HUSSMANN®/CHINO

RDI

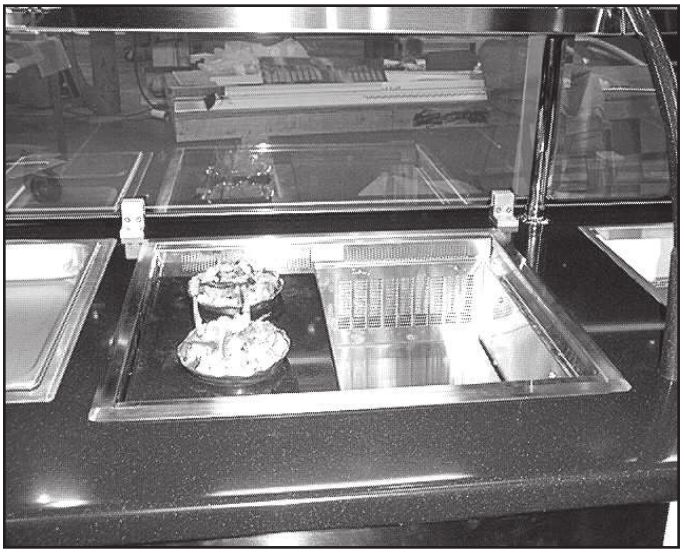
REFRIGERATED DROP IN DISPLAY

Installation & Operation Manual

REV. 0913

HUSSMANN® RDI

REFRIGERATED DROP IN DISPLAY



INSTALLATION & OPERATION GUIDE

Table of Contents

THIS BOOKLET CONTAINS INFORMATION ON:

RDI: Refrigerated "Drop-In" display designed for installation into the top of dry service counters. Featuring upper and lower air discharges allowing display of unwrapped food whether in platters, bowls or pans.

SHIPPING DAMAGE

All equipment should be thoroughly examined for shipping damage before and during unloading.

This equipment has been carefully inspected at our factory and the carrier has assumed responsibility for safe arrival. If damaged, either apparent or concealed, claim must be made to the carrier.

APPARENT LOSS OR DAMAGE

If there is an *obvious loss or damage*, it must be noted on the freight bill or express receipt and signed by the carrier's agent; otherwise, carrier may refuse claim. The carrier will supply necessary claim forms.

CONCEALED LOSS OR DAMAGE

When loss or damage *is not apparent until after equipment is uncrated*, a claim for concealed damage is made. Make request in writing to carrier for inspection within 15 days, and retain all packaging. The carrier will supply inspection report and required claim forms.

SHORTAGES

Check your shipment for any possible shortages of material. If a shortage should exist and is found to be the responsibility of Hussmann Chino, *notify Hussmann Chino*. If such a shortage involves the carrier, *notify the carrier immediately*, and request an inspection. Hussmann Chino will acknowledge shortages within ten days from receipt of equipment.

HUSSMANN CHINO PRODUCT CONTROL

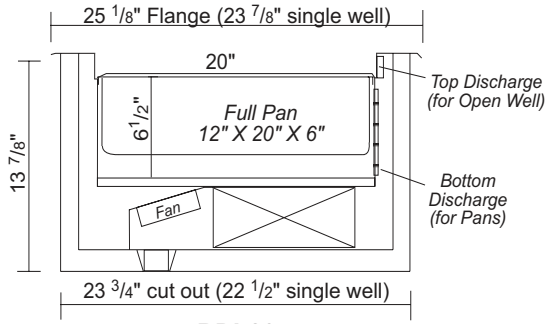
The serial number and shipping date of all equipment has been recorded in Hussmann's files for warranty and replacement part purposes. All correspondence pertaining to warranty or parts ordering must include the serial number of each piece of equipment involved, in order to provide the customer with the correct parts.

Keep this booklet with the case at all times for future reference.

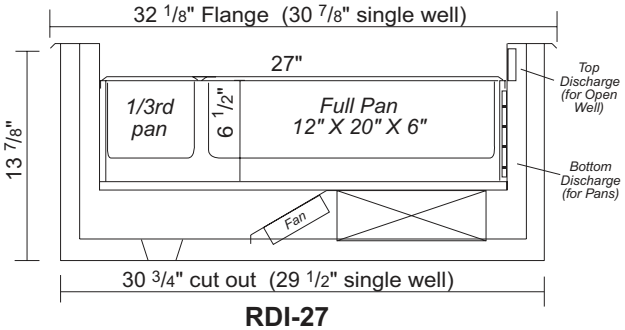
HUSSMANN®/CHINO
A publication of
Hussmann® Chino
13770 Ramona Avenue • Chino, California 91710
(909) 628-8942 FAX
(909) 590-4910
(800) 395-9229

This equipment is to be installed to comply with the applicable NEC, Federal, State, and Local Plumbing and Construction Code having jurisdiction.

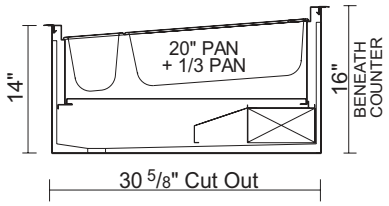
Cut & Plan Views



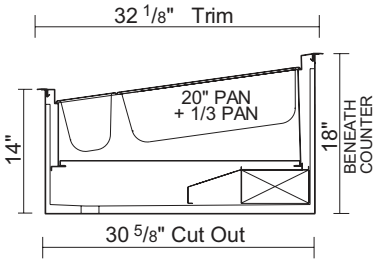
RDI-20
Self-Service – 2-10 wells
Scale = 1"



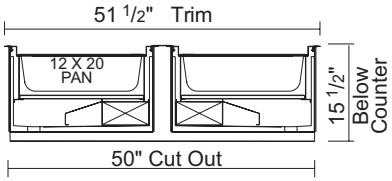
RDI-27
Self-Service – 2-10 Wells
Scale = 1"



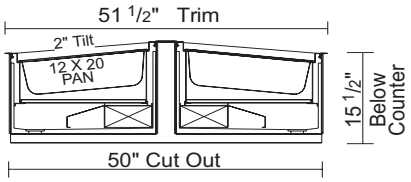
RDI 27
Refrigerated Drop-In
Self Service Case
Shown with Optional 2" Tilt
Scale = 1/2"



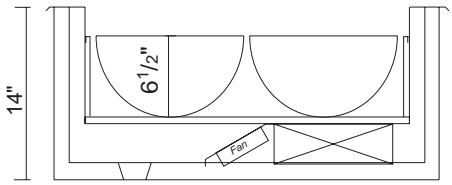
RDI 27
Refrigerated Drop-In
Self Service Case
Shown with Optional 4" Tilt
Scale = 1/2"



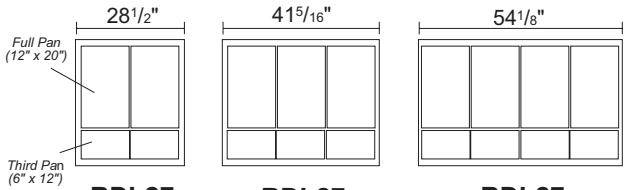
RDI
BACK TO BACK 20"
Refrigerated Self Service Case
Scale = 3/8"



RDI BACK TO BACK 20"
Refrigerated Self Service Case
Shown with Optional 2" Tilted Pan
Scale = 3/8"



RDI BOWL OPTION
Self-Service



RDI-27
2-Well
Scale = 1/4"

RDI-27
3-Well
Scale = 1/4"

RDI-27
4-Well
Scale = 1/4"

Three sample modules are shown above. The RDI has been engineered for lengths from 1-Well up to 11-Wells in one full pan or one pan & 1/3rd design.

Opening Dimensions

Well Dimensions

20"

Front to Back		1 well	2 or more wells
	flange	23 7/8"	25 1/8"
	cutout	22 1/2"	23 3/4"

Side to Side		1 wells	2 wells	3 wells	4 wells	5 wells	6 wells	7 wells	8 wells	9 wells	10 wells
	length										
	flange	17 1/8"	28 3/4"	41 1/2"	54 3/8"	67 1/8"	80"	92 3/4"	105 1/2"	118 3/8"	131 1/8"
	cutout	15 3/4"	27 3/8"	40 1/8"	53"	65 3/4"	78 5/8"	91 3/8"	104 1/8"	117"	129 3/4"

27"

Front to Back		1 well	2 or more wells
	flange	30 7/8"	32 1/8"
	cutout	29 1/2"	30 3/4"

Side to Side		1 wells	2 wells	3 wells	4 wells	5 wells	6 wells	7 wells	8 wells	9 wells	10 wells
	length										
	flange	17 1/8"	28 3/4"	41 1/2"	54 3/8"	67 1/8"	80"	92 3/4"	105 1/2"	118 3/8"	131 1/8"
	cutout	15 3/4"	27 3/8"	40 1/8"	53"	65 3/4"	78 5/8"	91 3/8"	104 1/8"	117"	129 3/4"

Installation

The RDI comes in various lengths and should be installed in a proper and uniform manner. The following guidelines will help ensure proper installation.

1. Case location should be near a floor sink or waste outlet - with electrical and refrigeration access usually under the case.
2. All plumbing should conform to local codes.
3. When the RDI is to be installed in an existing fixture or in a supplied fixture, the RDI and the new or existing fixture should be leveled front to back and side to side.
4. The electrical junction box is located under the RDI which is where the electrical is terminated by the manufacturer. The junction box is a standard 2x4 box with knock-outs and cover.
5. The refrigeration is also stubbed down under the case for connection to liquid and suction lines from the remote RDI case.
6. In cases where more than one RDI are installed, run drains separately to the sink or drain outlet.
7. For RDI units installed in an existing table, the lip on the unit should be sealed with a NSF approved sealant and all Phillips screws slots should be sealed with same.
8. The RDI should be dropped in the existing table oriented with the discharge air blowing from the front to the back of the fixture, the front is identifiable by the adjustable top air discharge control pins.
9. A thermostat and solenoid mounted in the suction line is recommended for temperature control and defrost.
10. Set defrost per case specs section of this book.

Location

The refrigerated merchandisers have been designed for use only in air conditioned stores where temperature and humidity are maintained at or below 75°F and 55% relative humidity. DO NOT allow air conditioning, electric fans, ovens, open doors or windows (etc.) to create air currents around the merchandiser, as this will impair its correct operation.

Product temperature should always be maintained at a constant and proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize life of the product.

Uncrating the Stand

Place the fixture as close to its permanent position as possible. Remove the top of the crate. Detach the walls from each other and remove from the skid. Unbolt the case from the skid. The fixture can now be lifted off the crate skid. **Lift only at base of stand!**

Exterior Loading

These models have **not** been structurally designed to support excessive external loading. **Do not walk on their tops;** This could cause serious personal injury and damage to the fixture.

Leveling

IMPORTANT! IT IS IMPERATIVE THAT THE RDI AND THE FIXTURE THAT THE RDI IS INSTALLED IN, BE LEVELED FROM FRONT TO BACK AND SIDE TO SIDE PRIOR TO JOINING. A LEVEL CASE IS NECESSARY TO INSURE PROPER OPERATION, WATER DRAINAGE.

NOTE: A. To avoid removing concrete flooring, begin lineup leveling from the highest point of the store floor.

B. When wedges are involved in a lineup, set them first.

Installation (Cont'd)

All cases were leveled and joined prior to shipment to insure the closest possible fit when cases are joined in the field. When joining, use a carpenters level and shim legs accordingly. Case must be raised correctly, under legs where support is best, to prevent damage to case.

1. Check level of floor where cases are to be set. Determine the highest point of the floor; cases will be set off this point.
2. Level and set the first case, carefully guiding the electrical, refrigeration and drain lines through the parent case. Case must be raised under legs where support is best to prevent damage to case. Internal bracing may be removed at this time.
3. Apply liberal bead of case joint sealant (NSF Approved) to cover dotted area shown below.

DO NOT USE PERMAGUM!

Proper case-joint sealing is extremely important to prevent water leaks!

It is the contractor's responsibility to install case(s) according to local construction and health codes.

Plumbing

Waste Outlet and P-TRAP

The waste outlet is located at the left hand end of these fixtures allowing drip piping to be run under the fixture lengthwise.

A 1 1/2" P-TRAP and threaded adapter are supplied with each fixture. The P-TRAP must be installed to prevent air leakage and insect entrance into the fixture.

Installing Condensate Drain

Poorly or improperly installed condensate drains can seriously interfere with the operation of this refrigerator, and result in costly maintenance and product losses. Please follow the recommendations listed below when installing condensate drains to insure a proper installation:

1. Never use pipe for condensate drains smaller than the nominal diameter of the pipe or P-TRAP supplied with the case.
2. When connecting condensate drains, the P-TRAP must be used as part of the condensate drain to prevent air leakage or insect entrance. Store plumbing system floor drains should be at least 14" off the center of the case to allow use of the P-TRAP pipe section. Never use two water seals in series in any one line. Double P-TRAPS in series will cause a lock and prevent draining.
3. Always provide as much down hill slope ("fall") as possible; 1/8" per foot is the preferred minimum. PVC pipe, when used, must be supported to maintain the 1/8" pitch and to prevent warping.
4. Avoid long runs of condensate drains. Long runs make it impossible to provide the "fall" necessary for good drainage.
5. Provide a suitable air break between the flood rim of the floor drain and outlet of condensate drain. 1" is ideal.
6. Prevent condensate drains from freezing:
   a. Do not install condensate drains in contact with non-insulated suction lines. Suction lines should be insulated with a nonabsorbent insulation material such as Armstrong's Armaflex.
   b. Where condensate drains are located in dead air spaces (between refrigerators or between a refrigerator and a wall), provide means to prevent freezing. The water seal should be insulated to prevent condensation.

Refrigeration

Refrigerant Type
The standard refrigerant will be R-22 unless otherwise specified on the customer order. Check the serial plate on the case for information.

Piping
The refrigerant line outlets are piped through the rear of the fixture at the left hand end when viewed from the back. Insulate suction lines to prevent condensation from dripping.

Refrigeration Lines

Liquid	Suction
3/8” O.D.	5/8” O.D.

NOTE: The standard coil is piped at 5/8" (suction); however, the store tie-in may vary depending on the number of coils and the draw the case has. Depending on the case setup, the connecting point in the store may be $^{5}/_{8}$", $^{7}/_{8}$", or $^{11}/_{8}$". Refer to the particular case you are hooking up.

Refrigerant lines should be sized as shown on the refrigeration legend furnished by the store.

Install P-TRAPS (oil traps) at the base of all suction line vertical risers.

Pressure drop can rob the system of capacity. To keep the pressure drop to a minimum, keep refrigerant line run as short as possible, using the minimum number of elbows. Where elbows are required, use long radius elbows only.

Control Settings
See RDI technical data sheet for the appropriate settings for your merchandiser. Maintain these parameters to achieve near constant product temperatures. Product temperature should first be measured in the morning, after having been refrigerated overnight. For all multiplexing, defrost should be time terminated. Defrost length and frequency should be as directed in the RDI technical data sheet. The number of defrosts per day should never change. The duration of the defrost cycle may be adjusted to meet conditions present at your location

Evaporator Fans
The evaporator fans are located at the center front of these merchandisers directly beneath the display pans.

FOR ACCESS TO THE FANS: Remove the right hand deck pan as viewed from the front of the case.

Access to TX Valves and Drain Lines
MECHANICAL - Remove product from end of case. Remove product racks. Remove refrigeration and drain access panels (labeled). TX valve (mechanical only) and drain are located under each access panel at end of the case.

ELECTRONIC - The Electronic Expansion valve master and slave cylinder(s) are located within the electrical access panel(s).

Electronic Expansion Valve *(Optional)*
A wide variety of electronic expansion valves and case controllers can be utilized. Please refer to EEV and controller manufacturers information sheet. Sensors for electronic expansion valves will be installed on the coil inlet, coil outlet, and in the discharge air. (Some supermarkets require a 4th sensor in the return air). Case controllers will be located in the electrical raceway or under the case.

Thermostatic Expansion Valve Location
This device is located on the same side as the refrigeration stub. A Sporlan balanced port expansion valve model is furnished as standard equipment, unless otherwise specified by customer.

Expansion Valve Adjustment
Expansion valves must be adjusted to fully feed the evaporator. Before attempting any adjustments, make sure the evaporator is either clear or very lightly covered with frost, and that the fixture is within 10°F of its expected operating temperature.

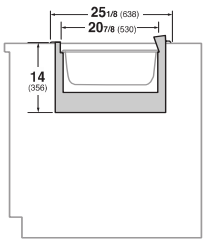
Measuring the Operating Superheat
1. Determine the suction pressure with an accurate pressure gauge at the evaporator outlet.
2. From a refrigerant pressure temperature chart, determine the saturation temperature at the observed suction pressure.
3. Measure the temperature of the suction gas at the thermostatic remote bulb location.
4. Subtract the saturation temperature obtained in step No. 2 from the temperature measured in step No. 3.
3. The difference is superheat.
5. Set the superheat for 5°F - 7°F.

T-STAT Location
T-STATS are located within the electrical raceway.

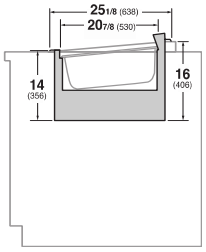
REFRIGERATED DROP-IN, REMOTE & SELF-CONTAINED REVISION DATE 08/22/18

HUSSMANN - RDI-20" (CHINO)

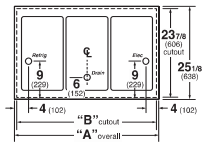
RDI-20



with 2" product tilt



RDI 20



Wells	1W	2 W	3W	4W	5W	6W	7W	8W
A overall	17 1/8	28 1/2	41 3/8	54 1/8	54 1/8	80	92 3/4	105 1/2
B cutout	15 3/4	27 1/4	40 1/8	52 7/8	52 7/8	78 5/8	91 3/8	104 1/8

REFRIGERATION DATA:

NUMBER OF WELLS	CASE USAGE	CAPACITY *** (BTU/HR/WELL) RATING CONDITION		TEMPERATURE (ºF) EVAPORATOR		DISCHARGE AIR ** (ºF)	VELOCITY (FT/MIN)
		NSF 7	AHRI 1200	NSF 7	AHRI 1200	NSF 7	NSF 7
1, 2, 3, 4, 5, 6, 7, 8	COUNTER	840	NA	20	NA	29~31	325~375

WELLS	EST. REFG. CHRG. (LBS)	GPM	PSI DROP
1	0.2	0.3	0.0
2	0.2	0.6	0.3
3	0.3	0.9	0.5
4	0.5	1.2	0.7
5	0.6	1.5	0.9
6	0.8	1.8	1.3
7	0.9	2.1	0.8

****FRONT DISCHARGE AIR MEASURED INSIDE AIR CURTAIN HONEYCOMB**

*****REFRIGERATION NOTES:**

1) USE DEW POINT FOR HIGH GLIDE REFRIGERANTS. CARE SHOULD BE TAKEN TO USE THE DEW POINT IN P/T TABLES FOR MEASURING AND ADJUSTING SUPERHEAT. ADJUST EVAPORATOR PRESSURE AS NEEDED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SHOWN.
2) REMOTE CASE RATING CONDITION IS NSF TYPE I, 75°F/55% RH
3) SELF CONTAINED CASE RATING CONDITION IS PER NSF 7.5.2

REFRIGERATION DATA CONTINUED:

ELEC. THERMOSTAT / AIR SENSOR SETTINGS					DEFROST TYPE	TIME (MIN)	DEFROST FREQUENCY (#/DAY)	TERM. TEMP (°F) COIL ONLY	DRIP TIME	DEFROST WATER (LBS/DAY/FT)
USAGE	CUT IN (ºF)	CUT OUT (ºF)	SET POINT (ºF)	DIFFER-ENTIAL (ºF)						
REMOTE	32	29	-	-	OFF TIME	20	6	48	TBD	1.7
SELF-CONTAINED	-	-	25	7						

END PANEL WIDTH KEY		
# OF END PNLS	END PNL WIDTH (IN.)	TOTAL ADDED LENGTH (IN.)
1	1.125	1.125
2	1.125	2.25

ELECTRICAL DATA:

STANDARD FANS, HEATERS, LED LIGHTS (115 VOLT)

NUMBER OF WELLS	EVAPORATOR FANS (4.7" AXIAL FANS)			CANOPY LIGHTS LED		OPTIONAL LED SHELF LIGHTS		MAX. LED LOAD (W/ ALL OPTIONS)		ANTI-SWEAT HEATERS		CONVENIENCE OUTLETS (OPTIONAL)		
	# OF EVAP FANS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	# OUTLETS	VOLTS	AMPS
1	1	0.8	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	1	0.8	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	2	1.6	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	2	1.6	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	3	2.3	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	3	2.3	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	4	3.1	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	5	3.9	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CONDENSING UNIT AND EVAPORATIVE PANS

NUMBER OF WELLS	CONDENSING UNIT						EVAPORATIVE PAN			EST. REFG. CHRG. R404A (LBS) SELF-CONTAINED
	NOM. HP	REFRIG.	Hz/Ph	VOLTS	RLA	FUSE AMPS	AMPS	VOLTS	WATTS	
1	1/4	R-404A	60 / 1	115	8	15	N/A	N/A	N/A	1.9
2	1/4	R-404A	60 / 1	115	8	15	N/A	N/A	N/A	2.0
3	1/3	R-404A	60 / 1	115	6	15	8.3	120	1000	2.6
4	1/2	R-404A	60 / 1	115	10.5	20	8.3	120	1000	3.2
5	1/2	R-404A	60 / 1	115	10.5	20	8.3	120	1000	3.3
6	3/4	R-404A	60 / 1	115	15	30	10.0	120	1200	5.4
7	1	R-404A	60 / 1	208	9	20	6.3	240	1500	6.9
8	1	R-404A	60 / 1	208	9.3	20	N/A	N/A	N/A	7.1

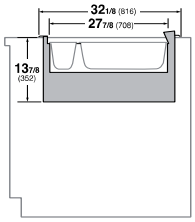
OPTIONAL HIGH OUTPUT LED LIGHTS (115 VOLT)

NUMBER OF WELLS	CANOPY LIGHTS H.O. LED		OPTIONAL SHELF		MAX. H.O. LED LOAD	
	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A	N/A	N/A

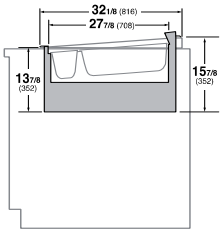
REFRIGERATED DROP-IN, REMOTE & SELF-CONTAINED REVISION DATE 10/27/17

HUSSMANN - RDI-27" (CHINO)

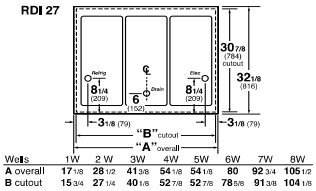
RDI-27



with 2" product tilt



RDI 27



Wells	1W	2 W	3W	4W	5W	6W	7W	8W
A overall	17 1/8	28 1/2	41 3/8	54 1/8	54 1/8	80	92 3/4	105 1/2
B cutout	15 3/4	27 1/4	40 1/8	52 7/8	52 7/8	78 5/8	91 3/8	104 1/8

REFRIGERATION DATA:

