



# ZSP20K User Manual

## Description

The ZSP20K is designed to protect telephone, modem and DSL lines against high-energy transients like lightning. The ZSP20K consists of three stages of surge protection, and provides both line-to-line and line-to-ground protection.

### Stage 1:

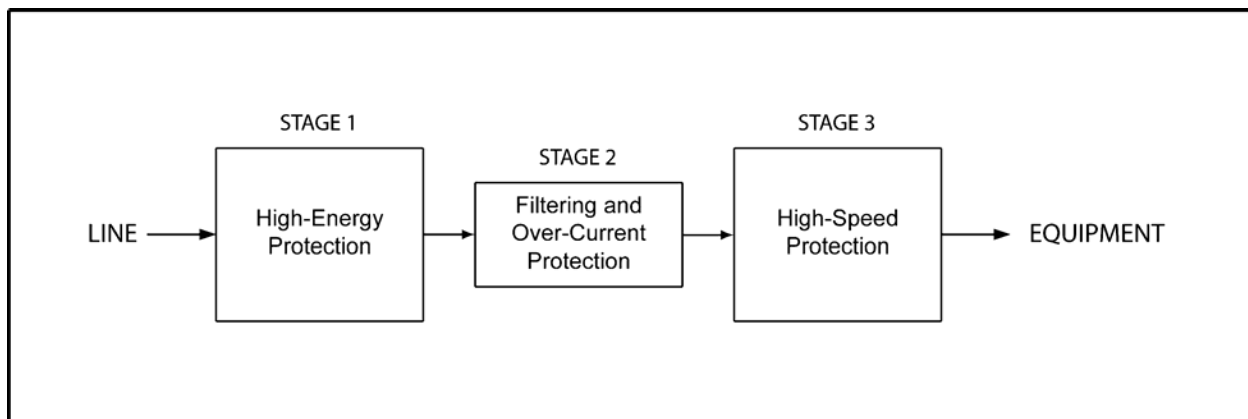
The first stage provides 3 types of high-energy voltage clamping protection. In the event that a surge exceeds the specified ratings, the primary stage will fail in a short-circuit state to ground to protect the down-stream electronics.

### Stage 2:

The second stage provides additional transient attenuation and over-current protection.

### Stage 3:

The third stage provides ultra high-speed voltage clamping to ensure that no harmful transients are passed beyond the ZSP20K.



ZSP20K BLOCK DIAGRAM

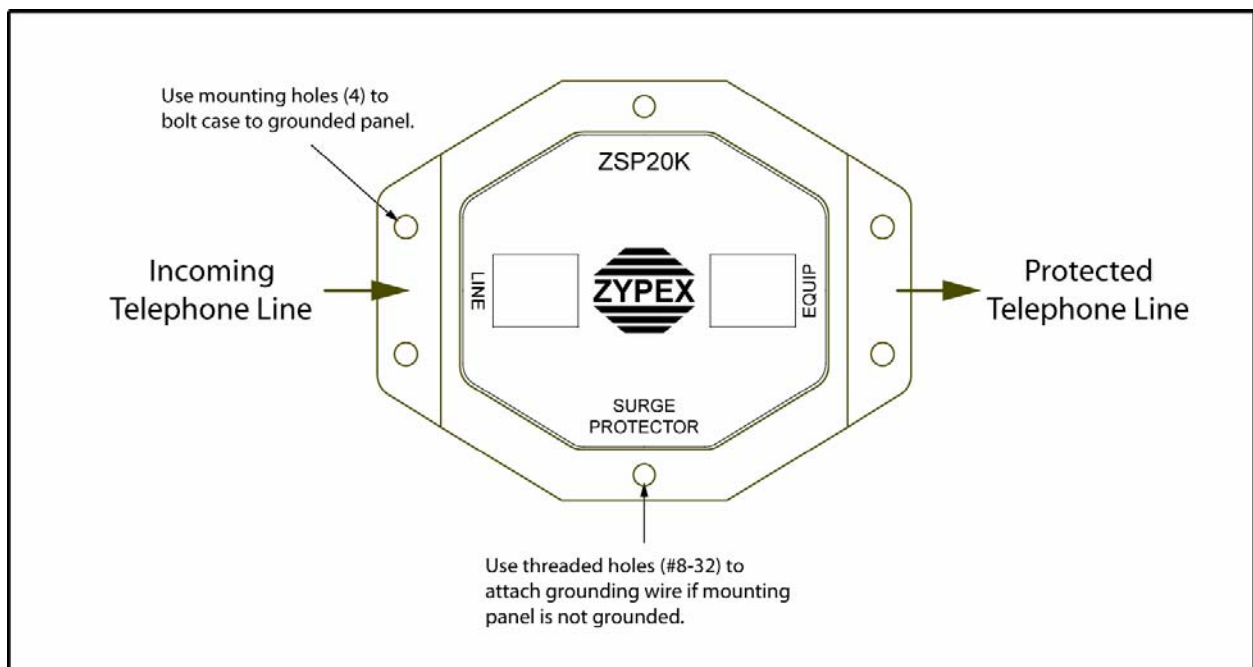
## Mounting

The most important mounting consideration is a good connection to earth ground. The ZSP20K's case is specially designed to provide the internal electronics with a very low impedance connection to ground by bolting the case to a panel that has a good earth ground.

