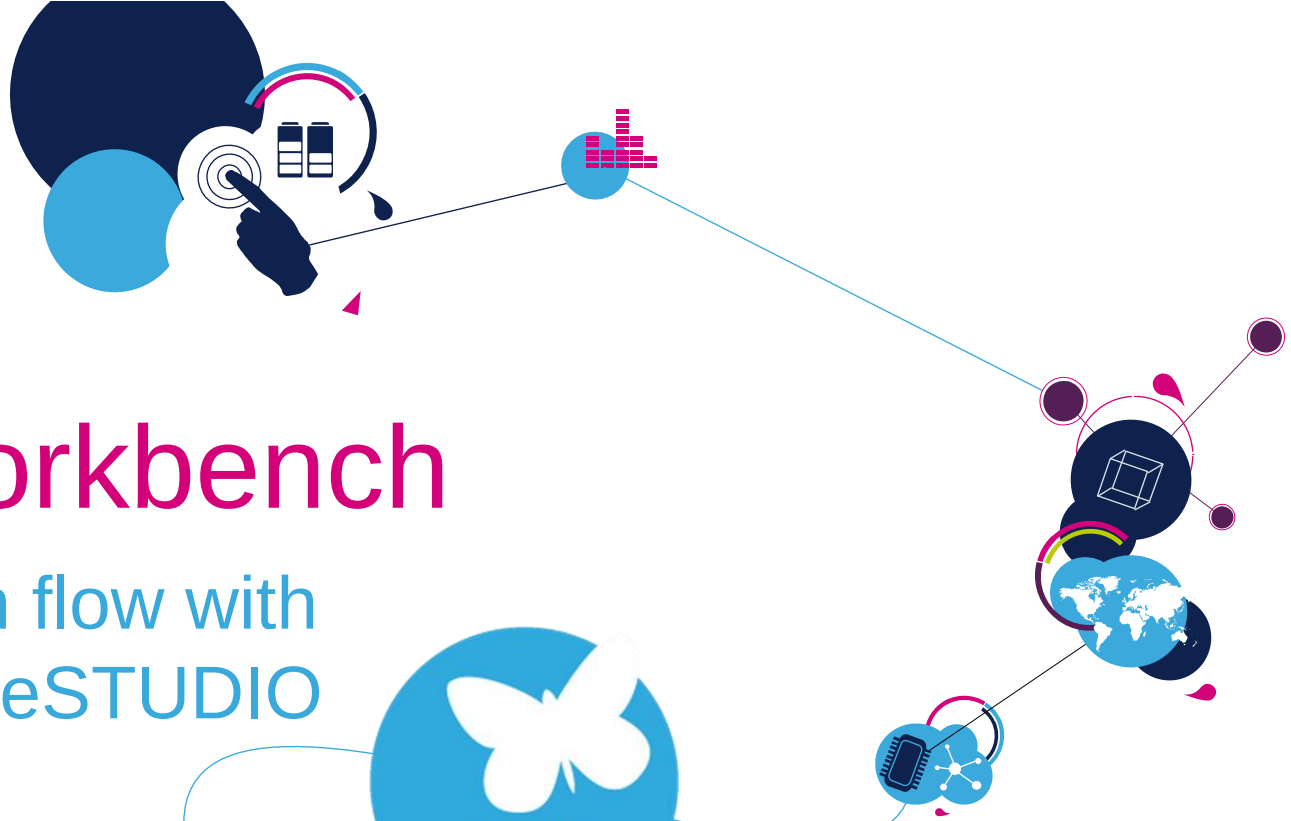


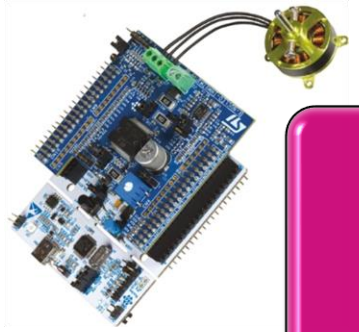
ST Motor Control Workbench

Lab 3: Motor Control Workbench flow with STM32CubeMX and STM32 TrueSTUDIO

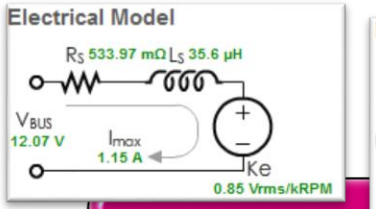
life.augmented

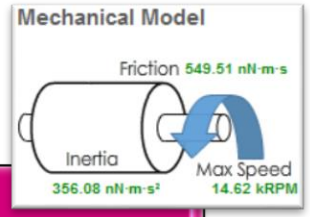
Motor Control Development Workflow

#3 – System Configuration



Hardware Setup





Motor Characterization

Motor Profiler
Motion Control Suite

System Configuration

Hands-On section

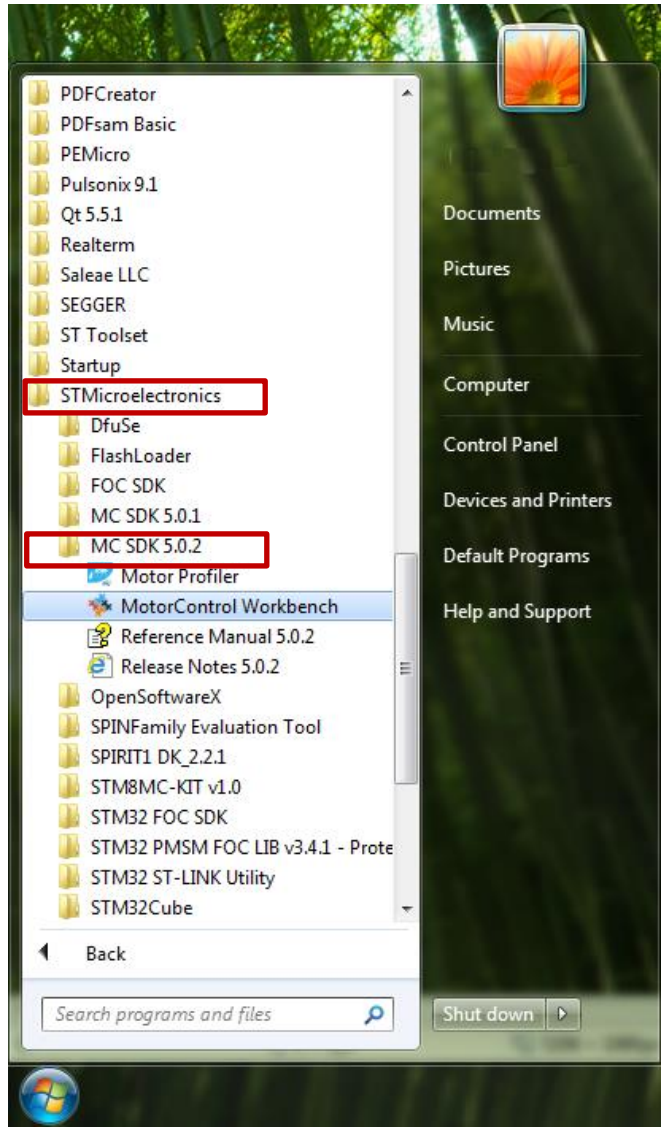
LAB 3 tasks

- Project system configuration using MC Workbench
- Generation of a project firmware
- Project compilation in IDE (ST TrueSTUDIO)

Create new project

- Open the **MC Workbench** application

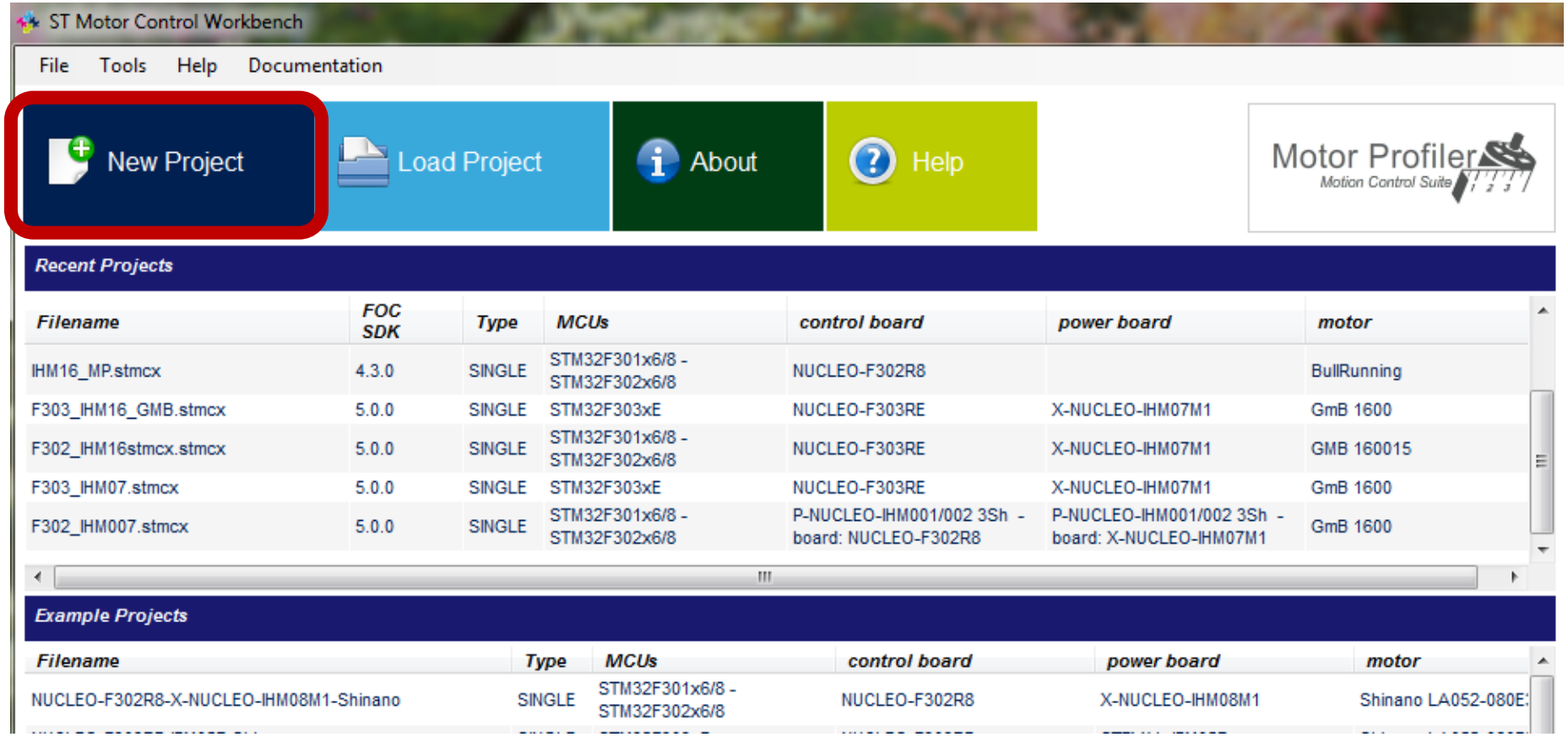
or



Hands-On section

Create new project

- Press the button **New Project**



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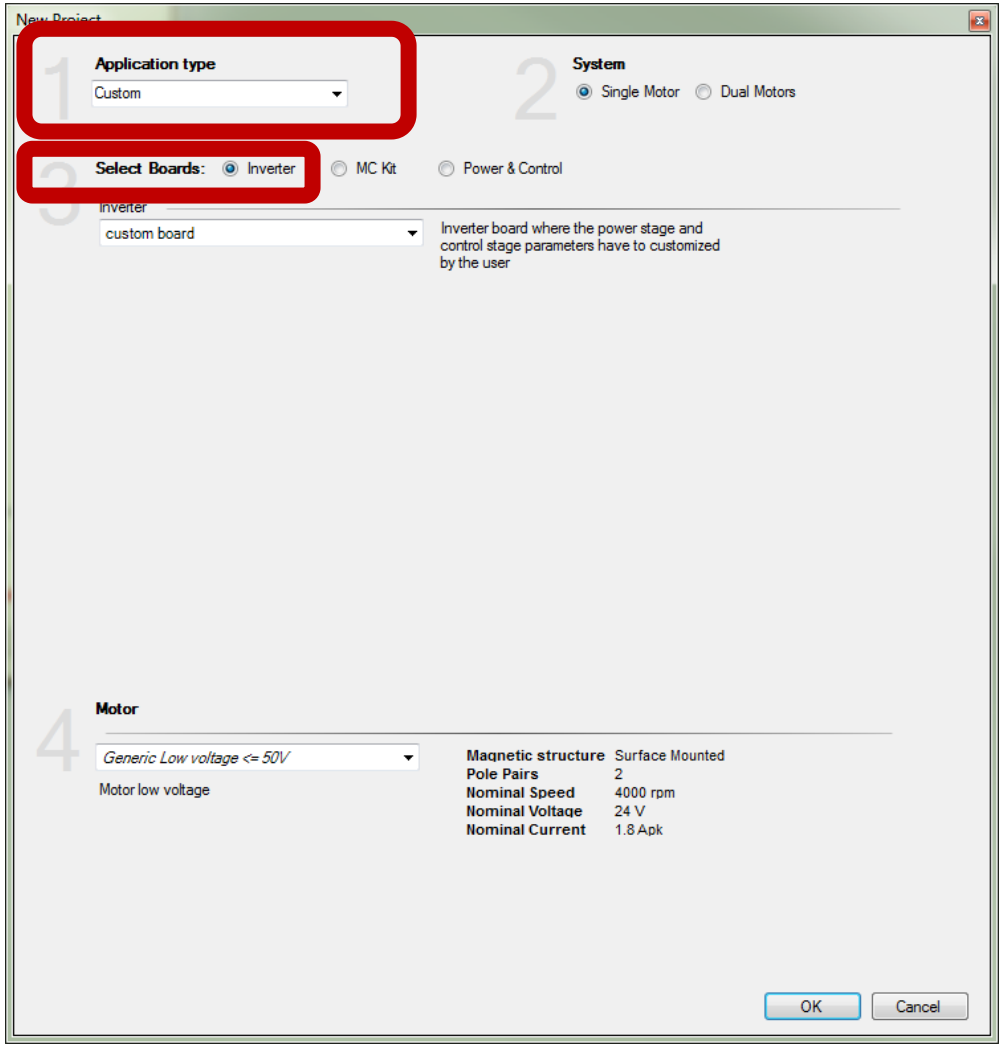
Select the Application type

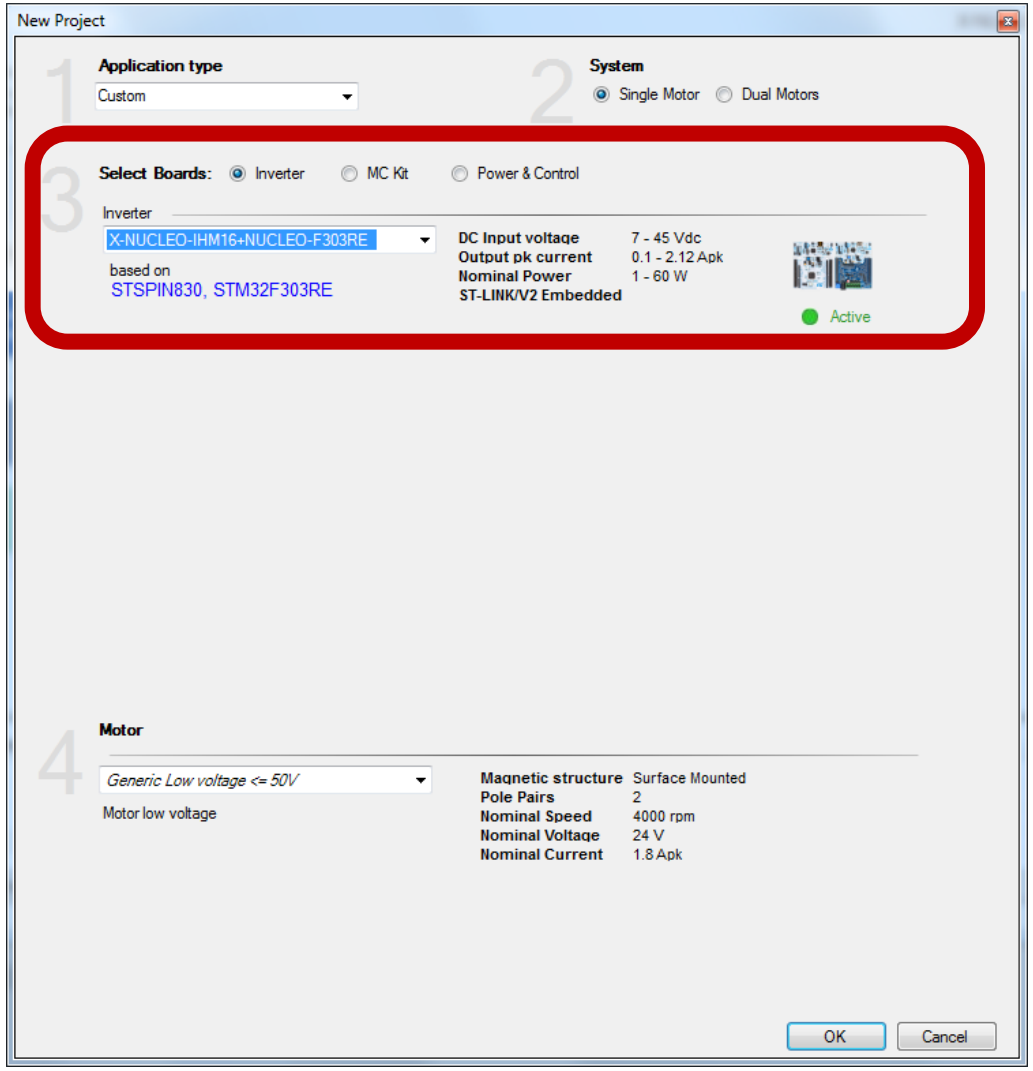
- 1 – Select “**Custom**”
  Application type
- 3 – Select “**Inverter**”
  Select boards check box



Hands-On section

Use motor in MC Workbench

- Select **“X-NUCLEO-IHM16+NUCLEO-F303RE”** in **Inverter** part



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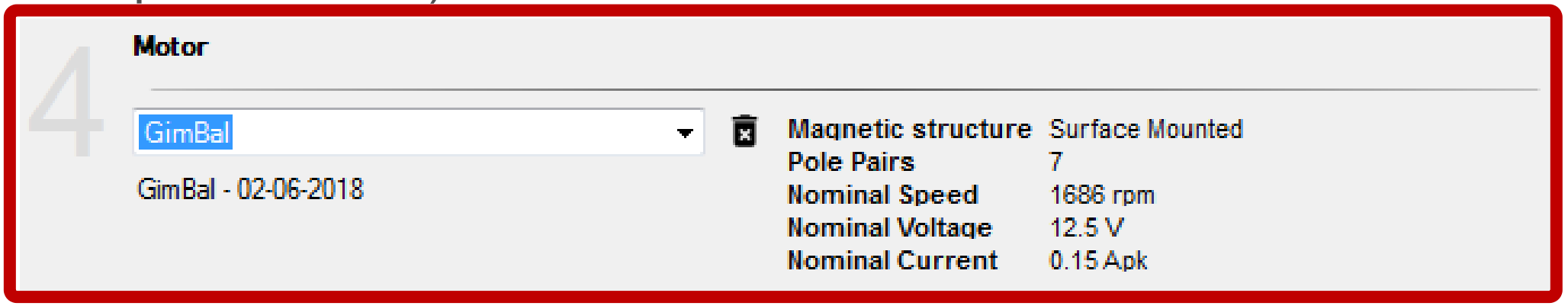
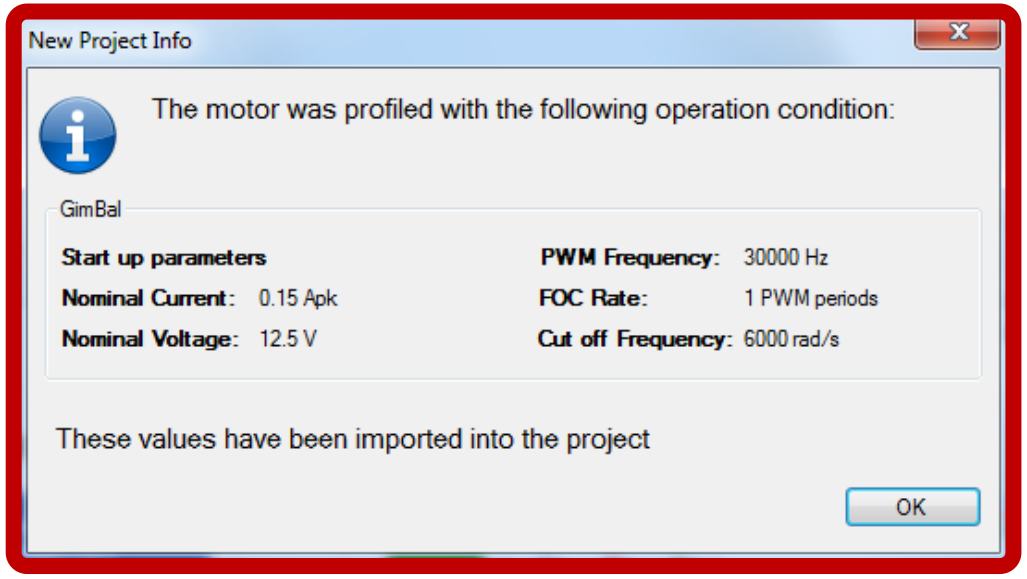
Select the motor

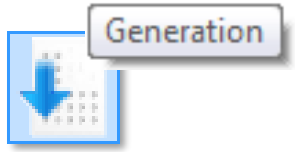
- Select your saved motor at the bottom of the window New Project. (for example „*GimBal*“)