NUMBER OF WELLS	CASE USAGE	CAPACITY *** (BTU/HR/WELL) RATING CONDITION		TEMPERATURE (ºF) EVAPORATOR		TEMPERATURE (ºF) DISCHARGE AIR ** (ºF)	VELOCITY (FT/MIN)
		NSF 7	AHRI 1200	NSF 7	AHRI 1200	NSF 7	NSF 7
1, 2, 3, 4, 5, 6, 7, 8	COUNTER	840	NA	20	NA	29~31	325~375

****FRONT DISCHARGE AIR MEASURED INSIDE AIR CURTAIN HONEYCOMB**

*****REFRIGERATION NOTES:**

1) USE DEW POINT FOR HIGH GLIDE REFRIGERANTS. CARE SHOULD BE TAKEN TO USE THE DEW POINT IN P/T TABLES FOR MEASURING AND ADJUSTING SUPERHEAT. ADJUST EVAPORATOR PRESSURE AS NEEDED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SHOWN.
2) REMOTE CASE RATING CONDITION IS NSF TYPE I, 75°F/55% RH
3) SELF CONTAINED CASE RATING CONDITION IS PER NSF 7.5.2

REFRIGERATION DATA CONTINUED:

ELEC. THERMOSTAT / AIR SENSOR SETTINGS					DEFROST TYPE	TIME (MIN)	DEFROST FREQUENCY (#/DAY)	TERM. TEMP (°F) COIL ONLY	DRIP TIME	DEFROST WATER (LBS/DAY/FT)
USAGE	CUT IN (ºF)	CUT OUT (ºF)	SET POINT (°F)	DIFFER-ENTIAL (°F)						
REMOTE	32	29	-	-	OFF TIME	20	6	48	TBD	1.7
SELF-CONTAINED	-	-	25	7						

END PANEL WIDTH KEY		
# OF END PNLS	END PNL WIDTH (IN.)	TOTAL ADDED LENGTH (IN.)
1	1.125	1.125
2	1.125	2.25

ELECTRICAL DATA:

STANDARD FANS, HEATERS, LED LIGHTS (115 VOLT)

NUMBER OF WELLS	EVAPORATOR FANS					CANOPY LIGHTS LED		OPTIONAL LED SHELF LIGHTS		MAX. LED LOAD (W/ ALL OPTIONS)		ANTI-SWEAT HEATERS		CONVENIENCE OUTLETS (OPTIONAL)		
	# OF EVAP FANS	BLADE DIA. (IN.)	BLADE PITCH (°)	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	# OUTLETS	VOLTS	AMPS
1	1	N/A	N/A	0.78	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	1	N/A	N/A	0.78	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	2	N/A	N/A	1.56	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	2	N/A	N/A	1.56	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	3	N/A	N/A	2.34	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	3	N/A	N/A	2.34	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	4	N/A	N/A	3.12	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	5	N/A	N/A	3.90	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CONDENSING UNIT AND EVAPORATIVE PANS

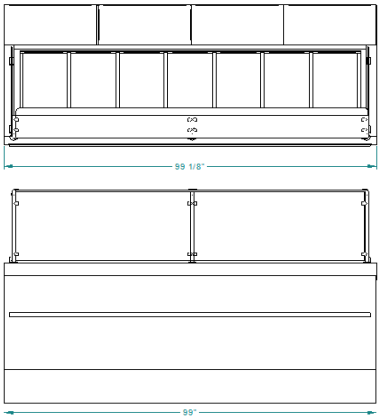
NUMBER OF WELLS	CONDENSING UNIT						EVAPORATIVE PAN			EST. REFG. CHRG. R404A (LBS) SELF-CONTAINED
	NOM. HP	REFRIG.	Hz/Ph	VOLTS	RLA	FUSE AMPS	AMPS	VOLTS	WATTS	
1	1/4	R-404A	60 / 1	115	8	15	N/A	N/A	N/A	1.9
2	1/4	R-404A	60 / 1	115	8	15	N/A	N/A	N/A	2.0
3	1/3	R-404A	60 / 1	115	6	15	8.3	120	1000	2.6
4	1/2	R-404A	60 / 1	115	10.5	20	8.3	120	1000	3.2
5	1/2	R-404A	60 / 1	115	10.5	20	8.3	120	1000	3.3
6	3/4	R-404A	60 / 1	115	15	30	10.0	120	1200	5.4
7	1	R-404A	60 / 1	208	9	20	6.3	240	1500	6.9
8	1	R-404A	60 / 1	208	9.3	20	N/A	N/A	N/A	7.1

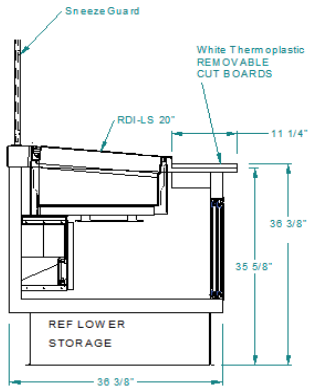
OPTIONAL HIGH OUTPUT LED LIGHTS (115 VOLT)

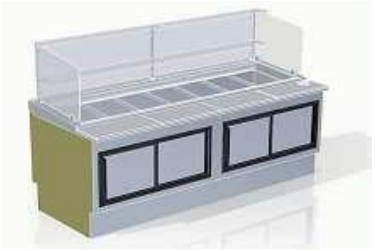
NUMBER OF WELLS	CANOPY LIGHTS H.O. LED		OPTIONAL SHELF		MAX. H.O. LED LOAD	
	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS
1	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A	N/A	N/A

REVISION DATE 08/30/18

HUSSMANN - RDI-LS COUNTERS (CHINO)







NOTE: 7 WELLS SHOWN. SEE BELOW FOR SIZES PER PAN CONFIGURATION

REFRIGERATION DATA:

# OF WELLS	CASE USAGE	CAPACITY *** (BTU/HR/WELL)		TEMPERATURE (ºF)			VELOCITY (FT/MIN)
		RATING CONDITION		EVAPORATOR		DISCHARGE AIR ** (°F)	
		NSF 7	AHRI 1200	NSF 7	AHRI 1200	NSF 7	NSF 7
2, 3, 4, 5, 6, 7, 8	COUNTER	500	NA	22	NA	29~31	100~150

# OF WELLS	EST. REFG. CHRG. (LBS)	20°F GLYCOL 6° RISE	
		GPM	PSI
2	0.3	0.4	0.6
3	0.5	0.8	2.0
4	0.6	0.9	3.3
5	0.8	1.1	4.8
6	0.9	1.2	1.9
7	1.1	1.4	2.5
8	1.3	1.5	3.0

CASE LENGTH DIMENSION
2'-3"
4'-3"
5'-3"
6'-3"
7'-3"
8'-3"
9'-3"

****FRONT DISCHARGE AIR MEASURED INSIDE AIR CURTAIN HONEYCOMB**
*****REFRIGERATION NOTES:**

1) USE DEW POINT FOR HIGH GLIDE REFRIGERANTS. CARE SHOULD BE TAKEN TO USE THE DEW POINT IN P/T TABLES FOR MEASURING AND ADJUSTING SUPERHEAT. ADJUST EVAPORATOR PRESSURE AS NEEDED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SHOWN.
2) RATING CONDITION IS NSF TYPE I, 75°F/55% RH.

REFRIGERATION DATA CONTINUED:

ELEC. THERMOSTAT / AIR SENSOR SETTINGS			DEFROST TYPE	TIME (MIN)	DEFROST FREQUENCY (#/DAY)	TERM. TEMP (°F) COIL ONLY	DRIP TIME	DEFROST WATER (LBS/DAY/FT)
USAGE	CUT IN (ºF)	CUT OUT (ºF)						
COUNTER	30	27	OFF TIME	60	4	48	N/A	TBD

END PANEL WIDTH KEY		
# OF END PNLS	END PNL WIDTH (IN.)	TOTAL ADDED LENGTH (IN.)
1	1.125	1.125
2	1.125	2.25

ELECTRICAL DATA:

STANDARD FANS, HEATERS, LED LIGHTS (115 VOLT)

# OF WELLS	CASE LENGTH	EVAPORATOR FANS					CANOPY LIGHTS LED		OPTIONAL LED SHELF LIGHTS		MAX. LED LOAD (W/ ALL OPTIONS)		ANTI-SWEAT HEATERS		CONVENIENCE OUTLETS (OPTIONAL)		
		# OF EVAP FANS	BLADE DIA. (IN.)	BLADE PITCH (°)	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	# OUTLETS	VOLTS	AMPS
2	2'-3"	1	N/A	N/A	0.78	20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	4'-3"	2	N/A	N/A	1.56	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	5'-3"	2	N/A	N/A	1.56	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	6'-3"	3	N/A	N/A	2.34	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	7'-3"	4	N/A	N/A	3.12	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	8'-3"	4	N/A	N/A	3.12	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	9'-3"	4	N/A	N/A	3.12	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

OPTIONAL HIGH OUTPUT LED LIGHTS (115 VOLT)

# OF WELLS	CANOPY LIGHTS H.O. LED		OPTIONAL SHELF		MAX. H.O. LED LOAD	
	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS
2	N/A	N/A	N/A	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A	N/A	N/A

Electrical

Wiring Color Code

STANDARD CASE WIRE COLOR CODE CODIGO DE COLORES DE LOS ALAMBRES PARA LAS VITRINAS ESTANDAR CODE COULER POUR FILS DE BOITIER NORMALISE		
COLOR DESCRIPTION	DESCRIPCION	DESCRIPTION
GROUND	TIERRA MASA	MASSE
ANTI-SWEAT	ANTICONDENSACION	ANTI-SUINTEMENT
LIGHTS	LUCES	ECLAIRAGE
RECEPTACLES	ENCHUFES	PRISE DE COURANT
T-STAT/SOLENOID 230VAC	TERMOSTATO/SOLENOIDE (230VAC)	SOUPAPE A SOLENOID (230 VAC)
T-STAT/SOLENOID 115VAC	TERMOSTATO/SOLENOIDE (115VAC)	SOUPAPE A SOLENOID (115 VAC)
T-STAT/SOLENOID 24VAC	TERMOSTATO/SOLENOIDE (24VAC)	SOUPAPE A SOLENOID (24 VAC)
FAN MOTORS	VENTILADORES	VENTILATEUR
BLUE CONDENSING UNIT	UNIDAD DE CONDENSACION	UNITE DE CONDENSATION

USE COPPER CONDUCTORS ONLY
UTILISEZ LES CONDUCTEURS DE CUIVRE SEULEMENT
UTILICE LOS CONDUCTORES DE COBRE SOLAMENTE
430-01-0338 R101003

CASE MUST BE GROUNDED

NOTE: Refer to label affixed to case to determine the actual configuration as checked in the "TYPE INSTALLED" boxes.

Electrical Circuit Identification

Standard lighting for all models will be full length fluorescent lamps located on the front of the parent case.

The switch controlling the lights is located on the parent case.

Field Wiring and Serial Plate Amperage

Field Wiring must be sized for component amperes printed on the serial plate. Actual ampere draw may be less than specified. Field wiring from the refrigeration control panel to the merchandisers is required for refrigeration thermostats. Case amperes are listed on the wiring diagram, but always check the serial plate.

DANGER

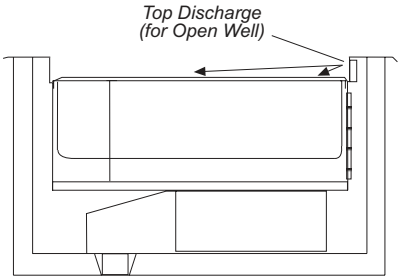
**BEFORE SERVICING
ALWAYS DISCONNECT ELECTRICAL
POWER AT THE MAIN DISCONNECT
WHEN SERVICING OR REPLACING ANY
ELECTRICAL COMPONENT.
This includes (but not limited to) Fans, Heaters
Thermostats, and Lights.**

User Information

Stocking

Improper temperature and lighting will cause serious product loss. Discoloration, dehydration and spoilage can be controlled with proper use of the equipment and handling of product. Product temperature should always be maintained at a constant and proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize life of the product. Hussmann cases were not designed to "heat up" or "cool down" product-but rather to maintain an item's proper temperature for maximum shelf life. To achieve the protection required always:

1. Minimize processing time to avoid damaging temperature rise to the product. Product should be at proper temperature.
2. Keep the air in and around the case area free of foreign gasses and fumes or food will rapidly deteriorate.
3. Maintain the display merchandisers temperature controls as outlined in the refrigerator section of this manual.
4. Do not place any product into these refrigerators until all controls have been adjusted and they are operating at the proper temperature. Allow merchandiser to operate a minimum of 6 hours before stocking with any product.
5. When stocking, never allow the product to extend beyond the recommended load limit. **Air discharge and return air flow must be unobstructed at all times to provide proper refrigeration.** Do not stock product within the top air discharge zone (See diagram).



6. This case was designed and tested using stainless steel hotel pans. The use of any other material (such as crocks) may insulate the product and thus, not be kept cold. Containers made of materials other than stainless steel is discouraged and may void warranty.
7. Avoid the use of supplemental flood or spot lighting. Display light intensity has been designed for maximum visibility and product life at the factory. The use of higher output fluorescent lamps (H.O. and V.H.O.), will shorten the shelf life of the product.

User Information (Cont'd)

Important Steps

1. Do not set temperature too cold, as this causes product dehydration. **Refer to case specs section for proper settings.**
2. Temperature control should be by means of a T-STAT and Suction Stop Solenoid at each case. Do not use EPR valves, Liquid Line Solenoids or electronic control devices of any kind, as these allow temperature swings causing dehydration and excessive energy consumption.

Case Cleaning

Long life and satisfactory performance of any equipment are dependent upon the care given to it. To insure long life, proper sanitation and minimum maintenance costs, the refrigerator should be thoroughly cleaned frequently. SHUT OFF FAN DURING CLEANING PROCESS. It can be unplugged within the case, or shut off case at the source. The interior bottom may be cleaned with any domestic soap or detergent based cleaners. Sanitizing solutions will not harm the interior bottom, however, these solutions should always be used according to the manufacturer's directions. It is essential to establish and regulate cleaning procedures. This will minimize bacteria causing discoloration which leads to degraded product appearance and significantly shortening product shelf life.

Soap and hot water are not enough to kill this bacteria. A sanitizing solution must be included with each cleaning process to eliminate this bacteria.

1. Scrub thoroughly, cleaning all surfaces, with soap and hot water.
2. Rinse with hot water, but do not flood.
3. Apply the sanitizing solution according to the manufacturer's directions.
4. Rinse thoroughly.
5. Dry completely before resuming operation.

Cleaning Glass and Mirrors

Only use a soft cloth and mild glass cleaner for cleaning any glass or mirrored components. Be sure to rinse and/or dry completely. **Never use hot water on cold glass surfaces! It may shatter and cause serious injury!** Allow glass surfaces to warm first.

CAUTION

CLEANING PRECAUTIONS

When cleaning:

- **Do not use high pressure water hoses**
- **Do not introduce water faster then waste outlet can drain**
- **NEVER INTRODUCE WATER ON SELF CONTAINED UNIT WITH AN EVPORATOR PAN**
- **NEVER USE A CLEANING OR SANITIZING SOLUTION THAT HAS AN OIL BASE (these will dissolve the butyl sealants) or an AMMONA BASE (this will corrode the copper components of the case)**
- **TO PRESERVE THE ATTRACTIVE FINISH:**
- **DO USE WATER AND A MILD DETERGENT FOR THE EXTERIOR ONLY**
- **DO NOT USE A CHLORANITED CLAENER ON ANY SURFACE**
- **DO NOT USE ABRASIVES OR STEEL WOOL SCOURING PADS (these will mar the finish)**

Maintenance

DANGER

BEFORE SERVICING
ALWAYS DISCONNECT ELECTRICAL POWER AT THE MAIN DISCONNECT WHEN SERVICING OR REPLACING ANY ELECTRICAL COMPONENT.
This includes (but not limited to) Fans, Heaters Thermostats, and Lights.

Evaporator Fans

The evaporator fans are located at the center front of these merchandisers directly beneath the display pans. *Should fans or blades need servicing, always replace fan blades with the raised embossed side of the blade TOWARD THE MOTOR.*

Copper Coils

The copper coils used in Hussmann merchandisers may be repaired in the field. Materials are available from local refrigeration wholesalers.

Hussmann recommends using #15 Sil-Fos for repairs.

Tips and Troubleshooting

Before calling for service, check the following:

1. Check electrical power supply to the equipment for connection.
2. Check fixture loading. Overstocking case will affect its proper operation.
3. If frost is collecting on fixture and/or product, check that Humidity Control is working properly, and that no outside doors or windows are open - allowing moisture to enter store.

IMPORTANT INFORMATION

FOR PROMPT SERVICE
When contacting the factory, be sure to have the Case Model and Serial Number handy. This information is on a plate located on the case itself.

Stainless Steel Cleaning and Care

There are three basic things, which can break down your stainless steel's passivity layer and allow corrosion.

1. **Mechanical Abrasion**
   Mechanical Abrasion means those things that will scratch the steels surface. Steel Pads, wire Brushes, and Scrapers are prime examples.
2. **Water**
   Water comes out of our tap in varying degrees of hardness. Depending on what part of the country you live in, you may have hard or soft water. Hard water may leave spots. Also, when heated, hard water leaves deposits behind that if left to sit, will break down the passive layer and rust your stainless steel. Other deposits from food preparation and service must be properly removed.
3. **Chlorides**
   Chlorides are found nearly everywhere. They are in water, food and table salt. One of the worst perpetrators of chlorides can come from household and industrial cleaners.

Don't Despair! Here are a few steps that can help prevent stainless steel rust.

1. **Use the Proper Tools**
   When cleaning your stainless steel products, take care to use non-abrasive tools. Soft Clothes and plastic scouring pads will NOT harm the steel's passive layer. Stainless steel pads can also be used but the scrubbing motion must be in the same direction of the manufacturer's polishing marks.
2. **Clean With the Polish Lines**
   Some stainless steels come with visible polishing lines or "grain". When visible lines are present, you should ALWAYS scrub in a motion that is parallel to them. When the grain cannot be seen, play it safe and use a soft cloth or plastic scouring pad.
3. **Use Alkaline, Alkaline Chlorinated or Non-chloride Containing Cleaners**
   While many traditional cleaners are loaded with chlorides, the industry is providing an ever increasing choice of non-chloride cleaners. If you are not sure of your cleaner's chloride content contact your cleaner supplier. If they tell you that your present cleaner contains chlorides, ask for an alternative. Also, avoid cleaners containing quaternary salts as they also can attack stainless steel & cause pitting and rusting.
4. **Treat your Water**
   Though this is not always practical, softening hard water can do much to reduce deposits. There are certain filters that can be installed to remove distasteful and corrosive elements. Salts in a properly maintained water softener are your friends. If you are not sure of the proper water treatment, call a treatment specialist.
5. **Keep your Food Equipment Clean**
   Use alkaline, alkaline chlorinated or non-chlorinated cleaners at recommended strength. Clean frequently to avoid build-up of hard, stubborn stains. If you boil water in your stainless steel equipment, remember the single most likely cause of damage is chlorides in the water. Heating cleaners that contain chlorides has a similar effect.
6. **RINSE, RINSE, RINSE**
   If chlorinated cleaners are used you must rinse, rinse, rinse and wipe dry immediately. The sooner you wipe off standing water, especially when sit contains cleaning agents, the better. After wiping the equipment down, allow it to air dry for the oxygen helps maintain the stainless steel's passivity film.
7. **Never Use Hydrochloric Acid (Muriatic Acid) on Stainless Steel**
8. **Regularly Restore/Passivate Stainless Steel**

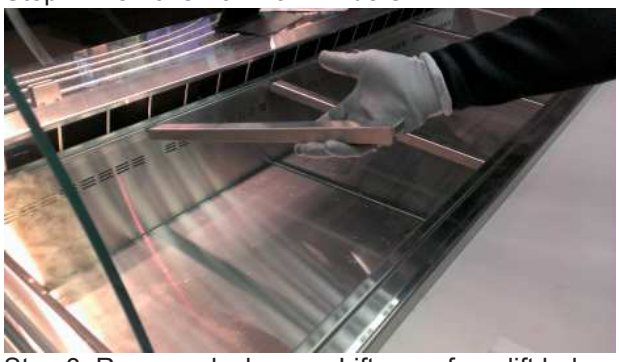
Grille Cleaning Instructions

The following instructions will demonstrate step by step on how to properly remove and clean the following components:

- Discharge Air Grille
- Return Air Grille
- Honeycomb

Step 1: Carefully clear all inserts from case.

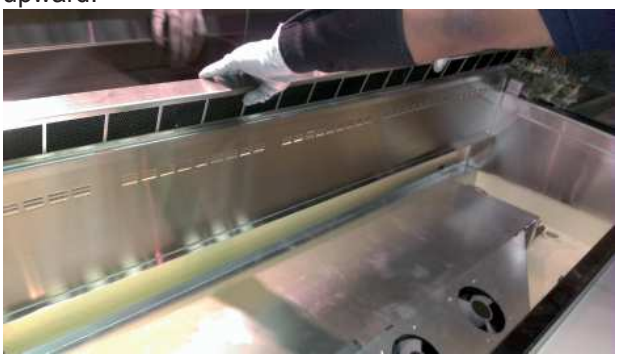
Step 2: Remove Pan Bar/Dividers.



Step 3: Remove deck pans. Lift pans from lift hole.

Step 4: Disengage Return Air Grille from resting hooks upward.

Step 5: Disengage Discharge Air Grille from resting hooks upward.



Note: Honeycomb may be pressure washed while placed inside Discharge Air Grille as well comes the option to remove and clean individually in sink with soap and hot water. Honeycomb can be disengaged from hooks in Discharge Air Grille and slide out.

