DATASHEET

MEMEX

A87L-0001-0017

OTHER SYMBOLS:

A87L00010017, A87L0001 0017, A87L0001-0017, A87L 00010017, A87L 0001 0017, A87L 0001-0017, A87L-00010017, A87L-0001 0017, A87L-0001-0017

www.rgbelektronika.pl

www.rgbautomatyka.pl

YOUR PARTNER IN MAINTENANCE

LINEAR ENCODERS

PLC SYSTEMS

INDUSTRIAL COMPUTERS

ENCODERS

SERVO AMPLIFIERS

CNC CONTROLS

MOTORS

CNC MACHINES

OUR SERVICES

POWER SUPPLIERS

SERVO DRIVERS

OPERATOR PANELS

At our premises in Wrocław, we have a fully equipped servicing facility. Here we perform all the repair works and test each later sold unit. Our trained employees, equipped with a wide variety of tools and having several testing stands at their disposal, are a guarantee of the highest quality service.
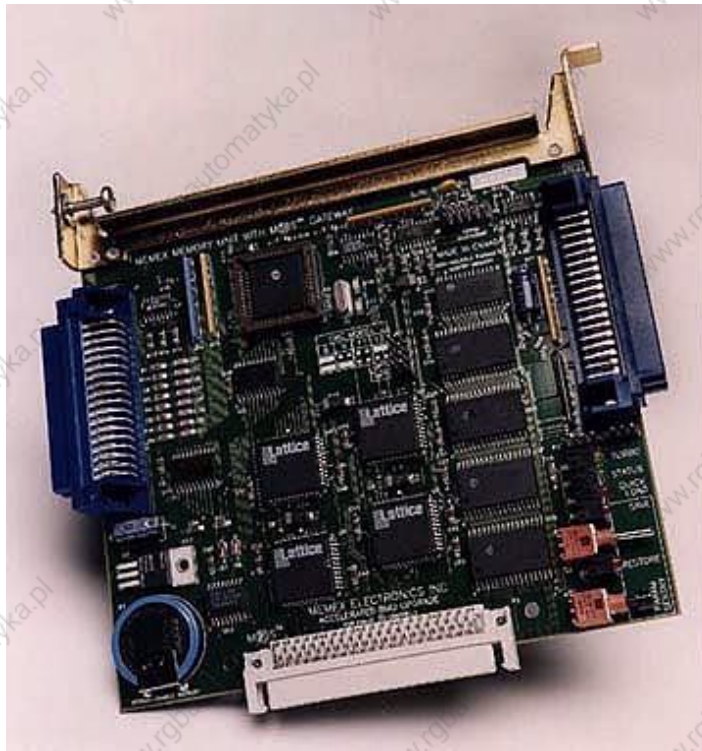
MME/HSL Memory Upgrade for Fanuc®
For Series 6, 11 & 12

*Installation Instructions
and Operator's Manual*

M100700D

Table of Contents

Introduction

General

The MME (Memex Memory Engine) is a Static RAM based memory board, designed to replace the old BMU (Bubble Memory Unit) found in Fanuc Series 6, 9, 11 and 12 machine tool controls. Our leading edge technology has enabled us to create a high speed, low power alternative to conventional Fanuc® memory.

Besides being a memory replacement the MME has a unique feature called "QUICK-LOAD". This allows the various parameters stored in the original BMU to be automatically transferred to the MME via a special BMU socket on the side. With the BMU "piggy-backed" onto the installed MME, all NC and PC parameters can be transferred by just powering on the control normally. Generally, the "QUICKLOAD" feature installs the MME board easily with very little downtime – that said, still perform a backup of parameters and key macro programs.

Once the new MME has been proven (all parameters checked and the machine functionally tested), the "PARAMETER SENTRY" (PS) system can be used to backup the verified parameter settings. This useful feature will keep a copy of the machine's critical parameters in a special on-board, non-volatile, memory location for safekeeping.

Finally, the battery backup system is unique in that the battery is continuously conditioned and recharged when the power is on. New Lithium rechargeable technology has been implemented to keep your data safe for more than 10 years.

Features

- 20 MHz on-board RISC processor
- High speed, low power, SRAM in 128k, 512k or 2 meg sizes (HSL5 board only)
- Non-volatile SRAM for on-board "Parameter Sentry" backup
- Easy-to-use switches for parameter save and restore
- Rechargeable, long life, Lithium battery for Part Program Storage SRAM enabling a feature called "PermaCharge Battery System"
- On-board 19200-BAUD serial port for diagnostics
- In-line BMU connector for "Quick Load" parameter transfer
- Compact 5.3" x 5.9" board size

Board Features Description (Fanuc 6/11/12 - 320M to 1280M)

1 **CNC Connector**
   Plugs into the BMU slot on the CNC

2 **CPU**
   20 Mhz processor in socket

3 **Option Jumpers**
   Used to select CNC type

4 **NVSRAM**
   8K x 8 Non-Volatile SRAM for Parameter
   Sentry System

5 **Serial Port**
   High speed serial port for diagnostics

6 **BMU Connector**
   Used for quick-loading old BMU

7 **SRAM (1 – 4)**
   128K x 8 high speed, low power

8 **Status LEDs**
   Turbo, Data Status, Quick Load, Save
   and Restore

9 **Parameter Sentry System**
   Toggle switch & push button

10 **MOS® Connector**
   Used for HSL upgrades

11 **Perma-Charge Battery**
   Rechargeable, Lithium battery

Note: 2 Megs on a Fanuc 11/12 uses HSL

The Basics

Using the Parameter Sentry System

The MME's Parameter Sentry System is unique and simple to use. The system offers protection of the first 20 meters (8K) of memory, thus protecting all of your NC system parameters, PC parameters, Tool Offset data, Pitch Error Compensation data and System data. Note that part programs are not included. The HSL saves the bottom 1280 meters (512k). All of these parameters are stored in Non-Volatile SRAM (NVSRAM). This memory is Non-Volatile meaning that it does not require a backup power source of any kind and is a relatively permanent and a convenient form of storing your critical control parameters.

To use the Parameter Sentry System, power on your Fanuc control and bring the CRT to the Position screen. Open the control cabinet with the Fanuc control. Make sure that the power remains ON when you open the door to the cabinet. While holding the toggle switch at the bottom of the Memex MME board toward the "SAVE" position, momentarily PUSH the "PARAM SENTRY" button, and then release the toggle switch. You should notice the LED adjacent to the toggle switch light up for approximately one second. This will save your Fanuc system parameters in the NOVRAM.

To RESTORE your parameters, reverse the above procedure. Make sure that your Fanuc CNC is turned on and that you have access to the Memex MME. While holding the toggle switch toward "RESTORE", momentarily PUSH the "PARAM SENTRY" button, then release the toggle switch. Again, you should notice the "Restore" LED light up for one second. Power off your control, then power on again for the saved parameters to take effect.

