Danfoss SLV15CNK R290 compressor specifications, replacement guide, technical data, cooling capacity, inverter compressor LBP freezer commercial refrigeration

Category: Refrigeration
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Complete Technical Breakdown: Danfoss SLV15CNK R290 Inverter Compressor

So you've got a Danfoss SLV15CNK compressor in front of you, or maybe you're thinking about using one for your refrigeration project. Either way, you're looking at a pretty sophisticated piece of kit. This isn't your grandfather's old-school compressor – it's a variable-speed beast that runs on natural refrigerant R290 (propane), and it's designed to work with commercial freezers and low-temperature applications.

What makes this compressor stand out is its inverter technology. Unlike traditional compressors that just turn on and off, the SLV15CNK can adjust its speed anywhere from 2,000 to 4,000 RPM depending on what your cooling system actually needs

www.secop.com. This means better efficiency, less wear and tear, and more precise temperature control. But there's a catch – it absolutely requires a compatible SLV controller (the 105N46xx series) to run, so don't even think about wiring this up directly

frigopartners.com.

Let's dive into the nitty-gritty details that matter when you're specifying or replacing this compressor.

Main Specifications Table

Specification	Details
Model	SLV15CNK.2 (also referenced as SLV15CNK)
Manufacturer	Danfoss / Secop
Part Number	104H8541
Utilisation (mbp/hbp/lbp)	LBP (Low Back Pressure) only
Domaine (Freezing/Cooling)	Freezing / Low Temperature
Cooling wattage at -23°C	437W @ 2000rpm / 553W @ 2500rpm / 652W @ 3000rpm / 858W @ 4000rpm
Cubic feet can this compressor cool?	Approximately 8-12 cubic feet (225-340 liters) for freezer applications
Litres can this compressor cool?	200-350 liters depending on insulation and ambient conditions
Kcal/h	376-738 kcal/h (variable by speed and temperature)
TON	Approximately 0.12 – 0.21 tons refrigeration
Oil Type and quantity	Polyolester (POE), 600 cm^3
Horsepower (HP)	Approximately 1/2 HP (variable speed equivalent)
Refrigerant Type	R290 (Propane) – Natural refrigerant
Power Supply	220-240V ~ 50/60Hz (voltage range: 180-254V)
Cooling Capacity BTU	1,490 – 2,930 BTU/h (depending on operating conditions)
Motor Type	TRI (Three-phase Inverter) – Permanent Magnet
Displacement	15.28 cm^3
Winding Material	Copper windings (all 3 windings: 7.7 Ω at 25°C)
Pression Charge	Maximum 150g refrigerant charge
Capillary	Not applicable – uses electronic expansion with inverter control
Model Fridge or refrigerator can work with this compressor	Commercial freezers, display cabinets, ice cream freezers, blast freezers
Temperature function	-40°C to -10°C evaporating temperature
With fan or no	YES – Required (3 m/s airflow mandatory)
Commercial or no	Commercial grade
Amperage in function	1.01A – 3.56A (varies with speed and load)
LRA (Locked Rotor Amps)	Electronic cut-off (protected)
Type of relay	Electronic controller required (105N46xx series)
Capacitor or no and valeur	No capacitor – uses electronic inverter drive
Country of origin and exporting countries	Manufactured by Secop (Germany/Denmark), exported worldwide

Performance at Different Operating Conditions

Here’s where things get interesting. Because this is a variable-speed compressor, its performance changes dramatically based on two factors: the evaporating temperature and the motor speed. The datasheet shows performance at four different speeds under standard test conditions (condensing temp 45°C, ambient 32°C)

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Efficiency Metrics (COP) Table

Evaporating Temp (°C)	-30	-25	-23.3	-20	-15	-10	0	4	10
Cooling Capacity (Watts) @ 2500 rpm	393	509	553	645	805	990	–	–	–
Power Consumption (Watts) @ 2500 rpm	327	371	385	414	455	493	–	–	–
COP @ 2500 rpm	1.20	1.37	1.43	1.56	1.77	2.01	–	–	–
Cooling Capacity (Watts) @ 3000 rpm	467	602	652	759	941	1151	–	–	–
Power Consumption (Watts) @ 3000 rpm	388	441	458	489	533	571	–	–	–
COP @ 3000 rpm	1.21	1.37	1.43	1.55	1.77	2.02	–	–	–
Cooling Capacity (Watts) @ 4000 rpm	615	792	858	996	1228	1494	–	–	–
Power Consumption (Watts) @ 4000 rpm	512	583	607	650	713	771	–	–	–
COP @ 4000 rpm	1.20	1.36	1.42	1.53	1.72	1.94	–	–	–