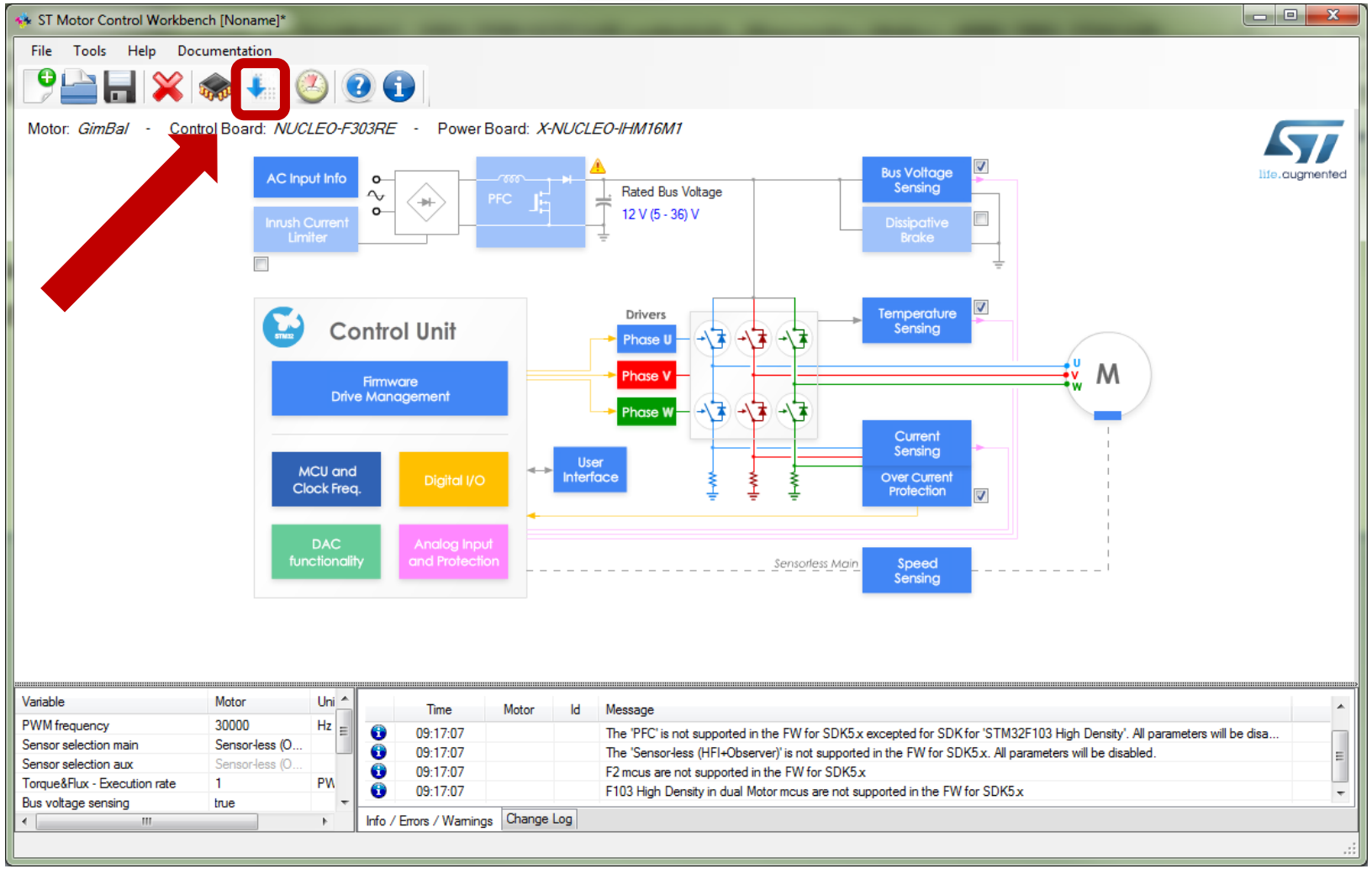


- Info windows



Generate the Firmware

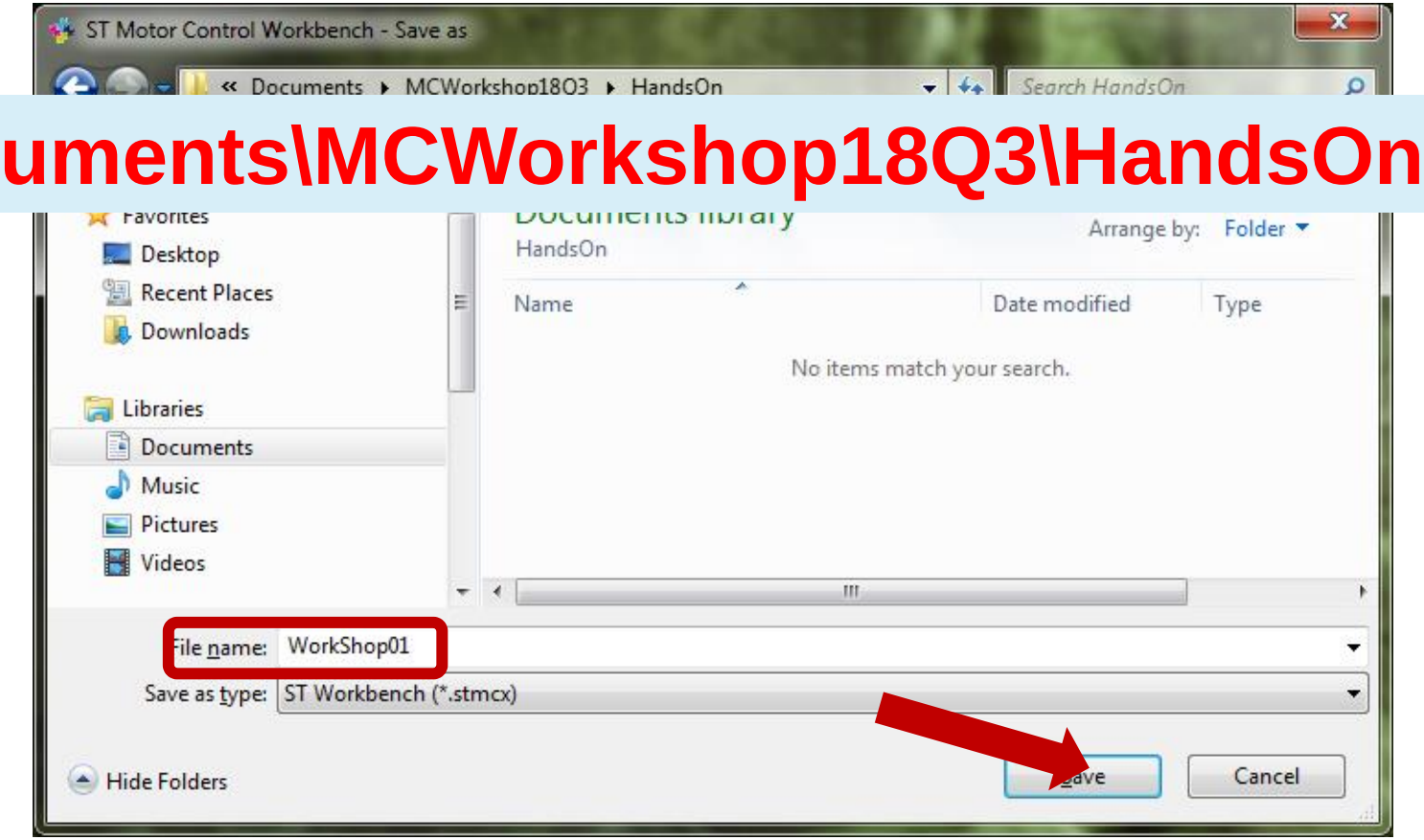
- Click on the icon **“Generation”.** 



Generate the Firmware

C:\Users\User Name\Documents\MCWorkshop18Q3\HandsOn

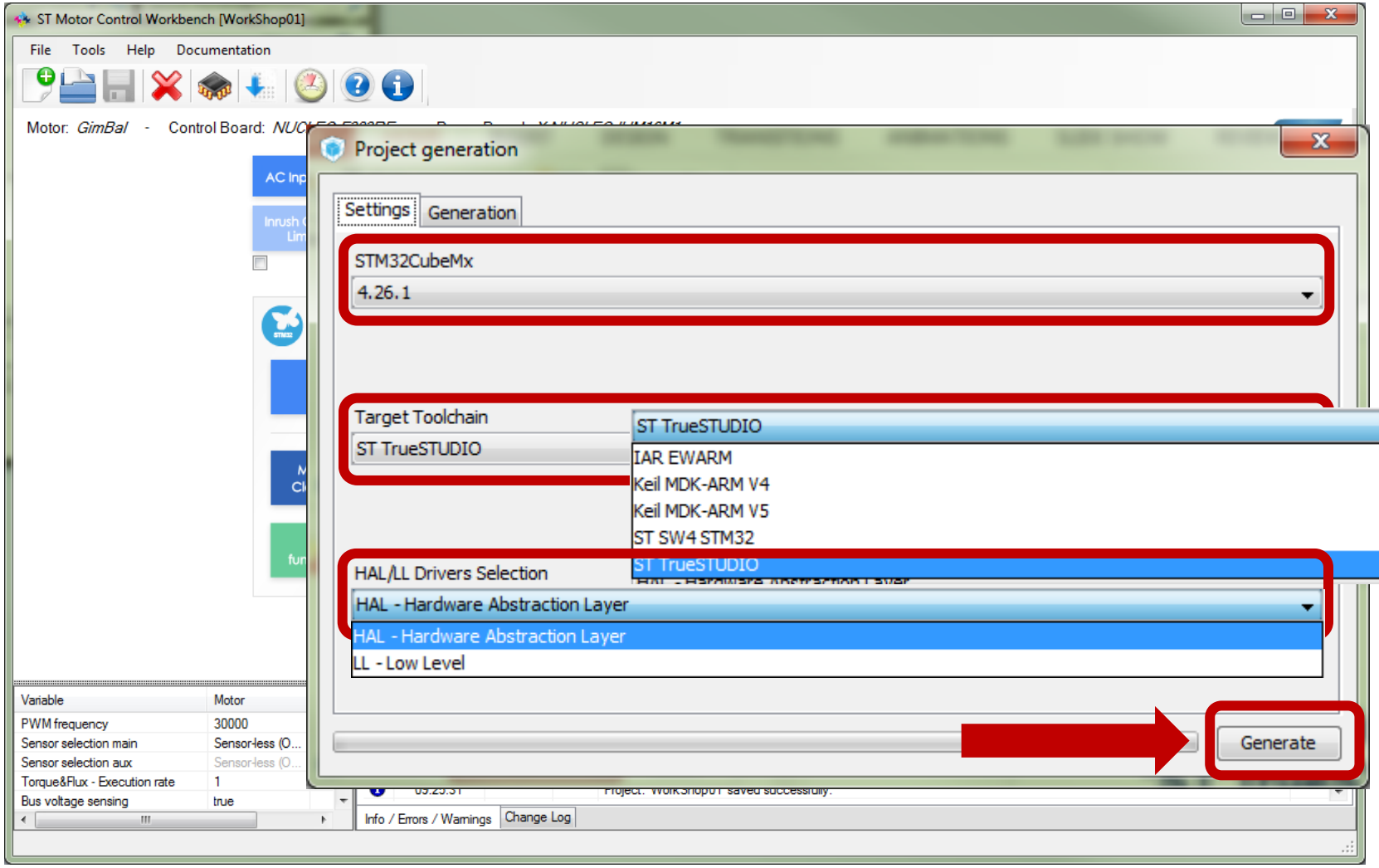
- Provide your Project Name
  a) Select the "**HandsOn**" subfolder in the Documents…
  b) Type "**WorkShop01**"
  c) Click on the Save button



Hands-On section

Project generation - Settings

- Select the proper version of STMCubeMX - “**4.26.1**”!
- Select Target toolchain “**ST TrueSTUDIO**”
- Select driver HAL/LL “**HAL**”
- Click on button **Generate**



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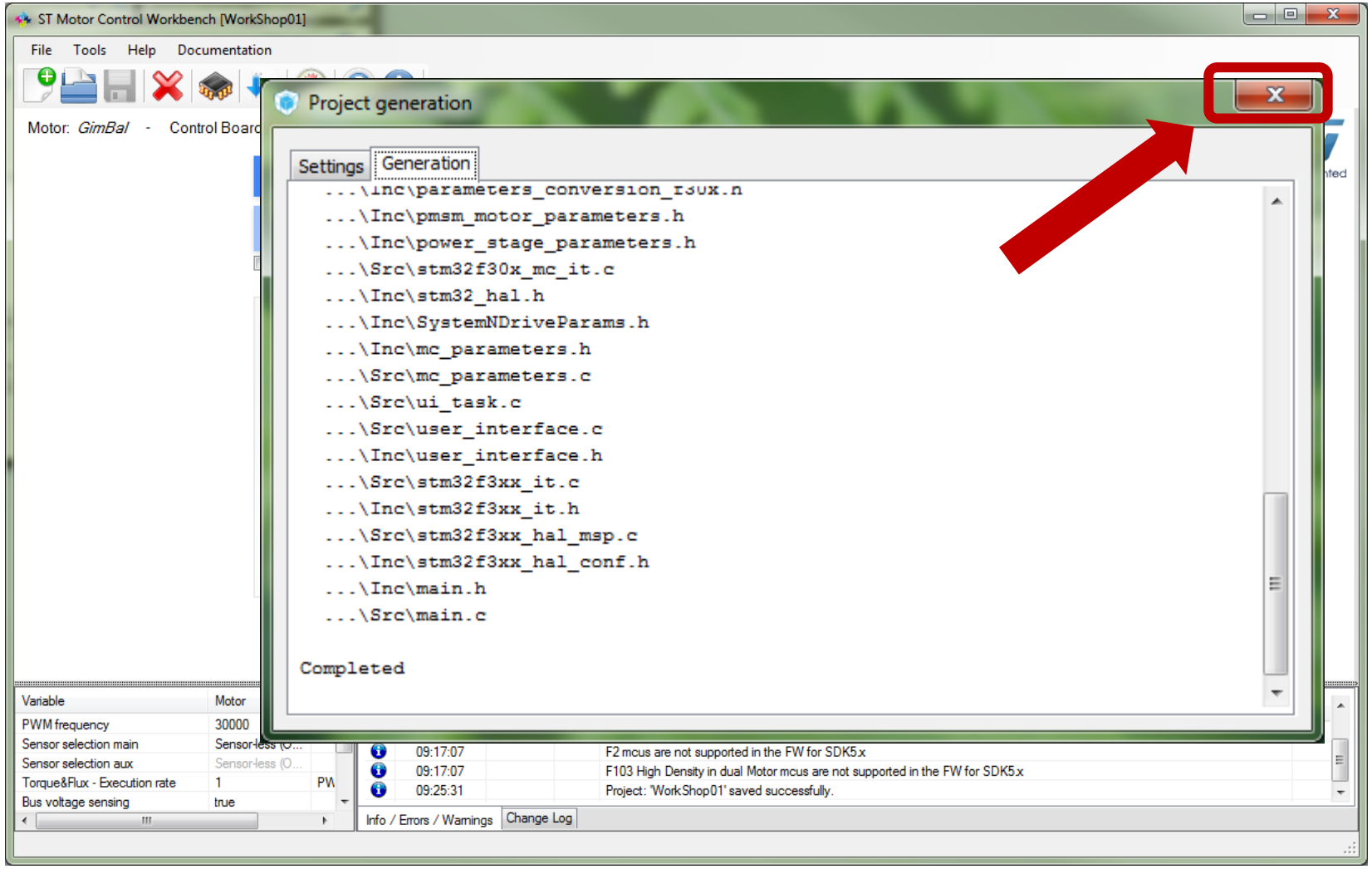
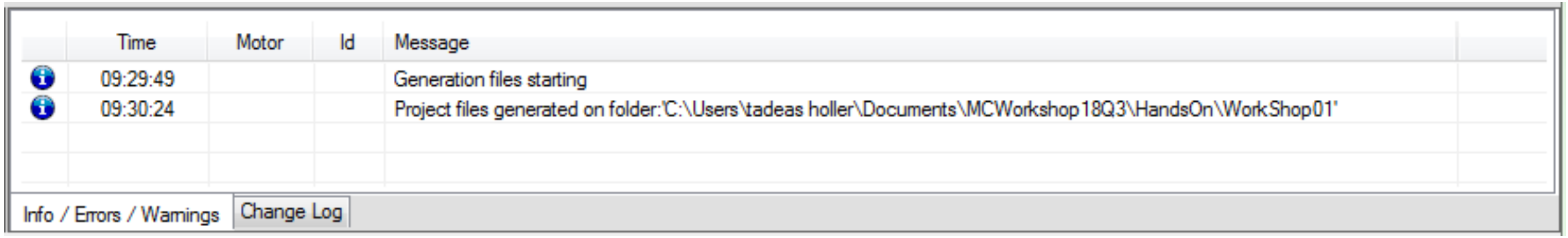
Project Settings

- Close the Project generation by exiting at the upper right arrow.



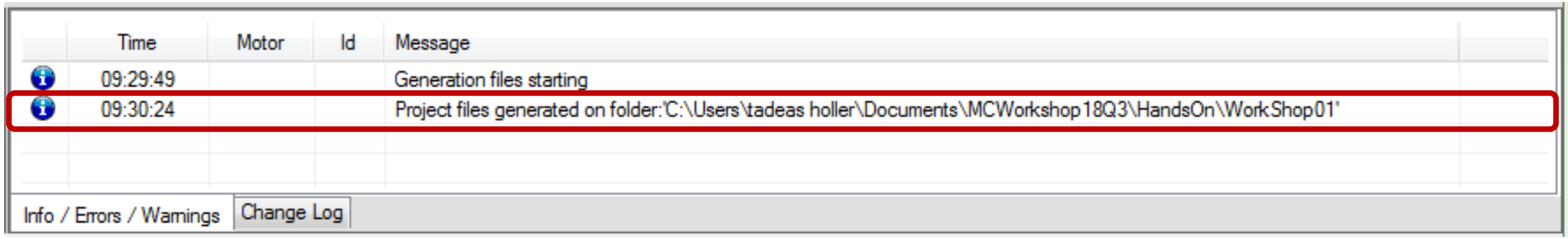
Generate the code

- Code is generated. You can see the log table

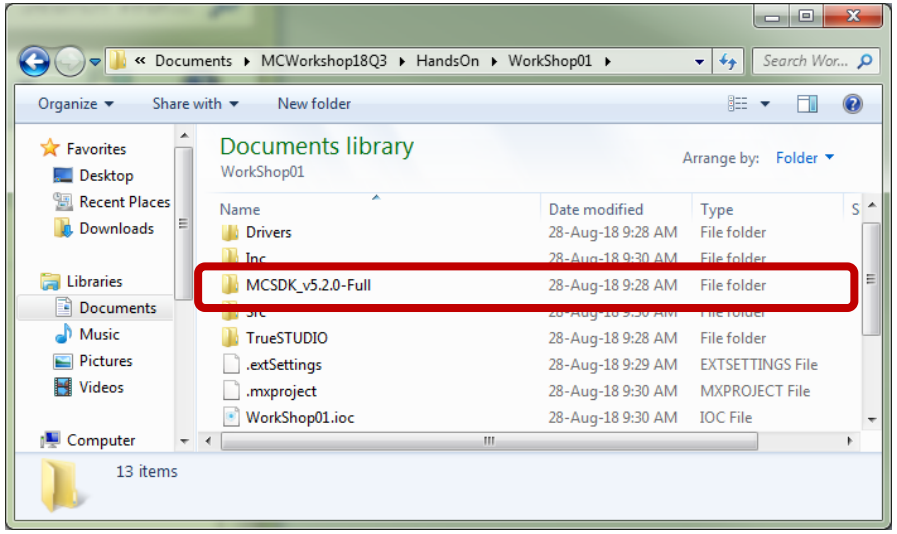


Open ST TrueSTUDIO – simple installation

- **Double** click on the line **“Project files generated on folder…”**.

