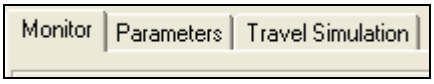
Win-ADrive
Monitor/Simulator Software
User's Manual

Index

1. Introduction

Win-ADrive Monitor/Simulator Software is a software that helps the elevator technician to adjust and monitor the performance of *ARKEL-ADrive VVVF Motor Driver.*
To use this software, a PC or laptop with Microsoft Windows (98/ME/XP/NT /2000) installed is needed.

The software has three functions selectable from the tab:



Travel Simulation:
Thanks to simulation function, it is possible to see how the *ADrive motor driver* will give reaction to which parameters and make some experiments on the computer environment even the device is not present.

Monitoring:
Monitoring function makes it possible to monitor real time data (speed and motor current) from the *ADrive VVVF motor driver* and save this data for future analysis. It may be used to adjust the parameters, to increase the performance and for diagnostics of errors.

Parameter transfer:
Makes it possible to transfer whole parameters easily to *ADrive VVVF motor driver.*

Details of these functions are explained at *Using the Monitor Screen, Using the Simulator Screen* and *Using the Parameter Screen* sections.

2. System requirements

A PC with 1 GHZ or faster CPU and Microsoft Windows(98/ME/XP/NT/2000) installed is recommended.

3. Software installation

Run *setup.exe* from software setup CD.

4. Connecting to ADrive

Press connection icon after connecting the RS–232 serial communication cable between ADrive and PC. Complete connection by selecting the serial port at the dialog window.

