

TECHNICAL BULLETIN
MAY 1983
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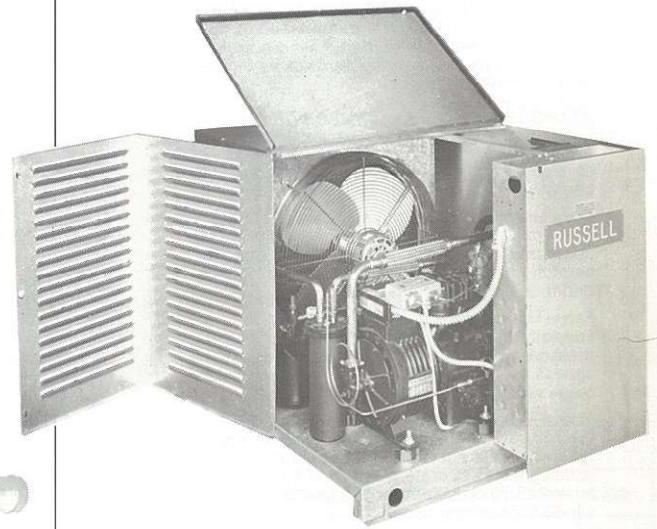
**RC
REC**

Russell

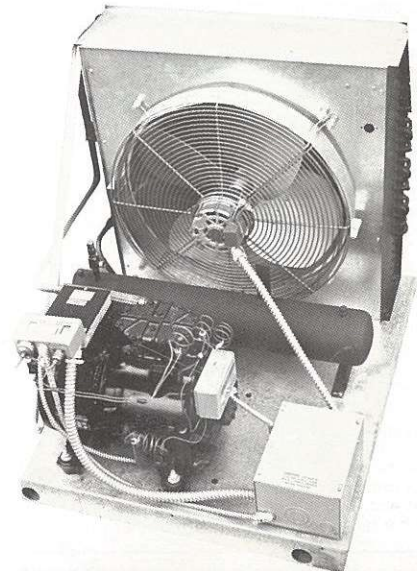
CONDENSING UNITS

3 through 30 HP

RussCon



Russ-E-Con



Russell
Russell Coil Company

Russell RussCon

The Complete Outdoor Condensing Unit

General Information

INTRODUCTION

The RussCon Condensing Unit may be matched with a variety of evaporators and offers great flexibility in refrigerant and evaporating temperature.

By effective utilization of a list of options, the standard basic unit can be transformed to meet many requirements of defrost, head pressure control and electrical characteristics as dictated by the job requirements.

STANDARD SYSTEM FEATURES

The standard system consists of condenser coil, condenser fan, fan motor, fan guard, compressor control panel, piping, receiver and housing.

Condenser Coil—The coil consists of copper tubes mechanically expanded into a die-formed collar on each fin. The circuiting of the coil is carefully planned to provide some sub-cooling under design conditions.

Fan—The fan manufactured by Russell is specially designed to operate against the static pressure of the air-cooled condenser at low tip speeds for low noise level. This efficient design results in low power consumption.

Motor—The fan motor is single-phase, 1050 R.P.M., ball bearing, permanent split capacitor type with inherent overload protection. The motor is designed to operate well below the maximum temperature allowable for the type of motor winding insulation used.

Fan Guard—The fan guard is designed to protect against injury in accordance with latest U.L. and O.S.H.A. standards. Split for easy access.

Compressor—The compressor is an accessible semi-hermetic with built-in overload protection. Oil failure switch for protection against loss of oil is provided on all but LAH compressors. The compressor is spring mounted and isolated from the unit by vibration eliminators. Compressors are provided with crankcase heaters to boil off any entrapped liquid in crankcase.

Control Panel—Houses circuit breaker. Control circuit fuses protect against short circuiting. High-Low pressure control with manual reset hi side and automatic reset low side is field adjustable to suit job conditions.

Piping—All internal piping is made with type "L" copper tubing — preformed to eliminate fittings, minimize joints, and reduce leak possibilities. Standard components are liquid-moisture indicator, receiver isolation shutoff valves, liquid strainer-drier, suction line filter, and compressor service valves.

Receiver—The receiver is sized to operate for all low ambient control systems; it is also adequately sized to contain the entire refrigerant charge and can be isolated from the system by inlet and outlet valves. This unique design requires only a minimum charge to maintain refrigerant seal. A fusible plug is provided per applicable codes.

The Entire System is pressurized for leak detection, then fully evacuated to 200 microns pressure. The electrical circuit is given a full dielectric test prior to the unit being given a complete run test. The unit is prepared for shipment with a holding charge of dry nitrogen.

Standard Electrical Characteristics are 208/230 volt, three-phase, 60 Hertz. All holding coils on relays are designed to operate on 208/230 volts. The control circuit is fused against short circuit. Condensing unit is capable of handling upto 16 amps @ 230 volt or 8 amps @ 460 volt of evaporator fan motor current.

All Weather Housing—A light weight aluminum housing is provided for outdoor service. Die-formed air grilles are provided to direct the air across the compressor and away from return air side. Hinged panels on 1 fan models and a removable panel on 2 fan models are provided for easy access into the unit.

