



H. C. DUKE & SON, INC.

2116 - 8th Avenue • East Moline, Illinois 61244

Replacement Parts Manual with Illustrations

**QUALITY PARTS
PROTECT
YOUR
EQUIPMENT**

**Soft Serve
Freezer Model
957CMT**

184616-01 7/08

ILLUSTRATIONS

Parts are listed on each page using terminology that best fits the function of the part. It is very important to know the serial number of the machine when ordering parts because many parts are not interchangeable from one serial number to another of the same model. The illustrations in this manual can be used as a reference for obtaining the correct part description and part number. All returned items must have a Return Authorization Number prior to returning.

All parts listed in the manual should be ordered through:



H. C. Duke & Son, Inc.
2116 - 8th Avenue
East Moline, Illinois 61244
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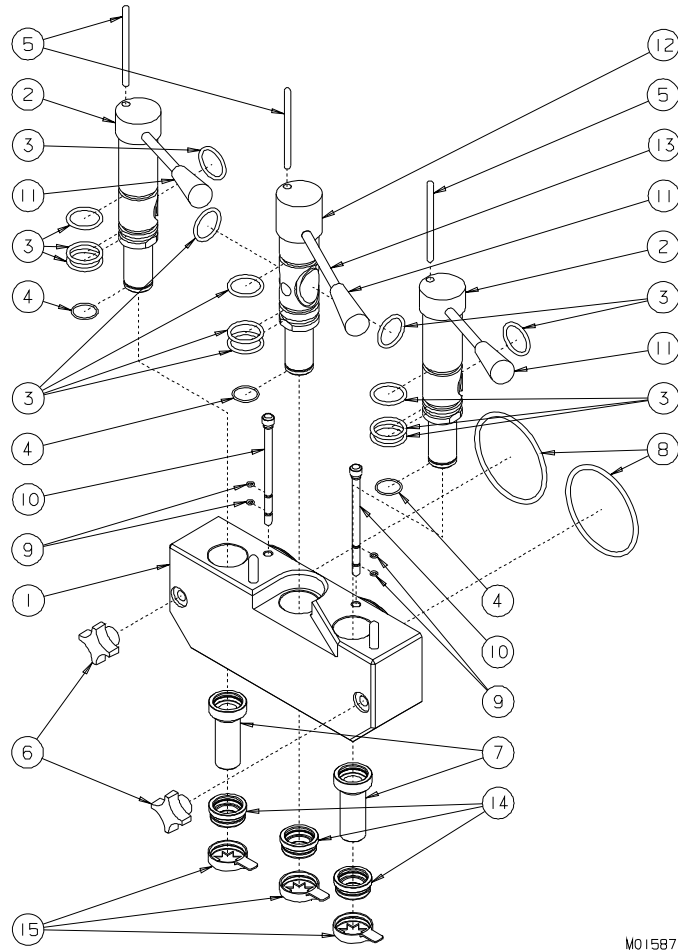
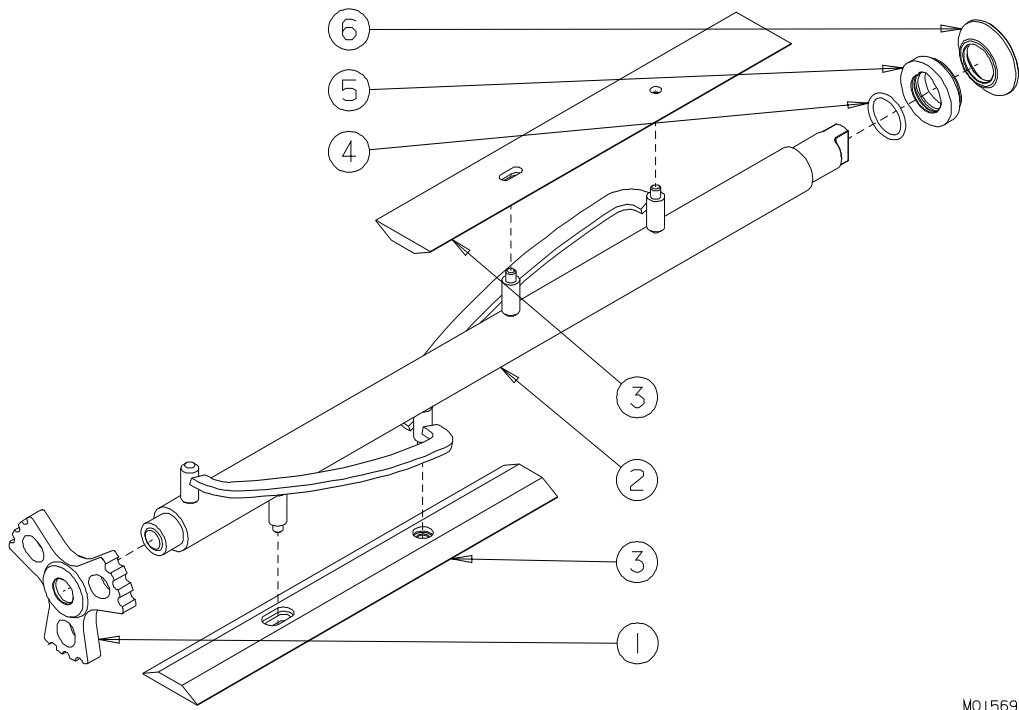


Figure 1 Head Assembly

Item	Part No.	Description
*	HC119915	Head-Assy. Dispense (Complete)
1	HC119913	Head-Assy. w/Actuator (Less Parts)
2	HC118641	Spigot-Assy. Side w/Handle
3	HC159295	O-Ring (Spigot)
4	HC160584	O-Ring (Extension)
5	HC136794	Rod-Spigot Switch
6	HC162625	Knob-Hand
6A	HC114341-01	Stud-Assy. Cylinder 3-13/16"(not shown)
7	HC136713	Extension-Spigot (Cakes)(Optional)
7A	HC137870	Adapter-Star/Spigot (Yogurt Nozzle-not shown)(Optional)
7B	HC196185	Nozzle-Serrated (not shown)(Optional)
8	HC160583	O-Ring (4" Head)
9	HC160562	O-Ring (Air Bleed Plug)
10	HC115129	Bleeder-Assy.(Air Relief Plug)
11	HC162626	Handle-Tapered Black
12	HC137018	Spigot-Long Center (w/o handle)
13	HC136618	Rod-Handle, Center Spigot (Stainless Steel Extension only)
* Includes items 1-4 and 8-13.		
	HC116410	Kit-Dispense Head Switch (not shown)

Use only original or authorized replacement parts with this freezer.
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M01569

Figure 2 Beater Shaft Assembly

Item	Part No.	Description
1	HC196079	Bushing-Cylinder
2	HC113438	Shaft-Assy. Beater
3	HC137334	Blade-Scraper Soft Serve
4*	HC160500	O-Ring (Shaft Seal)
5*	HC133098	Washer-Shaft Seal
6*	HC160557	Seal-Beater Shaft
*Items 4-6		HC111875
Seal-Assy Shaft (Complete)		

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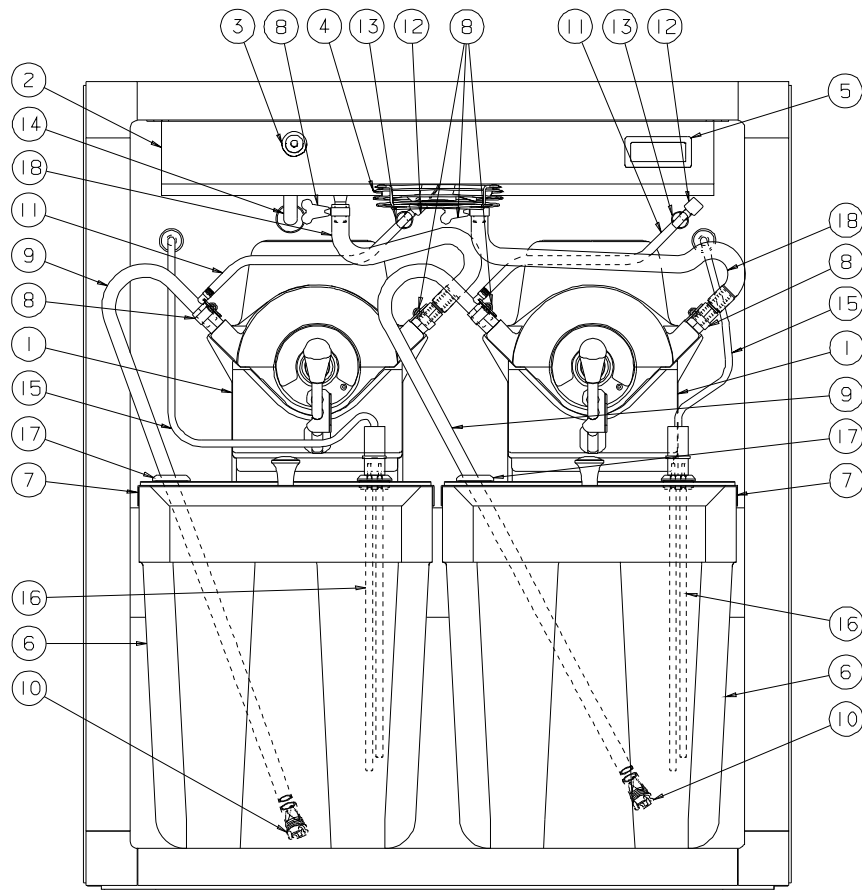


Figure 3 Cabinet Parts

Item	Part No.	Description	Item	Part No.	Description
1	HC16012	MTS-Assy. Housing (See Figure 5)	9	HC116069	Tube-Assy. Pickup
2	HC117129-01	Shroud-Assy. Evaporator in- cludes	10	HC199032	Duckbill-Inlet (Valve)
	HC150532	Cord-Assy. Male Plug	11	HC138170	Tube-Air 11 in. (Hose)
	HC151105	Fan-Open 230v	12	---	Meter-Air (Order by Meter Number)
	HC151076	Guard-Fan Open	13	HC117092	Retainer-Assy. Air Line
	HC150509	Switch-Door Push Button	14	HC196068	Tubing-.375 x .500 OD
	HC161004	Thermometer	14A	HC138919	Tube-Drain Support
2A	HC155111	Coil-Evaporator	14B	HC160738	Clamp-Hose (Drain)
2B	HC150533	Cord-Assy. Female Plug	15	HC150537	Cordset-Mix Level Probe
3	HC150509	Switch-Door Push Button	15A	HC150536	Receptacle-Molded Level Sensor
4	HC151076	Guard-Fan Open	16	HC115397	Probe-Assy. Mix Level 10-3/4" includes HC137120 Base-Probe Mtg.
5	HC161004	Thermometer (Cabinet)	17	HC199033	Boot-Mix Tube (Seal)
6	HC196100	Tank-Mix 6 Gal. Height 13-1/8"	18	HC116094	Hose-Assy. Mix Braided
7	HC117553	Cover-Assy. Mix Tank Front	18A	HC138184	Hose-Transfer Black Line
7A	HC140446	Cover-Rear Mix			
8	HC116065	Clamp-Assy. Soft Hose 5/8			

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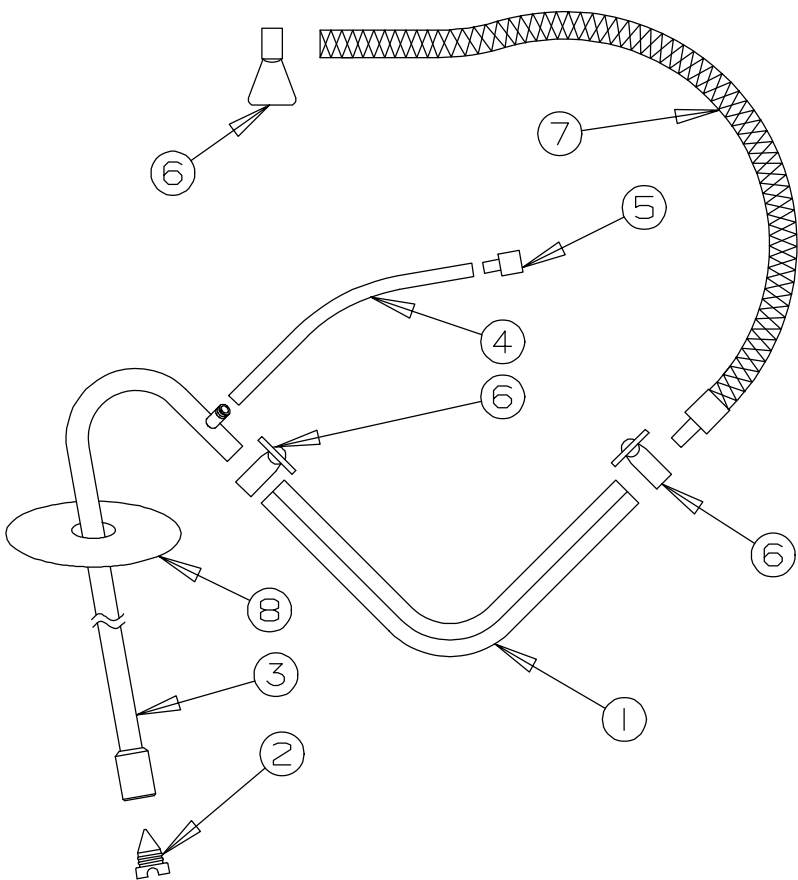
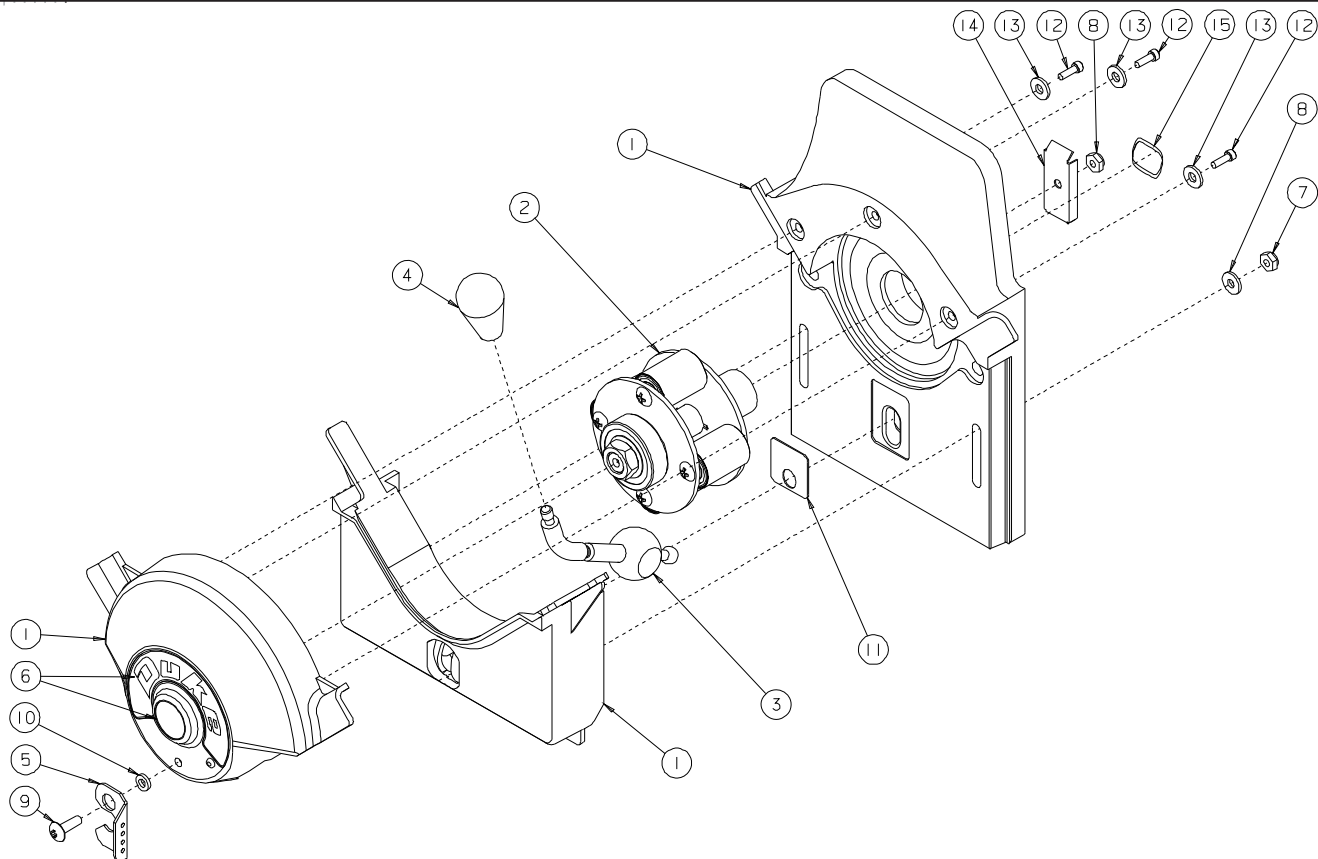


Figure 4 MTS Hose Assembly

Item	Part No.	Description
1.....	HC138184	Hose-Transfer Black Line
2.....	HC199032	Duckbill-Inlet (Valve)
3.....	HC116069	Tube-Assy. Pickup
4.....	HC138170	Tube-Air
5.....	---	Meter-Air (Order by meter number)
6.....	HC116065	Clamp-Assy. Soft Hose 5/8
7.....	HC116094	Hose-Assy. Braided
8.....	HC199033	Boot-Mix Tube

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MO1317

Figure 5 Mix Transfer System (MTS)

Item	Part No.	Description
*	HC116012	MTS-Assy. Housing (Complete)
1	HC117054	MTS-Assy. Housing w/o roller
2	HC116009-01	Kit-Roller Complete
3	HC116164	Handle-Assy. Round (MTS)
4	HC162627	Knob-Oval Taper (Handle-MTS)
5	**	Hook-Swing (Lock-MTS)
6	HC165021	Decal-Duke Mix Transfer
7	HC159421	Nut-EL Stop #10-32
8	HC160157	Washer-1/2 x .196 x 1/16
9	HC160026	Screw-TRPM #10-32 x 5/8 SST (Swing Hook)
10	HC160158	Washer-Flat .190 x .365 x .075 SST
11	HC138142	Plate-Pivot Cover
12	HC160307	Screw-SKHM #10 SST
13	HC159962	Washer-Flat #10 SST
14	HC117125	Actuator-Assy. Slide
15	HC160173	Washer-Spring Wave SST

* Includes all above items except item 15.

** Order by freezer serial number

Not Shown:

HC159219	Screw-TRPM 1/4 -20 x 1 SST (MTS Mounting)
HC151129	Gearmotor-MTS
HC138369	Bushing-Alignment
HC116312	Gauge-Assy. Pressure Test
HC116411	Kit-MTS Slide Switch

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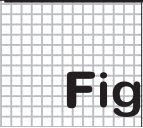
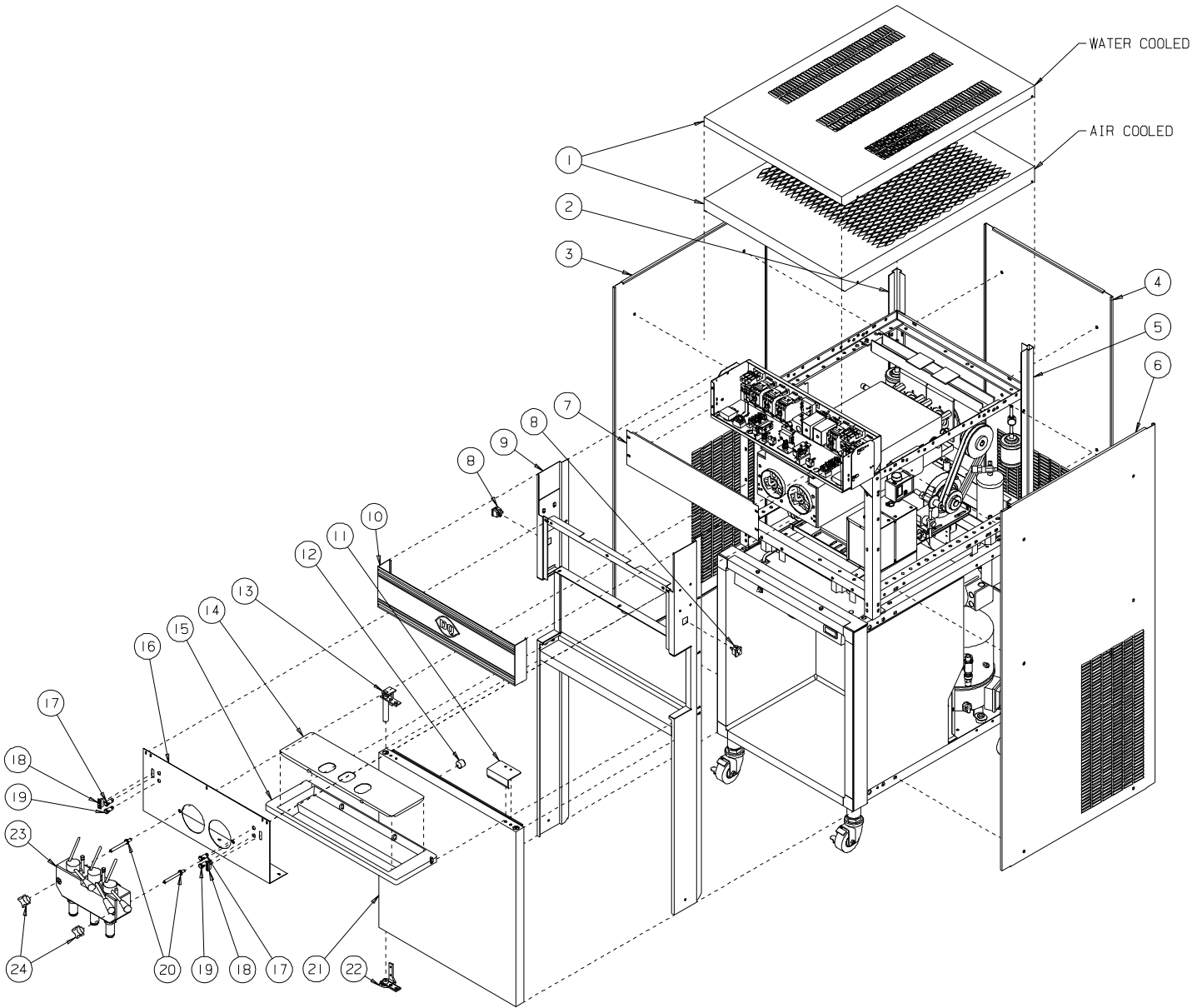


Figure 6 Panel Breakdown (Sheet 1 of 2)



Hardware for Panels for 957CMT				
Panel	Screw	Nut-Speed	Spacer	Nut-Speed on Frame
Channel-Rear	HC160048	HC160117	n/a	n/a
Dispense	HC160076	HC159132	HC138456	n/a
Front	HC160076	HC159132	n/a	HC159067
Rear	HC159219	HC160114	HC138456	n/a
Side	HC159219	HC160114	HC138456	n/a
Top	HC160305	n/a	n/a	n/a
Trimstrip	HC160076	n/a	n/a	n/a
n/a – Not Applicable				

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Figure 6 Panel Breakdown (Sheet 2 of 2)

Item Part No. Description

- 1 HC114157 Panel-Assy. Top (WC & AC Remote)
 or HC116567 Panel-Assy. Top (AC)
 2 HC135254 Channel-Rear LH (Corner)
 3 HC136289 Panel-Side LH
 2 HC136313 Panel-Rear (WC & AC)
 or HC138982 Panel-Upper Rear (AC Remote)
 or HC138983 Panel-Lower Rear (AC Remote)
 5 HC130021 Channel-Rear RH (Corner)
 6 HC136216 Panel-Side RH
 7 HC116355 Cover-Assy. Electric Box
 8 HC159050 Receptacle-Snap In
 9 HC115116 Panel-Assy. Front includes
 HC159175 Catch-Bullet (Drain Pan)
 HC160289 Nut-Push Round (Clip for Button)
 9A HC199016 Grommet-Rubber 5/8 ID (Drain Tube)
 10 HC119336-02.. Trimstrip -Assy. 26 in. IDQ
 11 HC136199 Pull-Door (Handle)
 12 HC118597 Actuator-Assy. Door Switch
 13 HC162045 Hinge-Pivot 1-3/8" Top LH includes
 HC162052 Spring L.H.
 14 HC115132 Insert-Assy. Drip Tray 26" includes
 HC199030 Bumper-Rubber-Insert
 15 HC196108-01.. Tray-Drip 26" White
 16 HC140128 Panel-Dispense
 17 HC150561 Light-Pilot Red
 18 HC150540 Light-Indicator "Add Mix"
 19 HC150562 Light-Pilot Amber
 20 HC114341-01.. Stud-Assy. Cylinder 3-13/16 in.
 21 HC114260-03.. Door-Assy. 26" IDQ (w/o actuator)
 includes
 HC160563 Gasket-Magnetic
 (Door V-Groove)
 HC136199 Pull-Door (Handle)
 22 HC162046 Hinge-Pivot 1-3/8" Bottom LH
 23 HC119915 Head-Assy. Dispense (See Figure 1)
 24 HC162625 Knob-Hand

AC = Air Cooled
 WC = Water Cooled
 LH = Left hand side of freezer when facing front.
 RH = Right hand side of freezer when facing front.

