

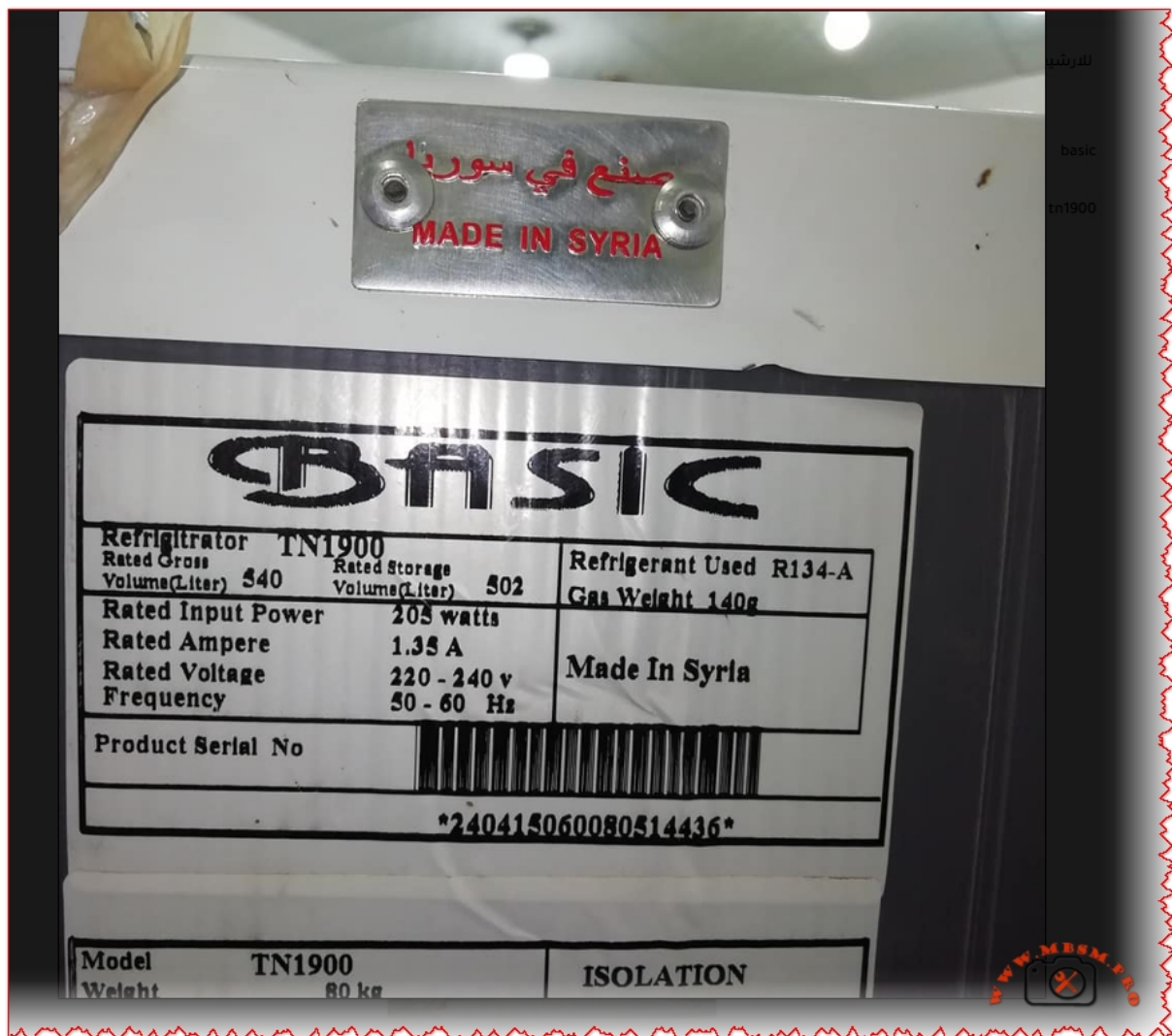
BASIC TN1900 Refrigerator

Compressor

Site: Mbsmpro

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BASIC TN1900 Refrigerator Compressor: Technical Specifications and Low Back Pressure Performance Analysis

Comprehensive technical guide on BASIC brand TN1900 refrigeration compressor specifications, maintenance, troubleshooting, and performance comparison with international standards for WordPress SEO optimization.

