PRODUCT:NSXXX   SUBJECT: NSXXX EXAMPLE
                                           CONFIGURATION

CATEGORY: TECH NOTE
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NSxxx Configuration Guide

NSxxx software is a configuration tool for setting up the NS300 or NS500 application modules. This document steps the user through the use of NSxxx to demonstrate motion or trouble shoot the NS300 or NS500 application modules. This document references a parameter file and point table file 300DEMO.PRM and 300DEMO.PNT. These example files set speeds and target distances that maybe inappropriate for a specific machine. Therefore it is recommended that the motor be decoupled from the load while using NSxxx with these files.

Begin by attaching the YS-16 cable to the com port of the PC and to CN11 on the NS300/500. Apply main power and control power to the SGDH/NS300. Run the file "NS_MMI.exe". The screen below will appear.

1) Press the Connect button to establish communication with NS300 or NS500.
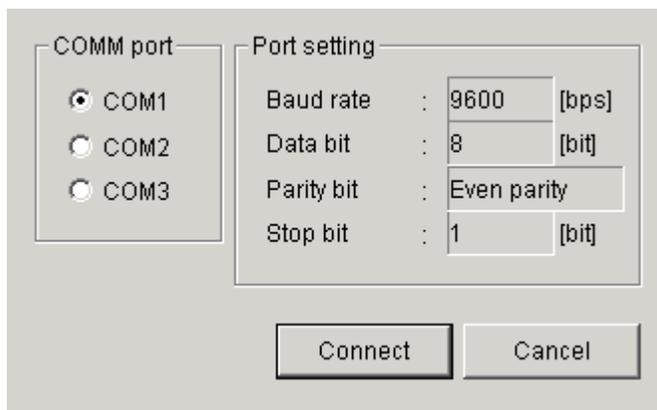
The status bar at the bottom of the screen should read "Ready", "Servo OFF", and "Main Power ON". If the connection is not established, try a different com port. Also make sure the serial cable is connected to the CN11 connector with the correct orientation.

2) Load the parameter file "300DEMO.PRM" and point table file 300DEMO.PNT.

NOTE – A system reset is required to save parameters to non-volatile memory. Choose RESET from the System Menu after editing or loading new parameters.

These files can be found at FTP.YASKAWA.COM under Public/Servo/Sigma II DeviceNet/Application Tips/Yaskawa App Module Utility.
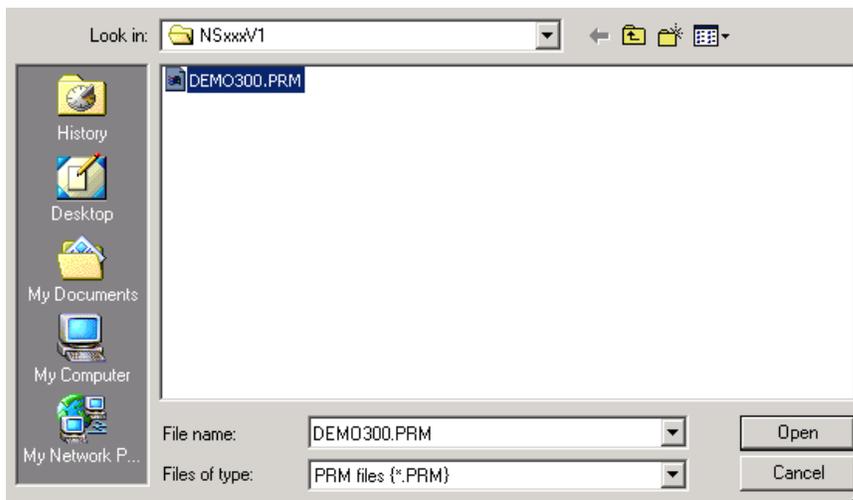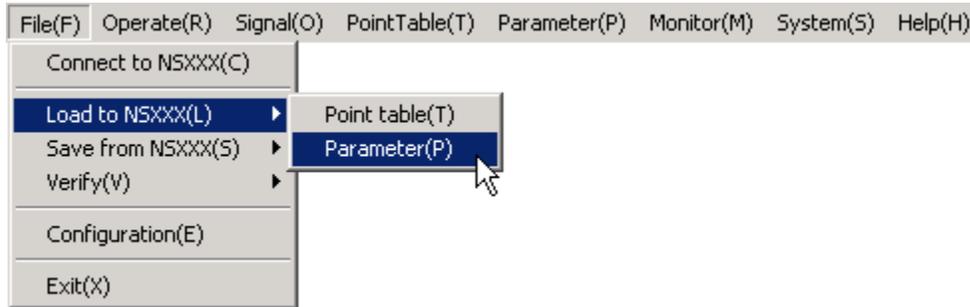
After editing parameters or loading new parameters, conduct a system reset to save the parameters to non-volatile memory. Choose Reset from the System Menu
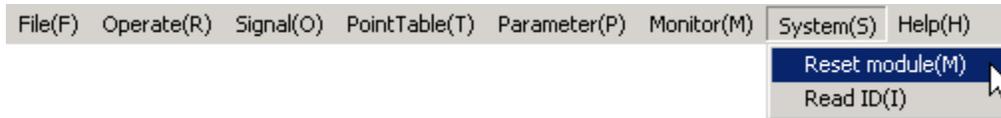
3) Configure NSxxx to show the appropriate units.

