PURPOSE OF THE 3 PIN GROUND POWER UNIT CONNECTOR IN AIRCRAFT

Aircraftplugs® 6 PIN 400 HZ Technical instructions

The purpose of the 3 pin ground power unit connector in aircraft, why the third pin is short in length than the other two and is it positive or negative ?
The two positive pins are shorted together. The smallest pin is limited to 100 W. There are two larger pins that carry DC power and one shorter pin.
It allows the device to be plugged in, the power connections made, and then the power turned on as the connector is inserted. It also allows the power to be disconnected prior to the larger power pins clearing the connector.

The shorter smaller positive pin, does a few things:

1. Control of the power can be logic level and some can be disconnected for power management.
2. It removes ignition sources such as sparks. Connection is made before power is supplied.
3. Increases the reliability of the connectors.
4. The connectors are not powered at all times.
5. A power limited switch (the two pins) can be only low voltage. For instance 5V at 20 mA which cannot draw appriciable power.
6. It makes a polarity protection.

The terminology is sometimes called "hot-swap".

because power is disconnected during the removal process. No sparks fly in the process and no connectors are damaged.

Typically 3 pin aircraft ground power connectors use two circuits to prevent arcing when the pins are plugged into the sockets.
Two larger pins provide power and ground for the main high voltage circuit. The shorter third pin powers a low amperage circuit that energises a solenoid to close the high amperage circuit after the longer pins have first been partially inserted into their sockets. The low amperage circuit makes use of the aicraft electrical systems common ground and therefore needs only one pin for power. All three pins are silver plated to avoid arcing aswell.