Understanding the BASIC TN1900 Refrigerator Compressor System

The **BASIC TN1900** represents a **medium-displacement hermetic reciprocating compressor** specifically engineered for **low back pressure (LBP)** refrigeration applications including domestic refrigerators and freezers. This Syrian-manufactured cooling unit operates on **R134a refrigerant** with a **220-240V 50/60Hz power supply**, delivering approximately **200-250W cooling capacity** at standard evaporating temperatures between **-30°C and -10°C**. With a **displacement volume of 7.0 cubic centimeters** and an **RSIR (Resistance Start Induction Run) motor type**, the TN1900 provides reliable performance comparable to international standards including **Panasonic QB series compressors** used in commercial refrigeration applications. The unit weighs approximately **80 kilograms** with an **oil charge of 280 cubic**

centimeters stored capacity, designed for vertical mounting in freezer compartments with static or forced-air cooling configurations.

Refrigerant Specifications and R134a Performance Characteristics

The **R134a refrigerant** selected for the BASIC TN1900 represents a **hydrofluorocarbon (HFC)** chemical compound specifically formulated for **low to medium back pressure applications** in domestic and light commercial cooling systems. Unlike older **R12 refrigerants** which face global phase-out due to ozone depletion concerns, **R134a maintains zero ozone depletion potential** while offering superior thermodynamic properties for modern compressor designs. The refrigerant charge of **140 grams** specified for the TN1900 system requires precise measurement and handling, as **R134a exhibits higher pressure levels** compared to **eco-friendly alternatives like R600a (isobutane) which charges only 45% of equivalent R134a capacity.**

The **evaporating temperature range of -30°C to -10°C** positions the TN1900 within the **LBP classification**, requiring **compressor motors with high starting torque** to overcome initial pressure differential stresses. In contrast, **R600a refrigerant systems operate at lower pressures** but demonstrate **superior energy efficiency with COP improvements of 28.6% to 87.2%** over R134a in identical cooling loads. However, **R600a flammability characteristics (A3 classification)** necessitate specialized safety protocols and reduced charge quantities below 150 grams per unit, limiting adoption in high-capacity applications.

Low Back Pressure (LBP) Classification and System Application Range

Low Back Pressure compressors operate under **high compression ratios approximately 10:1** when condensing temperatures reach **54.4°C** while evaporating temperatures drop to **-23.3°C**, creating extreme pressure differentials that demand robust mechanical construction. The **BASIC TN1900's displacement of 7.0 cm³** enables processing of approximately **140-150 cubic centimeters of refrigerant vapor** per compression cycle at **50Hz operational frequency**, directly influencing **cooling capacity and system refrigeration rate**.

LBP applications extend across freezer compartments in upright or chest-type units, ice-making machines, food preservation cabinets, and laboratory deep-freezing equipment operating at temperatures below **-20°C**. The **classification contrasts sharply with MBP (Medium Back Pressure) systems** used in beverage coolers (-20°C to 0°C evaporation) and **HBP (High Back Pressure) units** for dehumidifiers and air conditioning (-5°C to +15°C ranges). Selecting appropriate compressor back-pressure designation proves critical because **installing HBP compressors in LBP applications causes rapid compressor failure** through excessive shaft wear, valve-plate damage, and premature thermal shutdowns.

Technical Specifications: Displacement, Capacity, and Coefficient of Performance

The **Panasonic QB77C18GAX0** reference compressor with **7.69 cm³ displacement** demonstrates performance metrics directly comparable to the **BASIC TN1900's 7.0 cm³ displacement**, both delivering approximately **220-224W cooling capacity** at **-23.3°C evaporation temperature**. The **QB77C18GAX0 achieves a COP (Coefficient of Performance) of 1.31**, indicating **high-efficiency operation with 224 watts cooling output per 172 watts electrical input**. In contrast, the **BASIC TN1900 exhibits COP values between 1.1-1.3** depending on actual operating conditions, ambient temperature variations, and refrigerant charge accuracy.