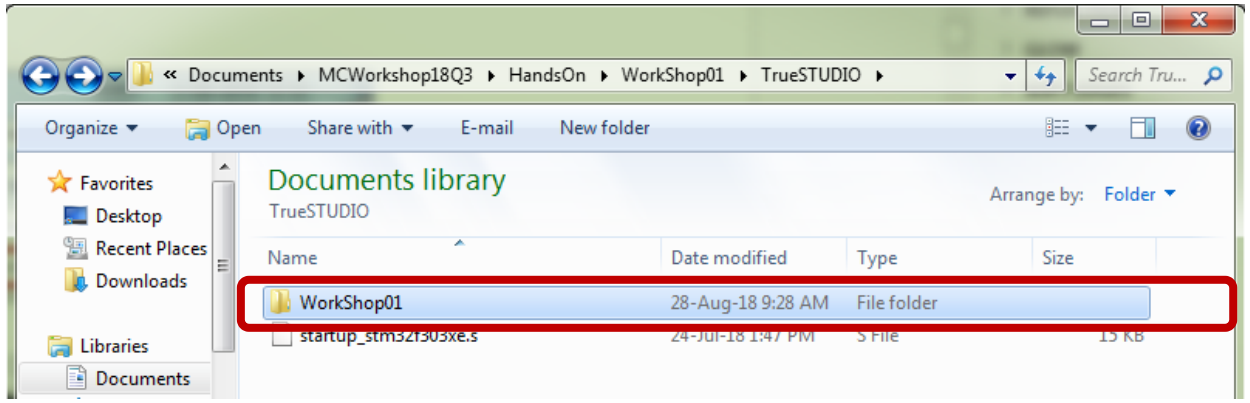


- Double click on the **“TrueSTUDIO”**

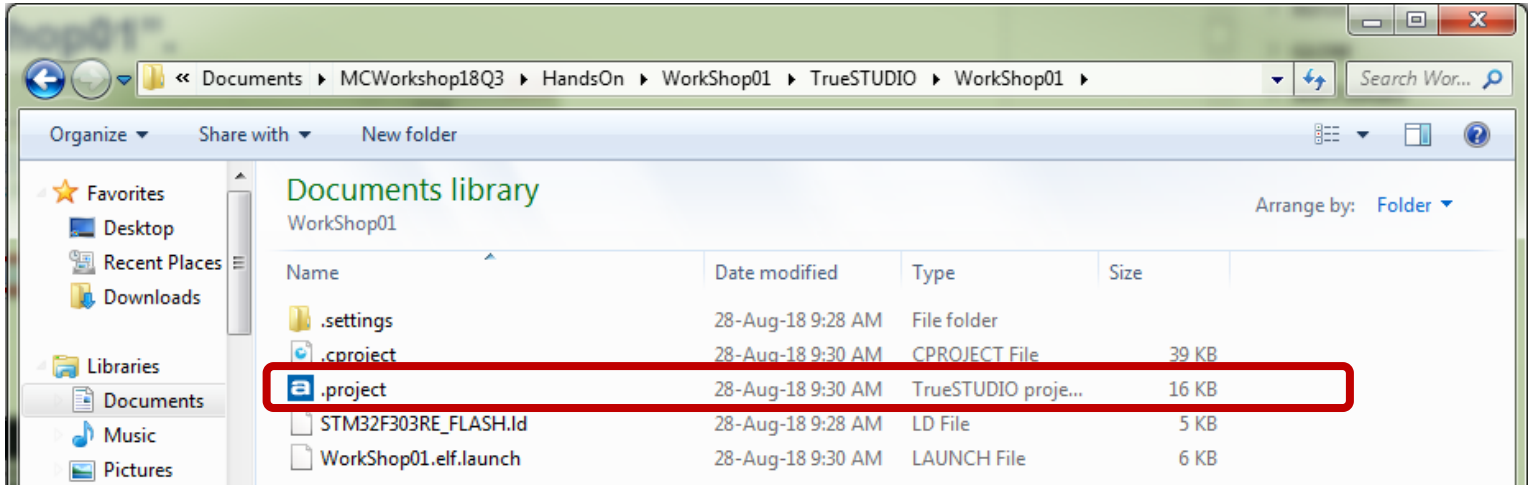


Open ST TrueSTUDIO – simple installation

- Double click on the **“WorkShop01”.**

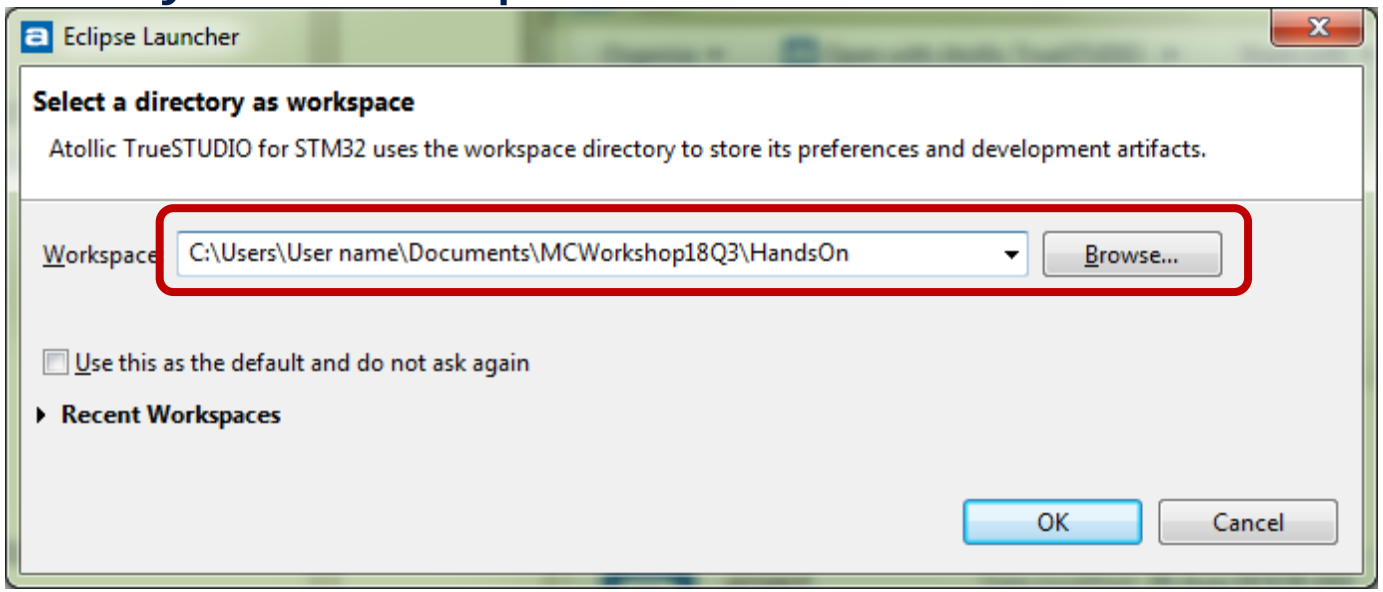


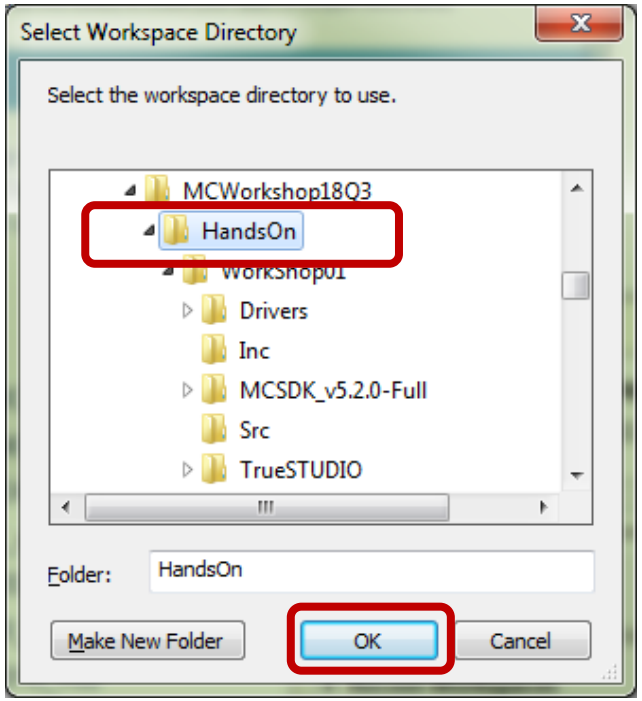
- Open the **“.project”**



Open ST TrueSTUDIO – simple installation

- Select your workspace, click to the “**Browse…**”





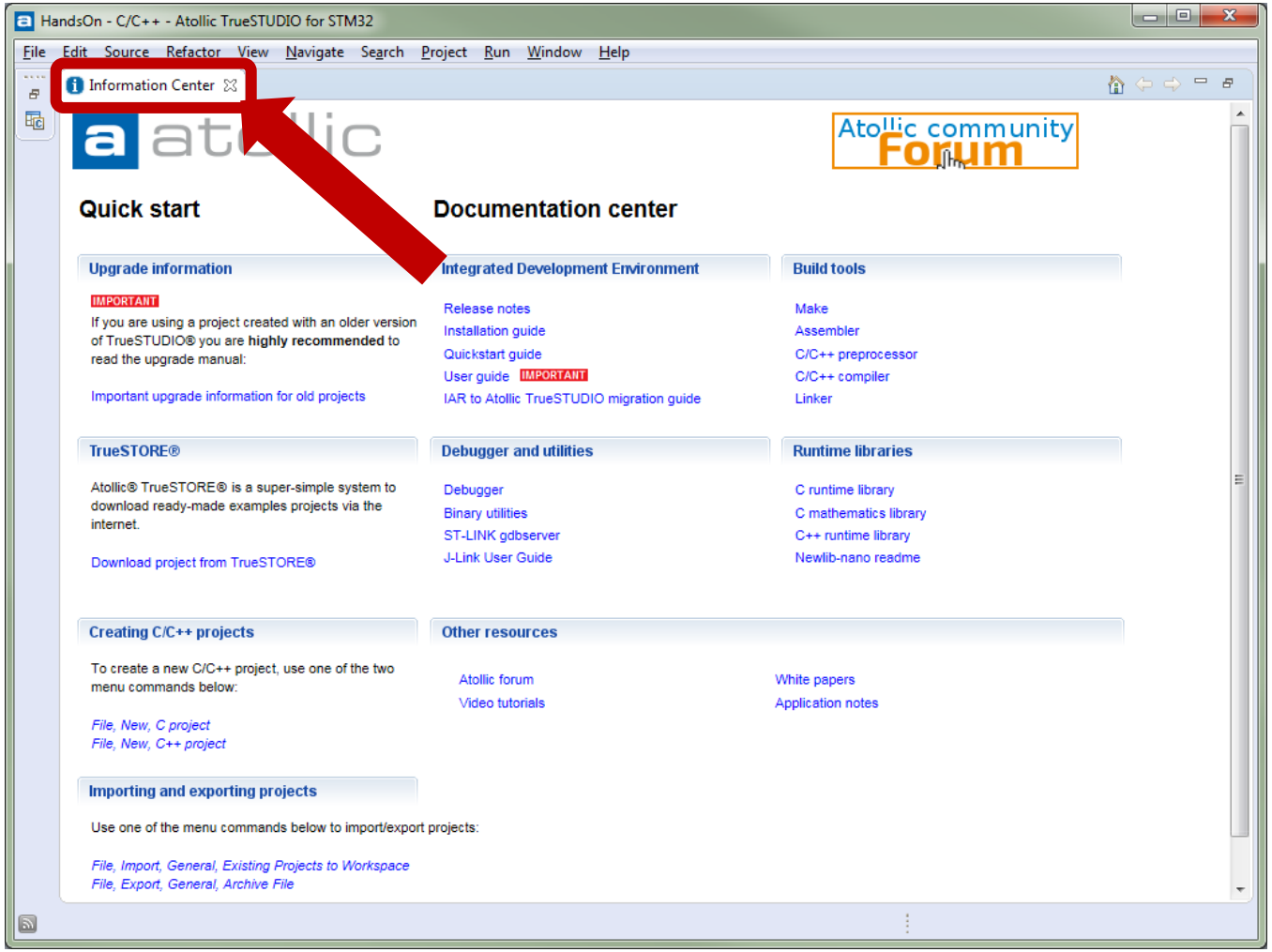
- Select “**HandsOn**” located

*C:\Users**User Name**\Documents\MCWorkshop18Q3\HandsOn*

or you can select your folder and click OK

ST TrueSTUDIO – Close Information Center

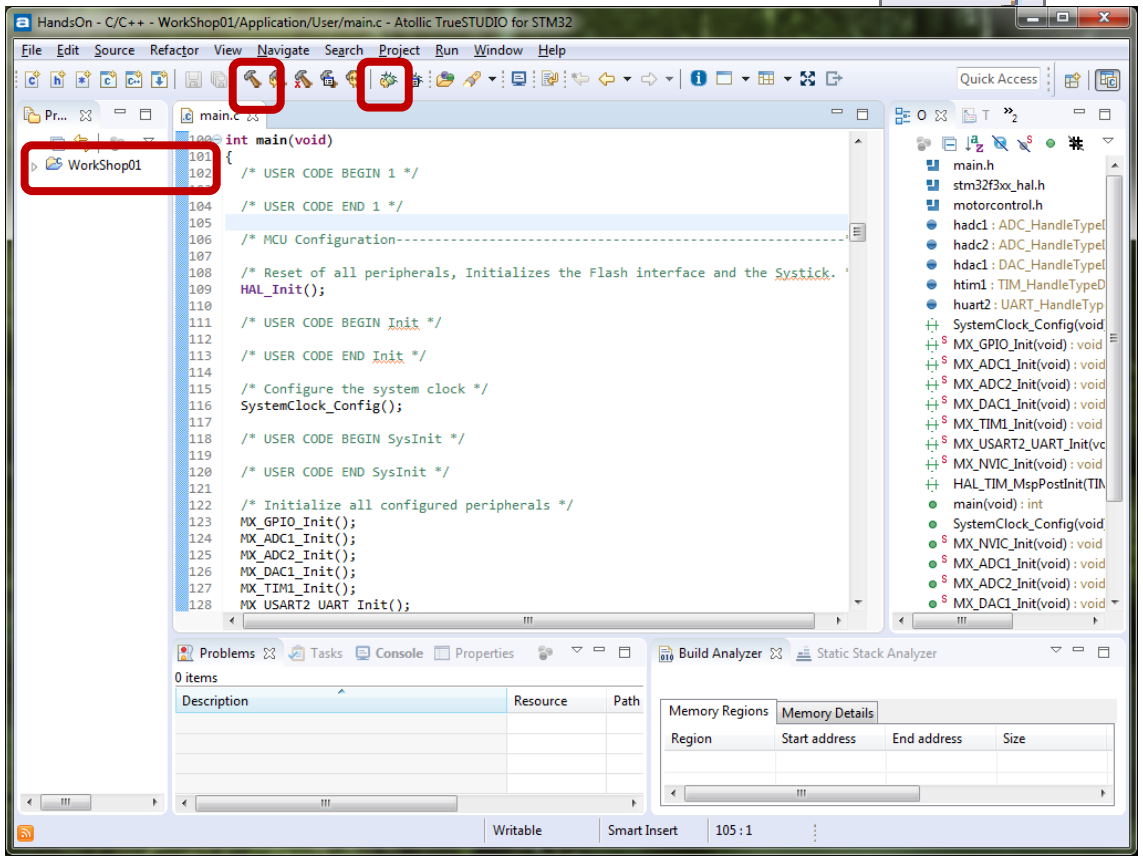
- Close “**Information Center**”



Upload & run MC Application

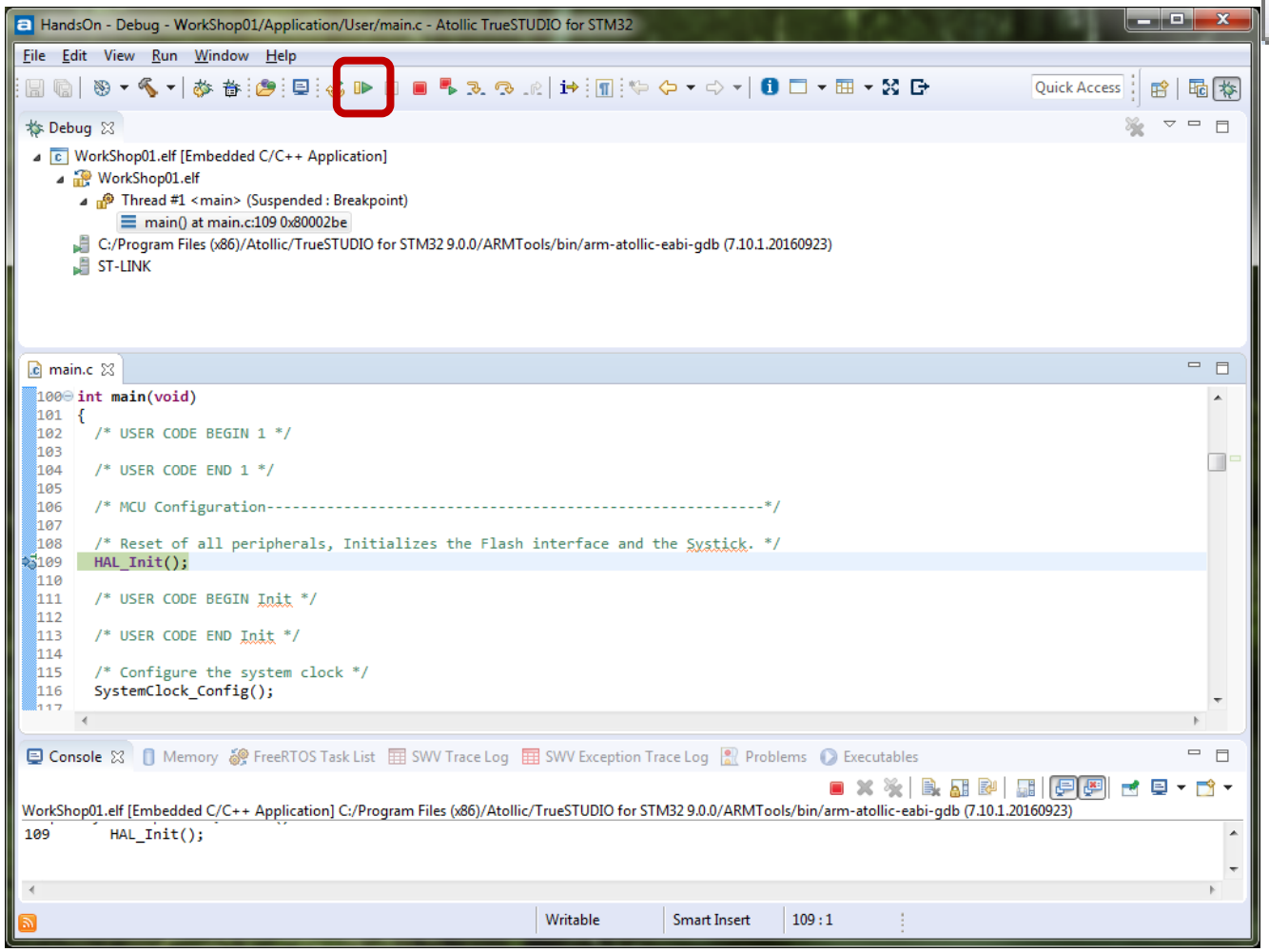
- Select project WorkShop01 and click on the button **“Build”**  or **Ctlr+B**

- Click on the button **“Debug”**  or **F11**



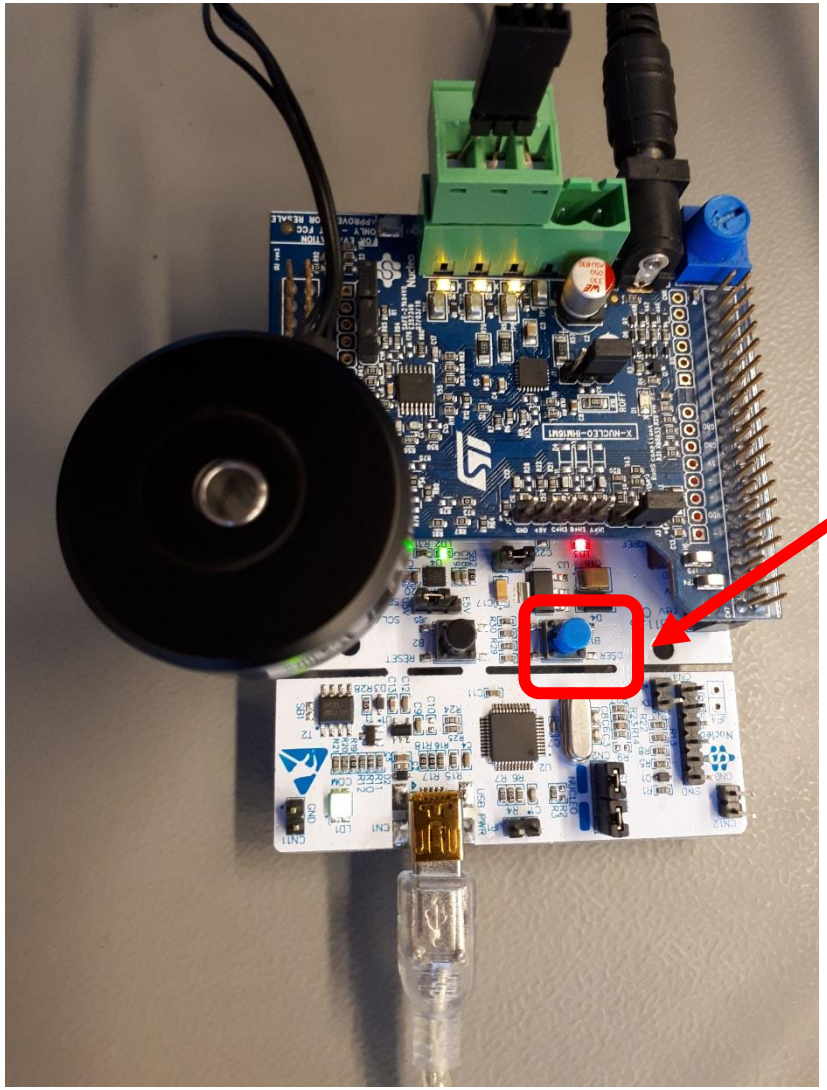
Upload & run MC Application

- After downloaded click on the **“Resume”**  or **F8**



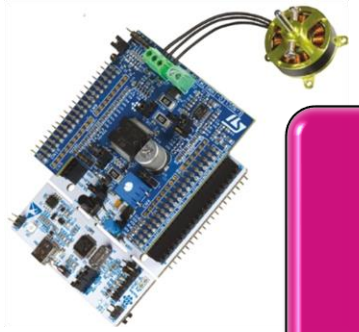
Test MC Application by blue USER button

- To run the motor, click on the blue USER button
- To stop click again

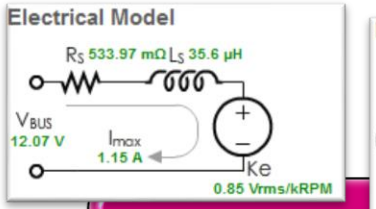


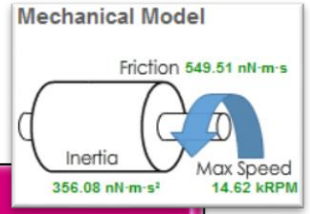
Motor Control Development Workflow

#3 – System Configuration



Hardware Setup



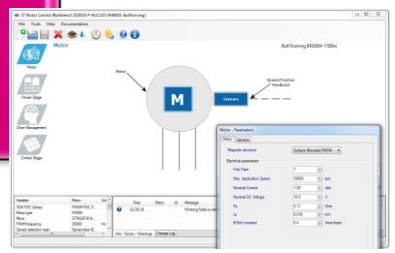


Motor Characterization

Motor Profiler
Motion Control Suite

System Configuration

Motor Control Workbench



Project Configuration

CubeMX & IDE

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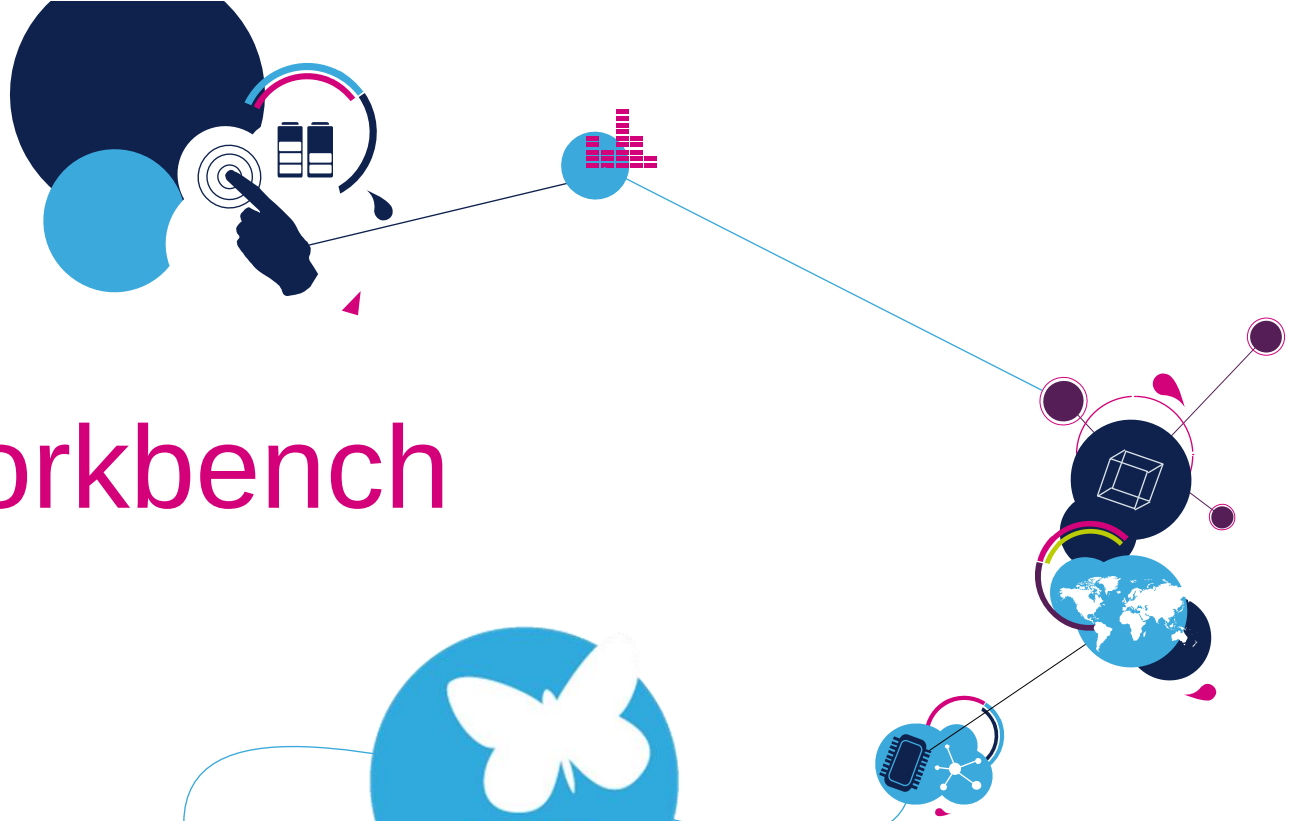