5. Using the monitor screen

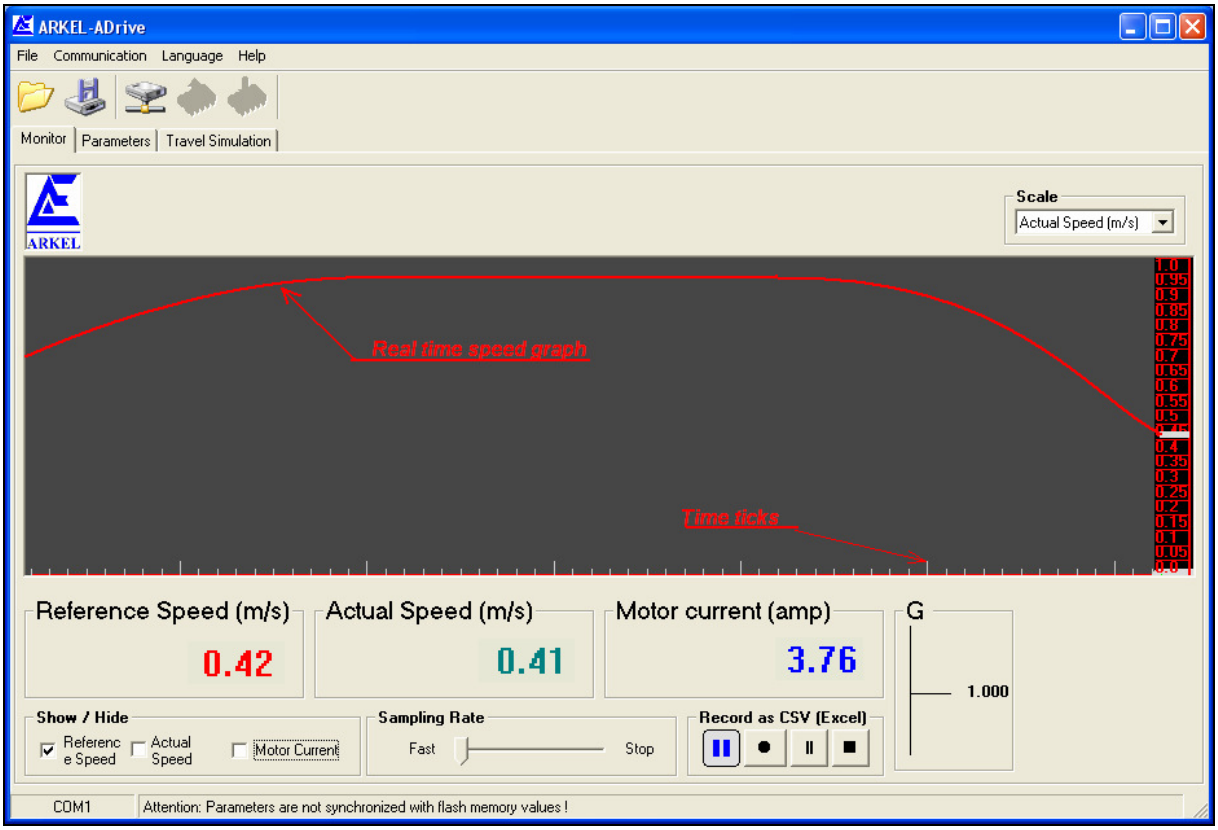


Figure-1

Monitor screen can be used only if *ADrive VVVF motor driver* is connected a PC or laptop on which the software is running (4. Connecting to ADrive)

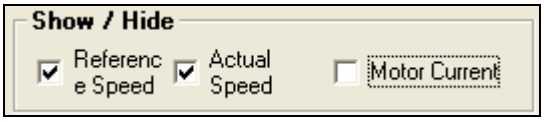
After establishing connection, real time data (reference speed, real speed and motor current) coming from ADrive is displayed on a scrolling chart. Scrolling white line at the bottom of this screen is time scale. Time between two long lines is 1 second, time between two short lines is 0,1 second. (Figure–1)

Red line displays the actual speed data coming from encoder, the green line shows the reference speed that ADrive sends to its internal PID motor driver. Normally, it is expected these two lines to be very close to eachother. If an abnormal difference is observed between these two lines, there may be a mistake in motor parameters, a problem in the mechanical parts of the machine, or the motor is not suitable for this load.

The blue line displays the instant motor current.

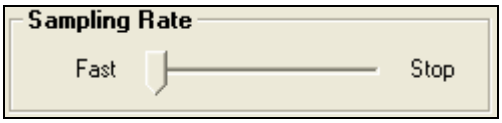
5.1. Parts of monitor screen

The options at figure–2 determines which data of ADrive will be displayed on the graph.



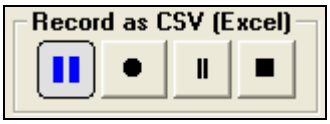
Figure–2

The sampling rate may be increased or decreased by dragging the slider in the sampling rate frame (Figure–3).



Figure–3

By using the buttons on Record as CSV frame(Figure–4), you can save the data coming from ADrive for future analysis in csv format.



Figure–4

 Starts recording data.

 Pauses recording until ,  pressed again.

 Pressing this button saves the recorded data to a file “log.csv” in CSV format in “csv” directory created in the directory which the software is installed.

This file can be viewed with a software (ex. Microsoft Excel) which can open CSV (Comma Seperated Values) format.

6. Using the simulator screen

Simulator screen gives the possibility to make some practices on the invertor's parameters and see the estimated travel curve by changing the parameters even without connecting to an invertor. The algorithm of the Simulator software is one to one correspondent with the embedded algorithm of the *ADrive VVF motor driver*, so the reference travel curve acquired at the Simulator will be the same with the real reference travel curve.