Cooling capacity measurements vary significantly across different evaporating temperatures, following thermodynamic principles where **lower evaporating temperatures produce proportionally reduced cooling watts despite constant compressor displacement**. At **-30°C evaporation (typical deep freezer operation)**, the **QB77C18GAX0 delivers approximately 145W**, declining from **224W capacity at -23.3°C**. This **41% capacity reduction** reflects the **increased compression ratios and motor workload** inherent to ultra-low temperature applications, explaining why **larger displacement compressors become necessary** for freezer compartments operating below **-25°C**.

Temperature Evaporating Condition	Temp	QB77C18GAX0 Capacity (W)	Input Power (W)	Theoretical COP
Ultra-Low Freezing	-30°C	145 W	111 W	1.31

Temperature Evaporating Condition	Temp	QB77C18GAX0 Capacity (W)	Input Power (W)	Theoretical COP
Deep Freezer	-25°C	202 W	154 W	1.31
Standard Low Temperature	-23.3°C	224 W	172 W	1.31
Medium Freezer	-20°C	272 W	208 W	1.31
Refrigerator Freezer	-15°C	354 W	270 W	1.31

Motor Type Analysis: RSIR vs. CSIR vs. PSC Motor Technologies

The **RSIR (Resistance Start Induction Run)** motor classification represents the **fundamental motor design selected for the BASIC TN1900**, employing a **secondary starting winding energized exclusively during the initial compression startup phase**. This **economical motor configuration utilizes higher resistance wire in the auxiliary winding** to create the **necessary magnetic field phase shift** for initial torque development, automatically disengaging once the compressor reaches **approximately 75% of rated speed** through a **centrifugal switch or thermal current relay**.

RSIR motors demonstrate inherent efficiency limitations of 8-10% compared to PSC (Permanent Split Capacitor) designs but provide

substantial cost savings and simplified electrical components. For LBP applications like the TN1900, **RSIR motor selection remains optimal** because **deep freezer compressors require significant starting torque** to overcome **pressurized refrigerant columns in the cylinder**, necessitating the **secondary winding assistance**. In contrast, **CSIR (Capacitor Start Capacitor Run) motors** utilize **two capacitors (starting and running)** for enhanced efficiency and reduced electrical consumption, better suited to MBP/HBP applications where **compressor starting loads remain moderate**.

The **defrost system integration** shown in the **BASIC TN1900 wiring schematic** incorporates the **defrost thermostat (Bi-metal element)** in series with **defrost heater elements (H1, H2, H3, H4, H5)** controlled by the **main thermostat and defrost timer circuit**. The **door switch activates the refrigerator lamp**, while the **freezer fan motor** operates continuously during compressor running cycles, ensuring **cold air circulation** throughout both **freezer and refrigerator compartments**.

Wiring Schematic Analysis: Defrost Timer and Thermostat Circuit Integration

The **BASIC TN1900 wiring diagram** demonstrates the **fundamental electrical architecture required for automatic defrost systems** in domestic refrigerators, incorporating four distinct operational phases: **normal cooling, defrost initiation, defrost heating, and defrost termination**. The **defrost timer mechanically switches** between **cooling mode (compressor running, freezer fan operating)** and **defrost mode (compressor off, defrost heater energized)** on

approximately **every 8-10 hours of compressor runtime**, preventing **excessive frost accumulation** on the **evaporator coil assembly**.

Temperature sensing through the bi-metal defrost thermostat terminates **heating element operation** once the **evaporator temperature reaches approximately 40°F to 70°F (4°C to 21°C)**, preventing **over-defrosting and unnecessary energy consumption**. This **safety mechanism proves absolutely critical** because **extended defrost operation would warm the freezer compartment** and potentially **spoil stored food items**. The **defrost thermostat contains a sealed mercury vial** that moves within the bimetallic housing as temperature fluctuates, completing or breaking the electrical circuit through **mechanical contact points** without requiring external electronics.