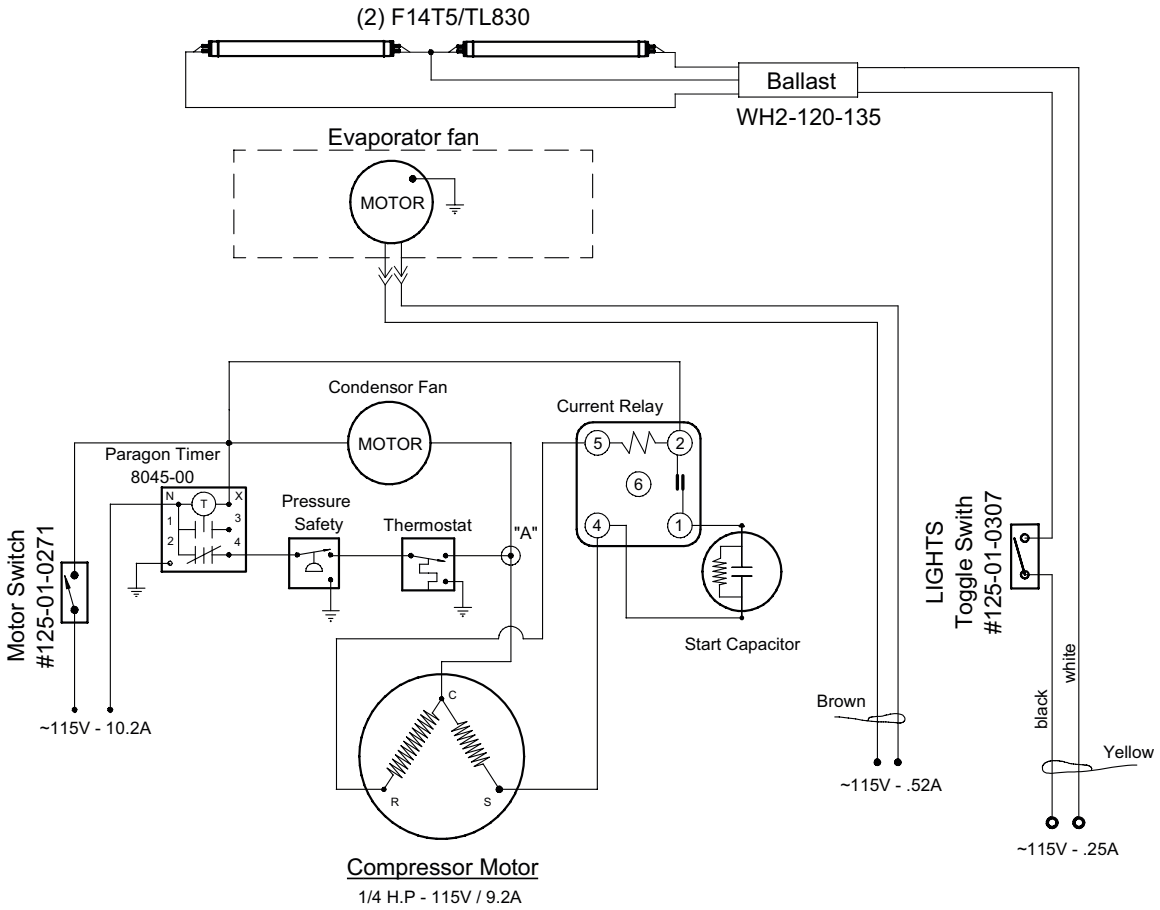
Step 6: Disengage Side Internal Panel from resting hooks upward.

Upon clearing all components follow cleaning instructions exactly to ensure long life and satisfactory performance.

1. Scrub thoroughly, cleaning all surfaces, with soap and hot water.
2. Rinse with hot water, but do not flood.
3. Apply the sanitizing solution according to the manufacturer's directions.
4. Rinse thoroughly.
5. Dry completely before resuming operation.

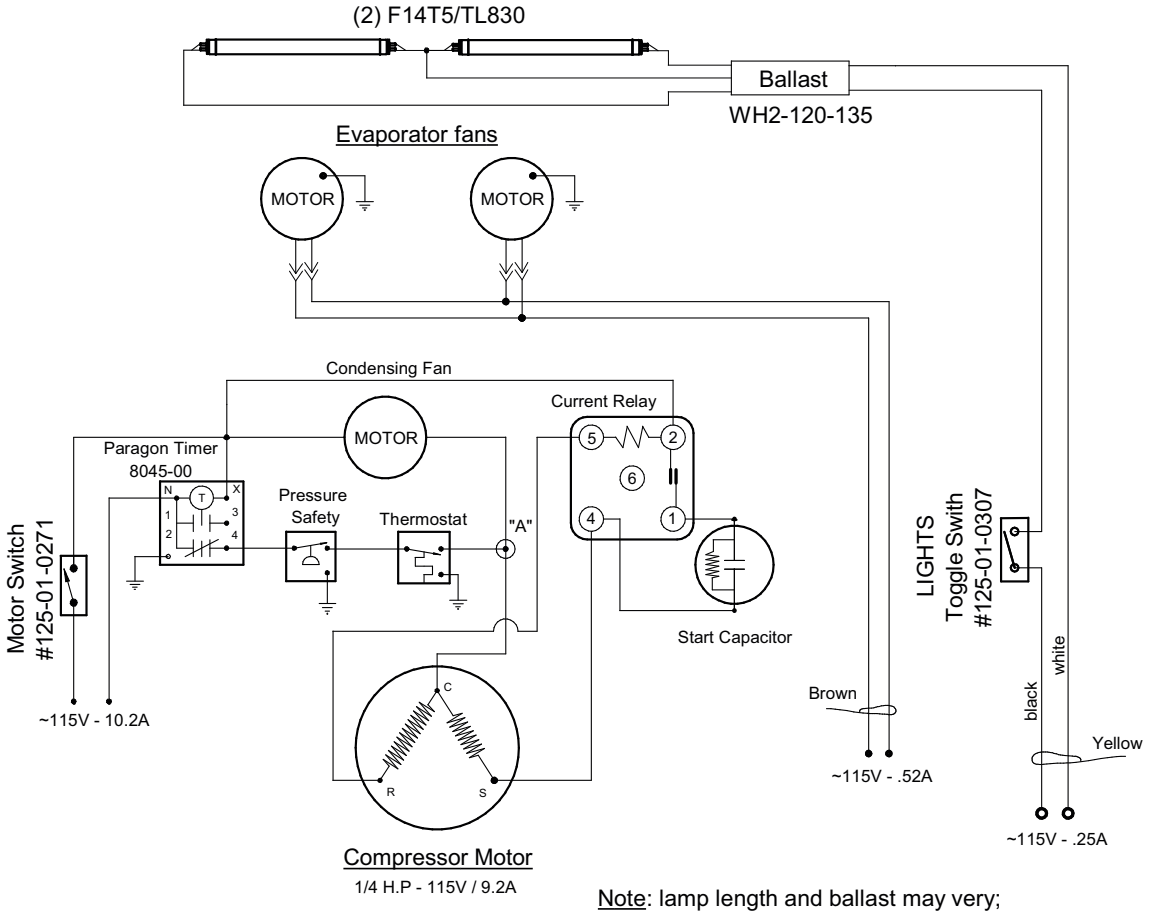
Electrical Wiring Diagrams

RDI	1 or 2 Pans, 1/4 HP-115V		W2100001
Remote or S/Contained	3 or 4 Pans, 1/4 HP-115V		W2100002
	5 or 6 Pans, 1/4 HP-115V		W2100003
	7 or 8 Pans, 1/3 HP-115V	8'	W2100004
	11 Pans, 3/4 HP-230V		W2100006
	RDI-20-3 WELL SC	3'	3041786
	RDI-20-4 WELL SC	4'	3041705
	RDI-20-5 WELL SC	5'	3041706
	RDI-20-6 WELL SC	6'	3041708
	RDI-20-7 WELL SC	7'	3041709



Note: lamp length may very.
case must be grounded.

HUSSMANN®	Hussmann Corporation 13770 Ramona Avenue Chino, CA. 91710 (909)-590-4910 Lic.#: 644406	Revisions: No. Description: Date: By:	Drawn By: Boris Kasrel Checked By: BK Date: 00.28.2000 Next Assembly: final	Project Title: 1 or 2 Pan Self-Contained Cold Food/Deli Display Drawing Title: RDI1/2-27sc wiring	Drawing No.: W2100001.dft Sheet 1 of 1



Note: lamp length and ballast may very;
case must be grounded.

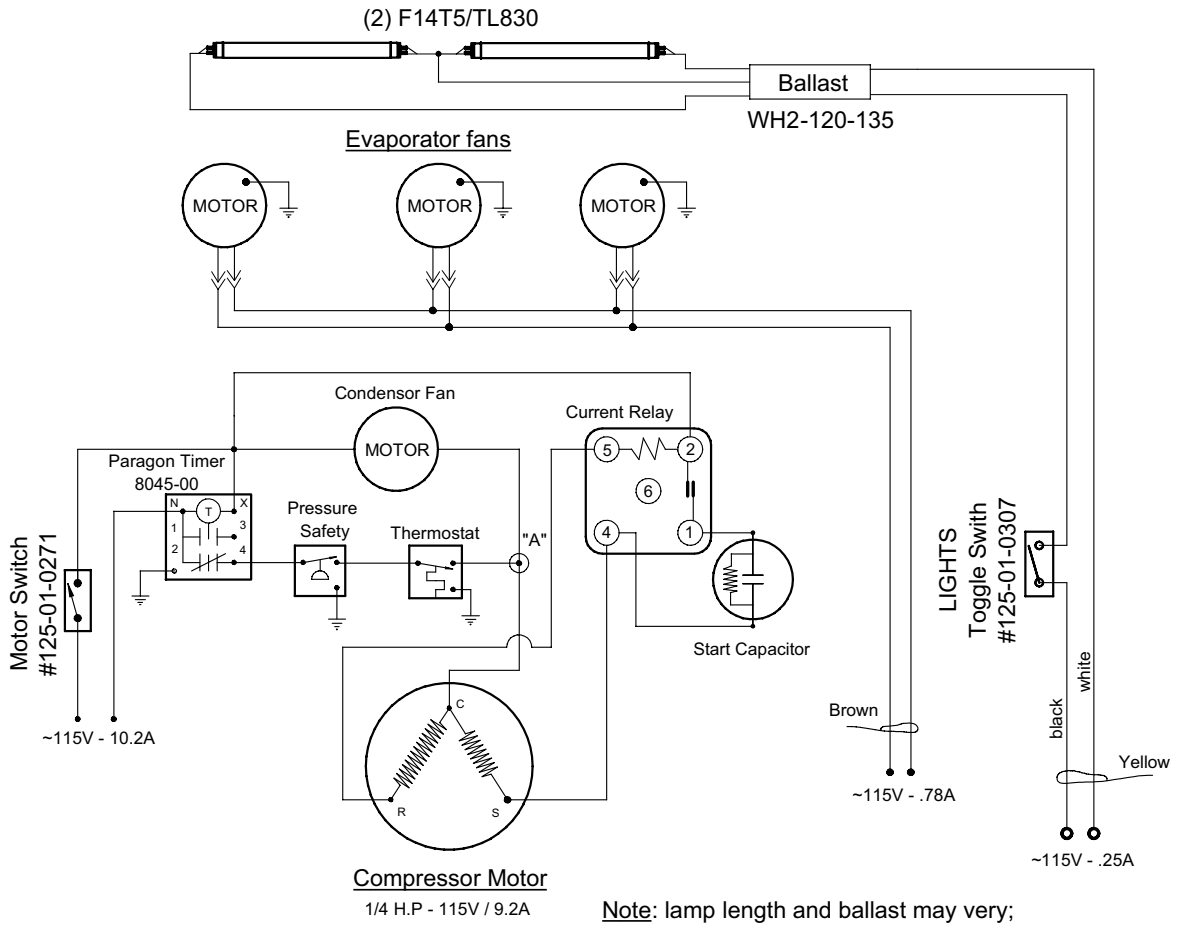
HUSSMANN®
Hussmann Corporation
13770 Ramona Avenue
Chino, CA. 91710
(909)-590-4910
Lic.#: 644406

Revisions:

No.	Description:	Date:	By:

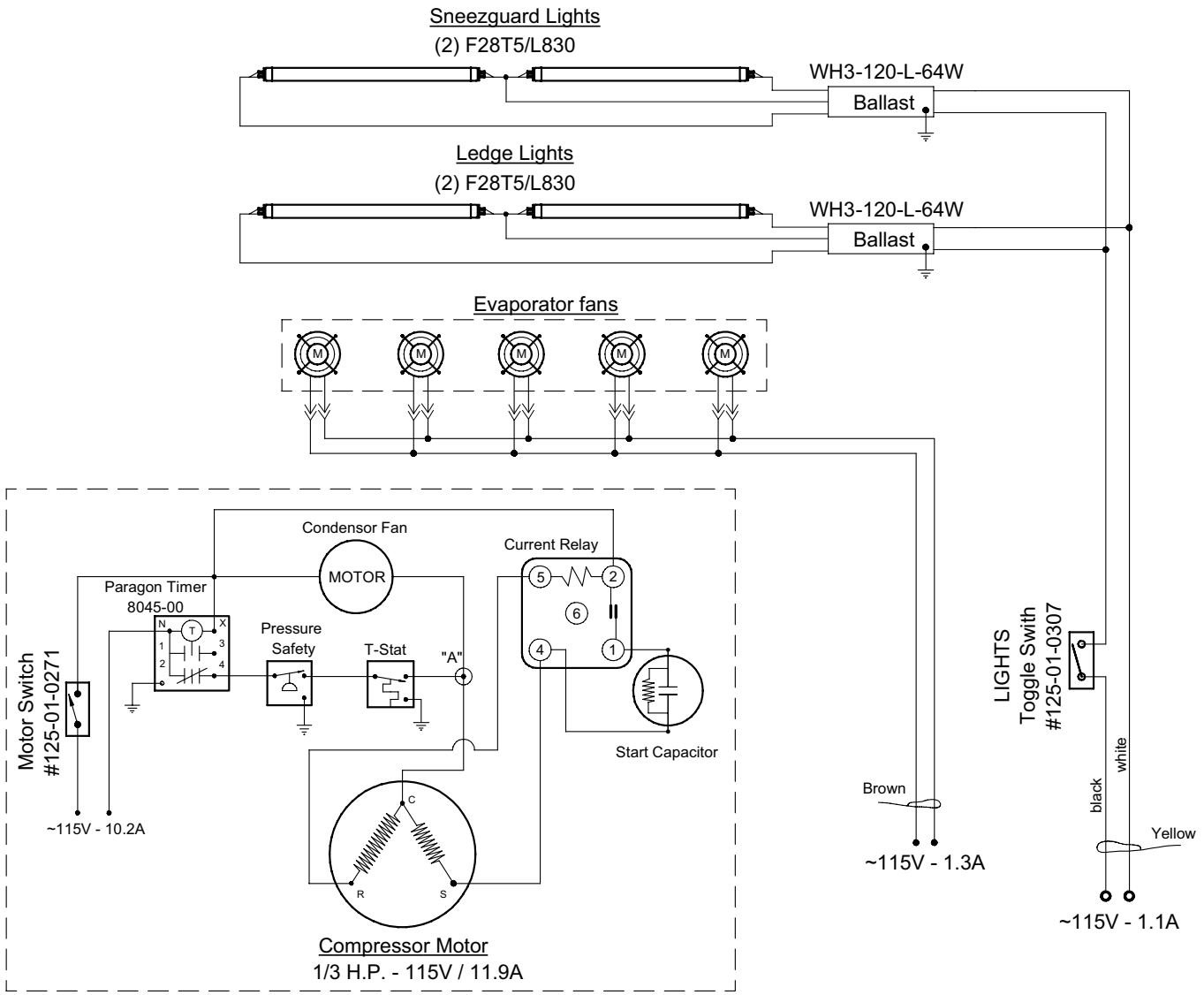
Drawn By: Boris Kasrel
Checked By: BK
Date: 00.28.2000
Next Assembly: final

Project Title: 3 or 4 Pan Self-Contained Cold Food/Deli Display
Drawing Title: RDI3/4-27sc wiring
Drawing No.: W2100002.dft
Sheet 1 of 1



Note: lamp length and ballast may very; case must be grounded.

HUSSMANN®	Hussmann Corporation 13770 Ramona Avenue Chino, CA. 91710 (909)-590-4910 Lic.#: 644406	Revisions: No. Description: Date: By:	Drawn By: Boris Kasrel Checked By: **BK** Date: **02.04.2000** Next Assembly: final	**Project Title:** 5 Pan Self-Service Cold Food/Deli Display **Drawing Title:** RDI5-27sc wiring	Drawing No.: W2100003 Sheet 1 of 1



Condensing Unit for Self-Contained Counters only

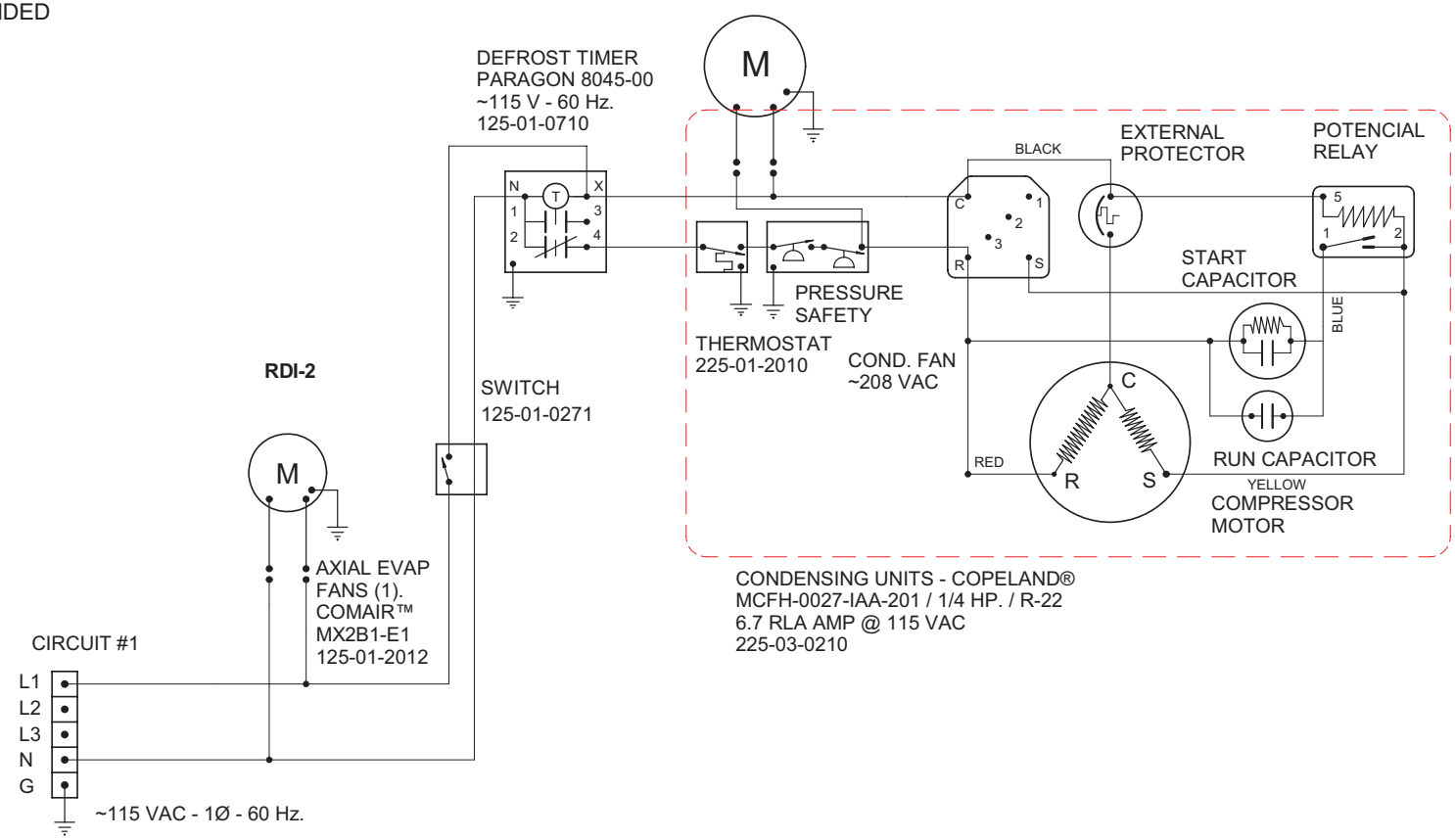
Note:case must be grounded.

HUSSMANN®	Hussmann Corporation 13770 Ramona Avenue Chino, CA. 91710 (909)-590-4910 Lic.#: 644406	Revisions: No. Description: Date: By:	Drawn By: Boris Kasrel Checked By: BK Date: 05.10.2000 Next Assembly: final	Project Title: Custom 7 Pan Service Cold Food/Deli Display with rear storage Drawing Title: RDI7-27 Self-Contained or Remote wiring	Drawing No.: W2100004 Sheet 1 of 1

