

# Sanden International (USA), Inc.

An ISO/TS 16949-2002 Company

[www.sanden.com](http://www.sanden.com)



# SANDEN

Delivering Excellence

# Sanden International (U.S.A.), INC SD COMPRESSORS

## ALL NEW OEM COMPRESSORS

- Sanden International (USA), Inc. began marketing automotive air conditioning compressors in 1974 and has been manufacturing compressors in the U.S. since 1980.

## Sanden's Quality Policy

- *Sanden International (USA), Inc., as a world leader in the design and manufacture of automobile air conditioning compressors, is committed to:*
  - Continually improve the effectiveness of our Quality Management System
  - Meet and exceed established requirements
  - Develop, review, measure and communicate quality objectives and performance indicators throughout the organization.
  - Over 30 years later, Sanden continues as a top supplier of automotive compressors to the worlds most prestigious vehicle manufacturers.

# **SUPER HEAVY DUTY**



## Sanden “Super Heavy Duty” ...unmatched performance and durability for heavy duty applications

### Sanden “Super Heavy Duty” (SHD) A/C Compressor

Sanden, the world’s largest independent supplier of mobile A/C compressors, is proud to announce the launch of our new “Super Heavy Duty” (SHD) A/C compressor line. Drawing on our extensive experience in the global heavy truck industry, Sanden has developed the SHD specifically for use in the most severe application environments.

*Current SD7 Compressor  
(F69-6001-122 Shown)*

*New SHD Compressor  
(F69-6003-122 Shown)*



#### **ADVANTAGES:**

The SHD features many new or revised components compared to our current SD7H15 compressor, all of which have been designed to provide longer service life with no loss of cooling performance:

- New long-life clutch, lip seal, and internal bearing package.
- Revised internal lubricant flow passages.
- New “fail safe” clutch design that prevents loss of the accessory drive belt in the event of A/C compressor clutch failure.
- 2X Durability
- One Million Clutch Cycles
- Same Performance

# Super Heavy Duty Compressor – Design Features

Friction liner and larger friction face

Over-molded Lip Seal

Planet Plate w/ Alumite Coating

Keyed Shaft (in current SIA product)