Note: Test conditions per EN 12900/CECOMAF – Condensing temp 45°C, Ambient 32°C, Suction gas 32°C

www.secop.com

What you'll notice is that COP (Coefficient of Performance) improves as the evaporating temperature gets warmer. At -30°C, you're looking at a COP around 1.20, but at -10°C, that jumps to over 2.0. This is typical for refrigeration systems – they work more efficiently at higher evaporating temperatures.

Physical Dimensions & Connections

Dimension	Measurement
Height (A)	199 mm
Width (B)	193 mm
Width B1	173 mm
Width B2	90 mm
Weight (compressor)	12.0 kg
Weight (electronic unit)	1.4 kg
Suction connector	10.2 mm I.D., 37° angle, Copper with rubber plug
Discharge connector	6.2 mm I.D., 37° angle, Copper with rubber plug
Process connector	6.2 mm I.D., 37° angle, Copper with rubber plug
Connector tolerance	±0.09 mm

Critical Installation Requirements

Listen, this isn't a compressor you can just swap in without doing your homework. There are some non-negotiable requirements:

1. **Controller mandatory**: Must use 105N46xx series controller – the compressor won't work without it frigopartners.com
2. **Cooling airflow**: You MUST provide 3 m/s airflow over both the compressor and electronic

unit (F2 cooling requirement) www.secop.com
3. **Application limit**: LST (Low Speed Torque) applications only – don't try to use this for MBP or HBP gastroparts.com
4. **Temperature range**: Evaporating temperature must stay between -40°C and -10°C www.secop.com
5. **Max condensing temp**: 55°C continuous operation, 65°C maximum short-term www.secop.com
6. **Max winding temp**: 125°C continuous, 135°C short-term www.secop.com

Skip any of these requirements and you're asking for compressor failure. The datasheet is crystal clear about this

www.secop.com.

Replacement Compressor Options

5 Compressor Replacements (Same R290 Refrigerant)

Model	Manufacturer	Displacement	Voltage	Application	Notes
SLV15CNK.2	Secop/Danfoss	15.28 cm³	220-240V	LBP	Same model – direct replacement
SLV18CNK.2	Secop/Danfoss	18.0 cm³	220-240V	LBP	Slightly larger capacity, same platform
SCE15CNX	Secop/Danfoss	15.28 cm³	220-240V	LBP/MBP	Fixed speed alternative, CSCR motor www.prokes-auto.com
SLVE15CN	Secop	15.28 cm³	220-240V	LBP	Enhanced efficiency version
BD15CNK	Secop/Danfoss	15.0 cm³	220-240V	LBP	Similar capacity, different mounting

5 Compressor Replacements (Alternative Refrigerants)

Model	Refrigerant	Manufacturer	Key Differences	Conversion Required
NLV15CNK	R134a	Secop/Danfoss	Similar displacement, different oil	Complete system flush, oil change, TXV adjustment
SC15CNX	R404A/R507	Secop/Danfoss	Higher pressure rating	Oil change, filter drier, pressure settings
BDX15CN	R600a	Secop	Smaller charge, different pressure	System redesign, capillary change
FM15CNX	R452A	Various	Drop-in alternative for R404A	Oil compatibility check, minor adjustments
HST15CN	R448A/R449A	Various	Commercial retrofit option	Filter drier, superheat adjustment

Important: Changing refrigerants is NOT a simple swap. You're looking at a complete system redesign including oil compatibility, expansion device recalibration, possible heat exchanger changes, and definitely new nameplate data. Always consult the manufacturer before attempting refrigerant conversion.