ST Motor Control Workbench

Theory

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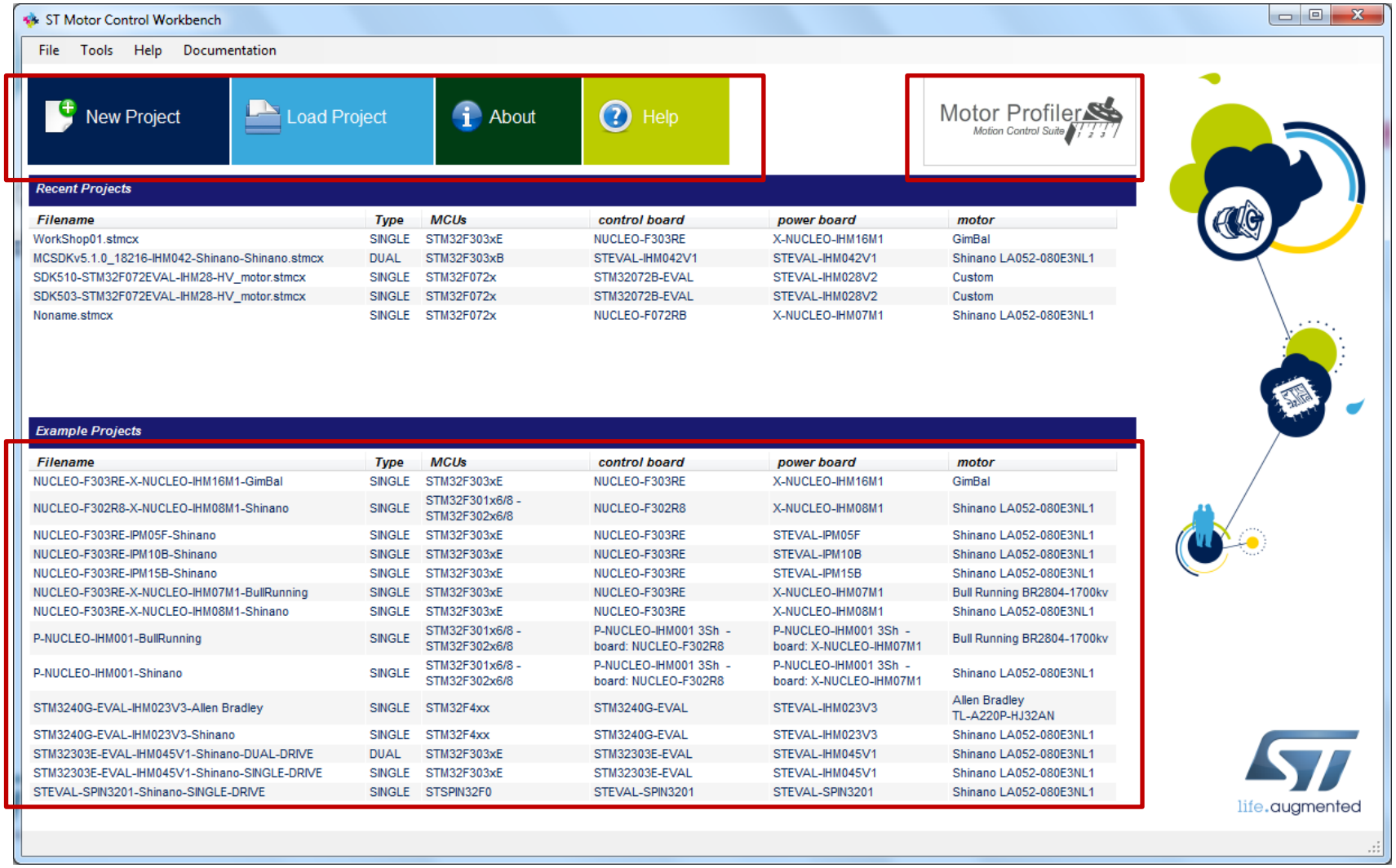
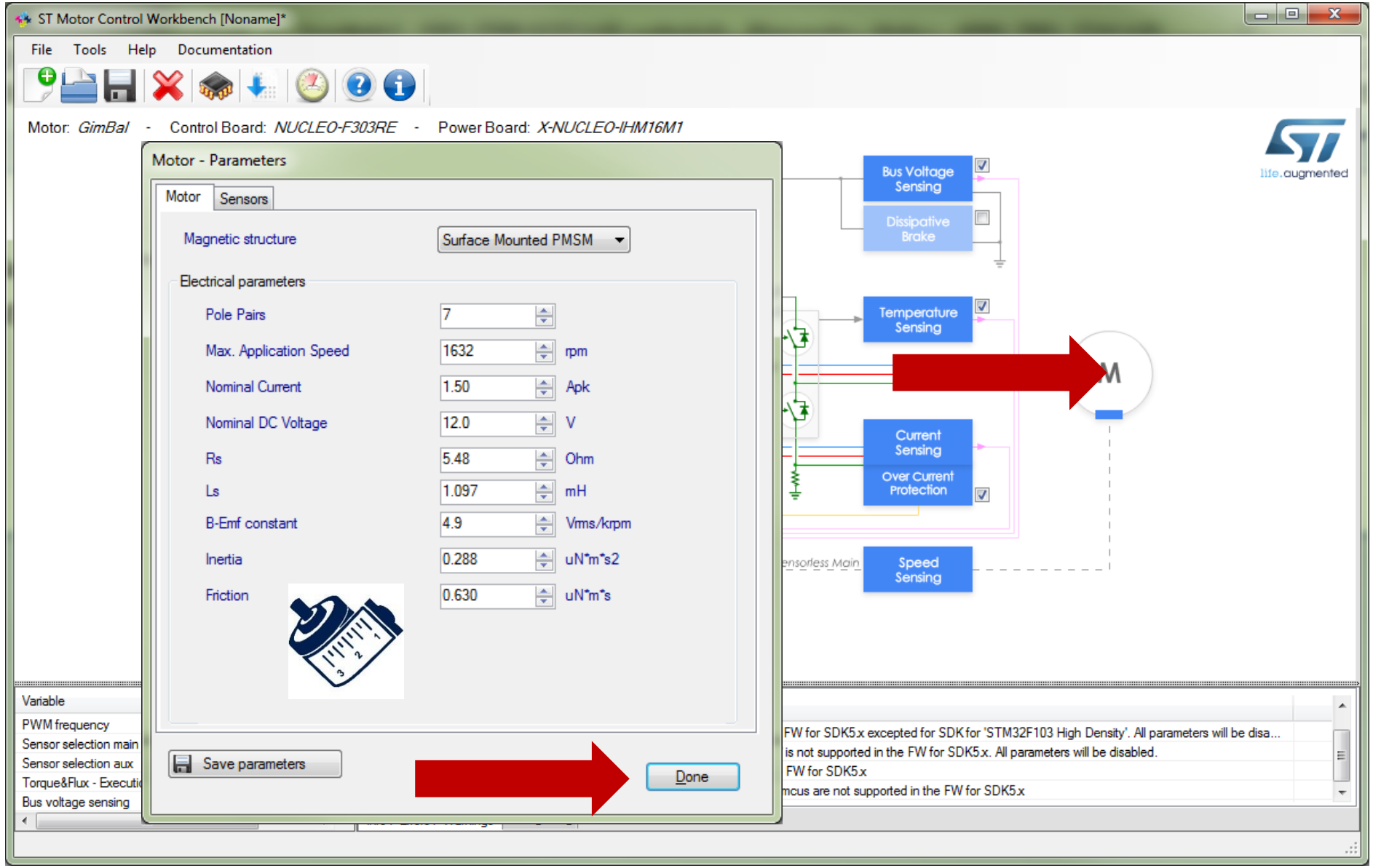
Motor Control Workbench Splashpage

- List of example projects
- Motor Profiler button
- New project
- Load exist project
- About and Help



Motor Characteristics



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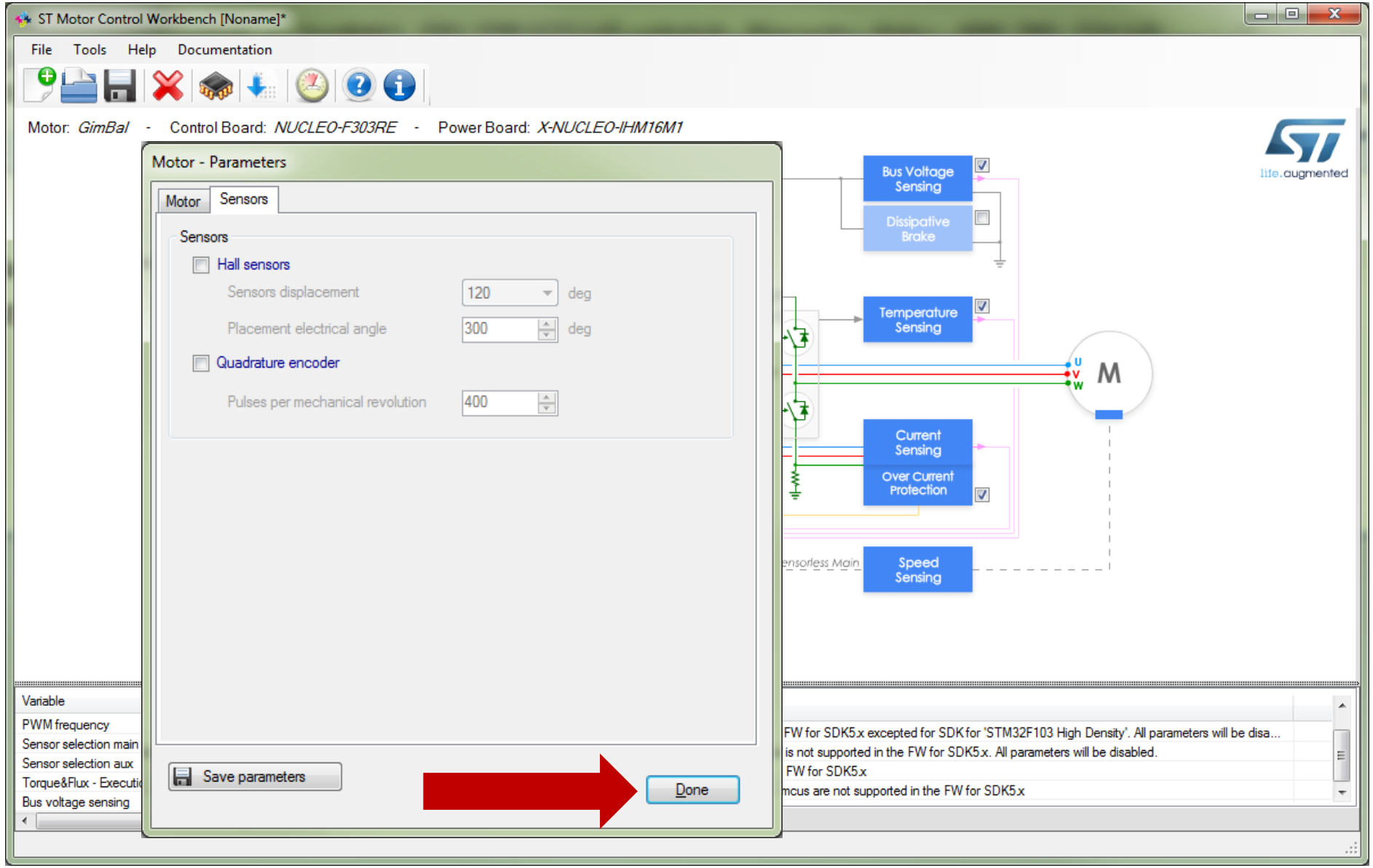
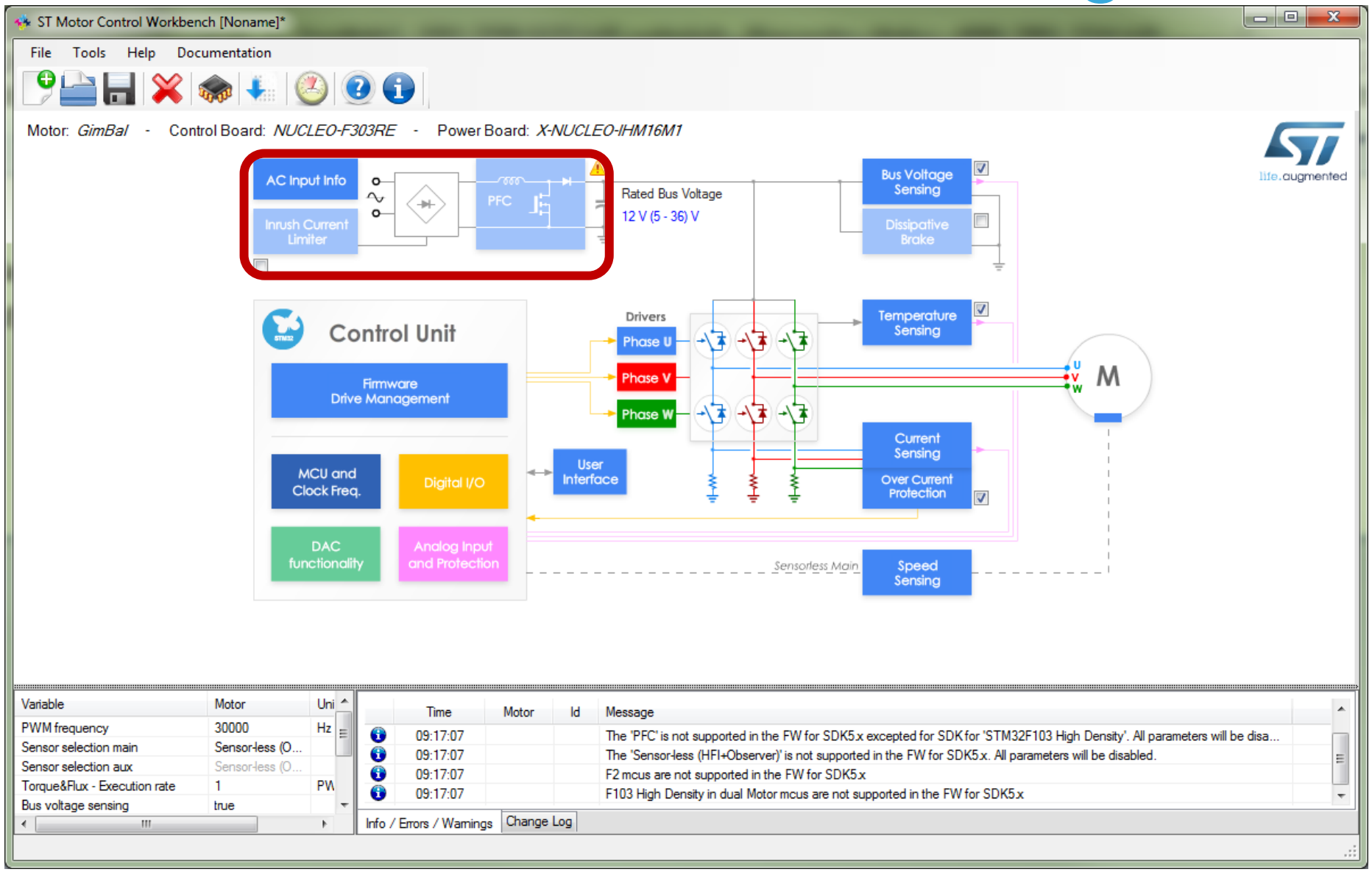
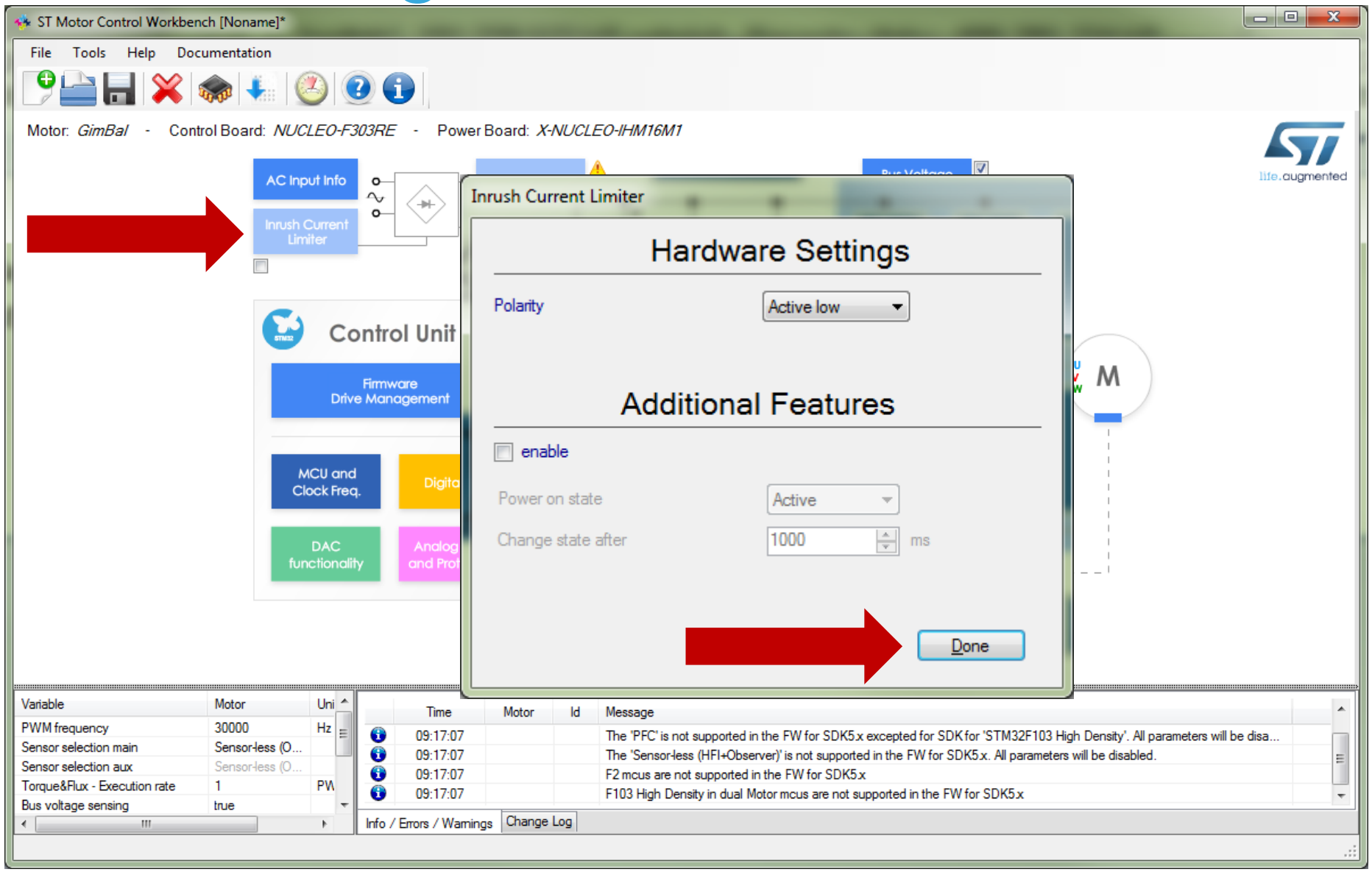
Motor Characteristics



