g GE Energy	**Functional Testing Specification**
Parts & Repair Services ***Louisville, KY***	**LOU-GED-IS200BICR**

Test Procedure for a IS200BICR Bridge Interface Board

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1. SCOPE

1.1 This is a functional testing procedure for the IS200BICR Bridge Interface Board.

2. STANDARDS OF QUALITY

2.1 Refer to the current revision of the IPC-A-610 standard for workmanship standards.

3. APPLICABLE DOCUMENTS

3.1 The following document(s) shall form part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue shall apply.

3.1.1 Check Electronic folder for more information

4. ENGINEERING REQUIREMENTS

4.1 Equipment Cleaning

4.1.1 Equipment should be clean and free of debris prior to applying power unless performing an initial check. Refer to the local documented procedures for cleaning guidelines.

4.2 Equipment Inspection

4.2.1 Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:

4.2.1.1 Wires - broken, cracked, or loosely connected
4.2.1.2 Terminal strips / connectors - broken or cracked
4.2.1.3 Components - visually damaged
4.2.1.4 Capacitors - bloated or leaking
4.2.1.5 Solder joints - damaged or cold
4.2.1.6 Circuit board - burned or de-laminated
4.2.1.7 Printed wire runs / Traces - burned or damaged

5. EQUIPMENT REQUIRED

5.1 The following equipment is required to perform the process requirements. Equipment may be substituted provided that all accuracy's and test ratios are equivalent or better.

Qty	Reference #	Description
1	H188666	Innovation Series Drive test rack w/DSPX, ACLA,, BICR, BPIR, RAPA, BAIA
1		Test PC loaded with Toolbox and HyperTerminal
1		Function Generator
1		O-Scope
1		Fluke 85 DMM or equivalent

6. TESTING PROCESS

If the ACLA and the DSPX are the test units these step can be skipped.

6.1 Setup and RAPA TEST

6.1.1.1 Install the RAPA card into the rack. Ensure all six cards are installed.

6.1.1.1.1 IS200BAIAH1BDC
6.1.1.1.2 IS200RAPAG1BAA
6.1.1.1.3 IS200DSPXH1DBD
6.1.1.1.4 IS200BICRH1AAA
6.1.1.1.5 IS215ACLAH1AS
6.1.1.1.6 IS200BPIRG1AAA

6.1.1.2 Power on the Innovation power switch.

6.1.1.3 Verify on the Rapa the IPOK and the MPOK LEDS are on.

6.1.1.4 With a Fluke 85 DMM or equivalent verify the following voltages.

6.1.1.5 Connect a meter across DCOM (TP2) and P5 (TP1), verify 5V +/-5%.

6.1.1.6 Connect a meter across DCOM (TP2) and P15 (TP3), verify 15 +/-5%.

6.1.1.7 Connect a meter across DCOM (TP2) and N15 (TP4), verify 15 +/-5%.

6.1.1.8 Press the reset button and verify the system reboots.

6.1.1.9 Burn-in unit for several hours and measure the output voltages again.

6.2 Setup and ACLA TEST

6.2.1.1 Short JP1 pins 1 & 2 for at least two minutes before installing card into test rack.

6.2.1.2 Write down serial number of card.

6.2.1.3 Install card into test rack with power off.

6.2.1.4 Attach serial cable from PC COM1 to ACLA card COM1.

6.2.1.5 Attach UDH (Unit Data Highway) Ethernet cable to ENET port of card.

6.2.1.6 1.1.10Attach PC COM2 to DSPX HS serial port via adapter.

6.2.1.7 Testing Procedure

6.2.1.8 Open Hyper term session on PC. (COM1, 9600, N, 8 1) and connect.

6.2.1.9 Open Hyper term session on PC. (COM2, 19200, N, 8 1) and connect.

6.2.1.10 Apply power to test rack and observe both hyper term windows.

6.2.1.11 CMOS clear and reload

6.2.1.12 On Hyper term COM1 window (ACLA).

6.2.1.13 Verify the following items appear at the beginning of the session.

6.2.1.14 “INVALID CMOS CHECKSUM! USING DEFAULTS”

6.2.1.15 “Low RAM : 640K”

6.2.1.16 "Extended RAM : 007M"

