



Creating *Healthy* Living Spaces



Demand Switch NEFA20 Plus

Installation Guide

Please read this entire guide before beginning the installation!



Supplied Parts



NEFA20 Plus



Protective Covers



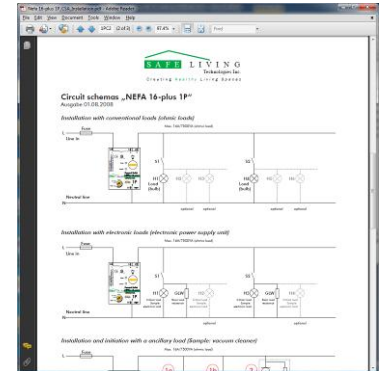
DIN Mounting Rail



Mounting Rail Spacer



Warning Stickers



Wiring Diagram
Documentation

Additional Parts - Supplied by your installer

- 10"x10" Electrical Enclosure "D" Type
- Conduit to Main Electrical Panel
- Mounting Hardware

Accessories - Supplied by Safe Living Technologies

- **Monitoring Light** - An ultra low current light installed into a receptacle of the controlled circuit that turns off and on in sync with the switch
- **Constant Load Resistor** – Supplies a constant resistive load to a device which has an inductive, non-linear load such as low voltage, transformer based lighting systems.



Typical Installation:
Assembled View

Theory of Operation:

AC Electric Fields are produced by the presence of electricity. Their strength is determined by voltage; the higher the voltage, the stronger the field. AC Electric Fields are radiated from live electrical wires and generally travel 6-8 feet from the source, but in some cases further. An electric field will exist even when a device is not in use (turned off). In other words, these sources produce a continual emission. AC Electric Fields have a natural attraction to ground and are considered low frequency electromagnetic radiation. (5 Hz – 400,000 Hz).

The Demand Switch was designed to eliminate the radiation of AC electric fields on a single branch circuit at the source of the problem, the main electrical panel (MEP). Controlled circuits typically include the sleeping area and adjacent living spaces. The Demand Switch works by automatically shutting off the power at the MEP, when there is no demand for it. Each demand switch controls a single branch circuit or

single circuit breaker and switches the hot/black wire on and off. The Automatic Demand Switch continually monitors the power requirements of an individual branch circuit and automatically restores power when necessary. This automatic switching is load or current dependent. The demand switch is rated for 20 Amps AC and is compatible with standard and arc fault circuit breakers.

Note: The Demand Switch simply interrupts the hot wire and switches it off and on. The switching is load dependent.

The demand switch has 2 modes of operation **Protection mode** and **Normal mode**. Protection mode means the 120 VAC will be switched off, thus protecting you from AC Electric Field exposure. Normal mode operation means the 120 VAC will be left on as in normal line conditions.

The front of the demand switch has 3 important items, the control lights **Net** and **Load**, the **On/Off Switch** and the load **Current Adjustment Potentiometer**.

The **Net** LED will illuminate green when power is applied to the device. The **Load** LED will illuminate green when the demand switch is in “protection mode”. In this mode the switch supplies a 9 VDC monitoring voltage to the circuit. The **Load** LED will illuminate red when the demand switch is in “normal mode” and supply 120VAC to the circuit. Think of it as green is good, and red is a warning.

The yellow **On/Off Switch** located on the front of the demand switch will physically toggle up and down as the demand switch changes modes. You will hear a gentle clicking noise as it automatically changes position. Up is “normal mode” where the load LED is red and down is “protection mode” where the load LED is green.

The **Current Adjustment Potentiometer** is used to set the desired level of trigger current to control mode changes. The level is adjustable from 0 mA to 100 mA and can be adjusted with a fine slot screwdriver. When the circuit draws more current than the level of current set on the current adjustment potentiometer, the demand switch will be in “normal mode” supplying 120 VAC to the circuit. When the circuit draws less current than the level set on the current adjustment potentiometer, the demand switch will be in “protection mode” switching off the 120VAC. A black dot beside the dial marks the **Default Position** and is recommended as the standard setting. The automatic feature of the demand switch can be bypassed when the potentiometer is turned completely counter clockwise, to the 0 mA position. When in this position the demand switch can be controlled manually by moving the toggle switch up or down. Please be gentle when rotating the dial.