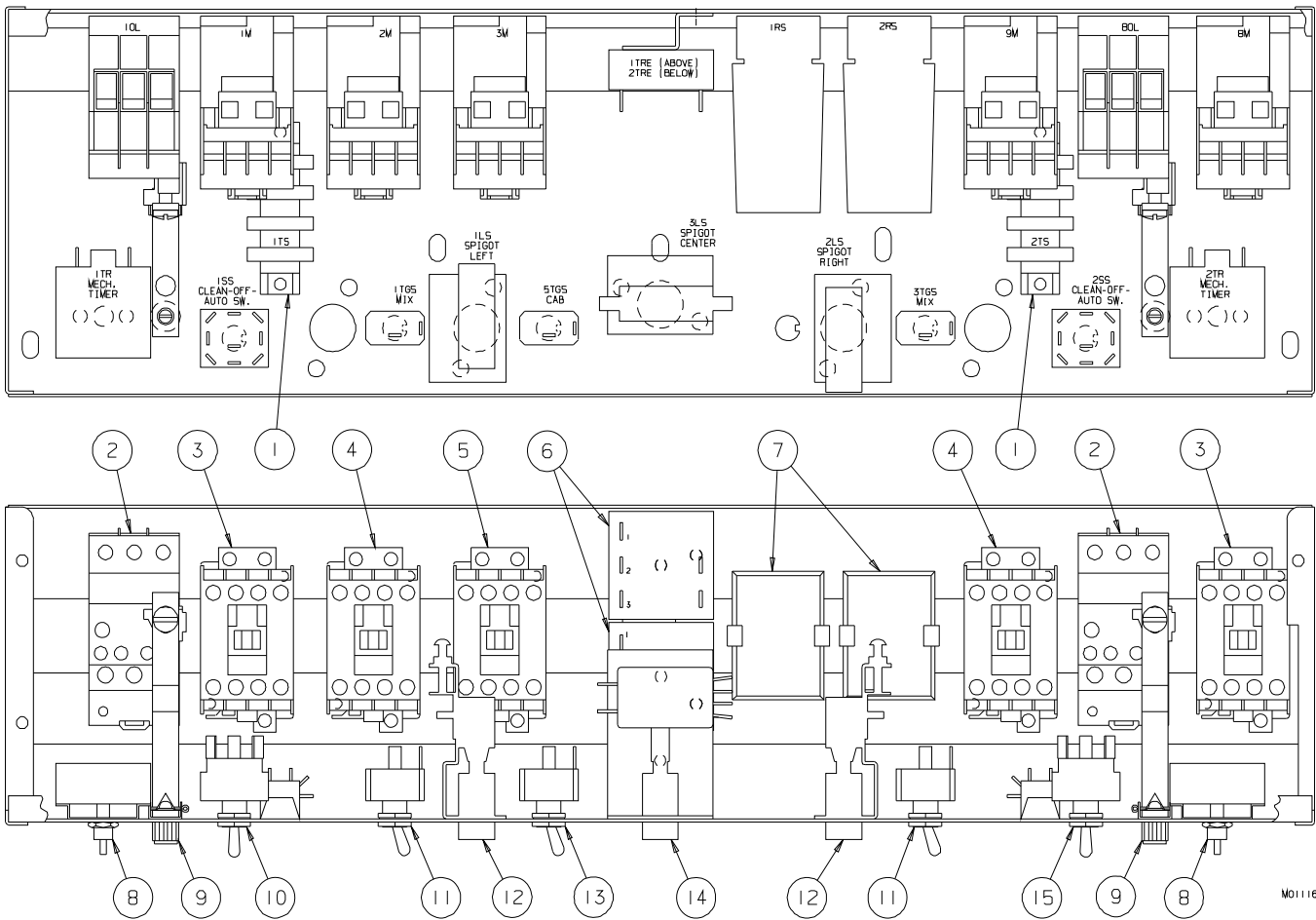
Panel Decals & Labels

Part No.	Description
HC165119	6" Air Flow
HC165025	Beater Warning
HC164031	Blade Installation
HC165249	Cleaning Instructions
HC165093	Clear Overlay
HC164027	CMT Connection
HC165013	CMT Patent
HC165002	General Purpose Recept
HC164127	Operating Instructions
HC165126	Panel Removal
HC165124	Top Air Discharge
HC165440-02	Trimstrip IDQ 26"
HC164128	Trimstrip LH
HC164129	Trimstrip RH
HC165246	Warning - Pressurized

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Figure 7 Switch Box (Sheet 1 of 2)

TOP VIEW

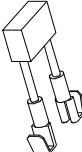


FRONT VIEW

**Detailed Drawings of
Filter and MOV Assemblies**



Item #1A
MOV-Assy.
116188



Item #10A
Filter-Assy.
116125

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Figure 7 Switch Box (Sheet 2 of 2)

Item	PartNo.	Description
1	HC150795	Strip-Terminal
1A	HC116188	MOV-Assy. (See Detailed Drawings)
2	HC118359	Relay-Assy. Overload 1 Phase 5-15A
	HC150145	Adaptor-Overload Din Rail
	HC150150	Button-Overload Reset Adaptor
	HC150140	Relay-SS Overload 1 Phase 5-15A
or	HC118361	Relay-Assy. Overload 3 Phase 3.7-12A
	HC150145	Adaptor-Overload Din Rail
	HC150150	Button-Overload Reset Adaptor
	HC150142	Relay-SS Overload 3 Phase 3.7-12
3	HC150155	Contactor-IEC 23A 240V COIL (Beater Motor)
3A	HC150156	Coil-Replacement Only
4	HC150155	Contactor-IEC 23A 240V COIL (Compressor)
4A	HC150156	Coil-Replacement Only
5	HC150155	Contactor-IEC 23A 240V COIL (Cabinet)
5A	HC150156	Coil-Replacement Only
6	HC150208	Timer-12 Sec. Delay on Break
7	HC150202	Indicator-Mix Level
7A	HC150119	Socket-Octal Terminal
7B	HC150120	Clip-Retainer (Set of 2)
8	HC150218	Timer-5 Minute Mechanical
8A	HC162604	Knob-Timer (not shown)
9	HC118390	Lever-Reset & Button C23
	HC159036	Button-Reset
10	HC150465	Switch-Toggle 3PDT Center Off (Selector)
10A	HC116125	Filter-Assy. (See Detailed Drawings)
11	HC159235	Switch-Toggle SPST (Mix Transfer System)
12	HC113903	Switch-Assy. Spigot (Sides) (See Figure 8)
	HC150456	Switch-Snap Button
13	HC159235	Switch-Toggle SPST (Cabinet)
14	HC114486	Switch-Assy. Spigot Center IDQ (See Figure 8)
	HC150479	Switch-Push Button DPDT
15	HC150465	Switch-Toggle 3PDT Center Off (Selector)

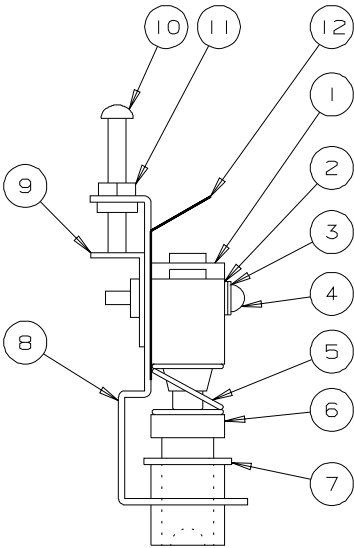
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Figure 8 Switch Assemblies

SIDE SWITCH ASSEMBLY

Item	Part No.	Description
*	HC113903	Switch-Assy. Spigot (Side)
1	HC150456	Switch-Snap Button
2	HC160393	Washer-Flat #6 Brass
3	HC160392	Washer-Ext. Tooth #6 ZN
4	HC160296	Screw-RDHM #6-32 x 1-1/4 SST
5	HC162321	Spring-Spigot Switch
6	HC136124	Button-Spigot Switch
7	HC160303	Ring-Retaining 1/2 External
8	HC113902	Bracket-Assy. Spigot Switch Mtg.
9	HC113901	Bracket-Assy. Adjusting
10	HC160267	Screw-RDHM #8-32 x 7/8 Brass
11	HC160102	Nut-Hex #8-32 ZN
12	HC135744	Insulator-Switch

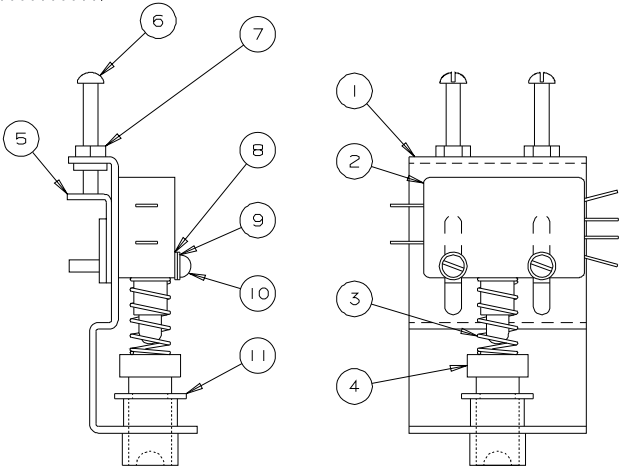
* Includes all items above.



CENTER SWITCH ASSEMBLY

Item	Part No.	Description
*	HC114486	Switch-Assy. Spigot IDQ Center
1	HC114485	Bracket-Assy. Spigot Switch Mtg.
2	HC150479	Switch-Push Button DPDT
3	HC162320	Spring-Spigot Switch
4	HC136124	Button-Spigot Switch
5	HC114484	Bracket-Assy. Adjusting
6	HC160099	Screw-RDHM #8-32 x 1-1/8 ZN
7	HC160102	Nut-Hex #8-32 ZN
8	HC160393	Washer Flat #6 Brass
9	HC160392	Washer-Ext. Tooth 1/2 Extnal
10	HC160296	Screw-RDHM #6-32 x 1-1/4 SST
11	HC160303	Ring-Retaining 1/2 External

* Includes all items above.



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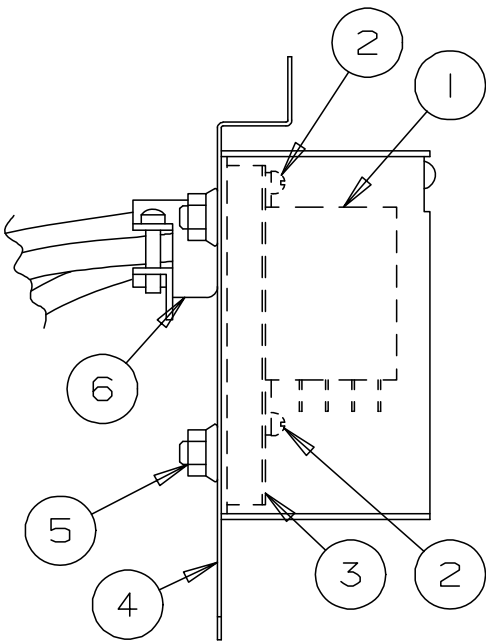


Figure 9 Relay Box - MTS

Item	Part No.	Description
*	HC119208	Box-Assy. Relay
1	HC150381	Relay-Flange Base w/Cover
2	HC160308	Screw-RDHM #6-32 x 5/16 ZN
2A	HC160116	Nut-Speed #6-32 BKOX
3	HC138159	Bracket-Flange Relay Mtg.
4	HC139805	Support-MTS
5	HC159950	Screw-HXSF 1/4-20 x 1/2 ZN
5A	HC159951	Nut-HXSF 1/4-20 ZN
6	HC150828	Connector-1/2

* Includes all items above.

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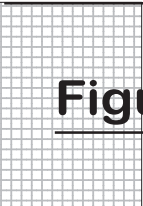
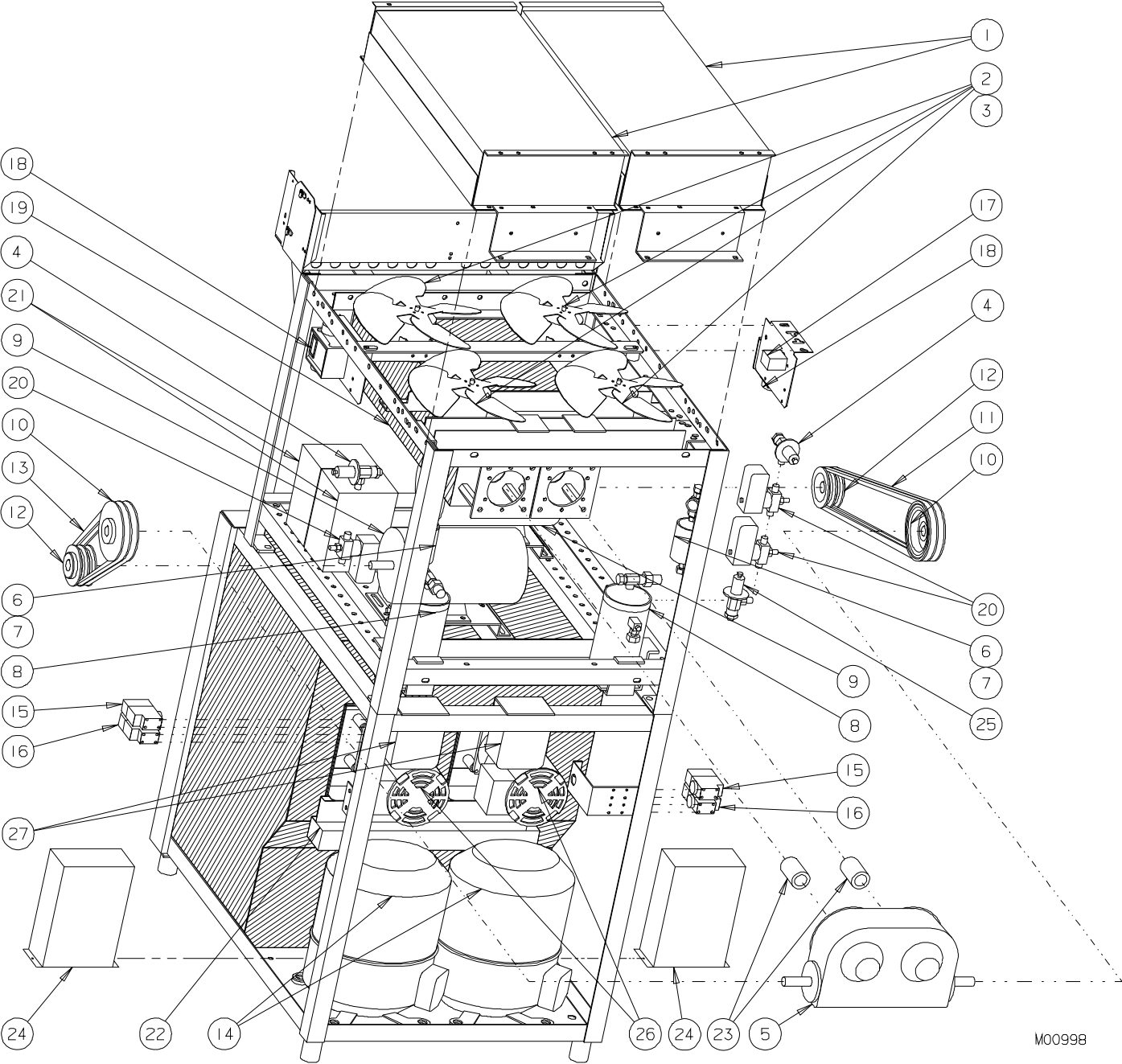
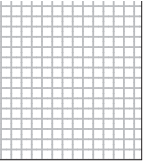


Figure 10 Air Cooled Side/Back View (Sheet 1 of 2)



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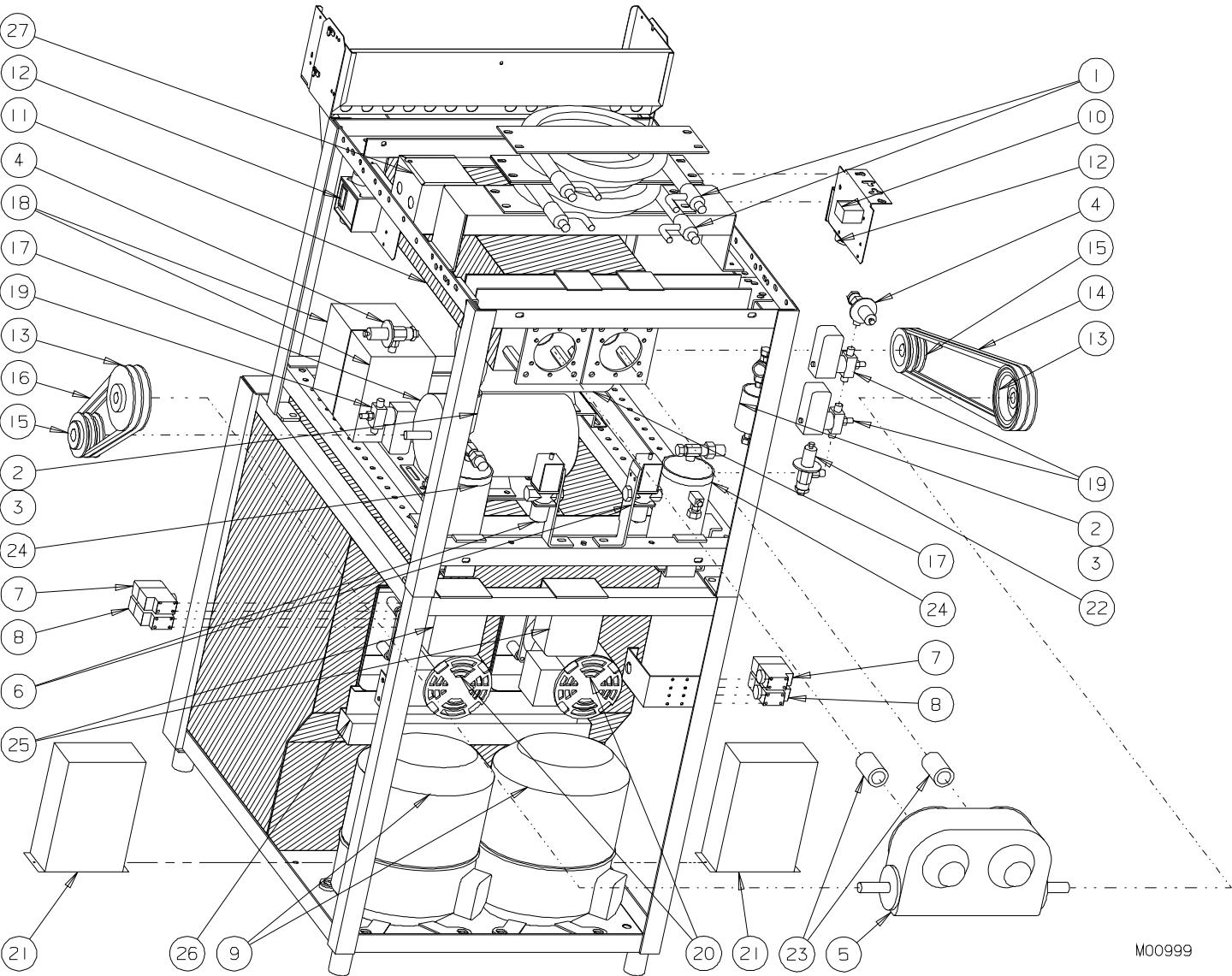
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Figure 10 Air Cooled Side/Back View (Sheet 2 of 2)

Item	Part No.	Description	Item	Part No.	Description
1	HC155120	Condenser-Air	20	HC155421	Valve-Solenoid
2	HC159023	Blade-Fan 11" 36°	20A	HC155434	Kit-Repair Solenoid Valve
3	HC151077-01 ..	Motor-Fan 50w	21	----	Box-Assy.Capacitors & Components (1 Phase) (Beater Motor) includes HC150318 Capacitor-Run HC150872 Capacitor-Start (2 required)
4	HC155490	Valve-Automatic Expansion (Cylinder)	22	HC117133	Pan-Assy. Condensate
4A	HC165531	Insulator-Expansion Valve	23	HC111964	Coupling-Assy. 1" Drive
5	HC153341	Reducer-Gear (See Figure 12)	24	HC119481	Box-Assy. Capacitor & Relay (Bristol Compressor) Includes box and HC151463 Capacitor-Run HC151436 Capacitor-Start HC151462 Relay-Compressor Start
6	HC155059	Glass-Sight	25	HC155449	Valve-Automatic Expansion (Cabinet)
7	HC155054	Drier-Filter 16 cu in	25A	HC165531	Insulator-Expansion Valve
8	HC155071	Receiver-3 lb 3/8 ID Sweat w/o Valve	26	HC151129	Gearmotor-1/8 HP (MTS)
9	HC118140	Kit-Motor & Capacitor 2HP (1 Phase) includes motor and HC150318 Capacitor-Run HC150872 Capacitor-Start (2 required)	27	HC119208	Box-Assy. Relay (MTS) (See Figure 9)
9A	HC151052	Motor-2 HP (3-Phase)	Not Shown:		
10	HC153625	Sheave-3/4 Bore 4.75 OD (Pulley-Driven)		HC161216	Sensor-10K Thermistor
10A	HC153322	Key-Drive 3/16 Sq x 1-1/2		HC118594	Tube-Assy. Lower Heat
10B	HC160495	Screw-SK Set 1/4 - 20 x 1/4	LH = Left hand side of freezer when facing front. RH = Right hand side of freezer when facing front.		
11	HC153161	Belt-V (LH)			
12	HC153626	Sheave-7/8 Bore 3.25 OD (Pulley-Driven)			
12A	HC153322	Key-Drive 3/16 Sq x 1-1/2			
12B	HC160495	Screw-SK Set 1/4 - 20 x 1/4 BKOX			
13	HC153171	Belt-V (RH)			
14	HC119541	Compressor-Assy. (3 Phase) includes Bristol compressor and HC155054 Drier-Filter HC155419 Valve-Access			
or	HC119540	Compressor-Assy (1 Phase) includes Bristol compressor and HC151463 Capacitor-Run HC151436 Capacitor-Start HC155054 Drier-Filter HC151462 Relay-Compressor Start HC155419 Valve-Access			
15	HC120494	Kit-HPCO 155450 Field			
16	HC120496	Kit-LPCO 155701 Field			
17	HC118813	Kit-CAB Thermostat (Cabinet)			
18	HC119989	Kit-Thermostat & Retainer (Cylinder)			
19	HC118593	Cylinder-Assembly Complete			
19A	HC117014	Kit-Pressure Switch Field Replacement			
19B	HC116410	Kit-Dispense Head Switch			
19C	HC114341-01 ..	Stud-Assy. Cylinder 3-13/16"			
19D	HC115004-01 ..	Tube-Assy.Drain 20-1/4"			

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Figure 11 Water Cooled Side/Back View (Sheet 1 of 2)



M00999

Use only original or authorized replacement parts with this freezer.
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Figure 11 Water Cooled Side/Back View (Sheet 2 of 2)

Item	Part No.	Description	Item	Part No.	Description
1	 HC155029	 Condenser-Water	19	 HC155421	 Valve-Solenoid
1A	.. HC139877	 Bracket-Condenser Mtg.	19A	.. HC155434	 Kit-Solenoid Valve Repair
2	 HC155059	 Glass-Sight	20	 HC151129	 Gearmotor-1/8 HP (MTS)
3	 HC155054	 Drier-Filter	21	 HC119481	 Box- Assy. Capacitor & Relay (Bristol Compressor) Includes box and HC151463 ... Capacitor-Run HC151436 ... Capacitor-Start HC151462 ... Relay-Compressor Start
4	 HC155490	 Valve-Automatic Expansion (Cylinder)	22	 HC155449	 Valve-Automatic Expansion (Cabinet)
4A	.. HC165531	 Insulator-Expansion Valve	22A	.. HC165531	 Insulator-Expansion Valve
5	 HC153341	 Reducer-Gear (See Figure 12)	23	 HC111964	 Coupling-Assy. 1" Drive
6	 HC112080	 Valve-Assy. Water	24	 HC155071	 Receiver-3 lb 3/8 ID Sweat w/o Valve
		HC155410 Valve-Water	25*	... HC119208	 Box-Assy. Relay (MTS) (See Figure 9)
6A	.. HC155444	 Kit-Valve Water Repair	26	 HC117133	 Pan-Assy. Condensate
7	 HC120495	 Kit-HPCO 155702 Field			
8	 HC120496	 Kit-LPCO 155701 Field			
9	 HC119541	 Compressor-Assy. (3 Phase) includes Bristol compressor and HC155054 Drier-Filter HC155419 Valve-Access			
or	 HC119540	 Compressor-Assy (1 Phase) includes Bristol compressor and HC151463 Capacitor-Run HC151436 Capacitor-Start HC155054 Drier-Filter HC151462 Relay-Compressor Start HC155419 Valve-Access			
10	 HC118813	 Kit-CAB Thermostat (Cabinet)			
11	 HC118593	 Cylinder-Assy. Complete			
11A	.. HC117014	 Kit-Pressure Switch 30 PSI			
11B	.. HC116410	 Kit-Dispense Head Switch			
11C	.. HC114341-01	 Stud-Assy. Cylinder 3-13/16"			
11D	.. HC115004-01	 Tube-Assy. Drain 20-1/4"			
12	 HC119989	 Kit-Thermostat & Retainer (Cylinder)			
13	 HC153625	 Sheave-3/4 Bore 4.75 OD (Driven Pulley)			
13A	.. HC153322	 Key-Drive 3/16 SQ x 1-1/2			
13B	.. HC160495	 Screw-SK Set 1/4-20 x 1/4			
14	 HC153161	 Belt-V (RH)			
15	 HC153626	 Sheave-7/8 Bore 3.25 OD (Driver Pulley)			
15A	.. HC153322	 Key-Drive 3/16 SQ x 1-1/2			
15B	.. HC160495	 Screw-SK Set 1/4-20 x 1/4			
16	 HC153171	 Belt-V (LH)			
17	 HC151052	 Motor-2 HP (3 Phase)			
or	 HC118140	 Kit-Motor & Capacitor 2HP (1 Phase) includes motor and HC150318 Capacitor-Run HC150872 Capacitor-Start (2 required)			
18	 ---*	 Box-Assy. Capacitors & Components (1 Phase) (Beater Motor) includes HC150318 Capacitor-Run HC150872 Capacitor-Start (2 required)			

* Location may vary.

Not Shown:

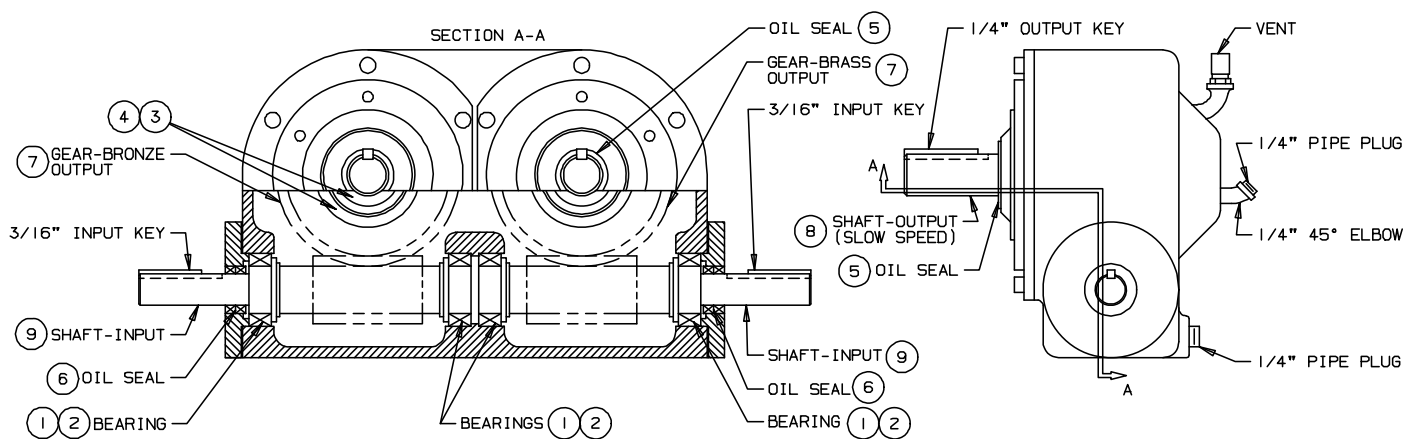
HC161216 Sensor-10K Thermistor
HC118594 Tube-Assy. Lower Heat

LH = Left hand side of freezer when facing front.

RH = Right hand side of freezer when facing front.

Use only original or authorized replacement parts with this freezer.
Use of unapproved parts will void warranty.

Figure 12 Gear Reducer



M00057

(Order by freezer serial number)
Model — Wintwin

HC153341 Wintwin 10 - 1 Ratio A and B Side

Item	Part No.	Description	Required Per Side
1	HC153014	Bearing-High Speed Cup	2 ea.
2	HC153015	Bearing-High Speed Cone	2 ea.
3	HC153011	Bearing-Slow Speed Cup	2 ea.
4	HC153012	Bearing-Slow Speed Cone	2 ea.
5	HC153051	Seal-Oil (Slow Speed)	2 ea.
6	HC153053	Seal-Oil (High Speed)	2 ea.
7	HC153349	Gear-Bronze	1 ea.
8	HC153350	Shaft-Slow Speed	1 ea.
	HC153000	Gear-Assy. Output (Slow Speed)	
9	HC153348	Shaft-Input (High Speed)	1 ea.
10	HC114874	Kit-Reducer Gasket 4CB	1 ea.
11	HC111964	Coupling-Assy. 1 inch Drive	
	HC153322	Key-Drive 3/16" High (in)	
	HC153323	Key-Drive 1/4" Slow (out)	

****Oil-Gear Reducer (per quart)**

****Note:** To order oil always verify type of oil from the tag located on the gear reducer. Improper oil usage will cause the gear reducer to fail.

Use only original or authorized replacement parts with this freezer.
Use of unapproved parts will void warranty.