CIRCUIT #1

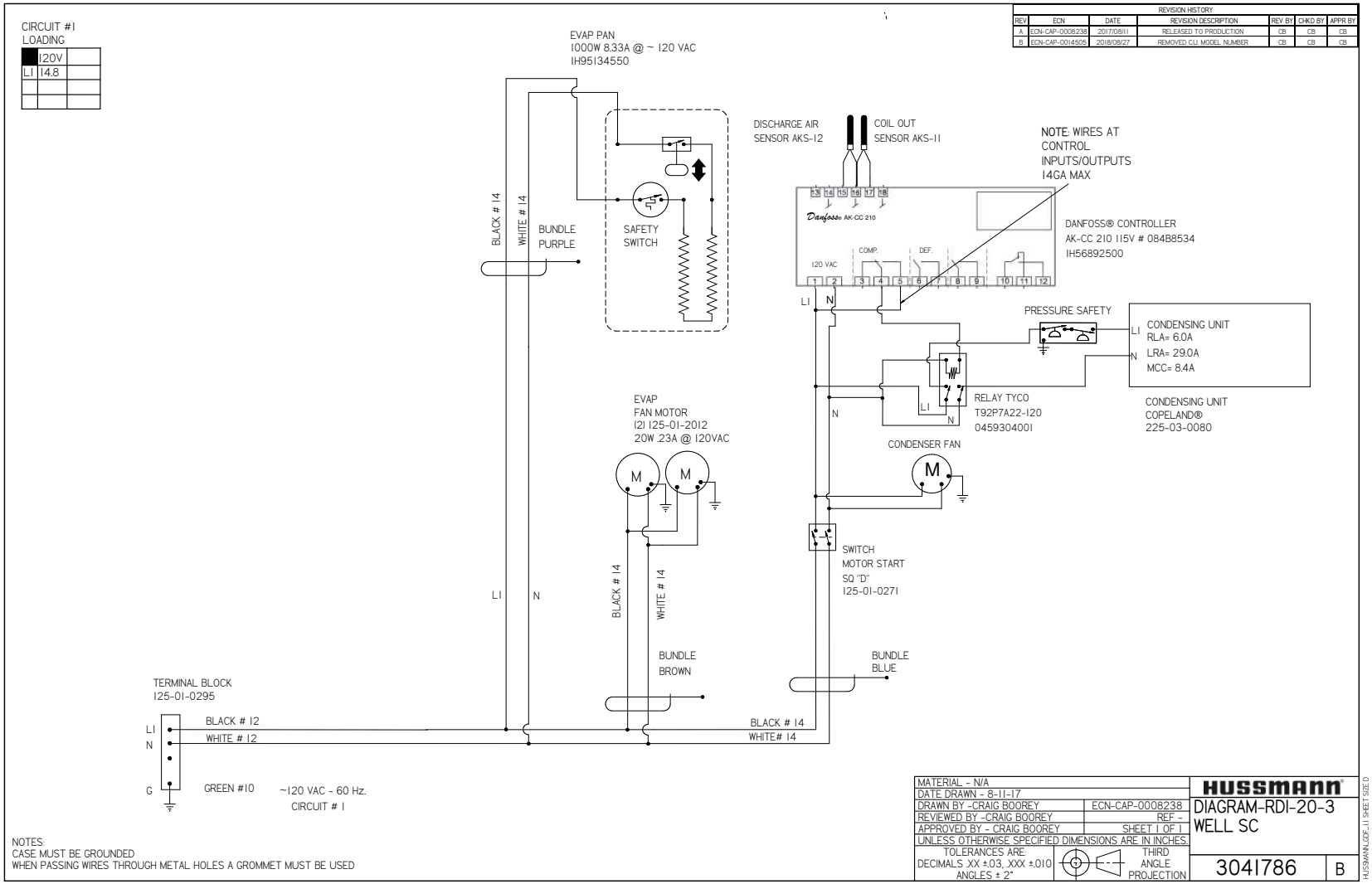
	LOADING	
	115 V	
L1	6.8	
L2		
L3		

NOTE: CASE MUST BE GROUNDED

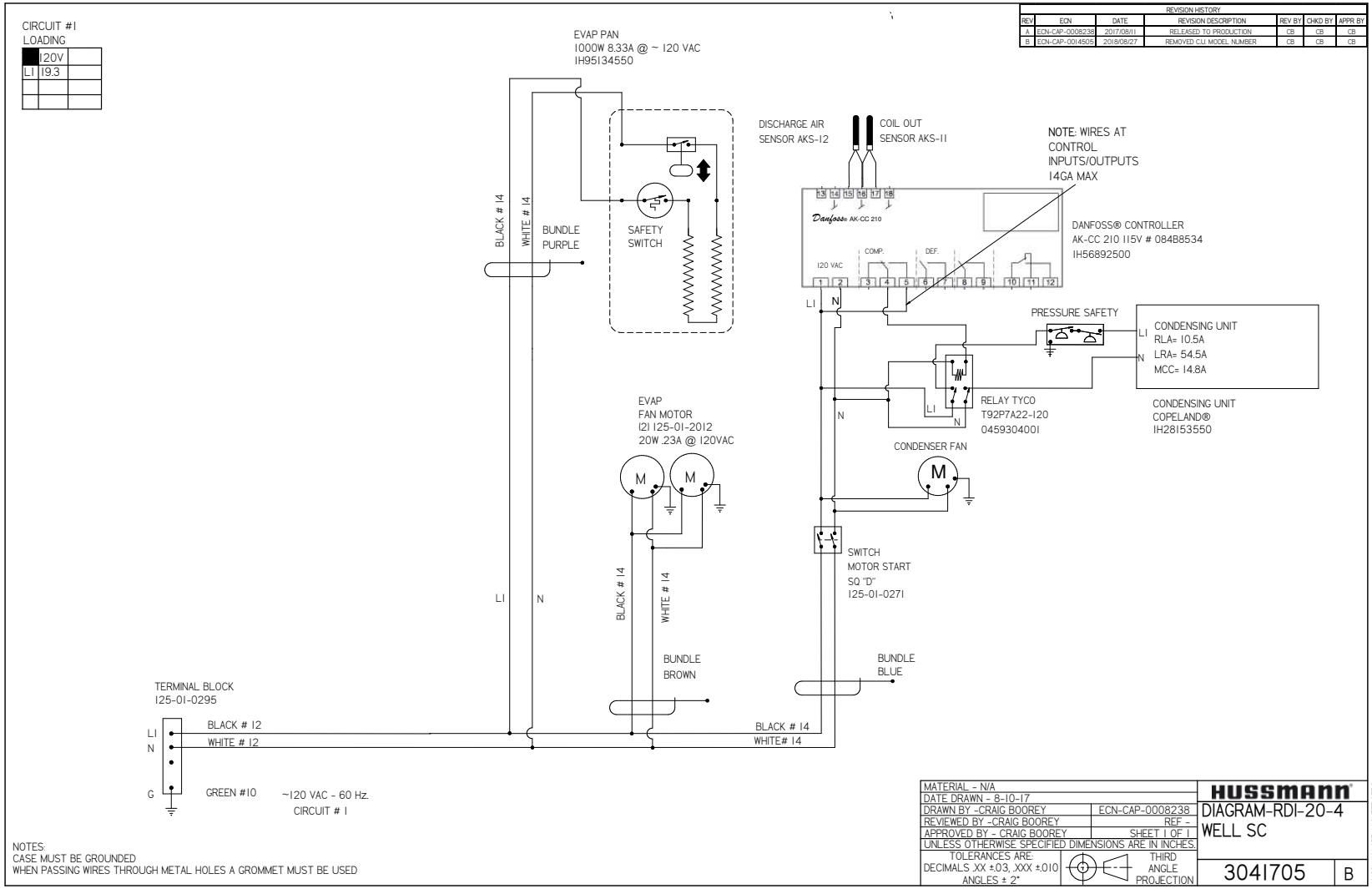


PAGE 1 OF 1

HUSSMANN®	REVISIONS:			DRAWN BY: D.QUAN	PROJECT TITLE: RDI-20-2WELL-SC	DWG #: W2100006
	#: DESCRIPTION:	DATE:	BY:	CHECKED BY: --- DATE: 07/25/06		
HUSSMANN CORPORATION 13770 RAMONA AVENUE CHINO, CA 91710 (909) 590-4910 LIC.#: 644406	1			PRODUCTION ORDER #: 884961	DRAWING TITLE:	
	2			FILE LOCATION:		
	3			\ENG\WIRESCHEMATICS\NEW-WIRING	RDI-20-2WELL-SC	PAGE 1 OF 1



REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0008238	2017/08/11	RELEASED TO PRODUCTION	CB	CB	CB
B	ECN-CAP-0014505	2018/08/27	REMOVED CU MODEL NUMBER	CB	CB	CB



REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0008238	2017/08/11	RELEASED TO PRODUCTION	CB	CB	CB
B	ECN-CAP-0014505	2018/08/27	REMOVED CU MODEL NUMBER	CB	CB	CB

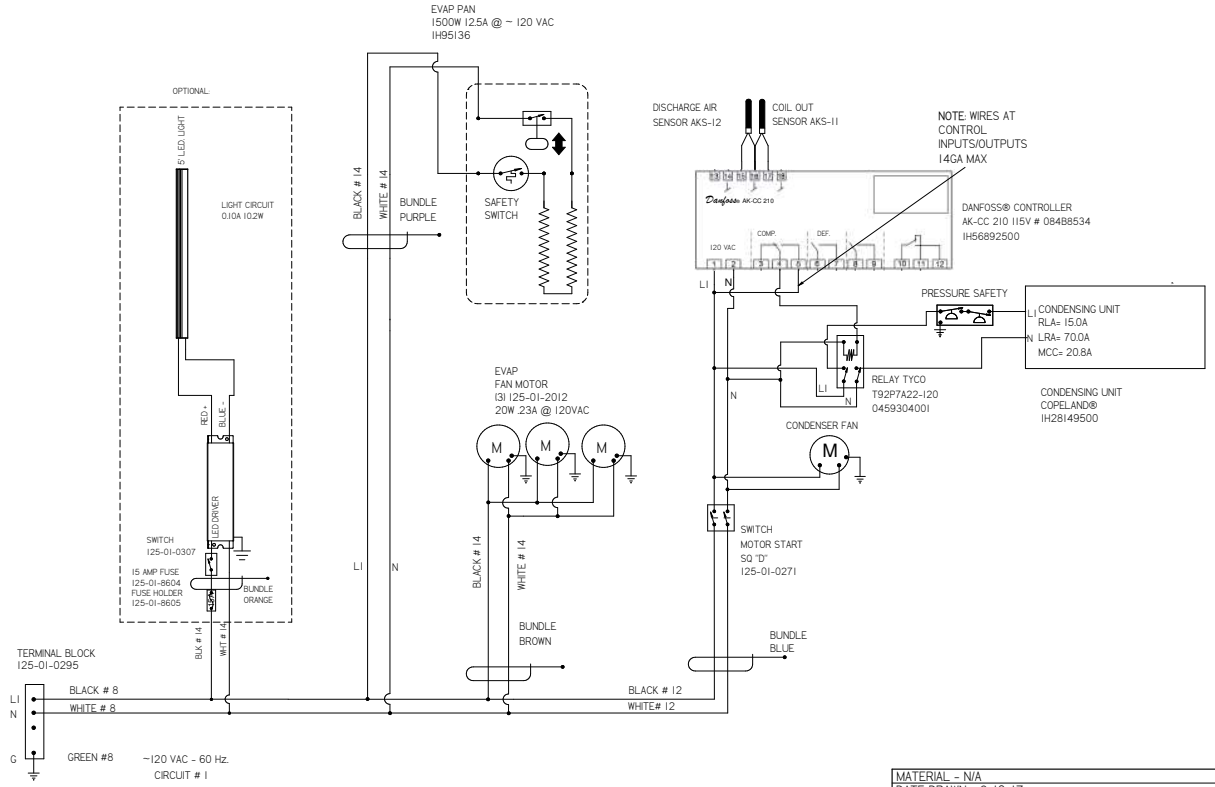
MATERIAL - N/A		HUSSMANN
DATE DRAWN - 8-10-17		
DRAWN BY -CRAIG BOOREY	ECN-CAP-0008238	DIAGRAM-RDI-20-4
REVIEWED BY -CRAIG BOOREY	REF -	WELL SC
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.		
TOLERANCES ARE: DECIMALS .XX ±.03, .XXX ±.010 ANGLES ± 2°	THIRD ANGLE PROJECTION	3041705 B

HUSSMANN_LOF_1 | SHEET SIZE D

CIRCUIT #1
LOADING

	120V	
L1	28.2	

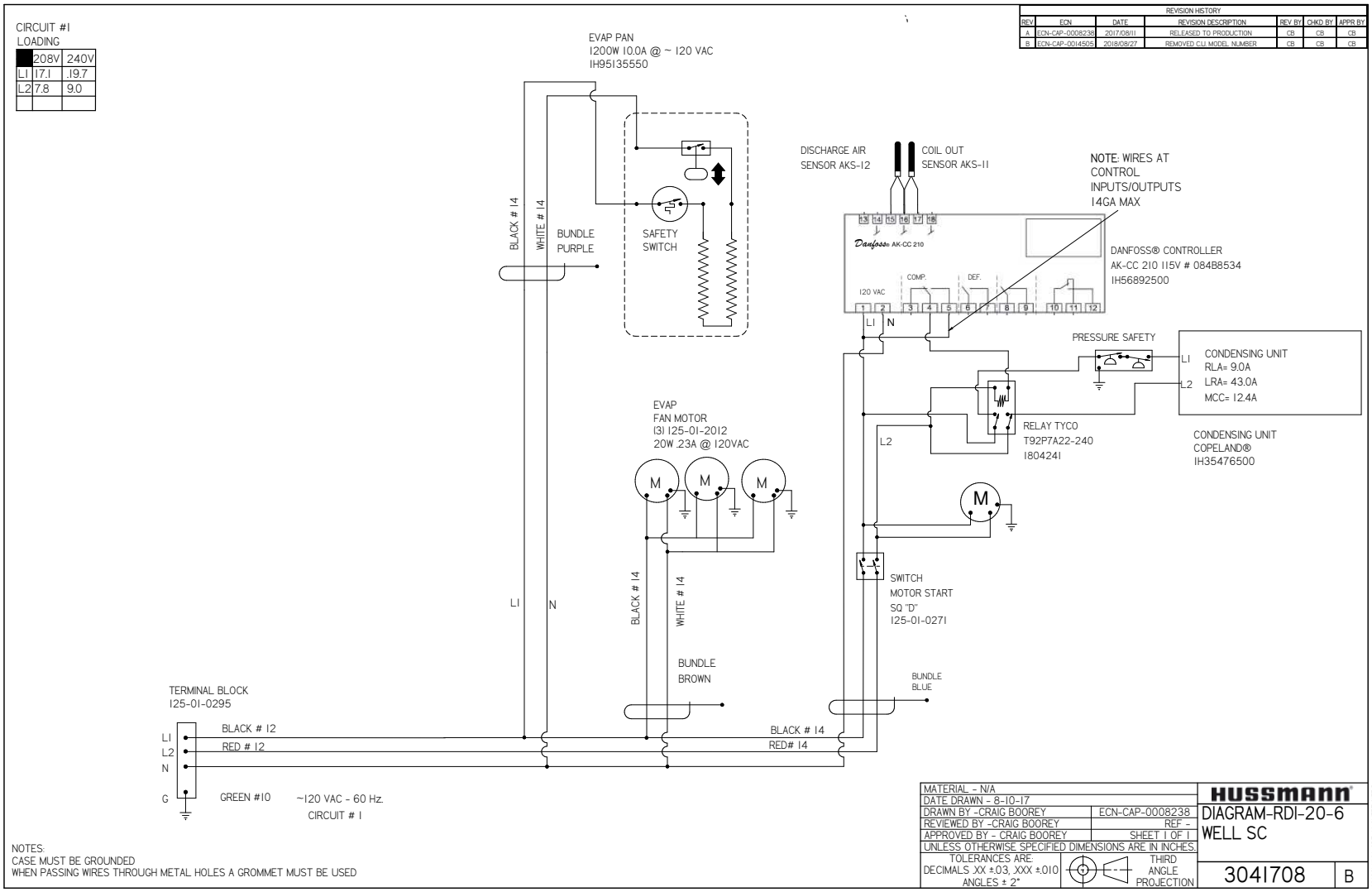
REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0008238	2017/08/11	RELEASED TO PRODUCTION	CB	CB	CB
B	ECN-CAP-0010804	2017/11/28	CHANGED EVAP PAN	CB	CB	CB
C	ECN-CAP-0011918	2018/04/06	CHANGED COND. UNIT TO 3/4 HP	CB	CB	CB
D	ECN-CAP-0012694	2018/05/16	ADDED OPTIONAL LIGHTS	CB	CB	CB
E	ECN-CAP-0014505	2018/08/27	REMOVED CU MODEL NUMBER	CB	CB	CB

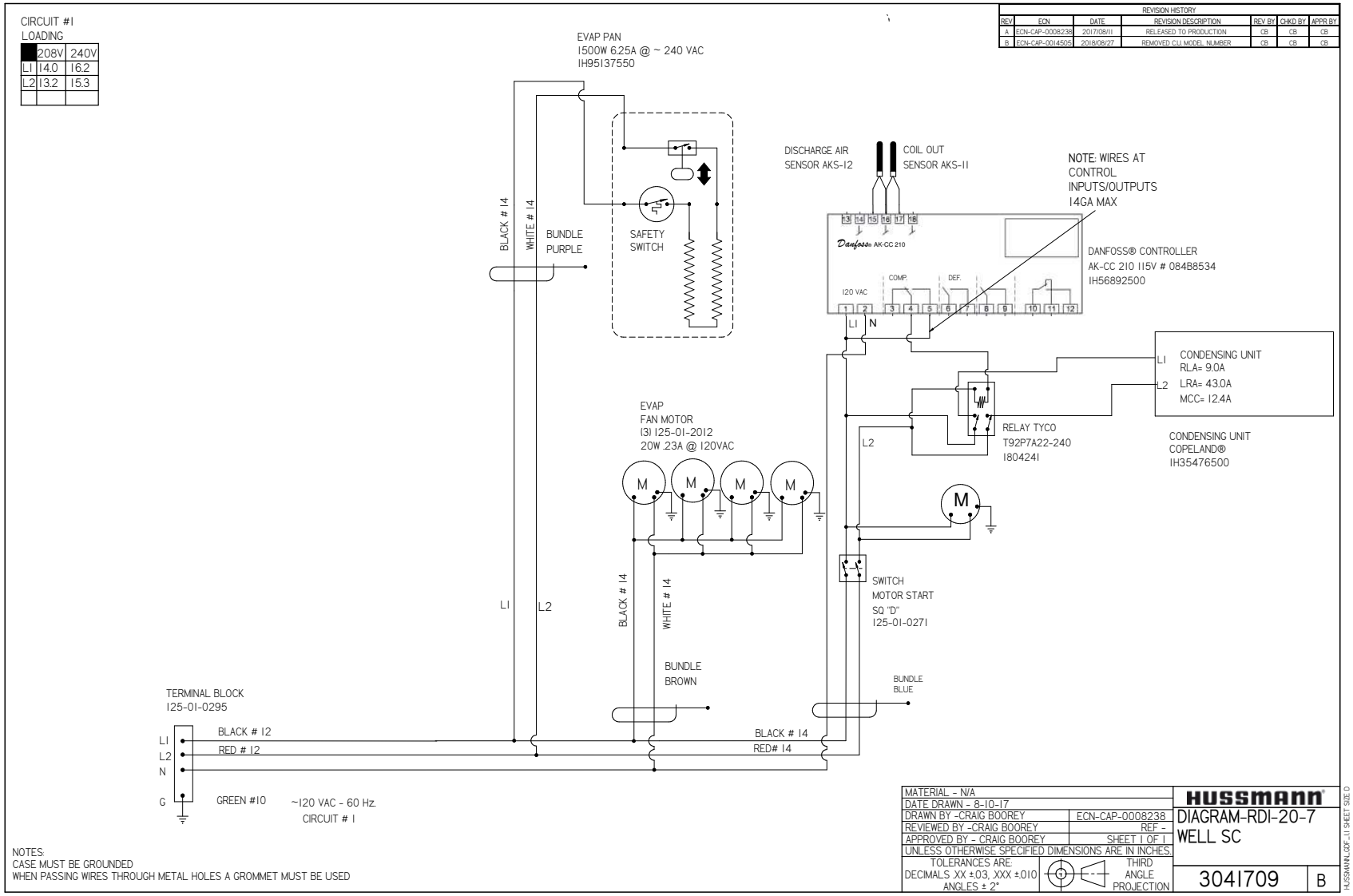


NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A		HUSSMANN®
DATE DRAWN - 8-10-17		DIAGRAM-RDI-20-5
DRAWN BY -CRAIG BOOREY	ECN-CAP-0008238	WELL SC
REVIEWED BY -CRAIG BOOREY	REF: -	
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.		
TOLERANCES ARE: DECIMALS .XX ±.03, .XXX ±.010 ANGLES ± 2°	THIRD ANGLE PROJECTION	3041706 E

HUSSMANN.DGF_1.1 SHEET SIZE D


CIRCUIT #1
LOADING
208V 240V
L1 17.1 19.7
L2 7.8 9.0
REVISION HISTORY
REV ECN DATE REVISION DESCRIPTION REV BY CHKD BY APPR BY
A ECN-CAP-0008238 2017/08/11 RELEASED TO PRODUCTION CB CB CB
B ECN-CAP-0014505 2018/08/27 REMOVED CU MODEL NUMBER CB CB CB
EVAP PAN
1200W 10.0A @ ~ 120 VAC
IH95135550
BLACK # 14
WHITE # 14
BUNDLE
PURPLE
SAFETY
SWITCH
DISCHARGE AIR
SENSOR AKS-12
COIL OUT
SENSOR AKS-11
NOTE: WIRES AT
CONTROL
INPUTS/OUTPUTS
14GA MAX
Danfoss AK-CC 210
DANFOSS® CONTROLLER
AK-CC 210 115V # 084B8534
IH56892500
COMP.
DEF.
120 VAC
L1 N
PRESSURE SAFETY
CONDENSING UNIT
RLA= 9.0A
LRA= 43.0A
MCC= 12.4A
CONDENSING UNIT
COPELAND®
IH35476500
RELAY TYCO
T92P7A22-240
180424I
L2
EVAP
FAN MOTOR
(3) 125-01-2012
20W .23A @ 120VAC
M
SWITCH
MOTOR START
SQ "D"
125-01-0271
BUNDLE
BROWN
BUNDLE
BLUE
TERMINAL BLOCK
125-01-0295
L1
L2
N
G
BLACK # 12
RED # 12
GREEN #10
~120 VAC - 60 Hz.
CIRCUIT # 1
BLACK # 14
RED# 14
NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED
MATERIAL - N/A
DATE DRAWN - 8-10-17
DRAWN BY -CRAIG BOOREY
REVIEWED BY -CRAIG BOOREY
APPROVED BY - CRAIG BOOREY
ECN-CAP-0008238
REF -
SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:
DECIMALS .XX ±.03, .XXX ±.010
ANGLES ± 2°
THIRD
ANGLE
PROJECTION
HUSSMANN
DIAGRAM-RDI-20-6
WELL SC
3041708
B
HUSSMANN_QDP_11 SHEET SIZE D


CIRCUIT #1
LOADING
208V 240V
L1 14.0 16.2
L2 13.2 15.3
EVAP PAN
1500W 6.25A @ ~ 240 VAC
1H95137550
DISCHARGE AIR SENSOR AKS-12
COIL OUT SENSOR AKS-11
NOTE: WIRES AT CONTROL INPUTS/OUTPUTS 14GA MAX
BLACK # 14
WHITE # 14
BUNDLE PURPLE
SAFETY SWITCH
Danfoss AK-CC 210
DANFOSS® CONTROLLER
AK-CC 210 115V # 084B8534
1H56892500
120 VAC
COMP.
DEF.
L1
N
CONDENSING UNIT
RLA= 9.0A
LRA= 43.0A
MCC= 12.4A
CONDENSING UNIT
COPELAND®
1H35476500
EVAP
FAN MOTOR
(3) 125-01-2012
20W .23A @ 120VAC
RELAY TYCO
T92P7A22-240
1804241
L2
SWITCH
MOTOR START
SQ "D"
125-01-0271
BUNDLE BROWN
BUNDLE BLUE
TERMINAL BLOCK
125-01-0295
BLACK # 12
RED # 12
GREEN #10
~120 VAC - 60 Hz.
CIRCUIT # 1
BLACK # 14
RED# 14
NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED
REVISION HISTORY
REV ECN DATE REVISION DESCRIPTION REV BY CHKD BY APPR BY
A ECN-CAP-0008238 2017/08/11 RELEASED TO PRODUCTION CB CB CB
B ECN-CAP-0014505 2018/08/27 REMOVED CU MODEL NUMBER CB CB CB
MATERIAL - N/A
DATE DRAWN - 8-10-17
DRAWN BY -CRAIG BOOREY
ECN-CAP-0008238
REVIEWED BY -CRAIG BOOREY
REF -
APPROVED BY - CRAIG BOOREY
SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:
DECIMALS .XX ±.03, .XXX ±.010
ANGLES ± 2°
THIRD ANGLE PROJECTION
HUSSMANN
DIAGRAM-RDI-20-7
WELL SC
3041709
B
HUSSMANN_LOOP_11 SHEET SIZE D

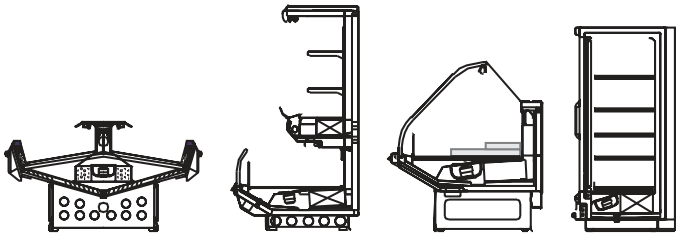
Appendices

Appendix A. - Temperature Guidelines

The refrigerators should be operated according to the manufacturer's published engineering specifications for entering air temperatures for specific equipment applications. Table 1 shows the typical temperature of the air entering the food zone one hour before the start of defrost and one hour after defrost for various categories of refrigerators. Refer to Appendix C for Field Evaluation Guidelines.

TABLE

Type of Refrigerator	Typical Entering Air Temperature
I. OPEN DISPLAY	
A. Non frozen:	
1) Meat	28°F
2) Dairy/Deli	32°F
3) Produce	
a. Processed	36°F
b. Unprocessed	45°F
B. Frozen	0°F
C. Ice Cream	-5°F
II. CLOSED DISPLAY	
A. Non frozen:	
1) Meat	34°F
2) Dairy/Deli	34°F
3) Produce	
a. Processed	36°F
b. Unprocessed	45°F
B. Frozen	0°F
C. Ice Cream	-5°F



Single Deck Multi Deck Service Case Reach-In

I. Open Display Styles ***II. Closed Display Styles***

Appendix B. - Application Recommendations

1.0 Temperature performance is critical for controlling bacteria growth. Therefore, the following recommendations are included in the standard. They are based on confirmed field experience over many years.