Power Stage - PFC



Power Stage – Inrush Current Limiter



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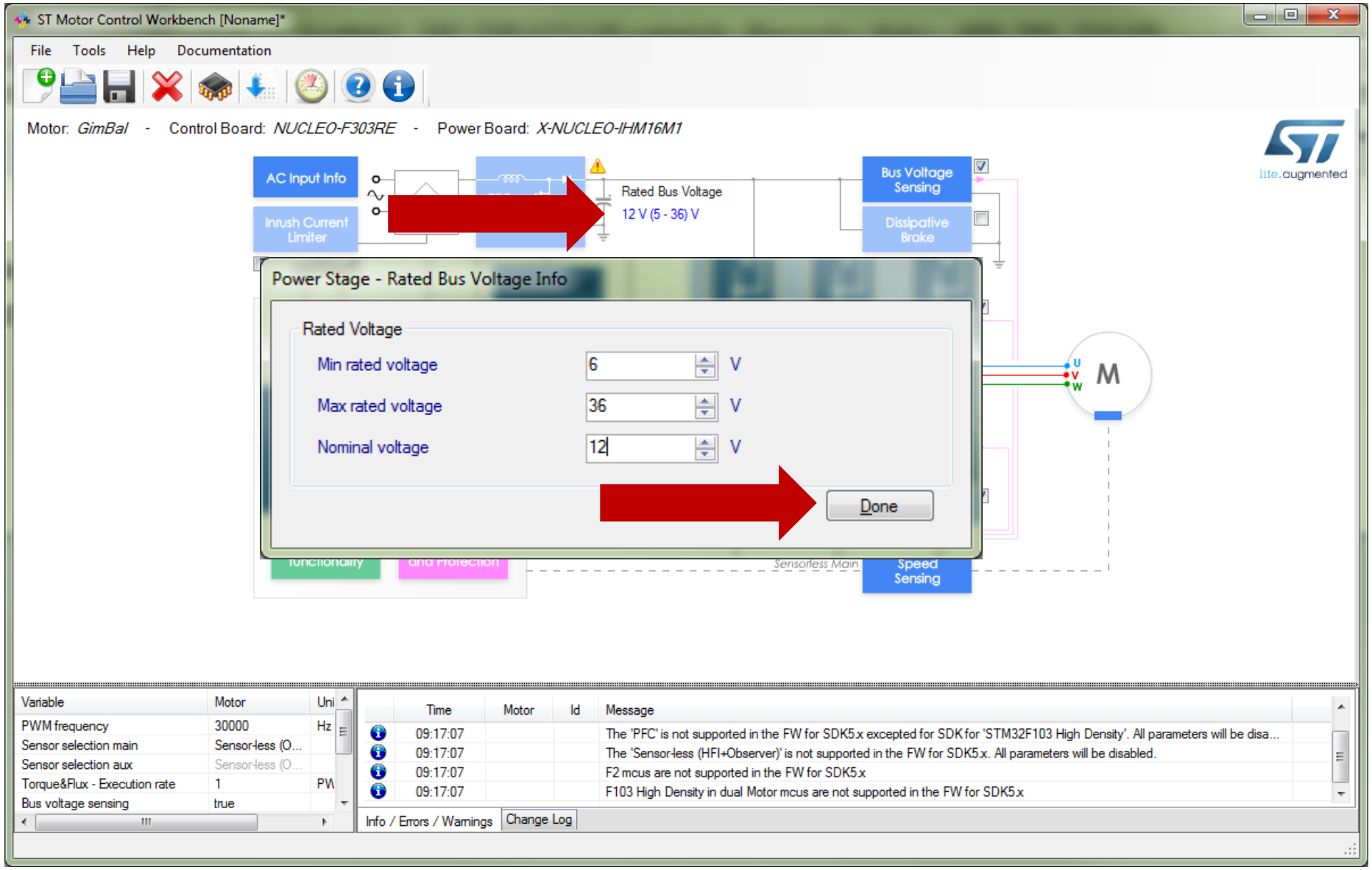
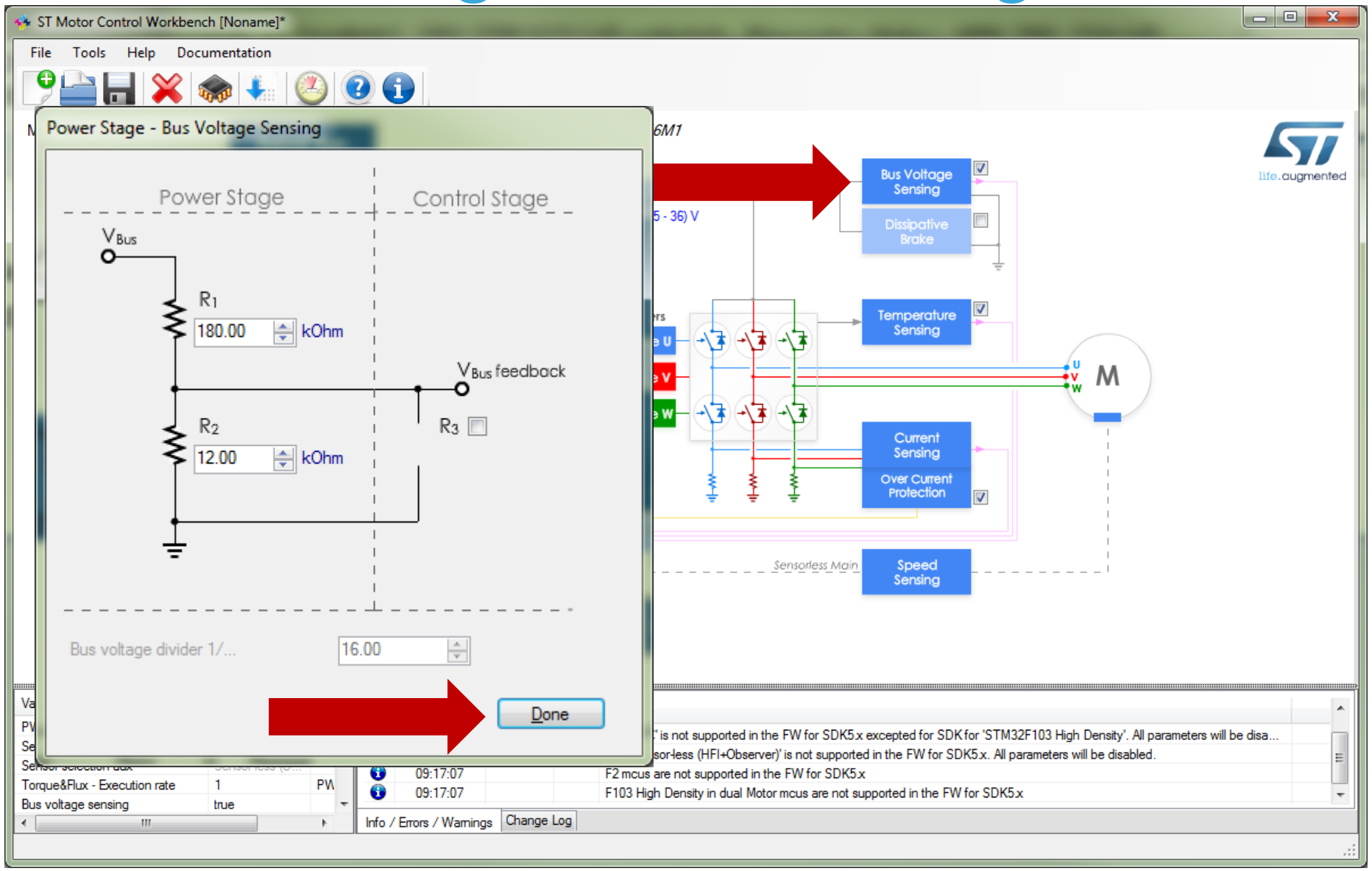
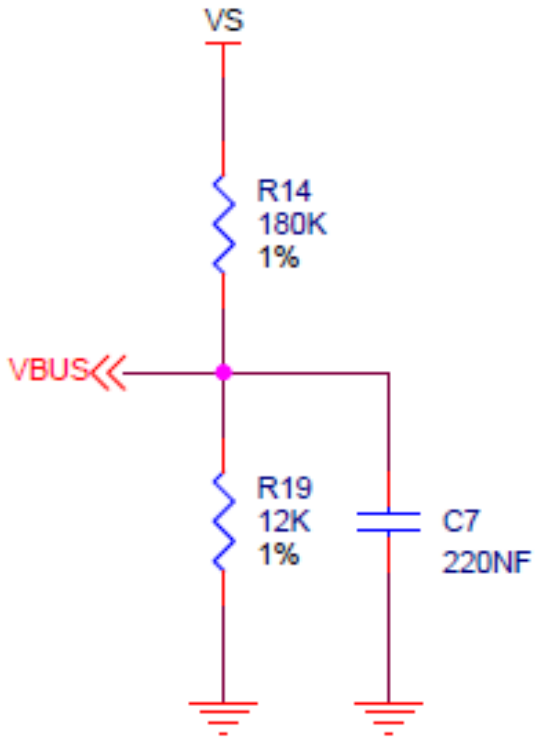
Power Stage - Correct Rated Bus Voltage



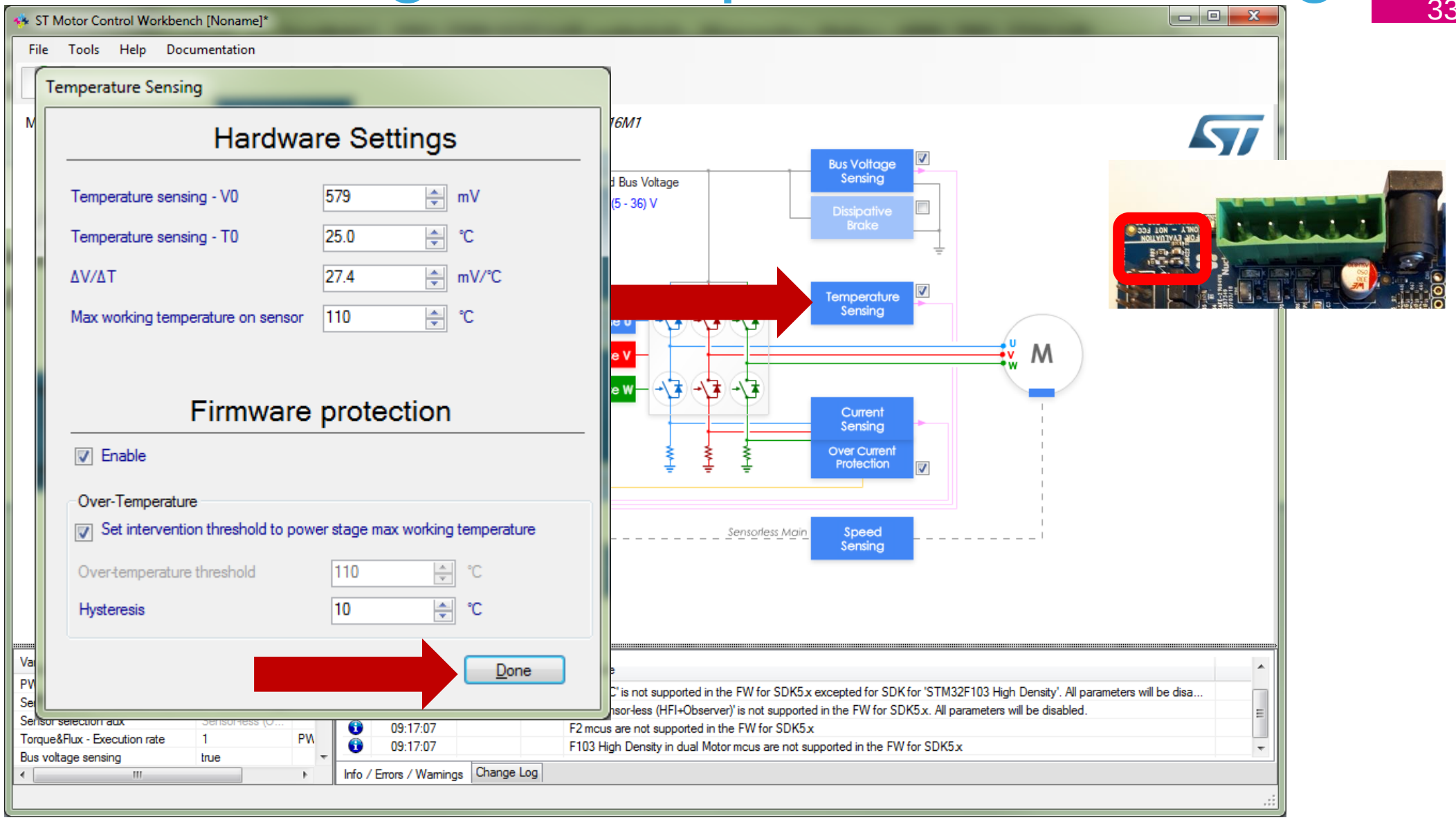
Power Stage - Bus Voltage Sensing



X-Nucleo-IHM16M1 Schematic, VBus



Power Stage – Temperature Sensing



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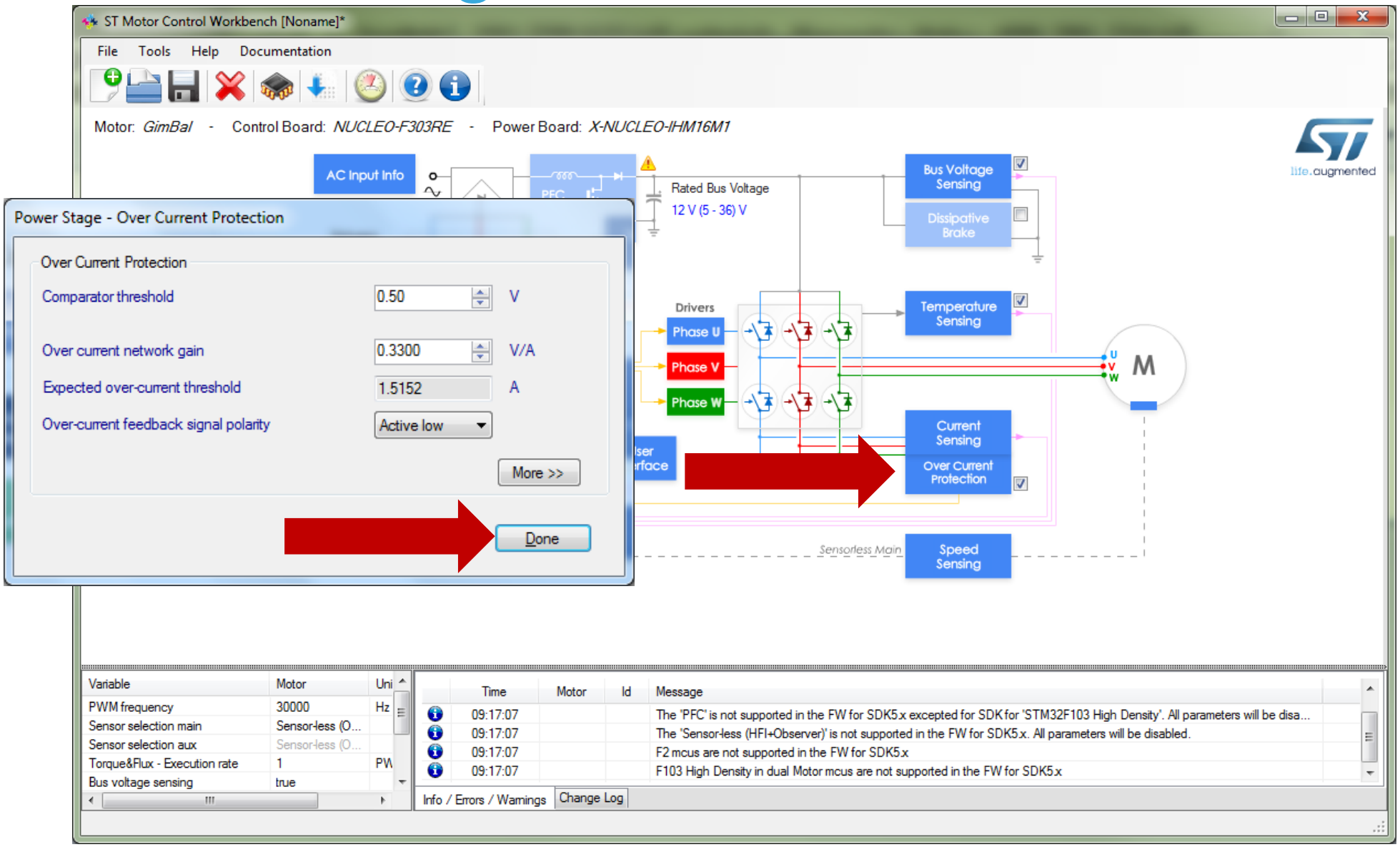
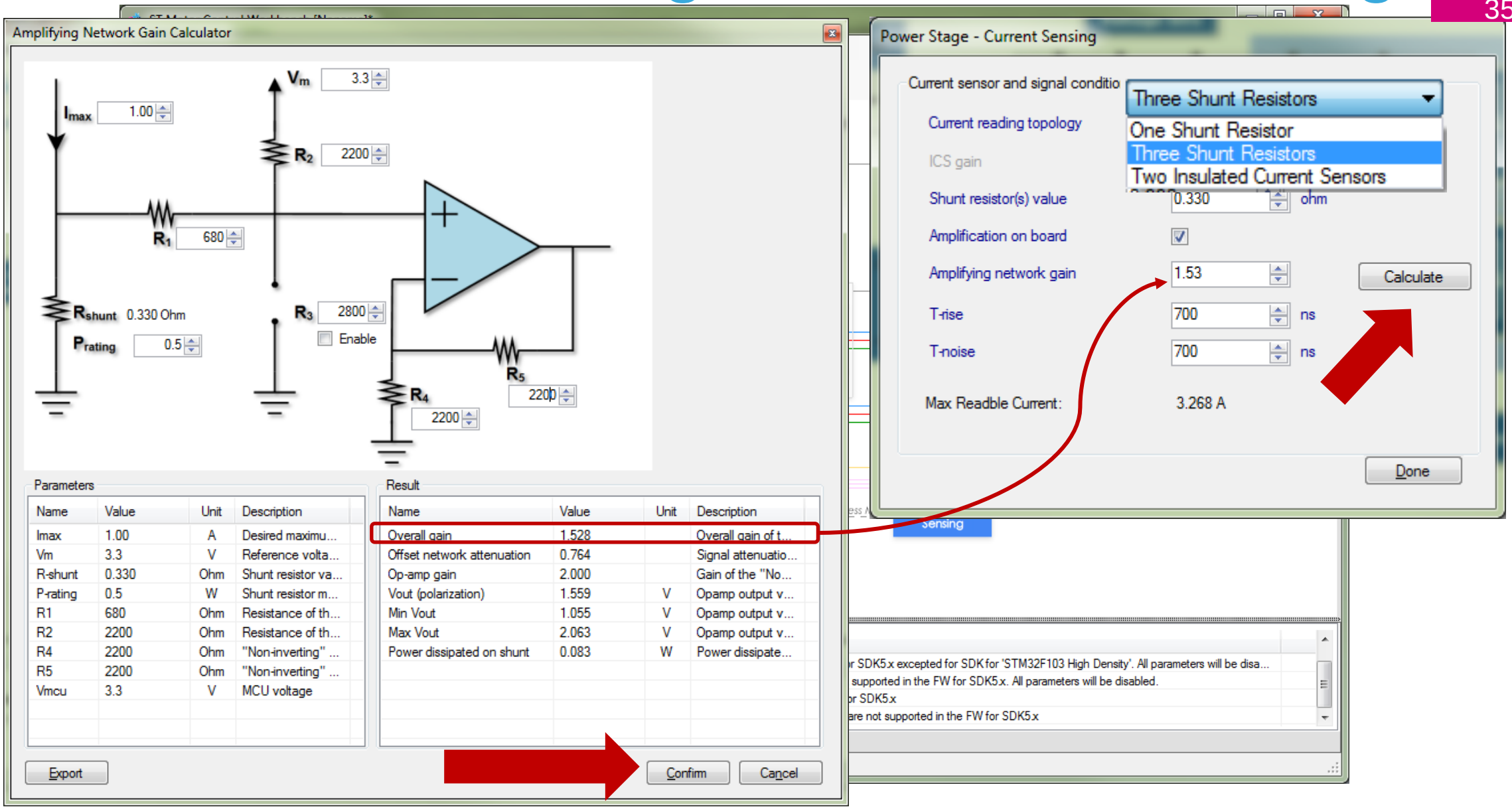
Power Stage – Over Current Sensing