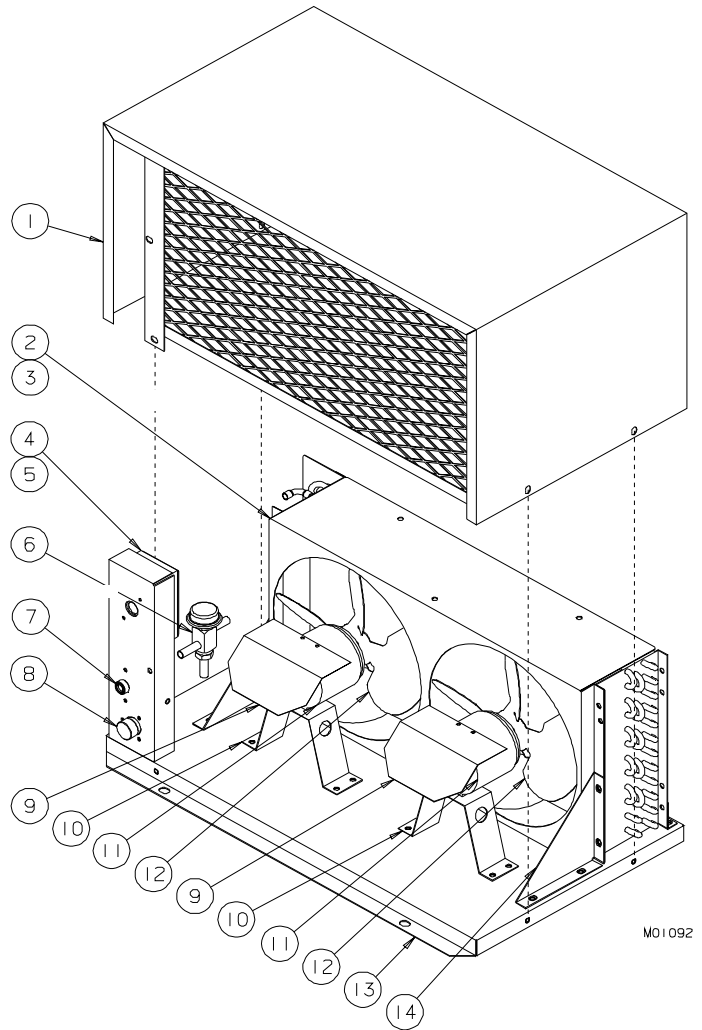
Figure 13 Air Cooled Remote Condensing Unit

Item	Part No.	Description
*	HC116781-01	Condenser-Assy. 2 Hp Remote (Complete)
1	HC117207	Cover-Assy. Condenser
2	HC155120	Condenser-Air
3	HC138465	Shroud-Fan
3A	HC137628	Brace-Condenser (Front)
4	HC150732	Box-Electric 2-3/4 x 4-1/2 x 2
5	HC150737	Cover-Electric Box 2-3/4 x 4-1/2
6	HC155454	Valve-Head Pressure Control
7	HC153420	Coupling-Refr. 3/8 MQC 3/8 SW
7A	HC140039	Plate-Coupling Mtg.
8	HC153418	Coupling-Refr. 1/2MQC 1/2 SW
8A	HC153502	Flange-Refr. Coupling Mount 1/2
8B	HC153503	Cap-Dust Refr. Coupling
9	HC139017	Shield-Motor Rain
10	HC137632	Bracket-Fan Condenser
11	HC151072	Motor-Fan 50W 230V 60Hz
12	HC159029	Blade-Fan 11" Dia 36°
13	HC117206	Base-Assy. Condenser
14	HC137629	Support-Condenser

* Includes all items above.

Not Shown:

HC155058	Receiver-12 lb. Sweat Horizontal Mount
HC120494	Kit-HPCO 155450 Field
HC120498	Kit-LPCO 155705 Field
HC155466	Control-Pressure Fan
HC155487	Check-Valve 5/8 ODF Sweat
HC119124	Kit-25 Foot Line Sets 404a
HC119125	Kit-50 Foot Line Sets 404a



M01092

**Use only original or authorized replacement parts with this freezer.
Use of unapproved parts will void warranty.**

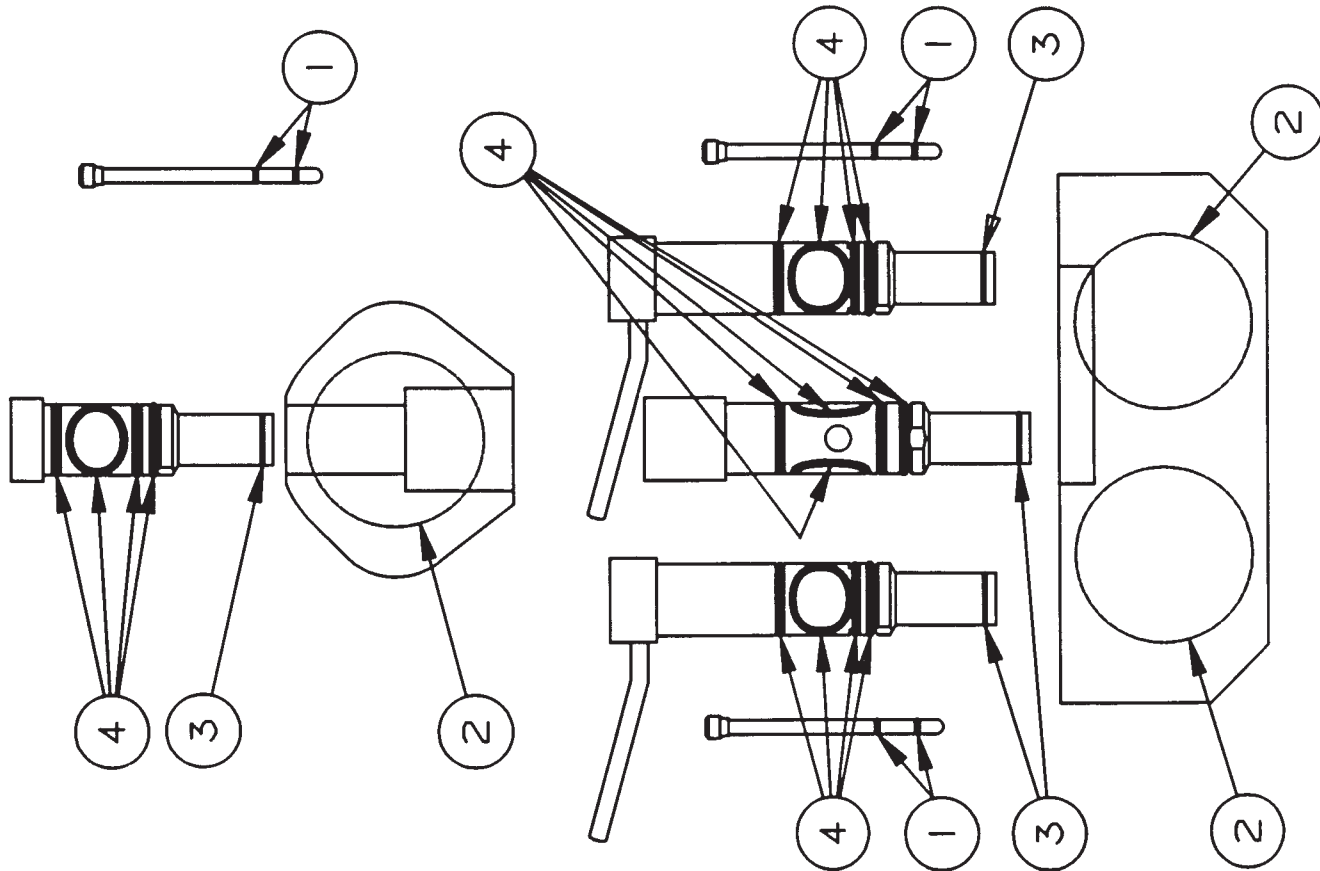
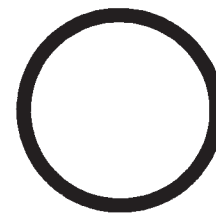
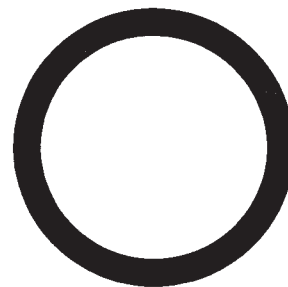
Accessories

Part No.	Description
HC137870	Adaptor-Star/Spigot
HC196103	Bottle-Wash 500 ml
HC158009	Brush-4" Cylinder w/o Handle (Use handle HC158012)
HC158018	Brush-7/16" Dia 12" Overall Length
HC158019	Brush-9/16" Dia 30" Overall Length
HC158026	Brush-1" Dia 12" Long
HC158037	Brush-1/4 Dia x 18-1/2" Overall Length
HC162105	Caster-1-1/4" ST PT With Brake
HC162106	Caster-1-1/4" ST PT Without Brake
HC184238	Chart-O-Ring (Laminated)
HC158051	Cup-Overrun Measuring One Pint
HC158012	Handle-Brush 36 inch Fiberglass (Use with brush HC158009)
HC136567	Hose-Spigot Drain
HC115538	Kit-O-Ring
HC112978	Leg-Assy. 6"
HC158066	Lubricant-Compound 7 (per tube)
HC158054A....	Lubricant-Lubri Film (per tube)
HC196192	Nozzle-Serrated Six Point (Star)
HC150736	Nut-Lock Conduit 1-1/4 (Casters)
HC158014	Sanitizer-Stera Sheen (case of 4 jars)
HC158014A....	Sanitizer-Stera Sheen (4 lb. jar)
HC117246	Sensor-Assy. 1 Bag/Bag-in-Box (Adapter Kit)
HC158049	Scale-Overrun
HC169374	Tool-O-Ring Removal
HC-184818	Video-Training CMT (Operational)
HC196061	Tubing-Mix Line-Std.-.600ID x .850OD PVC

**Use only original or authorized replacement parts with this freezer.
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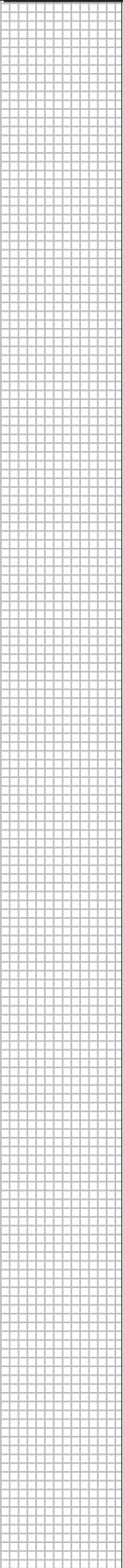


PART NO.
HC160583 ②



O-RING CHART

Use only original or authorized replacement parts with this freezer.
Use of unapproved parts will void warranty.



Notes: _____

Use only original or authorized replacement parts with this freezer.
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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM - TO)
Actuator-Door Switch	-----	1	Order by Freezer S/N
Adaptor-3/8 ODF x 1 for Rotalock Valve (Manurop Compressors)	HC151397	2	G2H-1588 — B2M-465
Base-Assy. Condenser (ACR)	HC117206	1	G2Z-1673 —
Base-Probe Mounting	HC137120	2	G2Z-1673 —
Bearing-High Speed Cone 3/4"	HC153015	4	G2Z-1673 —
Bearing-High Speed Cup 3/4"	HC153014	4	G2Z-1673 —
Bearing-Slow Speed Cone 1"	HC153012	4	G2Z-1673 —
Bearing-Slow Speed Cup 1"	HC153011	4	G2Z-1673 —
Belt-V LH	HC153171	2	Order by Freezer S/N
Belt-V RH	HC153161	2	Order by Freezer S/N
Blade-Fan 11-inch Dia. 26° A/C (R502)	HC159020	4	G2Z-1673 — E2A-1196
Blade-Fan 11-inch Dia. 36° A/C (R404a)	HC159023	4	E2A-1197 —
Blade-Fan 11-inch 36° AC Remote (R404a)	HC159029	4	G2Z-1673 —
Blade-Scraper	HC137334	4	G2Z-1673 —
Bleeder-Assy.	HC115129	2	G2Z-1673 —
Bolt-Pivot (NLA use Hinge-162045)	HC162054		
Bottle-Wash Spigot and MTS	HC196103	1	G2Z-1673 —
Boot-Mix Tube	HC199033	2	G2Z-1673 —
Brace- Condenser (ACR)	HC137628	2	G2Z-1673 —
Bracket-Fan Condenser (ACR)	HC137632	2	G2Z-1673 —
Bracket-Flange Relay Mtg. (MTS Relay Box)	HC138159	2	G2Z-1673 —
Brush-1/4-inch Dia w/18-1/2-inch Handle	HC158037	1	G2Z-1673 —
Brush-1-inch Dia. 12-inches Long	HC158026	1	G2Z-1673 —
Brush-4-inch w/36" Handle (Cylinder) NLA	HC158004	*	G2Z-1673 — B2N
Brush-4 inch Cylinder w/o Handle	HC158009	1	G2Z-1673 —
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM – TO)
Brush-7/16-inch Dia. w/12-inch Handle	HC158018	1	G2Z-1673 —
Brush-9/16-inch Dia. w/30-inch Handle	HC158019	1	G2Z-1673 —
Bumper-Rubber (Insert)	HC199030	4	G2Z-1673 —
Bushing-Alignment (Loaner)	HC138369	1	G2Z-1673 —
Bushing-Head	HC196079	2	G2Z-1673 —
Bushing-Seal (Beater Shaft)	hc133098	2	G2Z-1673 —
Button-Drip Tray (Catch-Bullet)	HC159175	2	G2Z-1673 —
Button-Reset	HC159036	2	G2Z-1673 —
Capacitor-Relay Assy.	<i>See Compressor Assembly 1 Phase</i>		
Capacitor-Run	<i>See Motor-Kit 1 Phase</i>		
Capacitor-Start	<i>See Motor-Kit 1 Phase</i>		
Caster-1-1/4 ST PT with Brake	HC162105	2	G2Z-1673 —
Caster-1-1/4 ST PT without Brake	HC162106	2	G2Z-1673 —
Catch-Bullet (Button Drip Tray)	HC159175	2	G2Z-1673 —
Channel-Rear LH (Corner)	HC135254	1	G2Z-1673 —
Channel-Rear RH (Corner)	HC130021	1	G2Z-1673 —
Chart-O-ring (Laminated)	HC184238	1	G2Z-1673 —
Clamp-Assy. Soft Hose 5/8	HC116065	6	G2Z-1673 —
Clamp-Magnet (NLA)	HC138820	2	G2Z-1673 —
Clip-Air Tube (NLA-DI)	HC138220	2	G2Z-1673 —
Clip-Retainer (Set of 2) (Mix Level Indicator-Switch Box)	HC150120	2	G2Z-1673 —
Coil-Cabinet-Refrigeration (MJ70)	1	<i>Order by Freezer S/N</i>	
Coil-Cabinet-Refrigeration (Ceiling type)	1	<i>Order by Freezer S/N</i>	
Coil-Replacement (NLA use HC150HC135)	HC150108	5	G2Z-1673 — B2G-311
Coil-Replacement	HC150134	5	B2G-312 — D2J
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM - TO)	
Coil-A/B 208-230V (Replacement)	HC150156	5	D2J	—
COMPRESSORS - 3 PHASE				
Compressor-AH555RT 3ph (R-502) (NLA Use HC118235)	HC154975	2	G2Z-1673	— H2A-2055
Compressor-AH556RT 208-230-3-60 (R-502 and R-404a)(NLA Use HC118235)	HC117018	2	E2A-1197	— I2E-2632
Compressor-AV195RT 208-230-3-60	HC118235	2	I2E-2633	— E2H-1173
Also includes				
Filter-Drier	HC155054	2	I2E-2633	— E2H-1173
Valve-Access	HC155419	2	I2E-2633	— E2H-1173
Compressor-Assy 3 Phase			E2H-1174	— B2I-342
			<i>Order by Freezer S/N</i>	
Compressor-MTZ40JH3AVE 208-230-3-60	HC118686	2	B2I-343	— B2M-465
Also includes				
Filter-Drier	HC155054	2	B2I-343	— B2M-465
Compressor-L63A113DBLA	HC119541	2	D2M-1171	—
Also includes				
Filter-Drier	HC155054	2	D2M-1171	—
COMPRESSORS - 1 PHASE				
Compressor-AH556ET 230-1-60 (R-502 & R-404a)(NLA Use HC118234)	HC116973	2	A2B-117	— E2D-1307
Capacitor-Relay Assy.	HC151356	2	A2B-117	— E2D-1307
Capacitor-Start	HC150361	2	A2B-117	— E2D-1307
Capacitor-Run	HC150362	2	A2B-117	— E2D-1307
Relay	HC150363	2	A2B-117	— E2D-1307
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.				

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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM – TO)
COMPRESSORS - 1 PHASE (continued)			
Compressor-Assy. AV195ET 230-1-60	HC118234	2	E2D-1308 — G2F-2178
Also includes			
Box-Assy. Capacitor & Relay	HC151362	2	E2D-1308 — G2H-1587
Capacitor-Start	HC150398	2	E2D-1308 — G2H-1587
Capacitor-Run	HC150399	2	E2D-1308 — G2H-1587
Relay	HC150401	2	E2D-1308 — G2H-1587
Filter-Drier	HC155054	2	E2D-1308 — G2H-1587
Valve-Access	HC155419	2	E2D-1308 — G2H-1587
Compressor-Assy. MTZ40JH1AVE 230-1-60	HC118685	2	G2H-1588 — B2M-465
Also includes			
Capacitor-Run	HC151447	2	G2H-1588 — B2M-465
Kit-compr Start Cap & Relay	HC151448	2	G2H-1588 — B2M-465
Filter-Drier	HC155054	2	G2H-1588 — B2M-465
Compressor-Assy. L63A113BBCA	HC119540	2	D2M-1171 —
Also includes			
Capacitor-Run	HC151463	2	D2M-1171 —
Capacitor-Start	HC151436	2	D2M-1171 —
Filter-Drier	HC155054	2	D2M-1171 —
Relay-Compressor Start	HC151462	2	D2M-1171 —
Condenser-Air (R-502 and R-404a)	HC155120-C	2	K2Z-2668 —
Condenser-Assy. – Complete (ACR) (NLA)	HC116781	1	G2Z-1673 — D2I-932
Condenser-Assy. 2HP Remote			
Complete (ACR)	HC116781-01 ..	1	D2I-933 —
Condenser-Water LH (A) Side			
(R-502 and R-404a)			
(NLA use HC119003 & HC139877)	HC155039	1	G2Z-1673 — C2H-557
Condenser-Water RH (B) Side			
(R-502 and R-404a)			
(NLA use HC119003 & HC139877)	HC155026	1	G2Z-1673 — C2H-557
Condenser-Water (Round, 404A)	HC155029	2	C2H-558 —
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM - TO)
Contactor-IEC (Beater Motor, Compressor & Cabinet Fan)(NLA use HC150HC135)	HC150106	5	G2Z-1673 — B2G-311
Contactor-IEC (Beater Motor, Compressor & Cabinet Fan) (NLA use HC150155)	HC150135	5	B2G-312 — D2J
Contactor-IEC 23A 208-230V (Beater Motor, Compressor & Cabinet Fan)	HC150155	5	D2J —
Container-Mix	See Tank-Mix		
Cord-Assy. Female Plug (Mix Level Probe)	HC150528	2	G2Z-1673 — K2B-277
Cord-Assy. Female Plug (Mix Level Probe)	HC150536	2	K2B-278 —
Cordset-Retractable (Mix Level Probe)	HC150527	2	G2Z-1673 — K2B-277
Cordset-Retractable (Mix Level Probe)	HC150537	2	K2B-278 —
Coupling-Assy. 1 in. Drive (Beater Shaft)	HC111964	2	G2Z-1673 —
Coupling-Refr. 1/2 M w/Stub (ACR)	HC153410	1	G2Z-1673 — C2I
Coupling-Refr. 3/8 M w/Stub (ACR)	HC153413	1	G2Z-1673 — C2I
Coupling-Refr. 1/2 MQC 1/2 Sw (ACR)	HC153418	1	C2I —
Coupling-Refr. 3/8 MQC 3/8 Sw (ACR)	HC153420	1	C2I —
Cover-Assy. Electric Box	HC116355	1	J2I-2577 —
Cover-Assy. Mix Tank Front 6 gallon 10-1/2"HT ...	HC113997	2	G2Z-1673 — H2L
Cover-Assy. Mix Tank Front 7 gallon 13-1/4"HT ...	HC113997	2	G2Z-1673 — H2L
Cover-Assy. Mix Tank Front 6 gallon 13-1/8"HT ...	HC117553	2	H2L —
Cover-Rear Mix Tank 6 gallon 10-1/2"HT	HC138HC165	2	G2Z-1673 — H2L
Cover-Rear Mix Tank 7 gallon 13-1/4"HT	HC138HC165	2	G2Z-1673 — H2L
Cover-Rear Mix Tank 6 gallon 13-1/8"HT	HC140446	2	H2L —
Cup-High Speed-Gear Reducer	HC153014	4	G2Z-1673 —
Cup-Overrun (use with P/N HC158049 scale)	HC158051	*	G2Z-1673 —
Cup-Seal (Beater Shaft)	HC160557	2	G2Z-1673 —
Cup-Slow Speed (Gear Reducer)	HC153011	4	G2Z-1673 —
Cut Out-High Pressure (AC or WC) (R-502)	HC155425	2	G2Z-1673 — D2I
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM – TO)
Cut Out-High Pressure 440 PSIG (AC)	HC155481	2	E2I — D2N
Cut Out-High Pressure 375 PSIG (WC)	HC155484	2	E2I — D2N
Cut-Out-High Pressure Kit-155450 (AC or ACR) ..	HC120494	2	D2N —
Cut-Out-High Pressure Kit-155702 (AC or ACR) ..	HC120495	2	D2N —
Cut Out-Low Pressure (R-502 or R-404a) (Air or Water Cooled)	HC155403	2	G2Z-1673 — D2I
Cut Out-Low Pressure (ACR)	HC155465	2	G2Z-1673 — D2N
Cut Out-Low Pressure 0 PSIG (AC or WC)	HC155482	2	E2I — D2N
Cut-Out-Low Pressure Kit-155701 (AC or WC)	HC120496	2	D2N —
Cut-Out-Low Pressure Kit-155705 (ACR)	HC120498	2	D2N —
Cylinder-Assy. Complete (R-502)		2	Order by Freezer SN
Cylinder-Assy. Complete (R-404a)		2	Order by Freezer SN
Decal-6" Air Flow	HC165119	1	G2Z-1673 —
Decal-Beater Warning	HC165025	1	G2Z-1673 —
Decal-Blade Installation	HC164031	1	G2Z-1673 —
Decal-Cleaning Instructions	HC165307	1	G2Z-1673 —
Decal-Clear Overlay	HC165093	1	G2Z-1673 —
Decal-CMT Connection (MTS Hook-up)	HC164027	1	G2Z-1673 —
Decal-CMT Patent	HC165013	1	G2Z-1673 —
Decal-Mix Transfer	HC165021	1	G2Z-1673 —
Decal-MTS Operating Instructions	HC164060	1	G2Z-1673 —
Decal-Operating Instructions	HC164127	1	B2I-343 —
Decal-Panel Removal	HC165126	3	G2Z-1673 —
Decal-Top Air Discharge (AC)	HC165124	1	G2Z-1673 —
Decal-Trimstrip IDQ Logo 26 in.	HC165215	1	G2Z-1673 — J2I-2576
Decal-Trimstrip IDQ 26"	HC165440-02	1	J2I-2577 —
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM - TO)
Decal-Trimstrip Switches	See Label		
Decal-Warning Pressurized	HC165246	2	G2Z-1673 —
Door-Assy. (w/o actuator)	HC114260-03	1	G2Z-1673 —
Drier-Filter (Sweat-both R-502-R-404a)	HC155054	1	G2Z-1673 —
Evaporator-Assy. Cabinet	1	Order by Freezer SN	
Filter-Assy. (Switch Box)	HC116125	1	C2Y-616 —
Flange-Refr. Coupling Mount 1/2 (ACR)	HC153415	1	G2Z-1673 — C2I
Flange-Refr. Coupling Mount 1/2 (ACR)	HC153418	1	C2I —
Flange-Refr. Coupling Mount 3/8 (ACR)	HC153414	1	G2Z-1673 — C2I
Gasket Kit-Gear Reducer	HC114874	1	G2Z-1673 —
Gasket-Magnetic Door (V-Groove)	HC160563	1	G2Z-1673 —
Gauge-Assy. Pressure Test CMT Pump	HC116312	1	G2Z-1673 —
Gear-Bronze (Gear Reducer)	HC153349	2	G2Z-1673 —
Gear-Input-Shaft (Gear Reducer)	HC153348	2	G2Z-1673 —
Glass-Sight-w/sweat	HC155059	2	G2Z-1673 —
Grill & Bracket Assy.-Fan MJ70	HC155114	1	G2Z-1673 — K2B-277
Grommet-Rubber 5/8 I.D.	HC199016	2	G2Z-1673 —
Guard-Fan (Ceiling Type Cabinet Evaporator)	HC151076	1	K2B-278 —
Handle-Brush 36 inch Fiberglass (use with Brush p/n HC158004)	HC158012	1	B2N —
Handle-Tapered Black	HC162626	3	G2Z-1673 —
Handle-Pull Door (Cabinet)	HC136199	1	G2Z-1673 —
Handle-Assy. Round (MTS)	HC116164	2	G2Z-1673 —
Hanger-Assy. Air Condenser	HC113989	1	G2Z-1673 —
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM – TO)
Head-Assy.Dispense (Complete)	HC114765	1	G2Z-1673 — D2M-1299
Head-Assy Dispense (Complete)	HC119915	1	D2M-1300 —
Head-Dispense (Without Spigots)	HC115905	1	G2Z-1673 — D2M-1299
Head-Dispense (Without Spigots)	HC119913	1	D2M-1300 —
Hinge-Lower Pivot	HC162046	1	G2Z-1673 —
Hinge-Upper Pivot	HC162045	1	G2Z-1673 —
Hose-Assy. Mix Braided (CMT Pump)	HC116094	2	G2Z-1673 —
Hose-Air (CMT Pump)	HC138170	2	G2Z-1673 —
Hose-Transfer (CMT Pump)	HC138184	2	G2Z-1673 —
Indicators-Mix Level	HC150202	2	G2Z-1673 —
Insert-Assy. Drip Tray 26-inch	HC115132	1	G2Z-1673 —
Bumper-Rubber	HC199030	1	G2Z-1673 —
Insulation-Compr Wrap MTZ	HC165522	2	A2I —
Insulator-Expansion Valve	HC165531	3	C2I —
Insulator-Rotalock Valve	HC165532	2	G2H-1588 — B2M-465
Key-Drive 3/16 sq. x 1-1/2 long	HC153322	2	G2Z-1673 —
Kit-Dispense Head Switch	HC116410	*	G2Z-1673 —
Kit-Gear Reducer Gasket	HC114874	*	G2Z-1673 —
Kit-O-ring (Head Only)	HC115538	*	G2Z-1673 —
Kit-Pressure Switch	HC117014	*	G2Z-1673 —
Kit-Repair Solenoid Valve	HC155434	*	G2Z-1673 —
Kit-MTS Slide Switch	HC116411	*	G2Z-1673 —
Kit-Water Valve Repair	HC155444	*	G2Z-1673 —
Knob-Cabinet Condenser w/ MJ70	HC155116	4	G2Z-1673 — K2B-277
Knob-Hand (Dispense Head)	HC162625	4	G2Z-1673 —
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Alphabetized Parts List for Model 957CMT

