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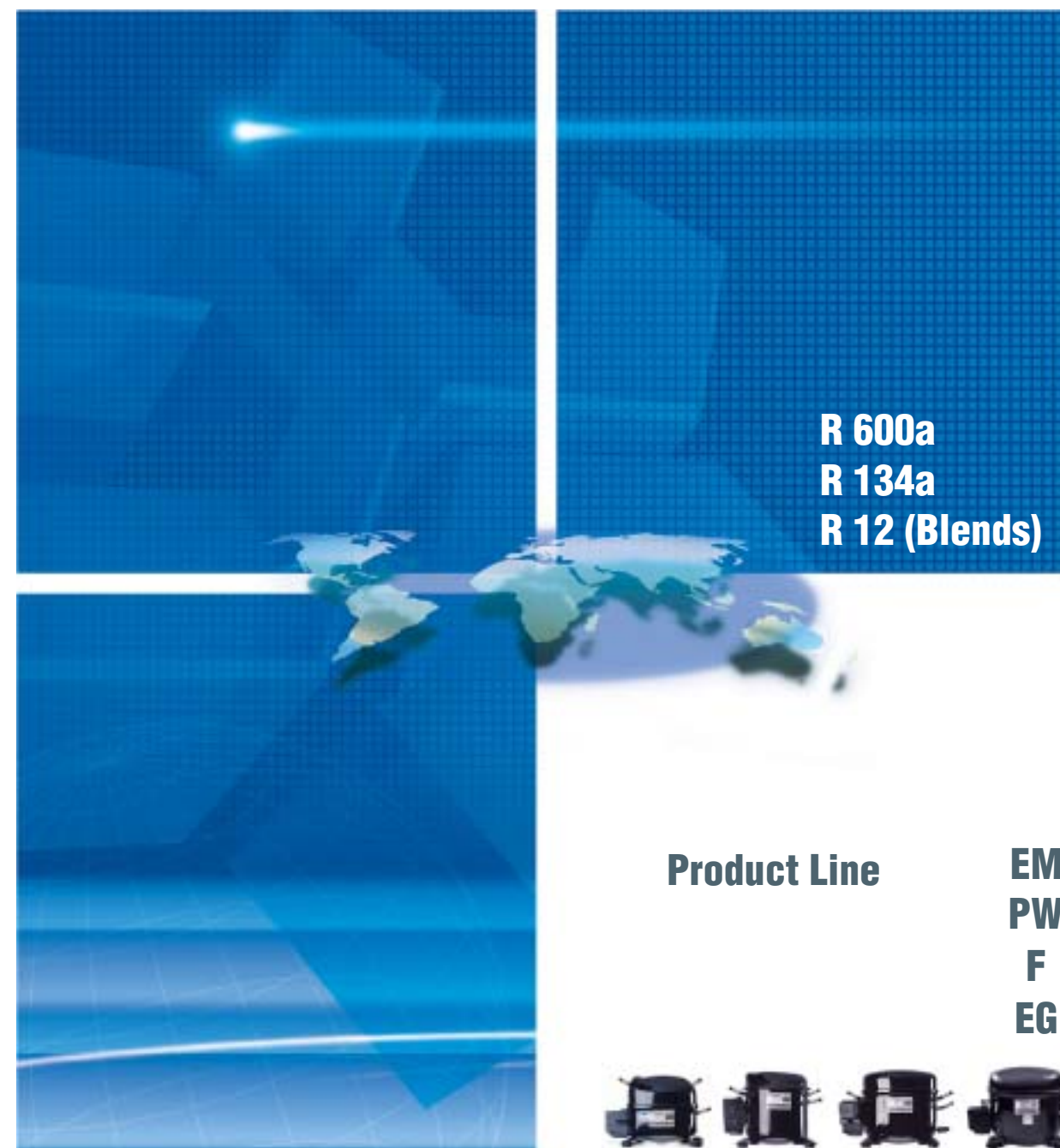
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 **Embraco**®

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Soluções.com

COOLING SOLUTIONS



R 600a
R 134a
R 12 (Blends)

Product Line

EM
PW
F
EG

 **Embraco**®

R 600a - R 134a - R 12 (Blends)

1) - COMPRESSOR COOLING TYPE

1.1) - Static Cooling (S)

The compressor does not require fan cooling and must be installed in such a way so as to allow cooling through ambient air, thus, preventing over heating.

