ENGINEERING PUBLICATION
MOTION CONTROL DIVISION

PRODUCT: JUSP-NS600 and HMI-G4X20M-31 with HMI-OPLC-30 Module

SUBJECT: Setting up the HMI for Sigma II Indexer Command Demo

CATEGORY: Application Note
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Summary: This document describes the steps required to set up and run the HMI for Sigma II Indexer Command Demo. It is assumed that a Sigma II amplifier with the JUSP-NS600 Sigma II Indexer and servomotor are already set up and correctly wired. A step-by-step explanation of the demo is provided.

Demo purpose: The purpose of this demo is to demonstrate using an HMI to download recipes (machine set-ups), run, and monitor a selectable batch count. This demo is set-up using a single Sigma II Indexer but the concept can be easily equated to several axes of servos. Also, a 80 sec video file, *HMI and Two-Axis Indexer Demo.avi,* is available[*] for demonstrating a two axis demo.
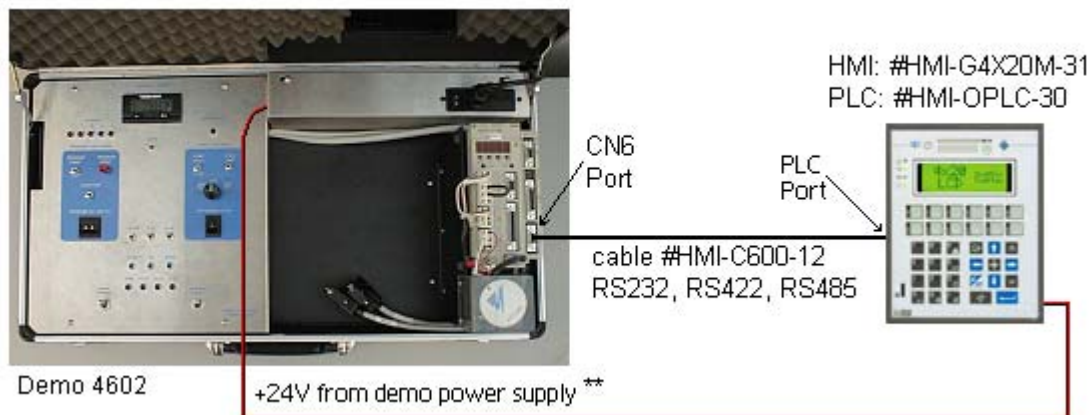

Demo Wiring Setup

Demo Prerequisites[*]:
1) In addition to wiring and correct power connections shown above, the Indexer demo has been preloaded with NS600HMI.spj and parameter 800 on the Indexer has been set to 0.
2) It is likely that the HMI and PLC demo programs have not been changed.

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[*] Demo files for the above are available 24/7 @ ftp://ftp.yaskawa.com/public/development/Servo/Indexer/HMI. If it becomes necessary, more complete step-by-step descriptions of reestablishing these files are listed in Appendix A of this document.

[**] See appendix B for wiring the HMI power supply.

HMI keys used in the demo

The demo makes use of the following highlighted keys:
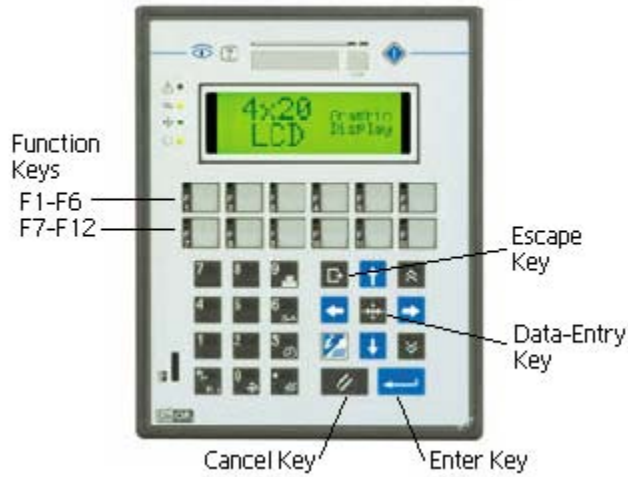
The function keys referred to in the on screen instructions are located in the top two rows. The escape key can be used on most screens to return to a previous menu. Also, editable fields, such as the number of runs for a batch, can be selected using the data-entry key and changed using the numeric keypad. The cancel key will cancel a data-entry.

