650S
SERIES

HA501254

650S

Parker

Application Notes

650S Application Notes

Application advice is available through our Technical Support Department, who can also arrange for on-site assistance if required.

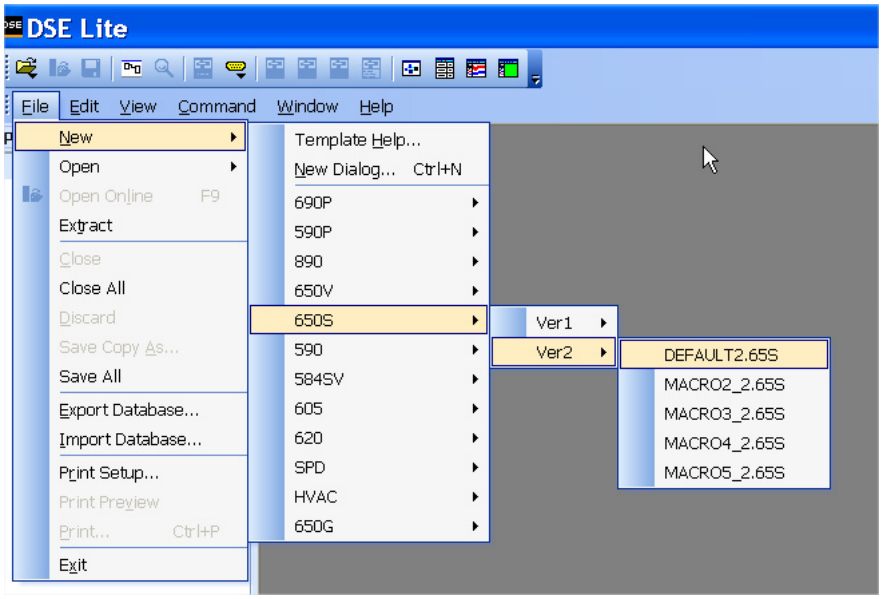
How to set up a 650S

All figures are extracted from DSELite v2.14

Page No.

CREATE A NEW CONFIGURATION

Using DSELite to generate a configuration file for the 650S product :



EXTRACT AND CREATE A CONFIGURATION

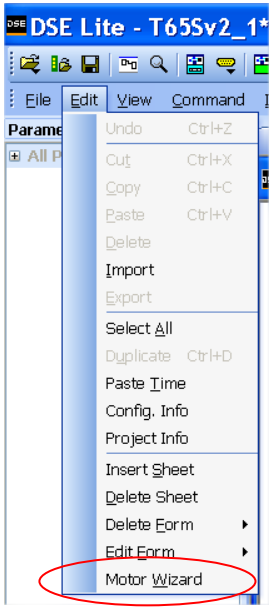
Open the “default2.65S” configuration .

Connect your laptop to a 650S drive.

Extract the drive configuration.

Use the Motor Wizard to set up your application.

MOTOR WIZARD



When you create a configuration, the first thing is to select a motor.

Using the Motor Wizard Tool, you can :

- Select a motor which is already included in the motor data base,
- clone an existing motor of the actual data base,
- create a new motor by filling in the set of parameters that are asked by the tool.

Compare to the set of parameters needed to describe a motor in ‘Sv motor data 1 & 2’ blocks (page 2) of the configuration, the number of parameters needed is quite important and some of them can be ignored for a 650S configuration.