6.2.1.17 **Serial ID verification**

6.2.1.18 On COM2 window (DSPX).

6.2.1.19 Verify that the UUT card is listed and the serial number matches card being tested.

6.2.1.20 Disconnect the terminal session with the UUT but do not close the window.

6.2.1.21 **Serial Communications and flash load via SLOADER**

6.2.1.22 Open the GE Serial Loader program.

6.2.1.23 Select the "IS215ACLA" platform.

6.2.1.24 Set the TCP/IP settings as follows:

6.2.1.25 Computer Name: ICS1

6.2.1.26 IP Address: 192.168.101.61

6.2.1.27 Subnet Mask: 255.255.255.0

6.2.1.28 Default Gateway: Disabled

6.2.1.29 Router IP: - not used

6.2.1.30 Check the following commands and select "Start Commands"

6.2.1.31 Configure TCP/IP

6.2.1.32 Load Flash File System

6.2.1.33 Display Summary Information

6.2.1.34 Cycle power on the UUT when prompted.

6.2.1.35 Verify the "Active" and "Flash" LEDs illuminate on the UUT during the load procedure.

6.2.1.36 Note: This step will take 5-10 minutes

6.2.1.37 When prompted, cycle power on the UUT and acknowledge the message box on the display.

6.2.1.38 Verify "OK" and "Active" LEDs are lit on UUT and "Status" LEDs are scrolling two at a time in a clockwise pattern.

6.2.1.39 Minimize the SLOADER application and open a DOS Command Prompt window.

6.2.1.40 **Ethernet connection and file transfer**

6.2.1.41 From the DOS command prompt, enter the following commands:

6.2.1.42 cd\

6.2.1.43 ping 192.168.101.61

6.2.1.44 (verify a reply was received)

6.2.1.45 ftp 192.168.101.61

6.2.1.46 This will start the FTP application and make a connection to the UUT via the Ethernet port.

6.2.1.47 Enter user name: root

6.2.1.48 Password: ge

6.2.1.49 (prompt should change to ftp>)

6.2.1.50 type binary

6.2.1.51 (this will set transfer mode to binary)

6.2.1.52 send c:\ist.1

6.2.1.53 (this transfers the INSYNC loop test program from the PC to the UUT)

6.2.1.54 quit

6.2.1.55 Minimize the DOS command window.

6.2.1.56 **Ram Testing**

6.2.1.57 Type “NVTEST” to test UUT ram (This test takes 12 minutes).

6.2.1.58 Verify no errors were displayed during test.

6.2.1.59 Cycle power on UUT.

6.2.1.60 **GE Toolbox test – Active COMM, DP ram, VXI Interface**

6.2.1.61 The innovation series medium voltage- GP type H drive is setup with IS215ACLA and IS200DSPX

6.2.1.62 Open the GE “Toolbox” application and load the following files:

6.2.1.63 ISC1.ucb and open **NB260**.icb

6.2.1.64 If opening for the first time, enter the following information

6.2.1.65 Select 4: Full Drive Access

6.2.1.66 Password = gesalem9

6.2.1.67 User ID = your initials

6.2.1.68 Once the ISC1.ucb and **NB260**.icb windows are opens, perform the following operation to download to the ACLA:

6.2.1.69 Verify that the serial cable is still connected to the ACLA and the Ethernet net cable is connected.

6.2.1.70 On the ISC1.ucb file download the product code (runtime).

6.2.1.71 Select Device/Download/Product code (Runtime)

6.2.1.72 Filename = select.dnl

6.2.1.73 Only the following should be selected:

6.2.1.73.1 Monitor

6.2.1.73.2 Utility

6.2.1.73.3 ACL

6.2.1.73.4 Select OK

6.2.1.73.5 File will download to UUT

6.2.1.74 Cycle power when prompted for REBOOT

6.2.1.75 Select YES and YES at the two prompts

6.2.1.76 After reboot select:

6.2.1.77 Device/Online ACLA should report no code at the bottom right of toolbox.

6.2.1.78 **NOTE: before the next step is ran ensure the DSPX is on-line and not corrupted is the DSPX has invalid load the ACLA will not down the Application Code.**

6.2.1.79 Select Device/Download/Application Code

6.2.1.80 Verify all boxes are checked.

6.2.1.81 When complete, verify a single status LED is cycling in a counter clockwise pattern.

6.2.1.82 If toolbox shows minor differences then cycle power.

6.2.1.83 Reconnect Toolbox and verify green EQUAL in bottom right corner.

6.2.1.84 To verify data navigate down ISC1/Hardware and I/O definitions/Dual port memory interface to ISD1.

6.3 Setup and DSPX TEST

6.3.1 Connect comm2 from the computer to the DSPX HS Serial Port on the front of the DSPX. Below is an example DSPX boot:

DSPX Self-Test V1.32
SRAM: 64K
NVRAM: 32K
FLASH: 4M
Loading DSPX Monitor...
DSPX Boot Monitor V02.19.00C (05/24/1999 16:21:00)
DSPX ASIC Version (09/30/98 - 1)
Hardware detection...
ID SN: 0016134204, 4187967, IS200BAIAH1BDC
ID SN: 0016811002, VNH1Y, IS200RAPAG1BAA
ID SN: 0086507454, J32T155, IS200DSPXH1DBD
ID SN: 0026319049, 4871263, IS200BICRH1AAA
ID SN: 0057937885, 8791724, IS215ACLAH1AS
ID SN: 0025283723, RRS1C, IS200BPIRG1AAA
Press <ESC> to abort application load in 0 seconds
ACMVACR-G V02.38.00B (Jun 15 2001 10:23:51)
MONITOR V3.14
>

6.3.2 Verify all six cards are booting and are installed into the rack.

6.3.3 Verify the S/N and model number of the card under test, the other S/N and model numbers are the GOLD units.

6.3.4 If the DSPX does not boot correctly and or has missing data the next steps should clear the errors.

6.3.5 In toolbox open the **NB260** file double. The **NB260** is the type and size of IS Drive.

6.3.6 Click on the ISD1 at the top on the tree.

6.3.7 Under the communications menu chose Serial port.

6.3.8 Click ok

6.3.9 The ISD1 should turn RED. Validate zero errors and zero warnings.

6.3.10 This sets the **NB260** program to connect to the DSPX via serial COM1 19200. Does not connect thru the ACLA this is a direct serial connection.

6.3.11 Connect the computer's Comm1 cable to the IS200CABP backplane COM cable.

6.3.12 Now go ON-LINE and download pattern flash runtime, parameter values, keypad DDI menus and DDI runtime. This ensures all the devices have the correct load while running the test. These will only download thru serial comm.

6.3.13 There should be several errors or trips in the active fault list. The next test should clear all errors.

6.4 Setup and BPIR TEST

6.4.1 The IS200BPIR Digital interface board, it provides a 15v to 5v digital bus interface. The board has 14 inputs and 15 outputs.

6.4.2 Verify all the switches DI-1 thru DI-8 are in the up position.

6.4.3 Verify MASEN, LOCFLT and SYSFLT are in the up position.

6.4.4 Verify POWER CELL TEMP is turned fully clockwise.

6.4.5 Verify C SENSING is turned fully clockwise.

6.4.6 Verify WATER CONDUCTANCE is turned fully counter clockwise.

6.4.7 Verify WATER TEMP is turned fully counter clockwise.

6.4.8 Verify ANALOG 1 is turned fully clockwise.

6.4.9 Verify ANALOG 2 is turned fully clockwise.

6.4.10 Verify NHVAVL (PLO-18) in the up position.

6.4.11 Verify HDAT0 (PLO-2) in the up position.

6.4.12 Verify MVENA (PLO-7) in the down position.

6.4.13 Verify PSFLT (PLO-49) in the down position.

6.4.14 Verify Master Link Board switch is in the down position.

6.4.15 Locate the function generator under the meter panel. The frequency should be set at 60Hz. Adjust the sine level to zero volts.

6.4.16 HSYNC input PLO-1 this is connected to the Frame PLL of the system. The system is setup for 5 cells Line-Neutral. ISD1/Main Menu/Catalog Number (IPN)/IPN_CellCnt. This sets the Frequency the system requires.

6.4.17 Connect an O-scope to the o-scope 6009.6Hz square wave output and verify correct frequency of 6009.6Hz Square wave. This frequency will drift a little when cold.

6.4.18 If frame PLL=0, not OK adjust to 6009.6Hz

6.4.19 The system variable is found at ISD1/Main Menu/Network Communications/Configuration & health/Variables. Frame PLL OK Status (Fpll_OK)

6.4.20 Locate the Frame PLL generator black box on the side of the system and adjust it to 6009.6Hz

6.4.21 It is measured from the SYNC output on the BPIR board P1-B24.

6.4.22 With the system innovation power on locate the VAT20 behind the keypad verify a blinking 60.1.

6.4.23 Press the run stop button and verify the VDC BUS and Motor Voltage meters go to full scale.

6.4.24 Clear all errors.

6.4.25 Inputs HDAT1 (PLO-4), HDAT2 (PLO-16), HDAT3 (PLO-12), HDAT4 (PLO-8), HDAT5 (PLO-14), HDAT6 (PLO-10), HDAT7 (PLO-6), NHFLT (PLO-20) are tied to the switch labeled Master link board. It should be in the down position.