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PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM - TO)
Knob-Handle (MTS)	HC162627	2	G2Z-1673 —
Knob-Timer	HC162604	2	F2A-1470 —
Knob-Timer	<i>Prior to S/N F2A-1470 Order by Freezer S/N</i>		
Label-MTS Trimstrip LH (Switches)	HC164062	1	G2Z-1673 —
Label-MTS Trimstrip LH (Switches)	HC164128	1	B2I-343 —
Label-MTS Trimstrip RH (Switches)	HC164061	1	G2Z-1673 —
Label-MTS Trimstrip LH (Switches)	HC164129	1	B2I-343 —
Leg-Assy. 6-inch	HC112978	4	G2Z-1673 —
Lever-Assy. Reset	HC115524	2	G2Z-1673 — B2G-280
Button-Reset	HC159036	2	G2Z-1673 — B2G-280
Lever-Reset & Button	HC118390	2	B2G-312 —
Button-Reset	HC159036	2	B2G-312 —
Light-Indicator ADD MIX	HC150540	2	G2Z-1673 —
Light-Pilot Amber	HC150553	2	G2Z-1673 — J2I-2576
Light-Pilot Amber	HC150562	2	J2I-2577 —
Light-Pilot Red	HC150552	2	G2Z-1673 — J2I-2576
Light-Pilot Red	HC150561	2	J2I-2577 —
Line Sets-25 Foot Kit 404a (ACR) (NLA use HC119124)	HC117292	1	G2Z-1673 — C2I
Line Sets-50 Foot Kit 404a (ACR) (NLA use HC119125)	HC117293	1	G2Z-1673 — C2I
Line Sets-25 Foot Kit 404a (ACR)	HC119124	1	C2I —
Lines Sets-50 Foot Kit 404a (ACR)	HC119125	1	C2I —
Lock-Swing (Hook) MTS		2	<i>Order by Freezer SN</i>
Lubricant-Petrol Gel (per tube)	HC158000A	*	G2Z-1673 —
Lubricant-Lubri-Film (per tube)	HC158054A	*	G2Z-1673 —
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM – TO)
Meter-Air #9-31	HC163423 to	HC163442	* G2Z-1673—
Mix Container	<i>See Tank-Mix</i>		
Motor-Kit-Motor & Capacitors 230-1-60	HC118140	2	G2Z-1673 —
Capacitor-Start	HC150872	4	G2Z-1673 —
Capacitor-Run	HC150873	2	G2Z-1673 —
Motor-208-230-3-60	HC151052	2	K2E-3253 — E2F-1297
Motor-Cabinet Fan-w/ MJ70		1	<i>Order by Freezer SN</i>
Motor-Cabinet Fan-w/ ceiling type		1	<i>Order by Freezer SN</i>
Motor-Fan-Air Condenser (R-404a)	HC151077-01 ..	4	E2A-1197 —
Motor-Fan-Air Condenser (R-502)	HC151080	4	K2Z-2668 — E2A-1260
Motor-Fan-Air Condenser (ACR)	HC151072	4	G2Z-1673 —
Motor (Gear)-Mix Transfer	HC151129	2	G2Z-1673 —
MOV Assy. (Switch Box)	HC116188	2	E2Y-1047 —
MTS Assy.-Complete	HC116012	2	G2Z-1673 —
MTS Housing Assy.-w/o roller	HC117054	2	G2Z-1673 —
Nut-#6-32 BKOX (MTS Relay Box)	HC160116	*	G2Z-1673 —
Nut-Assy. Pressure Switch	HC116105	*	G2Z-1673 —
Nut-EL Stop #10-32	HC159421	*	G2Z-1673 —
Nut -HEX 1/4 x 20 ZN (Spigot Switch)	HC160104	*	G2Z-1673 —
Nut-HXSf 1/4-20 ZN (MTS Relay Box)	HC160116	*	G2Z-1673 —
Nut-Speed #10-24 .025-.064 SST (Dispense & Front Panel)	HC160117	*	G2Z-1673 —
Nut-Speed #10-24 .100-.125 SST (On Frame)	HC159067	*	G2Z-1673 —
Nut-Speed 1/4-20 .064-.125 (Rear Channel)	HC160117	*	G2Z-1673 —
* As Required			
** Items Included In O-Ring Kit No. 116100			
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NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote			
SN = Serial Number AC = Air Cooled			
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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM - TO)
Nut-Speed 1/4-20 BP&O (Rear & Side Panels)	HC160117	*	G2Z-1673 —
O-Ring (Head)	HC160583	**	G2Z-1673 —
O-Ring (Air Plug)	HC160562	**	G2Z-1673 —
O-Ring (Seal-Beater Shaft)	HC160500	**	G2Z-1673 —
O-Ring (Spigot)	HC159295	**	G2Z-1673 —
Oil-Special Gear Lube (per quart)	HC158055	*	See Tag on Gear Reducer
Overload Block	2		Order by Freezer S/N & Amps
Pan-Condensate (w/ MJ70)	1		Order by Freezer SN
Pan-Condensate-(w/ ceiling type-26")	1		Order by Freezer SN
Panel-Dispensing (w/ lights)	HC137228-C	1	G2Z-1673 — J2I-2576
Panel-Dispense	HC140128	1	J2I-2577 —
Panel-Assy. Front	HC1HC15116-C 1		G2Z-1673 —
Panel-Rear (Air and Water Cooled)	HC136313-C	1	G2Z-1673 —
Panel-Side LH	HC136289-C	1	G2Z-1673 —
Panel-Side RH	HC136216-C	1	G2Z-1673 —
Panel-Spacer (Rear & Side Panels)	HC138456	*	G2Z-1673 —
Panel-Assy. Top (Air Cooled) (R-404a & R-502)	HC116567-C	1	G2Z-1673 —
Panel-Top (Water Cooled & ACR) (R-404a & R-502)	HC114157-C	1	G2Z-1673 —
Panel-Lower Rear (ACR)	HC138983	1	G2Z-1673 —
Panel-Upper Rear (ACR)	HC138982	1	G2Z-1673 —
Pin-Stop Hinge (NLA use HC162045-Hinge)	HC162108	*	G2Z-1673 —
Plate-Pivot Cover	HC138142	2	G2Z-1673 —
Plug-Air Relief	HC115129	2	G2Z-1673 —
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

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Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM – TO)
Probe-Assy. 6 gallon	HC116439	2	G2Z-1673 —
Probe-Assy. 7 gallon	HC115397	2	G2Z-1673 —
Pulley	See Sheave		
Receiver-Assy. w/flare (NLA use HC155057)			
Receiver-3 lb. 3/8 ID Sweat	HC155057	2	G2Z-1673 — G2M
Receiver-3 lb. 3/8 ID Sweat w/o Valve	HC155071	2	G2M —
Receiver-12 lb w/flare (NLA use HC155058)			
Receiver-12 lb. Sweat (ACR)	HC155058	2	G2Z-1673 —
Receptacle-Level Sensor (Double Prong)	HC150528	2	G2Z-1673 — K2B-277
Receptacle-Level Sensor (Single Prong)	HC150536	2	K2B-278 —
Reducer- Gear 4CB	HC153341	1	G2Z-1673 —
Relay-Flange Base with cover	HC150381	2	G2Z-1673 —
Relay-MTS	HC150381	2	G2Z-1673 —
Relay-Start	See Compressor Assembly 1 Phase		
Resistor Assy.	HC116154	2	C2Z-1673 —
Rivet-Ratchet Plastic (Compressor Wrap)	HC160419	8	A2I —
Rod-Spigot Switch	HC136794	3	G2Z-1673 —
Roller-Assy. Complete (MTS)	HC116009-01 ..	2	G2Z-1673 —
Sanitizer-Stera-Sheen (per case)	HC158014	*	G2Z-1673 —
Sanitizer-Stera-Sheen (per jar)	HC158014A	*	G2Z-1673 —
Scale-Overrun Z32	HC158049	*	G2Z-1673 —
Screw-RDHM #6-32 x 5/16 (MTS Relay Box)	HC160308	*	G2Z-1673 —
Screw-HXHM 4-20 x 2-1/2 (Spigot Switch)	HC160104	*	G2Z-1673 —
Screw-HXSF 1/4 x 20 x 1/2 (MTS Relay Box)	HC159950	*	G2Z-1673 —
Screw-Hinge 1/4 x 20 x 3/4	HC160019	*	G2Z-1673 —
* As Required			
** Items Included In O-Ring Kit No. 116100			
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SN = Serial Number		AC = Air Cooled	
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Alphabetized Parts List for Model 957CMT

Important: All parts shown are for standard models designed for 230V/1PH/60HZ or 203-230V/3PH/60HZ.

PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM - TO)
Screw-Hinge 10 x 32 x 5/8 SST	HC160026	 *	G2Z-1673 —
Screw-TRPM #10-24 x 3/8 SST (Top Panel)	HC160305	 *	G2Z-1673 —
Screw-TRPM #10-24 x 1/2 SST (Trimstrip, Front and Dispense Panels)	HC160076	 *	G2Z-1673 —
Screw-TRPM 1/4-20 x 1/2 SST (Rear Panel)	HC160048	 *	G2Z-1673 —
Screw-TRPM 1/4-20 x 1 SST (Side Panel)	HC159219	 *	G2Z-1673 —
Screw-SKHM #10 x 32 x 7/16 SST (MTS)	HC160307	 *	G2Z-1673 —
Screw-Swing Lock #10 x 32 x 5/8 SST	HC160026	 *	G2Z-1673 —
Seal-Assy. Shaft Complete (Beater)	HC111875	 2	G2Z-1673 —
Seal-Oil 63 x141(High Speed-Gear Reducer)	HC153053	 4	G2Z-1673 —
Seal-Oil 63 x 291(Slow Speed-Gear Reducer)	HC153051	 4	G2Z-1673 —
Sealant-Clear Silicone	HC162509-01	.. *	G2Z-1673 —
Sealant-Gray Silicone	HC162513-01	.. *	G2Z-1673 —
Sensor-10K Thermistor	HC161216	 2	L2F-3475 —
Set Screw 1/4 x 20 x 3/8 (Sheave)	HC160495	 *	G2Z-1673 —
Shaft-Assy. Long (Beater Shaft)	HC114752	 2	G2Z-1673 — D2M-1299
Shaft-Assy. Beater	HC113438	 2	D2M-1300 —
Shaft-High Speed (Gear Reducer)	HC153348	 1	G2Z-1673 —
Shaft-Slow Speed (Gear Reducer)	HC153350	 2	G2Z-1673 —
Sheave-3/4 Bore 4.75 OD (Driven) (order by freezer S/N)	HC153625	 2	G2Z-1673 —
Sheave-7/8 Bore 3.25 OD (Driver) (order by freezer S/N)	HC153626	 2	G2Z-1673 —
Shield-Motor Rain (ACR)	HC139017	 2	G2Z-1673 —
Shroud-Assy.Cab	HC116792	 1	Order by Freezer SN
Shroud-Fan (Air Condenser)(R-502)	HC136218	 2	E2A-1260 — K2Z-2668
Shroud-Fan (Air Condenser) (R-404a)	HC138465	 2	G2Z-1673 —
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PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM – TO)	
Spacer-Panel	HC138456	*	G2Z-1673	—
Spring-Spigot Switch Side	HC162321	*	G2Z-1673	—
Spring-Spigot Switch Center	HC162320	*	G2Z-1673	—
Spring-Hinge Pivot LH	HC162052	1	G2Z-1673	—
Stud-Assy. Cylinder	HC114341-01 ..	4	G2Z-1673	—
Support-Condenser (ACR)	HC137629	2	G2Z-1673	—
Support-MTS (MTS Relay Box)	HC138169	2	G2Z-1673	—
Switch-Assy. Spigot Center (Complete)	HC114486	1	G2Z-1673	—
Button-Spigot Switch	HC136124	1	G2Z-1673	—
Ring-Retaining	HC160303	1	G2Z-1673	—
Spring-Spigot Switch	HC162320	1	G2Z-1673	—
Switch-Push Button DPDT	HC150479	1	G2Z-1673	—
Switch-Assy. Spigot Sides (Complete)	HC113903	2	G2Z-1673	—
Button-Spigot Switch	HC136124	2	G2Z-1673	—
Ring-Retaining	HC160303	2	G2Z-1673	—
Spring-Spigot Switch	HC162321	2	G2Z-1673	—
Switch-Snap Button	HC150456	2	G2Z-1673	—
Switch-Dispense Head Kit	HC116410	1	G2Z-1673	—
Switch-Door Push Button (NLA use Kit p/n HC119163)	HC150416	1	G2Z-1673	— B2I-342
Switch-Door Push Button	HC150509	1	B2I-343	—
Switch-Kit MTS Slide	HC116411	2	G2Z-1673	—
Switch-Pressure Switch Kit (MTS)	HC117014	2	G2Z-1673	—
Switch-Toggle SPST (Cabinet)	HC159235	1	G2Z-1673	—
Switch-Toggle 3PDT (Selector)	HC150465	2	G2Z-1673	—
Switch-Toggle DPDT (MTS)	HC150463	2	G2Z-1673	— B2I-342
Switch-Toggle SPST (MTS)	HC159235	2	B2I-343	—
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PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM - TO)
Tank-Mix 7 Gallon 13-1/4" HT	HC196222	2	G2Z-1673 — H2L
Tank-Mix 6 Gallon 10-1/2" HT (NLA use #HC196222)	HC196092-01	2	G2Z-1673 — H2L
Tank-Mix 6 Gallon 13-1/8" HT	HC196100	2	H2L —
Thermometer-2.5 Dial Vapor	HC161026	2	G2Z-1673 — J2I-2576
Thermometer-Cabinet (Ceiling Mount)	HC161001	1	Order by Freezer S/N
Thermometer-Cabinet (Front Mount)	HC161004	1	Order by Freezer S/N
Thermostat-A30 w/OFF Sw (Cabinet)	HC155443	1	G2Z-1673 — C2H-557
Thermostat-Assy. w/Cover (Cabinet)	HC118868	1	C2H-558 — J2I-2576
Thermostat-CAB Kit (Cabinet)	HC118813	1	J2I-2577
Thermostat & Retainer Kit (Cylinder)	HC119989	2	G2Z-1673 —
Timer-12 Sec. Delay on Break	HC150208	2	G2Z-1673 —
Timer-5 Minute		2	Prior to S/N F2A-1470 Order by Freezer S/N
Timer-5 Minute (NLA use p/n HC119256)	HC150215	2	F2A-1470 — B2I-342
Timer-5 Minute Mechanical	HC150218	2	B2I-343 —
Tool-O-Ring Removal	HC169374	*	G2Z-1673 —
Tool-Assy. Pressure Switch Installation	HC117013	*	G2Z-1673 —
Tray-Drip 26-inch	HC196108-01	1	G2Z-1673 —
Trimstrip-Assy. w/o Decals	HC115108	1	G2Z-1673 — J2I-2576
Trimstrip-Assy. 26 in. IDQ	HC119336-02	1	J2I-2577 —
Tube-Assy. Drain	HC115004-01	1	G2Z-1673 —
Tube-Assy. Pickup	HC116069	2	G2Z-1673 —
Valve-Access (Low Side)	HC155419	2	J2E-2962 —
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PART DESCRIPTION	PART NUMBER	QTY	SERIAL NUMBER (FROM – TO)
Valve-Assy. Rotalock LH MTZ	HC119327	2	G2H-1588 — B2M-465
Kit-Washer Rotalock	HC151399	2	G2H-1588 — B2M-465
Insulator-Rotalock Valve	HC165532	2	G2H-1588 — B2M-465
Valve-Assy. Rotalock RH MTZ	HC119326	2	G2H-1588 — B2M-465
Kit-Washer Rotalock	HC151399	2	G2H-1588 — B2M-465
Insulator-Rotalock Valve	HC165532	2	G2H-1588 — B2M-465
Valve-Check (ACR)	HC155409	2	G2Z-1673 —
Valve-Duckbill-Inlet	HC199032	2	G2Z-1673 —
Valve-Expansion Automatic (Cylinder) Flare	HC155400	2	G2Z-1673 — H2B-1963
Valve-Expansion Automatic (Cylinder) Sweat	HC155448	2	H2B-1964 —
Valve-Expansion-Automatic (Cabinet) Flare	HC155416	1	G2Z-1673 — H2B-1963
Valve-Expansion-Automatic (Cabinet) Sweat	HC155449	1	H2B-1964 —
Valve-Head Pressure Control	HC155454	1	G2Z-1673 —
Valve-Solenoid Flare	HC155422	3	G2Z-1673 — H2B-1963
Valve-Solenoid Sweat	HC155421	3	H2B-1964 —
Valve-Water (Also see kit)	HC155410	1	G2Z-1673 —
Video-Operational	HC184818	1	G2Z-1673 —
Washer-1/2 x .HC196 x 1/6 (MTS)	HC160157	*	G2Z-1673 —
Washer-Flat #10 (MTS)	HC160158	2	G2Z-1673 —
Washer-Flat #10 SST (MTS)	HC159962	6	G2Z-1673 —
Washer -Kit Rotalock	HC151399	2	G2H-1588 — B2M-465
Washer-Spring Curved (MTS) (NLA use HC160173)	HC160145	4	G2Z-1673 — K2I
Washer-Spring Wave (MTS)	HC160173	2	K2I —
* As Required ** Items Included In O-Ring Kit No. 116100 *** LH or RH — Left or right hand is determined as you face the front of freezer. NLA = No Longer Available WC = Water Cooled ACR = Air Cooled Remote SN = Serial Number AC = Air Cooled ¹ I2A-2278 designates the complete changeover to R-404a. Serial numbers B2A-376 to I2A-2278 could be R-502 or R-404a. Contact H.C. Duke & Son, Inc. Service Department if unsure.			

Use only original or authorized replacement parts with this freezer.
Use of unapproved parts will void warranty.



H. C. DUKE & SON, INC.

2116 - 8th Avenue • East Moline, Illinois 61244

Installation and Service Manual

for Refrigeration Technician only

Models 957CMT, 917N-CMT, 927CMT



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1 Introduction

This Installation and Service Manual is for use by qualified service technicians only. All service technicians using this manual must follow the Installation and service instructions when servicing the freezer. Failure to follow this manual when servicing the freezer is considered misuse and could violate the warranty.

Do not refer to this manual if you are not a qualified service technician. Do not attempt to service the freezer until the safety precautions are understood. If problems occur that are not covered in this manual, further technical assistance can be obtained by calling H.C. Duke & Son, Inc. as follows:

Phone: (309) 755-4553

(800) 755-4545

Fax: (309) 755-9858

E-mail: service@hcduke.com

2 Safety First

2.1 Recognize Safety Information

Look for this safety alert symbol throughout this manual.

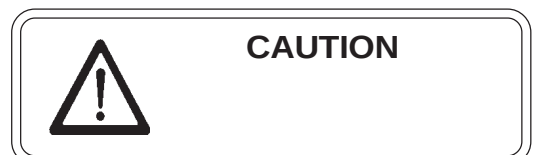


When you see this symbol on the freezer or in this manual, be alert to the potential for personal injury. Follow recommended precautions and safe operating procedures.

2.2 Understand Signal Words

The signal words – DANGER, WARNING, and CAUTION – are used with the safety alert symbol (DANGER decals on the freezer may or may not have the safety alert symbol, but the message is the same). Decals with the words DANGER, WARNING, or CAUTION appear on the freezer. DANGER identifies the most serious hazard. Decals with the words DANGER or WARNING are typically near specific hazards on the freezer. General precautions are listed on CAUTION safety decals.

In this manual, CAUTION messages with the safety alert symbol  call attention to safety messages.



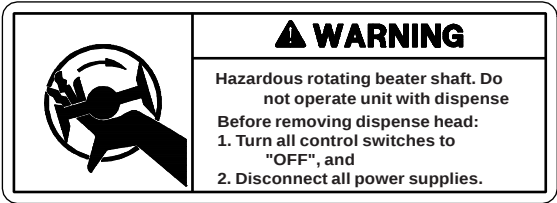
2.3 Follow Safety Instructions

Read and understand all safety messages in this manual. Read and understand the decal safety messages on the freezer. Take notice of the location of all decals on the freezer and keep the safety decals in good condition. Check them periodically and replace missing, damaged or illegible safety decals. The safety decals must remain in place and

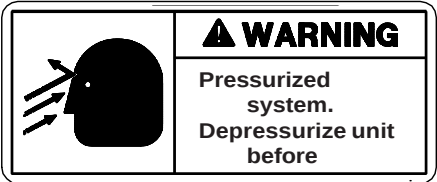
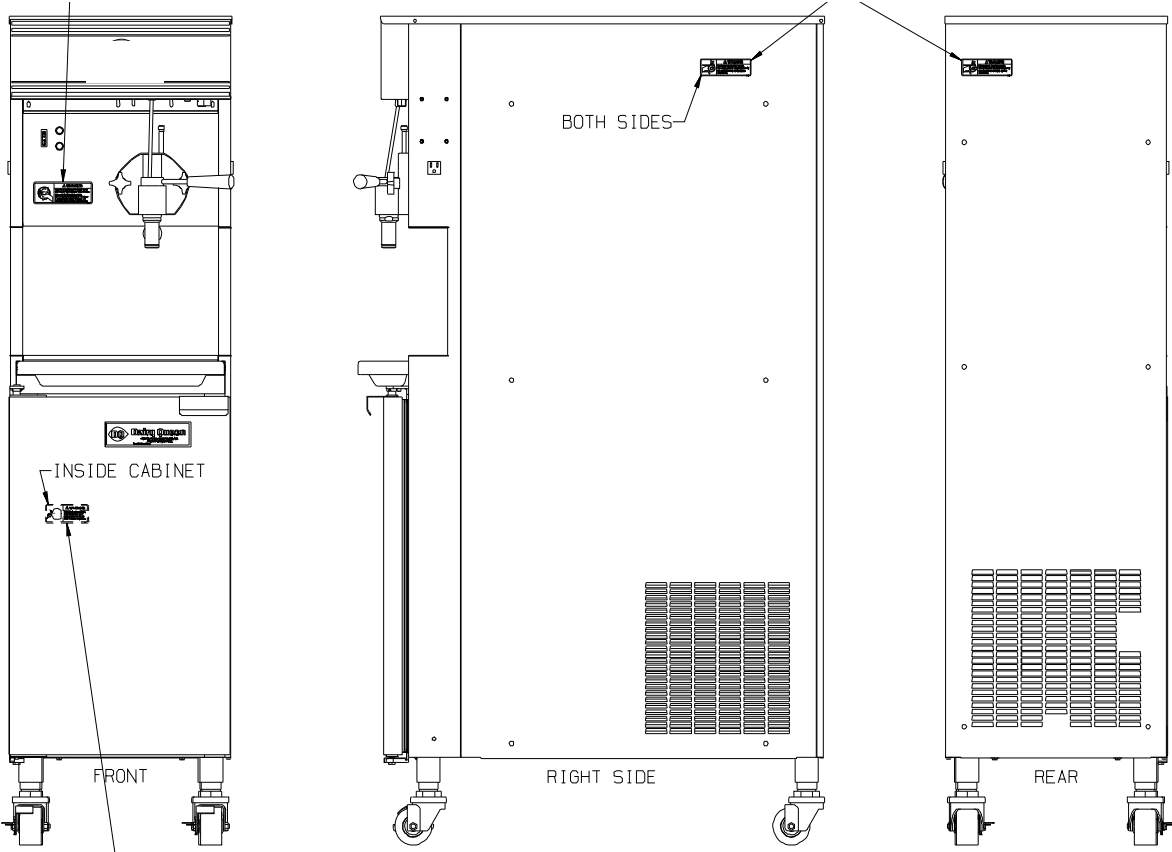
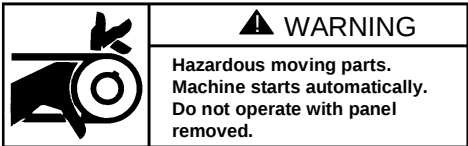
legible for the life of the freezer. Use the information and illustrations on this page to identify the decal, and call or write to H.C. Duke & Son, Inc. for new decals.

DO NOT attempt to operate the freezer until you read and understand all safety messages and the operating instructions in this manual.

P/N HC165025



P/N HC165126



P/N HC165246

2.4 Operate Safely

DO NOT allow untrained personnel to maintain or service this machine. Failure to follow this instruction may result in severe personal injury. **DO NOT** operate the freezer unless all service panels and access doors are secured with screws. **DO NOT** attempt to clean, maintain, or repair the freezer until the main power supply has been disconnected. Contact H.C. Duke & Son, Inc. Service Department at (309) 755-4553 or (800) 755-4545.



3 Service "FIRST"

When servicing Duke freezers, remember most service calls involve simple operator error or small component malfunction. Always try to approach each call in a systematic way. Use the FIRST method of diagnosing problems and servicing the freezer:

- F** ***Find*** the problem by listening to the operator first. Daily use of the freezer gives the operator a good "feel" for the normal operation of the freezer. Sometimes the operator will experience symptoms of more subtle problems. Listening closely will also help to establish a good working relationship with the operator.
- I** ***Inquire*** from the operator what they have already done to try to remedy the situation. You can avoid repetition in the work and find operational procedures that may be done incorrectly.
- R** ***Respond*** to the operator's concerns. Try to make the operator feel "heard." If they feel you are there to help them, they will be more patient and understanding of the work you do.
- S** ***Start*** by applying simple corrective measures first. For example, before removing panels, try all relevant switch combinations to trace the electrical routes and establish if a component is bad.
- T** ***Train*** the operator once you have determined the problem. If there is an operational problem, the operator will appreciate the information to avoid recurring problems.

3.1 Installation, Start-up, and Instruction Checklist

Remove, follow, and complete the checklist provided on the last pages of this manual to insure proper installation of the freezer.

4 Uncrating and Inspecting the Freezer

1. As soon as the freezer is received, and while the carrier is still present, inspect the shipping crate for any damage which may have occurred in transit. If the crate is broken, torn or punctured, note the damage on the carrier's freight bill and call the carrier's local agent immediately, requesting prompt inspection by their personnel.
2. The freezer should always be stored or moved in its normal upright position and moving should be accomplished by an appropriate method of large appliance handling. Do not move the freezer by "walking" it on the corners of the skid, and do not uncrate the freezer until it has been transferred as close as possible to its location site.

4.1 Uncrating and Inspection



CAUTION
Be sure to properly support the machine when removing bolts and installing legs or casters.

1. Use caution in handling uncrating tools so as not to mar or dent the cabinet. Do not pierce the crate with a pry bar or similar tool. Note, in Figure 4-1, that the unit is bolted directly to the wooden pallet, or shipping base. Remove these bolts and carefully "walk" the freezer off the wooden pallet.
2. Check all separately packed components and spare parts against the packing list. If any items appear to be missing, contact H. C. Duke & Son, Inc.
3. Screw each leg or caster into place at the four corners of the base (Figure 4- 2). When the unit is in position at its intended location, the legs or casters must be adjusted until the unit is level (Section 5.1).

