



# ENGINEERING DOCUMENT

757-4005-080

Rev. G

[Link to 757-4005-080 Rev. F](#)

**Rev. G is for Frame # H-V10767 and Higher  
(Z Axis Maximum Feedrate 750 imp /19050 mmpm)**

**Note: Check Z Servo Amp PN300 = 897**

**SUBJECT: Parameters VM1/VMX1 (Edition 2)  
with ISA Software V2.33**

Spindle Drive Type: **Yaskawa MC5**  
Axis Drive Type: **Yaskawa Sigma II**  
Console Type: **Ultimax 4**  
ATC Type: **5 (“Swing Arm” 16 station)**

Responsible		Reviewed/ Approved	
<b>Sam Thomas</b>	<b>12/10/02</b>	<b>Dan Ornelas</b>	<b>12/10/02</b>
Originator	Date	Mgr. Control Systems Engineering	Date

# RECORD OF CHANGES

## Engineering Document 757-4005-080

Revision	ECN #	Revision Description	Rev By	Date	Appd By	Date
A	-	Original Release				
B	15540	1) Was 12.0000, p.9 2) New Parameter, p.12 3) Revised description & new default, p.12	SJT	5/27/03	DEO	5/29/03
C	15649	1) Was 0.0000, p.7 2) Was 0.6000, p.7	SJT	8/20/03	DEO	8/24/03
D	15673	1) Pgs 16,19 was 425. 2) Pgs 16,19 was 5080000. 3) Pgs 16,19 was 12.7	DEO	10/15/03	DEO	10/19/03
E	15721	1) Pgs 17&18, was 708. 2) Pgs 17,18,&21, was 1022. 3) Pg 20, was 701. 4) Pg 20, was 710. 5) Pg 20, was 1081. 6) Pg 21, was 635. 7) Pg 21, was 642. 7) Added F96:42-44, N95:68-70, N95:268	DEO	3/11/04	DEO	3/17/04
F	15746	1) Pgs 16, 19 EPFT was 6.35.	DEO	6/15/04		
G	15717	1) Page 5,9. Was 12700.0 2) Page 16,19. Was 1265. 3) Page 17. Was 1022. 4) Page 17,18. Was 650. 5) Page 20. Was 1081 6) Page 20. Was 875 7) Page 21. Was 725 8) Page 21. Was 497 9) Page 16,19. Was 1020	SJT	9/1/04		

## I. INTENT

To provide parameter documentation for:

- ?? Mill System STD; Standard default parameter settings for production machine configurations with variable time MX4 CNC++ firmware.

## II. APPLICABILITY

Applicable to a VM1/VMX1 machine type utilizing Ultimax 4 software V2.33.

## IV. INDEX

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??	Page 22	Contour Cornering Feedrate Parameters (STD & AVC)
??	Page 22	Reversal Spike Axes Parameters (STD & AVC)

## V. INTEGRATOR SUPPORT SERVICES

The “**Integrator Support Services**” utility provide several screens to allow the integrator access to standard machine tool parameters. All parameter documented are default values for a particular machine type. At times there may be a need to adjust a certain parameter during an integration. To access to the “**Integrator Support Services**” screen perform the following steps:

- ?? Depress the **Auxiliary** key which displays the **Auxiliary** screen on the console.
- ?? Press the **Enter** key.
- ?? Type the number **100**.
- ?? Press the **Enter** key.

The following services that deal with parameters are available from the “**Integrator Support Services**” screen and can be accessed in the following manner:

- ?? **(F1) CNC Config Parameters** - The CNC Configuration Parameters needed to tailor the CNC for machine specifications. These parameters are stored and controlled by the CNC, and the LC may use them.
- ?? **(F2) Integrator Config Parameters** - These parameters are the customized parameters the LC needs to perform the operations controlled by the ladder logic.
- ?? **(F6) Servo Tuning / (F1) Servo Tuning** - The integrator uses this feature to enter tuning parameters for motion control system performance.
  - ?? **(F1)** – Spindle Parameters
  - ?? **(F2)** – Standard Parameters
  - ?? **(F3)** – Jog Parameters
  - ?? **(F4)** – Rapid Parameters
  - ?? **(F5)** – Contour Precision Parameters
  - ?? **(F6)** – Contour Standard Parameters
  - ?? **(F7)** – Contour Performance Parameters
- ?? **(F7) Miscellaneous Sevices** – This option allows the integrator to reload ladder files and set miscellaneous parameters.