Power Stage – Current Sensing



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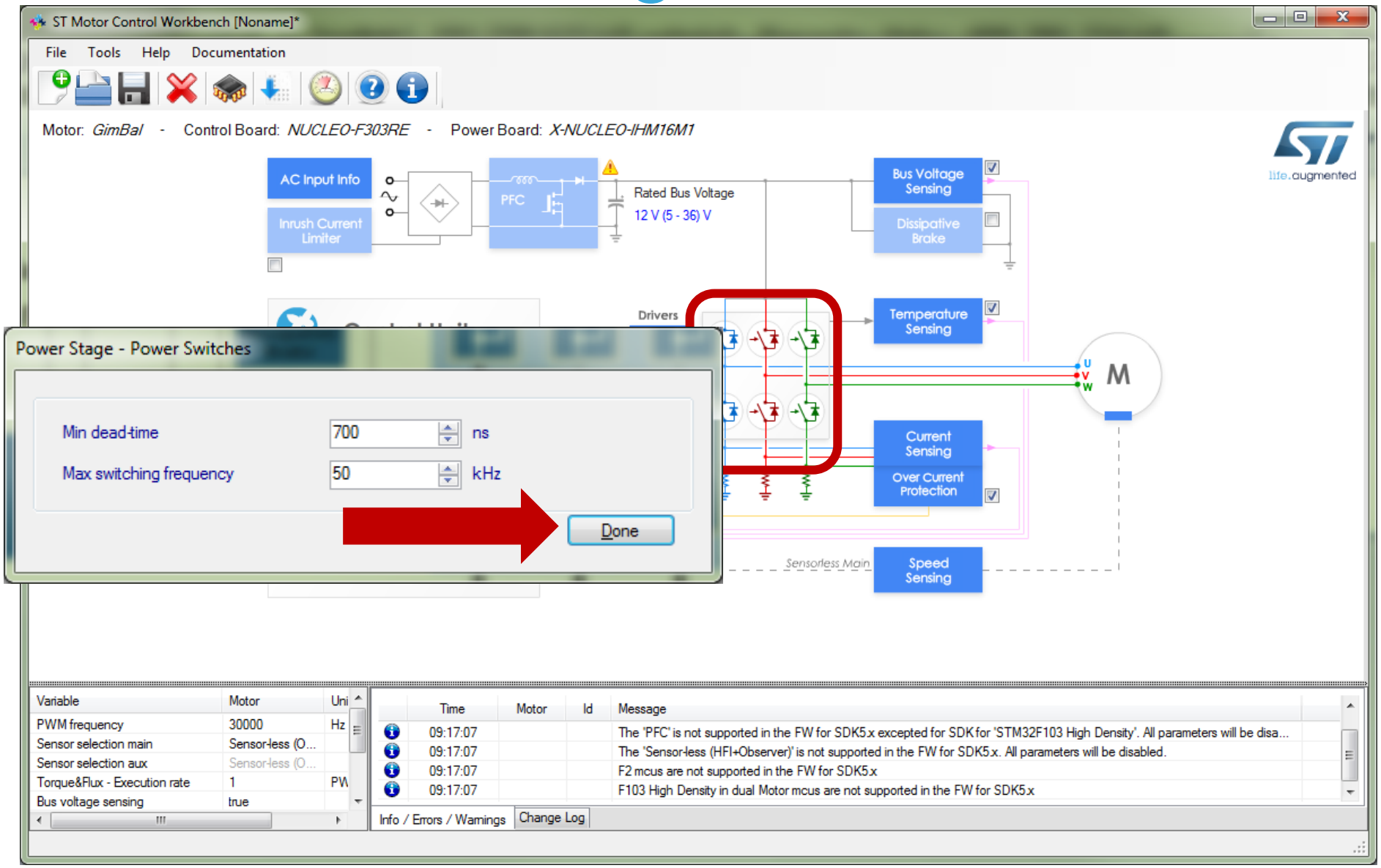
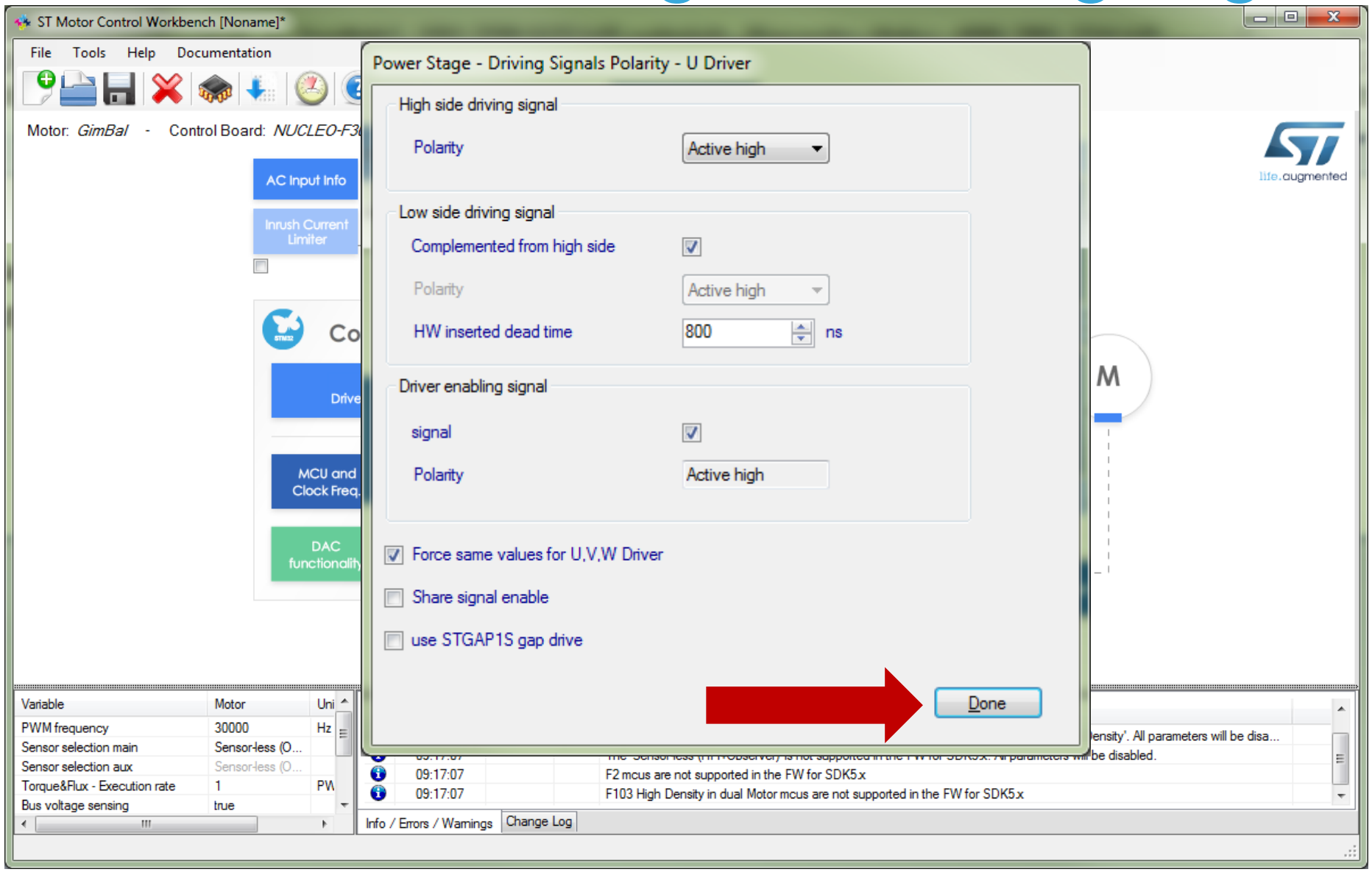
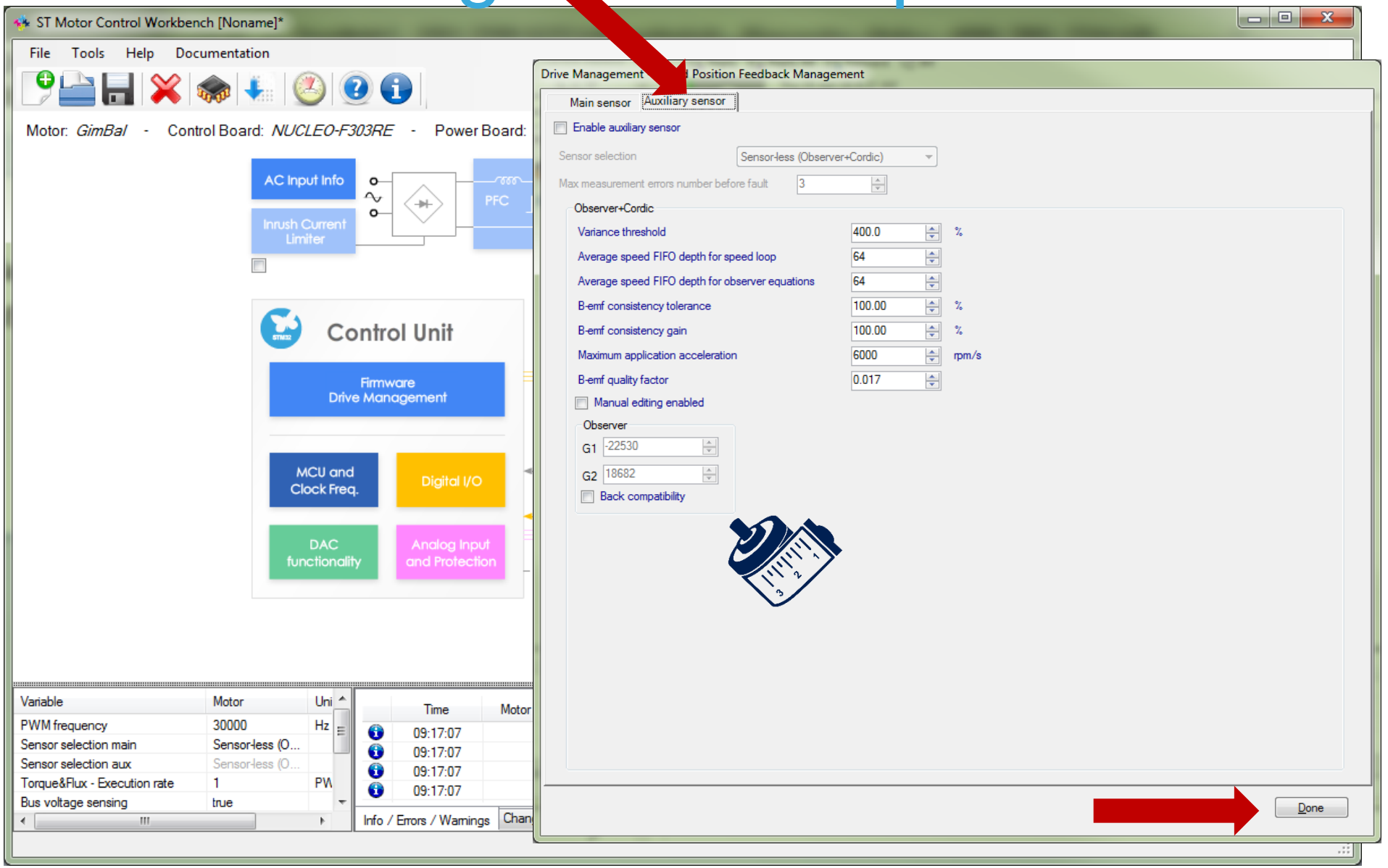
Power Stage – Power Switches