– continued

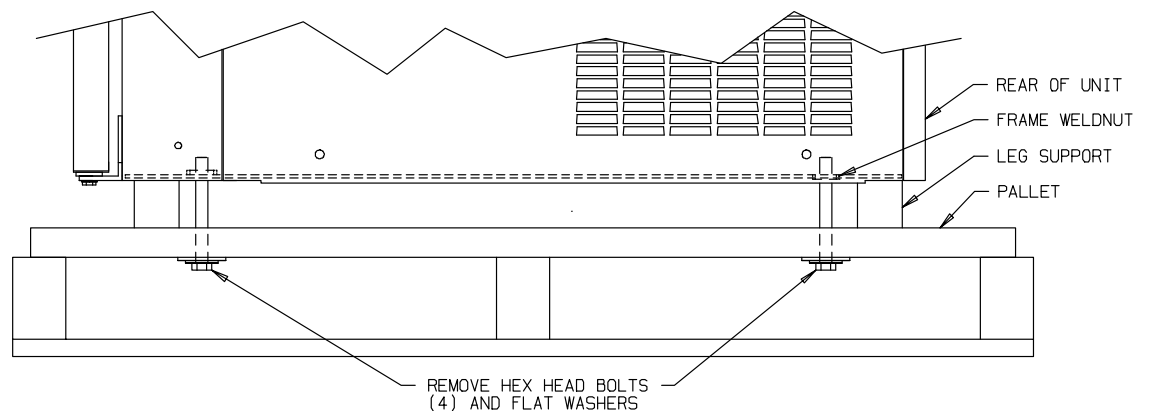


Figure 4-1 Machine bolted to Shipping Base

4.1 Uncrating and Inspection — continued

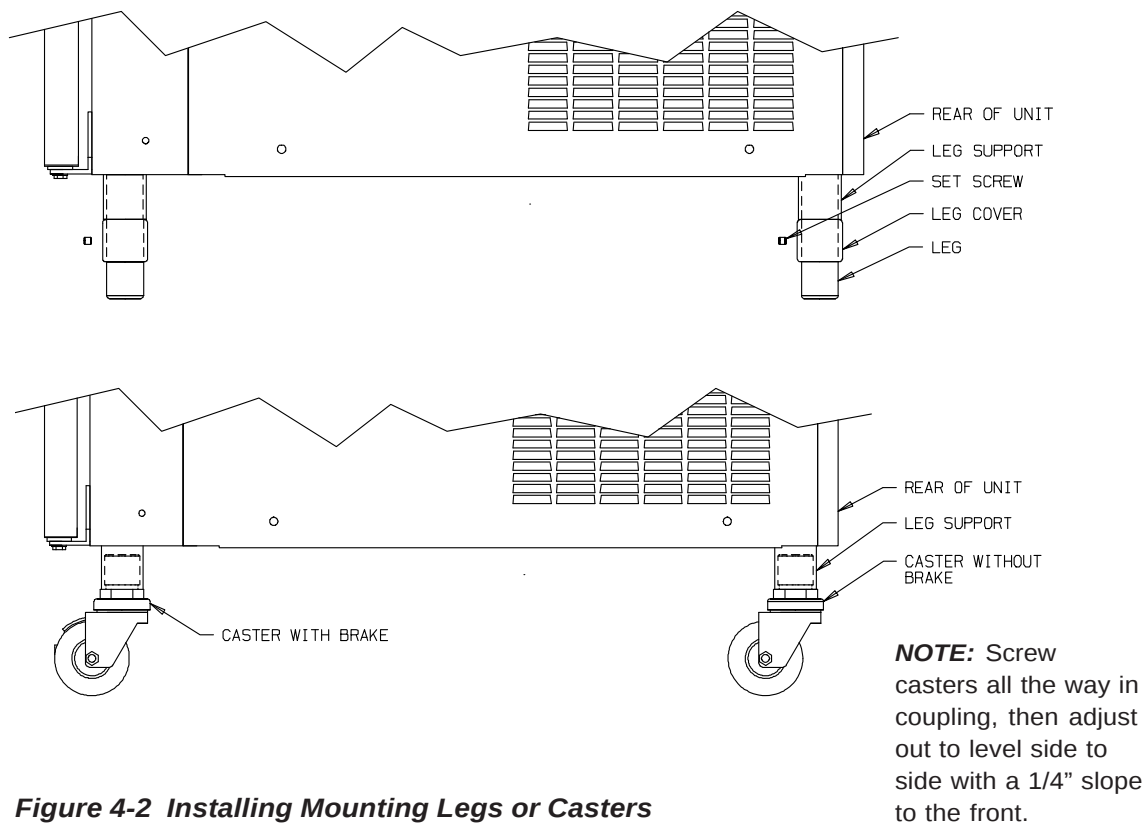


Figure 4-2 Installing Mounting Legs or Casters

4.2 Inspecting the Freezer

1. Inspect the freezer exterior for damage.
2. Remove the panels from the unit by unscrewing the attaching screws; then swing the bottom of the panel outward and pull down.
3. Check all tubing to make sure that metal-to-metal contact does not exist.
4. Check pulley alignment and belt tension (Section 11.3).
5. On air-cooled models, turn the condenser fan blade by hand to make sure that the blade turns freely and does not strike the shroud.

5 Installation Procedures

5.1 Placement of the Freezer

1. In positioning the freezer, be sure that it is accessible for periodic maintenance checks. Where codes permit, we recommend that the freezer be installed on casters and have flexible water and electrical connections for easy servicing and cleaning.
2. Air-cooled models require a minimum eighteen inches (18") clearance on the top panel for adequate ventilation. Anything (including cone dispensers) in this area will reduce the efficiency of these models.
3. Double-cylinder water-cooled models will require a 1/2" MPT water inlet and water waste connection. Single cylinder freezers require a 3/8" MPT water inlet and waste connection. The connections are found under the rear of the freezer and can be identified by removing the rear panel. A manual shut-off valve should be installed in the water inlet line at the time of installation. Also be sure that inlet water pressure is above 35 psig and below 140 psig. If the pressure drops below 35 psig, condenser pressure will increase and result in more prolonged periods of running and overall inefficiency.
4. The inlet water temperature should not be higher than 90°F. When inlet water temperature is higher than 90°F water usage becomes excessive and production capacity is reduced.
5. Place the freezer in its final location and level the machine by adjusting the legs or casters so that the unit is level side-to-side, and the front is approximately 1/4" lower than the rear, to allow proper drainage of the freezing cylinder. If the unit is moved to a new location, be sure to check level and readjust, if necessary.

NOTE: Water-cooled freezers are not equipped with vacuum breaker valves. Be aware of local codes concerning this and all plumbing requirements.

5.2 Water and Drain Connections

When making water and drain connections to water-cooled models, the following items must be taken into consideration:

1. Maintain water temperature and pressure limits as specified in Section 5.1.
2. A minimum $\frac{3}{8}$ " ID water line for a single freezer or $\frac{1}{2}$ " ID water line for a twin freezer must be provided immediately behind or adjacent to the freezer. Make sure lines are sized properly, free of corrosion, and flushed prior to connecting to the freezer. Provide a shut-off valve in the water supply line with a male flare connection. Install a water strainer at the inlet and use flexible water line hose 5 to 6 feet long with female flare fittings to allow mobility of the freezer for servicing and cleaning. Connect the freezer to cold water only.
3. Provide a drain close to the freezer. This can be a floor drain. Do not restrict or control the flow of the drain water, as this will cause operational problems. Make the connection to the freezer with a flexible water line hose.

IMPORTANT:

All water cooled models must have condensers blown out if exposed to temperatures below freezing. Pressure of at least 20 psig should be put through the water lines starting inside the water valve.

4. If the water to the inlets is to be tee-connected, make sure that the pipe feeding the tee is one size larger.

IMPORTANT:

Do NOT install a solid connection from the drain to a sanitary service line. Allow an air break to prevent the possibility of the reverse flow of sewer water. Drain connections must comply with local code regulations.

5. If glycol/water recirculating system is used, refer to manufacturer's instructions. Adjust the freezer water valve to specifications in Section 8.2 Refrigeration Settings. Also allow for a shut off valve to return freezer to city water.

5.3 Electrical Requirements



CAUTION
To prevent accidental electrical shock, a positive earth ground is required.

1. Always verify electrical specifications on the data plate of each individual freezer. Data plate specifications will always supersede the information in this manual.
2. Supply voltage must be within $\pm 10\%$ of voltage indicated on the nameplate. Also, on three-phase systems, voltage between phases must be balanced within 2%. (More than a 6 volt difference between any two voltage measurements at 208-230 volts indicates a possible imbalance.) Request the local power company to correct any voltage problem.
3. A main power disconnect must be supplied and should be:
 - a. easily accessible
 - b. within sight of the freezer
 - c. provided for all poles of the wiring to the freezer
 - d. installed in the line ahead of the unit connections.
4. Use flexible connections, if possible. All connections must conform to local code requirements and be in compliance with the National Electric Code.
5. Use fuses or HACR type circuit breakers not exceeding the maximum rating allowed on the nameplate on the back panel of the freezer.
6. If the 120V receptacles on the freezer are to be used, a separate 120V power supply is required to be connected to the freezer service connection box marked for 120V.

Use a disconnect box rated for the amperage noted on the nameplate of the freezer. For twin models, provide a separately-fused disconnect switch for each side of the unit.

5.4 Beater Rotation

The beater shaft is designed for clockwise rotation as viewed from the front of the freezer. Single phase freezers are pre-wired for proper rotation, but the direction must be checked on three-phase freezers. The high leg, if present is attached to L2. If rotation is not clockwise interchange L1 and L3.



CAUTION
Hazardous moving parts.
Freezer starts automatically.



CAUTION
To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

1. Remove one side panel.
2. Install the beater shaft assembly(ies), head assembly, and spigot rods. Connect the main power supply. Turn the selector switch(es) to the "CLEAN" position.
3. View the drive coupling from the side. Couplings should be turning in a clockwise direction (as viewed from the front of the freezer). If the couplings do not rotate as specified, turn the selector switch(es) to the "OFF" position and disconnect power. Reverse position of any two of the three-phase service leads. Do not disturb any factory wiring.
4. Reconnect the main power supply and turn selector switch to the "CLEAN" position. Verify proper rotation. Turn selector switch to the "OFF" position.
5. Reinstall side panel.

5.5 Data Plate

The diagram shows a data plate for International Dairy Queen, Inc. with the following fields and callouts:

- 1** points to the **MODEL** field.
- 2** points to the **SER. NO.** field.
- 3** points to the **VOLTS** field.
- 4** points to the **WIRE** field.
- 5** points to the **PH** field.

The data plate includes the following information:

INTERNATIONAL DAIRY QUEEN, INC. MINNEAPOLIS, MINN. U.S.A. **DQ** H.C. DUKE & SON, INC. EAST MOLINE, IL, U.S.A.

WFO BY: SER. NO.

MODEL VOLTS WIRE PH HZ

SINGLE UNIT OR LEFT SIDE			RIGHT SIDE		
FLA	LRA	V.	FLA	LRA	V.
FLA	HP	V.	FLA	HP	V.
FLA	HP	V.	FLA	HP	V.
FLA	HP	V.	FLA	HP	V.
FLA	HP	V.	FLA	HP	V.
FLA	HP	V.	FLA	HP	V.
FLA	HP	V.	FLA	HP	V.
FLA	HP	V.	FLA	HP	V.

MAX. FUSE SIZE OR HACR TYPE CIRCUIT BREAKER AMPS MIN. CIRCUIT AMPACITY AMPS MAX AMPS 115V CIRCUIT 12 AMPS

REFRIGERANT LBS. DESIGN PRESSURE HIGH 450 PSIG LOW 230 PSIG

The date plate provides important information that the operator should record and have available for parts ordering, warranty inquiries, and service requests.

5.6 Reference Information

Fill in the following information below as soon as you receive your freezer. The item numbers, encircled, correspond with the callout numbers above.

- | | |
|----------------------------------|-------------------------|
| ① Model Number _____ | Installation Date _____ |
| ② Serial Number _____ | Installed by _____ |
| ③ Electrical Spec: Voltage _____ | Address _____ |
| Phase _____ Hertz _____ | _____ |
| ④ Minimum Circuit Ampacity _____ | Phone _____ |
| ⑤ Maximum Fuse Size _____ | |

6 Remote Air Condenser

The remote air-cooled system consists of a) the freezer, b) the condensing unit, and c) pre-charged line sets. The follow-

ing procedures will insure leak-free connections are made when installing these pre-charged units.

6.1 Placement of the Remote Air Condenser

1. Select a location as close as possible to the freezer for placing the remote condensing unit. No more than 30ft. of condenser line can be installed outdoors.
2. Position the condenser(s) where there is minimal restriction to air flow, giving consideration to prevailing wind direction. Allow for at least two (2) feet clearance at inlet and outlet. If there are two condenser units, position them so they will not discharge hot air from one into the other.
3. Bolt the condenser to a secure foundation, using the four slot holes on the condenser base plate.

IMPORTANT:

Thirty feet is the maximum length of condenser line which may be installed outdoors. Exceeding 30 ft. may cause operational problems during cold weather.

6.2 Remote Air Condenser Installation

1. Two factory pre-charged and insulated condenser line sets are required for each condenser:
 - a. Discharge-1/2 in. OD line set
 - b. Liquid return-3/8 in. OD line set

IMPORTANT:

Before routing line sets for a freezer with two condensers, label each end or coupling of one line set with tape, marker, etc. The couplings at the rear of the freezer are labeled "A-SIDE" and "B-SIDE". (See Figure 6-1.) For example, label both ends of a 1/2" and 3/8" line set for the "A-SIDE". Labeling will insure that the line sets are properly connected.

2. Route the condenser line sets between the freezer and condenser.

Position the lines in a safe location so they can be securely clamped to a wall or structural member of the building. Any excess tubing should be coiled and laid flat in an indoor location.

3. The 6 foot flexible lines connect at the rear of the freezer. Each flexible line can have only one bend. (See Figure 6-2 for reference).
4. Provide proper pitch and oil trap bends in the discharge line where required. Avoid sharp bends wherever possible. Do not remove the insulation on the lines due to condensation and refrigerant heat loss during cold weather conditions. Position the condenser lines to their final location.
5. Be sure to keep the discharge line separate from the liquid line by approximately 6 inches.

6.2.1 Connecting Condenser Line Couplings

The refrigerant couplings that connect at the freezer and condenser eliminate the need for initial field charging. The coupling design prevents air inclusion and refrigerant loss during connection. Follow these installation procedures to insure leakproof connections.

1. Remove protector caps and plugs and examine the couplings for dirt or foreign material. If necessary, carefully wipe coupling seats and threads with a clean, dry cloth.
2. Lubricate male half diaphragm and synthetic rubber seal with POE refrigerant oil.
3. Thread the coupling halves together by hand to insure proper mating of threads. Use proper size wrenches (on coupling body hex and on union nut) and tighten until coupling bodies "bottom" or definite resistance is felt.
4. Using a pencil or marker, mark a line lengthwise from the coupling union nut to the bulkhead panel. Then tighten an additional $\frac{1}{4}$ turn (approximately 90°); the marked line rotation on the coupling union nut will indicate the amount the coupling has been tightened. (See figure 6-3.) If a torque wrench is used, the following torque values are recommended:

3/8 in. OD liquid return line couplings:
20 ft-lbs.

1/2 in. OD discharge line couplings:
35 ft-lbs.

5. After connecting the condenser line couplings at both the freezer and the condenser, secure the condenser lines to their permanent location with U-type clamps.
6. Inspect all refrigerant tubing connections for leaks.

NOTE: The freezer is shipped with the service valves backseated in the normal operating position.

IMPORTANT:

Condensers are matched to the freezer. To insure proper freezer refrigerant charge, connect "A" side condenser to "A" side of freezer making sure the serial numbers match. If you have a double unit, make sure "B" side condenser, freezer and serial number also match. If this step is followed then refrigerant does not need to be added or removed at installation, or as the seasons change. Refrigerant does not need to be added or removed at installation, or as seasons change. The freezer, condenser, and line sets are factory charged with the proper amount of refrigerant for all ambient conditions and for either 25 ft. or 50 ft. line lengths. The total system charge is 10.5 lb. of R404a. If a leak is found, recover the refrigerant, repair the leak, evacuate the system, and recharge with 10.5 lb. of R404a.

— continued

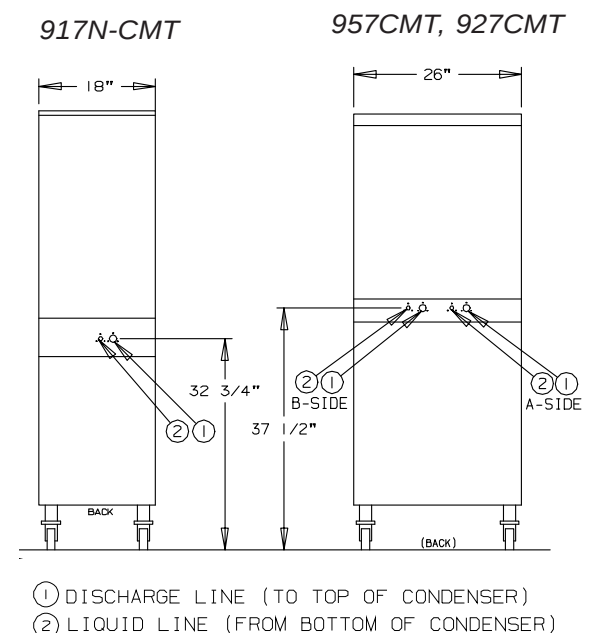


Figure 6-1 Line Connections

6.2.1 Connecting Condenser Line Couplings – continued

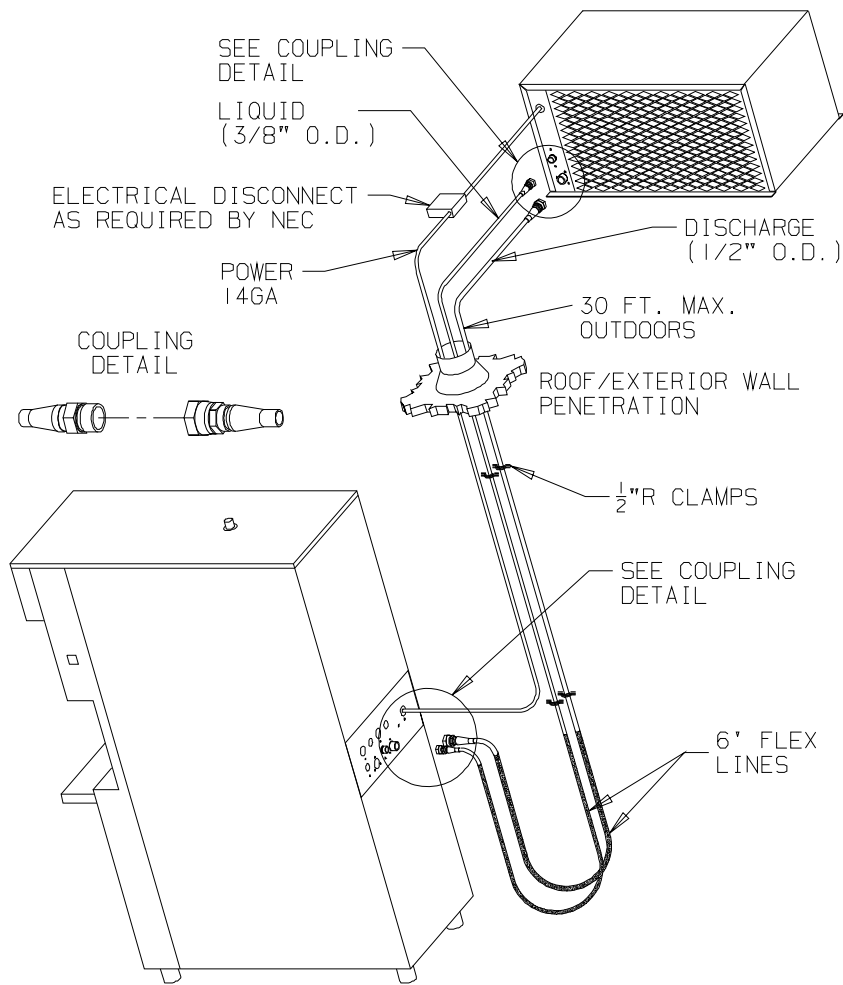
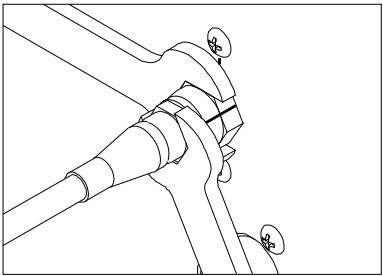


Figure 6-2 Line Connections & Coupling Detail – Remote Condenser



1/2 in. O.D. Line Set:
Union Nut = 1-3/16 in.
Body Hex = 1 in.

3/8 in. O.D. Line Set:
Union Nut = 24mm
Body Hex = 19mm

Figure 6-3 Detail – Connections

6.2.2 Condenser Electrical Wiring



CAUTION:

To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

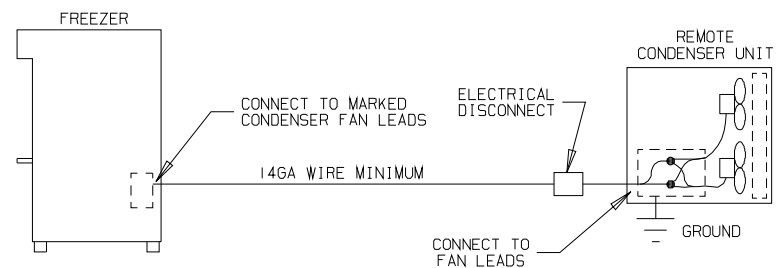
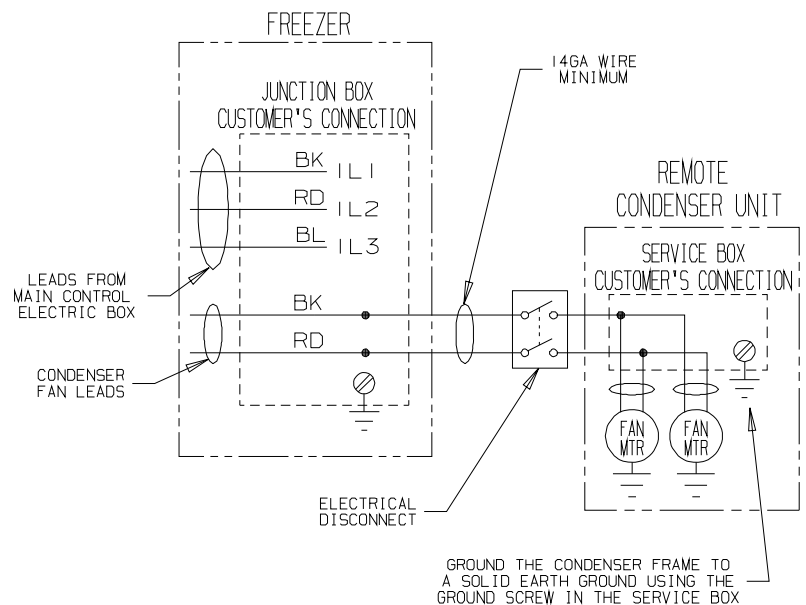
IMPORTANT:

Each condenser requires separate leads. The "B-SIDE" leads are labeled "Right Side Condenser Fan." Label the ends of the wires so they are connected to the correct condenser.

1. Identify the condenser fan leads at the freezer service box. (See below.)

2. Run 14ga minimum wires (copper conductors that are suitable for outdoor use) to the condenser fan motor leads at the condenser service box. Install an electrical disconnect at the condenser unit. Ground the condenser frame to a solid earth ground using the ground screw provided in the service box.

— continued



NOTE:
SINGLE COMPRESSOR FREEZER WIRING SHOWN.
DOUBLE COMPRESSOR FREEZERS REQUIRE (2)
REMOTE CONDENSER UNITS. REFERENCE
FREEZER WIRING SCHEMATIC AND DIAGRAM.

Figure 6-4 Electrical Schematic

6.2.2 Condenser Electrical Wiring – continued

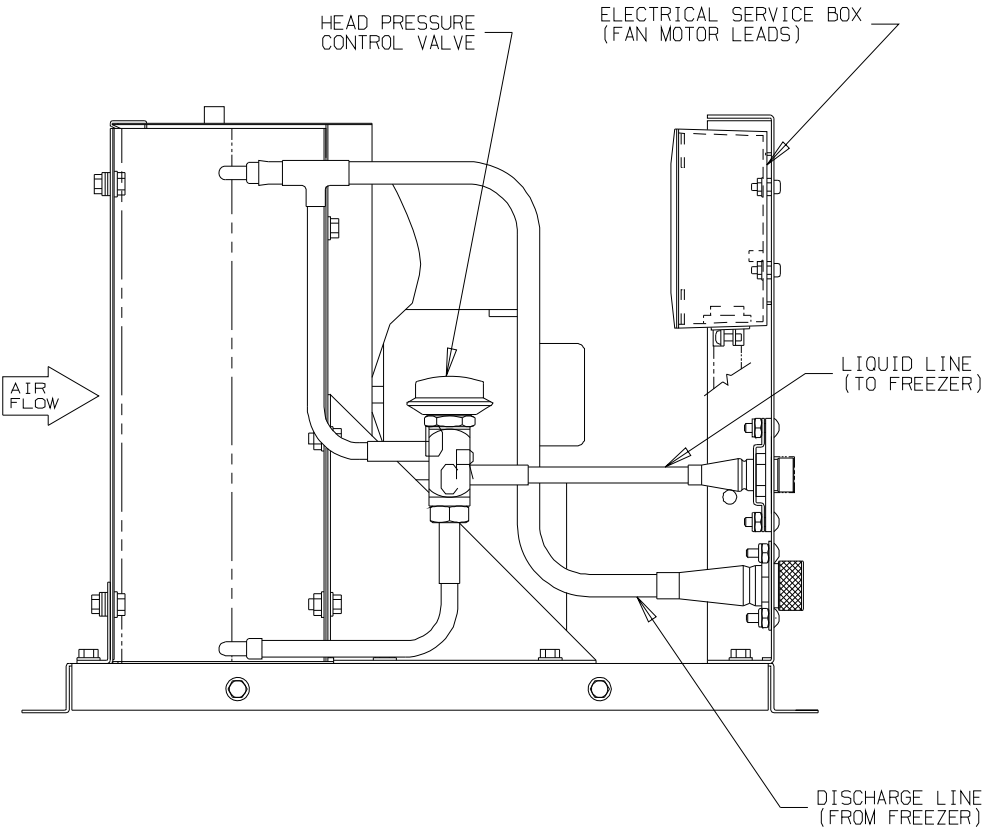


Figure 6-5 Side View

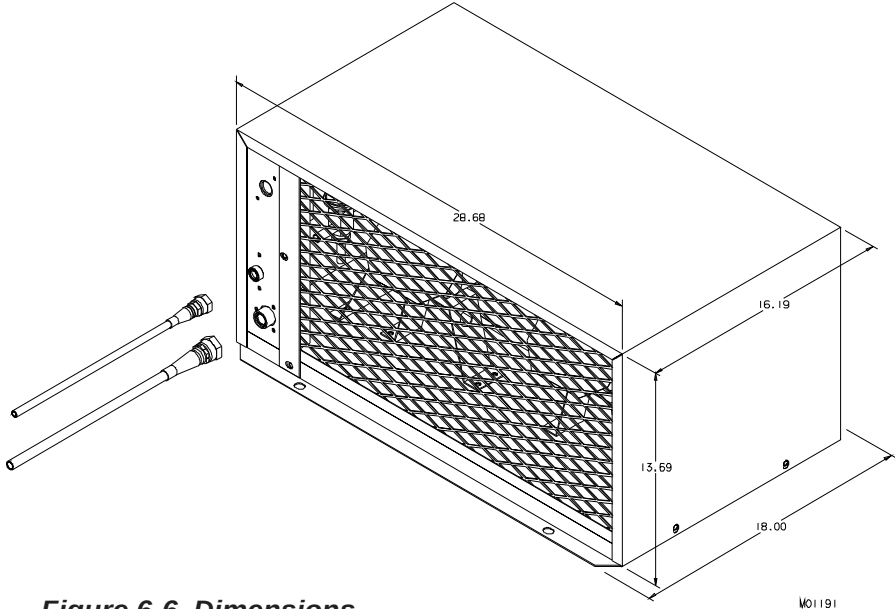


Figure 6-6 Dimensions

7 Tests of Installation

7.1 Head Switch Operation

The head switch feature is designed to prevent the beater shaft from being accidentally activated. The beater motors should not operate with the head assembly removed. It is essential that the proper operation of this switch be verified routinely. Use the following instructions to test for proper operation:

1. Make sure all switches are in the "OFF" position.



CAUTION

To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

2. Disconnect the main power supply.
3. Remove the dispense head and beater shaft assemblies.
4. Connect the main power supply.



CAUTION

Moving parts. Do not place hands in the freezing cylinder. Severe personal injury could result.

5. Turn the selector switches to "CLEAN", then the "AUTO" position. Look inside the freezing cylinder toward the rear—the drive shaft coupling should **NOT** be turning in either position. Turn the switch off and disconnect the main power supply. If a coupling is turning this condition should be corrected before the freezer is put in operation.

