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LV8961 start up setting for EVB and GUI

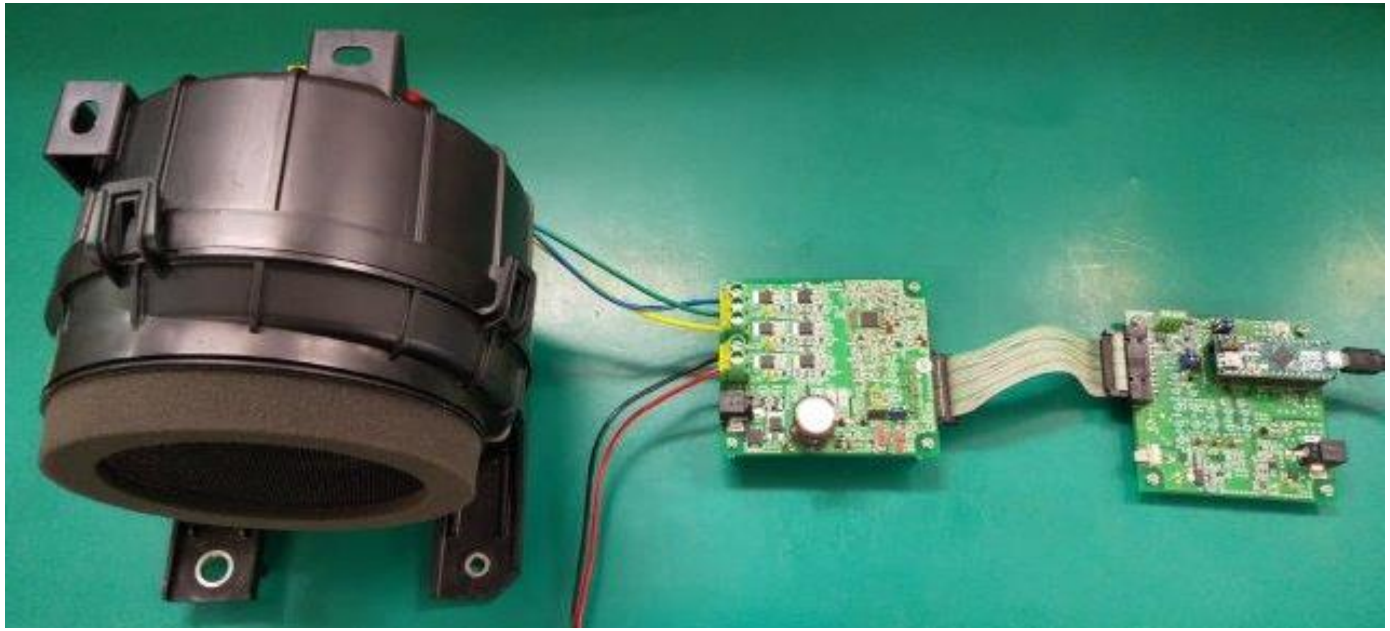
Sensor and Actuator ICs BU

Feb, 2021

Public Information

LV8961 Evaluation board set up

This document presents a typical procedure for rotating the motor using the LV8961 GUI and the communication board. Minimum requirement of parameter tuning for a very first trial is assumed.



Left: Connect motors U, V, W to EVB's U, V, W. COM (black line) may not be connected
Center: Connect to power supply with VS-PGND. Apply 12V
Right: Communication board: Connect to PC via USB (USB-micro)
Connect the EVB and the communication board with the supplied connector cable.

LV8961 evaluation board and communication board

LV8961 evaluation board

Motor

W

V

U

GND

VS

Either power supply
or AC adapter

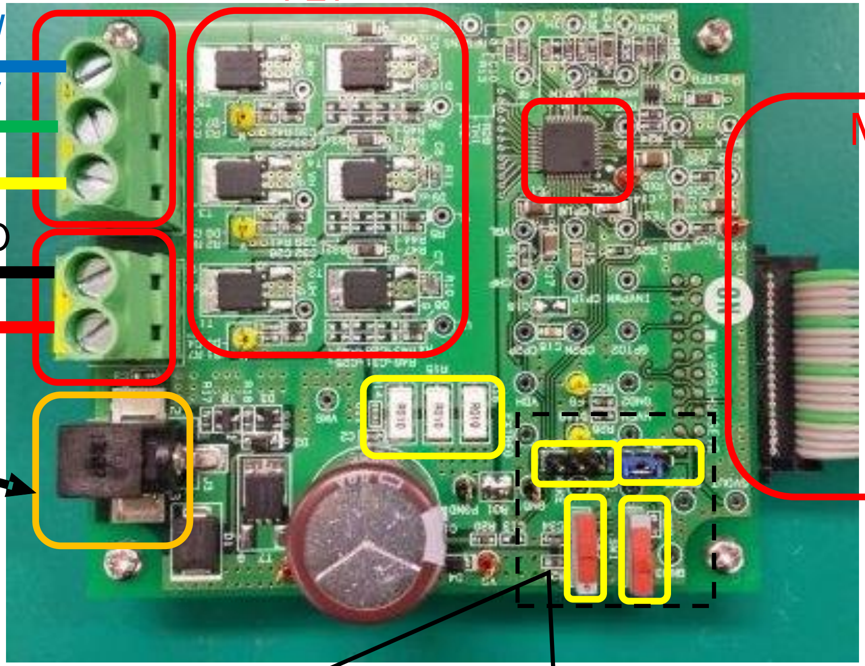
AC adapter

AC adapter is rated 5A max.

FET

LV8961 IC

MCU Interface

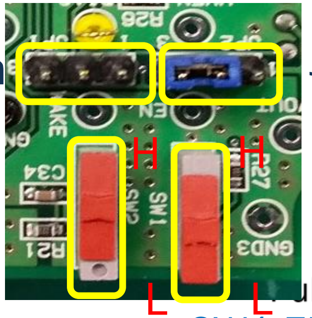


Zoom

SW1 set to L and SW2 set to H

JP1 is open

JP2 is short
2 to3.



H H

L L

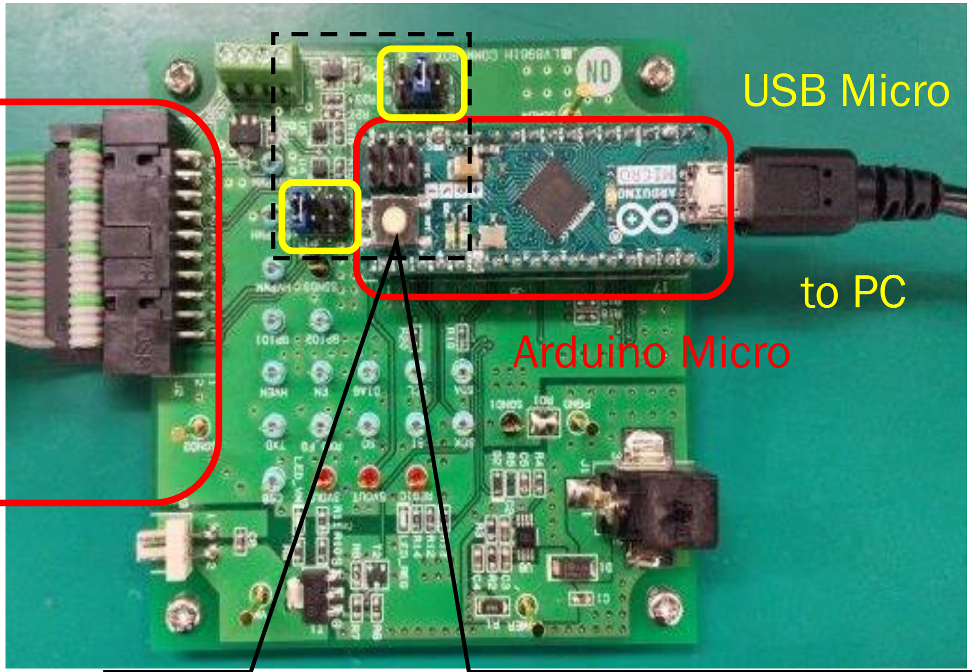
SW2:WAKE SW1:EN

Communication board (SPI - USB)

USB Micro

to PC

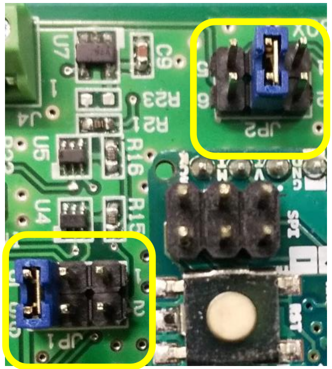
Arduino Micro



Zoom

JP2 is short
3 to 4.

JP1 is short
5 to 6.



Setting Motor parameter :Current Limit

Set the current limit according to the motor specifications and operating conditions.

The current limit is determined by the current sense resistors on the EVB: R14, R15, R16 and the internal register: CLSEL.

The current limit is given by the following equation.

$$I_{\lim\_1} = V_{CL} \times \frac{1}{R_{cs}}$$

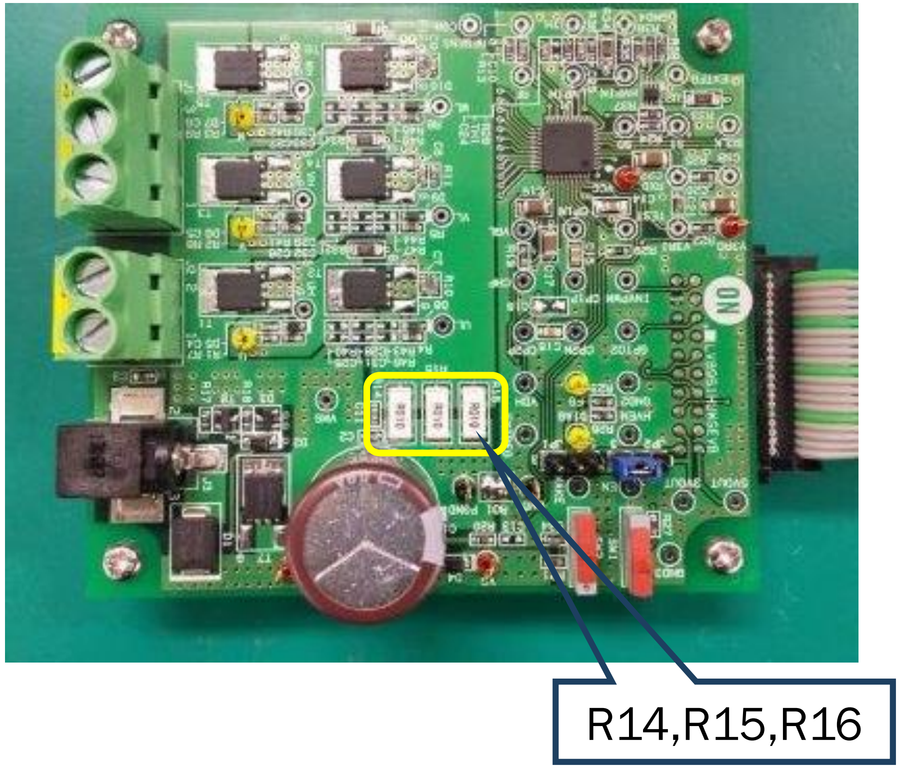
$$R_{\mathrm{cs}} = \frac{1}{\frac{1}{R14}+\frac{1}{R15}+\frac{1}{R16}}$$

CLSEL=1⇒ $V_{CL} = 100mV$
CLSEL=0⇒ $V_{CL} = 50mV$

It is set that current limit is 30A in this board.

Because 3 resistors of 10mohm connect to parallel.

Initial limit threshold voltage V_{CL} is 100mV.



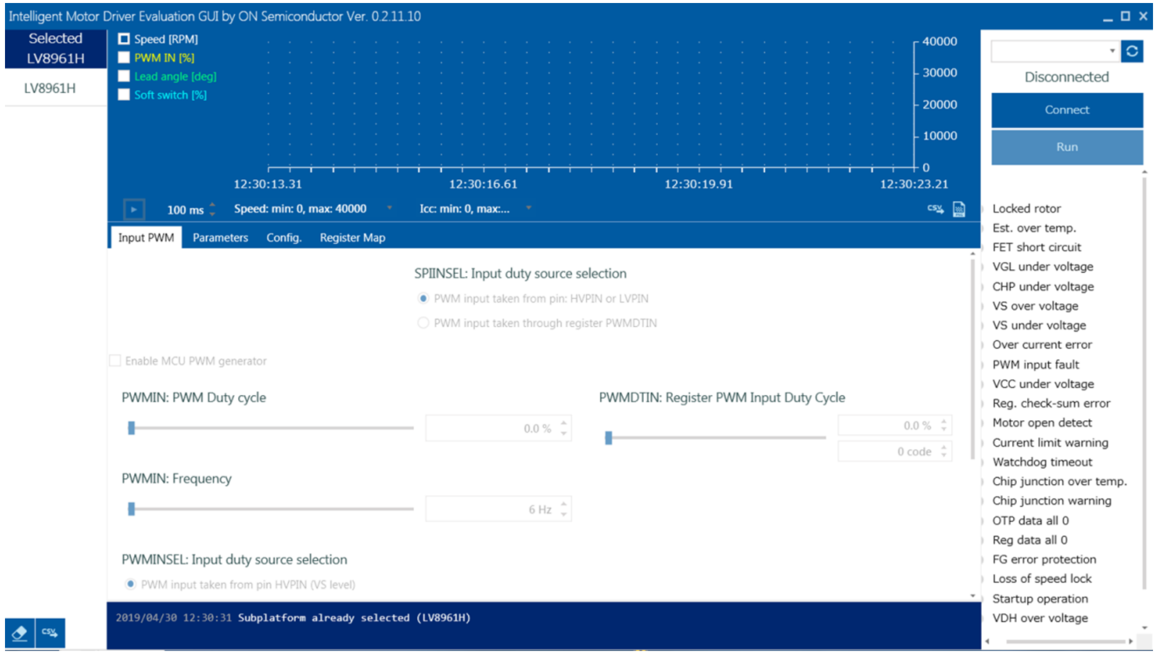
Set up GUI for LV8961 EVB

1.Install the GUI program

Install the LV8961H_GUI_0_2_11_16.zip

Please contact ONSEMI Sales for information on obtaining the GUI program.

Note: The file name may change.

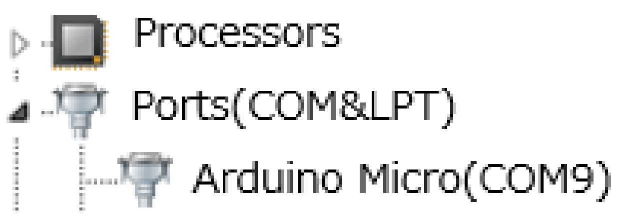


DEVICE DRIVER AND PROGRAM INSTALLATION

1. Obtain the GUI program(LV8961H_GUI_0_2_11_16.zip).
2. Unzip the program package
3. Confirm that the SW1 on the LV8961 EVB is L and SW2 is H.
4. Connect the power supply VS to the LV8961 EVB
5. Connect the Communication EVB to the PC using the USB micro cable.

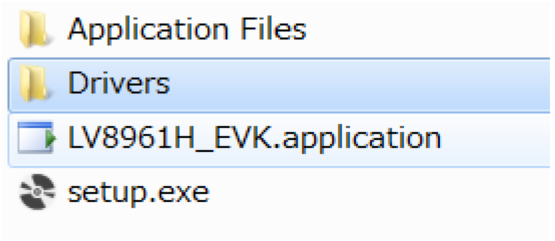
   Steps 4 to 12 show the driver installation procedure. It is required only for the first time when the LV8961 EVB is connected to the USB port.

6. The Windows OS will try to install driver on its own. Wait for 5-10 minutes. Installation will fail.
7. Click on the Start Menu, and open the Control Panel.
8. Open the Device Manager.
9. Either under ‘Ports (COM & LPT)’ or ‘Other Devices’, you should see an open port named ‘Arduino Micro’.



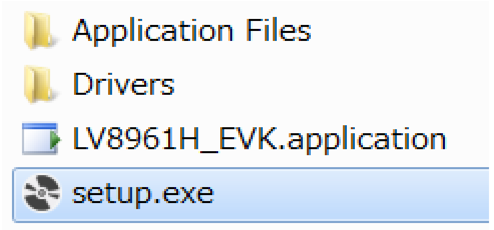
10. Right click on the ‘Arduino Micro’ port and choose the ‘Update Driver Software’ option. a. If the update driver software option is not available, then the Windows OS is still trying to install the driver on its own. Please wait till the OS finishes self-try.

11. Next, choose the "Browse my computer for Driver software" option.
12. Finally, navigate to and select the driver file named **‘arduino.inf’**, located in the ‘Drivers’ folder.

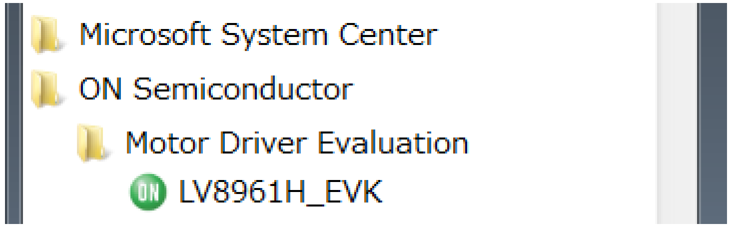


13. Windows will finish up the driver installation from there.
14. When the installation is successful, the recognized Arduino Micro port with the port number is shown in the Device Manage.

15. Run setup.exe of the installation package



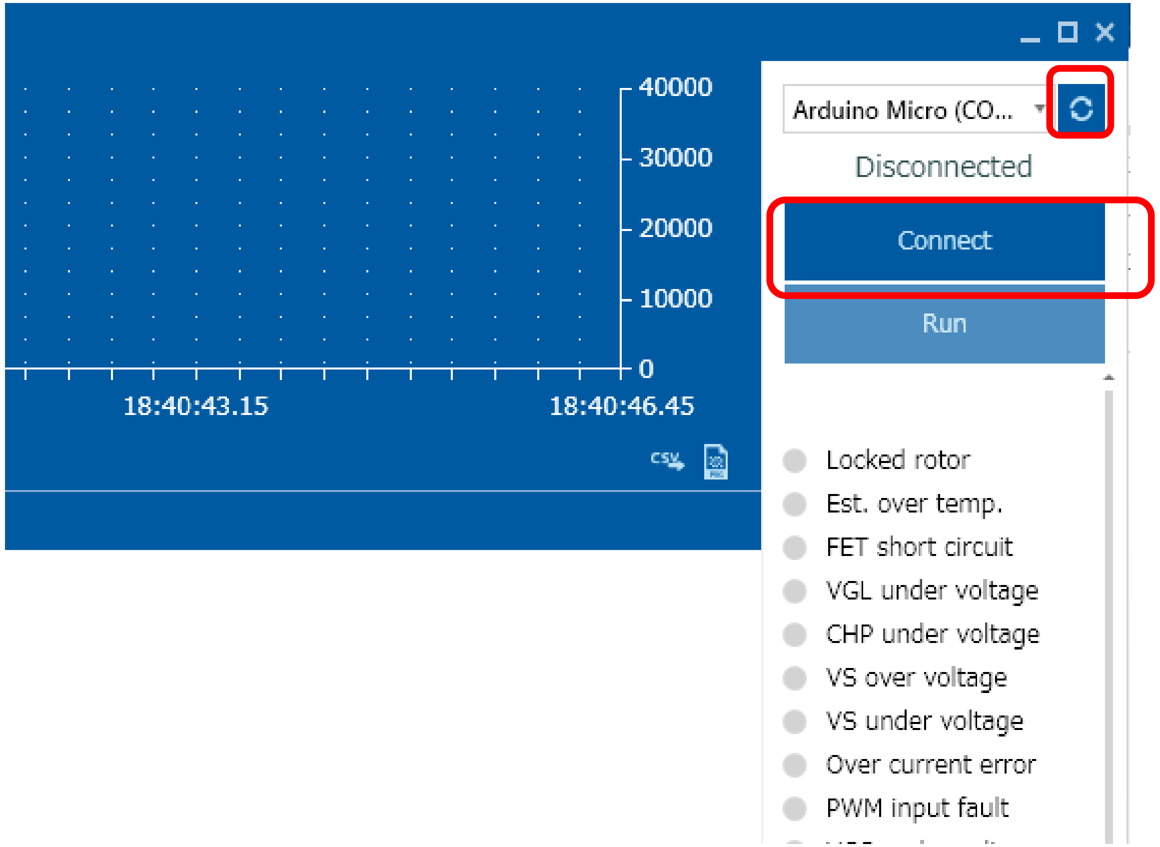
16. Launch the program



GUI for LV8961 EVB

1.Connect a USB cable to the microprocessor on the communication board
Click the button
and "Connect" button on the upper right.

2. Supply a voltage(6V-28V) to VS of LV8961 evaluation board.

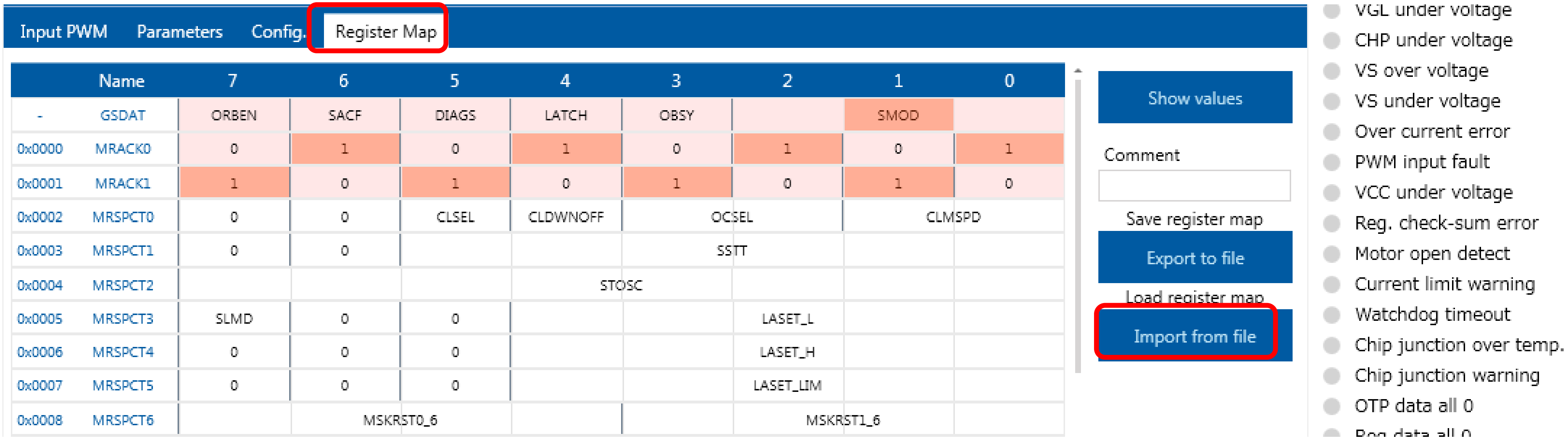


GUI for LV8961 EVB

3.Resister setting with external file

In this document, it is assumed that the configuration file prepared by ON Semiconductor will be imported first, which selects the driving mode of one BEMF detection window per electrical cycle. Please refer to the appendix for the details of the number of windows.