1.2) - Fan Cooling (F)

The compressor requires a minimum air flow of 3 m/s for its cooling. Flows of lesser values must be evaluated through laboratory tests.

1.3) - Oil Cooling (OC)

The compressor uses an internal coil immersed in oils and connected to the hermetic system to help with compressor cooling. The use of more efficient compressors can eliminate the need for oil cooling.

2) - OPERATING CONDITIONS

2.1) - Starting and Operating Voltage

The compressors start at 90% of the nominal voltage

- Equalized pressures of up to 4 kgf/cm² gauge (58 psig) (R 600a).
- Equalized pressures of up to 5 kgf/cm² gauge (R 12 / Blends).
- Equalized pressures of up to 6 kgf/cm² gauge (R 134a).

Depending on the working condition and system characteristics, the compressor can operate at even lower voltages, see performance table.

2.2) - Winding Temperature

The winding temperature should not exceed 130°C (266 °F) when in continuous operation. For the winding temperature evaluation we recommend the "Ohmic Resistance Measurement Method".

(According to Application Manual Embraco)

2.3) - Condensing Pressure Limit

The compressors must operate in accordance with that described below:

R 600a

Condensing pressure must not exceed 7.7 kgf/cm² (113 psig) when in continuous operation at maximum expected ambient temperature (43°C) and the peak condensing temperature must not exceed 9.8 kgf/cm² gauge (145 psig).

R 12 (Blends)

Condensing pressure must not exceed 14.5 kgf/cm² (206 psig) when in continuous operation at maximum expected ambient temperature (43°C) and the peak condensing temperature must not exceed 18.2 kgf/cm² gauge (259 psig).

R 134a

Condensing pressure must not exceed 16.2 kgf/cm² (230 psig) when in continuous operation at maximum expected ambient temperature (43°C) and the peak condensing temperature must not exceed 20.6 kgf/cm² gauge (293 psig).

2.4) - Evaporating Temperature Range

APPLICATION	TEMPERATURE RANGE
LBP	-35°C to -10°C (-31°F to +14°F)
L / MBP	-35°C to -5°C (-31°F to +23°F)
M/HBP	-10°C to +15°C (-14°F to +5°F)
HBP	-5°C to +15°C (-23°F to +59°F)
L/M/HBP	-35°C to +15°C (-31°F to +59°F)

3) - MOTOR

The compressors in the performance table are equipped with monophase, induction motors.

3.1) - Motor Torque

The compressor motors are denominated:

LST - Low Starting Torque,
used in systems with capillary tube

HST - High Starting Torque,
used in systems with expansion valve or with capillary tube

3.2) - Types of Electric Motors

RSIR (PTCSIR) - Resistive Start - Inductive Run
Does not use capacitors

CSIR - Capacitive Start - Inductive Run
Uses electrolytic capacitor (starting)

RSCR (PTCSCR) - Resistive Start - Capacitive Run
Uses permanent capacitor (running)

CSR (CSCR) - Capacitive Start & Run
Uses electrolytic (starting) and permanent capacitor
at the same time – used with 4 terminal PTC

4) - WARNINGS

Compressors must not be charged with anti-freeze agents, as their use can have adverse effects on the various materials used, jeopardizing the useful life of the compressor (the use of anti-freeze agents renders the compressor warranty null and void).

Please note the use of any capacitor other than the ones listed in the tables of this catalog or in the Application Table, will cause the starting relay and overload protector not to work properly and may even cause the compressor motor to burn.

It is recommended that manufacturers of refrigeration systems using flammable refrigerants such as R 600a, develop accurate charging, leak testing and system testing methods to guarantee that all necessary safety procedures have been met.

Use flushing agents which are compatible with the refrigerant used to clean systems.

The system to which the compressor will be assembled must be developed and adequately prepared for use with R 134a and ester oil, i.e. without anti-freeze agents, greasy residues, mineral oil, impurities in R 134a and without chlorides, alkaline residues and moisture.

The compressors must not be tested unless they are connected to the refrigeration system.

The compressor must not be subjected to high voltage or starting tests while under vacuum. All Embraco compressors have already been submitted to a 1650 V high voltage test for one second.

Gas charging and evacuating equipment must only be used for R 134a in order to avoid chloride residue contamination.