## VI. Saving Parameters

After typing a value in the field, the integrator must press the **Enter** key to force the screen to hold the new value for inclusion in the parameters files. However the value is not actually saved to the parameter files until the integrator exits to the first “**Integrator Support Services**” screen. For the **Servo Tuning** screen the integrator selects softkeys to indicate whether or not the data should be saved.

<enter>, 100, <enter> **\*\*Integrator Support Services\*\***

**F1 - CNC Configuration Parameters**

**AXES**

Physical Parameters	X Axis	Y Axis	Z Axis
Positive Limit Switch Signal Logic	0	0	0
Negative Limit Switch Signal Logic	0	0	0
Maximum Feedrate (mmpm)	19050.0	19050.0	19050.0 <sup>G1</sup>
Max DAC Volts	9.5	9.5	9.5
Feedback Loop Type	Single Loop	Single Loop	Single Loop
Counts per Revolution	9600	9600	9600
Distance per Revolution (mm)	12.0000	12.0000	12.0000

Vertical Parameters	X Axis	Y Axis	Z Axis
Machine Wiring Logic	Normal	Normal	Inverted
Minus Direction Travel Limit (mm)	0.0000	0.0000	-457.2000
Plus Direction Travel Limit (mm)	660.4000	355.6000	0.0000
Calibrate Home Position (mm)	0.0000	0.0000	0.0000

**SPINDLE**

Physical Parameters	Spindle
Spindle Control Type	Closed Loop Control
Feedback Loop Type	Single Loop
Counts per Revolution	1024
Maximum DAC Volts	9.500
Orient Mechanism Type	Servo Orient
Spindle Orient Angle (deg)	60
Gear Table Manager	CNC
Number of Gears	1
Minimum Tap RPM	100
Maximum Tap RPM	2000
Spindle Hour Meter	0.0

Vertical Parameters	Spindle
Machine Wiring Logic	Inverted
Maximum Spindle Motor Speed	8000
Maximum Spindle Tool Speed	8000

Vertical Parameters	10K Spindle Opt.
Machine Wiring Logic	Inverted
Maximum Spindle Motor Speed	8000
Maximum Spindle Tool Speed	10000

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**F1 - CNC Configuration Parameters**

**SPINDLE GEAR**

Vertical Parameters	Spindle Gear Parameters
Gear	0
Ratio	1.0000
Minimum RPM	1
Maximum RPM	8000
Tap Acceleration	80000

Vertical Parameters	10K Spindle Opt. Gear Parameters
Gear	0
Ratio	0.8000
Minimum RPM	1
Maximum RPM	10000
Tap Acceleration	100000

**GENERAL**

General Parameters	
Machine Class	Vertical
Configuration Parameter Units	Metric
Max. Programmable Contour Feedrate (mmpm) (STD)	7620.0
Max. Programmable Contour Feedrate (mmpm) (AVC or ASF)	15240.0
Logic Control Sleep Time (msec)	50
Text Screen Monitor Type	Color
Graphic Screen Monitor Type (DSM only)	Color
Pointing Device Mode	Incremental
Pointing Device Mode (note: MAX console)	Absolute

