

# SINGLE STAGE SEMI-HERMETIC

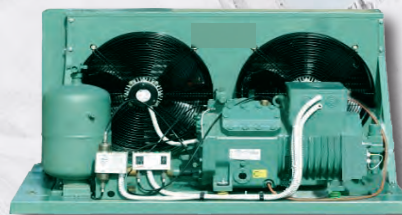
AIR COOLED REFRIGERATION CONDENSING UNITS

MCRM6 Series Chiller Solutions  
MCRL6 Series Freezer Solutions

**60HZ**

*Ecoline Green*

**Tropical**



PRODUCT SELECTION DATA ( PSD )



# Single-Stage Semi-Hermetic Refrigeration Condensing Units

## MCRM6 Series Chiller Solutions

## MCRL6 Series Freezer Solutions

Thank you for your choice of MCRM6 & MCRL6 series single-stage semi-hermetic condensing units. These fine products have been carefully designed and manufactured under strict quality conditions to give you full satisfaction through the efficient operation with minimum maintenance and service.

MCRM6 & MCRL6 series single-stage semi-hermetic condensing units was born of a very simple concept:

“An excellent product isn’t enough; it must offer more than its competitors”. In addition to true cooling,

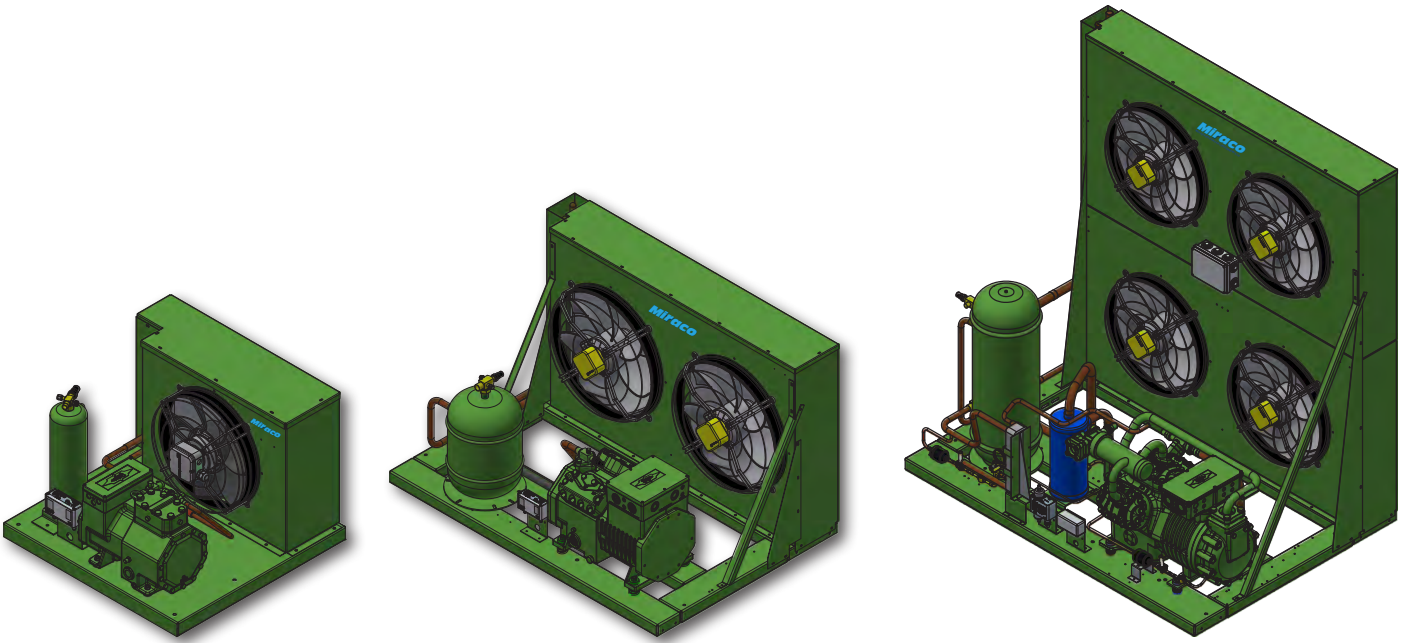
MCRM6 & MCRL6 series single-stage semi-hermetic condensing units have advanced features and performance level, which our competitors will find difficult to equal, maintaining the same quality/ price ratio.

*TAKE A LOOK AT THESE FEATURES*

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## Condensing Unit Appearance



## Applications

- With Miraco new Ecoline series, Miraco offers highly efficient all-purpose refrigeration condensing units.
- MCRM6 complete range of air-cooled semi hermetic refrigeration condensing units are especially designed for medium evaporating temperatures applications with HFC ( R404A, R507A ) refrigerants.
- The condensing unit is equipped with semi-hermetic compressor which filled with ester oil.
- MCRL6 complete range of air-cooled semi hermetic refrigeration condensing units are especially designed for low evaporating temperatures applications with HFC ( R404A, R507A ) refrigerants.
- The condensing unit is equipped with semi-hermetic compressor which filled with ester oil.

## Cold storage

- Warehouses
- Large cold rooms

### MCRM6 Series Chiller Solutions

- Dairy
- Pharma
- Fruits
- Vegetables
- Floriculture

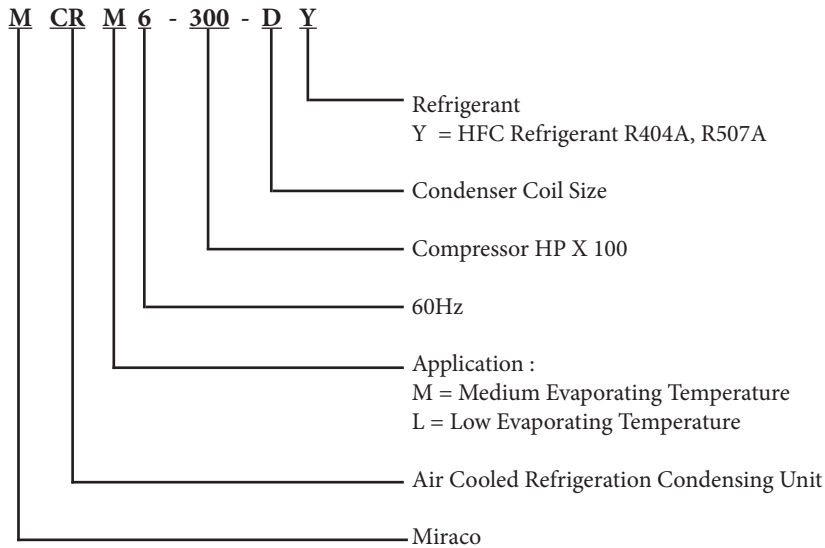
### MCRL6 Series Freezer Solutions

- Freezing tunnel
- Fisheries



## Condensing Unit Model Designation

Example :



## Unit Model and Part Number

### Medium Evaporating Temperature Condensing Units 60Hz HFC ( R404A, R507A )

Model	HP	Part Number	Compressor Type
MCRM6 - 150 - BY	1.5	46308861	2HES-2Y-20D
MCRM6 - 200 - CY	2	46308862	2GES-2Y-20D
MCRM6 - 300 - DY	3	46308863	2DES-3Y-20D
MCRM6 - 400 - DY	4	46308864	2CES-4Y-20D
MCRM6 - 600 - EY	6	46308865	4EES-6Y-20D
MCRM6 - 700 - FY	7	46308866	4DES-7Y-20D
MCRM6 - 1000 - FY	10	46308867	4VE-10Y-20D
MCRM6 - 1200 - GY	12	46308868	4TE-12Y-20D
MCRM6 - 1500 - GY	15	46308869	4PE-15Y-20D
MCRM6 - 2000 - GY	20	46308870	4NE-20Y-20D
MCRM6 - 2500 - HY	25	46308871	4HE-25Y-20D

### Low Evaporating Temperature Condensing Units 60Hz HFC ( R404A, R507A )

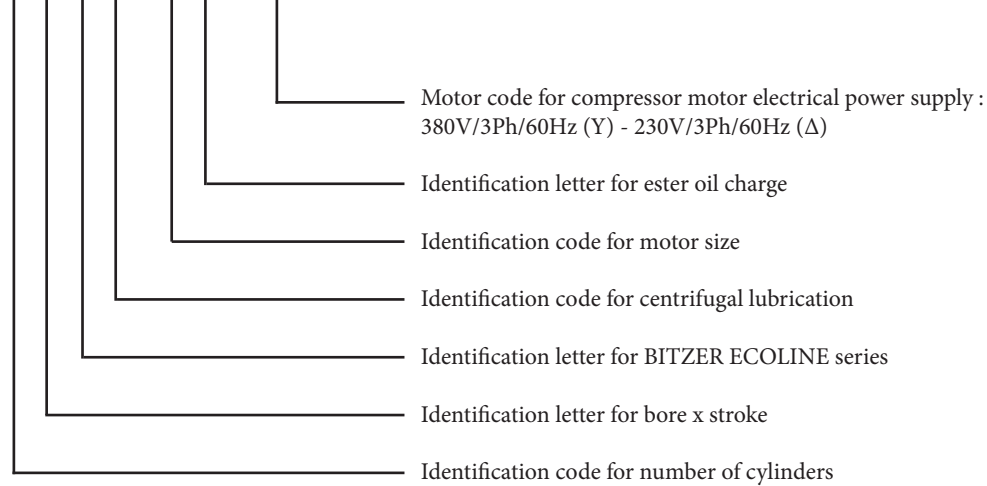
Model	HP	Part Number	Compressor Type
MCRL6 - 150 - BY	1.5	46308872	2GES-2Y-20D
MCRL6 - 200 - CY	2	46308873	2EES-2Y-20D
MCRL6 - 300 - CY	3	46308874	2CES-3Y-20D
MCRL6 - 400 - DY	4	46308875	4EES-4Y-20D
MCRL6 - 500 - DY	5	46308876	4DES-5Y-20D
MCRL6 - 700 - EY	7	46308877	4VE-7Y-20D
MCRL6 - 900 - EY	9	46308878	4TE-9Y-20D
MCRL6 - 1200 - EY	12	46308879	4PE-12Y-20D
MCRL6 - 1500 - FY	15	46308880	4JE-15Y-20D
MCRL6 - 1800 - GY	18	46308881	4HE-18Y-20D
MCRL6 - 2300 - GY	23	46308882	4GE-23Y-20D
MCRL6 - 2800 - HY	28	46308883	4FE-28Y-20D
MCRL6 - 3400 - HY	34	46308884	6GE-34Y-20D