1.1 The installer is responsible for following the installation instructions and recommendations provided by the manufacturer for the installation of each individual type refrigerator.

1.2 Refrigeration piping should be sized according to the equipment manufacturer's recommendations and installed in accordance with normal refrigeration practices. Refrigeration piping should be insulated according to the manufacturer's recommendations.

1.3 A clogged waste outlet blocks refrigeration. The installer is responsible for the proper installation of the system which dispenses condensate waste through an air gap into the building indirect waste system.

1.4 The installer should perform a complete start-up evaluation prior to the loading of food into the refrigerator, which includes such items as:

a) Initial temperature performance, Coils should be properly fed with a refrigerant according to manufacturer's recommendations.

b) Observation of outside influences such as drafts, radiant heating from the ceiling and from lamps. Such influence should be properly corrected or compensated for.

c) At the same time, checks should be made of the store dry-bulb and wet-bulb temperatures to ascertain that they are within the limits prescribed by the manufacturer.

d) Complete start-up procedures should include checking through a defrost to make certain of its adequate frequency and length without substantially exceeding the actual needs. This should include checking the electrical or refrigerant circuits to make sure that defrosts are correctly programmed for all the refrigerators connected to each refrigeration system.

e) Recording instruments should be used to check performance.

Appendix C. - Field Recommendations

Recommendations for field evaluating the performance of retail food refrigerators

1.0 The most consistent indicator of display refrigerator performance is temperature of the air entering the product zone (see Appendix A). In practical use, the precise determination of return air temperature is extremely difficult. Readings of return air temperatures will be variable and results will be inconsistent. The product temperature alone is not an indicator of refrigerator performance.

NOTE: Public Health will use the temperature of the product in determining if the refrigerator will be allowed to display potentially hazardous food. For the purpose of this evaluation, product temperature above the FDA Food Code 1993 temperature for potentially hazardous food will be the first indication that an evaluation should be performed. It is expected that all refrigerators will keep food at the FDA Food Code 1993 temperature for potentially hazardous food.

1.1 The following recommendations are made for the purpose of arriving at easily taken and understood data which, coupled with other observations, may be used to determined whether a display refrigerator is working as intended:

a) INSTRUMENT - A stainless steel stem-type thermometer is recommended and it should have a dial a minimum of 1 inch internal diameter. A test thermometer scaled only in Celsius or dually scaled in Celsius and Fahrenheit shall be accurate to 1°C (1.8°F). Temperature measuring devices that are scaled only in Fahrenheit shall be accurate to 2°F. The thermometer should be checked for proper calibration. (It should read 32°F when the stem is immersed in an ice water bath).

b) LOCATION - The probe or sensing element of the thermometer should be located in the airstream where the air first enters the display or storage area, and not more than 1 inch away from the surface and in the center of the discharge opening.

c) READING - It should first be determined that the refrigerator is refrigerating and has operated at least one hour since the end of the last defrost period. The thermometer reading should be made only after it has been allowed to stabilize, i.e., maintain a constant reading.

d) OTHER OBSERVATIONS - Other observations should be made which may indicate operating problems, such as unsatisfactory product, feel/ appearance.

e) CONCLUSIONS - In the absence of any apparent undesirable conditions, the refrigerator should be judged to be operating properly. If it is determined that such condition is undesirable, i.e., the product is above proper temperature, checks should be made for the following:

1. Has the refrigerator been loaded with warm product?
2. Is the product loaded beyond the "Safe Load Line" markers?
3. Are the return air ducts blocked?
4. Are the entering air ducts blocked?
5. Is a dumped display causing turbulent air flow and mixing with room air?
6. Are spotlights or other high intensity lighting directed onto the product?
7. Are there unusual draft conditions (from heating /air-conditioning ducts, open doors, etc.)?
8. Is there exposure to direct sunlight?
8. Are display signs blocking or diverting airflow?
9. Are the coils of the refrigerator iced up?
11. Is the store ambient over 75°F, 55% RH as set forth in ASHRAE Standard 72 and ASHRAE Standard 117?
12. Are the shelf positions, number, and size other than recommended by the manufacturer?
13. Is there an improper application or control system?
14. Is the evaporator fan motor/blade inoperative?
15. Is the defrost time excessive?
16. Is the defrost termination, thermostat (if used) set too high?
17. Are the refrigerant controls incorrectly adjusted?
18. Is the air entering the condenser above design conditions? Are the condenser fins clear of dirt, dust, etc.?
19. Is there a shortage of refrigerant?
20. Has the equipment been modified to use replacements for CFC-12, CFC-502 or other refrigerant? If so, have the modifications been made in accordance with the recommendations of the equipment manufacturer? Is the refrigerator charged with the proper refrigerant and lubricant? Does the system use the recommended compressor?

Appendix D. - Recommendations to user

1.0 Hussmann Corporation provides instructions and recommendations for proper periodic cleaning. The user will be responsible for such cleaning, including the cleaning of low temperature equipment within the compartment and the cooling coil area(s). Cleaning practices, particularly with respect to proper refrigerator unloading and warm-up, must be in accordance with applicable recommendations.

1.1 Cleaning of non frozen food equipment should include a weekly cleaning of the food compartment as a minimum to prevent bacteria growth from accumulating. Actual use and products may dictate more frequent cleaning. Circumstances of use and equipment design must also dictate the frequency of cleaning the display areas. Weekly washing down of the storage compartment is also recommended, especially for equipment subject to drippage of milk or other liquids, or the collection of vegetable, meat, crumbs, etc. or other debris or litter. Daily cleaning of the external areas surrounding the storage or display compartments with detergent and water will keep the equipment presentable and prevent grime buildup.

1.2 Load levels as defined by the manufacturer must be observed.

1.3 The best preservation is achieved by following these rules:

a) Buy quality products.

b) Receive perishables from transit equipment at the ideal temperature for the particular product.

c) Expedite perishables to the store's storage equipment to avoid unnecessary warm-up and prolonged temperature recovery. Food store refrigerators are not food chillers nor can they reclaim quality lost through previous mishandling.

d) Care must be taken when cross merchandising products to ensure that potentially hazardous vegetable products are not placed in non refrigerated areas.

e) Display and storage equipment doors should be kept closed during periods of inactivity.

f) Minimize the transfer time of perishables from storage to display.

g) Keep meat under refrigeration in meat cutting and processing area except for the few moments it is being handled in processing. When a cut or tray of meat is not to be worked on immediately, the procedure should call for returning it to refrigeration.

h) Keep tools clean and sanitized. Since mechanical equipment is used for fresh meat processing, all such equipment should be cleaned at least daily and each time a different kind of meat product comes in contact with the tool or equipment.

i) Make sure that all refrigeration equipment is installed and adjusted in strict accordance with the manufacturer's recommendations.

j) See that all storage and refrigeration equipment is kept in proper working order by routine maintenance.

Controller Parameters

RDI					PGM0007A01		PGM0007A02		PGM0007A03	
					STANDARD CASE 20 &27 REV C 10/27/17		SL CASES ONLY REV C 10/27/17		POKE REV C 10/27/17	
Parameter	**Code**	**Min**	**Max**	**Default**	**Actual (°C)**	**Actual (°F)**	**Actual (°C)**	**Actual (°F)**	**Actual (°C)**	**Actual (°F)**
Temperature (set point)										
Deli (Type I)	---	-50.0°C	50.0°C	2.0°C	-3.9	25	-3.9	25	-3.9	25
Thermostat										
Differential	r01	0.1 K	20.0K	2.0 K	3.9	7	3.9	7	5.6	10
Max. limitation of setpoint setting	r02	-49.0°C	50°C	50.0°C	3.3	38	3.3	38	3.3	38
Min. limitation of setpoint setting	r03	-50.0°C	49.0°C	-50.0°C	-3.9	25	-3.9	25	-3.9	25
Adjustment of temperature indication	r04	-20.0 K	20.0 K	0.0 K	0.0 K		0.0 K		0.0 K	
Temperature unit (°C=0/°F=1)	r05	0	1	0	1		1		1	
Correction of the signal from S4	r09	-10.0 K	+10.0 K	0.0 K	0.0 K		0.0 K		0.0 K	
Correction of the signal from S3	r10	-10.0 K	+10.0 K	0.0 K	0.0 K		0.0 K		0.0 K	
Manual service, stop regulation, start regulation (-1, 0, 1)	r12	-1	1	0	1		1		1	
Displacement of reference during night	r13	-10.0 K	10.0 K	0.0 K	0.0 K		0.0 K		0.0 K	
Definition and weighting, if applicable, of thermostat sensors - S4% (100%=S4,	r15	0%	100%	100%	100%		100%		100%	
The heating function is started a number of degrees below the thermostats cutout	r36	-15.0 K	-3.0 K	-15.0 K	-15.0 K		-15.0 K		-15.0 K	
Activation of reference displacement r40	r39	OFF	ON	OFF	OFF		OFF		OFF	
Value of reference displacement (activate via r39 or DI)	r40	-50.0 K	50.0 K	0.0 K	0.0 K		0.0 K		0.0 K	
Alarm										
Delay for temperature alarm	A03	0 min	240 min	30 min	30 min		30 min		30 min	
Delay for door alarm	A04	0 min	240 min	60 min	60 min		60 min		60 min	
Delay for temperature alarm after defrost	A12	0 min	240 min	90 min	60		60		60	
High alarm limit	A13	-50.0°C	50.0°C	8.0°C	5.0	41	5.0	41	5.0	41
Low alarm limit	A14	-50.0°C	50.0°C	-30.0°C	-9.4	15	-9.4	15	-9.4	15
Alarm delay DI1	A27	0 min	240 min	30 min	30 min		30 min		30 min	
Alarm delay DI2	A28	0 min	240 min	30 min	30 min		30 min		30 min	
Signal for alarm thermostat. S4% (100%=S4, 0%=S3)	A36	0%	100%	100%	100%		100%		100%	
Compressor										
Min. ON-time	c01	0 min	30 min	0 min	1		1		1	
Min. OFF-time	c02	0 min	30 min	0 min	2		2		2	
Time delay for cutin of comp.2	c05	0 sec	999 sec	0 sec	0 sec		0 sec		0 sec	
Compressor relay 1 must cutin and out (NC-function)	c30	0 OFF	1 ON	0 OFF	0 OFF		0 OFF		0 OFF	
Defrost										
Defrost method (none/EL/GAS/BRINE)	d01	no	bri	EL	EL		EL		EL	
Defrost stop temperature	d02	0.0°C	25.0°C	6.0°C	12.2	54	12.2	54	8.9	48
Interval between defrost starts	d03	0 hours	240 hours	8 hours	4		4		4	
Max. defrost duration	d04	0 min	180 min	45 min	20		25		60	
Displacement of time on cutin of defrost at	d05	0 min	240 min	0 min	0 min		0 min		0 min	
Drip off time	d06	0 min	60 min	0 min	0 min		0 min		0 min	
Delay for fan start after defrost	d07	0 min	60 min	0 min	0 min		0 min		0 min	
Fan start temperature	d08	-15.0°C	0.0°C	-5.0°C	-5.0°C		-5.0°C		-5.0°C	
Fan cutin during defrost 0: Stopped 1: Running 2: Running during pump down and defrost	d09	0	2	1	1		1		1	
Defrost Sensor (0=time, 1=S5. 2=S4)	d10	0	2	0	1		1		1	
Pump down delay	d16	0 min	60 min	0 min	0 min		0 min		0 min	
Drain delay	d17	0 min	60 min	0 min	0 min		0 min		0 min	
Max. aggregate refrigeration time between two defrosts	d18	0 hours	48 hours	0 hours						
Defrost on demand - S5 temperature's permitted variation during frost build-up. On central plant choose 20 K (=off)	d19	0.0 K	20.0 k	20.0 K						
Delay of hot gas defrost	d23	0 min	60 min	0 min	0 min		0 min		0 min	
Fan										
Fan stop at cutout compressor	F01	no	yes	no	no		no		no	
Delay of fan stop	F02	0 min	30 min	0 min	0 min		0 min		0 min	
Fan stop temperature (S5)	F04	-50.0°C	50.0°C	50.0°C	50.0°C		50.0°C		50.0°C	

HACCP										
Actual temperature measurement for the	h01									
Last registered peak temperature	h10									
Selection of function and sensor for the HACCP function. 1 = S4 used (maybe also	h11	0	2	0	0		0		0	
Alarm limit for the HACCP function	h12	-50.0°C	50.0°C	8.0°C	8.0°C		8.0°C		8.0°C	
Time delay for the HACCP alarm	h13	0 min.	240 min.	30 min.	30 min.		30 min.		30 min.	
Select signal for the HACCP function. S4%	h14	0%	100%	100%	100%		100%		100%	
Real time clock										
Six start times for defrost. Setting of hours. 0=OFF	t01-	0 hours	23 hours	0 hours	0 hours		0 hours		0 hours	
Six start times for defrost. Setting of minutes. 0=OFF	t11-	0 min	59 min	0 min	0 min		0 min		0 min	
Clock - Setting of hours	t07	0 hours	23 hours	0 hours	0 hours		0 hours		0 hours	
Clock - Setting of minute	t08	0 min	59 min	0 min	0 min		0 min		0 min	
Clock - Setting of date	t45	1	31	1	1		1		1	
Clock - Setting of month	t46	1	12	1	1		1		1	
Clock - Setting of year	t47	0	99	0	0		0		0	
Miscellaneous										
Delay of output signals after start-up	o01	0 s	600 s	5 s	5 s		5 s		5 s	
Input signal on DI1. Function:	o02	1	11	0	0		0		0	
Network address	o03	0	240	0	0		0		0	
On/Off switch (Service Pin message)	o04	OFF	ON	OFF	OFF		OFF		OFF	
Access code 1 (all settings)	o05	0	100	0	0		0		0	
Used sensor type (Pt /PTC/NTC)	o06	Pt	ntc	Pt	Pt		Pt		Pt	
Display step = 0.5 (normal 0.1 at Pt sensor)	o15	no	yes	no	no		no		no	
Max hold time after coordinated defrost	o16	0 min	60 min	20	20		20		20	
Select signal for display view. S4%	o17	0%	100%	100%	100%		100%		100%	
Input signal on DI2. Function:	o37	0	12	0	0		0		0	
Configuration of light function (relay 4)	o38	1	3	1	1		1		1	
Activation of light relay (only if o38=2)	o39	OFF	ON	OFF	OFF		OFF		OFF	
Rail heat On time during day operations	o41	0%	100%	100	100		100		100	
Rail heat On time during night operations	o42	0%	100%	100	100		100		100	
Rail heat period time (On time + Off time)	o43	6 min	60 min	10 min	10 min		10 min		10 min	
Case cleaning. 0=no case cleaning. 1=Fans	o46	0	2	0	0		0		0	
Selection of EL diagram. See overview page	o61	1	10	1	1		1		1	
Download a set of predetermined settings.	o62	0	6	0	0		0		0	
Access code 2 (partly access)	o64	0	100	0	0		0		0	
Save the controllers present settings to the	o65	0	25	0	0		0		0	
Load a set of settings from the	o66	0	25	0	0		0		0	
Replace the controllers factory settings	o67	OFF	On	OFF	OFF		OFF		OFF	
Service										
Status codes are shown on page 17	S0-S33									
Temperature measured with S5 sensor	u09									
Status on DI1 input. on/1=closed	u10									
Temperature measured with S3 sensor	u12									
Status on night operation (on or off)	u13									
Temperature measured with S4 sensor	u16									
Thermostat temperature	u17									
Read the present regulation reference	u28									
Status on DI2 output. on/1=closed	u37									
Temperature shown on display	u56									
Measured temperature for alarm	u57									
Status on relay for cooling	u58									
Status on relay for fan	u59									
Status on relay for defrost	u60									
Status on relay for railheat	u61									
Status on relay for alarm	u62									
Status on relay for light	u63									
Status on relay for valve in suction line	u64									
Status on relay for compressor 2	u67									

ENGINEERING
TOMORROW

User Guide

Controller for temperature control
AK-CC 210

ADAP-KOOL® Refrigeration control systems

Contents

Introduction

Application

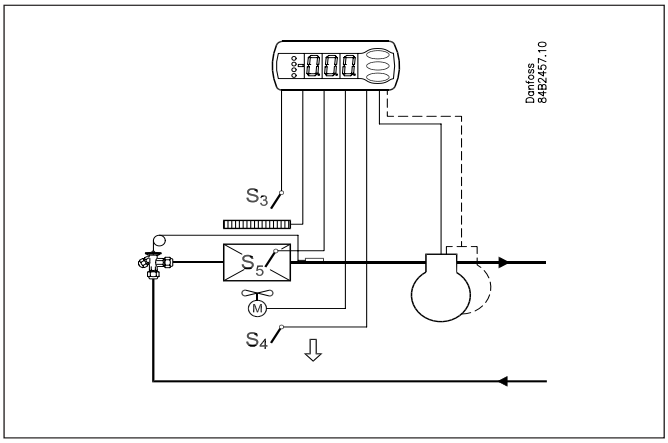
- The controller is used for temperature control refrigeration appliances in supermarkets
- With many predefined applications one unit will offer you many options. Flexibility has been planned both for new installations and for service in the refrigeration trade

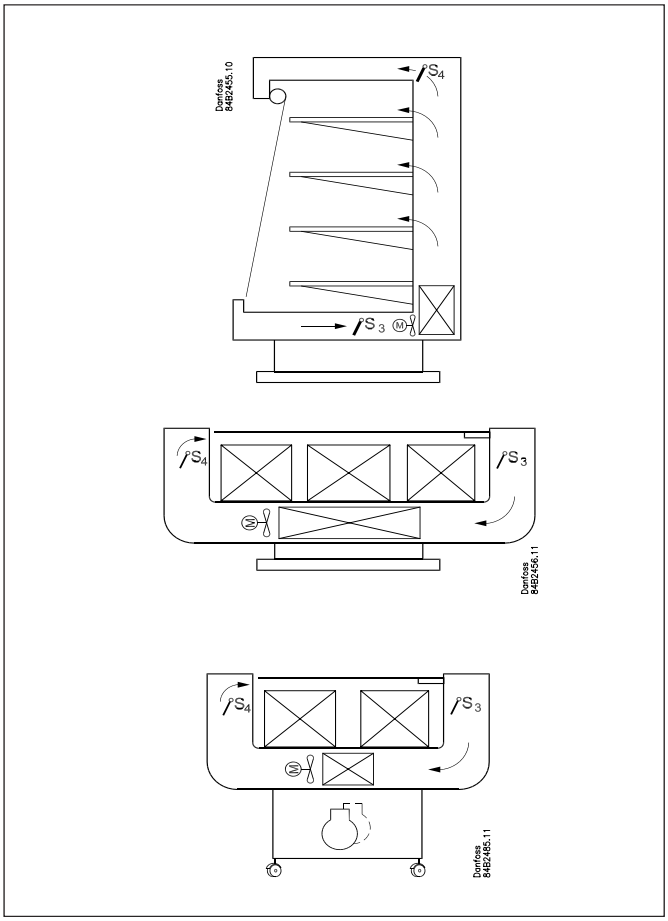
Principle

The controller contains a temperature control where the signal can be received from one or two temperature sensors.
The thermostat sensors are either placed in the cold air flow after the evaporator, in the warm air flow just before the evaporator, or both. A setting will determine how great an influence the two signals are to have on the control.
A measurement of the defrost temperature can be obtained directly through the use of an S5 sensor or indirectly through the use of the S4 measurement. Four relays will cut the required functions in and out – the application determines which. The options are the following:

- Refrigeration (compressor or relay)
- Fan
- Defrost
- Rail heat
- Alarm
- Light
- Fans for hotgas defrost
- Refrigeration 2 (compressor 2 or relay 2)

The different applications are described on page 6.





Advantages

- Many applications in the same unit
- The controller has integrated refrigeration-technical functions, so that it can replace a whole collection of thermostats and timers
- Buttons and seal imbedded in the front
- Can control two compressors
- Easy to remount data communication
- Quick setup
- Two temperature references
- Digital inputs for various functions
- Clock function with super cap backup
- HACCP (Hazard Analysis and Critical Control Points)
  - Temperature monitoring and registration of period with too high temperature (see also page 19)
  - Factory calibration that will guarantee a better measuring accuracy than stated in the standard EN 441-13 without subsequent calibration (Pt 1000 ohm sensor)

Operation

Sensors
Up to two thermostat sensors can be connected to the controller. The relevant application determines how.

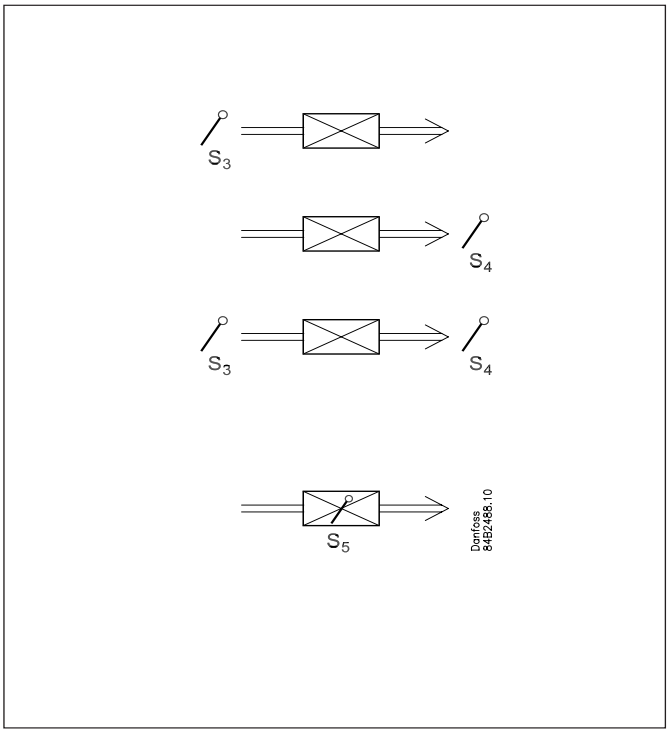
A sensor in the air before the evaporator:
This connection is primarily used when control is based on area.

A sensor in the air after the evaporator:
This connection is primarily used when refrigeration is controlled and there is a risk of a too low temperature near the products.

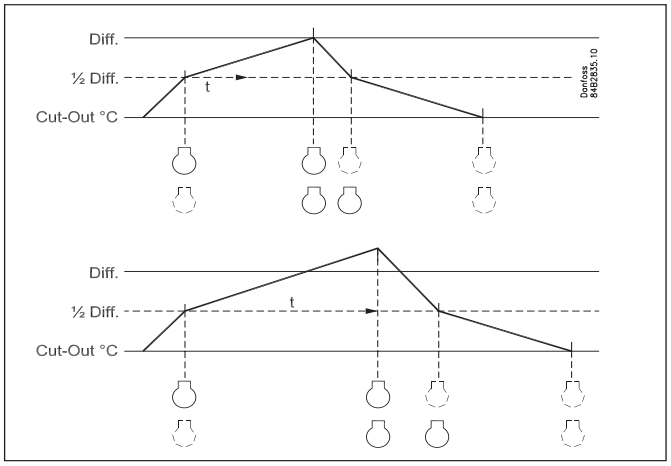
A sensor before and after the evaporator:
This connection offers you the possibility of adapting the thermostat, the alarm thermostat and the display to the relevant application. The signal to the thermostat, the alarm thermostat and the display is set as a weighted value between the two temperatures, and 50% will for example give the same value from both sensors.
The signal to the thermostat, the alarm thermostat and the display can be set independently of one another.