<enter>, 100, <enter> **\*\*Integrator Support Services\*\***

**F1 - CNC Configuration Parameters**

**M CODE**

M Code Table (0-255)	Status	Time (sec)	Program Operation Label
0	CNC Predefined	0.0000	Program Stop
1	CNC Predefined	0.0000	Optional Program Stop
2	CNC Predefined	0.0000	Prog End-No Restart
3	CNC Predefined	0.0000	Spindle - On CW
4	CNC Predefined	0.0000	Spindle - On CCW
5	CNC Predefined	0.0000	Spindle Off
6	CNC Predefined	8.0000	Tool Changer
7	CNC Predefined	0.0000	Coolant System #2 On
8	CNC Predefined	0.0000	Coolant System #1 On
9	CNC Predefined	0.0000	Coolant Both Off
10	CNC Predefined	0.0000	Coolant Both On
11	CNC Predefined	0.0000	M11 - Reserved
12	CNC Predefined	0.6000 <sup>C1</sup>	Clamp C-Axis
13	CNC Predefined	0.6000	Unclamp C-Axis
14	CNC Predefined	0.0000 <sup>C2</sup>	Auto Clamp On
15	CNC Predefined	0.0000	Auto Clamp Off
16	CNC Predefined	0.0000	Rotary Unwind On
17	CNC Predefined	0.0000	Rotary Unwind Off
18	CNC Predefined	0.0000	M18 - Reserved
19	CNC Predefined	2.0000	Orient Spindle
20	CNC Predefined	0.0000	Indexer
21	CNC Predefined	0.0000	Lube
22-24	CNC Predefined	0.0000	Reserved For Future Use
25	CNC Predefined	0.0000	Retract Z Axis
26-28	CNC Predefined	0.0000	Reserved For Future Use
29	CNC Predefined	0.0000	Fanuc Rigid Tap
30	CNC Predefined	0.0000	Prog End, w/Restart
31	CNC Predefined	0.0000	Reserved For Future Use
32	CNC Predefined	0.6000	Clamp A-Axis
33	CNC Predefined	0.6000	Unclamp A-Axis
34	CNC Predefined	0.6000	Clamp B-Axis
35	CNC Predefined	0.6000	Unclamp B-Axis
36	CNC Predefined	0.0000	Servos Off
37	CNC Predefined	0.0000	Reserved For Future Use
38	CNC Predefined	0.0000	Probe OK
39	CNC Predefined	0.0000	Probe Static
40	CNC Predefined	0.0000	Probe Dynamic
41	CNC Predefined	0.0000	Probe 1 Touch
42	CNC Predefined	0.0000	Probe 2 Touch
43	CNC Predefined	0.0000	Probe Air On
44	CNC Predefined	0.0000	Probe Air Off
45	CNC Predefined	0.0000	Probe Shutter Open
46	CNC Predefined	0.0000	Probe Shutter Closed
47	CNC Predefined	0.0000	Probe Laser On
48	CNC Predefined	0.0000	Probe Laser Off
49	CNC Predefined	0.0000	Probe Receiver On
50	CNC Predefined	0.0000	Probe Receiver Off
51	Undefined	0.0000	-
52	Integrator Defined	0.0000	Aux Out 1
53	Integrator Defined	0.0000	Aux Out 2
54	Integrator Defined	0.0000	Aux Out 3
55	Integrator Defined	0.0000	Aux Out 4
56-61	Undefined	0.0000	-
62	Integrator Defined	0.0000	Aux Out 1 Off

63	Integrator Defined	0.0000	Aux Out 2 Off
64	Integrator Defined	0.0000	Aux Out 3 Off
65	Integrator Defined	0.0000	Aux Out 4 Off
66	CNC Predefined	0.0000	Rotary Transform On
67	CNC Predefined	0.0000	Rotary Transform Off
68-74	Undefined	0.0000	-
75	CNC Predefined	0.0000	Part Count Change
76-79	CNC Predefined	0.0000	Reserved For Future Use
80	CNC Predefined	0.0000	C-Axis Right Hand
81	CNC Predefined	0.0000	C-Axis Left Hand
82-97	CNC Predefined	0.0000	Reserved For Future Use
98	CNC Predefined	0.0000	Subprogram Call
99	CNC Predefined	0.0000	Subprogram Return
100-255	Undefined	0.0000	-