HMI program screen organization and explanation
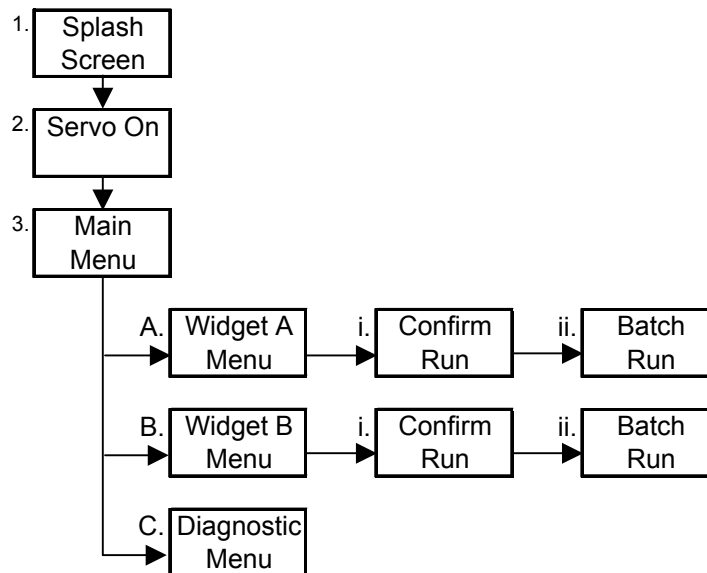
1. When the demo is started, a splash screen appears for 3 seconds and then disappears.
2. The servo on screen will appear automatically. Pressing F6 will turn on the servo and bring up the main menu.
3. The main menu appears as follows:

```
F1 - Start Widget A
F2 - Start Widget B
F3 - Diagnostic
F6 - Servo OFF
```

Selecting F1 will bring the user through the menus necessary for doing a batch run of widget A.
Selecting F2 will bring the user through the menus necessary for doing a batch run of widget B.
Selecting F3 will bring up a diagnostic screen.
Selecting F6 will turn the servo back off and return to the previous screen.

A. Selecting F1 will bring up the following widget A menu:

```
        Widget A
Number of runs:      1
With Settings:
F7-A F8-B F9-C F10-D
```

The user can edit the number of runs that are desired using the data-entry key. The screen also lists four preset production settings that might be used on widget A.

Setting A makes 10 full revolution moves with a 500ms pause separating each move. Setting B makes 24 quarter revolution moves with no pauses. Setting C makes 5 moves of 3 full revolutions each with no pause. Setting D makes a full revolution forward, 5 full revolutions backwards and then repeats. Selecting any of those four options downloads the appropriate index table to the servo and brings up the widget A confirmation screen.

   i. The confirmation screen looks like the following:

```
        Widget A
Number of runs:      1
Settings:    A
<ENTER> to run batch
```

      This screen provides the user with a summary of the widget and settings selected and the number of runs desired in the batch. Hitting enter will start the batch run and brings up the batch run screen to monitor progress.

   ii. The batch run screen looks like the following:

```
Batch Run: Widget  A
Settings:    A
Run    0 of    1
<ESC> to Abort
```

      Hitting escape will stop the batch run and return the user to the main menu.

B. Selecting F2 will bring up the following widget B menu:

```
            Widget B
Length Param:    3600
Steps Param:  20
<ENTER> to continue
```

Instead of having preset settings as with widget A, this menu provides the user with 2 variable parameters to edit. The first parameter, length, defines the length of a spin (3600 is one full rotation). The second parameter, steps, defines the number of times it repeats that move in one run. Again, by using the data-entry key, the user can select and edit these parameters. The index program will move the servo 5 full revolutions and then will repeat a move of the specified length the specified number of times.

Hitting enter brings the user to the widget B confirmation screen.

    i.   The widget B confirmation screen is similar to the widget A confirmation screen.

    ii.   The widget B batch run screen is similar to the widget A batch run screen.

C. Selecting F3 brings up the diagnostic screen.

```
         Diagnostic
<-Left  Jog  Right->
Alarm Status: INPOS
    F1 - Alarm Reset
```

The diagnostic screen allows the user to jog the servo (using left and right arrows on the keypad) and to view and reset alarms. To test the alarm reset, hold the disc and keep it from moving while pressing one of the jog buttons for at least 3 seconds. Release the disc and an overspeed alarm should trigger. The alarm code A.51 should appear on the screen. Pressing F1 will reset this alarm.

Appendix A – Setting up the Demo

A. Setting up the HMI (#HMI-G4X20M-31).
1. Open the file NS600HMI.prj in Designer.
2. Using the programming cable #HMI-CPROG-20, connect the PC serial communications port to the PC/Printer port of the HMI.
3. Turn the HMI on. If no application has been download to the HMI, it will automatically enter into configuration mode. If an application has been downloaded, it will start in operation mode. Put the HMI in configuration mode by holding the ENTER button down. When the selection menu appears, use the arrows to select "CFG" and hit enter.
4. In Designer, hit F2 to start a download. A progress bar should appear as the program downloads.
5. After the download, the HMI should automatically boot into operation mode.