## Compressor Model Designation

Example :

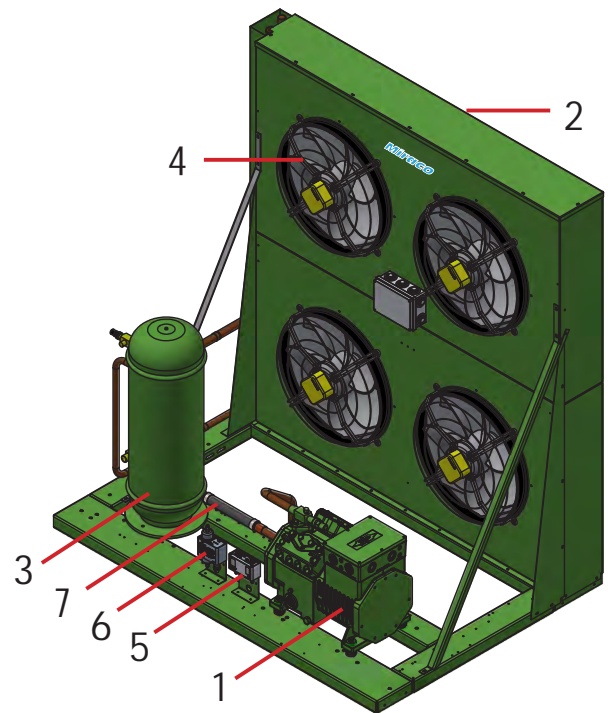
2 D E S - 3 Y - 20D



## Standard Components

### Main Components

- 1- Compressor
- 2- Condenser Coil
- 3- Liquid Receiver
- 4- Fan / Motor
- 5- Dual High / Low Pressure Control
- 6- Oil Pressure Differential Control
- 7- Standard Vibration Absorber On Discharge Line



## Operating Limits

### Refrigeration Condensing Units

Inlet air conditions		Cooling
		DBT (°C)
MCRM6 Series Chiller Solutions		
Outdoor	Minimum	21
	Maximum	50
MCRL6 Series Freezer Solutions		
Outdoor	Minimum	21
	Maximum	50

## Standard Features

### (1) Efficient Refrigerating Capacity with Reduced Electrical Consumption

#### ■ Condenser Coil

- Golden aluminum fins.
- Available over sizes condenser coil
- Oversized coil for high ambient temperatures.
- Inner groove copper tubes & aluminum corrugated fins

#### ■ Semi-Hermetic Reciprocating Compressor

- Highly efficient working valves
- Efficient, large volume motor
- Optimized rotor and stator sections for maximum efficiency and power factor
- Short gas canals
  - Generously sized suction connection
  - Minimum heat exchange
- Reduced flow losses at low condensing temperatures
- Minimal dead space

#### ■ Generously Sized Liquid Receiver

#### ■ Fan Motor

- High efficiency with low power consumption.
- Airflow stability however fouled the condenser coil is.
- The aerodynamic shape of the blades has been specially designed for maximum air movement consumption.
- The fan casing has been designed to optimize the position of the fan blade in its opening.

### (2) Quiet and Low Vibrations

#### ■ Semi-Hermetic Reciprocating Compressor

- Compressors are mounted on rigid base plates.
- Efficient resilient rubber mounts for the compressors of the refrigeration condensing units chillers 1.5 ~ 6 HP and freezers 1.5 HP ~ 5 HP.
- Efficient spring mounts for the compressors of the refrigeration condensing units chillers 7 ~ 25 HP and freezers 7 HP ~ 34 HP.
- Efficient compressor mounting with rubber vibration or with spring vibration dampers as per model.
- Vibration absorber on discharge line.
  - Optimized mass balance.
- Low discharge gas pulsations due to special cylinder design.

#### ■ Fan Motor

- High acoustic performance and minimum vibrations of asynchronous internal rotor motor and ball bearings.

### (3) Durable Construction

#### ■ Robust construction with compact dimensions

#### ■ Metal parts of the fans cannot be corroded.

- Hot galvanized steel frame protected against corrosion.
- Protected against corrosive agents stemming from their specific use.

#### ■ Powder painted metal parts with perfect adhesion of highly resistant polyester paint which is electro-statically applied and backed at a temperature of 220°C.

#### ■ The sheet metal parts of condensing unit are anti-rust, weather proof and long life made of zinc coated

#### ■ Wear resistant drive gear of compressor

- Surface hardened eccentrics and crank shafts
- Patented oil return system to ensure extremely low oil carry over
- Hard chrome plated piston rings
- Sealed main bearing and generously sized oil pump
- Low friction bearings and aluminum pistons
- Special wrist pin bearings

#### ■ Robust compressor.

- Solid valve plate design
- Valves of impact resistant spring steel

#### ■ Efficient lubrication of compressor.

- For medium and low evaporating temperature compressors 1.5 HP to 7.5 HP  
Centrifugal lubrication is used with optimum oil supply in the compressor even under extreme operating conditions.
- For medium evaporating temperature compressors 10 HP to 25 HP  
For low evaporating temperature compressors 7.5 HP to 34 HP  
Oil pump lubrication is used with patented oil return system, sealed main bearing, generously sized oil pump and less carry over than with pump lubrication.

### (4) Easy and Fast Installation

- Fully wired electrical components.
- Factory charged with holding charge of refrigerant.
- Elimination of flare type fittings.
- Reinforced base frame with small footprint.

### (5) Easy Service And Maintenance

- Easy access to the electrical and control components for easy service.
- Compressor oil sight glass through which the oil quantity and its condition in the crankcase can observe.
- Accessible hermetic construction for the compressor by use bolted parts.
- Accessible construction for fan/motor.
- Compressor suction and discharge service of Rota lock type with gauge connections.
- Liquid line service Rota lock valve.

### (6) Safety Protections

#### ■ Semi-Hermetic Reciprocating Compressor

- Electronic motor protection with thermal monitoring with PTC sensors
- Internal pressure relief valve to protect the compressor against high discharge pressures.
- Terminal box enclosure class is IP65 or IP54 (as per standard IEC34).
- IP65 for terminal box enclosure for units below 20 HP
- IP54 for terminal box enclosure for units above 20 HP

#### ■ Fan Motor

- Thermal protection.
- Protection grill on propeller side for safety of personnel conforms to machinery directive (CE)
- Class F insulation as per standards NFC 51200-11 and CEI 34-1.
- Terminal box enclosure class is IP54 (as per standard IEC34).

#### ■ Crankcase Heater

- To guard compressor against flood back conditions and to eliminate oil fluffing on start up.
- Insertion type, temperature dependent control.
- Self regulating PTC heater.
- Standard mandatory for :
  - Outdoor installation of condensing unit.
  - Long shut-off period
  - High refrigerant charge
- For compressor 1.5 HP to 5 HP  
The crankcase heater is mounted in housing pocket ( at bearing cover ).
- For compressor 7.5 HP to 34 HP  
The crankcase heater is mounted into pre-mounted heater sleeve ( near sight glass ).

#### ■ Dual High / Low Pressure Control

- To protect the compressor against high discharge pressures and low suction pressures.
- Terminal box enclosure class is IP30 (as per standards IEC529/EN60529)

#### ■ Oil Pressure Differential Control

- To protect compressor against lack of oil.
- Connected to the oil pump discharge outlet and the crankcase pressure.  
The oil pressure control breaks the control circuit when the pressure difference between the oil pump outlet and the crankcase drops below 0.7 bar, then the compressor will be stopped after a 120 seconds delay after having solved the problem, the control has to be reset manually.
- Terminal box enclosure class is IP20 (as per standards IEC529/EN60529).

#### ■ Safety pressure relief valve for liquid receiver

- To protect the liquid receiver against excessive pressures as per PED directive.