The halogen leak detectors presently used in R 12 (blends) systems are not efficient with R 134a. This type of leak detector reacts with chlorine, a halogen, which is absent in R 134a. Equipment that uses helium as a tracer gas in combination with helium detectors, is recommended for the assembly lines of HFC 134a systems. There are compact electronic leak detectors on the market which are compatible with the R 134a refrigerant.

To maintain the performance presented in the performance table, the suction line must be connected to the suction connector.

For each type of refrigerant fluid there are appropriate dryer filters. (According to Application Manual Embraco).

To prevent excessive moisture from entering the compressor, the connector should be kept sealed at all times. Plugs should only be removed immediately before brazing connectors to system tubes (maximum time allowed is 15 minutes).

5) - OIL TYPE AND SPECIFICATION

Compressors are charged with a specific quantity of completely degassed oil which is moisture free:

R 600a

- Mineral Naphthenic (ISO 32 / ISO 10).
- Alkylbenzene (ISO 32).

R 12 (Blends)

- Mineral Naphthenic (ISO 32).
- Alkylbenzene (ISO 32).

Note: The blends R 401a and R 401b can only be applied with alkylbenzene oil + additive.

The compressors charged with Alkylbenzene oil + additive, receive the label bellow.

COMPRESSOR APPROVED TO BE USED WITH BLENDS LISTED BELOW	
REFRIGERANT GAS	
ASHRAE	Commercial Name
R 401a	SUVA MP39
R 401b	SUVA MP66
R 409a	FORANE FX56
R 413a	ISCEON 49

R 134a

- Ester oil (ISO 22).
- Ester oil (ISO 10).
- Ester oil (ISO 7).

Note: The oil charge must not be removed or mixed.

6) - TEST CONDITIONS

TEMPERATURE	CHECK POINT HBP (ASHRAE)		CHECK POINT LBP (ASHRAE)		CHECK POINT (CECOMAF)	
	°C	°F	°C	°F	°C	°F
EVAPORATING TEMPERATURE	7.2	45	-23.3	-10	-25	-13
CONDENSING TEMPERATURE	54.4	130	54.4	130	55	131