Select the Register Map tab and click " Import from file".

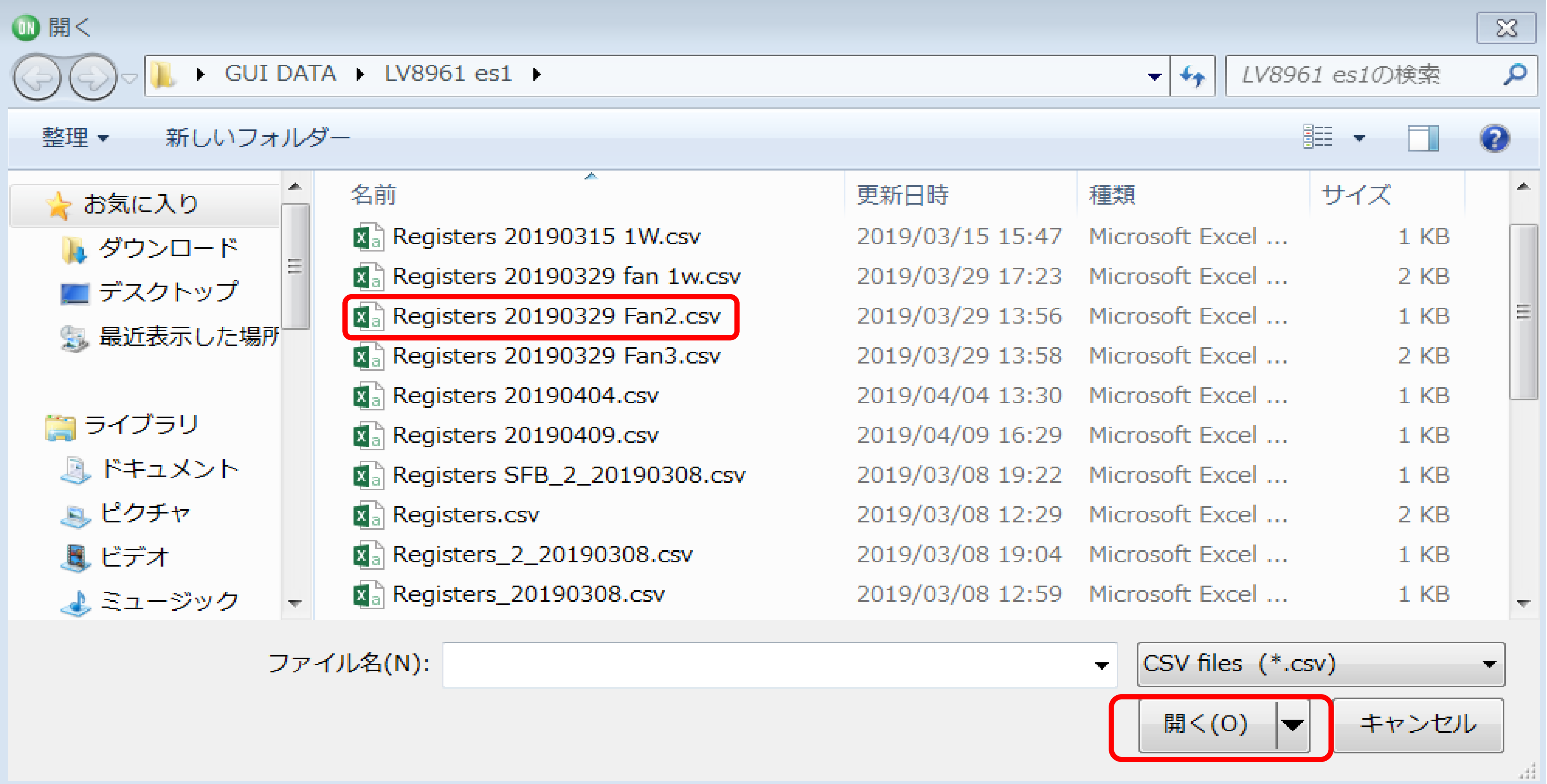


Each register can change in "Config tab" or "Resister Map“.

GUI for LV8961 EVB

Note: The file name may be changed by case.

a) Select External file
   Select “Registers 20190329 Fan2.csv”
   Click open(開く)



GUI for LV8961 EVB

3.By clicking the RECALC bit, the register value is reflected in the actual operation.

0x0010	MRSPCT14	0				TAG_L_1			
0x0011	MRSPCT15				TAG_H_0				
0x0012	MRSPCT16	0				TAG_H_1			
0x0013	MRSPCT17	0	0	0	0	0	0	0	RECALC
0x0015	MRSPCT19	0	0	0	0	0	0	WINDSEL	
0x0016	MRSPCT20		MSKRSTNUM0_INI				MSKRSTNUM1_INI		
0x0017	MRSPCT21		MSKRSTNUM0_THR				MSKRSTNUM1_THR		
0x0018	MRSPCT22		MSKRSTNUM0_TWO				MSKRSTNUM1_TWO		
0x0019	MRSPCT23		MSKRSTNUM0_ONE				MSKRSTNUM1_ONE		

RECALC: Trigger for updating target speed setting

RECALC=0: No operation.

RECALC=1: Update latched values (SCEN, DUTY_L, DUTY_H, TAG_L and TAG_H) in the target speed calculation module and RECALC will be cleared automatically.

Please click RECALC when (SCEN, DUTY_L, DUTY_H, TAG_L and TAG_H) is changed.

Overall sequence of register setting tuning

1. Set motor parameters. Number of poles and the current sense resistance.
2. Set drive mode (sinusoidal or trapezoidal)
3. Set speed curve full span (output duty cycle 0 to 100% responding to 0 to 100% input, in open-loop linear control)
4. Set input PWM duty cycle 30% for the first try
5. Set the initial open-loop commutation frequency STOSC, 100ms interval
6. Set soft-start parameters: 2 seconds timeout, current ramp control, starting from 0%
7. Set the dead time FDTI, maximum (if the power FET and gate circuit is different from ON EVB.)
8. Run
9. Tune the mask width and delay from zero cross detection to commutation

1. Setting Motor parameter

Select “Parameters” tab.

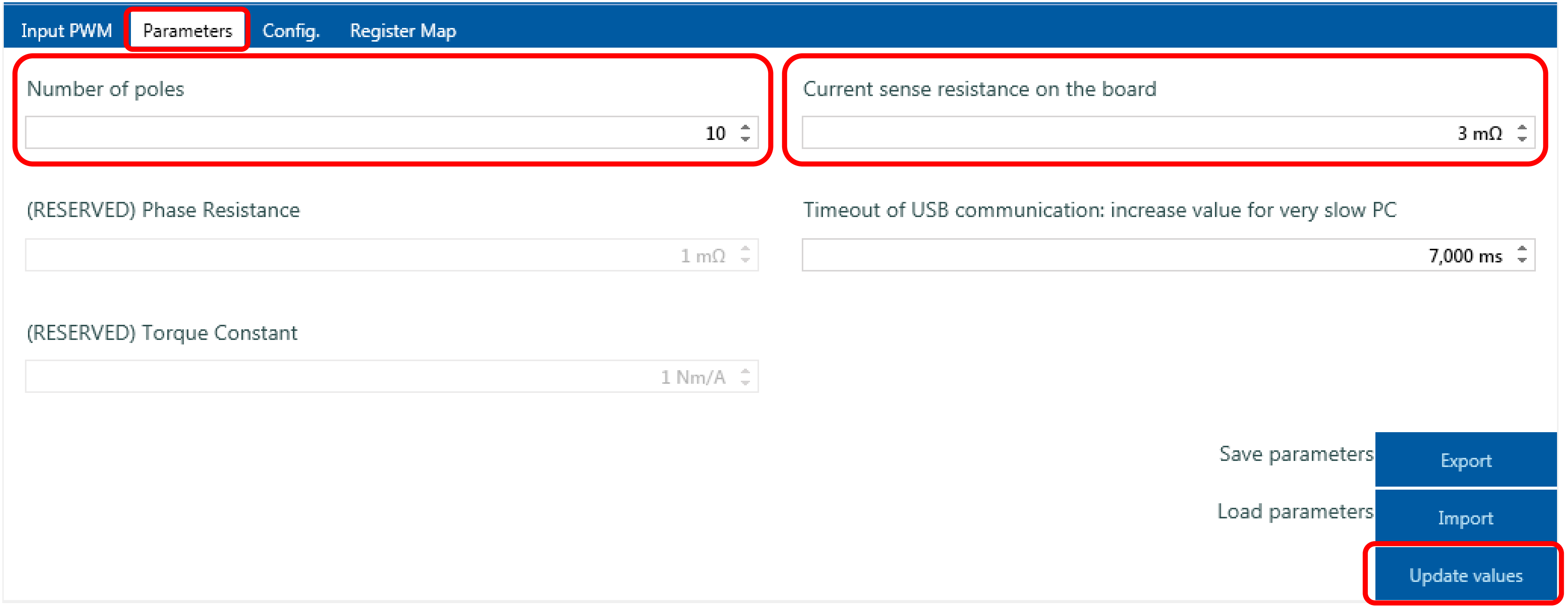
1.Set number of poles for motor in “Number of poles”.

ex.10poles motor setting is 10.

2.Set current sense resistance(R_{cs}) on the board.

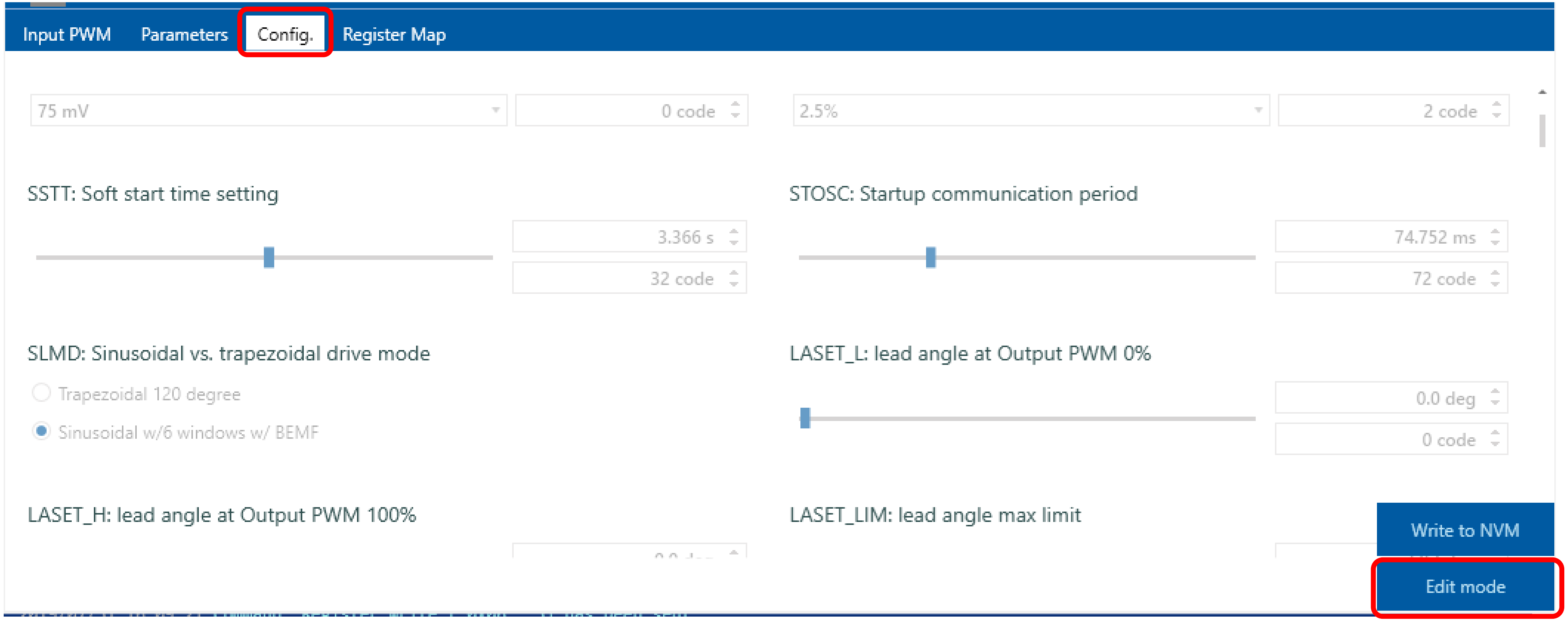
ex.3mohm resistance on the board sets 3mohm.

3.Click “update values”.



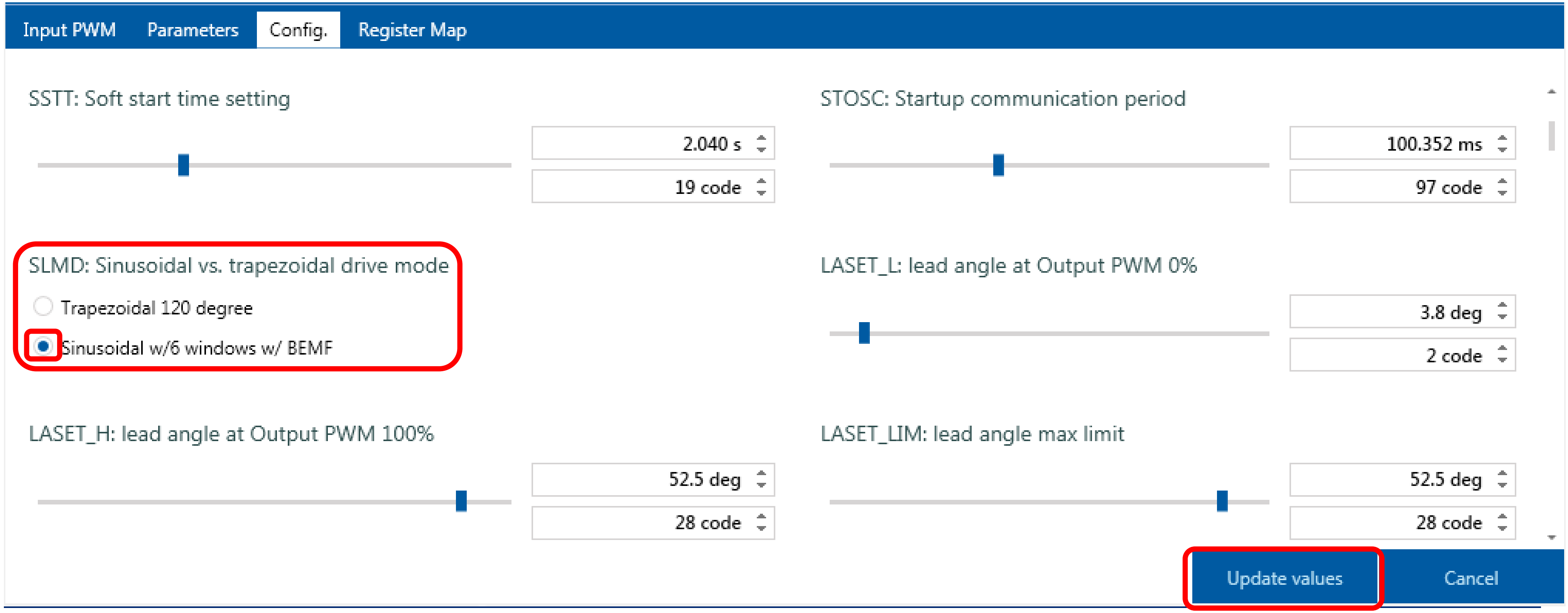
2. Set Drive mode (Sinusoidal or trapezoidal)

Select "Config" tab. Click Edit mode.



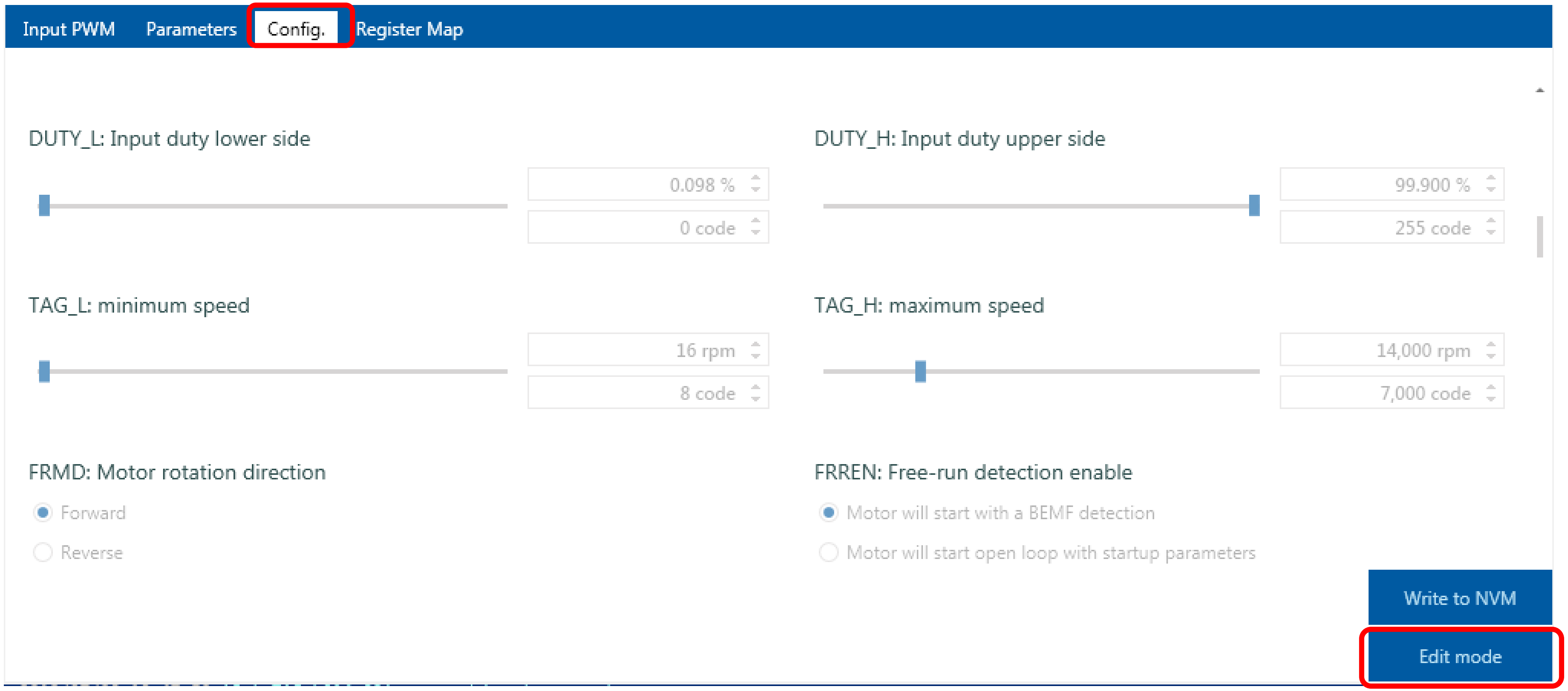
2. Set Drive mode (Sinusoidal or trapezoidal)

Select “Sinusoidal”   Click “Update values.

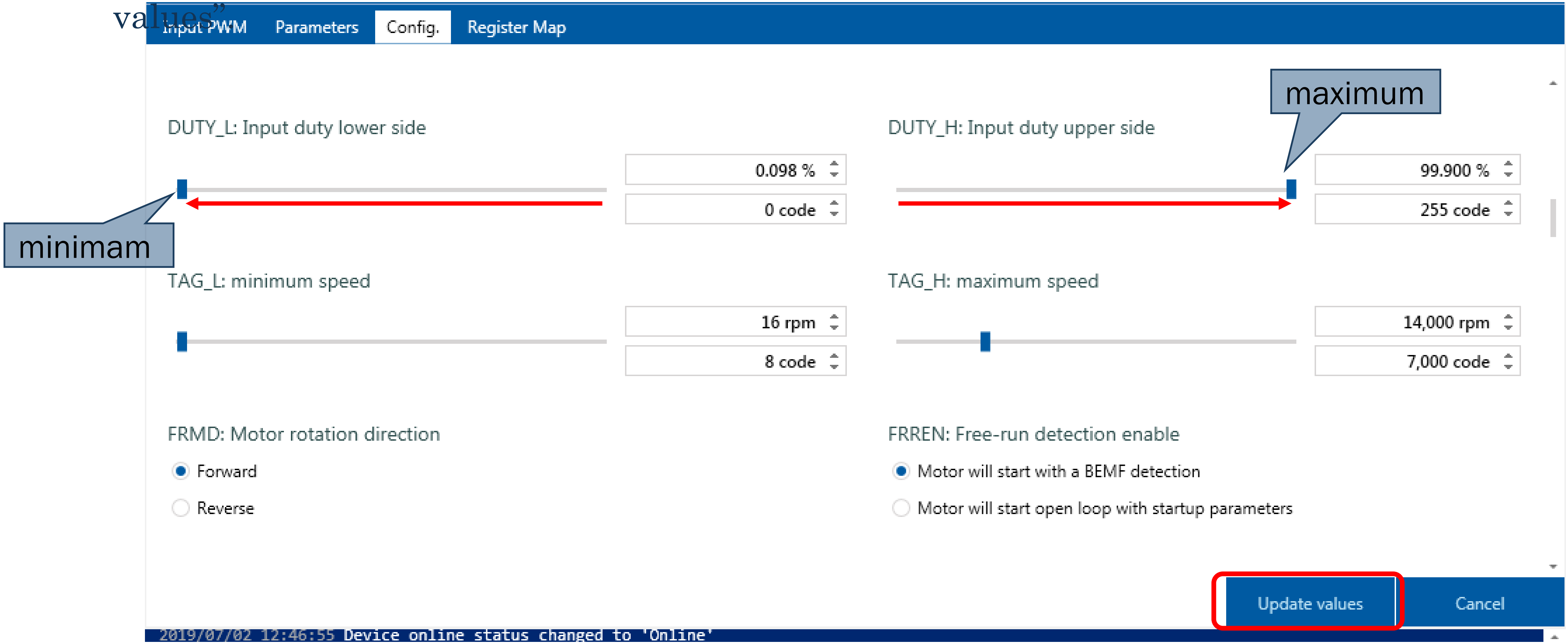


3.Set speed curve full span

Select "Config" tab. Click Edit mode.

