Section 18: Fuses, Heaters, Parameters

FUSE LIST FOR FADAL VMC　　　　　　　　　　　LBL-0017 Rev. D 3-17-03

TYPE	AMPS	PART#	DESCRIPTION	RELAY	PART#	LOC	BRN	WHT
			1100-1					
F9 ...MDL	5		SPINDLE COOLER PUMP	K15	ELE-0070	TB2	18	17
CB4 .... ETA	2.5	ELE-0098						
F10...AGC	2		DUAL PROBE INTERFACE - M64 / M65	K16	ELE-0070	TB2	36	RET
F11...AGC	2		A-AXIS BRAKE SOLENOID (OPT.) - M60 / M61	K17	ELE-0937	TB2	40	RET
F14...AGC	2		EMERGENCY STOP	controls K1 & K2	K20	ELE-0937	TB2	26	-
F16... MDA	10		120 VAC Power Input to 1100-1					
F17...AGC	2		SERVO CHASSIS POWER			TB1	8	9
F18...AGC	2		COOLANT TWO PUMP	K22	ELE-0070	TB2	24	23
F21... --	--		M18 – Air Indexer	K25	--	TB2	14	15
F22...MDL	5		FLOOD COOLANT PUMP	K26	ELE-0070	TB2	28	27
CB7... ETA	2.5	ELE-0098	for 60Hz, all machines except 2016L and 3016L					
CB7... ETA	3.5	ELE-0993	for 2016L, 3016L, or 50Hz					
F23...AGC	1		AXIS AMP FANS			TB2	2	1
F25...MDL	5		120 VAC PENDANT			TB2	4	3
F27...AGC	3		CABINET COOLING FANS			TB2	10	9
F29...AGC	2		MP12 TRANSFORMER			TB2	6	5
CB1...KD1	2.5	ELE-0086						
F30...AGC	2		VALVE COIL, HI RANGE IDLER ARM	K27	ELE-0937	TB2	14	13
F31... --	--		M68 / 69	K28	ELE-0070	TB2	16	RET
F34...AGC	2		VALVE COIL, LO RANGE IDLER ARM	K10	ELE-0937	TB2	34	33
F40...			M66 / 67	K31	ELE-0070	TB2	20	RET
F41... --	--		SPARE-2	K32	--	TB2	22	21
F42...MDL	3		CE DOOR LOCK (Power for 2030 board)			TB2	8	7
F43... --	--		SPARE			TB2	12	11
CB2...KD1	--		--					
F44...AGC	2		B-AXIS BRAKE SOLENOID (OPT.) - M62 /63	K8	ELE-0937	TB2	38	RET
			1100-2					
F1 ...AGC	1		SPINDLE ON	controls K3	K7	ELE-0937*	TB1	19	20
F3 ...AGC	1		SPINDLE REVERSE	controls K4	K9	ELE-0937*	TB1	17	18
F4 ...AGC	2		SERVO TURRET	K12	ELE-0937*	TB1	31	--
CB7 ...KD1	2.5	ELE-0086						
F5 ...AGC	1		TURRET MOTOR REVERSE	controls K5	K11	ELE-0937*	TB1	7 & 5	-
F6 ...ABC	5		TURRET MOTOR (GENEVA) passes thru K33	K12	ELE-0070	TB1	6	8
-or-...ABC	5		TURRET MOTOR (SERVO) passes thru K33	K12	ELE-0937*	TB1	6	8
CB2 ...KD1	2.5	ELE-0086	for 60Hz					
CB2 ...KD1	3	ELE-0087	for 50Hz					
F7 ...AGC	1		ATC SLIDE MOTOR REVERSE	controls K6	K13	ELE-0937*	TB1	3 & 5	-
F8 ...AGC	5		ATC SLIDE MOTOR	K14	ELE-0070	TB1	2	4
CB1 ...KD1	2.5	ELE-0086	for 60Hz					
CB1 ...KD1	3	ELE-0087	for 50Hz					
F13...AGC	2		WAY LUBRICATOR	K19	ELE-0937	TB1	11	12
F15...AGC	2		AIR THROUGH SPINDLE	K21	ELE-0937	TB1	15	16
F19...AGC	2		VALVE COIL, SPINDLE ORIENTATION	K23	ELE-0937	TB1	27	28
F20...AGC	2		VALVE COIL, DRAWBAR	K24	ELE-0937	TB1	23	24
F24...MDL	3		SPINDLE MOTOR FAN			TB1	29	30
CB8 ...KD1	3	ELE-0087	for 60Hz					
CB8 ...KD1	5	ELE-0089	for 50Hz					
F26... MDA	10		120 VAC Power Input to 1100-2					
F28...AGC	3		COOLING FAN			TB1	21	22
F32... --	--		Spare-4	K29	--	TB1	9	10
F33... --	--		Spare-1	K30	--	TB1	13	14
			1100-3 PALLET CHANGER					
F1 ...AGC	1		HYDRAULIC PUMP STARTER	K1	ELE-0070	J2	1	2
F2 ...AGC	1		PALLET TO TABLE VALVE	K2	ELE-0937	J2	3	4
F3 ...AGC	1		PALLET TO STORAGE VALVE	K3	ELE-0937	J2	5	6
F4 ...AGC	1		OPEN PALLET DOOR SOLENOID	K4	ELE-0937	J2	7	8
F5 ...AGC	1		UNCLAMP SOLENOID	K5	ELE-0937	J2	9	10
F9 ...MDA	10		MAIN 120 VAC POWER SUPPLY					
F10...AGC	3		24V DC TO LIGHT CURTAIN					
			MISCELLANEOUS					
F1 ...MDL	7		120 VAC INPUT	K1	ELE-0071			DC POWER SUPPLY
...AGC	3		DISK DRIVE POWER			1270		
			AUGER PUMP	K1	ELE-0070	1310		
			AUGER VALVES, CONTACTOR, ETC.	K2-4, K6, K101	ELE-0937	1310		
CB1...ETA	3.5	ELE-0993	DUAL-ARM TOOL CHANGER 120 VAC	K1-K4	ELE-0937	1330		
CB1...KD1	10	ELE-1492	SERVO TURRET POWER SUPPLY (1350-0 uses MDA 6 fuse)			1350-1		
F1 ... MDA	15		CHILLER AND PUMP			1560		
F1 ...MDL	5		HYDROSWEEP CONTROL	K1-9	ELE-0070	1790		
F1, F2 ...AGC	10		SERVO TURRET AMP			1810-0-1		
F1 ...AGC	2		AIR/OIL CONTROL			1980		
			BEACON, 32MP POWER SUPPLY	K1, K2	ELE-0070	1990-1 & 1990-2		
			SPINDLE RELAY CONTROL	K1	ELE-0937*	2000 (CE machines)		
			AXIS CONTACTOR CONTROL	K8	ELE-0937	2030 (CE machines)		
... BLN OR KLK	30	ELE-0837	SERVO AMP CHASSIS INPUT (AC BRUSHLESS)					
... KTK OR KLK	20	ELE-0994	SERVO AMP CHASSIS OUTPUT (AC BRUSHLESS)					
... T16L250AC			SERVO COOLANT AMP			in 120V Inlet or Amp		

Solid state relays are:　ELE-0070 (Crouzet GA8-6B02 or Magnecraft 70S2-04-B-03-V, rated 3 amps, color black),
　　　　　　　　　　ELE-0937 (Crouzet M-0AC5-315, rated 1 amp, color yellow, or Grayhill 70YY14350, color green) (Grayhill 70YY14303 may be substituted for those marked "*".)
　　　　　　　　　　ELE-0071 (Grayhill, 70YY21084, drops out at 4.7V, color white)

All mechanical relays are   ELE-0072 (Omron MY4N-AC110/120 or equivalent).
THERMAL OVERLOAD HEATERS: B4.15 Coolant Thru Spindle Pump (3/4 Hp)   B4.85 Pallet Changer Hydraulic Pump (1 Hp)   B12.8 Wash Down Pump (3 Hp)

VMC with fuses at Main Disconnect ***		INPUT VOLTAGE		AMPERAGE	CLASS
60Hz 3-Phase	2216 / 3016 /4020	208V / 240V / 480V	60Hz 3-phase	45 / 40 / 20	RK1, 600V
	4020A / 5020A / 6030 / 8030 & HT	208V / 240V / 480V	60Hz 3-phase	50 / 45 / 25	RK1, 600V
	All VHT models	230V	60Hz 3-phase	60	RK5, 600V
Single Phase	All models except VHT	240V	60Hz 1-phase	40 (45 for HT models)	RK5, 600V
50Hz 3-Phase	2216 / 3016 / 4020	380-415V	50Hz 3-phase	25	RK5, 600V
	6030 / 8030 & all HT models	380-415V	50Hz 3-phase	30	RK5, 600V
	All VHT models	230V	50Hz 3-phase	60	RK5, 600V

*** Machines with slant sheet metal have a circuit breaker in place of fuses at the main power disconnect

FUSE LIST FOR EMC
Fadal EMC Fuse List LBL-0501 Rev. A 2-4-03

	TYPE	AMPS	PART#	DESCRIPTION	RELAY	PART#	LOC	BRN	WHT
1100-1									
F9	MDL	5		SPINDLE COOLER PUMP	K15	ELE-0070	TB2	18	17
CB4	ETA	2.5	ELE-0098						
F10	AGC	2		DUAL PROBE INTERFACE M64 / M65	K16	ELE-0070	TB2	36	RET
F11	AGC	2		A-AXIS BRAKE SOLENOID M60 / M61	K17	ELE-0937	TB2	40	RET
F14	AGC	2		EMERGENCY STOP controls K1 & K2	K20	ELE-0937	TB2	26	-
F16	MDA	10		120 VAC INPUT TO 1100-1					
F17	AGC	2		AXIS AMPLIFIER CHASSIS POWER			TB1	8	9
F18	AGC	2		COOLANT TWO PUMP	K22	ELE-0070	TB2	24	23
F21	--	--		M18	K25	ELE-0070	TB2	14	15
F22	MDL	5		FLOOD COOLANT PUMP	K26	ELE-0070	TB2	28	27
CB7	ETA	2.5	ELE-0098	for 60HZ, all machines except 2016L and 3016L					
CB7	ETA	3.5	ELE-0993	for 2016L, 3016L, or 50Hz					
F23	AGC	1		AXIS AMP FANS			TB2	2	1
F25	MDL	5		120 VAC PENDANT			TB2	4	3
F27	AGC	3		CABINET COOLING FANS			TB2	10	9
F29	AGC	2		MP12 TRANSFORMER			TB2	6	5
CB1	KD1	2.5	ELE-0086						
F30	AGC	2		VALVE COIL, HI RANGE IDLER ARM	K27	ELE-0937	TB2	14	13
F31	--	--		M68 / 69	K28	ELE-0070	TB2	16	RET
F34	AGC	2		VALVE COIL, LO RANGE IDLER ARM	K10	ELE-0937	TB2	34	33
F40	--	--		M66 / 67	K31	ELE-0070	TB2	20	RET
F41	--	--		SPARE-2	K32	ELE-0070	TB2	22	21
F42	MDL	3		CE DOOR LOCK (2030-0A)			TB2	8	7
F43				SPARE			TB2	12	11
CB2	KD1	--							
F44	AGC	2		B-AXIS BRAKE SOLENOID M62 /63	K8	ELE-0937	TB2	38	RET
1100-2									
F1	AGC	1		SPINDLE ON controls K3	K7	ELE-0937	TB1	19	20
F3	AGC	1		SPINDLE REVERSE controls K4	K9	ELE-0937	TB1	17	18
F4	AGC	2		SERVO TURRET	K12	ELE-0937	TB1	31	-
CB7	KD1	2.5	ELE-0086						
F5	AGC	1		TURRET MOTOR REVERSE controls K5	K11	ELE-0937	TB1	7 & 5	-
F6	ABC	5		TURRET MOTOR (GENEVA) passes thru K33	K12	ELE-0070	TB1	6	8
-or-	ABC	5		TURRET MOTOR (SERVO) passes thru K33	K12	ELE-0937	TB1	6	8
CB2	KD1	2.5	ELE-0086	for 60Hz					
CB2	KD1	3	ELE-0087	for 50Hz					
F7	AGC	1		ATC SLIDE MOTOR REVERSE controls K6	K13	ELE-0937	TB1	3 & 5	-
F8	AGC	5		ATC SLIDE MOTOR	K14	ELE-0070	TB1	2	4
CB1	KD1	2.5	ELE-0086	for 60Hz					
CB1	KD1	3	ELE-0087	for 50Hz					
F13	AGC	2		WAY LUBRICATOR	K19	ELE-0937	TB1	11	12
F15	AGC	2		AIR THROUGH SPINDLE	K21	ELE-0937	TB1	15	16
F19	AGC	2		VALVE COIL, SPINDLE ORIENTATION	K23	ELE-0937	TB1	27	28
F20	AGC	2		VALVE COIL, DRAWBAR	K24	ELE-0937	TB1	23	24
F24	MDL	3		SPINDLE MOTOR FAN			TB1	29	30
CB8	KD1	3	ELE-0087	for 60Hz					
CB8	KD1	5	ELE-0089	for 50Hz					
F26	MDA	10		120 VAC INPUT TO 1100-2					
F28	AGC	3		COOLING FAN			TB1	21	22
F32	--	--		SPARE-4	K29	--	TB1	9	10
F33	--	--		SPARE-1	K30	--	TB1	13	14

MISCELLANEOUS

	TYPE	AMPS	PART#	DESCRIPTION	RELAY	PART#	LOC
	KTK or KLK20		ELE-0994	SERVO AMP X,Y,Z,A POWER INPUT			
	AGC	3		DISK DRIVE POWER			1270-2
F1	TR5 373	1	ELE-1485	Z-AXIS BRAKE			1290-0
				BEACON, 32MP POWER SUPPLY	K1,K2	ELE-0070	1990-1 & 1990-2
F1	MDL	7		POWER SUPPLY MAIN 120 VAC	K1	ELE-0071	DC Power Supply
				SPINDLE RELAY CONTROL	K1	ELE-0937	2000 (CE machines)
				AXIS CONTACTOR CONTROL	K8	ELE-0937	2030 (CE machines)

Solid state relays are:
ELE-0070 (Crouzet GA8-6B02 or Magnecraft 70S2-04-B-03-V, rated 3 amps, color black),
ELE-0937 (Crouzet M-0AC5-315, rated 1 amp, color yellow)
ELE-0071 (Grayhill, 70YY21084, drops out at 4.7V, color white)
All mechanical relays are ELE-0072 (Omron MY4N-AC110/120 or equivalent).

TOOL ROOM MILL FUSE LIST

Fuse List for Tool Room Mill - LBL-0500 Rev. A 1-29-03

FUSE TYPE	AMPS	PART#	DESCRIPTION	RELAY	PART#	PINK
WHITE						

1100-5

TERMINALS

CB1 .... KD1 .... 5 ..... ELE-0089 .... 18 VAC INPUT TO 1100-5

.... SPINDLE FWD (controls K3 relay) .... K7   ELE-1649 .... TB2 .... 19 20

.... SPINDLE REV (controls K4 relay) .... K9   ELE-1649 .... TB2 .... 17 18

F1 .... TR5 374 ...... 2 ..... ELE-1487 .... SPARE (jumper selectable) optional .... K40   ELE-1649 .... TB3 ...... 1 2

F2 .... TR5 374 ...... 2 ..... ELE-1487 .... SPARE (jumper selectable) optional .... K41   ELE-1649 .... TB3 ...... 3 4

F14 ...... TR5 374 ...... 2 ..... ELE-1487 .... EMERGENCY STOP (controls K1 & K2 relays) .... K20   ELE-1649 .... TB2 .... 26 .... --

F15 ...... TR5 374 ...... 2 ..... ELE-1487 .... AIR THROUGH SPINDLE .... K21   ELE-1649 .... TB2 .... 15 16

F18 ...... TR5 374 ...... 2 ..... ELE-1487 .... COOLANT TWO PUMP .... K22   ELE-1649 .... TB2 .... 24a 23a

F20 ...... TR5 374 ...... 2 ..... ELE-1487 .... DRAWBAR .... K24   ELE-1649 .... TB2 .... 23 24

F25 ...... TR5 374 ...... 2 ..... ELE-1487 .... BEACON .... K6   ELE-1649 .... TB5 ...... 1 2

F11 ...... TR5 374 ...... 2 ..... ELE-1487 .... M60 / M61 .... K17 .... TB2 39 & 40

DC POWER SUPPLY

CB .... KD1 .... 5 .... POWER SUPPLY MAIN 240 VAC

Tool Room Mill uses 24 VDC solenoids.

All solid state relays except K17 are DC. Use ELE-1649 Crouzet type MODC5, Grayhill type 70M-ODC5, or equivalent.
The relay used for K17 is dependent on what M60/M61 controls.

All mechanical relays have 24 VDC coil. Use ELE-1110, Omron MY4N-DC24.

All fuses are Wickman TR5 No. 374 or Littlefuse LT-5 665 series subminiature fuses.
Use an insulated alligator clip to remove fuse. Always power off machine before removing or inserting fuses.

Table 1: Parameter Settings

Options in SETP Mode	Available Formats	Factory Setting	Customer Preference
There are two Program Formats available. Do you want 6MB/10M/11M compatibility (Format 2)?	1&2	2	
Enter the default Baud rate (the rate after power on)	1&2	6	
Should spindle come on automatically after a tool change when the M6 had to turn the spindle off?	1&2	1	
Enter the Axis Configuration	1&2		
Enter X,Y,Z travel	1&2		
Enter the Pendant style	1&2	3	
Enter the default value (G0,G1)	1&2	2	
Enter the A axis ratio	1&2		
Does M60 turn on the A axis brake?	1&2		
Enter the default value (G90,G91)	1&2	1	
Enter the B axis ratio	1&2		
Does M62 turn on the B axis brake?	1&2		
Enter the default value (G17,G18,G19)	1&2	1	
Enter the Tool Changer capacity	1&2		
Should a Fixed Cycle execute immediately?	1		
Enter the Spindle RPM Adjustment factor The factor must be between 0 and 31	1&2		
Enter the Spindle Drive Type and RPM	1&2		
Enter the Spindle Orientation RPM Adjustment factor The factor must be between 0 and 31	1&2		
Enter the default value (Inch, Metric)	1&2	1	
Enter M7, M8 preference	1&2	2	
Is your 3 Phase power more than 5% low?	1&2	2	
Select Punch Output format	1&2	2	
Enter the N Word sequence configuration	2	1	
Will the Tool Compensation Table have the radius or the diameter?	2	1	
Enter the default outside corner movement (M96,M97)	1&2	1	
Select the number of binary buffers for CNC look ahead	1&2	5	
Do you have the High Torque or Rigid Tapping option?	1&2		
Do you want the spindle to turn off when exiting JOG or MANUAL DATA INPUT?	1&2	1	
Enter the Engagement factor for the Tool Turret Geneva Gear The factor must be between 1 and 50 **Note:** For Servo Turret the factor must ALWAYS be 1	1&2		

Table 1: Parameter Settings

Options in SETP Mode	Available Formats	Factory Setting	Customer Preference
Turn the Command Menus ON or OFF?	1&2	3	
Do you have a Pallet Changer?	1&2		
Enter the Gain factor for Rigid Tapping The factor must be between 0 and 255	1&2		
Enter the Ramp factor for Rigid Tapping The factor must be between 0 and 255	1&2		
Enter the Graphics Aspect Ratio of Y to X	1&2	65	
Select the Automatic Tool Timer mode	1&2	1	
Enter the Motor Overload factor The factor must be between 1 and 8	1&2	2	
Select the Screw Pitch type	1&2		
Select the Maximum Rapid Feed Rate	1&2		
Enter the X, Y, & Z Ramp Length factor The factor must be between 50 and 200	1&2		
Enter the Z Gain during Rigid Tapping	1&2		
Do you have a vector drive (10 RPM min).	1&2		
Display the axis following error or Load?	1&2	1	
Automatically apply the A or B brake during Idle Time?	1&2	2	
Which rotary axis is installed on this pallet	1&2	1	
Do you have the 5th axis programmable head attachment?	1&2	1	
Enter the detail desired for G0 moves between 2 to 250 (241=Off)	1&2	241	
Do you have air valve feedback?	1&2	2	
Wait until spindle is at-speed before next block is executed?	1&2	1	
Enter slide hold ramp factor between 1 to 10 (10 is Standard)?	1&2	10	
Is this a Manual Machine with 1 MPG for each Axis?	1&2		

Machine Parameters   This section covers parameter settings and their purpose.

To enter the parameter setting area of a Fadal VMC, type "**SETP**" at the "**ENTER NEXT COMMAND**" prompt and press the <**ENTER**> key.

To enter the parameters using the menus; enter the "**Function Menu**" then select "**2 Memory**" then "**6 Settings**" and "**2 Parameters**".

The selected parameter will be stated under the parameters listed for that page with all the possible selections and the current selection with an "*" sign.

To navigate the parameters, the <**ENTER**> key will move to the next parameter each time it is pressed, the "**D**" key will move to the next line down, the "U" key will move to the last line above and the "**P**" will move to the next page of parameters.

To change a parameter, select the parameter and enter the number of the setting to be changed to and press the <**ENTER**> key.

Many of the parameter changes will require machine to be powered off and back on to make the change take effect.

Note: Machine factory set parameter settings are located inside the pendant door.

Note: The current machine software will have three pages of parameters. Older software revisions may not have all of the parameters listed in this document.

**Machine Parameters:
Page One**

FORMAT   DO YOU WANT MAXIMUM 6MB/10M/11M CAPABILITY?

1)NO, ORIGINAL FADAL STYLE – FORMAT 1
2)YES, FORMAT 2

THERE ARE TWO PROGRAM OPERATION FORMATS AVAILABLE.
This parameter allows the user to select Fanuc 6MB/10M/11M compatibility. The operational difference between the two formats depends upon the coding used.

BAUD RATE   ENTER DEFAULT BAUD RATE (THE RATE AFTER POWER-ON)

1) 110	5) 1200	9) 19200
2) 150	6) 2400	10) 38400
3) 300	7) 4800	11) 57600
4) 600	8) 9600	12) 115200

The operator may select the desired communications baud rate.

SPINDLE AFTER M6   SHOULD SPINDLE COME ON
AUTOMATICALLY AFTER A TOOL CHANGE
WHEN THE M6 HAD TO TURN THE SPINDLE
OFF?

1)NO (FADAL RECOMMENDS THIS RESPONSE)
2)YES
IF YES, ALL PERSONNEL MUST BE AWARE OF THE POSSIBILITY OF OVER SPEEDING A TOOL BEFORE THE NEW S-WORD IS ENCOUNTERED

When this parameter is selected as YES, the spindle automatically turns on after the tool change. The spindle comes on at the last programmed spindle speed. This may cause an overspeed of the next tool. **It is recommended that this parameter is set to number 1.**

AXES: X,Y,Z   ENTER THE AXIS CONFIGURATION

1)A
2)A, B
3)X,Y,Z
4)X,Y,Z,A
5)X,Y,Z,A,B
6)X,Y,Z,B
7)C only

When selecting the axes, the machine must be powered off. When the power is returned the axes selected will be active. COLD START must be performed. The axes that are not selected will be inactive, the CPU will not look for them or try to move them.

TRAVEL   ENTER X,Y,Z TRAVEL

1) X22 Y16 Z20	8) X40 Y20 Z28	15) X50 Y20 Z20	22) X65 Y35 Z34
2) X20 Y12 Z20	9) X60 Y30 Z30	16) X50 Y20 Z28	23) X85 Y35 Z34
3) X45 Y25 Z24	10) X22 Y16 Z28	17) X80 Y30 Z30	24) X30 Y14 Z14
4) X45 Y25 Z32	11) X20 Y16 Z20	18) X30 Y20 Z24	
5) X22 Y13 Z20	12) X20 Y16 Z28	19) X30 Y20 Z32	
6) X20 Y13 Z20	13) X30 Y16 Z20	20) X20 Y20 Z24	
7) X40 Y20 Z20	14) X30 Y16 Z28	21) X20 Y20 Z32	

The machine travel limits are selected with this parameter. This parameter will default to selection 7 if parameters are lost.

DANGER!   Serious damage to machine may occur if this parameter is set incorrectly.

PENDANT   ENTER THE PENDANT STYLE

1)KEYBOARD BESIDE THE VIDEO TUBE
2)KEYBOARD BELOW THE VIDEO TUBE
3)SAME AS 2 BUT MOUNTED ON FULL-ENCLOSURE CHIP GUARDS

Select the appropriate pendant location for the machine. When option 2 is selected the table may make a Y axis positive move before a tool change. This occurs only when the Y axis is five inches or more, in the negative direction, from the cold start position.

DEFAULT: G0   ENTER THE DEFAULT VALUE

1)G0
2)G1

The code selected is active at power on and when entering the MDI mode. The G0 is rapid travel and the G1 is linear interpolation (travels at a stated feedrate).

A-AXIS RATIO   ENTER A-AXIS RATIO
Note: Displayed only when
            A axis selected

1) 90:1
2) 180:1
3) 360:1
4) 120:1
5) 72:1
6) COOLANT
7) 60:1
8) 144:1

Select the appropriate gear ratio for the rotary table being used or select the servo coolant option (see rotary table nameplate for ratio).

M60/A-AXIS BRAKE   DOES M60 TURN ON THE A-AXIS BRAKE?
Note: Displayed only when
            A axis selected

1) YES
2) NO

Select the option desired to activate or de-activate the air for the axis brake.

DEFAULT: G90   ENTER THE DEFAULT VALUE

1)G90
2)G91

The code selected is active at power on and when entering the MDI mode. The G90 is absolute positioning and the G91 is incremental positioning.

B-AXIS RATIO　ENTER B-AXIS RATIO
Note: Displayed only when
　　　B axis selected

1) 90:1
2) 180:1
3) 360:1
4) 120:1
5) 72:1
6) COOLANT
7) 60:1
8) 144:1

Select the appropriate gear ratio for the rotary table being used or select the servo coolant option (see rotary table nameplate for ratio).

M62/B-AXIS BRAKE　DOES M62 TURN ON THE B-AXIS BRAKE?
Note: Displayed only when
　　　B axis selected　　　　1)YES
　　　　　　　　　　　　　　2)NO

Select the option desired to activate or de-activate the air for the axis brake.

DEFAULT: G17　ENTER THE DEFAULT VALUE

　　　　　　　　　1)G17
　　　　　　　　　2)G18
　　　　　　　　　3)G19

This parameter is used to select the default machine plane. The G17 selects the XY plane, the G18 selects the ZX plane and the G19 selects the YZ plane.

TOOL CHANGER　ENTER THE TOOL CHANGER CAPACITY
CAP
1) 16 TOOL ATC
2) 21 TOOL ATC
3) 30 TOOL ATC
4) 24 TOOL DATC　(Dual Arm Tool Changer)
5) 32 TOOL DATC　(Dual Arm Tool Changer)
6) 62 TOOL DATC　(Dual Arm Tool Changer)
7) NONE　　　　　(TRM)

Select the appropriate tool changer capacity

IMM. FIXED CYCLE   SHOULD A FIXED CYCLE EXECUTE IMMEDIATELY?

Note: Displayed only when
        Format 1 is selected.

1)YES
2)NO, ONLY IF X OR Y DIMENSION WORDS ARE IN THE DEFINITION LINE

A YES response causes a fixed cycle to be executed immediately upon definition at the current axis location. A NO response requires axis motion to activate the fixed cycle.

RPM FACTOR   ENTER THE SPINDLE RPM ADJUSTMENT
FACTOR. THE FACTOR MUST BE BETWEEN 0 AND 31.

This parameter adjusts the speed command signal voltage from the spindle controller card to the spindle drive in small increments in order to adjust the spindle RPM. Adjustment procedure: run the spindle at the desired RPM with a M49. Measure the spindle speed with a tach or read the RPM on the spindle vector drive (remember that the drive is motor speed so you must account for the pulley ratio). Change the RPM factor for the closest RPM.

SPINDLE TYPE   ENTER THE SPINDLE DRIVE TYPE & RPM

1)10,000 HI/LOW
2)10,000 3 STEP
3)15,000 DIRECT
4)5,000 HI/LOW
5)6,500 HI/LOW
6)3750 WYE/DEL.
7)7500 WYE/DEL.
8)5000 DIRECT
9)15K WYE/DEL.

Select the correct spindle type for the machine. If set incorrectly the spindle RPM will most likely be incorrect and performance will be poor. The RPM is the maximum spindle RPM and the type after the RPM is: DIRECT which means one belt selection only, 3 STEP has three belt ranges but must be changed manually, HI/LOW is changed between two range is performed by idler arms or the WYE/DELTA changes motor wiring configuration by using relays.

| ORIENTATION FACTOR | ENTER THE SPINDLE RPM ADJUSTMENT
FACTOR THE FACTOR MUST BE BETWEEN 0 AND 31 |

This parameter adjusts the speed command signal voltage from the spindle controller card to the spindle drive in small increments in order to adjust the spindle RPM during orientation. Find a factor that works for both high and low range.

To set, observe the orientation of the spindle. If it appears to be too fast with overshooting then lower factor, if it is too slow or does not always go around far enough then increase the factor. Check both ranges before completing selection. Normal setting is around 10 to 12.

Machine Parameters: Page Two

DEFAULT: INCH   ENTER THE DEFAULT VALUE

1)INCH
2)METRIC

The operator selects the mode (inch or metric) for the machine. The G70, G71, G20 and G21 check this setting to verify the operational mode.

M7-FLOOD M8-MIST   ENTER M7, M8 PREFERENCE

1)M7 IS FLOOD COOLANT, M8 IS MIST
2)M8 IS FLOOD COOLANT, M7 IS MIST

The operator may select either M7 or M8 as the flood coolant code. This selects the appropriate electrical outlet on the back of the machine.

3 PHASE NO 5% LOW: NO   IS YOUR 3 PHASE POWER MORE THAN 5% LOW?

1)YES
2)NO

The selection chosen is based upon the building power supply. This lowers the rapid rate by 5% to reduce the fault point when the input power is too low. This may be selected if the input power has a large voltage variance or low input such as 208 VAC.

PU FORMAT SELECT PUNCH OUTPUT FORMAT

1)PUNCHED TAPE FORMAT (TELETYPE STYLE)
2)COMPUTER FILE FORMAT (NO NULLS)

This parameter is set to file for computer use. The punch tape format is used when a tape reader is used.

N-WORDS ORDERED ENTER THE N-WORD SEQUENCE
CONFIGURATION
Note: Displayed only when
       Format 2 is selected.

1) THE N-WORDS ARE IN ASCENDING
   NUMERICAL ORDER OR THE PROGRAM
   WILL BE RENUMBERED AFTER INPUT.
 2) THE N-WORDS ARE NOT IN ORDER.

The CNC 88 requires each block of NC code to have sequence numbers in numerical order. Since the 6MB/10M/11M controls do not require block numbers in numerical order, select option number 2. Upon tape input the CNC will add sequence numbers for reference. Otherwise, after tape input the program must be renumbered if the sequence numbers are not in numerical order.

TOOL TABLE WILL THE TOOL COMPENSATION TABLE
HAVE THE RADIUS OR DIAMETER?

Note: Displayed only when
       Format 2 is selected.

1)DIAMETER
2)RADIUS

The cutter offset specification in the tool compensation table may be defined as a diameter or radius.

CRC MODE ENTER THE DEFAULT OUTSIDE CORNER MOVEMENT

1)M96 – ROLL
2)M97 – INTERSECTIONAL

This parameter selects the default mode for intersectional cutter radius compensation.

BINARY BUFFERS:
255

SELECT THE NUMBER OF BINARY BUFFERS LOOKAHEAD.

1) 15   3) 50   5) 255
2) 30   4) 100

The BINARY BUFFERS parameter can be changed to increase or decrease the control look ahead. The factory sets the buffers at 255. This is the most effective for programs with many small moves that must be executed rapidly. This parameter is used to more efficiently utilize the Run Time Menu. The smaller the buffers the more quickly the Run Time Menu changes will take effect in the program.

HIGH TORQUE

DO YOU HAVE THE HIGH TORQUE OPTION OR RIGID TAP OPTION?

1)NO
2)YES

This parameter is for machines with the hydraulic Hi/Low system. A yes allows more time for the belt change process required by the hydraulic system.

SPINDLE OFF

DO YOU WANT THE SPINDLE TO TURN OFF WHEN EXITING JOG OR MANUAL DATA INPUT?

1)NO
2)YES

The Fadal recommended setting is NO.

TURRET FACTOR

ENTER THE ENGAGEMENT FACTOR FOR THE TOOL TURRET GENEVA GEAR THE FACTOR MUST BE BETWEEN1 AND 50 (1 FOR SERVO TURRET)

This parameter adjusts the position of the Geneva gear with the Geneva wheel. For VMCs equipped with the servo turret, this factor MUST always be 1. This should be adjusted for the pin of the Geneva gear to be opposite the Geneva wheel when at tool position.

CMD MENU

TURN COMMAND MENUS:

1)OFF
2)ON
3)TOGGLE ON WITH SPACE BAR

The operator may select the command menu display method.

PALLET   DO YOU HAVE A PALLET CHANGER?

1)NO
2)YES

Select yes if a Fadal pallet changer is installed.

GAIN   ENTER THE GAIN FACTOR FOR RIGID TAPPING
THE FACTOR MUST BE BETWEEN 0 AND 255

This parameter effects the spindle response during rigid tapping. The higher the number the faster the spindle turns in relation to the feed rate. When the speed is too fast the thread may be too loose. See the Rigid Tapping Procedure in the "Spindle Drive and Motors" Section.

RAMP   ENTER THE RAMP FACTOR FOR RIGID TAPPING
THE FACTOR MUST BETWEEN 0 AND 255

This parameter sets the speed at which the spindle accelerates during rigid tapping.
See the Rigid Tapping Procedure in the "Spindle Drive and Motors" Section.

ASPECT   ENTER THE ASPECT RATIO OF Y TO X

THE RATIO MUST BE BETWEEN 25 AND 150

This parameter affects the look of the display. Program a circle and change the aspect to get a round circle on the display.

TIMERS   SELECT THE AUTOMATIC TOOL TIMER MODE?

1)ALL TOOL TIMING OFF
2)DO NOT CHECK
3)END OF TOOL (AT M6)
4)AFTER EACH MOVE
5)AT END OF PROGRAM

Select the desired option and set a value in the DTT table for TIME. The USED value will be inserted by the control. See DTT command in Users Manual.

OVERLOAD   ENTER THE MOTOR OVERLOAD FACTOR
(2 IS STANDARD)
THE FACTOR MUST BE BETWEEN 1 AND 8

This parameter determines the allowable following distance the actual axis position can be behind the computer commanded position. Each number is a turn of the ball screw.

Machine Parameters: Page Three

SCREW   SELECT THE SCREW PITCH TYPE

1)INCH PITCH
2)8/10 MILLIMETER PITCH
This parameter sets the type of ballscrews installed in the machine.

DANGER!   Serious damage to machine may occur if this parameter is set incorrectly.

IPM   SELECT THE MAX RAPID FEED RATE

1) 400 IPM   4) 800 IPM
2) 500 IPM   5) 900 IPM
3)700 IPM   6) 1000 IPM

This parameter sets the maximum rapid feed rate for the machine. Check machine specifications for proper setting.
Caution! Machine damage and excessive faults may occur if this parameter is set too high.

XYZ RAMP   ENTER THE X, Y, & Z RAMP LENGTH
FACTOR (160 IS STANDARD)
THE FACTOR MUST BE BETWEEN 50 AND 200

This parameter sets the speed at which the axes accelerate and decelerate during travel. The typical standard settings are 160 for millimeter and 100 for inch ballscrews. For the 6536, 12 mm pitch screws, use 250. Lower numbers than the typical standard may be used for any machines. A lower number will result in faster accelerations/decelerations. Varing machine environments and parameters (ie rapid travel parameter) will affect the absolute minimum for a particular machine.

Z TAP GAIN   SELECT THE Z GAIN DURING RIPID
TAPPING?

1)NORMAL
2)MEDIUM
3)HIGH

This parameter should be set to Normal for Millimeter and High for Inch ball screws. It determines the gain of the Amplifier.

VECTOR   DO YOU HAVE VECTOR DRIVE
(10 RPM MIN)?

1)YES
2)NO

If the machine is equipped with a vector drive then this parameter will allow a 10 RPM minimum spindle speed. A closed loop Baldor or AMC drive is required for a yes response. Closed loop vector systems will have the encoder cable coming all the back the axis controller card used.

AXIS DISPLAY   DISPLAY THE AXIS FOLLOW ERROR OR
LOAD?

1)LOAD PERCENTAGE
2)FOLLOWING ERROR

This option is used to select what the axis display will show on the position display while auto running a program. DC amplifiers can not display the load percentage.

AUTO BRAKE   AUTOMATICALLY APPLY THE A OR B
BRAKE DURING IDLE TIME?

1)YES
2)NO

Select the option desired to activate or de-activate the air for the axes brake. The brake will apply after 75 seconds of non-activity.

A-PALLET   WHICH ROTARY AXIS IS INSTALLED ON
THIS PALLET?

1)NOT APPLICABLE
2)A-AXIS
3)B-AXIS
4)A-AXIS & B-AXIS

Select the appropriate option for the rotary axis being used.

B-PALLET   WHICH ROTARY AXIS IS INSTALLED ON
THIS PALLET?

5)NOT APPLICABLE
6)A-AXIS
7)B-AXIS
8)A-AXIS & B-AXIS

Select the appropriate option for the rotary axis being used.

5TH AXIS HEAD   DO YOU HAVE THE 5TH AXIS PROGRAMMABLE HEAD ATTACHMENT?
HEAD
1)NO
2)YES

Answer YES if a 4th or 5th axis rotary head attachment is installed in the spindle. This will turn on the vectoring jog when the axis selector is set to C.

G0 DETAIL   ENTER THE DETAIL DESIRED FOR G0 MOVES
BETWEEN 2 TO 240 TENTHS (241=OFF)

This command is a parameter that adjusts the tolerance of positioning in G0 Rapid moves. The smaller the number, the closer the machine is held to the commanded position before moving to the next position. Holding the rapid travel moves to a tight tolerance in the majority of cases is not needed. This parameter just allows flexibility for the rapid travel move. VMC's are shipped with this parameter set at 241, which is the OFF setting. Setting the value too low will slow the machine down considerably.

AIR VALVE FEEDBACK   DO YOU HAVE AIR VALVE FEEDBACK?

1)NO
2)YES

Answer NO only for machines built previous to having feedback on the drawbar.

AT SPEED   WAIT UNTIL SPINDLE IS AT-SPEED BEFORE
NEXT BLOCK IS EXECUTED?

1)NO
2)YES

This will inhibit any axis motion until 80% of the commanded RPM is achieved.

ENTER SLIDE HOLD RAMP FACTOR
BETWEEN 1 TO 10 (10 IS STANDARD)?

This parameter will change the amount of time permitted to bring the machine to a Slide Hold condition. The typical setting is 10, this is about 250 milliseconds. Lower values may be used, but the higher the feed rate of the machine the more deceleration time will be needed to avoid amplifier faults.

IS THIS A MANAUL MACHINE WITH 1 MPG FOR EACH AXIS?

This will enable the manually operated machines (i.e. TRM, Tool Room Mill). Setting this parameter incorrectly will cause the JOG mode to malfunction.

SLIDE HOLD   ENTER SLIDE HOLD RAMP FACTOR
BETWEEN 1 TO 10 (10 IS STANDARD)?

This parameter controls the ramp after pressing Slide Hold. Depending on the size of the machine and customer preference, this parameter can be made smaller to generate sharper stops after pressing slide hold. The default value is 10. If the number is too small the machine could generate Amplifier Fault #18. Choose a number that best fits desired results without causing faults.

MANUAL   IS THIS A MANAUL MACHINE WITH 1 MPG FOR EACH AXIS?

This parameter enables the "Manual" feature of some machines. Manual machines are those that are outfitted with separate MPG handwheels on each axis, as on the Tool Room Mill machine. Set the parameter to YES if it has these MPG on each axis. If the machine does not have separate MPG handwheels on each axis the parameter must be set to NO.

Fadal

Typical TRM Parameters

The following parameters in red are the typical settings for the Tool Room Mill machine:

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*FORMAT: 1	BAUD RATE: 2400	SPINDLE AFTER M6: NO
AXES: X,Y,Z	TRAVEL: X30 Y14 Z14	PENDANT: MOUNTED
DEFAULT: G1		
DEFAULT: G91		
DEFAULT: G17	TOOL CHANGER CAP: 0	IMM. FIXED CYCLE: NO
RPM FACTOR: 5	SPINDLE TYPE: 4,000	ORIENTATION FACTR: 10

PAGE 2 OF 3

*DEFAULT: INCH	_M8=FLOOD M7=MIST	3 PHASE > 5% LOW: NO
PU FORMAT: FILE		
CRC MODE: M96	BINARY BUFFERS: 255	HI TORQUE/RIGID: NO
SPINDLE OFF: NO	TURRET FACTOR: 1	CMD MENU: SPACE
PALLET: NO	GAIN: 100	RAMP: 100
ASPECT: 65	TIMERS: OFF	OVERLOAD: 2

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*SCREW: #1	IPM: 200	XYZ RAMP: 100
Z TAP GAIN: HI	VECTOR: NO	AXIS DISPLAY: LOAD
AUTO BRAKE: YES	A-PALLET: A-AXIS	B-PALLET: B-AXIS
5 AXIS HEAD: NO	G0 DETAIL: 241	FEEDBACK: NO
AT-SPEED: NO	SLIDE HOLD: 10	MANUAL: NO

15" (SHARP) LCD display

Here are the settings for the 15" LCD Display unit used with the Fadal Control:

Clock: 127
Phase: 0
H Pos: 12
V Pos: 34
640x480V:60Hz   H:31.4 KHz

Black Level: 68
Contrast: 29

400 Lines   640   720
Expand: ON1   ON2
Scaling: 3
Bright: Auto   Low   Med   High   if Auto selected set to 31.