OPTIONS

In addition to the standard equipment, certain options are available to make the Russell RussCon adaptable to a variety of applications.

Suction Line Accumulator—A suction line accumulator is provided with adequate volume to entrap normal amounts of liquid which might not be evaporated.

Liquid Line Solenoid—The unit may be equipped with a liquid line solenoid electrically connected to provide continuous pumpdown when operating thermostat is satisfied. It is completely wired and assembled into liquid line. This feature, along with minimum charge and optional suction line accumulator, minimizes the possibility of compressor bearing washout due to refrigerant in the crankcase.

Timer—On evaporators that require defrosting, a timer can be installed in the control panel. **The timer is supplied on all electric and hot gas defrost provisions as a part of the specific option, discussed below.**

Oil Separator—An efficient oil separator can be installed to minimize the migration of oil which impedes the heat transfer process in the evaporator, condenser and heat exchangers. Recommended on 0° box and lower.

Low Ambient Operation—Four methods:

a. Russ-Saver—An energy saving control system for all climatic conditions. It allows the compressor to operate with lower head pressures as ambient temperatures drop below design conditions. In combination with liquid subcooling, a dramatic reduction in power usage is achieved. See following page for complete details.

b. Fan Cycling Control—This system cycles one fan of the unit in response to head pressure. As the head pressure falls, due to lower temperature air entering condenser coil, a pressure controller will act to stop operation of one fan. A partition between fans prevents short cycling of the air. This option can be used for applications where outdoor ambient does not drop below 35° F. Not available on L35, L55 and L85.

c. Fan Speed Control—Head pressure is sensed by solid state speed controller, which varies the speed of fan motor to regulate the head pressure at desirable value. This option should be used where outdoor ambient does not drop below +20° F. Not UL Listed.

d. Flooded Type—This system operates to flood the condenser coil, reducing its heat transfer so that head pressure can build up when outdoor ambient is low. This is achieved by a valve sensing receiver pressure. When the receiver pressure is normal the valve is positioned to allow refrigerant to flow freely from the condenser coil. When the receiver pressure is lowered, due to lowered air temperature to the condenser coil, the valve begins to throttle the liquid flow, flooding the condenser surface and elevating the head

pressure. At the same time, the by-pass valve opens to allow hot gas to be introduced into the receiver to assist in overcoming the pressure drops in the system liquid line.

A timed electrical by-pass of the low pressure cut-out permits uninterrupted operation of the system on start-up. This option should be used where outdoor ambient may drop below +20°

Low Wattage Electric Defrost—Single Phase—This option includes timer and block-out switch to prevent operation of compressor and heaters at the same time. It is designed for a maximum 5750 watts at 230 volts, single-phase.

Low Wattage Electric Defrost—Three-Phase, with Contactor—This option includes timer and block-out switch to prevent operation of compressor and heaters at the same time. It is designed for a maximum 11,950 watts - 230 volts, three-phase; 11,950 watts - 460 volts three-phase.

Medium Wattage Electric Defrost—Single-Phase or Three-Phases, with Contactor—This option includes timer and block-out switch to prevent operation of compressor and heaters at the same time. It is designed for a maximum 11,500 watts - 230 volts, single-phase; 19,900 watts - 230 volts, three-phase; 19,900 watts - 460 volts, three-phase.

High Wattage Electric Defrost, Single-Phase or Three-Phase, with Contactor—This option includes timer, and block-out switch to prevent operation of compressor and heaters at the same time. It is designed for a maximum 20,700 watts - 230 volts, single-phase; 35,800 watts - 230 volts, three-phase; 39,800 watts - 460 volts, three-phase.

Multiple Evaporators-Electric Defrost—In addition to the components listed under low, medium or high wattage, the control panel is wired to accommodate multiple unit coolers with sequencing relays. These relays provide for interconnection so that each unit cooler is allowed to terminate on temperature and the system will be returned to refrigeration cycle only after all unit coolers are terminated on temperature.

Insulated and Heated Receiver—Thermostat controls heat to receiver that is insulated for operation under low ambient conditions. Not UL Listed.

Hot Gas Defrost Provisions for Re-Evap Type System—Includes HG solenoids (NO & NC), Hot Gas Tee, Time Clock, Crankcase Pressure Regulator (to control back pressure), Oil Separator, suction Line Accumulator and piping, factory installed. Not UL Listed.

Spring Loaded Relief Valve is available in lieu of fusible plug.

460 Volt Electrical Characteristics available including transformer for 230 volt secondary control voltage, not suitable for 230 volt unit cooler fan motor load.

230 Volt, Single-Phase, 60 Hertz is available on some models.

Limited Warranty—This covers the estimated cost of replacing the compressor for four years after the standard one year warranty.

Fan Contactor—A 25-Amp, 3-pole contactor may be required in conjunction with a timer.

Add contactor if:

- (a) Unit Cooler control circuit cannot carry full motor load.
- (b) Unit Cooler motors are 460 volts.
- (c) Unit Cooler motors are three phase.

All features U.L. Listed excepted as noted. Specifications subject to change without notice.