**Refrigerating Cooling Capacity ( Q Watts ) and Power Input ( P kW )  
60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRM6 series**

**HFC ( R404A / R507A )**

Model	Ambient °C	Evaporating Temperature (°C)						
		5	0	-5	-10	-15	-20	-25
MCRM6 – 150 – BY  Q Watt	32	7154	6019	5012	4116	3331	2654	2073
	37	6560	5498	4550	3725	3001	2374	1806
	42	5967	4978	4088	3333	2672	2095	1539
	46		4577	3724	3022	2406	1865	1308
	50				2711	2140	1635	1078
P kW	32	2.102	1.979	1.855	1.727	1.599	1.455	1.308
	37	2.239	2.092	1.947	1.796	1.644	1.481	1.312
	42	2.375	2.206	2.040	1.866	1.689	1.507	1.317
	46		2.297	2.114	1.922	1.725	1.528	1.321
	50				1.978	1.761	1.549	1.325
MCRM6 – 200 – CY  Q Watt	32	7961	6722	5624	4643	3783	3026	2385
	37	7305	6148	5114	4213	3408	2721	2123
	42	6649	5575	4604	3784	3033	2415	1862
	46			4204	3446	2731	2168	1645
	50					2428	1920	1428
P kW	32	2.544	2.383	2.215	2.048	1.878	1.712	1.526
	37	2.718	2.533	2.338	2.148	1.955	1.765	1.562
	42	2.891	2.682	2.462	2.246	2.033	1.819	1.598
	46			2.561	2.324	2.095	1.862	1.627
	50					2.157	1.905	1.656
MCRM6 – 300 – DY  Q Watt	32	14974	12686	10625	8807	7191	5782	4558
	37	13707	11573	9658	7971	6490	5183	4049
	42	12441	10460	8691	7136	5789	4584	3540
	46			7932	6471	5228	4095	3116
	50					4666	3606	2693
P kW	32	4.358	4.055	3.757	3.457	3.145	2.836	2.524
	37	4.621	4.272	3.933	3.594	3.244	2.901	2.557
	42	4.883	4.490	4.109	3.732	3.343	2.966	2.590
	46			4.250	3.842	3.422	3.018	2.616
	50					3.501	3.070	2.642

**Notes :**

- (1) Performance data are based on 20°C suction gas temperature with 0°K sub cooling and 60Hz driving frequency with system inherently liquid subcooling based on liquid subcooler according to European Standard EN 13215 .
- (2) Q = Refrigerating Capacity (watts).
- (3) P = Total input power include compressor input power and fan motors input power, (kW).



**Refrigerating Cooling Capacity ( Q Watts ) and Power Input ( P kW )  
60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRM6 series**

**HFC ( R404A / R507A )**

Model	Ambient °C	Evaporating Temperature (°C)						
		5	0	-5	-10	-15	-20	-25
MCRM6 – 400 – DY  Q Watt	32	19189	16192	13543	11186	9129	7343	5815
	37	17628	14841	12353	10174	8271	6618	5201
	42	16066	13490	11163	9162	7413	5892	4586
	46	14891	12463	10241	8369	6732	5307	4082
	50			9318	7577	6052	4723	3577
P kW	32	5.155	4.844	4.526	4.191	3.844	3.498	3.130
	37	5.495	5.132	4.764	4.380	3.988	3.598	3.192
	42	5.835	5.420	5.002	4.569	4.132	3.698	3.253
	46	6.107	5.650	5.192	4.720	4.247	3.778	3.302
	50			5.382	4.871	4.362	3.858	3.351
MCRM6 – 600 – EY  Q Watt	32	26062	21902	18198	14968	12139	9686	7623
	37	23888	20028	16603	13588	10983	8748	6828
	42	21715	18155	15008	12208	9827	7810	6033
	46		16718	13773	11121	8907	7060	5383
	50				10034	7987	6310	4732
P kW	32	7.074	6.668	6.229	5.757	5.274	4.766	4.255
	37	7.526	7.048	6.542	6.010	5.464	4.898	4.336
	42	7.979	7.429	6.855	6.262	5.654	5.031	4.417
	46		7.734	7.105	6.464	5.806	5.137	4.482
	50				6.666	5.958	5.243	4.547
MCRM6 – 700 – FY  Q Watt	32	30320	25691	21328	17620	14361	11555	9130
	37	27860	23420	19516	16031	13045	10420	8205
	42	25401	21149	17704	14443	11729	9285	7280
	46			16318	13200	10694	8373	6529
	50					9659	7461	5779
P kW	32	8.666	8.126	7.561	6.981	6.381	5.768	5.142
	37	9.207	8.589	7.948	7.295	6.627	5.682	5.266
	42	9.747	9.052	8.334	7.609	6.873	6.134	5.390
	46			8.643	7.860	7.070	6.496	5.489
	50					7.267	6.858	5.588

**Notes :**

- (1) Performance data are based on 20°C suction gas temperature with 0°K sub cooling and 60Hz driving frequency with system inherently liquid subcooling based on liquid subcooler according to European Standard EN 13215 .
- (2) Q = Refrigerating Capacity (watts).
- (3) P = Total input power include compressor input power and fan motors input power, (kW).

**Refrigerating Cooling Capacity ( Q Watts ) and Power Input ( P kW )  
60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRM6 series**

**HFC ( R404A / R507A )**

Model	Ambient °C	Evaporating Temperature (°C)						
		5	0	-5	-10	-15	-20	-25
MCRM6 – 1000 – FY  Q Watt	32	37668	31641	26259	21547	17406	13836	10754
	37	34428	28773	23804	19416	15614	12309	9494
	42		25906	21349	17286	13822	10783	8234
	46			19406	15571	12361	9515	7171
	50						8247	6109
P kW	32	11.290	10.347	9.408	8.487	7.587	6.704	5.826
	37	11.922	10.580	9.812	8.795	7.807	6.854	5.904
	42		11.369	10.229	9.124	8.037	6.994	5.980
	46			10.563	9.387	8.221	7.106	6.040
	50						7.218	6.100
MCRM6 – 1200 – GY  Q Watt	32	47874	40169	33305	27316	22069	17611	13764
	37	44018	36784	30440	24853	19973	15833	12275
	42	40163	33399	27576	22390	17878	14055	10785
	46		30815	25374	20464	16211	12614	9554
	50				18538	14545	11174	8323
P kW	32	13.154	12.201	11.228	10.230	9.225	6.988	7.198
	37	13.989	12.894	11.788	10.671	9.557	7.197	7.352
	42	14.825	13.588	12.348	11.113	9.889	7.405	7.506
	46		14.143	12.796	11.467	10.155	7.571	7.630
	50				11.821	10.421	7.737	7.754
MCRM6 – 1500 – GY  Q Watt	32	55485	46384	38380	31308	25189	19931	15404
	37	50953	42396	34904	28381	22684	17803	13518
	42	46421	38409	31428	25454	20178	15675	11632
	46		35344	28706	23137	18157	13923	10026
	50				20821	16136	12171	8419
P kW	32	14.941	13.841	12.711	11.557	10.382	9.187	8.007
	37	15.842	14.571	13.283	11.983	10.679	9.369	8.087
	42	16.744	15.301	13.856	12.410	10.976	9.552	8.168
	46		15.885	14.314	12.752	11.214	9.698	8.233
	50				13.094	11.452	9.844	8.298

**Notes :**

- (1) Performance data are based on 20°C suction gas temperature with 0°K sub cooling and 60Hz driving frequency with system inherently liquid subcooling based on liquid subcooler according to European Standard EN 13215 .
- (2) Q = Refrigerating Capacity (watts).
- (3) P = Total input power include compressor input power and fan motors input power, (kW).

**Refrigerating Cooling Capacity ( Q Watts ) and Power Input ( P kW )  
60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRM6 series**

**HFC ( R404A / R507A )**

Model	Ambient °C	Evaporating Temperature (°C)						
		5	0	-5	-10	-15	-20	-25
MCRM6 – 2000 – GY	32	63657	53493	45529	36603	29644	23661	18557
	37	58462	48912	40622	33226	26824	21272	16590
	42	53266	44332	35715	29848	24005	18883	14624
	46			31666	27186	21761	16947	13008
	50					19517	15011	11393
Q Watt	32	18.125	16.740	15.357	13.958	12.554	11.168	9.791
	37	19.237	17.668	16.111	14.551	13.005	11.491	10.008
	42	20.349	18.594	16.863	15.145	13.457	11.815	10.225
	46			17.465	15.620	13.819	12.074	10.399
	50					14.181	12.333	10.573
P kW	32	80463	68295	57333	47653	39051	31549	25041
	37	73939	62494	52351	43302	35370	28449	22391
	42		56692	47369	38952	31689	25349	19741
	46			43523	35536	28768	22857	17564
	50					25848	20366	15388
Q Watt	32	24.289	22.343	20.409	18.610	16.831	15.085	13.377
	37	25.572	23.504	21.327	19.335	16.738	15.462	13.591
	42		23.301	22.262	20.045	17.929	15.846	13.822
	46			22.893	20.613	18.882	16.153	14.007
	50					18.615	16.460	14.192
P kW	32	24.289	22.343	20.409	18.610	16.831	15.085	13.377
	37	25.572	23.504	21.327	19.335	16.738	15.462	13.591
	42		23.301	22.262	20.045	17.929	15.846	13.822
	46			22.893	20.613	18.882	16.153	14.007
	50					18.615	16.460	14.192

**Notes :**

- (1) Performance data are based on 20°C suction gas temperature with 0°K sub cooling and 60Hz driving frequency with system inherently liquid subcooling based on liquid subcooler according to European Standard EN 13215 .
- (2) Q = Refrigerating Capacity (watts).
- (3) P = Total input power include compressor input power and fan motors input power, (kW).

