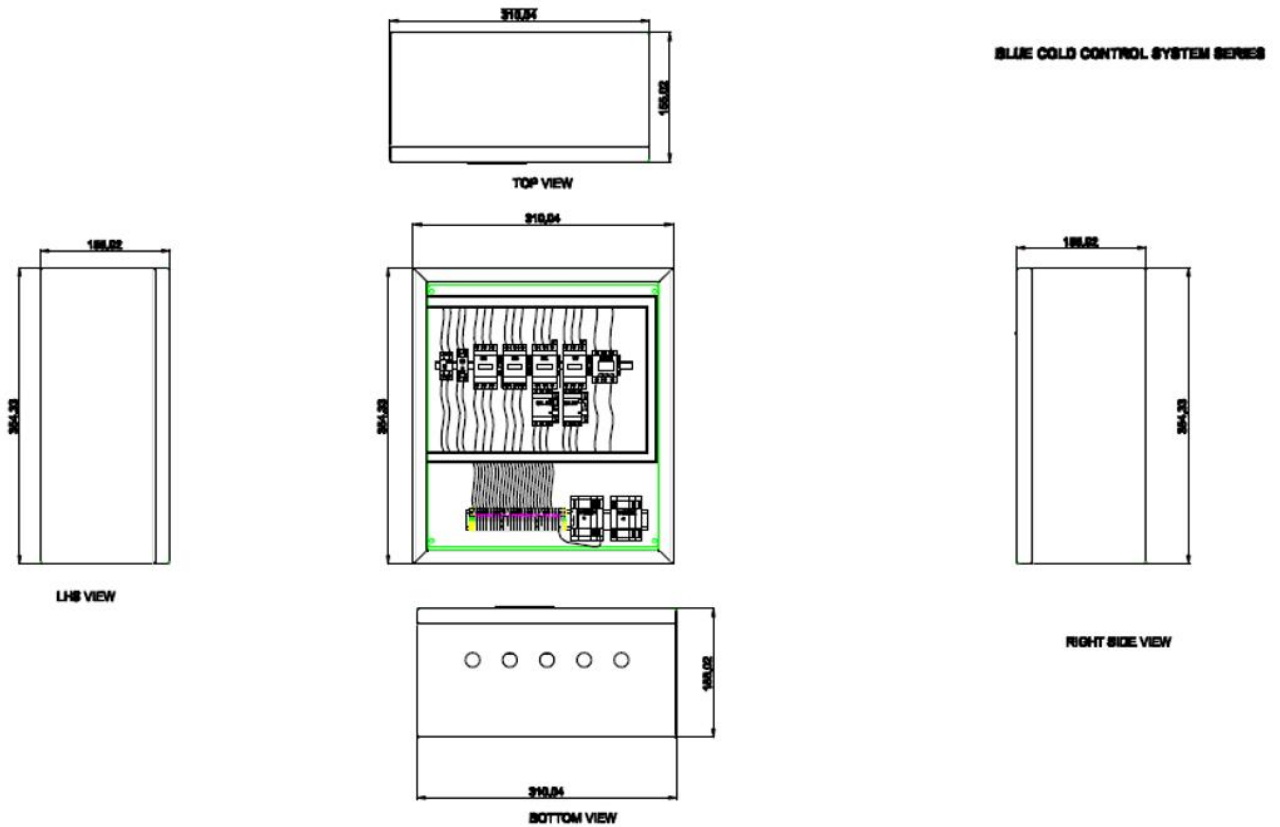
Check before putting installation into operation if all driven items have covers. Also check if all safety measures are operational.

Never bypass safety installations, the function of the safety installations always has to be guaranteed.



In case of disturbances or damages, shutdown the installation immediately in order to avoid further damage. When the installation without our authorization is continued to operate, any further damage is excluded from our responsibility.

3. Drawing & Part List:



<u>S. No.</u>	<u>Description</u>
1	MCB
2	Contactor (K1)
3	Contactor (K2)
4	Contactor (K3)
5	Contactor (K4)
6	LVM (Low Voltage Monitor)
7	Thermal O/L Relay for Compressor (For K1 & K2)
8	Controller
9	Casing / Encloser

4. Mounting Instructions:

The Control Unit main board is supplied screws and spring washers for mounting into the Control Unit box. The earth lug from the wiring loom must be earthed to ensure the effectiveness of the surge suppression board.