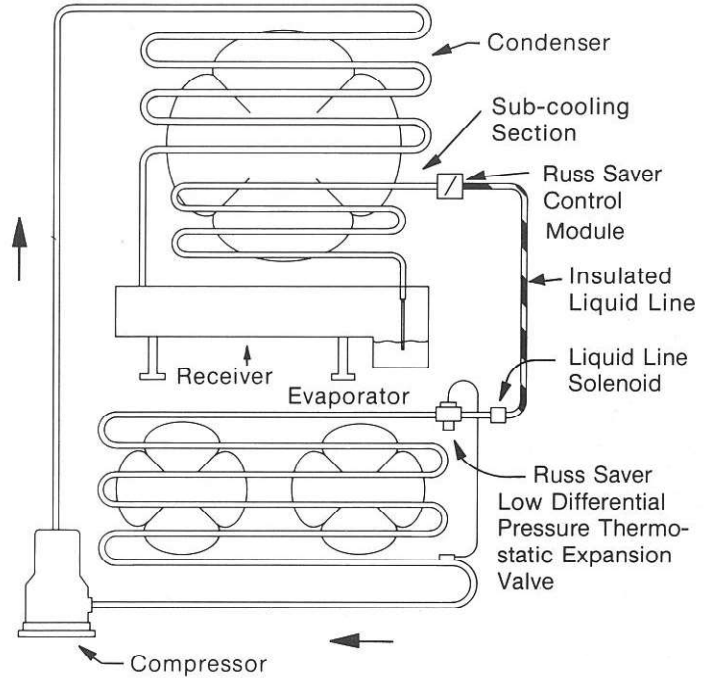
Russ-Saver

The Russ-Saver is an energy saving control system used with refrigeration systems which use outdoor air-cooled condensers. It operates, without adjustments, on a year-around basis at both high and low outside ambient conditions. The head pressure is allowed to vary with ambient temperature. Therefore, as ambient temperature drops, the head pressure drops. This drop in head pressure results in the compressor pumping more refrigerant per stroke and, due to the lower head pressure, requires less energy to compress the refrigerant. Operating at very low head pressures, which would exist at low outside air temperature, the power savings is remarkable.

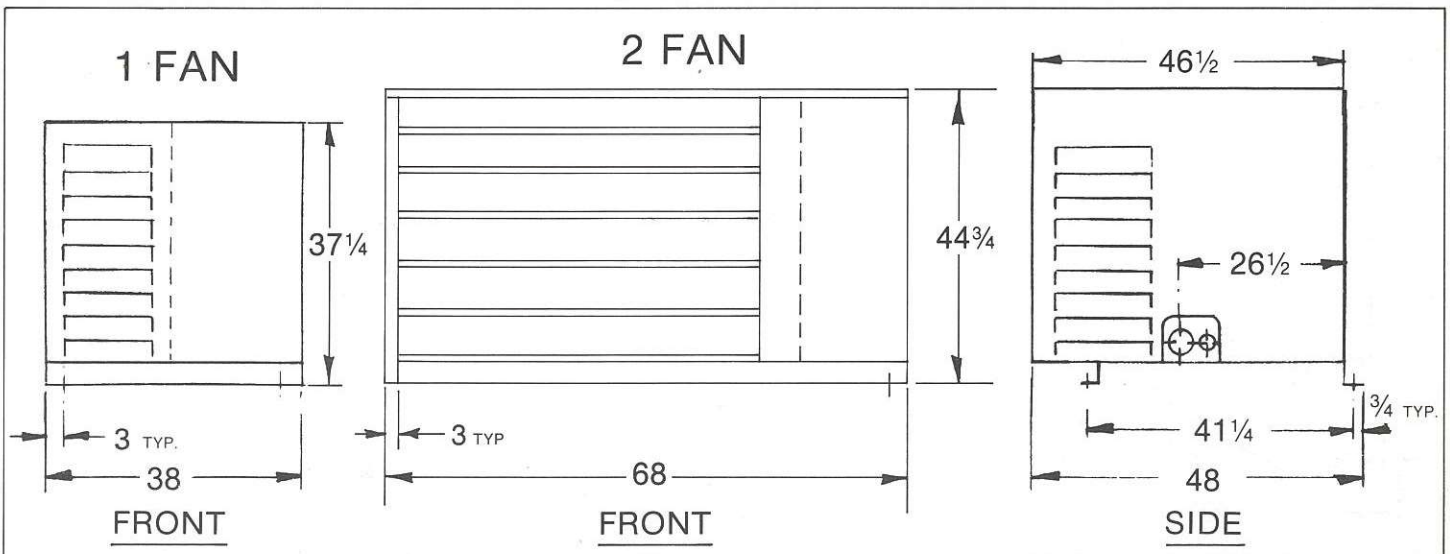
The Russ-Saver System also automatically maintains a solid head of sub-cooled liquid at the Russell special low differential pressure thermostatic expansion valve. This solid head of liquid at the thermostatic expansion valve eliminates flashing. The sub-cooling improves refrigeration efficiency by 1/2% for each degree of sub-cooling.