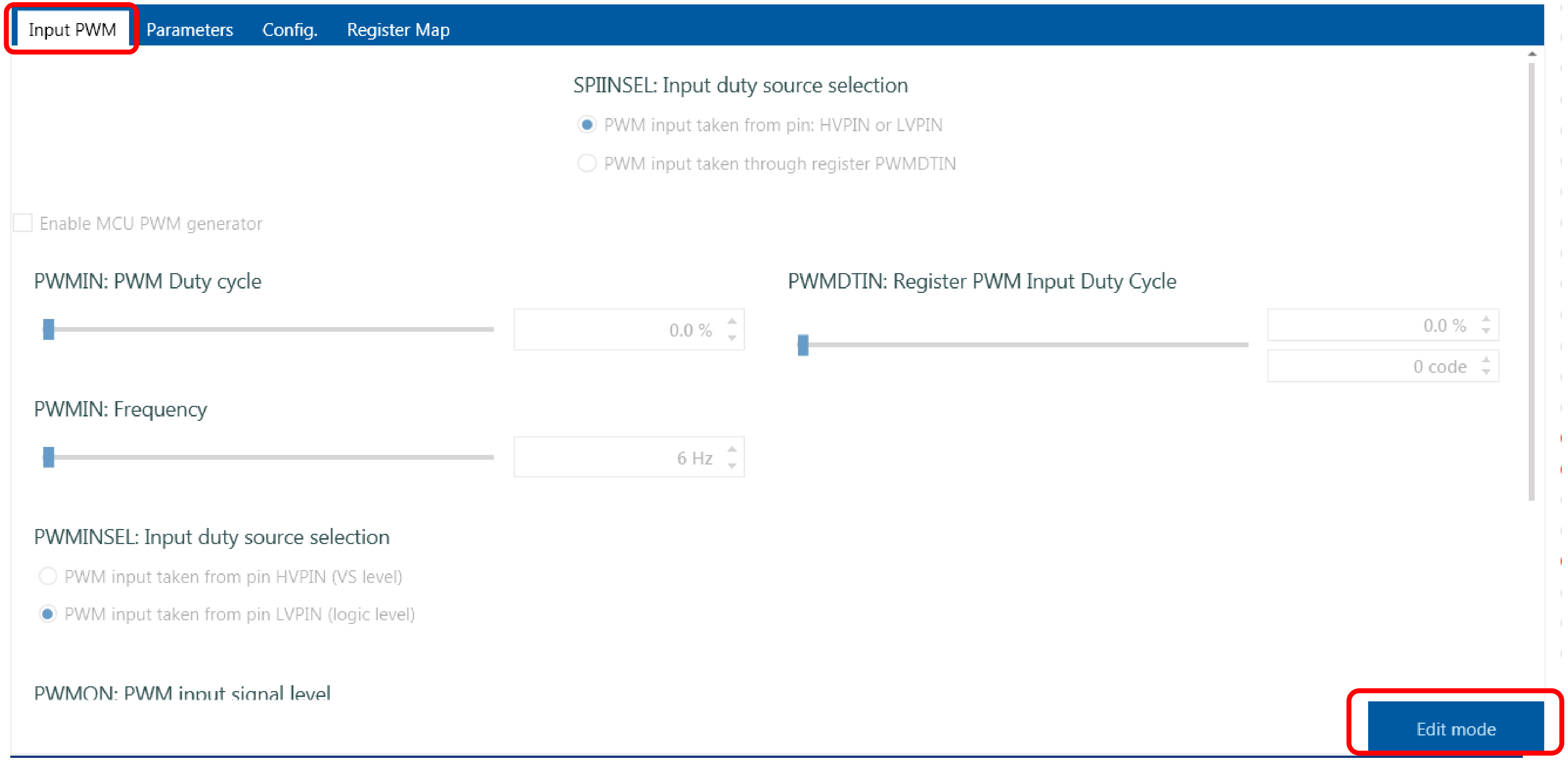


To simplify tuning, set Duty_L and Duty_H as follows. Later, it can be changed to proper values to match the target application. Minimize the Duty_L slider and maximize DUTY_H. Click "Update values".



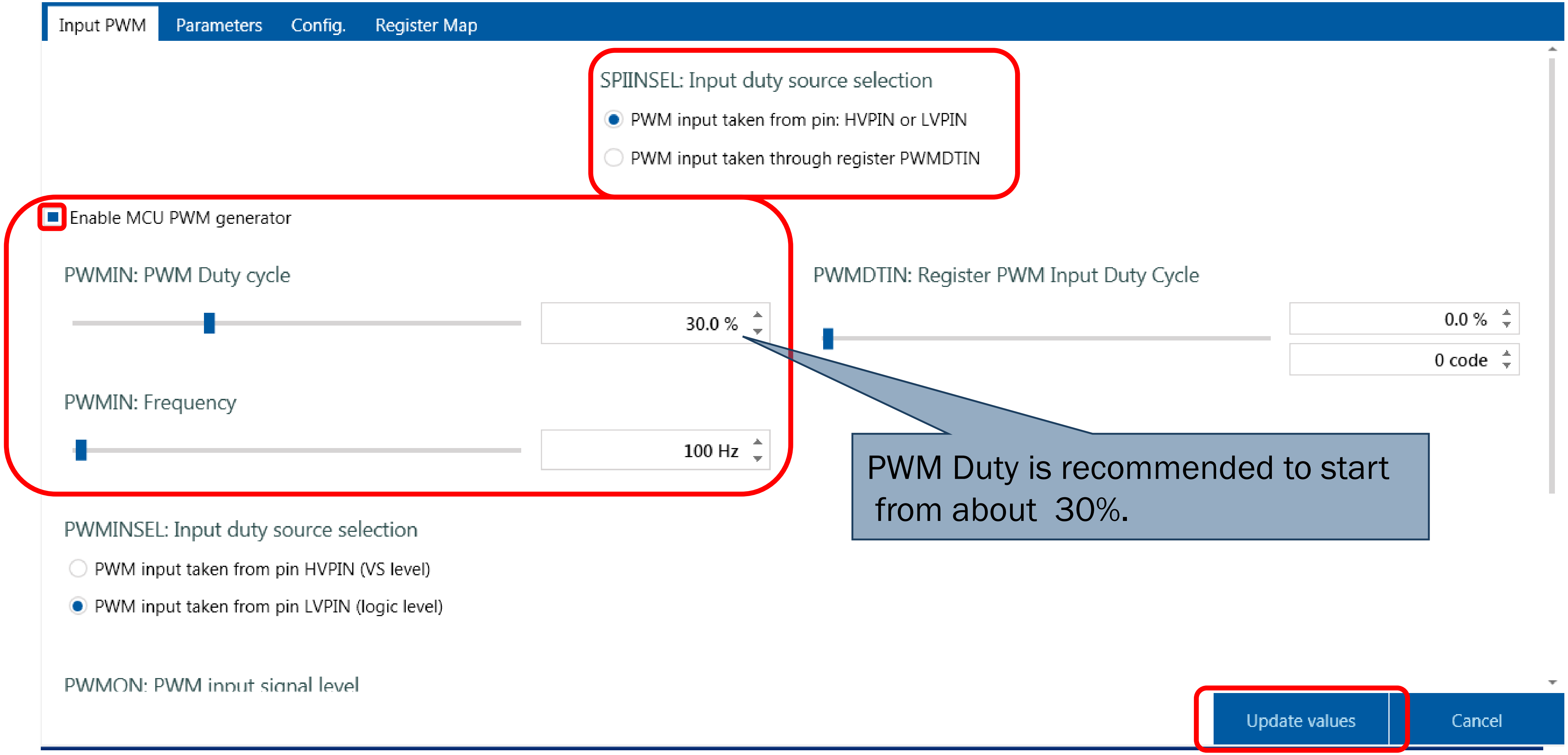
4.PWM setting

Select “Input PWM” tab. Click Edit mode.



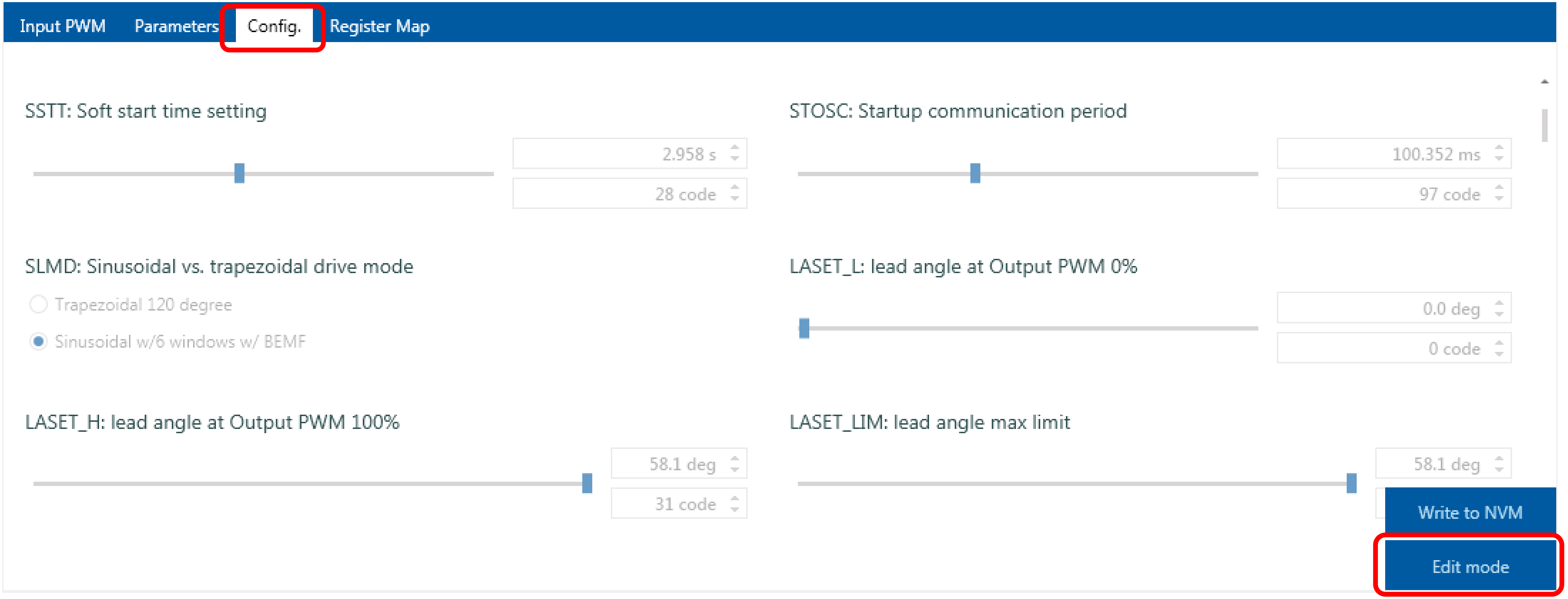
Public Information

Select PWM input taken from pin : HVPIN or LVPIN.
Click “Enable MCU PWM generator”.
Input Value of PWM duty cycle or Frequency.
Click Update values.

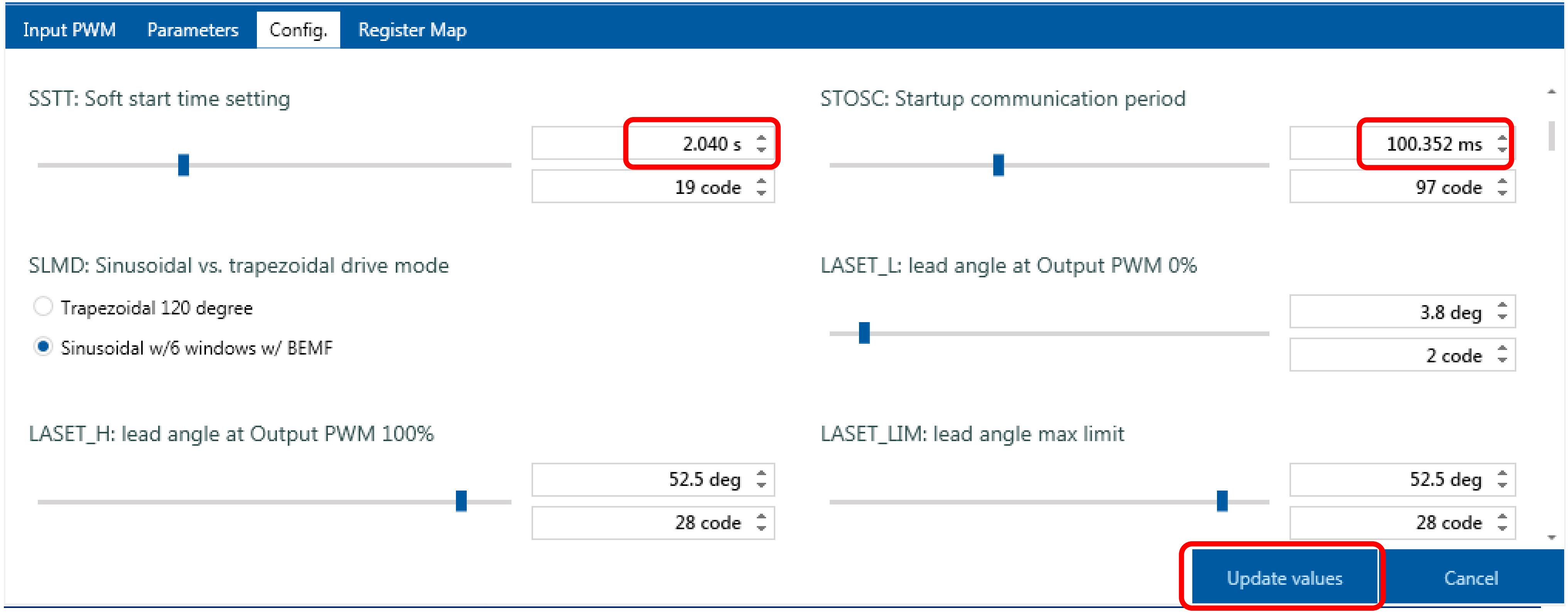


5&6 Adjustment SSTT(soft start time) & STOSC(startup commutation frequency)

Adjust SSTT and STOSC in the case of a motor does not rotate with initial configulation file, or to adjust the start up time and inrush current.
"SSTT" is soft start time, "STOSC" is startup commutation period. They are set by internal registers.
Select Config tab. Click Edit mode.

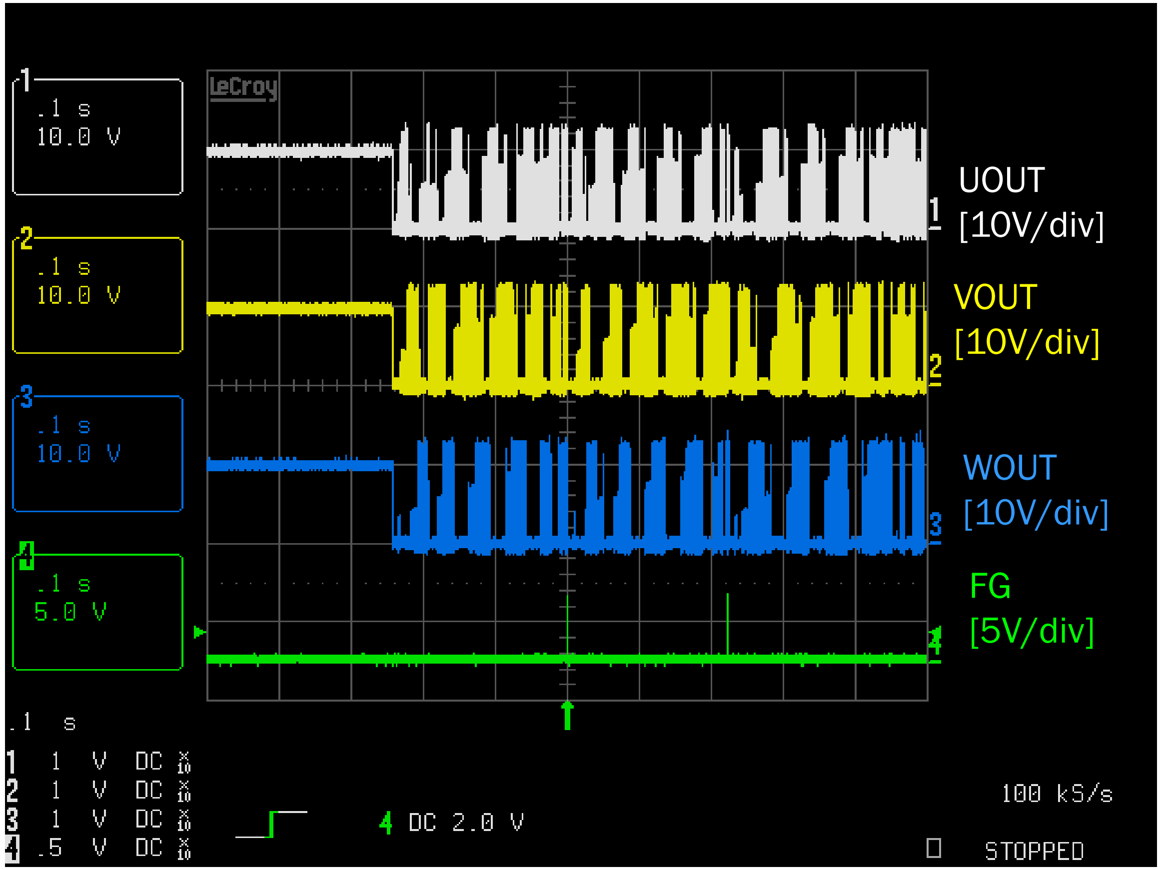


Input Value of SSTT and STOSC. Click Update values.

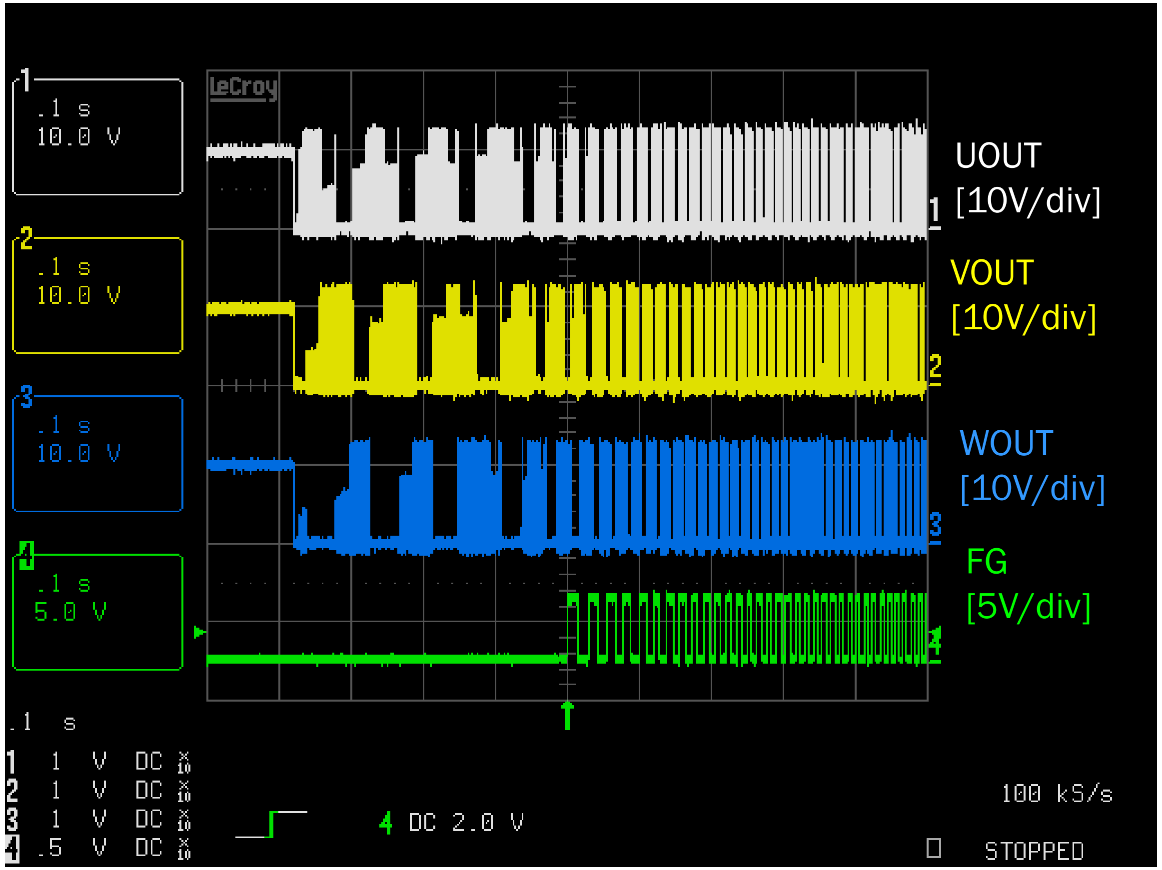


STOSC(Startup commutation period)

When “STOSC” is small, the waveform at start up become as the left figure, and the motor does not rotate normally. In this case, increase “STOSC” until motor to rotate normally.