<enter>, 100, <enter> \*\*Integrator Support Services\*\*

**F2 - Integrator Configuration Parameters**

**FLOATING POINT**

Double Parameters (F96:0-F96:139)	Description	Value
F96:0 <sup>B1</sup>	Limit Switch to Marker Dist (mm) X	9.6000
F96:1 <sup>B1</sup>	Limit Switch to Marker Dist (mm) Y	9.6000
F96:2	Limit Switch to Marker Dist (mm) Z	12.0000
F96:3	Limit Switch to Marker Dist (deg) C	0.0000
F96:4	Limit Switch to Marker Dist (deg) A	0.0000
F96:5	Limit Switch to Marker Dist (deg) B	0.0000
F96:6	Cal to Limit Sw Velocity (mmpm) X	-1270.0000
F96:7	Cal to Limit Sw Velocity (mmpm) Y	-1270.0000
F96:8	Cal to Limit Sw Velocity (mmpm) Z	1270.0000
F96:9	Cal to Limit Sw Velocity (DPM) C	0.0000
F96:10	Cal to Limit Sw Velocity (DPM) A	0.0000
F96:11	Cal to Limit Sw Velocity (DPM) B	0.0000
F96:12	Cal to Limit Sw Velocity (mmpm) X	254.0000
F96:13	Cal to Limit Sw Velocity (mmpm) Y	254.0000
F96:14	Cal to Limit Sw Velocity (mmpm) Z	-254.0000
F96:15	Cal to Limit Sw Velocity (DPM) C	0.0000
F96:16	Cal to Limit Sw Velocity (DPM) A	0.0000
F96:17	Cal to Limit Sw Velocity (DPM) B	0.0000
F96:18	Warmup Spindle Sdp 1 (RPM)	100.0000
F96:19	Warmup Spindle Sdp 2 (RPM)	-1000.0000
F96:20	Warmup Spindle Sdp 3 (RPM)	3000.0000
F96:21	Warmup Axis Feedrate (mmpm)	2920.0000
F96:22	X Tool Probe Safety Range (mm)	0.0000
F96:23	Y Tool Probe Safety Range (mm)	0.0000
F96:24	Z Tool Probe Safety Range (mm)	0.0000
F96:25	Tilt-Axis Safety Position	0.0000
F96:26	Tilt-Axis Safety Velocity	0.0000
F96:27	X-Axis Table Safety Position	0.0000
F96:28	Y-Axis Table Safety Position	0.0000
F96:29	Spindle Gear Chg Cog Sdp (RPM)	100.0000
F96:30	Tool Change Position (mm)	0.0000 (*)
<b>F96:31<sup>G1</sup></b>	<b>Maximum Jog Feed (mmpm)</b>	<b>19050.0000</b>
F96:32	Current Manual Spindle Speed	500.0000 (**)
F96:33	Rapid Detent Jog (mmpm)	19050.0000
F96:34	Pulse Jog Increment (mm)	0.0010
F96:35	Reserved for ICP	0.0000
F96:36	Pulse Jog Velocity (mmpm)	5000.0000
F96:37	Manual Rapid Jog (mmpm)	7620.0000 (**)
F96:38-F96:39	.....	0.0000
F96:40	Lube Distance (m)	0.0000
<b>F96:41<sup>G1</sup></b>	<b>Z Retract Velocity (ATC)</b>	<b>19050.0000</b>
F96:42	X-Axis Manual T/C Position	0.0000
F96:43	Y-Axis Manual T/C Position	0.0000
F96:44 <sup>E7</sup>	Z-Axis Manual T/C Position	0.0000
F96:45-F96:49	.....	0.0000
F96:50	Cal to Zero Spd (DPM) A	0.0000
F96:51	Cal to Zero Spd (DPM) C	0.0000
F96:52	Cal to Zero Spd (DPM) B	0.0000
F96:53-F96:139	.....	0.0000
F96:140	X Axis Fixture Position (mm)	0.0000
F96:141	Y Axis Fixture Position (mm)	0.0000
F96:142	Z Axis Fixture Position (mm)	0.0000
F96:143	X Axis Access Position (mm)	0.0000
F96:144	Y Axis Access Position (mm)	0.0000

- (\*) Z - Axis machine position is different for each machine.
- (\*\*) These values are set by the user from the MANUAL screen.

