

# FRANKLIN AID



Franklin Electric



Franklin Application/Installation Data (AID) ... For The Professional Driller-Installer

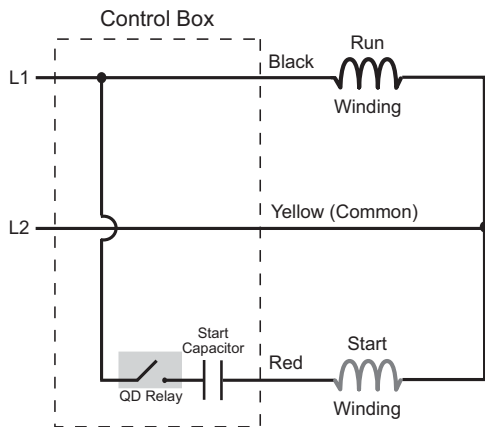
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## CSIR vs. CSCR: What's the Difference?

If you've heard the terms "CSIR" and "CSCR" and wondered what they mean, you're not alone. This is a common question, and the answer may have a significant effect on how your motor runs, depending on its size and application.

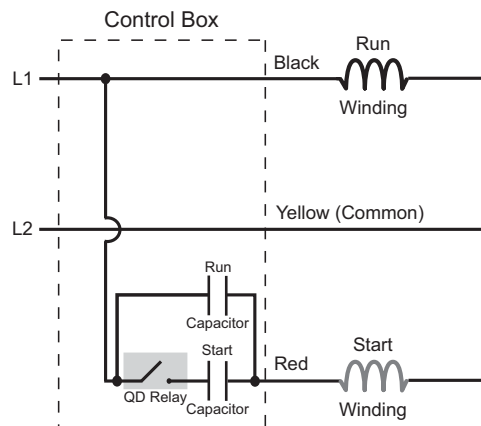
Franklin Electric manufactures 2 types of single-phase, 3-wire submersible motor systems: capacitor-start/induction-run (CSIR) and capacitor start/capacitor run (CSCR). Actually, both systems use the same induction-run motor design. The difference, however, is evident in the control box.

The control box in a capacitor-start/induction-run (CSIR) system contains a relay and a start capacitor. The start capacitor is connected to the start winding in the motor (the red lead). The motor starts using both windings, but as the motor in the CSIR system comes up to speed, the relay removes the start winding from the circuit. This happens in about one-third of a second, and the motor then runs on the run winding alone with no capacitor. This is why the current in the red lead of a CSIR motor will be zero after the motor has started.



**CSIR System**

The control box in a capacitor start/capacitor run (CSCR) system has 3 components: a relay, a start capacitor, and a run capacitor. The start capacitor is black, and the run capacitor is generally gray or silver. Prior to the motor's start, both the start and run capacitors are connected to the start winding. Once again, the motor in the CSCR system reaches operating speed in about one-third of a second. And once again, the start capacitor is removed from the circuit, just as in the CSIR motor. In this case, however, the run capacitor and the start winding remain in the circuit, and the motor runs using both windings.

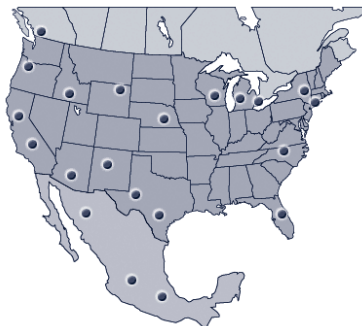


**CSCR System**

The result is that motors in CSCR systems are slightly more efficient, tend to have slightly higher starting torque, and tend to run slightly smoother than motors in CSIR systems. In smaller horsepower ratings (1 Hp or below),

## 2002 Seminar Schedule Now Available!

Franklin Electric is pleased to announce its annual fall seminar schedule. This year, 21 seminars will be held across the United States, Canada, and Mexico. Each seminar will cover both single- and three-phase motors, and will address topics from basic electricity to installation to troubleshooting, with additional highlights on our new SubDrive75. You may even qualify for continuing education credit.



