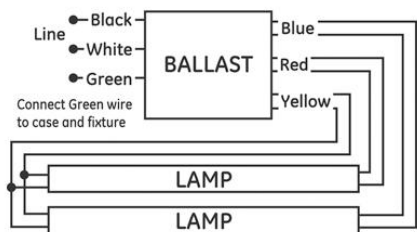


## Lamp Holders with T12 and T8 Instant Start and Rapid Start or Programmed Start Ballasts

T12 ballasts for 2-4ft 2-pin lamps are rapid start ballasts. They provide voltage to the lamp cathodes during starting that heats the cathodes prior to the ballast applying an open circuit voltage (OCV) to start the lamp. This is referred to as a “soft-start” to the lamp and is good for maintaining longer lamp life in frequent switching applications. The lamps have 2-pin bases on each side of the lamp.

T12 ballasts for 4 through 8ft single pin lamps are instant start ballasts. They do not apply voltage to the cathodes during starting and therefore need to apply a higher OCV to the lamp in order to start the lamp. Please see wiring diagram below for a typical T12 rapid start two-lamp ballast. Please note that each lamp base has two wires going to each end of the lamp to provide the rapid start; “soft-start” of the lamp.

### Rapid Start Diagram



### Rapid Start Lamp Holder

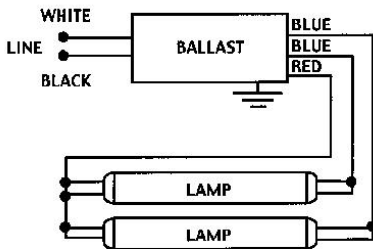


As the lighting industry went to T8 lamps with electronic ballasts the primary ballast that was used was an instant start ballast. T8 lamps have the same 2-pin bases as their T12 counterpart lamps. These lamps can be instant started or rapid/ programmed started. The difference in wiring between T8 instant start and T12 rapid start is that an instant start only requires one wire from the ballast to each end of the lamp. However, the lamp holder for T8 instant must be “shunted”.

Shunted is where the lamp holder bridges the contacts of each lamp pin together. There were two primary ways to achieve the shunted effect. During retrofits of T12 fixtures many electricians would cut the two wires coming out of a rapid start lamp holder and wire nut the two wires together to effectively “shunt” the socket. This method did not require the fixture to have new lamp holders when changing from T12 lamps to T8 lamps with instant start ballasts. If an electrician did not shunt the wires of the lamp holder together then the ballast was not able to apply current to both sides of the lamp cathode and the arc within the lamp most likely followed the path of least resistant and established the hot point of the cathode not at the center of the cathode as intended but, closer to the ends of the cathode where the cathode support wires crimp on to the cathode. By not shunting the wires of the lamp holder this effectively resulted in much shorter lamp life.

The other option was to buy a new fixture that came with dedicated lamp holders that were shunted internally within the lamp holder. Electricians may have also purchased new shunted instant start lamp holders for retrofits to make the job easier. Physically a shunted socket instant start socket and a rapid start socket look very similar. However, the shunted socket typically is marked with an “S” on the socket.

**Instart Start Diagram**

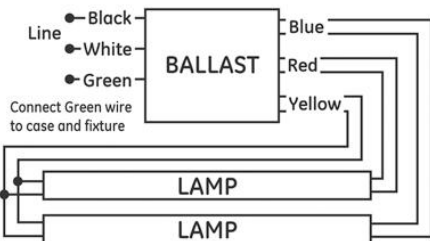


**Shunted Instant Start Lamp Holder**



As ballasts have become more energy efficient, optical sensors have been developed and are being used in more applications. In addition, programmed start T8 ballasts are required in frequent switch applications in order to maintain lamp life and the product warranty. If a fixture was retrofitted from T12 to T8 and lamp holders were shunted by connecting the wires with a wire nut, than new sockets are not needed when going from instant start to programmed start ballasts. If new fixtures were installed with shunted “S” type sockets, then the lamp holders must be replaced with rapid start sockets to use a programmed start ballast. If instant start shunted sockets are used with programmed start ballasts than the ballast will instant start the lamp and not provide the intended “soft-start” to the lamp and effectively shorten lamp life and void product warranties. Incorrect application of lampholders voids the lamp and ballast warranties because they result in shortened lamp and ballast life. See NEMA.org LSD 29-2005 for more details.

**Rapid/Programmed Start Diagram  
(same as T12 rapid start above)**



**Rapid Start Lamp Holder  
(same as T12 rapid start above)**