**Refrigerating Cooling Capacity ( Q Watts ) and Power Input ( P kW )  
60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRL6 series**

**HFC ( R404A / R507A )**

Model	Ambient °C	Evaporating Temperature (°C)					
		-15	-20	-25	-30	-35	-40
MCRL6 – 150 – BY	32	3570	2948	2321	1783	1331	941
	37	3213	2638	2072	1554	1116	755
	42	2856	2328	1822	1325	901	568
	46	2567	2074	1617	1128	708	395
	50		1820	1411	930	515	222
Q Watt	32	1.894	1.727	1.535	1.351	1.158	0.969
	37	1.697	1.780	1.570	1.365	1.155	0.952
	42	2.050	1.833	1.605	1.379	1.153	0.936
	46	2.332	1.875	1.633	1.390	1.151	0.923
	50		1.917	1.661	1.401	1.149	0.910
P kW	32	5507	4558	3609	2796	2073	1471
	37	4944	4074	3205	2446	1762	1179
	42	4381	3591	2801	2095	1451	888
	46	3924	3194	2464	1796	1174	618
	50			2128	1496	898	347
Q Watt	32	2.654	2.378	2.087	1.812	1.540	1.277
	37	2.723	2.421	2.103	1.803	1.508	1.226
	42	2.796	2.464	2.119	1.794	1.475	1.174
	46	2.854	2.498	2.132	1.787	1.449	1.132
	50		2.532	2.145	1.780	1.423	1.090
P kW	32	8439	7004	5569	4337	3270	2366
	37	7603	6296	4977	3842	2747	1964
	42	6767	5588	4385	3348	2224	1563
	46	6093	5014	3897	2934	1754	1199
	50		4441	3410	2520	1284	835
Q Watt	32	3.176	2.877	2.554	2.226	1.907	1.596
	37	3.287	2.945	2.587	2.229	1.881	1.548
	42	3.393	3.013	2.620	2.231	1.855	1.500
	46	3.478	3.067	2.646	2.233	1.834	1.461
	50		3.121	2.672	2.235	1.813	1.422
P kW	32	8439	7004	5569	4337	3270	2366
	37	7603	6296	4977	3842	2747	1964
	42	6767	5588	4385	3348	2224	1563
	46	6093	5014	3897	2934	1754	1199
	50		4441	3410	2520	1284	835

**Notes :**

- (1) Performance data are based on 20°C suction gas temperature with 0°K sub cooling and 60Hz driving frequency with system inherently liquid subcooling based on liquid subcooler according to European Standard EN 13215 .
- (2) Q = Refrigerating Capacity (watts).
- (3) P = Total input power include compressor input power and fan motors input power, (kW).

**Refrigerating Cooling Capacity ( Q Watts ) and Power Input ( P kW )  
60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRL6 series**

**HFC ( R404A / R507A )**

Model	Ambient °C	Evaporating Temperature (°C)					
		-15	-20	-25	-30	-35	-40
MCRL6 – 400 – DY  Q Watt	32	10898	9065	7241	5664	4320	3216
	37	9837	8151	6479	5039	3829	2769
	42	8775	7236	5718	4413	3339	2321
	46		6495	5093	3894	2929	1930
	50			4469	3374	2519	1538
P kW	32	5.558	5.023	4.423	3.844	3.287	2.761
	37	5.768	5.179	4.527	3.898	3.299	2.738
	42	5.995	5.335	4.630	3.951	3.311	2.714
	46		5.460	4.712	3.993	3.321	2.695
	50			4.794	4.035	3.331	2.695
MCRL6 – 500 – DY  Q Watt	32	13026	10481	8406	6606	5074	3785
	37	11870	9419	7511	5874	4484	3273
	42	10714	8358	6616	5142	3893	2762
	46	9815	7497	5880	4534	3397	2316
	50			5510	3926	2900	1871
P kW	32	6.649	6.017	5.286	4.582	3.917	3.300
	37	6.907	6.200	5.411	4.656	3.945	3.288
	42	7.169	6.382	5.535	4.729	3.973	3.276
	46	7.379	6.528	5.634	4.787	3.995	3.266
	50			5.570	4.845	4.017	3.256
MCRL6 – 700 – EY  Q Watt	32	14920	12301	9711	7475	5534	3911
	37	13278	10891	8545	6505	4756	3252
	42	11637	9482	7379	5535	3977	2593
	46			6390	4697	3295	1997
	50				3860	2612	1401
P kW	32	7.926	7.029	5.984	5.024	4.151	3.356
	37	8.223	7.195	6.085	5.067	4.144	3.287
	42	8.339	7.371	6.194	5.119	4.134	3.225
	46			6.281	5.161	4.126	3.175
	50				5.203	4.118	3.125

**Notes :**

- (1) Performance data are based on 20°C suction gas temperature with 0°K sub cooling and 60Hz driving frequency with system inherently liquid subcooling based on liquid subcooler according to European Standard EN 13215 .
- (2) Q = Refrigerating Capacity (watts).
- (3) P = Total input power include compressor input power and fan motors input power, (kW).



**Refrigerating Cooling Capacity ( Q Watts ) and Power Input ( P kW )  
60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRL6 series**

**HFC ( R404A / R507A )**

Model	Ambient °C	Evaporating Temperature (°C)						
		-15	-20	-25	-30	-35	-40	
MCRL6 – 900 – EY	32	19219	15920	12636	9786	7381	5353	
	37	17239	14236	11234	8652	6424	4466	
	Q	42	15259	12552	9832	7518	5466	3580
	Watt	46		11170	8665	6565	4640	2779
	50				5612	3813	1978	
P	32	9.661	8.589	7.417	6.322	5.306	4.375	
	37	10.013	8.826	7.570	6.400	5.322	4.337	
	42	10.357	9.064	7.724	6.478	5.338	4.300	
	46		9.254	7.847	6.540	5.351	4.270	
	50				6.602	5.364	4.240	
MCRL6 – 1200 – EY	32	21079	17439	13817	10626	7947	5671	
	37	18854	15513	12207	9324	6894	4566	
	Q	42	16629	13586	10596	8021	5841	3461
	Watt	46			9240	6911	4927	2439
	50				5801	4014	1417	
P	32	10.771	9.441	8.111	6.861	5.694	4.630	
	37	11.014	9.581	8.148	6.807	5.565	4.436	
	42	11.257	9.721	8.185	6.753	5.435	4.243	
	46			8.215	6.710	5.331	4.089	
	50				6.667	5.227	3.935	
MCRL6 – 1500 – FY	32	28650	23979	19316	15187	11592	8529	
	37	25751	21466	17205	13434	10173	7239	
	Q	42	22851	18954	15094	11681	8755	5950
	Watt	46			13345	10208	7547	4804
	50				8735	6339	3658	
P	32	15.029	13.542	11.816	10.199	8.690	7.285	
	37	15.512	13.855	11.997	10.259	8.647	7.153	
	42	15.994	14.169	12.179	10.319	8.604	7.019	
	46			12.325	10.367	8.570	6.912	
	50					8.536	6.805	

**Notes :**

- (1) Performance data are based on 20°C suction gas temperature with 0°K sub cooling and 60Hz driving frequency with system inherently liquid subcooling based on liquid subcooler according to European Standard EN 13215 .
- (2) Q = Refrigerating Capacity (watts).
- (3) P = Total input power include compressor input power and fan motors input power, (kW).

**Refrigerating Cooling Capacity ( Q Watts ) and Power Input ( P kW )  
60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRL6 series**

**HFC ( R404A / R507A )**

Model	Ambient °C	Evaporating Temperature (°C)					
		-15	-20	-25	-30	-35	-40
MCRL6 – 1800 – GY  Q Watt	32	36505	30406	24404	19090	14569	10742
	37	32967	27439	21838	17036	12903	9191
	42	29429	24472	19273	14982	11238	7639
	46		22093	17169	13287	9842	6271
	50				11593	8446	4903
P kW	32	17.799	15.871	13.943	12.113	10.376	8.741
	37	18.391	16.305	14.219	12.249	10.395	8.666
	42	18.983	16.739	14.495	12.385	10.414	8.590
	46		17.086	14.716	12.494	10.429	8.529
	50				12.603	10.444	8.468
MCRL6 – 2300 – GY  Q Watt	32	42621	35571	28642	22582	17336	12925
	37	38536	32115	25747	20192	15325	11268
	42	34451	28660	22852	17803	13315	9612
	46	31193	25892	20505	15841	11624	8186
	50				13879	9934	6760
P kW	32	20.906	18.835	16.517	14.337	12.274	10.359
	37	21.792	19.415	16.907	14.569	12.380	10.362
	42	22.568	19.994	17.297	14.801	12.486	10.364
	46	23.189	20.457	17.609	14.987	12.571	10.366
	50				15.173	12.656	10.368
MCRL6 – 2800 – HY  Q Watt	32	48874	41041	33189	26262	20307	15197
	37	44263	37026	29793	23461	17987	13163
	42	39651	33011	26398	20660	15667	11129
	46			23635	18354	13724	9362
	50				16049	11780	7595
P kW	32	25.272	22.765	19.964	17.278	14.747	12.368
	37	26.077	23.389	20.368	17.478	14.758	12.215
	42	27.101	24.012	20.772	17.677	14.770	12.061
	46			21.095	17.836	14.780	11.938
	50				17.995	14.790	11.815
MCRL6 – 3400 – HY  Q Watt	32	57889	48900	39896	31929	25002	18959
	37	51821	43976	35757	28488	22164	16738
	42		39052	31619	25048	19327	14518
	46			27481	22208	16953	12646
	50					14579	10774
P kW	32	32.367	29.284	25.547	22.123	18.916	15.995
	37	33.732	30.267	26.258	22.574	19.148	16.025
	42		31.250	26.970	23.025	19.378	16.055
	46			27.682	23.386	19.562	16.079
	50					19.746	16.103

**Notes :**

- (1) Performance data are based on 20°C suction gas temperature with 0°K sub cooling and 60Hz driving frequency with system inherently liquid subcooling based on liquid subcooler according to European Standard EN 13215 .
- (2) Q = Refrigerating Capacity (watts).
- (3) P = Total input power include compressor input power and fan motors input power, (kW).