Parts of simulator screen (Figure–5):

- Travel curves frame
- Control Input signals frame
- Travel curve parameters frame
- Stopping type options frame

6.1. Travel curves:

In this section speed/time and acceleration/time charts are displayed corresponding to entered parameters and control input signals. (Figure 5)

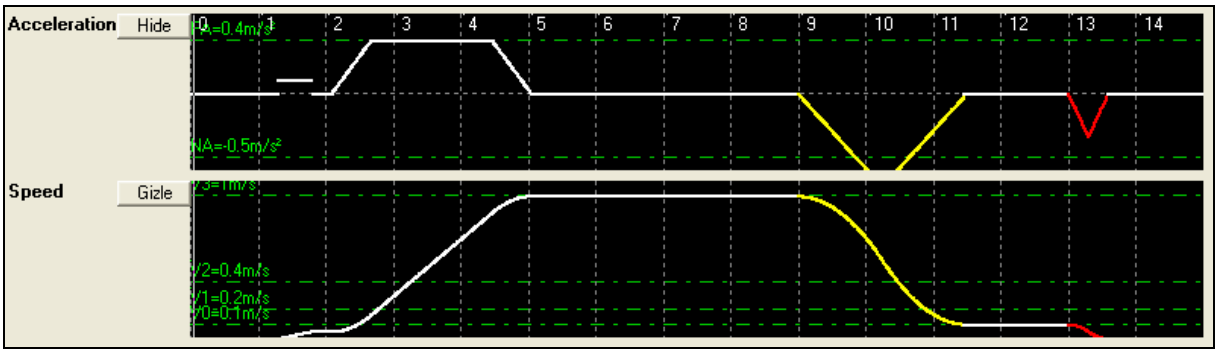


Figure-5

6.2. Control input signals:

In this section the reaction of the invertor can be analized by changing the V0,V1,V2,V3 speed control signals.

In the time axis; `V0` speed signal is the red line, `V1` speed signal is the yellow line, `V2` speed signal is the blue line and `V3` speed signal is the green line. The thin parts of the line are where the signal is OFF, and the thick parts of the line are where the signal is ON. (Figure–6)

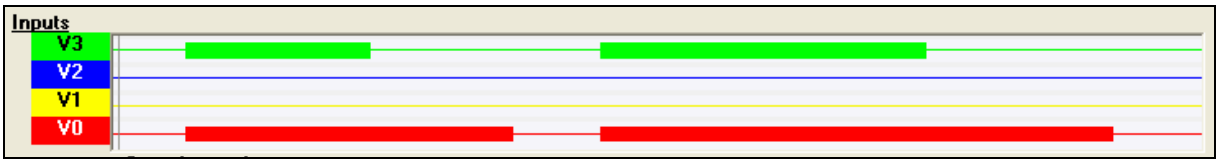


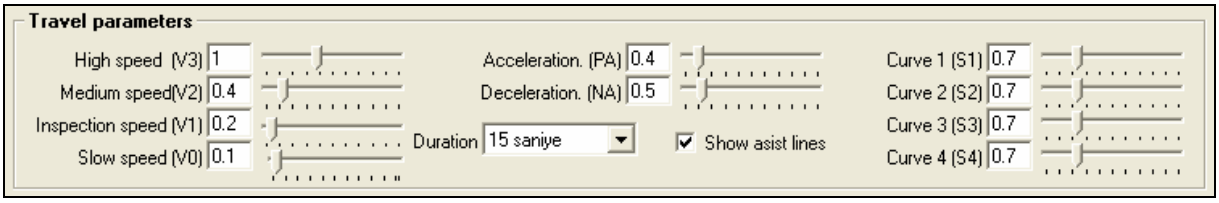
Figure-6

Clicking the left button of the mouse and dragging on the line will make the line thick (the signal is on) and clicking the right button of the mouse and dragging on the line will make the line thin (the signal is off). As speed signals coming from the main controller in time axis change, the speed/time and acceleration/time graphs in the *travel curve frame* will be updated consequently to the new signals.