File(F) Operate(R) Signal(O) PointTable(T) Parameter(P) Monitor(M) System(S) Help(H)

Connect to NSXXX(C)

Load to NSXXX(L) ▶
Save from NSXXX(S) ▶
Verify(V) ▶

Configuration(E)

Exit(X)
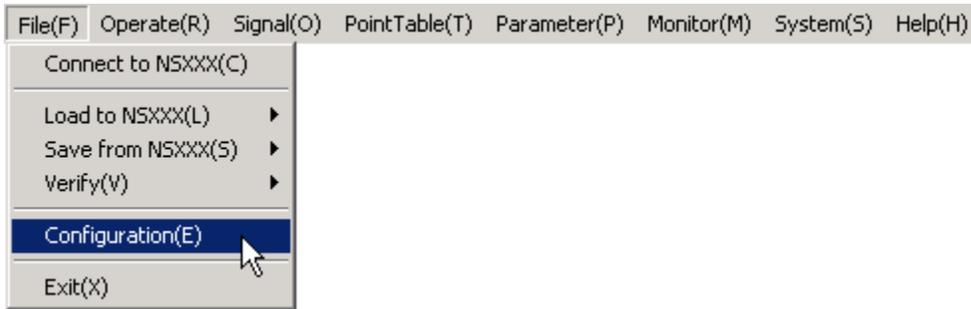
Change the "Display Unit" from "mm" to "none". Change the "Command Unit" from 0.001 to 1.

Configuration

Interval for continuos operation :

`0` [msec]

Display speed and position

Display unit : `None` ▼

Command unit : `1` ▼

OK   Cancel
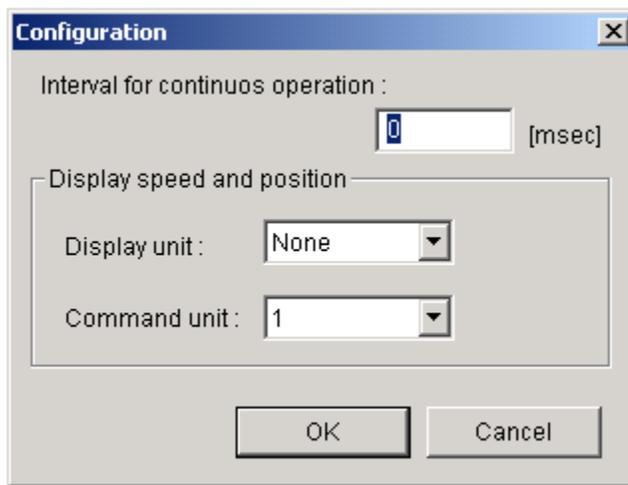
DEMO300.prm has important parameters set that effect speed and positioning. Commands for both speed and positioning are done with Reference Units. The electronic gear ratio defines the number of encoder pulses per Reference Unit. DEMO300.PRM sets the electronic gear ratio at 1:1 (Pn810 =1 and Pn811=1). Therefore, one reference unit equals one encoder pulse.

$$\frac{Pn810}{Pn811} = \frac{1\,\text{encoder count}}{1\,\text{R.U.}}$$

The Maximum Feed Speed Pn843, Feed Speed for Positioning Pn821, and Constant Feed Speed (for jogging) are set to the default 24000 [1000 R.U./min].

