# CT-11: FPL ZERO-SEQUENCE SENSORS WITH LITTELFUSE RELAYS

Toroidal (Type T) zero-sequence sensors manufactured by Federal Pioneer Ltd. can be used with Littelfuse Startco ground-fault and motor-protection relays. Table 1 lists compatible FPL sensors and window sizes. These sensors can be used on resistance-grounded systems and on solidly grounded systems where the maximum ground-fault current is less than 50 kA.

| FPL CATALOG NUMBER | WINDOW SIZE | |
| --- | --- | --- |
| | INCHES | MM |
| T2A | 1-7/8 | 48 |
| T3A | 2-3/4 | 70 |
| T6A/T6A-S | 5-3/4 | 146 |
| T9A | 8-3/4 | 222 |

TABLE 1

When using an FPL sensor with the SE-701 Ground-Fault Monitor, the CT-primary rating is 50 A. The SE-701 set-point range is 1 to 99% in 1% increments, which corresponds to 0.5 to 49.5 A in 0.5-A steps. If the ground-fault current can exceed 400 A, a voltage-clamping device must be used as shown in Fig. 1. An SE-EFVC is recommended for these applications.
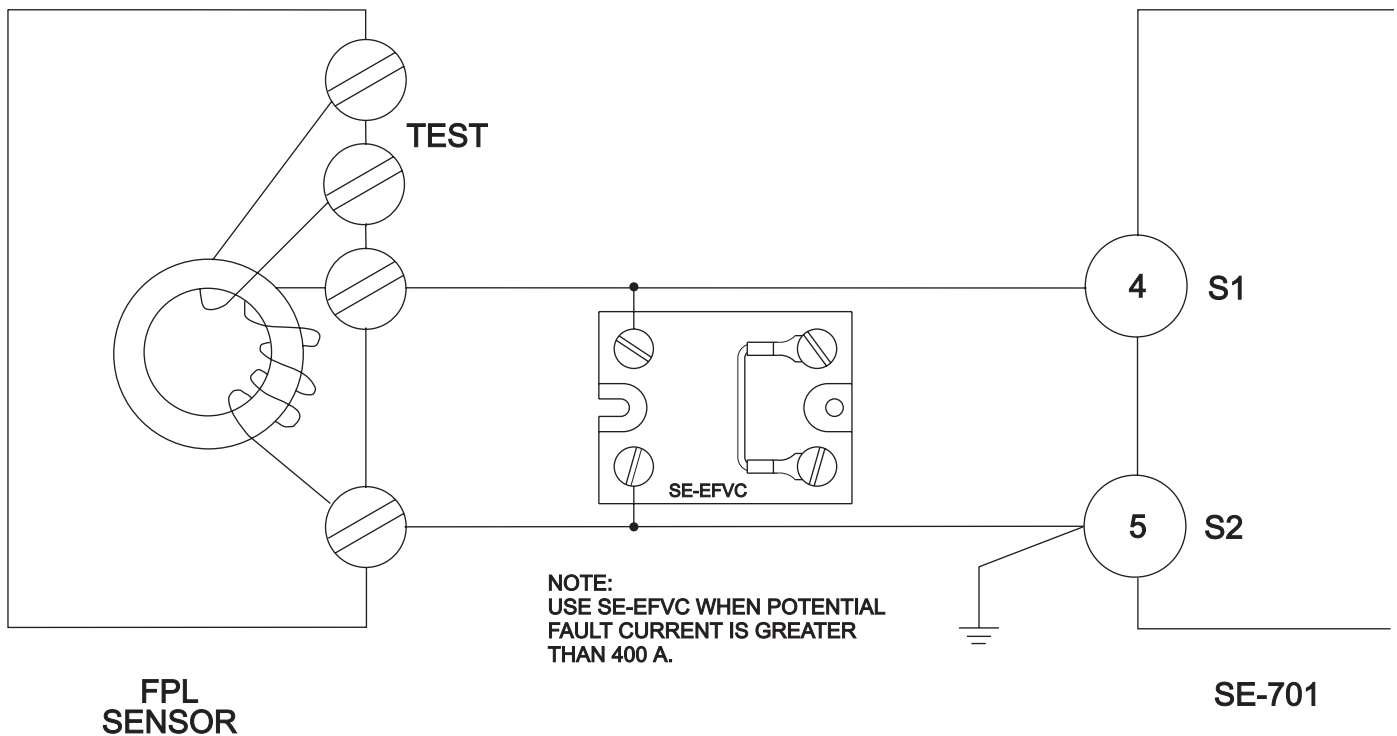


FIGURE 1. Connection Diagram for SE-701.