6.4.26 Push the Master Link board switch to the up and verify cell errors.

6.4.27 Open the Active faults list Press reset faults and verify cell trips.

6.4.28 Press reset faults again and verify trip Master Link BRD CFG trip

6.4.29 Press the switch to the down position and clear faults.

6.4.30 Press the NHVAVL (PLO-18) in the down position.

6.4.31 Wait 5 seconds the system should trip. The red fault LED on the DSPX should be solid.

6.4.32 Verify the trip fault in the list as follows: VDC<200v after 5 seconds.

6.4.33 Now put NHVAVL (PLO-18) in the up position. Wait 5 seconds and press reset faults.

6.4.34 All faults should clear.

6.4.35 Flip HDAT0 (PLO-2) in the down position (PRESS RESET) and verify master link board CFG trip.

6.4.36 Now flip PSFLT (PLO-49) to the up position and flip HDAT0 (PLO-2) in the up position (PRESS RESET).

6.4.37 Verify a trip: hub PWR supply lost.

6.4.38 Flip PSFLT (PLO-49) in the down position press reset.

6.4.39 Now Press reset faults again verify the master link board trip clears and LED display PLO-22 thru PLO-48 blinks. This means the system is sending a strobe for the cells.

6.4.40 Verify MVENA (PLO-7) in the down position.

6.4.41 Flip PSFLT (PLO-49) in the up position and verify trip: hub PWR supply lost.

6.4.42 Flip PSFLT (PLO-49) in the down position and clear faults.

6.5 Setup and BAIA TEST

6.5.1 The BAIA has 6 DI's, 3 DO's 1 solid state DO, 2 AI's, 2 AO's 4 meter drive circuits and a tachometer input.

6.5.2 Navigate down ISD1/main menu/I/O interface.

6.5.3 Analog output 1 reads the motor speed feedback it displays 901 rpm's

6.5.4 Analog output 2 reads the motor power and is controlled by the function generator tied to meter 4. Range 0 to 20,000 depends on the output of the function generators max output.

6.5.5 Slowly turn up the voltage on the function generator and verify that meter 4 will increase to full scale.

6.5.6 Analog inputs 1 and to are controlled by the pot's on the control panel. The ranges are from 0 to 10 volts.

6.5.7 Turn down analog input 2 to 0V this should cause AIN 2 SIGNAL ALARM. Turn back to 10 Volts and clear faults.

6.5.8 Meter 1 is controlled by analog 1 -0 rpm to 900 rpm's and motor speed when in SIM mode 0 rpm to 1000 rpm's.

6.5.9 Meter 1 is also controlled by motor speed when in SIM mode 0 to 1000 rpm's.

6.5.10 When in SIM mode the speed -/+ buttons control the speed and meter 1.

6.5.11 Turn down analog input 1 to 0V this should cause AIN 1 SIGNAL ALARM and meter 1 should drop to 0. Turn back to 10 Volts and clear faults.

6.5.12 Meter 2 read the VDC bus it in controlled by the VAT20 and the system when in SIM mode.

6.5.13 Verify the VAT20 has a blinking 60.1 if so meter 2 and meter 3 should read zero.

6.5.14 Press the run/stop button and the 60.1 should be solid this enables the VAT20 output.

6.5.15 Verify that meter 2 measures 200 this is equal to 6400 to 6500 volts on the VDC bus.

6.5.16 Meter 3 is max full scale 125 on the meter 3 this equals 5700 to 5800 volts.

6.5.17 Please see the help notes in toolbox for the trip fault tied to each input.

6.5.18 Six digital inputs are tied to the six digital inputs of the BICR card.

6.5.19 Digital outputs please see help note in toolbox.

6.6 Setup and BICR TEST

6.6.1 Open Toolbox and then open three files ISC1-ucb, BICR_6A-icb and NB260.icb.

6.6.2 The BICR has 8 DI's, 8 DO's, 2 0-20mA inputs, 1 0-10v input, 1 MASEN, 1 SYS_FLT, 1 LOC_FLT inputs and bridge control circuit.