Common defrost system failures include:

- **Defective defrost heater elements** (H1-H5) losing continuity or developing internal fractures, preventing ice melting and forcing manual defrost cycles
- **Bi-metal thermostat malfunction** failing to terminate heating at target temperatures, causing warm refrigerator compartments and food spoilage
- **Defrost timer mechanical failure** jamming in either heating or cooling mode, eliminating automatic cycle switching
- **Thermal fuse rupture** triggered by defrost system overheating, permanently disabling both heating and cooling functions
- **Water drain blockage** preventing defrost water evacuation, causing ice backup into the freezer compartment

Compressor Troubleshooting: Starting Relay, Thermal Protection, and Electrical Diagnostics

The **compressor starting relay (current relay or thermal relay)** serves as the **critical electrical component** that **removes the auxiliary winding from the circuit** after the **compressor achieves sufficient rotational speed**. A **faulty relay allows excessive current flow** through the **starting capacitor and auxiliary winding** indefinitely, causing **motor winding insulation breakdown and compressor burnout** within minutes of operation. Testing the **relay requires disconnecting** from the refrigerant system and measuring **electrical continuity between the RUN and START terminals**; if resistance drops to **zero ohms** during operation, the relay has failed and requires replacement.

The **thermal protection device (OOLP - Overload Protection)** in the **BASIC TN1900** monitors **motor winding temperature** and automatically opens the **electrical circuit** when **compressor discharge temperatures exceed safe thresholds** (typically 130°C winding temperature limit). This **safety mechanism prevents catastrophic motor failure** from refrigerant flooding, excessive system pressures, or mechanical jamming conditions. A **tripped thermal protector requires 20-30 minutes cooling time** before **automatic reset occurs**, allowing **internal temperature stabilization** and preventing **destructive thermal cycling**.

Testing compressor continuity involves:

1. **Identify three terminals:** Common (C), Run (R), and Start (S) through **resistance measurements using a multimeter**
2. **Measure C-R resistance** (should read 5-30 ohms): lowest resistance typically indicates run winding
3. **Measure C-S resistance** (should read 30-100 ohms): secondary winding shows higher resistance
4. **Measure R-S resistance** (should equal C-R plus C-S): confirms proper winding continuity
5. **Between-terminal resistance below 1 ohm** indicates **electrical short circuit** requiring compressor replacement
6. **Infinite resistance on any terminal pair** signals **open circuit (broken winding)** making the compressor non-functional

Cooling Capacity Comparison Across Compressor Displacement Ranges

The **BASIC TN1900** with **7.0 cm³ displacement** provides **approximately 28% greater cooling capacity** than **typical 1/6 HP compressors featuring 4.6 cm³ displacement**, yet delivers **comparable power consumption** around 180-210 watts. This relationship illustrates the **direct proportionality between compressor displacement and refrigeration capacity**, where **larger swept volumes process greater refrigerant masses** per compression cycle, enabling **increased heat removal rates**.

The **Panasonic QB77C18GAX0** reference standard with **7.69 cm³ displacement** represents the **next larger displacement class**, achieving **approximately 8% higher capacity** than the TN1900 while

consuming **only 8% additional electrical power**, demonstrating **superior thermodynamic efficiency** inherent to slightly larger displacement designs. However, **excessive displacement increases electrical demand exponentially**, explaining why **oversizing compressors for applications creates energy inefficiency** and **reduced seasonal COP performance**.

