

SINGLE-PHASE SCROLL COMPRESSOR START ASSIST COMPONENTS

1 Starting components are not normally required

Due to the inherent design of the Copeland™ Scroll, the internal compression components start unloaded, **even if system pressures are not balanced**. Since the compressor internal pressures are balanced at start-up, low voltage starting characteristics are excellent, and starting components **are not normally required**.

2 Weak power supplies

When weak power supply is encountered, starting current on **any** compressor may result in a significant “sag” in voltage that reduces the starting torque of the compressor and increases the start time. This could influence the rest of the electrical system in the building by lowering, for a period of 300 to 400 milliseconds, the voltage to the lights etc. This momentary low voltage, **caused by inadequate power supplies**, could cause "light dimming". In addition supply lines pulled through hard conduits could experience a "buzzing" during this period of high inrush current.

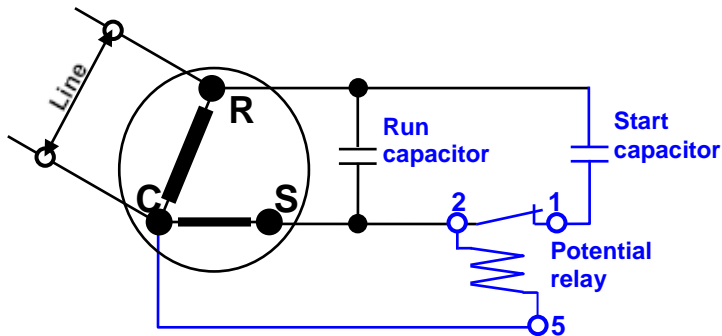
3 Approved start components for Scroll compressors

The approved start components listed below will substantially reduce the compressor start time, and the magnitude plus duration of both dimming lights and conduit buzzing.

4 Start kits: start capacitor and potential relay

Start capacitors are used on compressors where system designs require **high starting torque**.

Compressor model	Start kit = start capacitor & relay	Start capacitor			Potential relay			
	Part no.	µFD	Volts	Part no.	Pick-up volts	Drop-out volts	Coil voltage	Part no.
ZR18K*E to ZR48K3E-PFJ	8541078	88 - 106	330	8562346	170 - 180	40 - 96	332	8556665
ZRD42KCE								
ZP23 to 41K3E-PFJ								
ZP16 to 54KSE-PFZ								
ZPD42KSE-PFZ, ZPD54KSE-PFZ								
ZS09KAE-PFJ, ZS11K4E-PFJ								
ZB15 to 29KCE-PFJ								
ZBD21 to 29KCE-PFJ								
ZH12K4E-PFZ								
ZH15 to 26K4E-PFJ								
ZH09KVE-PFZ								
ZH04 to 12K1P-PFZ								
ZHI05 to 11K1P-PFZ								
ZS13KAE-PFJ								
ZH13KVE-PFJ	8408175	175 - 216	330	8562664	170 - 180	40 - 96	332	8556665
ZR61KCE-PFZ	8560760	270 - 234	330	8556541	320 - 340	60-135	452	8560759
ZB30 to 38KCE-PFJ								
ZH38K4E-PFZ								
ZB42KCE-PFJ	8542526	270 - 234	330	8556541	320 - 340	60 - 160	502	8556654
ZH30K4E-PFJ								

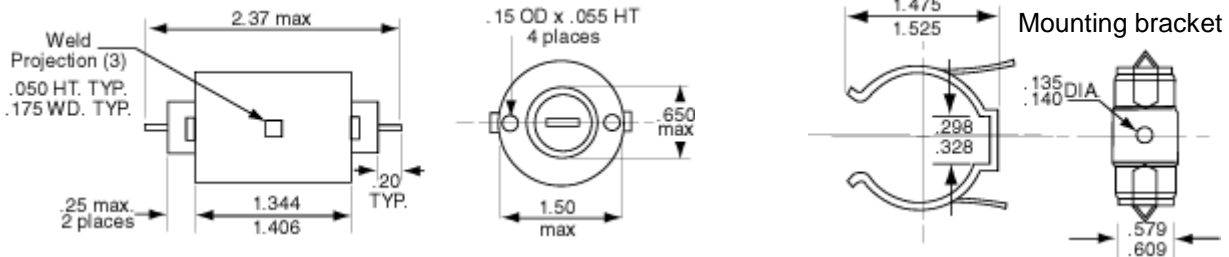


The potential relay places the start capacitor in series with the start winding. It senses the voltage developed across the start winding (C-S). It is designed to pick up, open its contacts and disconnect the start capacitor from the start winding, when sufficient voltage is generated. The relay will open when the motor has started and is approaching normal running speed.