6.6.3 There are three programs used while testing the BICR card. The (ISC1.ucb ACLA program) (BICR_6A.icb and NB260.icb DSPX programs).

6.6.4 Verify all the switches DI-1 thru DI-8 are in the up position.

6.6.5 Verify MASEN, LOCFLT and SYSFLT are in the up position.

6.6.6 Verify POWER CELL TEMP is turned fully clockwise.

6.6.7 Verify C SENSING is turned fully clockwise.

6.6.8 Verify WATER CONDUCTANCE is turned fully counter clockwise.

6.6.9 Verify WATER TEMP is turned fully counter clockwise.

6.6.10 Verify ANALOG 1 is turned fully clockwise.

6.6.11 Verify ANALOG 2 is turned fully clockwise.

6.6.12 Verify NHVAVL (PLO-18) in the up position.

6.6.13 Verify HDAT0 (PLO-2) in the up position.

6.6.14 Verify MVENA (PLO-7) in the down position.

6.6.15 Verify PSFLT (PLO-49) in the up position.

6.6.16 Verify Master Link Board switch is in the down position.

6.6.17 Locate the function generator under the meter panel. The frequency should be set at 60Hz. Adjust the sine level to zero volts.

6.6.18 In toolbox open the ISC1.ucb and **BICR_6A.icb** files. The **BICR_6A** is the type and size of IS Drive.

6.6.19 Power on the system rack and allow the system to boot.

6.6.20 Click on the ISD1 at the top of the tree and verify that it is set to connect with serial Communications.

6.6.21 Under the communications menu verify serial communications is checked.

6.6.22 If Serial is already set select cancel after verifying all the parameters.

6.6.23 This sets the **BICR_6A** program to connect to the DSPX thru serial communications.

6.6.24 Verify the IP address 192.168.101.61 greyed out.

6.6.25 Verify the network interface is set to ACL DPM interface.

6.6.26 If the data is correct select cancel if not change to serial and select ok.

6.6.27 The ISD1 should turn RED if ok was selected. Validate zero errors and zero warnings.

6.6.28 Download parameters.

6.6.29 Verify the status of all cards.

6.6.30 RAPA IMPOK and IPOK LEDS are on.

6.6.31 BAIA IMOK led is on.

6.6.32 ACLA OK and ACTIVE LEDS are on, the ENET light is blinking (must be on-line to blink) and the status LED is walking in a counter clockwise pattern.

6.6.33 DSPX STATUS LED has three conditions and the FAULT LED has three conditions.

1. GREEN STATUS LED Blinking DSPX needs a parameter Download.
2. GREEN STATUS LED OFF means there is an active trip condition on the system.
3. GREEN STATUS ON solid means system has no active trips.

A. RED FAULT LED Blinking means system has an active alarm.

B. RED FAULT LED on solid means system has an active trip.

C. RED FAULT LED off means no active trips or alarms.

6.6.34 Verify the BICR IMOK led is on.

6.6.35 The BPIR card does not have any LEDS.

6.6.36 If the ACLA has not been downloaded or Ethernet is not connected it will give a LAN watchdog error. Refer to the ACLA section of this test.

6.6.37 Verify function generator located under the meter panel is set to 60Hz and ZERO volts.

6.6.38 Verify meters 2 VDC BUS, meter 3 MOTOR VOLTAGE, and meter 4 MTR_SHFT_PWR are reading zero.

6.6.39 On the keypad press the remote/local key to put the unit into local mode and verify that meter 1 goes to zero.

6.6.40 Press the key again to place the unit back into remote mode and verify the meter is full scale on.

6.6.41 In toolbox navigate down to analog inputs—ISD1/Main Menu/I/O Interface/Analog Inputs/Variables.

6.6.42 Adjust Analog 1 on the panel above the rack this controls meter 1 and toolbox analog input 1 volts while in remote mode.

6.6.43 When turned to zero this will generate AIN 1 signal alarm and frame PLL alarm.

6.6.44 Set to max output fully clockwise 10 volts.

6.6.45 Now adjust Analog 2 and verify in toolbox that analog input 2 volts adjust from 0 to 10 volts. Also AIN 2 signal alarm is generated. Set to max and clear alarms.

