MULTI-DECK MERCHANDISER

INSTALLATION & OPERATIONS MANUAL

PF-SC (R-290)

WARNING / FOR YOUR SAFETY
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WARNING
R290 flammable refrigerant in use. Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

Table of Contents

To ensure proper functionality and optimum performance, it is STRONGLY recommended that Hillphoenix specialty cases be installed/serviced by qualified technicians who have experience working with commercial refrigerated display merchandisers and storage cabinets. For a list of Hillphoenix-authorized installation/service contractors, please visit our website at www.hillphoenix.com.

Intertek Intertek 2017 DOE COMPLIANT

Hillphoenix
a DOVER company

05/26

Important

At Hillphoenix®, the safety of our customers and employees, as well as the ongoing performance of our products, are top priorities. To that end, we include important warning messages in all Hillphoenix installation and operations handbooks, accompanied by an alert symbol paired with the word "DANGER", "WARNING", or "CAUTION".

All warning messages will inform you of the potential hazard; how to reduce the risk of case damage, personal injury or death; and what may happen if the instructions are not properly followed.

This manual must be stored near the display case where it can be easily consulted. If this manual does not provide the information you require please contact Hillphoenix for more information.

⚠ DANGER

Indicates an immediate threat of death or serious injury if all instructions are not followed carefully.

⚠ WARNING

Indicates a potential threat of death or serious injury if all instructions are not followed carefully.

⚠ CAUTION

Indicates that failure to properly follow instructions may result in case damage.

Revision History

- new manual format_08/21
- technical reference_01/23
- technical reference and compliance_02/25
- technical reference and appendices_03/26
- added compliance information_05/26

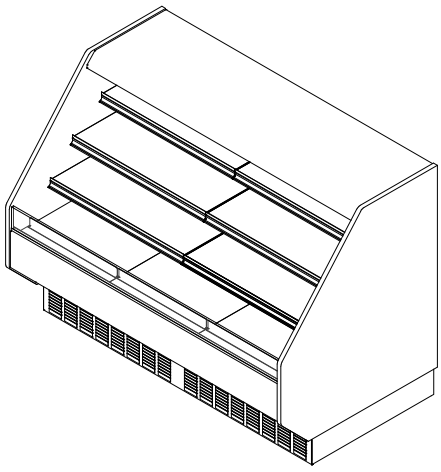
PF-SC

Self-Service Open Muti-Deck Merchandiser
3', 4' & 6' (Bakery/Beverage/Cheese/Deli)

R-290 ECO FRIENDLY

GENERAL NOTES:

- "---" Indicates that the feature is not an option on this case model and/or the data is not yet available at this time.
- 6' Case length is only available for the 54" tall case model.
- WARNING: R-290 flammable refrigerant in use. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.



SHIPPING WEIGHT	
Case	Weight
PF-SC	---

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ENGINEERED FOR STORES WITH NSF TYPE II AMBIENT CONDITIONS, NOT TO EXCEED 80°F (27°C) AND 55% RELATIVE HUMIDITY. DUE TO ENGINEERING IMPROVEMENTS SPECIFICATIONS MAY CHANGE WITHOUT NOTICE. ALL MEASUREMENTS ARE TAKEN PER ASHRAE-72 SPECIFICATIONS. HILLPHOENIX REFRIGERATED DISPLAY CASES FOR SALE IN THE UNITED STATES MEET OR EXCEED DEPARTMENT OF ENERGY 2017 REQUIREMENTS. NUMBERS ARE BASED ON STANDARD CASE SIZES. CONSULT ENGINEERING.

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Rev. Date	Rev. #	Rev. Title
05-19-26	4	DATA UPDATE
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SECOND NATURE NATURAL
Clearvyant LED SYSTEM
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PF-SC

Self-Service Open Muti-Deck Merchandiser
3', 4' & 6' (Bakery/Beverage/Cheese/Deli)

R-290 ECO FRIENDLY

SYSTEM REQUIREMENTS

Case Height	Case Length	Volts	Phase	Total Amps	Minimum Circuit Ampacity (MCA)	Maximum Overcurrent Protection (MOP)	THR (BTUH)
48"	3'	120	1	6.56	7.89	15.00	790
48"	4'	120	1	10.13	12.23	15.00	1220
48"	3'	120/208	1	5.30	6.63	15.00	1100
48"	4'	120/208	1	8.40	10.50	15.00	1750
54"	3'	120	1	8.17	9.92	15.00	980
54"	4'	120	1	7.42	9.10	15.00	900
54"	6'	120	1	14.61	15.90	22.00	1750
54"	3'	120/208	1	6.10	7.63	15.00	1269
54"	4'	120/208	1	6.10	7.60	15.00	1269
54"	6'	120/208	1	7.54	8.90	15.00	1568
72"	3'	120	1	9.92	11.90	15.00	1190
72"	4'	120	1	16.01	19.39	20.00	1921
72"	3'	120/208	1	6.10	7.63	15.00	1269
72"	4'	120/208	1	11.70	14.63	20.00	2434

ELECTRICAL DATA

Case Length	Fans Per Case	High Efficiency Fans		Anti-Condensate Fans		Drain Heaters	
		120 Volts		120 Volts		120 Volts	
		Amps	Watts	Amps	Watts	Amps	Watts
3'	1	0.30	25.00	---	---	---	---
4'	2	0.60	25.00	---	---	---	---
6'	2	0.60	25.00	---	---	---	---

LIGHTING DATA

Case Length	Lights Per Row	Light Length	Clearvoyant 4 LED Lighting (Per Light Row)			
			Standard Power (Cornice or Shelf)		High Power (Cornice)	
			120 Volts		120 Volts	
			Amps	Watts	Amps	Watts
3'	1	3'	0.03	4.7	0.08	11.9
4'	1	4'	0.04	5.9	0.11	14.9
6'	2	3'	0.03	4.7	0.08	11.9

NOTES:

- "---" Indicates that the feature is not an option on this case model and/or the data is not yet available at this time.
- Listed discharge air velocity represents the average velocity at the peak of defrost.
- LRA - Locked Rotor Amps
- RLA - Running Load Amps
- 6' Case length is only available for the 54" tall case model.

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Clearvoyant LED SYSTEM
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PF-SC

Self-Service Open Muti-Deck Merchandiser
3', 4' & 6' (Bakery/Beverage/Cheese/Deli)

R-290 ECO FRIENDLY

GUIDELINES AND CONTROL SETTINGS

Case Height	Case Length	24hr Energy Usage (kWh)	Discharge Air (°F)	Discharge Air Velocity (FPM)
48"	3'	---	---	---
48"	4'	---	28 - 30	200
54"	3'	---	---	---
54"	4'	14.63	28 - 30	143
54"	6'	21.50	28 - 30	168
72"	3'	---	---	---
72"	4'	22.49	28 - 30	200

CONDENSING UNIT DATA

Case Height	Case Length	Volts	Phase	HP	RLA (Amps)	LRA (Amps)	Qty	Refrig.	Grams	Condenser Fans	
										Amps	Watts
48"	3'	115	1	---	5.30	32.0	1	R-290	135	0.70	30
48"	4'	115	1	---	8.40	40.2	1	R-290	175	0.70	30
54"	3'	115	1	---	6.10	42.0	1	R-290	135	0.70	30
54"	4'	115	1	---	6.10	42.0	1	R-290	132	0.70	30
54"	6'	115	1	---	6.10	42.0	2	R-290	132	1.40	60
72"	3'	115	1	---	6.10	42.0	1	R-290	149	0.70	30
72"	4'	115	1	---	11.70	60.0	1	R-290	200	0.70	30

MINIMUM ROOM SIZE

Case Height	Case Length	Case Charge (grams)	Case Charge (lbs)	Minimum Room Size	
				SQM	SQFT
48"	3'	135	0.30	6.5	69.5
48"	4'	175	0.39	8.4	90.1
54"	3'	124	0.27	5.9	63.9
54"	4'	132	0.29	6.3	68.0
54"	6'	124	0.27	5.9	63.9
72"	3'	149	0.33	7.1	76.7
72"	4'	200	0.44	9.6	103.0

DEFROST CONTROLS

Case Length	Defrosts Per Day	Electric Defrost		Timed-Off Defrost		Hot Gas Defrost	
		Fail-Safe (Min)	Termination Temp (°F)	Fail-Safe (Min)	Termination Temp (°F)	Fail-Safe (Min)	Termination Temp (°F)
3'	4	---	---	30	45	---	---
4'	4	---	---	30	45	---	---
6'	4	---	---	30	45	---	---

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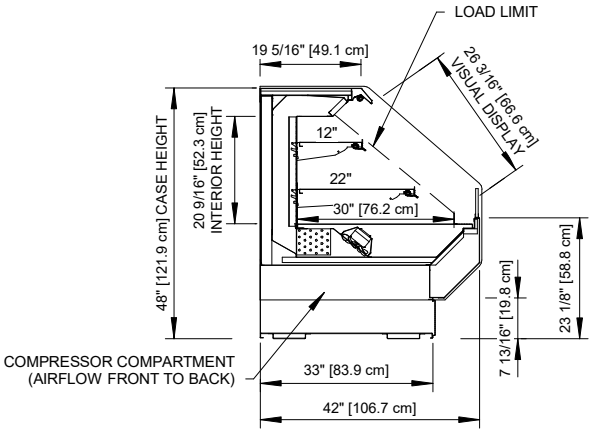
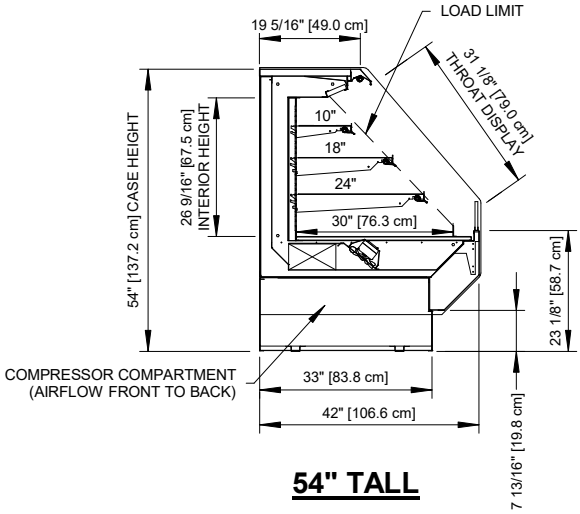
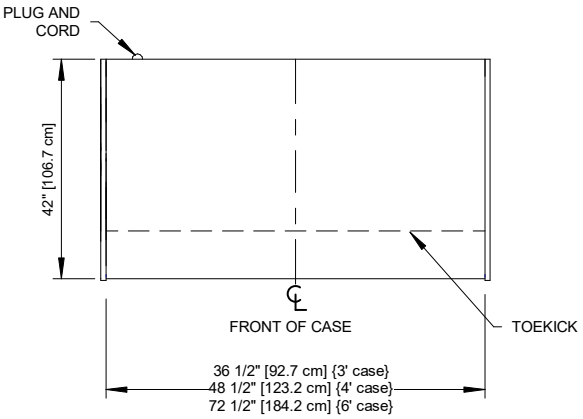
R-290
ECO FRIENDLY



48" TALL



54" TALL



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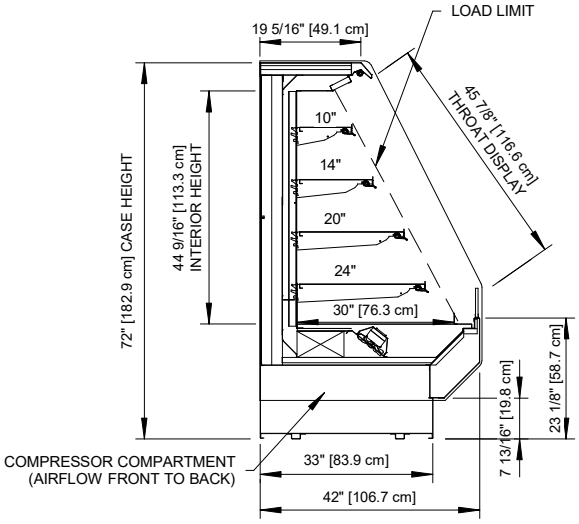

72" TALL

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Clearvyant LED SYSTEM
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GENERAL INFORMATION

Thank you for choosing Hillphoenix for your food merchandising needs. This manual contains important technical information and will assist you with the installation and operation of your new Hillphoenix specialty cases. By closely following the instructions, you can expect peak performance; attractive fit and finish; and long case life.

We are always interested in your suggestions for improvements (e.g. case design, technical documents, etc.). Please feel free to contact our Marketing Services group at the number listed below. Thank you for choosing Hillphoenix, and we wish you the very best in outstanding food merchandising.

CASE DESCRIPTION

This manual specifically covers the PF-SC (R-290) bakery, beverage, cheese and deli application self-service open multi-deck merchandiser.

STORE CONDITIONS

Hillphoenix cases are designed to operate in an air-conditioned store that maintains a 75°F (24°C) store temperature and 55% (max) relative humidity (ASHRAE conditions). Case operation will be adversely affected by exposure to excessively high ambient temperatures and/or humidity.

REFRIGERATION SYSTEM OPERATION

Air-cooled condensing units require adequate ventilation for efficient performance.

THIS UNIT CONTAINS R-290 FLAMMABLE REFRIGERANT. USE CAUTION WHEN HANDLING, MOVING OR SERVICING THE DISPLAY CASE. AVOID DAMAGING THE REFRIGERANT TUBING WHICH COULD INCREASE THE RISK OF A LEAK.

SHIPPING CASES

Transportation companies assume all liability from the time a shipment is received by them until the time it is delivered to the consumer. Our liability ceases at the time of shipment.

RECEIVING CASES

Examine fixtures carefully and in the event of shipping damage and/or shortages, please contact the Service Parts Department at the number listed below.

CASE DAMAGE

Claims for obvious damage must be 1) noted on either the freight bill or the express receipt and 2) signed by the carrier's agent; otherwise, the carrier may refuse the claim. If damage becomes apparent after the equipment is unpacked, retain all packing materials and submit a written request to the carrier for inspection within 14 days of receipt of the equipment.

Failure to follow this procedure will result in refusal by the carrier to honor any claims with a consequent loss to the consumer.

If a UPS shipment has been damaged, retain the damaged material, the carton and notify us at once. We will file a claim.

LOST/MISSING ITEMS

Equipment has been carefully inspected to insure the highest level of quality. Any claim for lost/missing items must be made to Hillphoenix within 48 hours of receipt of the equipment. When making a claim please use the number listed below.

SERVICE PARTS & TECHNICAL SUPPORT

For service parts questions regarding our cases, please contact our Service Parts Department at 1-844-HPX-PART (1-844-479-7278) or SpecialtyParts@doverfoodretail.com

For technical questions regarding our cases, please contact our Technical Support Department at 1-833-280-5714.

CONTACTING THE FACTORY

If you need to contact Hillphoenix regarding a specific fixture, be certain that you have both the case model number and serial number. (This information can be found on the data tag, located at the top-left interior, rear exterior panel or interior rear lower storage of the case. *Location may vary based on case design.)*

Hillphoenix Specialty Products
703 Franklin Street, PO Box 478
Keosauqua, IA 52565
Website: www.hillphoenix.com

⚠ CAUTION

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

⚠ WARNING

Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.

⚠ WARNING

Do not use electrical appliances inside the food/ice storage compartments unless they are of the type recommended by the manufacturer.

LOCATION

This refrigerated display case has been designed for displaying and storing perishable food product. It is engineered for air-conditioned stores with a maximum ambient of 75°F and 55% relative humidity.

When selecting the location for placement of this case, avoid the following conditions:

Excessive Air Movement

1. Doors
2. Air-conditioned vents
3. Other air sources

Excessive Heat

1. Windows
2. Sun
3. Flood lamps 8 feet or less from the product
4. Other heat sources

Note: The following checks shall be applied to installations using flammable refrigerants.

a. The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;

b. The ventilation machinery and outlets are operating adequately and are not obstructed;

c. If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

d. Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

e. Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

FLOOR PREP

1. Ask the general contractor if your current copy of the building dimensions are the most recently issued. Also, ask for the points of reference from which you should take dimensions to locate the cases.
2. Using chalk lines or a laser transit, mark the floor where the cases are to be located for the entire lineup. The lines should coincide with the outside edges of the case feet.
3. Move case as close as possible to its permanent location. Remove all crating and shipping braces above the shipping pallet. Loosen the plastic dust cover from the pallet, but leave cover over the case to protect it while removing the case from the pallet.
4. The power cord shipping brace (Fig. 1) can be removed with a screw gun. As for case shipping braces, the same would be applied with sled runner or caster constrction. If the braces are metal brackets or locks they can be removed with a screw gun. If they are wood blocks they can be removed with a J-bar. **Note: Shipping braces are normally located at each corner of the case. Some case models with casters will use bracing that surrounds the casters entirely and some will use braces that affix to the toekicks at each corner. (Shipping braces used vary and are based on case design for best transport.)**
5. Carefully, if horizontal supports, lift case up and off the pallet. Remove dust cover. Installation hardware ships in a marked packet located inside the case. Remove dust cover. Installation hardware ships in a marked packet located inside the case. (Hillphoenix self-contained display cases are sometimes designed with casters. In most situations, one or two persons can easily move the case into position.) If there are casters simply roll them on to

5. the store floor to the proper staging area. First remove all crating then all sled runner, caster, and/or power cord shipping braces. (Dependent on case design.)

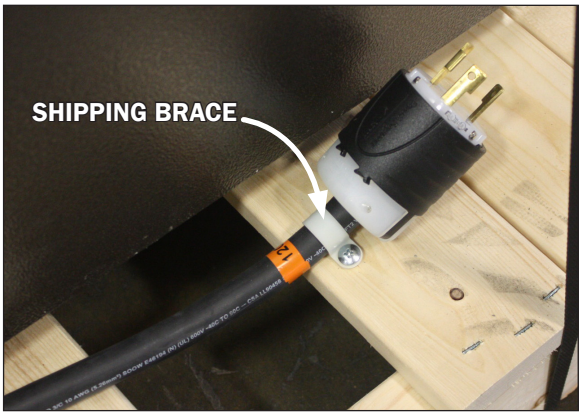


Fig. 1 Power cord shipping brace

6. Leveling is necessary to ensure proper operation of the refrigeration system and drainage of the condensate. Locate the highest point on the positioning lines as a reference for determining the proper height of the shim-pack levelers. A laser transit is recommended for precision and requires just one person. Level adjustable feet by twisting, if applicable, or shim as necessary under vertical stationary or caster supports as this will help ensure that the case is not settling over time.

⚠ CAUTION

Failure to properly level the case could result in lack of proper condensation drainage leading to failure of the unit.

7. Locate horizontal or vertical (caster) support positions along the chalk line (Fig. 2). Spot properly leveled shim packs at each support location.

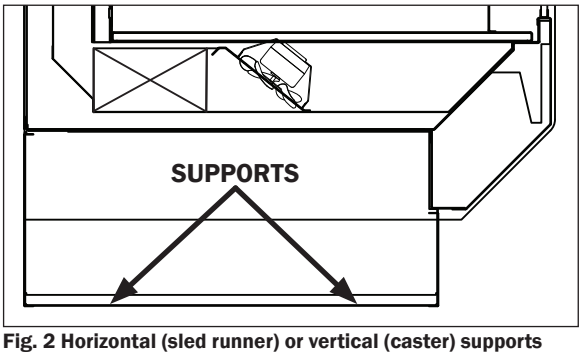


Fig. 2 Horizontal (sled runner) or vertical (caster) supports

8. (SLED RUNNERS) If necessary, drill a hole in each end of every horizontal support (Fig. 3) and fasten to the floor with concrete anchors. **Note: The holes do not need to be in the exact locations specified here. Be sure that the anchors are close to the end of the horizontal supports and at each corner of the case.**

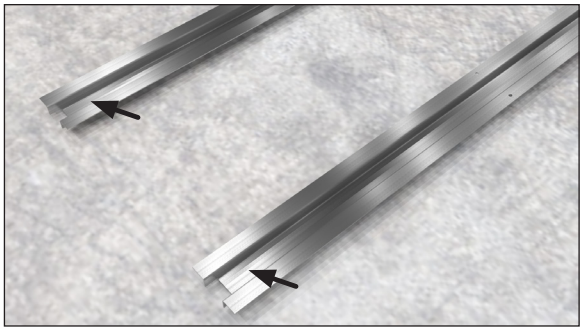


Fig. 3 Seismic anchoring locations (sled runners)

the store floor to the proper staging area. First remove all crating then all sled runner, caster, and/or power cord shipping braces. (Dependent on case design.)

6. Leveling is necessary to ensure proper operation of the refrigeration system and drainage of the condensate. Locate the highest point on the positioning lines as a reference for determining the proper height of the shim-pack

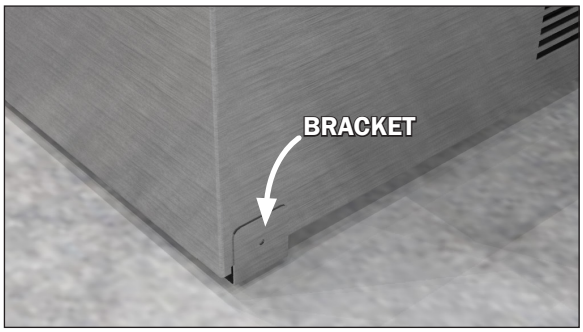


Fig. 4 Seismic anchoring locations (caster brackets)

⚠ CAUTION

Locate the horizontal or vertical (caster) supports under unit before removing from pallet. Failure to do so will damage the finished metal if correct lift points are not identified prior to removal.

⚠ CAUTION

These cases are not designed for excessive external weight. Do not walk on top or inside of cases. Doing so may result in case damage and/or personal injury.

LINE-UP & INSTALLATION

NOTE: Install in accordance with the Safety Standard for Refrigeration Systems, ANSI/ASHRAE 15.

Single Case

1. Move the case into position. Using a "J" bar, raise the end of the case (under cross support), and lower the horizontal

⚠ WARNING

Be certain that your hands and feet are out of the way before lowering the case. Failure to do so may result in serious injury.

support on to the shim packs. Repeat on the other end of the case.

2. Once the case is properly placed on the shim packs, check the vertical plumb of the case by placing a bubble level on the rear wall. Add/remove shim packs as needed. For the horizontal level, repeat this process after placing the bubble level on the front sill.
3. Install the bumper, if applicable, into pre-attached bumper track and snap into place. (Most self-contained cases ship with bumper pre-installed.)
4. After sufficient time has passed to allow for bumper shrinkage, cut away the excess bumper for final fit and finish. Be certain to use an appropriate cutting tool (tubing- or PVC-cutter) to ensure a smooth cut.
5. Install case shelves and reconnect lights. Be aware that differing shelf configurations will affect energy consumption and case performance. Max shelf loading: 200 lbs.
6. Install toekick/compressor compartment access panel back onto the base of case, if applicable.
7. Equipment is designed to be sealed to the floor once installed in final location. This is intended to prevent liquid, dirt, debris, etc. from collecting under the case after installation. **Exception: Cases using casters are not required to be sealed to the floor.**

   Once case is set in the final location and all panels are attached, run a bead of silicone/sealant around the bottom edge of the case and the floor to create a barrier to prevent liquid, dirt, debris, etc. from collecting underneath the case.

⚠ CAUTION

Do not obstruct ventilation around the base of the display case condensing unit. Obstructing could cause the case to not operate correctly and failure to maintain product temperatures.

Multi-Case

NOTE: Install in accordance with the Safety Standard for Refrigeration Systems, ANSI/ASHRAE 15.

1. Remove any shelves (discard the shelf clips) and/or loose items from the cases that may interfere with case joining. Keep all loose items as they will be used later in the installation process.
2. Follow the single-case installation instructions for the first case, excluding #6, then position the next case in the line-up approximately 3' away.