## Technical Data

### 60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRM6 series

Refrigeration Condensing Unit	Model	MCRM6-150-BY	MCRM6-200-CY	MCRM6-300-DY	MCRM6-400-DY	MCRM6-600-EY	MCRM6-700-FY
	Refrigerant	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A
<b>COMPRESSOR</b>							
Model		2HES-2Y-20D	2GES-2Y-20D	2DES-3Y-20D	2CES-4Y-20D	4EES-6Y-20D	4DES-7Y-20D
Power supply V/Ph/Hz	Y	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60
	Δ	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60
Displacement	m <sup>3</sup> /hr	7.86	9.15	16.20	19.60	27.42	32.39
Speed	RPM	1750	1750	1750	1750	1750	1750
Number of cylinders		2	2	2	2	4	4
Bore x Stroke	mm	38 x 33	41 x 33	50 x 39.3	55 x 39.3	46 x 39.3	50 x 39.3
Motor electrical connection		Y / Δ	Y / Δ	Y / Δ	Y / Δ	Y / Δ	Y / Δ
Maximum Operating Current	A	5.7 / 9.5 Y / Δ	6.3 / 10.5 Y / Δ	10.9 / 18.1 Y / Δ	12.7 / 21.1 Y / Δ	17.3 / 28.6 Y / Δ	21.0 / 34.7 Y / Δ
Maximum Power Input	Kw	2.9 / 2.9 Y / Δ	3.3 / 3.3 Y / Δ	5.6 / 5.6 Y / Δ	6.8 / 6.8 Y / Δ	9.2 / 9.2 Y / Δ	10.7 / 10.7 Y / Δ
Starting Current	A	26.1 / 44.8 Y / Δ	26.1 / 44.8 Y / Δ	47.0 / 81.4 Y / Δ	56.2 / 97.3 Y / Δ	79.0 / 136.8 Y / Δ	104.6 / 181.2 Y / Δ
Enclosure class		IP 66	IP 66	IP 66	IP 66	IP 66	IP 66
Motor protection		SE-B3	SE-B3	SE-B3	SE-B3	SE-B3	SE-B3
Crankcase Heater	W	60	60	120	120	120	120
Max. Pressure ( LP / HP )	bar	19 / 32	19 / 32	19 / 32	19 / 32	19 / 32	19 / 32
Oil charge	Liter	1	1	1.5	1.5	2	2
Oil type for HFC refrigerant		BSE32	BSE32	BSE32	BSE32	BSE32	BSE32
Net Weight	Kg	49	49	77	76	95	100
<b>FAN / MOTOR</b>							
Power supply V/Ph/Hz	Y	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60
	Δ	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60
Quantity		1	2	2	2	2	2
Fan Diameter	mm	450	350	450	450	500	500
Fan type		Compost Material	Compost Material	Compost Material	Compost Material	Aluminum	Aluminum
Current / Motor	Y / Δ	A	0.79 / 1.35	0.48 / 0.83	0.79 / 1.35	0.79 / 1.35	1.90 / 3.30
Total current	Y / Δ	A	0.79 / 1.35	0.96 / 1.66	1.58 / 2.7	1.58 / 2.7	3.80 / 6.60
Power Input / Motor	Y / Δ	Kw	0.490	0.28	0.49	0.49	1.100
Total Input Power	Y / Δ	Kw	0.490	0.56	0.98	0.98	2.200
Number of Blades of Propeller		7	7	7	7	7	7
Total Air Flow @ 0 Pascal	m <sup>3</sup> /hr	6,150	8,000	12,300	12,300	17,000	17,000
	cfm	3,620	4,709	7,240	7,240	10,030	10,030
<b>CONDENSER COIL</b>							
Quantity		1	1	1	1	1	1
Coil Tubes Type		Inner Grooved Copper Tubes					
Coil Fins Type		Aluminum Sine Fins					
Coil Finned Width	mm	660	860	1090	1090	1200	1440
Coil Finned Height	mm	560	560	660	660	790	840
Coil Tube Diameter	Inch	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Coil Number of Rows		4	4	5	5	5	5
Coil Number of Circuit		5	5	8	8	11	16
Coil Fins per Inch		12	12	12	12	12	12
Coil Total Number of Fins		264	406	514	514	568	708
Coil Fins Configuration		1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866

## Technical Data

### 60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRM6 series

Refrigeration Condensing Unit	Model	MCRM6-150-BY	MCRM6-200-CY	MCRM6-300-DY	MCRM6-400-DY	MCRM6-600-EY	MCRM6-700-FY						
	Refrigerant	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A						
<b>LIQUID RECEIVER</b>													
Capacity	Liter	7	7	14	14	18	18						
<b>REFRIGERANT PIPING</b>													
Suction Diameter	Inch mm	5/8 16	5/8 16	7/8 22	7/8 22	1-1/8 28	1-1/8 28						
Discharge Diameter	Inch mm	1/2 12	1/2 12	5/8 16	5/8 16	5/8 16	7/8 22						
Liquid Diameter	Inch mm	1/2 12	1/2 12	1/2 12	1/2 12	7/8 22	7/8 22						
<b>ELECTRICAL CABLE</b>													
Motor electrical connection		Y    Δ	Y    Δ	Y    Δ	Y    Δ	Y    Δ	Y    Δ						
Power cables C.S.A	mm <sup>2</sup>	1.5 RM	1.5 RM	1.5 RM	1.5 RM	4 RM	2.5 RM	6 RM	4 RM	10 RM	6 RM	16 RM	
Main C.B	A	10	20	13	20	20	32	25	40	32	63	50	63
<b>UNIT DIMENSIONS</b>													
Width	mm	827	1023	1291	1291	1377	1665						
Height	mm	615	615	720	720	845	895						
Depth	mm	800	800	910	910	910	1160						
<b>NET WEIGHT</b>													
Net Weight	Kg	94	116	188	187	267.5	314						

## Technical Data

### 60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRM6 series

Refrigeration Condensing Unit	Model	MCRM6-1000-FY	MCRM6-1200-GY	MCRM6-1500-GY	MCRM6-2000-GY	MCRM6-2500-HY
	Refrigerant	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A
<b>COMPRESSOR</b>						
Model		4VE-10Y-20D	4TE-12Y-20D	4PE-15Y-20D	4NE-20Y-20D	4HE-25Y-20D
Power supply V/Ph/Hz	Y	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60
	Δ	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60
Displacement	m <sup>3</sup> /hr	41.92	49.88	58.53	67.89	88.83
Speed	RPM	1750	1750	1750	1750	1750
Number of cylinders		4	4	4	4	4
Bore x Stroke	mm	55 x 42	60 x 42	65 x 42	70 x 42	70 x 55
Motor electrical connection		Y / Δ	Y / Δ	Y / Δ	Y / Δ	Y / Δ
Maximum Operating Current	A	25.3 / 41.9 Y / Δ	31.9 / 52.8 Y / Δ	35.8 / 59.4 Y / Δ	42.2 / 69.9 Y / Δ	55.9 / 92.6 Y / Δ
Maximum Power Input	Kw	14.5 / 14.5 Y / Δ	16.9 / 16.9 Y / Δ	19.3 / 19.3 Y / Δ	22.9 / 22.9 Y / Δ	30.2 / 30.2 Y / Δ
Starting Current	A	126 / 208 Y / Δ	143 / 238 Y / Δ	168 / 278 Y / Δ	201 / 333 Y / Δ	268 / 444 Y / Δ
Enclosure class		IP 66	IP 66	IP 66	IP 66	IP 54
Motor protection		SE-B3	SE-B3	SE-B3	SE-B3	SE-B3
Crankcase Heater	W	140	140	140	140	140
Max. Pressure ( LP / HP )	bar	19 / 32	19 / 32	19 / 32	19 / 32	19 / 32
Oil charge	Liter	2.60	2.60	2.60	2.60	4.50
Oil type for HFC refrigerant		BSE32	BSE32	BSE32	BSE32	BSE32
Net Weight	Kg	149	148	156	159	207
<b>FAN / MOTOR</b>						
Power supply V/Ph/Hz	Y	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60
	Δ	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60
Quantity		2	4	4	4	4
Fan Diameter	mm	500	500	500	500	500
Fan type		Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Current / Motor Y / Δ	A	1.90 / 3.30	1.90 / 3.30	1.90 / 3.30	1.90 / 3.30	1.90 / 3.30
Total current Y / Δ	A	3.80 / 6.60	7.60 / 13.20	7.60 / 13.20	7.60 / 13.20	7.60 / 13.20
Power Input / Motor Y / Δ	Kw	1.10	1.100	1.100	1.10	1.10
Total Input Power Y / Δ	Kw	2.20	4.400	4.400	4.40	4.40
Number of Blades of Propeller		7	7	7	7	7
Total Air Flow @ 0 Pascal	m <sup>3</sup> /hr	17,000	34,000	34,000	34,000	34,000
	cfm	10,030	20,059	20,059	20,059	20,059
<b>CONDENSER COIL</b>						
Quantity		1	2	2	2	2
Coil Tubes Type		Inner Grooved Copper Tubes				
Coil Fins Type		Aluminum Sine Fins				
Coil Finned Width	mm	1440	1440	1440	1440	1440
Coil Finned Height	mm	840	713	713	713	840
Coil Tube Diameter	Inch	3/8"	3/8"	3/8"	3/8"	3/8"
Coil Number of Rows		5	5	5	5	5
Coil Number of Circuit		16	14	14	14	16
Coil Fins per Inch		12	12	12	12	12
Coil Total Number of Fins		708	708	708	708	708
Coil Fins Configuration		1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866



## Technical Data

### 60Hz Refrigeration Condensing Units – Medium Evaporating Temperature - MCRM6 series

Refrigeration Condensing Unit	Model	MCRM6-1000-FY	MCRM6-1200-GY	MCRM6-1500-GY	MCRM6-2000-GY	MCRM6-2500-HY					
	Refrigerant	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A					
<b>LIQUID RECEIVER</b>											
Capacity	Liter	18	24	24	24	40					
<b>REFRIGERANT PIPING</b>											
Suction Diameter	Inch mm	1-1/8 28	1-3/8 35	1-5/8 42	1-5/8 42	2-1/8 54					
Discharge Diameter	Inch mm	7/8 22	1-1/8 28	1-1/8 28	1-1/8 28	1-1/8 28					
Liquid Diameter	Inch mm	7/8 22	7/8 22	7/8 22	7/8 22	7/8 22					
<b>ELECTRICAL CABLE</b>											
Motor electrical connection		Y    Δ	Y    Δ	Y    Δ	Y    Δ	Y    Δ					
Power cables C.S.A	mm <sup>2</sup>	10 RM	16 RM	16 RM	25 RM	16 RM	35 RM	16 RM	35 RM	25 RM	70 SM
Main C.B	A	50	80	63	100	80	125	80	125	100	160
<b>UNIT DIMENSIONS</b>											
Width	mm	1665	1665	1665	1665	1665					
Height	mm	895	1482	1482	1482	1735					
Depth	mm	1160	1160	1160	1160	1160					
<b>NET WEIGHT</b>											
Net Weight	Kg	363	452	460	463	625					