Power Stage – Driving Signals

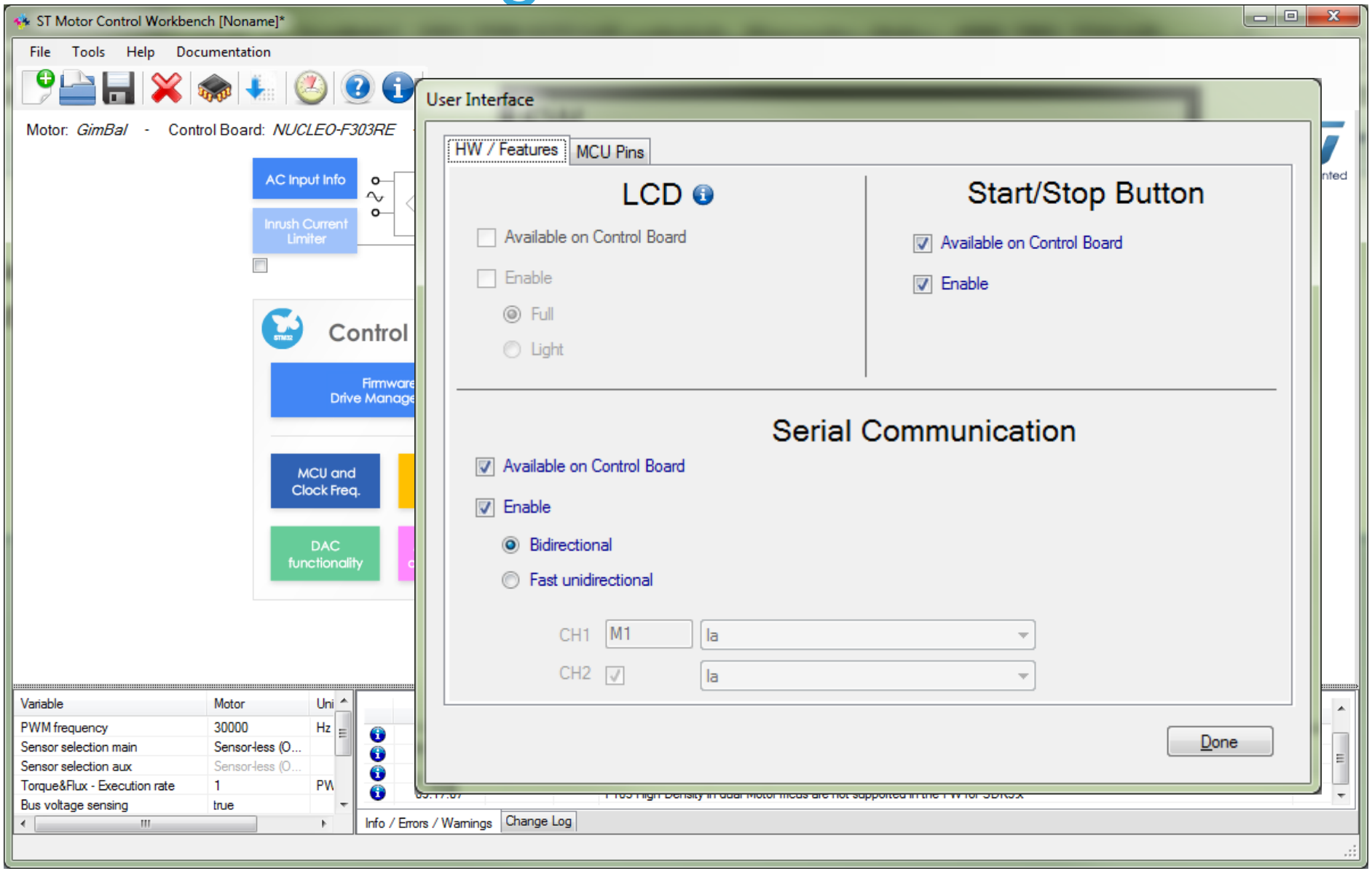


Drive Management – Speed Position



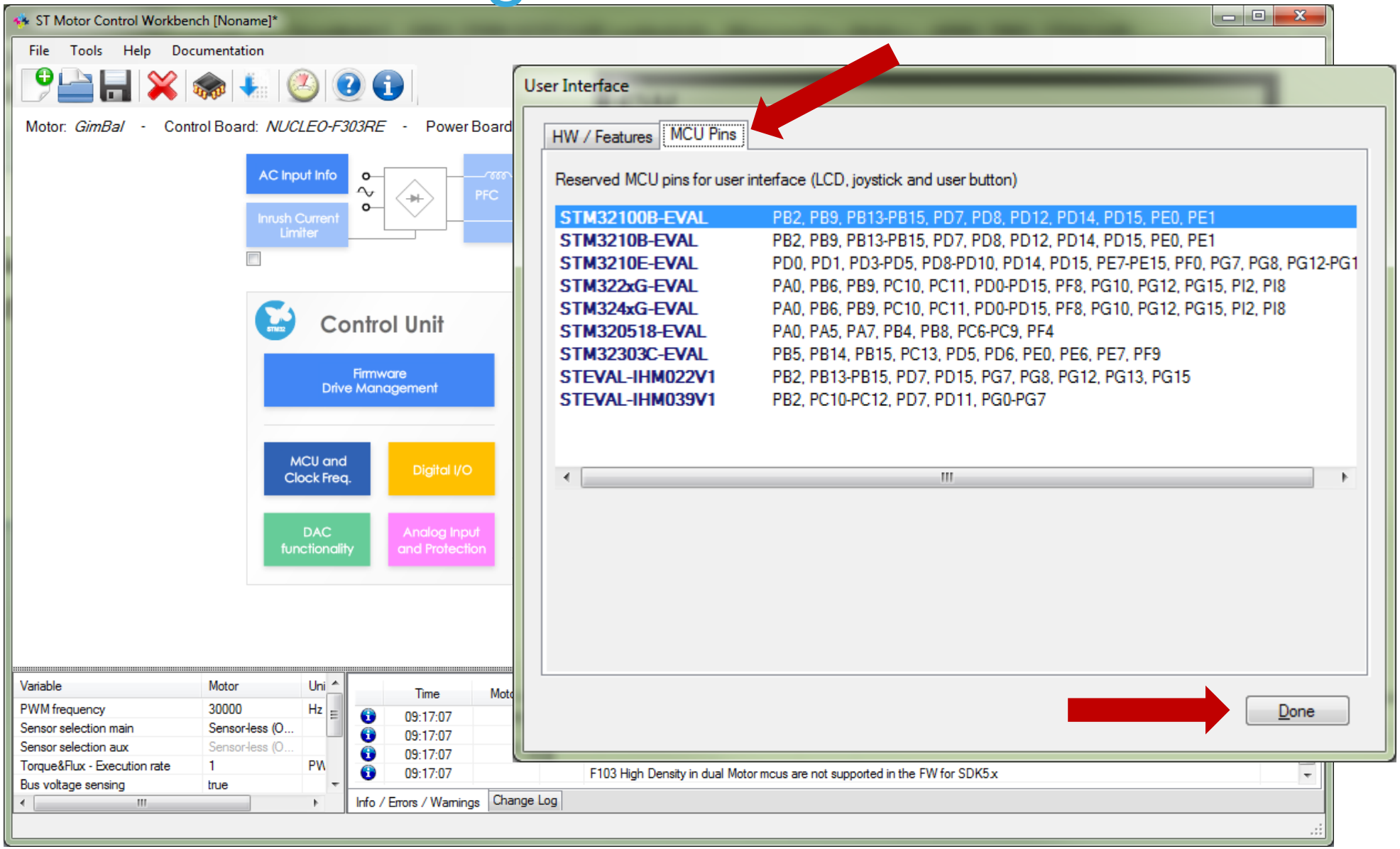
life.augmented

Drive Management – User Interface



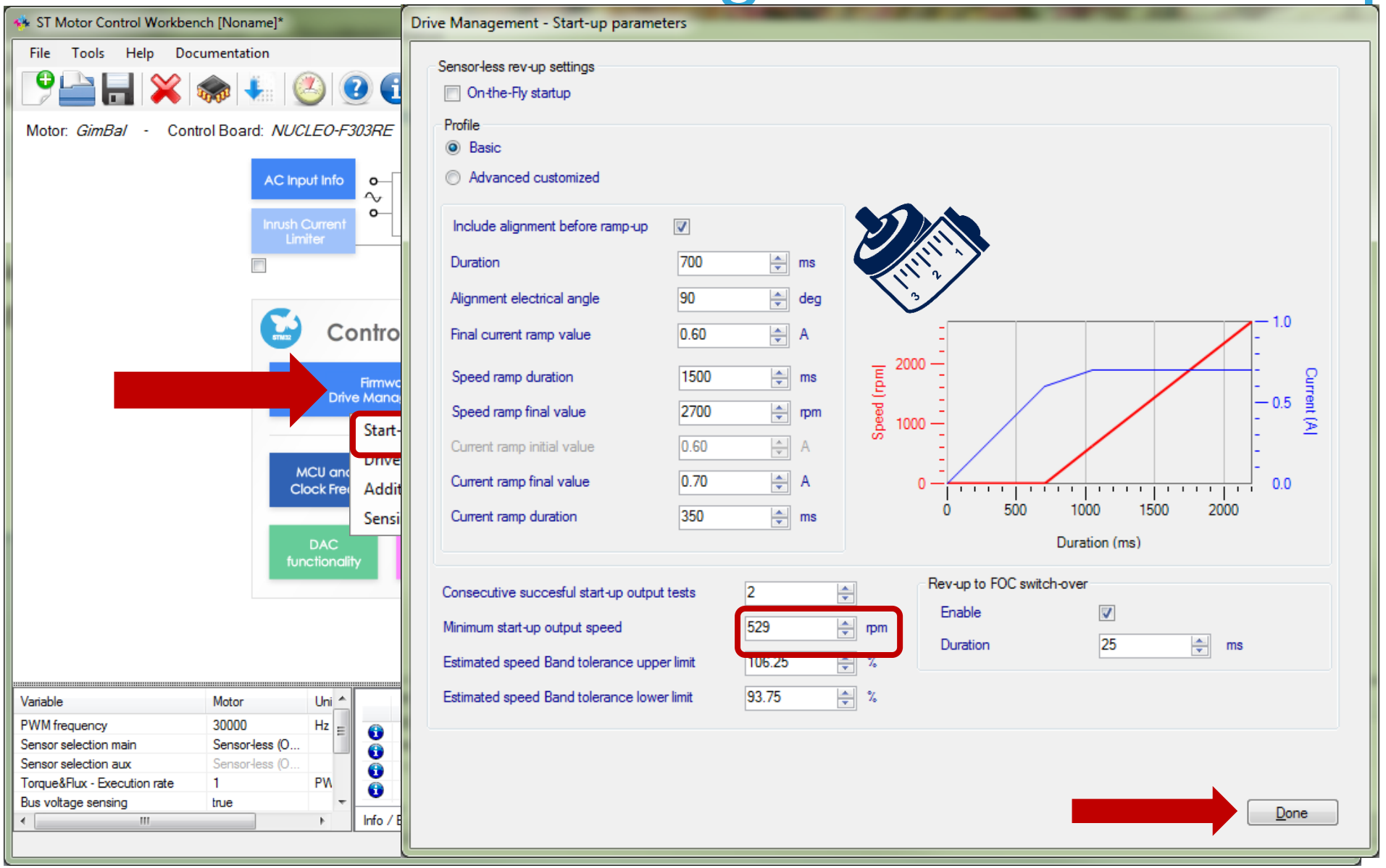
life.augmented

Drive Management – User Interface



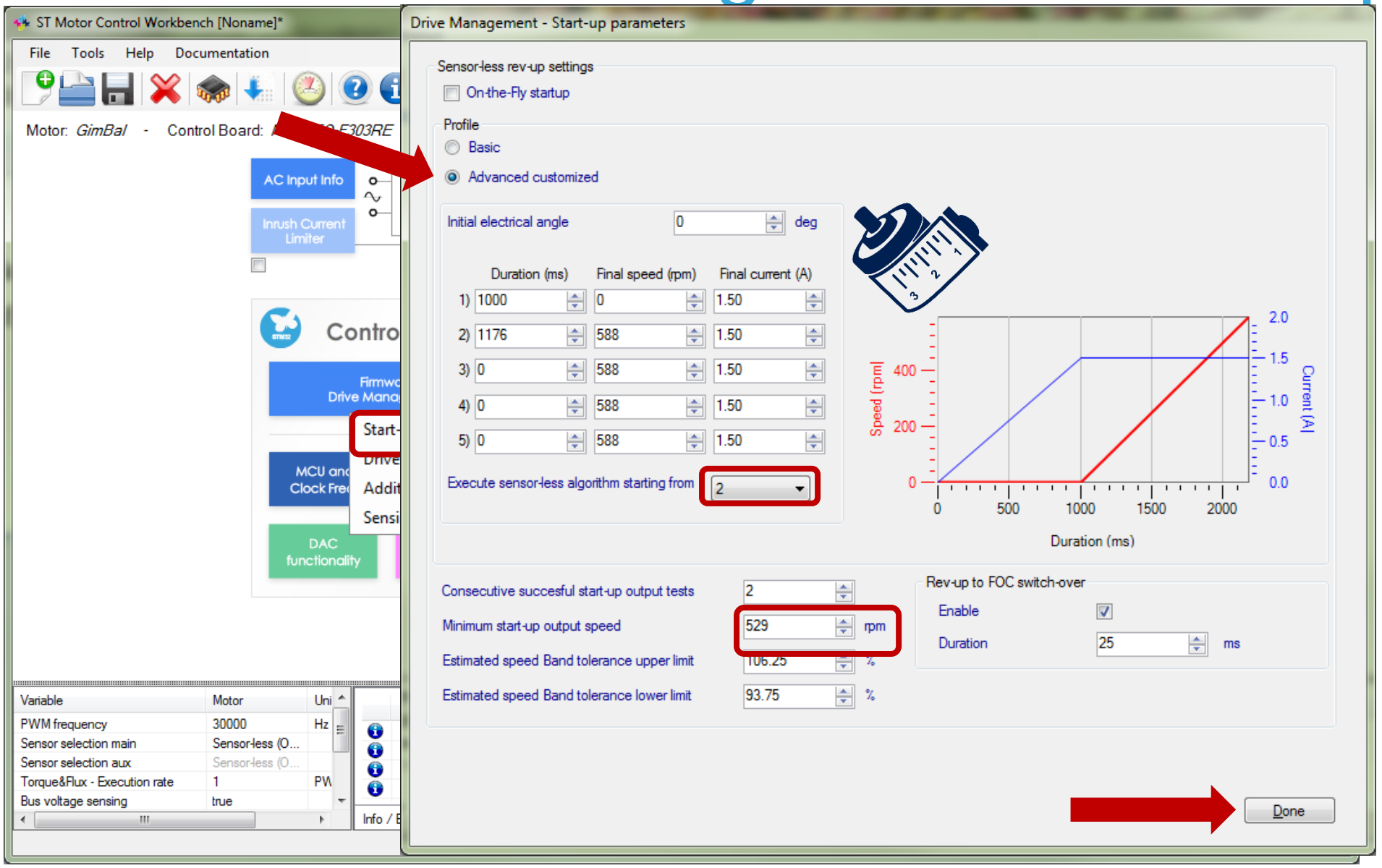
life.augmented

Drive Management – Start Up



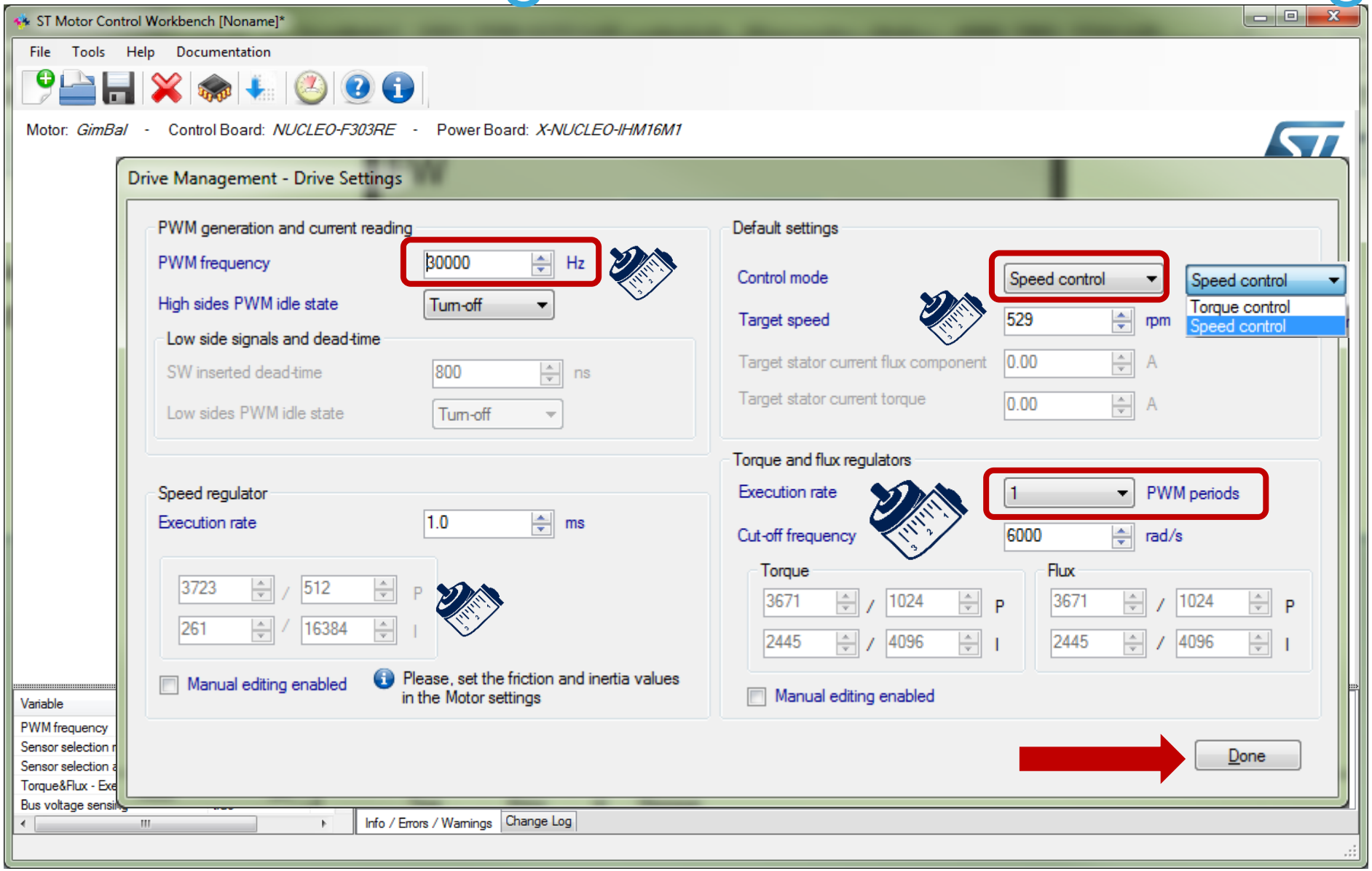
life.augmented

Drive Management – Start Up



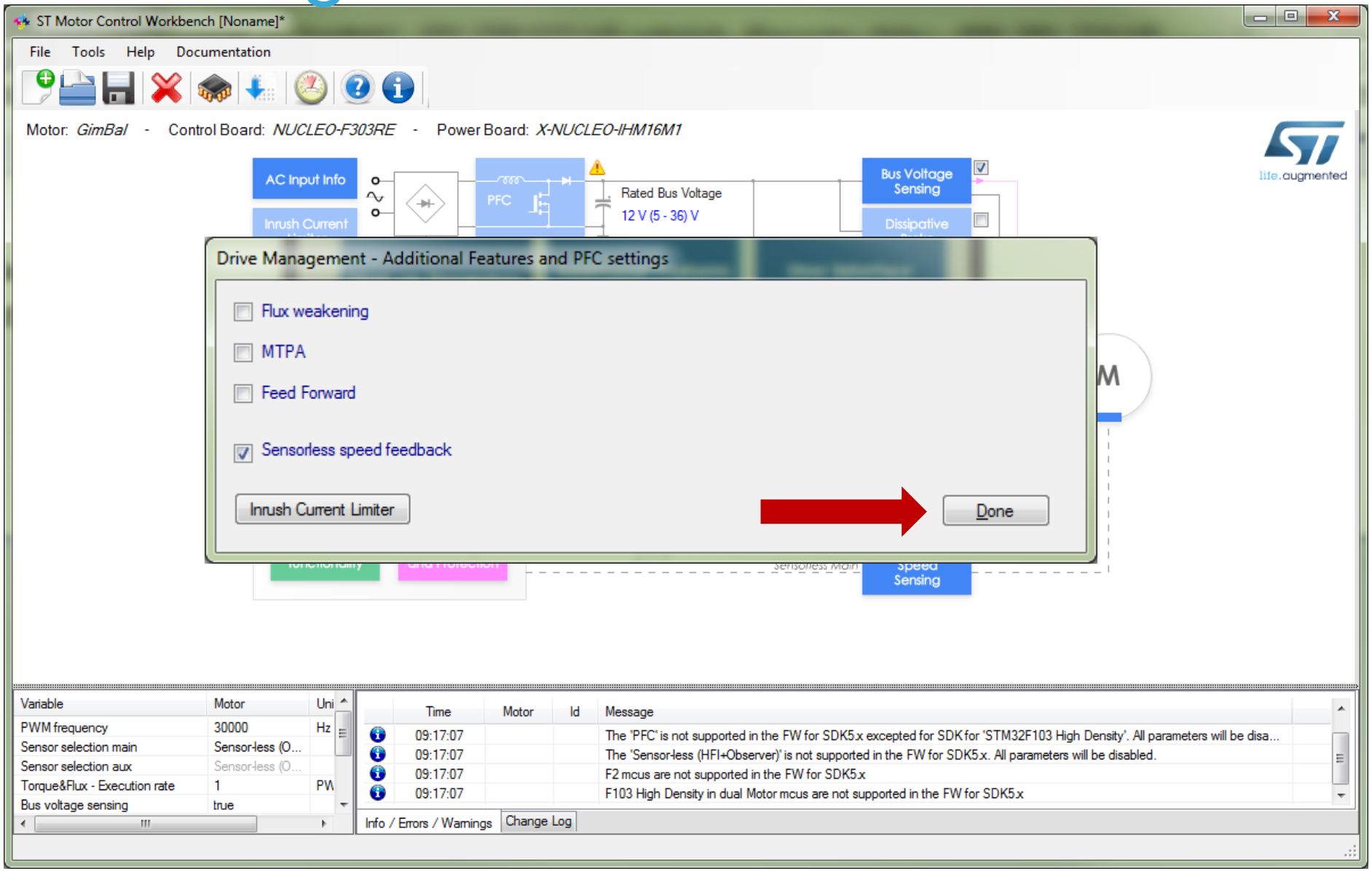
life.augmented

Drive Management – Drive Settings

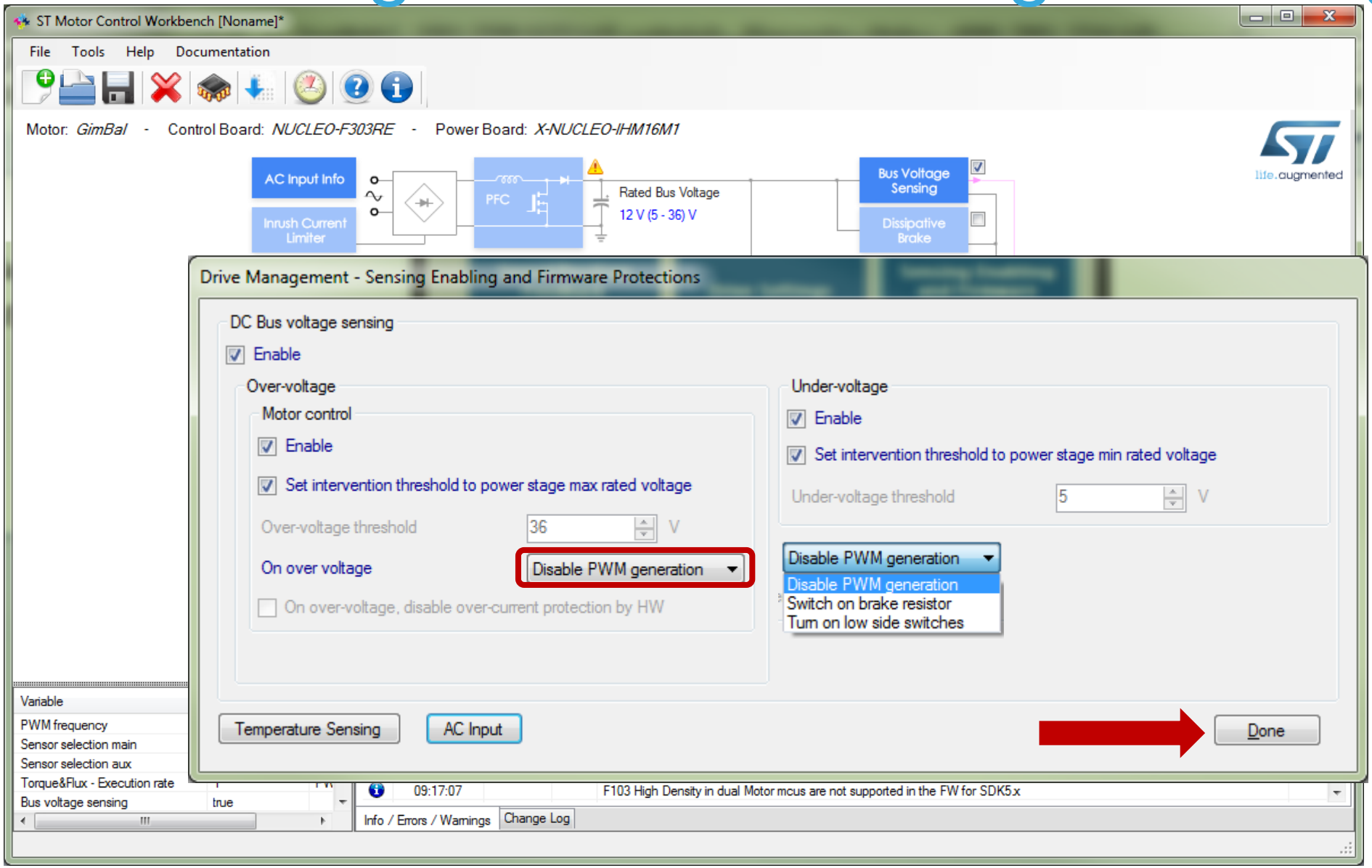


life.augmented

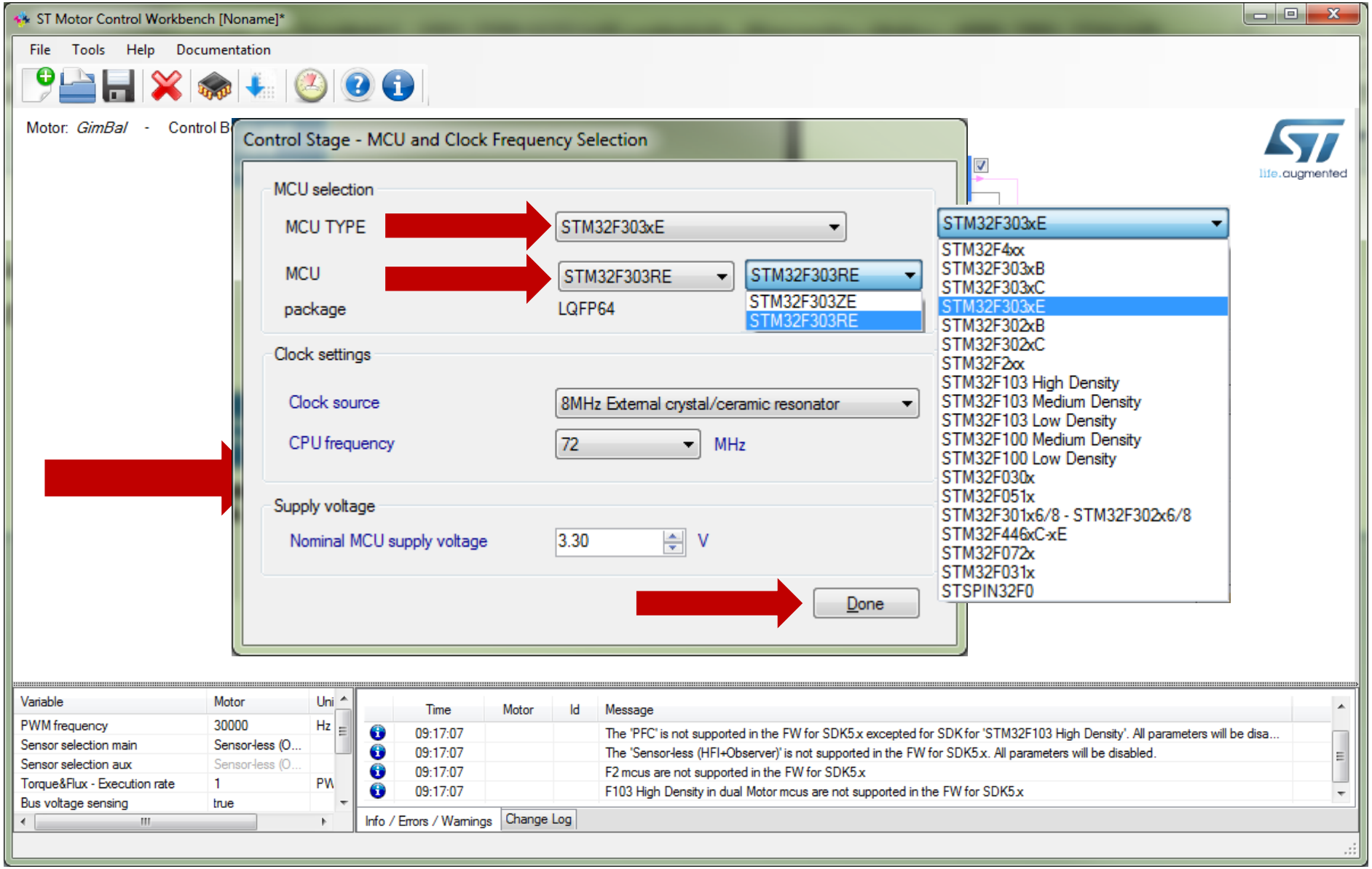
Drive Management – Additional Features



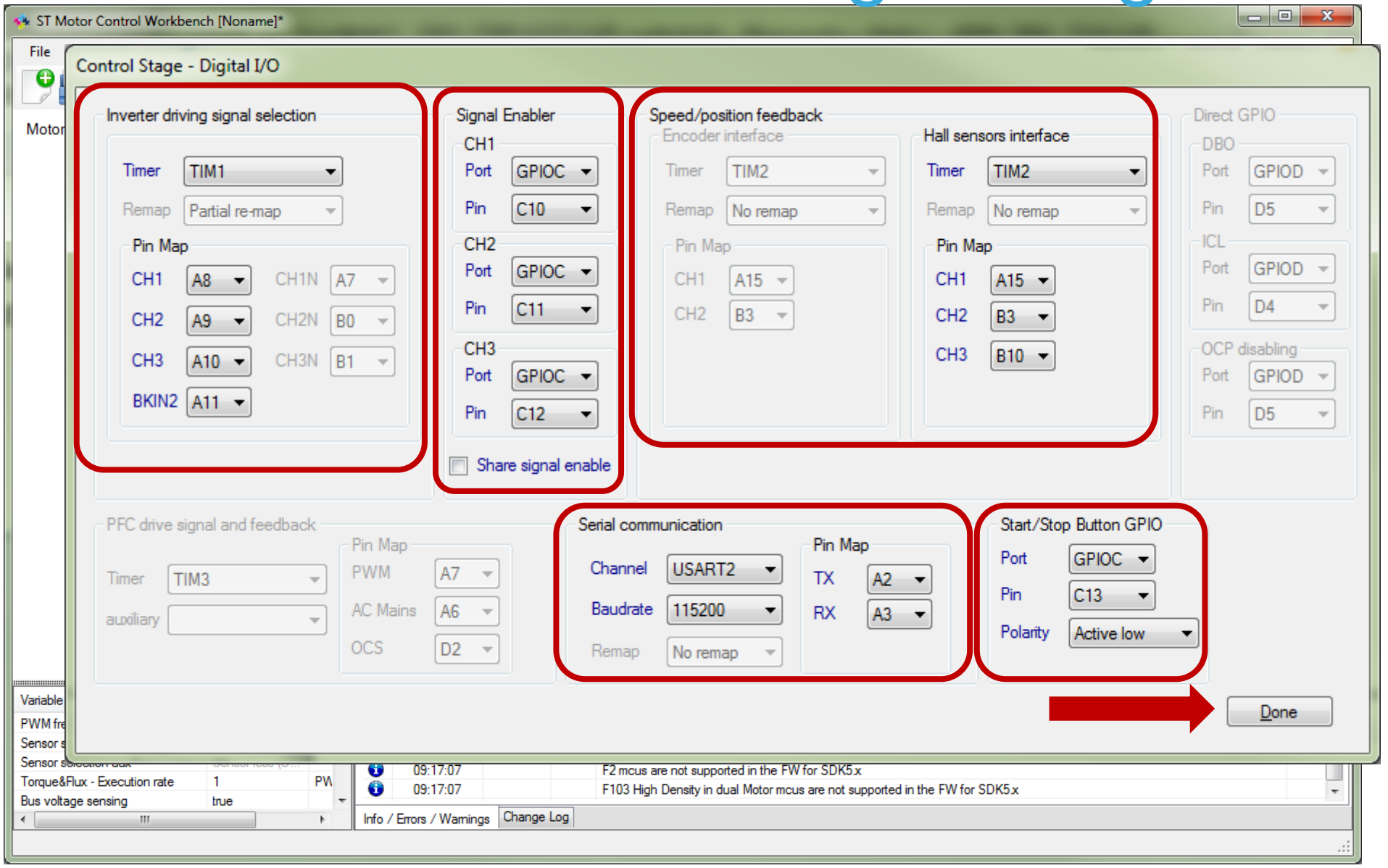
Drive Management – Sensing Enabling



Control Stage – MCU and CLK Selection

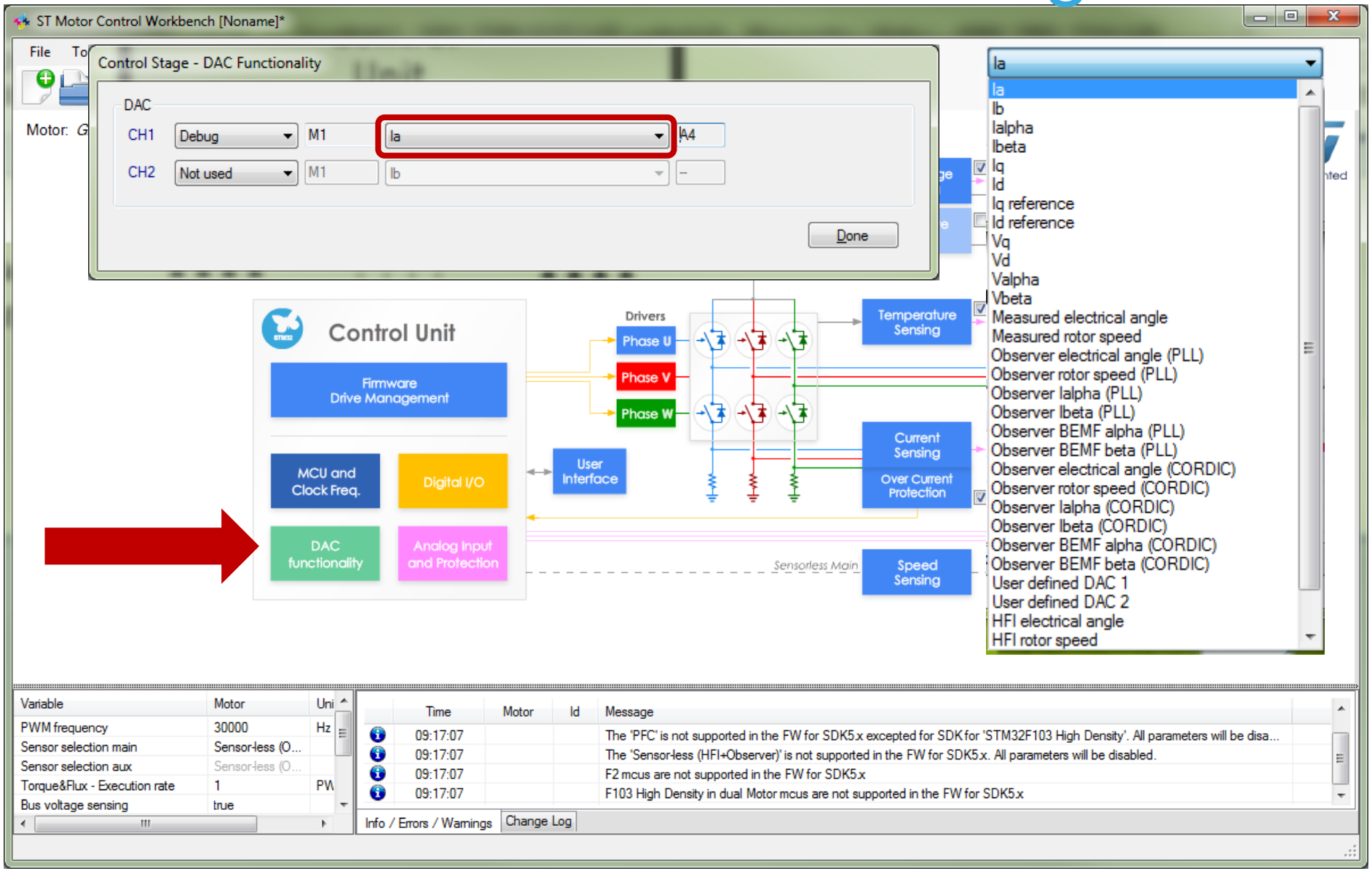


Control Stage – Digital I/O



life.augmented

Control Stage – DAC



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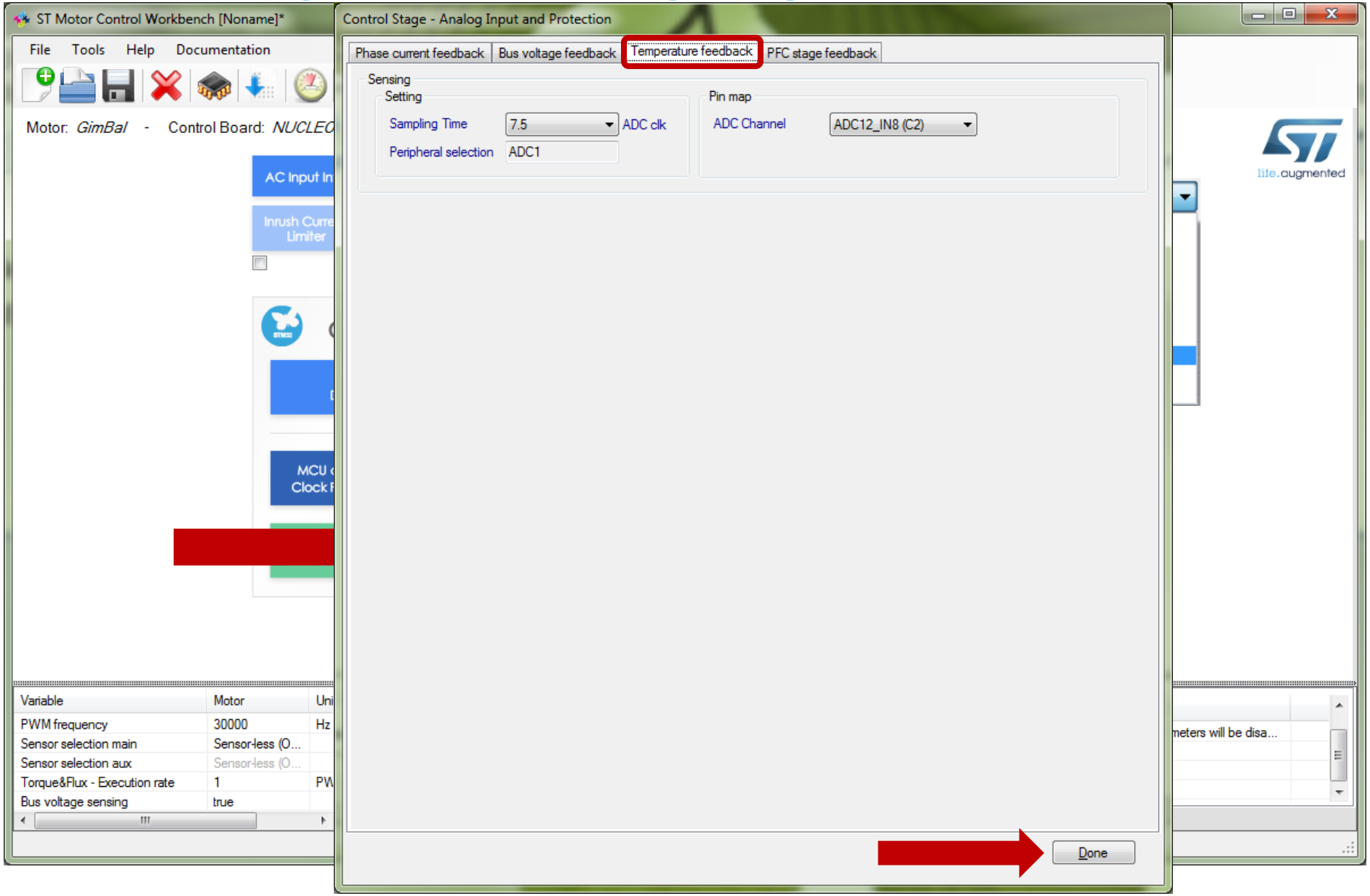
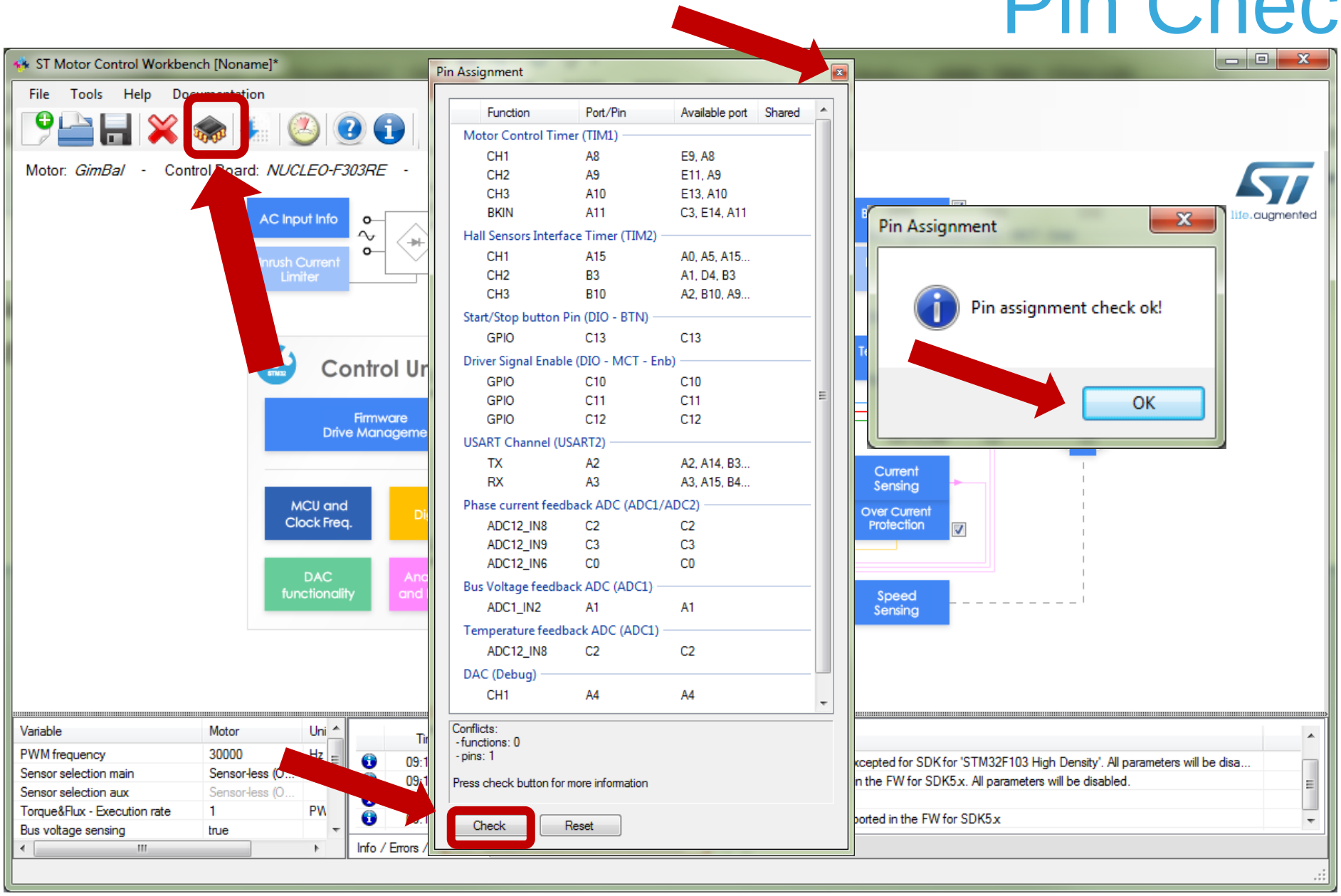
Control Stage – Analog Input and Protection



Pin Check


ST Motor Control Workbench [Noname]*
File
Tools
Help
Motor: GimBal - Control Board: NUCLEO-F303RE -
AC Input Info
Control Ur
Firmware Drive Manageme
MCU and Clock Freq.
DAC functionality
Pin Assignment
Function
Port/Pin
Available port
Shared
Motor Control Timer (TIM1)
CH1 A8 E9, A8
CH2 A9 E11, A9
CH3 A10 E13, A10
BKIN A11 C3, E14, A11
Hall Sensors Interface Timer (TIM2)