7.2 Cylinder Frost Pattern

The cylinder frost pattern test will show the proper refrigeration. To test the refrigeration system and certain controls, perform the following:

1. Disconnect the main power supply.
2. Remove the dispense head and beater shaft.
3. Connect the main power supply.
4. Turn the selector switch to "AUTO". Observe the frost pattern as the refrigeration system runs until the cylinder thermostat satisfies (approximately 2 minutes). There should be an even frost pattern starting 1" from the front going to the rear of the cylinder.

During normal operation throughout the course of the day, and when not dispensing product, the unit should run for a minimum of 30-50 seconds about every 8-10 minutes.

5. Turn the manual timer knob one quarter turn. Let the refrigeration system run until it shuts off automatically (approximately 1½ minutes) to verify proper operation.



CAUTION
Hazardous moving parts.
Freezer starts automatically.

6. On water-cooled models, check to make certain that water is flowing through the condenser by feeling the water inlet and outlet tubes. The inlet tube should feel cold and the outlet tube warm. Check to be sure the water flow stops when the compressor is not running. Be sure that the hand shut-off valve is fully open.
7. While the unit is operating, listen for unusual noises such as vibration (metal tubes making contact), rattles (loose mountings), or noisy belts (dry or misaligned belts).
8. All machines are carefully checked for leaks prior to shipment. Nevertheless, it is advisable to inspect all refrigerant tubing connections for leaks with an electronic leak detector. If leaks are detected, tighten the connection and check the sight glass for proper charge. If leakage persists, or if leakage is discovered at brazed joints, it will be necessary to recover the refrigerant and repair the leak.

7.3 Spigot Switch Operation

The spigot switch is designed to start the compressor and beater motor just before product begins to flow from the spigot. To test and adjust the switch:



CAUTION
To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected.

1. Remove the dispensing head and view the back of the head. With the spigot inserted in the dispense head, turn the spigot so that the edge of the spigot dispensing port is visible. This is the point at which product will begin to enter the spigot.
2. Mark this position on the dispensing head and spigot with a pencil, as shown in figure 7-1 and figure 7-2, item C.
3. Install the dispensing head and spigot rod (Item A, Figure 7-2) on the freezer.

4. Slowly open the spigot (Item B, Figure 7-2). The micro switch should click at the point the pencil marks line up on the spigot and head assembly.
5. If the switch does not click, a switch adjustment must be made. Remove the cover from the electrical box and slightly loosen the two mounting screws (#1 Figure 7-2). Loosen the locking nuts (2). Adjust screws (3) for proper actuation of the switch.
6. Tighten all screws and nuts. Recheck for proper operation.

NOTE: Excessive force on these screws may change the position of the switch assembly. Once they are in place, recheck for correct position.

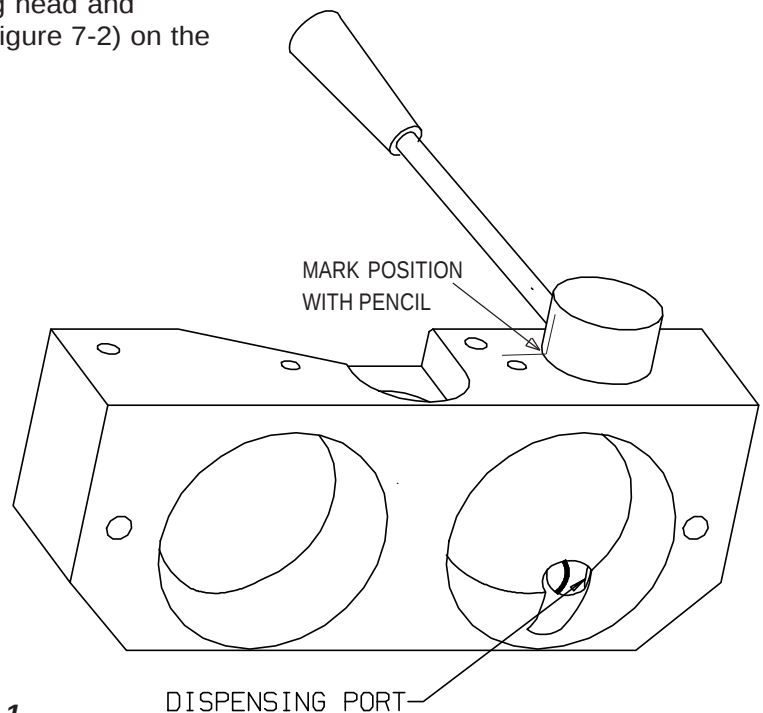


Figure 7-1

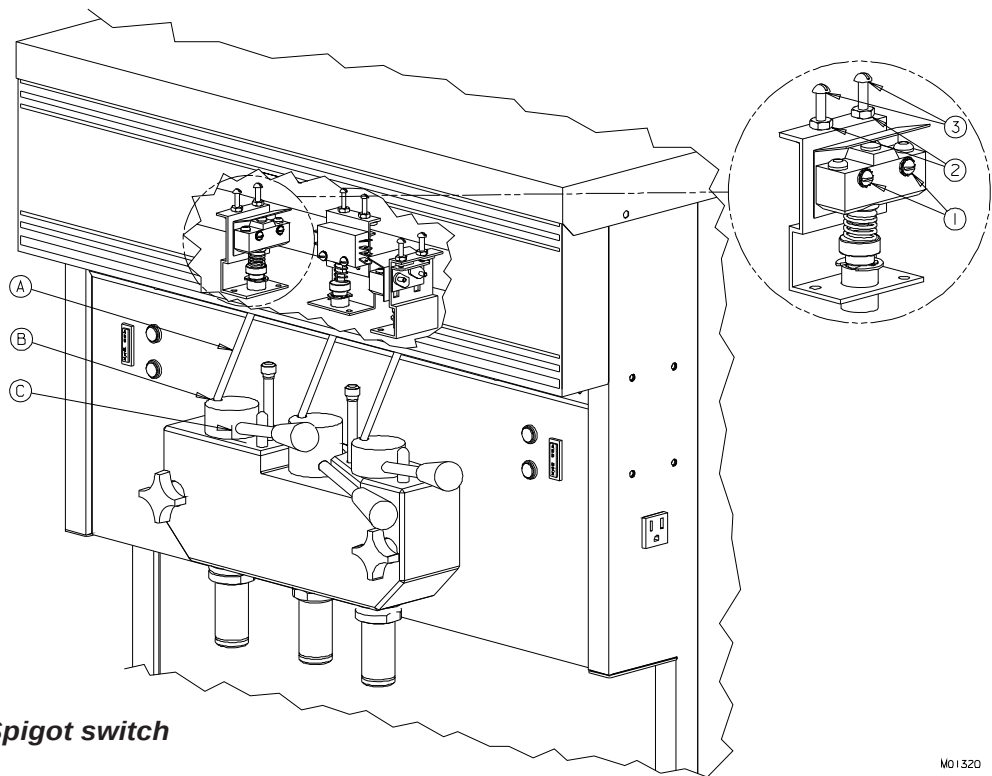


Figure 7-2 Spigot switch

M01320

8 Operating Adjustments

The freezer will need to be tested with mix for verification of proper control settings. Follow the disassembly, cleaning and assembly instructions in the Operator's Manual. Once the freezer has been assembled and sanitized, prime the freezer with mix in accordance with the Operator's Manual instructions.

The following adjustments are mandatory on installation. All adjustments must be within specifications to obtain proper operation of the freezer.

8.1 Thermostat

IMPORTANT:

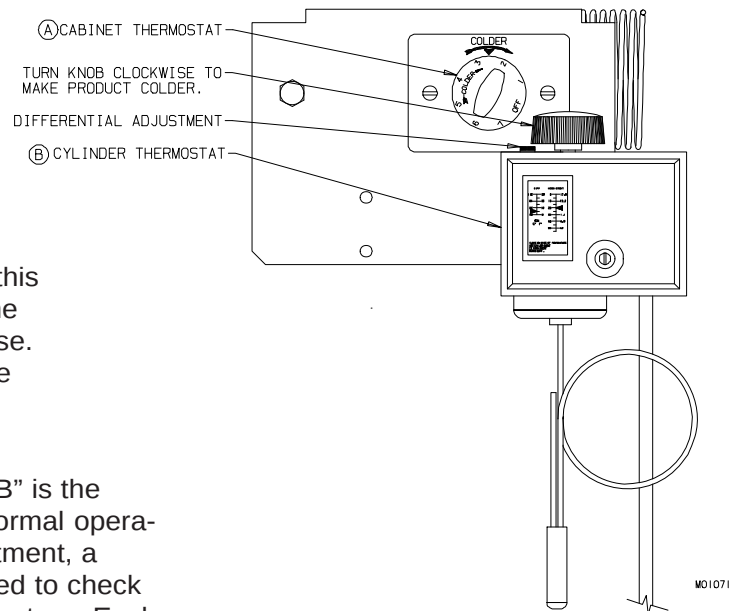
To correctly set the cylinder expansion valve, the cabinet thermostat switch must be in the "OFF" position (Full counterclockwise) with the compressor running.

IMPORTANT:

To correctly set the cabinet expansion valve, the selector switch must be in the "OFF" position, and the cabinet switch in the "ON" position (with the compressor running).

NOTE: Do NOT adjust the product temperature below 17°F. A freeze-up may result. The setting on the thermostat are ONLY to be used as a guide; actual setting must be determined by measuring the frozen product temperature with an accurate thermometer.

1. Thermostat "A" is the cabinet refrigeration thermostat. The cabinet thermostat maintains a mix temperature of 35°-41°F in the mix storage cabinet. This thermostat can be adjusted by rotating the adjustment knob. To set this thermostat colder, turn the adjustment knob clockwise. The normal setting for the cabinet thermostat is between #2 and #4.
3. The thermostat marked "B" is the cylinder thermostat for normal operation. For a correct adjustment, a thermometer must be used to check the actual product temperature. Each thermostat should be set for the product being used. In most cases, a temperature setting of between 18° and 19°F will result in a satisfactory product.



8.2 Refrigeration Settings

A refrigeration test gauge must be used when adjusting the suction pressure. To reduce the suction pressure, turn the adjustment screw on the expansion valve counterclockwise. Do not turn more than ¼ turn at a time. Let the unit operate a sufficient length of time — at least two minutes — to properly read the adjustment.

1. **On self-contained air or water-cooled freezers:**
 - a. Check the refrigeration pressure settings with the gauges attached to the service valves on the compressor and receiver tank. Adjust to the proper settings (See Figure 8-2.)

SELF-CONTAINED FREEZERS

Refrigerant	Model	Cabinet Suction	Cylinder Suction	Head Pressure	Head Pressure Control Valve Setting	Fan Control Cut-in	Diff.
Bristol Compressors							
R-404a	917N-CMT	10-12	17-19	250-350 psig	250 psig	245	20
R-404a	957CMT	10-12	17-19	250-350 psig	250 psig	245	20
R-404a	927CMT	10-12	17-19	250-350 psig	250 psig	245	20
Maneurop Compressors							
R-404a	917N-CMT	10-12	15-17	250-350 psig	250 psig	245	20
R-404a	957CMT	10-12	15-17	250-350 psig	250 psig	245	20
R-404a	927CMT	10-12	15-17	250-350 psig	250 psig	245	20
Tecumseh Compressors							
R-404a	917N-CMT	10-12	16-18	250-350 psig	250 psig	245	20
R-404a	957CMT	10-12	16-18	250-350 psig	250 psig	245	20
R-404a	927CMT	10-12	16-18	250-350 psig	250 psig	245	20

Figure 8-2 Self-contained freezer settings

2. **On air-cooled remote freezers:**
 - a. Refrigerant does not need to be added or removed at installation, or as the seasons change. The freezer, condenser, and line sets are factory charged with the proper amount of refrigerant for all ambient conditions and for either 25 ft. or 50 ft. line lengths. The total system charge is 10.5 lb. of R404a. If a leak is found, recover the refrigerant, repair the leak, evacuate the system, and recharge with 10.5 lb. of R404a.
 - b. Operate the freezer until the system stabilizes before adjusting pressures. Adjust to proper settings (See Figure 8-3.)

AIR-COOLED REMOTE FREEZER SETTINGS

Refrigerant	Model	Cabinet Suction	Cylinder Suction	Head Pressure	Head Pressure Control Valve Setting	Fan Control Cut-in	Diff.
Bristol Compressors							
R-404a	917N-CMT	10-12	17-19	250-350 psig	250 psig	245	20
R-404a	957CMT	10-12	17-19	250-350 psig	250 psig	245	20
R-404a	927CMT	10-12	17-19	250-350 psig	250 psig	245	20
Maneurop Compressors							
R-404a	917N-CMT	10-12	15-17	250-350 psig	250 psig	245	20
R-404a	957CMT	10-12	15-17	250-350 psig	250 psig	245	20
R-404a	927CMT	10-12	15-17	250-350 psig	250 psig	245	20
Tecumseh Compressors							
R-404a	917N-CMT	10-12	16-18	250-350 psig	250 psig	245	20
R-404a	957CMT	10-12	16-18	250-350 psig	250 psig	245	20
R-404a	927CMT	10-12	16-18	250-350 psig	250 psig	245	20

Figure 8-3 Air-cooled remote freezer settings

8.3 Operational Checks

It is important to observe the general performance of the freezer and make corrections as necessary.

1. If set correctly, the freezer will have a cycle time of 8-10 minutes off and 30-50 seconds run time. Keep the suction pressure setting as high as possible but not more than 18 PSIG.
2. Check for mix leaks around the dispensing head and the beater shaft seal in the rear of the freezer cylinder.
3. Check the 12-second timer by activating the dispensing switch, which should automatically start the compressor and beater motor. When the spigot is closed, the compressor and beater motor will continue to run approximately 12 seconds before shutting off.

NOTE: If the cylinder thermostat calls for additional refrigeration, these components may continue to run and will shut off when the thermostat has been satisfied.

4. Slowly dispense some product from the freezer. The product should flow smoothly and dispense at 18°F (-8°C). If the product comes out in spurts, slowly, or if there are popping sounds, check to see that the mix transfer system is operating properly.



CAUTION

To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

5. There should be no squeaking, squealing or slapping of the beater drive belt. With the freezer selector switch in the "OFF" position, check the belt tension (1/2" deflection with approximately 5 pounds of pressure) and use a straight edge to check pulley alignment.

9 Mix Transfer System

The Mix Transfer System (MTS) is designed to provide a constant pressure in the cylinder and maintain a consistent overrun. The MTS operates by peristaltic action; the MTS hose is squeezed by the MTS rollers, forcing the mix up from the mix container, through the MTS and into the cylinder. The overrun is controlled by the size of the air meter.

The MTS will shut off when the cylinder pressure reaches 22 to 26 psig (152 to 180 kPa) and start when the pressure in the cylinder drops below 19 PSIG (131 kPa). The differential is 2 to 5 psig (14 to 34 kPa).

It is important that the mix transfer hose be replaced every thirty days. Because the hose is under constant pressure, it will lose elasticity and durability.

9.1 MTS Housing Replacement



CAUTION

To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position, and that the main power supply is disconnected. Some freezers have more than one disconnect switch.



CAUTION

Pressurized system. Depressurize before disassembling.

A. REMOVING THE ROLLER ASSEMBLY

1. Unlock the MTS handle and pull down to open the housing and give access to the hose cavity.
2. Remove the mix transfer hose assembly.
3. Remove the two screws located inside the hose cavity. See Figure 9-1.
4. Remove the MTS from the cabinet wall by pulling straight out with a rocking action.

Important:

Make sure the wavy spring washer stays on the motor shaft behind the cabinet wall.

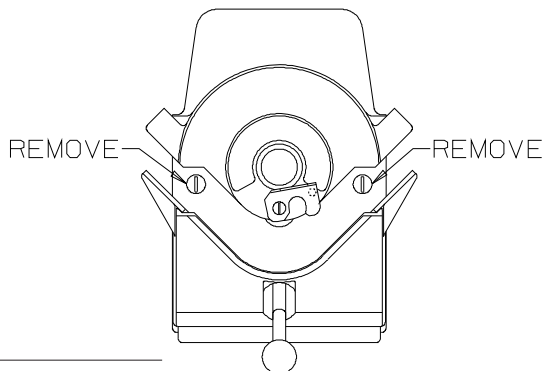


Figure 9-1

9.1 MTS Housing Replacement — continued

B. INSTALLING NEW MTS HOUSING

1. Remove all RTV from the MTS slide switch on the rear wall of the cab. Reapply a thin coat (less than 1/32" thick or .8 mm) to the left side of the switch, and 1/16" (1.5 mm) thick coat to the top, bottom, and right side of the switch. (See Figure 9-3.) Do not reapply RTV to the surface of the switch that faces the cab opening. Failure to complete this procedure could result in the slide opening and closing improperly.
2. Check to ensure the spring washer is on the motor shaft.
3. Install the MTS on the cabinet wall by aligning the coupling and the motor shaft.
4. Turn the roller assembly while pushing the MTS back until completely engaged.
5. Install the two mounting screws being sure the base is flush against the back wall before tightening screws.

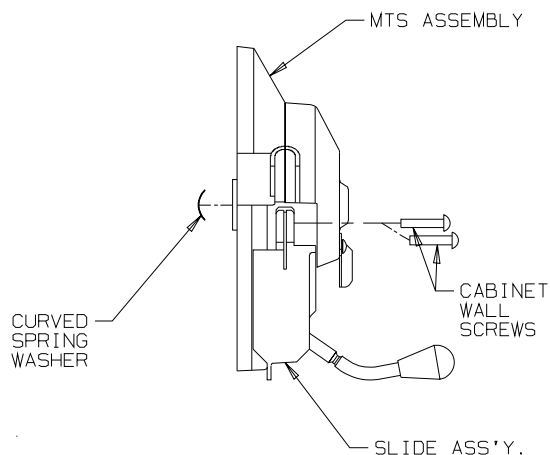


Figure 9-2

C. TEST INSTALLATION

1. Reassemble the freezer according to the Operator's Manual. Reconnect power to the freezer, turn the mix switch to the "ON" position and pressurize the unit with water. Then depressurize. Repeat 5 times. With the unit depressurized, turn the mix switch to the "OFF" position.
2. Unlock the MTS handle and pull the slide down to open the hose cavity. Carefully check the position of the hose in relation to the rollers. The hose should be near the center of the roller. If the hose is too far back or forward, the hose could be cut by the edge of the roller. If this is the case, call H. C. Duke & Son, Inc. Service Department for further instructions.

NOTE: This mix transfer housing has been completely tested at the factory with a roller assembly installed.

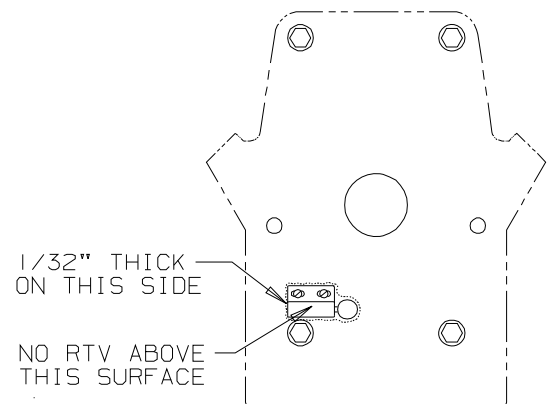


Figure 9-3

9.2 MTS Motor Replacement



CAUTION
To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position, and that the main power supply is disconnected. Some freezers have more than one disconnect switch.



CAUTION
Pressurized system. Depressurize before disassembling.

1. Disassemble the Mix Transfer System by unlocking the MTS handle and pulling down to open the housing and gain access to the hose cavity.
2. Remove the mix transfer hose.
3. Remove the two mounting screws located inside the hose cavity. (See figure 9-4)
4. Remove the MTS from the cabinet wall by pulling straight out with a rocking action.

Important
Make sure wavy washer is removed from motor shaft in cabinet wall.

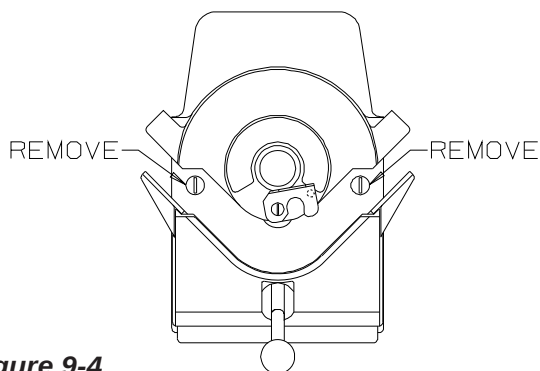


Figure 9-4

5. Remove side and rear panels. Locate the mounting plate for the MTS gearmotor and remove the 4 bolts holding the motor. Remove the bolt on the rear motor support bracket where it is connected to the 4" x 4" (10 cm x 10 cm) electrical box bracket. Remove 2 screws and cover for electrical connections on the motor. Disconnect wires to the motor
6. Remove motor.
7. Install new motor and leave bolts loose.
8. Rewire motor.
9. Insert the alignment bushing (p/n HC138369) over the motor shaft in the cabinet, with arrow pointing to the 12 o'clock position.

NOTE: Alignment bushing must be inserted to shoulder. See figure 9-5.

10. Move motor side to side and up and down to allow for proper alignment.
11. Tighten 4 bolts evenly in a "X" pattern. Tighten bolt on rear motor support bracket.

— continued

ARROW AT
TOP

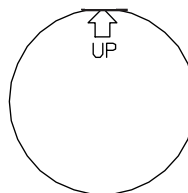
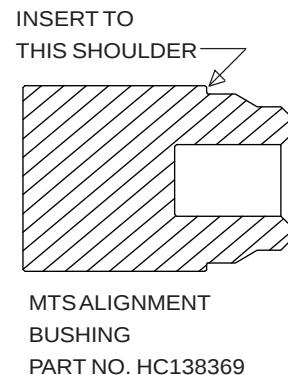


Figure 9-5



9.2 MTS Motor Replacement – continued

NOTE: If the hole in motor bracket and the hole in the electrical box bracket do not line up, loosen nuts on the 2 bolts that secure the 4" x 4" (10 cm x 10 cm) electrical box to the frame, tighten nuts on bolts when holes align. (If the holes still do not line up it may be necessary to enlarge the holes on the motor support bracket so the bolt will go through without binding.)

12. Remove the alignment bushing and install the wavy spring washer.
13. Install the MTS on the cabinet wall by aligning the coupling and the motor shaft.
14. Turn the roller assembly while pushing the MTS back until completely engaged.
15. Install the two mounting screws. Be sure the base is flush against the back wall before tightening screws.
16. Install the MTS hose assembly according to the Operator's Manual.

Important

Use original Duke hose only. The freezer will not operate properly with any other type of hose. Never twist the hose when assembling or installing.

Important

The MTS will not operate unless the handle is in the closed and locked position.



CAUTION
Mix Transfer System will be pressurized during operation. Make sure all components and fasteners are secure before start-up.

17. Place a container of water in the cabinet and insert pickup tube in bucket. Place an empty bucket under the dispense head.
18. Reconnect the main power supply. Place the MTS switch in the "ON" position and allow MTS to fill and pressurize the cylinder. Open the spigot and allow some water to drain.
19. Repeat so that the MTS runs for at least two minutes.
20. Place MTS switch in the "OFF" position and drain the water from the cylinder. Remove the duckbill valve and allow water to drain from the mix pickup tube.
21. Unlock the MTS handle and pull down to gain access to the hose/roller cavity. Check to make sure the MTS hose has not moved to the back side of the rollers. If hose has moved to the back side of the roller cavity, contact the factory.

9.3 MTS Slide Switch Replacement



CAUTION
To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position, and that the main power supply is disconnected. Some freezers have more than one disconnect switch.



CAUTION
Pressurized system. Depressurize before disassembling.

A. REMOVING THE MTS SLIDE SWITCH

1. If the freezer is in operation with frozen mix in the cylinder, it first must be emptied and cleaned.
2. Remove the rear panel.
3. Locate and disconnect the MTS slide switch connectors that come through the back of the cabinet to the MTS motor area.
4. Inside the cabinet, unlock the MTS handle and pull down to open housing and gain access to hose cavity.
5. Remove the mix transfer hose assembly.
6. Remove the two mounting screws located inside the hose cavity.
7. Remove the MTS from the cabinet wall by pulling straight out with a slight rocking action.
8. Remove the 2 screws and washers holding the MTS slide switch and pull switch wires out through the cabinet.
9. Remove the bushing from the cabinet wall and thread the wires on the new slide switch through the bushing. Install the switch with the two mounting screws and washers. Install the bushing back into the hole in the cabinet wall making sure the wires are threaded through the bushing as far as possible.
10. Check to ensure the wavy spring washer is on the motor shaft.
11. Install the MTS on the cabinet wall by aligning the coupling and motor shaft.
12. Turn the roller assembly while pushing the MTS back until completely engaged. The MTS base should seat flush to the wall of the cabinet.
13. Install the two mounting screws.
14. Reinstall the MTS hose assembly.
15. From the rear of the freezer, reconnect wires from the slide switch to the wire's "slide switch cord." (If wire terminals have been removed from cord marked "cord switch," use electrical tape and wrap around connectors.)
16. Install rear panel.

Important:
Make sure the wavy washer stays on the motor shaft behind the cabinet wall.

— continued

9.3 MTS Slide Switch Replacement – continued

B. CHECKING THE MTS SLIDE SWITCH ASSEMBLY



CAUTION
DO NOT place hands near the MTS rollers. Severe personal injury could result.

1. Reconnect power to the freezer.
2. With the MTS handle in the down position put the MTS switch in the "ON" position. If the slide switch is working properly, the MTS will not come on.
3. Place the MTS switch in the "OFF" position.
4. Close the MTS handle and lock in place with the swing hook.
5. Place the MTS switch in the "ON" position. If the slide switch is working properly, the MTS will come on.
6. With the MTS running, unlock the swing hook and slowly lower the housing using the handle. If the slide switch is working properly, the MTS will shut off within 3/8" (9.5 mm) travel.

NOTE: If the MTS slide switch will not turn on, readjust switch to left or right and test again. If the MTS slide switch does not operate properly, call the factory.

7. After the slide switch has been checked for proper operation, disconnect power.



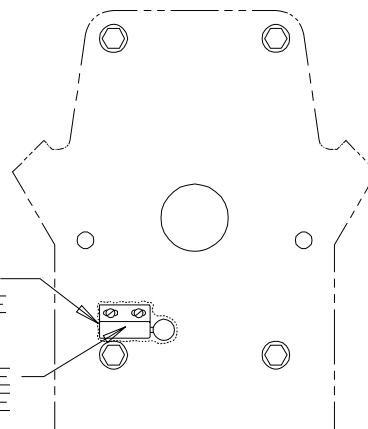
CAUTION
To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position, and the main power supply is disconnected. Some freezers have more than one disconnect switch.

8. Open the slide, and remove screws holding the MTS in place.
9. Pull off MTS to expose switch. Apply silicone sealant around switch and lead wires. See figure 9-6
10. Reapply a thin coat (less than 1/32" thick or .8 mm) to the left side of the switch, and 1/16" (1.5 mm) thick coat to the top, bottom, and right side of the switch. (See Figure 9-3.) Do not reapply RTV to the surface of the switch that faces the cab opening. Failure to complete this procedure could result in the slide opening and closing improperly.

1/32" THICK
ON THIS SIDE

NO RTV ABOVE
THIS SURFACE

Figure 9-6



9.4 MTS Roller Assembly Replacement

A. REMOVING THE ROLLER ASSEMBLY



CAUTION

To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position, and the main power supply is disconnected. Some freezers have more than one disconnect switch.



CAUTION

Pressurized system. Depressurize before disassembling.

1. Unlock the MTS handle and pull down to open the housing and give access to the hose cavity.
2. Remove the Mix transfer hose assembly.

3. Remove the two screws located inside the hose cavity. See figure 9-7.
4. Remove the MTS from the cabinet wall by pulling straight out with a rocking action. Take the MTS to a work bench.

IMPORTANT

Make sure the curved spring washer stays on the motor shaft behind the cabinet wall.

