**Manual Reference of TEREFES functions.**

**Library Version 2.**

Author: Francisco Resquín.

Institution: Neural Rehabilitation Group, Cajal Institute.

//------------------------------------------------------//

//--- Channel configuration --//

//- fd: FES file descriptor --//

//- Ch: Channel to be configured --//

//- ap, an: positive and negative amplitude in [mV] --//

// Range 0 to 90 mV

//- tp, tn: positive and negative pulse width in [us] --//

// Range 0 to 5067 us

//- repeat: Channel pulse repetition; Range: 0-3 --//

//- order: pulse order; 0: Pos/Neg; 1: Neg/Pos --//

int fcn\_SetUpChannel(int fd, uchar\_t ch, uchar\_t ap, unsigned int tp, uchar\_t an, unsigned int tn, uchar\_t repeat, uchar\_t order);

//------------------------------------------------------------//

//-- Modify Channel amplitude Compatible with Terefes V1 --//

//- fd: FES port file descriptor --//

//- Ch: Channel to be configured --//

//- ap, an: positive and negative amplitude in [mV] --//

**//---- No longer supported, Do not use ---//**

int fcn\_SetChannelAmplitude(int fd, uchar\_t ch, uchar\_t ap, uchar\_t an);

//------------------------------------------------------------//

//-- Modify Channel Pulse width Compatible with Terefes V1 --//

//- fd: FES file descriptor //

//- Ch: Channel to be configured //

//- tp, tn: positive and negative pulse width in [us] //

**//----- No longer supported, Do not use ---//**

int fcn\_SetChannelPulseWidth(int fd, uchar\_t ch, unsigned int tp, unsigned int tn);

//-----------------------------------------------------------//

//--- Write Global Repetitions Compatible with Terefes V1 -//

//- fd: FES port file descriptor -//

//- rep: Global repetitions; range[0-255] -//

int fcn\_SetMaxGlobalRepetition(int fd, uchar\_t rep);

//------------------------------------------------------------//

// Write InterGroup and global time Compatible with Terefes V1//

//- tinter: period of inter-group pulses in mili seconds [ms];

// Range 2 to 10000 ms //

//- tglobal: stimulation period in mili second [ms];

// Range 2 to 10000 ms //

int fcn\_SetStimulationPeriod(int fd, unsigned int tinter, unsigned int tglobal);

//------------------------------------------------------------//

//--- Set the number of channels of the vector list that

// will be stimulated //

// fd: FES file descriptor //

// Len\_ch: number of channels in the vector list to be

// considered for stimulation; Range [1-32] //

int fcn\_StimulationChannels(int fd, uchar\_t len\_ch);

//------------------------------------------------------------//

// Add channel to the stimulation vector list -> Compatible

// with terefes V1 //

//- fd: FES file descriptor //

//- ch: channel number to be added in the vector list //

//- pos: List’s position in which the channel will be added //

int fcn\_AddChannelToList(int fd, uchar\_t ch, uchar\_t pos);

//-----------------------------------//

//-- Turn on stimulation Source 1 --//

//- fd: FES file descriptor //

int TurnOnF1(int fd);

//----------------------------------//

//-- Turn on stimulation Source 2 --//

//- fd: FES file descriptor //

int TurnOnF2(int fd);

//-----------------------------------//

//-- Turn off stimulation Source 1 --//

//- fd: FES file descriptor //

int TurnOffF1(int fd);

//-----------------------------------//

//-- Turn off stimulation Source 2 --//

//- fd: FES file descriptor //

int TurnOffF2(int fd);

//--------------------------------------//

//-- start Stimulation --//

//- fd: FES file descriptor //

int StartStimulation(int fd);

//--------------------------------------//

//-- Stop Stimulation --//

//- fd: FES file descriptor //

int StopStimulation(int fd);

//----------------------------------------------------//

// --- Set Terefes function Mode ---//

// --- Range: 1-6 ---//

// --- Recommendation: use only mode 6 ---//

// --- Further details, see Diego Galeano's Manual --//

int fcn\_SetConfigurationMode(int fd, uchar\_t mode)

//------------------------------------------------------------//

//--- Modify the Positive Channel amplitude of channels

// included in the list vector ---//

//--- Only work with terefes V2 ---//

//--- Further details, see Diego Galeano's Manual ---//

//- fd: FES file descriptor ---//

//- Amp\_ch: it can be a vector of values or a single value.

// The position of the values correspond to each included

// channel in the vector list

//- len: len of the channel list ---//

**//--- When mode 6 is set, this function also modify the**

**// negative pulse amplitude ---//**

int fcn\_SetFastPositiveChAmp(int fd, uchar\_t ampCh[16], uchar\_t len)

//------------------------------------------------------------//

//--- Modify the Negative Channel amplitude of channels

// included in the list vector ---//

//--- Only work with terefes V2 ---//

//--- Further details, see Diego Galeano's Manual ---//

//- fd: FES port file descriptor ---//

//- Amp\_ch: it can be a vector of values or a single value.

// The position of the values correspond to each included

// channel in the vector list

//- len: len of the channel list ---//

int fcn\_SetFastNegativeChAmp(int fd, uchar\_t ampCh[16], uchar\_t len);

//------------------------------------------------------------//

//--- Modify the positive Pulse Width of channels

// included in the list vector ---//

//--- Only work with terefes V2 ---//

//--- Further details, see Diego Galeano's Manual ---//

//- fd: FES port file descriptor ---//

//- pwCh: it can be a vector of values or a single value.

// The position of the values correspond to each included

// channel in the vector list

//- len: len of the channel list ---//

**//--- When mode 6 is set, this function also modify the**

**// negative pulse width ---//**

int fcn\_SetFastPositivePWidth(int fd, uint16\_t pwCh[16], uchar\_t len);

//------------------------------------------------------------//

//--- Modify the negative Pulse Width of channels

// included in the list vector ---//

//--- Only work with terefes V2 ---//

//--- Further details, see Diego Galeano's Manual ---//

//- fd: FES port file descriptor ---//

//- pwCh: it can be a vector of values or a single value.

// The position of the values correspond to each included

// channel in the vector list

//- len: len of the channel list ---//

int fcn\_SetFastNegativePWidth(int fd, uint16\_t pwCh[16], uchar\_t len);