If you have not yet received your schedule in the mail, call our **Submersible Service Hotline at 1-800-348-2420** to order your free copy. Or better yet, visit us online at [www.franklin-electric.com](http://www.franklin-electric.com) for dates, locations, and instant registration. Remember, these sessions are available at no cost to you, and lunch and refreshments are even included. We hope you will be able to join us this fall for a day *well* spent!

the differences are usually not enough to be significant.

In larger ratings, the advantages of the run capacitor become more significant, and all Franklin single-phase 3-wire motors 1½ Hp and above are CSCR systems. That is, their control boxes all have one or more start and run capacitors. Since the run winding remains in the circuit of a CSCR motor after starting, there will always be current in the red (start winding) lead. Values can be found on page 13 of Franklin's Application-Installation-Maintenance (AIM) Manual, August 2000 edition.

For 1 Hp and below, the standard configuration of Franklin single-phase 3-wire motor systems is CSIR. That is, there is no run capacitor in the control box. However, in some cases, there may be a need to convert these installations to a CSCR configuration. Long-running applications such as fountains and aerators are the most common examples. Since many of these installations run continuously, every percentage point of efficiency may be important.

These systems can easily be converted into a CSCR configuration using Franklin's CRC Box, or "Capacitor Run Control" Box. The CRC Box



QD Control Box  
(No Run Capacitor)  
For CSIR Systems



CRC Control Box  
(With Run Capacitor)  
For CSCR Systems

comes in the familiar QD Box configuration, so reconfiguration becomes a simple matter of removing the standard QD lid and replacing it with the CRC lid. The CRC Box is available in 230V ratings, ½ Hp, ¾ Hp and 1 Hp.

In case you're wondering where Franklin 2-wire motors fit in, they too are induction-run motors, and have both a start and a run winding. However, these motors do not use capacitors, and therefore have no need for a control box. Instead, there is a switch inside the motor (the BIAC switch) that removes the start winding from the circuit on start-up, just like the 3-wire capacitor-start, induction-run motor.

The bottom line is that, although there are differences, each of these single-phase motors is more alike than different. If you want to know more about the CRC Box or have other installation questions, contact our Submersible Service Hotline. Our Headquarters Service Engineers are available by telephone at 800.348.2420, or by e-mail at [hotline@fele.com](mailto:hotline@fele.com). You may also visit our web site at [www.franklin-electric.com](http://www.franklin-electric.com) to view our online AIM manual and other product and service information.

## Getting to Know Your Field Service Team: Ken Martin



Backed by nearly 35 years of experience at Franklin Electric, Ken Martin stands ready to answer your technical questions as a Franklin Submersible Hotline Engineer.

Particularly well-versed in motor construction and motor operation, Ken's 30 years as a technician in the Engineering Laboratory have provided

him a tremendous opportunity to understand and gauge the performance of submersible motors. Using this experience,

Ken has answered Hotline inquiries for the last 4 years.

From the electrical function of a motor to its mechanical operation, Ken can help resolve your problem.

Home for Ken and his wife Linda is a farm near Franklin's corporate offices in Bluffton, Indiana. Very proud of his 5 children, one of whom is also a Franklin employee, Ken is even quicker to beam about his 3 grandsons (a fourth grandchild is due near the end of the year). Ken's favorite pastime is competing in tractor pulling contests where he frequently finishes "in the money." Contact Ken on the Hotline at 800-348-2420 or by e-mail at [kmartin@fele.com](mailto:kmartin@fele.com).

## TOLL-FREE HELP FROM A FRIEND

Phone Franklin's toll-free SERVICE HOTLINE for answers to your installation questions on submersible pump motors. When you call, a Franklin expert will offer assistance in troubleshooting submersible systems and provide immediate answers to your motor application questions.

Franklin Electric SERVICE HOTLINE 800-348-2420 FAX 260-827-5102  
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