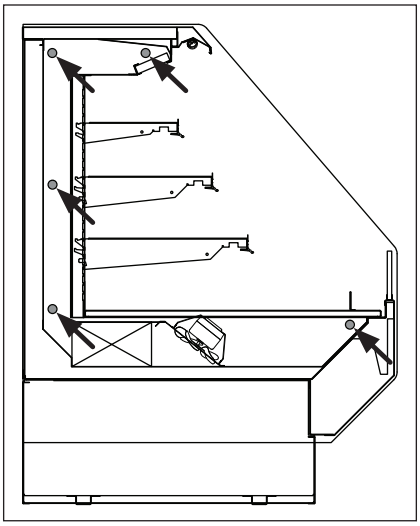


Fig. 5 Bolt locations

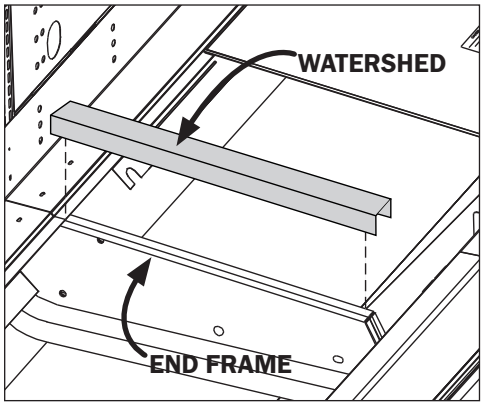


Fig. 6 Sealing the pipe chase

3. Apply a bead of butyl or silicone sealant to the end of the first case. From the opposite end, push the second case to a position that is approximately 6" from the first case, then position the case on the shim packs.
4. Push the cases tightly together, then lightly bolt them together through the holes provided (Fig. 5). Tighten all the joining bolts until all margins are equal. Be careful not to over tighten.
5. If applicable, the stub-up location can be found under the tank on the customer left. *See technical reference on page 5 for access locations.*
6. Apply case-to-case watershed (supplied) over the end frame seam (Fig. 6). The watershed prevents water from settling in the case joint.
7. Repeat steps 3-6 of this sequence for all remaining cases. Be certain to properly level all cases.
8. Properly align the front panels as needed, then install, if applicable, front panel trim (supplied).
9. Install the bumper into pre-attached bumper track and snap into place.
10. After sufficient time has passed to allow for bumper shrinkage, cut away the excess bumper for final fit and finish. Be certain to use an appropriate cutting tool (tubing- or PVC-cutter) to ensure a smooth cut.
11. Install case shelves and reconnect lights. Be aware that differing shelf configurations will affect energy consumption and case performance. Max shelf loading: 200 lbs.
12. Install toekick/compressor compartment access panel back onto the base of case, if applicable.
13. Equipment is designed to be sealed to the floor once installed in final location. This is intended to prevent liquid, dirt, debris, etc. from collecting under the case after installation. **Exception: Cases using casters are not required to be sealed to the floor.**

    Once case is set in the final location and all panels are attached, run a bead of silicone/sealant around the bottom edge of the case and the floor to create a barrier to prevent liquid, dirt, debris, etc. from collecting underneath the case.

⚠ CAUTION

Installation of 3rd-party materials may result in diminished case performance.

⚠ CAUTION

Display case shall not be installed in public corridors or lobbies.

⚠ CAUTION

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

ELECTRICAL

Electrical hookups are made through the junction box which can be accessed by removing the lower panel to the compressor compartment.

When connecting to the power supply on the case, field wiring should exit box from the side furthest away from case wiring to allow more room inside for wiring connections. The case must be grounded. *For more detailed electrical wiring information (see Appendix A1).*

Prior to plugging in and starting up the case always check the data tag located on the left end exterior panel or top interior of the case, as well as the voltage label found on the main power cord (Fig. 7) which can be found at the rear base panel. **Note: Check that the voltage of the receptacle you are going to use for power and the voltage required for the case match.**

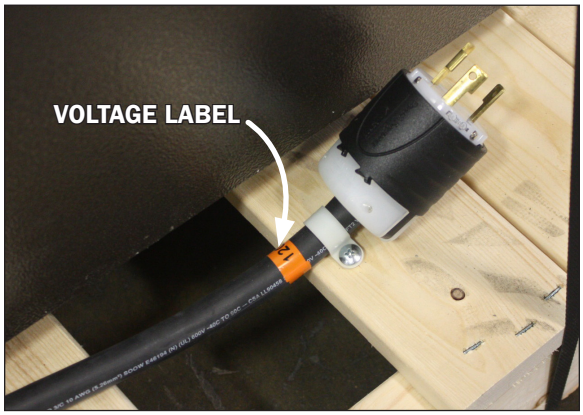


Fig. 7 Main power cord voltage label

⚠ CAUTION

Prior to plugging in and starting up the case. Be certain that the voltage of the receptacle you are going to use and the voltage required for the case match. Failure to do so may result in case/system damage.

⚠ CAUTION

Be certain that all electrical connections are compliant with local codes.

⚠ DANGER

CAUTION, RISK OF ELECTRIC SHOCK. If the cord or plug becomes damaged, replace only with a cord and plug of the same type.

⚠ CAUTION

This case must be powered only in electrical installations with ground fault circuit interrupter (GFCI) circuit breakers or residual current device (RCD).

REFRIGERATION & COMPRESSOR COMPARTMENT

A bottom mounted compressor compartment can be accessed by removing the front or rear panel (Fig. 8). *See Appendices for full instructions on how to program the Carel electronic controller.*

Access locations and/or R-290 compartment configurations will vary based on case design. *See technical reference on page 5 for access locations and page 11 for a compressor compartment diagram.*

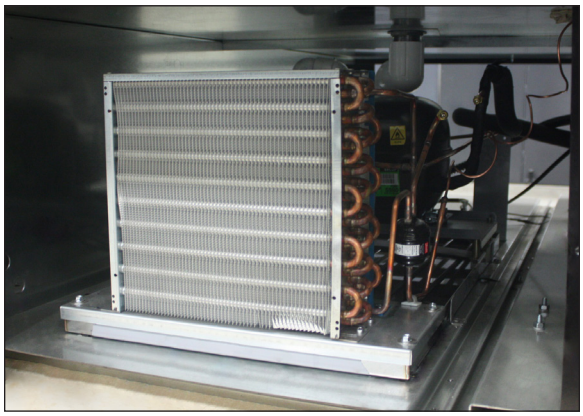


Fig. 8 Compressor compartment

⚠ CAUTION

Be sure to remove all styrofoam shipping blocks from piping and refrigerant lines. Failure to do so may result in case damage.

⚠ DANGER

When carrying out maintenance tasks inside the refrigerated case or compressor compartment, it is essential to disconnect the power source to the case from the main power.

Pressure Switch & Power Supply

1. After the main power cord (Fig. 7) located at the base panel of the case is plugged in and the power switch (Fig. 9) flipped to ON the case should begin normal operations.
2. After establishing power the light control switch (Fig. 10) (if applicable) located in the upper front interior cornice can be flipped to the ON position. The case should now be fully operational and all lights functioning when in the ON position (if applicable).

⚠ DANGER

ALWAYS CHECK THE THERMOSTAT CURRENT RATING. It may have a limited current, as low as 2A. If necessary protect digital thermostat contacts with a contractor.

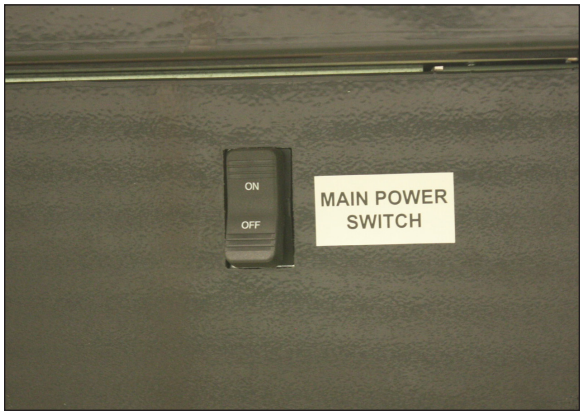
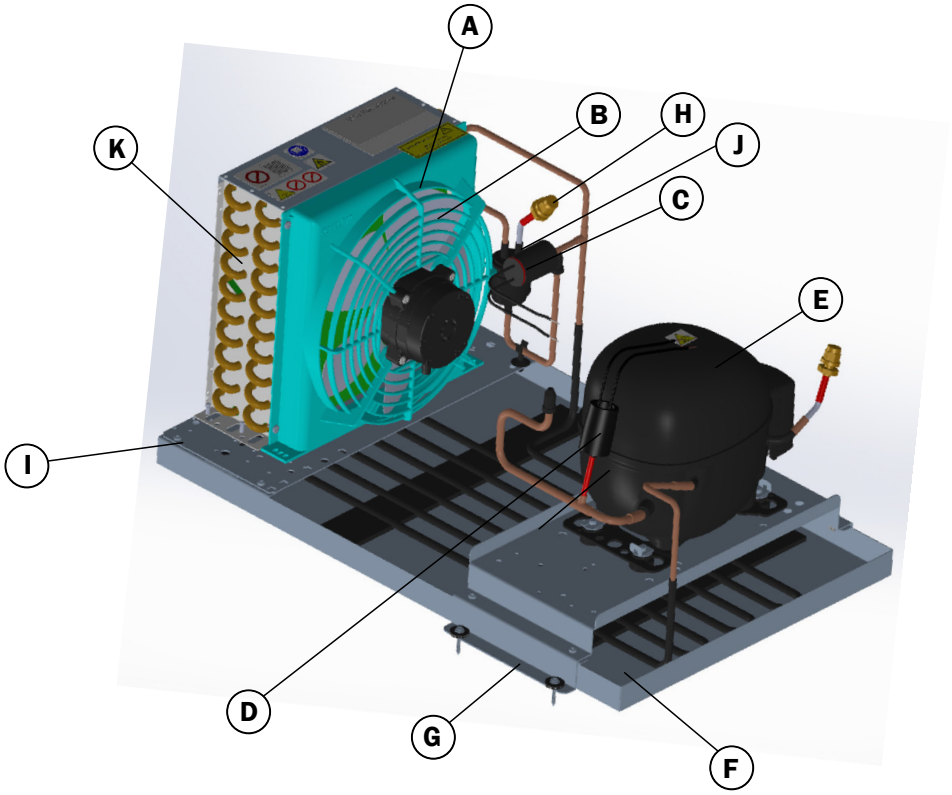


Fig. 9 Lower panel power switch

Fig. 10 Upper cornice light switch

R-290 COMPRESSOR COMPARTMENT DIAGRAM

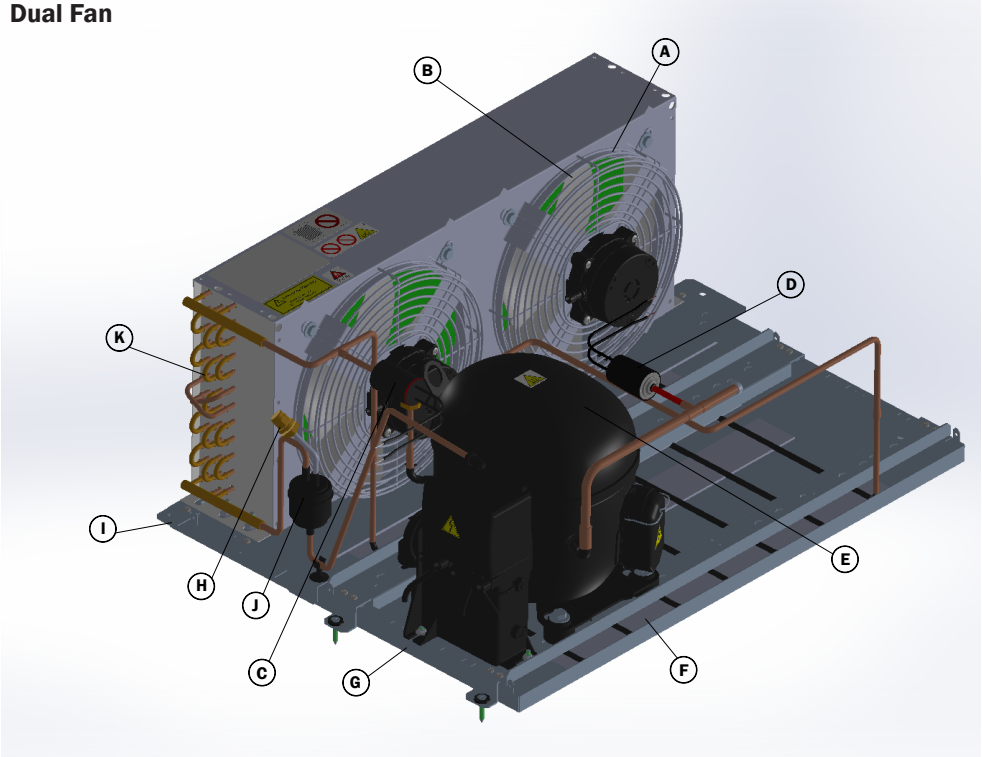
Single Fan



A	Fan Guard	E	Compressor	I	Condenser Bracket
B	Condenser Fan	F	Dissipater Pan	J	Filter Dryer
C	High Pressure Switch	G	Compressor Bracket	K	Condenser Coil
D	Low Pressure Switch	H	High Side Access		

Note: Access locations and/or compartment configurations will vary based on case design.

Dual Fan



A	**Fan Guard**
B	**Condenser Fan**
C	**High Pressure Switch**
D	**Low Pressure Switch**
E	**Compressor**
F	**Dissipater Pan**
G	**Compressor Bracket**
H	**High Side Access**
I	**Condenser Bracket**
J	**Filter Dryer**
K	**Condenser Coil**

Note: Access locations and/or compartment configurations will vary based on case design.

GENERAL LIGHTING INFORMATION

Hillphoenix cases are equipped with LED luminaires and feature specially designed light reflectors in the cornice to improve the illumination of products. LED power supplies operate both the cornice and shelf lights and are located above the cornice reflectors.

The lighting system has an ON/OFF switch located in the raceway, power box or at the inside back of the case. Once a case has been properly positioned in the store the lights may be turned on to verify that they are connected and functioning properly.

To ensure peak performance, it is advisable to run the lighting systems only when the store climate control is on and case refrigeration is started. **Note: It is highly recommended that the ambient store temperature not exceed 80°F.**

⚠ DANGER

SHOCK HAZARD

Always disconnect power to case when cleaning, servicing or configuring components of the lighting system. Failure to do so may result in serious injury or death.

⚠ WARNING

Using improper DC power supplies may damage the luminaires, resulting in sub-standard operation and increased chances of safety issues/injury.

⚠ WARNING

Never replace a 24V DC power supply with a T8 or T5 ballast of any kind! Ballasts use alternating current (AC) instead of direct current (DC) and operate at a much higher voltage than is used by this LED system. Doing so will damage the LED system and increases the chance of safety issues/injury.

LED DRIVER/POWER SUPPLY ACCESS

To gain access to the LED driver or power supplies remove the raceway cover (Fig. 11). The power supply can be located at the customer left side of the case.

REPLACING LED LIGHTS

Once store power is connected the Clearvoyant LED system should operate without the need for any significant mainte-

nance for several years. Should a power supply need to be removed and/or replaced, turn off the power to the case before proceeding. Be certain to replace the power supply with genuine Hillphoenix parts or a comparable UL-listed Class-2 rated regulated 24V DC power supply with 100W output capacity.

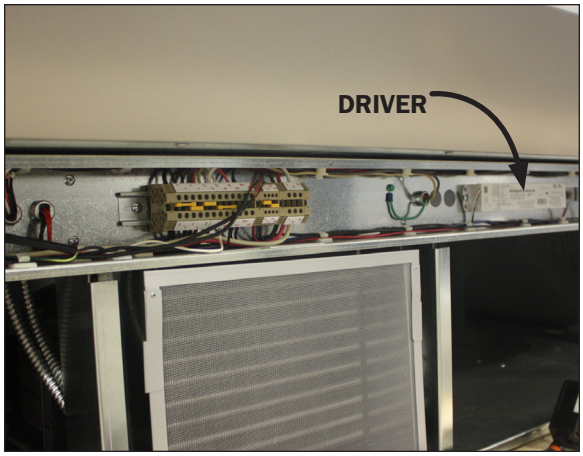


Fig. 11 Clear view of the driver

LED LUMINAIRES

Removing LED luminaires:

1. Unplug the luminaire (Fig. 12).

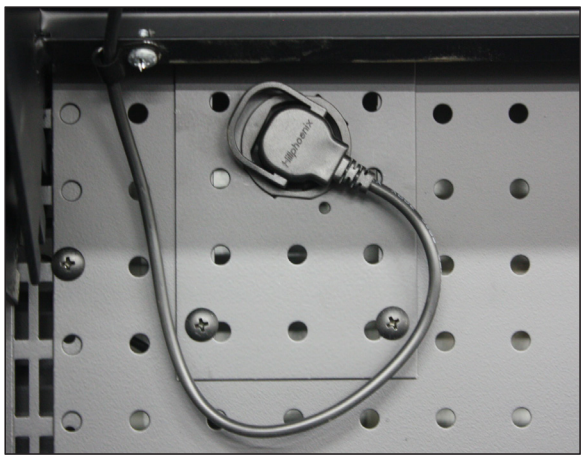


Fig. 12 LED light power cord

2. Remove the screws from the light clamps (Fig. 13) while keeping ahold of the light. Once the screws are removed the light rod will come away from the case with the clamps still holding to the light.
3. Remove the closed clamps and inner rings (Fig. 14) by unclipping the clamp ends located above the screw opening. This will release the grip around the inner ring (Fig. 15) and allow for the two pieces to be separated from one another.
4. Carefully remove the inner rings from around the light rod.

⚠ CAUTION

Too much tension on the inner clamp rings while removing them from an LED light rod may cause breakage. Use only enough tension for removal.

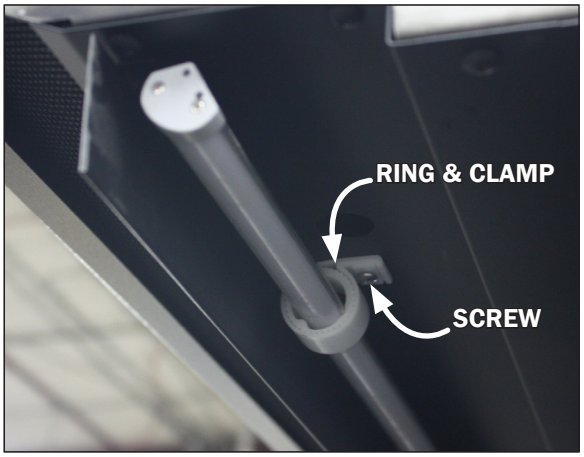


Fig. 13 LED light & ring/clamp

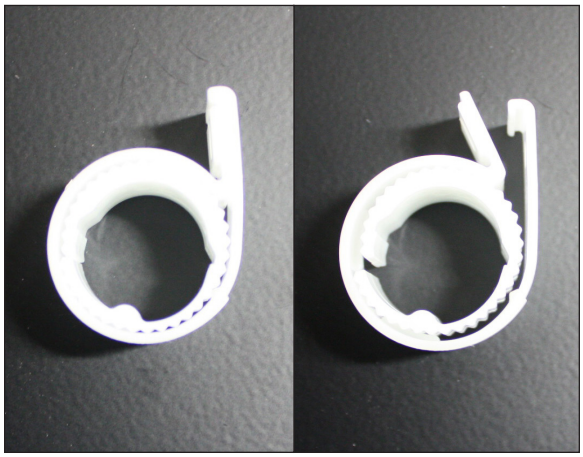


Fig. 14 Closed clamp **Fig. 15 Open clamp**

Re-installing LED luminaires:

1. Place a ring (Fig. 16) around each end of the light rod and rotate until both edges of the rod line-up and snap ahold to the ridges in the ring.
2. Slide a clamp (Fig. 16) over each ring and close them tight around the rings by clipping together the clamp ends located above the screw opening.
3. Line-up the closed clamps (Fig. 14) and light rod with the existing screw holes on the case and re-attach.
4. Rotate the light rod into desired position after the clamps are firmly re-attached.

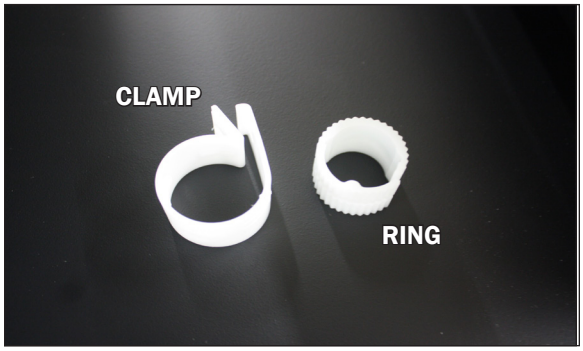


Fig. 16 LED ring and clamp

Before powering-up the case, be certain that all of the steps listed below have been completed to ensure proper case functionality, safety and compliance with warranty terms.

- ☐ **Have you thoroughly examined the case for shipping damage? (see pg. 6)**
- ☐ **Have you checked to ensure the case is horizontally level? (see pg. 7)**
- ☐ **Have you checked all exposed refrigeration lines to ensure that they are not kinked, dented or rubbing together and have installed the compressor com partment access panel? (see pg. 9)**
- ☐ **Have you checked and verified the voltage of the receptacle you are going to use for power and the voltage required for the case match? (see pg. 9)**
- ☐ **Have you verified the display case switch is in the OFF position prior to plug ging in to the main power source? (see pg. 9)**
- ☐ **Have you reviewed safety warning labels and verified all are present and in good condition?**

After powering-up the case, be certain that all of the steps listed below have been completed to ensure proper case functionality, safety and compliance with warranty terms.

1. **Check case temperature and adjust controller as needed. All display case connections comply with the information/instructions?**
2. **Store the installation manual in the vicinity of the display case itself to where it can be accessed and consulted by all members of staff involved in the use of the refrigerator display case.**
3. **Before placing food in the display case, allow the case to operate for approx imately two (2) hours and ensure the case is at the proper temp before loading.**

AIRFLOW & PRODUCT LOAD

Hillphoenix cases provide maximum product capacity within the refrigerated air envelope. Please keep products within the appropriate load limit.

It is important that you do not overload the food product display so that it impinges on the airflow pattern (Fig. 17). Overloading will cause malfunction and the loss of proper temperature levels. The designed load limit is 3" above the deck for critical temperature products and 6" for non-critical temperature products. *For full technical reference drawings with load limit lines refer to page 5.*

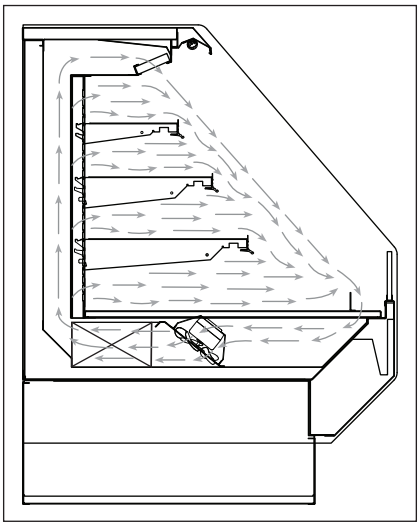


Fig. 17 Airflow pattern

⚠ WARNING

Always keep product within the designated air curtain. Failure to do so may result in case malfunction and product losing proper temperature, resulting in sub-standard operation and increased chances of food contamination.

⚠ CAUTION

Proceed to the loading only once the display case has reached the proper temperature setting.

DEFROST

Cases are equipped with Temperature Terminated Off-Time defrost.

The defrost cycle is very important in that it ensures correct operation of the case. It is activated and controlled by the thermostat which temporarily stops the condensing unit, allowing the evaporator to shed the build-up of ice. The controllers synchronize the defrost between condensing units via the auxiliary ports.

⚠ DANGER

FLAMMABLE

DANGER - Risk of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing.