Energy Savings (up to 50%):

At 0° F ambient, the energy savings will be about 50%, but even at design ambient conditions, a 5% savings will be realized due to sub-cooling. In addition, since even the warmer climates will have cool nights, it is reasonable to expect an annual savings of 10-15% in the "sun belt" states and, as much as 25-30% in the cold climates as compared to conventional systems with head pressures held artificially high.



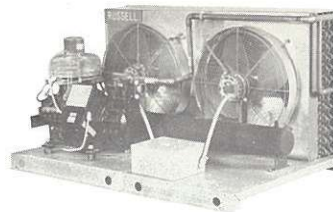
1 FAN												2 FAN											
MODEL	H31	M31	L35	M51	L55	H51	H52	M81	L85	H81	H82	H101	H102	M101	L105	H151	H152	L155	H201	H202	L205	L255	L305
H.P.	3	3	3	5	5	5	5	7½	7½	7½	7½	10	10	10	10	15	15	15	20	20	20	25	30
REF.	12	12	502	12	502	12	22	12	502	12	22	12	22	12	502	12	22	502	12	22	502	502	502
LIQUID ODS	1/2						5/8		1/2	5/8		7/8		5/8		7/8		5/8	7/8				
SUCTION ODS	1½		1¾			1½	1¾			1½	1¾	1¾		1¾			2½						



*Only applies to H201, H202, L305 - all other units 37 1/4" high.

Russell Russ-E-Con

Indoor Econo-Mizer Condensing Unit



General Information

THE RUSS-E-CON CONDENSING UNIT may be matched with a variety of evaporators and offers great flexibility in refrigerant and evaporating temperature:

Standard System Features

The standard system consists of condenser coil, condenser fan, fan motor, fan guard, compressor, discharge-line piping and receiver.

CONDENSER COIL — The coil consists of copper tubes mechanically expanded into a die-formed collar on each fin. The circuiting of the coils is carefully planned to provide some sub-cooling under design conditions.

FAN — The fan manufactured by Russell is specially designed to operate against the static pressure of the air-cooled condenser at low tip speeds for low noise level. This efficient design results in low power consumption.

MOTOR — The fan motor is single phase, 1050 R.P.M., ball bearing, permanent split-capacitor type with inherent overload protection. The motor is designed to operate well below the maximum temperature allowable for the type of motor winding insulation used.

FAN GUARD — The fan guard is designed to protect against injury in accordance with latest U.L. and OSHA standards.

COMPRESSOR — The compressor is an accessible semi-hermetic with built-in overload protection. Oil failure switch for protection against loss of oil is provided on all but LAH compressors. The semi-hermetic compressor is spring mounted and isolated from the unit by flexible connector in discharge line. Compressors are provided with crankcase heaters to boil off any entrapped liquid in crankcase.

RECEIVER — The receiver is sized to operate for all low-ambient control systems. It is also adequately sized to contain the entire refrigerant charge and can be isolated from the system by inlet and outlet valves. This unique design requires only a minimum charge to maintain refrigerant seal. A fusible plug is provided per applicable codes.

BASE — The base is constructed of heavy-gauge galvanized steel.

CONTROLS — Hi-Lo pressure switch and oil failure switch where required.

THE ENTIRE SYSTEM is pressurized for leak detection, then fully evacuated to 200 microns pressure. The electrical circuit is given a full dielectric test prior to shipment. The unit is prepared for shipment with a holding charge of dry nitrogen.

230-VOLT ELECTRICAL CHARACTERISTIC — U.L. Listed with 230 volt contactor option on models marked "*" below.

Options

460-VOLT ELECTRICAL CHARACTERISTIC — Compressor and fan motors, not U.L. Listed.

CONTACTOR for compressor and condenser motor(s), wired to Hi-Lo pressure switch and oil failure switch (where required), housed in NEMA 1 box and wired to compressor. Includes 230V control circuit transformer on 460 Volt contactor option.

FUSED DISCONNECT — Sized for compressor and condenser motor(s) only. Dual element fuses. Wired to contactor option.

LIQUID-LINE KIT — Solenoid, sight glass, drier, piping.

SUCTION-LINE KIT — Suction filter, piping, vibration eliminator.

ACCUMULATOR — Piped in with suction-line kit (above).