6.6.46 The only alarms that should be active are AC line volts low and Frame PLL.

6.6.47 Connect an O-scope to the o-scope 6009.6Hz square wave output and verify correct frequency of 6009.6Hz. This frequency will drift a little when cold.

6.6.48 Navigate down ISD1/Main Menu/Protection/Bridge Thermal Variables.

6.6.49 Verify Control Rack temp is room temp.

6.6.50 Verify power cell temp =10.

6.6.51 Press the reset button on the RAPA card.

6.6.52 Wait 5 seconds and press the reset faults in toolbox verify that the LAN watchdog alarm and power cell temp is dropping to zero.

6.6.53 When power cell temp drops below 1 press reset faults again the LAN watchdog should clear and the power cell hot should be active. These two alarms have nothing to do with one another. When the reset button is pressed this reboots the ACLA and DSPX. The ACLA boot slower than the DSPX so the DSPX is looking for the ACLA to acknowledge communications and gives the alarm.

6.6.54 Turn the power cell temp pot back to max fully clockwise.

6.6.55 Verify in toolbox that power cell temp is above 9.5 press reset faults and the power cell temp alarm will clear leaving only the AC line volts low alarm.

6.6.56 Now adjust the water temp pot fully clockwise and verify the water temperature increased to 225 degrees F.

6.6.57 Verify the water temp fault in toolbox and DO-3 should be on DO-6 and DO-8 is off.

6.6.58 Turn back to max fully counter clockwise. When water temp drop below 90 degrees clear faults. DO-6 and DO-8 is on, DO3 should be off.

6.6.59 DO-8 closed when no trip fault is true.

6.6.60 Verify water conductance is below 3.

6.6.61 Turn water conductance fully clockwise and verify above 7.

6.6.62 Verify a water conductance trip is active.

6.6.63 Turn back fully counter clockwise and verify below 3.

6.6.64 Clear water conductance trip.

6.6.65 Locate the VAT20 behind the keypad. Verify that it has 60.1 blinking. To adjust use the up and down arrow keys to adjust to 60.1Hz.

6.6.66 Open the ISC1 file and go on-line. At the bottom right verify the green Equal. If not refer to the ACLA section of the test for download and connecting.

6.6.67 Verify on the BICR card that DO-1, DO-4, DO-6, DO-8 and all DI's are on.

LED	Color	Name	Description
DS1	Green	IMOK ON	when power applied and board functioning properly
DS2	Yellow	DO2	Digital relay number 2 output, ON when closed
DS3	Yellow	DO3	Digital relay number 3 output, ON when closed
DS4	Yellow	DO4	Digital relay number 4 output, ON when closed
DS5	Yellow	DO5	Digital relay number 5 output, ON when closed
DS6	Yellow	DO6	Digital relay number 6 output, ON when closed
DS7	Yellow	DO7	Digital relay number 7 output, ON when closed
DS8	Yellow	D08	Digital relay number 8 output, ON when closed
DS9	Yellow	DO1	Digital relay number 1 output, ON when closed
DS10	Yellow	DI1	Discrete digital input number 1, ON when active
DS11	Yellow	DI2	Discrete digital input number 2, ON when active
DS12	Yellow	DI3	Discrete digital input number 3, ON when active
DS13	Yellow	DI4	Discrete digital input number 4, ON when active
DS14	Yellow	DI5	Discrete digital input number 5, ON when active
DS15	Yellow	DI6	Discrete digital input number 6, ON when active
DS16	Yellow	DI7	Discrete digital input number 7, ON when active
DS17	Yellow	DI8	Discrete digital input number 8, ON when active
DS18	Yellow	CONF_DONE	ON when contactor control configuration complete

6.6.68 Use the table below to verify all 8 digital inputs create a fault condition in toolbox and also control's the LED's on the BICR card.

DIGITAL INPUT	STATUS	FAULT GENERATED	BICR LED
DI1	OFF	No Water Flow	DS10
DI2	OFF	Cooling System Fail	DS11
DI3	OFF	Motor Over temp Trip	DS12
DI4	OFF	Main XFMR H20 Hot	DS13
DI5	OFF	Power Cell Water	DS14
DI6	OFF	Water Level Low alarm	DS15
DI7	OFF	Water Level Low Trip	DS16
DI8	OFF	XFMR over Temp	DS17