7) - CONVERSION

1 Watt	=	3.41 Btu/h
1 Watt	=	0.86 kcal/h
1 kcal/h	=	3.97 Btu/h
1 cu.ft.	=	28.32 liters

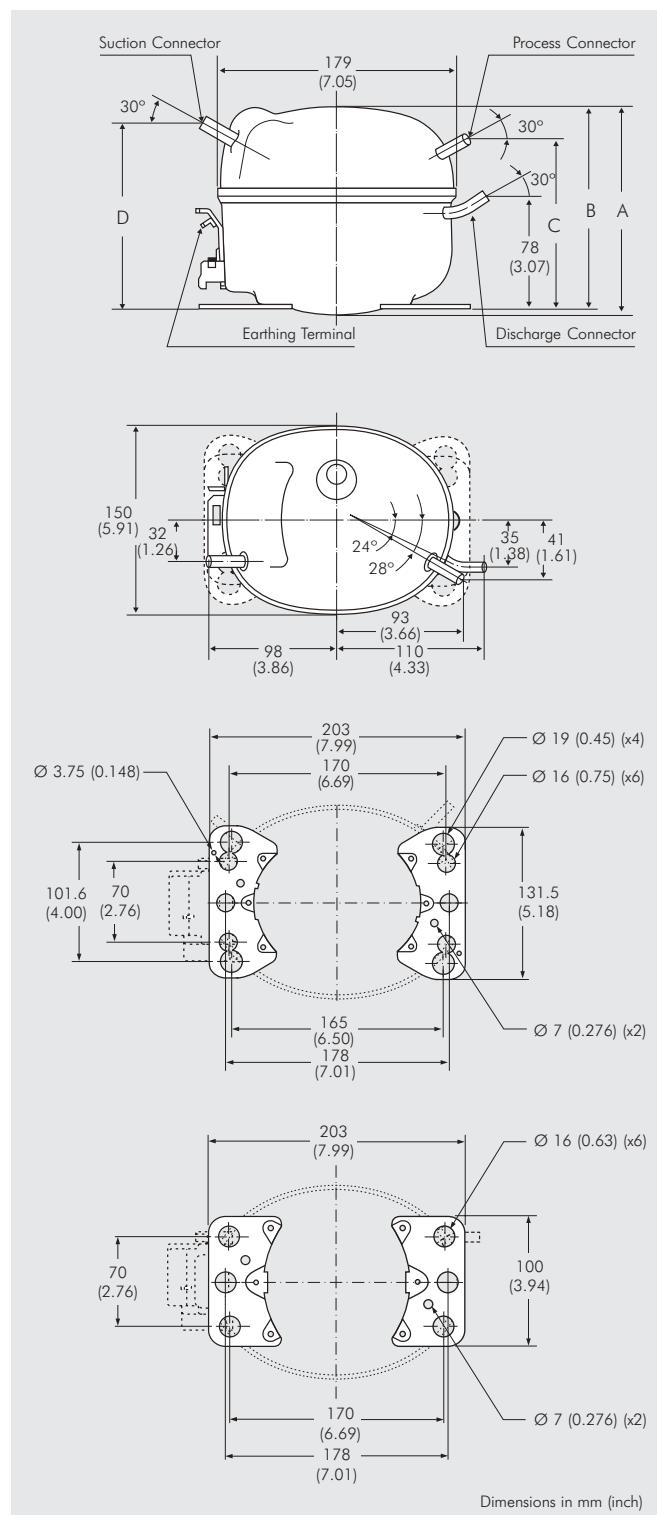
8) - TOLERANCES

Capacity	=	±5%
Power Consumption	=	±5%
Current Consumption	=	±5%
Efficiency	=	±7%

R 600a - R 134a - R 12 (Blends)