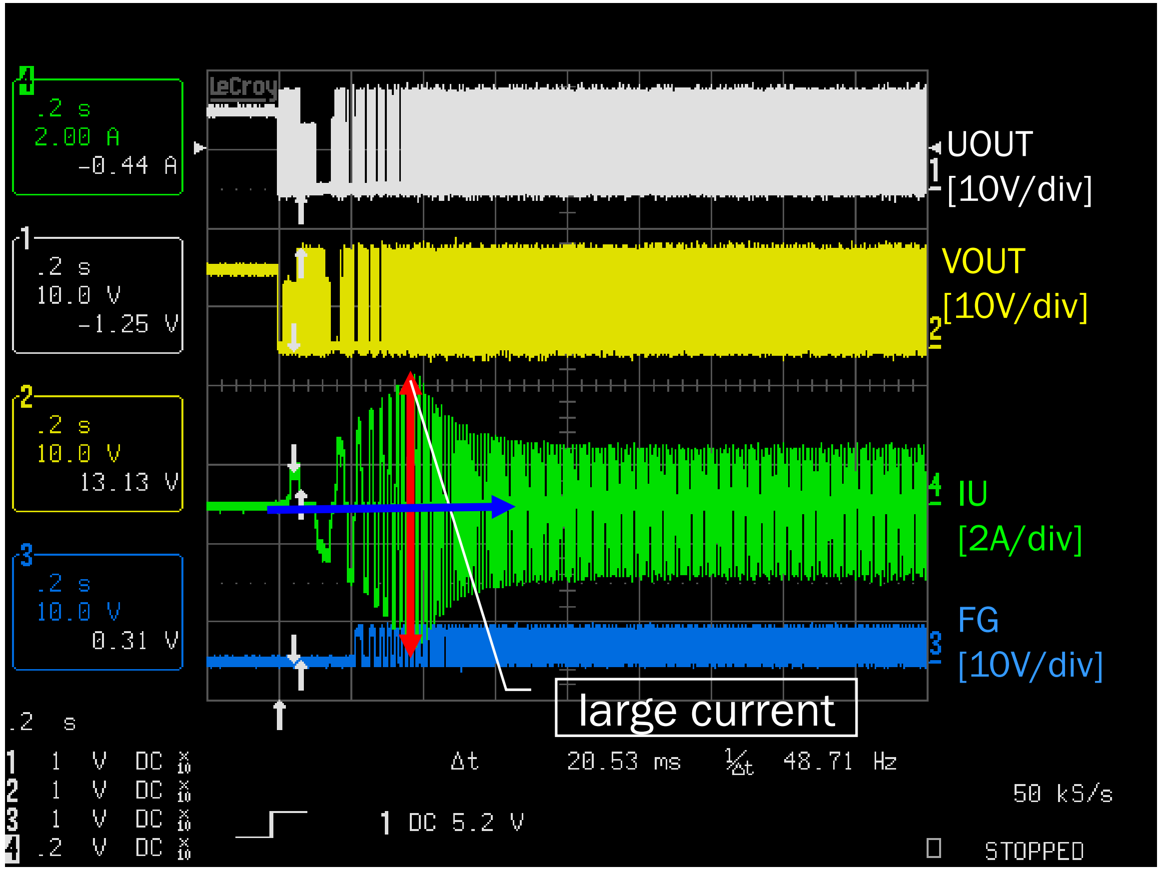
Startup failed because STOSC is too small.



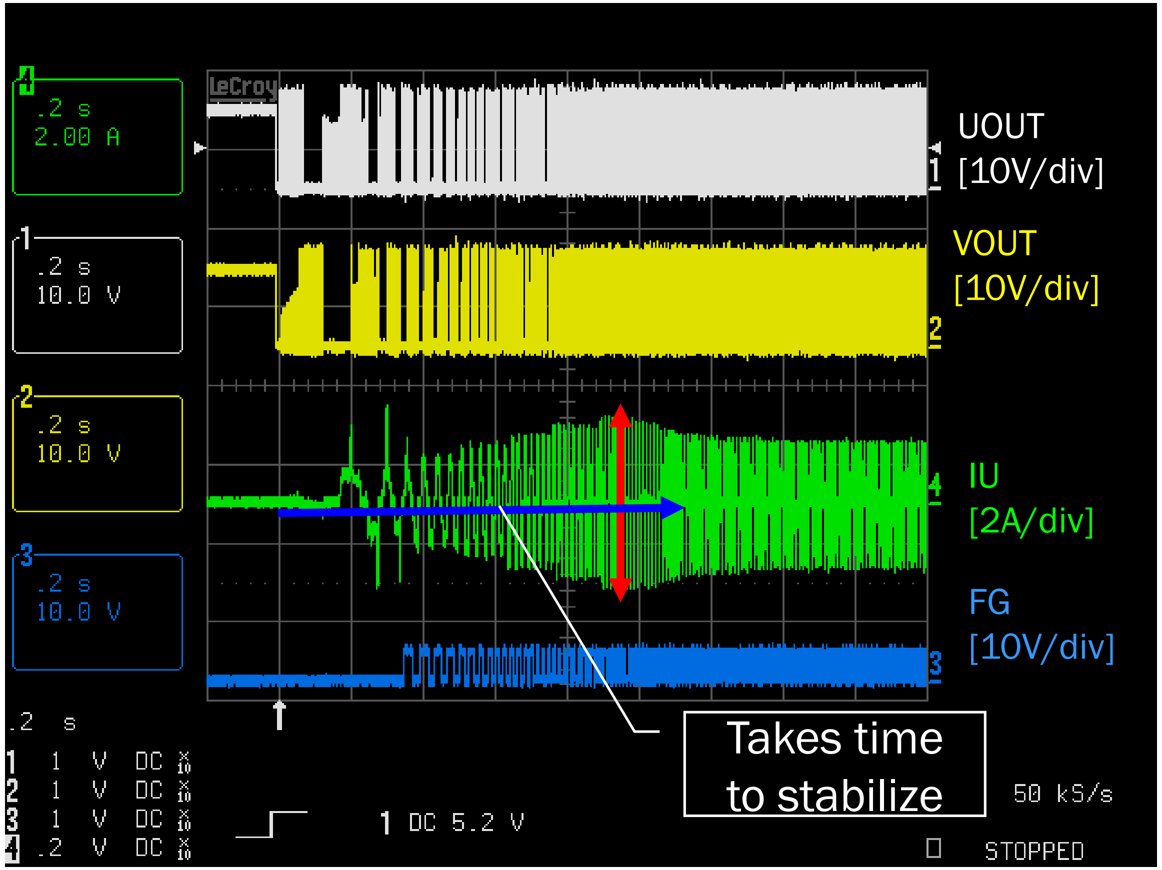
Startup success by increasing STOSC

SSTT(Soft start time)

When “SSTT” is a small value (left waveform), stable operation starts in a short time, but inrush current gets larger.
If “SSTT” is increased(right waveform), the time until to get stable operation is longer, but the inrush current gets smaller.



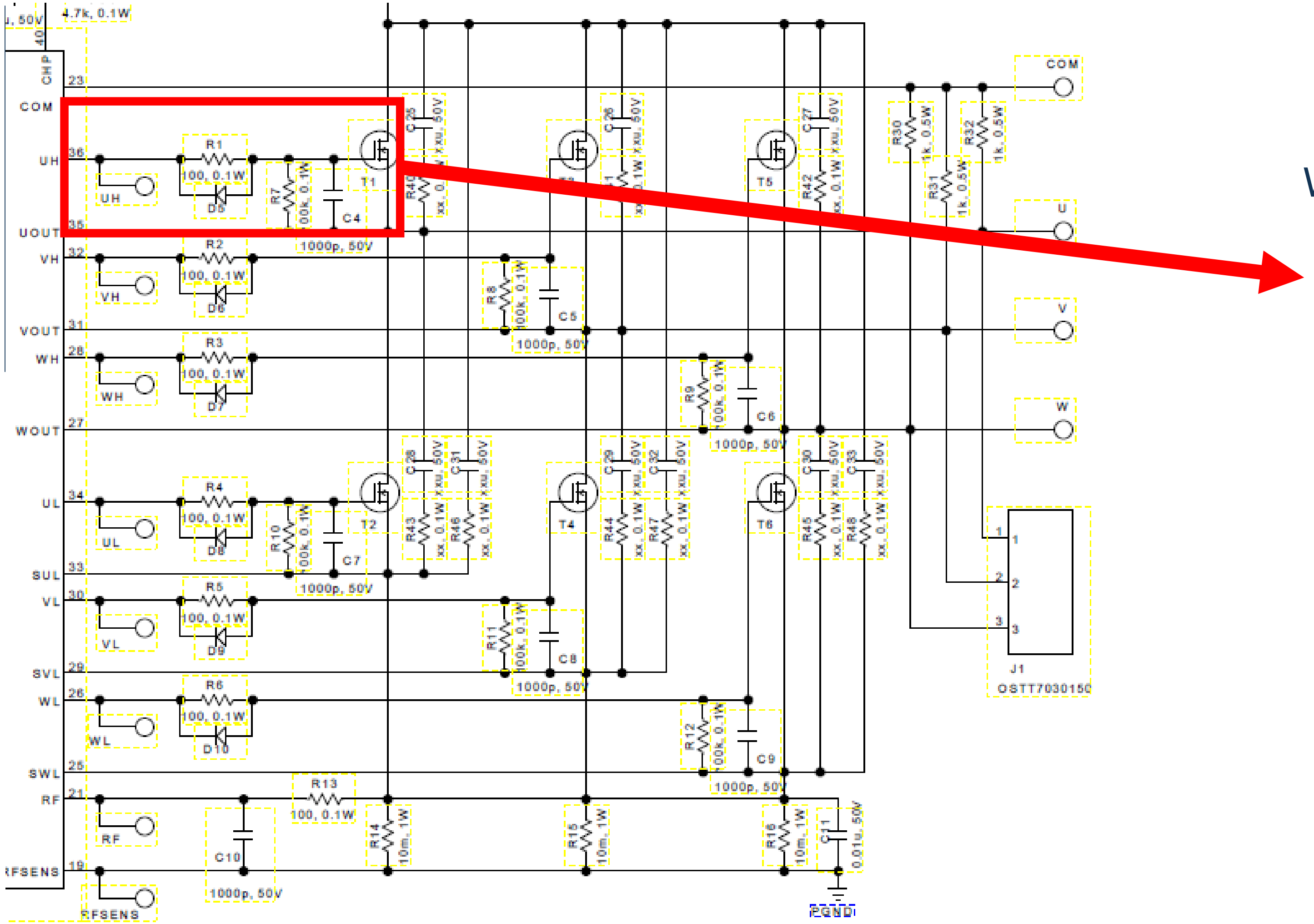
SSTT:small Immediately stabilizes, but the current is large



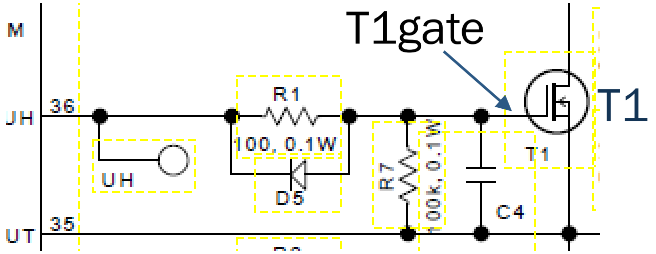
SSTT:large It takes time to stabilize but the current is small

7.Dead-Time setting

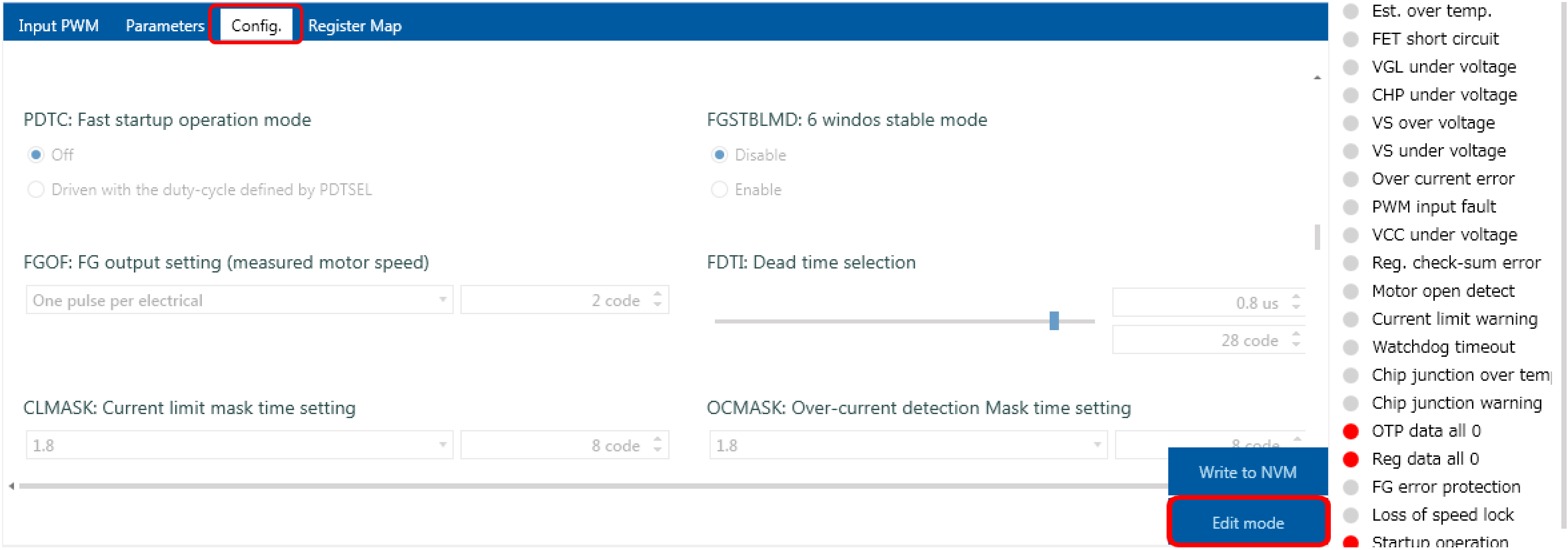
Output stage circuit block(LV8961EVB)



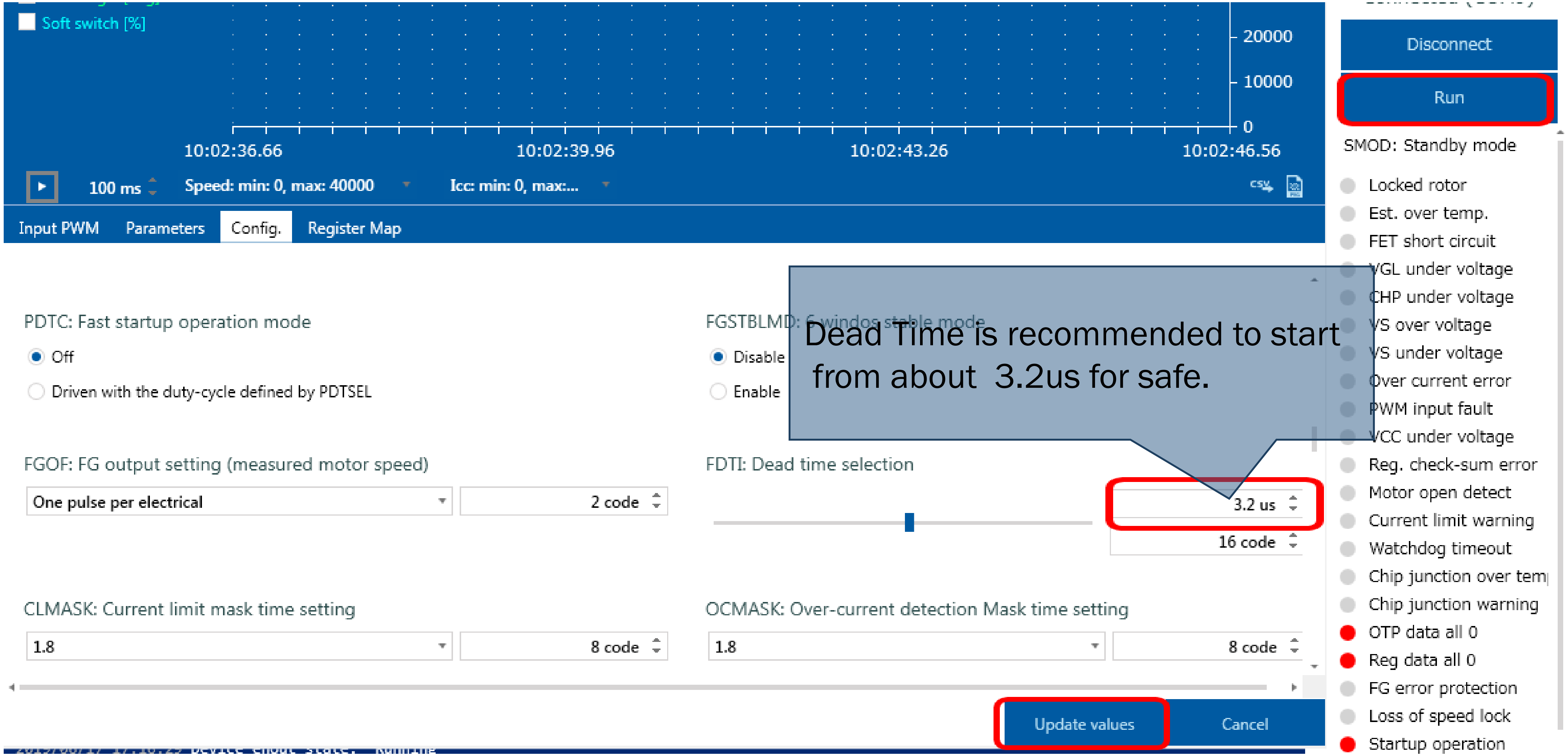
With diode



Select Input Config tab. Click Edit mode.



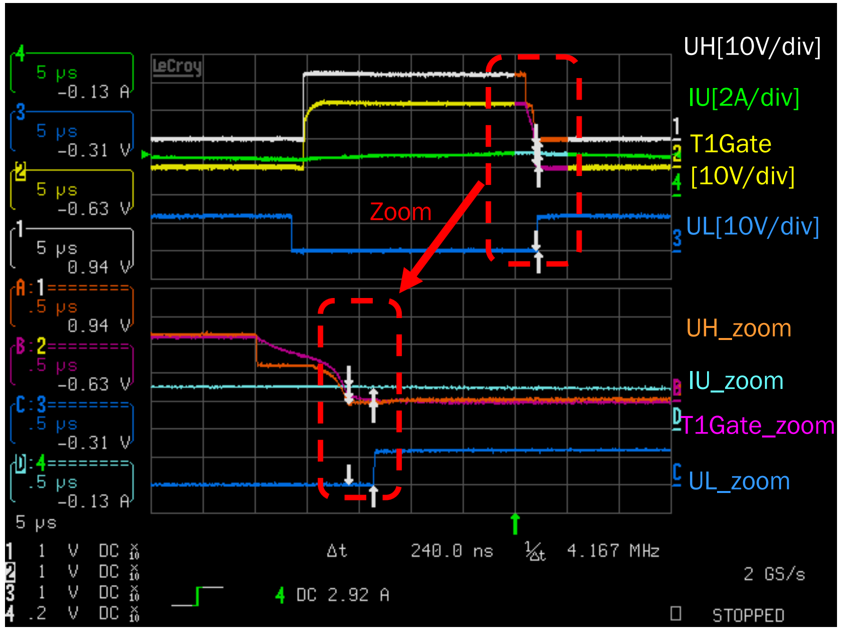
Input Value of the Dead time(0.2us-6.4us,0.2us/step).
Click the Update button and finally the Run button.



Through Current at the Dead Time setting

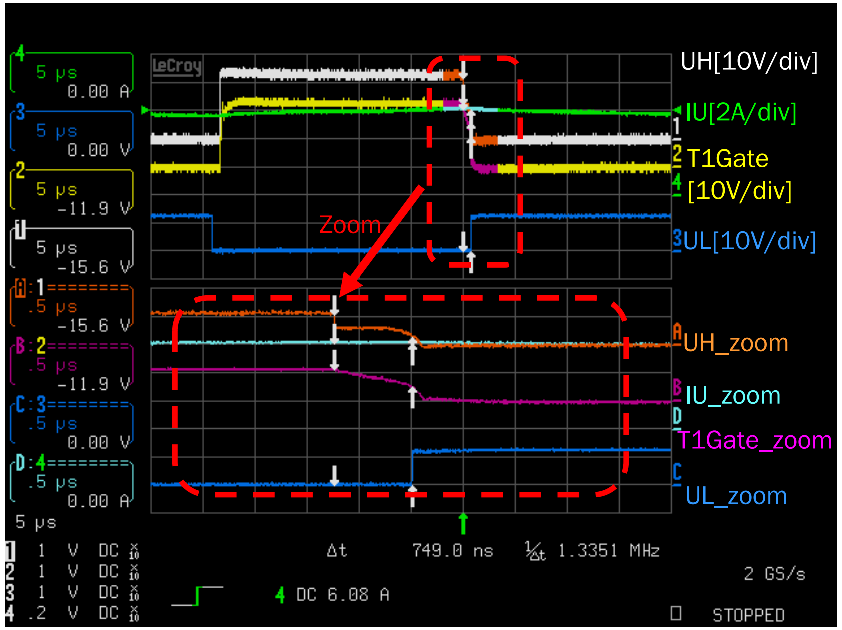
The most important thing is through current at the Dead Time setting.
As the Dead Time is reduced, timing occurs that UH and UL overlap, V phase and W phase are the same.
These conditions causes a through current to occur when the external FET is turned on simultaneously.
In the waveform on the left, UL goes high after UH goes low, so there is no problem. In the right waveform, UL becomes Hi during UH falls to Low, and there is a risk of through current flow.
It is important to set Dead Time not to occur through current.

Normal wave @Dead Time:Large



This is OK because Hi of UH and UL are not overlapped.

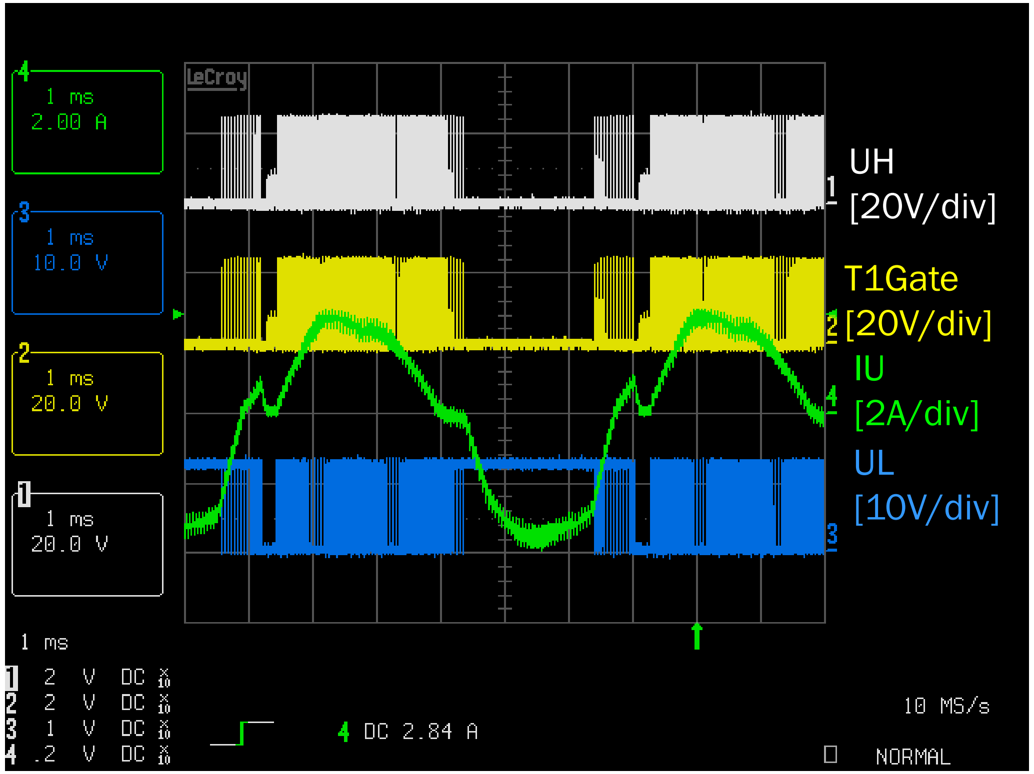
Normal wave @Dead Time:too Small



This is not suitable, because Hi of UH and UL are overlapped.