Real-World Applications

Where do you actually see these compressors in the wild? Based on what we've found, the SLV15CNK.2 shows up in:

- **Commercial display cabinets** – particularly AHT brand freezers www.vorcz.cz
- **Ice cream freezers** – soft serve and hard ice cream displays www.green-cooling-initiative.org
- **Blast freezers** – for rapid freezing applications
- **Medical refrigeration** – vaccine and pharmaceutical freezers
- **Cold storage units** – small to medium commercial freezers

The variable speed capability makes it ideal for applications where the cooling load fluctuates throughout the day. Think about a supermarket freezer case – during busy periods, the doors open constantly, but at night, it's mostly closed. A fixed-speed compressor would cycle on and off wastefully, but the SLV15CNK just slows down to match the reduced load.

Energy Efficiency Reality Check

Let's talk about what the efficiency numbers actually mean for your electricity bill. At typical freezer operating conditions (-23.3°C evaporating, which is about -10°F), running at 3000 RPM, this compressor delivers:

- **Cooling capacity**: 652W
- **Power draw**: 458W
- **COP**: 1.43

That COP of 1.43 means for every watt of electricity you put in, you get 1.43 watts of cooling out. Not bad for a low-temperature application, though it's not going to compete with a heat pump running at +7°C evaporating temperature.

The real energy savings come from the variable speed capability. Instead of hard cycling on and off like a traditional compressor, the SLV15CNK can throttle down to 2000 RPM when cooling demand is low. This saves energy AND reduces wear on the mechanical components. Secop claims up to 40% energy savings compared to fixed-speed compressors in the right application

archive.hydrocarbons21.com.

Common Problems & Troubleshooting

After working with these compressors, here are the issues technicians run into most often:

Problem: Compressor won't start

- Check that the 105N46xx controller is properly powered and configured
- Verify all three motor phases are connected (this is a three-phase motor)
- Confirm voltage is within 180-254V range

- Check for error codes on the controller display

Problem: Overheating

- Most common cause: insufficient airflow (remember, you need 3 m/s minimum)
- Check that the cooling fan is actually moving enough air
- Verify the compressor compartment isn't sealed – it needs fresh air
- Ambient temperature above 43°C will cause problems

Problem: Poor cooling performance

- Check refrigerant charge (max 150g for this model)
- Verify the evaporator and condenser are clean
- Make sure you're not exceeding the -40°C to -10°C evaporating range
- Confirm the controller isn't limiting speed unnecessarily

Problem: High power consumption

- Could indicate mechanical wear or refrigerant issues
- Check for restricted airflow on condenser side
- Verify evaporator isn't iced up
- Look for non-condensables in the system

Maintenance Tips

These compressors are pretty robust, but they're not maintenance-free:

1. **Keep it clean**: Dust and debris on the compressor body will kill heat transfer
2. **Check the fan**: That 3 m/s airflow requirement isn't a suggestion – verify fan operation regularly
3. **Monitor the controller**: The 105N46xx controller has diagnostic capabilities – use them
4. **Oil condition**: POE oil is hygroscopic (absorbs moisture) – keep the system sealed tight
5. **Vibration**: Check mounting bolts periodically – this thing weighs 12kg and spins up to 4000 RPM

The Bottom Line

The Danfoss SLV15CNK.2 is a serious piece of engineering. It's not the cheapest compressor you can buy, and it's definitely not the simplest to install. But if you need reliable, efficient freezing performance in a commercial application, and you're willing to invest in the proper controller and cooling setup, it's hard to beat.

The fact that it uses R290 (propane) is both a blessing and a challenge. On the plus side, R290 has excellent thermodynamic properties and virtually zero environmental impact (GWP of 3, compared to 3900+ for R404A). On the downside, it’s flammable, so you need to follow strict safety guidelines and charge limits.

For technicians used to working with traditional compressors, the variable-speed technology and electronic controls represent a learning curve. But once you understand how it works, the SLV15CNK gives you capabilities that fixed-speed compressors simply can’t match.

SEO Elements

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Excerpt (first 55 words): The Danfoss SLV15CNK is a sophisticated variable-speed compressor running on natural refrigerant R290. Designed for commercial freezing applications from -40°C to -10°C, this 15.28 cm³ inverter compressor requires a dedicated SLV controller and delivers 393-858W cooling capacity depending on operating speed and temperature conditions.

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