For the SGMAH and SGMPH motors, the Maximum Feed Speed, Feed Speed for Positioning, and Constant Feed Speed equate to the following motor speed.

$$\frac{24000\,[1000\,\text{R.U.}]}{\text{min}} \times \frac{1000\,\text{R.U.}}{[1000\,\text{R.U}]} \times \frac{1\,\text{encoder count}}{1\,\text{R.U.}} \frac{1\,\text{REV}}{8192\,\text{encoder counts.}} = 2929\,[\text{rev/min}]$$

With Pn810 and Pn811 set to 1, and the NSxxx Configuration set as above, all target positions set in NSxxx are in Reference Units (R.U.'s) which equal encoder pulses. Target Feed Speeds set in NSxxx are in (R.U./ minute).

4) Example of editing specific parameters

NOTE – A system reset is required to save parameters to non-volatile memory. Choose RESET from the System Menu after editing parameters.

In order to obtain reasonable speeds with the SGMGH and SGMSH motors, either change the Electronic Gear Ratio (Pn810 and Pn811) or Change the Maximum Feed Speed Pn843, Feed Speed for Positioning, and the Constant Feed Speed (Pn843, Pn821, and Pn831).

The following example shows changing the electronic gear ratio.

$$\frac{\text{Pn810}}{\text{Pn811}} = \frac{16\,\text{encoder counts}}{1\,\text{R.U.}}$$

File(F)   Operate(R)   Signal(O)   PointTable(T)   **Parameter(P)**   Monitor(M)   System(S)   Help(H)

Servo Parameter List(L)
Option Parameter List(O)
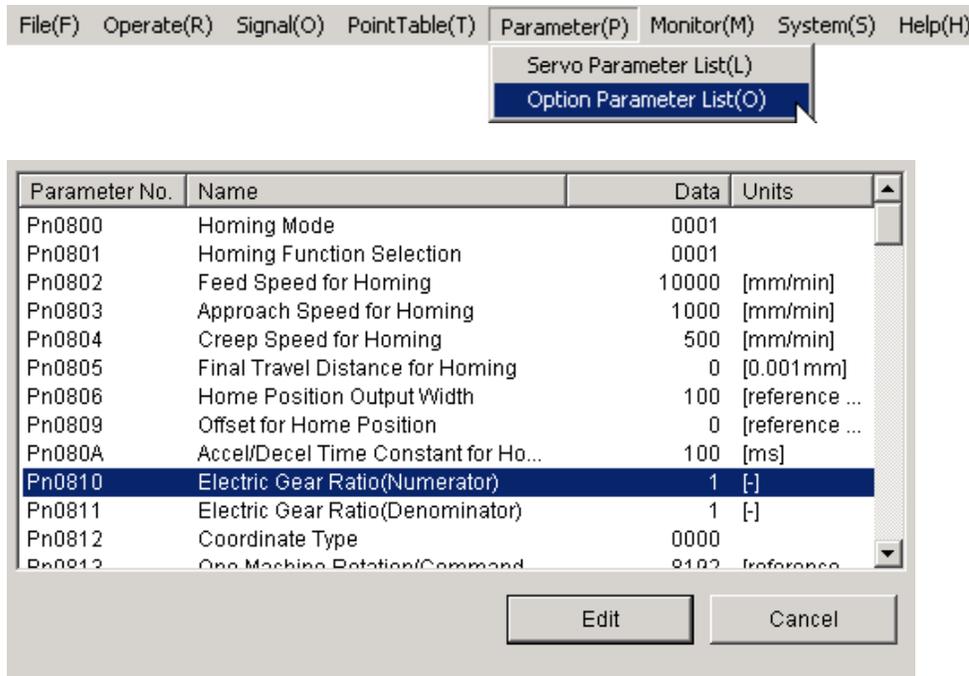
Parameter No.	Name	Data	Units
Pn0800	Homing Mode	0001	
Pn0801	Homing Function Selection	0001	
Pn0802	Feed Speed for Homing	10000	[mm/min]
Pn0803	Approach Speed for Homing	1000	[mm/min]
Pn0804	Creep Speed for Homing	500	[mm/min]
Pn0805	Final Travel Distance for Homing	0	[0.001mm]
Pn0806	Home Position Output Width	100	[reference ...
Pn0809	Offset for Home Position	0	[reference ...
Pn080A	Accel/Decel Time Constant for Ho...	100	[ms]
Pn0810	Electric Gear Ratio(Numerator)	1	[-]
Pn0811	Electric Gear Ratio(Denominator)	1	[-]
Pn0812	Coordinate Type	0000	
Pn0813	One Machine Rotation/Command	8192	[reference...