6.3. Travel parameters:

At this frame, travel parameters may be changed and the effects of those changes on the travel curves may be analyzed (Figure–7)

- High Speed (V3)
- Middle Speed (V2)
- Inspection Speed (V1)
- Low Speed (V0)
- Acceleration (PA)
- Decceleration (NA)
- Curve 1 (S1)
- Curve 2 (S2)
- Curve 3 (S3)
- Curve 4 (S4)



Figure–7

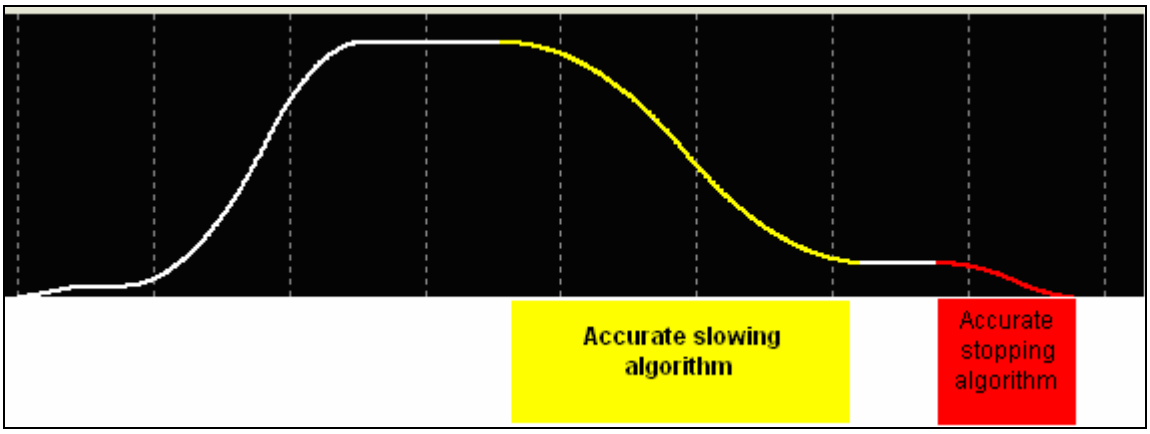
6.4. Stopping mode options:

ADrive VVVF motor driver, has an *accurate slowing/stopping algorithm* which ensures an accurate stop at floor level by using speed, acceleration, deceleration and soften parameters.

This algorithm is activated only in cases of reception of V0 signal right after a V3 signal or cutting of all signals (0) right after a V0 signal. For other speed changes (V3→V2, V3→V1, V3→0, V2→V1, V2→V0, V2→0, V1→V0, V1→0), the driver will slow down and stop according to its normal travel parameters.

There are two modes of slowing/stopping.
- Distance dependent
- Travel parameters dependent.

Selection of this mode determines in which situation the *accurate slowing/stopping algorithm* will be used. The sections where the algorithm is used are showed by yellow (on slow down) and red (on stop) in the simulation drawing.(Figure–8)



Figure–8

6.4.1. **Distance dependent slowing/stopping**

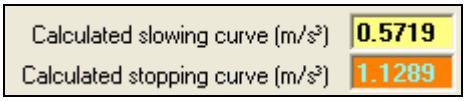
In this mode of slowing/stopping, it is possible for the invertor to automatically calculate the appropriate slowing parameters. All you need to do is to enter the two distance values in "slowing distance" and "stopping distance" fields after placing the magnets to a certain, known position. This method eliminates the need of determining the magnet's positions by trial and error.

Slowing distance and stopping distance boxes are activated when this mode is selected. The real distance between the slowing/stopping magnets and the floor level must be entered by the user into these fields in centimeter units.(Figure–9)