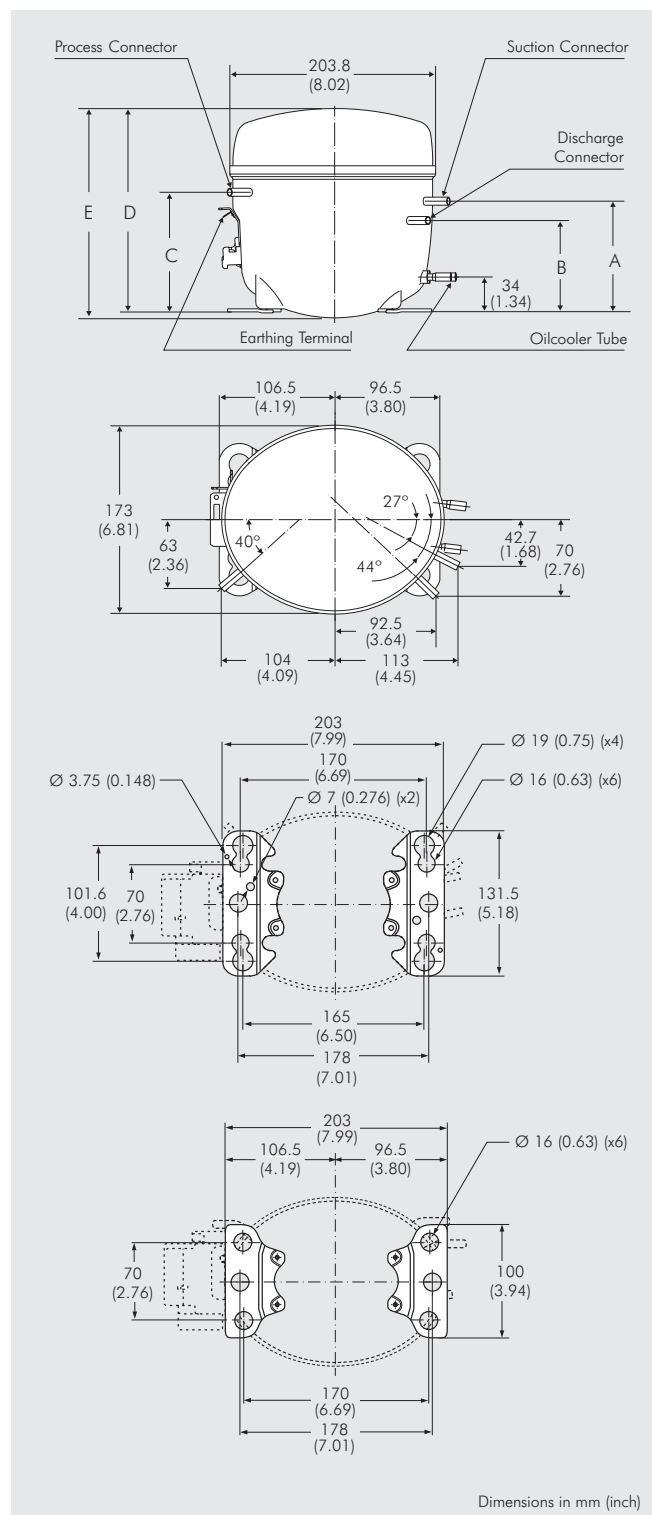
9) - COMPRESSOR HOUSING

EM



COMPRESSORS	A	B	C	D
EM (tall)	168 (6.61)	166 (6.54)	150 (5.91)	155 (6.10)
EM (short)	157 (6.18)	155 (6.10)	139 (5.47)	144 (5.67)

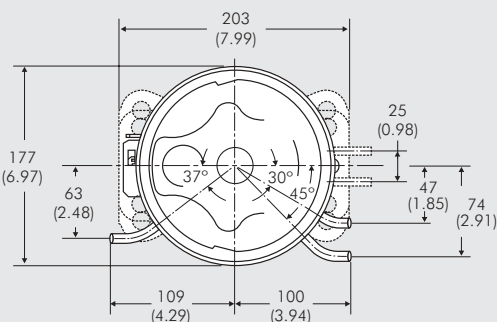
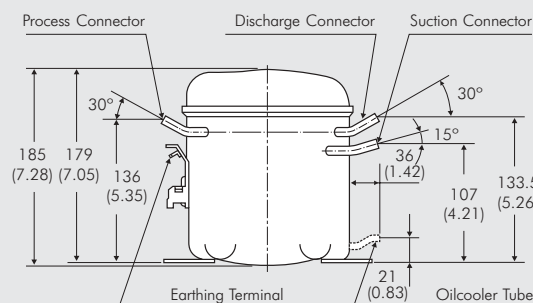
EG / F



COMPRESSORS	A	B	C	D	E
EG / F (tall)	109 (4.29)	90 (3.54)	118 (4.65)	201 (7.91)	207 (8.15)
EG / F (short)	103 (4.06)	84 (3.31)	112 (4.41)	195 (7.68)	201 (7.91)

Compressors may be supplied with either of the above plates. Please make sure you indicate which base should be supplied.

PW



Note: The base plates used in the PW compressors are the same as those used in the EM compressors.

Dimensions in mm (inch)

CONNECTORS INTERNAL DIAMETERS - mm (in)

COMPRESSORS CONNECTORS	EM									PW					
	COPPER					COPPER PLATED STEEL				COPPER			COPPER PLATED STEEL		
MATERIAL															
SUCTION	6.50 (0.256)	6.50 (0.256)	8.20 (0.323)	8.20 (0.323)	6.50 (0.256)	6.10 (0.240)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	8.20 (0.323)	8.20 (0.323)	6.50 (0.256)	8.20 (0.323)	6.10 (0.240)
DISCHARGE	4.94 (0.194)	6.50 (0.256)	4.94 (0.194)	6.50 (0.256)	5.10 (0.201)	5.00 (0.197)	5.00 (0.197)	6.50 (0.256)	4.94 (0.194)	6.50 (0.256)	6.50 (0.256)	5.00 (0.197)	6.50 (0.256)	5.00 (0.197)	5.00 (0.197)
PROCESS	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.10 (0.240)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	8.20 (0.323)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.10 (0.240)
OIL COOLER TUBE	—	—	—	—	—	—	—	—	—	—	—	—	4.77 (0.188)	—	—

CONNECTORS INTERNAL DIAMETERS - mm (in)

COMPRESSORS CONNECTORS	F / EG														
	COPPER						COPPER PLATED STEEL								
MATERIAL															
SUCTION	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	8.20 (0.323)	8.20 (0.323)	6.10 (0.240)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	8.20 (0.323)	8.20 (0.323)	6.50 (0.256)
DISCHARGE	4.94 (0.194)	4.94 (0.194)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	4.94 (0.194)	5.00 (0.197)	5.00 (0.197)	5.00 (0.197)	5.00 (0.197)	6.50 (0.256)	6.50 (0.256)	5.00 (0.197)	6.50 (0.256)	6.50 (0.256)
PROCESS	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.10 (0.240)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)	6.50 (0.256)
OIL COOLER TUBE	4.90 (0.193)	5.10 (0.201)	4.90 (0.193)	6.50 (0.256)	6.50 (0.256)	—	—	4.90 (0.193)	5.10 (0.201)	6.50 (0.256)	6.50 (0.256)	5.10 (0.201)	5.10 (0.201)	6.50 (0.256)	4.77 (0.188)