Improved rear thrust bearing race

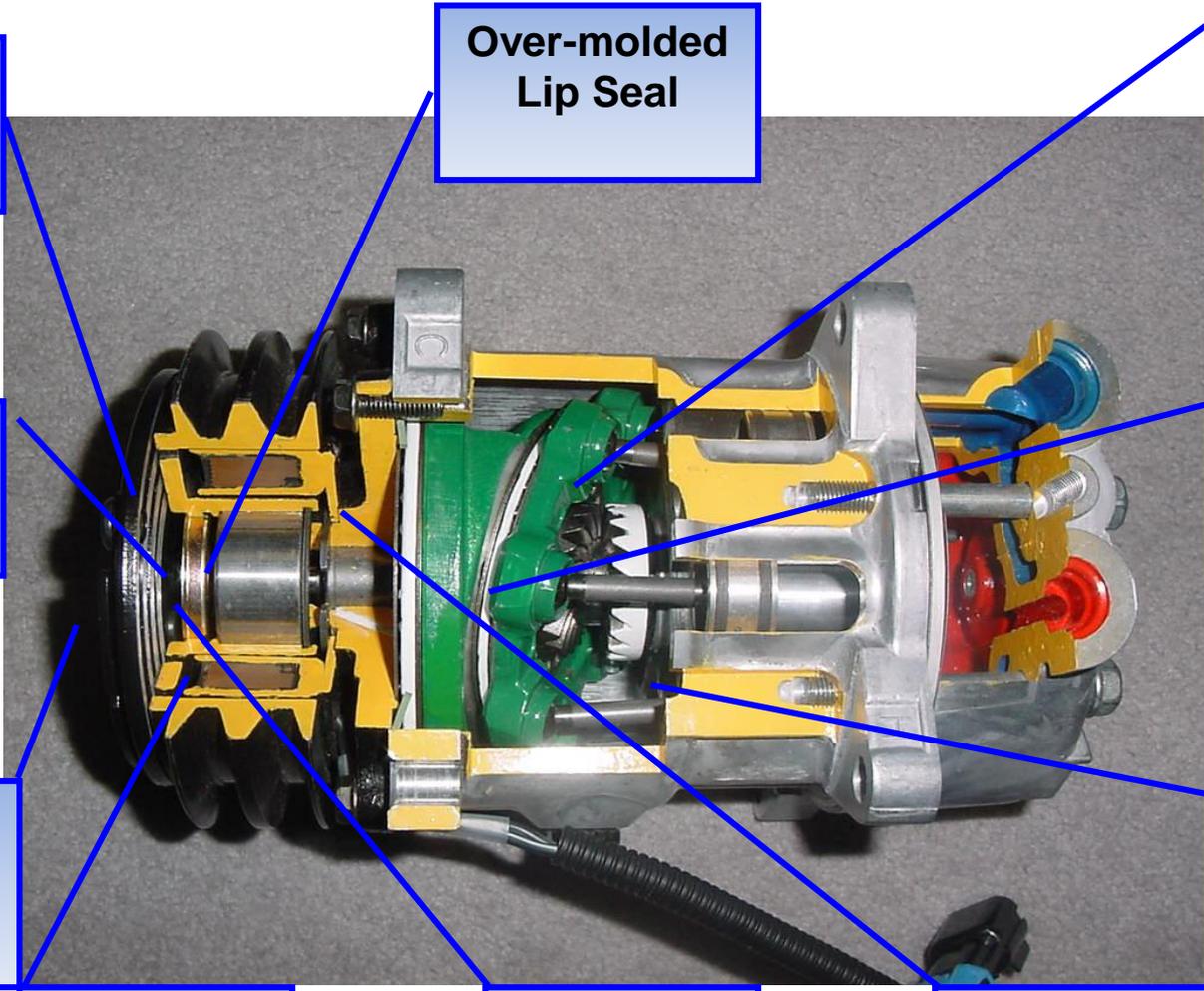
Rubber Armature (Eliminate Leaf Springs)

Dual front head oil flow passages

Internal Thermal Fuse

EP Steel Bearing

Unit Coil Internal Diode



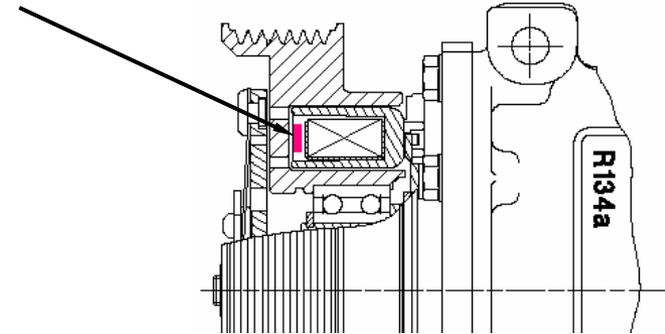
# SHD Compressor – New Design Features – Thermal Fuse



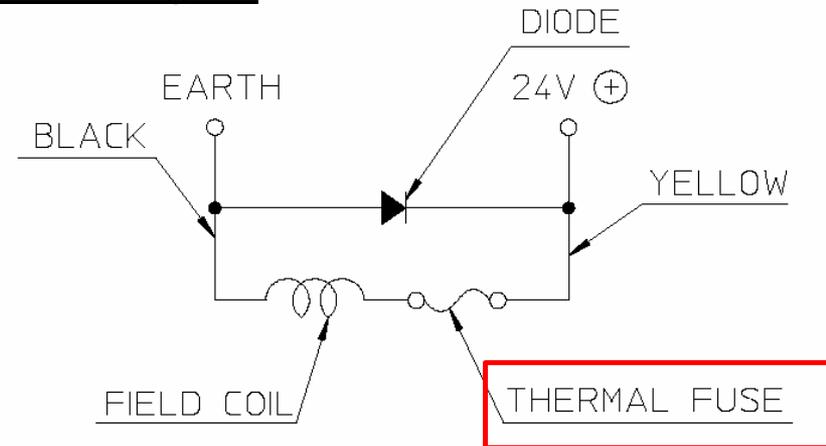
## • Thermal Fuse:

- Placed inside the clutch coil
- Principal of operation:
  - Fuse senses heat from clutch slip
  - Fuse opens, cutting current flow through clutch
  - Clutch disengages, allowing pulley to continue to spin
  - Prevents loss of accessory belt
- Included on all SHD and many SD7E compressors
- Fuse cannot be reset
  - Clutch must be replaced after fuse opens

## Position of thermal fuse



## Circuit diagram



# SHD Compressor – New Design Features – Diode



- During clutch disengagement, the clutch magnetic field rapidly collapses, sending a large voltage spike (400+ Volts are possible, depending on the speed at which the circuit is broken) back into the vehicle wiring
- To prevent this spike from damaging sensitive electronics, many Sanden compressors use a diode located in the clutch lead wires
- **Cautionary Notes:**
  - *If exposed to reversed polarity, the diode will usually fail “closed”, meaning that the clutch will not engage and the coil assembly must be replaced*
  - *The diode can be damaged as a result of rough handling*

## Clutch Diodes

Figure 1: Sanden Clutch Coil With Diode Wiring Diagram

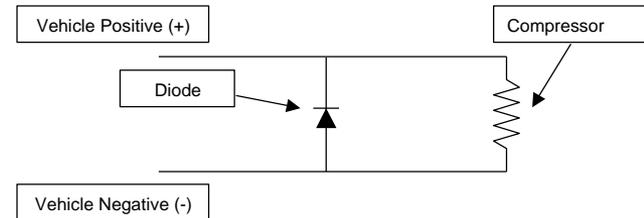
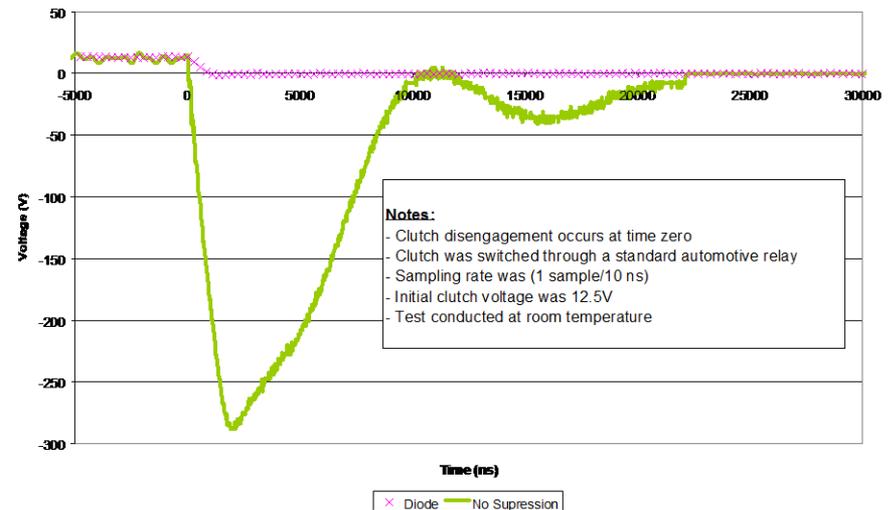


Figure #2 - Voltage Transient During Clutch Disengagement



# SD7 ENHANCED



# SD7E “Enhanced” Compressor:

- In mid-2006, Sanden introduced a new drop-in product for the TM21 compressors found on many small buses and large construction vehicles
- This product is known as the SD7E “Enhanced” compressor