If an error relating to part programs occurs at this point after powering on the control, you may also need to Delete All Part Programs by powering on the control while holding the

DELET & RESET keys.
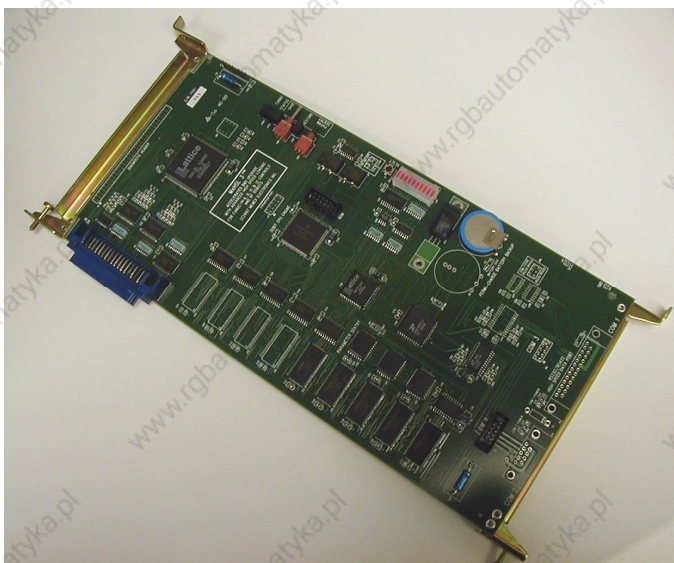
Memex HSL3 Board Used For Fanuc 11 & 12 Upgrades to 2 Megs

Installation Considerations

The installation of the MME should be conducted with care. Never install or remove a board with the control power on (the main power can be on, but not the control). Take care with the handling of the MME and BMU, as they are static sensitive. Keep the boards in the anti-static bags provided. Take care not to place the circuit boards on a metal surface as the backup battery could suffer damage if shorted. Do not place the MME in any other slot on the Fanuc master-board, other than the one, labeled BMU. Do not force, drop or otherwise mishandle the boards during the installation procedure. Always check the functionality of the machine at the end of the installation (i.e. move the axes, perform a tool change, run a program, etc.).

Backup Critical Parameters

Although the MME has the ability to transfer the relevant NC parameters, it is a good idea to make a manual backup of all information in the BMU before proceeding (if possible). The MME will contain no useful information when shipped, and as such the following data must be reloaded: NC parameters, PC parameters, tool offsets, part programs, macro variables and names (if applicable), etc. Follow your Fanuc manual for the appropriate procedure.

Verify Your Control

Once the MME has been installed either manually or by the Quick-Load method, satisfy yourself that the control is working properly and that all of your parameters have been restored.

Test the machine by the following procedure through either MDI or program:

- Home all axes, tool-changers and pallets.

- Check spindle functionality through all speeds and gear ranges.

- Check also Clockwise and Counter-clockwise rotation with M3 and M4 commands.

- Check the tool changer. Be sure that the tool you received was the tool requested and that the carousel rotates in the proper direction.

- Check the pallet changer (if applicable). If your machine requires special custom macros for a pallet changer or tool changer, be sure that they have been loaded.

Once your machine has been proven with the MME, you have successfully upgraded your control.

Installation for Fanuc® 6

Backup Your Control

Before starting the installation, power on the control and verify that the machine tool is in good working order. If the control has a system error, or the BMU is inoperable, you will have to replace your memory board with the MME, and restore the information from existing backup sources.

Important!

Backup the following BMU memory contents: NC parameters, PC Parameters (if parameter 3.7 = 1), Tool Offsets, Pitch Error Compensation, and Part Programs (if applicable). All of this information is contained in the Bubble Memory Unit (BMU) and must be restored; therefore all of this information must either be written down or punched out of the control via the RS-232 serial port. Use the "Fanuc System 6 Machine Parameter Worksheet" provided at the end of this document to record the important parameter data. Use the following procedures to save the data on a computer. If in doubt, consult your Fanuc manuals, as they are your ultimate authority on your particular version of control.

1. Set up your computer to receive data through its COM port and connect it to your Fanuc control. Set the communication parameters on your PC for 7 data bits, and the stop bits and baud rate as determined by the applicable parameters for your control. Please refer to the "Fanuc 6 Technical Summary" at the end of this document for the appropriate parameters.

NC Parameters

2. Make the computer ready to receive the data.
   - Select EDIT Mode.
   - Press the | PARAM | key to display the Parameter Screen.
   - Press | P | | - | | 9 | | 9 | | 9 | | 9 | | PUNCH |

   The Parameters will be punched out.

Pitch Error Compensation

3. Make the computer ready to receive the Pitch Error data.
   - Confirm that EDIT Mode is selected.
   - Confirm the Parameters are displayed on the screen.
   - Press | P | | - | | 9 | | 9 | | 9 | | 8 | | PUNCH |

   The Pitch Error data will be punched out.

Part Programs 4. **NOTE:** Any macro programs in the range of O8000-O9999 that have been protected from editing will not be transferred. Release the parameter bits that are protecting them. On a Fanuc 6-B2, one would go through the following steps:

To release the Macro Program "Edit Protect" on a Fanuc 6-B2:
- Select MDI Mode.
- Switch the Parameter Write switch to the ON position (ignore the PW100 alarm).
- Press the PARAM key to display the Parameter Screen.
- Set parameter 319 bit 7 and 318 bit 7 (left most digit) to a 0 (zero).
- Switch PWE to the OFF position.
- Press RESET to clear the PW100 alarm.

Make the computer ready to receive the programs.
- Select EDIT Mode.
- Press PRGRM to display the Program Screen.
- Press O - 9 9 9 9 PUNCH

All of the programs will be punched out.

Tool Offsets 5. Make the computer ready to receive the Tool Offset data.
- Confirm that EDIT Mode is selected.
- Press OFSET to display the Tool Offset Screen.
- Press P - 9 9 9 9 PUNCH
  The Tool Offsets will be punched out.

Work Offsets 6. Press OFSET again to display the Work Offset Screen. If it does not appear, you do not have any Work Offsets in your machine—proceed to the next step.

If you do have a Work Offset screen, record the Work Offsets in the following chart:

Relative	00	01	02	03
X				
Y				
Z				

Relative		04	05	06
X				
Y				
Z				

PC Parameters

7. Check Parameter 3, bit 7. If this is a 0, go to step #8 (System Parameters) as you have no PC Parameters. Write down the PC Parameters between, and including the following parameters: N600-619, N1001-1040, N2001-2010 and N3001-3036.

- Press the $\boxed{PARAM}$ key twice to display the PC Parameter Screen.

- Type $\boxed{N}$ $\boxed{6}$ $\boxed{0}$ $\boxed{0}$ $\boxed{INPUT}$ to select PC Parameter 600.

  You can use the $\boxed{\downarrow}$ (cursor) key to advance the PC Parameter number.

- Write down the PC Parameter values on the Parameter chart found in the back of this manual.

- Repeat the last two lines to record the remaining PC Parameters.

System Parameters

8. Press the $\boxed{PARAM}$ key once again to display the Parameter Screen.

- Type $\boxed{N}$ $\boxed{0}$ $\boxed{INPUT}$ to select Parameter 0. You can use the $\boxed{\downarrow}$ (cursor) key to advance the Parameter number.