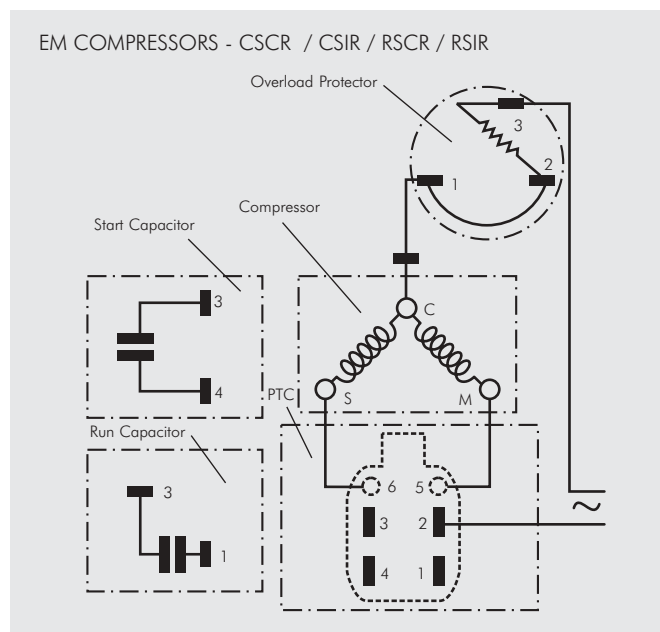
For other connectors configurations, please contact our sales division.

TOLERANCE

MATERIAL	COPPER				COPPER PLATED STEEL			
CONNECTORS	4.94	5.10	6.50	8.20	5.00	6.10	6.50	8.20
	+0.08	+0.10	+0.12	+0.12	+0.18	+0.10	+0.12	+0.12
	-0.08	-0.00	-0.08	-0.08	+0.06	-0	-0.08	-0.08
	$\begin{pmatrix} 0.194 \\ +0.003 \\ -0.003 \end{pmatrix}$	$\begin{pmatrix} 0.201 \\ +0.004 \\ -0.000 \end{pmatrix}$	$\begin{pmatrix} 0.256 \\ +0.005 \\ -0.003 \end{pmatrix}$	$\begin{pmatrix} 0.323 \\ +0.005 \\ -0.003 \end{pmatrix}$	$\begin{pmatrix} 0.197 \\ +0.007 \\ +0.002 \end{pmatrix}$	$\begin{pmatrix} 0.201 \\ +0.004 \\ -0.000 \end{pmatrix}$	$\begin{pmatrix} 0.256 \\ +0.005 \\ -0.003 \end{pmatrix}$	$\begin{pmatrix} 0.323 \\ +0.005 \\ -0.003 \end{pmatrix}$
OILCOOLER TUBE	4.77	4.90	5.10	6.50				
	+0.17	+0.02	+0.10	+0.09				
	-0.17	-0.05	-0.00	+0.09				
	$\begin{pmatrix} 0.188 \\ +0.007 \\ -0.007 \end{pmatrix}$	$\begin{pmatrix} 0.193 \\ +0.001 \\ -0.002 \end{pmatrix}$	$\begin{pmatrix} 0.201 \\ +0.004 \\ -0.000 \end{pmatrix}$	$\begin{pmatrix} 0.256 \\ +0.004 \\ -0.004 \end{pmatrix}$				