Edit   Cancel

Parameter No. :
Pn0810

Parameter name :
Electric Gear Ratio(Numerator)

16   [-]

[OK] [Cancel]

After editing parameters or loading new parameters, conduct a system reset to save the parameters to non-volatile memory. Choose Reset from the System Menu

File(F) Operate(R) Signal(O) PointTable(T) Parameter(P) Monitor(M) System(S) Help(H)

Reset module(M)
Read ID(I)

[Reset]
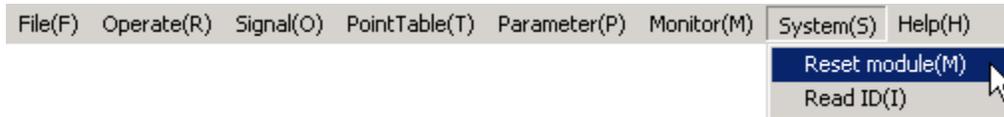
For the SGMGH and SGMSH motors, the Maximum Feed Speed, Feed Speed for Positioning, and Constant Feed Speed equate to the following motor speed.

$$\frac{24000\,[1000\,\text{R.U.}]}{\text{min}} \times \frac{1000\,\text{R.U.}}{[1000\,\text{R.U.}]} \times \frac{16\,\text{encoder counts}}{\text{R.U.}} \times \frac{1\,\text{Rev}}{131,072\,\text{encoder counts}} = 2929\,[\text{rev/min}]$$

In this case 1 R.U. is 16 encoder pulses and 8192 R.U. is one rotation with the SGMGH and SGMSH motors.

5) Enable the SGDH/NS300.
Choose the Servo ON/OFF in the Signal Menu. Enable the servo by choosing SERVO ON

[Servo ON] [Servo OFF]
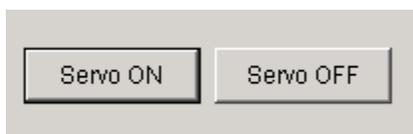
The SGDH display should read, "run". If it still reads "bb", check that the EMSTOP circuit is wired correctly and has not disabled the drive, or disable the EMSTOP input by setting Pn081B to 0000.

6) Monitor Position
Choose the Current Position selection from the Monitor Menu

File(F)	Operate(R)	Signal(O)	PointTable(T)	Parameter(P)	Monitor(M)	System(S)	Help(H)

Motion status(M)
Input signal(I)
Output signal(O)
Current position(N)
Alarm(A)
Alarm history(H)

Monitoring position

Commanded position	:	1000000	
Feedback position	:	1000000	
Position Error	:	0	
Latch position	:	278279	
Output torque	:	1	[%]
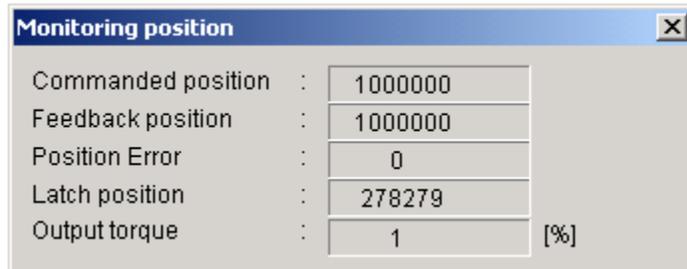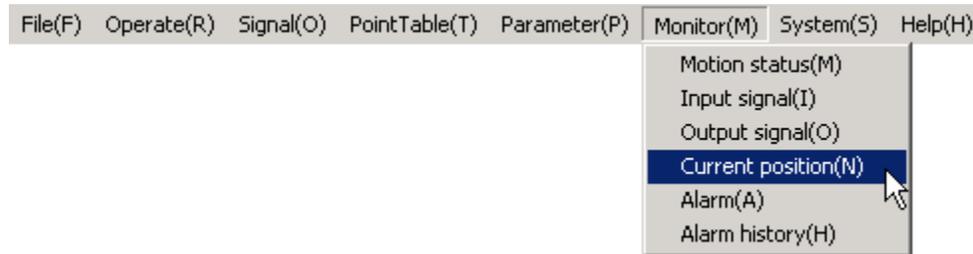
The position is displayed in Reference Units. Leave this window open to observe the position changing.

7) Jogging the motor
Choose the JOG function from the Operate Menu.