## FPL ZERO-SEQUENCE SENSORS WITH LITTELFUSE RELAYS

When using an FPL sensor with an FPS, FPU-32, MPS, or MPU-32, the earth-fault CT-primary rating should be set to 50 A. This will provide correct earth-leakage metering information and trip levels. The set-point range is 1 to 100% in 1% increments, which corresponds to 0.5 to 50 A in 0.5-A steps. For the MPS, the set-point range is 5 to 100% in 1% increments, which corresponds to 2.5 to 50 A in 0.5-A increments.

If the earth-fault current can exceed 200 A, a voltage-clamping device must be used. An SE-EFVC is recommended for these applications, as shown in Figs. 2, 3a, and 3b.
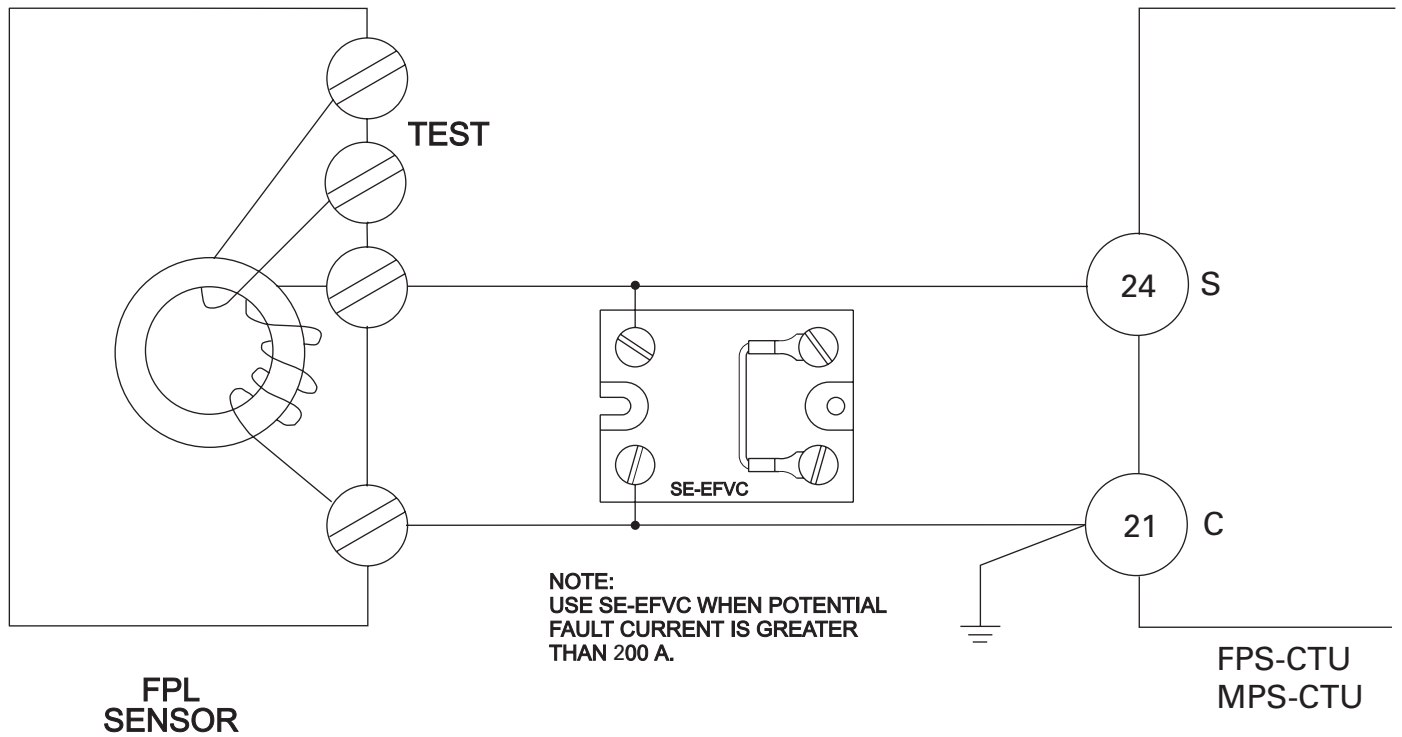