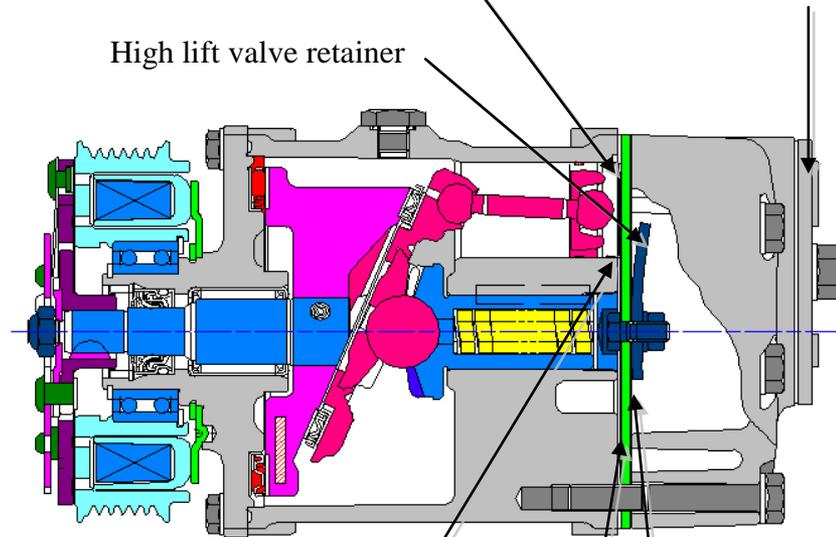
# SD7E “Enhanced” Compressor:

- “High flow” version of the SD7, with performance comparable to competitor’s 210cc product
- Possesses same external dimensions as other SD7 product
- Provides weight savings and significant added packaging flexibility compared to competitor designs

Use “Butterfly” suction valve, corresponding block gasket, and 108mm block recess.

Increased Suction and Discharge Port I.D. of cylinder head

High lift valve retainer



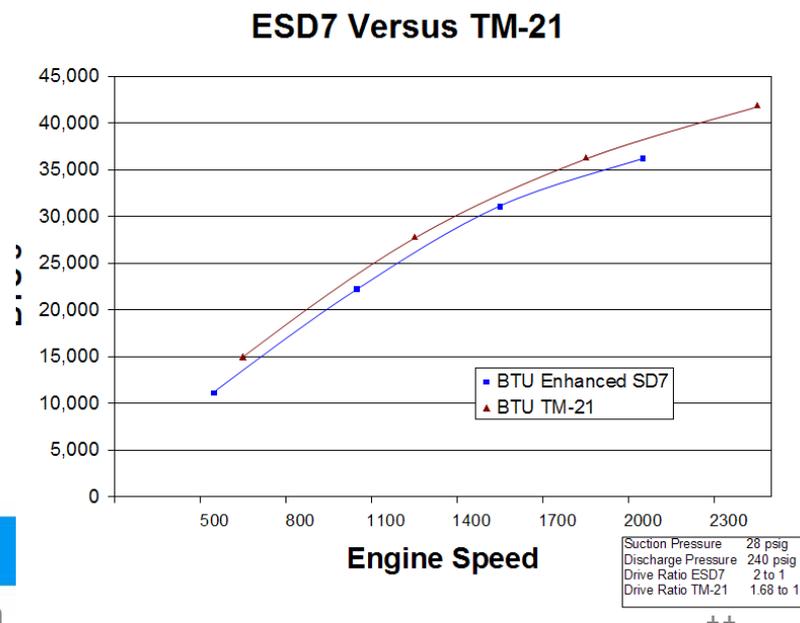
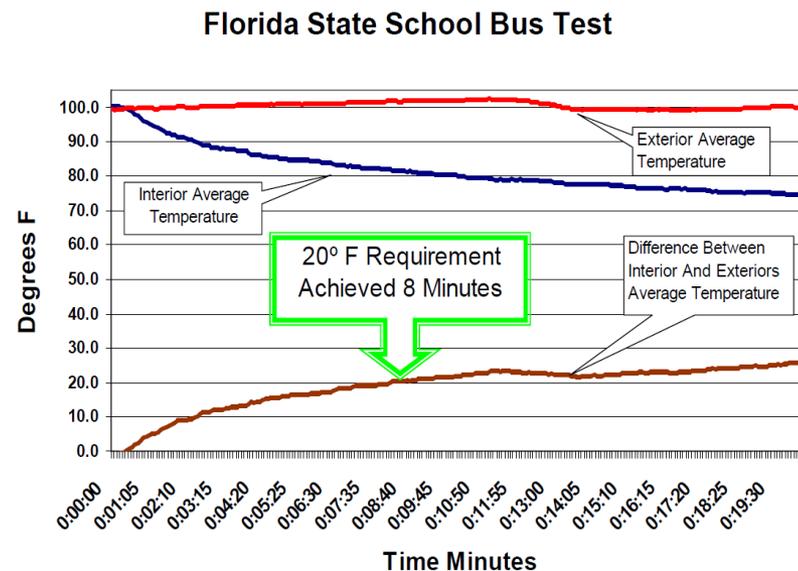
Increase depth of suction valve stop in cylinder block from 1.2 to 1.75 mm