File(F)	Operate(R)	Signal(O)	PointTable(T)	Parameter(P)	Monitor(M)	System(S)	Help(H)

JOG(J)
STEP(S)
Positioning(P)
Point table positioning(T)
Station positioning(I)
External positioning(E)
Multi-speed positioning(M)
Zone-signal output positioning(A)
Homing(H)

JOG operation

Feed speed :

12000000
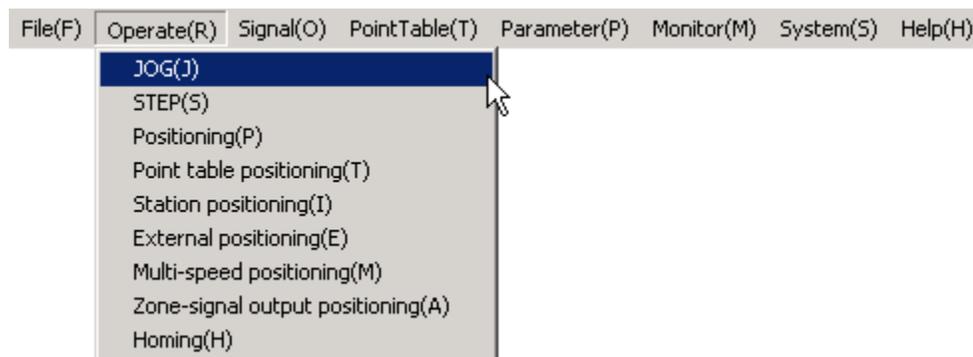
Forward

Reverse

Select a speed in Reference Units per Minute and select Forward or Reverse.
The servo should rotate at the speed set in the Feed Speed input box.

For the SGMAH and SGMPH motor:

$$\frac{12{,}000{,}000\ \text{R.U.}}{\min} \times \frac{1\ \text{encoder count}}{1\ \text{R.U.}} \times \frac{1\ \text{REV}}{8192\ \text{encoder counts.}} = 1464.8\ [\text{rev/min}]$$

If the servo does not rotate, check the positive and negative over travel. To verify these signals are off, choose Input Signal from the Monitor Menu.

Monitoring input signal

SGDH

si0	[CN1]Input signal 0:Close/1:Open	:	OFF	alm	Alarm	:	OFF
si1	[CN1]Input signal 0:Close/1:Open	:	OFF	coin	Positioning completed	:	ON
si2	[CN1]Input signal 0:Close/1:Open	:	OFF	v-cmp	Speed coincidence	:	OFF
si3	[CN1]Input signal 0:Close/1:Open	:	OFF	tgon	Servomotor rotating	:	OFF
si4	[CN1]Input signal 0:Close/1:Open	:	OFF	s-rdy	Servo ready	:	ON
si5	[CN1]Input signal 0:Close/1:Open	:	OFF	clt	Torque limitting	:	OFF
si6	[CN1]Input signal 0:Close/1:Open	:	OFF	vlt	Speed limitting	:	OFF
Reserved		:	ON	bk	Brake output	:	OFF

NSXXX

exst	External start	:	OFF	Reserve	:	OFF
exsp	External stop	:	OFF	Reserve	:	OFF
esp	Emergency stop	:	OFF	Reserve	:	OFF
A or B-phase broken		:	ON	Reserve	:	OFF
C-phase broken		:	ON	Reserve	:	OFF
DeviceNet communication power		:	ON	Reserve	:	OFF
Reserved		:	OFF	Reserve	:	OFF
Reserved		:	OFF	Reserve	:	OFF

SI1 → DECEL
SI2 → P-OT
SI3 → N-OT
SI4 → EXTP

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Publication # *eng/01.044/MCD*
Date 11/3/2005

Page 7 of 14

SI5 → ZERO

8) Stepping the NS300/500.
Choose STEP from the Operation Menu
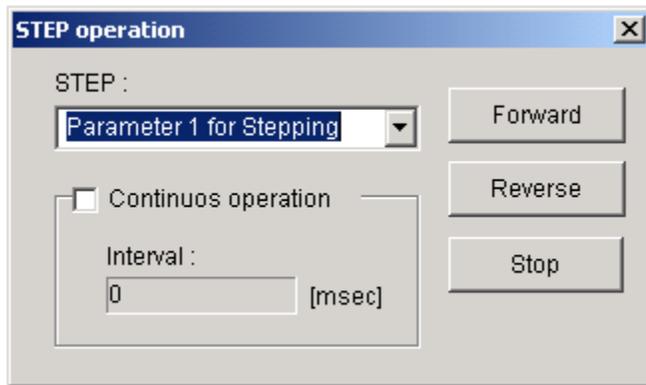
The step operation indexes the servo a distance stored in the NS300/500 parameters.