B. Setting up the internal PLC (#HMI-OPLC-30).
1. Copy the folder NS600HMI into the ./ISaGRAF/ISAWIN/SMP directory.
2. Open Workbench and select NS600HMI from the project list.
3. With the HMI in operation mode, hold down on the enter key and select the system mode ("SYS") from the menu.
4. Scroll down to the Printer line and use the left/right arrows to select "SCM#0 A". Scroll up and select exit.
5. Make sure that the #HMI-CPROG-20 serial cable is still connected to the PC and the PC/Printer port.
6. From the Workbench programs screen select Debug->Debug.
7. Select File->Stop Application and then File->Download. A progress bar should show the download.
8. After the download completes, cycle power to the HMI.

C. Setting up the JUSP-NS600.
1. Connect the YS-12 serial communication cable to port CN6 on the JUSP-NS600 Indexer.
2. Open the file NS600HMI.spj in IndexWorks.
3. From the menu in IndexWorks, select Tools->Online.
4. From the menu, select Tools->Download->Download All. Hit OK at the prompt to download the settings.
5. From the menu, select Module->Monitoring&Troubleshooting.
6. From the menu, select Tools->Terminal and hit OK at the prompt
7. In the terminal, type 0PRM800=0. The response should be "0OK". Close the terminal
8. Cycle control power on the servo amp.
9. Connect the cable #HMI-C600-12 to the CN6 port of the NS600 and to the PLC Port of the HMI.

D. Resetting for the NS600 Demo after using the HMI Demo
1. Connect the YS-12 serial communication cable to port CN6 on the JUSP-NS600 Indexer.
2. Open the file DemoCase.spj in IndexWorks.
3. From the menu in IndexWorks, select Tools->Online.
4. From the menu, select Module->Monitoring&Troubleshooting.
5. From the menu, select Tools->Terminal and hit OK at the prompt
6. In the terminal, type 0PRM800=1. The error message "*** ERROR SENDING SERIAL RESPONSE!" will appear. Close the terminal.
7. Cycle control power on the servo amp.
8. From the menu, select Module->Indexer Setup.
9. From the menu, select Tools->Download->Download All. Hit OK at the prompt to download the settings.
10. Cycle control power on the servo amp.

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Appendix B – Wiring the HMI Power Supply

1. Remove the two screws shown below with a 3/32 size allen wrench. Then remove the power supply cover.
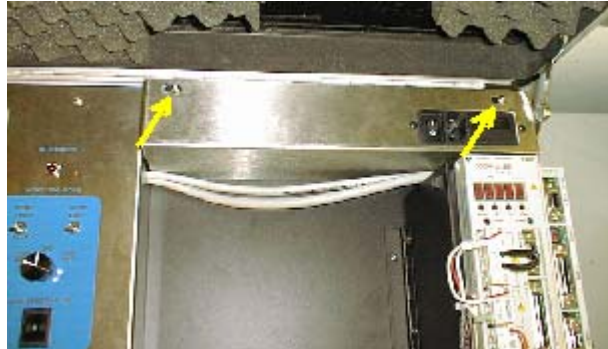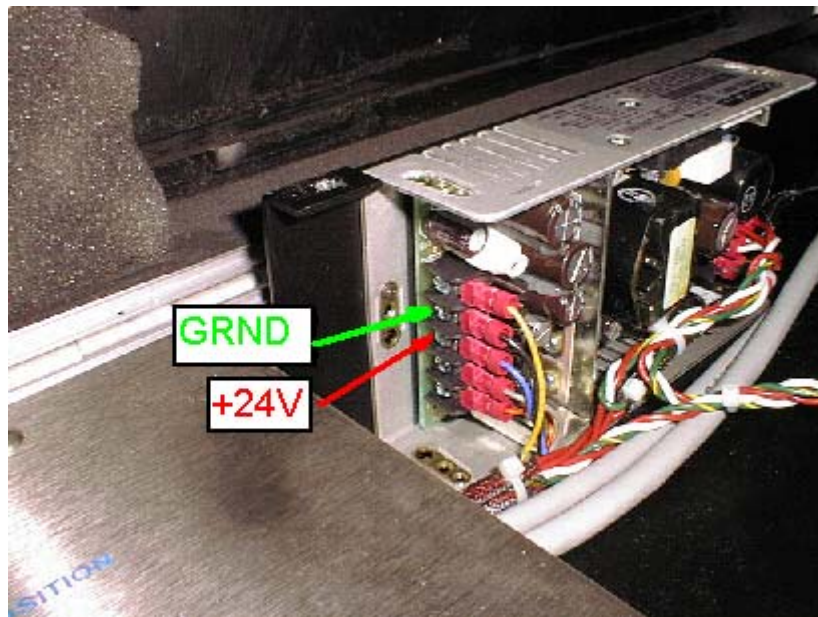

Remove these screws.

2. There are two methods to connect the HMI power to the power supply. The preferred method is to install a connector in the power supply cover. The mating connector would then be connected to the HMI's power connector.

   The optional method is to directly connect the HMI's power connector to the power supply. The power wire can be run out of an opening behind the power supply cover.

   The Ground and +24V signal lines are identified below. The Ground connector is the second from the top. The +24V connector is third from the top.

Ground and +24V Connectors