<enter>, 100, <enter> **\*\*Integrator Support Services\*\***

***F2 - Integrator Configuration Parameters***

**FLOATING POINT**

Double Parameters (F96:140-F96:499)	Description	Value
F96:145	X Axis Distance To Clear (mm)	0.0000
F96:146	Y Axis Distance To Clear (mm)	0.0000
F96:147-F96:149	.....	0.0000
F96:150	Max 4 Jog Enh. Min Vel	25.0000
F96:151	Max 4 Jog Enh. Max Vel	11000.0000
F96:152	Max 4 Jog Enh. Constant	95.0000
F96:153	Max 4 Jog Enh. Factor	7.4500
F96:154-F96:158	.....	0.0000
F96:159	Probe Safety Range Feed (mmpm)	500.0000
F96:160-F96:199	.....	0.0000
F96:200	Current Rotary Jog Speed (RPM)	0.0000
F96:201	Rotary Pulse Incr (deg)	0.0000
F96:202	SSM Mouse Scale Factor	0.4500
F96:203	Rotary Pulse Jog Vel (DPM)	0.0000
F96:204	.....	0.0000
F96:205	Probe in Spind. Jog Velocity (mmpm)	2540.0000
F96:206-F96:207	.....	0.0000
F96:208	Large Tool Rotate Debounce Time (sec)	0.0000
F96:209	Velocity Mode Scale Factor	0.0000
F96:210	Max Spindle Speed (Non CE door switch)	0.0000
F96:211	Hawk 30/40 Lo Belt G0 Ratio	0.0000
F96:212	Hawk 30/40 Lo Belt G0 Min RPM	0.0000
F96:213	Hawk 30/50 Lo Belt G0 Max RPM	0.0000
F96:214	Hawk 30/40 Lo Belt G0 Tap Accel	0.0000
F96:215	Hawk 30/40 Lo Belt G1 Ratio	0.0000
F96:216	Hawk 30/40 Lo Belt G1 Min RPM	0.0000
F96:217	Hawk 30/50 Lo Belt G1 Max RPM	0.0000
F96:218	Hawk 30/40 Lo Belt G1 Tap Accel	0.0000
F96:219	Hawk 30/40 Hi Belt G0 Ratio	0.0000
F96:220	Hawk 30/40 Hi Belt G0 Min RPM	0.0000
F96:221	Hawk 30/50 Hi Belt G0 Max RPM	0.0000
F96:222	Hawk 30/40 Hi Belt G0 Tap Accel	0.0000
F96:223	Hawk 30/40 Hi Belt G1 Ratio	0.0000
F96:224	Hawk 30/40 Hi Belt G1 Min RPM	0.0000
F96:225	Hawk 30/50 Hi Belt G1 Max RPM	0.0000
F96:226	Hawk 30/40 Hi Belt G1 Tap Accel	0.0000
F96:227	CSX50 Lo Belt Min RPM	0.0000
F96:228	CSX50 Lo Belt Max RPM	0.0000
F96:229	CSX50 Lo Belt Gear Ratio	0.0000
F96:230	CSX50 Hi Belt Min RPM	0.0000
F96:231	CSX50 Hi Belt Max RPM	0.0000
F96:232	CSX50 Hi Belt Gear Ratio	0.0000
F96:233	CSX50 Spindle Orient Window	0.0000
F96:234	MXV/MXU40 Y Retract Velocity	0.0000
F96:235	MXV/MXU40 Y Retract Position	0.0000
F96:236	MXV/MXU40 Y TC Velocity	0.0000
F96:237	MXV/MXU40 Y TC Position	0.0000
F96:238	CSX50 Spdl Orient Flt Wdw	0.0000
F96:239	CSX50 Low Belt Tap Accel	0.0000
F96:240	CSX50 High Belt Tap Accel	0.0000
F96:241	Reserved for TC9	0.0000
F96:242	Reserved for TC9	0.0000
F96:243	Reserved for TC9	0.0000
F96:244	Reserved for TC9	0.0000

F96:245	ATC9: Manual TC Velocity	0.0000
F96:246-F96:499	.....	0.0000

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**F2 - Integrator Configuration Parameters**

**INTEGER**

Integer Parameters (N95:0-45)	Description	Value
N95:0	Fault Signal Logic X	0
N95:1	Fault Signal Logic Y	0
N95:2	Fault Signal Logic Z	0
N95:3	Fault Signal Logic S	1
N95:4	Fault Signal Logic A	0
N95:5	Fault Signal Logic B	0
N95:6	Cal Limit Switch-Vert X	1
N95:7	Cal Limit Switch-Vert Y	1
N95:8	Cal Limit Switch-Vert Z	0
N95:9	Cal Limit Switch (Unused)	0
N95:10	Cal Limit Switch-Vert A	0
N95:11	Cal Limit Switch-Vert B	0
N95:12	Cal Limit Switch-Horz X	1
N95:13	Cal Limit Switch-Horz Y	1
N95:14	Cal Limit Switch-Horz Z	0
N95:15	Cal Limit Switch (Unused)	0
N95:16	Cal Limit Switch-Horz A	0
N95:17	Cal Limit Switch-Horz B	0
N95:18	Spin Winding Select Present	0
N95:19	Spin Winding Threshold	0
N95:20	Spindle Purge Time (min.)	30
N95:21	Clamp Mechanism Pres (Unused)	0
N95:22	Clamp Mechanism Pres (Unused)	0
N95:23	Clamp Mechanism Pres (Unused)	0
N95:24	Clamp Mechanism Pres (Unused)	0
N95:25	Clamp Mechanism Present A	0
N95:26	Clamp Mechanism Present B	0
N95:27	Clamp Signal Present (Unused)	0
N95:28	Clamp Signal Present (Unused)	0
N95:29	Clamp Signal Present (Unused)	0
N95:30	Clamp Signal Present (Unused)	0
N95:31	Clamp Signal Present A	0
N95:32	Clamp Signal Present B	0
N95:33	Clamp Signal Logic (Unused)	0
N95:34	Clamp Signal Logic (Unused)	0
N95:35	Clamp Signal Logic (Unused)	0
N95:36	Clamp Signal Logic (Unused)	0
N95:37	Clamp Signal Logic A	0
N95:38	Clamp Signal Logic B	0
N95:39	Unclamp Signal Pres (Unused)	0
N95:40	Unclamp Signal Pres (Unused)	0
N95:41	Unclamp Signal Pres (Unused)	0
N95:42	Unclamp Signal Pres (Unused)	0
N95:43	Unclamp Signal Present A	0
N95:44	Unclamp Signal Present B	0
N95:45	Unclamp Signal Logic (Unused)	0