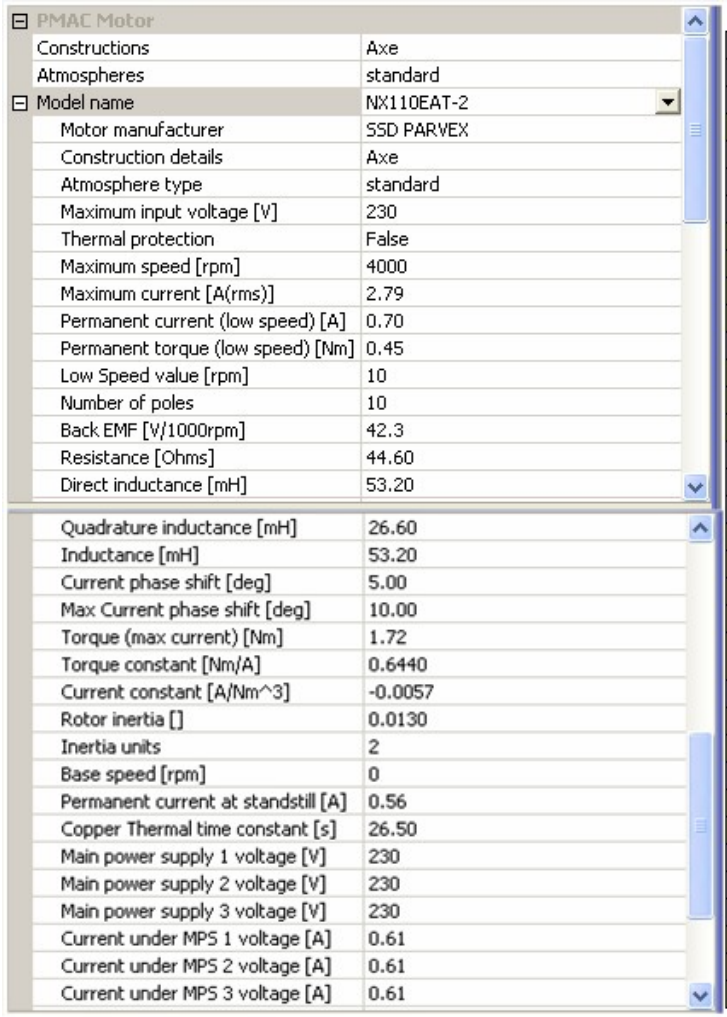
This section explains the parameters that have to be correctly set for declaring a new PMAC motor and describes windows of the motor wizard.

Motor description

Creating a new motor needs to fill in the table below.

Parameters marked with a ☻ needed to be filled in. For some of them, the value is the same as an existing parameter (for example, Permanent current at standstill[A] = Permanent current (low speed)).

Others parameters can keep the default value given by the tool.



PMAC Motor	
Constructions	Axe
Atmospheres	standard
Model name	NX110EAT-2
Motor manufacturer	SSD PARVEX
Construction details	Axe
Atmosphere type	standard
Maximum input voltage [V]	230
Thermal protection	False
Maximum speed [rpm]	4000
Maximum current [A(rms)]	2.79
Permanent current (low speed) [A]	0.70
Permanent torque (low speed) [Nm]	0.45
Low Speed value [rpm]	10
Number of poles	10
Back EMF [V/1000rpm]	42.3
Resistance [Ohms]	44.60
Direct inductance [mH]	53.20
Quadrature inductance [mH]	26.60
Inductance [mH]	53.20
Current phase shift [deg]	5.00
Max Current phase shift [deg]	10.00
Torque (max current) [Nm]	1.72
Torque constant [Nm/A]	0.6440
Current constant [A/Nm^3]	-0.0057
Rotor inertia []	0.0130
Inertia units	2
Base speed [rpm]	0
Permanent current at standstill [A]	0.56
Copper Thermal time constant [s]	26.50
Main power supply 1 voltage [V]	230
Main power supply 2 voltage [V]	230
Main power supply 3 voltage [V]	230
Current under MPS 1 voltage [A]	0.61
Current under MPS 2 voltage [A]	0.61
Current under MPS 3 voltage [A]	0.61