## Technical Data

### 60Hz Refrigeration Condensing Units – Low Evaporating Temperature - MCRL6 series

Refrigeration Condensing Unit	Model	MCRL6- 150-BY	MCRL6- 200-CY	MCRL6- 300-CY	MCRL6- 400-DY	MCRL6- 500-DY	MCRL6- 700-FY	MCRL6- 900-EY
	Refrigerant	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A
<b>COMPRESSOR</b>								
Model		2GES-2Y-20D	2EES-2Y-20D	2CES-3Y-20D	4EES-4Y-20D	4DES-5Y-20D	4VE-7Y-20D	4TE-9Y-20D
Power supply	V/Ph/Hz	Y	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60
		Δ	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60
Displacement	m <sup>3</sup> /hr	9.15	13.71	19.60	27.42	32.39	41.92	49.88
Speed	RPM	1750	1750	1750	1750	1750	1750	1750
Number of cylinders		2	2	2	4	4	4	4
Bore x Stroke	mm	41 x 33	46 x 39.3	55 x 39.3	46 x 39.3	50 x 39.3	55 x 42	60 x 42
Motor electrical connection		Y / Δ	Y / Δ	Y / Δ	Y / Δ	Y / Δ	Y / Δ	Y / Δ
Maximum Operating Current	A	6.3 / 10.5 Y / Δ	7.6 / 12.6 Y / Δ	11.6 / 19.2 Y / Δ	15.5 / 25.7 Y / Δ	18.4 / 30.5 Y / Δ	21.1 / 34.9 Y / Δ	25.3 / 41.9 Y / Δ
Maximum Power Input	Kw	3.3 / 3.3 Y / Δ	4.0 / 4.0 Y / Δ	6.0 / 6.0 Y / Δ	8.3 / 8.3 Y / Δ	9.8 / 9.8 Y / Δ	13.3 / 13.3 Y / Δ	15.7 / 15.7 Y / Δ
Starting Current	A	26.1 / 44.8 Y / Δ	33.9 / 58.7 Y / Δ	47.0 / 81.4 Y / Δ	67.9 / 117.6 Y / Δ	79.0 / 136.8 Y / Δ	86 / 143 Y / Δ	103 / 171 Y / Δ
Enclosure class		IP 66	IP 66	IP 66	IP 66	IP 66	IP 66	IP 66
Motor protection		SE-B3	SE-B3	SE-B3	SE-B3	SE-B3	SE-B3	SE-B3
Crankcase Heater	W	60	120	120	120	120	140	140
Max. Pressure ( LP / HP )	bar	19 / 32	19 / 32	19 / 32	19 / 32	19 / 32	19 / 32	19 / 32
Oil charge	Liter	1.0	1.5	1.5	2	2.0	2.6	2.60
Oil type for HFC refrigerant		BSE32	BSE32	BSE32	BSE32	BSE32	BSE32	BSE32
Net Weight	Kg	49	74	76	93	94	142	144
<b>FAN / MOTOR</b>								
Power supply	V/Ph/Hz	Y	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60
		Δ	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60
Quantity		1	2	2	2	2	2	2
Fan Diameter	mm	450	350	350	450	450	500	500
Fan type		Compost Material	Compost Material	Compost Material	Compost Material	Compost Material	Aluminum	Aluminum
Current / Motor	Y / Δ	A	0.79 / 1.35	0.48 / 0.83	0.48 / 0.83	0.79 / 1.35	0.79 / 1.35	1.90 / 3.30
Total current	Y / Δ	A	0.79 / 1.35	0.96 / 1.66	0.96 / 1.66	1.58 / 2.7	1.58 / 2.7	3.80 / 6.60
Power Input / Motor	Y / Δ	Kw	0.490	0.28	0.28	0.49	0.49	1.100
Total Input Power	Y / Δ	Kw	0.490	0.56	0.56	0.98	0.98	2.200
Number of Blades of Propeller		7	7	7	7	7	7	7
Total Air Flow @ 0 Pascal	m <sup>3</sup> /hr	6,150	8,000	8,000	12,300	12,300	17,000	17,000
	cfm	3,620	4,709	4,709	7,240	7,240	10,030	10,030
<b>CONDENSER COIL</b>								
Quantity		1	1	1	1	1	1	1
Coil Tubes Type		Inner Grooved Copper Tubes						
Coil Fins Type		Aluminum Sine Fins						
Coil Finned Width	mm	660	860	860	1090	1090	1200	1200
Coil Finned Height	mm	560	560	560	660	660	790	790
Coil Tube Diameter	Inch	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Coil Number of Rows		4	4	4	5	5	5	5
Coil Number of Circuit		5	5	5	8	8	11	11
Coil Fins per Inch		12	12	12	12	12	12	12
Coil Total Number of Fins		264	406	406	514	514	568	568
Coil Fins Configuration		1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866

## Technical Data

### 60Hz Refrigeration Condensing Units – Low Evaporating Temperature - MCRL6 series

Refrigeration Condensing Unit	Model	MCRL6- 150-BY	MCRL6- 200-CY	MCRL6- 300-CY	MCRL6- 400-DY	MCRL6- 500-DY	MCRL6- 700-FY	MCRL6- 900-EY							
	Refrigerant	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A							
<b>LIQUID RECEIVER</b>															
Capacity	Liter	7	7	7	14	14	18	18							
<b>REFRIGERANT PIPING</b>															
Suction Diameter	Inch mm	5/8 16	7/8 22	7/8 22	1-1/8 28	1-1/8 28	1-1/8 28	1-3/8 35							
Discharge Diameter	Inch mm	1/2 12	5/8 16	5/8 16	5/8 16	7/8 22	7/8 22	1-1/8 28							
Liquid Diameter	Inch mm	1/2 12	1/2 12	1/2 12	7/8 22	7/8 22	7/8 22	7/8 22							
<b>ELECTRICAL CABLE</b>															
Motor electrical connection		Y    Δ	Y    Δ	Y    Δ	Y    Δ	Y    Δ	Y    Δ	Y    Δ							
Power cables C.S.A	mm <sup>2</sup>	1.5 RM	1.5 RM	1.5 RM	2.5 RM	1.5 RM	4 RM	4 RM	6 RM	4 RM	10 RM	6 RM	16 RM	10 RM	16 RM
Main C.B	A	13	20	13	25	20	32	32	50	32	50	40	63	50	80
<b>UNIT DIMENSIONS</b>															
Width	mm	827	1023	1023	1291	1291	1377	1377							
Height	mm	615	615	615	720	720	845	845							
Depth	mm	800	800	800	910	910	910	910							
<b>NET WEIGHT</b>															
Net Weight	Kg	94	141	143	204	205	314.5	316.5							

## Technical Data

### 60Hz Refrigeration Condensing Units – Low Evaporating Temperature - MCRL6 series

Refrigeration Condensing Unit	Model	MCRL6- 1200-EY	MCRL6- 1500-FY	MCRL6- 1800-GY	MCRL6- 2300-GY	MCRL6- 2800-HY	MCRL6- 3400-HY
	Refrigerant	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A
<b>COMPRESSOR</b>							
Model		4PE-12Y-20D	4JE-15Y-20D	4HE-18Y-20D	4GE-23Y-20D	4FE-28Y-20D	6GE-34Y-20D
Power supply	V/Ph/Hz	Y	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60	380 / 3 / 60
		Δ	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60
Displacement	m <sup>3</sup> /hr	58.53	76.64	88.83	101.98	121.3	153.0
Speed	RPM	1750	1750	1750	1750	1750	1750
Number of cylinders		4	4	4	4	4	6
Bore x Stroke	mm	65 x 42	65 x 55	70 x 55	75 x 55	82 x 55	75 x 55
Motor electrical connection		Y / Δ	Y / Δ	Y / Δ	Y / Δ	Y / Δ	Y / Δ
Maximum Operating Current	A	28.8 / 47.8 Y / Δ	39.1 / 64.8 Y / Δ	46.6 / 77.3 Y / Δ	55.7 / 92.4 Y / Δ	67.0 / 111.2 Y / Δ	83.2 / 137.9 Y / Δ
Maximum Power Input	Kw	16.9 / 16.9 Y / Δ	22.9 / 22.9 Y / Δ	26.6 / 26.6 Y / Δ	32.6 / 32.6 Y / Δ	37.4 / 37.4 Y / Δ	48.3 / 48.3 Y / Δ
Starting Current	A	126 / 208 Y / Δ	201 / 333 Y / Δ	201 / 333 Y / Δ	201 / 333 Y / Δ	296 / 4918 Y / Δ	296 / 491 Y / Δ
Enclosure class		IP 66	IP 54	IP 54	IP 54	IP 54	IP 54
Motor protection		SE-B3	SE-B3	SE-B3	SE-B3	SE-B3	SE-B3
Crankcase Heater	W	140	140	140	140	140	140
Max. Pressure ( LP / HP )	bar	19 / 32	19 / 32	19 / 32	19 / 32	19 / 32	19 / 32
Oil charge	Liter	2.60	4.00	4.00	4.50	4.50	4.75
Oil type for HFC refrigerant		BSE32	BSE32	BSE32	BSE32	BSE32	BSE32
Net Weight	Kg	147	192	191	196	207	230
<b>FAN/MOTOR</b>							
Power supply	V/Ph/Hz	Y	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60	400 / 3 / 60
		Δ	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60	230 / 3 / 60
Quantity		2	2	4	4	4	4
Fan Diameter	mm	500	500	500	500	500	500
Fan type		Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Current / Motor	Y / Δ	A	1.90 / 3.30	1.90 / 3.30	1.90 / 3.30	1.90 / 3.30	1.90 / 3.30
Total current	Y / Δ	A	3.80 / 6.60	3.80 / 6.60	7.60 / 13.20	7.60 / 13.20	7.60 / 13.20
Power Input / Motor	Y / Δ	Kw	1.100	1.100	1.100	1.100	1.100
Total Input Power	Y / Δ	Kw	2.200	2.200	4.400	4.400	4.400
Number of Blades of Propeller		7	7	7	7	7	7
Total Air Flow @ 0 Pascal	m <sup>3</sup> /hr	17,000	17,000	34,000	34,000	34,000	34,000
	cfm	10,030	10,030	20,059	20,059	20,059	20,059
<b>CONDENSER COIL</b>							
Quantity		1	1	2	2	2	2
Coil Tubes Type		Inner Grooved Copper Tubes					
Coil Fins Type		Aluminum Sine Fins					
Coil Finned Width	mm	1200	1440	1440	1440	1440	1440
Coil Finned Height	mm	790	840	790	790	840	840
Coil Tube Diameter	Inch	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Coil Number of Rows		5	5	5	5	5	5
Coil Number of Circuit		11	16	14	14	14	14
Coil Fins per Inch		12	12	12	12	12	12
Coil Total Number of Fins		568	708	680	680	680	680
Coil Fins Configuration		1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866	1" x 0.866