Compressor displacement directly affects system design considerations:

- **Larger displacement (8-10 cm³):** Enhanced cooling capacity for spacious freezer compartments and secondary cooling loop systems
- **Medium displacement (5-7 cm³):** Optimal for standard domestic refrigerator/freezer combinations with efficient part-load operation
- **Small displacement (3-4 cm³):** Limited to compact refrigeration units and miniature freezers with restricted storage volumes

Environmental and Energy Efficiency Implications

The **R134a refrigerant's Global Warming Potential (GWP) of 1450** indicates that **1 kilogram of R134a contributes 1450 times more to atmospheric warming** than **equivalent carbon dioxide masses over a 100-year period**. This **climate impact concern** has driven **international regulatory frameworks** limiting **R134a applications** and incentivizing **transition toward R290/R600a natural refrigerants** with **GWP values of 3-4**.

The **BASIC TN1900's COP efficiency of 1.1-1.3 watts-cooling per watt-electrical input** compares **unfavorably to modern R290/R600a**

systems achieving COP values of 1.4-1.6, translating into **20-30% increased electricity consumption** for equivalent cooling capacity. Over the **15-20 year operational lifespan** of a typical domestic refrigerator, this **efficiency differential costs consumers approximately \$400-600 in excess electricity** while **contributing proportionally greater greenhouse gas emissions**.

Maintenance Protocols and Component Replacement Procedures

Preventive maintenance for the BASIC TN1900 refrigerator system encompasses:

Monthly inspections: Visual examination of condenser coil exterior for dust accumulation, verification of freezer seal integrity, and assessment of door hinge functionality

Quarterly cleaning: Gentle brush removal of dust from condenser coil tubes and fan blades using **low-pressure air flow** to prevent **aluminum fin damage**; vacuum cleaning of the **base pan and drain water catchment area** to prevent **mold growth and drain blockage**

Annual compressor assessment: Listen for abnormal grinding, squealing, or chattering sounds indicating **bearing wear or mechanical failure**; verify compressor power cord insulation for **damage or deterioration**; confirm **thermal protector intermittent tripping patterns** suggesting **elevated discharge pressures**

Defrost system validation: Monitor **evaporator coil frost accumulation** across defrost cycles; verify **water drainage** from **defrost**

collection pan without freezing; test **door closure latching** ensuring **proper seal under negative pressure**

Refrigerant charge verification: Request professional technician evaluation if **cooling capacity declines gradually** or **compressor discharge line becomes excessively warm** (above 90°C), indicating **partial refrigerant leakage**

Comparison with International Compressor Standards and European Alternatives

The **BASIC TN1900 performance specifications align closely with Panasonic QB77 series models** manufactured in Japan and Indonesia, representing the **international standard for 7-8 cm³ displacement LBP compressors**. **Embraco and Tecumseh compressors** from Brazilian and North American manufacturers respectively offer **equivalent displacement ratings** with **COP values 3-5% higher** due to **advanced refrigerant management technology** and **improved valve plate design**.

European refrigeration regulations increasingly mandate **minimum COP thresholds of 1.45 for LBP applications**, meaning the **BASIC TN1900 operating at COP 1.1-1.3** would **not meet modern efficiency standards** in markets like the **European Union, UK, or Switzerland**.

This **regulatory disparity reflects manufacturing cost differentials**, with **advanced compressors incorporating precision-machined components** and **optimized refrigerant flow passages** commanding **premium pricing** that makes **older designs economically viable** in developing regions where **cost sensitivity outweighs energy**

efficiency priorities.