⚠ WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

CASE CLEANING

A periodic cleaning schedule should be established to maintain proper sanitation, insure maximum operating efficiency, and avoid the corrosive action of food fluids on metal parts that are left on for long periods of time. We recommend cleaning once a week. Further suggestions for case cleaning include the following:

- To avoid shock hazard, be sure all electrical power is turned off before cleaning. In some installations, more than one disconnect switch may have to be turned off to completely de-energize the case.
- All surfaces pitch downward to a deep-drawn drain trough, funneling liquids to the center of the case where the waste outlet is located for easy access. Check the waste outlet to insure it is not clogged before starting the cleaning process and avoid introducing water faster than the case drain can carry it away.
- To clean the LED luminaires, shut off the lights in the case, then wipe the luminaires down with a soft, damp cloth. Avoid using harsh or abrasive cleaners as they may damage the lights. Be certain that the luminaires are completely dry before re-energizing.
- Clean from top to bottom when cleaning the display case to avoid cross contamination.
- If any potentially harmful cleaners are used, be certain to provide a temporary separator (e.g., cardboard, plastic wrap, etc.) between those cases that are being cleaned and those that may still contain product.
- Avoid spraying any cleaning liquids directly on the electrical connections.
- Allow cases to be turned off long enough to clean any frost or ice from coil and pans.
- Remove toekick and clean underneath the case with a broom and a long-handled mop. Use warm water and a disinfecting cleaning solution when cleaning underneath the cases.

⚠ DANGER

SHOCK HAZARD

Always disconnect power to case when servicing or cleaning. Failure to do so may result in serious injury or death.

⚠ CAUTION

Use specific products for disinfection and cleaning: use soft, non-abrasive sponges and rags!

Fans and Pressure Plate

1. Disconnect power to the case and wait for fans to come to a complete stand-still.
2. To reach the fans and pressure plate first remove the base deck with help of the pre-drilled access lift supplied (Fig. 18). **Note: It is recommended that more than one person lift the deck.**

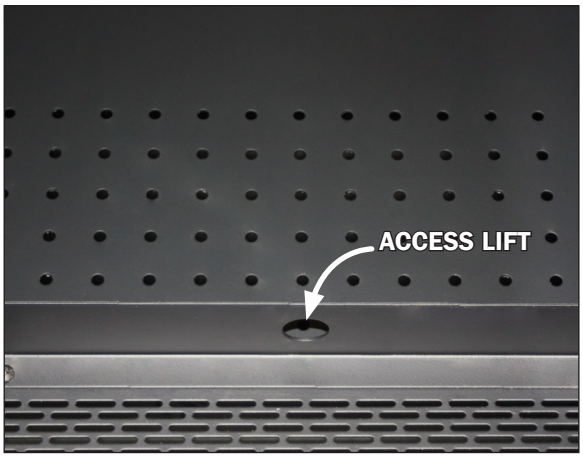


Fig. 18 Base deck pre-drilled access lift

3. To access the underside of the fans first remove the screws on the top ends and front sill of the pressure plate cover (Fig. 19). Lift the pressure plate by use of the provided lift handles (Fig. 19). There are hinges shared between the pressure plate and coil covers. **Note: It is recommended that more than one person lift the pressure plate.** The topside of pressure plate will rest against the topside of the coil cover, exposing the underside of the pressure plate and fans (Fig. 19).
4. Clean as necessary. Use a spray bottle filled with an approved mild detergent and warm water.
5. Be sure to move the pressure plate back to its original position after cleaning and/or inspection is complete.

⚠ CAUTION

Only lift the pressure plate and/or coil cover for a qualified inspector or a trained service provider. Failure to do so may result in damage to the refrigerant system.

⚠ DANGER

When carrying out cleaning work or maintenance on the condensing unit it is essential to disconnect the machine and all its accessories from the main power.

⚠ DANGER

DANGER OF BURNS

Be careful of the elements inside the condensate dissipator pan: this operates at high temperature.

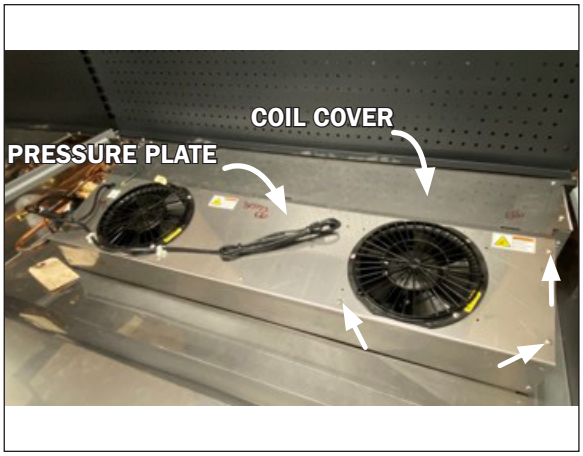


Fig. 19 Pressure plate, coil cover, and screws

Coil Inspection

1. Disconnect power to the case and wait for fans to come to a complete stand-still.
2. Disconnect the fan cord before accessing the screws. Remove the top two screws at both ends of the coil cover (Fig. 19), as well as the screws from the top ends and front sill of the pressure plate cover (Fig. 19). **Be sure to save the removed screws for reassembly.**
3. Carefully, without bending the sheet metal cover, lift up the bottom edge of the pressure plate to expose the evaporator coil.

⚠ WARNING

Exercise extreme caution when working in a case with the pressure plate removed. The coil contains many sharp edges that can result in severe cuts to the hands and arms.

⚠ WARNING

Exercise extreme caution when working in a case with the coil cover removed. The coil contains many sharp edges that can result in severe cuts to the hands and arms.

4. Clean as necessary. Use a spray bottle filled with an approved mild detergent and warm water. **This location should be accessed by qualified personnel only.**
5. Be sure to screw the coil cover back to its original position after cleaning and/or inspection is complete.

⚠ CAUTION

Always be sure to move the pressure plate and screw the coil cover back to their original position after the cleaning and/or inspection is complete. Failure to do so may result in damage to the refrigerant system.

⚠ DANGER

FLAMMABLE

DANGER - Risk of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing.

Condenser Air Intake Filter

Clean and remove the debris from the condenser air intake filter monthly. If filter is not cleaned regularly the head pressure will rise and cut all power off to the compressor by means of the pressure switch.

The filter will either have a slide-out screen or pull-off magnetic application. **Note: Prior to cleaning, be sure to remove the filter from the case completely and move to a distance far enough away that no debris will come in to contact with the case or the product inside.** Both can be cleaned with an air hose and/or rinsed with water. Be sure to remove all debris and wait until completely dry before placing back on to the case. (Top mounted compressors will not have an air intake filter.)

⚠ CAUTION

Be sure to clean the condenser air intake filter monthly. Failure to do so may result in loss of normal compressor functions and case damage.

Cleaning Condensate Dissipator Pan

Inspect the dissipator pan (Fig. 20) at least once every six months. Ensure you disconnect the electrical power supply and make sure you DO NOT touch the elements as they reach high temperatures (necessary for evaporation inside the pan).

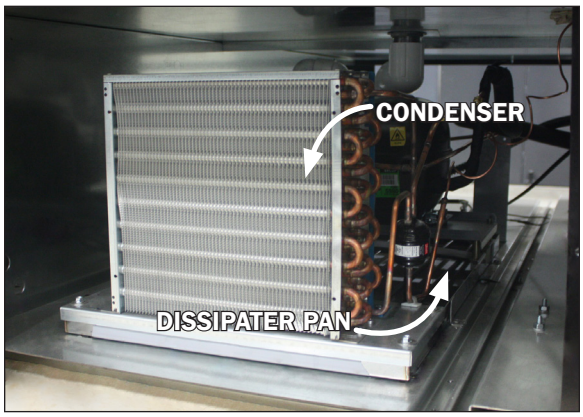


Fig. 20 Cleaning the dissipator pan and condensing unit

Cleaning Condenser

The condensers used on the condensing units gather dust and dirt and must be cleaned regularly. Under normal working conditions this task must be executed at least once a month using a soft-bristled brush and a vacuum cleaner. A dirty condenser will reduce the display case performance: it will also result in increased energy consumption. (Fig. 21)

UNSCHEDULED CASE MAINTENANCE

Unscheduled maintenance concerns all those tasks that cannot normally be carried out by the routine user as specified. Such tasks require qualified personnel with specific technical skills (e.g. refrigeration system specialists, electricians etc.) and must be carried out at least once a year. See the scheduled maintenance table for a list of the main tasks (Fig. 21).

If inspection reveals any rust, cracks and etc...it will be necessary to carry out repairs and/or replacement of parts so that the case meets code and the display case is in prime operating condition. To enhance safety, it is recommended that you always seek the advice of a specialized technician before carrying out any repair work.

PARTS SUBJECT TO WEAR & SPARE PARTS

Most spare parts carry clear, complete ID information. It is important that the refrigerated case parts be replaced by analogous parts of equivalent safety and quality: to order spare parts please contact Hillphoenix, stating the case model and serial number, found in this manual or on the case ID plate, and provide a description of the component and the desired quantity. Refer to the Parts section in the back of the manual for parts ordering and to identify parts that may need to be replaced.

⚠ CAUTION

Do not pressure wash equipment as damage to electrical components may result.

SCHEDULED MAINTENANCE TABLE

Maintenance	Weekly	Monthly	Half Yearly	Yearly
Cleaning case	✓			
Cleaning gas condenser		✓		
Case visual check	✓			
Safety labels visual check	✓			
Check electric system				✓
Check water drainage system.			✓	
Check refrigeration system				✓
General inspection				✓

Fig. 21 Recommended cleaning schedule

TROUBLESHOOTING

INSTRUCTIONS FOR PERSONNEL

In the Event of General Emergency

Immediately inform those in the vicinity of the perceived danger, gesticulating if necessary; cut the electrical power to the cabinet.

In the Event of Fire

In the event that the refrigerated case catches fire or is involved in a fire it is possible to use an extinguisher with a powder-type or CO2 extinguishing agent.

Resetting the Case

To restore normal operation it is necessary to eliminate all the causes of the emergency situation; if necessary repair or replace damaged parts.

Note: If safety devices are tripped it will be necessary to identify the cause before continuing work.

⚠ CAUTION

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

⚠ CAUTION

R-290 flammable refrigerant in use. Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation operating and maintenance instructions thoroughly before installing or servicing this equipment.

⚠ DANGER

FLAMMABLE

DANGER - Risk of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing.

FAILURES AND SHOOTING

Failures

In the event of a failure of mechanical/electrical/refrigeration parts the initial safety conditions must be restored immediately by replacing or repairing such faulty parts.

TABLE OF FAILURES AND SHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
The refrigerated cabinet does not work.	1) the mains circuit breaker is set to OFF; 2) the power line between refrigerated cabinet and power socket is faulty; 3) the switch on the refrigerated cabinet control panel is not switched on.	1) turn the mains power on; 2) make sure the plug is inserted properly in the socket; 3) turn the power switch on the refrigerated cabinet panel to ON.
The refrigerated cabinet does not cool enough.	1) the temperature thermostat is adjusted incorrectly; 2) the refrigerated cabinet has been filled too much 3) the condensing unit is clogged with dust 4) the evaporator is covered in ice	1) reprogram the temperature thermostat; 2) remove goods and observe the maximum load level; 3) clean the condensing unit with a soft-bristled brush and vacuum cleaner 4) carry out a defrost cycle.
The refrigerated cabinet cools too much.	1) the temperature thermostat is adjusted incorrectly.	1) reprogram the temperature thermostat;
The refrigerated cabinet runs continuously.	1) the temperature thermostat is adjusted incorrectly; 2) the refrigerated cabinet has been filled too much and is preventing correct air circulation.	1) reprogram the temperature thermostat; 2) remove goods and observe the maximum load level.

SAFETY DEVICES

⚠ WARNING

It is absolutely forbidden for the user to tamper with safety devices. Before using the refrigerated case check that mechanical safety covers are properly in place. Any tampering shall render the warranty null and void and exonerate Hillphoenix from any liability with regard to users of the refrigerated case.

Only maintenance personnel may carry out maintenance tasks involving safety devices. These tasks are listed below.

SAFETY DEVICE	SCOPE OF INTERVENTION	ACTION
Incorporated over-pressure cut-out	On incorporated condenser unit compressor	Cuts the electrical power of the compressor if the pressure of the refrigerant rises above the safety limits.
Fixed cover on electrical control panel. Remove only with aid of tools	Electrical control panel	Prevents access to live parts. Electrical danger warning sign applied (see "DESCRIPTION OF DANGERS AND RISKS RESIDUAL)
Fixed safety gratings. Remove only with aid of tools	On evaporator fans.	Prevents access to fans when they are running or slowing down to a stop.

DESCRIPTION OF DANGERS AND RISKS RESIDUAL

Residual Dangers

Dangers that have not been reduced/eliminated with the safety measures adopted on the refrigerated case can nevertheless be reduced/eliminated as long as users apply proper managerial practices. Users must:

☐ Ensure that all safety warning and labels are always in good condition; inspect them periodically and have them replaced whenever necessary.

☐ Do not install any spare parts that are not identical to the originals or of equivalent performance.

☐ Do not carry out any modifications or structural work without approval from Hillphoenix or a qualified field service technician.

☐ Should the refrigerated case be dented, inspect the structure visually or have qualified personnel carry out an inspection.

After a long period of disuse have a qualified field service technician carry out an inspection of the case to check that it is in good condition and working properly.

Residual Risks

While the refrigerated case has been designed to ensure maximum safety, there nevertheless remain some residual risks. Hillphoenix has identified the main **dangers and residual risks for users and maintenance personnel** as follows in chart below:

SCHEDULED MAINTENANCE TABLE

DESCRIPTION OF RESIDUAL RISK	CAUSE	SAFETY MEASURES
Danger of falls in area surrounding the cabinet	Presence of: stairs, columns etc. and/or slippery floors and objects and/or work tools	Mark out the relevant zones and highlight them with warning signs and symbols (e.g. yellow/black striped marker tape on stairs etc.) that are visible during both routine use and maintenance.
Danger of objects accidentally falling	Haphazard storage of tools/objects.	Use tool boxes in work areas. Ensure personnel are trained.
Danger of injury to hands, arms, legs and head	During cleaning and maintenance there may be objects or parts of the cabinet protruding from the case itself (e.g. glass covers open during cleaning)	Mark out the work area with appropriate barriers. Always use the recommended personal safety devices.
Risk of refrigerating gas leaks	Accidental damage to pipes	Immediate shutdown of case operation. Disconnect electrical power supply. Contact a service technician.

REFRIGERANT

This piece of equipment uses a R-290 Refrigeration system. This equipment has been clearly marked on the serial tag the type of refrigerant that is being used. There is also a warning labels stating that the unit contains R-290 refrigerant.

No smoking or open flames when servicing this equipment. If needed, use a CO2 or dry=power type fire extinguisher

Only authorized service technician, certified in R-290 system should service this equipment.

MANIFOLD SET

A R-134A manifold set can be used for servicing this equipment.

REFRIGERANT RECOVERY

Follow all national and local regulations for R-290 refrigerant recovery.

LEAKING CHECKING AND REPAIR

Leak check an R-290 system the same way you would an R-134a or R-404A system with the following exceptions.

1. Do not use a Halid leak detector on a R-290 system.
2. Electronic leak detector must be designated specifically for combustible gas.

Use of a bubble solution or an ultrasonic leak detector are acceptable.

When repairing a leak, it is recommended using oxygen free dry nitrogen with a trace gas not exceeding 200PSI.

When accessing an R-290 system, proper charge is to be weighed into the system and the system is to be leak checked afterwards.

The R-290 equipment must have red process tubes and other devices through which the refrigerant is serviced, such as any service port. This color marking must remain on the equipment. If marking is removed, it must be replace and extend at least 2.5 centimeters (1") from the compressor.

⚠ CAUTION

Component parts shall be replaced with like components. Service work shall be done by factory authorized service personnel, so as to minimize the risk of possible ignition due to incorrect parts or improper service.

CHARGING

Follow the charge amount specified on the data tag. It is recommended to use the shortest hoses possible to prevent undercharging.

- Ensure the system is sealed and leak checked
- Evacuate system to a minimum 500 micron
- Weigh in correct charge
- Leak check the system again
- Bleed the refrigerant from the high side hose to the low side hose
- Disconnect the hoses
- Remove line taps

⚠ DANGER

FLAMMABLE

DANGER - Risk of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing.

⚠ CAUTION

It is highly recommended that a technician servicing a case with HC refrigerant is aware of safety considerations and maintenance procedures on how to safely handle flammable refrigerants.

SERVICE PERSONNEL INFORMATION

1. Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, the items below shall be completed prior to conducting work on the system.
2. Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
3. All maintenance staff and others working in the local area shall be structed on the nature of work being carried out. Work in confined spaces shall be avoided.
4. The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e., non-sparking, adequately sealed, or intrinsically safe.
5. If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available on hand. A dry chemical or CO2 fire extinguisher should be adjacent to the charging area.
6. No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment shall be surveyed to make sure that there are no flammable hazards or ignition risks. *"No Smoking"* signs shall be displayed.
7. Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel externally into the atmosphere.
8. Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.
9. Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised. Initial safety checks shall include:

    a. That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

    b. That no live electrical components and wiring are exposed while charging, recovering or purging the system;

    c. That there is continuity of earth bonding.

REPAIRS TO SEALED COMPONENTS

1. During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
2. Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

    a. Ensure that the apparatus is mounted securely.

    b. Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

REPAIRS TO INTRINSICALLY SAFE COMPONENTS

1. Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.
2. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.
3. Replace components only with parts specified by the manufacturer. Other parts can result in the ignition of refrigerant in the atmosphere from a leak.
4. The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

DETECTION OF FLAMMABLE REFRIGERANTS

1. Under no circumstances shall potential souces of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
2. The following leak detection methods are deemed acceptable for all refrigerant systems:

    a. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity might not be adequate, or might need recalibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.

    b. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipework.

    c. Examples of leak detection fluids are:

        i. Bubble method

        ii. Fluorescent method agents

    d. If a leak is suspected, all naked flames shall be removed/extinguished.

    e. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Removal and Evacuation instructions (Clause 101.DVS.9).

REMOVAL AND EVACUATION

1. When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

    a. Safely remove refrigerant following local and national regulations;

    b. Purge the circuit with inert gas;

    c. Evacuate;

    d. Purge with inert gas;

    e. Open the circuit by cutting or brazing.

2. The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.
3. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
4. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

CHARGING PROCEDURES

1. In addition to conventional charging procedures, the following requirements shall be followed:

    a. Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.

    b. Cylinders shall be kept in an appropriate position according to the instructions.

    c. Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.

    d. Label the system when charging is complete (if not already).

    e. Extreme care shall be taken not to overfill the refrigerating system.

2. Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

DECOMMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task commences.

1. Become familiar with the equipment and its operation.
2. Isolate the system electrically.

3. Before attempting the procedure, ensure that:

   a. Mechanical handling equipment is available, if required, for handling refrigerant cylinders;

   b. All personal protective equipment is available and being used correctly;

   c. The recovery process is supervised at all times by a competent person;

   d. Recovery equipment and cylinders conform to the appropriate standards;

   e. Pump down refrigerant system, if possible.

   f. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

   g. Start the recovery machine and operate in accordance with instructions.

   h. Do not overfill cylinders (no more than 80% volume liquid charge).

   i. Do not exceed the maximum working pressure of the cylinder, even temporarily.

   j. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

   k. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

4. Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

RECOVERY

1. When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
2. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
3. The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
4. The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
5. If compressors or compressors oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerator does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

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a DOVER company

Contact the Service Parts Department at:

1-844-HPX-PART (1-844-479-7278)
or
SpecialtyParts@doverfoodretail.com

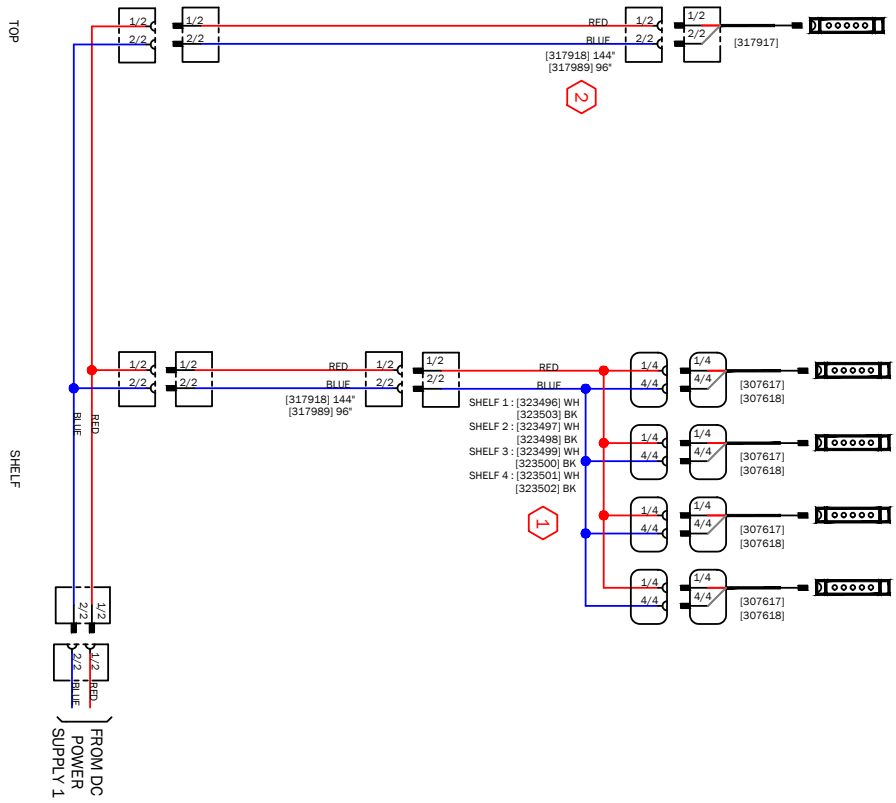
Provide the following information about the part you are ordering:

- **Model number and serial number* of the case for which the part is intended.**
- **Length of the part (if applicable).**
- **Color of part (if painted) or color of polymer part.**
- **Whether part is for left or right-hand application.**
- **Quantity**

***Data tag is located on the left end exterior panel or top interior of the case.**

If the parts are to be returned for credit, contact the Parts Department. Do not send parts without authorization.

A1: WIRING DIAGRAM



DESIGN NOTES:

1. Shelving option: up to 4 shelves shown. Refer to Job paperwork for actual quantity.
2. Extn. cord option: 2 Extension cord option shown consult job paperwork for actual usage

DRAWING #: 132838	JOB #: -	Hillphoenix P.O. BOX 478 KEOSAUQUA, IA 52565 PHONE: (319)293-3777 FAX: (319)293-3776	HILLPHOENIX LIGHTING HARNESS COLUMNS:1, PS:1 TOP:1HO,SHELF:4SOMAX	CASE #: - OF: - SIZE: A	VOLTS: -
DATE: 06/16/2025	ORDER #: -				PHASES: -
REVISION #: 0	DRAWN BY: NITHEEN A			PAGE #: OF: 1	HERTZ: -
REV DATE 06/16/2025	REV BY: NITHEEN A	REV DESCRIPTION: 1.RELEASED.			