## Technical Data

### 60Hz Refrigeration Condensing Units – Low Evaporating Temperature - MCRL6 series

Refrigeration Condensing Unit	Model	MCRL6- 1200-EY	MCRL6- 1500-FY	MCRL6- 1800-GY	MCRL6- 2300-GY	MCRL6- 2800-HY	MCRL6- 3400-HY						
	Refrigerant	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A	R404A R507A						
<b>LIQUID RECEIVER</b>													
Capacity	Liter	18	18	24	24	40	40						
<b>REFRIGERANT PIPING</b>													
Suction Diameter	Inch mm	1-3/8 35	1-5/8 42	1-5/8 42	2-1/8 54	2-1/8 54	2-1/8 54						
Discharge Diameter	Inch mm	1-1/8 28	1-1/8 28	1-1/8 28	1-1/8 28	1-1/8 28	1-3/8 35						
Liquid Diameter	Inch mm	7/8 22	7/8 22	7/8 22	7/8 22	7/8 22	7/8 22						
<b>ELECTRICAL CABLE</b>													
Motor electrical connection		Y    Δ	Y    Δ	Y    Δ	Y    Δ	Y    Δ	Y    Δ						
Power cables C.S.A	mm <sup>2</sup>	10 RM	25 RM	16 RM	35 RM	25 RM	50 SM	25 RM	70 SM	35 RM	70 SM	50 SM	95 SM
Main C.B	A	50	100	80	125	100	150	100	160	125	200	150	250
<b>UNIT DIMENSIONS</b>													
Width	mm	1377	1665	1665	1665	1665	1665						
Height	mm	845	895	1482	1482	1735	1735						
Depth	mm	910	1160	1160	1160	1160	1160						
<b>NET WEIGHT</b>													
Net Weight	Kg	319.5	406	495	500	627	650						



## Important Information

### **⚠ Warning!**

Only qualified personnel should install and repair compressors.

The electrical connection of the compressor and of its accessories is also to be done by authorized personnel only.

### **Delivery**

Please check whether the delivery is complete and intact. Deficiencies should be immediately reported in writing.

### **General Safety Information**

- Refrigeration compressors must be used with approved refrigerants and refrigeration oils only.  
It is not allowed to run a test without the compressor being connected to the system and without refrigerant.
- It is of vital importance that the discharge stop valve has been fully opened before the compressor is started.
- If the discharge stop valve is closed or partly closed an unacceptable pressure with accordingly high temperature.  
Even when handling the compressor correctly high temperatures may develop and cause injuries when touching.
- The maximum operating pressures stamped on the nameplate are compulsory and should never be exceeded.

### **Installation Guidance**

- Do not use the units outside of the operating limits specified.
- Install only in a properly ventilated area.
- Check tightness of all screw terminals.
- Check that the electrical supply to the installation is suitable and that the motor is connected correctly.
- Check the currents drawn.
- The refrigerant circuit must be perfectly clean, dry and installed according to best refrigeration practice.
- Check settings of all safety devices.
- Limit the superheat of the suction gas to 20K for low temperature operation.

### **Electrical Connections of compressor**

Closely observe Star or Delta -winding electrical connections of the compressor

Star ( Y ) electrical connections for 380V/3Ph/60Hz power supply

Delta ( Δ ) electrical connections for 230V/3Ph/60Hz power supply.

### **! Attention !**

Danger of compressor damage!

Wrong wiring results in opposing or displaced rotating fields due to changed phase angle. This leads to locked rotor conditions.

Mount connections correctly.

### **! Attention !**

Compressor motor is equipped with electronic protection device!

- The electrical connections should be made according to the wiring diagram.
- When the protection device cuts out, this indicates either an overload or impermissible operating conditions:  
Determine the source of the problem and correct it!
- Terminals B1-B2, M1-M2 and cables 1-2 must not come into contact with supply or control voltage!

### **Electrical Connections of Fan Motor Thermal Protector**

Closely observe Star or Delta - winding electrical connections of the fan motor.

Star ( Y ) electrical connections for 380V/3Ph/60Hz power supply

Delta ( Δ ) electrical connections for 230V/3Ph/60Hz power supply

- The electrical connections between the control line and the thermal protection switch of fan motor must be carried out on site. If this is omitted, the fan motor is not protected against damage.

### System Cleanness

Braze only when using inert gas. Only materials and components approved by refrigeration engineering are suitable. It is absolutely necessary that all impurities (dirt, brazing scale, flux, scobs etc.) are removed from the system before operation in order to avoid breakdowns. Many of these impurities are so small that they can pass through the filter built into the suction side of the compressor. Other blockages can occur in the suction filter situated in the compressor. A high pressure drop can even damage the filter. For this reason we strongly recommend the use of a large suction tube filter (which causes only a minimal drop of pressure) for all installations which are to be assembled on site or in cases where the required cleanness cannot be guaranteed.

### Pipe Connections

The pipe connections are designed to accept tubes with standard millimeter or inch dimensions. Solder connections have stepped diameters. According to the size the tube can be pushed more or less into the fitting. If not required the end with the largest diameter can be cut off.

### **Warning!**

Compressor is under pressure with holding charge.  
Possibility of skin and eyes injury. Wear safety goggles while working on compressor:  
Do not open connections before pressure has been released.

### **! Attention!**

Absolutely avoid penetration of air!  
The shut-off valves should remain closed until evacuating.

### Pipelines

Only use tubes and components which are  
• Clean and dry inside (free from slag, swart, rust, and phosphate coatings) and which are delivered with an air tight seal.

### Leak Test

The suction shut-off valve and discharge shut-off valve on the compressor remain closed during pressure testing to prevent air and moisture from entering. The test pressure (dried nitrogen) must not exceed 20.5 bar provided no other system component's pressure is lower; in these cases the lower pressure is the test pressure.

### Evacuation (Drying)

Energize the crankcase heater.  
Open all shut-off valves and solenoid valves. Evacuate the entire system including compressor using a vacuum pump connected to the high and low pressure sides.  
When the pump is switched off a "standing vacuum" of less than 1.5 mbar must be maintained.  
If necessary repeat this procedure several times.

### **! Attention!**

Danger of motor and compressor damage!  
Do not start compressor under vacuum!  
Do not apply any voltage - not even for test purposes!

## Charging Refrigerant

### System Cleanness

Charge only permitted refrigerants

- Before refrigerant is charged:
  - Energize the crankcase heater.
  - Check the compressor oil level.
  - Do not switch on the compressor!
- Liquid refrigerant must be filled through the charge fitting in the receiver shut-off valve or in the liquid line. The use of a filter drier in the charging line is highly recommended.
- For systems with flooded evaporator refrigerant can be also charged into the evaporator.
- After commissioning it may be necessary to add refrigerant :  
Charge the refrigerant from the suction side while the compressor is in operation. Charge preferably at the evaporator inlet. For blend Refrigerants must be taken from the charging cylinder as “Totally liquid”.  
Such as R-404A (R-125/R-143A)

### If liquid is charged:

#### **! Attention !**

Danger of wet operation!

Charge small amounts at a time!

Keep the oil temperature above 40°C.

#### **⚠ Danger**



Explosion risk of components and pipelines by hydraulic overpressure.  
Avoid absolutely overcharging of the system with refrigerant!