<enter>, 100, <enter> **\*\*Integrator Support Services\*\***

**F2 - Integrator Configuration Parameters**

**INTEGER CONT**

Integer Parameters (N95:46-163)	Description	Value
N95:46	Unclamp Signal Logic (Unused)	0
N95:47	Unclamp Signal Logic (Unused)	0
N95:48	Unclamp Signal Logic (Unused)	0
N95:49	Unclamp Signal Logic A	0
N95:50	Unclamp Signal Logic B	0
N95:51	Fault Signal Present X	1
N95:52	Fault Signal Present Y	1
N95:53	Fault Signal Present Z	1
N95:54	Fault Signal Present S	1
N95:55	Fault Signal Present A	0
N95:56	Fault Signal Present B	0
N95:57	Maximum Magazine Capacity	16
N95:58	ATC Type	5
N95:59	Enable Following Error Mode	0
N95:60	Axis Clamp Output Invert A	0
N95:61	Axis Clamp Output Invert B	0
N95:62	Enable Chip Removal	1
N95:63	Enable Hydraulic System	0
N95:64	Autobalance Enable	1
N95:65	Mouse Scale Factor	0
N95:66	Mouse Maximum Delta Per Scan	0
N95:67 <sup>B2</sup>	TC Enhance	0
N95:68 <sup>E7</sup>	Jorgenson Conveyor	0
N95:69 <sup>E7</sup>	Tool In Spindle	0
N95:70 <sup>E7</sup>	Safe Move Manual Mode ATC	0
N95:71-N95:99	.....	0
N95:100	Number of Pockets to Skip	0
N95:101-N95:139	.....	0
N95:140 <sup>B3</sup>	Max 4 Jog Enhance (V2.33e/V2.01i)	3
	Max 4 Jog Enhance (Pre-V2.33e/V2.01i)	2
	Max 4 Jog Enhance (Pre-V2.33e/Pre-V2.01i)	1
N95:141-N95:142	.....	0
N95:143	TPS Tracking (do not edit)	(***)
N95:144	TPS Tracking (do not edit)	(***)
N95:145	TPS Tracking (do not edit)	(***)
N95:146	TPS Tracking (do not edit)	(***)
N95:147	TPS Tracking (do not edit)	(***)
N95:148	TPS Tracking (do not edit)	(***)
N95:149	TPS Tracking (do not edit)	(***)
N95:150-N95:190	.....	0

(\*\*\*) These values are updated after every tool change cycle.

<enter>, 100, <enter> **\*\*Integrator Support Services\*\***

**F2 - Integrator Configuration Parameters**

**INTEGER CONT**

Integer Parameters (N95:164-226)	Description	Value
N95:191	.....	0
N95:192	X Cal Allowed	1
N95:193	Y Cal Allowed	1
N95:194	Z Cal Allowed	1
N95:195-N95:196	.....	0
N95:197	Warmup cycle Time (sec) ea. Pass	300
N95:198	Lube On Time (sec)	0
N95:199	Lube Off Time (sec)	0
N95:200	ATC Disable	0
N95:201	ATC Mag Encoder Type	0
N95:202	ATC Mag Encoder Logic	0
N95:203	ATC Mag Enc. Counts/Rev	0
N95:204	ATC Non-Adj Decel Band	0
N95:205	ATC Adjacent Decel Band	0
N95:206	ATC Stop Band	0
N95:207	ATC Gray Code Count Dir	0
N95:208	(ATC Type 5,6) Default State	0
N95:209	A-Axis Calibrate Allowed	0
N95:210	B-Axis Calibrate Allowed	0
N95:211	Spindle Drive Type	0
N95:212	Indexer Type	0
N95:213	X,Y,Z Servo Type	1
N95:214	Force Rotate Before Orient	0
N95:215	Spindle Override Range	0
N95:216	ATC Rapid Override Enable	0
N95:217	Disable Rapid Override	0
N95:218	Jog Direction Reverse	0
N95:219	Coolant Delay Time (sec)	0
N95:220	X-Axis Load Bar "One" Value	1
N95:221	X-Axis Load Bar "Overload" Value	80
N95:222	Y-Axis Load Bar "One" Value	1
N95:223	Y-Axis Load Bar "Overload" Value	80
N95:224	Z-Axis Load Bar "One" Value	10
N95:225	Z-Axis Load Bar "Overload" Value	120
N95:226	Spindle Load Bar "One" Value	20