Limitations:

The demand switch is designed for bedroom circuits with 120 volt lighting systems such as incandescent and halogen. Transformer based lighting systems will impede the automatic “Turn ON” function of the demand switch because of their non-linear load characteristics. To achieve a low EMF environment, the use of transformer based lighting systems is not recommended. However if change or removal is not possible then a constant load resistor can be installed across one of the lights or switches which will allow proper function. This would also apply to dimmer switches and compact fluorescent bulbs “CFL’s”. This resistor should be installed on the load side of the light switch thus creating a constant resistive, linear load that the demand switch will recognize. See installation schematics for details on installation.

Other considerations are devices that create a phantom load. A phantom load occurs when a device always draws current even when it is turned off. Some examples are Alarm Clocks, TV’s, DVD Players, Stereo Equipment, portable music players and power adapters / charging units.

Items/appliances which can disrupt automatic function when installed on the controlled circuit

Smoke Detectors , Door Bell transformers, TV, VCR, Alarm Clock, Dirty Electricity Filters, Some GFI Outlets, Electronic Ceiling Fans, Fluorescent lighting (transformer based), Low voltage lighting (transformer

based), Low voltage LED lighting, Compact fluorescent bulbs “CFL’s” (transformer based), Dimmer Switches, Electronic washing machines, Electronic Dish Washers, Refrigerators, Furnaces.

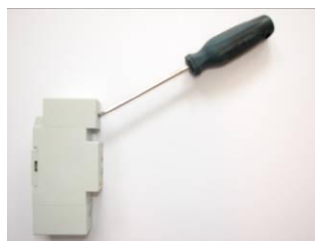
Installation Procedure:

Warning: To be installed by a Licensed Electrician and must conform to local electrical code!

- 1] Attach electrical enclosure to the breaker panel with conduit
- 2] Mount electrical enclosure onto the wall / backing board with 4 screws which may require the drilling of holes
- 3] Attach the mounting rail to the electrical box with 2 screws which may require the drilling of Holes



- 4] Ensure enclosure is properly grounded
- 5] Remove the Demand Switch from its packaging
- 6] Preparing the switch for wiring by removing its protective covers
- 7] Prepare the switch for mounting by **gently** removing the mounting rail spacer with a slot screw driver. The tab is spring loaded and will release the spacer when pressure is applied.
- 8] To attach the demand switch to the mounting rail hook the top of the demand switch onto the mounting rail and gently push the bottom of the switch onto the mounting rail until a click is heard. This indicates the switch is secured to the rail.
- 9] To remove a demands switch for maintenance purposes, a slot screw driver is required. Insert the screw driver into the spring loaded tab on the bottom of the switch and apply a **gentle** upward pressure with the screw driver forcing the spring latch to open. This will unlock the switch from the rail for removal.



- 10] If required, prepare the protective cover for protecting the wires by cutting or drilling out the end to allow wires to pass through