Mount the Extinguishing Control Unit Main Board as follows:

- Align the main board chassis mounting slots with the lower studs of the Unitbox.
- Insert the main board into the Unit box so that the main board chassis rests on the studs.
- Insert the mounting screws, spring washers and the free earth lug of the wiring loom, and tighten screws.

5. Main Characteristics:

- Cold room temperature displaying and regulation with decimal point
- Evaporator temperature displaying from parameter
- Plant control activation/deactivation
- Plant alarms signaling (probe error, minimum and maximum temperature alarm, compressor protection)
- LED indicators and large display illustrate system status.
- User-friendly keypad.
- Evaporator fans management
- Manual and automatic defrost (static, through heaters)
- Cold room light activation through key on the panel or through door-switch
- Direct control of compressor, defrosting elements, evaporator fans, room light with outputs directly connectable to the various units.

6. Receiving, Unpacking and Checking Procedure:

- Remove the transport casing.
- Visually inspect the terminal.
- Check that all items are included in accordance with the delivery documents.
- Check for transport damages.

7. Transport and Storage:

Every panel is packed to be delivered without damages in normal transport conditions. In case of following transport it must be verified that:

- No objects or free parts could be inside the panel.
- The door is correctly closed and locked.
- In case of not using the original package, protect the product to allow transport without any damages.
- Storage room must have an adequate temperature and low humidity value; then avoid contact between the electrical panel and aggressive contaminating substances that could prejudice functionality and electrical security.

8. Assembly & Installation:

OBJECTIVE- To lay down the procedure to specify the responsibilities of production department.

SCOPE- This SOP describes the functions and responsibilities of production department.

RESPONSIBILITY-

- Execution : Trained and authorized Technicians
- Checking : Production Manager

ACCOUNTABILITY- HOD Production / Assigned Designee.

PROCEDURE-

- Check the unit there is no scratch and damage
- Make sure that all the components as per in the documents
- Connect the main line to the control panel box as per given in the manual
- Check the supply voltage in the control panel
- Ensure, all the operations in the control panel working properly
- Finally connect the control panel to the Refrigeration system

9. Connection Details * :

For Single Winding Connection																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
R	Y	B	N	R	Y	B	N	L	N	Out	In	Out	In	14	11	P	N	Probe	Ground				
Compressor				Evaporator				Crankcase Heater		HP		LP		SEB2		Solenoid Valve		Room		Room		HP Trip Signal	Earth

For Single Winding with defrost Connection																											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
R	Y	B	N	R	Y	B	N	R	Y	B	N	L	N	Out	In	Out	In	14	11	P	N	Probe	Ground	Probe	Ground		
Compressor				Defrost				Evaporator				Crankcase Heater		HP		LP		SEB2		Solenoid Valve		Room		Evaporator		HP Trip Signal	Earth

For Part Winding Connection																									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
R	Y	B	R	Y	B	N	R	Y	B	N	L	N	Out	In	Out	In	14	11	P	N	Probe	Ground			
Part Winding 1 (Pw 1)			Part Winding 2 (Pw 2)																						
Compressor				Evaporator				Crankcase Heater		HP		LP		SEB2		Solenoid Valve		Room		HP Trip Signal		Earth			

For Part Winding with defrost Connection																															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
R	Y	B	R	Y	B	N	R	Y	B	N	R	Y	B	N	L	N	Out	In	Out	In	14	11	P	N	Probe	Ground	Probe	Ground			
Part Winding 1 (Pw 1)			Part Winding 2 (Pw 2)																												
Compressor				Defrost				Evaporator				Crankcase Heater		HP		LP		SEB2		Solenoid Valve		Room		Evaporator		HP Trip Signal	Earth				

For Part Winding with Oil Pressure Switch Connection																											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
R	Y	B	R	Y	B	N	R	Y	B	N	L	N	Out	In	Out	In	Out	In	14	11	P	N	Probe	Ground			
Part Winding 1 (Pw 1)			Part Winding 2 (Pw 2)																								
Compressor				Evaporator				Crankcase Heater		HP		LP		Oil Pressure Switch		SEB2		Solenoid Valve		Room		OPS Trip Signal		HP Trip Signal		Earth	

