Siberia GFF93AA Compressor 1/3+ hp R134a 270W Technical Specifications and Professional Replacements Review

Category: Refrigeration
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Mbsmpro.com, Siberia Compressor, GFF93AA, 1/3+ hp, Motech, Cooling, R134a, 270 W, 1.4 A, 1Ph 160-260V 50Hz, LBP, RSIR/RSCR, −35°C to −10°C, Freezing

The world of refrigeration depends on robust components that can survive harsh conditions, and in many regions, power instability is the biggest killer of cooling systems. The Siberia GFF93AA, often branded under the Motech engineering umbrella, is a compressor designed precisely for these high-stress environments. Known as the “Siberia Copper” series, it prides itself on having 100% copper windings—a massive advantage over the aluminum windings found in cheaper units that often succumb to internal heat and early insulation breakdown.

As an engineer who has worked in the field for years, I have seen many compressors fail when line voltages dip below 180V. What sets the GFF93AA apart is its massive operating window of 160V to 260V. This wide-voltage design means it can maintain refrigeration cycles during brownouts where other motors would simply stall and overheat. Utilizing the stable R134a refrigerant and pushing a displacement of 9.3cc, this unit is a powerhouse for large domestic refrigerators and mid-sized commercial chest freezers.

Complete Technical Specifications

Parameter	Data Detail
Model	GFF93AA
Utilisation (mbp/hbp/lbp)	LBP (Low Back Pressure)
Domaine (Freezing/Cooling)	Heavy-duty Freezing & Deep Cold Storage
Cooling wattage at -23.3°C	270 Watts
Cubic feet capacity	18 to 22 Cubic Feet
Litres capacity	450 to 600 Litres

Kcal/h	232 Kcal/h
Oil Type and quantity	Ester / POE RL 10H (230 cc)
Horsepower (HP)	1/3+ HP
Refrigerant Type	R134a
Power Supply	1Ph / 160-260V / 50Hz
Cooling Capacity BTU	921 BTU/h
Motor Type	RSIR / RSCR
Displacement	9.3 cc
Winding Material	100% High-Grade Copper
Pression Charge	Low side 0.5 – 5 PSI / High side 150 PSI (operating)
Capillary Recommendation	0.036″ to 0.040″
Applicable Models	Double-door large fridges, commercial chest freezers
Temperature function	-35°C to -10°C
Fan Cooling Required	Recommended for ambient above 35°C, otherwise Static
Commercial Application	Yes (Light commercial / Household heavy duty)
Amperage (Working)	1.25 A to 1.54 A
LRA (Locked Rotor Amps)	14.0 A
Relay Type	PTC QP2-15
Capacitor Value	4 µF (450 V) optional for RSCR configuration
Origin & Exporting	Manufactured by Motech (China) – Exported globally via Agent Alfardi

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Efficiency Metrics (COP) & Load Performance

Efficiency isn’t just a number; it is how well a machine handles the physics of heat exchange. The GFF93AA shows high stability at standard boiling points for R134a.

Evaporating Temp (°C)	Cooling Capacity (Watts)	Power Consumption (Watts)	COP (W/W)
-35	135	115	1.17
-30	174	142	1.22
-25	230	168	1.37
-23.3 (Rated LBP)	**270**	**185**	**1.46**
-20	310	205	1.51
-15	390	235	1.66
-10	519	265	1.96

Comparison: Why Choose Siberia over Standard Alternatives?

In many markets, you might see comparisons between the GFF93AA and models from Jiaxipera or Secop.

1. **Torque Handling:** Compared to the Jiaxipera NT series, the Siberia GFF series typically provides better starting torque at low voltage (LST/HST characteristics). While standard units might struggle to restart a system after a short power trip (short-cycling), the GFF93AA is

engineered to push against the head pressure more effectively.
2. **Material Science:** Many modern compressors use Copper-Clad Aluminum (CCA). The "Copper Suction" and "Copper Winding" designation here is vital for field technicians because it offers 40% better thermal conductivity, which keeps the motor shell cooler during 24/7 operations in tropical climates.

Engineering Conseil, Notices, and Maintenance

From an field engineer's desk:

- **Vacuum Requirement:** Since this unit uses POE (Polyolester) oil, it is incredibly thirsty for moisture. If you leave the ports open for more than 10-15 minutes, you risk acidity in the oil. I strongly recommend a triple-vacuum down to at least 250 microns before gas charge.
- **Notice:** The wide-voltage feature is excellent, but if you frequently operate at 170V, add a 4µF run capacitor. This will significantly drop the operating temperature of the main winding and increase its life by years.
- **Benefits:** Choosing the 9.3cc displacement model for a fridge designed for 7.5cc is an "upgrading" move. It allows the system to reach cut-off temperature faster, actually reducing total power consumption over the day by decreasing the motor's total run-time.

