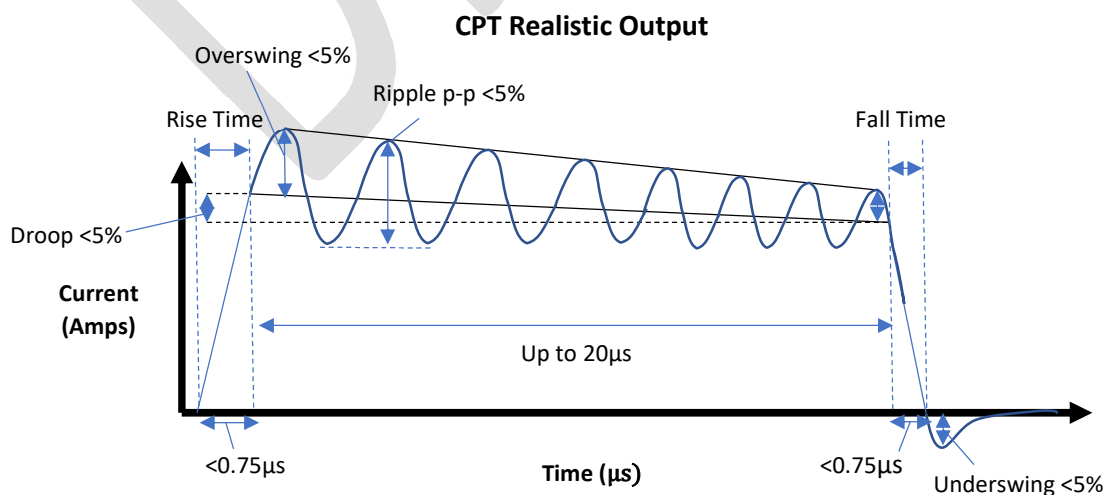
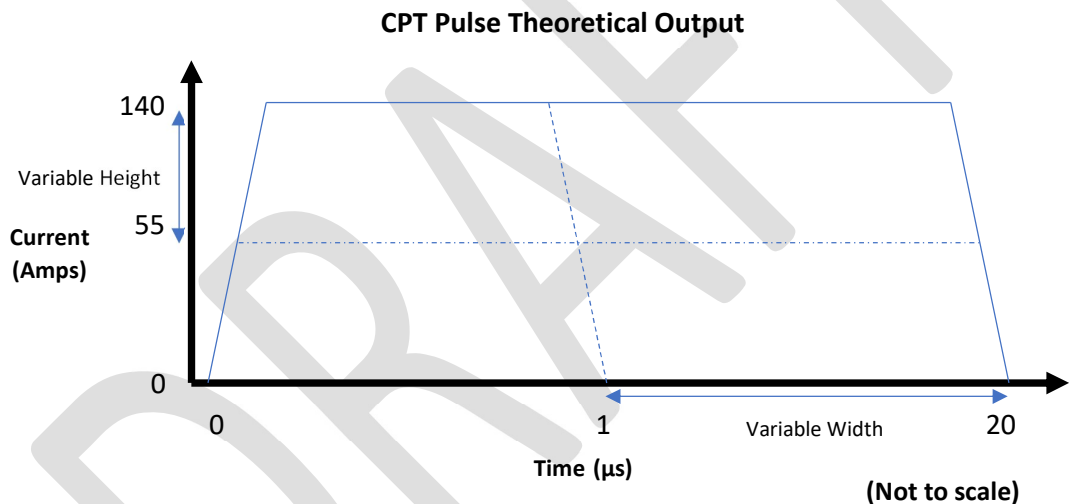


Current Pulse Tester (CPT) Requirements

The goal of the CPT is to provide a shaped current pulse across a component that has a dynamic impedance. It must also record various pieces of data that are output from the component to an appropriate resolution dictated by the width of the drive pulse.