5. Remove three screws on the back of the base holding the bearing housing and pull the bearing housing from the base. See Figure 9-8.

IMPORTANT

The plastic base, bearing housing, and slide assembly are machined parts that form a matched set. DO NOT attempt to interchange parts of this assembly with other parts.

6. Gently rock and pull the old roller assembly out of the bearing housing. The roller assembly is press-fitted and cemented to the housing.

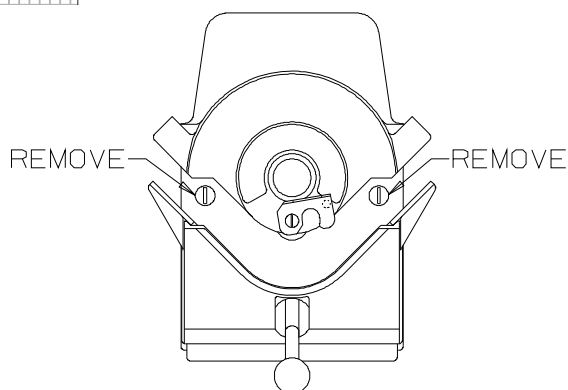


Figure 9-7

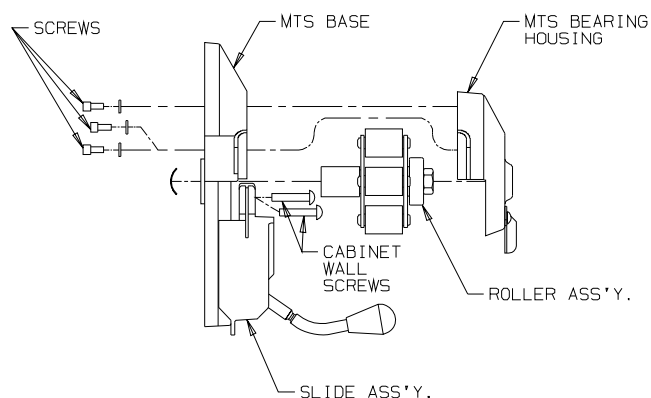


Figure 9-8

9.4

MTS Roller Assembly Replacement (continued)

B. INSTALLING THE ROLLER ASSEMBLY INTO THE NEW BEARING HOUSING

1. Take the roller assembly and check fit with the motor shaft at the freezer. The roller should fit snugly with very little rocking. A severely worn motor shaft or roller coupling must be replaced for proper operation of the MTS.
2. Inspect the roller assembly, making sure it is clean and all rollers move smoothly and freely.
3. Wipe clean with rubbing alcohol the outside bearing surface and the 8 spline's inside the bearing housing. Apply a drop of Loctite 414® adhesive (provided) to each spline in the bearing housing.
4. Take the roller assembly and align the end bearing over the plastic housing. Note that the bearing will have to be pressed into the machined step in the housing. Press firmly with two hands, using your body weight to help bottom out the bearing in the cavity. Let the adhesive cure for 5 minutes.
5. Reassemble the bearing housing to the base with the three screws. Apply a drop of Loctite #242® to each screw and use the flat washers provided in the kit to secure the screws.
6. Remove all RTV from the MTS slide switch on the rear wall of the cab. Reapply a thin coat (less than 1/32"

[0.8 mm] thick) to the left side of the switch, and 1/16" (1.6 mm) thick coat to the top, bottom, and right side of the switch. Do not reapply RTV to the surface of the switch that faces the cab opening. (See figure 9-9) Failure to complete this procedure could result in the slide opening and closing improperly.

7. Check to ensure the curved spring washer is on the MTS motor shaft.
8. Install the MTS on the cabinet wall by aligning the coupling and the motor shaft.
9. Turn the roller assembly while pushing the MTS back until completely engaged.
10. Install the two mounting screws being sure the base is flush against the back wall before tightening screws.

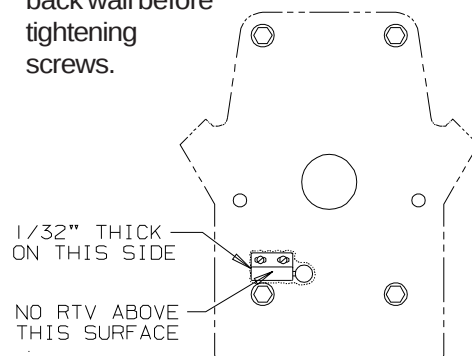


Figure 9-9

C. TEST INSTALLATION OF MTS

1. Reassemble the freezer according to the Operator's Manual. Turn the mix switch to "PRIME" or "ON" if there is no "PRIME" position. Pressurize the unit with water, then depressurize. Repeat 5 times. With the unit depressurized, turn the mix switch to the "OFF" position.
2. Unlock the MTS handle and pull the slide down to open the hose cavity.

Carefully check the position of the hose in relation to the rollers. The hose should be near the center of the roller. If the hose is too far back or forward, the hose could be cut by the edge of the roller. If the hose shows excessive wear or cuts contact the factory for further instructions.

NOTE: This mix transfer housing has been completely tested at the factory with a roller assembly installed.

9.5 MTS Actuator Replacement Instructions



CAUTION

To avoid electrical shock and contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

1. Remove MTS housing assembly as noted in section 1.1.A.
2. Remove the two nuts (figure 9-14, 1) and remove old magnet (2) located on the inside of the slide assembly.
3. Install new slide actuator assembly and tighten nuts snug but still allowing slide to move.
4. Check to ensure the curved spring washer is on the MTS motor shaft.
5. Install the MTS on the cabinet wall by aligning the coupling and the motor shaft.
6. Turn the roller assembly while pushing the MTS back until completely engaged.
7. Install the two mounting screws being sure the base is flush against the back wall before tightening screws.

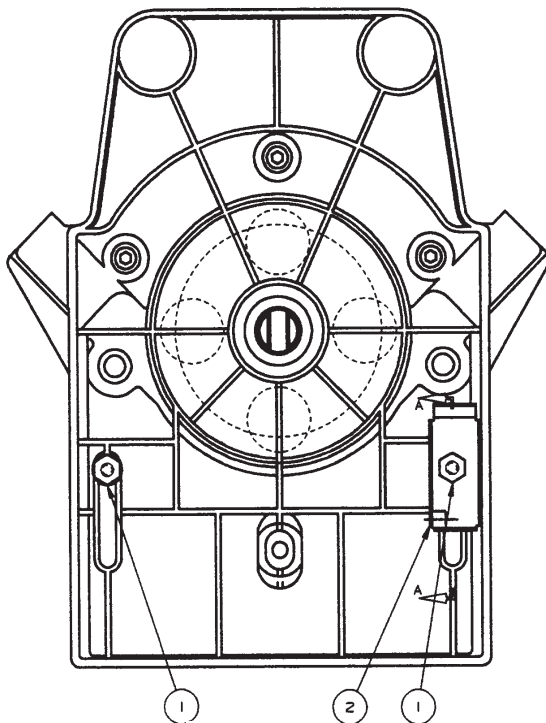


Figure 9-14

- ① NUT
- ② MAGNET

10 Equipment Operation

10.1 The Refrigeration System

(See Figures 10-1 and 10-2) The compressor discharges the refrigerant to the condenser as a high-temperature, high-pressure gas. Either by water-cooling or air-cooling, the refrigerant gas condenses to liquid. This high pressure liquid flows into the receiver which serves as the refrigerant reservoir. Upon leaving the receiver, the refrigerant flows through the filter drier, sight glass, and cylinder solenoid valve (which is controlled by the cylinder thermostat).

When the cylinder thermostat calls for cooling, the cylinder solenoid coil is energized and the valve opens to permit the flow of refrigerant to the automatic expansion valve. This expansion valve controls the flow of refrigerant in the evaporator in such a way as to keep practically the entire coil filled with evaporating refrigerant.

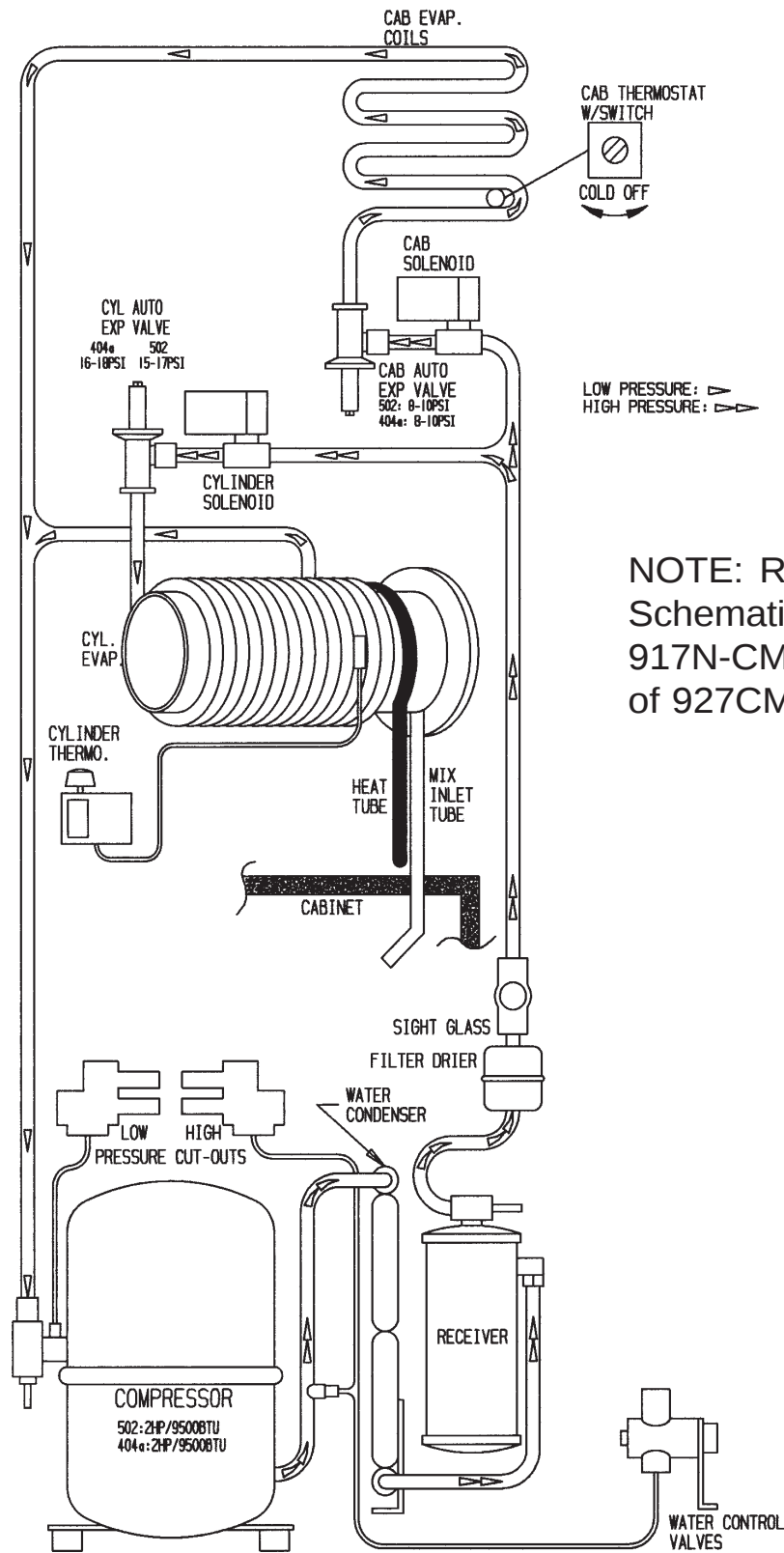
As the refrigerant in the cylinder evaporator absorbs the heat, it changes to a low pressure vapor. This vapor is re-

turned to the low pressure side of the compressor through the suction line leading from the freezing cylinder, thus completing the refrigeration cycle.

In water-cooled systems the flow of cooling water to the condenser is metered by a pressure-controlled regulating valve. Here, two forces control the size of the valve opening through which condenser water may flow. An adjustable tension spring tends to keep the valve closed while a bellows, connected by tubing to the high-pressure side of the system, tends to open the valve. When the refrigeration system begins operation, the increased pressure caused by the compressor opens the water regulating valve and permits water to flow through the condenser. When the unit cycles off, the water continues to flow through the valve until the condensing pressure has decreased below the valve setting. (See Section 8.2, for settings.)

10.1

The Refrigeration System – continued



NOTE: Refrigeration Schematic for Model 917N-CMT and one side of 927CMT and 957CMT.

Figure 10-1 Refrigeration Schematic

MO0912

10.1

The Refrigeration System – continued

Refrigeration Schematic for Remote Condenser

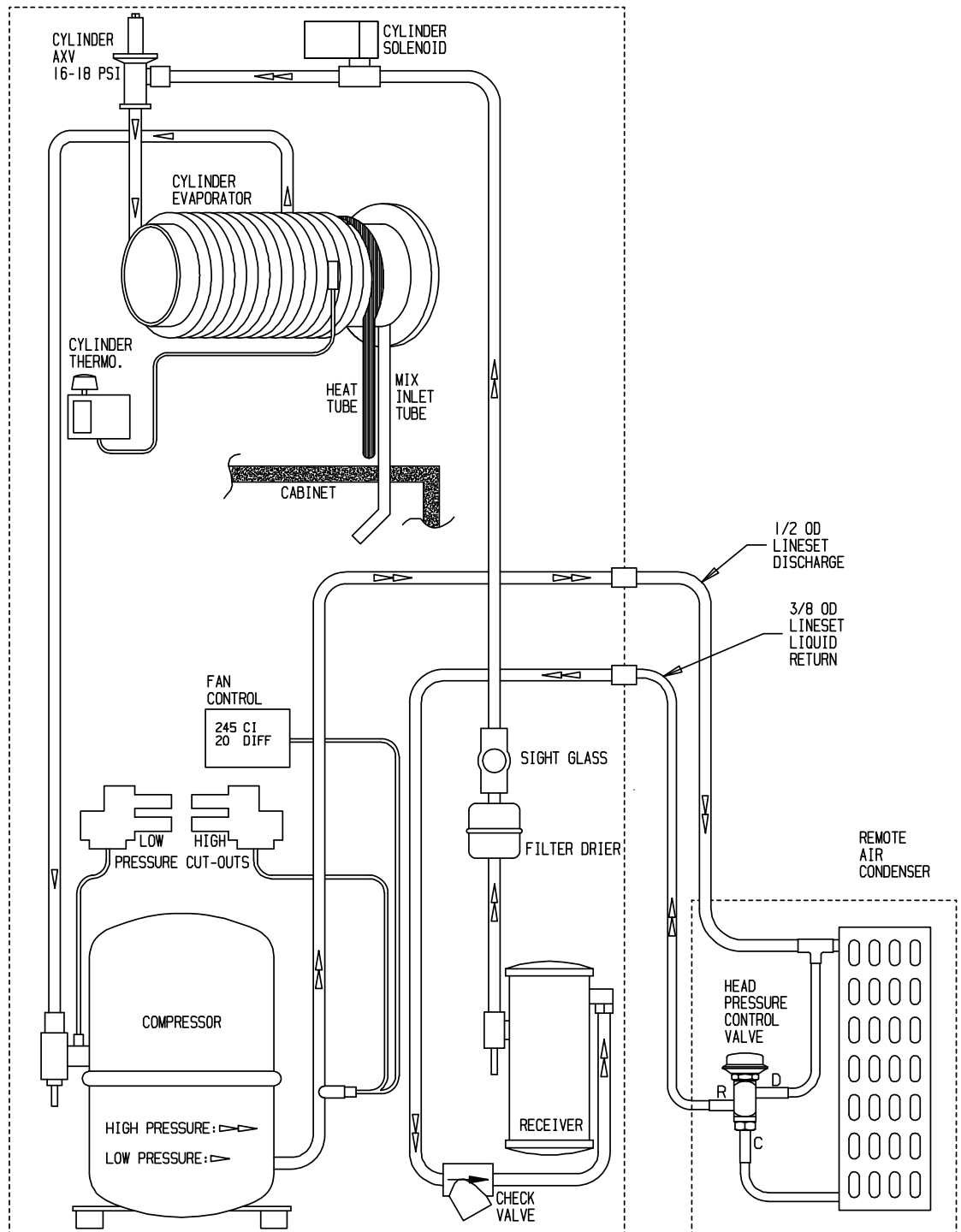


Figure 10-2 Refrigeration Schematic

10.2 The Electrical Circuit

The electrical operation of the system depends on the position of the MTS switch, selector switch and mode of operation. In the following discussion, five examples are considered.

- 1) operation when the selector switch is in the "AUTO" position but product is not being dispensed
- 2) operation during the time that the product is being dispensed
- 3) operation immediately after dispensing the product
- 4) operation when the selector switch is in the "CLEAN" position
- 5) operation of the pump when the MTS switch (mix) is in the "ON" position.

Note the differences between the single-phase circuit and the three-phase circuit.

NOTE: The following schematic shown (Figure 10-3) is for a standard 917N-CMT. Always refer to the schematic and wiring diagram supplied with the freezer.

NOTE: If the head is removed, the magnetic head switch will be open, cutting power to the beater motor contactor coil.

When the selector switch is in the "AUTO" position but product is not being dispensed, the refrigeration circuit is controlled by the cylinder thermostat. Note that current cannot flow through the mechanical timer or the spigot switch circuit, when both are open. When the temperature in the cylinder exceeds the setting of its controlling thermostat, the thermostat contacts close, thus energizing the solenoid valve and releasing the flow of refrigerant to the cylinder coils. This action also energizes the compressor contactor and beater motor starter coils, closing the points on the contactors.

When the operator is dispensing product, the spigot switch closes the contacts 1-2 on the solid state timer. This in turn energizes the coils on the contactors for the beater motor, compressor, and cylinder solenoid.

When the operator closes the spigot to shut off the flow of product, the spigot switch opens which starts the time delay period. The time delay contacts will remain closed for a period of 12 seconds after dispensing. The purpose of this delay is to refrigerate the new mix that entered the freezing cylinder when the frozen product was dispensed. Control of the refrigeration circuit is returned to the thermostat at the end of the 12 second period.

When the selector switch is in the "CLEAN" position, the refrigeration circuit is de-energized and only the beater motor starter and beater motor are energized.

The mechanical timer bypasses the thermostat, forcing the compressor and beater motor to run up to 3 minutes. This timer is used for quick start-ups or fast recovery when dispensing large portions.

Important:

Excessive use of the mechanical timer can causes freeze-up and damage to the freezer.

When the mix switch is in the "ON" position the mix motor relay coil is energized through the mix pressure switch and magnetic slide switch. The mix motor is then energized through the mix motor relay points. When the mix pressure switch opens the mix motor relay coil is de-energized and the mix motor stops.

10.2 The Electrical Circuit – continued

917N-CMT Electrical Schematic

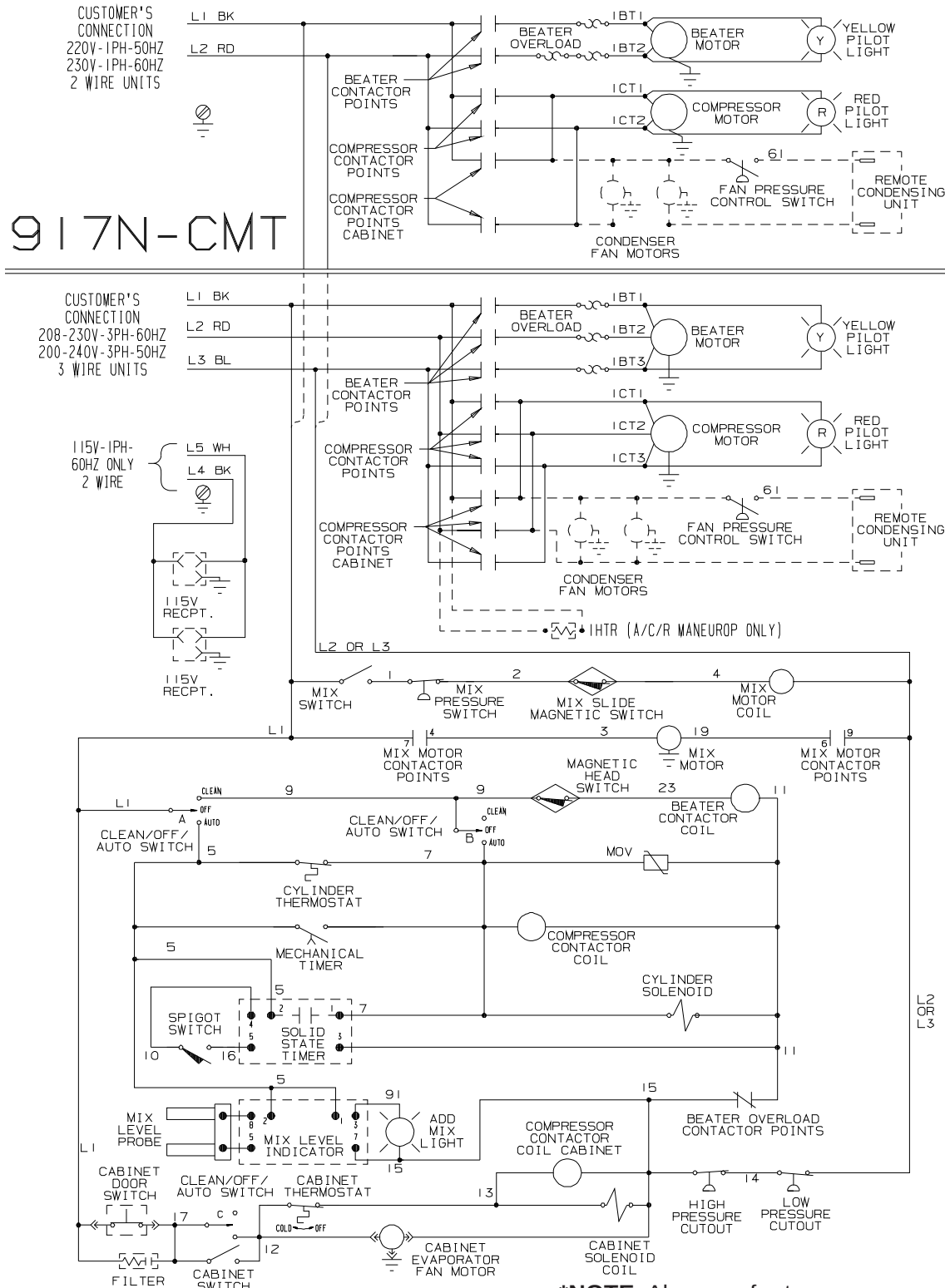


Figure 10-3 Electrical Schematic*

10.2

The Electrical Circuit – continued

927/957CMT Electrical Schematic

***NOTE:** Always refer to the Electrical Schematic and diagram supplied with the freezer.

*Figure 10-4 Electrical Schematic**

11

Maintenance and Adjustments



CAUTION

All maintenance and adjustments must be done by an authorized service technician.



CAUTION

To avoid electrical shock and contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

11.1 Gear Reducer Lubrication Instructions

The gear reducers are heavy duty, worm-gearred units manufactured to H. C. Duke & Son, Inc. specifications. The following lubrication procedures should be followed.



CAUTION

To avoid electrical shock and contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

IMPORTANT:

DO NOT overfill. Overfilling can damage the gear reducer.

1. OIL – This is a special oil and will not mix with petroleum base oil. When adding or changing oil verify type of oil from the tag located on the gear reducer. Improper oil usage will cause the gear reducer to fail.

2. INITIAL OIL CHANGE – The oil in a new gear reducer should be drained at the end of 1500 hours of operation or 6 months, whichever occurs first.
3. OIL CHANGING – Under normal conditions, after the initial change, the oil should be changed after every 5000 hours of operation, or every year, whichever occurs first.
4. OVERFILLING OR UNDERFILLING – If a gear reducer is overfilled with oil, the energy used in churning the excessive oil can result in overheating. If the gear reducer is underfilled, the resultant friction can cause overheating. If underfilling occurs, fill the gear reducer to the oil level plug hole. See Figure 11-1.

NOTE: Normal operation can generate temperatures up to 200°F (93°C). If overheating occurs due to overfilling, shut down the drive, remove the oil level plug and allow excess oil to drain. Reinstall the oil level plug, and restart the drive.

– continued

11.1 Gear Reducer Lubrication Instructions – continued

5. **DRAINING OIL** – Open oil drain plug(s). Drain oil with speed reducer at normal operating temperature.
6. **PROPER OIL LEVEL** – Fill until oil is at the bottom of the threads in the oil level plug hole.
7. **INSPECTION** – When changing oil, always inspect all areas around the reducer for traces of oil. If oil is found in the immediate area, repair the leak (usually an oil seal) and check for proper oil level.

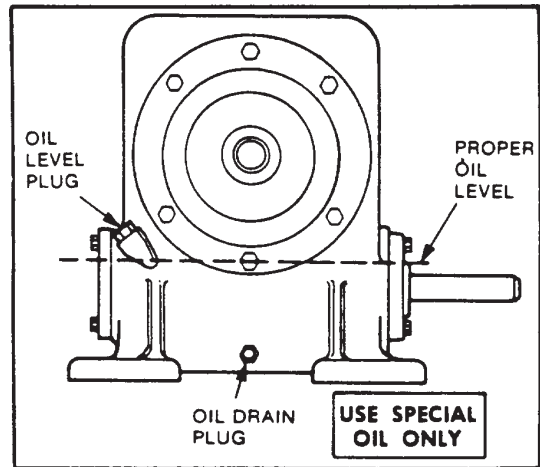


Figure 11-1 Gear Reducer

11.2 Condenser Cleaning



CAUTION
To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and the main power supply is disconnected. Some freezers have more than one disconnect switch.

A. Air Cooled Condensers

At least once a month, the face area of the condensers should be inspected for accumulation of dirt and dust. Surface dirt and dust can usually be removed with a stiff brush and/or vacuum cleaner or compressed air. After brushing, hold a light between the fan blades and look through the condenser from the opposite side. This procedure will locate those areas where accumulated dirt has lodged between the condenser fins.

When using compressed air:

1. Place a damp towel or cloth over the face area of the condensers.
2. Blow dirt through the clogged areas of the condenser into the damp towel.

B. Water Cooled Condensers

Depending on water conditions, the condenser may require cleaning. Usually a restricted flow of water resulting in a high head pressure indicates a dirty condenser. Flush the condenser with a commercially available condenser cleaner suitable for use on copper and rubber components.

C. Beater and Condenser Fan Motor Inspection



CAUTION
To avoid electrical shock and contact with moving parts, make sure all selector switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

The beater and fan motors do not require lubrication but should be inspected and cleaned annually.

11.3 Pulley Alignment and Belt Tension



CAUTION
To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

1. Remove the side panels to expose the pulleys and the belts.
2. Check the alignment of the beater motor pulley and the gear reducer pulley by placing a straight edge across the faces of the two pulleys. If the pulleys are not aligned, adjust as necessary until proper alignment is obtained.
3. Depress the belt at a point midway between the two pulleys. When properly adjusted, the belt should depress $\frac{1}{2}$ inch from its normal position with approximately five pounds of pressure.
4. If the belt is too tight or too loose, adjust as necessary until proper belt deflection is obtained by loosening the four (4) bolts which hold the motor mounting plate to the frame. With these loose, adjust the tension bolt in or out as required to obtain proper belt tension. Retighten bolts.
5. Periodically inspect the belts. If they are worn, replace both belts, as they are manufactured in matched sets.

NOTE: Most pulleys are mounted with Loctite®. It may be necessary to heat for removal.

11.4 Beater Drive Coupling Replacement and End Play Setting

11.4.1 Beater Drive Coupling Removal

IMPORTANT:
Improper drive coupling spacing will damage the beater shaft, dispensing head, and drive coupling. When checking end play settings or replacing a coupling, proceed as follows.



CAUTION
Make sure freezer is depressurized before proceeding.