(\*\*\*) These values are updated after every tool change cycle.

<enter>, 100, <enter> \*\*Integrator Support Services\*\*

**F2 - Integrator Configuration Parameters**

**INTEGER CONT**

Integer Parameters (N95:227-269)	Description	Value
N95:227	Spindle Load Bar "Overload" Value	160
N95:228	Washdown Multiplex Time/Enable (sec/100)	500
N95:229	Disable TIS Unverify	0
N95:230	CE Logic Enable	0
N95:231	X-Axis CE Safe Jog Speed (mmpm)	2000
N95:232	Y-Axis CE Safe Jog Speed (mmpm)	2000
N95:233	Z-Axis CE Safe Jog Speed (mmpm)	2000
N95:234	.....	0
N95:235	A-Axis CE Safe Feed (dpm)	0
N95:236	B-Axis CE Safe Feed (dpm)	0
N95:237	.....	0
N95:238	E-Stop Door Cycle Enable	0
N95:239	.....	0
N95:240	High Speed Spindle Enable	0
N95:241	Coolant Through Tool Enable	0
N95:242	HSS Spindle RPM	0
N95:243	CTT Spindle RPM w/o Clnt	0
N95:244	Cal to Zero Allowed A	0
N95:245	Cal to Zero Allowed C	0
N95:246	Cal to Zero Allowed B	0
N95:247	Wshdn Pulsating Enable	0
N95:248	Washdown Multiplex Left ON Time (sec/100)	0
N95:249	Washdown Multiplex OFF Time (sec/100)	0
N95:250	Aux. Output Confirmation Enable	0
N95:251	Spindle Breakover RPM (Hawk5)	0
N95:252	Spindle Break Enable Time (Hawk5)	0
N95:253	Hawk Low Belt Low Gear Scale	0
N95:254	Hawk High Belt Low Gear Scale	0
N95:255	Max 4 Low Range Multiplier	1
N95:256	Max 4 Mid Range Multiplier	10
N95:257	Max 4 High Range Multiplier	100
N95:258	Hawk 30/40 Current Belt Position	0
N95:259	Hawk 30/40 Spindle Gears	0
N95:260	CE Access Code Keycode Digit 1	0
N95:261	CE Access Code Keycode Digit 2	0
N95:262	CE Access Code Keycode Digit 3	0
N95:263	CE Access Code Keycode Digit 4	0
N95:264	Lower Spindle Override pct	50
N95:265	Upper Spindle Override pct	200
N95:266	Spindle Override Sensitivity	2
N95:267	Aux. Output Interrupt Restore	0
N95:268 <sup>E7</sup>	Disable Overtemp Alarm	0
N95:269	Enable Oil Chiller Alarm	0