- Write down the System Parameter values on the Machine Parameter Worksheet found at the end of this manual.

- Repeat the last two lines to record the remaining Parameters.

Setting Data

9. Press the $\boxed{SET}$ key to display the Setting Data Screen.

- Record all of the Setting Data on the Parameter Worksheet found in the Appendix of this manual.

Fanuc 6-TB Control – Memex Also Makes BTRs For Serial Dripfeeding

Quick-Load Procedures for Fanuc® 6

Time Needed: 1 hour (approx.)
Tools Needed: 1 Philips Screwdriver
Components: 1 MME memory board
Controls: Fanuc 6A, 6B and 6-B2

Before starting the installation, power on the control and verify that the machine tool is in good working order.

Important!	Make sure that you have a current backup of the NC parameters, including PC Parameters, Tool Offsets, Pitch Error Compensation, and Part Programs. For instructions on downloading your control's information, refer to previous section entitled "Backup Your Control" at the beginning of Chapter 3.

1. Inspect the Memex Memory Engine (MME) for any damage during shipping. Also check that the "CNC Type" jumpers have been set to the Fanuc 6 control type.

Remove the Bubble memory

2. With the Fanuc control powered off and the Emergency Stop (E-STOP) button depressed, gain access to the main master-board. Find the Bubble Memory Unit (BMU) board on the right-hand side of the master-board, and carefully remove it with a Philips screwdriver. Carefully place the BMU in the anti-static box supplied, and set it aside.

Install the MME memory

3. Install the MME in the slot where the BMU was removed once again using the Philips screwdriver.

4. Locate the Parameter Write Enable (PWE) switch on the lower left of the master-board. Move the switch to the right to the "ON" (enable) position.

CAUTION!

5. With the 0 (zero) and DEL "DELETE" keys depressed on the front MDI panel, power on the control. This action will cause the control to start-up and immediately clear the entire memory of the MME. If the control will not power on at this point, check that the cabinet door interlock is bypassed. The control may take a few seconds to clear the entire memory. You will then be given a "WARNING: SYSTEM INCONSISTENT" alarm and will be prompted to press RESET to continue. Ignore this "Reset" prompt.

6. Power off the control.

7. Restore the PWE switch to the "OFF", or disabled, position.

**MME
Quickload!**

8. Mount the original BMU onto the blue "BMU" connector found on the MME board. Screw down the top screw into the MME to secure the BMU properly.

Copy the Data

9. Power on the control with the door interlock disabled. The control should start-up normally from the original BMU. During this boot up process, parameter data is being relocated to the appropriate memory areas in the MME. To ensure a complete transfer, view the parameter screen, page through all the tool offsets, etc. If all looks normal, release the EMERGENCY STOP (E-STOP) button.

10. Power off the control and carefully remove the BMU. Set the BMU aside in the anti-static bag provided.

**Check the
Parameters**

11. Power the control on holding [DELET] and [RESET] . It should start-up and arrive at the position screen. Check all your parameters, tool offsets etc., carefully. Note that Part Programs do not get Quick-loaded at this time. At the program screen, in EDIT mode, view the directory by pressing [CAN] then [ORIGIN] . This will verify the available memory in the new MME.

12. Initiate a Parameter Sentry *"SAVE"* operation to save your parameters to non-volatile memory. It is best to do this when there are no part programs present as the directory that is saved should be clear of entries.

13. Test your machine thoroughly. You can proceed to the section of this manual entitled "Verify Your Control" for assistance.
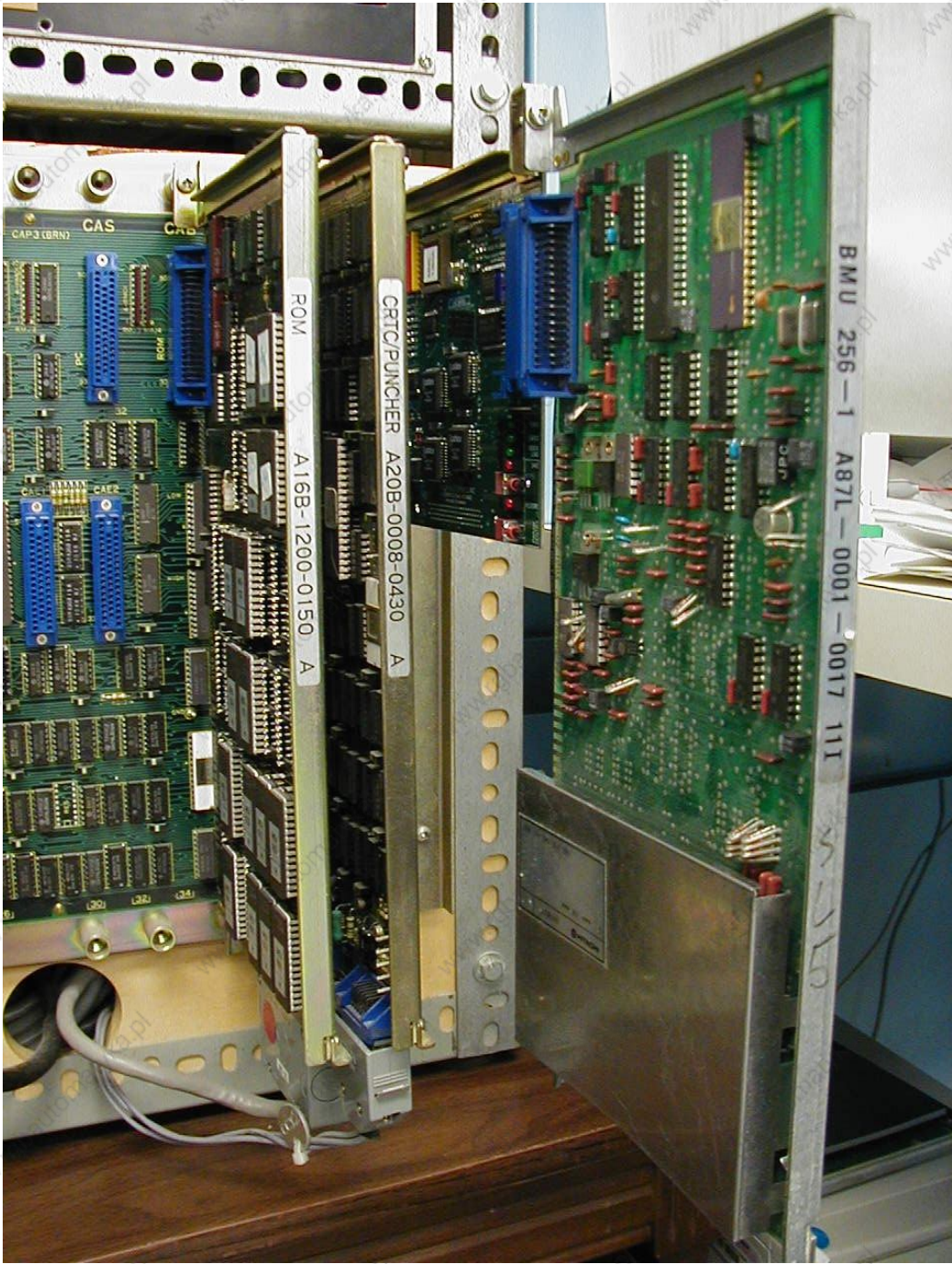
MME Quickload on a Fanuc 6

Installation Checklist for Fanuc® 6

- Check Machine - Power On - Check for Machine Problems Before You Start.