FIGURE 2. Connection Diagram for FPS or MPS.
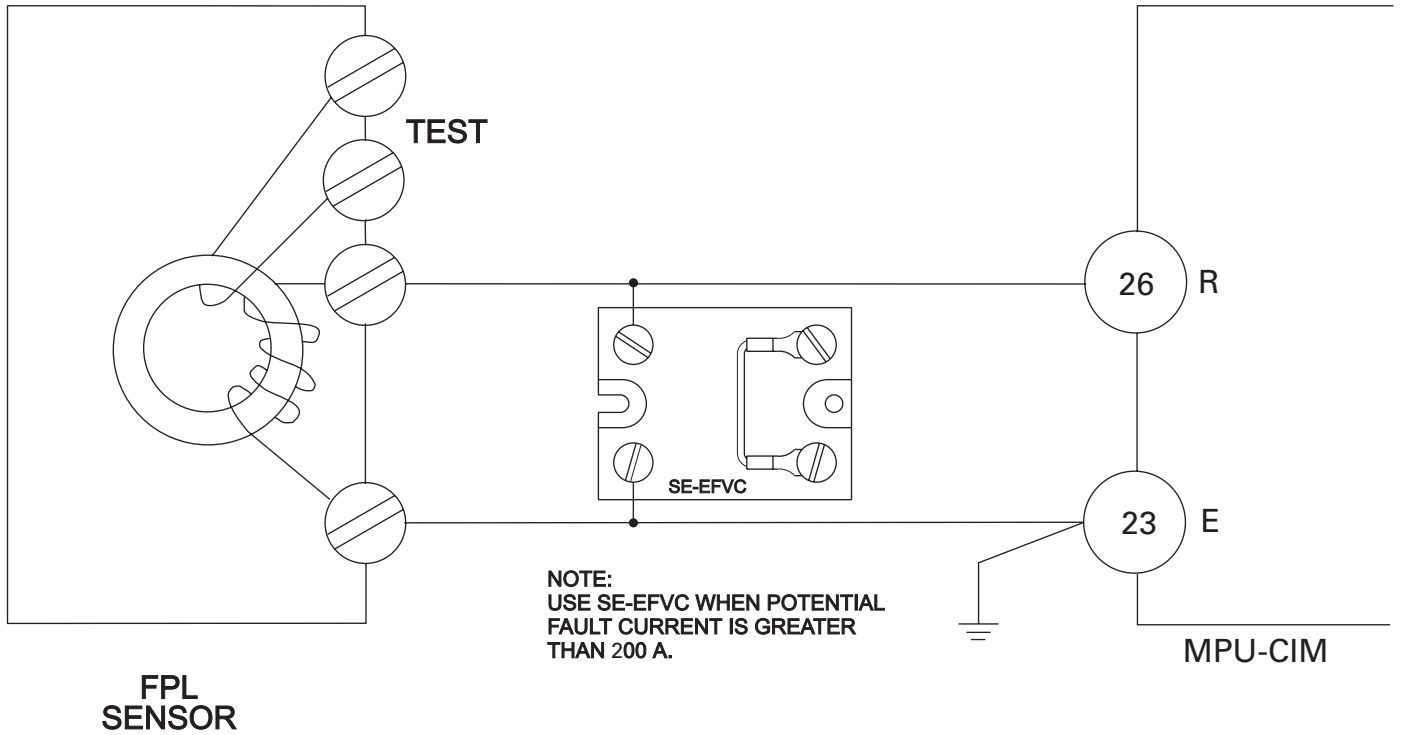
## CT-11: FPL ZERO-SEQUENCE SENSORS WITH LITTELFUSE RELAYS



TEST

SE-EFVC

26 R

23 E

NOTE:
USE SE-EFVC WHEN POTENTIAL
FAULT CURRENT IS GREATER
THAN 200 A.

