SIEMENS SINUMERIK 840D CONTROL

OPERATOR MANUAL



FADAL MACHINING CENTERS, LLC

Corporate Office	phone (818) 407-1400	fax (818) 407-0020
Service / Parts		fax (818) 407-1004
Programming Support		fax (818) 407-0061

support@fadal.com 20701 Plummer Street, Chatsworth, California 91311 USA

TABLE OF CONTENTS

1.0 POWER ON /OFF	1
1.1 PRE-START CHECKING STEPS 1.1.1 OIL RESERVOIR 1.1.2 AIR PRESSURE 1.1.3 WATER RESERVOIR 1.1.4 FLOOD COOLANT 1.1.5 SPINDLE COOLER RESERVOIR 1.2 POWER ON/OFF 1.2.1 POWER ON 1.2.2 POWER OFF	2 2 3 3 3 3 4 4
2.0 PENDANT LAYOUT / HHU	5
2.1 PENDANT HARD KEYS FUNCTION GUIDE	7
2.1.1 PENDANT KEYBOARD	
2.1.2 UPPER MACHINE CONTROL PANEL (MCP)	
2.1.3 LOWER MACHINE CONTROL PANEL (MCP)	
2.2 HAND HELD UNIT (HHU)	
3.0 MANUAL OPERATION	19
3.1 MANUAL DATA AUTOMATIC (MDA)	
3.2 JOG MODE	
3.2.1 SETTING INCREMENT	
3.2.2 RAPID JOG	
3.3 TOOL OPERATION	
3.3.1 MANUAL TOOL LOADING AND UNLOADING	
3.3.2 LOADING AND UNLOADING A TOOL FROM TOOL CHANGER (ATC)	
3.4 MANUALLY JOGGING THE DATC	
3.5 SPINDLE OPERATION	
3.5.1 ESTABLISHING SPINDLE RPM	
3.5.2 SPINDLE START	
3.5.3 SPINDLE OFF	
Λ Ω ΩΕΕSETS	21
4.0 OFFSETS	31
	-
4.1 COORDINATE SYSTEMS	
4.1 COORDINATE SYSTEMS 4.2 OFFSETS	
 4.1 COORDINATE SYSTEMS 4.2 OFFSETS 4.2.1 BASE OFFSET 	
4.1 COORDINATE SYSTEMS 4.2 OFFSETS	32 34 34 34

4.2.4 USING THE SET BASE SOFT KEY TO SET THE BASE OFFSET	36
4.2.5 USING THE MEASURE WORKPIECE SOFT KEY TO SET THE BASE AND ZERO OFFSETS	39
4.2.6 USING THE MEASURE TOOL SOFT KEY TO SET THE TOOL OFFSET	47
4.2.7 USING THE ZERO OFFSET SOFT KEY TO SET THE BASE AND ZERO OFFSETS	54
4.2.8 USING THE TOOL SOFT KEY TO SET THE TOOL OFFSETS	55
4.2.9 SETTING TOOL LENGTH OFFSET	57

5.0 GENERAL INFORMATION 61

5.1 FINDING MACHINE REFERENCE (COLD START)	62
5.2 TOOL DIAMETER INPUT	63
5.3 TOOL WEAR TABLE	
5.4 MAGAZINE TABLE	
5.5 R VARIABLE TABLE	
5.6 A NEW PROGRAM FOR AUTO	
5.7 EDITING AN EXISTING PROGRAM	
5.8 CHOOSING A PROGRAM TO RUN IN AUTO	70
5.9 AUTO, RUNNING A PROGRAM	
5.10 MID-TAPE (PROGRAM) START	
5.11 OEM ALARM (V050805)	
5.12 M CODES	79

INDEX	31
-------	----



FADAL MACHINING CENTERS

1.1 PRE-START CHECKING STEPS

1.1.1 OIL RESERVOIR

Examine the oil levels. Both should be filled before the levels are one inch from the bottom of the reservoir. The spindle oil reservoir may have oil in it for up to six months. The way lube oil reservoir may run out of oil in one week.



NOTE

VMCs with linear way systems require grease. See the Maintenance Manual for specifications on the way lube and the spindle oil.

1.1.2 AIR PRESSURE Visually inspect the air pressure gauge to verify that it is set to at least 80-100 PSI. Air is used to change belt ranges in the spindle, orient the spindle, activate the tool in-out cylinder, and for the air blast during a tool change. The tool changer gauge should not exceed 120 PSI.



1.1.3 WATER RESERVOIR

1.1.4 FLOOD COOLANT Most new VMC models release water collected in the water reservoir automatically. It is advisable to place an additional water trap in the air line going to the machine.

Replenish the flood coolant level to avoid running out of coolant during execution of the program.



1.1.5 SPINDLE COOLER RESERVOIR Examine the spindle cooler reservoir once a month.



FADAL MACHINING CENTERS

1.2 POWER ON/OFF

1.2.1 **POWER ON** To power on the machine, press the safety lock and turn the power switch in the clockwise direction. CNC will boot up and enter operating status.

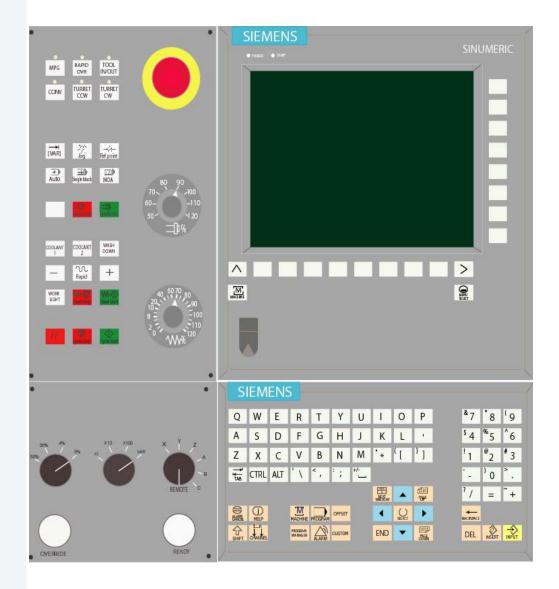


1.2.2 **POWER OFF** To power off machine follow the next procedure:

- 1. From the MDA mode, type SETCS.
- 2. Press the CYCLE START hard key.
- 3. Leave the machine at this display.
- 4. Press the E-stop button.
- 5. To power off the machine, turn the power switch counter clockwise.



2.0 PENDANT LAYOUT / HHU



The table on the following pages shows the various buttons on the pendant. A brief description of the function of each button is given to assist the operator in becoming familiar with the control. Refer to the Siemens operator manuals for detailed instructions on how to use these buttons.

2.1. PENDANT HARD KEYS FUNCTION GUIDE

2.1.1 PENDANT KEYBOARD

SIEMENS (9 Е [&]7 8 W R Υ L Ο Ρ Q Т U ^6 [%]5 \$4 F G А S D н J К L ı. }] {[[#] 3 [!]1 [@]2 Μ • Ζ ۷ В Ν Х С ۶. +/-___) 0 ta CTRL ALT 1 < , ; -MEXT WHILEOW 111 ₩ '/ ۸ = + () HELP SHLICT PROGRAM OFFSET ∢ CHANNEL 순 SHFT 冒騷 PREIGRA N MA MAG ER CUSTOM END Ŧ DEL

Table 2-1: Pendant Keyboard Keys

KEY	NAME	FUNCTION
ALARM	Alarm	Displays alarms/messages screen.
ALARM CANCEL	Alarm Acknowledge	Resets CNC soft alarms.
	Cursor (left, right, up, down)	Moves the cursor around the display screen.
END	End	Moves the cursor to the end of the pro- gram.
(i) HELP	Help / Information	Toggles between test and graphic displays in Shop Mill. Active when displayed on lower line of display.

KEY	NAME	FUNCTION
	Input	Used to accept entry of data.
INSERT	Insert	Used to edit the existing data entry.
NEXT WINDOW	Next Window	Goes to the top of the next active display.
OFFSET	Offset/Parameters	Displays the offsets screen and offset sof keys menu.
PAGE DOWN	Page Down	Page down the screen display.
PAGE UP	Page Up	Page up the screen display.
MACHINE	Position	Displays the position screen and the mair soft key menu of the active mode (Manua / Auto).
PROGRAM MANAGER	Program Manager	Displays the program manager screen.
PROGRAM	Program	Displays the program edit screen.
SELECT	Select	Allows to toggle between values.

Table 2-1: (Continued) Pendant Keyboard Keys

KEY	NAME	FUNCTION
SHIFT	Shift	Allows to use second character.
BACKSPACE	Backspace	Allows to move the cursor back on space.
DEL	Delete	Deletes character.
	Channel	This button is not functional.
CUSTOM	Custom	This button is not functional.

Table 2-1: (Continued) Pendant Keyboard Keys

NOTE

CHANNEL AND CUSTOM keys are not usable.

FADAL MACHINING CENTERS

2.1.2 UPPER MACHINE CONTROL PANEL (MCP)

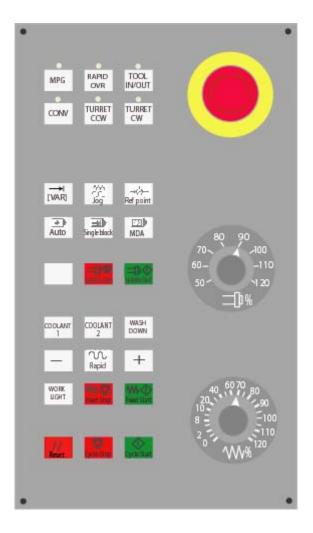


Table 2-2: Machine Control Panel Keys

KEY	NAME	FUNCTION
Auto	Auto	Initiates the automatic mode.
COOLANT 1	Coolant 1	Toggles the flood coolant feature on and off. Works in combination with M7 (to turn it on) and M9 (to turn it off) codes.
COOLANT 2	Coolant 2	Toggles the mist coolant feature on and off. Works in combination with M8(to turn it on) and M9 (to turn it off) codes.

KEY	NAME	FUNCTION
[VAR]	Increment Jog	Activates Incremental sub-mode of Manual Mode. Allows incremental JOG by JOG keys or MPG (hand wheel).
	Jog	Initiates Manual Mode. Note: Reference, Incre- mental Jog and MDA are all sub-modes of the Manual Mode.
MDA	MDA	Use to access Manual Data Automatic mode in ISO. Not active in Shop Mill. In Shop Mill MDA is accessed via a soft key in the Manual Mode.
_	Minus	Use for jogging in the negative direction.
MPG	Manual Pulse Generator	Activates the MPG mode of the manual screen. The LED above the button will be lit when the MPG mode is active.
+	Plus	Use for jogging in the positive direction.
۲ ۰ Rapid	Rapid Jog	Use in conjunction with the JOG "+" and "-" but- tons. Activates the rapid JOG feed rate.
→&— Ref point	Reference	Activates the Reference submode of the Man- ual Mode.
TOOL IN/OUT	Tool In/Out	Activates the drawbar to manually load or unload a tool from the spindle. This button is active only in the Manual Mode.
TURRET CCW	Turret CCW	Rotates the turret in a counterclockwise direc- tion. This button is active only in the Manual Mode.

KEY	NAME	FUNCTION
TURRET CW	Turret CW	Rotates the turret in the clockwise direction. This button is active only in the Manual Mode.
WORK LIGHT	Work Light	Toggles the machine work lights ON and OFF
CONV	Conveyor	Allows to toggle the conveyor ON and OFF.
// Reset	Reset	Resets the currently active program and some alarms. Note: Using the reset button will reset the program to its beginning.
Spindle Start	Spindle On	Turns the spindle on in the last programmed direction and RPM, (S-word). Note that on early production models the text on the key reads "SPINDLE RIGHT".
二〇1〇 Spindle Stop	Spindle Stop	Stops the spindle.
Cycle Start	NC Cycle Start	Starts the execution of the CNC in Auto Mode or operation in Manual Mode.
Cycle Stop	NC Cycle Stop	Stops the execution of CNC program, control waits for NC Cycle Start signal or Reset signa
₩ Feed Start	Feed Start	Feed start (Slide Start).
·₩, ۞ Feed Stop	Feed Stop	Stop feed (Slide Hold)

Table 2-2: (Continued) Machine Control Panel Keys

KEY	NAME	FUNCTION
	Emergency Stop	Emergency Push button will cut the power to all axis motors, spindle drives and the tool changer. To cancel Emergency Stop first press READY pushbutton, then Reset hard key. The program will start from the beginning.
70 \ 60- 50- -110 50- -120	Spindle Override (RPM)	Allows to override programmed spindle speed.
20, 100 8 = 2 0 + 110 2 0 + 120	Feed rate override	Allows to override programmed feed rate speed. When feed rate override switch is pointing 0 motion will stop.

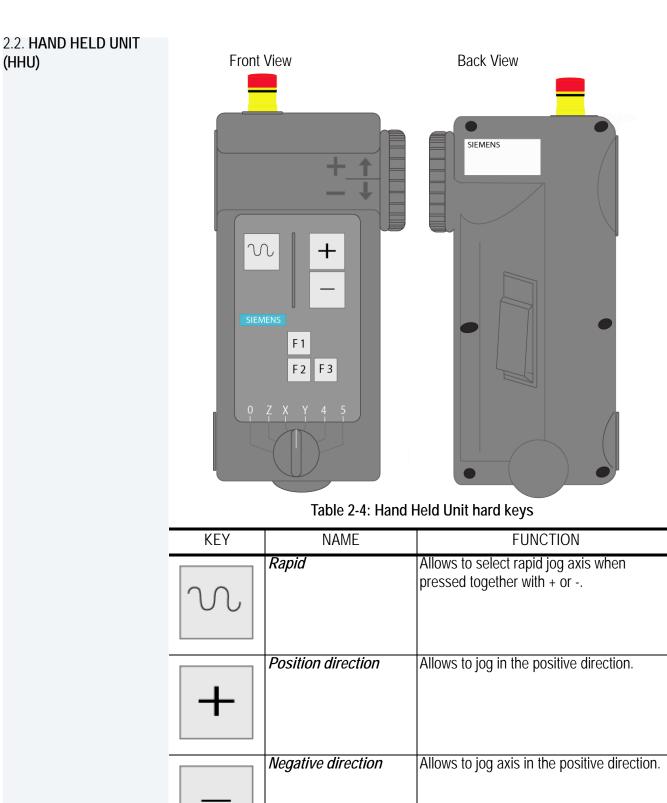
2.1.3 LOWER MACHINE CONTROL PANEL (MCP)



KEY	NAME	FUNCTION
50% ^{4%} 0%	<i>Rapid Rate Override</i>	Allows to override programmed rapid rate. (G0)
X10 X100 WAR	Resolution	Allows to select increment.
REMOTE C	Axis Selector	To select the axis, use Axis Selector switch.
OVERRIDE	Override	Override push button is used to override the door interlock when using MPG.
READY	Machine Safety Circuits.	Resets external safety circuits for door and an emergency stop.
6	Door Interlock	Unlocks front door when lit. (CE machines only)

Table 2-3: Machine Control Panel Keys

SIEMENS OPERATOR MANUAL



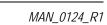
(HHU)

KEY	NAME	FUNCTION
F 1	Tool IN/OUT	To manually load or unload a tool into the spindle press F1 key.
F 2	Jog/MPG	To switch from Jog mode into MPG and vice verse, press F2 key on the HHU. To check if MPG is active, check LED above MPG hard key on the MCP panel.
F 3	Resolution	To change resolution (X1, X10, X100 or VAR) press F3 key as many times as needed.
	Axis Selector	To select 0, X, Z, Y, 4, or 5 axis, switch axis selector to the right position.
	Emergency Stop	Emergency Push button will cut the power to all axis motors, spindle drives and the tool changer. To cancel Emergency Stop first press READY pushbutton then Reset hard key. The program will start from the begin- ning.

Table 2-4: (Continued) Hand Held Unit hard keys

KEY	NAME	FUNCTION
	Override	Override push button is used to override the door interlock when using the MPG. (Excep- tion, if the feedrate is at 0% then MPG will stop the motion) It allows to jog machine with open doors. Override push button can be either in active or inactive position: active (when push but- ton is gently pressed), inactive (when push button is pressed harder or not pressed at all). Every time, when Override push button is in active position, operator can jog machine. Once Override push buttom is in inactive position, operator will not be able to jog machine. Machine will stop movement.
	MPG (Manual Pulse Generator)	To activate MPG, press MPG hard key on the MCP panel. The LED of MPG hard key will turn on. To move the tool in a plus direction, turn the manual pulse generator in the clockwise direction. To move the tool in a minus direction, turn the manual pulse generator in the counter- clockwise direction.

Table 2-4: (Continued) Hand Held Unit hard keys



3.0 MANUAL OPERATION

•

3.1 MANUAL DATA AUTOMATIC (MDA)

To display MDI screen follow next steps:

Press the MDA hard key.

Workpiece Position Linch M / H functions X 0.0000 Auxi fun Y 0.0000 Auxi fun Z 0.0000 B	G iliary ction
X 0.0000 Y 0.0000 Z 0.0000	11 G
Y 0.0000 Z 0.0000	11 G
Z 0.0000	ll G tions:
Z 0.0000	ctions
R	
ti	un- imes
	lete prog.
1 мэ21	
==eof==	
Ma	chine
pos	ition

L____MDI display

3.2 **JOG MODE** To display Jog mode position readout display follow the next step:

• Press the JOG hard key.

M MANUAL				
∥ Reset				G function
Workpiece	Position [inch]		M / H function	ns Auxiliary
Х	0.0000			function
Y	0.0000			All G functions
Z	0.0000			Tunections
				Run- times
				Machine position
2 20		Magaa	- Deci	
📕 Т,Ѕ,М	Set Meas. T WO workp.	Meas. tool	Posi- tion	Face mill.

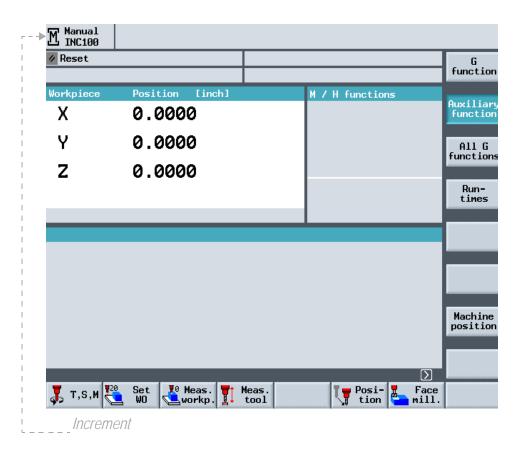
3.2.1 SETTING INCREMENT

Incremental jog using JOG hard key

- 1. Press JOG hard key.
- 2. Press VAR hard key.

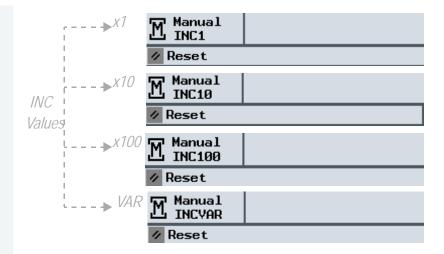
(On the upper left corner of the display we get INC...)

- 3. Select increment using increment selector switch to toggle between x1, x10, x100 and VAR.
- 4. Indicate direction pressing +/- hard key



Incremental jog using HHU

- 1. Select **REMOTE** on axis selector switch that is located on the lower MCP panel.
- 2. Press JOG hard key
- 3. Press F2 on HHU (LED above MPG should turn on)
- 4. Press F3 to toggle increment between x1, x10, x100 and VAR.
- 5. Indicate direction pressing +/- hard key.

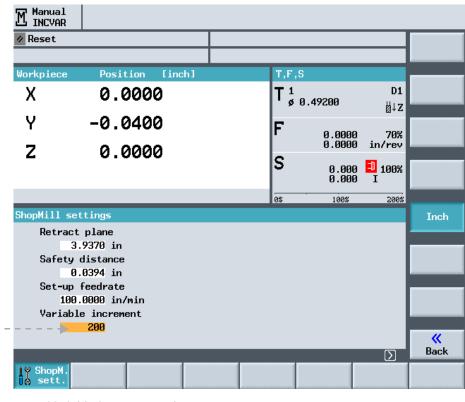


If axis selector is set on VAR, set jog increment value manually following the next steps:

- 1. Press menu extention key ">".
- 2. Press ShopM. Sett. soft key
- 3. With the blue cursor keypad arrow, cursor down to the variable increment box.
- 4. Type in the new value (between 0 200INC) and press INPUT hard key.

NOTE
1INC = 0.0001inch
1INC = 0.001mm

FADAL MACHINING CENTERS



_____Variable Inctement value

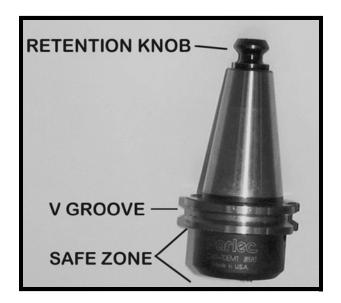
3.2.2 RAPID JOG

- 1. Press the **JOG** hard key and select the axis to be jogged from the axis selector switch located on the lower MCP panel.
- 2. Select the direction of the tool by pressing the "+" or "-" hard key.
- 3. Pressing the **RAPID** hard key together with the "+" or "-" buttons activates the Rapid Jog feed rate.
- 4. With both **JOG** and **RAPID** hard keys user has the option to vary the feed rate override to control the speed.

3.3 TOOL OPERATION

3.3.1 MANUAL TOOL LOADING AND UNLOADING A tool can be manually loaded or unloaded into the spindle by using the **TOOL IN/OUT** hard key.

1. The tool holder must be held in the left hand with the thumb and the first finger grasping the holder below the "V" groove. No other fingers should have contact with the holder or the tool in the holder. The area below the "V" groove is called the safe zone. The safe zone is the only place where the tool holder should be held.



2. When unloading a tool from the spindle, grasp the tool in the safe zone and press the **TOOL IN/OUT** hard key. Keep the **TOOL IN/OUT** hard key pressed until the tool is completely out of the spindle.

When loading a tool into the spindle, grasp the tool in the safe zone and press the **TOOL IN/OUT** hard key. Place the holder into the spindle after pressing the **TOOL IN/OUT** hard key, not before. The keys on the nose of the spindle must fit into the keyways on the tool holder flange. Release the **TOOL IN/OUT** hard key to lock the tool into the spindle.

NOTE

When loading a holder into the spindle, inspect the taper for chips and dents. Remove any chips or dents from the taper with a flat stone.

3.3.2 LOADING AND UNLOADING A TOOL FROM TOOL CHANGER (ATC)

NOTE

When tool holders are in the ATC (Automatic Tool Changer), they can be loaded into the spindle by using the T,S,M mode.

- 1. Press the **T**,**S**,**M** soft key.
- 2. Type T# (where # is the turret location of the tool to be loaded into the spindle).
- 3. Press the **INPUT** hard key.
- 4. Press the CYCLE START hard key to make the exchange.

NOTE If the feed rate potentiometer is set to 0%, no motion will occur when the START button is pressed.

/ Reset						_	
Workpiece	Position [inch]		T,F,S			
Х	0.0000			Τ ¹ ø 0.4	19200	D1	То
Y	0.0000					ä↓z	Wo
-				F	0.0000 0.0000	70% in/rev	off
Z	0.0000			s	0.000 0.000	100% I	
				0%	100%	200%	
Г,Ѕ,М					Тс	ol name	
T - 1	D1						
Spindle Spindle	M-fct.	rpm	Gear s	tage			
						_	
Other M Work off							
Unit of							
Tool axi	is						<
						Σ	Ba

L_____ Tool number

CAUTION

If the tool change is interrupted, the selected tool becomes a null value and the machine will try to load a tool. If this occurs, remove the tool from the spindle and repeat the operation.

M11 can be used to set the current magazine location as T1. Note that this does not change the active Tool number.

3.4 MANUALLY Jogging the Datc	<i>NOTE</i> Machine must be in JOG mode. Multiple key combinations are required to move the dual tool arm changer.					
	• Press and hold the SPINDLE STOP (<i>d</i>), FEED STOP (<i>e</i>), and CYCLE STOP (<i>f</i>) red hard keys and the RAPID OVR (<i>a</i>)located between the MPG and the TOOL IN/ OUT hard keys.					
	 The bucket will motion either up or down depending on its previous position. Press and hold the SPINDLE STOP (<i>d</i>), FEED STOP (<i>e</i>), and CYCLE STOP (<i>f</i>) red hard keys and the CONV (<i>b</i>)located to the left of the TURRET CCW hard key. 					
	 The arm will motion forwarddepending on its previous position. Press and hold the SPINDLE STOP (<i>d</i>), FEED STOP (<i>e</i>), and CYCLE STOP (<i>f</i>) r hard keys and the blank key (<i>c</i>)located to the left of the red SPINDLE STOP hard key. 					
	The arm will motion backwardsdepending on its previous position.					
	The arm will only move if the Z-axis is at its home position.					
	b					
	IVARI					
	$\mathcal{L} = $					
	CODULANT COOLANT WASH CODULANT COOLANT DOWN - Rapid +					
	WORK 40 60 70 80 C					

FADAL MACHINING CENTERS

3.5 SPINDLE OPERATION

3.5.1 ESTABLISHING SPINDLE RPM **NOTE** Use the spindle OVERRIDE switch to vary the RPM manually from 50% to 120% of the programmed value.

M3 = CW SPINDLE ON

M4 = CCW SPINDLE ON

M5 = SPINDLE OFF

M40 = AUTO BELT RANGE

M41 = LOW BELT RANGE

M42 = HIGH BELT RANGE

CAUTION

The last RPM setting used by the control is active when the spindle is turned on manually unless it is changed in the T,S,M mode.

The spindle RPM can be started at the desired RPM and Rotational direction by using the T,S,M soft key.

- 1. Press the JOG hard key.
- 2. Press the T,S,M soft key.
- 3. With the blue cursor keypad arrows, cursor down to RPM box, type in the new value and press the **INPUT** hard key.
- 4. With the blue cursor keypad arrows, cursor down to the spindle M-fct box. Use the Alternat. soft key to toggle to CW and CCW direction.
- 5. Press the CYCLE START hard key to activate.

M MANUAL			
1 Reset			() Alternat.
Workpiece	Position [inch]	T,F,S	
Х	0.0000	T ¹ Ø.49200 D1 ₿↓2	
Y Z	0.0000 0.0000	F 0.0000 70% 0.0000 in/rev	Work offset
2	0.0000	S 0.000 1 100%	
тем		0% 100% 200% right/left/off/positioning	
Т,S,M Т	D	right/left/off/positioning	
	le-—— 3000 rpm le-M=fct. 2	Gear stage	
Work o	M fct. offs G of meas.		
Toola			« Back
其 т,ѕ,м	VO Vorkp.	Meas. tool	
<i>R</i>	PM value		
Spi	indle direction (CW/CCV	\mathcal{N}	

3.5.2 SPINDLE START	After establishing the RPM from T,S,M Mode, or at any time in any mode of operation,
	the spindle can be turned on manually by using the green SPINDLE START hard key
	button.

• Press the **SPINDLE START** hard key. The spindle will turn on in the last programmed direction and spindle speed (RPM).

3.5.3 **SPINDLE OFF** When the spindle is on, from any mode of operation, press the red SPINDLE OFF button alone, to turn the spindle off.

The **RESET** button will also turn the spindle off.



4.0 **OFFSETS**

4.1 COORDINATE SYSTEMS

Machine coordinate system (MCS)

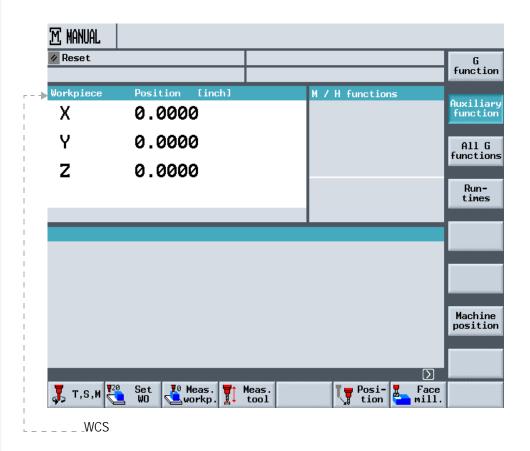
The machine coordinate system is based on the machine axes that are designated X1, Y1, Z1, A1 and B1 in the actual value display. At the reference point (alignment position) all machine axes = 0. Tool and pallet change positions are defined in MCS.

🗹 MANUAL				
Reset				G functio
Machine	Position [inch]	М	/ H functions	
X1	0.3013			Auxilia functio
Y1	0.4703			A11 G
Z1	0.4630			functio
61	0.4000			Run- times
				CIMES
		i		
				Machin positio
				\sum
📕 Т, S, M 🛃	20 Set 🚺 Meas. 🚏 I Set WO Set Vorkp.	leas. tool	Posi-	Face mill.

L _ _ _ MCS

The Work Coordinate System (WCS)

The workpiece coordinate system is based on the MCS with offsets to shift the workpiece to zero. Workpiece programming is done in WCS using the workpiece axes designations X, Y, Z, A and B. The WCS includes all active offsets including the Base Offset, Settable Work (Zero) Offset and the Tool Offset.



In the MANUAL operating mode it is possible to change between the WCS and MCS by toggling the Act. Val. MCS soft key.

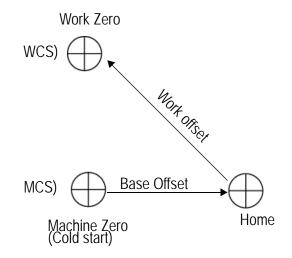
4.2 OFFSETS The most commonly used offsets are the Base Offset, Zero (Work) Offset, and Tool Offset. These offsets are combined together to define the WCS relative to the MCS Machine Zero (Cold Start) position. The Base Offset is always active unless G153 is programmed in the movement block 4.2.1 BASE OFFSET (non-modal command). The Base Offset can be set to zero. The Base Offset is used to set the "Home" position relative to the Machine Zero. Based on the current axis position the Base Offset can be calculated and entered into the CNC via the SET Base or Measure Workpiece soft keys in the Manual screens (X, Y and Z only, no A or B). The Base Offset can also be manually entered for all the axes via the Zero Offset screen. Zero Offsets (Fixture Offset) 1-8 (ZO1,ZO2,..., ZO8) are programmed via commands 4.2.2 ZERO OFFSET G54 - G57 and G505 - G508, the active ZO (example ZO3) is displayed in the light blue field below the axis actual value display. Based on the current axis position, Zero Offsets can be calculated and entered into the CNC via the Measure Workpiece soft keys in the main Manual screens (X, Y & Z only, no A and B). Zero Offsets can also be entered manually for all axes via the Zero offset screen. The tool changer allows each tool with its own offset for tool length and diameter, and 4.2.3 TOOL OFFSET tool wear settings for length and diameter. Tool Offsets for the active Tool number (e.g. T3) are activated with the command D1, the offset is deactivated with the command D0. The tool offset D1 is always activated as part of a tool change. Tool offset values for both length and diameter based on measured values can be calculated and entered into the CNC via the measure Tool screens in the main Manual screens. Tool offsets can also be entered manually via the Tool List screen.

SIEMENS OPERATOR MANUAL

Work of	fset						Basic	ref. (G500	·
Workpie	се				Mach.				
Х			0.0000))	X1	0.0	0000 _{in}	
Y			0.0000			Y1		0000	Wo Meas
T			0.0000	in		Τ⊥	0.0	in 0000	Meas
Z			0.0000) _{in}	2	Z1	0.0	0000 _{in}	
	х		Y	Z		хQ	YQ	ZΩ	
Base ref	0	.0000	0.000		0.0000	0.0000	0.0000	0.0000	Cle
G54	0	.0000	0.000	1	0.0000	0.0000	0.0000	0.0000	Off
	0	.0000	0.0000	1	0.0000				
655		.0000	0.0000		0.0000	0.0000	0.0000	0.0000	Posi
000	_	.0000			0.0000	0.0000	0.0000	0.0000	set
		.0000	0.0000		0.0000				
G56	0	.0000	0.000	1	0.0000	0.0000	0.0000	0.000	Posi set
F	0	.0000	0.0000		0.0000				300
Program	0	.0000	0.000	1	0.0000	0.0000	0.0000	0.0000	Posi
Scale	1	.0000	1.0000		1.0000				set
Mirror									
Total	0	.0000	0.000		0.0000	0.0000	0.0000	0.0000	Posi set

_ _ _ _ _ _ Offset screen

The figure below is a two dimensional diagram illustrating the various coordinate systems and their relationship.



FADAL MACHINING CENTERS

4.2.4 USING THE SET BASE SOFT KEY TO SET THE BASE OFFSET

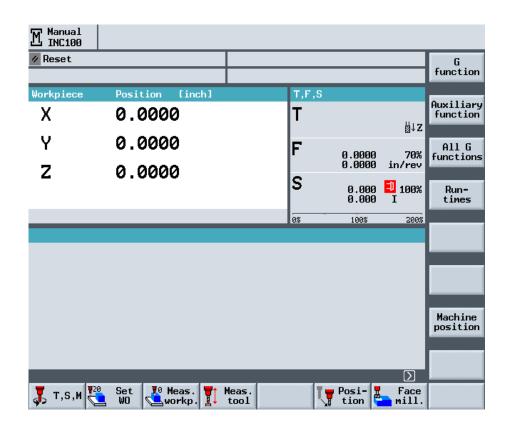
NOTE

Only the X, Y and Z Axes can be set with this method. The Base Offset for the A and B axes must be set directly in the Zero Offset screen.

- 1. Press JOG hard key.
- 2. Press Set WO soft key. The X-axis will be highlighted in orange.
- 3. Switch axis selector to Remote.
- 4. Press the MPG hard key to activate the MPG hand wheelin the HHU.
- 5. Select the X-Axis with the axis selector switch.
- 6. Jog the X-Axis to the desired Base (Home) position.

/ Reset		X=
Workpiece	Position [inch]	T,F,S
[−] X	3.0314	Τ Υ=
Y	0.0000	- <u>-</u> F a aaaa za∗ Z=
Z	0.0000	F 0.0000 70% Z= 0.0000 in/rev
2	0.0000	S 0.000 1 100%
		0% 100% 200%
		Dela
		X=Y=
		Ba
_		

7. Press the X=0 soft key to set the X-Axis base position for the WCS. The WCS position for the X-Axis will reset to Zero.



8. Press Machine Position soft key. MCS screen displays.

 Toggle to the MCS display. The WCS base position for the machine will be displayed. In the example below the X-Axis was jogged to +3.0314". The MCS display for the X-Axis now shows the Machine Zero (Cold Start) position is -1.00 inches away from the base position set for the X-Axis in the WCS.

Manual INC100					
∥ Reset					G function
Machine	Position [inch]	Т	,F,S		0
X1	3.0314	T		ll a	Auxiliary function
Y1	0.0000			ä↓z	A11 G
		F	0.0000 0.0000	70% in/rev	functions
Z1	0.0000	S	0.000 0.000	D 100% I	Run- times
		0%	100%	200%	
					Machine position
		M		\sum	
📕 Т,S,M 🖁	20 Set 🚺 Meas. 🏹 WO 📞 workp.	Meas. tool	Posi- tion	Face mill.	

10. To set the Y and Z axes base position, perform steps 1-6 for each axis. Use the cursor key pad arrows to highlight the appropriate axis.

4.2.5 USING THE MEASURE WORKPIECE SOFT KEY TO SET THE BASE AND ZERO OFFSETS NOTE

Only the X, Y and Z Axes can be set with this method, the Base Offset for the A and B axes must be set directly in the Zero Offset screen.

- 1. Press JOG hard key.
- 2. Press the Measure Worp. soft key. The operator has five options to choose from on the vertical soft keys: Edge, Corner, Hole, Spigot and Calibrate probe. Choose the option that will be used to set the offsets.

M MANUAL					
∥ Reset					°
Machine	Position [inch]	T,	,F,S		
X1	0.0000	Т		₿↓z	200
Y1 Z1	0.0000 0.0000	F	0.000 0.0000	70% in/rev	®
21	0.0000	s	0.000 0.000	<mark>=</mark>] 100% I	ŵ
		0%	100%	200%	
MeasureWork	piece				Calibrate
					probe
		_	_	\sum	« Back
📕 Т,S,M	20 Set 🚺 Meas. 👖	Meas. tool	Posi- tion		

- 3. For all five options the operator must select:
- Which Offset to Calculate, Base or Zero Offsets 1-8 (G54-G57, G505-G508).
- **EXAMPLE** To calculate the Zero Offset 4 (G57) a value of 4 would be entered in the "Zero offs" field.
 - The Known dimension of the point being measured.
- **EXAMPLE** The "X0" field in the edge, is the X measurement.

4. Select the Edge soft key when using the X, Y and Z WCS position to determine the base setting by using an edge finder or touch probe on the part from each WCS axis.

Reset			O
			Alterna
Vorkpiece X	Position [inch]	T,F,S T	Work offset
Y Z	0.0000 0.0000	F 0.000	10 70% X 10 in/rev
		S 0.00	Й I Ч
et edge	St.	0% 100% pre measured value in wo	200% ork offset Z
Y 🛔	Yalues WO: X 0.0000 in Y 0.0000 in Z 0.0000 in	Work offs G <mark>Basic re</mark> Meas.direct. +X X0 0.0	if.
	Measured values: X0		
⁺ x₀	X		∑ Back

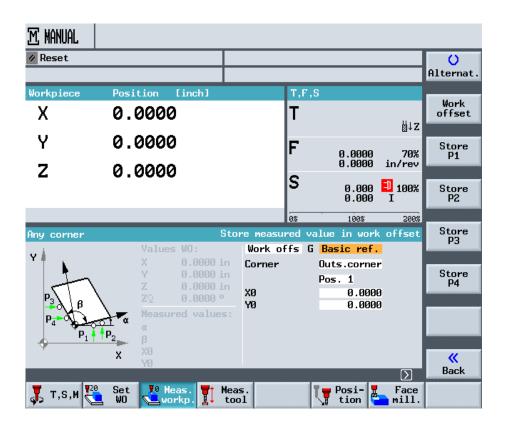
🕅 MANUAL				
∥ Reset				Alternat.
Workpiece X	Position [inch]	T,F,S T		Work offset
Y Z	0.0000 0.0000	F	0.0000 0.0000 in/	70% X /rev
_		S	0.000 I	100% Y
Set edge	St Values WO:	ore measured val Work offs G		200% fset Z
	X 0.0000 in Y 0.0000 in Z 0.0000 in Measured values: Y0	Meas.direct. Y0	• Y 0 . 0000	E
Т , s, м 🗜		as.	曼 Posi- 👖 🛛 F	Back

🗹 MANUAL			
🖉 Reset		A.	<mark>()</mark> lternat.
Workpiece X	Position [inch]	T,F,S T ∰↓Z	Work offset
Y Z	0.0000 0.0000	F 0.0000 70% 0.0000 in/rev	x
2	0.0000	S 0.000 1 100%	Y
Set edge	Sto	0% 100% 200% pre measured value in work offset	Z
z z _a	Values WO: X 0.0000 in Y 0.0000 in Z 0.0000 in Measured values: Z0	Work offs G Basic ref. Meas.directZ Z0 0.0000	
, Т,S,M	Set V 0 Meas. Meas. WD	as. ol Face in tion mill.	« Back

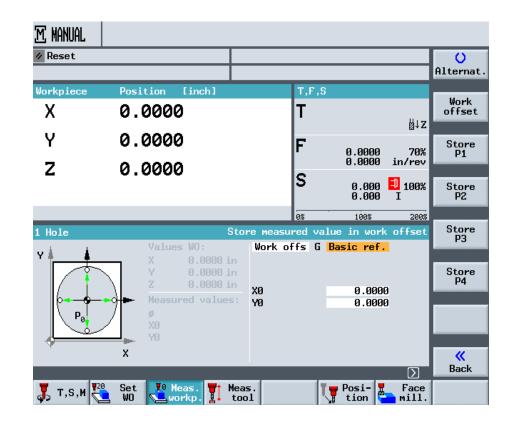
NOTE

An edge finder or probe can be used for these procedures.

5. Select the Corner soft key when setting the WCS base position by determining the orientation of the workpiece to a selected corner.

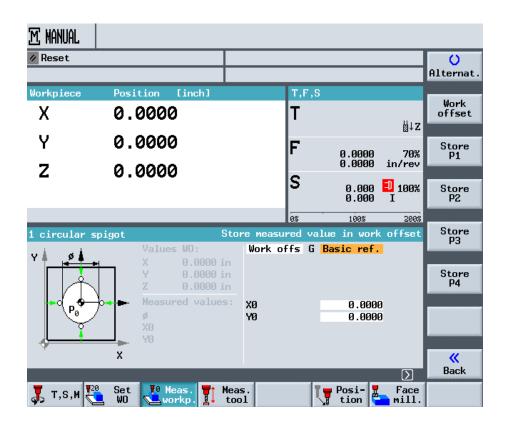


6. Select the Hole soft key when setting the WCS base position by determining the center of a hole at four positions.

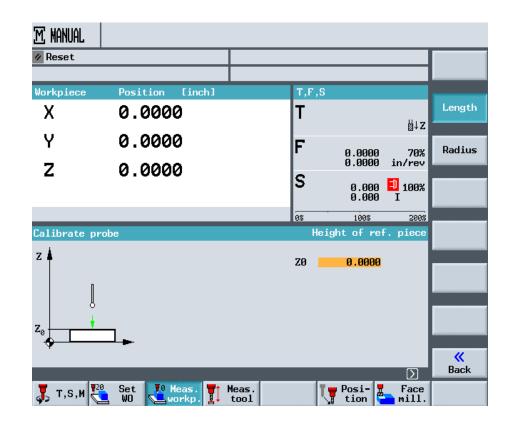


44

7. Select the Spigot soft key when setting the WCS base position by determining the center of a cylinder at four positions.



8. Select the Calibrate Probe soft key when checking the accuracy of the probe against standards for length or radius.



4.2.6 USING THE MEASURE TOOL SOFT KEY TO SET THE TOOL OFFSET

- 1. Press JOG hard key.
- 2. Press the MEASURE TOOL soft key. The operator has six options to choose from: Length Manual, Diameter Manual, Length Auto, Diameter Auto, Calibrate probe and Calibrate Fixed point.

MANUAL						
∥ Reset						Length manual
Workpiece X	Position [inch]		t,f,s T		ä∔z	Diameter manual
Y Z	0.0000 0.0000		F	0.0000 0.0000	70% in/rev	Length auto
			S	0.000	100% I 200%	Diameter auto
Measure tool						
						Calibrate probe
						Calibrate fixed pt.
	_			_	\sum	K Back
📕 Т,Ѕ,М 🄁	Set 🚺 Meas. Ţ WO 🗳 workp.	Meas. tool	. I.T	Posi- tion	Face mill.	

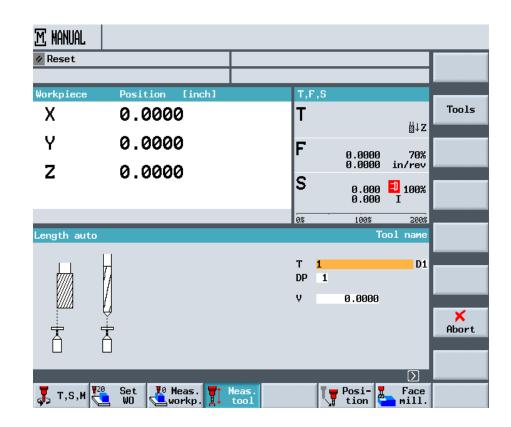
3. Select the Length Manual soft key when manually setting the tool length offset by jogging the tool to a reference block or part.

MANUAL					
∥ Reset					
Workpiece	Position [inch]	T,F	7,S		
х	0.0000	Т		ä↓z	Tools
Y Z	0.0000 0.0000	F	0.0000 0.0000	70% in/rev	
2	0.0000	s	0.000 0.000	100% I	
		0%	100%	200%	
Length manual	L		То	ool name	
z 🖡			1 1 erence point	D1	
_ +		wor ZØ	kpiece 0.0000;	ahs	×
		Len	gth sic ref.	0.0000 0.0000	Abort
				$\overline{)}$	Set length
炗 т,ѕ,м 👯		leas. tool	Posi- tion	Face mill.	

4. Select the Diameter Manual soft key when manually setting the tool diameter offset by jogging the tool to a reference block or part.

M HANUAL Reset					
Workpiece	Position [inch]	Т,	F,S		
Х	0.0000	Т		Ща	Tools
Y	0.0000			ä↓z	
Z	0.0000	F	0.0000 0.0000	70% in/rev	
2	0.0000	S	0.000 0.000	<mark>■</mark> 100% I	
		0%	100%	200%	
Diameter man	nual		T	ool name	
z 🛔		T DP	1	D1	
	s	X0 Y0 ø	0.0000	abs abs	X Abort Set
				\sum	diamet.
📕 Т,Ѕ,М	⁰ Set 🚺 Meas. 🚺 ■ WO 🛀workp.	leas. tool	Posi- tion	Face mill.	

5. Select the Length Auto soft key when setting the tool length offset with a touch probe.



6. Select the Diameter Auto soft key when setting the tool diameter offset with a touch probe.

MANUAL						
∥ Reset						
Workpiece	Position [inch]		T,F,S			
Х	0.0000	i	Т			Tools
Y	0.0000		_		ģ↓z	
Z	0.0000		F	0.0000 0.0000	70% in/rev	
2	0.0000		S	0.000 0.000	<mark>100% I</mark>	
		ē	3%	100%	200%	
Diameter auto)			Т	ool name	
			т <mark>1</mark> DP 1		D1	
	2			0.0000		
÷••		,	Ŷ	0.0000		X Abort
			_	_	\sum	
📕 Т,Ѕ,М 👯	Set 🚺 Meas. 👖	Meas. tool	I.	Posi- tion		

7. Select the Calibrate Probe soft key when checking the accuracy of the probe against standards for length or radius.

M MANUAL					
∥ Reset					<mark>()</mark> Alternat.
Workpiece	Position [inch]		T,F,S		
Х	0.0000		Т		
Ŷ	0.0000		_	ģ† z	
Z	0.0000	!	F 0.0000 0.0000	70% in/rev	
2	0.0000	:	S 0.000 0.000	<mark>100% I</mark>	
			3% 100%	200%	
Probe calibr	ation		gth/length and		× Abort
🗍 🛃 т,s,м 🎇	Set I® Meas.	Meas. tool	Posi-	∑ Face mill.	

8. Select the Calibrate Fixed point soft key.

M MANUAL		
Workpiece	Position [inch]	T,F,S
х	0.0000	T
Y Z	0.0000 0.0000	F 0.0000 70% 0.0000 in/rev
2	0.0000	S 0.000 1 100%
		0% 100% 200%
Calibrate f	ixed point	Distance
z 🛔		DZ 0.0000 inc
	ь.	Fixed point 0.0000
		Abort
	_	Calibrate
📕 Т,S,M	20 Set 10 Meas. T WO workp.	Meas. tool

4.2.7 USING THE ZERO OFFSET SOFT KEY TO SET THE BASE AND ZERO OFFSETS

- 1. Press OFFSET soft key to display the main manual display.
- 2. Press WORK OFFSET soft key. The zero offsets table displays.

Work off					Basic	ref. (650	30)
Workpiec			Machi		~ ~		
Х	l	0.0000	in)	(1	0.0	0000 _{in}	Work
Y	1	0.0000		/1	0.0	0000 _{in}	Measure
Z		0.0000	in Z	21		0000	
-	x		<u> </u>	хQ		Ζ Ω	_
Base ref	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
G54	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Clear Offset
	0.0000	0.0000	0.0000				
G55	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Positio set X
	0.0000	0.0000	0.0000				Jeen
G56	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Positio
F	0.0000	0.0000	0.0000				set Y
Program	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Positio
Scale	1.0000	1.0000	1.0000				set Z
Mirror							
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.000 0	Positio set al

- 3. Use the cursor key pad arrows to move to the desired fields in the table for editing.
- 4. The table shows the Base Offset and 3 Zero Offsets at a time. Additional Zero Offsets can be viewed by using the PAGE UP/PAGE DOWN hard keys as indicated in the display. Zero Offsets for the 4th and 5th axes can be accessed by using the Further Axes soft key.

4.2.8 USING THE TOOL SOFT KEY TO SET THE TOOL OFFSETS

- 1. The TOOL soft key is accessed from the main manual display. To get to the main manual display press the OFFSETS hard key.
- 2. Press the Tool List soft key. The Tool List table is displayed.

	lis	-					1		1 1	C C
C	Тур	Tool name	DP	1st cutti			₽	⇒ •		Alter
ŧ				Length	ø	N		1	2	Measu
L	▦	1	1	0.0000	0.00000	0	2			
2	趱	2	1	0.0000	0.00000	0	2			Dele
3	趱	3	1	0.0000	0.00000	0	Q			
1	≝	4	1	0.0000	0.00000	0	Q			Unlo
5	趱	5	1	0.0000	0.00000	0	2			
5	趟	6	1	0.0000	0.00000	0	2			
7	趱	7	1	0.0000	0.00000	0	2			
3	趱	8	1	0.0000	0.00000	0	2			
•	趟	9	1	0.0000	0.00000	0	2			Cutt: edge
0	趟	10	1	0.0000	0.00000	0	2			
1	趱	11	1	0.0000	0.00000	0	Q			Sor
2	趟	12	1	0.0000	0.00000	0	Q			
3	趟	13	1	0.0000	0.00000	0	Q			
									\sum	

3. Use the cursor key pad arrows to move to the desired fields in the table for editing.

4. Use the ALTERNATE soft key to toggle between options available in the Tool List variable fields. In the example below the ALTERNATE soft key was used to change the tool type for tool number 1 (compare with previous screen display).

	lis	-								0
oc	Тур	Tool name		1st cutt			4	∳ =		Alterr
				Length	ø	\$		1	2	Measu
₽										too
1	Ø	1	1	0.0000	0.00000	0.0	1	2		
2	≝	2	1	0.0000	0.00000		0	2		Dele too
3		3	1	0.0000	0.00000		0	2		
4		4	1	0.0000	0.00000		0	2		
5			1		0.00000		0	5		Unlo
-			1		0.00000		0			
7			1		0.00000		0			
8			1		0.00000		0			
9		9	1		0.00000		0	-		Cutti edge
10		10	1		0.00000		0			euge
10		11	1		0.00000		0			
12		12	1		0.00000		0			Sor
12		13	1		0.00000		0			
13		13	1	0.0000	0.00000		0	2		Σ

5. The default setting of the tool list shows the 1st cutting edge. To set offsets for tools with two cutting edges press the Cutting Edges soft key.

ol	lis	t					
oc	Тур	Tool name		2nd cutti			
				Length	ø	\$	Measu
₽							tool
1	Ø	1	1	0.0000	0.00000	0.0	
2	≝	2	1				Delet tool
3	趟	3	1				
4	趟	4	1				Unloa
5	趟	5	1				
6	趟	6	1				
7	趟	7	1				
8	趟	8	1				
9	趟	9	1				Cuttin edges
10		10	1				
11		11	1				Sort
12	≝	12	1				
13	≝	13	1				
						\sum	

Use the Cutting Edges soft key to toggle between the displays. The CNC command D2 is used to activate offsets for the cutting edges.

4.2.9 **SETTING TOOL LENGTH OFFSET** The point where the tools will be set, is called a gauge point. This is a common starting position for all the tools. This is where the programmer has established the Z axis zero position for the part program (not to be confused with Z zero at the MCS position).

To set the TLO (Tool Length Offset) manually:

- 1. Locate all tools specified for the program and load the tools into tool holders. Place the holders close to the machine. Place the machine in the Manual Mode.
- 2. Load tool #1 into the spindle using the TOOL IN/OUT button.
- 3. Place a gauge block, of any available size, on top of the part.

- 4. Press the MPG button and use the Manual Pulse Generator to jog the Z axis until the tip of the tool is just above the top of the gauge block. Select smaller increments for jog, and jog the tool down until the tip of the tool is close enough to the gauge-block for the desired tool length offset.
- 5. Remove the block from under the tool.
- 6. Press the Position soft key to return to the Main Manual screen.
- 7. Press the Measure Tool soft key.
- 8. Press the Length Manual soft key.
- 9. Use the cursor keypad arrows, cursor down to highlight Z0 _____ ABS.
- 10. Type in the gauge amount (tool block size).
- 11. Press the Set Length soft key button.

This inputs the tool length based on the current Z axis location into the tool table:

M MANUAL		
Workpiece	Position [inch]	T,F,S
Х	0.0000	T
Y Z	0.0000 0.0000	F 0.0000 70% 0.0000 in/rev
2	0.0000	S 0.000 1 100%
		0% 100% 200%
Calibrate f	ixed point	Distance
z 🛔		DZ 0.0000 inc
	L.	Fixed point 0.0000
		Abort
		Calibrate
📕 т, s, м	20 Set Meas.	Meas. tool



5.0 GENERAL INFORMATION

5.1 FINDING MACHINE REFERENCE (COLD START) The FADAL machine tool has software limits and does not contain position limit switches. Therefore, the machine tool must be physically located at set alignment marks. The Siemens control automatically powers on in the machine reference mode. It is recommended that the machine be shut down at its axis alignment position to simplify the Power On procedure.

To align each axis, place the machine in JOG:

- 1. Press the MPG hard key until the LED above the key is lit.
- 2. Find the alignment marks for each axis using the axis selector switch and the MPG.
- 3. Press the REF hard key button "reference point return". Use the Axis selector switch to select the desired axis.

Select the X axis then press + hard key button.

Select the Y axis then press + hard key button.

Select the Z axis then press + hard key button.

Select the A axis then press + hard key button.

Select the B axis then press + hard key button.

When each axis has completed finding the reference position this \bigcirc symbol will appear to the left of the axis. Press the JOG, MPG or AUTO hard keys to exit the Reference submode.

NOTE

In the reference mode the position display will indicate the actual position in WCS (X, Y, Z) or MCS (X1, Y1, Z1). The ACT. VAL. MCS soft key can be used to toggle between the WCS and MCS coordinate display.

5.2 TOOL DIAMETER INPUT To enter tool diameter offsets follow the next steps:

- 1. Press the OFFSET hard key.
- 2. Press the Tool List soft key.
- 3. Use the cursor keypad arrows, cursor down and over to highlight the diameter (Ø symbol) for the desired tool.
- 4. Type in the diameter amount, then press the INPUT hard key.

OFFSE	T												
Tool	lis	t											
Loc	Тур	Tool name	DP	1st cutt	ing edge			₽	4	÷.			
				Length	ø		N		1	2			- 1
₽												Measure tool	
1	Ø	1	1	0.0000	0.00000	0.0		Q					
2	≝	2	1	0.0000	0.50000		Ø	Q				Delete tool	
3	趟	3	1	0.0000	0.00000		Ø	Q					mä
4	趟	4	1	0.0000	0.00000		0	Q				Unload	
5	趱	5	1	0.0000	0.00000		0	Q					
6	趱	6	1	0.0000	0.00000		0	Q					
7	趱	7	1	0.0000	0.00000		0	Q					
8	₫	8	1	0.0000	0.00000		0	Q				Guttin	
9	₫	9	1	0.0000	0.00000		0	Q				Cutting edges	1
10	趱	10	1	0.0000	0.00000		0	Q					
11	₫	11	1	0.0000	0.00000		0	2				Sort	
12	₫	12	1	0.0000	0.00000		0	2					
13	₫	13	1	0.0000	0.00000		0	Q					
											\sum		
	Tool list	Tool wear		Mag zir	a- 💽 W ne 💽 of	ork fset	R	٧ē	R Iri				

5.3 **TOOL WEAR** The operator has the option to adjust the tool length or the tool diameter by an incremental value.

- 1. Press the OFFSET hard key.
- 2. Press the Tool wear soft key.
- 3. Use the cursor keypad arrows, cursor down and over to highlight tool length or diameter.
- 4. Type in incremental amount then press the INPUT hard key.

NOTE

When tool length offset is reset by choosing SET LENGTH from the OFFSET page, wear offsets will be zeroed.

oc	Тур	Tool name	DP	1st cutt	ting ed	qe		
				∆Length		T C		
₽								
1	Ø	1	1	0.0000	0.0000		L	
2	趟	2	1	0.0000	0.0050		L	
3	≝	3	1	0.0000	0.0000		L	
4		4	1	0.0000	0.0000		L	
5	≝	5	1	0.0000	0.0000		L	
6	₩	6	1	0.0000	0.0000		L	
7	₩	7	1	0.0000	0.0000		L	
8	₩	8	1	0.0000	0.0000		L	
9	≝	9	1	0.0000	0.0000		L	Cutti edge
10		10	1	0.0000	0.0000		L	
11		11	1	0.0000	0.0000		L	Sor
12		12	1	0.0000	0.0000		L	
13		13	1	0.0000	0.0000		L	

5.4 MAGAZINE TABLE

٠

Press OFFSET hard key. MAGAZINE soft key displays active tool and turret location.

OFFSE	T					
Magaz	ine				Block magazine loc.	O
Loc	Тур	Tool name	DP	Loc.	Tool	Alternat.
				disabl	State	
₽						
1	Ø	1	1			
2	趟	2	1			
3	趱	3	1		1 I U	
4	趟	4	1			Unload all
5	₫	5	1			911
6	₫	6	1			Relocate
7	₫	7	1			Refocate
8	₫		1			
9	₫	9	1			
10	趱	10	1			
11	₫	11	1			Position- ing
12	₫	12	1			
13	₫	13	1			
		1			$\mathbf{\Sigma}$	
	Tool list	l 🛛 Tool : 🖉 wear		B B Z	aga- ine 🏶 offset 🖪 vari.	

5.5 R VARIABLE TABLE

Press OFFSET hard key. *R vari*. soft key displays the user defined R parameters that can be activated by the program.

OFFSET				
R variabl	les			
R Ø 📒	0.0000000	R 19	0.0000000	
R 1	0.0000000	R 20	0.0000000	
R 2	0.0000000	R 21	0.0000000	
R 3	0.0000000	R 22	0.0000000	
R 4	0.0000000	R 23	0.0000000	
R 5	0.0000000	R 24	0.0000000	
R 6	0.0000000	R 25	0.0000000	
R 7	0.0000000	R 26	0.0000000	
R 8	0.0000000	R 27	0.0000000	Find
R 9	0.0000000	R 28	0.0000000	
R 10	0.0000000	R 29	0.0000000	
R 11	0.0000000	R 30	0.0000000	
R 12	0.0000000	R 31	0.0000000	
R 13	0.0000000	R 32	0.0000000	
R 14	0.0000000	R 33	0.0000000	
R 15	0.0000000	R 34	0.0000000	
R 16	0.0000000	R 35	0.0000000	
R 17	0.0000000	R 36	0.0000000	
R 18	0.0000000	R 37	0.0000000	
				$\mathbf{\Sigma}$
Tool list	Tool wear		fset R vari.	

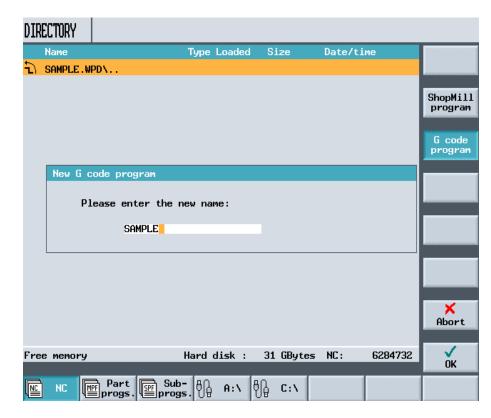
5.6 A NEW PROGRAM FOR AUTO

To create a new program for AUTO follow the next steps:

1. Press the PROGRAM MANAGER hard key.

DIRECTORY				
Name	Type Loaded	Size	Date/time	
SERVICE	WPD X	NCK-Dir.	26.08.2005 23:59	
				New
				Rename
				Mark
				Сору
				Paste
				Cut
Free memory	Hard disk :	31 GBytes	NC: 6284732	Continue
NC Part S	ogs. 🗄 A:\	₽ <u></u>		

- 2. Press the Program soft key.
- 3. Press the New soft key.
- 4. The operator has the option of using Shop Mill or G-code programming by selecting the appropriate soft key.



- 5. Type in the new program name.
- 6. Press the INPUT hard key.

SIEMENS OPERATOR MANUAL

5.7 EDITING AN EXISTING PROGRAM Follow the next steps:

- 1. Press the Program manager hard key.
- 2. Use the cursor keypad arrows, cursor down and over to highlight the program name.
- 3. Press INPUT hard key.
- 4. If the program is in the Shop Mill format, use the blue cursor keys to select (Arrow Up, Arrow Down) and open (Arrow Right) the desired step for editing.

5.8 CHOOSING A PROGRAM TO RUN IN AUTO

NOTE

To choose a program to run in AUTO it must first be active.

- 1. Press the PROGRAM MANAGER hard key.
- 2. Use the cursor keypad arrows, cursor down and over to highlight the program name.
- 3. Press the Execute soft key. The main screen in auto will be active.
- 4. Press the NC CYCLE START hard key to begin automatic operation.

DIR	ECTORY					
ţ	Name		e Loaded	Size	Date/time	Execute
5	SAMPLE.WPD\.					
	SAMPLE	MPF	X	27	04.01.1994 00	
Ð	SAMPLE2	MPF	х	108	04.01.1994 00	:12 New
						Rename
						Mark
						Сору
						Paste
						Cut
Fre	e memory	Hard	disk :	31 GBytes	NC: 62826	84 Continue
	NC Pa	art Sub- ogs. mprogs.	A:\	₽ <u></u> C:\		

5.9 AUTO, RUNNING A PROGRAM

The AUTO button will only execute the currently active program.

To run the currently active program:

- 1. Press the AUTO hard key.
- 2. Press the NC Cycle Start hard key to begin automatic operation.

m auto						
🖉 Reset		/_N_WKS_DIF	R7_N_SAMP	LE_WPD		G
		SAMPLE	SAMPLE			function
Workpiece	Position [inch]		T,F,S			Auxiliary
Х	3.0000		Т			function
Y	3.0000		_		ä↓z	
-			F	0.0000 0.0000	70% in/min	All G functions
Z	0.0000		S	0.000 0.000	<mark>]</mark> 100% I	Run- times
			0%	100%	200%	
Actual block		SAMPLE.MPF				
G500G0						
SETCS						
G1F100X3Y3 M2						
						Machine position
	Over- store		lock arch	•	∑ Real- sim.	Prog.

NOTE

NC Cycle Start is only active in the main Auto Screen.

5.10 MID-TAPE (PROGRAM) START

Using the mid-tape start option of the auto command, the program can be started from any block. The options are available from the BLOCK SEARCH soft keys on the auto display.

m auto						
∥ Reset		/_N_WKS_DIR	/_N_SAMPLE_W	PD		
		SAMPLE	SAMPLE			
Workpiece	Position [in	ich]	T,F,S			
Х	3.0000		Т		ģ↓z	
Y	3.0000		-		⊠≁Z	
Z	0.0000		F 0.0		70% in/min	To end point
2	0.0000		S 0. 0.	000 000	100% I	w/o cal- culation
			0% 10	0%	200%	
Actual block		SAMPLE.MPF				extern- no calc.
G500G0						
SETCS G1F100X3Y3						Find
M2						
						Search pointer
						poincer
						«
				_	$\mathbf{\Sigma}$	Back
) Over- store	NC Prog. NC B. Cntrl.	lock arch		Real- sim.	Prog.

5.11 OEM ALARM (V050805)

ALARM NO.	DEFINITION	REACTION	REMEDY	SOLLUTION
66500 Spindle Orientation Failed	The spindle failed to orient properly	Display alarm. Axis movement disable. NC start disable.	Check the spindle for proper positioning. Check orientation sensor.	Clear alarm with Reset key. Restart part program. Contact Service.
67000 Is The Spindle Empty? If Yes Press Cycle Start To Continue	Verify there is no tool in the spindle before going on with the tool change to avoid damaging the tool magazine. Tool zero is in the spin- dle.	Display alarm. Axis movement disable. NC start disable.	Verify there is not tool in the Spindle and continue as prompted.	Continue part program. Contact Service.
67001 Load Tool Active	The tool load func- tion is active.	Display message. Axis movement disable. NC start disable.	Normal message during tool load.	Continue part program. Contact Service.
67002 Tool (Un)load Not Possible; Tool In Spindle	The spindle is the load/unload position. If a tool is already there tool loading/ unloading is not pos- sible.	Display alarm. Axis movement disable. NC start disable.	Call T0 (tool zero) to remove the tool from the spindle.	Continue part program. Contact Service.
510007 Air/Oil system Fault	Fault in the Spindle Air/Oil system.	Display alarm. Program interrupted. Axis movement disable.	Refer to alarms 700056, 700057, 700058 for the cause.	Press the reset key and re- start the program.
510008 User Feed Stop	User has pressed the Feed Stop key.	Display alarm. Program interrupted. Axis movement disable.	Remove feed stop condition.	Press the Feed Start key or Cycle Start key.
510009 Feed Stop Selected >> Spindle Not Rotating	User feed stop condition prevents the spindle from starting.	Display alarm. Program interrupted. Spindle rotation disable.	Remove feed stop condition.	Press the Feed Start key or Cycle Start key.
510010 ATC Not In Home Position	Automatic Tool changer not in home position.	Display alarm. Program interrupted. Axis movement disable. Spindle rotation disable.	Check tool changer mechanism for malfunctions/obstructions. Bring the DATC arm to home position manually.	Clear alarm with Reset key. Restart part program. Contact Service.
510011 DATC Magazine Out Of Synchronization: Re- referencing needed.	Tool magazine position count has been lost.	Display alarm. NC start disable. Program interrupted.	Bring the tool magazine pocket 1 to tool change position, then run M11.	Alarm will re-set by running M11. Restart part program. Contact Service.

Table 5-1: Alarm List

ALARM NO.	DEFINITION	REACTION	REMEDY	SOLLUTION
510012 Dual Arm Active	The dual arm gripper in the tool changer in movement.	Display alarm. Axis movement disable. Spindle rotation disable.	Normal during tool change. Check dual-arm tool changer interface if dis- played outside tool change.	Clear alarm with Reset key. Restart part program. Contact Service.
510100 DATC Arm Motor Over- load	Dual arm tool changer arm motor overload tripped.	Display alarm. Axis movement disable. Program interrupted.	Check DATC arm for mechanical problems. Check DATC arm motor, brake, and electrical con- nections. Re-set DATC arm motor overload sensor.	Clear alarm with Reset key. Restart part program. Contact Service.
510101 DATC Magazine Motor Overload	Dual arm tool changer magazine motor over- load tripped.	Display alarm. Axis movement disable. Program interrupted.	Check DATC magazine for mechanical problems. Check DATC magazine motor, brake, and electrical connections. Re-set DATC magazine motor overload sensor.	Clear alarm with Reset key. Restart part program. Contact Service.
510102 DATC Arm Time-out	Dual arm tool changer arm failed to move in time allowed.	Display alarm. Axis movement disable. Program interrupted.	Check DATC arm for mechanical problems. Check DATC motor and electrical connections. Check any conditions that will prevent the DATC from normal function (door open, lack of compressed air, etc.)	Clear alarm with Reset key. Restart part program. Contact Service.
510103 DATC Magazine Time- out	Dual arm tool changer magazine failed to move in time allowed.	Display alarm. Axis movement disable. Program interrupted.	Check DATC magazine for mechanical problems. Check DATC magazine motor and electrical con- nections. Check any conditions that will prevent the DATC from normal function (lack of compressed air, motor brake malfunction, etc.)	Clear alarm with Reset key. Restart part program. Contact Service.
510104 DATC Tool Pocket Time- out	Dual arm tool changer tool pocket failed to move in time allowed.	Display alarm. Axis movement disable. Program interrupted.	Check DATC tool pocket for mechanical problems. Check any conditions that will prevent the DATC from normal function (door open, lack of compressed air, etc.) Check tool pocket actua- tion valves, electrical con- nection, fuses.	Clear alarm with Reset key. Restart part program. Contact Service.

Table 5-1: (Continued) Alarm List

SIEMENS OPERATOR MANUAL

ALARM NO.	DEFINITION	REACTION	REMEDY	SOLLUTION
510105 Spindle Draw Bar Arm Time-out	Draw bar mechanism failed to close/open in time allowed.	Display alarm. Axis movement disable. Program interrupted.	Check draw bar for mechanical problems, lack of compressed air. Check spindle for jammed tools. Check any conditions that will prevent the DATC from normal function (door open, lack of compressed air, etc.)	Clear alarm with Reset key. Restart part program. Contact Service.
510106 Z Axis Not In Tool Change Position	DATC is prevented to move because Z axis is not in position.	Display alarm. Axis movement disable. Program interrupted.	Move the Z axis to the cold start position. Check the Z-axis-in-position sensor. Verify Cold Start position.	Clear alarm with Reset key. Restart part program. Contact Service.
510124 ATC Active	Automatic Tool Changer in movement.	Display alarm. Axis movement disable. Spindle rotation disable.	Normal during tool change. Check ATC mechanism if displayed outside tool change.	Clear alarm with Reset key. Restart part program. Contact Service.
510125 Gear Change In Progress	Spindle is undergoing a gear change.	Display alarm. Program interrupted. Spindle rotation disable.	Normal during spindle speed range change. Check belt actuators and /or sensors. Contact Service	Alarm must clear after a few seconds. Power machine off and on. Contact Service.
510126 M5 In Progress	Spindle stop com- mand in progress	Display alarm. Spindle rotation stopped.	Normal during spindle stop.	Alarm must clear once spin- dle stops. Contact Service.
510127 ATC Motor Failure	Automatic Tool Changer failure. Tool changer board failure. Geneva type only: Magazine failed to rotate.	Display alarm. Program interrupted. Spindle rotation disable.	Press Reset key. Check tool changer for mechanical problems. Check air pressure to machine (air-oil board is interlocked). Check emergency stop hardware loop (110VAC cir- cuit is also interlocked).	Press RESET. Contact Service.
510128 ATC only 21 Tools	The tool changer is a 21 tool type and an attempt has been made to use more than 21 tools.	Display alarm. Program interrupted. Spindle rotation disable.	Check the tool number being called. Check the options available for the machine.	Press Reset key. Contact Service.
510200 Option Rigid Tapping Not Available	Rigid tapping was tried in a machine not equipped with this option.	Program interrupted (read-in disabled). Display alarm.	Check the options available for the machine.	Press Reset key. Contact Service.

Table 5-1: (Co	ntinued)	Alarm I	List
----------------	----------	---------	------

ALARM NO.	DEFINITION	REACTION	REMEDY	SOLLUTION
510216 Oiler level too low	Way-lube oiler level too low.	Display alarm. Program interrupted (read-in disabled).	Fill up way-lube oiler reservoir. Program will continue automatically.	Program will continue as soon as oil level is high again. Press Reset key. Contact Service.
510300 POWER ON Needed To Set Spindle Set Up	M83 has been run to measure the spindle belts.	Display alarm. NC-start disabled.	Power the machine off and on.	Power the machine off and on. Contact Service.
510308 Tool Loading Active	The tool loading function is active. A tool loading into the magazine is taking place.	Display alarm. NC-start disabled.	Normal during tool loading. If tool loading is interrupted and alarm lingers, power machine off and on and try tool loading/unloading again.	Press Reset key. Alarm must be cleared to run programs. Contact Service.
510309 Tool Unloading Active	The tool unloading function is active. A tool unloading from the magazine is taking place.	Display alarm. NC-start disabled.	Normal during tool unloading. If tool unloading is interrupted and alarm lingers, power machine off and on and try tool loading/unloading again.	Press Reset key. Alarm must be cleared to run programs. Contact Service.
600108 User Spindle Stop	The spindle stop key in the machine control panel has been pressed.	Display alarm. Axis movement disable. Spindle rotation disable.	Press the spindle start (green key) in the machine control panel. Press the Reset key. Press the Cycle Start key.	Press the Cycle Start key. Contact Service.
600109 Spindle Stop LOCK	The mechanical lock for spindle orientation is engaged.	Display alarm. Spindle rotation disable.	Normal during tool change. Appears when using M19 and M111.	Call an M5, M3, M4 com- mand. Press Reset key for more than 2 seconds Contact Service.
700032 X Axis Needs Referencing	The ìXî axis has not been referenced (cold started).	Display alarm. NC-start disableD until all axes are referenced.	Reference (cold start) the axis.	Reference (cold start) ALL axes. Contact Service.
700033 Y Axis Needs Referencing	The ìYî axis has not been referenced (cold started).	Display alarm. NC-start disableD until all axes are referenced.	Reference (cold start) the axis.	Contact Service. Reference (cold start) ALL axes.
700034 Z Axis Needs Referencing	The ìZî axis has not been referenced (cold started).	Display alarm. NC-start disableD until all axes are referenced.	Reference (cold start) the axis.	Reference (cold start) ALL axes. Contact Service.

Table 5-1.	Continued) Alarm List
	Continueu	Alarin List

ALARM NO.	DEFINITION	REACTION	REMEDY	SOLLUTION
700035 A Axis Needs Referencing	The ìAî axis has not been referenced (cold started).	Display alarm. NC-start disableD until all axes are referenced.	Reference (cold start) the axis.	Reference (cold start) ALL axes. Contact Service.
700036 B Axis Needs Referencing	The ìBî axis has not been referenced (cold started).	Display alarm. NC-start disableD until all axes are referenced.	Reference (cold start) the axis.	Reference (cold start) ALL axes. Contact Service.
700039 Doors Open	Doors-closed monitor- ing circuit open.	Display alarm. User Feed Stop. User Spindle Stop.	Check doors to be com- pletely closed. Check doors-closed moni- toring circuit (sensors, etc.). Check air pressure, air-oil board and auger board (interlocked).	Close doors. Use the Over- ride button in JOG (Manual) mode. Contact service.
700040 Handwheel Available Only In Jog Mode	MPG or INC keys pressed while in Automatic mode.	Display alarm.	Change over to JOG (Manual) mode before using the handwheel.	Contact service if alarm lingers.
700041 Feed Override = 0	A manual movement was attempted while the Feed Override is set to zero.	Display alarm.	Set Feed Override knob to desired setting other than zero. Check Feed Override switch.	Set Feed Override knob to desired setting other than zero. Contact Service.
700042 Please Press MDA hard Key	MDA hard key was pressed when in Shop Mill.	Display alarm. No change to MDA mode until MDA soft key (menu under the screen) is used.	Use MDA soft key to change over to MDA mode in Shop Mill.	Contact Service if alarm lin- gers.
700049 Function Available only in REEMOTE	This function is avail- able only in the Hand Held Unit (Remote MPG).	Display alarm.	Use the Hand Held Units keys or make an axis selec- tion in the machine control panel.	Contact Service if alarm lin- gers.
700050 Chiller Unit Fault	The chiller unit control- ler in the cabinet detected a fault condi- tion.	Display alarm. Machine continues to run but risk of spindle thermal changes occur.	Check chiller temperature sensor connections. Verify power supply to LOGO! Unit. Check LOGO! Unit.	Contact Service if alarm lin- gers.
700051 Move to safe location and perform TEST STOP	CE machines equipped with Safety Integrated require a Test-stop every 8 hours to verify the cor- rect works of the machine safety.	Display alarm. Machine continues to run.	Alarm will be displayed until the axes are moved to a safe location, changed to JOG mode and with the doors open the Override and CYCLE STOP keys are pressed at the same time to initiate the Test Stop check.	Once the Test Stop is per- formed, continue the pro- gram in a normal way. Contact Service if alarm lin- gers.

ALARM NO.	DEFINITION	REACTION	REMEDY	SOLLUTION
700056	The spindle air-oil air pressure is too low.	Display alarm. Machine continues to run.	Check incoming air pres- sure. Check spindle air-oil	Press the RESET key. Con- tact Service if alarm lingers.
Air Pressure Failure			air pressure sensor.	
700057	The spindle air-oil oil pressure is too low.	Display alarm. Machine continues to run.	Check oil pressure when oiler is activated. Check	Press the RESET key. Con- tact Service if alarm lingers.
Oil Pressure Failure			spindle air-oil oil pressure sensor.	
700058	The spindle air-oil oiler needs to be refilled.	Display alarm. Machine continues to run.	Re-fill oiler reservoir. Check reservoir level sensor.	Press the RESET key. Con- tact Service if alarm lingers.
Spindle Oiler Level Too Low				

Table 5-1: (Continued) Alarm List

5.12 M CODES

Table 5-2: M code list

CODE	FUNCTION	NOTES
MO	Unconditional NC stop	
M1	Conditional NC stop	
M2	NC program end	
M3	Spindle CW	
M4	Spindle CCW	
M5	Spindle Stop	
M6	Execute tool change	
M7	Activate Coolant 1	
M8	Activate Coolant 2	
M9	Stop all coolant	
M11	Set current tool pocket number to 1	Used to re-synchronize tool magazine
M19	Orient tool and lock	
M31	Exchange pallet	Reserved
M32	Call pallet A	Reserved
M33	Call pallet B	Reserved
M34	Unload pallet	Reserved
M40	Spindle auto gear range change	
M41	Spindle change to low gear	
M42	Spindle change to high gear	
M52	Air/Oil oil Priming	Air/Oil oil pump cycled once
M60	Set M60/M61 output	Misc. M Function. Apply A axis brake.
M61	Reset M60/M61 output	Misc. M Function. Release A axis brake.
M62	Set M62/M63 output	Misc. M Function. Apply B axis brake.
M63	Reset M62/M63 output	Misc. M Function. Release B axis brake.
M64	Set M64/M65 output	Misc. M Function. Also probe 1
M65	Reset M64/M65 output	Misc. M Function. Also probe 2
M66	Set M66/M67 output	Misc. M Function
M67	Reset M66/M67 output	Misc. M Function

CODE	FUNCTION	NOTES
M68	Set M68/M69 output	Misc. M Function
M69	Reset M68/M69 output	Misc. M Function
M83	Spindle set-up	
M84	Spindle belt measurement	
M85	Activate A axis	
M86	Deactivate A axis	Used to remove rotary table
M87	Activate B axis	
M88	Deactivate B axis	Used to remove rotary table
M111	Lock spindle	Triggered by orientation magnet
M150	Actuate Auger/HydroSweep	

Table 5-2: (Continued) M code list

INDEX

Α

(ATC) 26 A NEW PROGRAM FOR AUTO 67 AIR PRESSURE 2 AUTO, RUNNING A PROGRAM 71

В

BASE OFFSET 34

С

CHOOSING A PROGRAM TO RUN IN AUTO 70 COORDINATE SYSTEMS 32

Е

EDITING AN EXISTING PROGRAM 69 ESTABLISHING SPINDLE RPM 28

F

FINDING MACHINE REFERENCE (COLD START) 62 FLOOD COOLANT 3

G

GENERAL INFORMATION 61

Н

HAND HELD UNIT (HHU) 15

I INDEX 81

J JOG MODE 21

L

LOADING AND UNLOADING A TOOL FROM TOOL CHANGER LOWER MACHINE CONTROL PANEL (MCP) 13

M M CODES 79

MAGAZINE TABLE 65 MANUAL DATA AUTOMATIC (MDA) 20 MANUAL OPERATION 19 MANUAL TOOL LOADING AND UNLOADING 25 MANUALLY JOGGING THE DATC 27 MID-TAPE (PROGRAM) START 72

0

OEM ALARM (V050805) 73 OFFSETS 31 OFFSETS 34 OIL RESERVOIR 2

Ρ

PENDANT HARD KEYS FUNCTION GUIDE 7 PENDANT KEYBOARD 7 PENDANT LAYOUT / HHU 5 POWER OFF 4 POWER ON /OFF 1 POWER ON 4 POWER ON/OFF 4

R

PRE-START CHECKING STEPS 2 R VARIABLE TABLE 66 RAPID JOG 24

S

SETTING INCREMENT 21 SETTING TOOL LENGTH OFFSET 57 SPINDLE COOLER RESERVOIR 3 SPINDLE OFF 29 SPINDLE OPERATION 28 SPINDLE START 29

Т

TOOL DIAMETER INPUT 63 TOOL OFFSET 34 TOOL OPERATION 25 TOOL WEAR TABLE 64

U

UPPER MACHINE CONTROL PANEL (MCP) 10 USING THE MEASURE TOOL SOFT KEY TO SET THE TOOL OFFSET 47 USING THE MEASURE WORKPIECE SOFT KEY TO SET THE BASE AND ZERO OFFSETS 39 USING THE SET BASE SOFT KEY TO SET THE BASE OFFSET 36 USING THE TOOL SOFT KEY TO SET THE TOOL OFFSETS 55 USING THE ZERO OFFSET SOFT KEY TO SET THE BASE AND ZERO OFFSETS 54

W WATER RESERVOIR 3

Z ZERO OFFSET 34