- Backup Parameters and Programs.

- Power Off.

- Depress E-STOP

- Remove BMU and set it aside.

- Mount MME.

- Set PWE to enable.

- Power On the Control with $\boxed{0}$ and $\boxed{DEL}$ depressed, to erase MME.

- Power Off and turn PWE off.

- Piggy-Back BMU to MME - Secure with Screw.

- Power Up - Page through the Tool Offsets.

- Power Off.

- Remove BMU.

- Power On while holding $\boxed{DELET}$ and $\boxed{RESET}$.

- Check the Parameters and machine operation thoroughly.

- Save your parameters with the Parameter Sentry Save.

- Complete.

Restoring your Fanuc® 6

If you have successfully installed your MME via the Quick-Load method described in the previous section, then skip this chapter. This chapter is designed to step you through a manual BMU restore operation with the assumption that you have adequate backups.

CAUTION!

1. Open the door to the control's master-board on your machine.
   - Replace the BMU with your new memory board.
   - Turn ON (Enable) the Parameter Write switch located in the lower left corner of the control's master-board (ignore the PW100 alarm).
   - Power ON the control while holding both the $\boxed{0}$ (zero) and $\boxed{\text{DELET}}$ keys. This will delete the entire memory board in your control!
   - Wait for the control to completely erase your new memory board. It will be done when you get the "System Inconsistent" message.

2. Set up your computer to send data through the COM port and connect it to your Fanuc control.
   - Press the $\boxed{\text{PARAM}}$ key to display the Parameter Screen.
   - Type $\boxed{\text{N}}$ $\boxed{3}$ $\boxed{1}$ $\boxed{0}$ $\boxed{\text{INPUT}}$ to select Parameter 310.

     You can use the $\boxed{\downarrow}$ (cursor) key to advance the Parameter number.
   - Set the communication parameters by pressing $\boxed{\text{P}}$, the *original value*, then $\boxed{\text{INPUT}}$.
   - Repeat the last two lines to enter all the system parameters that you had previously recorded.

3. Power OFF the control, then power it back ON.

Loading NC Parameters

4. Make the computer ready to send the Parameter data to the control.
   - Select EDIT Mode.
   - Press the EMERGENCY STOP button in.
   - Press the $\boxed{\text{SET}}$ key to display the display Setting Screen.
   - Restore the correct Setting information from your backup.
   - Confirm that the Parameter Write switch is in the ENABLE position.
   - Press the $\boxed{\text{PARAM}}$ key to display the Parameter Screen.
   - Press $\boxed{\text{P}}$ $\boxed{-}$ $\boxed{9}$ $\boxed{9}$ $\boxed{9}$ $\boxed{9}$ $\boxed{\text{READ}}$

• Send the (backed-up) Parameters to the control from your computer.

Pitch Error Compensation

5. Make the computer ready to send the Pitch Error data to the control.
   • Confirm the EMERGENCY STOP button has been depressed.
   • Confirm that the Parameter Write switch is in the ENABLE position.
   • Confirm the Parameters are displayed on the screen.
   • Press $\boxed{P}$ $\boxed{-}$ $\boxed{9}$ $\boxed{9}$ $\boxed{9}$ $\boxed{8}$ $\boxed{READ}$
   • Send the Pitch Error data file to the control from your computer.

6. Power OFF the control, then power it back ON.

PC Parameters

7. If Parameter 3, bit 7 was a 0, then skip this step; otherwise:
   • Confirm that the EMERGENCY STOP button is in.
   • Confirm that the Parameter Write switch is in the ENABLE position.
   • Press the $\boxed{PARAM}$ key twice to display the PC Parameter Screen.
   • Type $\boxed{N}$ $\boxed{6}$ $\boxed{0}$ $\boxed{0}$ $\boxed{INPUT}$ to select PC Parameter 600. You can use the $\boxed{\downarrow}$ (cursor) key to advance the PC Parameter number and $\boxed{\Downarrow}$ (page down) to view a page worth of PC Parameters.
   • Set the PC Parameters by pressing $\boxed{P}$, the *original value*, then $\boxed{INPUT}$.
   • Repeat the last two lines to enter all the remaining PC Parameters that you recorded.

Program Data Input Option

8. Press the $\boxed{PARAM}$ key to display the Parameter Screen.
   • Type $\boxed{N}$ $\boxed{3}$ $\boxed{INPUT}$ to select System Parameter 3.
   • Check that bit 1 (2nd from right), of System Parameter 3 is a 1. If it is not, set it to a 1 by pressing $\boxed{P}$, the new value, then $\boxed{INPUT}$.

Reset the Control

9. Power OFF the control.
   • Turn OFF (Disable) the Parameter Write switch on the master-board.
   • Release the EMERGENCY STOP.
   • Power the control back ON.

**Loading
Tool Offsets**

10. Make the computer ready to send the Offset file.
   - Confirm that the control is in EDIT Mode.
   - Confirm that the Program Screen in showing.
   - Press $\boxed{O}$ $\boxed{0}$ $\boxed{0}$ $\boxed{0}$ $\boxed{1}$, then $\boxed{READ}$
   - Send the Tool Offset file to the control from your computer.
   - The Tool Offsets will be loaded into the control as program O0001.
     Once the file has been sent, press $\boxed{RESET}$.
   - Put the control in MEM Mode, then press $\boxed{CYCLE\ START}$.
   - Press the $\boxed{OFSET}$ key to display the Tool Offsets.
   - Verify that all of the Tool Offsets have been loaded successfully.
     If not, reload the Tool Offsets manually as necessary.
   - If all of the Tool Offsets have been reloaded successfully, delete
     program 1 by pressing $\boxed{O}$ $\boxed{0}$ $\boxed{0}$ $\boxed{0}$ $\boxed{1}$, then $\boxed{DELET}$.

**Loading
Part Programs**

11. Any macro programs that have been protected from editing will not be
    loaded. On a Fanuc 6-B, check that parameters 318 and 319 have bit 7
    equal 0.
   - To release the Macro Program "Edit Protect" on a Fanuc 6-B:
     - Select MDI Mode.
     - Switch PWE to the ON position (ignore the PW100 alarm).
     - Press the $\boxed{PARAM}$ key to display the Parameter Screen.
     - Set parameter 319 bit 7 and 318 bit 7 (left most digit) to a 0 (zero).
     - Switch PWE to the OFF position.
     - Press $\boxed{RESET}$ to clear the PW100 alarm.
   - Make the computer ready to send the program file.
   - Press $\boxed{PRGRM}$ to display the Program Screen.
   - Press $\boxed{O}$ $\boxed{-}$ $\boxed{9}$ $\boxed{9}$ $\boxed{9}$ $\boxed{9}$ $\boxed{READ}$
   - Send the programs to the control from your computer.

