SMALL CHAMFER GRINDER
MODEL 8-99

Chapter 1 Section 1
Set up and operation

1. Installation of the proper size collet.

This machine used a 5-C style collet. This can be changed by loosening of he set screw located just in front of the main air cylinder at the back of the workhead. This screw pushes a spring loaded pin down ;into a slot in the collet tube. Care must be taken not to over tighten the screw as it may damage the spring or pin. After loosening the set screw, the knurled knob on the very back of the closer will turn counterclockwise to remove the collet. Reverse the procedure to install a new collet of the desired size. When adjusting the collet, tighten the knurled knob by hand with a blank in the collet until the blank is snug, then back off the knob two or three clicks. The blank should have a little clearance to enhance loading.

2. Run out adjustment

The nose piece in the workhead is supported by 3 screws positioned radially about the spindle centerline. They can be adjusted through an access hole in the belt guard. With the collet closer closed on a blank, one can, with the use of an indicator, remove all of the run-out from the blank by adjusting the three screws.

3. Angular adjustment for the desired point angle.

The grinding wheel slide is mounted so that it moves 45 degrees in relation to the workhead axis rotation, when the machine is at 0 degrees. This is the normal setting for chamfering blanks.

4. Installation of loader bushing

This machine is designed so that the loader system is always in line with the bore in the collet. There are adjustments both up and down movement by an adjustable gib Screws are provided at each end of table to secure subtable. and also the component under the loader gib is slotted and keyed so it can be adjusted front to back. To install a different size bushing, just loosen the clamp screw on the front of the loader bushing support, slide the bushing out

and install the desired one in its place. Do not over tighten the clamp screw as it will restrict the clearance on the bushing bore. It must be tight enough to hold the bushing in place. If the loader system gets out of alignment, a good way to readjust it is to clamp a blank in the collet, then shut off the air supply, and push the loader slide up to the blank in the collet. By using another blank of the same size, one can easily see how far it is off and using the adjustments above, realign the loader system. The blanks should align perfectly when the adjustments are complete.

5. Automatic Hopper unit.

The hopper unit is of a straight thru design that does not require slot blocks as did the previous units. It has a slide adjustment that moves up and down to accommodate the various diameters. To adjust it , move it up slowly while trying to slide a blank under the fence that feeds the blanks into the popper section. There should be some free play between the blank and the fence, but not so much as the blanks can double up. There is also an adjustment that needs to be made on the lift popper assembly. The lifting popper must be in the middle of the last blank in order to push it up. The lifting popper unit is fixed, so one needs to move the front gate forward or back such that the blank is central to the lifting popper when it is against the back side of the gate.

Next, move the back plate forward or back so only one blank can be pushed up. Do not move the fence itself or it will cause problems at its back end where it needs to be close to the sweeper. The sweeper is moved by another air cylinder and has an adjustment on the rear of the cylinder to control its stroke length. There is a clamp that can be loosened and the sweep changed if it would be necessary. There are also flow controls provided on both the popper and sweeper to control their respective speeds. They are located on the air cylinders.

6. Ejector and back stop system

- **This machine uses a backstop/ejector cylinder that is mounted inside of the collet tube and extends out the back of the collet closer. It is moved back and forth by means of a split clamping arrangement on the rear of the collet closer. It serves three purposes.**

- **It ejects the blanks when they are finished. This function needs no mechanical adjustments, however the function needs timed with the swing arm to work properly. This is accomplished with flow control valves both on the swing arm and the ejector cylinder. The flow control valve on the ejector cylinder is turned in to slow it down, and the flow control on the front of the swing arm cylinder is turned in to slow it down. These need to be adjusted together to obtain the proper coordination between the two. There is a pusher end on the front of the piston rod assembly that comes in different sizes. The pusher end piece must be of smaller diameter than the blank that the machine is being set up for. It can be changed by removing the ejector/backstop cylinder from the rear of the collet closer.**

7. Frontstopping: This feature is the normal use of the function when chamfering blanks of varying lengths. During the loading cycle, the backstop cylinder extends at low pressure and keeps a pressure against the blank to keep it from being pushed too deep into the collet. The point of stopping is being controlled by the pusher cylinder's maximum stroke.
One must take care to insure that the adjustment of the ejector cylinder is back far enough so that the ejector cylinder does not bottom out before the loader cylinder reaches its full stroke.

8. Backstopping: This feature is used if one wishes to keep all of the blanks at uniform overall length. To set this feature up, Put the machine in manual operation. Load a blank with the loader function, close the collet,

then loosen the 2 clamp screws that hold the ejector cylinder and push it forward by hand until you see it push the loader rod back about 1/8 of an inch, clamp down the 2 screws on the ejector cylinder. Check then to see if the indicator light on the loader prox switch is on. If not, then adjust the switch back until the light is on. (NOTE) If the blanks are still inconsistent on the overall length, sometimes the switch is acting to quick and you need to add more dwell time to the collet delay timer.

9. Automatic rest assembly

This unit is necessary to keep chatter from developing in the diamond wheel for smaller blanks. Its use for blanks above ¼" in diameter is not necessary. Its air pressure is normally set about 8 to 10 pounds. The pressure control is located on the back of the rest cylinder.The sensor switch for this unit is mounted on top of the cylinder and is there to detect if a blank is present. If the cylinder extends too far, the switch will interrupt the cycle. The switch must be on for the machine to run. If the wear pad gets worn too much, the switch will detect this condition and will stop the cycle. Sometimes it might become necessary to move it forward a small amount if it gets out of operating range.

10. The Grinder head assembly.

This machine is equipped with a direct drive spindle that needs no attention for its life. It is fitted with a 6" by 1/2 by 1 1/4" diamond wheel. The wheel will form its own wear angle after some use and maintain it until it is used up. A small 45 degree lead angle is sometimes used on the front of the wheel to break the sharp edge so that the wheel edge won't chip. The wheel adapter and spindle both have right hand threads. The wheel rotation should be checked after installation to insure that the wheel is turning CCW as viewed from the end. There is a speed control adjustment for the feed stroke . This is located on the main table and is adjusted by the brass nut on the end of the cylinder. There is also an adjustment screw in front of it that can be moved to control the start of the feed stroke. The stroke length is controlled by a prox switch on the back of the table. It is triggered by a target that can be moved fore or aft. As required.

11. Lubrication and other maintenance requirements.

The machine is equipped with a central lubrication system that should be operated about once a day. The receiver should be filled with high quality lubricating oil as required. Note. If industrial oil can not be obtained easily, use 30 weight engine oil. The machine should be cleaned frequently and all ground powder removed, especially around the loader bellows and the loader slide system.

CHAMFER

Version 2

By

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Chapter 2 : GENERAL INFORMATION

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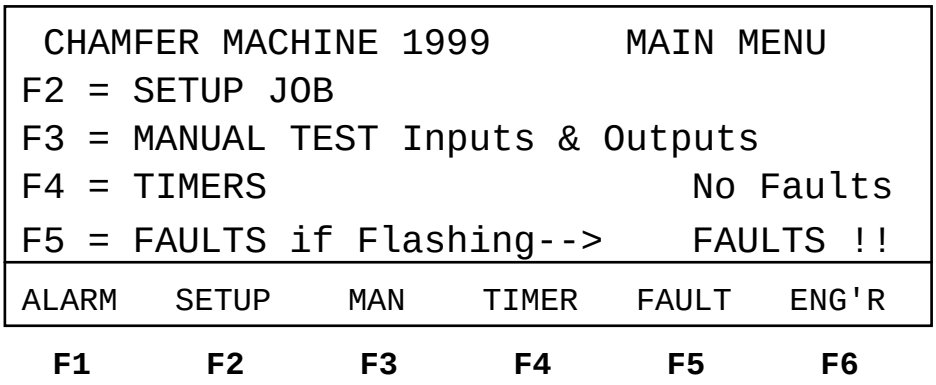
Screen #1, Main Menu



This is the **Main Menu** Screen for the **CHAMFER** Machine. When the machine is powered up either by choice or power failure, the "**FAULTS!**" prompt will be flashing. The Operator then needs to press the **'FAULT' Button** (F5) and follow the prompts from the FAULT Screen. When ALL Faults have been solved, the Operator will return back to this Screen. The "FAULTS!" prompt will be gone and "**No Faults**" prompt will be seen.

Next the Operator will be able to select:

F1 ALARM - Press this key to clear any Input Over-Limits Value made by Operator.

F2 SETUP – Press this key to setup the job and then select Hand, Single, or Auto cycle. (Seepage 3-2)

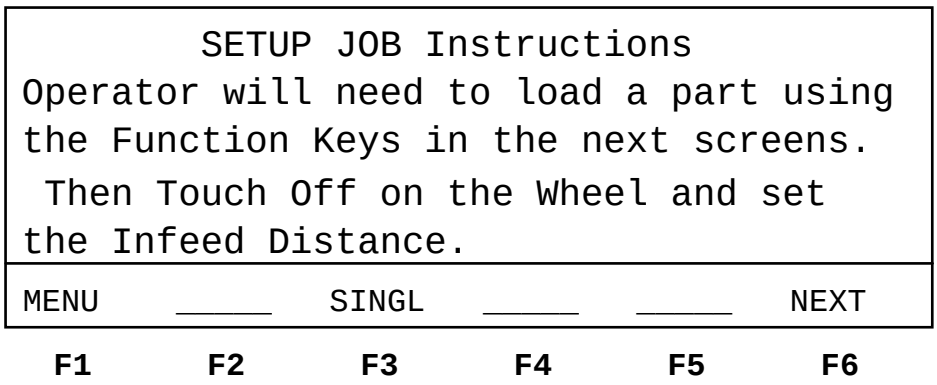
F3 MAN – Press this key for MANUAL OUTPUTS & JOG. (Seepage 3-13)

F4 TIMER – Press this key to access the timers section. (Seepage 3-19)

F5 FAULT - Press this key to view and clear any FAULTS if the red pilot lamp is flashing. (Seepage 3-22)

F6 ENG'R - Press this key for the Special Engineering Setup section. (Seepage 4-1)

Screen #2, Setup Job Instructions



F1 MENU - Press this key to return to the Main Menu. (Seepage 3-1)

F2 Key not used.

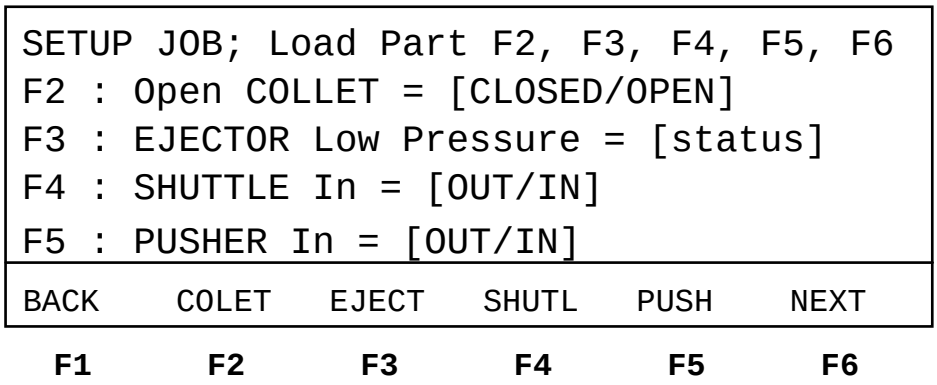
F3 SINGL - Press this key to go to the Single Cycle screen #10 and skip the axis setup screens. Use this key if running the same job. (Seepage 3-11)

F4 Key not used.

F5 Key not used.

F6 NEXT – Press this key to go to the “Setup Job” screens for a new tool setup. (Seepage 3-3)

Screen #3, Setup, Load Part



The first setup job procedure is loading the part.

F1 MENU2 - Press this key to return to the Operator Setup Routines menu. (Seepage 3-2)

F2 COLET – Press this key to open the Collet. The status will show the electrical output of either “Open” or “Closed”.

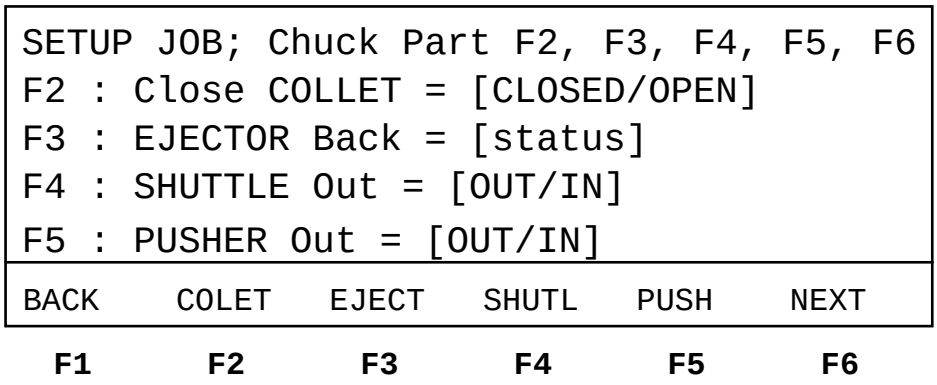
F3 EJECT – Press this key to move the Ejector forward at low pressure to buck the tool to be loaded. The status will show the electrical output of either “Back Low” or “Forward Low”.

F4 SHUTL – Press this key to move the Shuttle in toward the work head. The status will show the electrical output of either “OUT” or “IN”.

F5 PUSH – Press this key to push the part into the collet. The part popper drops down and Hopper shaker moves with the pusher air system. The status will show the electrical output of either “OUT” or “IN”.

F6 NEXT – Press this key for the next setup screen. (Seepage 3-4)

Screen #4, Setup, Chuck Part



The second setup job procedure is chucking the part.

F1 BACK - Press this key to go back to the first Setup Job routine screen. (Seepage 3-3)

F2 COLET – Press this key to close the Collet on the loaded part. The status will show the electrical output of either “Open” or “Closed”.

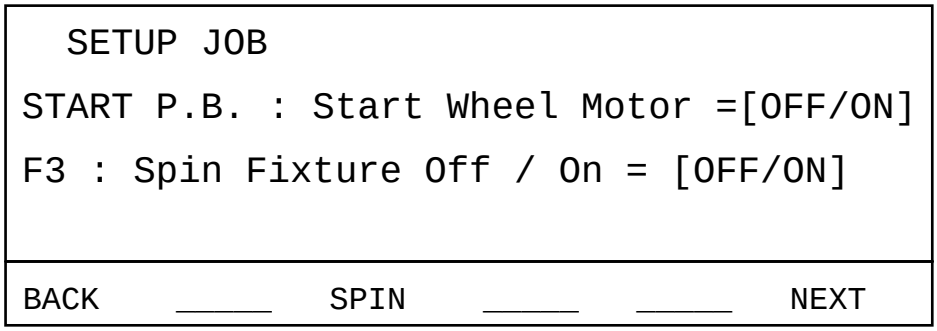
F3 EJECT – Press this key to move the Ejector back at low pressure. This turns the ejector off. The status will show the electrical output of either “Back Low” or “Forward Low”.

F4 SHUTL – Press this key to move the Shuttle out from the work head. The status will show the electrical output of either “OUT” or “IN”.

F5 PUSH – Press this key to move the Pusher out. The part popper moves up and Hopper shaker moves with the pusher air system. The status will show the electrical output of either “OUT” or “IN”.

F6 NEXT – Press this key for the next setup screen. (Seepage 3-5)

Screen #5, Setup, Wheel & Spin



The third setup job procedure is chucking the part.

F1 BACK - Press this key to go back to the second Setup Job routine screen. (Seepage 3-4)

F2 Key not used.

“Start PB” - Use the “Green Push Button” to turn on the Wheel motor.

Note: the “Red Push Button” will turn off the Wheel motor.

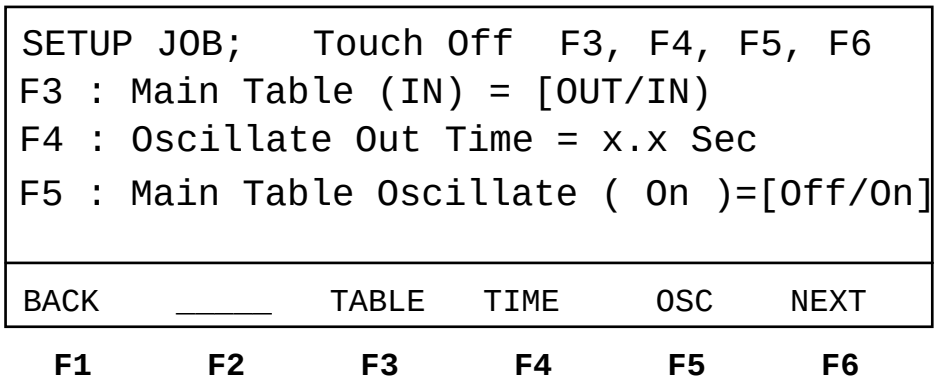
F3 SPIN - Press this key to turn “ON” the work head.

F4 Key not used.

F5 Key not used.

F6 NEXT – Press this key for the next setup screen. (Seepage 3-6)

Screen #6, Setup, Touch off Wheel



The forth setup job procedure is setting the main table for touching of the part.

F1 BACK - Press this key to go back to the third Setup Job routine screen. (Seepage 3-5)

F2 Not used.

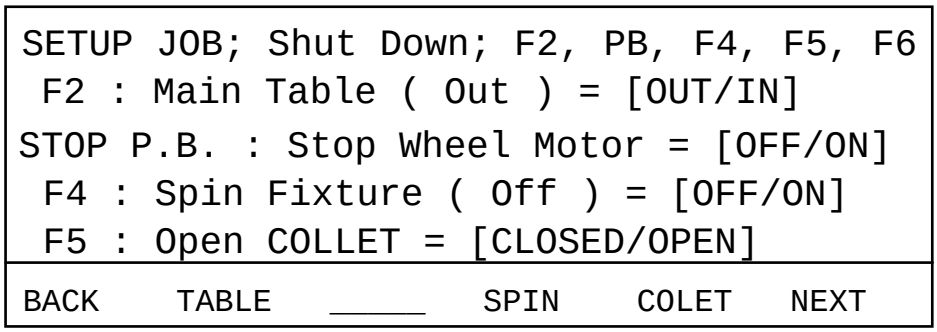
F3 TABLE – Press this key to move the Main Table “IN”.

F4 TIME – Press this key to enter the needed time to adjust the desired Main Table oscillation width. The time range is 0.1 seconds to 2.0 seconds.

F5 OSC – Press this key to latch the table oscillation movement. The main table will move to the end limit and then oscillate out from the end limit and the forward to the end limit. This is used to set the stroke of the main table in relation to the tool and to allow the cross axis to touch off on the higher wheel crest for the proper touch setting.

F6 NEXT – Press this key for the next setup screen. (Seepage 3-7)

Screen #7, Setup Job, Shut down



The fifth setup job procedure is shutting down the motors and releasing the part from the collet.

F1 BACK - Press this key to go back to the fourth Setup Job routine screen. (Seepage 3-6)

F2 TABLE – Press this key to move the Main Table “OUT”.

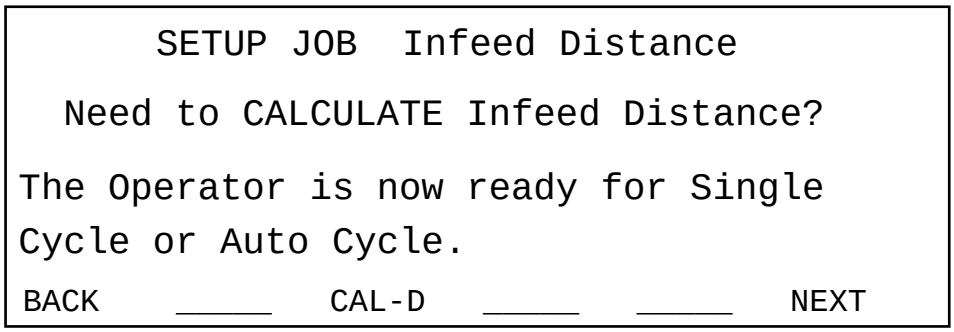
“Stop PB” - Use the “Red Push Button” to turn off the Wheel motor.

F4 SPIN - Press this key to turn “OFF” the work head.

F2 COLET – Press this key to open the Collet on the touched off part. The status will show the electrical output of either “Open” or “Closed”.

F6 NEXT – Press this key for the next setup screen. (Seepage 3-8)

Screen #8, Setup Infeed distance Cross axis



The sixth setup job procedure is entering the needed “Infeed” distance.

F1 BACK - Press this key to go back to the fifth Setup Job routine screen. (Seepage 3-7)

F2 Key not used.

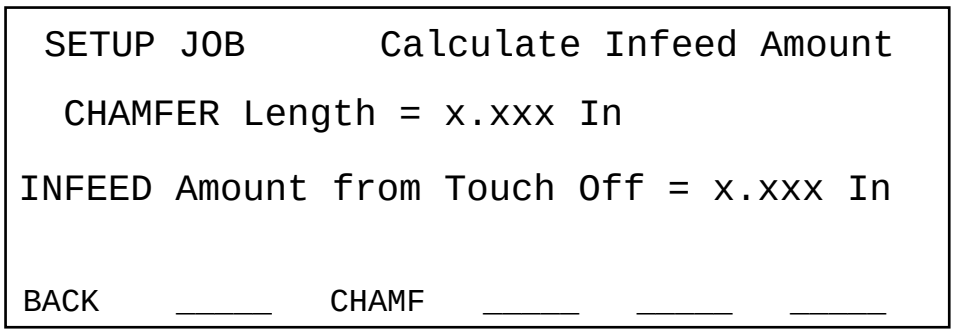
F3 CAL-D – Press this key for the screen to calculate the “Infeed” distance to move the Cross axis. (Seepage 3-9)

F3 Key not used.

F5 Key not used.

F6 NEXT – Press this key for the next setup screen. (Seepage 3-10)

Screen #26, Calculate Infeed distance



F1 BACK - Press this key to go back to the sixth Setup Job routine screen. (Seepage 3-8)

F2 Key not used.

F3 CHAMF - Press this key to enter the Chamfer length.

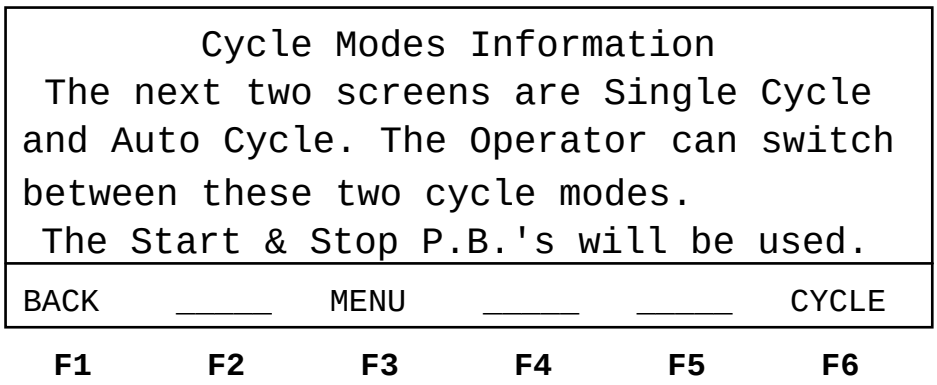
The PLC will calculate the Infeed distance to move the Cross axis from the Touch off position.

F4 Key not used.

F5 Key not used.

F6 Key not used.

Screen #9, Cycle Modes Information



F1 BACK - Press this key to go back to the sixth Setup Job routine screen. (Seepage 3-8)

F2 Key not used.

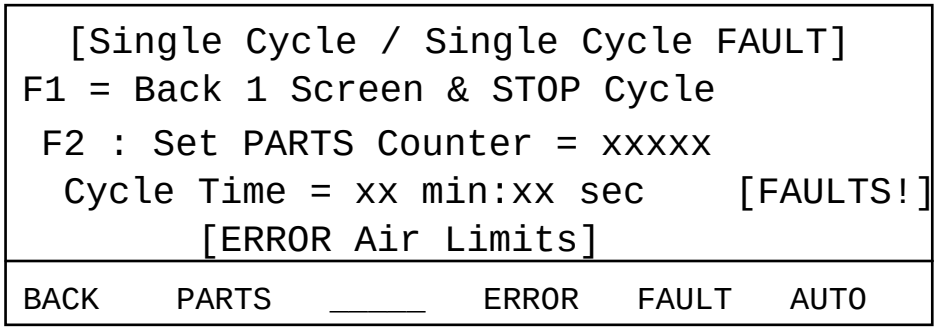
F3 MENU - Press this key to go directly to the Main Menu (screen 1). (Seepage 3-1)

F4 Key not used.

F5 Key not used.

F6 CYCLE - Press this key to go to the “Single Cycle” screen. (Seepage 3-11)

Screen #10, Single Cycle



F1 BACK – Press this key to go back to the Select modes of operation screens and to “Stop Cycle”. (Seepage 3-10)

“Stop PB” - Use the “Red Push Button” to stop the “Single” cycle.

“Start PB” - Use the “Green Push Button” to start the “Single” cycle.

F2 PARTS – Press this key to modify the parts counter to maintain the correct inventory count. The count could be incorrect if rejected parts have been run. Use this counter to track the parts for the job running.

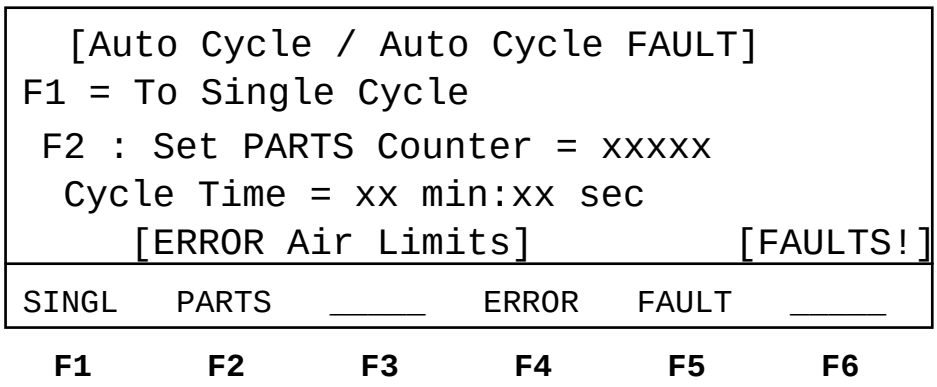
F3 Key not used.

F4 ERROR - Press this key if “Air Limit Errors” is flashing.

F5 FAULT – Press this key if “Faults!” is flashing to go to the faults section to find the problem.

F6 AUTO – Press this key to go to auto cycle. (Seepage 3-12)

Screen #11, Auto Cycle



F1 SINGL – Press this key to go to auto cycle. (Seepage 3-11)

F2 PARTS – Press this key to modify the parts counter to maintain the correct inventory count. The count could be incorrect if rejected parts have been run. Use this counter to track the parts for the job running.

"Stop PB" - Use the "Red Push Button" to stop the "Auto" cycle.

"Start PB" - Use the "Green Push Button" to start the "Auto" cycle.

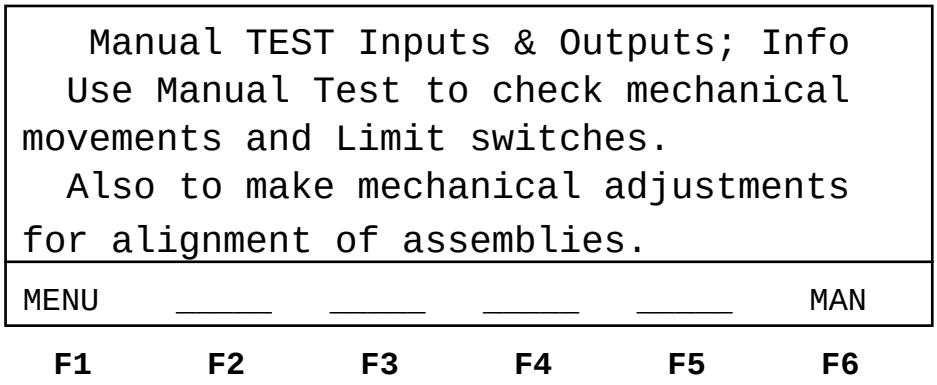
F3 Key not used.

F4 ERROR - Press this key if "Air Limit Errors" is flashing.

F5 FAULT – Press this key if "Faults!" is flashing to go to the faults section to find the problem.

F6 Key not used.

Screen #12, Manual Test Inputs & Outputs Information



F1 BACK - Press this key to go back to Main Menu. (Seepage 3-1)

F2 Key not used.

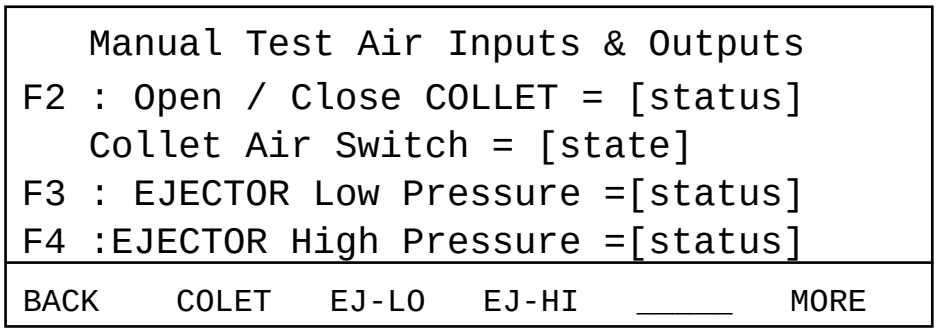
F3 Key not used.

F4 Key not used.

F5 Key not used.

F6 MAN – Press this key to go to the Manual mode and Test menu screen. (Seepage 3-14)

Screen #13, Manual Test Air Outputs #1



F1 BACK – Press this key to go back to the “Manual Test” Information screen. (Seepage 3-13)

F2 COLET – Press this key to close the Collet on the loaded part. The status will show the electrical output of either “Open” or “Closed”. *“Collet Air Switch” state will be “Open” or Closed”.* The status of each must match or the switch could be faulty.

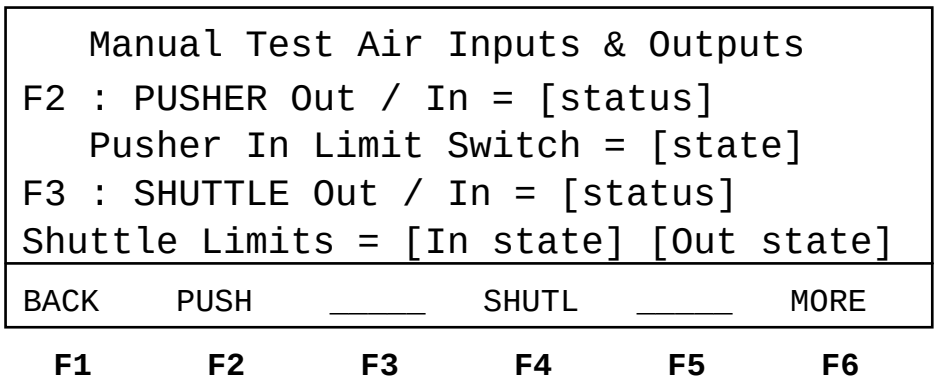
F3 EJ-LO – Press this key to move the Ejector back or forward at low pressure. The status will show the electrical output of either “Back Low” or “Forward Low”.

F3 EJ-HI – Press this key to move the Ejector back or forward at high pressure. The status will show the electrical output of either “Back Low” or “Forward HI”.

F5 Key not used.

F6 MORE - Press this key for more air operated screens. (Seepage 3-15)

Screen #14, Manual Test Air Outputs#2



F1 BACK - Press this key to back 1 screen in the “Manual Test Air Inputs and Outputs”. (Seepage 3-14)

F5 PUSH – Press this key to move the Pusher “Out” or “In”. The part popper and Hopper shaker moves with the pusher air system. The status will show the electrical output of either “OUT” or “IN”. *The “Pusher In Limit Switch” will display “Not In” or “IN”.*

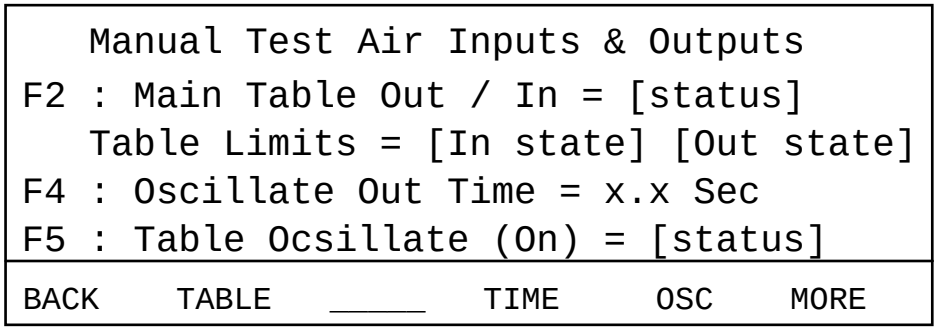
F3 Key not used.

F4 SHUTL – Press this key to move the Shuttle in toward the work head. The status will show the electrical output of either “OUT” or “IN”. *The “Shuttle Limits” will display “Not In” or “IN” and “Not Out” or “OUT”.*

F5 Key not used.

F6 MORE - Press this key for more air operated screens. (Seepage 3-16)

Screen #15, Manual Test Air Outputs #3



F1 BACK - Press this key to back 1 screen in the manual test air inputs and outputs. (Seepage 3-15)

F3 TABLE – Press this key to move the Main Table “IN” or “OUT”. *The “Table Limits” will display “Not In” or “IN” and “Not Out” or “OUT”.* If the table oscillation is active, pressing this key will stop the oscillation and make the table go back.

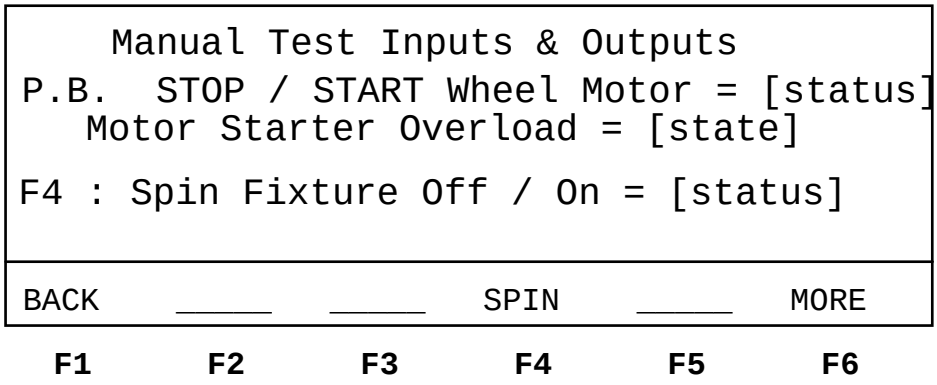
F3 Key not used.

F5 TIME – Press this key to enter the needed time to adjust the desired Main Table oscillation width. The time range is 0.1 seconds to 2.0 seconds.

F4 OSC – Press this key to latch the table oscillation movement. The main table will move to the end limit and then oscillate out from the end limit and the forward to the end limit.

F6 MORE - Press this key for more air operated screens. (Seepage 3-17)

Screen #16, Manual Test Ac & Dc Motors



F1 BACK – Press this key to go back to the “Manual Test” menu screen. (Seepage 3-16)

F2 Key not used.

F3 Key not used.

“Stop PB” - Use the “Red Push Button” to turn off the Wheel motor.

“Start PB” - Use the “Green Push Button” to turn on the Wheel motor.

The status of the Wheel Motor will display either “OFF” or “ON”.

The state of the Motor Starter Overload relay will display either “OK” or “Tripped”.

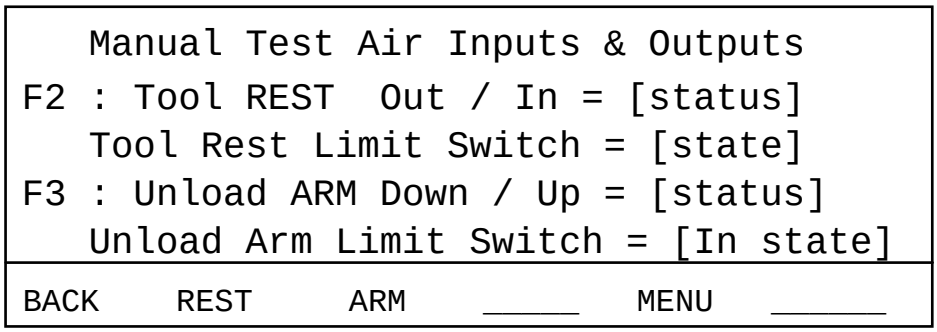
F3 SPIN - Press this key to turn “ON” the work head.

The status of the Spin Fixture will display either “OFF” or “ON”.

F5 Key not used.

F6 MORE - Press this key for more air operated screens. (Seepage 3-18)

Screen #17, Manual Test Air Outputs #3



F1 BACK - Press this key to back 1 screen in the manual test air inputs and outputs. (Seepage 3-17)

F2 REST - Press this key to move the Tool Rest “Out” or “In”. *The “Tool Rest Limit Switch” displays either “Not In” or “IN”.*

Important: 1) The tool rest stroke limiting adjustment needs to be set not to allow the tool rest to pass over the centerline of the part. 2) The tool rest Limit Switch needs to be adjusted to go off if the stroke goes pasted the part surface area. This will trip the lost tool internal logic.

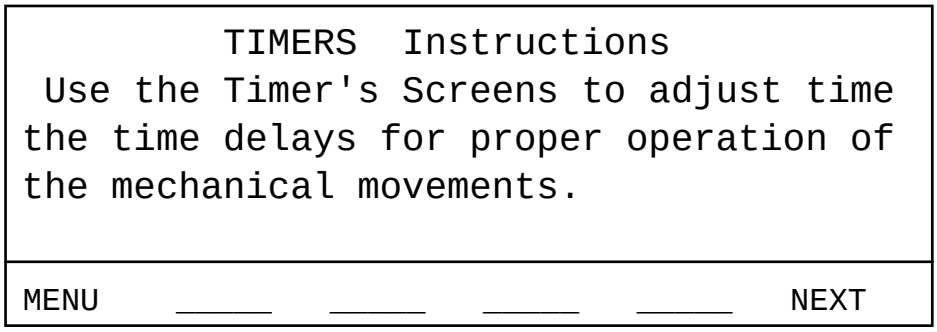
F3 ARM - Press this key to move the Unloader arm “Up” or “Down”. *The “Unload Arm Limit Switch” displays either “Not Down” or “Down”.*

F4 Key not used.

F5 MENU - Press this key to back to the Main menu. (Seepage 3-1)

F6 Key not used.

Screen #18, Dwell Timers Instructions



F1 MENU - Press this key to go back to the Main Menu. (Seepage 3-1)

F2 Key not used.

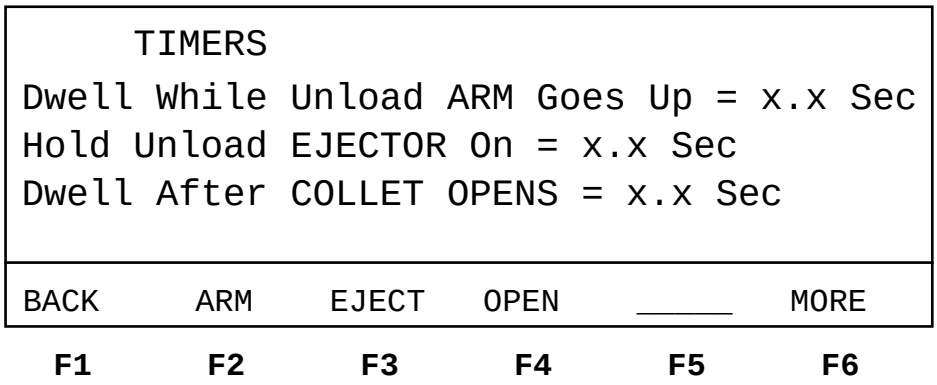
F3 Key not used.

F4 Key not used.

F5 Key not used.

F6 NEXT – Press this key to go to the first set of screens for the dwell timers. (Seepage 3-20)

Screen #19, Dwell Timers 1



F1 BACK – Press this key to go back to the timers' menu screen. (Seepage 3-19)

F2 ARM - Press this key to enter the needed time dwell to allow the Unload arm to reach it's up position before the sequence continues. *This time is dependent on the flow controls and air pressure.* Suggested values are 0.5 seconds to 1.0 second.

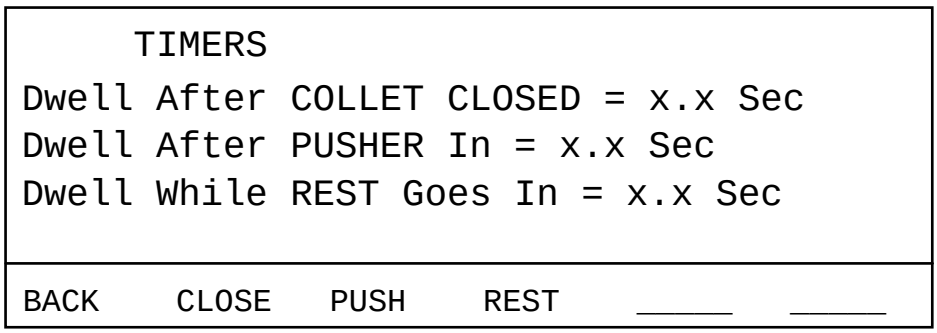
F3 EJECT – Press this key to enter the needed time dwell to allow the Unload Ejector to eject to part before the arm goes down. *This time is dependent on the flow controls and air pressure.* Suggested values are 1.5 seconds to 3.0 seconds.

F4 OPEN - Press this key to enter the needed time dwell to allow the Collet to open before the Ejector High pressure ejects the part. Suggested values are 0.3 seconds to 0.5 seconds.

F5 Key not used.

F6 MORE – Press this key to go to the next set of screens for the dwell timers. (Seepage 3-21)

Screen #20, Dwell Timers 2



F1 BACK – Press this key to go back 1 screen. (Seepage 3-20)

F2 CLOSE - Press this key to enter the needed time dwell to allow the Collet to close on the part before the shuttle pulls out. Suggested values are 0.3 seconds to 0.5 seconds.

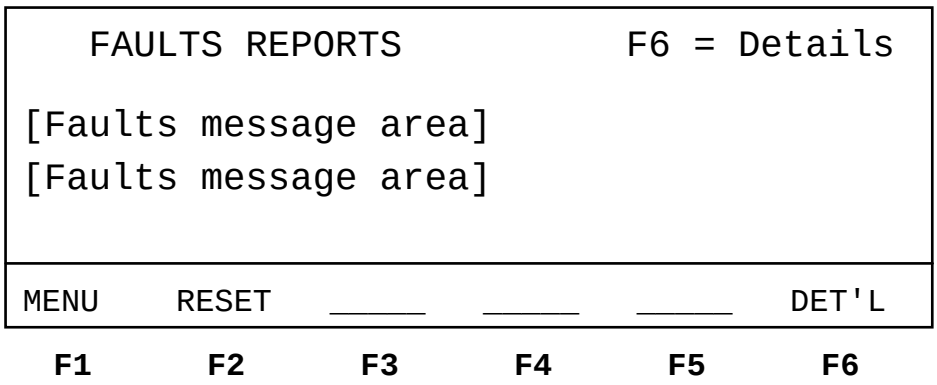
F3 PUSH – Press this key to enter the needed time dwell to allow the Pusher to load the part into the collet and not be moving. Suggested values are 0.5 seconds to 1.0 second.

F4 REST - Press this key to enter the needed time dwell to allow the Tool Rest to contact the part and activate the limit switch. Suggested values are 0.5 seconds to 1.0 second.

F5 Key not used.

F6 Key not used.

Screen #21, Faults Section Main screen



F1 MENU - Press this key to go back to the Main Menu. (Seepage 3-1)

F2 RESET – Press this key if instructed by the fault message.

F3 Key not used.

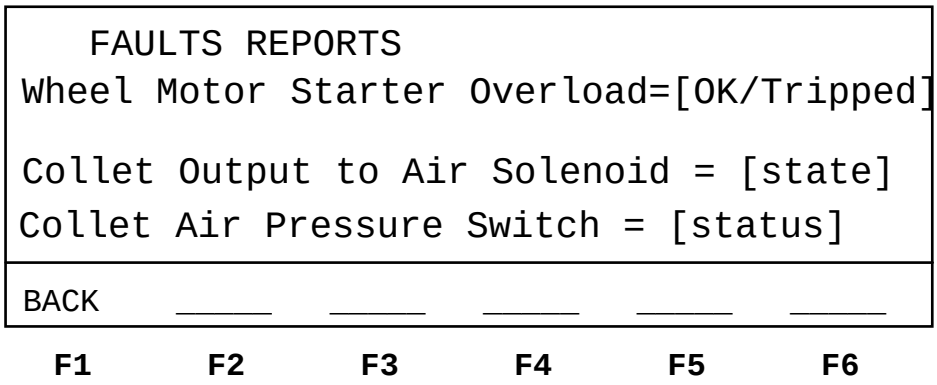
F4 Key not used.

F5 Key not used.

F6 DET'L – Press this key to go to the detailed faults screen section. (Seepage 3-23)

The Faults message area displays 16 detailed fault conditional messages and also instructs the operator how to fix the problem if possible.

Screen #22, Faults, Ac Motors



F1 BACK - Press this key to go back to the Select Faults group menu screen. (Seepage 3-22)

F2 Key not used.

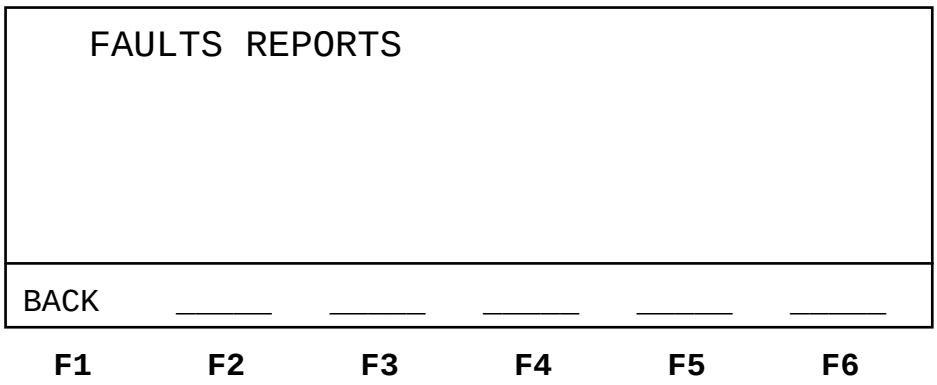
F3 Key not used.

F4 Key not used.

F5 Key not used.

F6 Key not used.

Screen #23, Faults, Black



F1 BACK - Press this key to go back to the Select Faults group menu screen. (Seepage **Error! Bookmark not defined.**)

F2 Key not used.

F3 Key not used.

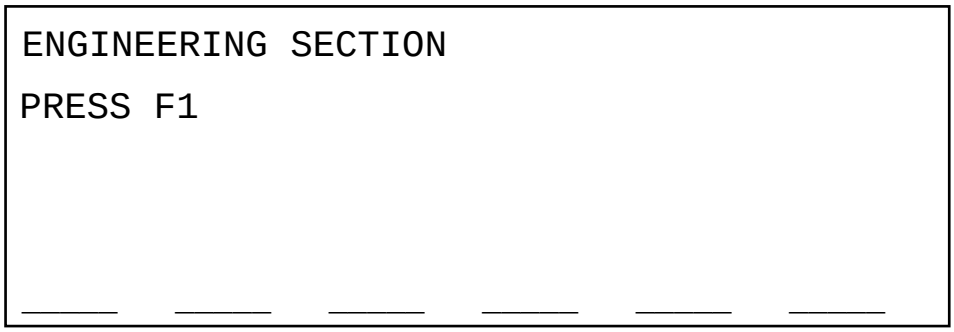
F4 Key not used.

F5 Key not used.

F6 Key not used.

Chapter 4 : Engineering Section

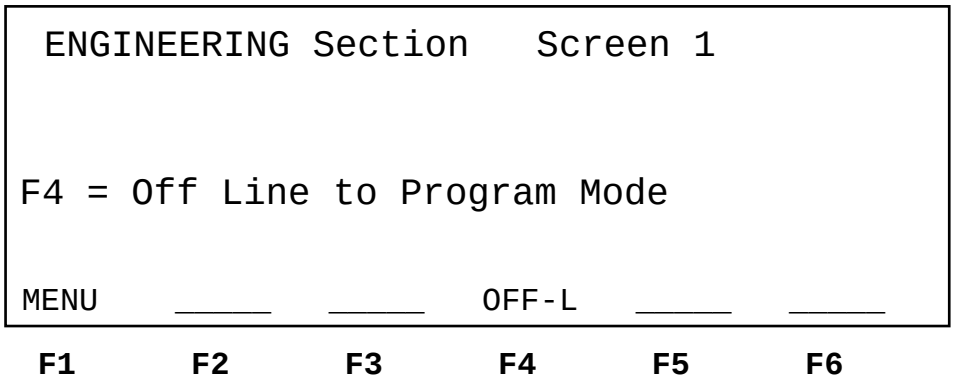
Screen #24, Engineering Screen Access



F1: MENU --- Return to the Main Menu Screen. (Seepage 3-1)

F4: MASKED -- To Engineering Main Screen. (Seepage 4-2)

Screen #25, Engineering Main Screen



This screen and the following screens are to be accessed by a SUPERVISOR or ENGINEERING ONLY!

F1: MENU --- Return to the Main Menu. (Seepage 3-1)

F2: Key not used.

F3: Key not used.

F4: OFF-L -- Changes Operator Interface from Run Mode to the Programming Mode.

F5: Key not used.

F6: Key not used.

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Chapter 5 Program Sequences

Single/Auto Sequencer with Load/Unload

```
%M0065;   MAIN-01; Check conditions; Open collet
%M0066;   MAIN-02; Unload Arm UP
%M0067;   MAIN-03; Open Collet and dwell
%M0067;   MAIN-04; Eject part with high pressure and dwell
%M0069;   MAIN-05; Unload Arm Down
%M0070;   MAIN-06; Shuttle IN and Ejector at low pressure to buck part
%M0071;   MAIN-07; Pusher IN to load part and dwell
%M0072;   MAIN-08; Close Collet and dwell
%M0073;   MAIN-09; Shuttle Out and dwell and Ejector off
%M0074;   MAIN-10; Pusher Out, hopper load new part
%M0075;   MAIN-11; Spin fixture ON
%M0076;   MAIN-12; Tool Rest IN
%M0077;   MAIN-13; Main Table Slide IN
%M0078;   MAIN-14; Main Table Slide Out, Rest Out
%M0079;   MAIN-15; Spin Fixture OFF
%M0080;   MAIN-16; Reset main sequencer and repeat cycle
```