6.6.69 DO-6 closed when no faults active is true.

6.6.70 DO-7 closed when running is true.

6.6.71 In toolbox open the **NB260** file double. The **NB260** is the type and size of IS Drive.

6.6.72 Verify all the switches DI-1 thru DI-8 are in the up position.

6.6.73 Verify MASEN, LOCFLT and SYSFLT are in the up position.

6.6.74 Verify POWER CELL TEMP is turned fully clockwise.

6.6.75 Verify C SENSING is turned fully clockwise.

6.6.76 Verify WATER CONDUCTANCE is turned fully counter clockwise.

6.6.77 Verify WATER TEMP is turned fully counter clockwise.

6.6.78 Verify ANALOG 1 is turned fully clockwise.

6.6.79 Verify ANALOG 2 is turned fully clockwise.

6.6.80 Locate the function generator under the meter panel. The frequency should be set at 60Hz. Adjust the sine level to zero volts.

6.6.81 Click on the ISD1 at the top of the tree and verify that it is set to connect with Ethernet Communications.

6.6.82 Under the communications menu verify Ethernet.

6.6.83 If Ethernet is already set select cancel after verifying all the parameters.

6.6.84 This sets the **NB260** program to connect to the DSPX thru the ACLA.

6.6.85 Verify the IP address 192.168.101.61

6.6.86 Verify the network interface is set to ACL DPM interface.

6.6.87 If the data is correct select cancel if not change and select ok.

6.6.88 The ISD1 should turn RED if ok was selected. Validate zero errors and zero warnings.

6.6.89 Validate and download parameters.

6.6.90 Locate the keypad verify that the unit is in REMOTE mode. On the right side of the display there should be an R. to change from local to remote mode press the REMOTE/LOCAL button.

6.6.91 Press the remote/local key and verify the meter 1 MOTOR SPEED changes from full scale to ZERO when in local mode.

6.6.92 Now place the unit back in REMOTE mode.

6.6.93 Verify the digital input with the chart below. Turn off one input at a time for DI1, DI5 and DI5.

DIGITAL INPUT	STATUS	FAULT GENERATED	BICR LED
DI1	OFF	Cooling System Fail	DS10
D12	OFF	Motor Over Temp	DS11
DI3	OFF	XFMR Over Temp	DS12
DI4	OFF	Cooling System Fail	DS13
DI5	OFF	Cooling System Fail	DS14
DI6	OFF	Customer use NIC Flt	DS15
DI7	OFF	Not Used	DS16
DI8	OFF	Not Used	DS17

6.6.94 Verify analog 1 controls meter 1.

6.6.95 Adjust analog 1 fully clockwise so meter 1 MOTOR SPEED is max.

6.6.96 Verify meter 2 VDC BUS is zero.

6.6.97 Verify meter 3 MOTOR VOLTAGE is zero.

6.6.98 Verify meter 4 MTR_SHFT_PWR is zero. Function generator under the meter panel controls this meter. Should be set at zero sin level.

6.6.99 Open the fault list and press reset faults.

6.6.100 All the errors and trips should clear except for AC line volts low and Frame PLL if not set to 6009.6Hz.

6.6.101 If frame PLL not OK re-adjust the to 6009.6Hz

6.6.102 The system variable is found at ISD1/Main Menu/Network Communications/Configuration & health/Variables. Frame PLL OK Status (Fpll_OK)

6.6.103 Connect an O-scope to the o-scope 6009.6Hz square wave output and verify correct frequency of 6009.6Hz. This frequency will drift a little when cold.

6.6.104 Verify only DO-8 is on when no trips are active. If the fault LED on the DSPX is solid this means there is an active trip faults and the DSPX status led should be off. Press reset faults if the trip clears the DSPX fault led should start blinking and the DSPX status led should be on this means the active faults cleared. If the DSPX fault led is now blinking verify DO-8 and DSPX status LEDS are on.

6.6.105 Verify only one error the AC line volts low remains.

6.6.106 Now locate the VAT20 behind the Keypad verify that it has a blinking 60.1Hz to adjust use the up and down arrow keys until 60.1Hz is displayed and blinking.

6.6.107 Now press the RUN/STOP button the Vat20 should start from 0 and increase to 60.1Hz the VAT20 produces the DC bus and motor voltages needed on the system.

6.6.108 After a few seconds DO-1, DO-3, DO-4 and DO-8 when the low voltage error clears the relay will enable and DO-6 will turn on the relays on the BAIA card.