CH1 A15 A0, A5, A15...
CH2 B3 A1, D4, B3
CH3 B10 A2, B10, A9...
Start/Stop button Pin (DIO - BTN)
GPIO C13 C13
Driver Signal Enable (DIO - MCT - Enb)
GPIO C10 C10
GPIO C11 C11
GPIO C12 C12
USART Channel (USART2)
TX A2 A2, A14, B3...
RX A3 A3, A15, B4...
Phase current feedback ADC (ADC1/ADC2)
ADC12_IN8 C2 C2
ADC12_IN9 C3 C3
ADC12_IN6 C0 C0
Bus Voltage feedback ADC (ADC1)
ADC1_IN2 A1 A1
Temperature feedback ADC (ADC1)
ADC12_IN8 C2 C2
DAC (Debug)
CH1 A4 A4
Conflicts:
- functions: 0
- pins: 1
Press check button for more information
Check
Reset
Pin Assignment
Pin assignment check ok!
OK
Current Sensing
Over Current Protection
Speed Sensing
Variable
Motor
PWM frequency 30000
Sensor selection main
Sensor selection aux
Torque&Flux - Execution rate 1
Bus voltage sensing true
Info / Errors /
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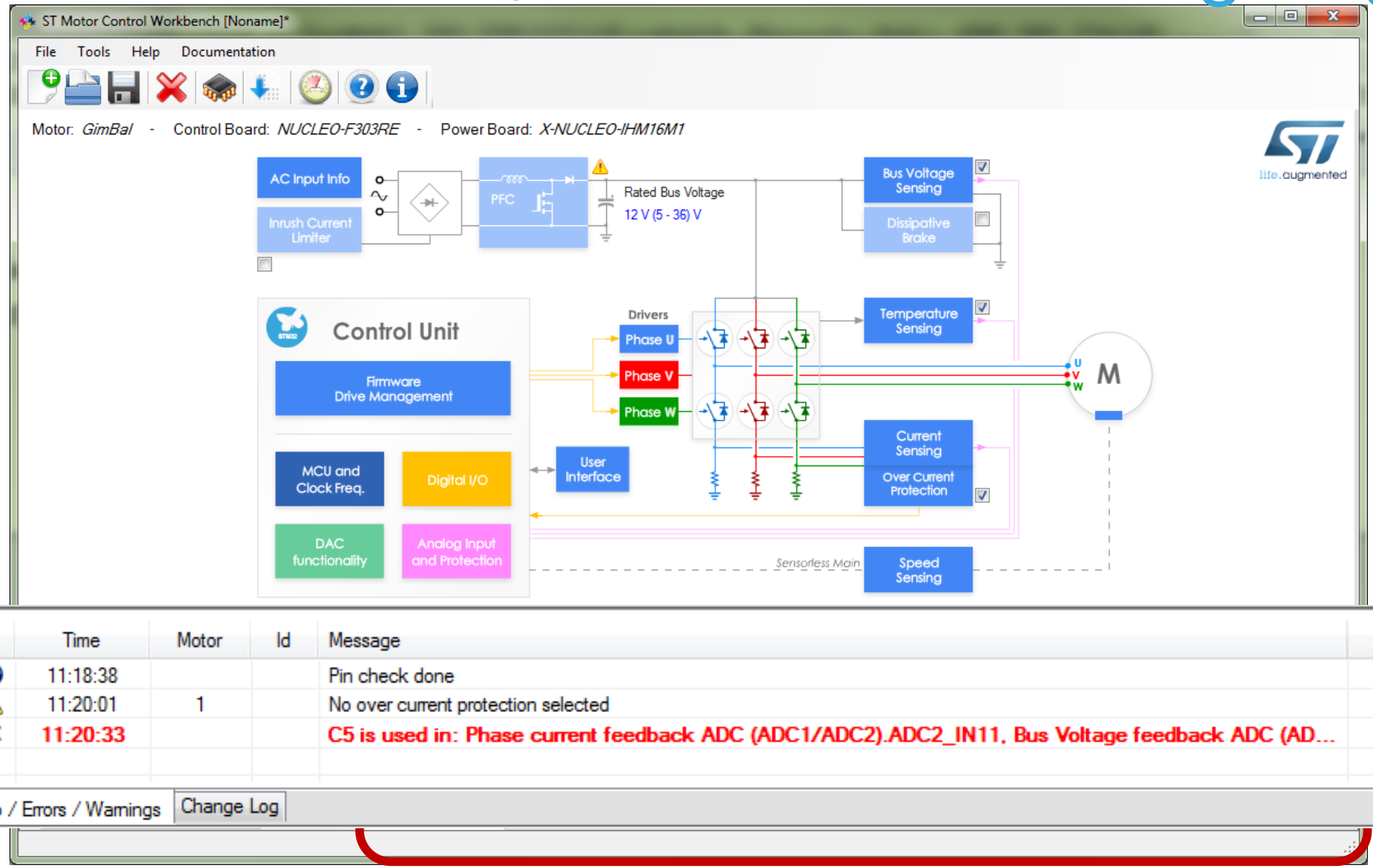
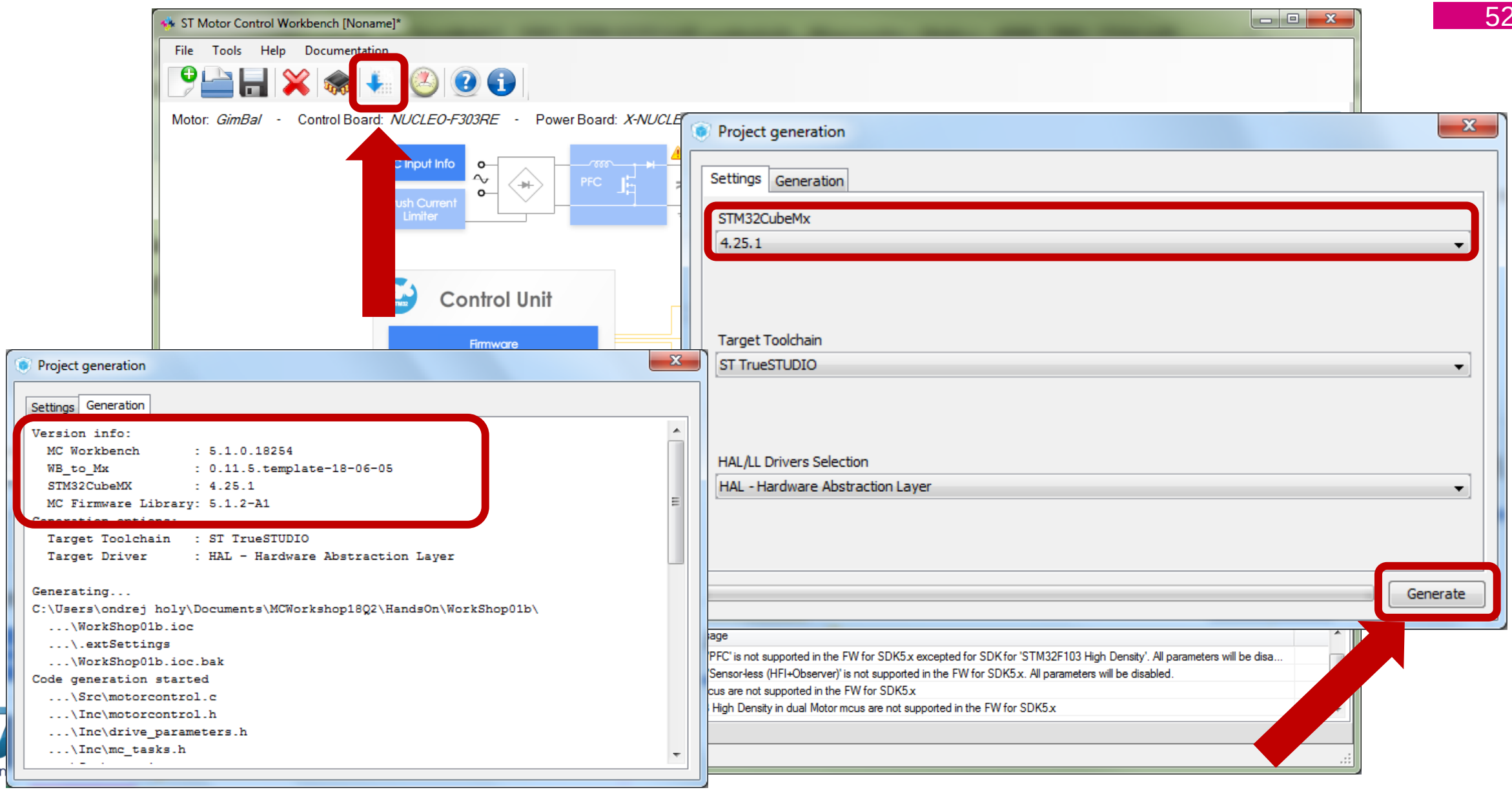
Info, Error and Warning Log

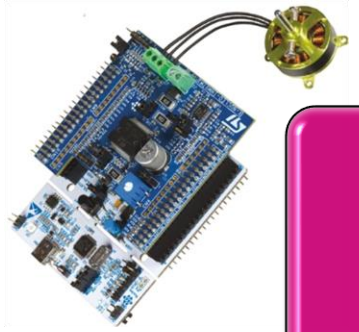


Generate Code

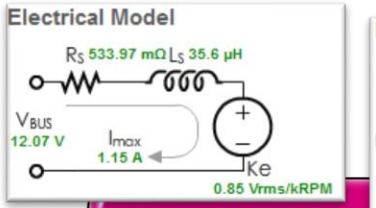


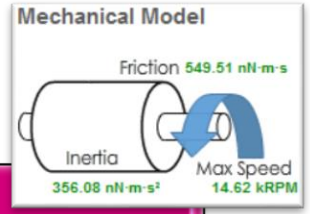
Motor Control Development Workflow

#4 – Project Configuration



Hardware Setup



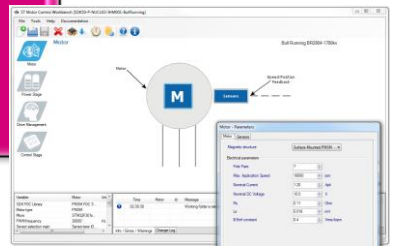


Motor Characterization

Motor Profiler
Motion Control Suite

System Configuration

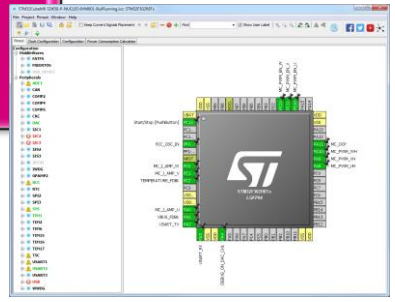
Motor Control Workbench



Project Configuration

CubeMX & IDE

STM32 CubeMX



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