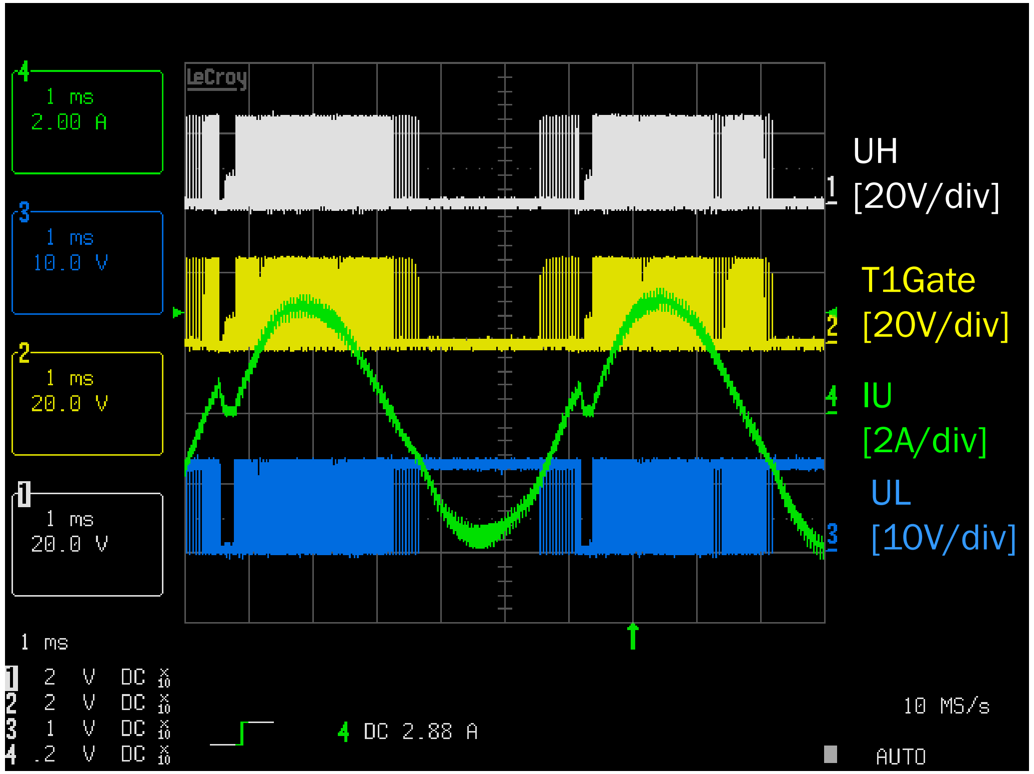
Set the "Dead Time" as short as possible without through current.
First, set the "Dead Time" parameter, then confirm current wave form.
The wave forms in two "Dead Time" settings are shown below.
In these cases, the setting of Dead Time = 3.2us where the IU waveform is distorted is not suitable value, and the Dead Time=0.6us is not distorted.

Abnormal wave @Dead Time=3.2us



Dead time = 3.2us is not suitable, because the IU waveform is distorted.

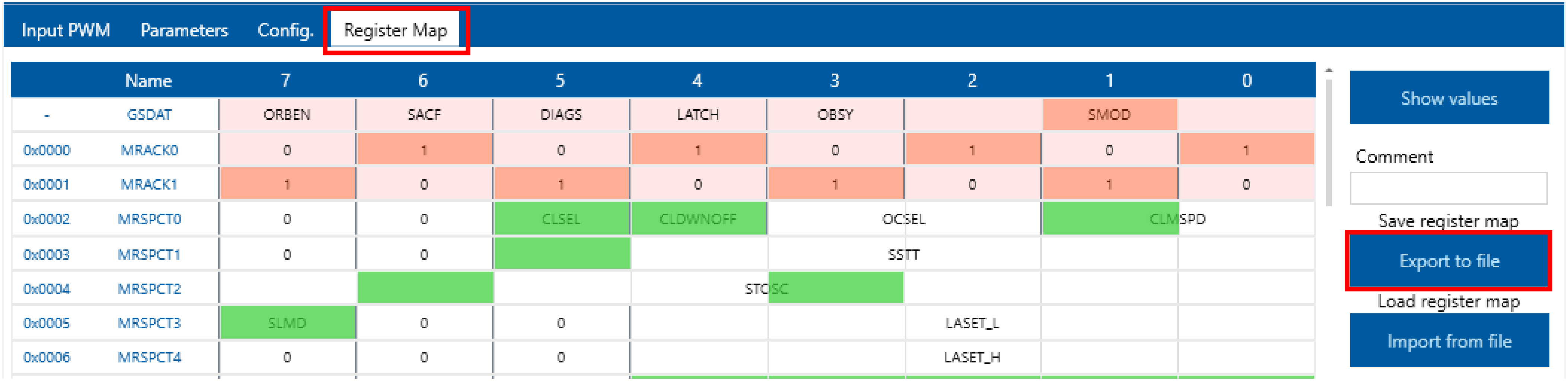
Normal wave @Dead Time=0.6us



This is OK, because IU waveform is not distorted.

Export to file

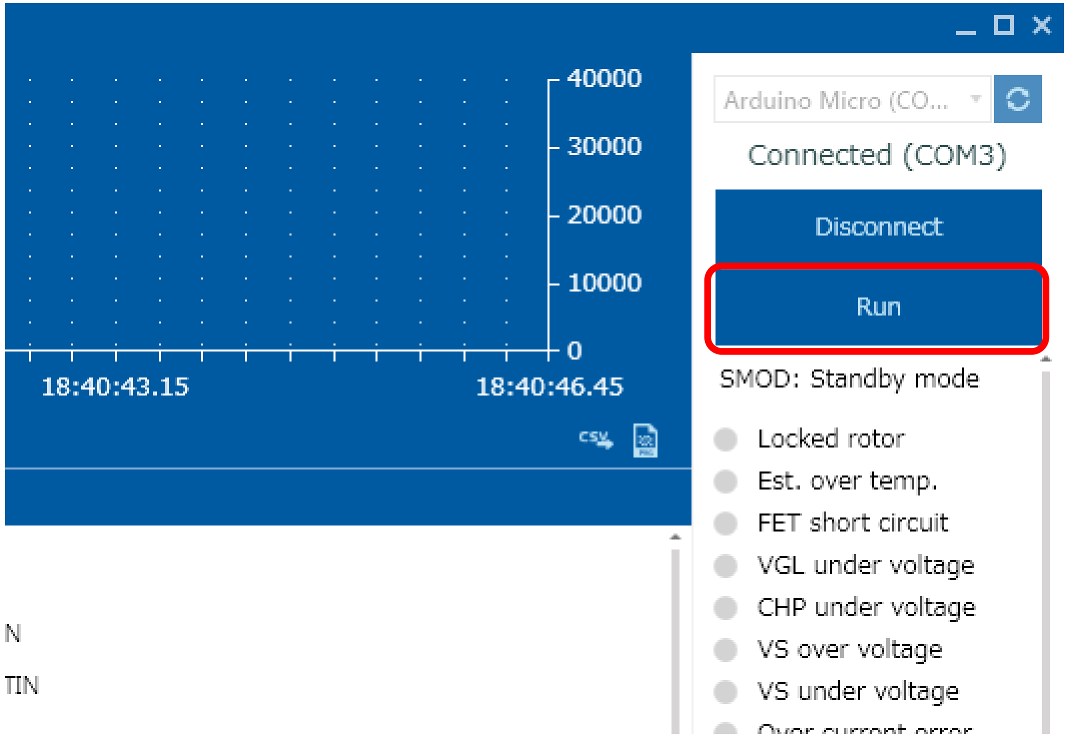
Save the setting.
Select "Register Map" tab and Click the"Export to file"



It is recommended to save an edited register setting to a file before running trial and power-off at the end of tuning. File name should be changed from the name provided by ON Semiconductor.

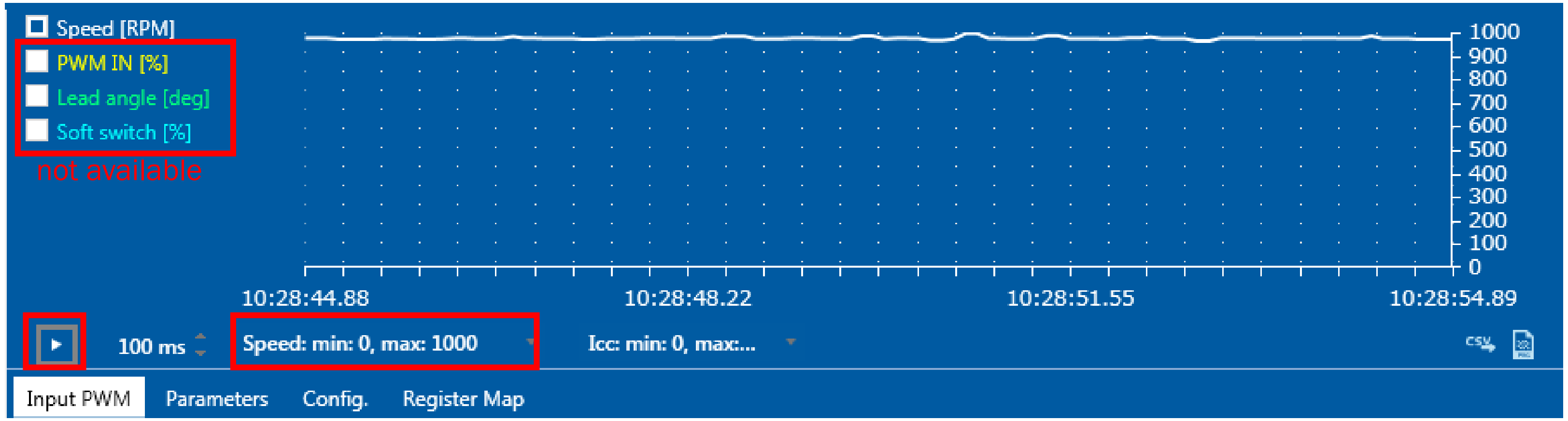
8.Run

Click the Run button and start rotating the mortar



Confirmation of Rotations of Motor

It can confirm Rotations of Motor on GUI.
The rotation speed is displayed on the graph when ▶ is pressed.
Press Speed: min … to change the scale of the Y axis.



Note: PWM, Lead angle, and soft switch are not available with this version.

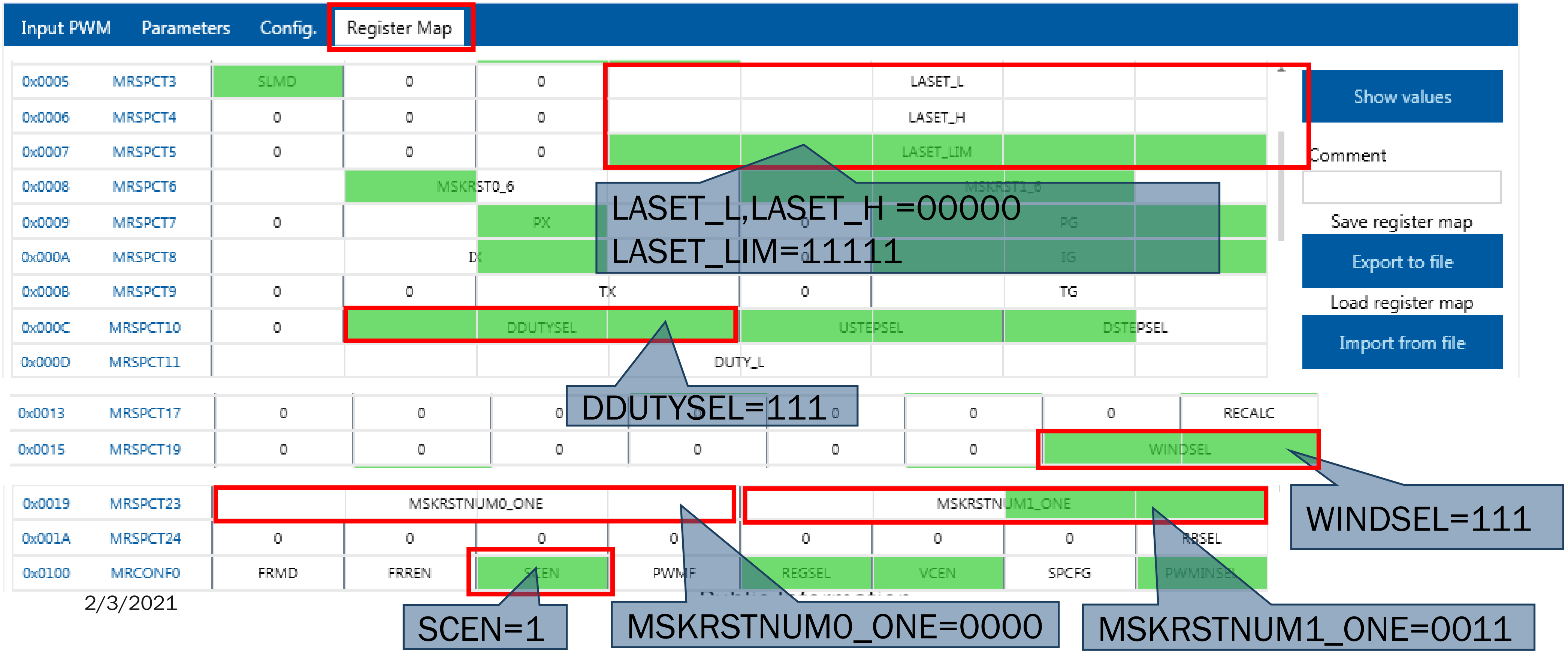
9.Lead angle & Mask width tuning

At first it set initial setting data. And tunes the Lead angle (LASET_H and LASET_LIM) and the Mask width (MSKRSTNUM0 / 1_ONE).Actually select ”Register Map” tab, it set value as following data.

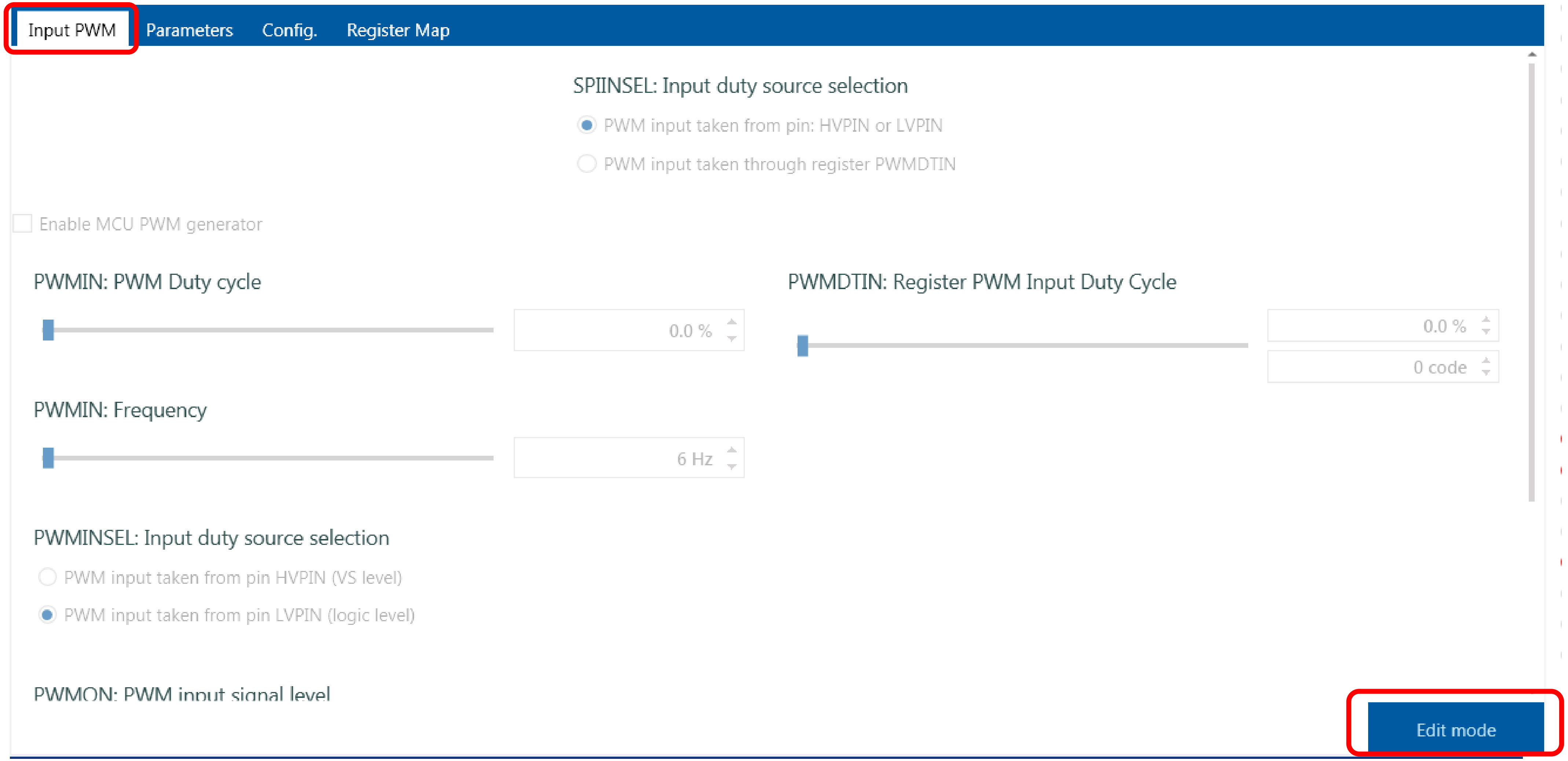
Select ”Register Map” tab. Set the following.

1. “LASET_L” and “LASET_H” set to 00000b, and “LASET_LIM” set to 11111b
2. “MSKRSTNUM0_ONE” set to 0000b, and “MSKRSTNUM1_ONE” set to 0011b
3. “DDUTYSEL” set to 111b
4. “SCEN” set to 1

Green :1
White :0



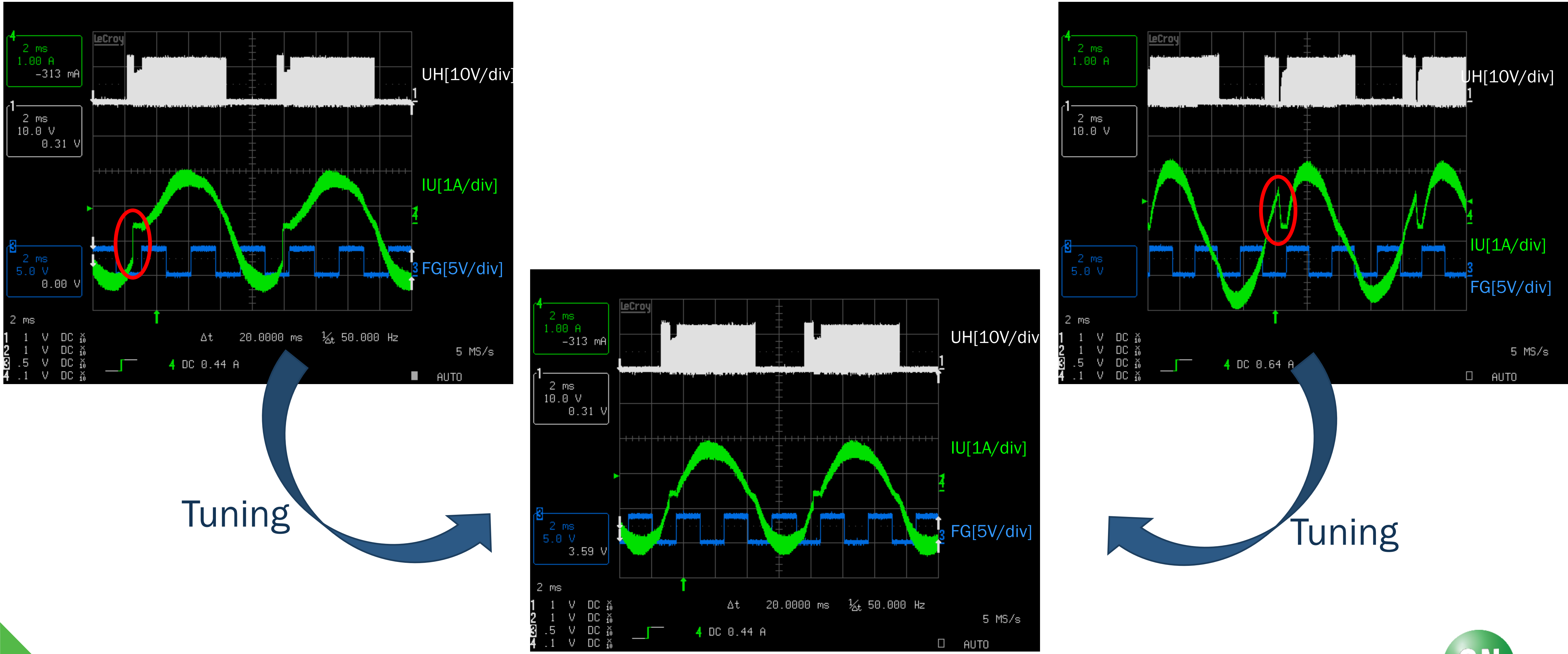
Select "Input PWM" tab. Click Edit mode.