Parameter 1 for stepping uses the value in Pn844 as the target position.
Parameter 2 for stepping uses the value in Pn845 as the target position.
Parameter 3 for stepping uses the value in Pn846 as the target position.
Parameter 4 for stepping uses the value in Pn847 as the target position

The file 300DEMO.PRM has the following values stored in these parameters.

Pn844 → 8,192
Pn845 → 81,920
Pn846 → 200,000
Pn847 → 500,000

Select Forward or Reverse. Do not select Continuous Operation while demonstrating the STEP operation. The motor should index to the stored value at the Feed Speed for Positioning Pn821. If there is no motion, check that the servo is enabled, EMSTOP input, P-OT input, and N-OT input.

9) Positioning the NS300/500
Choose Positioning from the Operation Menu

2121 Norman Drive South
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(847) 887-7000

Publication # *eng/01.044/MCD*
Date 11/3/2005

Page 8 of 14
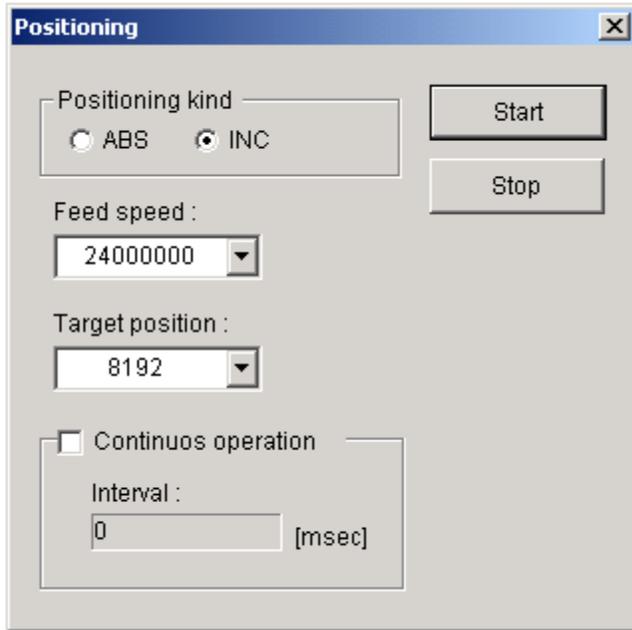
Set the Speed in the Feed Speed window in Reference Units per Minute. Set the Target Distance in Reference Units

Choose the INC radio button and press the Start Button. If the Continuous Operation box is checked the servo will move to the target position and back again continuously. If there is no motion, check that the servo is enabled, EMSTOP input, P-OT input, and N-OT input

10) Using the Point Table
Choose Point Table Positioning from the Operation Menu.
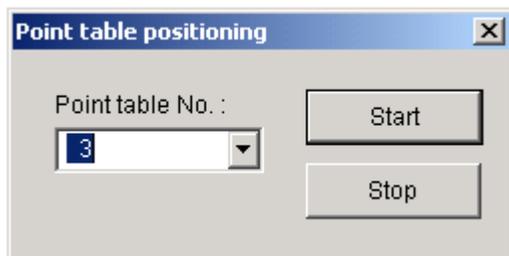
300DEMO.PNT loads the first seven point table cells. Choose 1 through 7 in the Point Table No. window and select Start. Always change the Point Table number before positioning. Point table values are in absolute positions while using NSxxx. If the user tries to position to the same point table number more than once, no motion will occur.

Choose List from the Point Table menu to view the point table contents

Point table list

Point table No.	Feed speed	Target position	
1	3000000	250000	
2	5000000	500000	
3	10000000	750000	
4	12000000	1000000	
5	15000000	1250000	
6	20000000	1500000	
7	24000000	2000000	
8	24000000	0	
9	24000000	0	

No. 10 point table data reading from NSXXX

Cancel

11) Station Positioning using the NS300/500

Choose the Station Positioning from the operation menu.