6.6.109 DO-6 may bounce on and off until the 6009.6Hz circuit warms up.

6.6.110 Open the fault list and press clear all the faults should clear. The frame PLL may bounce in and out until the circuit warms to running temp it may also need to be re-adjusted to 6009.6Hz.

6.6.111 Verify the DSPX status led is on and the fault led is off.

6.6.112 Verify in toolbox that all errors are clear.

6.6.113 On the keypad press the local/remote key and place the system in local mode.

6.6.114 Verify meter 1 MOTOR SPEED is between 0 and 50 on the scale

6.6.115 Meter 2 VCD BUS and meter 3 MOTOR VOLTAGE are max full scale.

6.6.116 Verify meter 4 MTR_SHFT_PWR is zero.

6.6.117 Navigate down to ISD1/MAIN MENU/SYSTEM DATA/VARIABLES.

6.6.118 Verify (phase A), (phase B) and (phase C) currents are zero.

6.6.119 Verify IA^2, IB^2 and IC^2 are less than 1.

6.6.120 Meter 4, phase A, phase B, phase C, IA^2, IB^2 and IC^2 are controlled by the small function generator, now increase the voltage on the function generator until meter 4 is full scale.

6.6.121 Verify Ia^2, Ib^2 and Ic^2 are increasing Ia^2 will be larger than Ib^2 and Ic^2.

6.6.122 Verify phase B and phase C have values and that phase A is the inverted sum on B and C. example: (PHASE C= -100), (PHASE B= -100), (PHASE A will =200).

6.6.123 Now to start the motor navigate to ISD1/main menu/Diagnostic and utility functions/simulator configuration.

6.6.124 Set SIM mode to yes

6.6.125 At the bottom right of the toolbox program is should read, R Ready = Alarm 500ms.

6.6.126 On the system locate the keypad.

6.6.127 Switch to Local mode by pressing the remote/local button.

6.6.128 Now it should be displayed on the right side of the keypad (L).

6.6.129 Meter 1 should read 18 rpm's

6.6.130 Meter 2 should read full scale (250), this equal to 8,505 volts on the VDC bus.

6.6.131 Meter 3 should read zero.

6.6.132 Meter 4 should read zero.

6.6.133 Flip DI4 down and wait 5 seconds. DO8 should turn off.

6.6.134 Now set DI4 back to the up position.

6.6.135 Read entire step before proceeding. Press the reset faults button on the keypad. This should turn DO8 back on. Now press reset again and while DO6 is on press the start button. This is very tricky due to timing because this is a timed reset and run start signal. Press the reset button, while DO6 is on press the GREEN run button. Note: **You can tell if this step has been completed successfully if the DO7 and DO6 are illuminated simultaneously. If DO6 and DO7 are not on repeat DI4 and reset start button again.**

6.6.136 This should enable the system now and lock it into a running status.

6.6.137 To verify, in toolbox on the bottom right it should display L Running = blank 500mS

6.6.138 The DSPX STATUS LEDS will be blinking very fast.

6.6.139 Now the digital outputs DO-1, DO-3, DO-4, DO-6, DO-7, and DO-8 should be on.

6.6.140 On the keypad speed feedback reads 60RPM.

6.6.141 Motor current 77.49 amps RMS.

6.6.142 Motor voltage 270 volts RMS.

6.6.143 Motor power 0.0 HP.

6.6.144 Now press the speed + button and increase the speed. **Note: it should take the speed to drop from max 1000 rpm's about 30 minutes for the motor to come to a full stop.**

6.6.145 Speed feedback should be increasing.

6.6.146 Motor current 100 amps.

6.6.147 Motor voltage will increase to 4000 volts.

6.6.148 Motor power will increase 700 HP until 1000 rpm's and then drop to 1.4 hp. Current will drop to 68 amps.

6.6.149 Verify toolbox reads all correct values.

6.6.150 Once the motor stops.

6.6.151 Press the reverse / forward button to put the unit in reverse direction it is the button to the right of the reset faults button. The double arrow on it.

6.6.152 If the motor is above 60 rpms it will not switch.

6.6.153 Meter 4 should reverse while the motor speed is increasing.

6.6.154 Meter 1 again is the speed, use the – button and set back to zero.

6.6.155 Press the stop button VDC bus voltage jumps to 9776 Volts and allow the motor to come to a stop about 30 minutes. Turn off power.

6.7 ***TEST COMPLETE ***

7. NOTES

7.1 None at this time.

8. ATTACHMENTS

8.1 None at this time.