Defrost sensor
The best signal concerning the evaporator's temperature is obtained from a defrost sensor mounted directly on the evaporator. Here the signal may be used by the defrost function, so that the shortest and most energy-saving defrost can take place.

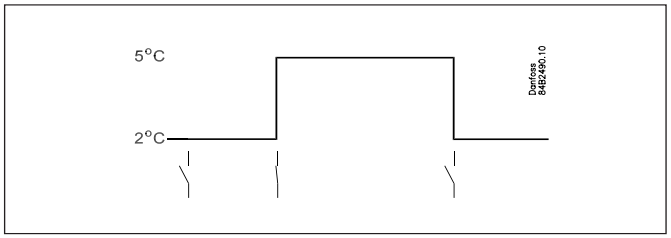
If a defrost sensor is not required, defrost can be stopped based on time, or S4 can be selected.



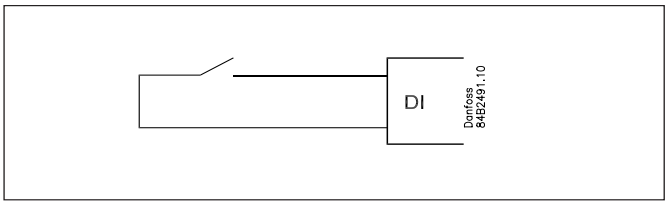
Control of two compressors
This control is used for controlling two compressors of the same size. The principle for control is that one of the compressors connects at ½ the differential of the thermostat, and the other at the full differential. When the thermostat cuts in the compressor with the fewest operating hours is started. The other compressor will only start after a set time delay, so that the load will be divided between them. The time delay has a higher priority than the temperature.
When the air temperature has dropped by half the differential the one compressor will stop, the other will continue working and not stop until the required temperature is achieved.
The compressors used must be of a type that is capable of starting up against a high pressure.



Change of temperature reference
In an impulse appliance, for example, used for various product groups. Here the temperature reference is changed easily with a contact signal on a digital input. The signal raises the normal thermostat value by a predefined amount. At the same time the alarm limits with the same value are displaced accordingly.



Digital inputs
There are two digital inputs both of which can be used for the following functions:
- Case cleaning
- Door contact function with alarm
- Starting a defrost
- Coordinated defrost
- Change-over between two temperature reference
- Retransmission of a contact's position via data communication

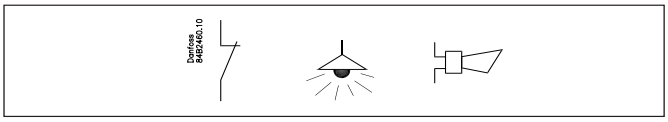


Case cleaning function
This function makes it easy to steer the refrigeration appliance through a cleaning phase. Via three pushes on a switch you change from one phase to the next phase.
The first push stops the refrigeration – the fans keep working
"Later": The next push stops the fans
"Still later": The next push restarts refrigeration
The different situations can be followed on the display.

On the network a cleaning alarm is transmitted to the system unit. This alarm can be "logged" so that proof of the sequence of events is provided.

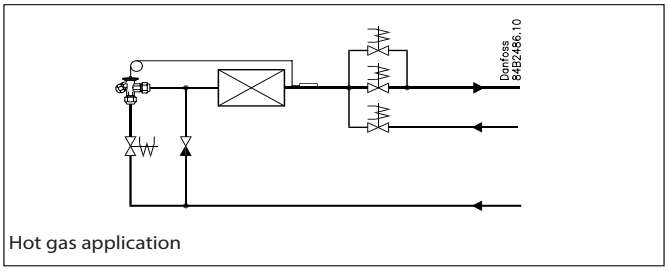
-	+	+	°C
1	÷	+	Fan
2	÷	÷	Off
3	+	+	°C

Door contact function
In cold rooms and frost rooms the door switch can switch the light on and off, start and stop the refrigeration and give alarm if the door has remained open for too long.



Defrost
Depending on the application you may choose between the following defrost methods:

Natural:	Here the fans are kept operating during the defrost
Electric:	The heating element is activated
Brine:	The valve is kept open so that the brine can flow through the evaporator
Hotgas:	Here the solenoid valves are controlled so that the hotgas can flow through the evaporator

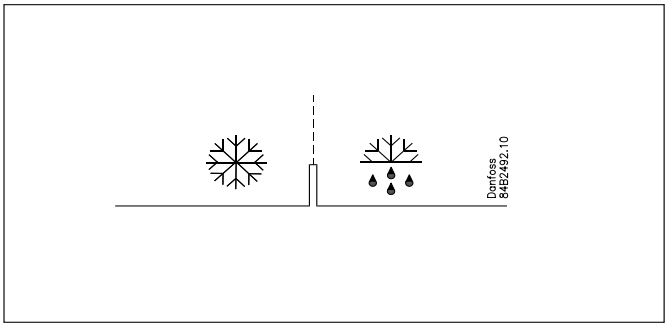


Hot gas application

Start of defrost
A defrost can be started in different ways

Interval:	Defrost is started at fixed time intervals, say, every eighth hour
Refrigeration time:	Defrost is started at fixed refrigeration time intervals, in other words, a low need for refrigeration will "postpone" the coming defrost
Schedule:	Here defrost can be started at fixed times of the day and night. However, max. 6 times
Contact:	Defrost is started with a contact signal on a digital input
Network:	The signal for defrost is received from a system unit via the data communication
S5 temp	In 1:1 systems the efficiency of the evaporator can be followed. Icing-up will start a defrost.
Manual:	An extra defrost can be activated from the controller's lower-most button. (Though not for application 4).

All the mentioned methods can be used at random – if just one them is activated a defrost will be started.

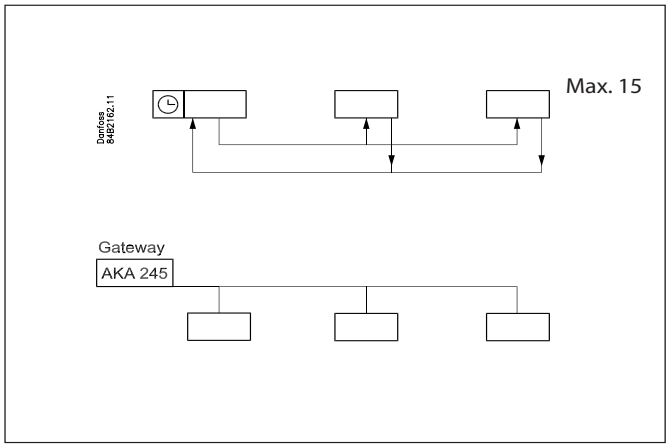


Coordinated defrost

There are two ways in which coordinated defrost can be arranged. Either with wire connections between the controllers or via data communication

Wire connections
One of the controllers is defined to be the controlling unit and a battery module may be fitted in it so that the clock is ensured backup. When a defrost is started all the other controllers will follow suit and likewise start a defrost. After the defrost the individual controllers will move into waiting position. When all are in waiting position there will be a change-over to refrigeration. (If just one in the group demands defrost, the others will follow suit).

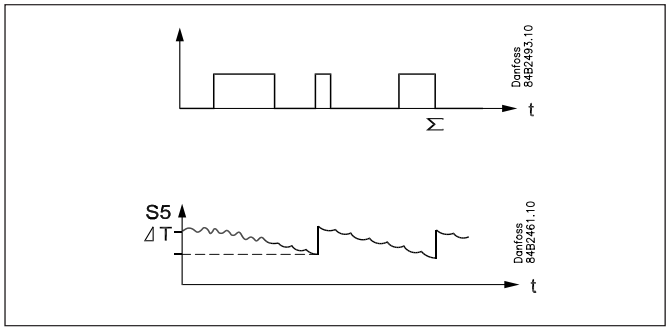
Defrost via data communication
All controllers are fitted with a data communication module, and via the override function from a gateway the defrost can be coordinated.



Defrost on demand

1 Based on refrigeration time
When the aggregate refrigeration time has passed a fixed time, a defrost will be started.

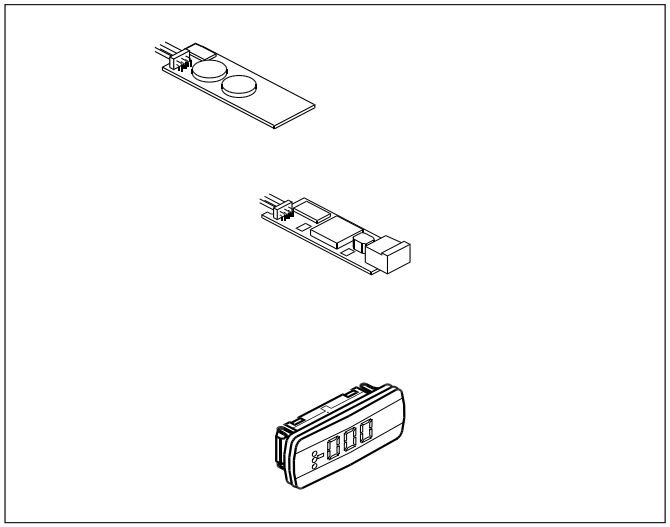
2 Based on temperature
The controller will constantly follow the temperature at S5. Between two defrosts the S5 temperature will become lower the more the evaporator ices up (the compressor operates for a longer time and pulls the S5 temperature further down). When the temperature passes a set allowed variation the defrost will be started.
This function can only work in 1:1 systems



Extra module

• The controller can afterwards be fitted with an insertion module if the application requires it.
The controller has been prepared with plug, so the module simply has to be pushed in
- Battery module
The module guarantees voltage to the controller if the supply voltage should drop out for more than four hours. The clock function can thus be protected during a power failure.
- Data communication
If you require operation from a PC, a data communication module has to be placed in the controller.

• External display
If it is necessary to indicate the temperature on the front of refrigeration appliance, a display type EKA 163A can be mounted. The extra display will show the same information as the controller's display, but does not incorporate buttons for operation. If operation from the external display is needed a display type EKA 164A must be mounted.



Applications

Here is a survey of the controller's field of application.

A setting will define the relay outputs so that the controller's interface will be targeted to the chosen application.

On page 20 you can see the relevant settings for the respective wiring diagrams.

S3 and S4 are temperature sensors. The application will determine whether either one or the other or both sensors are to be used. S3 is placed in the air flow before the evaporator. S4 after the evaporator.
A percentage setting will determine according to what the control is to be based. S5 is a defrost sensor and is placed on the evaporator.
DI1 and DI2 are contact functions that can be used for one of the following functions: door function, alarm function, defrost start, external main switch, night operation, change of thermostat reference, appliance cleaning, forced refrigeration or coordinated defrost. See the functions in settings o02 and o37.

Refrigeration control with one compressor

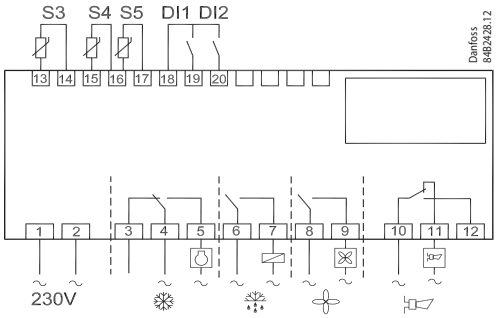
The functions are adapted to small refrigeration systems which either may be refrigeration appliances or cold rooms.
The three relays can control the refrigeration, the defrost and the fans, and the fourth relay can be used for either alarm function, light control or rail heat control

- The alarm function can be linked up with a contact function from a door switch. If the door remains open longer than allowed there will be an alarm.
- The light control can also be linked up with a contact function from a door switch. An open door will switch on the light and it will remain lit for two minutes after the door has been closed again.
- The rail heat function can be used in refrigeration or freezing appliances or on the door's heating element for frost rooms.

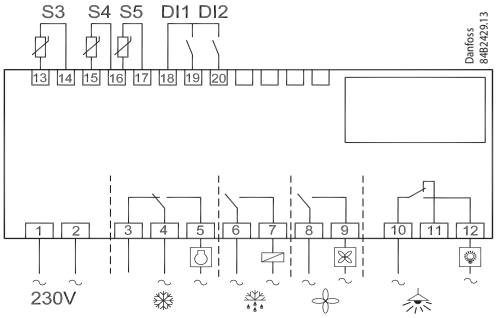
The fans can be stopped during defrost and they may also follow a door switch's open/close situation.

There are several other functions for the alarm function as well as the light control, rail heat control and fans. Please refer to the respective settings.

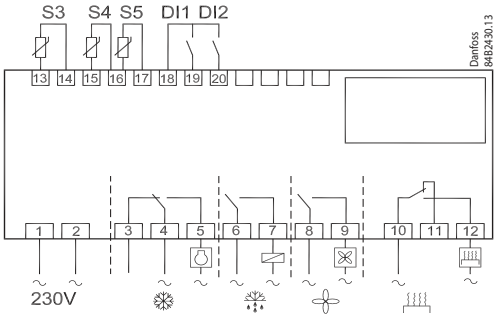
1



2



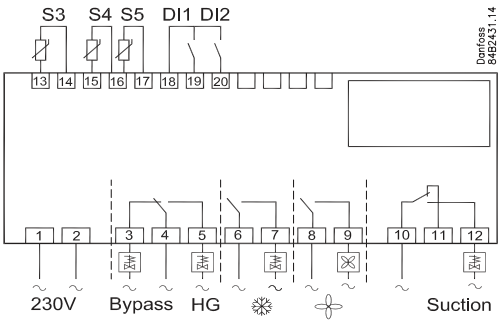
3



Hot gas defrost

This type of connection can be used on systems with hotgas defrost, but only in small systems in, say, supermarkets – the functional content has **not** been adapted to systems with large charges. Relay 1's change-over function can be used by the bypass valve and/or the hotgas valve.
Relay 2 is used for refrigeration.

4



Refrigeration control with two compressors

This group of applications can be used if the controller is to cut two compressors in and out.
The functions can be compared with wiring diagrams 1 to 3, but instead of controlling fans the relay is here used for compressor 2.

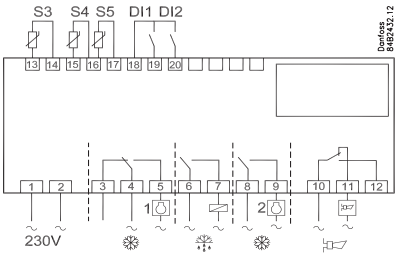
The two compressors must be of the same size. When the controller demands refrigeration it will first cut in the compressor with the shortest operating time. After the time delay the second compressor will be cut in.

When the temperature has dropped to "the middle of the differential", the compressor with the longest operation time will be cut out.
If the running compressor does not manage to reduce the temperature to the cutout point, the other compressor will be cut in again. This happens when the temperature reaches the top part of the differential. If the temperature is instead "stuck" in the differential for two hours, there will be a change-over between the two compressors so that the operating time can be equalised.
The two compressors must be of a type that can start up against a high pressure.

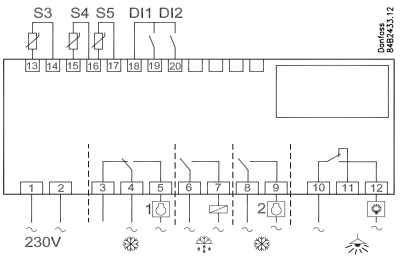
The compressors's settings for "Min On time" and "Min Off time" will always have top priority during normal regulation. But if one of the override functions is activated, the "Min On time" will be disregarded.

If the controller is to cut 2 compressor and 1 fan in and out, relay 4 must cut the fan in and out.
This function is activated in application 10.

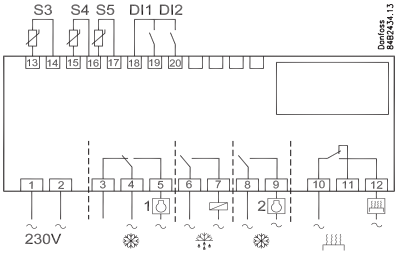
5



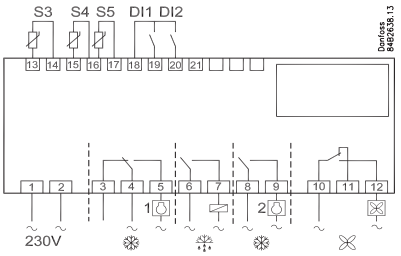
6



7



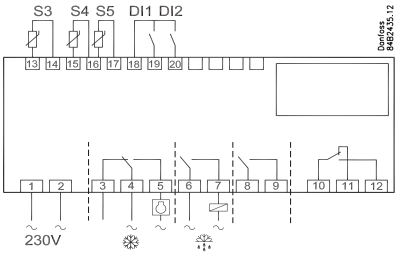
10



Simple refrigeration with defrost

This application can be used where there is only regulation of refrigeration and defrost.

8

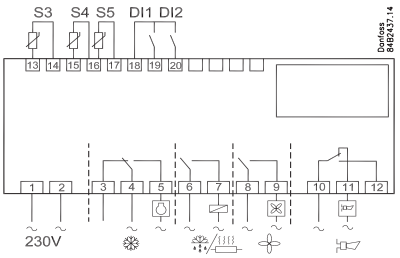


Heating function

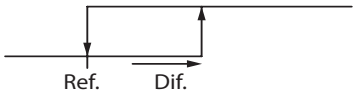
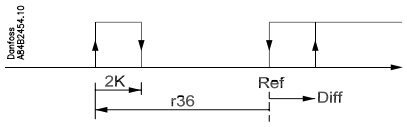
This application is the same as under 1, but a heating function has been added which protects the unit against too low temperature. The defrost function's heating element is here used for heating.

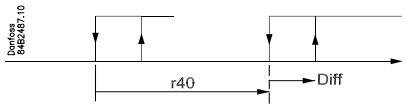
This application is used where the temperature can go below the set cutout temperature for the refrigeration. To ensure that the temperature will not become too low the heating element is activated x degrees below the reference value.
The S3 sensor must be mounted. It supplies the signal when there is heating.

9



Survey of functions

Function	Para-meter	Parameter by operation via data communication
Normal display		
Normally the temperature value from one of the two thermostat sensors S3 or S4 or a mixture of the two measurements is displayed. In o17 the ratio is determined.		Display air (u56)
Thermostat		**Thermostat control**
Set point Regulation is based on the set value plus a displacement, if applicable. The value is set via a push on the centre button. The set value can be locked or limited to a range with the settings in r02 and r 03. The reference at any time can be seen in "u28 Temp. ref"		Cutout °C
Differential When the temperature is higher than the reference + the set differential, the compressor relay will be cut in. It will cut out again when the temperature comes down to the set reference. 	r01	Differential
Setpoint limitation The controller's setting range for the setpoint may be narrowed down, so that much too high or much too low values are not set accidentally - with resulting damages.		
To avoid a too high setting of the setpoint, the max. allowable reference value must be lowered.	r02	Max cutout °C
To avoid a too low setting of the setpoint, the min. allowable reference value must be increased.	r03	Min cutout °C
Correction of the display's temperature showing If the temperature at the products and the temperature received by the controller are not identical, an offset adjustment of the shown display temperature can be carried out.	r04	Disp. Adj. K
Temperature unit Set here if the controller is to show temperature values in °C or in °F.	r05	Temp. unit °C=0. / °F=1 (Only °C on AKM, whatever the setting)
Correction of signal from S4 Compensation possibility through long sensor cable	r09	Adjust S4
Correction of signal from S3 Compensation possibility through long sensor cable	r10	Adjust S3
Start / stop of refrigeration With this setting refrigeration can be started, stopped or a manual override of the outputs can be allowed. Start / stop of refrigeration can also be accomplished with the external switch function connected to a DI input. Stopped refrigeration will give a "Standby alarm".	r12	Main Switch 1: Start 0: Stop -1: Manual control of outputs allowed
Night setback value The thermostat's reference will be the setpoint plus this value when the controller changes over to night operation. (Select a negative value if there is to be cold accumulation.)	r13	Night offset
Selection of thermostat sensor Here you define the sensor the thermostat is to use for its control function. S3, S4, or a combination of them. With the setting 0%, only S3 is used (Sin). With 100%, only S4. (For application 9 an S3 sensor must be used)	r15	Ther. S4 %
Heating function The function uses the defrost function's heating element for raising the temperature. The function enters into force a number of degrees (r36) below the actual reference and cuts out again with a differential of 2 degrees. Regulation is carried out with 100% signal from the S3 sensor. The fans will be operating when there is heating. The fans and the heating function will stop if door function has been selected and the door is opened. Where this function is used an external safety cutout should also be installed, so that superheating of the heating element cannot take place. Remember to set D01 to electrical defrosting. 	r36	HeatStartRel

Activation of reference displacement When the function is changed to ON the thermostat reference will be displaced by the value in r40. Activation can also take place via input DI1 or DI2 (defined in o02 or o37).  	r39	Th. offset
Value of reference displacement The thermostat reference and the alarm values are shifted the following number of degrees when the displacement is activated. Activation can take place via r39 or input DI	r40	Th. offset K
		Night setbck (start of night signal)
		Forced cool. (start of forced cooling)
Alarm		**Alarm settings**
The controller can give alarm in different situations. When there is an alarm all the light-emitting diodes (LED) will flash on the controller front panel, and the alarm relay will cut in.		With data communication the importance of the individual alarms can be defined. Setting is carried out in the "Alarm destinations" menu.
Alarm delay (short alarm delay) If one of the two limit values is exceeded, a timer function will commence. The alarm will not become active until the set time delay has been passed. The time delay is set in minutes.	A03	Alarm delay
Time delay for door alarm The time delay is set in minutes. The function is defined in o02 or in o37.	A04	DoorOpen del
Time delay for cooling (long alarm delay) This time delay is used during start-up, during defrost, immediately after a defrost. There will be change-over to the normal time delay (A03) when the temperature has dropped below the set upper alarm limit. The time delay is set in minutes.	A12	Pulldown del
Upper alarm limit Here you set when the alarm for high temperature is to start. The limit value is set in °C (absolute value). The limit value will be raised during night operation. The value is the same as the one set for night setback, but will only be raised if the value is positive. The limit value will also be raised in connection with reference displacement r39.	A13	HighLim Air
Lower alarm limit Here you set when the alarm for low temperature is to start. The limit value is set in °C (absolute value). The limit value will also be raised in connection with reference displacement r39.	A14	LowLim Air
Delay of a DI1 alarm A cut-out/cut-in input will result in alarm when the time delay has been passed. The function is defined in o02.	A27	AI.Delay DI1
Delay of a DI2 alarm A cut-out/cut-in input will result in alarm when the time delay has been passed. The function is defined in o37	A28	AI.Delay DI2
Signal to the alarm thermostat Here you have to define the ratio between the sensors which the alarm thermostat has to use. S3, S4 or a combination of the two. With setting 0% only S3 is used. With 100% only S4 is used	A36	Alarm S4%
		Reset alarm
		EKC error

Compressor		**Compressor control**
The compressor relay works in conjunction with the thermostat. When the thermostat calls for refrigeration will the compressor relay be operated.		
Running times To prevent irregular operation, values can be set for the time the compressor is to run once it has been started. And for how long it at least has to be stopped. The running times are not observed when defrosts start.		
Min. ON-time (in minutes)	c01	Min. On time
Min. OFF-time (in minutes)	c02	Min. Off time

Time delay for couplings of two compressors Settings indicate the time that has to elapse from the first relay cuts in and until the next relay has to cut in.	c05	Step delay
Reversed relay function for D01 0: Normal function where the relay cuts in when refrigeration is demanded 1: Reversed function where the relay cuts out when refrigeration is demanded (this wiring produces the result that there will be refrigeration if the supply voltage to the controller fails).	c30	Cmp relay NC
The LED on the controller's front will show whether refrigeration is in progress.		Comp Relay Here you can read the status of the compressor relay, or you can force-control the relay in the "Manual control" mode
Defrost		**Defrost control**
The controller contains a timer function that is zeroset after each defrost start. The timer function will start a defrost if/when the interval time is passed. The timer function starts when voltage is connected to the controller, but it is displaced the first time by the setting in d05. If there is power failure the timer value will be saved and continue from here when the power returns. This timer function can be used as a simple way of starting defrosts, but it will always act as safety defrost if one of the subsequent defrost starts is not received. The controller also contains a real-time clock. By means of settings of this clock and times for the required defrost times, defrost can be started at fixed times of the day. If there is a risk of power failure for periods longer than four hours, a battery module should be mounted in the controller. Defrost start can also be accomplished via data communication, via contact signals or manual start-up. All starting methods will function in the controller. The different functions have to be set, so that defrosts do not "come tumbling" one after the other. Defrost can be accomplished with electricity, hotgas or brine. The actual defrost will be stopped based on time or temperature with a signal from a temperature sensor.		
Defrost method Here you set whether defrost is to be accomplished with electricity, gas, brine or "non". During defrost the defrost relay will be cut in. (With brine the "refrigeration control valve" will be kept open during defrost)	d01	Def. method 0 = non 1 = El 2 = Gas 3= Brine
Defrost stop temperature The defrost is stopped at a given temperature which is measured with a sensor (the sensor is defined in d10). The temperature value is set.	d02	Def. Stop Temp
Interval between defrost starts The function is zero set and will start the timer function at each defrost start. When the time has expired the function will start a defrost. The function is used as a simple defrost start, or it may be used as a safeguard if the normal signal fails to appear. If master/slave defrost without clock function or without data communication is used, the interval time will be used as max. time between defrosts. If a defrost start via data communication does not take place, the interval time will be used as max. time between defrosts. When there is defrost with clock function or data communication, the interval time must be set for a somewhat longer period of time than the planned one, as the interval time will otherwise start a defrost which a little later will be followed by the planned one. In connection with power failure the interval time will be maintained, and when the power returns the interval time will continue from the maintained value. The interval time is not active when set to 0.	d03	Def Interval (0=off)
Max. defrost duration This setting is a safety time so that the defrost will be stopped if there has not already been a stop based on temperature or via coordinated defrost.	d04	Max Def. time
Time staggering for defrost cut ins during start-up The function is only relevant if you have several refrigeration appliances or groups where you want the defrost to be staggered in relation to one another. The function is furthermore only relevant if you have chosen defrost with interval start (d03). The function delays the interval time d03 by the set number of minutes, but it only does it once, and this at the very first defrost taking place when voltage is connected to the controller. The function will be active after each and every power failure.	d05	Time Stagg.