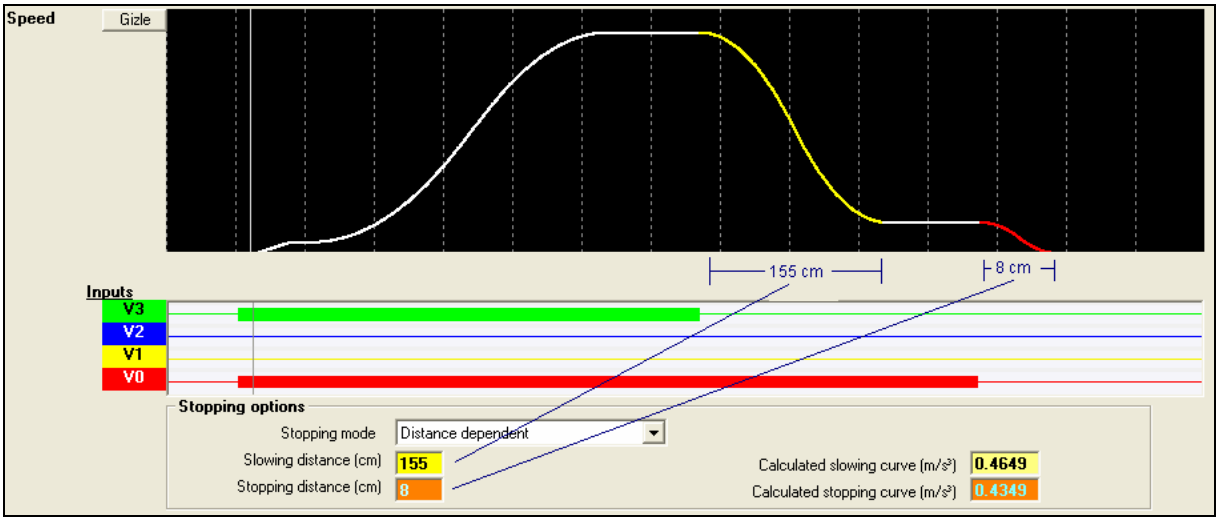
Figure–9

When these values are entered, the auto-calculated slowing soften parameter and stopping soften parameters will be shown in *calculated slowing curve* and *calculated stopping curve* fields(Figure–10) and travel curves will be updated to slow and stop at these distances(Figure–11).

Softening parameters are in m/s^3 which means they are the rate of change in acceleration with respect to time.



Figure–10



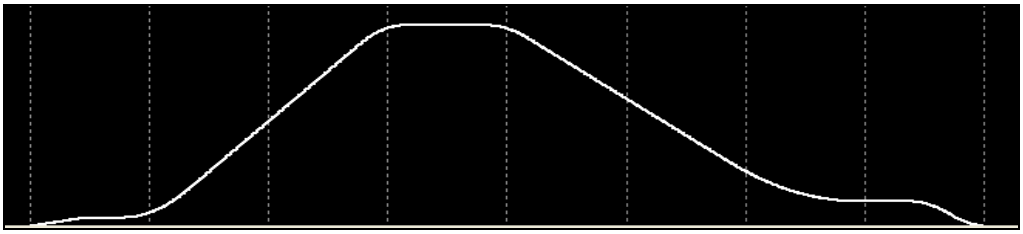
Figure–11

6.4.2. **Travel parameters dependent slowing/stopping**

In this mode; slowing/stopping will be performed according to given S3, S4, NA parameters and the *accurate slowing/stopping algorithm* will not be used normally *(Figure-12).*

Accurate slowing/stopping algorithm will only be used for short travels from floor to floor, where V0 signal is received before reaching V3 speed (6.4.3. Delayed slowing feature).

Slowing distance and stopping distance fields are disabled in this mode. Slowing distance for normal V3→V0 transition and stopping distance for normal V0→0 transition are calculated and shown in these fields.