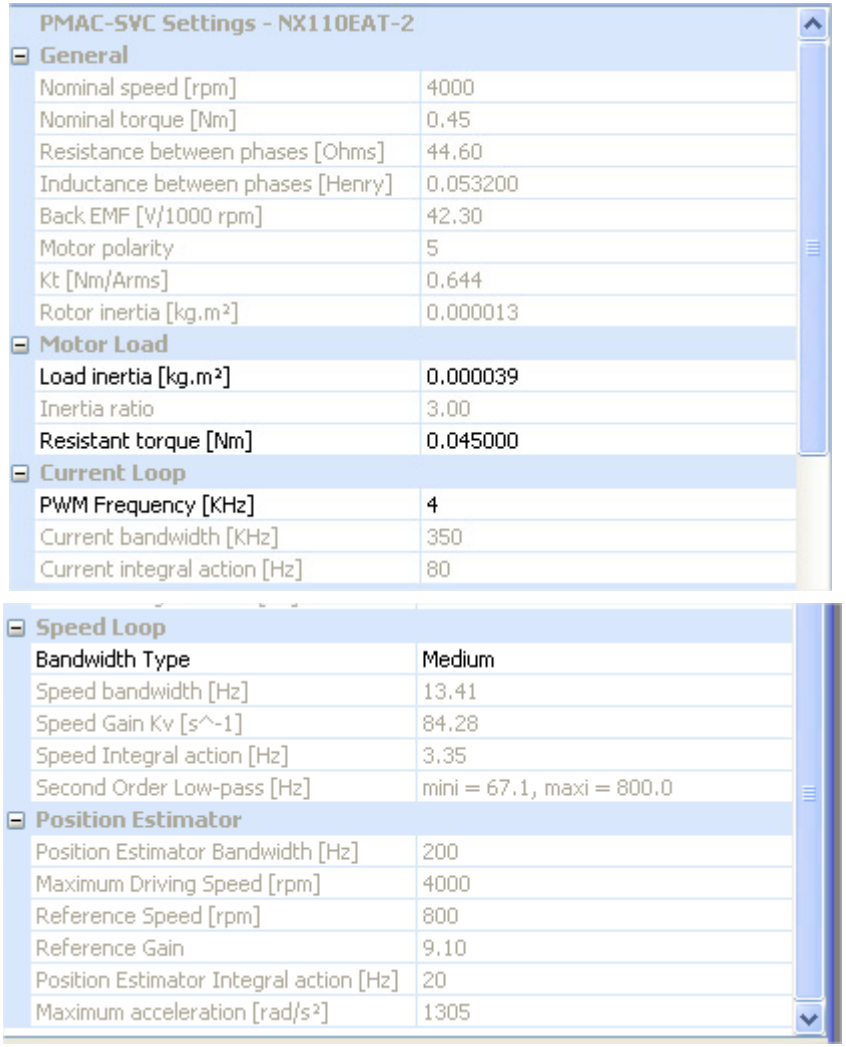
Parameter		Comment
Model name		Informative
Motor manufacturer		Informative
Construction details	☻	Axe-spindle-torque
Atmosphere type		Informative
Maximum input voltage[V]		Informative
Thermal protection		Informative
Maximum speed[rpm]	☻	Motor mechanical maxspeed in RPM
Maximum current{A(rms)]	☻	Maximum current in Arms
Permanent current (low speed)	☻	Permanent (nominal) current in Arms
Permanent torque (low speed)	☻	Permanent (nominal)torque in Nm
Low Speed value[rpm]		10 (Keep default value)
Number of poles	☻	Number of motor poles
Back EMF[V/1000rpm]	☻	In Vrms/1000RPM (line to line)
Resistance[Ohms]	☻	In Ohms (line to line)
Direct inductance[mH]		Not used
Quadrature inductance[mH]		Not used
Inductance[mH]	☻	In H (line to line)
Current phase shift[deg]	☻	If value not known : 0
Max Current phase shift[deg]	☻	If value not known : 0
Torque(max current)[Nm]	☻	Maximum Torque in Nm
Torque constant[Nm/A]	☻	Torque constant in Nm/Arms (⇔ Permanent Torque(low speed) / Permanent current(low speed))
Current constant[A/Nm^3]		0 (Keep default value)
Rotor inertia[]	☻	Rotor Inertia value
Inertia units	☻	Inertia Units (0=kgm² or 1=kgcm² or 2=gm²)
Base speed[rpm]		Not used
Permanent current at standstill[A]	☻	= Permanent current (low speed)
Copper thermal time constant[s]	☻	Thermal time constant of the motor in s
Main power supply 1 voltage[V]		Informative – not used
Main power supply 2 voltage[V]		Informative – not used
Main power supply 3 voltage[V]		Informative – not used
Current under MPS1 voltage[A]	☻	= Permanent current (low speed)
Current under MPS2 voltage[A]	☻	= Permanent current (low speed)
Current under MPS3 voltage[A]	☻	= Permanent current (low speed)