MPU-CIM

FPL
SENSOR

FIGURE 3a. Connection Diagram for FPU-32 or MPU-32 with MPU-CIM.



TEST

SE-EFVC

22 EF

21

NOTE:
USE SE-EFVC WHEN POTENTIAL
FAULT CURRENT IS GREATER
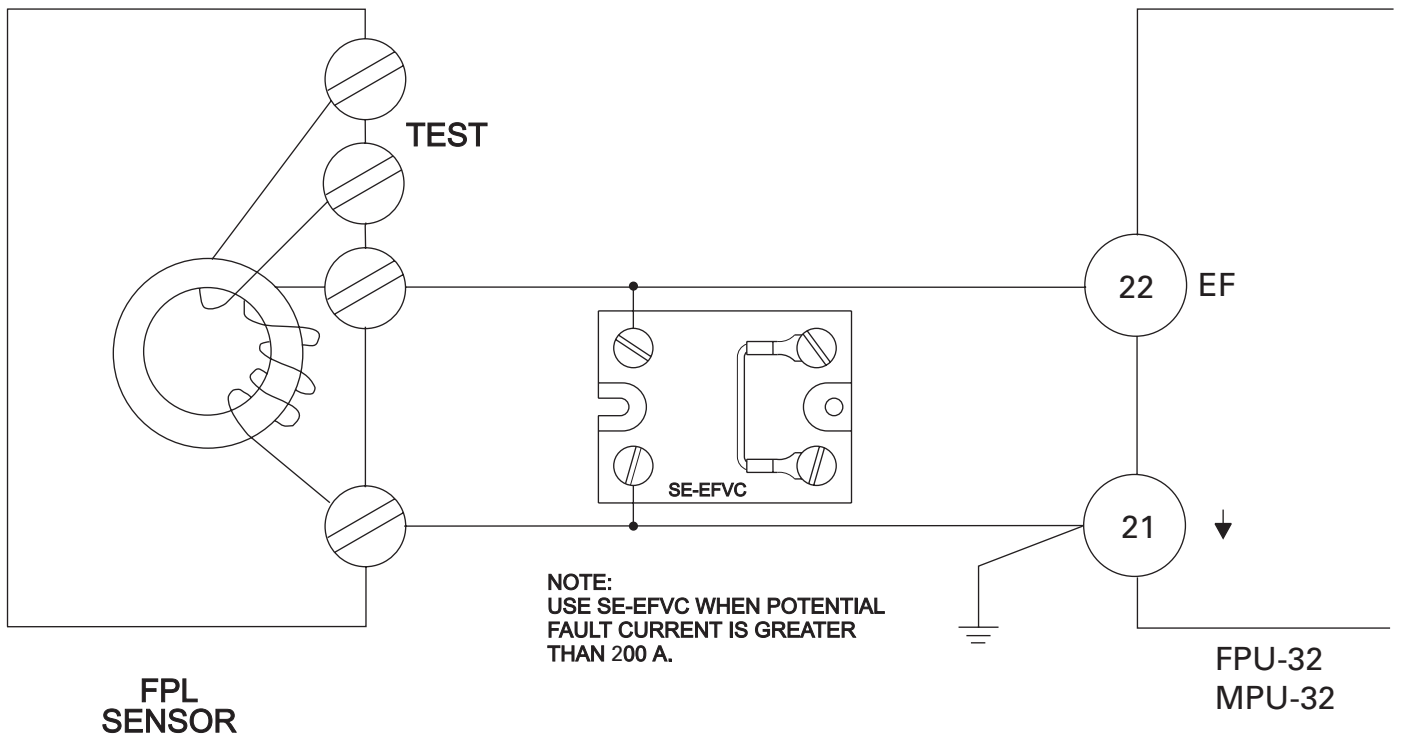THAN 200 A.

FPU-32
MPU-32

FPL
SENSOR

FIGURE 3b. Connection Diagram for FPU-32 or MPU-32 without MPU-CIM.