

Feature Comparison Chart

Product Ordering Information

5-2-1					CSRU1, CSRU2, CSR5
Kickstart		TO-5, KS8, MP-1			KS1
Mars			32701 32702		
Robertshaw			600-052 600-057		
Supco		SPP4E, SPP5E, SPP6E, SPP7E, SPP8E	SPP5, SPP6, SPP7, SPP8	SPP8	3K3W
A-1 Components			WSX-5 WSX-6	WSX-1	
DiversiTech	DST-10		DST-5 DST-6	DST-8	
Types of Hard Start Kits	Variable Torque	Non-Variable Torque	PTC	Timing Devices	3-wire Potential Relay & Capacitor Kit
2 wire connection, polarity doesn't matter	Yes	Yes	Yes	Yes	No
Hard start kit recycles immediately	Yes	Yes	No	Yes	Yes
Detects at a specific voltage point if the motor has started	Yes	Yes	No	No	Yes
PTCR device	No	No	Yes	No	No
Timing Circuit Device	Yes	No	No	Yes	No
Ambient temperature changes performance	No	No	Yes	Yes	No
Disconnects immediately on motor start	Yes	Yes	No	No	Yes
Patented circuit design	Yes	Yes	No	No	No
Adjustable timing	Yes	No	No	No	No
LED indicator to show kit is functioning	Yes	No	No	No	No
Automatic cut-off for over-voltage	Yes	Yes	No	No	No
Multiple mounting methods	Yes	No	Yes	Yes	No
Electronic precision voltage monitoring	Yes	No	No	No	No
Available from a multiple product line manufacturer	Yes	No	Yes	Yes	Yes
Antiquated spring & magnet mechanical voltage detection	No	Yes	N/A	N/A	N/A



Catalog No. DST-10
Description Hard Start w/Torque Adjustment
UPC 0 95247 08599 6
Unit Weight 1.3#
Case Quantity 56
Case Dimensions 27" x 10" x 18" @ 44#
SCC 5 00 95247 08599 1



Catalog No. DST-6
Description Hard Start - PTC 500%
UPC 0 95247 41524 3
Unit Weight 1.3#
Case Quantity 60
Case Dimensions 24" x 13.5" x 9.5" @ 35#
SCC 1 00 95247 41524 0



Catalog No. DST-5
Description Hard Start - PTC 300%
UPC 0 95247 41523 6
Unit Weight 1.1#
Case Quantity 60
Case Dimensions 21" x 11" x 9.5" @ 35#
SCC 1 00 95247 41523 3

About DiversiTech

DiversiTech Corporation is North America's largest manufacturer of equipment pads and a leading manufacturer and supplier of components and related products for the heating, ventilating, air conditioning, and refrigeration (HVACR) industry.

Headquartered in the Atlanta, GA metropolitan area, DiversiTech manufactures a suite of products, which includes a wide range of mechanical, electrical, chemical, and structural parts for HVACR systems. The company maintains manufacturing and distribution facilities in key U.S. locations and in the Far East. DiversiTech has enjoyed a continued history of successful growth and has acquired industry-recognized brand names including Wagner Manufacturing and Specialty Chemical.

VARI-TORQUE™ with Precision Relay

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Download an electronic version of this brochure at:
www.diversitech.com/literature/lit-fly-dst10.pdf

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Why are Hard Start Kits Needed?

PSC Motors (and Compressors)

A permanent split capacitor – (PSC) motor does not have separate capacitors for starting and running. Rather, a single capacitor, sized somewhere between the appropriate start and run sizes, is used in series with the motor's start winding. This permanently connected capacitor functions as an undersized start capacitor and an oversized run capacitor.

This single capacitor design is energy efficient and works well under low starting torque requirements. When there are higher starting torque needs (as in a hard to start condition), the motor will draw abnormally high current and may not start at all.

When a motor draws higher than normal current in a residential air conditioning installation, lights in the home will dim, and the motor will create excess heat, reducing its usable life.



Thermostatic Expansion Valves

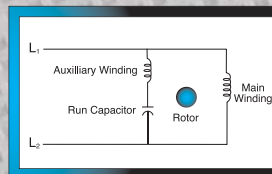
Use of a thermostatic expansion valve (TEV) can dramatically improve the efficiency of a cooling system. By accurately controlling the system's superheat, the TEV achieves full utilization of evaporator coil surface area.

A drawback to the use of TEVs with PSC motor powered compressors is the need for off-cycle pressure equalization.