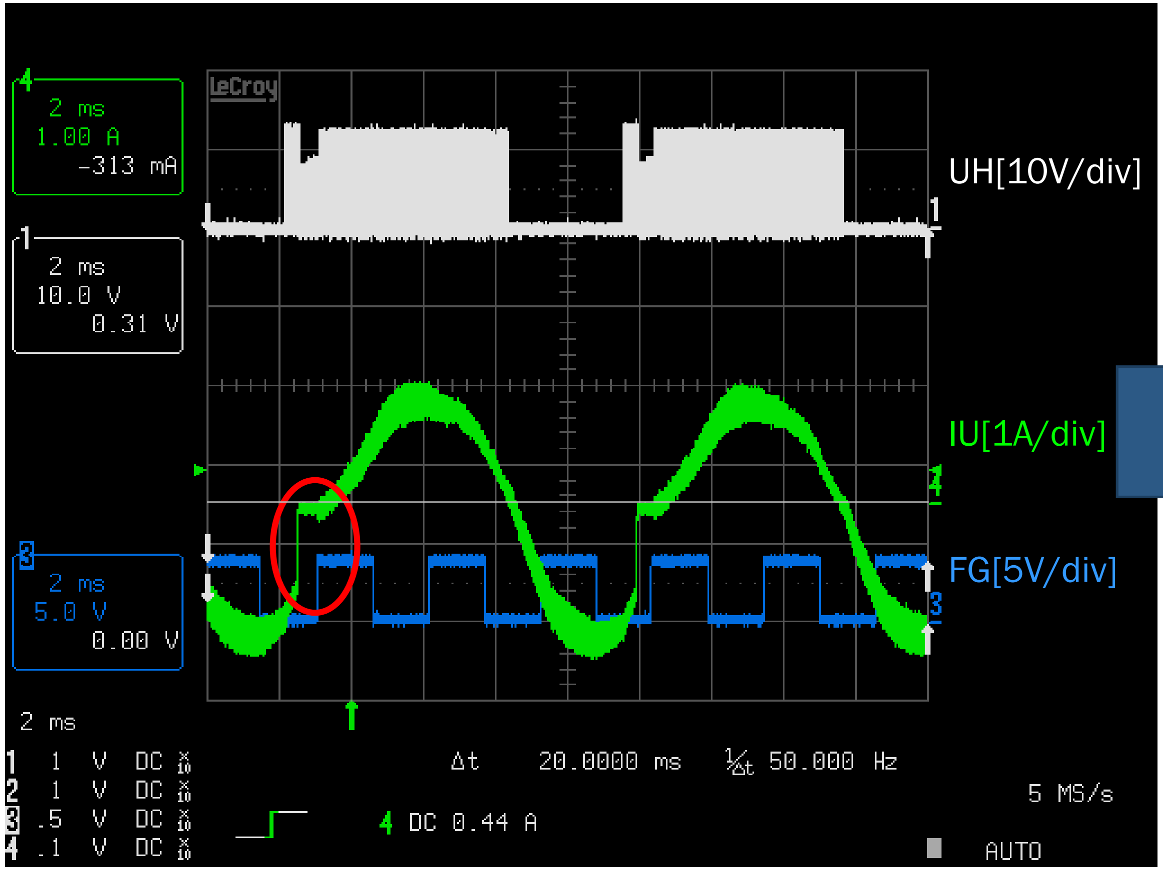
Click “Enable MCU PWM generator”.
Input Value of “PWM duty cycle” and “Frequency”.
Click “Update values” and “Run” .

Lead angle tuning

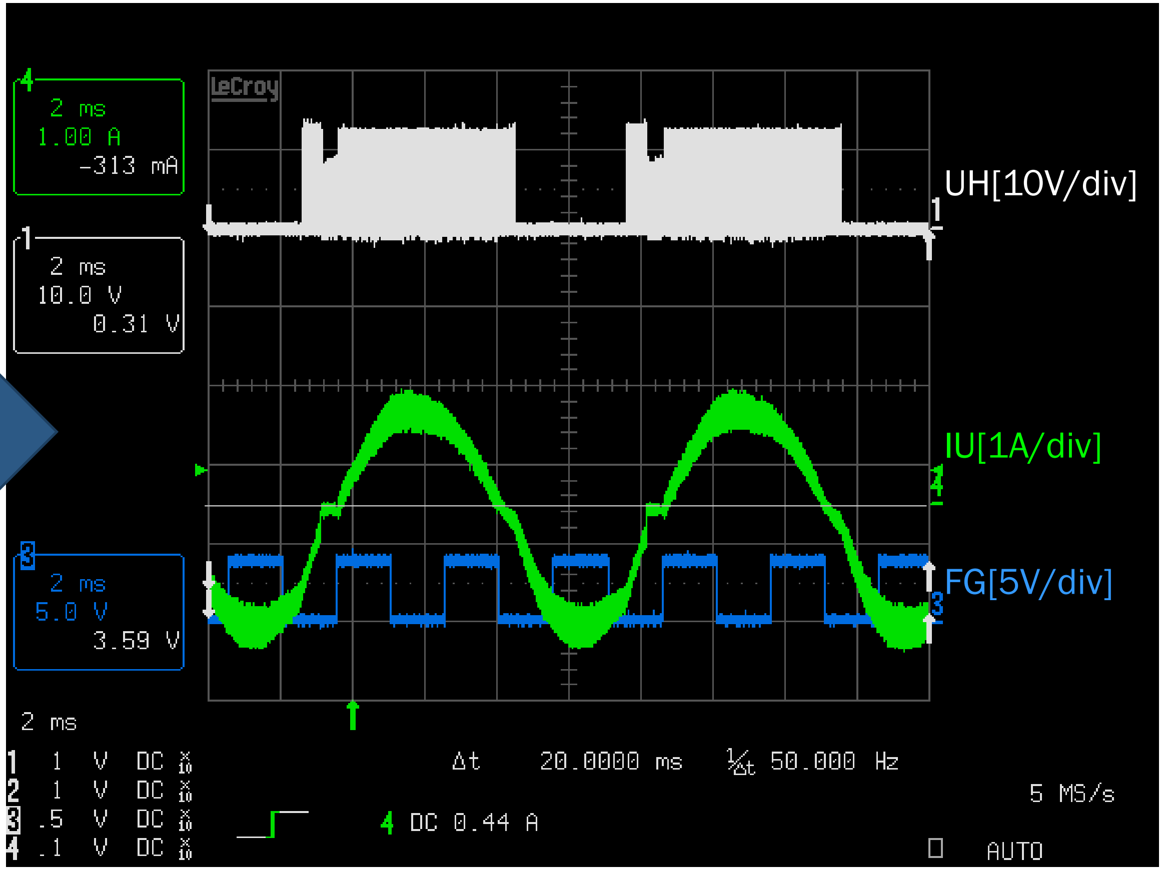
Confirm U phase and IU current. If the wave form is distorted as the left or the right figure, change “mask width” and “lead angle” to decrease distortion as the center figure.



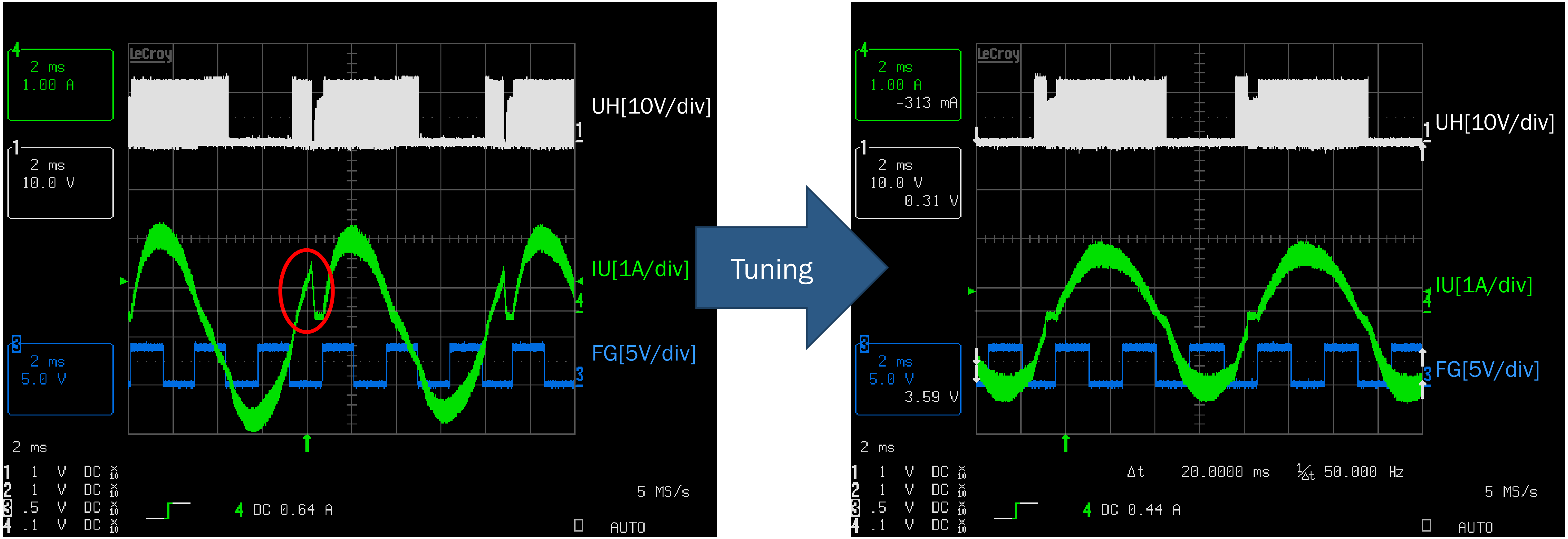
In the case of left figure which having distortion before zero cross, the value of “Lead angle” is too small.
Decrease distortion as right figure by to change Lead angle(LASET_L, LASET_H).
LASET_L and LASET_H are needed to be same value. Increasing “Lead angle”, distortion of wave form to get smaller.



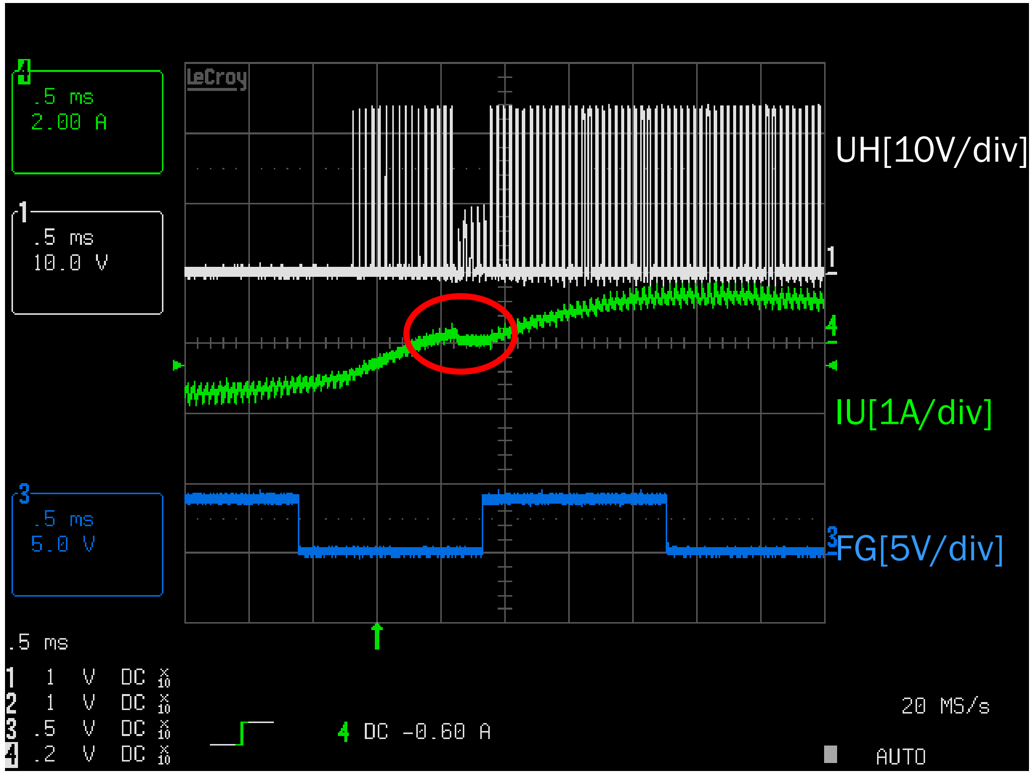
Tuning

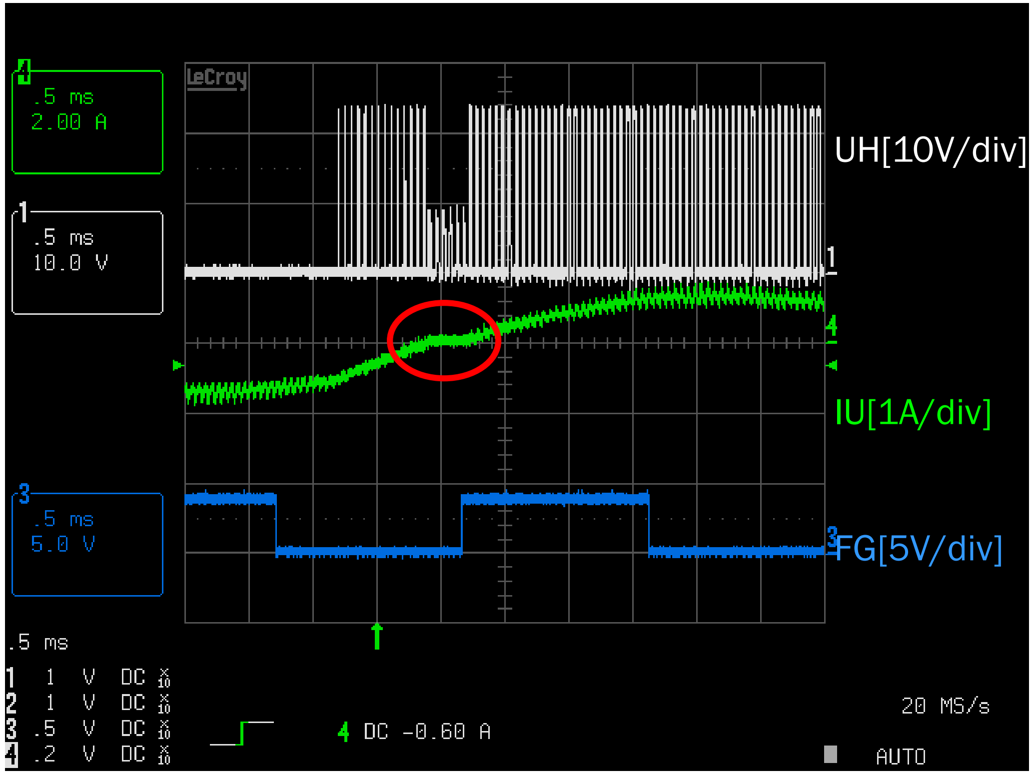


In the case of left figure which having distortion after zero cross, the value of “Lead angle” is too large.
Decrease distortion as right figure by to change Lead angle(LASET_L, LASET_H).
LASET_L and LASET_H are needed to be same value. Decreasing “Lead angle”, distortion of wave form to get smaller.



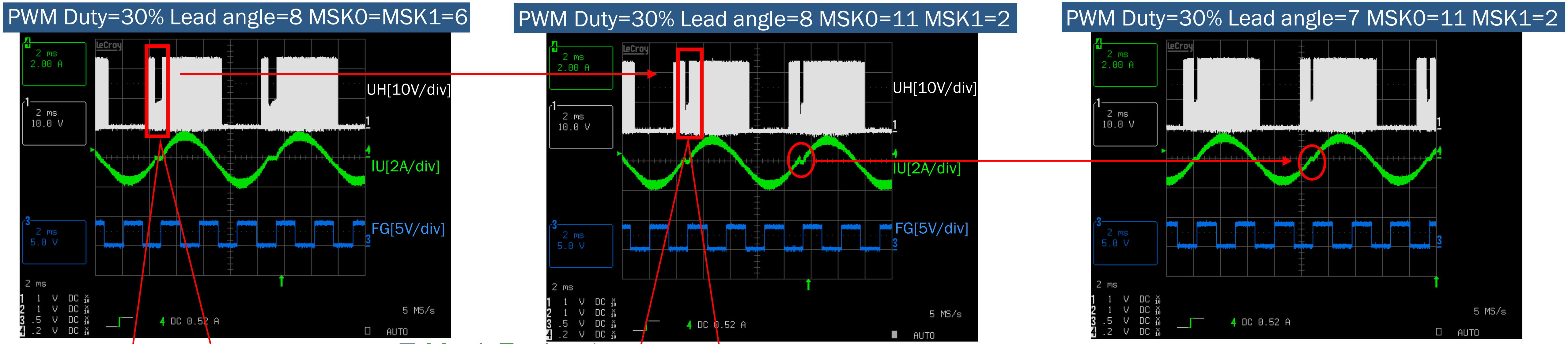
After adjusting the Lead angle and correcting the rough distortion, adjust the Lead angle by expanding the area near the zero cross.
Even if it looks like a proper Lead anlge in the long time axis, there is still possibility for adjustment when it is enlarged.

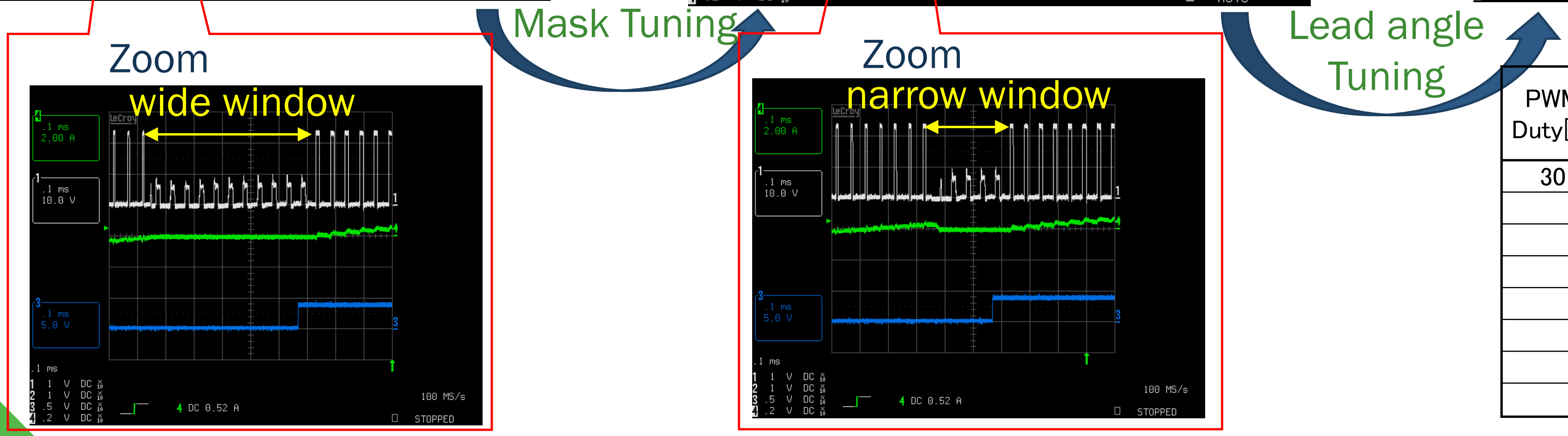




Lead angle Tuning

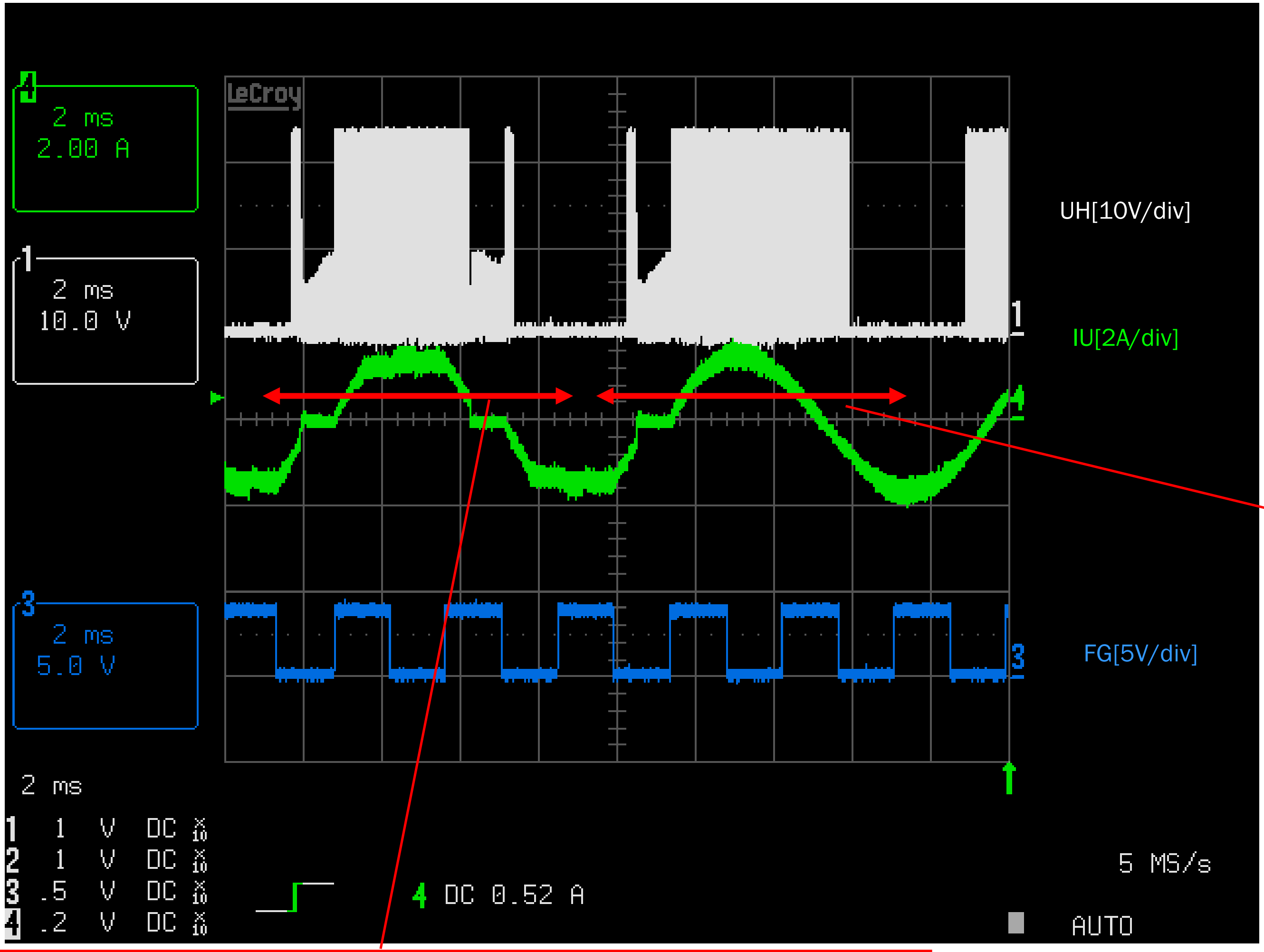
At PWM Duty 30%, once the setting of the Lead angle that can suppress distortion of the current waveform is decided, adjust the Mask width (MSKRSTNUM0_ONE = MSK0, MSKRSTNUM1_ONE = MSK1) , and change the window for seeking B-EMF narrowly. MSK0 is increased and MSK1 is decreased. One of the example is as below: MSK0 = MSK1 = 6 are changed to MSK0 = 11,MSK = 2 respectively. If you compare the red squares in the figures below, you can see that the window is narrower at the center than the left. Changing the Mask width shifts the Lead angle and causes distortion of the current waveform, so change Lead angle again. You can see that the distortion is corrected by comparing the red circles in the figures below. Make a note of the adjusted Lead angle and Mask width along with the PWM Duty value and motor speed.