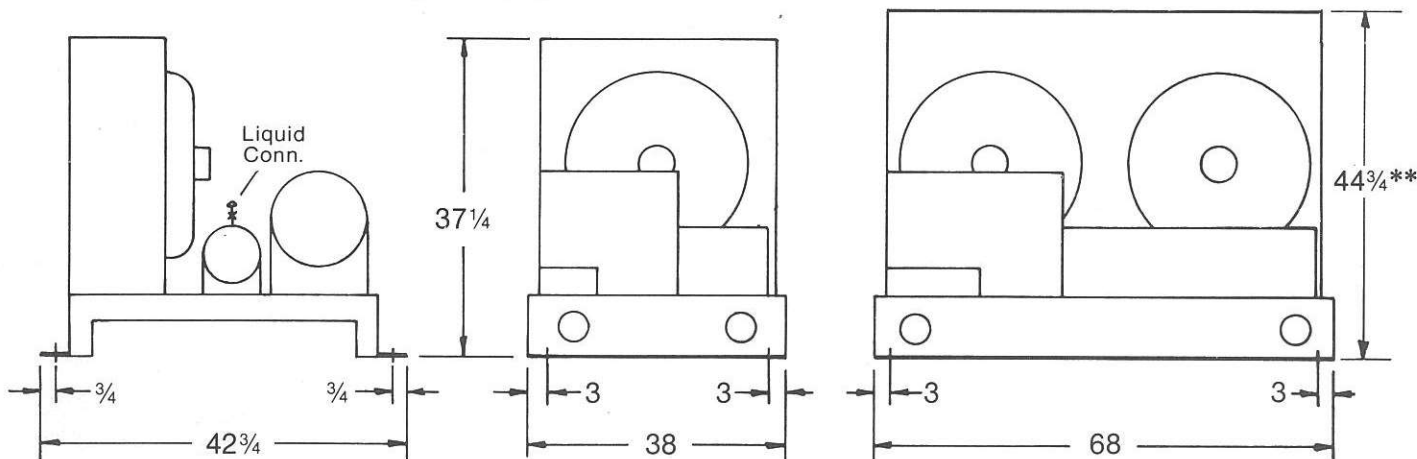
OIL SEPARATOR — Piped into discharge line.

RELIEF VALVE — Mounted in receiver.

OTHER OPTIONS — Low ambient and defrost provisions - see page 1 and 2.

MODEL	1 FAN										2 FAN												
	HE* 31	ME* 31	LE* 35	ME* 51	LE* 55	HE* 51	ME* 81	LE* 85	HE* 52	HE* 81	HE* 82	HE 101	HE 102	ME* 101	LE* 105	HE 151	HE 152	LE* 155	HE 201	HE 202	LE 205	LE 255	LE 305
H.P.	3	3	3	5	5	5	7½	7½	5	7½	7½	10	10	10	10	15	15	15	20	20	20	25	30
REF.	12	12	502	12	502	12	12	502	22	12	22	12	22	12	502	12	22	502	12	22	502	502	502

*U.L. Listed with 230 Volt Contactor option only. All others not U.L.



RussCon & Russ-E-Con ELECTRICAL SPECIFICATIONS

Nominal H.P.	Oper. Range	Unit Model Refrigerant			Compressor	Condenser			RCVR Cap # 90% Full	Electrical Data								
		R-12	R-22	R-502		Fan H.P.	Fan Dia.	CFM		230/1/60			230/3/60			460/3/60		
										Comp.		Cond. FLA	Comp.		Cond. FLA	Comp.		Cond. FLA
										RLA	LRA	FLA	RLA	LRA	FLA	RLA	LRA	FLA
	L M H	M31 H31		L35	LAH0310 LAH0310 LAH0310	1/3 1/3 1/3	24 24 24	3100 3100 3100	36.7 40.1 40.1	15.1 15.1 15.1	84.0 84.0 86.0	3.2 3.2 3.2	10.0 10.0 10.0	82.0 82.0 82.0	3.2 3.2 3.2	7.3 7.3 6.6	41.0 41.0 41.0	2.1 2.1 2.1
5	L M H H	M51 H51		L55	MRA0500 MRA0500 MRF0500 NRA0500	1/3 1/3 1/3 1/2	24 24 24 24	3100 3100 4600 4600	36.7 40.1 40.1 40.1	27.5 27.5 23.5 34.3	125.0 125.0 125.0 131.0	3.2 3.2 3.2 3.2	22.0 22.0 21.0 19.2	115.0 115.0 115.0 141.0	3.2 3.2 3.2 3.2	12.1 12.1 12.1 12.1	53.0 53.0 53.0 62.5	2.1 2.1 2.1 2.1
7-1/2	L M H H	M81 H81		L85	9RS0760 9RC0760 9RC0760 MRH0760	1/3 1/3 2-1/3 2-1/3	24 24 24 24	4600 4600 8600 8600	63.2 69.1 69.1 62.5	N/A N/A N/A N/A	N/A N/A N/A N/A	N/A N/A N/A N/A	29.3 30.6 30.6 30.3	164.0 164.0 164.0 164.0	3.2* 3.2 3.2 6.4	15.9 15.9 15.9 15.9	82.0 82.0 82.0 82.0	2.1 2.1 2.1 2.1
10	L M H H	M101 H101		L105	4RA1000 4RA1000 4RA1000 9RC1010	2-1/3 2-1/3 2-1/2 2-1/2	24 24 24 24	8600 8600 9000 8500	63.2 69.1 69.1 62.5	N/A N/A N/A N/A	N/A N/A N/A N/A	N/A N/A N/A N/A	54.8 54.8 54.8 42.8	240.0 240.0 240.0 208.0	6.4 6.4 8.4 8.4	27.4 27.4 27.4 22.1	120.0 120.0 120.0 104.0	4.2 4.2 4.2 4.2
15	L H H	H151		L155	4RL1500 4RH1500 9RS1500	2-1/3 2-1/2 2-1/2	24 24 24	8600 8500 8500	63.2 69.1 62.5	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	62.6 63.0 62.0	278.0 278.0 284.0	6.4 8.4 8.4	31.5 31.5 29.8	139.0 170.0 144.0	4.2 4.2 4.2
20	L H H	H201		L205	6RA2000 6RA-2000 4RA-2000	2-1/2 2-1/2 2-1/2	24 24 24	8500 9000 9000	63.2 120 110	N/A N/A N/A	N/A N/A N/A	N/A N/A N/A	67.4 67.3 71.4	308.0 308 308	8.4 8.4 8.4	35.7 33.7 35.7	154.0 154 154	4.2 4.2 4.2
25	L			L255	6RL2500	2-1/2	24	8500	63.2	N/A	N/A	N/A	97.0	428.0	8.4	48.5	214.0	4.2
30	L			L305	6RT-3000	2-1/2	24	9000	115	N/A	N/A	N/A	111.0	470	8.4	55.5	235	4.2