Station positoning

Direction
- ● Forward
- ○ Reverse
- ○ Near

Feed speed :
10000000

Station No. :
24

Start
Stop

☐ Continuos operation
Interval :
0   [msec]

The NS300/500 has a station mode for rotary dial tables. The number of Reference Units per Machine Rotation is defined in Parameter 813. The number of stations is defined in Parameter 85A. The file 300DEMO.prm has the following values:

Pn813 → 8192 reference units – one motor rotation
Pn85A → 4 stations

Enter a speed in the Feed Speed window. Select station 1, 2, or 3 and select start. Currently, NSxxx will not allow positioning to the highest station number, in this case station 4. Continuous operation will index between the current station and the last station continuously.

12) External Positioning using the NS300/500.

Choose External Positioning from the Operation Menu
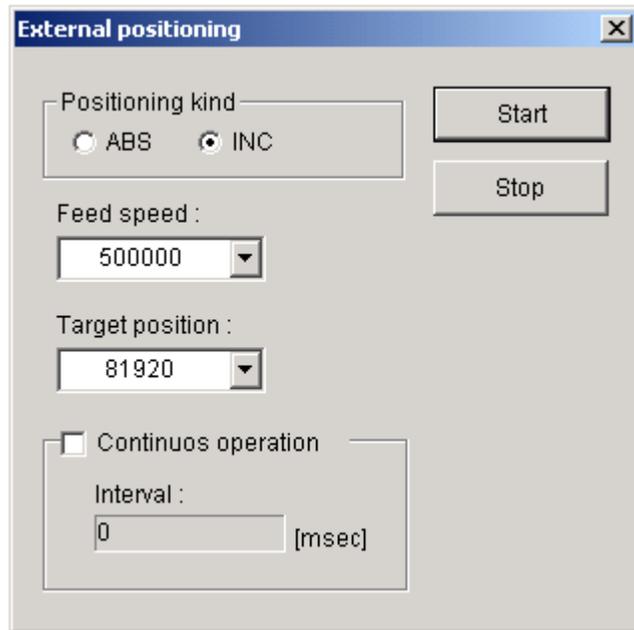
Enter a speed in the Feed Speed window. This speed is the initial speed before the Registration input (EXTP input) is reached. Enter a target position in the Target Position window. This position is the index length if no registration (EXTP) input occurs.

Once the EXTP signal is toggled the distance and speed of the registration move is set by parameters. Approach Speed for External Positioning is set by Pn854. Travel Distance for External Positioning is set by Pn855. The file 300DEMO.PRM sets the following values:

Pn854 → 12000 [1000 R.U./min] → 12,000,000 [R.U./min] → 1465 RPM
Pn855 → 4096 [R.U.]

For demonstration purposes set the speed in the Feed Speed window to 500,000 [R.U./min] → 61 RPM. In this case the initial speed is slow and the registration move is noticeably short and fast.

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(847) 887-7000

Publication # *eng/01.044/MCD*
Date 11/3/2005

Page 11 of 14

Choose the INC radio button and press start. While the motor is indexing at its initial speed toggle the EXTP input.

13) Multispeed Positioning using the NS300/500
Choose Multispeed Positioning from the Operation menu
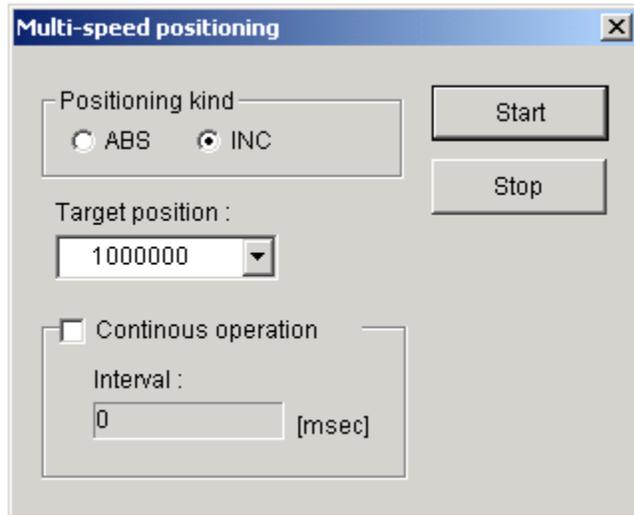
The multispeed position mode allows one index move to have up to 16 speeds. DEMO300.PRM sets the following positions and speeds