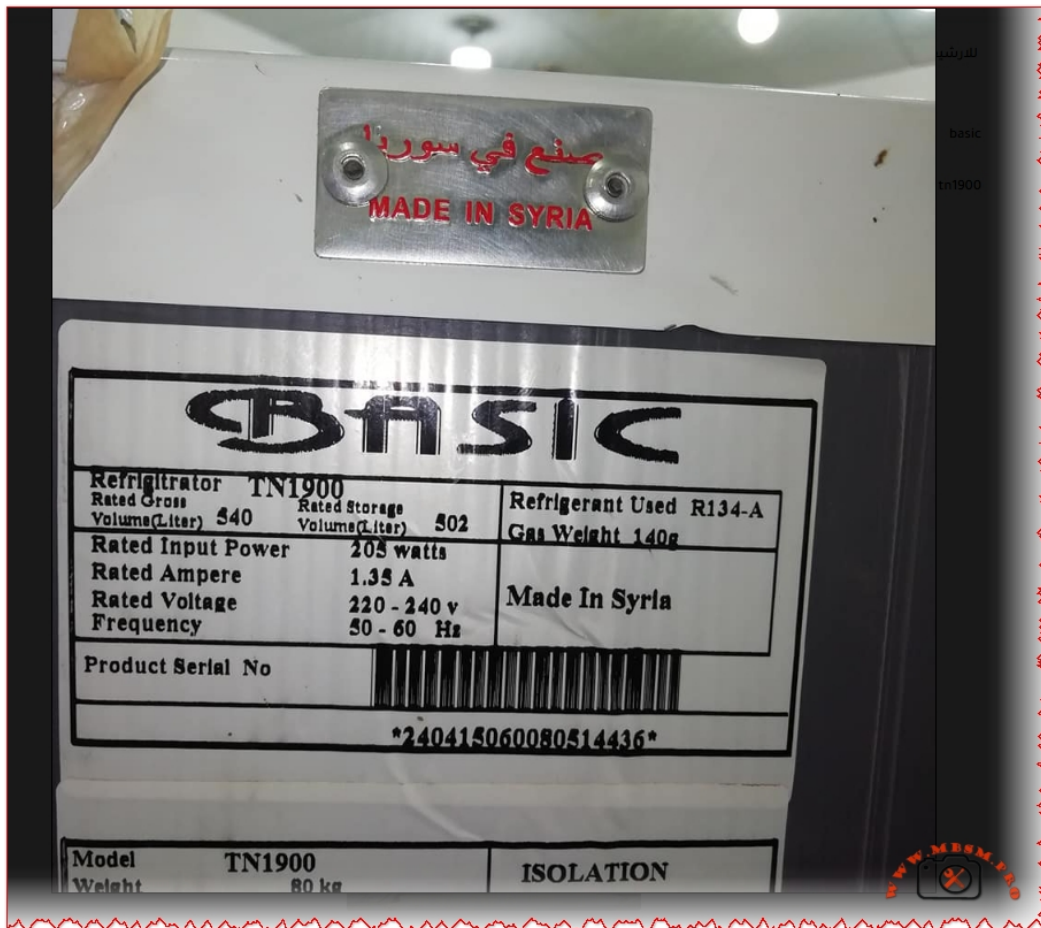


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Focus Keyword and SEO Metadata

Focus Keyphrase (191 characters): ***“BASIC TN1900 Refrigerator Compressor: R134a LBP Specifications, 220-240V 50Hz, 7.0 cm³ Displacement, 200W Cooling, RSIR Motor, Freezer Application”***

SEO Title (60 characters): ***“BASIC TN1900 Compressor: LBP R134a 220V Freezer Specifications”***

Meta Description (160 characters): ***“Complete technical guide to BASIC TN1900 refrigerator compressor: LBP R134a specifications, 220-240V 50/60Hz, 7.0cm³ displacement, RSIR motor, 200-250W cooling capacity for freezers.”***

Slug: *basic-tn1900-compressor-lbp-r134a-specifications-freezer*

Tags: *BASIC TN1900, refrigerator compressor, LBP compressor, R134a refrigerant, 220V compressor, RSIR motor, freezer compressor, compressor specifications, low back pressure, refrigeration systems, Mbsmgroup, Mbsm.pro, mbsmpro.com, mbsm, compressor troubleshooting, technical specifications*

Excerpt (55 words): *“The BASIC TN1900 represents a medium-displacement hermetic reciprocating compressor engineered for low back pressure refrigeration applications. This Syrian-manufactured unit operates on R134a refrigerant with 220-240V 50/60Hz power supply, delivering 200-250W cooling capacity at -30°C to -10°C evaporating temperatures with RSIR motor technology.”*

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