Equivalent compressors may be substituted on some models

The condensing unit may be equipped with optional electric defrost capability. The following table shows the **maximum** wattage allowable for each unit. This wattage information must be obtained from the technical information on the specific unit cooler(s) to be matched with the condensing unit.

RussCon & Russ-E-Con Maximum Wattage on Electric Defrost

MODEL	230/60/1 UNIT	230/60/3 UNIT		460/60/3 UNIT
	230/60/1 E.D.	230/60/1 E.D.	230/60/3 E.D.	460/60/3 E.D.
H31	11,500 watts	9,200 watts	15,900 watts	19,900 watts
M31	11,500	9,200	15,900	19,900
L35	11,500	9,200	15,900	19,900
H51	11,500	11,500	19,900	19,900
H52	16,100	13,800	23,900	27,800
M51	16,100	11,500	19,900	19,900
L55	16,100	11,500	19,900	19,900
H81	—	16,100	27,800	27,800
H82	—	16,100	27,800	27,800
M81	—	13,800	23,900	27,800
L85	—	13,800	23,900	27,800
H101	—	23,000	39,800	39,800
H102	—	18,400	31,800	31,800
M101	—	20,700	35,800	39,800
L105	—	20,700	35,800	39,800
H151	—	28,700	49,700	49,700
H152	—	28,700	49,700	49,700
L155	—	23,000	39,800	39,800
H201	—	28,700	49,700	49,700
H202	—	28,700	49,700	49,700
L205	—	28,700	49,700	49,700
L255	—	34,500	59,700	59,700
L305	—	40,200	69,700	63,700

RussCon & Russ-E-Con

CAPACITIES (BTUH)

80° AMBIENT

REFRIG.	MODEL	COMP. H.P.	SUCTION TEMPERATURE °F				
			+45	+35	+25	+20	0
R-12	H-31	3	39,300	33,100	27,200	24,600	15,500
	M-31	3	39,300	33,100	27,200	24,600	15,500
	H-51	5	55,000	47,200	39,400	35,600	21,000
	M-51	5	-	-	39,700	34,000	22,200
	H-81	7½	88,000	74,000	60,500	54,000	31,800
	M-81	7½	-	-	54,200	48,600	30,800
	H-101	10	137,000	115,000	95,100	86,100	56,100
	M-101	10	131,000	110,000	91,700	83,200	54,700
	H-151	15	172,000	146,000	123,000	113,000	78,900
	H-201	20	206,500	179,200	153,600	141,500	98,000
	R-22	H-52	5	72,700	60,600	49,000	43,200
H-82		7½	102,000	84,000	69,500	63,000	36,800
H-102		10	141,000	118,000	96,000	90,000	62,600
H-152		15	189,000	159,000	132,000	119,000	84,000
H-202		20	221,800	185,800	154,100	139,900	94,400
REFRIG.	MODEL	COMP. H.P.	SUCTION TEMPERATURE °F				
			0	-10	-20	-30	-40
R-502	L-35	3	-	20,400	15,300	11,500	8,900
	L-55	5	35,300	28,700	22,200	17,600	13,400
	L-85	7½	-	49,200	42,200	34,000	25,000
	L-105	10	87,600	70,900	55,800	42,300	30,600
	L-155	15	99,400	81,400	65,500	52,000	41,000
	L-205	20	121,000	98,800	77,800	59,100	42,900
	L-255	25	147,000	121,000	98,400	78,000	60,200
	L-305	30	154,900	130,400	107,900	87,500	69,300

90° AMBIENT

REFRIG.	MODEL	COMP. H.P.	SUCTION TEMPERATURE °F				
			+45	+35	+25	+20	0
R-12	H-31	3	36,700	30,800	25,400	22,900	14,300
	M-31	3	36,700	30,800	25,400	22,900	14,300
	H-51	5	51,500	44,000	36,500	32,800	19,100
	M-51	5	-	-	35,800	31,600	20,600
	H-81	7½	83,000	69,000	56,200	50,000	29,700
	M-81	7½	-	-	50,800	45,500	27,600
	H-101	10	129,000	108,000	88,900	80,400	52,100
	M-101	10	122,000	103,000	85,600	77,600	50,800
	H-151	15	164,000	138,000	115,000	105,000	71,900
	H-201	20	192,000	167,000	143,000	131,500	90,000
	R-22	H-52	5	67,600	56,700	45,400	38,300
H-82		7½	94,800	78,000	64,000	58,000	34,400
H-102		10	132,000	111,000	92,000	83,000	56,100
H-152		15	179,000	150,000	124,000	111,000	76,000
H-202		20	207,300	173,100	142,900	129,000	87,100
REFRIG.	MODEL	COMP. H.P.	SUCTION TEMPERATURE °F				
			0	-10	-20	-30	-40
R-502	L-35	3	-	18,600	13,900	10,100	7,600
	L-55	5	32,400	26,200	20,300	15,900	12,000
	L-85	7½	-	45,000	38,500	30,000	22,000
	L-105	10	80,100	65,100	51,200	38,800	28,100
	L-155	15	90,900	74,200	59,400	46,800	36,500
	L-205	20	111,000	90,400	71,300	54,200	39,300
	L-255	25	135,000	112,000	93,400	71,300	54,600
	L-305	30	142,300	119,600	98,500	79,000	61,500