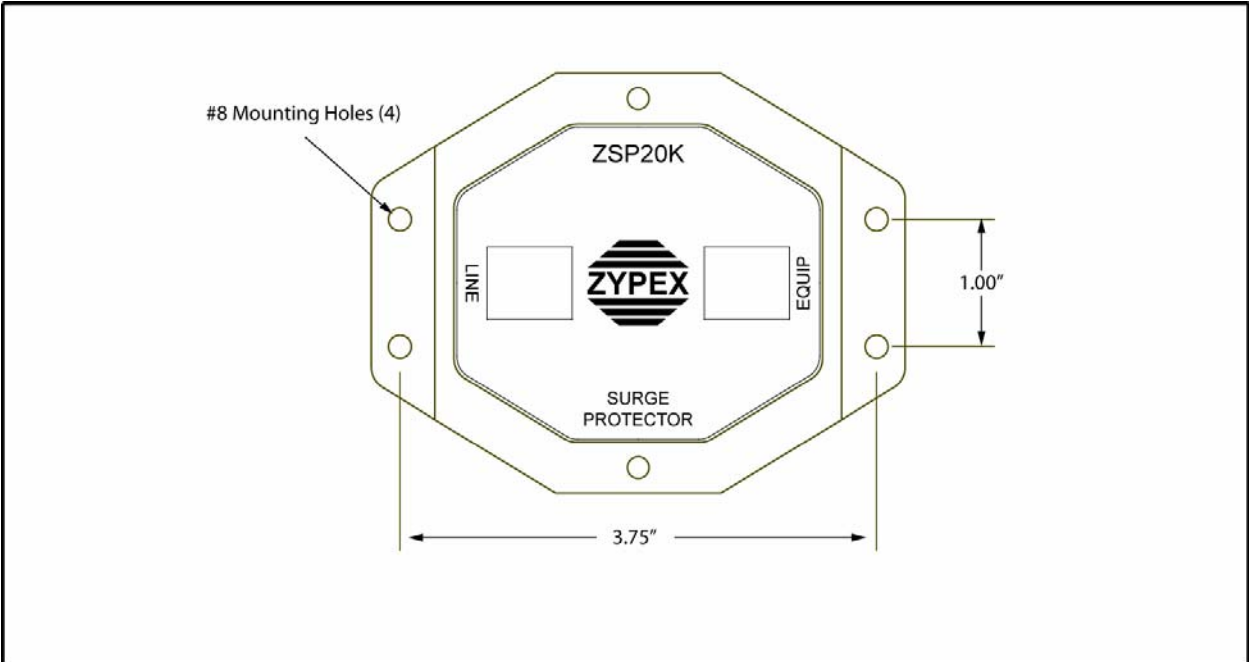
If the mounting panel does not have a good connection to earth ground, two tapped mounting holes (#8-32) are provided for the attachment of a ground wire. Use 12 gauge wire or better (bigger wire, smaller gauge number). Do NOT use more than one ground wire. A single connection to earth ground is important, and the grounding wire should be as short as possible.

The ZSP20K's effectiveness is limited only by its connection to earth ground. When properly installed, the ZSP20K will filter out virtually all harmful electrical transients.

It is not possible to have a connection to earth ground that is "too good"!



ZSP20K Installation



ZSP20K Mounting

## Ratings

| Characteristic             | Condition           | Rating            |
|----------------------------|---------------------|-------------------|
| Number of pairs protected  | 1 pair (2 wires)    |                   |
| Clamping Voltage           | Typical             | 330 V             |
| Capacitance Line to Line   | 1 MHz               | 82 pF (typical)   |
| Capacitance Line to Ground | 1 MHz               | 82 pF (typical)   |
| DC Breakdown               | 100 – 2000 V/s      | 300 to 400 V      |
| AC Breakdown               | 60 Hz               | 300 to 400 V      |
| Impulse Breakdown          | 100 V/us            | 600 V             |
|                            | 1000 V/us           | 650 V             |
| Impulse Life               | 100A, 10/1000 us    | > 3000 operations |
|                            | 300A, 10/1000 us    | > 1000 operations |
|                            | 500A, 10/1000 us    | > 1000 operations |
|                            | 2000A, 10/250 us    | > 100 operations  |
|                            | 5000A, 20/100 us    | > 10 operations   |
|                            | 20000A, 8/20 us     | > 10 operations   |
| AC Life                    | 0.5A rms continuous | > 30 seconds      |
|                            | 1A rms, 1 s         | > 60 operations   |
|                            | 10A rms, 1 s        | > 20 operations   |
|                            | 65A rms, 11 cycles  | > 1 operation     |
|                            | 120A rms, 0.1 s     | 1 operation       |
|                            | 200A rms, 11 cycles | 1 operation       |
| Fail-Short                 | Continuous          | > 30 A rms        |
| Operating Temperature      |                     | -40° to +85°C     |