Use valve plate with smaller 8 mm discharge holes

Narrow-angle, shot blasted discharge valve

# Sanden Enhanced SD7

- Capacity Increased 16.6% @ 2,500 rpm.
- Passes Texas & Florida School Bus Tests
- Conforms To Existing Dual Compressor Mounts
- Lower Cost / High Reliability Alternative to TM-21
- 8,000 Hour Compressor Life



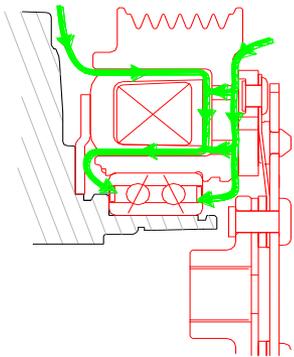
# SD7 SEALED HEAVY DUTY



# Sanden SD-7 Clutch Sealing Options:

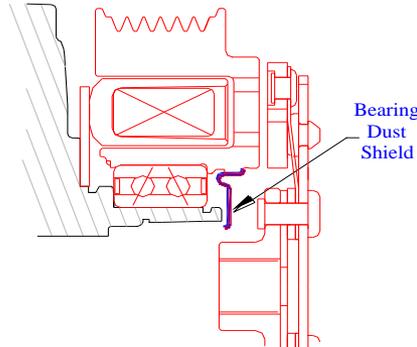
## “Standard” Configuration

- Suitable for most on-highway applications
- Multiple paths for dust to reach bearing (shown in green)



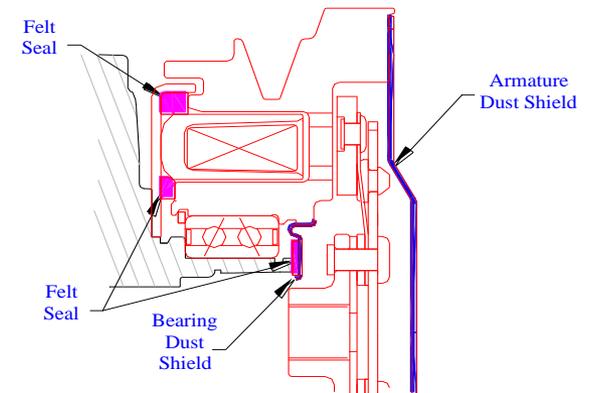
## “Heavy Duty” Configuration

- Adds a Bearing Dust Shield to the standard configuration
- Typically used in high mileage on-highway applications



## “Sealed Heavy Duty” Configuration

- Seal/shield package keeps contaminants away from the clutch surfaces, bearing, and lip seal
- Used in extreme off-highway environments



