XP Power

# XPerts in Power – Module 12
# Output Protection

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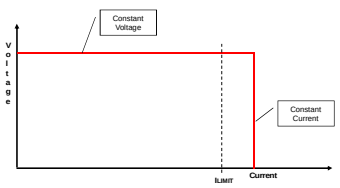
## Why do we need output protection?

- Protect the power supply from the customer's equipment
- Protect the customer's equipment from the power supply

**In most cases if the power supply suffers any single fault condition it WILL NOT damage the customer's equipment.**

## OUTPUT CURRENT - Constant current

Constant current limiting is to hold the output current at a specified value once the loading achieves a certain value. This scheme is mainly used for over current protection but it must be noted that in fault conditions the load sees a continuous high current.




Motor and lamp Applications (MHP series)

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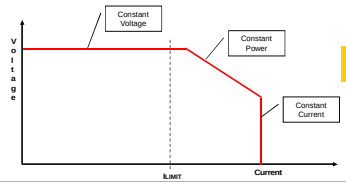
## OUTPUT CURRENT - Constant power

A constant power output is implemented on supplies that power multiple electrical sub-circuits, or devices that require a high in-rush current at start up. The constant power output ensures that the output current is maintained in overload condition, and the output voltage is reduced in proportion to the excess power required.




Use for battery applications

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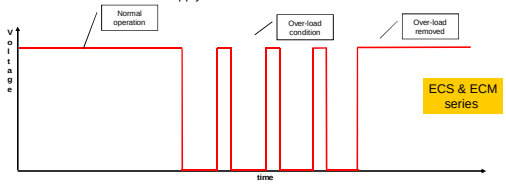
## OUTPUT CURRENT – Trip & restart 'hiccup'

When the current-sense circuit sees an over-current event, the controller shuts off the power supply for a given time and then tries to start up the power supply again. If the over-load condition has been removed, the power supply will startup and operate normally; otherwise, the controller will see another over-current event and shut off the power supply again, repeating the previous cycle. Long term trip and restart can be stressful to the supply.




ECS & ECM series

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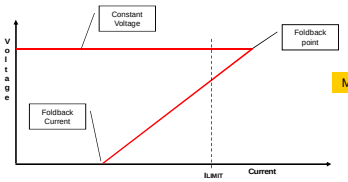
## OUTPUT CURRENT - Current foldback

Foldback current limiting decreases the output current and voltage when a short or abnormal load ( too low a load resistance ) is presented to the output. The output current and voltage decrease with the decreasing load resistance. This will reduce unnecessary current flow through the supply and power loss at the output

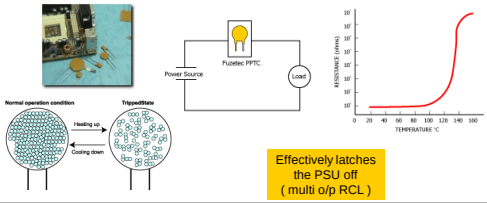



Mutil Output RCL



## OUTPUT CURRENT - Fuses

When connected in series to a circuit, positive temperature coefficient ( PTC ) resettable fuses remain at extremely low resistance and allow the electrical current to flow through it without any restriction. When overcurrent situations occur, PTC resettable fuses limit the current to a very small value (nearly to “open state”) and therefore protect the circuit from being damaged by the high current.

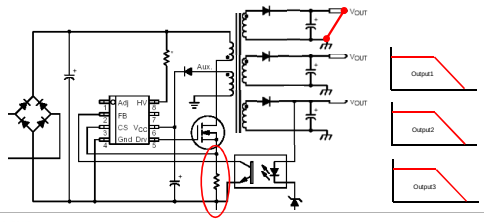



Effectively latches the PSU off ( multi o/p RCL )



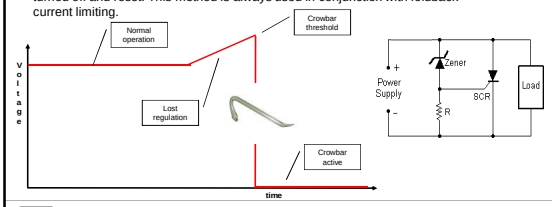
## OUTPUT POWER - Total power limiting

Power limiting is probably the most popular and least expensive method to protect against output overpower demands. When an overpower error is detected by the primary circuit, it reduces the power switch on period, hence all output voltages reduce to very low values. Normal operation resumes when the short is removed.



## OUTPUT VOLTAGE - Crowbar

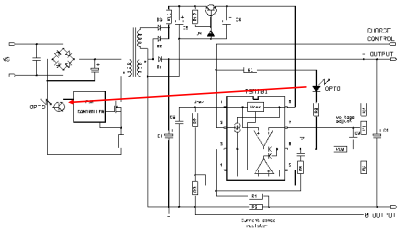
Overvoltage can damage customers equipment, to prevent this an overvolatge crowbar or clamp circuit can be used.
When the SCR turns on, it places a short circuit directly across the output, thereby protecting the load circuitry. This short remains in place until the power supply is turned off and reset. This method is always used in conjunction with foldback current limiting.






## OUTPUT VOLTAGE – Electronic over voltage

If an excursion of the output is detected beyond set limits the output is turned off. This is normally performed via a secondary feedback loop to the primary control circuit in case the primary feedback loop is faulty.





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