Specifically, when the system is off, and the compressor is not cycling refrigerant, the TEV is closed. The closed TEV does not allow refrigerant to flow through the system. The non-flowing refrigerant can cause high back pressure on the discharge of the compressor, and hence a hard starting condition. Select TEVs can be sized with a bleed port that allows a small flow of liquid refrigerant to bypass the TEV. Normal industry practice is for bleed holes to equalize systems in 3 to 5 minutes.

By definition, TEV bleed ports are very small – normally 0.028" to 0.055". As in any control valve, small holes are prone to corrosion and debris. TEVs with bleed holes are typically available only on original equipment, and are normally not available in the aftermarket. Additionally, TEVs with bleed holes are typically available only on original equipment. TEVs with bleed holes are normally not available in the aftermarket.

The simple solution is to install a hard start kit whenever a TEV is installed on a system.



Types of Hard Start Kits

PTC Devices

Positive Temperature Coefficient (PTC) equipped hard start kits use a thermally controlled resistor to connect and disconnect the boosting capacitor in the motor circuit.

At ambient temperature, the PTC has low resistance (near short circuit), and hence the boosting capacitor is connected to the motor circuit. As the motor starts, and begins to draw current, the PTC warms up, ultimately reaching a temperature near 180°C, has high resistance (open circuit) and disconnects the

boosting capacitor from the motor circuit.

This thermally based capacitor disconnection may or may not be after the motor actually starts. If the boosting capacitor disconnects before the motor starts, the hard start kit has little effect on starting. Once the motor circuit is de-energized, the PTC must cool down to ambient temperature before the boosting capacitor is connected back in the circuit. This cool down process can take 3 to 5 minutes.

Timing Devices

A hard start kit equipped with a timing device simply uses a several hundred millisecond or several second time delay. This delay leaves the boosting capacitor in the circuit until the timer expires and disconnects it from the motor circuit.

Voltage Monitoring (Potential Relay) Devices

During starting the voltage present on the auxiliary (starting) winding varies in proportion to the rotor speed and the applied line voltage. When the rotor is stopped or turning at low RPM, the voltage (in electrical terms called potential) is also low. As the motor spins up to speed, the voltage increases to a point where a voltage sensing device (potential relay) opens and disconnects the start boost capacitor.

Vari-Torque

The best motor starting technology is a combination of voltage monitoring and timing. The Vari-Torque uses a precision relay to monitor voltage, and an adjustable timer to precisely dial in the amount of time the boosting capacitor is connected in the circuit. Vari-Torque allows adjustment of the applied start boost-seconds while maintaining potentiometric protection of the start winding through precision electronic monitoring of the motor's dynamics as the rotor comes up to speed.

Vari-Torque™ Features & Benefits

Variable torque adjustment

The variable torque adjustment is unique to the DST-10 from DiversiTech. This feature allows for a single product to be used in a broad range of installations from small appliance compressors to 10 ton refrigeration compressors.



Multiple mounting methods

The DST-10 is equipped with a convenient stainless steel clip for simple slide on attachment. Additionally, the DST-10 has a conventional through hole for attachment with a sheet metal screw.



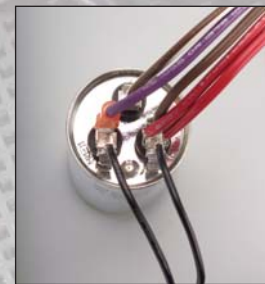
Simple 2-wire hookup

The DST-10 is furnished complete with two lead wires connected in parallel across the PSC motor's run capacitor. Simply push on terminal connectors to assure a rapid but secure connection.



LED indicating function

The DST-10 incorporates an LED that shows definitively when the hard start kit is working. The LED lights when the DST-10 is assisting with the motor start.

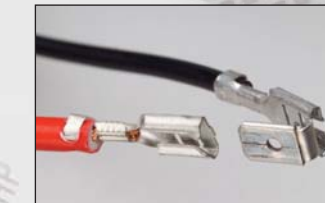


Slim consistent cylindrical design

The DST-10 product package does not include any boxy add-on components that make installation difficult.



Piggyback terminals



The DST-10 lead wires have piggyback end terminals in the event the run capacitor does not have a spare terminal available. In this instance, simply disconnect one of the wires attached to the capacitor and re-attach it to the DST-10 piggyback terminal. Then, attach the DST-10 piggyback terminal to the open terminal on the capacitor.