



## SERVICE BULLETIN

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**Title:** Solid-State Starters

Electrical Isolation Requirements

**Models Affected:** Any Centrifugal or Screw Chiller

**Number:** C9728

**Date:** 9/23/97

**Supersedes:** New

### PURPOSE:

To advise the field of a potential safety hazard to personnel and possible damage to equipment if proper procedures are not followed.

**FILE:** Compressor

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## **BACKGROUND:**

Solid state starters are not isolation devices, they stop current to the motor with an extremely high resistance. Although only milliamps of current can flow, anyone touching a motor lead will be subjected to full line voltage momentarily. This is sufficient to be fatal.

Inside delta starters have the contacts or SCRs in one terminal lead of each motor winding instead of in the line leads. This keeps the motor windings at full voltage and connected to the power system although current cannot flow through the windings because of the open SCRs and/or contactors.

Benshaw starters that have Model numbers 32STG, 32STJ, 32STS or 32STT are inside delta type starters. Any Benshaw starter shipped after June 1996 should be one of these.

The only way to eliminate voltage at the motor terminals is to open the circuit breaker that is located at the starter (CB1) or to open a disconnect that is upstream of the chiller.

An internal short can be produced by dehydration vacuum under which refrigerant gases lose their insulating properties. Unless the voltage is isolated by open contacts in the line, motor damage will result.

The following warning is being included in Operating and Maintenance Instructions from now on.

**DANGER! Risk of injury or death by electrocution. High voltage is present on motor leads even though the motor is not running when a solid state or inside delta starter is used. Open the power supply disconnect before touching motor leads or terminals.**

Procedure: It is common and good practice to have the chiller motor isolated from electrical power when working on the machine at any time. Power must be isolated from the compressor motor, oil sump heater, and oil pump motor.

**DO NOT SERVICE OR TOUCH MOTOR TERMINALS WITHOUT DISCONNECTING THE ELECTRICAL SUPPLY TO THE STARTER OR OPENING THE CIRCUIT BREAKER LOCATED ON THE STARTER. DEATH CAN OCCUR.**

**DO NOT ENERGIZE MAIN CIRCUIT BREAKER WHILE MACHINE IS UNDER A VACUUM. MACHINE DAMAGE WILL OCCUR.**