Speed at MPS 1 voltage [rpm]	4000
Speed at MPS 2 voltage [rpm]	4000
Speed at MPS 3 voltage [rpm]	4000
Torque under MPS 1 voltage [Nm]	0.38
Torque under MPS 2 voltage [Nm]	0.38
Torque under MPS 3 voltage [Nm]	0.38

Speed at MPS1 voltage[rpm]	☻	= Maximum speed [rpm]
Speed at MPS1 voltage[rpm]	☻	= Maximum speed [rpm]
Speed at MPS1 voltage[rpm]	☻	= Maximum speed [rpm]
M mps1		Informative – not used
M mps2		Informative – not used
M mps3		Informative – not used

Application description

Next window is also a list of parameters. Two of them can be changed to adapt the settings of the main loops to your application :



PMAC-SVC Settings - NX110EAT-2	
General	
Nominal speed [rpm]	4000
Nominal torque [Nm]	0.45
Resistance between phases [Ohms]	44.60
Inductance between phases [Henry]	0.053200
Back EMF [V/1000 rpm]	42.30
Motor polarity	5
Kt [Nm/Arms]	0.644
Rotor inertia [kg.m²]	0.000013
Motor Load	
Load inertia [kg.m²]	0.000039
Inertia ratio	3.00
Resistant torque [Nm]	0.045000
Current Loop	
PWM Frequency [KHz]	4
Current bandwidth [KHz]	350
Current integral action [Hz]	80
Speed Loop	
Bandwidth Type	Medium
Speed bandwidth [Hz]	13.41
Speed Gain Kv [s^-1]	84.28
Speed Integral action [Hz]	3.35
Second Order Low-pass [Hz]	mini = 67.1, maxi = 800.0
Position Estimator	
Position Estimator Bandwidth [Hz]	200
Maximum Driving Speed [rpm]	4000
Reference Speed [rpm]	800
Reference Gain	9.10
Position Estimator Integral action [Hz]	20
Maximum acceleration [rad/s²]	1305

Load inertia: Enter the estimated load inertia. The parameter ‘ Inertia ratio ‘ gives you the load inertia/motor inertia ratio. For a standard application a value between 0 to 10 is possible.

In a first approach, it is better to under-evaluate the load inertia. This parameter will be used to calculate the speed loop gain.