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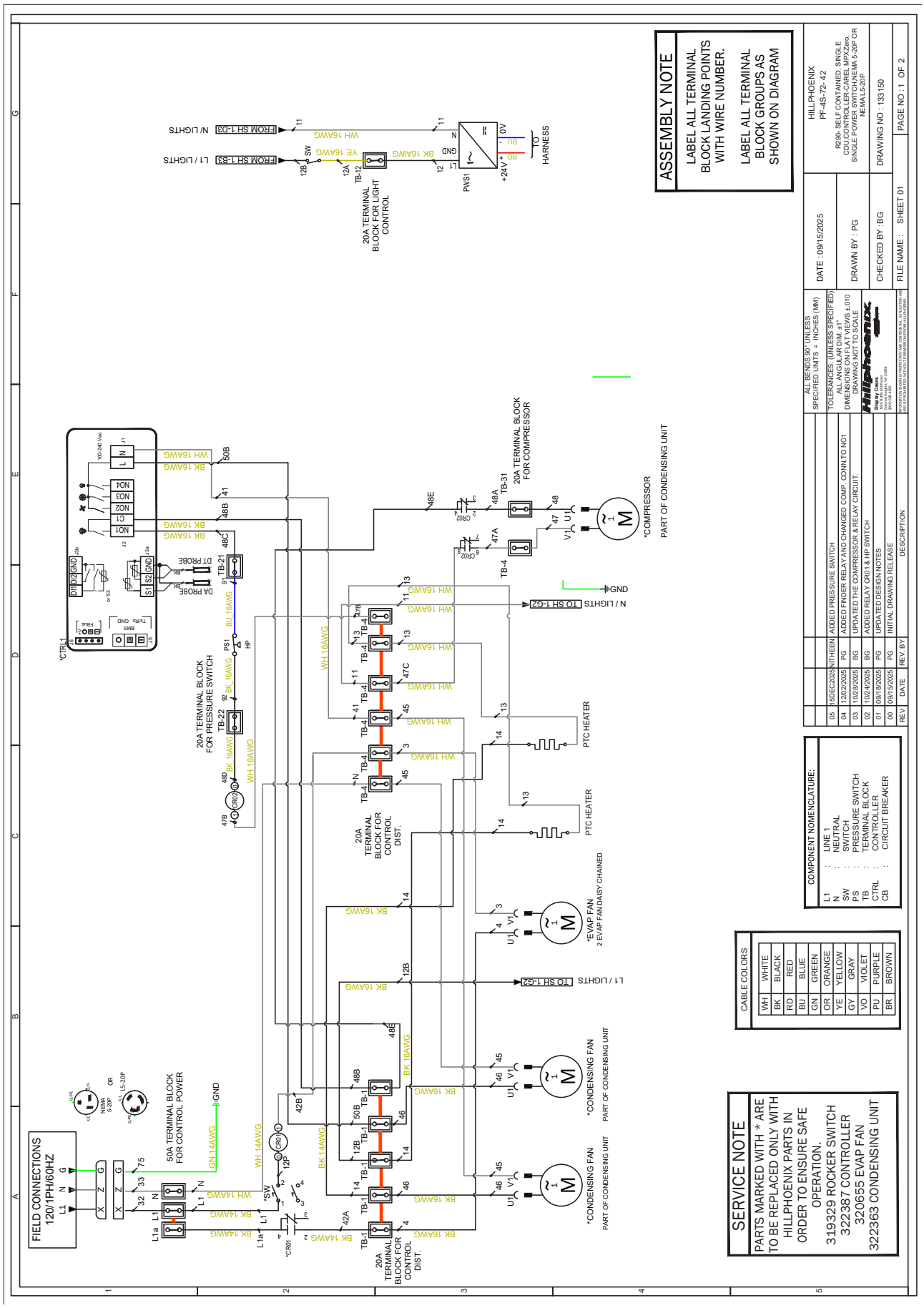

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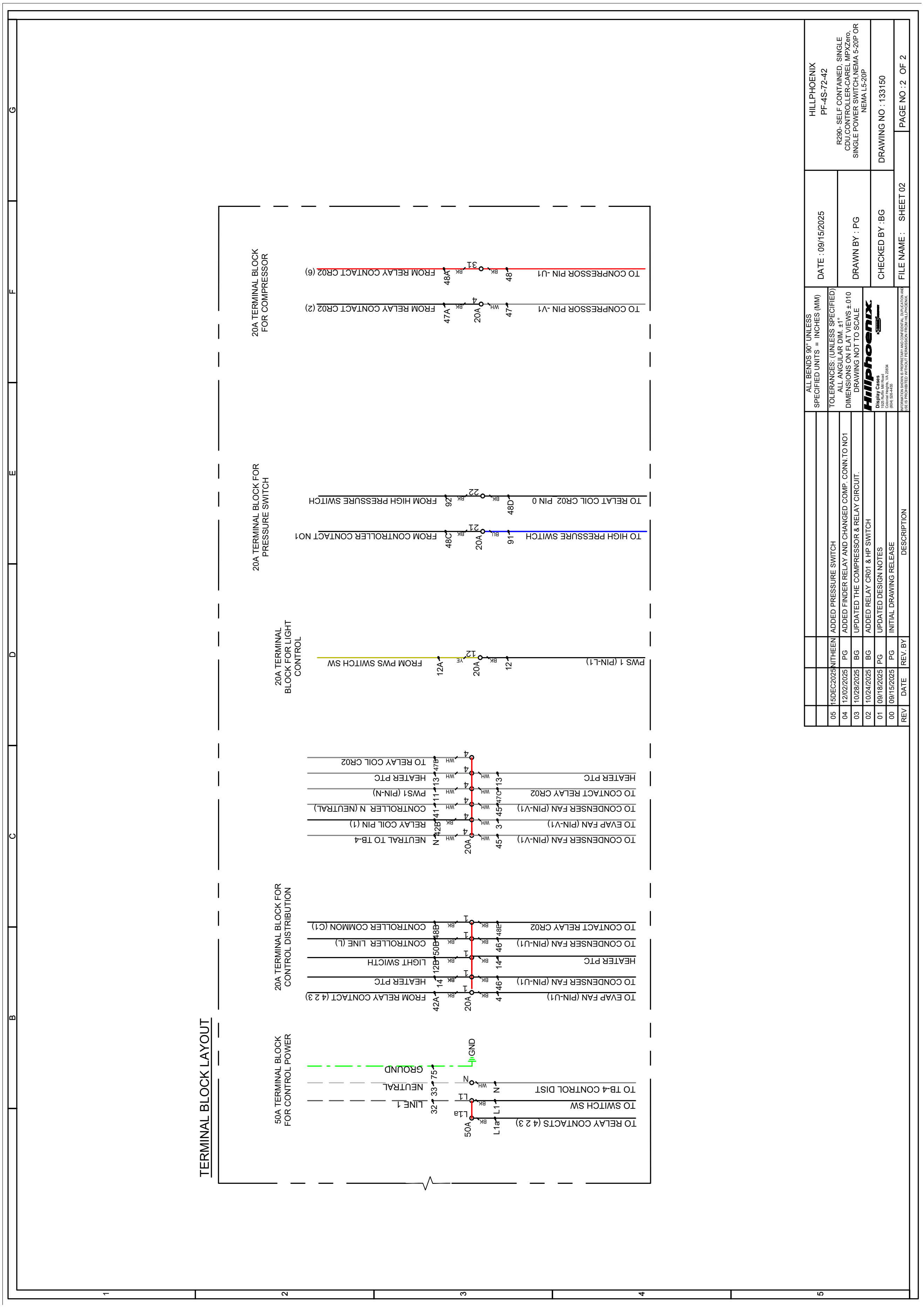

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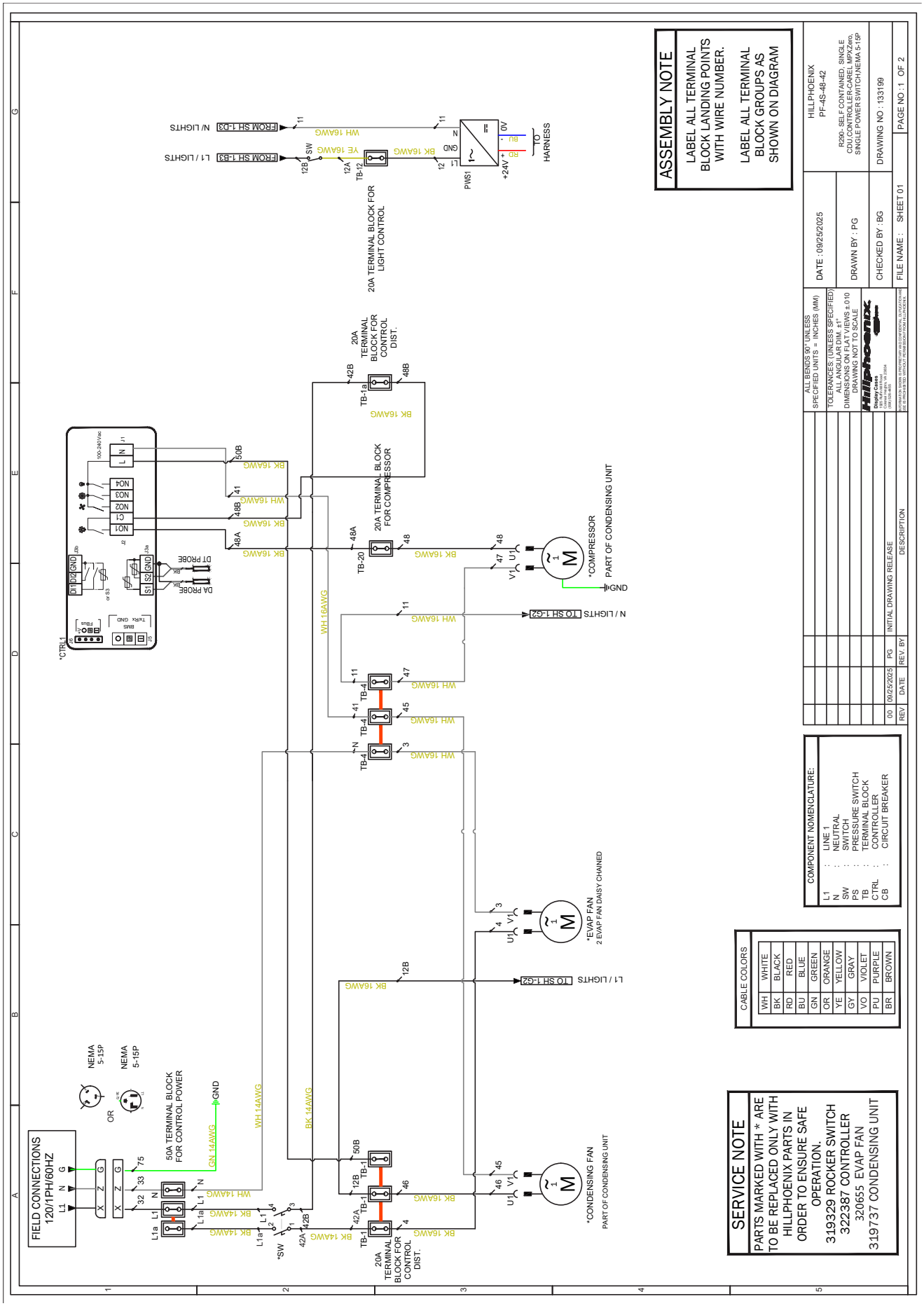

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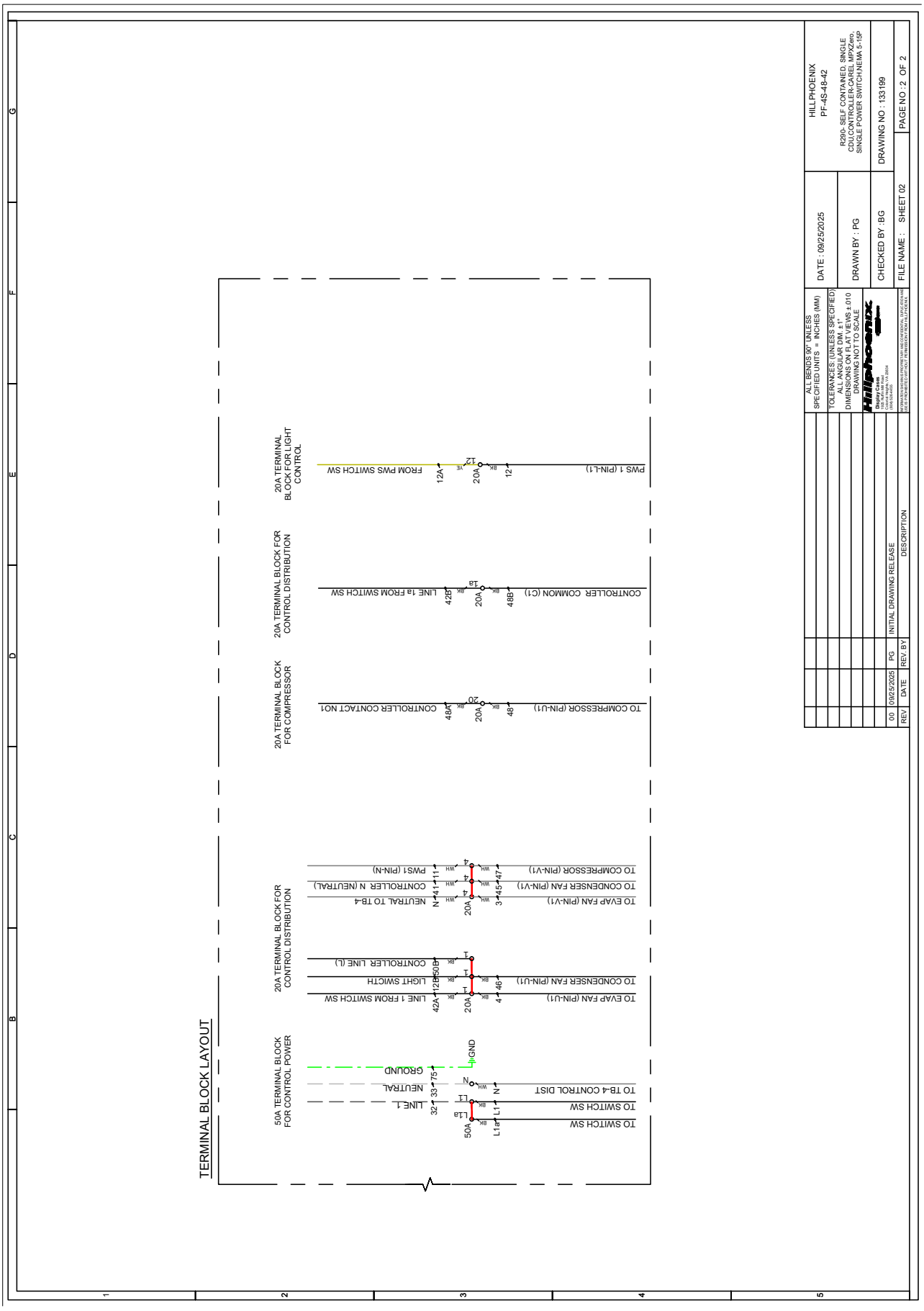

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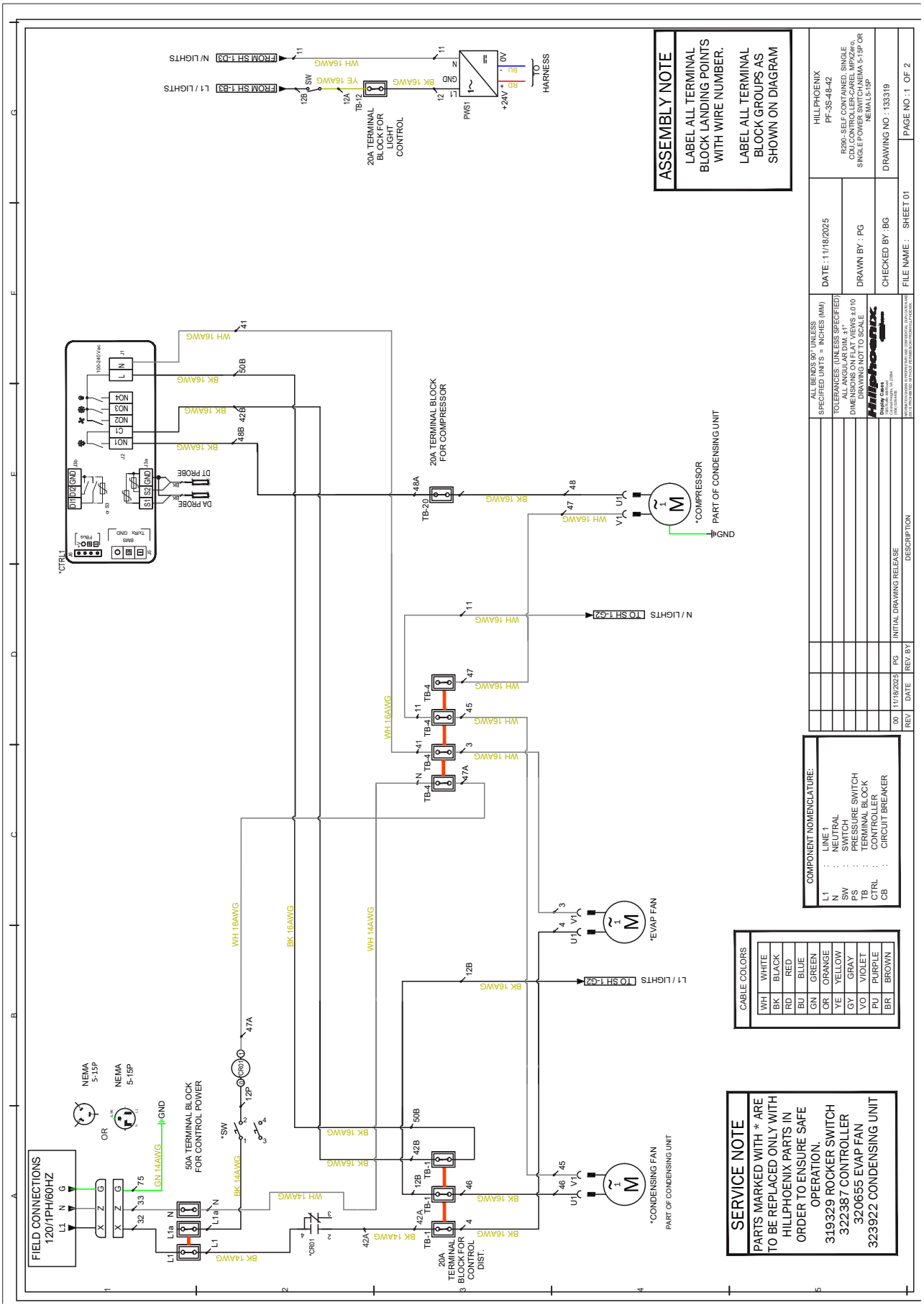

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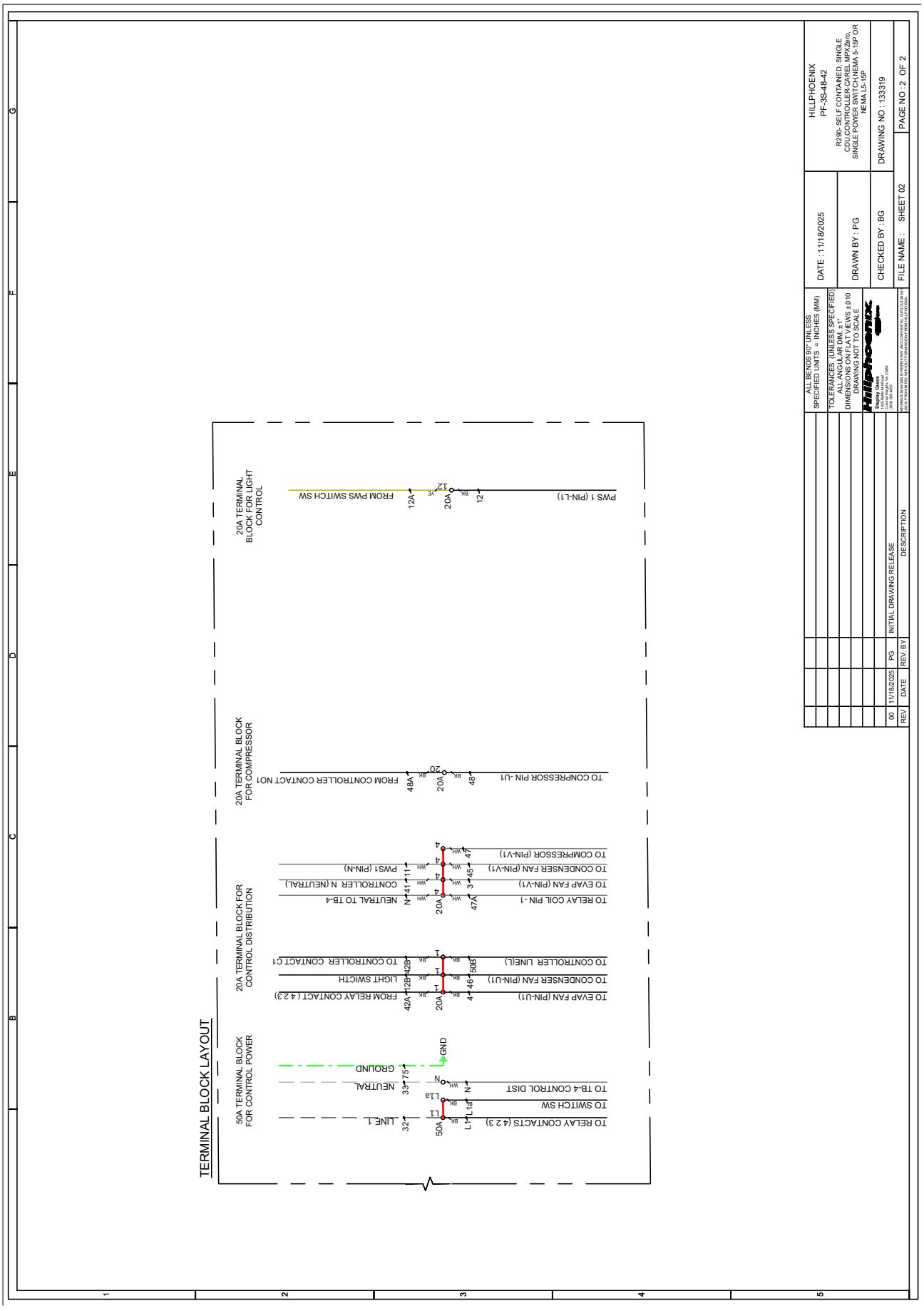

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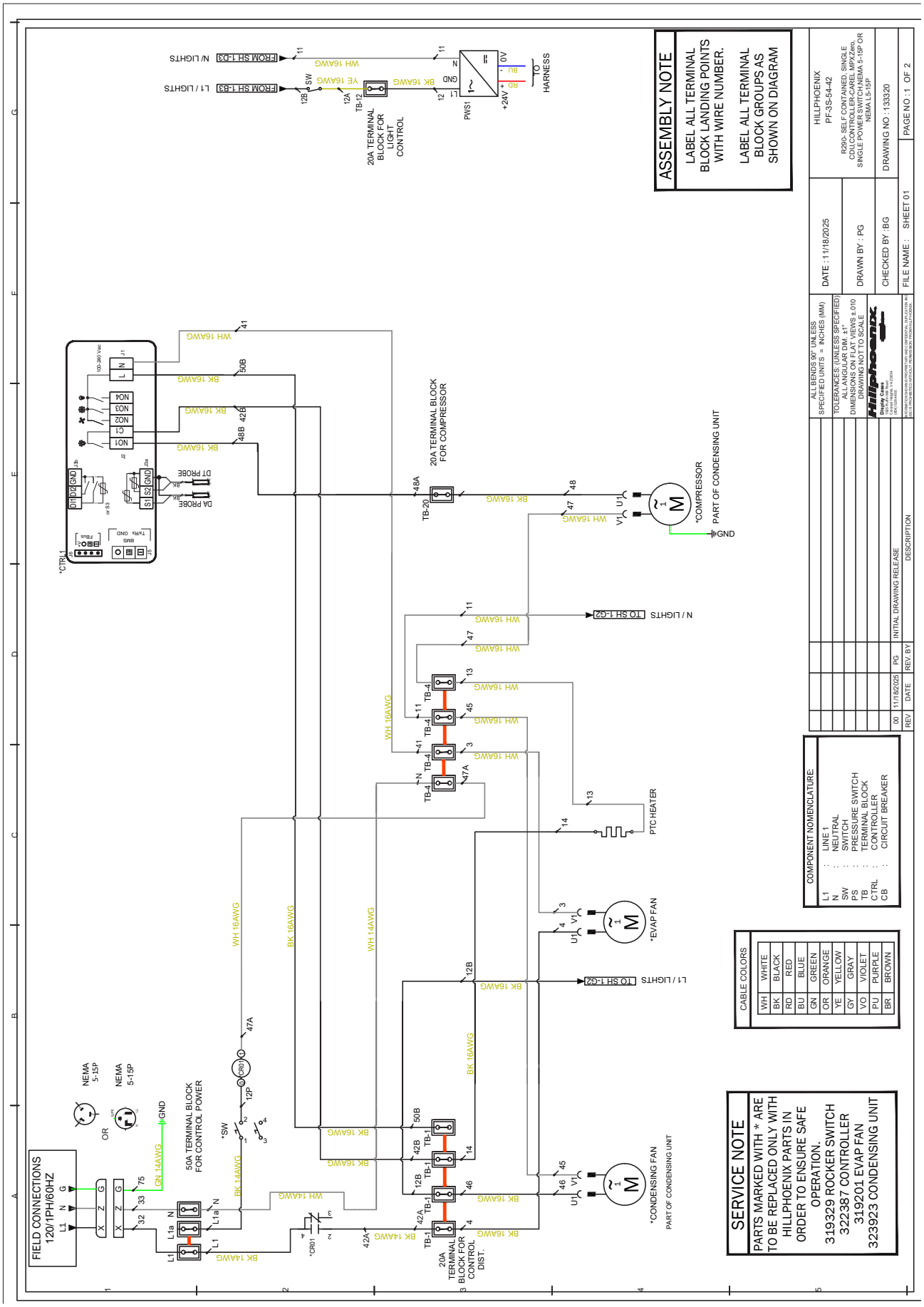