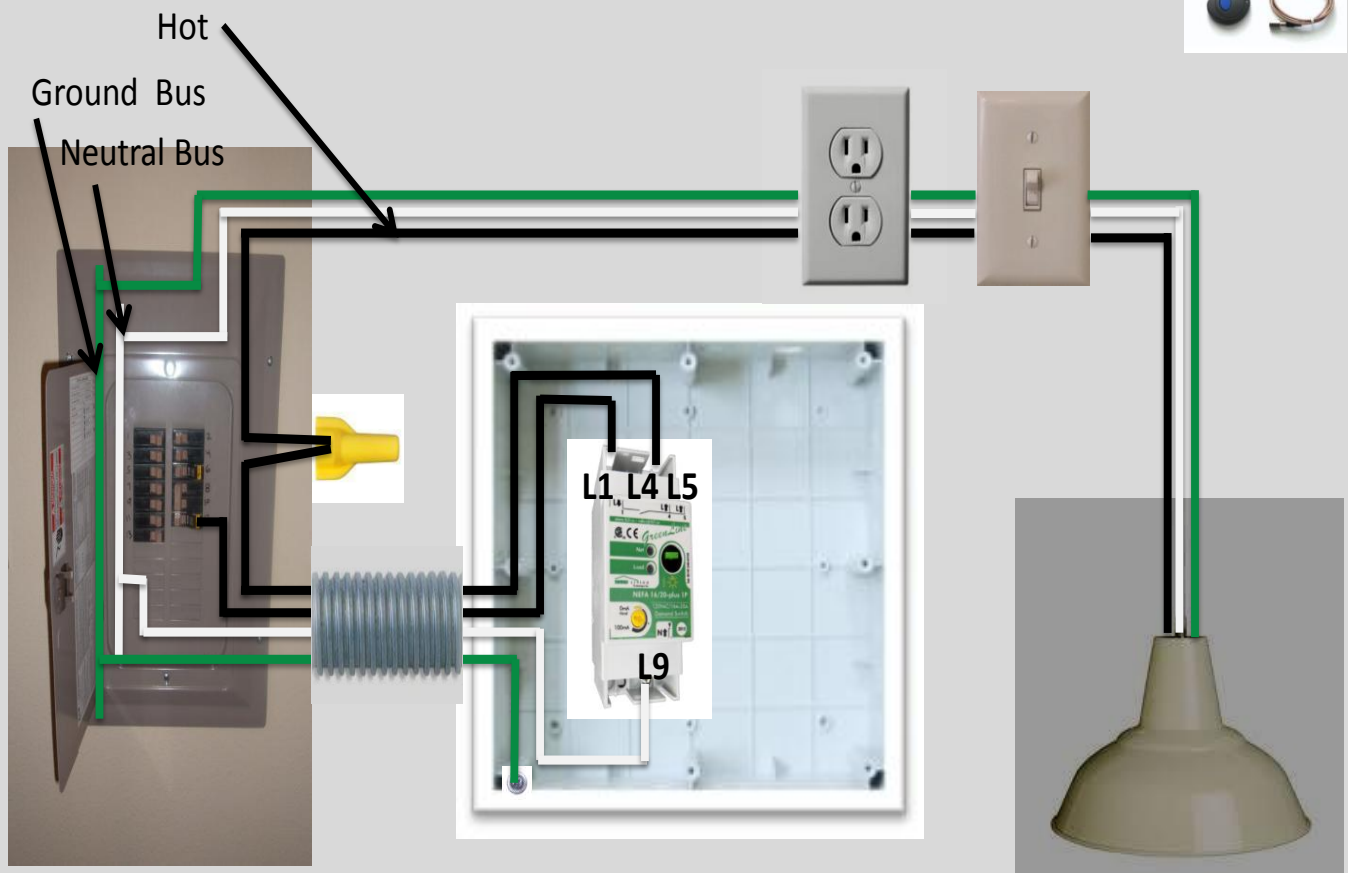


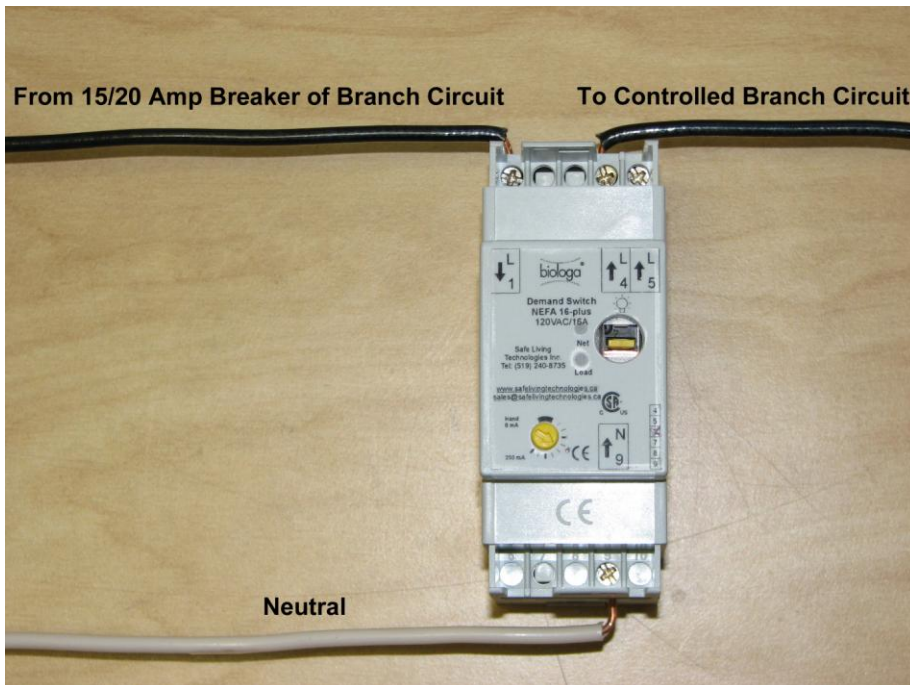
Wiring Connections

Connect pole **L1** of the Automatic Demand Switch to the breaker of the controlled branch circuit (Hot Input). Connect pole **L4** or **L5** of the Automatic Demand Switch to the controlled branch circuit (Hot Output). Connect the neutral to pole **L9** of the Demand Switch. L4 and L5 are connected internally and are intended to control only one 15 amp or one 20 amp circuit. The rating on the demand switch is 20 amps, if a fault occurs, the circuit breaker will trip before the demand switch,

Demand Switch Installation

Single Circuit Hookup





Initial Startup Procedure

- Label each demand switch with the number of the branch circuit it controls
- Attach the enclosed warning stickers to electrical enclosure clearly label the controlled circuits
- Mark the circuit breakers with warning stickers
- Ensure installation and wiring is correct and potentiometer is set to its default position
- Install one monitoring light in a visible receptacle on each demand switch controlled circuit. This will identify if a circuit is on or in protective mode
- Supply power by turning on branch circuit breaker
- Test the operation of the circuit by turning on/off the various loads of the circuit and observe the monitoring light for proper function
- To comply with local electrical code, an electrical inspection is recommended

Troubleshooting Automatic Demand Switch NEFA20 Plus:

1] If the demand switch is still not functioning as it should upon initial installation, chances are there is device installed on the circuit interfering with its operation. This is the problem in 99% of the cases. Please review limitation of the demand switch in the previous section. To resolve this problem, isolate the circuit in question by shutting off all other branch circuits. Trace the circuit by means of an AC electric field meter or a circuit tracing device to physically see where the circuit feeds. Inspect the circuit for any incompatible electrical devices or phantom loads. It can be surprising where the circuit actually feeds and can result in loads in unsuspected areas.