Resistant torque: do not modify this value

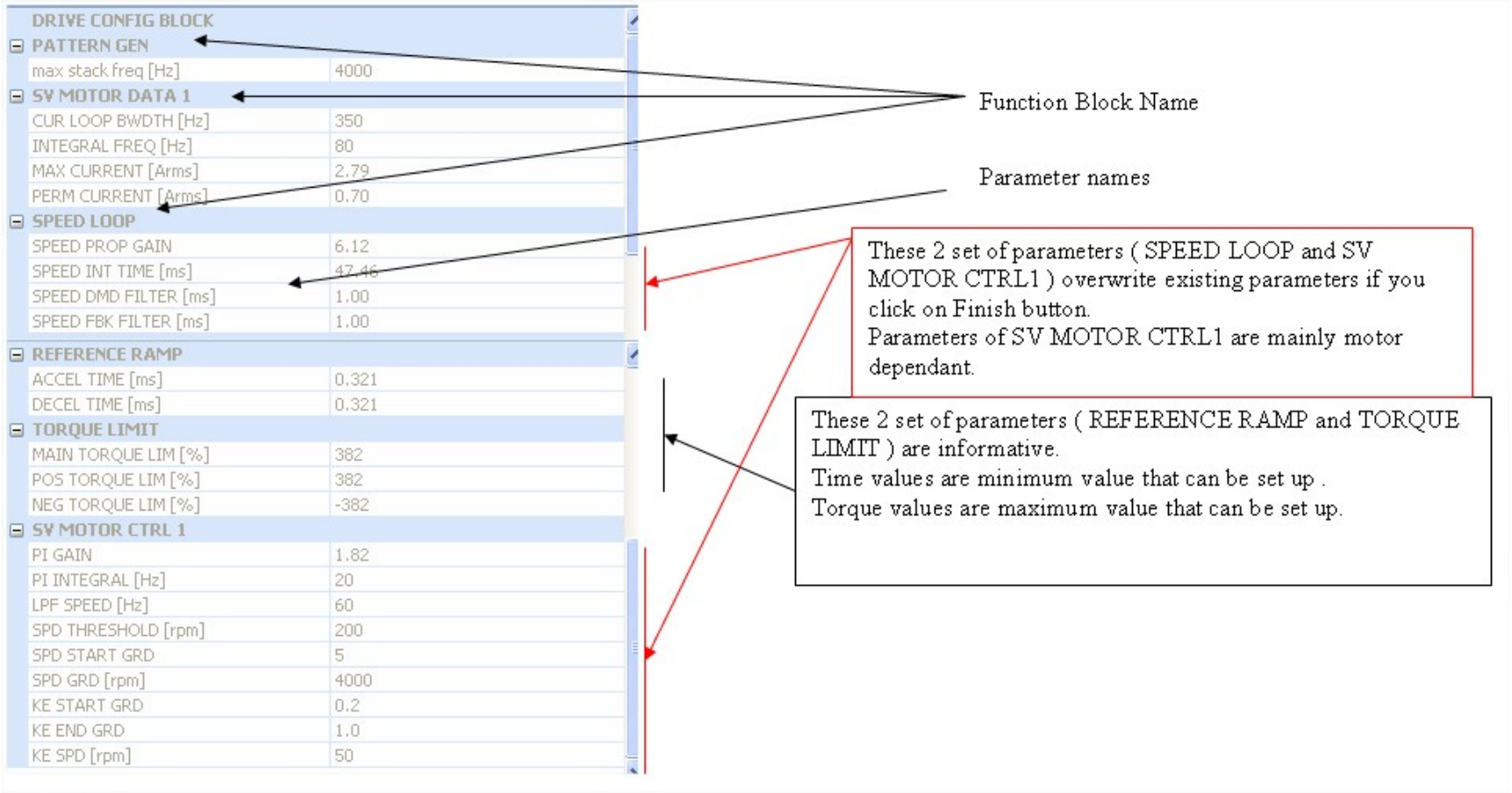
Bandwidth Type: You can select **low – Medium – High**

Medium value provides a correct speed loop setting for most of the applications.

If your inertia ratio is bigger than 10, select a **low** value

Parameters Extracted

The next window is a list of parameters. Some of them will overwrite existing parameters into the configuration blocks of your application.



Others are given as information

CONFIGURATION FILE

SV MOTOR CTRL 1

ENABLE STARTUP

Must be set to **TRUE** if you want to run the motor at low speed with torque capabilities.

This parameter can be used at **FALSE** if you have an application where you never need to run at low speed and your application just need to run the motor in a speed mode control. If you try to run the motor at low speed, you can have erratic and strange motions.

STARTUP TIME

To set up if ENABLE STARTUP = TRUE

The default value of 0.5s is well adapted for most of the motors. This is the time to install the current (STARTUP CURRENT value) in the motor.

Changing this value depends on your application.

Higher is your load inertia, higher must be this value.

STARTUP CURRENT

To set up if ENABLE STARTUP = TRUE

This parameter is used to set up the level of current in the motor phases when the drive is at a speed lower than the SPEED STARTUP (if ENABLE STARTUP = TRUE).

A value of 10% is equivalent to allow a maximum of 10% of the torque on the motor shaft. If you apply a resistant torque higher than this value, the motor stops.