What size capacitor is recommended for the Siberia GFF93AA?

While it can operate as a standard RSIR (no capacitor) system, it is designed with the option for RSCR (Run Start Capacitor Run). A 4µF 450V capacitor is the ideal specification. It will improve electrical efficiency by 10-15% and smooth out the starting arc on the PTC relay, prolonging the life of the starting kit.

Compressor Replacements and Equivalents

5 Direct Replacements (R134a – Same Characteristics):

1. **Secop/Danfoss:** FR11G or GL90AA
2. **Embraco:** FFI 12 HBK or FFU 130 HAK
3. **Tecumseh:** TPH1410Y
4. **Huayi:** GQR90AA
5. **ZMC:** GL90AA

5 Cross-Refrigerant Alternatives (Requires Full Flush/Purge):

1. **Donper (R600a):** LU140CY
2. **Embraco (R290):** NEK2134U (Note: Higher starting torque)
3. **Wanbao (R600a):** DQH140Y
4. **LG (R600a):** CMA121H
5. **Jiaxipera (R600a):** NT1114Y

Focus keyphrase: Siberia GFF93AA Compressor 1/3+ hp R134a 270W Technical Specifications and Professional Replacements Review

SEO title: Mbsmpro.com | Siberia GFF93AA Compressor | 1/3+ hp | R134a | 9.3cc

Meta description: Professional guide for the Siberia GFF93AA 1/3+ HP Compressor. Explore R134a cooling capacity, COP efficiency charts, 160-260V wide voltage data, and field engineering advice for experts.

Slug: siberia-gff93aa-compressor-1-3hp-r134a-specifications

Add Tags: Siberia, GFF93AA, Alfardi, Motech, R134a, 1/3+ HP, Mbsmgroup, Mbsm.pro, mbsmpro.com, mbsm, GL90AA, FFI12HBK, TPH1410Y, GQR90AA, Compressor replacement, Refrigeration engineering.

Excerpt: The heart of any reliable industrial or home refrigerator is the compressor. The Siberia GFF93AA stands out as a high-displacement 1/3+ HP unit featuring genuine copper windings and a massive wide-voltage tolerance from 160V to 260V. For technicians working in harsh power zones, this R134a unit provides 270W of efficient, stable cooling power…

1/3+ HP, Alfardi, Compressor Replacement, FFI12HBK, GFF93AA, GL90AA, GQR90AA, mbsm, mbsm.pro, mbsmgroup, mbsmpro.com, Motech, R134a, Siberia, TPH1410Y
GFF93AADownload

This is a full transcription of the Motech GFF93AA Data Sheet.

MOTECH GFF93AA Data Sheet

Refrigeration parts and equipment

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1. BASIC DATA

1.1 OPERATION

- **Application:** LBP (Low Back Pressure)
- **Refrigerant:** R134a

- **Expansion device:** Capillary tube
- **Cooling:** Static
- **Evaporating Temperature Range:** -35 to -10°C (-34 to +14 °F)
- **Max Ambient Temperature:** 43°C (110°F)
- **Max Operating Discharge Temperature (1):** 120°C (248°F)
- **Max Peak Discharge Temperature (1, 2):** 135°C (275°F)
- **Max Operating Condensing Temperature:** 60°C (140°F)
- **Max Peak Condensing Temperature (2):** 70°C (158°F)
- **Max Winding Temperature:** 130°C (266°F)
- **Max Impurities:** 30 mg
- **Max Water Content:** 100 mg

1.2 COMPRESSOR

- **Displacement:** 9.3 cc
- **Cylinder Bore:** 24.4 mm
- **Stroke:** 19.8 mm
- **Net Weight (3):** –
- **Shell size:** High
- **Oil charge:** 230 cc
- **Oil Type:** ICI RL 10H
- **Oil viscosity (4):** 10 cSt
- **Suction system:** Semi-direct

1.3 MOTOR

- **Power supply:** 220-240 V
- **Voltage limits:** 187 – 264 V
- **Frequency:** 50 Hz
- **Phase:** 1
- **Motor Type:** RSIR / RSCR
- **Electrical Insulation Class:** B
- **Locked Rotor Current at 220 V (Max value with RC):** 14.2A
- **Locked Rotor Current at 220 V (After 4 s with RC):** 7.8A
- **Locked Rotor Current at 220 V (Max value without RC):** 14.0A
- **Locked Rotor Current at 220 V (After 4 s without RC):** 8.0A
- **Main Winding Resistance at 20°C (68°F):** 9.13 Ω
- **Start Winding Resistance at 20°C (68°F):** 14.5 Ω