For Part Winding with Defrost & Oil Pressure Switch Connection																																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
R	Y	B	R	Y	B	N	R	Y	B	N	R	Y	B	N	L	N	Out	In	Out	In	Out	In	14	11	P	N	Probe	Ground	Probe	Ground					
Part Winding 1 (Pw 1)			Part Winding 2 (Pw 2)																																
Compressor				Defrost				Evaporator				Crankcase Heater		HP		LP		Oil Pressure Switch		SEB2		Solenoid Valve		Room		Evaporator		OPS Trip Signal	HP Trip Signal	Earth					

For Part Winding with Condenser & Oil Pressure Switch Connection																																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32		
R	Y	B	R	Y	B	N	R	Y	B	N	R	Y	B	N	L	N	Out	In	Out	In	Out	In	14	11	P	N	Probe	Ground					
Part Winding 1 (Pw 1)			Part Winding 2 (Pw 2)																														
Compressor				Condenser				Evaporator				Crankcase Heater		HP		LP		Oil Pressure Switch		SEB2		Solenoid Valve		Room		OPS Trip Signal		HP Trip Signal		Earth			

For Part Winding with Condenser, Defrost & Oil Pressure Switch Connection																																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38		
R	Y	B	R	Y	B	N	R	Y	B	N	R	Y	B	N	L	N	Out	In	Out	In	Out	In	14	11	P	N	Probe	Ground	Probe	Ground									
Part Winding 1 (Pw 1)			Part Winding 2 (Pw 2)																																				
Compressor				Condenser				Defrost				Evaporator				Crankcase Heater		HP		LP		Oil Pressure Switch		SEB2		Solenoid Valve		Room		Evaporator		OPS Trip Signal	HP Trip Signal	Earth					

***Subject to change according to customized requirement**

10. Operation:

- Ensure the incoming supply.
- Check the R, Y, B phase indication and check the voltage of each phase by using voltage selector switch.
- Switch on the main incomer and respective each motor of compressor incomers.
- Check the unit is running properly without any interruption
- Ensure that all the operation in Control Panel working correctly.

11. Electrical Wirings:

For the electrical wirings please refer to the wiring diagram and technical characteristics of the panel model to be installed.

- Panel power supply must be on a dedicated line, and must be placed a device suitable for protection against indirect contacts upstream the line(differential interruptor).
- Do not fit power supply wiring and signal wiring (probes/sensors and digital inputs) in the same race ways or ducts.
- Do not use multi-polar cables in which there are wires connected to inductive/power loads or signaling wires (e.g. probes/sensors and digital inputs).
- Minimize the length of connector wires so that wiring does not twist into a spiral shape as this could have negative effects on the electronics.
- When it is necessary to make a probe/sensor extension, the wires must have a cross-section of at least 1mm².
- All wiring must be of a cross-section suitable for relevant power levels. Insulation degree must be compatible with the applied voltages. Preferably use cables with insulator not propagating the flame and a low toxic smoke emission if interested by fire.

12. Verification Before Use:

After doing the wirings, please verify using the wiring diagram on the correct execution of the connections.

- Please check the correct screw clamping.
- Check, when possible, the correct functioning of the outside protection devices.
- Please correctly calibrate the motor circuit breaker (if present) dedicated to the compressor
- After powering the electrical panel, please check the correct current absorption on the loads, and after few hours of functioning check the good tightening of screws on terminal blocks (included power supply line connection).

13. Maintenance:

Before proceeding with maintenance operations please follow these security prescriptions:

- The electrical panel must be without voltage.
- Prevent the presence of unauthorized staff around the intervention area.
- Positioning of suitable notices to signal "Device under maintenance".
- Wear suitable and without free appendices work cloths (overalls, gloves, shoes).
- Remove if worn, every object which can get entangled in any part of the panel.
- Suitable tools for the maintenance operations must be at disposal.
- Tools must be correctly cleaned and greased.
- Necessary technical documentation to execute maintenance intervention must be at disposal (wiring diagrams, tables, drawings, etc....)
- At the end of the maintenance operations please remove all the residual materials and make a careful cleaning inside panel.

14. Trouble Shooting:

Before going for trouble shooting, make sure that system should be isolated from the operation.



WARNING

Dangerous voltage capable of causing shock is present in this system. Use extreme caution when handling, testing and adjusting. Only qualified personnel should service.

Note:

Replace failed MCB's, Indication lamps & Contactors etc... with exactly same specification / rating after fault analysis.