### General Safety Information

- ⚠ Ensure that all service valves are in the open position before start-up. A closed discharge or suction service valve may cause serious damage to the compressor and/or compromise safety device operation, thereby resulting in potential injury to personnel.
- Oil Level  
Each compressors is delivered with sufficient oil charge for normal operation.  
The optimum oil level should be checked by operating the compressor until the system is stable and then comparing the sight glass reading with the appropriate diagram.  
The oil level can also be checked within 10 seconds of compressor shut-down.
- Oil temperature (approx. 15 - 20 K above ambient temperature or suction side saturation temperature).
- Are all shut-off valves opened?
- Check that all safety devices are operational and properly set.
- For high-pressure switches the setting must not exceed maximum service pressure of any system component. Refer to the application Guidelines for relevant compressor pressure safety limits.
- A low-pressure switch is recommended to prevent operation under vacuum. Use a minimum setting of 1.1 bar (absolute).
- Verify that all electrical connections are properly fastened and in compliance with local safety regulations.
- Ensure that the crankcase heater of compressor has been energized for a minimum of 12 hours before initial start-up and/or after prolonged shutdown periods.

# Charging Refrigerant

## Start-Up Procedure

-  Never start the system in the absence of a refrigerant charge.
-  Do not bypass the safety switches during start up.

## Starting and Cooling Down Operations

For commissioning and pull down operations make sure that the maximum admissible operating evaporation temperature is achieved or fallen short of within a short time.

### **! Attention !**

During pull down operation:

Danger of extreme suction gas superheat and therefore thermal overload of the compressor!  
Ensure sufficient refrigerant charge bubble - free at intake of interstage expansion valve and subcooler.

## Lubrication / oil check

The compressor lubrication should be checked immediately after starting.

- Oil level 1/4 to 3/4 height of sight glass (repeat checks within the first hours of operation).
- Automatic monitoring by differential oil pressure switch (differential cutout pressure 0.7 bar, time delay 120 s).  
When this device cuts out a subsequent fault diagnosis of the system is required.  
Observe therefore recommendations shown on cover of differential oil pressure switch!

### **! Attention !**

Danger of wet operation!

Keep the discharge temperature at least 20 K (R404A, R507A) above condensing temperature.

If larger quantities of oil have to be added:

### **! Attention !**

Danger of liquid slugging!

Check the oil return.

## Vibrations

The whole plant especially the pipe lines must be checked for abnormal vibrations.

If necessary additional protective measures must be taken.

### **! Attention !**

Pipe fractures and leakages at compressor and other components of the plant possible !

Avoid strong vibrations!

## Switching Frequency

The compressor should not be started more than 8 times per hour. Thereby a minimum running time should be guaranteed :

Unit model	min. running time
to 7 HP	2 min
7.5 to 20 HP	3min
above 20 HP	5 min

## Checking Operating Data

- Evaporating temperature.
- Suction gas temperature.
- Condensing temperature
- Discharge gas temperature.
- Oil temperature.
- Switching frequency.
- Current.
- Voltage.

Prepare data protocol.

## Charging Refrigerant

### Start-Up Procedure

#### Refrigeration Oils for Bitzer Compressor

The following refrigeration oils are approved for Bitzer Compressor:

Refrigerant	Oil Charge
HFC	Ester Oil
R404A & R507A	Tc < 55°C Bitzer BSE 32

#### Selection of Contactors, Cables and Fuses

The maximum working current / maximum power consumption must be considered (“Technical Data”).

Contactors : operational category AC3

Select both compressor motor contactors for approximately 60% of maximum operating current.

#### Special recommendations for safe compressor and plant operation

Analyses show that the vast majority of compressor failures occur due to inadmissible operating conditions. This is especially true for failures deriving from lack of lubrication:

- Expansion valve operation -pay attention to the manufacturer’s guidelines!
  - Correct position and fixation of the temperature bulb at the suction line. When using a heat exchanger, place bulb behind evaporator, as usual -in no case behind the heat exchanger.
  - Sufficient superheat.
  - Stable operation at all operating and load conditions (also part load, summer / winter operation).
  - Bubble-free refrigerant at expansion valve.
- Avoid refrigerant migration (high pressure to low pressure side) during longer shut-off periods.
  - Application of a crankcase heater.
  - Pump down system (especially if evaporator can get warmer than suction line or compressor).
  - Automatic sequence change for systems with multiple refrigerant circuits.

### Service / Maintenance

#### Electric Shock Hazard

Disconnect the main power supply before servicing the system or handling any internal parts of the unit.

#### Regular Checks

Examine regularly the plant according to national regulations.

Check the following points:

- Operating data.
- Oil supply.
- Protection devices and all compressor monitoring (parts differential oil pressure switch, high / low pressure switch).
- Check electrical cable connections on tight fitting.
- Check tightening torques.
- Refrigerant charge, tightness test.
- Update data protocol.



# Charging Refrigerant

## Service / Maintenance

### Internal Pressure Relief Valve

The valve is maintenance free.

Repeated opening of the valve due to abnormal operating conditions, however, may result in steady leakage.

Consequences are losses in capacity and increased discharge temperature. Check and replace the valve in this case.

### Oil Changing

Oil changing is not normally necessary for factory assembled plants. For "field installations" and for applications near the operating limits a first oil change is recommended after approx 100 operating hours.

This includes cleaning the oil filter and magnetic plug.

After that the oil has to be replaced approx. every 3 years or 10000 - 12000 operating hours.

Clean also oil filter and magnetic plug.

### **! Attention !**

Ester oils are strongly hygroscopic.

Moisture is chemically compounded with these oils. It cannot be, or only insufficiently, removed by evacuation.

Handle very carefully:

Avoid air admission into the plant and oil can. Use only originally closed oil drums.

### **Dispose of waste oil properly !**

## De-Commissioning

### Standstill

Keep the crankcase heater switched on until dismantling the compressor! This prevents increased refrigerant solution in the compressor oil.

### Dismantling Compressor

For repair work, that makes dismantling necessary, or when decommissioning them:

Close the shut-off valves at the compressor. Pump-off the refrigerant. Do not release the refrigerant but dispose it properly!

### **! Warning !**

Compressor can be under pressure!

Severe injuries possible. Wear safety goggles!

Open the threaded joints or flanges at the compressor valves. Remove the compressor if necessary with a hoisting tool.

### Disposing Compressor

Drain the oil at the compressor.

Dispose of waste oil properly!

Chlorinated oil is pollutive waste.

Have the compressor repaired or disposed of properly!

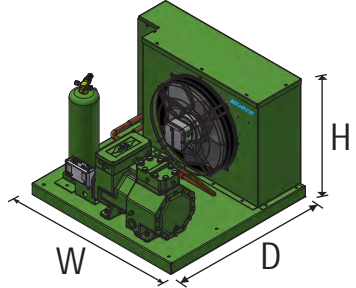
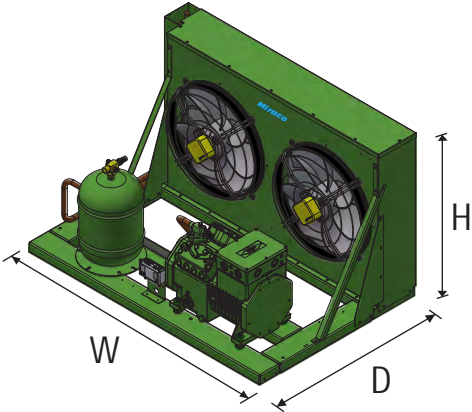
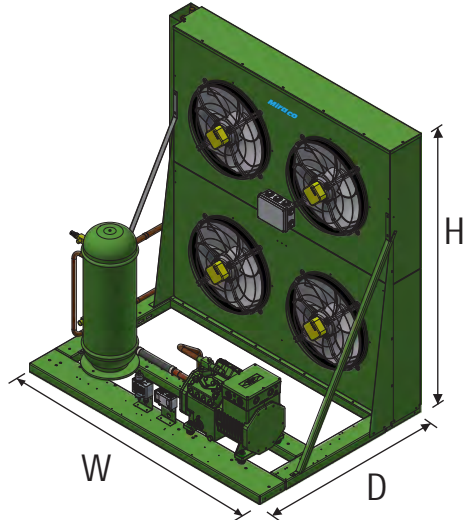
### When Exchanging a Compressor:

### **! Attention !**

Oil is already in the system,

Therefore it may be necessary to drain a part of the oil charge. If there are large quantities of oil in the circuit (possibly from a preceding compressor damage), there is also a risk of liquid slugging at start. Adjust oil level within the marked sight glass range!

## Net Dimensions (mm) & Net Weight (Kg)

Model	Net Unit Dimensions (mm)				Net (Kg)	Drawing
	W Width	H Height	D Depth	Mount Holes	Unit Weight	
<b>ONE FAN - Refrigeration Condensing Unit</b>						
MCRM6 - 150 - BY	827	615	800	767 X 355	94	
MCRL6 - 150 - BY					94	
<b>TWO FANS - Refrigeration Condensing Unit</b>						
MCRM6 - 200 - CY	1023	615	800	667 X 248	116	
MCRL6 - 200 - CY					141	
MCRL6 - 300 - CY					143	
MCRM6 - 300 - DY	1291	720	910	1175 X 468	188	
MCRM6 - 400 - DY					187	
MCRL6 - 400 - DY					204	
MCRL6 - 500 - DY					205	
MCRM6 - 600 - EY	1377	845	910	1261 X 468	267.5	
MCRL6 - 700 - EY					314.5	
MCRL6 - 900 - EY					316.5	
MCRL6 - 1200 - EY					319.5	
MCRM6 - 700 - FY	1665	895	1160	1549 X 474	314	
MCRM6 - 1000 - FY					363	
MCRL6 - 1500 - FY					406	
<b>FOUR FANS - Refrigeration Condensing Unit</b>						
MCRM6 - 1200 - GY	1665	1482	1160	1549 X 474	452	
MCRM6 - 1500 - GY					460	
MCRM6 - 2000 - GY					463	
MCRL6 - 1800 - GY					495	
MCRL6 - 2300 - GY					500	
MCRM6 - 2500 - HY	1665	1735	1160	1549 X 474	625	
MCRL6 - 2800 - HY					627	
MCRL6 - 3400 - HY					650	