Capacities based on 3°F sub-cooling and 2°F suction line (equiv.) pressure drop.

RussCon models shown — Add "E" for Russ-E-Con models, ie: HE-31

RussCon & Russ-E-Con CAPACITIES (BTUH)

100° AMBIENT

REFRIG.	MODEL	COMP. H.P.	SUCTION TEMPERATURE °F				
			+45	+35	+25	+20	0
R-12	H-31	3	33,900	28,400	23,300	21,000	13,000
	M-31	3	33,900	28,400	23,300	21,000	13,000
	H-51	5	49,000	41,600	34,100	30,400	17,800
	M-51	5	-	-	32,800	28,700	18,600
	H-81	7½	75,000	63,500	52,000	46,500	27,100
	M-81	7½	-	-	46,600	41,800	25,800
	H-101	10	120,000	100,000	82,600	74,600	48,200
	M-101	10	114,000	95,700	79,400	71,900	46,900
	H-151	15	156,000	130,300	110,000	97,900	65,000
	H-201	20	177,200	153,700	131,400	120,600	81,300
R-22	H-52	5	61,600	51,800	42,400	37,800	21,600
	H-82	7½	86,700	71,500	59,500	54,500	31,900
	H-102	10	125,000	104,000	85,000	76,000	51,600
	H-152	15	170,000	141,000	119,000	108,000	66,000
	H-202	20	192,700	160,500	132,100	119,500	80,500
REFRIG.	MODEL	COMP. H.P.	SUCTION TEMPERATURE °F				
			0	-10	-20	-30	-40
R-502	L-35	3	-	16,500	12,200	8,800	6,500
	L-55	5	28,300	24,000	18,200	14,100	10,600
	L-85	7½	-	41,000	34,000	26,500	19,100
	L-105	10	72,200	58,700	46,300	35,100	25,400
	L-155	15	82,300	66,800	53,100	41,500	32,100
	L-205	20	99,600	81,400	64,400	48,900	35,500
	L-255	25	122,000	101,000	81,800	64,300	48,800
	L-305	30	128,800	108,100	88,400	70,000	53,200

110° AMBIENT

REFRIG.	MODEL	COMP. H.P.	SUCTION TEMPERATURE °F				
			+45	+35	+25	+20	0
R-12	H-31	3	31,200	26,300	21,600	19,500	11,900
	M-31	3	31,200	26,300	21,600	19,500	11,900
	H-51	5	-	38,800	31,900	28,400	16,300
	M-51	5	-	-	30,800	27,100	18,000
	H-81	7½	70,500	59,500	48,500	43,000	25,700
	M-81	7½	-	-	42,800	38,400	23,400
	H-101	10	111,000	92,600	76,100	68,700	44,300
	M-101	10	105,000	88,200	73,000	66,100	43,100
	H-151	15	148,000	123,000	100,000	90,500	58,200
	H-201	20	161,000	139,600	118,900	108,900	71,800
R-22	H-52	5	56,500	47,200	38,400	34,600	18,900
	H-82	7½	79,500	65,700	54,500	49,500	29,100
	H-102	10	117,000	96,000	79,000	70,000	48,500
	H-152	15	160,000	133,000	105,000	96,000	61,000
	H-202	20	178,200	148,000	121,600	110,000	74,800
REFRIG.	MODEL	COMP. H.P.	SUCTION TEMPERATURE °F				
			0	-10	-20	-30	-40
R-502	L-35	3	-	14,600	10,700	7,500	5,100
	L-55	5	26,600	21,600	16,000	11,800	8,000
	L-85	7½	-	36,500	30,000	23,500	18,000
	L-105	10	63,800	52,000	41,000	31,100	22,500
	L-155	15	73,400	59,300	46,800	36,300	27,800
	L-205	20	87,600	71,800	56,900	43,300	31,300
	L-255	25	109,000	90,200	72,700	56,700	42,500
	L-305	30	114,600	95,800	77,600	60,400	44,500