12. If the programs were protected, restore parameters 318 and 319 to their
    original values.

13. Press the $\boxed{OFSET}$ key and restore the Work Zero offsets.

Installation for Fanuc® 11/12

Backup Your Control

Before starting the installation, power on the control and verify that the machine tool is in good working order. If the control has a system error, or the BMU is inoperable, you will have to replace your memory board with the MME, and restore the information from existing backup sources.

Important!

Be sure to write down the NC (Service) parameters; 0, 3, 20-23, 5001-5122, 9000 and 9100-9125/9131/9207 (depending on you control). Backup the Setting Screen Data, NC parameters, PC parameters (Timers, Counters, Keep Relays, Data Tables and Position Module Information) and Tool Offsets. Use the "Fanuc System 10/11/12 Machine Parameters" worksheet provided at the end of this document to record important parameter data. Use the following procedures to save the data on a computer. If in doubt consult your Fanuc manuals, as they are the ultimate authority on your particular control.

1. Set up your computer to receive data through its COM port and connect it to your Fanuc control. Set the communication parameters on your PC for 7 data bits, and the stop bits and baud rate as determined by the applicable parameters for your control. Please refer to the "Fanuc 6 Technical Summary" at the end of this document for the appropriate parameters.

NC Parameters
2. Make the computer ready to receive the data.
   - Select EDIT mode.
   - Press the SERVICE function key.
   - Press PUNCH + PARAM (or ALL for Both NC + Pitche Error)

   The Parameters will be punched out.

Pitch Error Compensation
3. Make the computer ready to receive the Pitch Error data.
   - Confirm that EDIT Mode is still selected.
   - Press the SERVICE function key.
   - Press PUNCH + PITCH

   The Pitch Error data will be punched out.

Part Programs

4. **NOTE:** Before backing up the Part Programs, check to see if there are any programs listed in the 8000's or 9000's. If there are, make sure the Program Protect Parameter, NC parameter 2201--bit 0, must be a 0 for the 9000 series part-programs and parameter 11--bit 0 must be a 0 for the 8000 series programs. This will allow ALL part-programs, macros and common variables (in the Setting Screen) to be properly output

Make the computer ready to receive the programs.
- Select EDIT Mode.
- Press the PRGRM function key.
- Press PUNCH + ALL

All of the programs will be punched out.

Tool Offsets

5. Make the computer ready to receive the Tool Offset data.
- Confirm that EDIT Mode is selected.
- Press the OFFSET function key.
- Press PUNCH + TOOL

The Tool Offsets will be punched out.

Macro Variables

6. Punch out an MACRO (500 and above) variables if present as well.
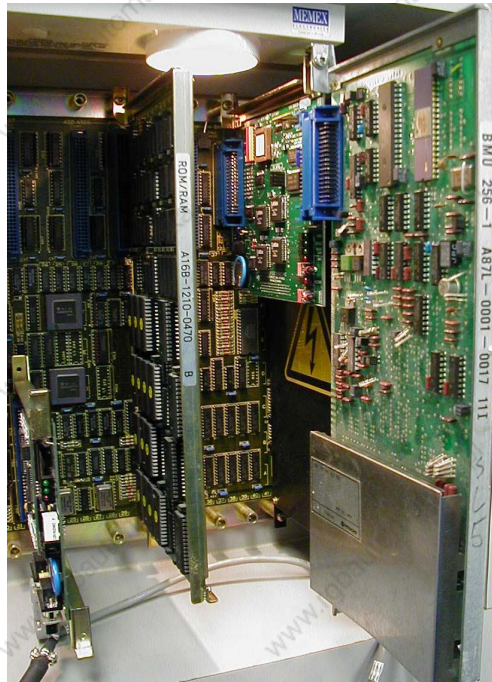
Fanuc 11 Quickload – BMU Mounted on MME in Slot Next to Power Supply

Quick-Load Procedures for Fanuc® 11/12

Time Needed: 1 hour (approx.)
Tools Needed: 1 Philips Screwdriver
Components: 1 MME memory board
Control: Fanuc 11A, 11B and 12

Before starting the installation, power on the control and verify that the machine tool is in good working order.

Important! Make sure that you have a current backup of the NC parameters, Tool Offsets, Pitch Error Compensation, and Part Programs. For instructions on downloading your control's information, refer to previous section entitled "Backup Your Control".

1. Inspect the Memex Memory Engine (MME) for any damage during shipping. Also check that the "CNC Type" jumpers have been set to either Fanuc 11 or 12.

Remove the Bubble memory

2. With the Fanuc control powered off and the Emergency Stop (E-STOP) button depressed, gain access to the main masterboard. Find the Bubble Memory Unit (BMU) board on the right-hand side of the masterboard, and carefully remove it with a Philips screw driver. Carefully place the BMU in the anti-static box supplied, and set it aside.

Install the MME memory.

3. Install the MME in the slot where the BMU was removed once again using the Philips screwdriver.

4. With the 7 + 9 keys depressed on the front MDI panel, power on the control. **This action will cause the control to start-up and immediately clear the entire memory of the MME**. If the control will not power on at this point, check that the cabinet door interlock is bypassed. When the control powers on, it will eventually show the IPL Screen.

CAUTION!

5. Power off the control.

MME Quickload!

6. Mount the original BMU onto the blue "BMU" connector found on the MME board. Screw down the top screw into the MME to secure the BMU properly.

Copy the Data

7. Power on the control. It should start-up normally with the original BMU in control. During this process parameter data is being relocated to the appropriate memory areas in the MME. To ensure a complete transfer, view the parameter screen, tool offset screen, part program screen,…etc. If it all looks normal, release the E-STOP button.

8. Power off the control and carefully remove the BMU. Set the BMU aside in the anti-static bag provided.

Check the Parameters

9. Power the control and check the functionality of the machine at this point. Re-Zero the axes, test the spindle, test the tool changing mechanism (be sure you get the tool you request and that it goes into the correct pocket), check out any pallet changers and other peripherals.
Caution: Keep your rapid and feed rate overrides low. The machine may not behave the way you might expect it to. If abnormalities in the operation are noticed, check all of the system parameters in case they may not have been properly restored by the Quick-Load (if so go to step 14).

10. Initiate a Parameter Sentry *"SAVE"* operation to save your parameters to non-volatile memory. It is best to do this when there are no part programs present as the directory that is saved should be clear of entries. (Note that powering on in IPL mode and clearing files "3 INPUT", then "7input" is needed)

11. Test your machine thoroughly. You can proceed to the section of this manual entitled "Verify Your Control" for assistance.

You are done…

12. If an error has occurred during the installation of your MME it is possible an alternative method may have to be used. Follow steps 1 through 4 as per the above directions but before continuing with step 5 complete the following extra steps.

13. Remove the Option Jumper #2 on the MME board. This will limit the Parameter Sentry system to protecting the System Label only. Following are the steps required to correctly write the System Label. After you follow through with the remainder of the Quick-Load procedure, you will have to restore the over-written System Label with backed up version that is guarded by Parameter Sentry.

14. With the $\boxed{.}$ + $\boxed{-}$ keys depressed on the front MDI panel, power on the control. When the control powers on it will eventually show the IPL

Screen

15. At the prompt, you will enter ⬚9 ⬚9 then ⬚INPUT . Use the input button to the right of the MDI keypad.

16. Press ⬚Y to initialize the system label.

17. Enter the number you wrote down from parameter 9000 on the parameter sheet, for the No. of Axes. Beginning with parameter 9100, enter the HEX value of each parameter for the option numbers that need to be entered. If you incorrectly enter a number at this point, you will have to press INPUT through the remaining Options, then go back and begin the process again.

18. When you reach the end press ⬚Y to clear the files.

19. Go back to the IPL menu and press ⬚6 to End IPL. If you should get any alarm in the 900's, call our toll free tech support line.

20. At this point initiate a Parameter Sentry save by moving the toggle switch on the right side of the MME towards the SAVE position, then pressing the Push Button. The SAVE light should momentarily light up. See Using the MME Parameter Sentry System for more detail.

21. Complete steps 8 through 10 above then continue. Once the following steps have been completed continue with 11 to 13 above.

22. Power on the control while holding ⬚. + ⬚- . This will again get you into the IPL screen.

23. Initiate a Parameter Sentry restore operation by moving the toggle switch on the right side of the MME towards the RESTORE position, then pressing the Push Button. The RESTORE light beside the toggle switch should momentarily light up.

24. Power off the control, then replace Option Jumper #2 on the MME.

(continue with step 6 to 11 as per above in this section)

Manual Installation Procedures for Fanuc® 11/12

Time Needed:	2 hours (approx.)
Tools Needed:	1 Philips Screwdriver
Components:	1 MME memory board
Controls:	Fanuc 11A, 11B and 12

Before starting the installation, power on the control and verify that the machine tool is in good working order.

Important!

Make sure that you have a current backup of the NC parameters, Tool Offsets, Pitch Error Compensation, and Part Programs. For instructions on downloading your control's information, refer to previous section entitled "Backup Your Control".

1. Inspect the Memex Memory Engine (MME) for any damage during shipping. Also check that the "CNC Type" jumpers have been set to either the Fanuc 11 or 12 (depending on control type).

Remove the Bubble memory

2. With the Fanuc control powered off and the Emergency Stop (E-STOP) button depressed, gain access to the main masterboard. Find the Bubble Memory Unit (BMU) board on the right-hand side of the masterboard, and carefully remove it with a Philips screw driver. Carefully place the BMU in the anti-static box supplied, and set it aside.

Install the MME memory.

3. Install the MME in the slot where the BMU was removed once again using the Philips screwdriver.

CAUTION!

4. With the ⎡7⎤ + ⎡9⎤ keys depressed on the front MDI panel, power on the control. **This action will cause the control to start-up and immediately clear the entire memory of the MME**. If the control will not power on at this point, check that the cabinet door interlock is bypassed. When the control powers on, it will eventually show the IPL Screen.

5. At the prompt, you will enter ⎡9⎤ ⎡9⎤ then ⎡INPUT⎤ . Use the input button to the right of the MDI keypad.

6. Press ⎡Y⎤ to initialize the system label.

7. Enter the number you wrote down from parameter 9000 on the parameter sheet, for the No. of Axes. Beginning with parameter 9100, enter the HEX value of each parameter for the option numbers that need to be entered. If you incorrectly enter a number at this point, you will have to press INPUT through the remaining Options, then go back and begin the process again.

8. When you reach the end press $\boxed{Y}$ to clear the files.

9. Go back to the IPL menu and press $\boxed{6}$ to End IPL. If you should get any alarm in the 900's, call our toll free tech support line.

10. Locate the Parameter Write Enable (PWE), parameter 8000 in the Settings (service) Screen, and change it to a 1 to enable PWE in MDI mode.

11. Now serially reload the remaining parameters or if need be re-enter these by hand from your parameter tape, list, or backup.

12. Once the NC parameters are reloaded, power off the control then power it on again. Turn on the PWE parameter again (8000), then press the NC/PC button and reload all of the PC parameters. When you are confident that all of the parameters are correct, turn off the power.

13. Power on the control and release the E-Stop. The control should start-up normally. Check the functionality of the machine at this point. Re-zero the axes, test the spindle, test the tool changing mechanism, check out any pallet changers and any peripherals.

14. Once the machine has been proven, now would be a good time to do a Parameter Sentry save. This will save a backup copy of all your critical machine parameters. Refer to the Using the parameter Sentry System sheet for more detailed instructions.

15. Now reload your Programs and Tool Offset data, your control should be fully operational, with the enhanced performance of the MME.

Installation Checklist for Fanuc® 11/12

- Check Machine - Power On - Check for Machine Problems Before You Start.

- Backup Parameters and Programs.

- Power Off.

- Depress E-STOP

- Mount MME.

- Power On the Control with $\boxed{7}$ + $\boxed{9}$ depressed, to erase MME.

- Enter $\boxed{9}$ $\boxed{9}$ in IPL menu.

- Enter the Number of axes and all of the Option data.

- Press $\boxed{6}$ to End IPL .

- Set PWE then restore the base Service Parameters.

- Reload the remaining NC Parameters.

- Power OFF then ON.

- Set PWE, then reload the PC Parameters. Add in any MACRO Variables, tool offsets or MACRO part programs if needed.

- Power OFF then ON.

- Check parameters and machine operation thoroughly.

- At this complete state, you can optionally save your parameters with the on-board Parameter Sentry System "save" feature.

- Complete.

Appendix

Technical Summary for Fanuc 6

PUNCHING:

Punch NC Parameters	-	EDIT mode, PARAM screen, key "P-9999", Punch
Punch Pitch Error Compensation	-	EDIT mode, PARAM screen, key "P-9998", Punch
Punch All Programs	-	EDIT mode, PGRM screen, key "O-9999", Punch
Tool Offsets	-	EDIT mode, OFSET screen, key "P-9999", Punch

READING:

Load NC Parameters	-	EDIT, E-Stop, PWE, PARAM screen, key "P-9999", Read
Load Pitch Error Compensation	-	EDIT, E-Stop, PWE, PARAM screen, key "P-9998", Read
Load All Programs	-	EDIT mode, PGRM screen, Mem. Protect Key, key "O-9999", Read

CLEARING:

Delete Directory and Programs	-	Power On holding "RESET" + "DELETE"
Delete Entire BMU	-	PWE enabled, Power On holding "0"+"DELETE"

Fanuc 6A

Masterboard: A20B-0007-0010   Software: 99x   Maximum Memory: 320 Meters

Parameter	Function		Description
2.5	1= punch	0=no punch	Punch Option Enable
7.7	1=LF,CR,CR	0=CR,LF	End of line on punch
9.1	1=ISO	0=EIA	Format (choose ISO)
24.0	1=2	0=1	Stop Bits
25	9600 = 1111 1111		Baud Rate for Serial Port
	4800 = 1110 1111		
	2400 = 1100 1111		
	1200 = 1100 1110		
	600 = 1100 1100		
	300 = 1000 1100		

Fanuc 6B (early version)

Masterboard:	A20B-0008-0410		
Software:	900 Level	Maximum Memory:	320 Meters (128k)
	901/06 or later		1280 Meters (512k)
	902/06 or later		1280 Meters (512k)

Parameter (.bit)	Function		Description
2.5	1= punch	0=no punch	Punch Option Enable
3.3	1=ISO	0=EIA	Format (choose ISO)
7.7	1=LF,CR,CR	0=CR,LF	End of line on punch
310-313.4	1=2	0=1	Stop Bits (leave at 0 - for standard Fanuc E-7-1)
310-313.5	1=Not Used	0=DC Codes	Software handshaking (leave at 0 for serial)
310-313.7	1=Tape Feed	0=No Feed	Punches tape feed at start of file (leave at 0)

Parameter	Function	Description
310-313.0-3	9600 = xxxx 1010	Baud Rate for Serial Port for Fanuc 6B
	4800 = xxxx 1001	
	2400 = xxxx 1000	
	1200 = xxxx 0111	
	600 = xxxx 0110	
	300 = xxxx 0101	
318.7	1=Not Editable 0=Editable	Protect 9000 series programs from editing
319.7	1=Not editable 0=Editable	Protect 8000 series programs from editing
340	2=Serial	Input Device Select
341	2=Serial	Output Device Select

Fanuc 6-B2 (or Fanuc 6B Level 2)

Masterboard: A16B-1000-0030
Software Versions:
(Power up in E-Stop to check software version)

320 Meters Memory Maximum	-Mxx	(06, 14, 15, 16, 21, 22, 25, 26, 27, 28, 30, 31, 33 Ver 06, 35, 40, 42, 44, 46, 81, 83 & 85)
1280 Meter Maximum	-Mxx	(01 to 05, 07 to 12, 33, 37, 39, 45, 1A to 1D, 47 to 7C, 87 to F3)

Standard Fanuc Serial Port: (DB-25 Female)

1 = Frame Ground	6 = Data Set Ready
2 = Transmit Data	7 = Signal Ground
3 = Receive Data	8 = Carrier Detect
4 = Ready To Send	20= Error (Data Terminal Ready)
5 = Clear To Send	25= +24 Volts

The usual software handshaking cable configuration has 2,3 & 7 connected through, with 4&5 jumpered (hardware handshake lines) and pins 6,8 & 20 jumpered on the Fanuc side only.

Bubble Memory Board Sizes (for all):

A87L-0001-0015	20 M	8 K
A87L-0001-0016	40 M	16 K
A87L-0001-0017	80 M	32 K
A87L-0001-0105	80 M	32 K
A87L-0001-0018	320 M	128 K
A87L-0001-0084	320 M	128 K
A87L-0001-0085	640 M	256 K
A87L-0001-0086	1280 M	512 K

Remember to check SETTING Screen Data. Tool Offsets can be downloaded but the G10/G11 option must be enabled (set parameter 3.1 to a 1) to reloaded them. They are loaded serially into program memory, then executed like a regular Part Program.

NOTE: Parameters are listed as "P" "number.bit" (e.g. P 2 bit 5 is P2=xx1x xxxx)

Technical Summary for Fanuc 11/12

PUNCHING:

Punch NC Parameters - EDIT mode, SERVICE screen, key PUNCH - ALL
Punch Pitch Error Compensation - EDIT mode, SERVICE screen, key PUNCH - PITCH
Punch All Programs - EDIT mode, PRGRM screen, key PUNCH - ALL
Tool Offsets - EDIT mode, OFFSET screen, key PUNCH - TOOL

READING:

Load NC Parameters - EDIT, E-Stop, PWE, PARAM screen, key READ - ALL
Load Pitch Error Compensation - EDIT, E-Stop, PWE, PARAM screen, key READ - PITCH
Load All Programs - EDIT mode, PGRM screen, Mem. Protect Key, key READ - ALL

CLEARING:

Delete Directory and Programs - EDIT mode, PRGRM screen, key DELETE - PROGRAM - ALL
Delete Entire BMU - PWE enabled, Power On holding "7" + "9"

Fanuc 11A

Masterboard: A20B-0007-0010 Software: 99x   Maximum Memory: 320 Metres

Parameter	Function		Description
0.2	1=Without	0=With	Parity Bit
0.3	1=LF	0=LF,CR,CR	End of line on punch
0.4	1=EIA	0=ISO	Punch Code Format (choose ISO)

See parameters 5111 and 5112 for STOP BITS and BAUD RATE information.

20	Input device interface number for foreground	
	0:	Tape Reader
	1:	RS-232-C interface 1
	2:	RS-232-C interface 2
	3:	RS-232-C interface 3
	10:	Remote (DNC)
	11:	20mA current type interface (ASR33, ASR44)
	13:	RS-422 interface

21   Output device interface number for foreground
(Same as 20 except no Tape Reader option)

22   Input device interface number for background
(Same as 20)

23   Output device interface number for background
(Same as 20 except no Tape Reader option)

5001   I/O device No. to be connected to RS232C interface 1
5002   I/O device No. to be connected to RS232C interface 2
5003   I/O device No. to be connected to RS232C interface 3
5011   I/O device No. to be connected to ASR33/44 interface
5013   I/O device No. to be connected to RS422 interface

5110   Specifications number of I/O device corresponding to device number 1

1:            Control codes (DC1 - DC4) are used and feed is punched
2:            Control codes (DC1 - DC4) are not used and feed is punched
3:            Control codes (DC1 - DC4) are used and feed is not punched **[Use This Setting]**
4:            Control codes (DC1 - DC4) are not used and feed is not punched
5:            Reserved
6:            PPR
7:            FANUC cassette

5111   Number of stop bits of I/O device corresponding to device number 1
        1:     1 Stop bit
        2:     2 Stop bits

5112   Baud rate of I/O device corresponding with device number 1

1:	50	7:	600
2:	100	8:	1200
3:	110	9:	2400
4:	150	10:	4800
5:	200	11:	9600

2201.0   Programs O9000 - O9999 (canned cycles) can
        0:     Be edited
        1:     Not be edited

11.0   Programs O8000 - O8888 can
        0:     Be edited
        1:     Not be edited

2200.3   When programs are loaded, M02, M30 and M99 should
        0:     Be assumed as program end
        1:     Not be assumed as program end. In this case a program number must exist in the first block of the program.

2200.6   When punching the program with external I/O device control (foreground editing only) [parameter 20 and 21],
        0:     Punch a single program
        1:     Punch all programs

Standard Fanuc Serial Port: (DB-25 Female)

1 =	Frame Ground	6 =	Data Set Ready
2 =	Transmit Data	7 =	Signal Ground
3 =	Receive Data	8 =	Carrier Detect
4 =	Ready To Send	20=	Data Terminal Ready
5 =	Clear To Send	25=	+24 Volts (DC)

The usual software handshaking cable configuration has lines 2, 3 & 7 connected through, with 4&5 optionally jumpered (hardware handshake lines) and pins 6, 8 & 20 jumpered on the Fanuc side only.

NOTE: Parameters are listed as "P" "number.bit" (e.g. P 2 bit 5 is P2=xx1x xxxx)

Fanuc Masterboard Serial Port: CD4 - RS-232 Honda 20 Pin Female – I/O Port 2

5 = ER1	16=CD	19=CTS
8=RD (TX)	17=SG	20=RTS
9=SD (RX)	18=DTR	14=+24VDC

Parameter Worksheet

Company:_____   Machine No.:_____   Date:_____

Fanuc 10 / 11 / 12 / 15   Software Version: _____   Masterboard No.:_____

Setting Screen (Handy Screen):
Record the settings only from the Handy Screen, separated by commas on the above line.

NC-Service Parameters

Par.#	Value	Par.#	Value	Par.#	Value	Par.#	Value	Par.#	Value
0		5001		5110		5130		5150	
3		5002		5111		5131		5151	
20		5003		5112		5132		5152	
21		5011		5120		5140			
22		5013		5121		5141		9000	
23				5122		5142			

Par.#	Op#	Value	Hex	Par.#	Op#	Value	Hex	Par.#	Op#	Value	Hex
9100	1			9116	17			9132	33		
9101	2			9117	18			9133	34		
9102	3			9118	19			9134	35		
9103	4			9119	20			9135	36		
9104	5			9120	21			9136	37		
9105	6			9121	22			9137	38		
9106	7			9122	23			9138	39		
9107	8			9123	24			9139	40		
9108	9			9124	25			9200	50		
9109	10			9125	26			9201	51		
9110	11			9126	27			9202	52		
9111	12			9127	28			9203	53		
9112	13			9128	29			9204	54		
9113	14			9129	30			9205	55		
9114	15			9130	31			9206	56		
9115	16			9131	32			9207	57		

Par.# = Parameter No. Op# = Option No. (To be entered from the I.P.L. screen.)

To convert the 9100 parameters to Hex, separate the left half of the parameter from the right half, look up the bit combination for each half on the following chart, and put the two back together to form the Hex value.
E.g. Param 9100 = 1101 0110 > becomes 1101 and 0110
                              or   D   6   > that then becomes D6 in hex!
New value for Param 9100 = D6.

```
0000 = 0     0100 = 4     1000 = 8     1100 = C
0001 = 1     0101 = 5     1001 = 9     1101 = D
0010 = 2     0110 = 6     1010 = A     1110 = E
0011 = 3     0111 = 7     1011 = B     1111 = F
```

Fanuc PC-Parameters Manual Backup

1. Timers				Spare		2. Counters			3. Keep Relays	
No.	Data	No.	Data	No.	Data	No.	Preset	Current	No.	Data
1		21				1			1	
2		22				2			2	
3		23				3			3	
4		24				4			4	
5		25				5			5	
6		26				6			6	
7		27				7			7	
8		28				8			8	
9		29				9			9	
10		30				10			10	
11		31				11			11	
12		32				12			12	
13		33				13			13	
14		34				14			14	
15		35				15			15	
16		36				16			16	
17		37				17			17	
18		38				18			18	
19		39				19				
20		40				20				

4. Data Tables

No.	Parameter	No. of Data	Offset	Special	Table No. 0
0	------------------		------------------	------------------	------------------
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

The remainder of the Data Tables can be written down on the following chart. Photocopy the chart as many times as you need to record the rest of the Data. Line 0 of the **No. of Data** column in the previous chart, will tell you how many tables there are. The remaining lines in the **No. of Data** column will tell you how many entries are in each table. **Page Down through each table, to record all the data on each.**

No.	Data	No.	Data	No.	Data	No.	Data.
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
0		0		0		0	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	

Specifications

Electrical:	Input Power Voltage:	5 VDC +/- 5%
	5V Power Consumption:	3.75 Watts (250 mA) Maximum (Excluding BMU)
	Battery Life:	Over 3,000 Discharge Cycles or 10 Years (Minimum)
	No-Power Data Retention:	1 Year @ 24 °C (Typical)
Physical:	Temperature (Operating):	-20 to +60 °C
	Temperature (Storage):	10 to 30 °C
	Humidity (Operating):	10 to 90% (non-condensing)
	Humidity (Storage):	10 to 60% (non-condensing)
	Dimensions:	5.3" L x 5.9" W
Processors:	MME:	20 MHz RISC Peripheral Controller
	HSL	32 Bit Motorola MC68340

HSL3 Mounted in a Fanuc 11 with BMI board connected

STANDARD ASCII TABLE

DEC.	HEX.	SYM.	DEC.	HEX.	SYM.	DEC.	HEX.	SYM.
0	00	NUL	43	2B	+	86	56	V
1	01	SOH	44	2C	,	87	57	W
2	02	STX	45	2D	-	88	58	X
3	03	ETX	46	2E	.	89	59	Y
4	04	EOT	47	2F	/	90	5A	Z
5	05	ENQ	48	30	0	91	5B	[
6	06	ACK	49	31	1	92	5C	\
7	07	BEL	50	32	2	93	5D	]
8	08	BS	51	33	3	94	5E	^
9	09	HT	52	34	4	95	5F	_
10	0A	LF	53	35	5	96	60	`
11	0B	VT	54	36	6	97	61	a
12	0C	FF	55	37	7	98	62	b
13	0D	CR	56	38	8	99	63	c
14	0E	SO	57	39	9	100	64	d
15	0F	SI	58	3A	:	101	65	e
16	10	DLE	59	3B	;	102	66	f
17	11	DC1	60	3C	<	103	67	g
18	12	DC2	61	3D	=	104	68	h
19	13	DC3	62	3E	>	105	69	I
20	14	DC4	63	3F	?	106	6A	j
21	15	NAK	64	40	@	107	6B	k
22	16	SYN	65	41	A	108	6C	l
23	17	ETB	66	42	B	109	6D	m
24	18	CAN	67	43	C	110	6E	n
25	19	EM	68	44	D	111	6F	o
26	1A	SUB	69	45	E	112	70	p
27	1B	ESC	70	46	F	113	71	q
28	1C	FS	71	47	G	114	72	r
29	1D	GS	72	48	H	115	73	s
30	1E	RS	73	49	I	116	74	t
31	1F	US	74	4A	J	117	75	u
32	20	SP	75	4B	K	118	76	v
33	21	!	76	4C	L	119	77	w
34	22	"	77	4D	M	120	78	x
35	23	#	78	4E	N	121	79	y
36	24	$	79	4F	O	122	7A	z
37	25	%	80	50	P	123	7B	{
38	26	&	80	51	Q	124	7C		
39	27	'	82	52	R	125	7D	}
40	28	(	83	53	S	126	7E	~
41	29	)	84	54	T	127	7F	Del *
42	2A	*	85	55	U			

Notes:

Memex Automation Inc.
200 – 3425 Harvester Rd.,
Burlington, Ontario
Canada L7N 3N1
Phone: 905-635-3040 Fax: 905-631-9640
www.memex.ca

support@memex.ca
(905) 635-3042

Thank you for using Memex products

File: /ISO9000/DOCS/M100700D - MME for Fanuc 6, 11, 12 Manual.doc