Pn861	number of points	8
Pn862	First Feed Speed	1000 [1000 R.U./min]
Pn863	speed switching position 1	20,000 R.U.
Pn864	speed switching position 2	40,000 R.U.
Pn865	speed switching position 3	80,000 R.U.
Pn866	speed switching position 4	120,000 R.U.
Pn867	speed switching position 5	160,000 R.U.
Pn868	speed switching position 6	250,000 R.U.
Pn869	speed switching position 7	500,000 R.U.
Pn86A	speed switching position 8	750,000 R.U.
Pn873	switch speed 1	1,000 [1000 R.U./min]
Pn874	switch speed 2	2,000 [1000 R.U./min]
Pn875	switch speed 3	5,000 [1000 R.U./min]
Pn876	switch speed 4	8,000 [1000 R.U./min]
Pn877	switch speed 5	12,000 [1000 R.U./min]
Pn878	switch speed 6	16,000 [1000 R.U./min]
Pn879	switch speed 7	20,000 [1000 R.U./min]
Pn87A	switch speed 8	24,000 [1000 R.U./min]

Enter a target position in Reference Units in the Target Position window. Preferably, enter a target position larger than the speed switching position 8.

Select the INC radio button and select START.

14) Zone Signal Output Positioning with the NS300/500
Choose the Zone Signal Output Positioning in the Operation Menu
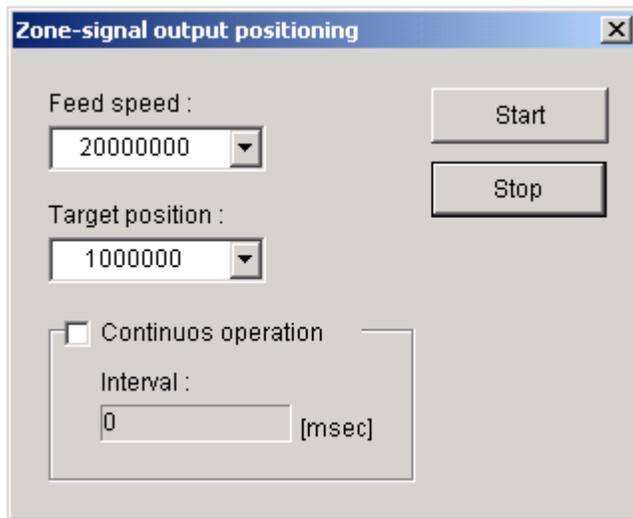
The Notch (zone signal) output mode allows two outputs to turn on and off at specified positions. DEMO300.PRM sets the following parameters:

Pn892	Notch 1 Output Position Lower Limit	100,000
Pn893	Notch 1 Output Position Upper Limit	300,000
Pn894	Notch 2 Output Position Lower Limit	600,000
Pn895	Notch 2 Output Position Upper Limit	800,000

Set the Feed Speed in the Feed Speed window in [R.U./min]. Set the Target Position in the Target Position window in Reference Units. Preferably, enter a target position larger than the Notch 2 Output Position Upper Limit.

Select start. Adjust the target position before indexing since NSxxx sets the Notch positioning in absolute mode.

15) Homing using the NS300/500
Choose Homing from the Operation Menu
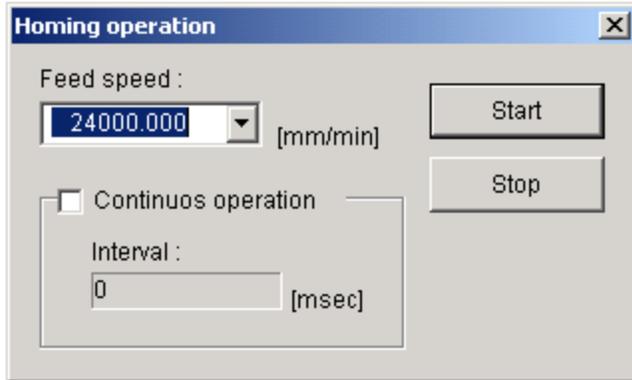
DEMO300.PRM sets the following important homing parameters.

Pn800	Home Type	1	
Pn803	Approach Speed for Zero Point Return	1000	[1000 R.U./min]
Pn804	Creep Speed for Zero Point Return	500	[1000 R.U./min]

Home Type 1 does not use Pn802 – Feed Speed for Zero Point Return. NSxxx writes the value in the Feed Speed Window to Pn802. Therefore adjusting the Feed Speed window will not affect the homing speed.

Select Start and toggle the Zero Input.