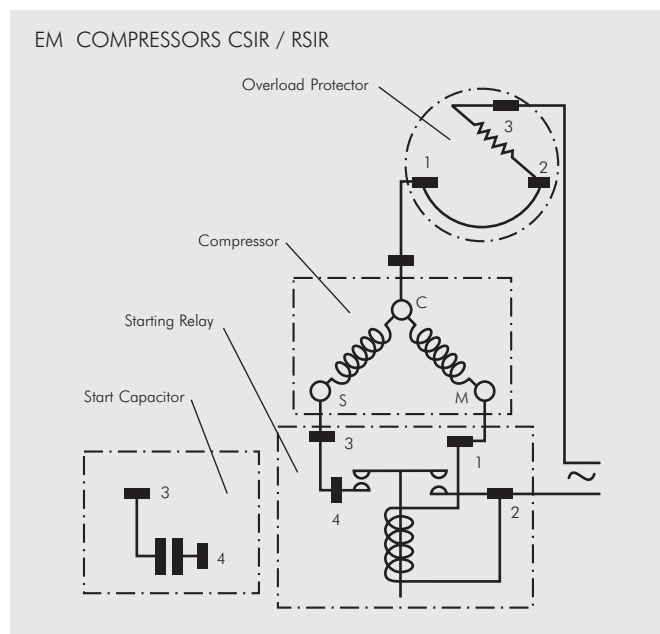
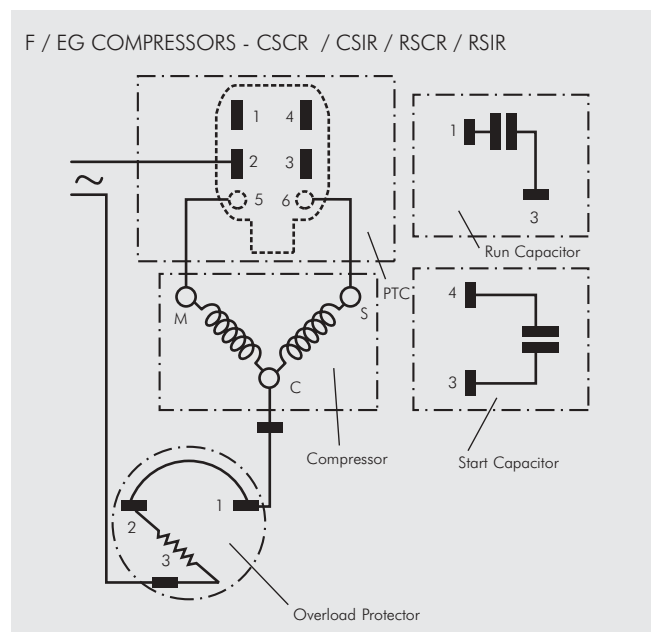
R 600a - R 134a - R 12 (Blends)

10) - ELECTRICAL DIAGRAMS

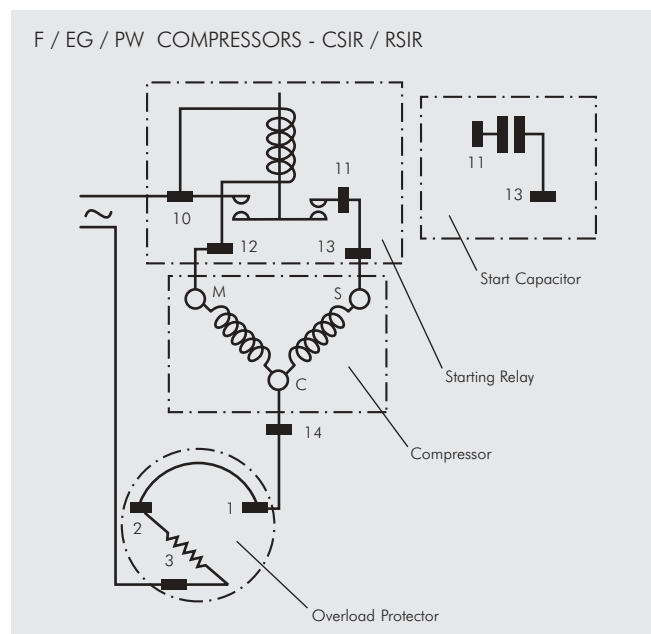


Compressors with a run capacitor must use PTC with 3 terminals.

Compressors without run capacitor use PTC with 1 terminal.