Drip-off time Here you set the time that is to elapse from a defrost and until the compressor is to start again. (The time when water drips off the evaporator).	d06	DripOff time
Delay of fan start after defrost Here you set the time that is to elapse from compressor start after a defrost and until the fan may start again. (The time when water is "tied" to the evaporator).	d07	FanStartDel
Fan start temperature The fan may also be started a little earlier than mentioned under "Delay of fan start after defrost", if the defrost sensor S5 registers a lower value than the one set here.	d08	FanStartTemp
Fan cut in during defrost Here you can set whether fan is to operate during defrost. 0: Stopped (Runs during pump down) 1: Running (stopped during "fan delay") 2: Running during pump down and defrost. After that stopped	d09	FanDuringDef
Defrost sensor Here you define the defrost sensor. 0: None, defrost is based on time 1: S5 2: S4	d10	DefStopSens.
Pumpdown delay Set the time where the evaporator is emptied of refrigerant prior to the defrost.	d16	Pump dwn del.
Drain delay (only in connection with hotgas) Set the time where the evaporator is emptied of condensed refrigerant after the defrost.	d17	Drain del
Defrost on demand – aggregate refrigeration time Set here is the refrigeration time allowed without defrosts. If the time is passed, a defrost will be started. With setting = 0 the function is cut out.	d18	MaxTherRunT
Defrost on demand – S5 temperature The controller will follow the effectivity of the evaporator, and via internal calculations and measurements of the S5 temperature it will be able to start a defrost when the variation of the S5 temperature becomes larger than required. Here you set how large a slide of the S5 temperature can be allowed. When the value is passed, a defrost will start. The function can only be used in 1:1 systems when the evaporating temperature will become lower to ensure that the air temperature will be maintained. In central systems the function must be cut out. With setting = 20 the function is cut out	d19	CutoutS5Dif.
Delay of the hot gas injection Can be used when vales of the type PMLX and GPLX are used. Time is set so that the valve is closed completely before the hot gas is turned on.	d23	--
If you wish to see the temperature at the defrost sensor, push the controller's lowermost button.		Defrost temp.
If you wish to start an extra defrost, push the controller's lowermost button for four seconds. You can stop an ongoing defrost in the same way		Def Start Here you can start a manual defrost
The LED on the controller's front will indicate whether a defrost is going on.		Defrost Relay Here you can read the defrost relay status or you can force-control the relay in "Manual control" mode.
		Hold After Def Shows ON when the controller is operating with coordinated defrost.
		Defrost State Status on defrost 1= pump down / defrost
Fan		**Fan control**
Fan stopped at cut-out compressor Here you can select whether the fan is to be stopped when the compressor is cut out	F01	Fan stop CO (Yes = Fan stopped)
Delay of fan stop when compressor is cut out If you have chosen to stop the fan when the compressor is cut out, you can delay the fan stop when the compressor has stopped. Here you can set the time delay.	F02	Fan del. CO

Fan stop temperature The function stops the fans in an error situation, so that they will not provide power to the appliance. If the defrost sensor registers a higher temperature than the one set here, the fans will be stopped. There will be re-start at 2 K below the setting. The function is not active during a defrost or start-up after a defrost. With setting +50°C the function is interrupted.	F04	FanStopTemp.
The LED on the controller's front will indicate whether a defrost is going on.		Fan Relay Here you can read the fan relay status, or force-control the relay in "Manual control" mode.

HACCP		**HACCP**
HACCP temperature Here you can see the temperature measurement that transmits signal to the function	h01	HACCP temp.
Last too high HACCP temperature was registered in connection with: (Value can be read out). H01: Temperature exceeding during normal regulation. H02: Temperature exceeding during power failure. Battery backup controls the times. H03: Temperature exceeding during power failure. No control of times.	h02	-
Last time the HACCP temperature was exceeded: Year	h03	-
Last time the HACCP temperature was exceeded: Month	h04	-
Last time the HACCP temperature was exceeded: Day	h05	-
Last time the HACCP temperature was exceeded: Hour	h06	-
Last time the HACCP temperature was exceeded: Minute	h07	-
Last exceeding: Duration in hours	h08	-
Last exceeding: Duration in minutes	h09	-
Peak temperature The highest measured temperature will continuously be saved when the temperature exceeds the limit value in h12. The value can be read out until the next time the temperature exceeds the limit value. After that it is overwritten with the new measurements.	h10	Max.temp.
Selection of function 0: No HACCP function 1: S3 and/or S4 used as sensor. Definition takes place in h14. 2: S5 used as sensor.	h11	HACCP sensor
Alarm limit Here you set the temperature value at which the HACCP function is to enter into force. When the value becomes higher than the set one, the time delay starts.	h12	HACCP limit
Time delay for the alarm (only during normal regulation). When the time delay has been passed the alarm is activated.	h13	HACCP delay
Selection of sensors for the measuring If the S4 sensor and/or the S3 sensor is used, the ratio between them must be set. At setting 100% only S4 is used. At setting 0% only S3 is used.	h14	HACCP S4%
Internal defrosting schedule/clock function		
(Not used if an external defrosting schedule is used via data communication.) Up to six individual times can be set for the defrost start throughout the day.		
Defrost start, hour setting	t01-t06	
Defrost start, minute setting (1 and 11 belong together, etc.) When all t01 to t16 equal 0 the clock will not start defrosts.	t11-t16	
Real-time clock Setting the clock is only necessary when there is no data communication. In the event of a power failure of less than four hours, the clock function will be saved. When mounting a battery module the clock function can preserved longer. There is also a date indication used for registration of temperature measurements.		
Clock: Hour setting	t07	
Clock: Minute setting	t08	
Clock: Date setting	t45	
Clock: Month setting	t46	
Clock: Year setting	t47	
Miscellaneous		Miscellaneous
Delay of output signal after start-up After start-up or a power failure the controller's functions can be delayed so that overloading of the electricity supply network is avoided. Here you can set the time delay.	o01	DelayOfOutp.

Digital input signal - DI1 The controller has a digital input 1 which can be used for one of the following functions: Off: The input is not used 1) Status display of a contact function 2) Door function. When the input is open it signals that the door is open. The refrigeration and the fans are stopped. When the time setting in "A4" is passed, an alarm will be given and refrigeration will be resumed. 3) Door alarm. When the input is open it signals that the door is open. When the time setting in "A4" is passed, there will be alarm. 4) Defrost. The function is started with a pulse signal. The controller will register when the DI input is activated. The controller will then start a defrost cycle. If the signal is to be received by several controllers it is important that ALL connections are mounted the same way (DI to DI and GND to GND). 5) Main switch. Regulation is carried out when the input is short-circuited, and regulation is stopped when the input is put in pos. OFF. 6) Night operation. When the input is short-circuited, there will be regulation for night operation. 7) Reference displacement when DI1 is short-circuited. Displacement with "r40". 8) Separate alarm function. Alarm will be given when the input is short-circuited. 9) Separate alarm function. Alarm will be given when the input is opened. (For 8 and 9 the time delay is set in A27) 10) Case cleaning. The function is started with a pulse signal. Cf. also description on page 4. 11) Forced refrigeration at hotgas defrost when the input is short-circuited.	o02	DI 1 Config. Definition takes place with the numerical value shown to the left. (0 = off) DI state (Measurement) The DI input's present status is shown here. ON or OFF.
If the controller is built into a network with data communication, it must have an address, and the master gateway of the data communication must then know this address. These settings can only be made when a data communication module has been mounted in the controller and the installation of the data communication cable has been finished. This installation is mentioned in a separate document "RC8AC".		After installation of a data communication module the controller can be operated on an equal footing with the other controllers in ADAP-KOOL® refrigeration controls.
The address is set between 1 and 60 (119), gateway determined	o03	
The address is sent to the gateway when the menu is set in pos. ON IMPORTANT: Before you set o04, you MUST set o61. Otherwise you will be transmitting incorrect data.	o04	
Access code 1 (Access to all settings) If the settings in the controller are to be protected with an access code you can set a numerical value between 0 and 100. If not, you can cancel the function with setting 0. (99 will always give you access).	o05	-
Sensor type Normally a Pt 1000 sensor with great signal accuracy is used. But you can also use a sensor with another signal accuracy. That may either be a PTC 1000 sensor (1000 ohm) or an NTC sensor (5000 Ohm at 25°C). All the mounted sensors must be of the same type.	o06	SensorConfig Pt = 0 PTC = 1 NTC = 2
Display step Yes: Gives steps of 0.5° No: Gives steps of 0.1°	o15	Disp. Step = 0.5
Max. standby time after coordinated defrost When a controller has completed a defrost it will wait for a signal which tells that the refrigeration may be resumed. If this signal fails to appear for one reason or another, the controller will itself start the refrigeration when this standby time has elapsed.	o16	Max HoldTime
Select signal for the display S4% Here you define the signal to be shown by the display. S3, S4, or a combination of the two. With setting 0% only S3 is used. With 100% only S4.	o17	Disp. S4%

Digital input signal - D2 The controller has a digital input 2 which can be used for one of the following functions: Off: The input is not used. 1) Status display of a contact function 2) Door function. When the input is open it signals that the door is open. The refrigeration and the fans are stopped. When the time setting in "A4" is passed, an alarm will be given and refrigeration resumed. 3) Door alarm. When the input is open it signals that the door is open. When the time setting in "A4" is passed an alarm will be given. 4) Defrost. The function is started with a pulse signal. The controller will register when the DI input is activated. The controller will then start a defrost cycle. If the signal is to be received by several controllers it is important that ALL connections are mounted the same way (DI to DI and GND to GND). 5) Main switch. Regulation is carried out when the input is short-circuited, and regulation is stopped when the input is put in pos. OFF. 6) Night operation. When the input is short-circuited, there will be regulation for night operation. 7) Reference displacement when DI2 is short-circuited. Displacement with "r40". 8) Separate alarm function. Alarm will be given when the input is short-circuited. 9) Separate alarm function. Alarm will be given when the input is opened. 10) Case cleaning. The function is started with a pulse signal. Cf. also description on page 4. 11) Forced refrigeration at hotgas defrost when the input is short-circuited. 12) The input is used for coordinated defrost in conjunction with other controllers of the same type	o37	DI2 config.
Configuration of light function (relay 4 in applications 2 and 6) 1) The relay cuts in during day operation 2) The relay to be controlled via data communication 3) The relay to be controlled by the door switch defined in either o02 or o37 where the setting is selected to either 2 or 3. When the door is opened the relay will cut in. When the door is closed again there will be a time delay of two minutes before the light is switched off.	o38	Light config
Activation of light relay The light relay can be activated here, but only if defined in o38 with setting 2.	o39	Light remote
Rail heat during day operation The ON period is set as a percentage of the time	o41	Railh.ON day%
Rail heat during night operation The ON period is set as a percentage of the time	o42	Railh.ON ngt%
Rail heat cycle The period of time for the aggregate ON time + OFF time is set in minutes	o43	Railh. cycle
Case cleaning The status of the function can be followed here or the function can be started manually. 0 = Normal operation (no cleaning) 1 = Cleaning with fans operating. All other outputs are Off. 2 = Cleaning with stopped fans. All outputs are Off. If the function is controlled by a signal at the DI1 or DI2 input, the relevant status can be seen here in the menu.	o46	Case clean
Selection of application The controller can be defined in various ways. Here you set which of the 10 applications is required. On page 6 you can see a survey of applications. *This menu can only be set when regulation is stopped, i.e. "r12" is set to 0.*	o61	--- Appl. Mode (only output in Danfoss only)
Transfer a set of presetting to the controller It is possible to select a quick setting of a number of parameters. It depends on whether an application or a room is to be controlled and whether defrost is to be stopped based on time or based on temperature. The survey can be seen on page 22. *This menu can only be set when regulation is stopped, i.e. "r12" is set to 0.* After the setting the value will return to 0. Any subsequent adjustment/setting of parameters can be made, as required.	o62	-
Access code 2 (Access to adjustments) There is access to adjustments of values, but not to configuration settings. If the settings in the controller are to be protected with an access code you can set a numerical value between 0 and 100. If not, you can cancel the function with setting 0. If the function is used, access code 1 (o05) **must also** be used.	o64	-
Copy the controller's present settings With this function the controller's settings can be transferred to a programming key. The key can contain up to 25 different sets. Select a number. All settings except for Application (o61) and Address (o03) will be copied. When copying has started the display returns to o65. After two seconds you can move into the menu again and check whether the copying was satisfactory. Showing of a negative figure spells problems. See the significance in the Fault Message section.	o65	-

Copy from the programming key This function downloads a set of settings earlier saved in the controller. Select the relevant number. All settings except for Application (o61) and Address (o03) will be copied. When copying has started the display returns to o66. After two seconds you can move back into the menu again and check whether the copying was satisfactory. Showing of a negative figure spells problems. See the significance in the Fault Message section.	o66	-
Save as factory setting With this setting you save the controller's actual settings as a new basic setting (the earlier factory settings are overwritten).	o67	-
		- - - Night Setback 0=Day 1=Night

Service		**Service**
Temperature measured with S5 sensor	u09	S5 temp.
Status on DI1 input. on/1=closed	u10	DI1 status
Temperature measured with S3 sensor	u12	S3 air temp
Status on night operation (on or off) 1=closed	u13	Night Cond.
Temperature measured with S4 sensor	u16	S4 air temp
Thermostat temperature	u17	Ther. air
Read the present regulation reference	u28	Temp. ref.
Status on DI2 output. on/1=closed	u37	DI2 status
Temperature shown on display	u56	Display air
Measured temperature for alarm thermostat	u57	Alarm air
** Status on relay for cooling	u58	Comp1/LLSV
** Status on relay for fan	u59	Fan relay
** Status on relay for defrost	u60	Def. relay
** Status on relay for railheat	u61	Railh. relay
** Status on relay for alarm	u62	Alarm relay
** Status on relay for light	u63	Light relay
** Status on relay for valve in suction line	u64	SuctionValve
** Status on relay for compressor 2	u67	Comp2 relay
*) Not all items will be shown. Only the function belonging to the selected application can be seen.		

Fault message		Alarms
In an error situation the LED's on the front will flash and the alarm relay will be activated. If you push the top button in this situation you can see the alarm report in the display. If there are more keep on pushing to see them. There are two kinds of error reports - it can either be an alarm occurring during the daily operation, or there may be a defect in the installation. A-alarms will not become visible until the set time delay has expired. E-alarms, on the other hand, will become visible the moment the error occurs. (An A alarm will not be visible as long as there is an active E alarm). Here are the messages that may appear:		1 = alarm
A1: High temperature alarm		High t. alarm
A2: Low temperature alarm		Low t. alarm
A4: Door alarm		Door Alarm
A5: Information. Parameter o16 is expired		Max Hold Time
A15: Alarm. Signal from DI1 input		DI1 alarm
A16: Alarm. Signal from DI2 input		DI2 alarm
A45: Standby position (stopped refrigeration via r12 or DI input)		Standby mode
A59: Case cleaning. Signal from DI1 or DI2 input		Case cleaning
A60: High-temperature alarm for the HACCP function		HACCP alarm
		Max. def time
E1: Faults in the controller		EKC error
E6: Fault in real-time clock. Check the battery / reset the clock.		-
E25: Sensor error on S3		S3 error
E26: Sensor error on S4		S4 error
E27: Sensor error on S5		S5 error
When copying settings to or from a copying key with functions o65 or o66, the following information may appear: 0: Copying concluded and OK 4: Copying key not correctly mounted 5: Copying was not correct. Repeat copying 6: Copying to EKC incorrect. Repeat copying 7: Copying to copying key incorrect. Repeat copying 8: Copying not possible. Order number or SW version do not match 9: Communication error and timeout 10: Copying still going on (The information can be found in o65 or o66 a couple of seconds after copying has been started).		
		Alarm destinations
		The importance of the individual alarms can be defined with a setting (0, 1, 2 or 3)

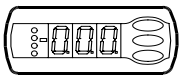
Operating status		(Measurement)
The controller goes through some regulating situations where it is just waiting for the next point of the regulation. To make these "why is nothing happening" situations visible, you can see an operating status on the display. Push briefly (1s) the upper button. If there is a status code, it will be shown on the display. The individual status codes have the following meanings:		EKC State: (Shown in all menu displays)
S0: Regulating		0
S1: Waiting for end of the coordinated defrost		1
S2: When the compressor is operating it must run for at least x minutes.		2
S3: When the compressor is stopped, it must remain stopped for at least x minutes.		3
S4: The evaporator drips off and waits for the time to run out		4
S10: Refrigeration stopped by main switch. Either with r12 or a DI-input		10
S11: Refrigeration stopped by thermostat		11
S14: Defrost sequence. Defrost in progress		14
S15: Defrost sequence. Fan delay — water attaches to the evaporator		15
S17: Door is open. DI input is open		17
S20: Emergency cooling *)		20
S25: Manual control of outputs		25
S29: Case cleaning		29
S30: Forced cooling		30
S32: Delay on outputs during start-up		32
S33: Heat function r36 is active		33
Other displays:		
non: The defrost temperature cannot be displayed. There is stop based on time		
-d-: Defrost in progress / First cooling after defrost		
PS: Password required. Set password		

*) Emergency cooling will take effect when there is lack of signal from a defined S3 or S4 sensor. The regulation will continue with a registered average cutin frequency. There are two registered values – one for day operation and one for night operation.

Warning ! Direct start of compressors *
To prevent compressor breakdown parameter c01 and c02 should be set according to suppliers requirements or in general :
Hermetic Compressors c02 min. 5 minutes
Semihermetic Compressors c02 min. 8 minutes and c01 min. 2 to 5 minutes (Motor from 5 to 15 KW)
*) Direct activating of solenoid valves does not require settings different from factory (0)

Operation

Display
The values will be shown with three digits, and with a setting you can determine whether the temperature are to be shown in °C or in °F.



Light-emitting diodes (LED) on front panel
HACCP = HACCP function is active
The other LED's on the front panel will light up when the belonging relay is activated.

= Refrigeration
= Defrost
= Fan running

The light-emitting diodes will flash when there is an alarm.
In this situation you can download the error code to the display and cancel/sign for the alarm by giving the top knob a brief push.

Defrost
During defrost a –d- is shown in the display. This view will continue up till 15 min. after the cooling has resumed.
However the view of –d- will be discontinued if:
- The temperature is suitable within the 15 minutes
- The regulation is stopped with "Main Switch"
- A high temperature alarm appears

The buttons
When you want to change a setting, the upper and the lower buttons will give you a higher or lower value depending on the button you are pushing. But before you change the value, you must have access to the menu. You obtain this by pushing the upper button for a couple of seconds - you will then enter the column with parameter codes. Find the parameter code you want to change and push the middle buttons until value for the parameter is shown. When you have changed the value, save the new value by once more pushing the middle button.

Examples

Set menu
1. Push the upper button until a parameter r01 is shown
2. Push the upper or the lower button and find that parameter you want to change
3. Push the middle button until the parameter value is shown
4. Push the upper or the lower button and select the new value
5. Push the middle button again to freeze the value.

Cutout alarm relay / receipt alarm/see alarm code
• Push short the upper button
If there are several alarm codes they are found in a rolling stack. Push the uppermost or lowermost button to scan the rolling stack.

Set temperature
1. Push the middle button until the temperature value is shown
2. Push the upper or the lower button and select the new value
3. Push the middle button again to conclude the setting.

Reading the temperature at defrost sensor
• Push short the lower button

Manuel start or stop of a defrost
• Push the lower button for four seconds.
(Though not for application 4).

See HACCP registration
1. Give the middle button a long push until h01 appears
2. Select required h01-h10
3. See value by giving the middle button a short push

Get a good start

With the following procedure you can start regulation very quickly:

1 Open parameter r12 and stop the regulation (in a new and not previously set unit, r12 will already be set to 0 which means stopped regulation.)

2 Select electric connection based on the drawings on page 6

3 Open parameter o61 and set the electric connection number in it

4 Now select one of the preset settings from the table on page 22.

5 Open parameter o62 and set the number for the array of presettings. The few selected settings will now be transferred to the menu.