PWM Duty[%]	Lead Angle =LASET_L =LASET_H	MSK0	MSK1	rpm
30	7	11	2	1400

It change Mask width.
If window time is narrowed, IU is unstable as below figure.
Therefore, adjusting of Mask width should be in range of normal IU wave.



stable
(1-window mode)

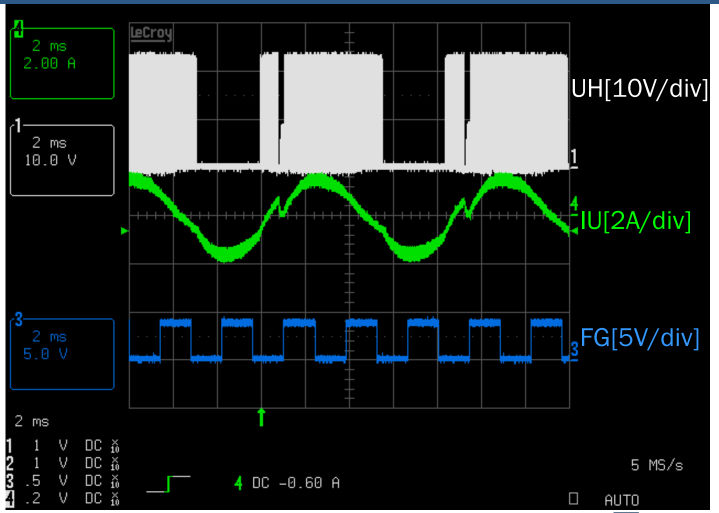
When the window narrows and B-EMF can not be detected, stable operation in 6-window mode.(6-window mode)

Next, while rotating the motor at PWM Duty 30%, increase the value of Lead angle by 2 (in this case, 7 + 2 = 9), and then set PWM Duty to 40%.

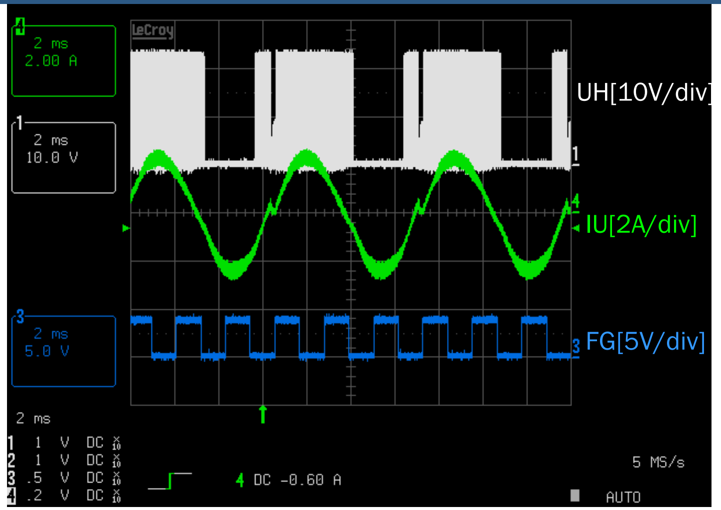
From the state as PWM Duty30%,
1. Adjust the Lead angle (LASET_L, LASET_H), and adjust the current waveform without distortion
2.Narrow the Mask width(MSK0,MSK1).
3.Readjust Lead angle(LASET_L,LASET_H),it takes note PWM Duty, motor speed, Lead angle , andMSK0,MSK1.
Repeat 1-3 to fill the table up to 100%.

PWM Duty[%]	Lead Angle =LASET_L =LASET_H	MSK0	MSK1	rpm
30	7	11	2	1400
40	8	11	3	1780

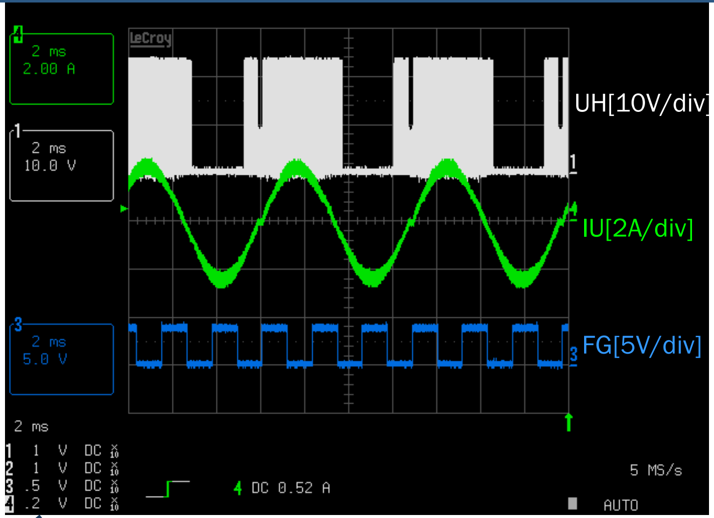
PWM Duty=30% Lead angle=9 MSK0=11 MSK1=2



PWM Duty=40% Lead angle=9 MSK0=11MSK1=2



PWM Duty=40% Lead angle=8 MSK0=11 MSK1=3



PWM Duty:30%→40%

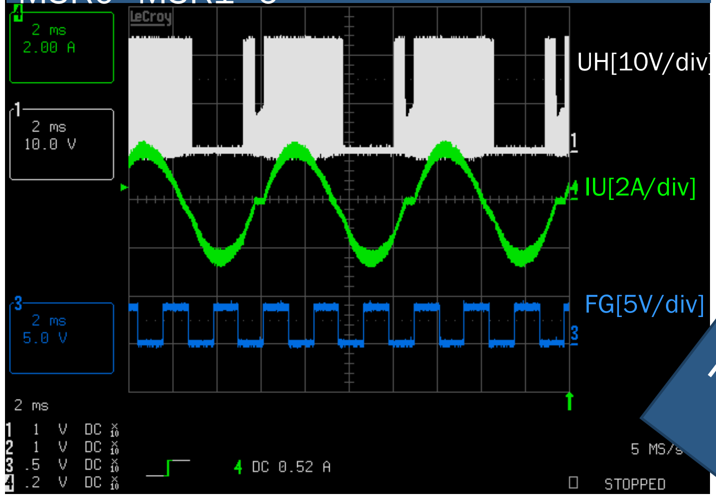
Lead angle &Mask Time Tuning

As a technique to increase PWM Duty at the time of tuning, for example, when changing from 40% to 50%, it should be increased in small steps from 40% to 45% to 50%.

When changing PWM Duty 40% → 50% in one step, it looks like the upper right waveform. Even if the motor does not rotate normally, increasing the PWM duty in 5% steps. It rotates normally like the lower right waveform.

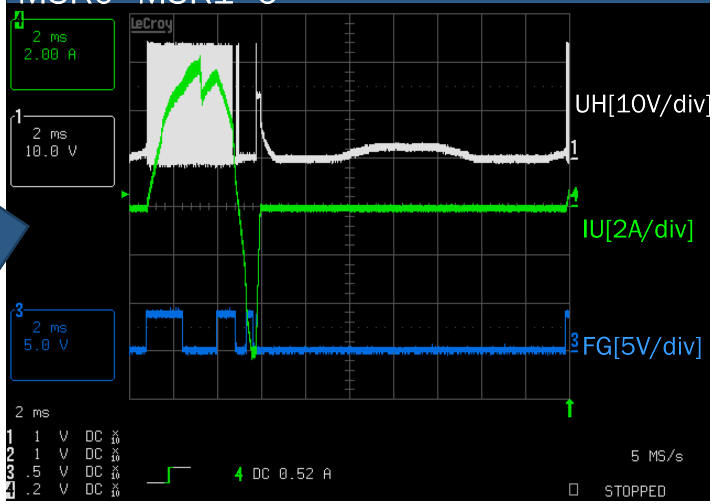
(Note)If it start with high duty, there possibly be in abnormal operation.
Therefore, the duty should be increased slowly.

PWM Duty=40% Lead angle=9
MSK0=MSK1=6



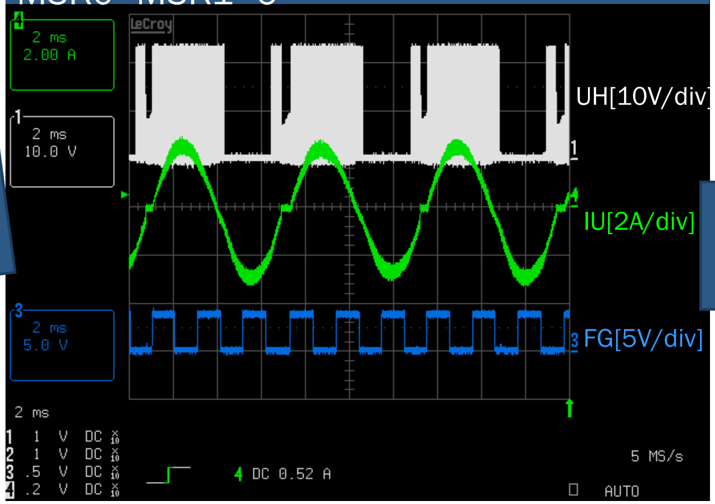
PWM Duty
+10%

PWM Duty=50% Lead angle=9
MSK0=MSK1=6



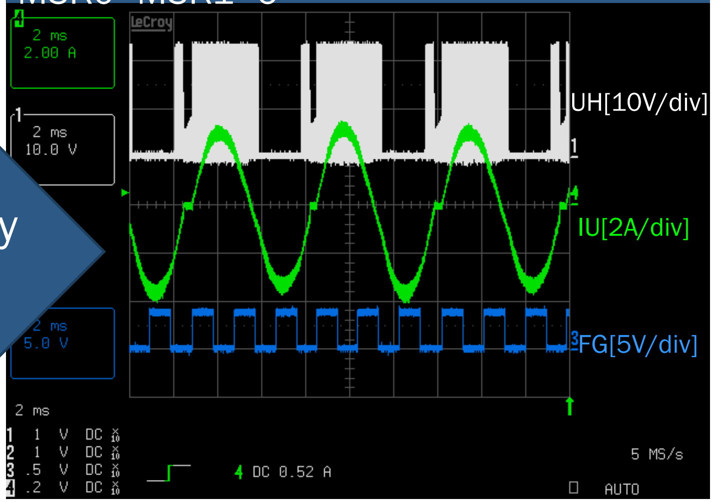
PWM Duty
+5%

PWM Duty=45% Lead angle=9
MSK0=MSK1=6



PWM Duty
+5%

PWM Duty=50% Lead angle=9
MSK0=MSK1=6



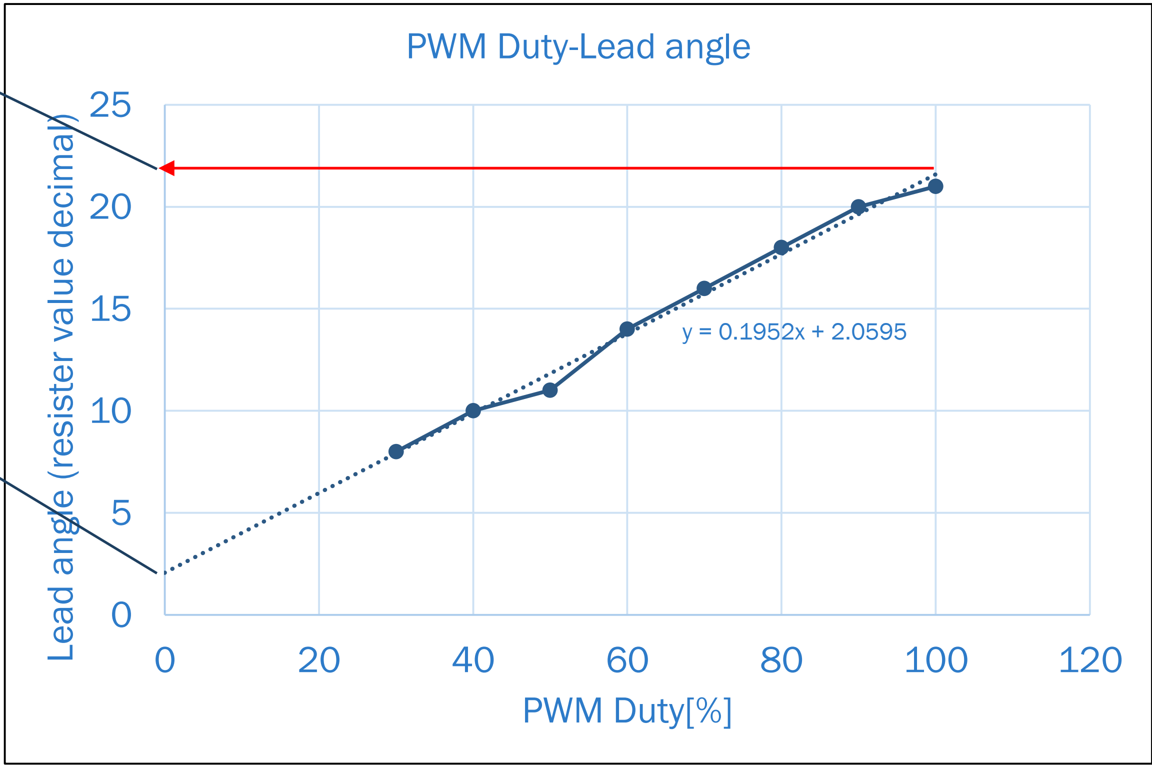
After it filled the table to 100% and search the widest mask setting. In the example below, it becomes MSK0 = 7 and MSK = 4. It set these value in MASK0 and MASK1,and it determine the Lead angle again. This time, Mask width (MSK0 = 7, MSK1 = 4) is fixed. It graphed these data(X-axis:PWM Duty,Y-axis Lead angle), it determine Lead angle at PWM Duty = 0% and 100% from the linear approximation formula.
In the example below, Lead angle = 2 at PWM Duty = 0%, Lead angle = 22 at PWM Duty = 100%.

PWM Duty[%]	Lead Angle =LASET_L =LASET_H	MSK0	MSK1	rpm
30	7	11	2	1400
40	8	11	3	1780
50	10	9	3	2200
60	12	8	3	2450
70	16	7	4	2750
80	18	7	4	2950
90	20	7	4	3150
100	21	7	4	3350

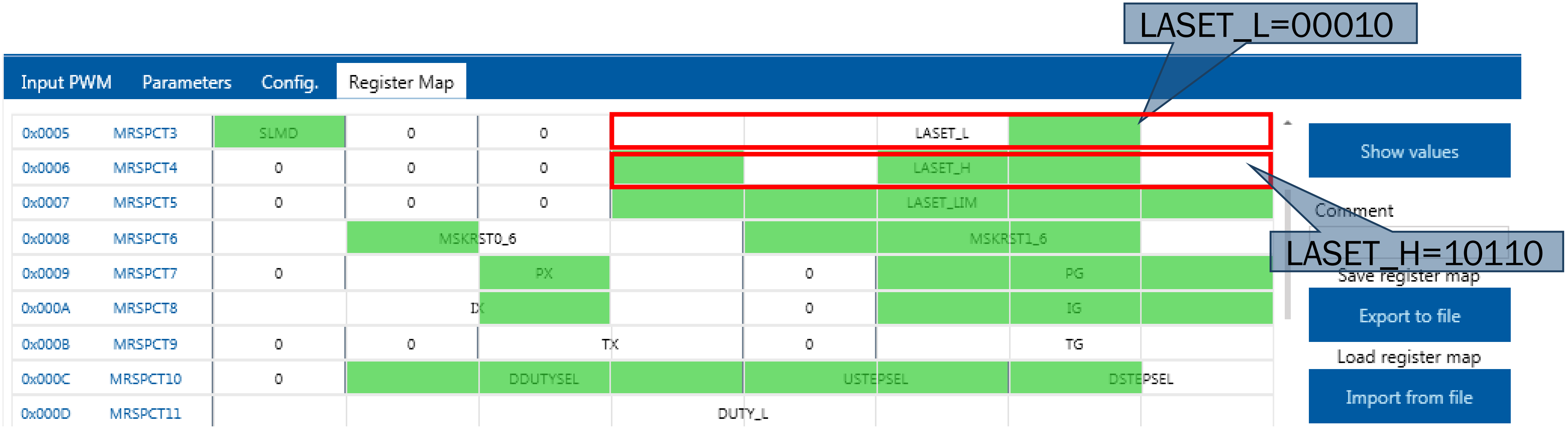
Lead angle(LASET_H) is 22 at PWM Duty 100%

PWM Duty[%]	Lead Angle =LASET_L =LASET_H	MSK0	MSK1	rpm
30	8	7	4	1400
40	10	7	4	1780
50	11	7	4	2200
60	14	7	4	2450
70	16	7	4	2750
80	18	7	4	2950
90	20	7	4	3150
100	21	7	4	3350

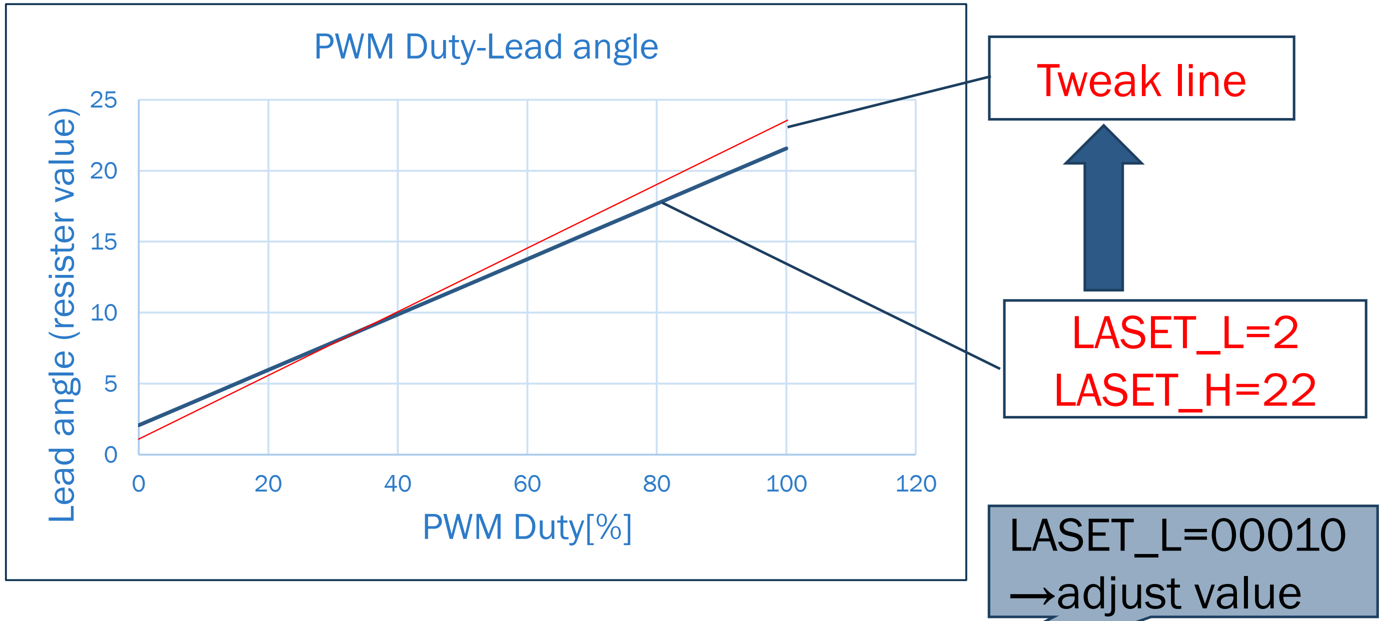
Lead angle(LASET_L) is 2 at PWM Duty 0%

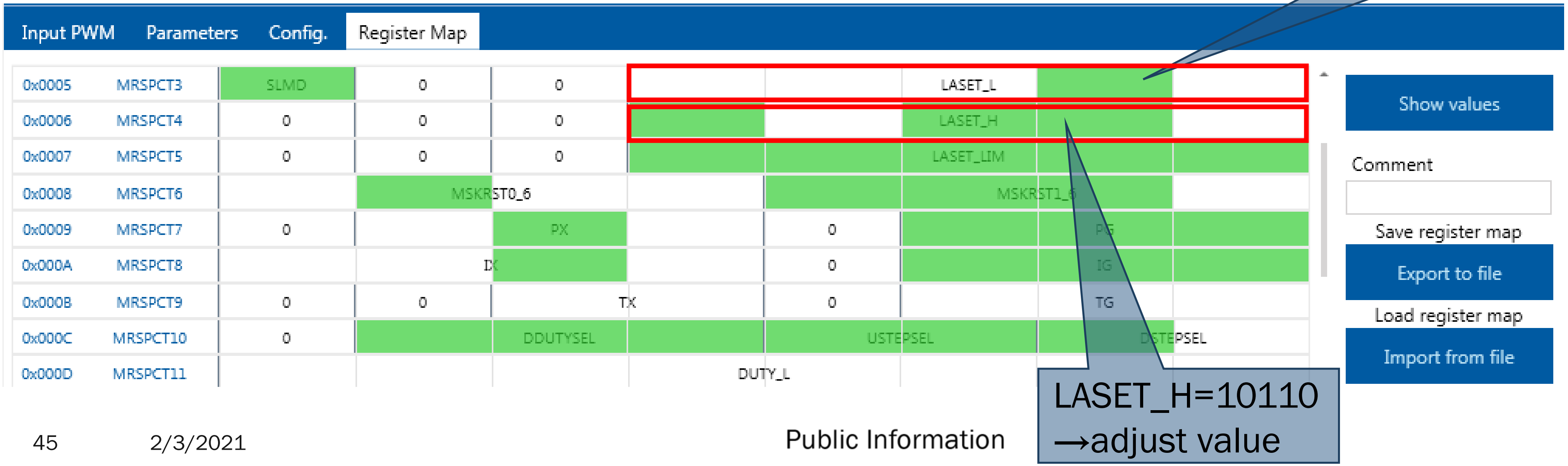


Enter Lead angle =(2d)= (00010b) with PWM Duty = 0% in LASET_L. Enter Lead angle =22d= (10110b) with PWM Duty = 100% in LASET_H. Check if stable operation is performed under the conditions from the minimum rotation speed to the maximum rotation speed used under this condition.