SL. NO.	POSSIBLE CAUSES	POSSIBLE ACTIONS
1	Frequent Tripping of MCB's & MCCB's	<ul style="list-style-type: none"> • Check clearance of MCB's & MCCB's • Check for any over loading • Check the MCB's & MCCB's operation without load (disconnect secondary wire) • Check Secondary control wiring
2	Indication lamps not working	<ul style="list-style-type: none"> • Check voltage at lamp • Check the voltage level as applicable
3	For VFD Over Temperature O/P Phase loss	<ul style="list-style-type: none"> • Check Air flow • Check Motor Connection

15. Warranty:

Products are covered by warranty period against all manufacturing defects as from the date indicated on the product ID code or from the date of product registration card, if present. Customers are entitled to have defective products repaired, spare parts and labor included. Transport expenses and risk shall be met entirely by the customer. Repairs carried out under warranty do not prolong or renew the warranty expiration date.

The Warranty does not cover:

- Damages resulting from tampering, impact or improper installation of humidifier and its accessories.
- Behavior inconsistent with Manufacturer's prescriptions and instructions.
- Damages caused by repairs made by unauthorized persons.
- Damages caused by natural phenomena as lightning, natural calamities, etc.
- Warranty cover may be refused if the device is modified or changed.
- Any consequential damages that may be caused due to failure.

16. Name Plate Marking:



17. Dismantling:

Please taken necessary safety precautions before starting disposal & dismantling like hand glouse, goggles, jacket & safety shoes etc.

- Kindly ensure incoming supply of panel should be OFF.
- Remove the filed cables & internal cables for using the suitable screw driver & spanner.
- Remove the componenets using suitable screw driver & spanner.
- Once all the componenets removed from the mounting plate, remove mounting plate using suitable spanner.
- Remove the hinge pin using hammer & flat rod.
- Remove the door using by hands

18. Disposal:

Do not dispose of electrical appliances/components as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection system available. If electrical appliances/components are disposed off in landfills or dumps, hazardous substances can leak into the groundwater and get into the food-chain, damaging your health and well being.

Once dismantling is done, Individual equipment's shall be packed and stored properly for disposal.

a) Electrical & Electronic Components:

Once the operation cycle of the component is completed, can be given to e-waste management system.

b) Metallic & Plastic Parts:

Can be taken for recycling once the operation lifetime of the device is completed.

Check list for Installation and Commissioning of Control Panel

1. Check visually inspect the terminal
2. Check that all items are included in accordance with the delivery documents
3. Check for transport damages
4. Check no objects or free parts could be inside the panel
5. Check the door is correctly closed and locked
6. check Storage room must have an adequate temperature and low humidity value
(If you want to store)
7. Check the contact between the electrical panel and aggressive contaminating
substances that could prejudice functionality and electrical security
8. Check the panel power supply must be on a dedicated line, and must be placed
a device suitable for protection against indirect contacts
9. Ensure that do not fit power supply wiring and signal wiring (probes/sensors
and digital inputs) in the same race ways or ducts
10. Ensure that do not use multi-polar cables in which there are wires connected to
inductive/power loads or signaling wires (e.g. probes/sensors and digital inputs)
11. Check to minimize the length of connect or wires so that wiring does not twist into
a spiral shape as this could have negative effects on the electronics
12. Make sure that when it is necessary to make a probe/sensor extension, the wires
must have a cross-section of at least 1mm²
13. Check the control panel fixed properly
14. Check the cold room temperature displaying correctly
15. Check the unit control activation/deactivation
16. Check the unit alarm working properly
17. Ensure the LED indicators and large display, illustrate system status.
18. Ensure that defrost operation condition
19. Make sure that cold room light ON/OFF correctly
20. Check the insulation of connecting wires

- 21. Ensure that during maintenance, electrical panel must be without power
- 22. Ensure that authorized staff only do the maintenance work
- 23. Check the tools must be correctly cleaned and greased during maintenance
- 24. Check clearance of MCB's & MCCB's
- 25. Check for any over loading
- 26. Check voltage at lamp
- 27. Make sure that all wiring is properly connected and routed away from heat sources, electromagnetic devices, and moving components
- 28. Check proper relay operation
- 29. Check the permanent labels affixed
- 30. Ensure that units/equipment accessible for maintenance/replacement
- 31. Check the fuses installed and labeling of wire done correctly
- 32. Make sure that all electrical connections are tight
- 33. Verify the proper grounding installed for components and unit
- 34. Check th unit placed in safe and operatable
- 35. Check the power supply flow into the circuit as per standard
- 36. Check the system running properly