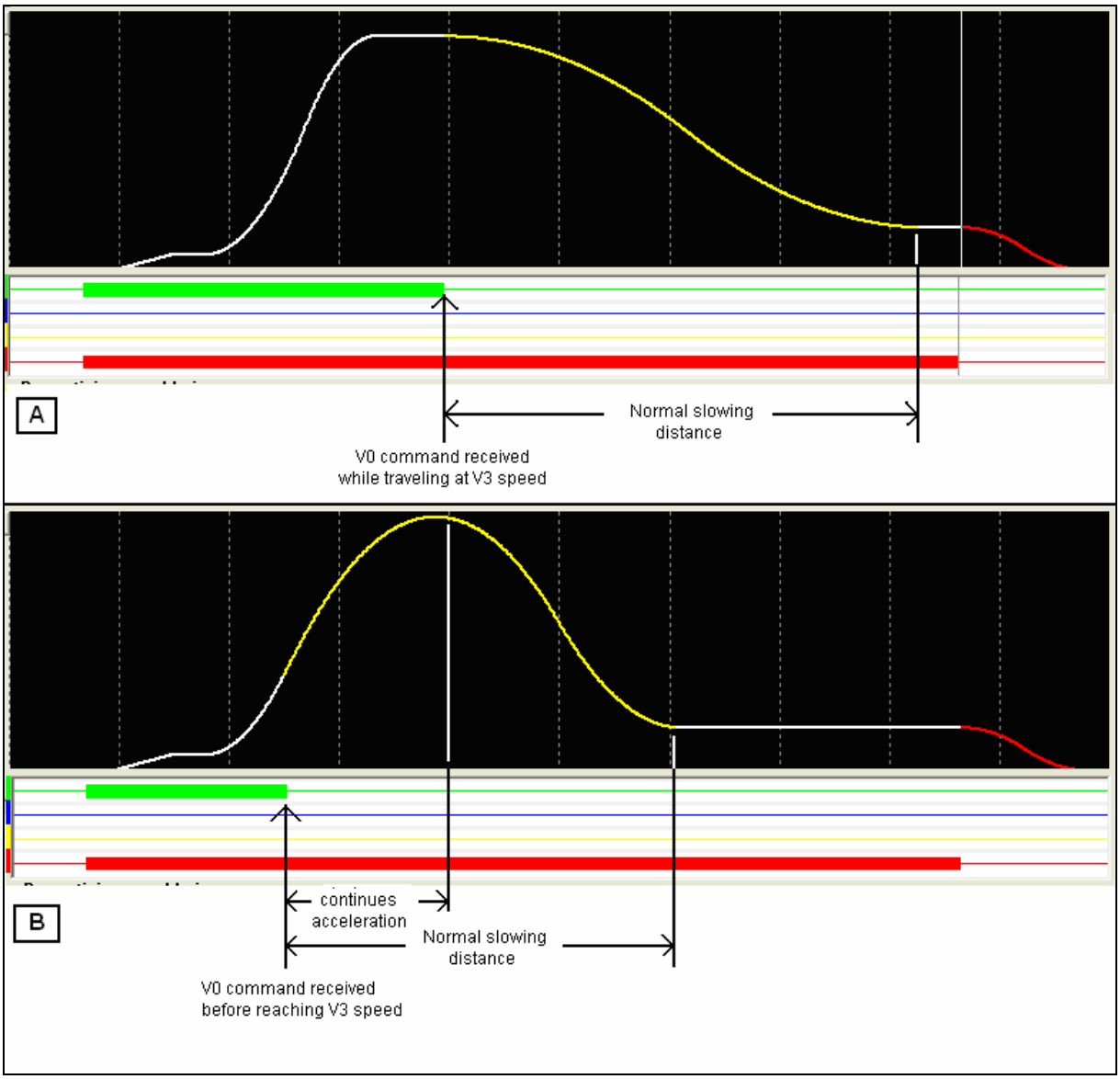

Figure–12

6.4.3. **Delayed slowing feature**

For short travels from floor to floor, if V0 signal is received before reaching V3 speed, the invertor, considering the slowing distance parameter, continues acceleration for a while and then begins deceleration. This shortens the travel time by avoiding early slowing.

This feature also ensures that, the distance traveled from reception of slowing signal to the instant of reaching V0 speed, remains equal to the distance that would be traveled if the V0 signal was received while traveling with V3 speed.