If the motor did not rotate with the settings on the previous page, finely adjust the Lead angle settings (LASET_L, LASET_H) based on the inclination at LASET_L = 2, LASET_H = 22 . And check the motor stability again.





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LV8961 N-window mode Timing chart

May 30th, 2019

iPS BU, Motor Control Solutions

Application team

Public Information

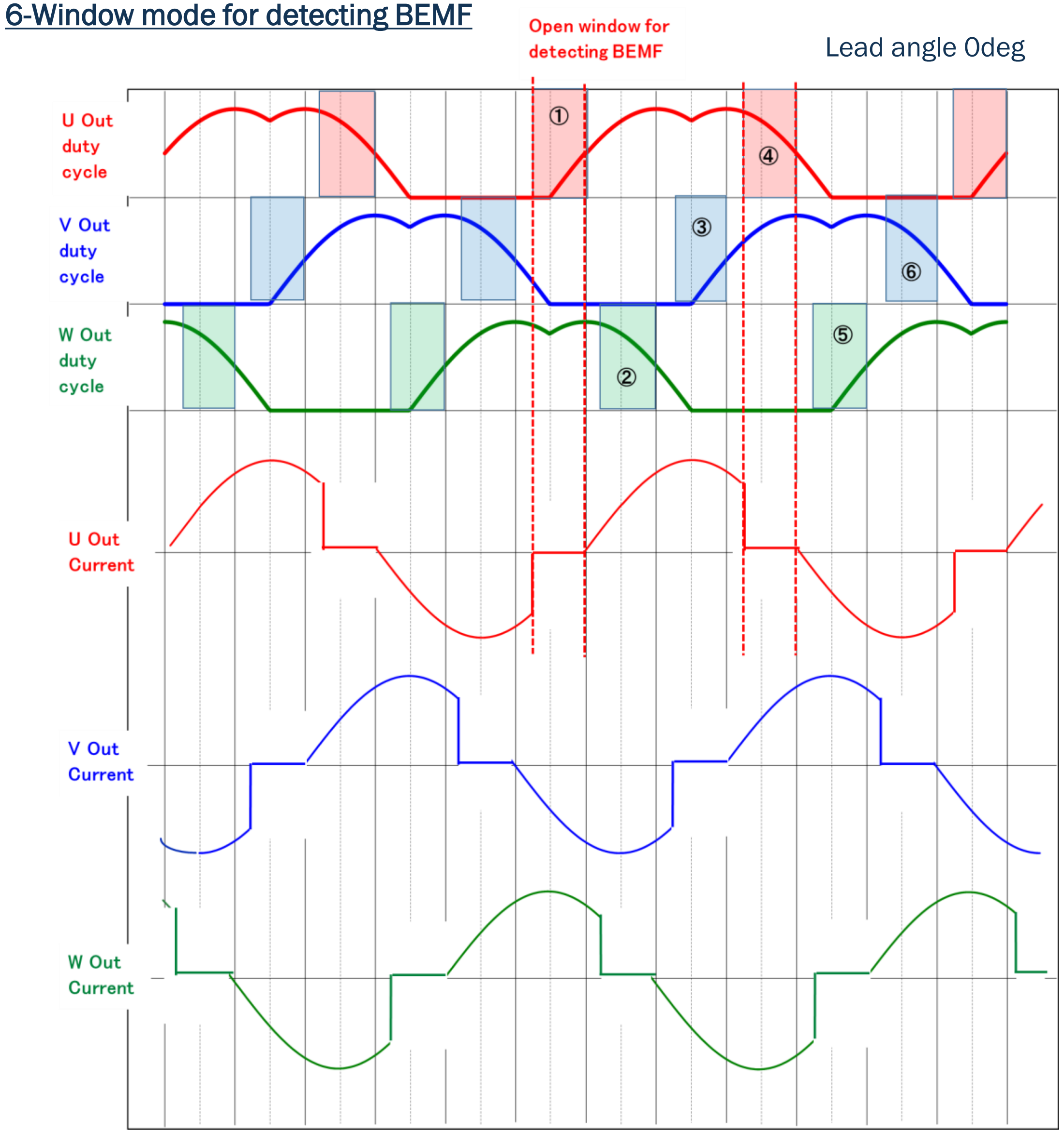
LV8961 N-window mode Timing Chart

LV8961H is a three-phase sensorless pre-driver with sinusoidal two-phase drive (space vector modulation).
This two-phase driver always activates all three driver outputs. To detect rotor position, this device monitor the BEMF zero cross timing. It is required to have the driver output floating timing; so called window.
The four selectable numbers of the detection window per electrical cycle.

- 6: all zero cross for all three phases
- 3: one rising zero cross for each phase
- 2: rising and falling zero crosses of the phase U
- 1: one rising zero cross of the phase U

Timing charts of these zero cross detection modes will be show in the following slides.

LV8961 6-window mode Timing Chart



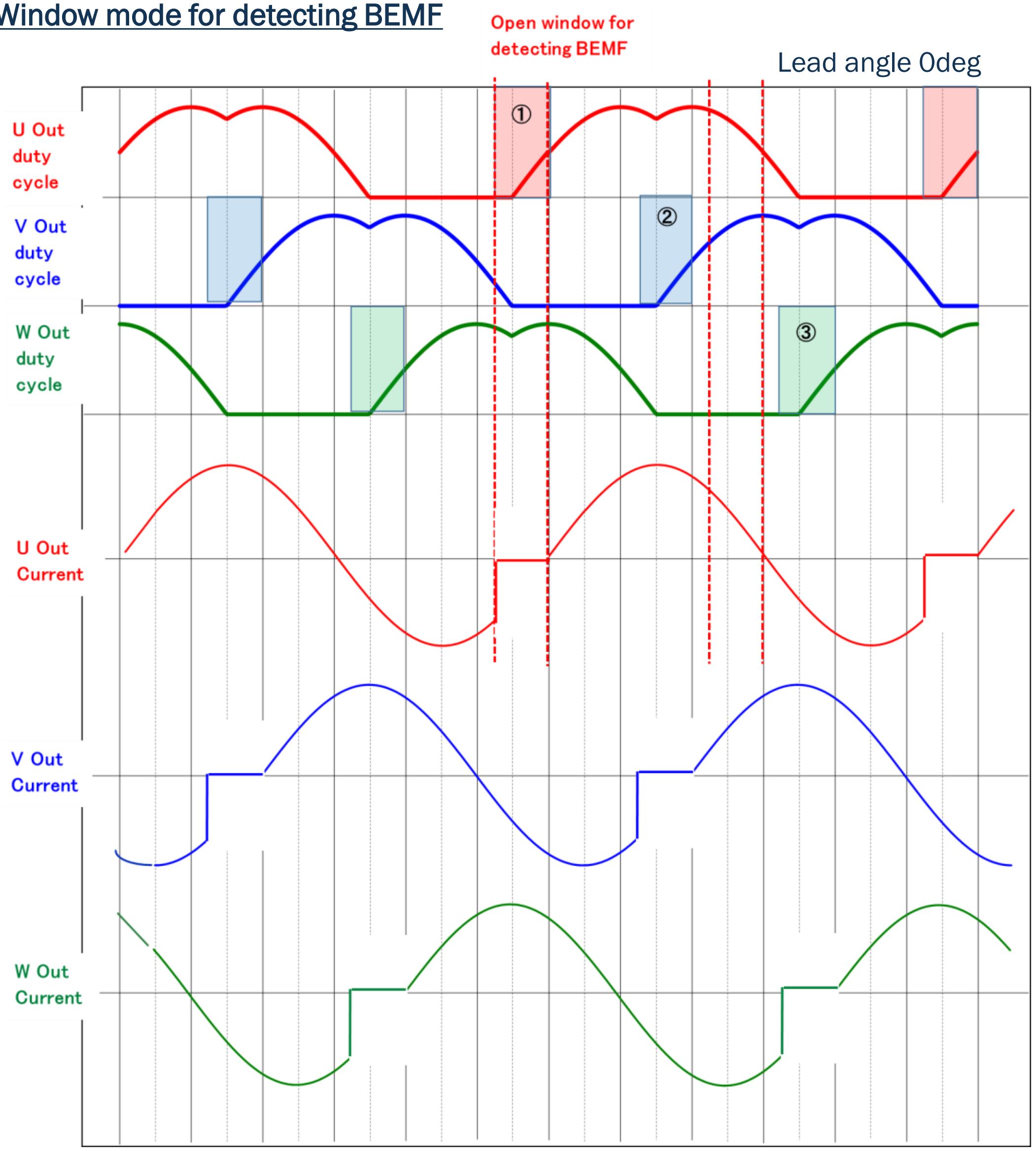
6-window mode

All zero cross (rising and falling) for all three phases will be detected by opening 6 windows per electrical cycle. The shaded period in the left chart, is the window i.e. floating output.

It gives best robustness to secure the all zero cross detection. However, the current waveform distortion will be higher. Even though, other window number (1, 2, or 3) is selected, 6-window mode is automatically selected at the initial motor start-up.

LV8961 3-window mode Timing Chart

3-Window mode for detecting BEMF



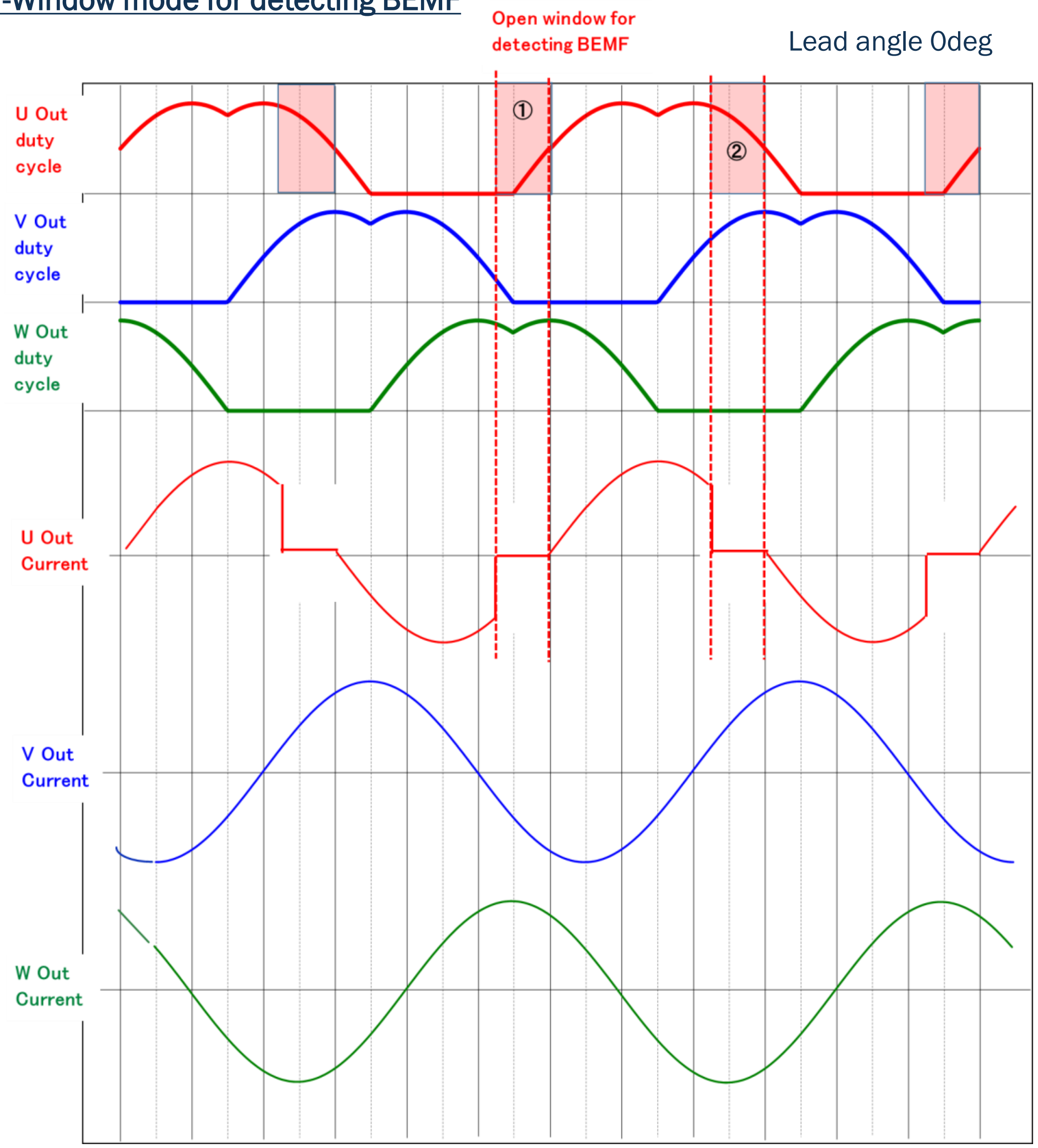
3-window mode

One rising zero cross for each phase will be detected by opening 3 windows per electrical cycle. The shaded period in the left chart, is the window i.e. floating output.

Balanced (or same) waveform is applied among three phases.

LV8961 2-window mode Timing Chart

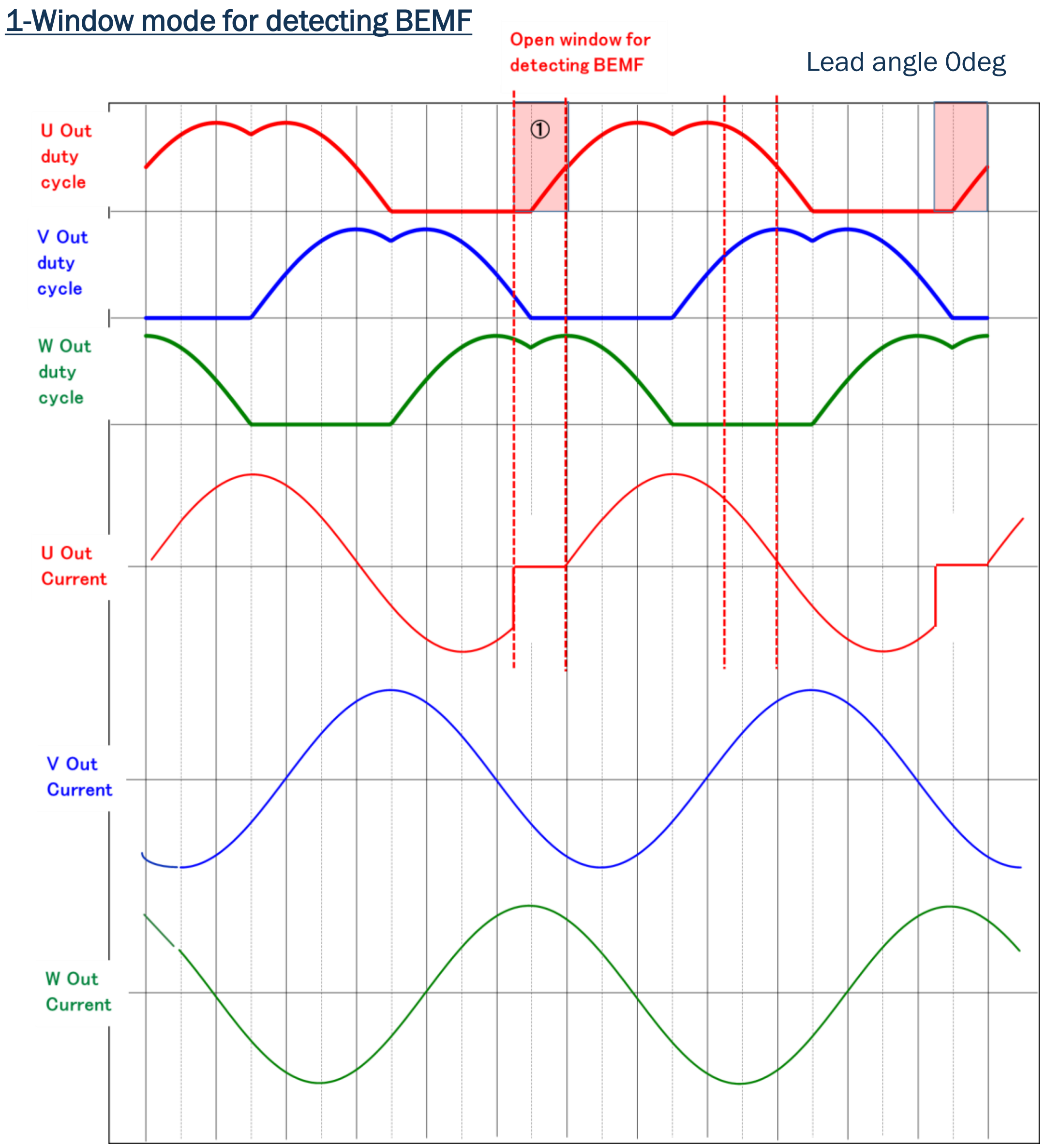
2 -Window mode for detecting BEMF



2-window mode

Rising and falling zero crosses of the phase U will be detected by opening two windows per electrical cycle. The shaded period in the left chart, is the window i.e. floating output.
Only phase U has the windows, and the others (V and W) doesn’t. Therefore, the current waveform distortion will be reduced.

LV8961 1-window mode Timing Chart



1-window mode

Rising zero crosses of the phase U will be detected by opening one window per electrical cycle. The shaded period in the left chart, is the window i.e. floating output.

Only phase U has the window, and the others (V and W) doesn't.

Therefore, the current waveform distortion will be minimized in the those four window modes.

LV8961 Register for window

Register Description

Speed Control Register Overview

ADDR	ADDR	Data Name	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
MSAENB=L	0015h	MRSPCT19	0	0	0	0	0	0	WINDSEL[1:0]	
	0016h	MRSPCT20	MSKRSTNUM0_INI[3:0]				MSKRSTNUM1_INI[3:0]			
	0017h	MRSPCT21	MSKRSTNUM0_THR[3:0]				MSKRSTNUM1_THR[3:0]			
	0018h	MRSPCT22	MSKRSTNUM0_TWO[3:0]				MSKRSTNUM1_TWO[3:0]			
	0019h	MRSPCT23	MSKRSTNUM0_ONE[3:0]				MSKRSTNUM1_ONE[3:0]			

LV8961 Register for window

MRSPCT19 (Default: 00h)

ADDR	Data Name	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
0015h	MRSPCT19	0	0	0	0	0	0	WINDSEL	

WINDSEL[1:0]: selects the number of BEMF zero cross detection window per electrical cycle

WINDSEL[1:0]=0h: 6-window

WINDSEL[1:0]=1h: 3-window

WINDSEL[1:0]=2h: 2-window

WINDSEL[1:0]=3h: 1-window

MRSPCT20 (Default: 00h)

ADDR	Data Name	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
0016h	MRSPCT20	MSKRSTNUM0_INI[3:0]				MSKRSTNUM1_INI[3:0]			

MSKRSTNUM0_INI[3:0]: Energization width setting from BEMF zero-cross to Hiz window start point, for 6-window initial mode

MSKRSTNUM0_INI[3:0]=x:

(x < 8) -> (15 + x * 3.75) deg.

(x ≧ 8) -> (41.25 + (x – 7) * 1.875) deg.

MSKRSTNUM1_INI[3:0]: Mask-period setting for detecting BEMF zero-cross from Hiz window start point, for 6-window initial mode

MSKRSTNUM1_INI[3:0]=x: ((x + 1) * 1.875) deg.

LV8961 Register for window

MRSPCT21 (Default: 00h)

ADDR	Data Name	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
0017h	MRSPCT21	MSKRSTNUM0_THR[3:0]				MSKRSTNUM1_THR[3:0]			

MSKRSTNUM0_THR[3:0]: Energization width setting from BEMF zero-cross to Hiz window start point, for 3-window mode

MSKRSTNUM0_THR[3:0]=x:

(x < 8) -> (15 + x * 3.75) deg.

(x ≧ 8) -> (41.25 + (x – 7) * 1.875) deg.

MSKRSTNUM1_THR[3:0]: Mask-period setting for detecting BEMF zero-cross from Hiz window start point, for 3-window mode

MSKRSTNUM1_THR[3:0]=x: ((x + 1) * 1.875) deg.

LV8961 Register for window

MRSPCT22 (Default: 00h)

ADDR	Data Name	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
0018h	MRSPCT22	MSKRSTNUM0_TWO[3:0]				MSKRSTNUM1_TWO[3:0]			

MSKRSTNUM0_TWO[3:0]: Energization width setting from BEMF zero-cross to Hiz window start point, for 2-window mode

MSKRSTNUM0_TWO[3:0]=x:

(x < 8) -> (15 + x * 3.75) deg.

(x ≧ 8) -> (41.25 + (x – 7) * 1.875) deg.

MSKRSTNUM1_TWO[3:0]: Mask-period setting for detecting BEMF zero-cross from Hiz window start point, for 2-window mode

MSKRSTNUM1_TWO[3:0]=x: ((x + 1) * 1.875) deg.

LV8961 Register for window

MRSPCT23 (Default: 00h)

ADDR	Data Name	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
0019h	MRSPCT23	MSKRSTNUM0_ONE[3:0]				MSKRSTNUM1_ONE[3:0]			

MSKRSTNUM1_ONE[3:0]: Mask-period setting for detecting BEMF zero-cross from Hiz window start point, for 1-window mode

MSKRSTNUM1_ONE[3:0]=x: ((x + 1) * 1.875) deg.

MSKRSTNUM1_ONE[3:0]: Mask-period setting for detecting BEMF zero-cross from Hiz window start point, for 1-window mode

MSKRSTNUM1_ONE[3:0]=x: ((x + 1) * 1.875) deg.