2] If the demand switch is still not functioning and you have exhausted your methods for physically tracing the circuit, then test the circuit for current flow. This can be done with a clamp-on Ammeter however most ammeters are not sensitive to detect small amounts of current in the milliamp range. A Fluke 189 multimeter and a fluke 80i-600A current clamp will do the job. This meter can measure AC current in the microAmp range. Ensure the demand switch is installed on the circuit in question. Connect the current clamp around the hot output wire off of L4 or L5 and energize the circuit and de-energize the circuit noting the difference in current flow. A constant draw of only 20mA's indicates a load is still present and is enough

to keep the demand switch turned on supplying 120VAC. If you do not have a sensitive ammeter, you will not be able to perform this test effectively.

3] If you suspect a problem with the demand switch, test the unit. Caution! This should only be conducted by a certified electrician. Set up a test location with a live 120VAC power source, test leads and a simple desk lamp with a 60 Watt incandescent bulb. The incandescent bulb will provide a proper resistive load.

Ensure the power is off! Connect L1 of the demand switch to the black hot wire and L9 to the white Neutral wire of the power supply. Connect the load or lamp to the Hot output, L4 or L5 and the Neutral to L9. Energize the circuit. This will simulate live conditions and will enable thorough testing of the device. The 60 Watt incandescent bulb will provide a load of 0.5 Amps, enough to energize the circuit when turned on. Turn on and off as desired.





Safe Living Technologies Inc.
7 Clair Road W, PO Box 27051
Guelph, ON
N1L 0A6
Canada
Tel - 519-240-8735

support@slt.co
www.slt.co