E-Vent Prototype Software Logic

Last updated: April 1, 2020

Variables:

Name	Type	Property	Description
Velocity			
V_{homing}	Float	Constant	Motor velocity for homing
V_{zero}	Float	Constant	Motor velocity for zeroing
V_{in}	Float	Variable (dependent)	Motor velocity for inhalation
V_{ex}	Float	Variable (dependent)	Motor velocity for exhalation
Location			
X_{bag}	Float	Constant	Encoder or motor travel to bag edge
ZeroPoint	Float	Variable (dependent)	Bag edge location found from homing and zeroing
Time			
T	Float	Variable (dependent)	Time for a complete inhale/exhale cycle
$T_{elapsed}$	Long	Variable	Timer between events
T_{pi}	Float	Variable (dependent)	Maximum time between breaths allowed during AC mode ventilation
T_{hold}	Float	Variable (hard code?)	Hold time after inhalation to measure plateau pressure
T_{in}	Float	Variable (dependent)	Expected time for inhalation
T_{ex}	Float	Variable (dependent)	Expected time for exhalation
Ventilator Variables			
Pmax	Float	Constant	Max allowable pressure; 40 cm H2O
Ppeak	Float	Variable (measured)	Peak inspiration pressure
Pplat	Float	Variable (measured)	Plateau pressure after inspiration
Ppeep	Float	Variable (measured)	End expiratory pressure
TV	Float	Variable (dependent)	Tidal Volume, for ventilator operation
BPM	Float	Variable (dependent)	Breaths per minute, for ventilator operation
IERatio	Float	Variable (dependent)	Inhalation to Exhalation ratio, for ventilator operation
AT	Float	Variable (dependent)	Assist pressure threshold, for ventilator operation
ModeSelect	Boolean	Variable (user set)	Selection between modes
UI Variables			
ParamChange	Boolean	Variable (user set)	Parameter change request or set
TV_temp	Float	Variable (user set)	Tidal Volume, for display only
BPM_temp	Float	Variable (user set)	Breaths per minute, for display only
IERatio_temp	Float	Variable (user set)	Inhalation to Exhalation ratio, for display only
AT_temp	Float	Variable (user set)	Assist pressure threshold, for display only

Variable Relations:

Name	Equation	Description
T	$T = 60/BPM$	Time for one complete inhale/exhale cycle
T_{in}	$T_{in} = T/(1 + IE_{ratio})$	Inhalation time
T_{ex}	$T_{ex} = T - T_{in}$	Exhalation time
T_{pi}	$T_{pi} = T$	Acceptable time without breath during AC mode
V_{in}	TV/T_{in}	Inhalation velocity/rotation rate
V_{ex}	TV/T_{ex}	Exhalation velocity/rotation rate