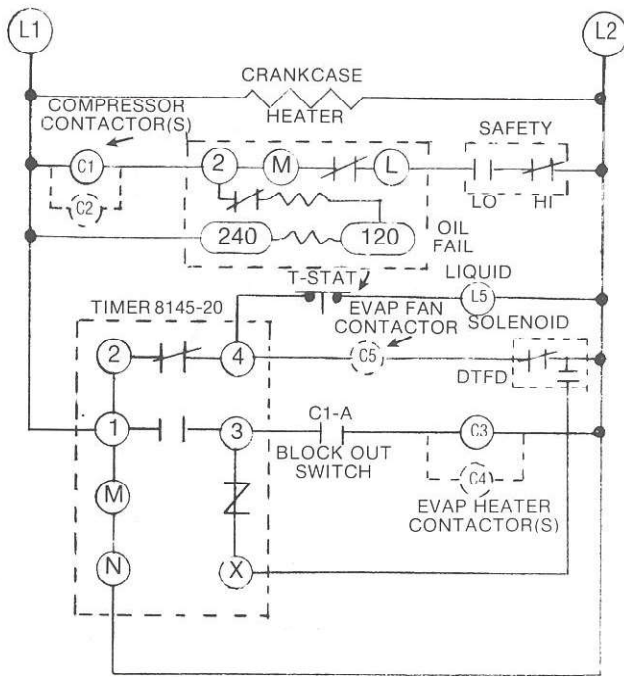
BTUH × 0.252 = KCAL/H

BTUH @ 60 Hz × 0.833 = BTUH @ 50 Hz

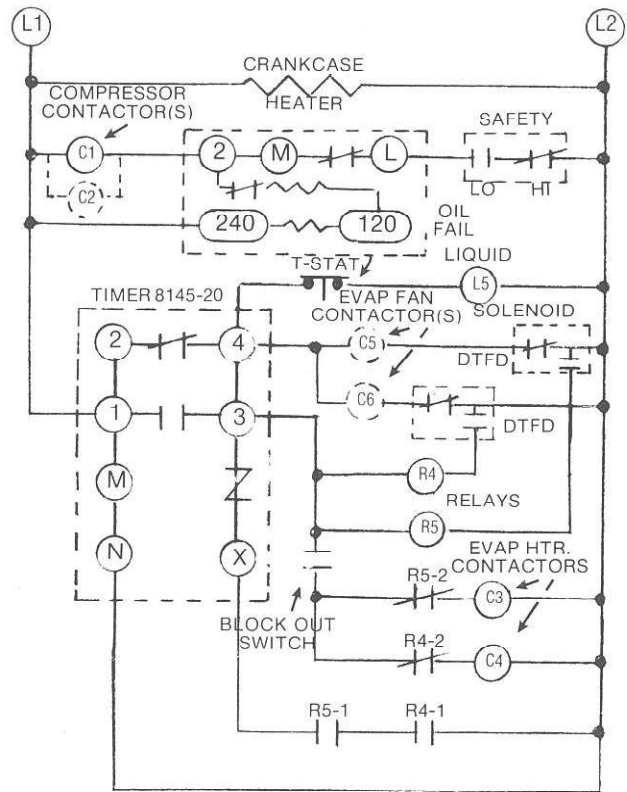
BTUH @ 60 Hz × 0.210 = KCAL @ 50 Hz

(°F - 32°) × 5/9 = °C

RUSSCON-SYSTEM CONTROL DIAGRAMS



TYPICAL SYSTEM CONTROL: 1 EVAP



TYPICAL SYSTEM CONTROL: 2 EVAPS.

WARRANTY

Russell warrants against defects in materials and workmanship in products which it manufactures for one year from date of shipment. On parts not manufactured by us, such as motors, controls, valves, and compressors, we extend to the buyer the same warranties made to us by the manufacturer. Extended warranties may be purchased from Russell on certain products: compressors (4 years). Consult Russell distributor or factory for cost.

Warranty shall be void if equipment has been subjected to abuse, misuse, negligence, low or high voltage, free chemicals in system, accident, excessive pressures, outward damage or hidden damage while in transit, operation contrary to the manufacturer's or Russell's recommendation, or if the serial number has been altered, defaced or removed. Russell shall not be liable for damages when unauthorized service is performed, or parts other than genuine Russell parts are used for repairs.

THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THOSE DESCRIBED HEREIN AND NO REPRESENTATIVE OF RUSSELL HAS THE AUTHORITY TO ENLARGE OR ALTER THIS WARRANTY.

Russell's only liability under this warranty or otherwise shall be to repair or replace (at Russell's option) non-conforming goods or parts, F.O.B. Russell's plant. (Warranty for the replacement runs for the unexpired time of the original warranty.) Russell assumes no liability for incidental or consequential damages such as injury to person or property.

While Russell RussCon and RussMetic Condensing Units are manufactured of the finest materials, under the strictest quality control procedures, and we believe they are the finest available units of their type, installers should provide in their contract price for start-up adjustments and in-warranty service, as we can make no labor or refrigerant allowances for component replacement or repairs.

Compressor replacement, in or out of warranty shall be handled as follows:

1. Determine that compressor is defective—We will make no allowance for charges on compressors which the compressor manufacturer determines not to be defective.
2. Exchange the defective compressor at an authorized wholesale distributor of the compressor manufacture. This exchange will be handled in accordance with the compressor manufacturer's procedure. We do not make compressor exchanges; however, if an authorized wholesale distributor cannot obtain specified compressor, consult factory.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

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