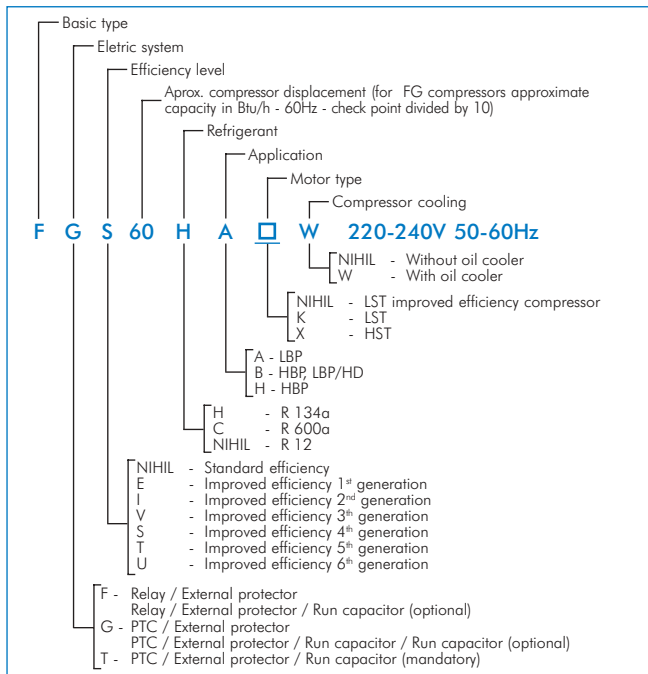
If application of a start capacitor is necessary, then it must be connected between terminals 3 and 4. To achieve this, just rupture this bridge.



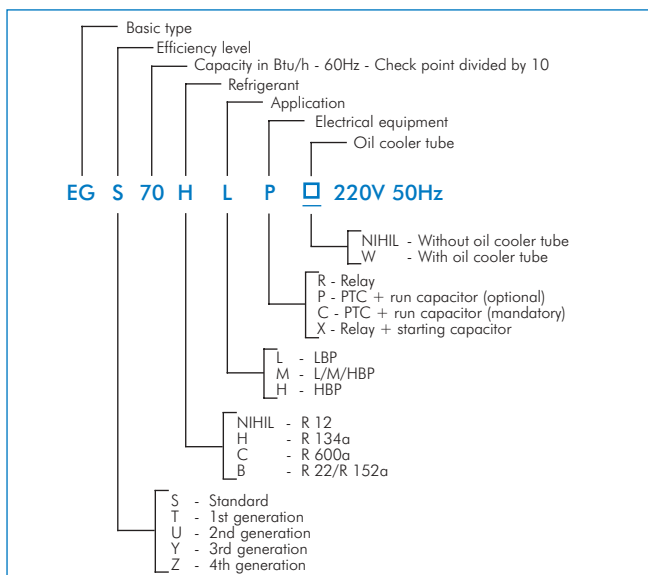
If application of a start capacitor is necessary, then it must be connected between terminals 11 and 13. This requires a specific relay, with fast on terminals for better start capacitor installation, which can be supplied upon request.

11) - COMPRESSOR DENOMINATION

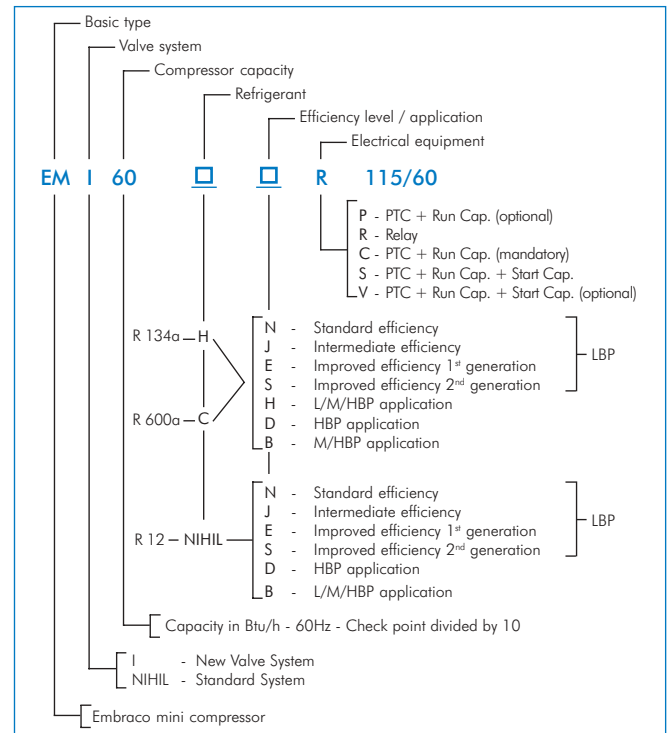
11.1) - F



11.3) - EG



11.2) - EM



11.4) - PW