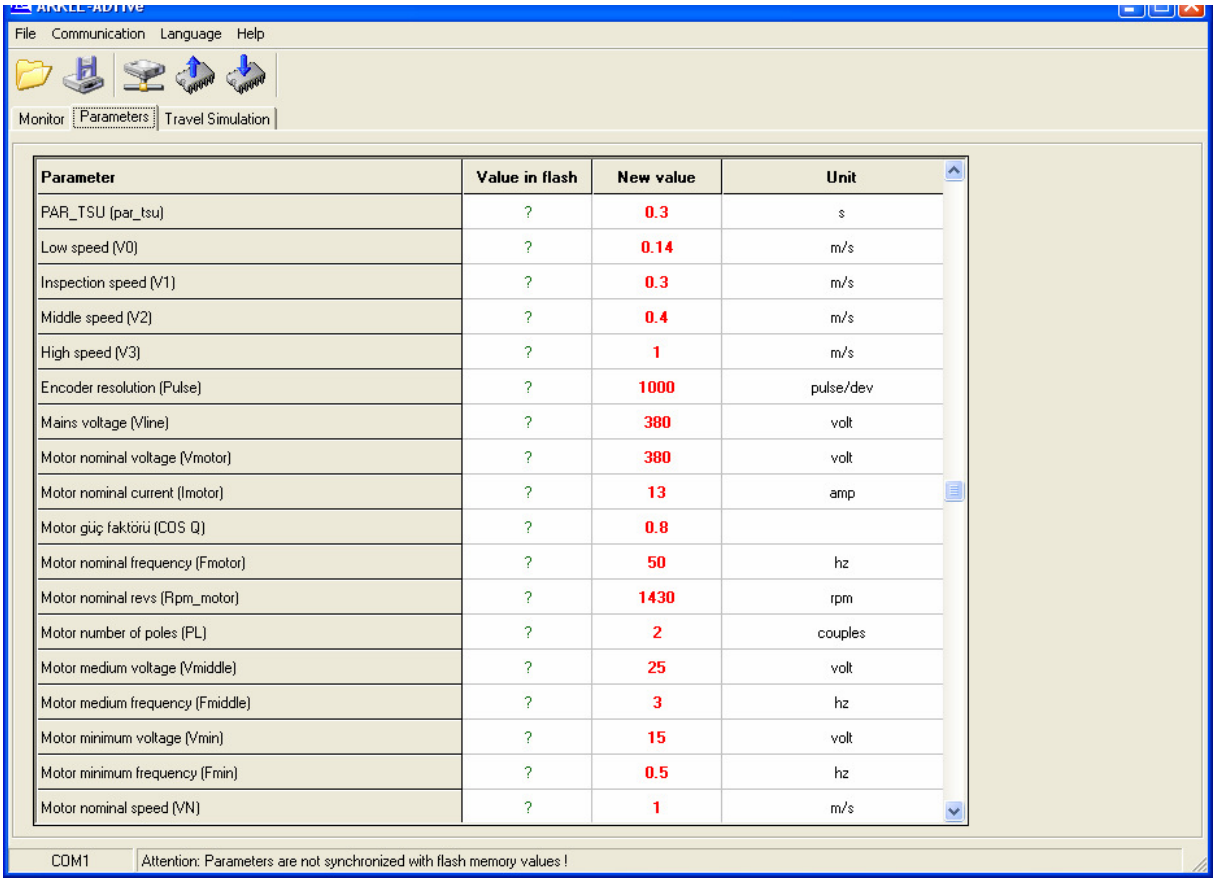
As an example, 2 situations are shown in Figures-13A and 13B.
At figure 13-A, slowing signal is received after reaching V3 speed and at figure 13-B slowing signal is received before reaching V3 speed. At Figure-13B, the elevator continues accelerating for a while although for both situations, the traveled distances (area under the yellow line) are equal.