STARTUP SPEED

To set up if ENABLE STARTUP = TRUE

The default value of 5% is well adapted for most of the motors. **That must remain an absolute value of the maximum motor speed**. For example, for a 400V, 3000RPM motor, 5% represents 150RPM.

This value must be adapted depending on the speed application. For example with the same motor, if your speed application is 1500RPM (representing a 100% speed setpoint), then the SPEED STARTUP must be changed to 10% (150RPM compare to 1500RPM)'

For some slow motors, this value can be increased to 10 or 15%.

PI GAIN

This parameter is motor dependant and must be calculated using the wizard tool.

SPEED LOOP

SPEED PROP GAIN:

This parameter is motor and load dependant.

The motor wizard helps you to set up this parameter.

You have to provide an estimation of your load inertia to get a correct calculation.

The default value for the ratio load inertia over motor inertia is 3, you can change it in the wizard itself .

If the ratio load inertia/motor inertia becomes too high (typically > 10) , the wizard generally over-evaluates the speed loop bandwidth and can generates GAIN and INT TIME that are false. In that case can appear as instability. Reducing the gain is the only solution.

REFERENCE

MAX SPEED

This parameter describes the 100% speed setpoint of your application. Its maximum value is the max motor speed, but you can decrease the value to your need. Don't forget to also adapt the SPEED STARTUP parameter of the SV MOTOR CTRL1 Block.

Sv Motor Data 1 & 2

MAX SPEED

This parameter describes the nominal motor speed. This is typically appearing on the motor nameplate and associated to an input AC voltage.

If you are using a 230V drive with a 400V motor, keep the value associated to the 400V in this parameter.

SERVICE & REPAIR CENTRES

UK Head Office: Parker SSD Drives
New Courtwick Lane, Littlehampton, West Sussex BN17 7RZ
Tel: +44 (0)1903 737000 Fax: +44 (0)1903 737100

CANADA
Parker Hannifin Canada
Motion and Control Division
160 Chisholm Drive
Milton, Ontario L9T 3G9
Tel: +1 (905) 693-3000
Fax: +1 (905) 876-1958

CHINA
Parker Hannifin Motion & Control
(Shanghai) Co. Ltd.
280 Yunqiao Road,
Jinqiao Export Processing Zone,
Pudong District, Shanghai 201206
Tel: +86(21)5031 2525
Fax: +86(21)5854 7599

FRANCE
Parker SSD Parvex
8 Avenue du Lac
B.P. 249
21007 Dijon Cedex
Tel: +33 (0)3 80 42 41 40
Fax: +33 (0)3 80 42 41 23

GERMANY
Parker Hannifin GmbH
Von-Humboldt-Strasse 10
64646 Heppenheim
Tel: +49 (6252) 798200
Fax: +49 (6252) 798205

ITALY
Parker Hannifin SPA
Via C. Gounod, Cinisello Balsamo
1-200092,
Milano
Tel: +39 (0236) 1081
Fax: +39 (0236) 108400

USA
Parker Hannifin Corporation
SSD Drives
9225 Forsyth Park Drive
Charlotte
North Carolina 28273
Tel: +1 (704) 588 3246
Fax: +1 (704) 588 3249

05/03/09

Local availability and service support also in:

Argentina • Australia • Austria • Bangladesh • Belgium • Brazil • Chile • Colombia • Costa Rica • Cyprus
Czech Republic • Denmark • Ecuador • Egypt • Finland • Greece • Hong Kong • Hungary • India • Indonesia
Iran • Ireland • Israel • Japan • Jordan • Kenya • Korea • Kuwait • Lithuania • Malaysia • Netherlands
New Zealand • Nigeria • Norway • Peru • Philippines • Poland • Portugal • Quatar • Romania • Russia
Saudi Arabia • Singapore • Slovenia • Slovakia • South Africa • Spain • Sri Lanka • Sweden • Switzerland
Taiwan • Thailand • Turkey • United Arab Emirates • Vietnam • Zimbabwe

www.ssddrives.com

HA501254-01