Pulse Output

- Trapezoidal voltage output of width 1-20 μs through a resistor
- Pulse rise time should be as close to a square as is *reasonably* achievable
- Adjustable current limiter 55-140 Amps in 5 Amp steps
- User defined voltages of up to 5 kV available
- System is not expected to drive the high voltage and high current demands simultaneously as impedance on resistor is dynamic.
- Previous design used a Pulse Forming Network, but other solutions could be explored
- The ideal pulse output can be seen below

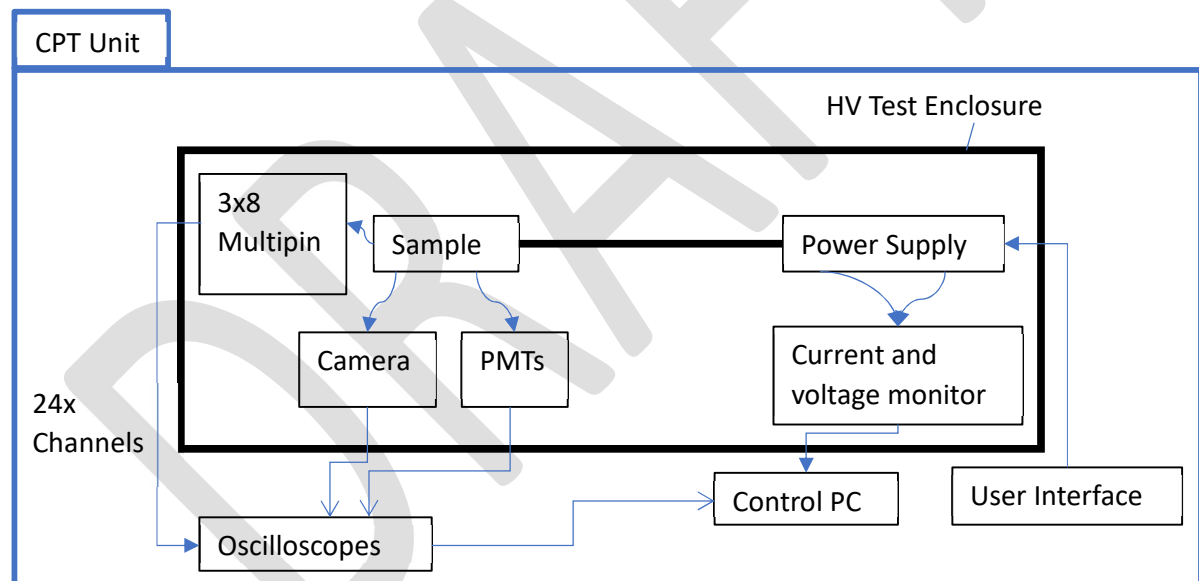


- CPT realistic output sets some boundaries for phenomena likely to be seen when creating a current pulse
- Rise time *could* be less than 0.75 μ s
- Any overswing must be not overshoot by any more than 5% of the desired current
- Any ripple must be contained to p-p 5%
- Over the course of a pulse the average current must not droop by any more than 5%
- Any underswing must not drop below 0 by any more than 5% of the desired current value.
- Pulse output is only required approximately once every 3 minutes.

Diagnostics / data channels

Must Have:

- Drive current and voltage
- Multipin channels (3x8 Channels)
- 2 x channels for photomultiplier tubes (PMTs) for specific wavelengths
- Channel for CCD/camera data
- Additional channels for potential future pieces of equipment RGA and/or mass spec



Safety

- Must exist in an enclosure to shield users from HV and to reduce noise on any light measurements
- Should be equipped with key interlock to avoid accidentally exposing wiring inside.
- Device should be difficult to operate unintentionally or unsafely.
- Should have a bleed down resistor to make safe in the event of power loss.
- Must be supplied with an earth wand
- Must have an emergency shutdown button
- Must have signs as to be compliant with The Health and Safety (Safety, Signs and Signals) Regulations 1996

Serviceability/Upgradability

- Should be built using mostly COTS parts

Control

- Pulse width (time)
- Current limiter dial
- Requires a human user interface for logging data and controlling input parameters
- Data channels should be easily accessible via USB

Size

- Should be able to fit through double doors when disassembled
- Should have an optical bench for mounting instruments.

Environment

- Kept in standard room conditions
- Preferably mains powered