Figure–13

7. Using the parameter screen

Parameter screen gives opportunity to see and change all parameters of *ADrive VVVF Invertor* together. (Figure-14)



Parameter	Value in flash	New value	Unit
PAR_TSU (par_tsu)	?	0.3	s
Low speed (V0)	?	0.14	m/s
Inspection speed (V1)	?	0.3	m/s
Middle speed (V2)	?	0.4	m/s
High speed (V3)	?	1	m/s
Encoder resolution (Pulse)	?	1000	pulse/dev
Mains voltage (Vline)	?	380	volt
Motor nominal voltage (Vmotor)	?	380	volt
Motor nominal current (Imotor)	?	13	amp
Motor güç faktörü (COS Q)	?	0.8	
Motor nominal frequency (Fmotor)	?	50	hz
Motor nominal revs (Rpm_motor)	?	1430	rpm
Motor number of poles (PL)	?	2	couples
Motor medium voltage (Vmiddle)	?	25	volt
Motor medium frequency (Fmiddle)	?	3	hz
Motor minimum voltage (Vmin)	?	15	volt
Motor minimum frequency (Fmin)	?	0.5	hz
Motor nominal speed (VN)	?	1	m/s

Figure-14

This screen is a 4-column table. Each line line of the table represents a parameter.

- 1. column: Name of the parameter and abbreviation in paranthesis.
- 2. column: Value of the parameter in *ADrive VVVF motor drivers* flash memory,
- 3. column: Value of parameter in *ADrive Monitor/Simulation Software*
- 4. column: Unit of the parameter.

When *ADrive Monitor/Simulation Software is run,* all values of column 2 are shown as "?"s because the values aren't read from ADrive yet. To downolad the values from ADrive VVVF invertor's flash memory to the computer, click "read from flash memory" () button after establishing connection between ADrive and the software.

When downloading is completed, real values at flash memory of ADrive VVVF invertor are displayed at column 2 in green color.

To change the value of any parameter, click on the 3.column of the related parameter. The clicked cell will become a input box.(Figure-15). Enter the desired value into this box and press “Enter” or “Tab” keys.

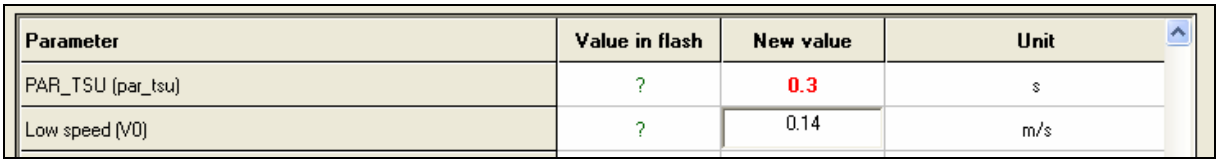
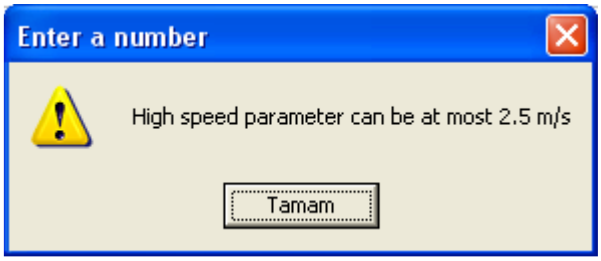


Figure-15

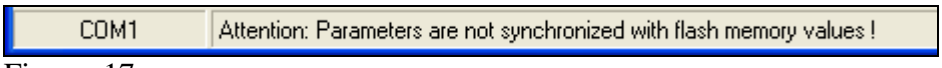
If the value entered is not in the allowed interval, a warning message is displayed (Figure–16) and the value of the parameter is returned to its original value.



Figure–16

If the entered value is in the allowed interval, the new value is displayed in red at column 3. This means that this value is different from the value in the flash memory of *ADrive VVVF invertor* at the moment.
When the parameter values are uploaded into flash memory by clicking *“Write into flash memory”* () button, all values will turn to green on column 3. Now simulation software and the flash memory are synchronized.

(If any of the values on column 3 is different from the value at flash memory; a flashing message in the status bar “*Attention: Parameters are not synchronized with flash memory values*” will warn you (Figure–17).)



Figure–17