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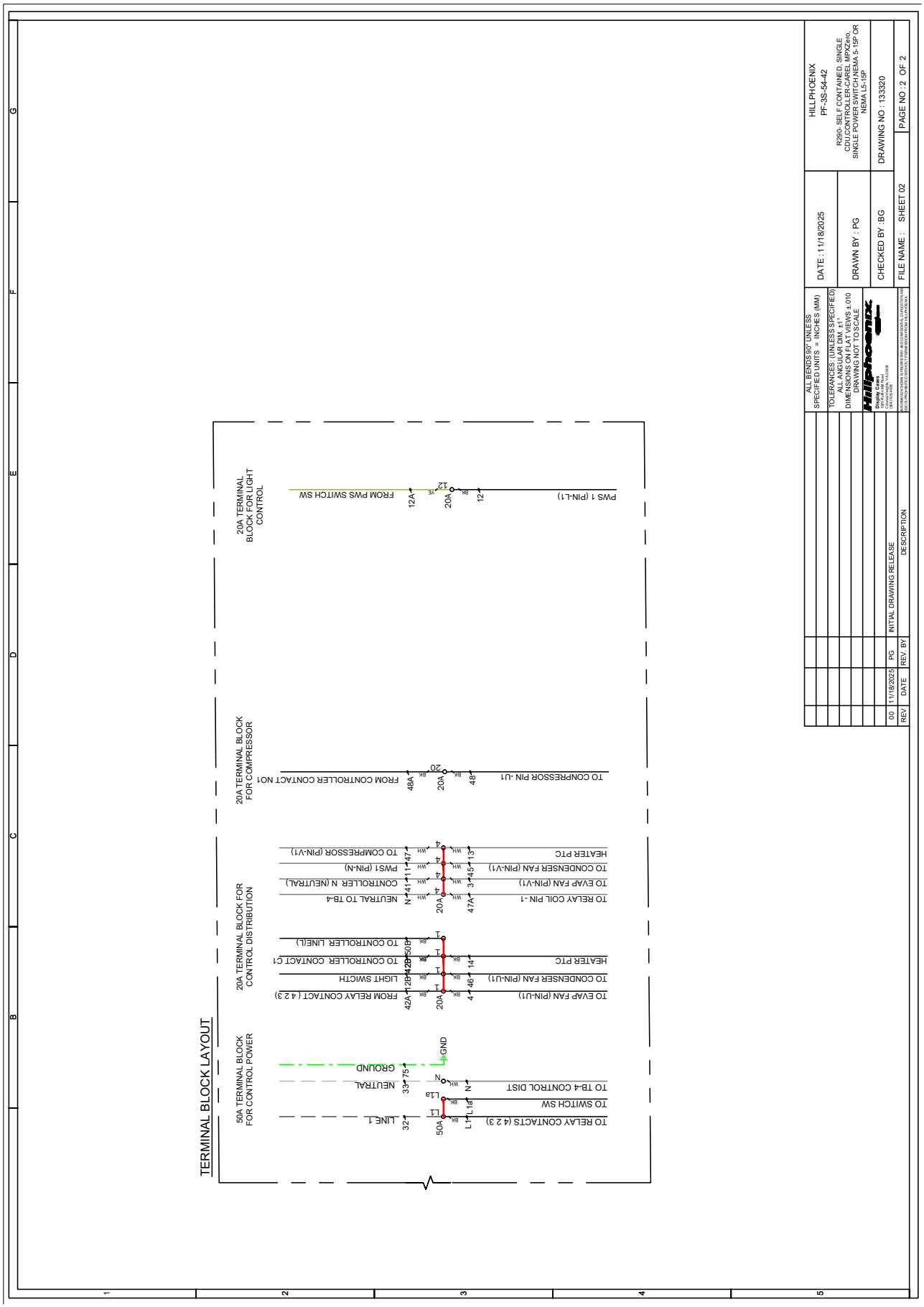

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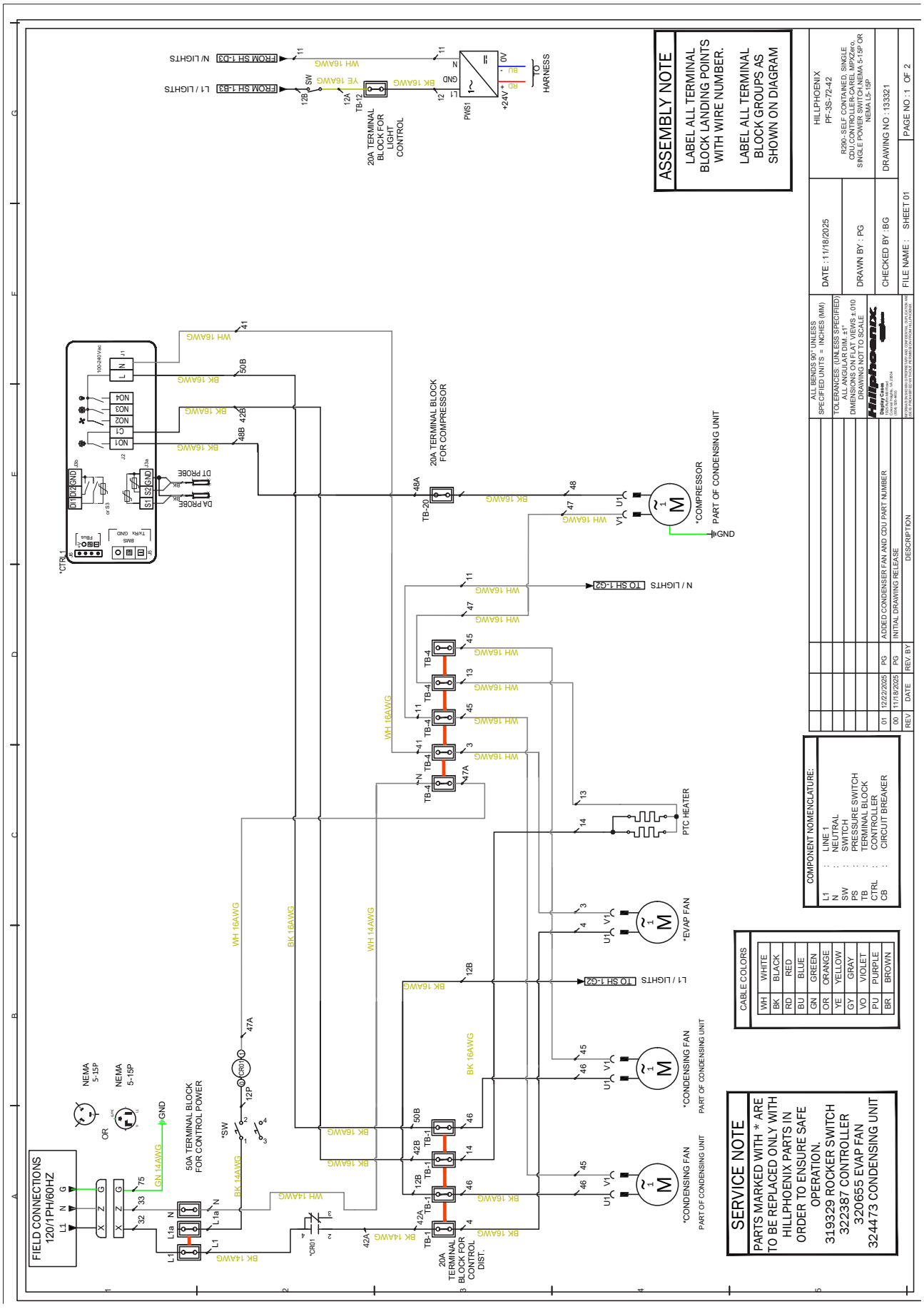

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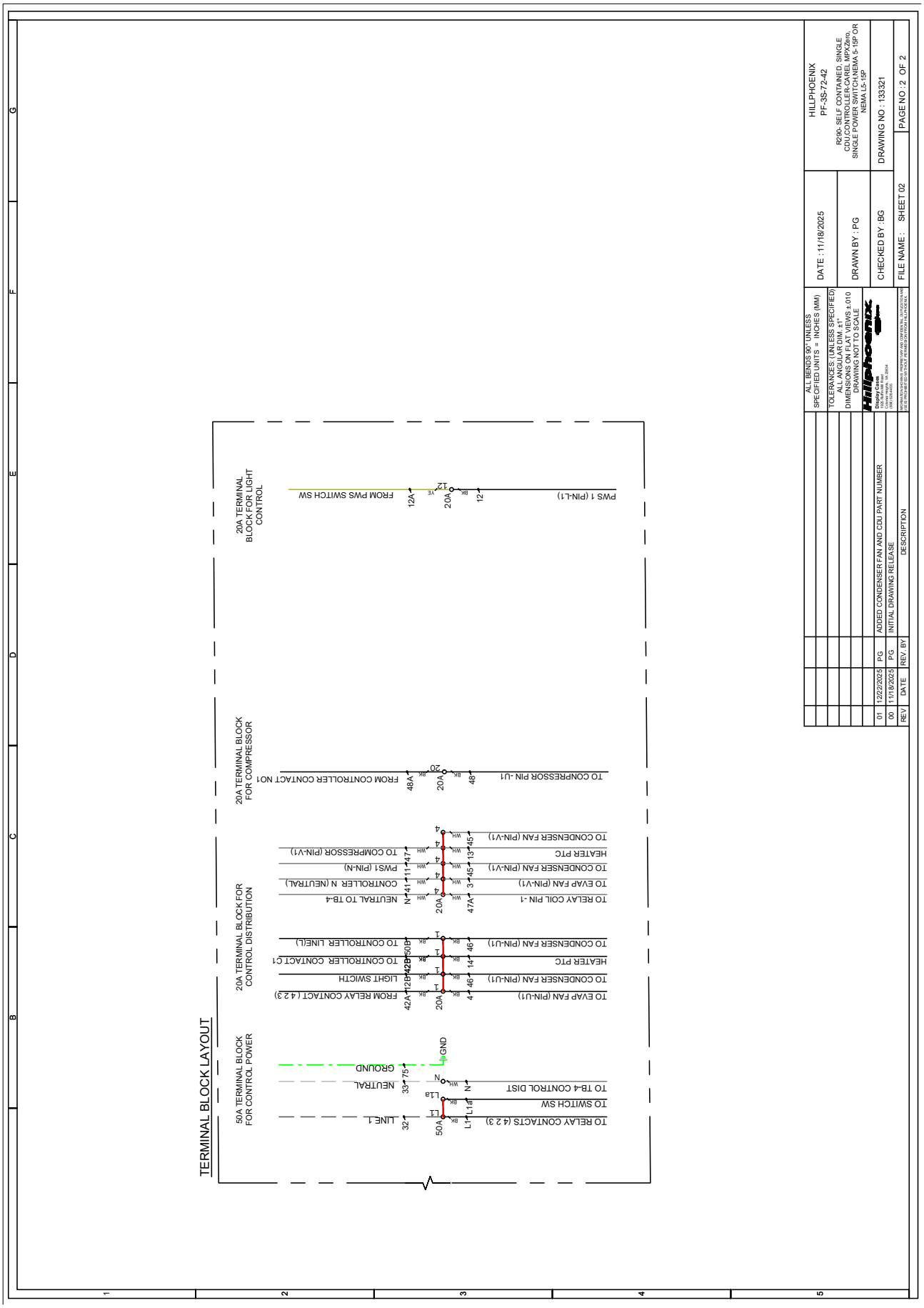

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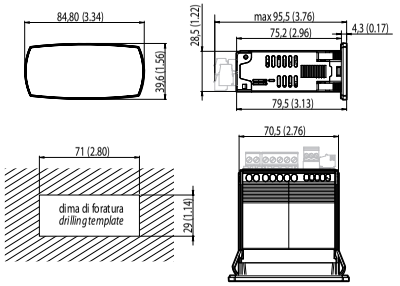
CAREL **MPXzero**

Descrizione/Description

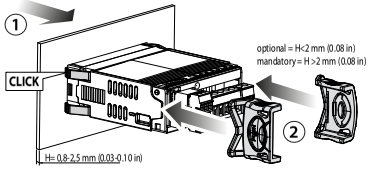
MPXzero è un controllo elettronico per applicazioni di refrigerazione commerciale centralizzate. La gamma prevede due versioni, MPXzero e MPXzero advanced, che differiscono principalmente per la seriale Fieldbus - tramite la quale un gruppo di banchi frigoriferi può operare in modo coordinato - il numero di uscite e la colorazione dell'interfaccia utente. La connettività wireless Near Field Connection (NFC) è sempre presente, mentre il Bluetooth (BLE) è opzionale per la versione advanced.

MPXzero is an electronic controller for centralised commercial refrigeration applications.
The range includes two versions, MPXzero and MPXzero advanced, which differ mainly due to the Fieldbus serial port - allowing a group of cabinets to operate in a coordinated manner - the number of outputs, and the colour of the user interface. In terms of wireless connectivity, near field communication (NFC) is always available, while Bluetooth (BLE) is optional on the advanced version.

DIMENSIONI / *DIMENSIONS [mm (in)]*

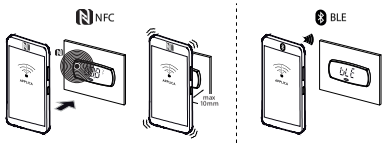


MONTAGGIO / *MOUNTING*



DISPOSITIVO MOBILE / *MOBILE DEVICE*

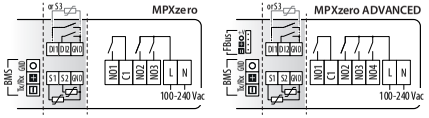
L'app CAREL "APPLICA", disponibile su Google Play e Apple Store (quest'ultimo solo Bluetooth), facilita le operazioni di configurazione dei parametri e di messa in servizio dell'unità sul campo. Il funzionamento di MPXzero è specificato nel manuale d'uso scaricabile dal sito www.carel.com.
The CAREL "APPLICA" app, available on Google Play e Apple Store (the latter only Bluetooth), can be used to configure parameters and commissioning of the unit. The operation of MPXzero is explained in the user manual, can be downloaded from the www.carel.com.



MODELLI E OPZIONI / *MODELS AND OPTIONS*

Modello/*Model*	*P/N*	Descrizione/*Description*
MPXzero NFC	S0MPSA3R02S****	Pannello 115...230V, 3 relè (2Hp/8A/5A) connett. Removibili, Disp. Rosso, NFC, BMS, Imballo singolo. *Panel 115...230V, 3 relays (2Hp/8A/5A) Plug-in term., RED Disp., NFC, BMS, Single Pack.*
	S0MPSA3R02M****	Pannello 115...230V, 3 relè (2Hp/8A/5A) connett. Removibili, Disp. Rosso, NFC, BMS, Imballo Multiplo (20pcs). *Panel 115...230V, 3 relays (2Hp/8A/5A) Plug-in term., RED Disp., NFC, BMS, Multiple Pack (20pcs).*
MPXzero ADVANCED NFC	S0MPSA4R03S****	Pannello ADVANCED 115...230V, 4 relè (2Hp/8A/5A/5A) connett. Removibili, Disp. Bianco, NFC, BMS, FBS Imballo Singolo. *Panel ADVANCED 115...230V, 4 relays (2Hp/8A/5A/5A) Plug-in term., WHITE Disp., NFC, BMS, FBS, Single Pack.*
	S0MPSA4R03M****	Pannello ADVANCED 115...230V, 4 relè (2Hp/8A/5A/5A) connett. Removibili, Disp. Bianco, NFC, BMS, FBS Imballo Multiplo (20 pcs). *Panel ADVANCED 115...230V, 4 relays (2Hp/8A/5A/5A) Plug-in term., WHITE Disp., NFC, BMS, FBS, Multiple Pack (20pcs).*
MPXzero ADVANCED NFC+BLE	S0MPSA4B03S****	Pannello ADVANCED 115...230V, 4 relè (2Hp/8A/5A/5A) connett. Removibili, Disp. Bianco, NFC/BLE, BMS, FBS Imballo Singolo. *Panel ADVANCED 115...230V, 4 relays (2Hp/8A/5A/5A) Plug-in term., WHITE Disp., NFC/BLE, BMS, FBS, Single Pack.*
	S0MPSA4B03M****	Pannello ADVANCED 115...230V, 4 relè (2Hp/8A/5A/5A) connett. Removibili, Disp. Bianco, NFC/BLE, BMS, FBS Imballo Multiplo (20 pcs). *Panel ADVANCED 115...230V, 4 relays (2Hp/8A/5A/5A) Plug-in term., WHITE Disp., NFC/BLE, BMS, FBS, Multiple Pack (20pcs).*

COLLEGAMENTI ELETTRICI / *ELECTRICAL CONNECTIONS*



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PERICOLO

- Questo foglio è parte del prodotto e deve essere conservato insieme al controllo per una rapida consultazione.
- Il controllo non deve essere usato per scopi diversi da quelli per cui è stato progettato, ovvero il controllo di unità frigorifere stand-alone o canalizzate a seconda del modello, in particolare non può essere usato come dispositivo di sicurezza.
- In caso di guasto contattare un centro assistenza autorizzato.
- Il controllo non deve essere aperto.
- Verificare la tensione di alimentazione prima dell'installazione.
- Utilizzare il controllo all'interno delle condizioni di funzionamento. Non esporre a liquidi o vapori ed evitare bruschi sbalzi di temperatura che potrebbero causare la formazione di condensa.
- Scollegare la tensione di alimentazione prima di effettuare qualsiasi operazione di manutenzione.
- Prestare attenzione alle correnti massime erogabili dai relè (vedere la sezione "Caratteristiche tecniche").
- Non applicare tensioni pericolose ai morsetti SELV (vedere la sezione "Caratteristiche tecniche").
- Utilizzare solamente cavi di sezione appropriata (vedere la sezione "Caratteristiche tecniche").
- Separare i cavi delle sonde e degli ingressi digitali dai cavi delle uscite e dai cavi di alimentazione. Non inserire mai cavi di potenza e cavi di segnale nella stessa condotta.

ATTENZIONE: le apparecchiature elettriche devono essere installate, usate e riparate solo da personale qualificato.

AVVERTENZE IMPORTANTI

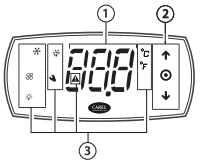
Il prodotto CAREL è un prodotto avanzato, il cui funzionamento è specificato nella documentazione tecnica fornita col prodotto o scaricabile, anche anteriormente all'acquisto, dal sito internet www.carel.com. Il cliente (costruttore, progettista o installatore dell'equipaggiamento finale) si assume ogni responsabilità e rischio in relazione alla fase di configurazione del prodotto per il raggiungimento dei risultati previsti in relazione all'installazione e/o equipaggiamento finale specifico. La mancanza di tale fase di studio, la quale è richiesta/indicata nel manuale d'uso, può generare malfunzionamenti nei prodotti finali di cui CAREL non potrà essere ritenuta responsabile. Il cliente finale deve usare il prodotto solo nelle modalità descritte nella documentazione relativa al prodotto stesso. La responsabilità di CAREL in relazione al proprio prodotto è regolata dalle condizioni generali di contratto CAREL editate nel sito www.carel.com e/o da specifici accordi con i clienti.

Smaltimento del prodotto: Il prodotto deve essere oggetto di raccolta differenziata in conformità alle normative locali vigenti in materia di smaltimento.

CARATTERISTICHE TECNICHE

Caratteristiche meccaniche	Contenitore	Policarbonato autoestinguente
	Temperatura di prova con la sfera	125 °C
	Grado di protezione	IEC: Retro: IP20; Fronte: IP65 — UL: Tipo 1
	Pulizia frontale	Utilizzare panno morbido non abrasivo, detergenti neutri o acqua
Condizioni ambientali	Temperatura di funzionamento	-20T60 °C, <90% U.R. non condensante
	Temperatura di immagazzinamento	-20T85 °C, <90% U.R. non condensante
Caratteristiche elettriche	Tensione di alimentazione nominale	100-240 Vac
	Tensione di alimentazione operativa	90-264 Vac
	Frequenza d'ingresso	50/60 Hz
	Corrente di ingresso massima	100 mArms
	Potenza assorbita min.	700mW
	Orologio	Precisione: 20 ppm a 25 °C; 100 ppm nel range di temperatura -20T60 °C. Conservazione data/ora con controllo spento fino a 2 anni (-20T60 °C).
	Classe e struttura del software	A
	Grado di inquinamento ambientale	2
	Classificazione secondo la protezione da scosse elettriche	Incorporabile in apparecchi di classe I o II
	Tipo di azione e disconnessione	1.C
	Tensione di impulso nominale	ingresso 100...240 Vac e uscita relè: 2,5 kV
	Categ. immunità alle sovratensioni	Ingresso 100...240 Vac e uscite relè: II
	Costruzione del dispositivo di comando	Dispositivo da incorporare
	Morsettiera	NO1, C1, NO2, NO3, NO4, L, N: Maschio-femmina estraibili 30÷12 AWG / 0,05÷3,3 mm²; Morsetti a vite 30÷14 AWG / 0,05÷2 mm²; Connettori Fast-on. S1, S2, S3, DI1, DI2, GND: Maschio-femmina estraibili 30÷17 AWG / 0,05÷1 mm²; Morsetti a vite 30÷17 AWG / 0,05÷1 mm². BMS: Maschio-femmina estraibili 30÷17 AWG / 0,05÷1 mm². FieldBus: Connettore JST ZH 32÷26 AWG / 0,03÷0,13 mm²
	Scopo del controllo	Dispositivo di comando elettrico
Interfaccia utente	Buzzer	Integrato
	Display	3 digit, punto decimale e icone polifunzionali
	Tastiera	Max 3 tasti
Connettività	NFC	Max distanza 10 mm, variabile secondo il dispositivo mobile utilizzato
	Bluetooth Low Energy (opz.)	Max distanza 10 m, variabile secondo il dispositivo mobile utilizzato
	Interfaccia seriale BMS	RS485, non optoisolata
	Interfaccia seriale FieldBUS (opz.)	RS485, non optoisolata, numero massimo di dispositivi collegabili: 20
Ingressi analogici (Lmax=10m)	S1, S2, S3: NTC / PT1000	NTC: risoluzione 0.1 °C; 10kΩ@25°C; errore: ±1°C nell'intervallo -50T50°C, ±3°C nell'intervallo 50T90°C. PT1000: risoluzione 0.1 °C; 1kΩ @0°C; errore: ±1°C nell'intervallo -60T120°C
Ingressi digitali	DI1, DI2 configurabili come ingressi digitali veloci	Contatto pulito: non otpoisolato corrente di chiusura 5 mA tipica tensione contatto aperto 12 V resistenza contatto max 50 Ω. Ingressi digitali veloci: 0-2 kHz, errore 2% fs, tipico 1%
Uscite digitali	NO1, NO2, NO3, NO4 Nota: Terminali a vite o removibili NO1: max 12A. NO2+NO3+NO4: max 12A	NO1 (2 hp): EN60730: 10(6) A, 250 Vac; UL60730: 16A, 250 Vac; 8FLA, 48LRA, 250 Vac; Pilot duty B300, 250 Vac. NO2 (8 A): EN60730: 8(3) A, 240 Vac; UL60730: 8A, 240 Vac; 2FLA, 12LRA, 240 Vac; Pilot duty C300, 240 Vac. NO3, NO4 (5 A): EN60730: 5(1) A, 240 Vac; UL60730: 5A, 240 Vac; 1FLA, 6LRA, 240 Vac; Pilot duty C300, 240 Vac.
Lunghezze cavi	Ingressi analogici, ingressi/uscite digitali, alimentazione sonde	< 10 m
	Seriali BMS e Fieldbus	< 500 m con cavo schermato
Conformità	Conformità sicurezza elettrica - direttiva LVD e certificazione UL	IEC/EN/UL 60730-1, CSA E60730-1, IEC 60335-1 (sezioni 29 e 30)
	Compatibilità elettromagnetica - Direttiva EMC	IEC/EN 61000-6-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, IEC/EN 61000-6-4
	Applicazioni con gas refrigeranti infiammabili	IEC/EN/UL 60335-2-40 (clausole 22.116 e 22.117), IEC/EN/UL 60335-2-89 (clausole 22.107, 22.108 e 22.109), IEC/EN/UL 60335-2-24 (clausole 22.109 e 22.110), per i gas R50, R290, R600, R600a, R-1234ze; IEC/EN/UL 60079-15 (clausole 17 e 19, applicate a i relè secondo il tipo. L'accettabilità dei relè deve essere comunque verificata e giudicata nell'applicazione finale).
	Conformità wireless	Direttiva RED, FCC (sezione 15, sottosezione B), IC.