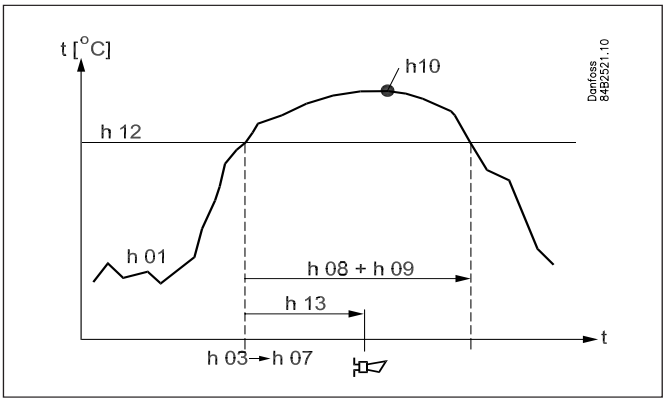
6 Open parameter r12 and start the regulation

7 Go through the survey of factory settings. The values in the grey cells are changed according to your choice of settings. Make any necessary changes in the respective parameters.

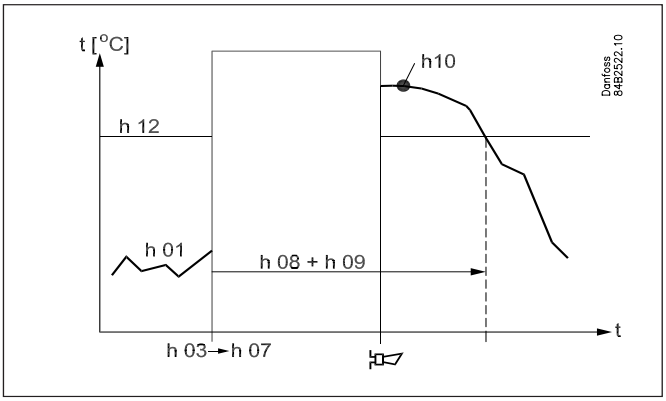
8 For network. Set the address in o03 and then transmit it to the gateway/system unit with setting o04.

HACCP
This function will follow the appliance temperature and sound an alarm if the set temperature limit is exceeded. The alarm will come when the time delay has elapsed.
When the temperature exceeds the limit value it will continuously be registered and the peak value will be saved until the later readout. Saved together with the value will be the time and duration of the temperature exceeding.

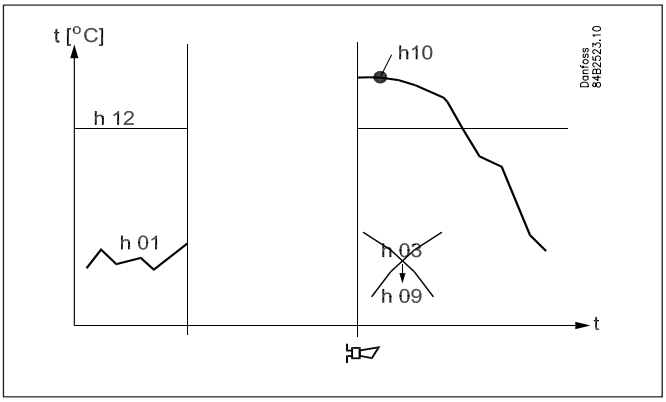
Examples of temperature exceeding:



Exceeding during normal regulation



Exceeding in connection with power failure where the controller can keep on registering the time performance.



Exceeding in connection with power failure when the controller has lost its clock function and hence also its time performance.

The readout of the various values in the HACCP function can take place with a long push on the middle button.
The readouts are, as follows:
h01: The temperature
h02: Readout of the controller's status when temperature was exceeded:
H1 = normal regulation.
H2 = power failure. Times are saved.
H3 = power failure. Times not saved.
h03: Time. Year
h04: Time. Month
h05: Time: Day
h06: Time. Hour
h07: Time. Minute
h08: Duration in hours
h09: Duration in minutes
h10: The registered peak temperature

(Setup of the function takes place just like the other setups. See menu survey on the next page).

Menu survey

SW = 2.3x

Parameters			EL-diagram number (page 6)										Min.-value	Max.-value	Factory setting	Actual setting
Function		**Codes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**				
Normal operation																
Temperature (set point)		---											-50.0°C	50.0°C	2.0°C	
Thermostat																
Differential	***	r01											0.1 K	20.0K	2.0 K	
Max. limitation of setpoint setting	***	r02											-49.0°C	50°C	50.0°C	
Min. limitation of setpoint setting	***	r03											-50.0°C	49.0°C	-50.0°C	
Adjustment of temperature indication		r04											-20.0 K	20.0 K	0.0 K	
Temperature unit (°C/°F)		r05											°C	°F	°C	
Correction of the signal from S4		r09											-10.0 K	+10.0 K	0.0 K	
Correction of the signal from S3		r10											-10.0 K	+10.0 K	0.0 K	
Manual service, stop regulation, start regulation (-1, 0, 1)		r12											-1	1	0	
Displacement of reference during night operation		r13											-10.0 K	10.0 K	0.0 K	
Definition and weighting, if applicable, of thermostat sensors - S4% (100%=S4, 0%=S3)		r15											0%	100%	100%	
The heating function is started a number of degrees below the thermostats cutout temperature		r36											-15.0 K	-3.0 K	-15.0 K	
Activation of reference displacement r40		r39											OFF	ON	OFF	
Value of reference displacement (activate via r39 or DI)		r40											-50.0 K	50.0 K	0.0 K	
Alarm																
Delay for temperature alarm		A03											0 min	240 min	30 min	
Delay for door alarm	***	A04											0 min	240 min	60 min	
Delay for temperature alarm after defrost		A12											0 min	240 min	90 min	
High alarm limit	***	A13											-50.0°C	50.0°C	8.0°C	
Low alarm limit	***	A14											-50.0°C	50.0°C	-30.0°C	
Alarm delay DI1		A27											0 min	240 min	30 min	
Alarm delay DI2		A28											0 min	240 min	30 min	
Signal for alarm thermostat. S4% (100%=S4, 0%=S3)		A36											0%	100%	100%	
Compressor																
Min. ON-time		c01											0 min	30 min	0 min	
Min. OFF-time		c02											0 min	30 min	0 min	
Time delay for cutin of comp.2		c05											0 sec	999 sec	0 sec	
Compressor relay 1 must cutin and out inversely (NC-function)		c30											0 OFF	1 ON	0 OFF	
Defrost																
Defrost method (none/EL/GAS/BRINE)		d01											no	bri	EL	
Defrost stop temperature		d02											0.0°C	25.0°C	6.0°C	
Interval between defrost starts		d03											0 hours	240 hours	8 hours	
Max. defrost duration		d04											0 min	180 min	45 min	
Displacement of time on cutin of defrost at start-up		d05											0 min	240 min	0 min	
Drip off time		d06											0 min	60 min	0 min	
Delay for fan start after defrost		d07											0 min	60 min	0 min	
Fan start temperature		d08											-15.0°C	0.0°C	-5.0°C	
Fan cutin during defrost 0: Stopped 1: Running 2: Running during pump down and defrost		d09											0	2	1	
Defrost sensor (0=time, 1=S5, 2=S4)		d10											0	2	0	
Pump down delay		d16											0 min	60 min	0 min	
Drain delay		d17											0 min	60 min	0 min	
Max. aggregate refrigeration time between two defrosts		d18											0 hours	48 hours	0 hours	
Defrost on demand - S5 temperature's permitted variation during frost build-up. On central plant choose 20 K (=off)		d19											0.0 K	20.0 k	20.0 K	
Delay of hot gas defrost		d23											0 min	60 min	0 min	
Fan																
Fan stop at cutout compressor		F01											no	yes	no	
Delay of fan stop		F02											0 min	30 min	0 min	
Fan stop temperature (S5)		F04											-50.0°C	50.0°C	50.0°C	
HACCP																
Actual temperature measurement for the HACCP function		h01														
Last registered peak temperature		h10														
Selection of function and sensor for the HACCP function. 0 = no HACCP function. 1 = S4 used (maybe also S3). 2 = S5 used		h11											0	2	0	
Alarm limit for the HACCP function		h12											-50.0°C	50.0°C	8.0°C	
Time delay for the HACCP alarm		h13											0 min.	240 min.	30 min.	
Select signal for the HACCP function. S4% (100% = S4, 0% = S3)		h14											0%	100%	100%	
Real time clock																
Six start times for defrost. Setting of hours. 0=OFF		t01-t06											0 hours	23 hours	0 hours	
Six start times for defrost. Setting of minutes. 0=OFF		t11-t16											0 min	59 min	0 min	
Clock - Setting of hours	***	t07											0 hours	23 hours	0 hours	
Clock - Setting of minute	***	t08											0 min	59 min	0 min	
Clock - Setting of date	***	t45											1	31	1	
Clock - Setting of month	***	t46											1	12	1	
Clock - Setting of year	***	t47											0	99	0	
Miscellaneous																
Delay of output signals after start-up		o01											0 s	600 s	5 s	

			1	2	3	4	5	6	7	8	9	10				
Input signal on DI1. Function: 0=not used. 1=status on DI1. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-signal). 5=ext.main switch. 6=night operation 7=change reference (activate r40). 8=alarm function when closed. 9=alarm function when open. 10=case cleaning (pulse signal). 11=forced cooling at hot gas defrost.		o02											1	11	0	
Network address		o03											0	240	0	
On/Off switch (Service Pin message) IMPORTANT! o61 **must** be set prior to o04		o04											OFF	ON	OFF	
Access code 1 (all settings)		o05											0	100	0	
Used sensor type (Pt /PTC/NTC)		o06											Pt	ntc	Pt	
Display step = 0.5 (normal 0.1 at Pt sensor)		o15											no	yes	no	
Max hold time after coordinated defrost		o16											0 min	60 min	20	
Select signal for display view. S4% (100%=S4, 0%=S3)		o17											0%	100%	100%	
Input signal on DI2. Function: (0=not used. 1=status on DI2. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-signal). 5=ext. main switch 6=night operation 7=change reference (activate r40). 8=alarm function when closed. 9=alarm function when open. 10=case cleaning (pulse signal). 11=forced cooling at hot gas defrost.). 12=coordinated defrost)		o37											0	12	0	
Configuration of light function (relay 4) 1=ON during day operation. 2=ON / OFF via data communication. 3=ON follows the DI-function, when DI is selected to door function or to door alarm		o38											1	3	1	
Activation of light relay (only if o38=2)		o39											OFF	ON	OFF	
Rail heat On time during day operations		o41											0%	100%	100	
Rail heat On time during night operations		o42											0%	100%	100	
Rail heat period time (On time + Off time)		o43											6 min	60 min	10 min	
Case cleaning. 0=no case cleaning. 1=Fans only. 2=All output Off.	***	o46											0	2	0	
Selection of EL diagram. See overview page 6	*	o61											1	10	1	
Download a set of predetermined settings. See overview next page.	*	o62											0	6	0	
Access code 2 (partly access)	***	o64											0	100	0	
Save the controllers present settings to the programming key. Select your own number.		o65											0	25	0	
Load a set of settings from the programming key (previously saved via o65 function)		o66											0	25	0	
Replace the controllers factory settings with the present settings		o67											OFF	On	OFF	
Service																
Status codes are shown on page 17		S0-S33														
Temperature measured with S5 sensor	***	u09														
Status on DI1 input. on/1=closed		u10														
Temperature measured with S3 sensor	***	u12														
Status on night operation (on or off) 1=closed	***	u13														
Temperature measured with S4 sensor	***	u16														
Thermostat temperature		u17														
Read the present regulation reference		u28														
Status on DI2 output. on/1=closed		u37														
Temperature shown on display		u56														
Measured temperature for alarm thermostat		u57														
Status on relay for cooling	**	u58														
Status on relay for fan	**	u59														
Status on relay for defrost	**	u60														
Status on relay for railheat	**	u61														
Status on relay for alarm	**	u62														
Status on relay for light	**	u63														
Status on relay for valve in suction line	**	u64														
Status on relay for compressor 2	**	u67														

*) Can only be set when regulation is stopped (r12=0)
**) Can be controlled manually, but only when r12=-1
***) With access code 2 the access to these menus will be limited

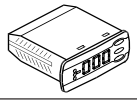
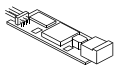
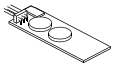
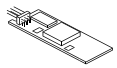
Factory setting
If you need to return to the factory-set values, it can be done in this way:
- Cut out the supply voltage to the controller
- Keep both buttons depressed at the same time as you reconnect the supply voltage

Auxiliary table for settings (quick-setup)	Case			Room		
	Defrost stop on time	Defrost stop on S5		Defrost stop on time	Defrost stop on S5	
Preset settings (o62)	**1**	**2**	**3**	**4**	**5**	**6**
Temperature (SP)	4°C	2°C	-24°C	6°C	3°C	-22°C
Max. temp. setting (r02)	6°C	4°C	-22°C	8°C	5°C	-20°C
Min. temp. setting (r03)	2°C	0°C	-26°C	4°C	1°C	-24°C
Sensor signal for thermostat. S4% (r15)	100%			0%		
Alarm limit high (A13)	10°C	8°C	-15°C	10°C	8°C	-15°C
Alarm limit low (A14)	-5°C	-5°C	-30°C	0°C	0°C	-30°C
Sensor signal for alarm funct.S4% (A36)	100%			0%		
Interval between defrost (d03)	6 h	6h	12h	8h	8h	12h
Defrost sensor: 0=time, 1=S5, 2=S4 (d10)	0	1	1	0	1	1
DI1 config. (o02)	Case cleaning (=10)			Door function (=3)		
Sensor signal for display view S4% (017)	100%			0%		

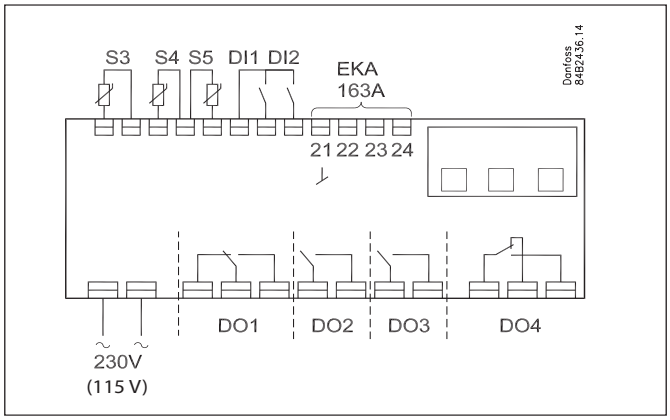
Override
The controller contains a number of functions that can be used together with the override function in the master gateway / System Manager.

Function via data communication	**Functions to be used in the gateway's override function**	**Used parameter in AK-CC 210**
Start of defrosting	Defrost control Time schedule	- - - Def.start
Coordinated defrost	Defrost control	- - - HoldAfterDef u60 Def.relay
Night setback	Day/night control Time schedule	- - - Night setbck
Light control	Day/night control Time schedule	o39 Light Remote

Ordering

Type		**Function**	**Code no.**	
AK-CC 210		Refrigeration controller without data communication but prepared for mounting of one module	**230 V a.c**	**084B8520**
			115 V a.c.	**084B8534**
EKA 178A		Data communication module MOD-BUS	**084B8564**	
EKA 179A		Data communication module LON RS 485	**084B8565**	
EKA 181C		Battery module that will protect the clock in case of lengthy power failure	**084B8577**	
EKA 182A		Copy key EKC - EKC	**084B8567**	
EKA 163A		External display for AK-CC 210	**084B8562**	

Connections



Power supply
230 V a.c.

Sensors
S3 and S4 are thermostat sensors.
A setting determines whether S3 or S4 or both of them are to be used.
S5 is a defrost sensor and is used if defrost has to be stopped based on temperature.

Digital On/Off signals
A cut-in input will activate a function. The possible functions are described in menus o02 and o37.

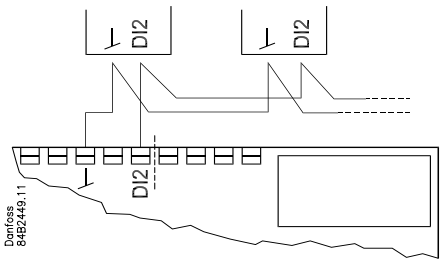
External display
Connection of display type EKA 163A (EKA 164A).

Relays
The general uses are mentioned here. See also page 6 where the different applications are shown.
DO1: Refrigeration. The relay will cut in when the controller demands refrigeration
DO2: Defrost. The relay will cut in when defrost is in progress
DO3: For either fans or refrigeration 2
Fans: The relay will cut in when the fans have to operate
Refrigeration 2: The relay will cut in when refrigeration step 2 has to be cut in
DO4: For either alarm, rail heat, light or hotgas defrost
Alarm: Cf. diagram. The relay is cut in during normal operation and cuts out in alarm situations and when the controller is dead (de-energised)
Rail heat: The relay cuts in when rail heat is to operate
Light: The relay cuts in when the light has to be switched on
Hotgas defrost: See diagram. The relay will cut out when defrost has to be done

Data communication
The controller is available in several versions where data communication can be carried out with one of the following systems: MOD-bus or LON-RS485.
If data communication is used, it is important that the installation of the data communication cable is performed correctly.
See separate literature No. RC8AC…

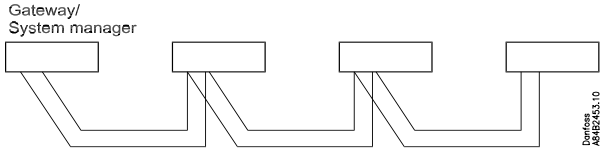
Electric noise
Cables for sensors, DI inputs and data communication **must** be kept separate from other electric cables:
- Use separate cable trays
- Keep a distance between cables of at least 10 cm
- Long cables at the DI input should be avoided

Coordinated defrost via cable connections



The following controllers can be connected up in this way:
AK-CC 210, AK-CC 250, AK-CC 450, AK-CC 550
Max. 10.
Refrigeration is resumed when all controllers have "released" the signal for defrost.

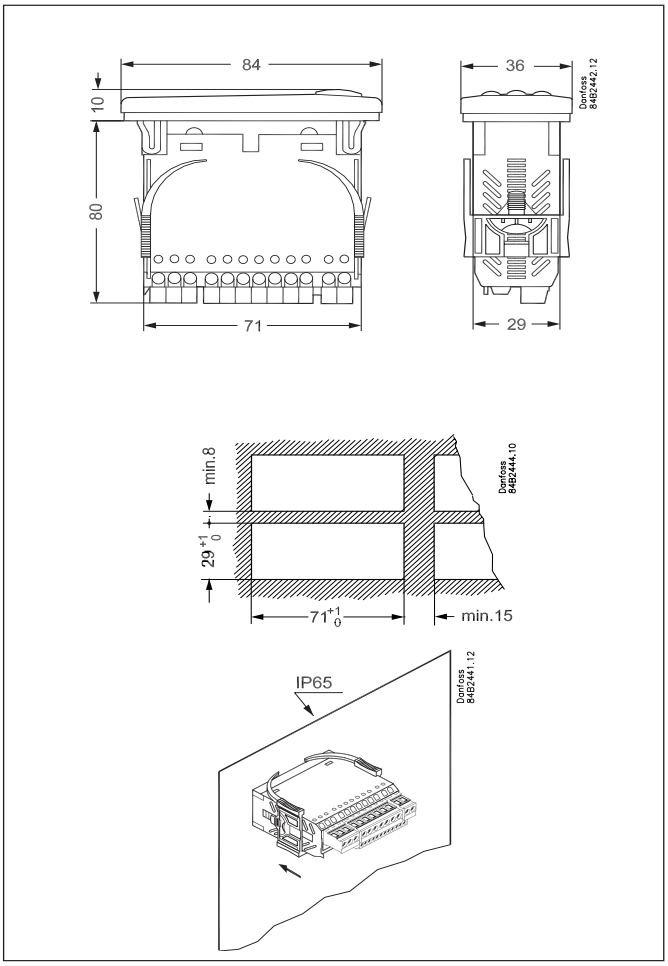
Coordinated defrost via data communication



Data

Supply voltage	230 V a.c. +10/-15 %. 2.5 VA, 50/60 Hz		
Sensors 3 pcs off either	Pt 1000 or PTC 1000 or NTC-M2020 (5000 ohm / 25°C)		
Accuracy	Measuring range	-60 to +99°C	
	Controller	±1 K below -35°C ±0.5 K between -35 to +25°C ±1 K above +25°C	
	Pt 1000 sensor	±0.3 K at 0°C ±0.005 K per grad	
Display	LED, 3-digits		
External display	EKA 163A		
Digital inputs	Signal from contact functions Requirements to contacts: Gold plating Cable length must be max. 15 m Use auxiliary relays when the cable is longer		
Electrical connection cable	Max.1,5 mm² multi-core cable		
Relays*		CE (250 V a.c.)	UL *** (240 V a.c.)
	DO1. Refrigeration	8 (6) A	10 A Resistive 5FLA, 30LRA
	DO2. Defrost	8 (6) A	10 A Resistive 5FLA, 30LRA
	DO3. Fan	6 (3) A	6 A Resistive 3FLA, 18LRA 131 VA Pilot duty
	DO4. Alarm	4 (1) A Min. 100 mA**	4 A Resistive 131 VA Pilot duty
Environments	0 to +55°C, During operations -40 to +70°C, During transport		
	20 - 80% Rh, not condensed		
	No shock influence / vibrations		
Density	IP 65 from front. Buttons and packing are imbedded in the front.		
Escapement reserve for the clock	4 hours		
Approvals	EU Low Voltage Directive and EMC demands re CE-marking complied with LVD tested acc. EN 60730-1 and EN 60730-2-9, A1, A2 EMC tested acc. EN61000-6-3 and EN 61000-6-2		

* DO1 and DO2 are 16 A relays. The mentioned 8 A can be increased up to 10 A, when the ambient temperature is kept below 50°C. DO3 and DO4 are 8 A relays. Max. load must be kept.
** Gold plating ensures make function with small contact loads
*** UL-approval based on 30000 couplings.



Capacitive load
The relays cannot be used for the direct connection of capacitive loads such as LEDs and on/off control of EC motors.
All loads with a switch mode power supply must be connected with a suitable contactor or similar.

This warning does not mean that Hussmann products will cause cancer or reproductive harm, or is in violation of any product-safety standards or requirements. As clarified by the California State government, Proposition 65 can be considered more of a ‘right to know’ law than a pure product safety law. When used as designed, Hussmann believes that our products are not harmful. We provide the Proposition 65 warning to stay in compliance with California State law. It is your responsibility to provide accurate Proposition 65 warning labels to your customers when necessary. For more information on Proposition 65, please visit the California State government website.

Service Record

Last service date: **By:**

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

HUSSMANN®/Chino

Additional copies of this publication may be obtained by contacting:

Hussmann® Chino
13770 Ramona Avenue • Chino, California 91710
(909) 628-8942 FAX
(909) 590-4910
(800) 395-9229

The *MODEL NAME* and *SERIAL NUMBER* is required in order to provide you with the correct parts and information for your particular unit.

They can be found on a small metal plate on the unit.
Please note them below for future reference.

MODEL:

SERIAL NUMBER: