Correcting ATC Double-arm after stoppage
( VM/EV/QM/NB series with Fanuc 0i-MC)  ( updated Feb 2013)
( VMP series with New Fanuc 0i-MD..  Data in Red)
(QM-22 with 0i-MD .Data in Blue)

Situation …. When emergency stop button is pressed or power is cut during ATC operation.

- **Do Not** Power off or attempt to move Z axis or spindle orientation.

- Reset emergency stop condition to make machine ready. (Emergency stop out + Emergency Reset + NC reset)

Observe the condition of **ATC READY** light on main console … is it lit? Without “ATC Ready” on Tool change is not possible and this condition must be corrected.

Before ATC READY light can be on the following conditions must be met.

- Arm must be at home 0° point ( input **X4.4 =1, X0.0 = 1  X9.4=0**)
- Magazine Tool pot must be up ( input status **X9.7 =1, X0.5 = 1**)  
  (except for QM-22 series, down **X0.6 =1**)
- Air pressure must be normal ( input status **X0.2 =1, X1.3 = 1**)

For VMP-30 and QM-22 that does not need manual reference return after power on … 
Skip the following steps and go to STEP #5

H:\HS FEELER\Service Notes\Vertical Machining Center\ATC\ATC Rescue Fanuc 0i controller.doc
After emergency stop the machine will normally require manual reference point return (home) before any function can be executed by MDI, but under the condition when ATC READY light is not lit it also becomes impossible to perform zero return.

The solution is to temporarily change Keep Relay K00 Bit #2 which will then enable the maintenance M codes to be executed without prior reference point return.

If machine has Rotary Table then need to also change Keep Relay K00 Bit #1, see note next page.

The procedure is as follows:-

1. Select MDI mode and write key to “Unprotect” position. Press OFF/SET key then SETTING soft key to display SETTING (Handy) page. Key in “1” for parameter write enable. Alarm #100, “Parameter write enable” alarm will occur which is normal under this condition.

2. 0i-MC controller … from SYSTEM menu select PMC soft key then PMCPRM then KEEPRL to display the following screen. Please write down the values of all data in the address K00 in case of confusion … EG “K00= 11001010” With the address K00 highlighted cursor across so Bit 2 (third from the right end) is highlighted. Change this from a “0” to “1” (K0.2=1) i.e. Key in “1” INPUT key

0i-MD controller … from SYSTEM, press the “+” soft key 4 times then the soft key KEEP RELAY
0i-MC Keep Relay screen
0i-MD PMC Maintenance (Keep Relay screen)

**Note:** if m/c has 4th axis rotary table it is also needed to change K0.1 from “1” to “0” to disable the need for rotary axis to be reference before MDI operation is possible.

3. Return to SETTING page and return Parameter Write Enable to “0” then press **RESET** to clear alarm.
   Now M95 and other M codes can be commanded and executed under MDI mode.

4. From here on refer to the instructions in the **FEELER ATC TROUBLESHOOTING** manual for various scenarios. Basically it’s as follows.

5. Switch to **MDI** mode and **“PROGRAM (MDI)”** screen, clear buffer memory and key in **M95, EOB, INSERT KEY**, then execute by pressing **CYCLE START**. Message will be displayed, “2010 SPINDLE TOOL NOT UNCLAMP” or “ARM STOP SENSOR ALARM” the F0 button on operators panel may now be flashing.

6. Reset, clear buffer memory and key in **M73, EOB, INSERT KEY** and execute. The tool will unclamp and the message **2020 ARM TROUBLESHOOTING** or **EX 1803** will be displayed on screen, the F0 button will now be active and flashing.

7. Press the F0 button (if not flashing execute M95 again as the arm jogging action of the F0 button only works when button is flashing) several times to jog double arm to the end of it’s current motion. When double arm has ascended and put the tool up into the spindle the message will appear “2011 SPINDLE TOOL NOT CLAMPED”

8. Key in **M75, EOB, INSERT KEY** and execute to clamp tool in spindle.

9. Press the F0 button several times again (execute M95 again if not flashing) to jog the Double-Arm back to it’s origin position. When arm arrives at it’s Origin
position (home) the F0 button will no longer be flashing. A message will appear “CHECK SPINDLE TOOL & STANDBY TOOL”

10. Key in **M77, EOB, INSERT KEY** and execute to put magazine pot up, The **ATC READY** led on panel should now be **ON** …

11. **IMPORTANT** …After problem solved be sure to set Keep Relay back to original settings (K0.2=0) … also K0.1 back to “1”

12. Reload the correct tool back into the spindle and check other tool location is correct look in PMC PARAMETER (Data table).
   For 0i-MC with 5 function keys ….. press **SYSTEM Menu key, PMC soft key, PMCPRM, then DATA**. The Address column is the magazine pot number and the Data is the Tool Number, D0000 is the spindle Tool No. Make sure data is correct.

   For 0i-MD with 10 function keys ….. press **SYSTEM menu key, “+” soft key 3 times, PMC MA INTE soft key , then finally DATA soft key.**
   For 0i-MD with 5 function keys ….. press **SYSTEM menu key, “+” soft key 3 times, PMC MNT soft key , then DATA soft key. Then with D0000 highlighted press (OPRT) then ZOOM softkeys

<table>
<thead>
<tr>
<th>NO. ADDRESS</th>
<th>DATA</th>
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<tbody>
<tr>
<td>0 D0000</td>
<td>2</td>
</tr>
<tr>
<td>1 D0001</td>
<td>25</td>
</tr>
<tr>
<td>2 D0002</td>
<td>5</td>
</tr>
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<td>3 D0003</td>
<td>22</td>
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<td>10 D0010</td>
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</tr>
<tr>
<td>11 D0011</td>
<td>1</td>
</tr>
</tbody>
</table>

***** Caution:- Be careful and do not change any other data, ask if not sure. *****
How to check INPUT signal status on Diagnosis Status display screen

For 0i-MC Press SYSTEM key, PMC soft key, PMC DGN, STATUS, then key in address (ex X4.4) and then press SEARCH soft key.

X4.4 Arm Home point (ARM0 = 1) (X0.0 = 1) (X9.4 = 0)
X8.3 Arm Stop point (ARMSP = 1) (X0.2 = 1) (X9.5 = 1)
X9.7 Pot up (X0.5 = 1) (X = 1)

For 0i-MD press SYSTEM menu key, then the “+” soft key 3 times, then PMC MAINTE (PMC MNT) to display the status screen
Then key in address Eg (“X0.0”) and then press SEARCH soft key.

Note:- If double arm has tools in the gripper and has stopped in the down position with tools clearly out from the spindle taper then it is safer to remove tools from arm before proceeding. To do this compress the locking pin on the arm and the gripper will then be unlocked and tool can be removed by hand from the gripper claw.

When all else seems to fail… Turn by hand

This method of recovery is possible when the above procedure will or can not be used, in some unusual stoppages it maybe the only way of recovery but needs care to avoid damage.
It is possible to operate the ATC double arm cam by manually rotating the motor that drives the cam unit.
Be very careful, have another person at the front of the machine to observe and confirm what is happening and which way the arm is going. Incorrect operation of forcing may bend or damage the ATC double arm leading to more trouble and expense.

On top of the machine you can access the motor for the ATC cam drive unit, releasing the motor brake lever wind the motor shaft around by hand with a small spanner. (12mm)
The normal direction of automatic rotation is **ANTI-CLOCKWISE** when looking down on the motor from the top. It is OK to wind backwards for short distance should you need to reverse back out away from the stopped position. (like when arm has stopped between home and 60 degree position.)
Do not under any circumstances use force and stop immediately if any resistance it felt.
To confirm when arm is back to origin position the ATC ready light on control will be lit and when looking in the window of the ATC cam and the two outer of the sensors will be on, or better still check Inputs from these on Diagnosis Status display as described earlier.

**Other related information**

1… Z axis ATC position is preformed at “2nd Reference point” commanded as
   G91 G30 Z0 M19; G30 X0 Y0

2… The value of this is set by parameter #1241 Ref Point #2
   e.g. –14.900mm  Record this value for future use.

3… Correct magazine pot call if out of relationship.   Manually rotate magazine so that **POT#1 comes to standby position** and command **M70** which will reset so that waiting is pot is set to “1”. M70 does not alter “Tool to Pot” relationship, it just sets pot 1 as pot at standby position.

4… Spindle Clamping LS signal are **X2.0 (X1.1) (X0.3)** & unclamping is **X2.1 (X1.2) (X0.4)**

5… Pot Up and Down LS signal is up **X9.6 (X1.5) (X0.5)** & down is **X9.7 (X1.4) (X0.6)**

6… Keep Relay K00 Bit #2 …..Enable M codes to be executed **without** prior reference point return.
   0 = Can not execute without reference return first (normal setting)
   1 = Can execute M code without reference return (for trouble shooting only)

7… Keep Relay K00 Bit #0 ….Whether to move axis by job feed when ATC READY lamp is not on
   0 = Can not move (normal setting)
   1 = Can be moved (for trouble shooting only)

8… Keep Relay K02 Bit #1 ….Whether to move Z axis or not when ATC is not at 0º position.
   0 = Can not move (normal setting)
   1 = Can be moved (for trouble shooting)

9… Keep Relay K02 Bit #2 ….Whether to make spindle orientation when arm is not at 0º position.
   0 = Can not do it (normal setting)
   1 = Can do it (for trouble shooting)