TERMINALE UTENTE



Legenda:
1 display
2 icone/tasti
3 icone

Icone/Tasti retroilluminati

Icona	Descrizione	Acceso	Lampeggiante
	Solenoide/ compressore	Attivo	Forzato da tempistiche
	Ventilatore evaporatore	Attivo	-
	Luci	Accesa	-
	Sbrinamento	Attivo	In attesa
	Assistenza	Manutenzione richiesta	-
	Allarme	allarme riconosciuto	allarme attivo
°C	°C	Unità di misura °C	-
°F	°F	Unità di misura °F	-

La tabella si riferisce alla configurazione standard di prodotto con tasti retroilluminati, consultare il manuale d'uso per altre configurazioni.

Tastiera

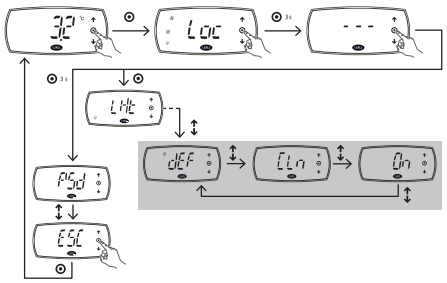
Codice	Descrizione
UP - DOWN	Incremento/ decremento valore Scorrimento funzioni ad accesso diretto LED acceso/ lampeggiante: scorrimento menu, parametri, funzioni ad accesso diretto/ modifica dei valori dei parametri
PRG	Pressione breve: salvataggio valore e ritorno al codice del parametro Ingresso menu funzioni ad accesso diretto (da maschera principale) e attivazione/ disattivazione funzioni Pressione lunga (3 s): ingresso in modo programmazione o ritorno al livello precedente senza salvataggio LED acceso: maschera principale/ modo programmazione

Schermate

Terminale	Stato	Descrizione
32 °C	A riposo	Il display mostra la grandezza principale alternata ad eventuali allarmi e segnalazioni
Loc	Visualizzazione carichi attivi	Il terminale mostra gli eventuali carichi attivi, la tastiera è bloccata
oFF	Attivazione diretta carichi e funzioni da tastiera	Da tastiera è possibile attivare o disattivare i carichi ed accedere alle funzionalità diretta
Ctl	Menu programmazione	Scorrimento del menu di programmazione mediante i tasti freccia
20 °C	Programmazione parametri/ visualizzazione valori	Modifica dei parametri mediante i tasti freccia o visualizzazione dei valori di sola lettura
bLE	Connessione Bluetooth	Il display è disabilitato in quanto il controllo è collegato ad una APP tramite Bluetooth Low Energy

B2: CAREL MPXzero OPERATING INSTRUCTIONS

Navigazione



PARAMETRI DI PRIMA CONFIGURAZIONE

Cod.	Descrizione	Def	Min	Max	U.M.
In	Tipo di unità: 0 = Secondary - 1 = Main	0	0	1	-
Sn	Numero di Secondary nella rete locale 0 = Nessuno Secondary	0	0	9	-
H0	Indirizzo seriale o di rete Main/Secondary	199	0	199	-
H3	Protocollo porta seriale BMS 0 = Carel - 1 = Modbus	1	0	1	-
/P1	Tipo sonda gruppo 1 (S1, S2, S3) 0 = PT1000 Standard Range –50T150 °C 1 = NTC Standard Range –50T90°C	1	0	1	-

ALLARMI

Al verificarsi di un allarme, l'icona ALARM diventa rossa e il terminale utente visualizza il codice corrispondente all'allarme.

Cod.	Descrizione
rE	Sonda di regolazione
E1	Sonda S1 guasta
E2	Sonda S2 guasta
E3	Sonda S3 guasta
E11	Sonda seriale S11 non aggiornata
E12	Sonda seriale S12 non aggiornata
E13	Sonda seriale S13 non aggiornata
E14	Sonda seriale S14 non aggiornata
LO	Bassa temperatura
HI	Alta temperatura
LO2	Bassa temperatura
HI2	Alta temperatura

Cod.	Descrizione
IA	Allarme immediato da contatto esterno
dA	Allarme ritardato da contatto esterno
dor	Porta aperta per troppo tempo
Etc	Real time clock non aggiornato
HA	HACCP di tipo HA
HF	HACCP di tipo HF
MA	Errore di comunicazione con il Main (solo su Secondary)
u1...u9	Errore di comunicazione con lo Secondary (solo su Main)
n1...n9	Allarme sull'unità 1...9 presente in rete
GHI	Funzione generica: allarme superamento soglia MAX
GLO	Funzione generica: allarme superamento soglia MIN

ITA ENG

⚠ ⚠ DANGER

- This leaflet is part of the product and should be kept near the control for quick reference.
- The control shall not be used for purposes other than those for which it was designed, in particular it can't be used as a safety device.
- In case of failure contact an authorized service center.
- The control must not be opened.
- Check the power supply voltage before installing.
- Use the control inside the operating conditions limits. Do not expose to liquids or steam and avoid sudden temperature changes that might cause condensation.
- Disconnect the power supply before any kind of maintenance.
- Observe the maximum current output value for each relay (see "Technical specifications" section).
- Do not apply dangerous voltage to the SELV connection terminals (see "Technical specifications" section).
- Only use cables with a suitable cross-section (see "Technical specifications" section).
- Separate the probe and digital input cables from output and power cables. Never run power cable and signal cables in the same conduct.

⚠ **ATTENTION:** electrical equipment must be installed, used and repaired only by qualified technicians

IMPORTANT WARNINGS

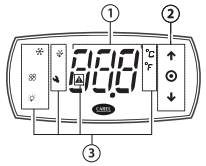
The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com. The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. Failure to complete such operations, which are required/indicated in the user manual, may cause the final product to malfunction; CAREL accepts no liability in such cases. The customer must only use the product in the manner described in the documentation relating to the product. The liability of CAREL in relation to its products is specified in the CAREL general contract conditions, available on the website www.CAREL.com and/or by specific agreements with customers.

Disposal of the product: the appliance (or the product) must be disposed of separately in accordance with the local waste disposal legislation in force.

TECHNICAL SPECIFICATIONS

Physical specifications	Case	Self-estinguish polycarbonate	
	Ball pressure test temperature	125 °C	
	Ingress protection	IEC • Rear: IP20 • Front: IP65	UL: • Type 1
	Front cleaning	Use soft, non-abrasive cloth and neutral detergent or water	
Environm. conditions	Operating temperature	-20T60 °C, <90% RH non-condensing	
	Storage temperature	-20T85 °C, <90% RH non-condensing	
Electrical specifications	Nominal power supply voltage	100-240 Vac	
	Operating power supply voltage	90-264 Vac	
	Input frequency	50/60 Hz	
	Maximum current draw	100 mArms	
	Min power consumption	700 mW	
	Clock	Precision: 20 ppm at 25 °C; 100 ppm in the range -20T60 °C; date/time retention with unpowered control: up to 2 years (-20T60 °C).	
	Software class and structure	A	
	Environmental pollution class	2	
	Class of protection against electric shock	To be incorporated in class I or II appliances	
	Type of action and disconnection	1.C	
	Rated impulse voltage	100-240 Vac input and relay outputs: 2,5 kV	
	Surge immunity category	100-240 Vac input and relay outputs: II	
	Control device construction	Device to be incorporated	
	Terminal block	NO1, C1, NO2, NO3, NO4, L, N: • Plug-in male-female 30-12 AWG/ 0,05÷3,3 mm² • Screw terminals 30-14 AWG / 0,05÷2 mm² • Spade connectors S1, S2, S3, DI1, DI2, GND: • Plug-in male-female 30-17 AWG / 0,05÷1 mm² • Screw terminals 30-17 AWG / 0,05÷1 mm² BMS: • Plug-in male-female 30-17 AWG / 0,05÷1 mm² FieldBus: • JST ZH connector 32÷26 AWG / 0,03÷0,13 mm²	
	Purpose of the controller	Electrical operating control	
User interface	Buzzer	Built-in	
	Display	3 digits, decimal point and multi-function icons	
	Keyboard	Max 3 keys	
Connectivity	NFC	Max distance 10 mm, variable according to the mobile device used	
	Bluetooth Low Energy (opt.)	Max distance 10 m, variable according to the mobile device used	
	BMS serial interface	RS485, not opto-isolated	
	FieldBUS serial interface (opt.)	RS485, not opto-isolated, maximum number of devices that can be connected: 20	
Analogue inputs (Lmax=10m)	S1, S2, S3: NTC / PT1000	NTC: resolution 0.1 °C; 10kΩ@25°C; error: ±1°C in the range -50T50°C, ±3°C in the range 50T90°C	
		PT1000: resolution 0.1 °C; 1kΩ@0 °C; error: ±1 °C in the range -60T120 °C	
Digital inputs	DI1, DI2 configurable as fast digital inputs	Voltage-free contact, not optically-isolated, typical closing current 5mA, voltage with contact open 12V, max contact resistance 50Ω Fast digital inputs: 0-10 V: error 2% fs, typical 1%	
Digital outputs	NO1, NO2, NO3, NO4 Note: Screw or plug-in terminals, NO1: max 12A. NO2+NO3+NO4: max 12A	NO1 (2 hp): EN60730: 10(6) A, 250 Vac; UL60730: 16A, 250 Vac; 8FLA, 48LRA, 250 Vac; Pilot duty B300, 250 Vac.	
		NO2 (8 A): EN60730: 8(3) A, 240 Vac; UL60730: 8A, 240 Vac; 2FLA, 12LRA, 240 Vac; Pilot duty C300, 240 Vac.	
		NO3, NO4 (5 A): EN60730: 5(1) A, 240 Vac; UL60730: 5A, 240 Vac; 1FLA, 6LRA, 240 Vac; Pilot duty C300, 240 Vac.	
Cable lengths	Analogue inputs, digital inputs/outputs, probe power	< 10 m	
	BMS and Fieldbus serial cables	< 500 m with shielded cable	
Conformity	Electrical safety compliance - LVD directive and UL certification	IEC/EN/UL 60730-1, CSA E60730-1, IEC 60335-1 (sections 29 & 30)	
	Electromagnetic compatibility - EMC directive	IEC/EN 61000-6-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, IEC/EN 61000-6-4	
	Applications with flammable refrigerant gases	IEC/EN/UL 60335-2-40 (clauses 22.116 & 22.117), IEC/EN/UL 60335-2-89 (clauses 22.107, 22.108 & 22.109), for R50, R290, R600, R600a, R-1234ze gases. IEC/EN/UL 60079-15 (clauses 17 & 19, applied to the relays according their type. Acceptability should be always verified and judged in the final application).	
	Wireless compliance	RED directive, FCC (section 15, subsection B), IC	

USER TERMINAL



Key:
1 display
2 icons/backlit buttons
3 icons

Backlit buttons/Icons

Icon	Description	On	Flashing
	Solenoid/ compressor	Active	Timings active
	Evaporator fan	Active	-
	Lights	On	-
	Defrost	Active	Waiting
	Service	Maintenance request	-
⚠	Alarm	Acknowledged alarm	Active alarm
°C	°C	Unit of measure °C	-
°F	°F	Unit of measure °F	-

Standard product configuration, see the user manual for other configurations.

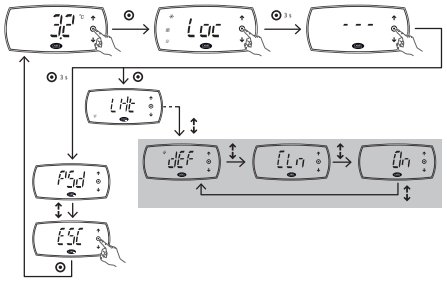
Keypad

Button	Description
↑ ↓ UP - DOWN	• Increase/decrease the value • Scroll direct access functions • LED on/flashing: scroll menu, parameters, direct access functions/ set parameter values
PRG	Pressed briefly: • Save value and return to the parameter code • Enter direct access function menu (from main screen) and activate/ deactivate functions Pressed and held (3 s): • Enter programming mode or return to previous level without saving • LED on: main screen/programming mode

Masks

Terminal	Status	Description
	Standby	The display shows the main value alternated with alarms and signalling
	Active loads visualization	The terminal shows active loads and the keyboard is disabled
	Direct activation of loads and functions from keyboard	It is possible to activate/ deactivate loads and to enter direct functionalities from keyboard
	Programming menu	Menu scrolling by arrow keys
	Parameters programming / visualizzation	Parameters modification by arrow keys or read only values visualization
	Bluetooth connection	The display is disabled since the control is connected to an APP by Bluetooth Low Energy

Navigation



INITIAL CONFIGURATION PARAMETERS

Code	Description	Def	Min	Max	UOM
In	Type of unit: 0 = Secondary - 1 = Master	0	0	1	-
Sn	Number of Secondaries in the local network 0 = No Secondary	0	0	9	-
H0	Serial or Main/Secondary network address	199	0	199	-
H3	BMS serial port protocol 0 = Carel - 1 = Modbus	1	0	1	-
/P1	Sensor type group 1 (S1, S2, S3) 0 = PT1000 Standard Range –50T150 °C 1 = NTC Standard Range –50T90°C	1	0	1	-

ALARMS

When an alarm occurs, the ALARM icon turns red and the user terminal displays the corresponding alarm code.

Code	Description
rE	Control probe
E1	Probe S1 fault
E2	Probe S2 fault
E3	Probe S3 fault
E11	Serial probe S11 not updated
E12	Serial probe S12 not updated
E13	Serial probe S13 not updated
E14	Serial probe S14 not updated
LO	Low temperature
HI	High temperature
LO2	Low temperature
HI2	High temperature

Code	Description
IA	Immediate alarm from external contact
dA	Delayed alarm from external contact
dor	Door open for too long
Etc	Real time clock not updated
HA	HACCP type HA
HF	HACCP type HF
MA	Communication error with the Main (only on Secondary)
u1...u9	Communication error with the Secondary (only on Main)
n1...n9	Alarm on unit 1 ... 9 in the network
GHI	Generic function: MAX threshold exceeded alarm
GLO	Generic function: MIN threshold exceeded alarm

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+0500153IE - rel. 1.1 - 08.10.2020

EASY (PJEZ* and PQEZ*) - controlli elettronici per unità statiche/ventilate a normale/bassa temperatura / electronic controller for static/ventilated normal/low temperature units

CAREL

Dimensioni (mm) / Dimensions (mm)

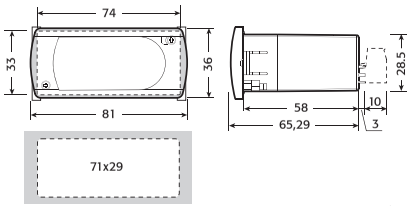


Fig. 1

Montaggio a pannello / Panel mounting

Frontale (con 2 viti ø 2,5x12 mm) / Front (with 2 screws ø 2,5x12 mm)

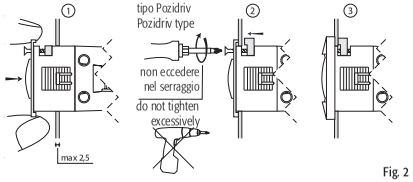


Fig. 2

Da dietro (con 2 staffe posteriori) / Rear (with 2 quick-fit side brackets)

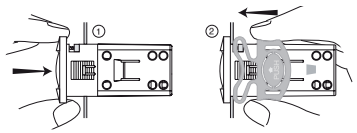
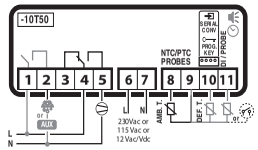


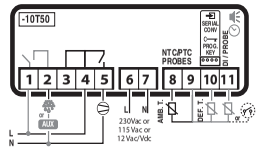
Fig. 3

Collegamenti elettrici / Electrical connections

P(J,Q)EZ(S, X)*



P(J,Q)EZ(S, X)* Compressor relay 2HP



(ITA) Descrizione

PJEZ* e PQEZ* (mod. S, C, M, Y, X) rappresenta una gamma di regolatori elettronici a microprocessore con visualizzazione a LED realizzati per la gestione di unità frigorifere, vetrine e banchi frigo. I regolatori PJEZ* sono dotati di relè standard. I regolatori PQEZ* sono progettati specificatamente per l'utilizzo in applicazioni con gas refrigeranti infiammabili.

Modelli disponibili:

- P(J,Q)EZS*, indicati per la gestione di unità frigorifere statiche, prive di ventilatore sull'evaporatore, funzionanti con temperature sopra lo 0°C;
- P(J,Q)EZC*, indicati per la gestione di unità frigorifere ventilate in bassa temperatura.
- P(J,Q)EZ(Y, X)*, indicati per la gestione di unità frigorifere statiche, prive di ventilatore, funzionanti a bassa temperatura;
- P(J,Q)EZM*, soluzione per la semplice misurazione della temperatura.

Nota: mod. Y= relè collegati elettronicamente all'interno tra loro; mod. X= relè indipendenti.

Caratteristiche tecniche

alimentaz. (*)	230 Vac +10/-15% 50/60 Hz; 115 Vac +10/-15% 50/60 Hz 12 Vac +10/-15% 50/60 Hz classe 2; 12 Vdc +10/-20% classe 2	
potenza nom.	3,5 VA	
ingressi (*)	sonda NTC o PTC 1 o 3 ingressi. Ingresso digitale in alternativa a terza sonda	
uscite relè (*)		
	PJEZ	PQEZ
relè 2 Hp	UL: 12 A Res. 12 FLA 72 LRA - 240 Vac(***), UL: 12 A Res. 10 FLA 60 LRA - 240 Vac(****) EN60730-1: 10(10) A 250 Vac (**)	UL60730: 12 A Res. 8 FLA 48 LRA - 240 Vac, EN60730: 10(6) A 250 Vac
relè 16 A	UL: 12 A Res. 5 FLA 30 LRA - 240 Vac C300, EN60730-1: 12(2) A NO/NC, 10(4) A up to 60 °C NO, 2(2) A CO - 250 Vac	UL60730: 12 A Res. 5 FLA 30 LRA - 240Vac C300, EN60730: 12 (2) A NO 100k cycles, 12(2) A NC 30k cycles, 2(2) A CO 30k cycles - 250 Vac
relè 8 A	UL: 8 A Res. 2 FLA 12 LRA - 240 Vac C300, EN60730-1: 8(4) A NO, 6(4) A NC, 2(2) A CO - 250 Vac	UL60730: 8 A Res. 2 FLA 12 LRA - 240 Vac C300, EN60730: 8(3) A NO, 6(3) A NC, 2(2) A CO - 250 Vac
tipo sonda (*)	NTC Std CAREL 10 KΩa 25 °C, PTC Std CAREL 985 Ω a 25 °C	
connessioni (*)	morsetti fissi a vite per cavi con sez. da 0,5 mm² a 1,5 mm². Morsetti estraibili per blocchetti a vite o con contatto a crimpare (sez. cavo fino a 2,5 mm²). Corrente nominale massima per morsetto 12 A.	
montaggio (*)	per terminale: mediante viti dal frontale o con staffe posteriori	
visualiz.	display LED 3 cifre con segno (-199…999) e punto decimale; sei LED di stato	
condizioni di funzionamento	-10T50 °C - umidità <90% U.R. non condensante	
condizioni di immagazzinamento	-20T70 °C - umidità <90% U.R. non condensante	
intervallo di rilevazione	-50T90 °C (-58T194 °F) - risoluzione 0,1 °C/°F	
grado di protezione frontale	montaggio a quadro con guarnizione: IP65 tipo 1	
contenitore	terminale plastico, 81x36x65 mm	
classificazione secondo la protezione contro le scosse elettriche	Classe II per incorporamento adeguato	
inquinamento ambientale	normale	
PTI dei materiali di isolamento	250 V	
periodo delle sollecitazioni elettriche delle parti isolanti	lungo	
categoria di resistenza al calore e al fuoco	categoria D (UL94 - V0)	
immunità contro le sovratensioni	categoria 1	
tipo di azione e disconnessione	contatti relè 1C	
n.ro di cicli di manovra delle operazioni automatiche relè (*)	EN60730: 100.000 operazioni UL: 30.000 operazioni (250 Vac)	
classe e struttura del software	Classe A	
pulizia dello strumento	utilizzare esclusivamente detergenti neutri ed acqua.	
lunghezza max. cavi	seriale: 1 km - sonde: 30 m - relè: 10 m	

AVVERTENZA:
Non passare cavi di potenza a meno di 3 cm dalla parte inferiore del dispositivo o dalle sonde; per le connessioni usare solo cavi di rame.
(*) Le caratteristiche indicate si differenziano a seconda del modello.
(**) T OFF minimo tra due start motore deve essere maggiore di 60 s.
(***) solo per i modelli PJEZ(M,S,X)*
(****) solo per i modelli PJEZ(C, Y)*

AVVERTENZE IMPORTANTI: Il prodotto CAREL è un prodotto avanzato, il cui funzionamento è specificato nella documentazione tecnica fornita col prodotto o scaricabile, anche anteriormente all'acquisto, dal sito internet www.carel.com. Il cliente (costruttore, progettista o installatore dell'equipaggiamento finale) si assume ogni responsabilità e rischio in relazione alla fase di configurazione del prodotto per il raggiungimento dei risultati previsti in relazione all'installazione e/o equipaggiamento finale specifico. La mancanza di tale fase di studio, la quale è richiesta/indicata nel manuale d'uso, può generare malfunzionamenti nei prodotti finali di cui CAREL non potrà essere ritenuta responsabile. Il cliente finale deve usare il prodotto solo nelle modalità descritte nella documentazione relativa al prodotto stesso. La responsabilità di CAREL in relazione al proprio prodotto è regolata dalle condizioni generali di contratto CAREL editate nel sito www.carel.com e/o da specifici accordi con i clienti.