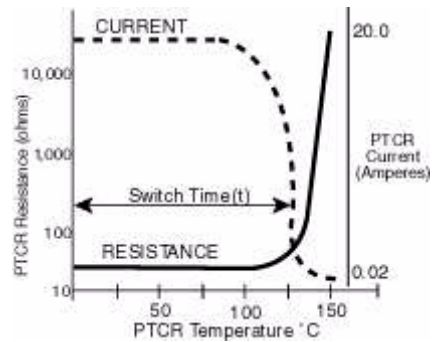
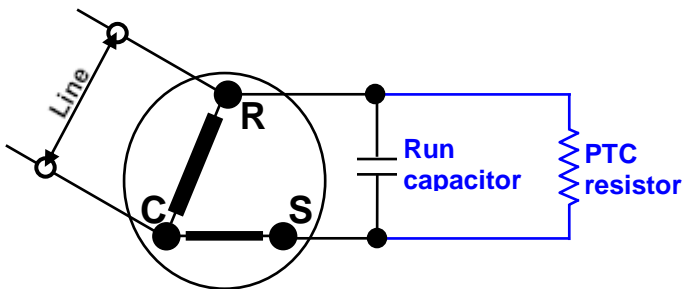
5 PTC start components

For **less severe** voltage drops or for use with a compressor that hesitates on start, solid state **Positive Temperature Coefficient** resistance rated at 25 Ohms (P/N 8400057 including the mounting bracket) may be used to facilitate the starting process for any of the compressors listed above.

Dimensions of the PTC and its mounting bracket (inches)

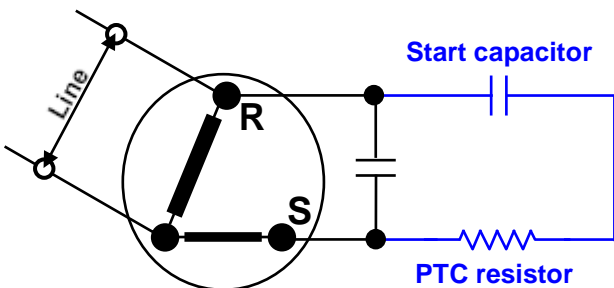


The PTC resistor is connected in parallel with the run capacitor.



6 PTC start components + start capacitor

If it is found that the compressor fails to start with the PTC device, a start capacitor (as specified above) may be fitted in series with the PTC device.



7 CSS-255 Smart Starter from Alco Controls

The CSS Smart Starter from Alco has been released by Emerson to be used with Copeland Scroll single-phase compressors in order to limit the starting current of those compressors.

Click on the following link to find more information about the Alco CSS-255 Smart Starter: http://www.emersonclimate.com/europe/ProductDocuments/AlcoLiterature/EN_CSS%20TB.pdf.

Appendix: Run capacitors

Run capacitors are not included in the start kit, they can be ordered separately. Only run capacitors supplied by Emerson should be used.

Compressor model				Run capacitor		
				µFD	Volts	Part no.
ZR18K5E-PFJ		ZS09KAE-PFJ ZS11KAE-PFJ		30	370 V	8557191
		ZS13KAE-PFJ		35	370 V	8565209
ZR18K4E-PFJ			ZH12K4E-PFZ	35	475 V	8540575
ZR22K3E-PFJ	ZP24K5E-PFJ ZP24KSE-PFZ	ZB15KCE-PFJ	ZH04K1P-PFZ ZH05K1P-PFZ ZH15K4E-PFJ ZHI05K1P-PFZ	40	475 V	8540586
ZR28K3E-PFJ			ZH30K4E-PFJ	45	440 V	8557146
ZR28K3E-PFJ		ZB19KCE-PFJ	ZH06K1P-PFZ ZH19K4E-PFJ ZHI08K1P-PFZ	45	475 V	8540597
ZR61KCE-PFZ		ZB42KCE-PFJ	ZH38K4E-PFZ	50	440 V	8557157
ZR34K3E-PFJ		ZB21KCE-PFJ	ZH21K4E-PFJ	50	475 V	8540600
ZR40K3E-PFJ				55	475 V	8540611
		ZB29KCE-PFJ ZB30KCE-PFJ	ZH26K4E-PFJ	60	440 V	8557179
ZR48K3E-PFJ ZRD42KCE-PFJ	ZP29K5E-PFJ ZP29KSE-PFZ ZP31K5E-PFJ ZP31KSE-PFZ ZPD34KSE-PFZ	ZB26KCE-PFJ ZBD21KCE-PFJ	ZH09KVE-PFZ ZH13KVE-PFJ	60	475 V	8540622
ZRD48KCE-PFZ	ZP36K5E-PFJ ZP36KSE-PFZ ZP42K5E-PFJ ZP42KSE-PFZ ZPD42KSE-PFZ ZPD54KSE-PFZ		ZH09K1P-PFZ ZH12K1P-PFZ ZHI11K1P-PFZ	80	370 V	8557180
	ZP54K5E-PFJ ZP54KSE-PFZ ZPD61KCE-PFZ	ZB38KCE-PFJ		80	440 V	8402508