(1) Measured at 5 cm from the shell with insulated thermocouples | (2) For transient conditions during “Pull Down” | (3) With oil and without external electricals | (4) Measured at 40°C (104°F)

1.4 ELECTRICALS

Motor-protector

Feature	WANBAO	SENSATA
Type	BT110-120A61D2	4TM 308 NFBYY-53
Open Temperature	115-125 °C	115-125 °C
Close Temperature	70-52 °C	70-52 °C
U.T.C. at 70°C	2.36 A	2.34 A (AT 70°C)
Time Check Current	11 A (7.5-14 sec)	11 A (5-15 sec)

PTC starting device

Feature	WANBAO	TIANYIN
Assembly type	QP2-15	QP2-15E
PTC Pill	QP2-15	QP2-15E
Resistance at 25°C	11-19Ω	11-19Ω
V max	350 V	350 V
I max	8A	8A
Curie Temp	120°C	120°C
Dimensions	20mm (dia), 3.3mm (thk)	16mm (dia), 2.5mm (thk)

Run capacitor (optional)

- **Type:** Plastic case
- **Capacity:** 4µF
- **Vmax:** 450 V
- **Working hours:** 10,000 h at 450 V

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2. CALORIMETER DATA

Test conditions according to ASHRAE:

- Condensing temp: +55°C
- Subcooling temp: +32°C
- Superheating temp: +32°C
- Suction temp: +32°C
- Supply Voltage: 220 V / 50 Hz

2.1 CALORIMETER TEST	-30°C (Without RC)	-23.3°C (Without RC)	-10°C (Without RC)	-30°C (With RC)	-23.3°C (With RC)	-10°C (With RC)

Cooling capacity (W)	174	270	519	170	270	524
Input power (W)	142	185	265	137	174	252
COP (W)/W	1.22	1.46	1.96	1.25	1.55	2.08
Current (A)	1.09	1.25	1.52	0.81	0.95	2.08

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3. OTHER PERFORMANCES

- **3.1 Starting Test:** Min. Starting Voltage (at 90°C / 5 Bar A) = 165V.
- **3.2 Calorimeter Test (GB9098):** A-weighted SPL: 42 dBA | Vibration Index TVI: 0.65 mm/s.
- **3.3 Life Test:** 500h Wear, 2000h High Temp, 200K On/Off Cycles (All Passed).
- **3.4 Transport Test:** Not required.
- **3.5 Oil Transport Test:** Not required.
- **3.6 Impact Test:** Not required.

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4. COMPARISON CHART & DIMENSIONS

Brand Cross-Reference

MOTECH	POWER	EMBRACO	TECUMSEH
GFF93AA	**1/3+ HP**	**FFI 12 HBK**	**TPH1410Y**
GFF86AA	1/3 HP	EGAS 100 HLR	TPH1410Y
GFF75AA	1/4+ HP	EGAS 80 HLR	TSB1390Y
GFF66AA	1/4 HP	EGAS 80 HLR	TSB1380Y
GFF57AA	1/5 HP	EGAS 70 HLR	TSB1355Y / TSB1374Y
GFF44AA	1/6 HP	EMI 60 HER	THG1346Y / THG1352Y
GVM35AA	1/8 HP	EMI 80 HLR	THG1335Y
GVM30AA	1/10 HP	EM 30 HNR	THG1330Y

Dimensional Data (R134a)

Model	A ± 2.5	B ± 2.5	C ± 2.5	D ± 2.5
GFF57AA / 66AA / 75AA / 86AA	98.5	100.5	113.5	174
GFF93AA	**108.5**	**110.5**	**123.5**	**184**
BFF12AA	108.5	110.5	123.5	184
BFM93AA	98.5	100.5	113.5	174

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5. TECHNICAL DRAWING LABELS

- **Air suction pipe:** Φ 6.1 + 0.1 (No paint allowed in length 12mm)
- **Exhaust pipe:** Φ 5 – 0.1 (No paint allowed in length 12mm)

- **Process pipe:** Φ 6.1 + 0.1 (No paint allowed in length 12mm)
- **Rating Label:** Located on the side of the compressor shell.
- **Serial Number:** Located near the base mounting feet.

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