Attenzione: separare quanto più possibile i cavi delle sonde e degli ingressi digitali dai cavi dei carichi induttivi e di potenza per evitare possibili disturbi elettromagnetici. Non inserire mai nelle stesse canaline (comprese quelle dei quadri elettrici) cavi di potenza e cavi di segnale.

(ENG) Description

PJEZ* and PQEZ* (models S, C, M, Y, X) represent a range of electronic controllers with LED display developed for the management of refrigerating units, display cabinets and showcases. PJEZ* controllers are provided with standard relays. PQEZ* controllers are

Tabella parametri

	Parametro		Min.	Max.	Def.	U.M.	M¹
PS	PASSWORD	F	0	200	22	-	
/	PARAMETRI SONDA						
/2	Stabilità misura	C	1	15	4	-	
/4	Selezione sonda/ingresso visualizzata/o (*)	F	1	3	1	-	
/5	Selezione °C / °F (0 = °C; 1 = °F)	C	0	1	0	-	
/6	Disabilitazione punto decimale	C	0	1	0	-	
/7	Abilitazione allarme sonda 2 (solo P(J,Q)EZM)	C	0	1	0	-	
/C1	Calibrazione sonda	F	-50,0	50,0	0,0	°C/°F	
/C2	Calibrazione sonda 2 (*)	F	-50,0	50,0	0,0	°C/°F	
/C3	Calibrazione sonda 3 (*)	F	-50,0	50,0	0,0	°C/°F	
r	PARAMETRI REGOLATORE						
St	Temperatura di regolazione	F	r1	r2	4.0	°C/°F	
r1	SET minimo consentito all'utente	C	-50,0	r2	-50,0	°C/°F	
r2	SET massimo consentito all'utente	C	r1	200,0	90,0	°C/°F	
r3	Modalità di funzionamento 0= direct+defrost; 1= direct; 2= reverse	C	0	2	0	-	-
r4	Variazione automatica set point notturno (*)	C	-50,0	50,0	3.0	°C/°F	
rd	Differenziale di regolazione (isteresi)	F	0,0	19,0	2,0	°C/°F	
c	PARAMETRI COMPRESSORE						
c0	Rit. partenza comp. e ventola dopo accensione	C	0	100	0	min	-
c1	Tempo min. tra accensioni successive comp.	C	0	100	0	min	-
c2	Tempo min. di spegnimento del compres.	C	0	100	0	min	-
c3	Tempo min. di funzionamento del compres.	C	0	100	0	min	-
c4	Sicurezza compressore (duty setting)	C	0	100	0	min	-
cc	Durata ciclo continuo	C	0	15	4	h	-
c6	Tempo esclusione allarme dopo ciclo cont.	C	0	15	2	h	-
d	PARAMETRI SBRINAMENTO						
d0	Tipo di sbrinamento (0= resistenza; 1= gas caldo; 2= resist. a tempo; 3= gas caldo a tempo; 4= resist. termostatato a tempo)	C	0	4	0	-	-
dI	Intervallo tra due sbrinamenti	F	0	199	8	h/min	-
dt	Temperatura di fine sbrinamento (*)	F	-50,0	130,0	4,0	°C/°F	-
dP	Durata max. o durata effettiva sbrinamento	F	1	199	30	min/s	-
d4	Sbrin. all'accensione dello strum. (1= attivato)	C	0	1	0	-	-
d5	Ritardo sbrinam. all'accensione o da ing. dig.	C	0	199	0	min	-
d6	Blocco visualizzazione temperatura durante lo sbrinamento (1= bloccata visualizzazione)	C	0	1	1	-	-
dd	Tempo di gocciolamento dopo lo sbrinam.	F	0	15	2	min	-
d8	Tempo di esclusione allarmi dopo lo sbrinam.	F	0	15	1	h	-
d9	Priorità sbrinam. sulle protezioni compres. (0= tempi protezione rispettati; 1= tempi protezione non rispettati)	C	0	1	0	-	-
d/	Visualiz. temp. sonda di sbrinamento (*)	F	-	-	-	-	-
dc	Base dei tempi (solo per lo sbrinamento; 0= h/min ; 1= min/s)	C	0	1	0	-	-
A	PARAMETRI DI ALLARME						
A0	Differenziale allarmi e ventole	C	-20,0	20,0	2,0	°C/°F	
AL	Soglia/Scostamento allarme di bassa temperatura (AL= 0; allarme escluso)	F	-50,0	250,0	0	°C/°F	
AH	Soglia/Scostamento allarme di alta temperatura (AH= 0; allarme escluso)	F	-50,0	250,0	0	°C/°F	
Ad	Ritardo allarme bassa e alta temperatura	C	0	199	0	min	
A4	Configurazione ingresso digitale (*) 0= ingresso non attivo; 1= allarme esterno istant. o ritardato (A7); 2= abilitazione defrost (aperto=disabilit.); 3= inizio defrost su fronte di chiusura; 4= switch tenda o funz. notturno (aperto= set normale); 5= ON/OFF remoto (aperto= OFF); 6= comando uscita AUX [H1=3] (aperto = AUX diseec.); 7= comando uscita AUX [H1=3] + FAN OFF (chiuso) (aperto = AUX eccitato); 8= comando uscita AUX [H1=3] + FAN-OFF (chiuso) + COMP-OFF (chiuso); (aperto= AUX eccitato); 9= selezione funzionam. direct/reverse: r3=0 => aperto= direct + defrost; chiuso= reverse r3=1/2 => aperto= direct; chiuso= reverse 10= sonda condensatore; 11= sonda prodotto	C	0	11	0	-	
A7	Ritardo rilevazione allarme esterno (*)	C	0	199	0	min	
A8	Abilitazione allarme 'Ed': fine sbrinamento per timeout (1= abilitato) (*)	C	0	1	0	-	-
Ac	Allarme alta temperatura condensatore (*)	C	-50,0	250,0	70,0	°C/°F	
AE	Differenziale allarme alta temp. condens. (*)	C	0,1	20,0	5,0	°C/°F	
Acd	Ritardo allarme alta temp. condensatore (*)	C	0	250	0	min	
F	PARAMETRI VENTOLE (**)						
F0	Gestione ventole: 0= ventole accese escluso	C	0	1	0	-	-

Table of parameters

	Parameter		Min.	Max.	Def.	UOM	M¹
PS	PASSWORD	F	0	200	22	-	
/	PROBE PARAMETERS						
/2	Measurement stability	C	1	15	4	-	
/4	Select probe/input displayed (*)	F	1	3	1	-	
/5	Select °C / °F (0 = °C; 1 = °F)	C	0	1	0	-	
/6	Disable decimal point	C	0	1	0	-	
/7	Enable probe 2 alarm (P(J,Q)EZM only)	C	0	1	0	-	
/C1	Probe calibration	F	-50.0	50.0	0.0	°C/°F	
/C2	Probe 2 calibration (*)	F	-50.0	50.0	0.0	°C/°F	
/C3	Probe 3 calibration	F	-50.0	50.0	0.0	°C/°F	
r	CONTROL PARAMETERS						
St	Control temperature	F	r1	r2	4.0	°C/°F	
r1	Minimum set point allowed to the user	C	-50.0	r2	-50.0	°C/°F	
r2	Maximum set point allowed to the user	C	r1	200.0	90.0	°C/°F	
r3	Operating mode 0= direct+defrost; 1= direct; 2= reverse	C	0	2	0	-	-
r4	Automatic night-time set point variation	C	-50.0	50.0	3.0	°C/°F	
rd	Control differential (hysteresis)	F	0.0	19.0	2.0	°C/°F	
c	COMPRESSOR PARAMETERS						
c0	Comp. and fan start delay after start-up	C	0	100	0	min	-
c1	Min. time between successive comp. starts	C	0	100	0	min	-
c2	Min. compressor off time	C	0	100	0	min	-
c3	Min. compressor on time	C	0	100	0	min	-
c4	Compressor safety (duty setting)	C	0	100	0	min	-
cc	Continuous cycle duration	C	0	15	4	h	-
c6	Alarm bypass time after cont. cycle	C	0	15	2	h	-
d	DEFROST PARAMETERS						
d0	Type of defrost (0= heater; 1= hot gas; 2= heater by time; 3= hot gas by time; 4= heater by time with temp. cont.)	C	0	4	0	-	-
dI	Interval between two defrosts	F	0	199	8	h/min	-
dt	End defrost temperature	F	50.0	130.0	4.0	°C/°F	-
dP	Max. or effective defrost duration	F	1	199	30	min/s	-
d4	Defrost when the instrument is switched on (1= activated)	C	0	1	0	-	-
d5	Defrost delay on start-up or from digital input	C	0	199	0	min	-
d6	Disable temperature display during defrost (1= display disabled)	C	0	1	1	-	-
dd	Dripping time after defrost	F	0	15	2	min	-
d8	Alarm bypass time after defrost	F	0	15	1	h	-
d9	Defrost priority over comp. protectors (0= protection time respected; 1= protection time not respected)	C	0	1	0	-	-
d/	Display defrost probe temp.	F	-	-	-	-	-
dc	Time base (for defrost only; 0= h/min; 1= min/s)	C	0	1	0	-	-
A	ALARM PARAMETERS						
A0	Alarm and fan differential	C	-20.0	20.0	2.0	°C/°F	
AL	Low temperature alarm threshold/deviation (AL= 0; alarm disabled)	F	-50.0	250.0	0	°C/°F	
AH	High temperature alarm threshold/deviation (AH= 0; alarm disabled)	F	50.0	250.0	0	°C/°F	
Ad	Low and high temperature alarm delay	C	0	199	0	min	
A4	Digital input configuration 0=input not active; 1= exter. alarm, instant (A7=0) or delayed (A7>0); 2=enable defrost (open=disabil.); 3=start defrost on closing; 4=curtain switch or night-time operation (open=normal setpoint); 5=remote ON/OFF (open=OFF); 6=AUX output control [H1=3] (open = AUX de-energ.); 7=AUX output [H1=3] + FAN OFF control (closed) (open = AUX energised); 8=AUX output [H1=3] + FAN-OFF (closed) + COMP-OFF control (closed); (open=AUX energised); 9=select direct/reverse operation: r3=0 => open= direct + defrost; closed= reverse r3=1/2 => open= direct; closed= reverse 10= condenser probe; 11= product probe	C	0	11	0	-	
A7	External alarm detection delay	C	0	199	0	min	
A8	Enable alarm 'Ed': end defrost by timeout (1= enabled)	C	0	1	0	-	-
Ac	High condenser temperature alarm	C	-50.0	250.0	70.0	°C/°F	
AE	High condenser temperature alarm differential	C	0.1	20.0	5.0	°C/°F	
Acd	High condenser temperature alarm delay	C	0	250	0	min	
F	FAN PARAMETERS (**)						
F0	Fan management: 0= fans on excluding specific	C	0	1	0	-	-

(ITA) Visualizzazione e funzioni

Durante il normale funzionamento il controllo visualizza a display il valore della sonda impostata con il parametro /4 (=1 sonda ambiente di default, =2 seconda sonda, 3= terza sonda). Inoltre sul display appaiono i LED che indicano l'attivazione delle funzioni del controllo (vedi Tab. 1), mentre i 3 tasti permettono di attivare/disattivare alcune funzioni (vedi Tab. 2).

LED e funzioni associate

icona	funzione	normale funzionamento			start up
		ON	OFF	blink	
	compressore	acceso	spento	richiesto	ON
	ventola	acceso	spento	richiesto	ON
	defrost	acceso	spento	richiesto	ON
AUX	aux	uscita accesa	uscita spenta	-	ON
	allarme	tutti	nessun allarme	-	ON
	orologio	RTC presente e abilitato, ed è stata impostata almeno 1 fascia oraria	RTC assente o disabilitato, o non è stata impostata nemmeno 1 fascia oraria	-	ON se RTC presente

Tab. 1

Tabella attivazione funzioni tramite i tasti - mod. S, X, Y, C

tasto	normale funzionamento		start up	
	pressione del singolo tasto	pressione conbinata		
	più di 3 s: alterna stati ON/OFF	Premuti insieme attivano/disattivano ciclo continuo	-	
	più di 3 s: attiva/disattiva defrost		Premuti insieme attivano procedura RESET parametri.	per 1 s visualizza cod. vers. firmware
set	- 1 s.: visualizza/permette di impostare set point - più di 3 s: accesso menù impostazione parametri (inserire password '22') - Tacita allarme acustico (buzzer)	-		per 1 s RESET banco EZY corrente

Tab. 2

Tabella funzioni tasti - variante mod. M

tasto	normale funzionamento	start up	
	selezione rapida sonda visualizzata	Premuto insieme a "set" attiva procedura RESET parametri.	per 1 s visualizza cod. vers. firmware

Tab. 3

Impostazioni del set point (valore di temperatura desiderato)

- premere per 1 s SET, dopo alcuni istanti il valore impostato lampeggia;
- aumentare o diminuire tale valore con UP o DOWN;
- premere SET per confermare il nuovo valore.

ON/OFF dello strumento

Premere per più di 3 s UP. In questa condizione gli algoritmi di regolazione e defrost sono disabilitati e lo strumento alterna la visualizzazione a display del messaggio "OFF" a quella della temperatura della sonda impostata.

Sbrinamento manuale (solo per mod. S, X, Y e C)

Premere per più di 3 s DOWN (si attiva solo se sussistono le condizioni di temperatura).

Ciclo continuo (solo per mod. S, X, Y e C)

Premere contemporaneamente per più di 3 s UP e DOWN.

Selezione rapida sonda visualizzata (solo per mod. M)

Premere rapidamente DOWN per selezionare la sonda da visualizzare temporaneamente.

Accesso e modifica parametri tipo F (frequenti) e tipo C (configurazione)

1. premere SET per 3 s (sul display comparirà "PS");
2. • per accedere al menù parametri di tipo F e C digitare la password "22" con UP/DOWN;
   • per accedere solo al menù parametri F premere SET (senza digitare la password);
3. navigare all'interno del menù parametri con UP/DOWN;
4. • per visualizzare/modificare i valori del parametro visualizzato premere SET, quindi UP/DOWN ed infine SET per confermare la modifica (si ritorna così al menù dei parametri).

Per salvare definitivamente tutti i valori modificati ed uscire dal menù parametri premere SET per 3 s;
Per uscire dal menù senza salvare i valori modificati (uscita per time out) non premere alcun tasto per almeno 60 s.

Normative di sicurezza

conforme alle Normative europee in materia. Precauzioni d'installazione:

- i cavi di collegamento devono garantire l'isolamento fino a 90 °C;
- per le versioni 12 Vac utilizzare trasformatori Classe II. Per il rispetto delle normative EN 61000-4-4, EN 61000-4-5, EN 61000-4-11, EN 61000-4-6, EN 60730-1, il trasformatore deve essere uno dei modelli indicati (vedi Listino Prezzi CAREL). Per le versioni 12 Vac/dc, non essendo possibile garantire il doppio isolamento tra i connettori di alimentazione e le uscite relè, si raccomanda di utilizzare carichi alimentati solamente in bassissima tensione di sicurezza (fino a 42 V nominali di valore efficace);
- prevedere almeno 10 mm di distanza tra il contenitore e parti conduttive vicine;
- collegamenti degli ingressi digitali e analogici inferiori a 30 m di distanza; adottare le adeguate misure di separazione dei cavi per il rispetto delle normative suddette.

Bloccare bene i cavi di connessione delle uscite per evitare contatti con parti in bassissima tensione di sicurezza.

Certificazioni solo per PQEZ

Applicazioni con gas refrigeranti infiammabili: IEC/EN/UL 60335-2-24 (clauses 22.109, 22.110) - IEC/EN/UL 60335-2-40 (clauses 22.116, 22.117) - IEC/EN/UL 60335-2-89 (clauses 22.107, 22.108, 22.109) for R50, R290, R600, R600a, R-1234ze gases. IEC/EN/UL 60079-15 (clausule 17 e 19, applicabili ai relè in base alla loro tipologia. L'accettabilità deve essere sempre verificata e valutata nella applicazione finale).

(ENG) Display and functions

During normal operation, the controller displays the value of the probe set using parameter /4 (=1 ambient probe, default, =2 second probe, 3= third probe). In addition, the display has LEDs that indicate the activation of the control functions (see Table

(FRE) Description:

PJEZ* et PQEZ* (modèles S, C, M, Y, X) constitue une gamme entière de régulateurs électronique à microprocesseurs avec affichage LED realisée pour la gestion d' unité frigorifique, vitrines et présentoir frigorifique. Les contrôleurs PJEZ * sont fournis avec des relais standard. Les contrôleurs PQEZ * sont spécialement conçus pour une utilisation dans des applications avec des réfrigérants inflammables. Modèles disponibles:

- P(J,Q)EZS*, indiqués pour la gestion d'unités frigorifiques statiques, sans ventilateur sur l'évaporateur, fonctionnant à des températures supérieures à 0°C;
- P(J,Q)EZC*, indiqués pour la gestion d'unités frigorifiques ventilées à basse température.
- P(J,Q)EZ(Y, X)*, indiqués pour la gestion d'unités frigorifiques statiques, sans ventilateur, fonctionnant à basse température;
- P(J,Q)EZM*, solution pour mesurer simplement la température

Note: mod. Y= relais reliée électroniquement à l' intérieur entre eux; mod. X= relais indépendants.

Affichage et fonctions: Pendant le fonctionnement normal le contrôle affiche sur l' écran la valeur de la sonde réglée au paramètre/4 (=1sonde air ambiant par défaut, =2 deuxième sonde, 3= troisième sonde). De plus sur l' écran apparaissent les LED qui indiquent l' activation des fonctions de contrôleo (voir Tab. 1), alors que les trois touches permettent d' activer/désactiver certaines fonctions (voir Tab. 2).

LED et fonctions associées

icone	fonction	fonctionnement normale			start up
		ON	OFF	blink	
	compresseur	accès	éteint	requis	ON
	ventilateur	accès	éteint	requis	ON
	defrost	accès	éteint	requis	ON
AUX	aux	sortie accès	sortie éteinte	-	ON
	alarme	tous	aucune alarme	-	ON
	horloge	RTC présent et activé, et une tranche horaire au moins a été réglée	RTC absent ou désactivé, ou une tranche horaire au moins n'a pas été réglée	-	ON si RTC présent

Tab. 1

Tableau activation fonctions à l'aide des touches - mod. S, X, Y, C

touche		fonctionnement normale		start up	
		simple pression de la touche	pression combinée		
	up ON/OFF	plus de 3 s: alterne phases ON/OFF	Appuyées ensemble activent/désactivent cycle continu	-	
	down defrost	plus de 3 s: active/désactive defrost		Appuyées ensemble activent procédure REINITIALISATION param.	pendant 1 s affiche cod. vers. firmware
set	set mute	- 1 s.: affiche/ permet de régler set point - plus de 3 s: accès au menu réglages paramètres (entrer mot de passe '22') - Eteint l' alarme accoustique (buzzer)	-		pour 1 s RESET banc EZY courant

Tab. 2

Tableau fonctions touches - variante mod. M

touche	fonctionnement normale	start up	
	sélection rapide sonde affichée	Enfoncée en même temps que "set" active la procédure RESET paramètres.	pendant 1 s affiche cod. vers. firmware

Réglages du set point (valeur de la température désirée)

- appuyer pendant 1 s sur SET, quelques instants après la valeur réglée clignote;
- augmenter ou diminuer cette valeur au moyen de UP ou DOWN;
- appuyer sur SET pour confirmer la nouvelle valeur.

ON/OFF de l'instrument

Appuyer pendant plus de 3s sur UP. Dans cette situation les algorithmes de régulation et defrost sont désactivés et l'instrument alterne l' affichage sur l' écran du message "OFF" et l' affichage de la température pré-réglée de la sonde.

Dégivrage manuel (seulement pour mod. S, X, Y e C)

Appuyer pendant plus de 3 s sur DOWN (il s'active seulement si subsistent les conditions de température).

Cycle contínu (seulement pour mod. S, X, Y e C)

Appuyer en meme temps pendant plus de 3 s sur UP et DOWN.

Sélection rapide sonde affichée (seulement pour mod. M)

Appuyer rapidement DOWN pour sélectionner la sonde à afficher temporairement.

Accès et modification paramètres type F (fréquents) et type C (configuration)

1. Appuyer sur SET pendant 3 s (sur l' écran apparaitra "PS");
2. • pour accéder au menu paramètres de type F et C entrer le mot de passe "22" en utilisant UP/DOWN;
   • pour accéder seulement au menu paramètres F appuyer sur SET (sans devoir entrer le mot de passe);
3. naviguer à l' intérieur du menu paramètresen utilisant UP/DOWN;
4. • pour afficher/modifier les valeurs du paramètre affiché appuyer sur SET, ensuite sur UP/DOWN et enfin sur SET pour cconfirmer la modification (on retourne ainsi au menu des paramètres).

Pour sauver définitivamente toutes les valeurs modifiées et sortir du menu paramètres appuyer sur SET pendant 3 s;
Pour sortir du menu sans suaver les valeurs modifiées (sortie timeout) n' appuyer sur aucun bouton pendant au moins 60s.

Normes de sécurité

conformes aux Normes européennes pertinentes. Precautions d' usage:

- les câbles de connexion doivent garantir l' isolation jusqu' à 90 °C;
- pour les versions12 utiliser transformateurs Classell. Pour respecter les normes de sûreté (surge), le transformateur doit etre un des modèles indiqués (voir catalogue CAREL). Pour les versions 12Vac/dc, une double isolation ne peut être garantie entre l'alimentation et les relais de sortie, utiliser uniquement avec des charges basse tension (jusqu'à 42 V nominal efficace);
- laisser au moins 10 mm de distance entre le boitier et les parties conductibles voisines;
- Connexions des entrées digitales analogiques inférieures à une distance de 30m; adopter les mesures de séparation appropriées des câbles pour le respect des normes de sûreté.

Bloquer avec soin les câbles de connexion des sorties pour éviter les contacts avec les éléments sous Très Basse tension de sécurité.

Certifications pour PQEZ uniquement

Applications avec des gaz réfrigérants inflammables: CEI / EN / UL 60335-2-24 (clauses 22.109, 22.110) - CEI / EN / UL 60335-2-40 (clauses 22.116, 22.117) - CEI / EN / UL 60335-2-89 (clauses 22.107, 22.108, 22.109) pour les gaz R50, R290, R600, R600a, R-1234ze. CEI / EN / UL 60079-15 (articles 17 et 19, appliqués aux relais en fonction de leur type. L'acceptabilité doit toujours être vérifiée et jugée dans l'application finale).

(GER) Beschreibung:

PJEZ* und PQEZ* (Modelle S, C, M, Y, X) umfasst einer Bandbreite elektronischer Mikroprozessorsteuerungen mit LED-Anzeige für die Ansteuerung von Kältegeräten, Kühlvitrinen und Kühlmöbeln. PJEZ * -Regler sind mit Standardrelais ausgestattet. PQEZ * -Regler wurden speziell für Anwendungen mit brennbaren Kältemitteln entwickelt. Verfügbare Modelle:

(SPA) Descripción:

PJEZ* y PQEZ* (modelos S, C, M, Y, X) representan una gama de reguladores electrónicos a microprocesador con visualización por LED realizados para la gestión de unidades frigoríficas, vitrinas y mostradores frigoríficos. Los PJEZ * se suministran con relés estándar. Los PQEZ * están diseñados específicamente para su uso en aplicaciones con refrigerantes inflamables. Modelos disponibles:

- P(J,Q)EZS*, indicados para la gestión de unidades frigoríficas estáticas, carentes de ventilador en el evaporador, que funcionan con temperaturas por encima de 0°C;
- P(J,Q)EZC*, indicados para la gestión de unidades frigoríficas ventiladas a baja temperatura.
- P(J,Q)EZ(Y, X)*, indicados para la gestión de unidades frigoríficas estáticas, carentes de ventilador, que funcionan a baja temp.;
- P(J,Q)EZM*, solución para la medida simple de la temperatura.

Nota: mod. Y= relés conectados electrónicamente en el interior entre sí; mod. X= relés independientes.