CAUTION
To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

1. Remove product from the cylinder.
2. Remove dispensing head and beater shaft. (See figure 11-2 Ref.#2.)
3. Remove both drive belts (not shown).

11.4.1 Beater Drive Coupling Removal – continued

4. Remove gear reducer bolts (Ref. #8). Six (6) bolts are located around the face of the reducer.

NOTE: Remove the top bolt last while holding the bottom of the reducer.

5. Remove the gear reducer (Ref. #1).

6. Replace two (2) bolts (Ref. #8), one (1) at the top and one (1) at the bottom, so that the reducer cover will not come off while the coupling is changed.
7. Loosen the four (4) set screws (Ref. #7), and remove the drive coupling (Ref. #4). If the coupling is stuck tight to the output shaft, lightly tap the coupling from the back with a brass or plastic hammer and bar, as a hard hammer can damage the bearings. Sometimes, due to age, this coupling will stick so tight it will have to be removed with a pulley-removing tool or a "wheel puller."

8. Remove the key (Ref. #10).

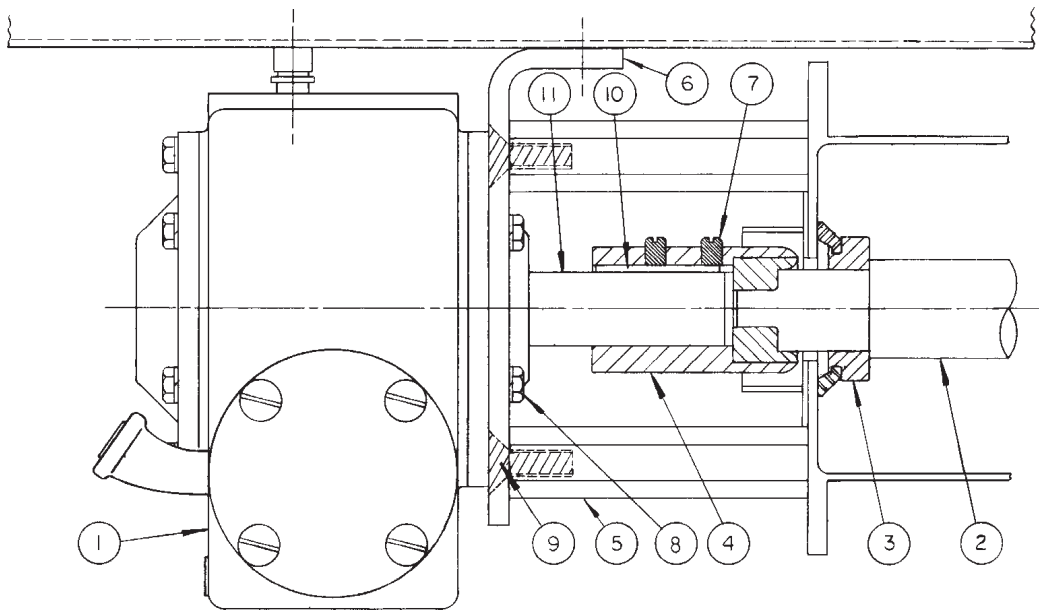


Figure 11-2

No.	DESCRIPTION	No.	DESCRIPTION
1.	Gear Reducer	7.	Set Screws
2.	Beater Shaft	8.	Bolt-Gear Reducer
3.	Shaft Seal	9.	Bolt-Reducer Mounting Plate
4.	Drive Coupling	10.	Key
5.	Spacer	11.	Output Shaft
6.	Reducer-Mounting Plate		

11.4.2 Installing the New Coupling

1. Clean gear reducer output shaft (Ref.#11) with fine emery cloth, and slide the new drive coupling on the reducer shaft. The coupling should slide on the shaft all the way without the key. If the coupling doesn't slide completely on, check both the coupling and reducer shaft for burrs.
2. When a smooth sliding fit is achieved, remove coupling and proceed with final assembly.
4. Remove the two (2) bolts added in preceding Step #6 of Beater Drive Coupling Removal (previous page).
5. Place one (1) gear reducer bolt (Ref.#8) in the top hole of the cylinder mounting plate.
6. Insert gear reducer onto cylinder mounting plate and start top bolt (Ref. #8). Do not tighten completely. Now insert the other bolts one at a time. When all bolts are in, tighten each bolt.

Place key (Ref. #10) in key slot on the reducer output shaft. Keep the key flush with the front end of the output shaft (Ref. #11).

NOTE: Coat output shaft with Loctite Anti-Seize to make future removal easier.

3. Slide the coupling (Ref. #4) until it bottoms out on the shaft. Leave the four (4) set screws loose as the coupling will have to be adjusted.

IMPORTANT:

Make sure the drain pan lip is on the front of the reducer mounting plate, not in between it and the reducer.

NOTE: Due to very close tolerance between the gear reducer and cylinder mounting plate, no alignment is required when installing the reducer. When the reducer bolts are tightened, the reducer will self-align with the cylinder.

11.4.3 End Play Adjustment for Beater Drive Coupling

- 1. Insert the beater shaft (Ref.#2) with the shaft seal and blades into the cylinder and engage beater shaft in the drive coupling.
- NOTE:** The four (4) set screws on the coupling must be loose, as the coupling will have to be adjusted.
- 2. Place the head bushing on the beater shaft.
- 3. Place the dispensing head into the cylinder and tighten with the hand knobs.

- IMPORTANT:**
Make sure hand knobs are tight and head is against the end of the cylinder tube.
- 4. Slide the drive coupling (Ref.#4) forward until it is tight against the beater shaft. Move the coupling back 1/16 of one inch (about the thickness of a dime)
 - 5. Tighten all four set screws.
 - 6. Replace the drive belts.
 - 7. Reconnect electrical power.

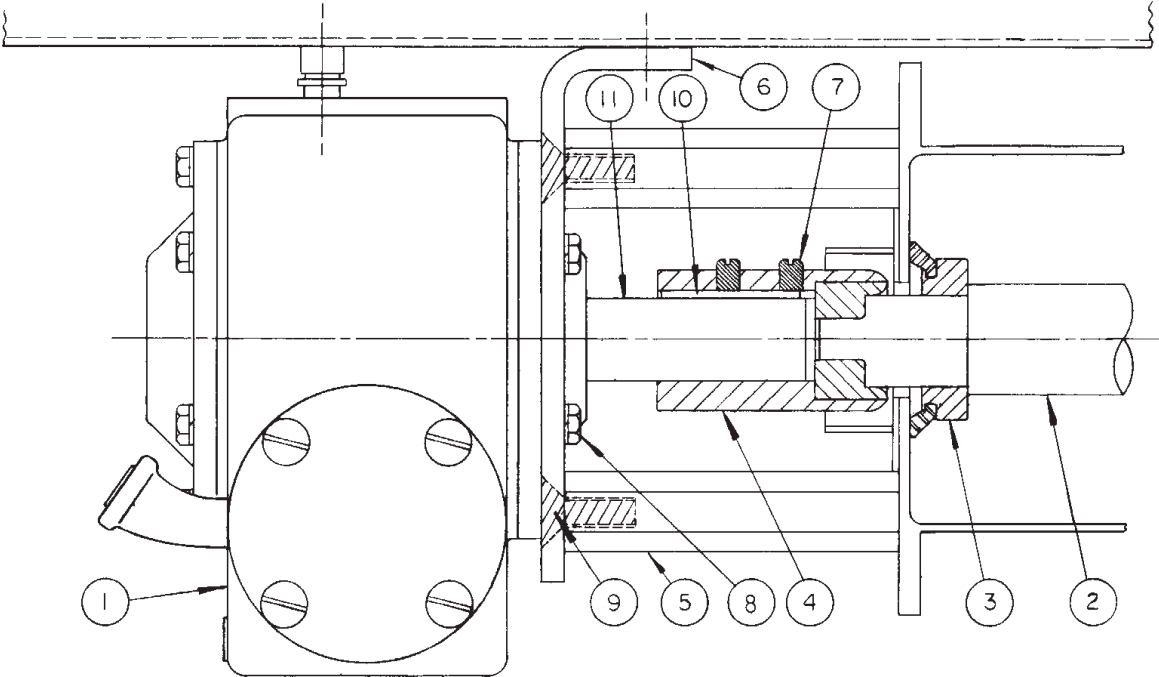


Figure 11-2

No. DESCRIPTION

- 1. Gear Reducer
- 2. Beater Shaft
- 3. Shaft Seal
- 4. Drive Coupling
- 5. Spacer
- 6. Reducer-Mounting Plate

No. DESCRIPTION

- 7. Set Screws
- 8. Bolt-Gear Reducer
- 9. Bolt-Reducer Mounting Plate
- 10. Key
- 11. Output Shaft

11.5 Cylinder Pressure Switch

11.5.1 Removing Cylinder Pressure Switch



CAUTION

To avoid electrical shock or contact with moving parts, make sure all switches are in the "OFF" position and that the main power supply is disconnected. Some freezers have more than one disconnect switch.

1. Remove Permagem Sealant putty around pressure switch and scrape off silicone sealant (if any).
2. Disconnect red and white wire 12 inches from switch.
3. Using 1/16" hex key, loosen the three set screws on the hex nut holding the pressure switch. Unscrew the nut from the switch and remove. Remove the spacer. Lightly tap the switch to break the silicone seal and push it through into the cylinder.
4. Carefully clean both surfaces of the cylinder wall with rubbing alcohol and remove all old silicone. The cylinder may be lightly sanded to remove old silicone. Clean the outer cylinder surface (nut & spacer side) of silicone and Permagem Sealant. SURFACES MUST BE PERFECTLY CLEAN FOR THE NEW SWITCH TO WORK PROPERLY. Use rubbing alcohol to remove any surface films.

11.5.2 Installing New Cylinder Pressure Switch

IMPORTANT:

Do not press diaphragm of new pressure switch, drop, or distort this surface in any way. This is very delicate and if abused will void all warranties. Retain protective cover on switch assembly until installation of switch.

1. Trial-fit new switch in cylinder, using the new spacer and nut. Hint: Tape the wires together at the ends. This will help when threading the wires through the pressure switch mounting hole.

IMPORTANT:

Do not drag threads on pressure switch through the hole in the cylinder. Lift and gently push the switch through.

2. Check to be sure the curvature of the cylinder matches the lip of the switch. Slide the switch holding tool into the cylinder and on to the head of the pressure switch, taking care not to depress the switch diaphragm.

Wiggle the switch and the curved spacer to get the exact match to the curvature of the cylinder.

IMPORTANT:

Any misalignment of pressure switch and wall of cylinder will change pressure set point and damage the switch!

3. Scribe a locator line on label of new switch with a pen to mark the horizontal position of the switch. Scribe a horizontal line on the curved spacer to match the line on the switch.
4. Remove the pressure switch from the cylinder. With rubbing alcohol, thoroughly clean the area to be sealed. Clean cylinder wall, inside and out, and clean mating surface of pressure switch. Allow to dry. It is important that surfaces receiving the sealant are clean to ensure a good bond.

— continued

11.5.2

Installing New Cylinder Pressure Switch – continued

5. Apply a thin film of grey RTV silastic sealant around O-ring on switch and a 1/8 in. bead around the head of pressure switch. (See figure 11-3.)
6. Install the switch into the cylinder hole, taking care not to smear the bead of RTV. Align the horizontal line into position noted in the trial installation. Place the holding tool in cylinder straight over the switch to hold the switch in place.
7. With the O-ring in the spacer, apply a thin film of gray RTV sealant on the o-ring, slide it over the switch body and thread it on the nut. Align the locating lines and tighten the nut finger-tight. Tighten 3 set screws uniformly to finger-tight. (2 in-lb torque)
8. Remove the holding tool from the cylinder.
9. Wipe off excess RTV inside the cylinder with a tissue or a soft paper towel. Allow RTV sealant to cure for 30 minutes.
10. Reconnect switch leads to wires and secure in place with tie-wraps.
11. While waiting, seal the wires where they exit the switch. Squeeze out a liberal amount of the clear silicone sealant and allow it to flow over the rear of the switch (See Fig 11-3.) The sealant should cover the entire black cap, 3/4 in. of the exposed wires and 1/4 in of the metal housing. Place a paper towel under the switch to catch the excess sealer which runs off. After a skin forms on the sealant—about 15 minutes—apply a full second coat.
12. The installation can be checked for leaks using water. Also check the cut-out and cut-in pressure setting of the switch. (Use part number 116312 pressure gauge assembly.)

NOTE: Cut out pressure must not exceed 26 psig and the cut in pressure should be within 2-5 psi of the cutout pressure.

NOTE: Minimum cut out PSIG is 19 PSIG.

Important

Pressures over 26 psig will cause the hose to stretch which will shorten the life of the hose.

13. Once the 2nd coat of clear sealant is dry, repack permagum insulation around pressure switch. Then the freezer can be cleaned, assembled, sanitized and placed in service.

Important

Excessive pressure on nut or set screws will change pressure setting and may damage pressure switch.

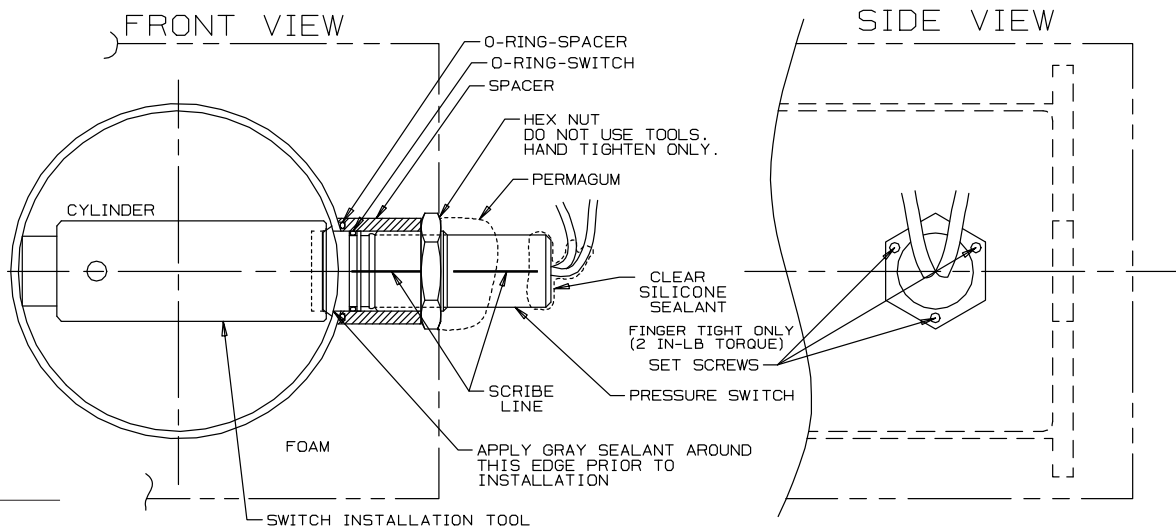


Figure 11-3

12 Service Troubleshooting Charts

SAFETY



This safety alert symbol identifies important personal safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury. **DO NOT** attempt to continue until the safety precautions are thoroughly understood.



CAUTION

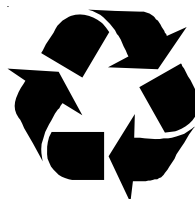
ALL MAINTENANCE AND ADJUSTMENTS MUST BE MADE BY A QUALIFIED REFRIGERATION TECHNICIAN.



CAUTION

WHEN EVACUATING EITHER SIDE OF THE FREEZER, DO NOT OPERATE THE OPPOSITE SIDE. ALL CONTROL SWITCHES MUST BE IN THE "OFF" POSITION AND THE MAIN POWER SUPPLY DISCONNECTED. IF POWER IS APPLIED TO A COMPRESSOR IN A VACUUM, A SHORT MAY OCCUR.

NOTE: Some refrigerants are hazardous to the Earth's atmosphere. To protect our environment, use a refrigerant recovery/recycling unit whenever removing refrigerant from the system.



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Service Troubleshooting Charts – continued

PROBLEM	PROBABLE CAUSE	REMEDY
Unit does not operate.	1. Freezer unplugged.	1. Plug in freezer.
	2. Fuse or breaker blown at main disconnect.	2. Make sure your freezer is connected to a separate circuit independent from any other electrical equipment. Check fuse or breaker size; check for low voltage; if not within 10% of nameplate rating call power company.
	3. Beater motor out on overload.	3. Press overload reset button. Check for low voltage. Check product temperature and overrun.
	4. Off on high pressure cut out control.	4. Check refrigerant charge, pressure settings and high pressure control. Check for restricted water or drain line. Check condenser fans. Clean air condenser coil.
	5. Off on low pressure cut out control.	5. Check refrigerant charge, pressure settings and low pressure control. Check for moisture in refrigeration system.
	6. Faulty selector switch.	6. Replace selector switch.
	7. Disconnected or broken wire in electrical circuit.	7. Check wiring and connections; repair or replace wires as necessary.
Leakage of mix or water from drain tube to drip tray.	1. Damaged beater shaft seal or installed improperly.	1. Replace cup seal or o-ring inside bushing. Install properly.
	2. Beater shaft end play not set properly.	2. Set per instructions in Maintenance and Adjustment section.
	3. Damaged beater shaft.	3. Replace beater shaft.
Mix leaking at dispensing head.	1. Faulty head o-ring.	1. Replace o-ring.
	2. Head not properly installed.	2. Install head properly. Replace o-ring if pinched.

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Service Troubleshooting Charts – continued

PROBLEM	PROBABLE CAUSE	REMEDY
Dispensed product too soft (Product temperature above 21°F)	1. Automatic expansion valve incorrectly set or erratic in operation.	1. Adjust or replace expansion valve. (See Section 8.2 or 8.3)
	2. Leak in refrigeration system resulting in little or not refrigeration.	2. Find refrigerant leak. Remove charge into a refrigerant recovery/recycling unit. Repair leak, evacuate and recharge system.
	3. Thermostat set too high or faulty.	3. Adjust thermostat or replace. (See Sec. 8.1)
Product dispenses slowly out of dispensing head.	1. Product too cold.	1. See "Dispensed Product Too Hard" this section.
	2. Reverse rotation on beater.	2. Correct rotation to clockwise as viewed from the front of freezer.
	3. MTS pressure too low.	3. Check dispensing pressure.
Dispensed product too hard.	1. Cylinder thermostat erratic or set too cold.	1. Adjust thermostat or replace.
	2. Faulty time delay. (Unit runs all the time.)	2. Replace time delay. (See Sec. 8.1)
	3. Low suction pressure.	3. See Maintenance and Adjustments for setting. (See Sec. 8.2 or 8.3)
	4. Spigot switch electrically or mechanically stuck closed. (Unit runs all the time.)	4. Adjust or replace spigot switch
Machine runs continually and product continues to get colder.	1. Spigot switch rod engaged.	1. Close spigot completely.
	2. Spigot switch (side or center) out of adjustment or defective.	2. Adjust or replace spigot switch. (Sec.7.3)
	3. Faulty thermostat or bulb not deep enough in well.	3. Check movister, time delay and thermostat, replace as needed.
	4. Starter contact points stuck.	4. Replace starter, and test head switch operation.
	5. Faulty time delay.	5. Replace time delay.
	6. Suction pressure too low, refrigeration system.	6. See Maintenance and Adjustments for setting. (See Sec. 8.2 or 8.3)

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Service Troubleshooting Charts – continued

PROBLEM	PROBABLE CAUSE	REMEDY
Poor or slow product recovery.	1. Dirty or blocked condenser, restricted air flow - high ambient temperature.	1. Clean condenser, lower ambient temperature.
	2. Thermostat cut in point out of adjustment or malfunctioning.	2. Adjust or replace.
	3. Defective condenser fan motor.	3. Replace fan motor.
	4. Defective compressor.	4. See Trouble Shooting Compressor/Condensing Circuit.
	5. Water flow restriction to machine or through condenser.	5. Remove restriction, clean or replace condenser.
Compressor does not operate or operates improperly.	1. Trouble in compressor condensing circuit.	1. Refer to Trouble Shooting Compressor/Condensing Circuit.
	2. Faulty start capacitor, run capacitor or relay. (single phase only)	2. Replace start capacitor. Replace run capacitor. Replace compressor relay
	3. Faulty contactor.	3. Replace contactor.
	4. Disconnected or broken wire in switch or capacitor relay box.	4. Check wiring and connections; repair or replace wire leads as necessary.
Beater motor does not operate.	1. Head assembly is not installed.	1. Install head assembly.
	2. Magnetic head switch defective.	2. Replace magnetic head switch.
	3. Loose connection in control circuit.	3. Locate and tighten connection.
	4. Open starter coil.	4. Replace coil.
	5. Worn out relay contact.	5. Replace relay.
	6. Faulty capacitor assembly, (1 phase)	6. Replace capacitor assembly.
	7. Faulty beater motor.	7. Replace beater motor.
	8. Beater overload open.	8. Reset or replace overload.
Compressor and beater motor operate only when dispensing.	1. Cylinder thermostat, setting too warm.	1. Replace or adjust thermostat. (See Sec. 8.1)
Compressor and beater motor do not operate when dispensing.	1. Spigot switch (es) defective or out of adjustment.	1. Replace or adjust. (See Sec. 7.3)
	2. Time delay defective	2. Replace time delay.

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Service Troubleshooting Charts – continued

PROBLEM	PROBABLE CAUSE	REMEDY
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Troubleshooting Charts Compressor/Condensing Circuits

Compressor will not start - hums intermittently (cycling on overload).	1. Improperly wired.	1. Check wiring against diagram.
	2. Low line voltage.	2. Ask power company to increase voltage to not less than 10% below dataplate rating or install transformer. Check for inadequate wire size and length of wire to circuit breaker.
	3. Open start capacitor. (single phase only)	3. Replace start capacitor.
	4. High discharge pressure.	4. See "Discharge Pressure Too High" this section.
	5. Defective compressor.	5. Replace compressor.
	6. Potential relay defective.	6. Replace potential relay.

Compressor starts, but remains in start windings.	1. Low line voltage.	1. Ask power company to increase voltage to not less than 10% below dataplate rating or install transformer. Check for inadequate wire size and length of wire to circuit breaker.
	2. Improperly wired.	2. Check wiring against diagram. Check wire size.
	3. Run capacitor shorted. (single phase only)	3. Check by disconnecting run capacitor.
	4. Start capacitor weak. (single phase only)	4. Check capacitor, replace.
	5. Defective relay. (single phase only)	5. Replace relay.

Contactor failure, points burned and pitted.	1. Low line voltage.	1. Make sure your freezer is connected to a SEPARATE circuit independent from any other electrical equipment. Ask power company to increase voltage to not less than 10% below dataplate rating or install transformer.
	2. Excessive line voltage.	2. Ask power company to reduce voltage to maximum of 10% over dataplate rating.
	3. Contactor chattering.	3. Check movister, time delay and thermostat. Replace as needed.

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Service Troubleshooting Charts – continued

Troubleshooting Charts Compressor/Condensing Circuits

Unit operates long or continuously.	1. Dirty condenser.	1. Clean condenser.
	2. Shortage of refrigerant.	2. Remove charge into a refrigerant recovery/recycling unit, repair leak and recharge.
	3. Moisture in system.	3. Remove charge into a refrigerant recovery/recycling unit, evacuate and recharge system.



CAUTION: When evacuating either side of a double freezer DO NOT OPERATE THE OPPOSITE SIDE. All control switches must be in the "OFF" position and the main power CORD(S) disconnected. If power is applied to a compressor in a vacuum a short may occur CAUSING PERSONAL INJURY.

	4. Compressor failing.	4. Check compressor for proper pressures. Replace if inadequate.
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Discharge pressure too high..	1. Water turned off or defective water regulating valve.	1. Turn on water, replace regulating valve, or install water valve kit.
	2. Restricted water cooled condenser.	2. Check water lines to see if they are kinked. Clean or replace condenser.
	3. Dirty condenser.	3. Clean condenser.
	4. Unit location too warm (air cooled).	4. Relocate unit away from restriction. Place nothing against the back or on top of the unit.



CAUTION: When evacuating either side of a double freezer DO NOT OPERATE THE OPPOSITE SIDE. All control switches must be in the "OFF" position and the main power CORD(S) disconnected. If power is applied to a compressor in a vacuum a short may occur CAUSING PERSONAL INJURY.

	5. Refrigerate overcharge.	5. Bleed refrigerant charge into a refrigerant recovery/recycling unit, until sight glass bubbles (flashes) then add refrigerant until sight glass clears.
	6. Air in system.	6. Purge system into a refrigerant recovery/recycling unit, evacuate and recharge.

12**Service Troubleshooting Charts – continued**

Troubleshooting Charts

Compressor/Condensing Circuits

PROBLEM	PROBABLE CAUSE	REMEDY
Capacitor failures.	1. Low line voltage.	1. Ask power company to increase voltage to not less than 10% below dataplate rating or install transformer.
	2. Improper capacitor. (single phase only)	2. Replace capacitor with properly rated capacitor as listed in manual.
Discharge pressure too low.	1. Water regulating valve open too wide.	1. Adjust for proper water temperature and discharge pressure or replace or repair water valve.
	2. Shortage of refrigerant	2. Remove charge into a refrigerant recovery/recycling unit, repair leak, evacuate and recharge system.
Noisy compressor	1. Tubing rattle.	1. Bend tubes away from contact.
	2. Spring broke internally.	2. Replace compressor.

NOTE: Contact H.C. Duke & Son, Inc. for instructions prior to warranty compressor replacement.

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Service Troubleshooting Charts – continued

Troubleshooting Charts Mix Transfer System (MTS)

PROBLEM	PROBABLE CAUSE	REMEDY
No Air (Overrun).	1. Air meter plugged.	1. Clean or replace air meter.
	2. Air tube pinched.	2. Replace tube.
	3. Incorrect air meter size.	3. Use higher number air meter.
Too much air, overrun too high-popping problems.	1. Air meter too large.	1. Install smaller air meter.
	2. Air leak between pick up tube and hose.	2. Replace as needed.
	3. Air line hose cracked.	3. Replace air line hose.
	4. Defective or missing duckbill valve.	4. Replace valve.
Mix shoots out air meter.	1. Transfer hose worn out.	1. Replace hose.
	2. MTS handle not fully closed.	2. Close handle and lock in place.
	3. Clip for handle worn.	3. Replace clip.
	4. MTS pressure too high.	4. Check pressure with gauge kit. Replace pressure switch if not 19-26 PSIG.
Mix pick up tube losses prime.	1. Transfer hose worn.	1. Replace transfer hose.
	2. Defective duckbill check valve.	2. Replace check valve.
Mix transfer system (MTS) will not operate.	1. MTS handle not closed.	1. Close slide and lock in place.
	2. Slide switch defective	2. Replace slide switch.
	3. MTS relay defective.	3. Replace MTS relay.
	4. Start capacitor defective .	4. Replace start capacitor.
	5. Pressure switch defective.	5. Replace pressure switch assembly.
	6. Motor burned out or tripped overload.	6. Replace motor or let cool down and check for cause .
	7. Hose not installed properly.	7. Check position-reinstall
MTS will not shut off.	1. MTS hose worn out.	1. Replace hose.
	2. Mix relay defective.	2. Replace mix relay.
	3. Pressure switch stuck in closed position.	3. Replace pressure switch.

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Service Troubleshooting Charts – continued

Troubleshooting Charts Mix Transfer System (MTS)

PROBLEM	PROBABLE CAUSE	REMEDY
MTS cycles on and off without dispensing.	1. Leak on pressure side of system.	1. Find leak and correct, check head, drain tube, pressure relief and all hoses.
	2. Worn transfer hose.	2. Replace hose.
Mix leaks out of MTS.	1. Hose clamp too loose.	1. Tighten hose clamp.
	2. Transfer hose worn and split.	2. Remove, clean inside MTS around rollers with spray bottle provided, install new hose.

Keep your freezer in excellent condition. Always contact H.C. Duke & Son, Inc. for replacement parts and maintenance information.

QUALITY PARTS

PROTECT

YOUR

EQUIPMENT