# SD7H15 FLX



# FLX7 Features



- **Model Consolidation**  
Utilizing interchangeable parts, the FLX7 compressor series allows distributors to consolidate hundreds of unique part numbers into less than 20. This translates into lower costs, and increased customer satisfaction. The FLX7 doesn't just replace existing models, it also creates compressor configurations previously unavailable from Sanden.
- **Lower Inventory Costs**  
The consolidation of part numbers means customers can stock fewer models and still meet customer demand. Consider this example: A distributor who previously stocked twelve different Sanden model numbers can now stock one FLX7 compressor and six port fittings. The port fittings and clutch lead wire options give customers the ability to tailor their compressor inventories to satisfy a variety of A/C system configurations which, in turn, will translate into reduced slow-moving and obsolete stock.
- **Application Flexibility**  
Flexibility truly is the key benefit of this compressor series. Customers will be confident, as they experience seasonal demand, that the FLX7 compressor on their shelf can be adapted on-the-fly to satisfy a variety of applications. The two clutch lead wire options and six fittings are just the beginning. More options are in development. The result will be an even more adaptable and flexible FLX7 compressor series.
- **Added Value**  
Designing the FLX7 series to be compatible with hundreds of different A/C systems wasn't enough. We gave the FLX7 added value to make it clearly superior to other compressors. Each FLX7 comes standard with heavy duty clutch bearings, a clutch diode, and a pressure relief valve. The port fittings are also a superior value. Sanden's FLX7 port fittings are low-profile and made from forged steel, giving them superior durability and lower weight to cast-iron fittings.
- **Reduced Lead times**  
Sanden's customers are demanding shorter lead times for delivery of products, and we have the answer. The FLX7 can be delivered from our factory in days, not weeks. This reduced lead time means customers can stock less on their shelves and still have the ability to capture unforeseen market opportunities. Now more time can be spent taking orders instead of forecasting compressor needs.



Sealed Packard Terminal is attached to the field coil on each FLX7



Jumper wire to convert field coil terminal to bullet-type is also included

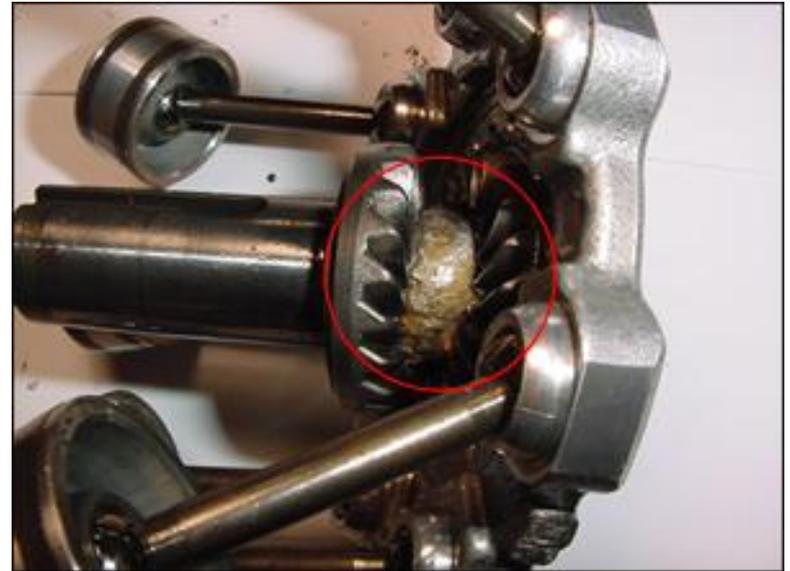


# WARRANTY



# Sanden Warranty

- **Centerball seizure occurs as a result of lack of lubrication and cooling around the centerball. This condition can be caused by the following:**
- A) TXV blockage or Malfunction.
- B) Thermostat failure.
- C) No air flow to Evaporator ( Blower fan motor failure
- D) Lack of refrigerant and I or oil due to a leak.
- E) Lack of return oil due to too long a circuit or system undercharge.
- F) Lack of refrigerant flow due to inadequate charge.
- G) Blockage in system due to Contamination in system.
- H) Defective centerball or gear mating surface.
  - 1) Liquid slugging due to improper system charging.
- J) Charging Liquid refrigerant into compressor (washes off oil film from around centerball).



## 9.0 Compressor Replacement

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- It's critical for successful compressor replacement that the new compressor is installed in a clean system with a correct oil charge. Contamination remaining in the system will be pulled into the new compressor and lodge under the valves and in bearings causing quick failure of the new compressor. Also it's important to maintain the original OEM oil charge amount when replacing the compressor.

### 9.1 Contamination Inspection

- Contamination from foreign material can be found by looking at the oil drained from either the compressor or the suction and discharge lines. Contamination can also be seen collecting in the orifice tube or expansion valve.



Example of contamination collected on inlet side of orifice tube requiring system flushing



Clean oil is clear or translucent



Contaminated oil with metal particles will require system flushing



Overheated oil is dark and will require flushing