Visualizaciones y funciones

Durante el funcionam. normal, el control muestra en el display el valor de la sonda ajustada con el parám. /4 (=1 sonda ambiente predeterminada, =2 segunda sonda, 3= tercera sonda). Además, en el display aparecen los LED que indican la activación de las funciones del control (ver Tab. 1), mientras que las 3 teclas permiten activar desactivar algunas funciones (ver Tab. 2).

LED y funciones asociadas

icono	función	funcionamiento normal			arranque
		ON	OFF	parpadeo	
	compresor	encendido	apagado	demanda	ON
	ventilador	encendido	apagado	demanda	ON
	desescarche	encendido	apagado	demanda	ON
AUX	aux	salida encendida	salida apagada	-	ON
	alarma	todas	ninguna alarma	-	ON
	reloj	RTC presente y habilitado, y se ha ajustado al menos una franja horaria	RTC ausente o deshabilitado, o no se ha ajustado al menos una franja horaria	-	ON si RTC presente

Tab. 1

Tabla de activación de funciones por medio de las teclas - mod. S, X, Y, C

teda		funcionamiento normal		arranque	
		presión de la teda sola	presión combinada		
	arriba ON/OFF	más de 3 s: alterna estados ON/OFF	Pulsados juntos activan/desactivan ciclo continuo	-	
	abajo desesc.	más de 3 s: activa/desactiva desescarche		Pulsados juntos activan el procedimiento RESET de los parámetros	durante 1 s muestra cód. vers. firmware
set	set mute	- 1 s.: muestra/permite ajustar el punto de consigna - más de 3 s: acceso al menú de ajuste de parámetros (insertar contraseña '22') - Apaga alarma acústica (zumbador)	-		por 1 s RESET banco EZY corriente

Tab. 2

Tabla de funciones de teclas - variante mod. M

teda	funcionamiento normal	arranque	
	selección rápida de sonda visualizada	Pulsando a la vez que "set" activa el procedimiento de RESETEO de parámetros.	durante 1 s muestra cód. vers. firmware

Ajustes del punto de consigna (valor de temperatura deseado)

pulsar durante 1 s SET, después de unos instantes el valor ajustado parpadea;

- aumentar o disminuir dicho valor con las flechas ARRIBA o ABAJO;
- pulsar SET para confirmar el nuevo valor.

ON/OFF del instrumento: Pulsar durante más de 3 s ARRIBA. En esta condición los algoritmos de regulación y desescarche son deshabilitados y el instrumento alterna la visualización en el display del mensaje "OFF" y la de la temperatura de la sonda ajustada.

Desescarche manual (sólo para mod. S, X, Y y C)

Pulsar durante más de 3 s ABAJO (se activa sólo si subsisten las condiciones de temperatura).

Ciclo continuo (sólo para mod. S, X, Y y C)

Pulsar simultáneamente durante más de 3 s ARRIBA y ABAJO.

Selección rápida de sonda visualizada (sólo para mod. M)

Pulsar repetidamente la tecla ABAJO para seleccionar la sonda a visualizar temporalmente.

Acceso y modificación de parámetros tipo F (frecuentes) y tipo C (configuración)

1. Pulsar SET durante 3 s (en el display aparecerá "PS");
2. • Para acceder al menú de los parámetros de tipo F e C dteclear la contraseña "22" con ARRIBA/ABAJO;
   • Para acceder sólo al menú de los parámetros F pulsar SET (sin tedecar contraseña);
3. navegar al interior del menú de parámetros con ARRIBA/ABAJO;
4. • Para visualizar/modificar los valores del parámetro visualizado pulsar SET, y luego ARRIBA/ABAJO y finalmente SET para confirmar la modificación (así se vuelve al menú de los parámetros).

Para guardar definitivamente todos los valores modificados y salir del menú de los parám. pulsar SET durante 3 s. Para salir del menú sin guardar los valores modificados (salida por agotamiento de tiempo) no pulsar ninguna tecla durante al menos 60 s.

Normativas de seguridad

Conforme a las Normativas europeas de la materia. Precauciones de instalación:

- Los cables de conexión deben garantizar el aislamiento hasta a 90 °C;
- Para las versiones de 12 Vca utilizar transformadores de Clase II. Para respetar las normativas EN 61000-4-4, EN 61000-4-5, EN 61000-4-11, EN 61000-4-6, EN 60730-1, el transformador debe ser de uno de los modelos indicados (ver Lista de Precios de CAREL). Para las versiones 12 vac/dc, no siendo posible garantizar el aislamiento doble, entre el conector de alimentación y las salidas relés, se aconseja utilizar cargas alimentadas solamente con muy baja tensión de seguridad (hasta 42V nominales de valor eficaz);
- Prever al menos 10 mm de distancia entre el contenedor y las partes conductoras próximas;
- Conexiones de las entradas digitales y analógicas inferiores a 30 m de distancia; adoptar las medidas adecuadas de separación de cables para respetar la normativa de inmunidad.

Bloquear bien los cables de conexión de las salidas para evitar contactos con las partes en Bajísima Tensión de seguridad.

Certificaciones solo para PQEZ

Aplicaciones con gases refrigerantes inflamables: IEC / EN / UL 60335-2-24 (cláusulas 22.109, 22.110) - IEC / EN / UL 60335-2-40 (cláusulas 22.116, 22.117) - IEC / EN / UL 60335-2-89 (cláusulas 22.107, 22.108, 22.109) para gases R50, R290, R600, R600a, R-1234ze. IEC / EN / UL 60079-15 (cláusulas 17 y 19, aplicadas a los relés según su tipo. La aceptabilidad siempre debe ser verificada y juzgada en la aplicación final).

(POR) Descrição:

PJEZ* y PQEZ* (modelos S, C, M, Y, X) representam uma gama de reguladores electrónicos com microprocessador e com visualização por LEDs concebidos para a gestão de unidades frigoríficas, vitrines e bancadas refrigeradas. Os PJEZ * são fornecidos com relés padrão. Os reguladores PQEZ * são projetados especificamente para uso em aplicações com refrigerantes in-

TEMPERATURE - PRESSURE CHART

NATURAL REFRIGERANTS

www.sporlanonline.com

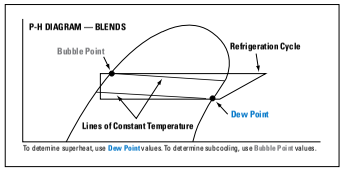
At Sea Level, psig

TEMP.		REFRIGERANT TYPE (SAFETY CLASS) REFRIGERANT (SPORLAN LETTER CODE)					
°F	°C	HC (A3) 170(K)	HC (A3) 290(O)	HC (A3) 441A	HC (A3) 600a(U)	AMMONIA (B2L) 717(A)	CO2 (A1) 744
-50	-45.6	78.9	4.3	21.1	23.6	14.3	103.4
-45	-42.8	88.1	0.9	19.7	22.6	11.7	116.6
-40	-40.0	98.1	1.4	18.1	21.4	8.8	131.0
-35	-37.2	108.7	3.4	16.3	20.2	5.4	146.5
-30	-34.4	120.0	5.7	14.3	18.8	1.6	163.1
-29	-33.9	122.4	6.1	13.8	18.5	0.8	166.6
-28	-33.3	124.7	6.6	13.4	18.1	0.0	170.1
-27	-32.8	127.1	7.1	12.9	17.8	0.4	173.7
-26	-32.2	129.6	7.6	12.5	17.5	0.8	177.3
-25	-31.7	132.1	8.1	12.0	17.2	1.3	181.0
-24	-31.1	134.6	8.6	11.5	16.8	1.7	184.8
-23	-30.6	137.1	9.1	11.0	16.5	2.2	188.5
-22	-30.0	139.7	9.6	10.5	16.2	2.6	192.4
-21	-29.4	142.3	10.2	10.0	15.8	3.1	196.3
-20	-28.9	144.9	10.7	9.5	15.4	3.6	200.2
-19	-28.3	147.6	11.3	9.0	15.1	4.1	204.2
-18	-27.8	150.3	11.8	8.4	14.7	4.6	208.3
-17	-27.2	153.0	12.4	7.9	14.3	5.1	212.4
-16	-26.7	155.7	13.0	7.3	13.9	5.6	216.5
-15	-26.1	158.5	13.6	6.7	13.5	6.2	220.8
-14	-25.6	161.4	14.2	6.1	13.1	6.7	225.0
-13	-25.0	164.2	14.8	5.5	12.7	7.3	229.4
-12	-24.4	167.1	15.4	4.9	12.2	7.8	233.8
-11	-23.9	170.0	16.1	4.3	11.8	8.4	238.2
-10	-23.3	173.0	16.7	3.7	11.4	9.0	242.7
-9	-22.8	176.0	17.4	3.0	10.9	9.6	247.3
-8	-22.2	179.0	18.0	2.4	10.4	10.3	251.9
-7	-21.7	182.1	18.7	1.7	10.0	10.9	256.6
-6	-21.1	185.2	19.4	1.0	9.5	11.5	261.3
-5	-20.6	188.3	20.1	0.3	9.0	12.2	266.1
-4	-20.0	191.5	20.8	0.2	8.5	12.9	271.0
-3	-19.4	194.7	21.5	0.6	8.0	13.6	275.9
-2	-18.9	197.9	22.2	0.9	7.5	14.3	280.9
-1	-18.3	201.2	22.9	1.3	7.0	15.0	285.9
0	-17.8	204.5	23.7	1.7	6.4	15.7	291.0
1	-17.2	207.9	24.5	2.1	5.9	16.4	296.2
2	-16.7	211.3	25.2	2.5	5.3	17.2	301.5
3	-16.1	214.7	26.0	2.9	4.8	18.0	306.8
4	-15.6	218.2	26.8	3.3	4.2	18.8	312.1
5	-15.0	221.7	27.6	3.7	3.6	19.6	317.6
6	-14.4	225.2	28.4	4.1	3.0	20.4	323.1
7	-13.9	228.8	29.2	4.5	2.4	21.2	328.6
8	-13.3	232.4	30.1	5.0	1.8	22.1	334.2
9	-12.8	236.0	30.9	5.4	1.2	22.9	339.9
10	-12.2	239.7	31.8	5.8	0.5	23.8	345.7
11	-11.7	243.5	32.7	6.3	0.0	24.7	351.5
12	-11.1	247.2	33.6	6.8	0.4	25.6	357.4
13	-10.6	251.1	34.5	7.2	0.7	26.5	363.4
14	-10.0	254.9	35.4	7.7	1.0	27.5	369.5
15	-9.4	258.8	36.3	8.2	1.4	28.4	375.6
16	-8.9	262.7	37.2	8.7	1.7	29.4	381.8
17	-8.3	266.7	38.2	9.2	2.1	30.4	388.0
18	-7.8	270.7	39.2	9.7	2.4	31.4	394.3
19	-7.2	274.8	40.1	10.3	2.8	32.4	400.7
20	-6.7	278.9	41.1	10.8	3.2	33.5	407.2
21	-6.1	283.0	42.1	11.3	3.5	34.6	413.8
22	-5.6	287.2	43.2	11.9	3.9	35.7	420.4
23	-5.0	291.4	44.2	12.5	4.3	36.8	427.1
24	-4.4	295.7	45.2	13.0	4.7	37.9	433.8
25	-3.9	300.0	46.3	13.6	5.1	39.0	440.7
26	-3.3	304.4	47.4	14.2	5.5	40.2	447.6
27	-2.8	308.8	48.5	14.8	5.9	41.4	454.6
28	-2.2	313.2	49.6	15.4	6.3	42.6	461.7
29	-1.7	317.7	50.7	16.0	6.8	43.8	468.8
30	-1.1	322.3	51.8	16.6	7.2	45.0	476.1
31	-0.6	326.8	53.0	17.3	7.6	46.3	483.4
32	0.0	331.5	54.1	17.9	8.1	47.6	490.8
33	0.6	336.1	55.3	18.6	8.5	48.9	498.3
34	1.1	340.9	56.5	19.2	9.0	50.2	505.8
35	1.7	345.6	57.7	19.9	9.4	51.6	513.4
36	2.2	350.4	58.9	20.6	9.9	52.9	521.2
37	2.8	355.3	60.1	21.3	10.4	54.3	529.0
38	3.3	360.2	61.4	22.0	10.9	55.7	536.9
39	3.9	365.2	62.7	22.7	11.4	57.2	544.8
40	4.4	370.2	63.9	23.4	11.9	58.6	552.9
41	5.0	375.2	65.2	24.2	12.4	60.1	561.0
42	5.6	380.3	66.6	24.9	12.9	61.6	569.3
43	6.1	385.5	67.9	25.7	13.4	63.1	577.6
44	6.7	390.7	69.2	26.4	14.0	64.7	586.0
45	7.2	395.9	70.6	27.2	14.5	66.3	594.5
46	7.8	401.2	72.0	28.0	15.0	67.9	603.1
48	8.9	412.0	74.8	29.6	16.2	71.1	620.5
50	10.0	422.9	77.6	31.3	17.3	74.5	638.3
52	11.1	434.1	80.6	67.7	18.5	78.0	656.5
54	12.2	445.5	83.6	70.2	19.7	81.6	675.0
55	12.8	451.2	85.1	71.4	20.3	83.4	684.5
56	13.3	457.1	86.7	72.7	20.9	85.2	694.0
58	14.4	468.9	89.8	75.3	22.2	89.0	713.3
60	15.6	480.9	93.0	77.9	23.5	92.9	733.1
62	16.7	493.2	96.3	80.6	24.9	96.9	753.2
64	17.8	505.7	99.7	83.4	26.3	101.1	773.8
65	18.3	512.1	101.4	84.7	27.0	103.2	784.2
66	18.9	518.5	103.1	86.2	27.7	105.3	794.8
68	20.0	531.4	106.6	89.0	29.1	109.7	816.2
70	21.1	544.7	110.2	91.9	30.6	114.2	838.1
72	22.2	558.2	113.9	94.9	32.2	118.8	860.5
74	23.3	571.9	117.6	97.9	33.7	123.5	883.3
75	23.9	578.9	119.5	99.5	34.5	125.9	894.9
76	24.4	585.9	121.4	101.0	35.3	128.3	906.7
78	25.6	600.2	125.4	104.2	37.0	133.3	930.5
80	26.7	614.8	129.3	107.4	38.7	138.4	954.9
82	27.8	629.7	133.4	110.7	40.4	143.7	979.8
84	28.9	644.9	137.6	114.1	42.2	149.1	1005.4
85	29.4	652.7	139.7	115.8	43.1	151.8	1018.4
86	30.0	660.5	141.8	117.5	44.0	154.6	1031.6
88	31.1	676.4	146.1	120.9	45.9	160.3	*
90	32.2	*	150.5	124.5	47.8	166.1	*
92	33.3	*	155.0	128.1	49.7	172.0	*
94	34.4	*	159.6	131.8	51.7	178.1	*
95	35.0	*	161.9	133.6	52.7	181.2	*
96	35.6	*	164.3	135.5	53.7	184.4	*
98	36.7	*	169.1	139.3	55.8	190.8	*
100	37.8	*	173.9	143.2	57.9	197.3	*
102	38.9	*	178.9	147.2	60.1	204.0	*
104	40.0	*	183.9	151.2	62.3	210.9	*
105	40.6	*	186.5	153.2	63.5	214.4	*
106	41.1	*	189.1	155.3	64.6	217.9	*
108	42.2	*	194.3	159.5	66.9	225.1	*
110	43.3	*	199.6	163.7	69.3	232.5	*
112	44.4	*	205.1	168.0	71.7	240.0	*
114	45.6	*	210.6	172.4	74.2	247.7	*
115	46.1	*	213.4	174.6	75.5	251.6	*
120	48.9	*	227.8	186.0	82.0	271.9	*
125	51.7	*	242.9	197.9	88.8	293.3	*
130	54.4	*	258.7	210.3	95.9	315.8	*
135	57.2	*	275.1	223.1	103.5	339.6	*
140	60.0	*	292.3	236.5	111.4	364.7	*
145	62.8	*	310.2	250.5	119.6	391.0	*
150	65.6	*	328.9	264.9	128.3	418.7	*
155	68.3	*	348.4	279.9	137.4	447.8	*
160	71.1	*	368.7	295.5	146.9	478.3	*
165	73.9	*	389.9	311.6	156.8	510.2	*

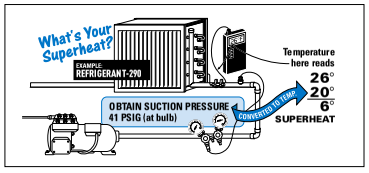
*Exceeds critical temperature

To determine Subcooling for 400-Series blends, use Bubble Point in Gray.
To determine Superheat for 400-Series blends, use Dew Point in Blue.

Pressure, psig (pounds per square inch guage), BOLD
Vacuum, inhg (inches of Mercury), Italics

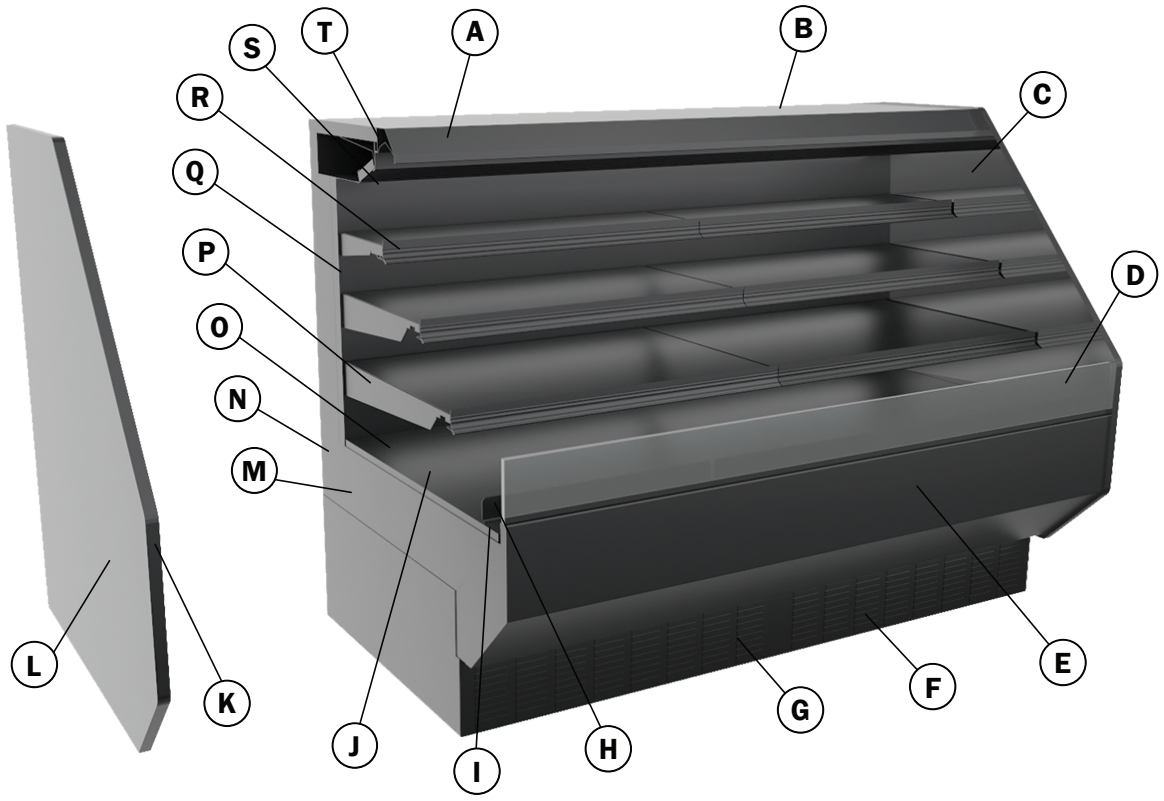


USE THIS QR CODE TO DOWNLOAD
CHILLMASTER P-T APP



P-T data generated by NIST Refprop

D1: PARTS LIST



A	Cornice
B	Case Top
C	Interior End Panel
D	Die Board Plex
E	Die Board
F	Condenser Air Intake
G	Front Toekick
H	Product Stop
I	Air Return
J	Insulated Drain Pan
K	End Panel Trim
L	End Panel
M	End Toekick
N	Outside Back
O	Bottom Deck
P	Adjustable Shelf Bracket
Q	Shelf Standard
R	Price Tag Molding
S	Inside Back
T	Air Discharge

Hillphoenix

A DOVER COMPANY

Hill PHOENIX, Inc.
Hereinafter Referred To As Manufacturer

LIMITED WARRANTY

GENERAL WARRANTY

Manufacturer's products are warranted to be free from defects in materials and workmanship under normal use and maintenance for fourteen months from date of shipment from manufacturer (the "Base Warranty Period"). In the event of a qualifying warranty claim, a new or rebuilt part to replace any defective part will be provided without charge. The replacement part is covered under this warranty for the remainder of the applicable Base Warranty Period. In order to be eligible for warranty coverage, customer must: (i) notify Manufacturer promptly upon discovery of a warrant defect, and (ii) comply with the warranty claim procedures provided by Manufacturer from time to time.

This equipment warranty does not include labor or other costs incurred for diagnosing, repairing, removing, installing, shipping, servicing, or handling of either defective parts or replacement parts.

The warranty shall not apply:

1. To any unit or any part thereof which has been subject to accident, alteration, negligence, misuse or abuse, or which has not been operated in accordance with the manufacturer's recommendations, or in conditions outside of Manufacturer's specifications, or if the serial number of the unit has been altered, defaced, or removed.
2. When the unit, or any part thereof, is damaged by fire, flood, or other act of God.
3. To products that are impaired or damaged due to improper installation.
4. When installation and startup forms are not properly completed or returned within two weeks after startup.
5. If the defective part is not returned to the Manufacturer.
6. To service, maintenance or wear and tear parts (such as lights, starters and ballasts)

MODIFICATIONS TO GENERAL WARRANTY

The following sets forth certain modifications to the General Warranty for specific products of Manufacturer:

DISPLAY CASE AND SPECIALTY PRODUCTS CLEARVOYANT® LED LIGHTING

The warranty period for Clearvoyant LED lighting components within the Clearvoyant lighting system is five years from date of shipment.

REMEDY LIMITATION/DAMAGES EXCLUSION

THE REMEDY OF REPAIR OR PROVISION OF A REPLACEMENT PART WITHOUT CHARGE SHALL BE THE EXCLUSIVE REMEDY FOR ANY WARRANTY CLAIM HEREUNDER. WITHOUT LIMITING THE FOREGOING, MANUFACTURER SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF PROFIT, LABOR COST, LOSS OF REFRIGERANT OR FOOD PRODUCTS.

EXCLUSIVE WARRANTY

THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY WITH RESPECT TO THE PRODUCTS. ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED. NO IMPLIED WARRANTY SHALL BE DEEMED CREATED BY COURSE OF DEALING OR USAGE OF TRADE. NO OTHER PERSON IS AUTHORIZED TO EXPAND OR CREATE ANY OBLIGATION GREATER THAN OR MORE EXPANSIVE THAN THE WARRANTY PROVIDED HEREIN.

Submit warranty claims to:

Hillphoenix Refrigeration & Power Systems Division
2016 Gees Mill Road
Conyers, GA 30013
Warranty / Service
Phone: 1-833-280-5714

Hillphoenix Display Case Division
1925 Ruffin Mill Road
Colonial Heights, VA 23834
Warranty / Service
Phone: 1-833-280-5714

Hillphoenix Specialty Products Division
703 Franklin Street
Keosauqua, IA 52565
Warranty / Service
Phone: 1-833-280-5714

Warning
Maintenance & Case Care

When cleaning cases the following must be performed PRIOR to cleaning:

To avoid electrical shock, be sure all electric power is turned off before cleaning. In some installations, more than one switch may have to be turned off to completely de-energize the case.

Do not spray cleaning solution or water directly on fan motors or any electrical connections.

All lighting receptacles must be dried off prior to insertion and re-energizing the lighting circuit.

Please refer to the Use and Maintenance section of this installation manual.

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