<enter>, 100, <enter> **\*\*Integrator Support Services\*\***

**F2 - Integrator Configuration Parameters**

**INTEGER CONT**

Integer Parameters (N95:270-499)	Description	Value
N95:270	Softkey Config Enable	1(****)
N95:271	F1 Softkey Bottom Position	213
N95:272	F1 Softkey Top Position	255
N95:273	F2 Softkey Bottom Position	186
N95:274	F2 Softkey Top Position	207
N95:275	F3 Softkey Bottom Position	158
N95:276	F3 Softkey Top Position	180
N95:277	F4 Softkey Bottom Position	131
N95:278	F4 Softkey Top Position	152
N95:279	F5 Softkey Bottom Position	104
N95:280	F5 Softkey Top Position	125
N95:281	F6 Softkey Bottom Position	77
N95:282	F6 Softkey Top Position	98
N95:283	F7 Softkey Bottom Position	50
N95:284	F7 Softkey Top Position	71
N95:285	F8 Softkey Bottom Position	1
N95:286	F8 Softkey Top Position	44
N95:287	ATC Type 8 Spindle Orient RPM	0
N95:288	CSX50 Spindle Gears	0
N95:289	CSX50 Lo Belt Gear Scale	0
N95:290	CSX50 Hi Belt Gear Scale	0
N95:291	CSX50 Current Belt Position	0
N95:292	Reserved for TC8	0
N95:293	CSX50 Spindle Decel Timer Sel	0
N95:294	CSX50 PMOV Feedrate for Orient	0
N95:295-N95:299	.....	0
N95:300	Fault Signal Logic C	0
N95:301	Clamp Mechanism Present C	0
N95:302	Clamp Signal Present C	0
N95:303	Clamp Signal Logic C	0
N95:304	Unclamp Signal Present C	0
N95:305	Unclamp Signal Logic C	0
N95:306	Fault Signal Present C	0
N95:307	Axis Clamp Output Invert C	0
N95:308	Cal Allowed C	0
N95:309-N95:499	.....	0

(\*\*\*\*) **Note:** Softkey Config Enable should be set =1 only with four-wire analog resistive touchscreens (Hurco P/N 8070006002).

## SYSTEM TUNING – MILL SYSTEM STD CONFIGURATION

### F1 – Mill System – STD Spindle Parameters

Spindle Tune Parameters	Standard	Alternate
Integral	50	0
Proportional	1200	1
Feed Fwd Vel	1280 <sup>G2</sup>	0
Derivative	250	0
Integral Limit	12	0
Output Loop Gain	1	1
Integral BW	1024	NA
Max. Acceleration	250000	1
Max. Deceleration	250000	1
Maximum Abort Accel	250000	NA
Following Error Halt	3000.0	0
Z/S Tap Error	4.0	NA
In Position Tol	1024	NA
Enc Phase Ferror Tol	3000.0	0

### F2 – Mill System – STD Standard Parameters

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Integral	50	50	50
Proportional	2500	2500	2500
Feed Fwd Vel	725	725	735 <sup>G9</sup>
Derivative	250	250	250
Integral Limit	12	12	12
Output Loop Gain	1	1	1
Integral BW	200	200	200
Max. Rapid Accel	4064000	4064000	4064000
Max. Contour Accel	4064000	4064000	4064000
Maximum Abort Accel	6096000	6096000	6096000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
Enc Phase Ferror Tol	0.635 <sup>F1</sup>	0.635 <sup>F1</sup>	0.635 <sup>F1</sup>

### F3 – Mill System – STD Jog Parameters

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Integral	50	50	50
Proportional	300 <sup>D1</sup>	300 <sup>D1</sup>	425
Feed Fwd Vel	0	0	0
Derivative	0	0	0
Integral Limit	10	10	10
Output Loop Gain	1	1	1
Max. Rapid Accel	4445000 <sup>D2</sup>	4445000 <sup>D2</sup>	4445000 <sup>D2</sup>
Following Error Halt	19.05 <sup>D3</sup>	19.05 <sup>D3</sup>	19.05 <sup>D3</sup>

**F4 – Mill System – STD Rapid Parameters**

<b>Axis Tune Parameters</b>	<b>X Axis</b>	<b>Y Axis</b>	<b>Z Axis</b>
Integral	50	50	50
Proportional	2500	2500	2500
Feed Fwd Vel	708	708	710 <sup>G3</sup>
Derivative	250	250	250
Integral Limit	12	12	12
Output Loop Gain	1	1	1
Integral BW	200	200	200
Feed Fwd Accel	0	0	0
Max. Rapid Accel	4064000	4064000	4064000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
S-Curve T1 Time	0	0	0
Stopping BW	0	0	0

**F5 – Mill System – STD Contour Precision Parameters**

<b>Axis Tune Parameters</b>	<b>X Axis</b>	<b>Y Axis</b>	<b>Z Axis</b>
Integral	50	50	50
Proportional	2500	2500	2500
Feed Fwd Vel	350 <sup>E1</sup>	350 <sup>E1</sup>	350 <sup>G4</sup>
Derivative	250	250	250
Integral Limit	12	12	12
Output Loop Gain	1	1	1
Integral BW	200	200	200
Feed Fwd Accel	0	0	0
Max. Rapid Accel	3048000	3048000	3048000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
S-Curve T1 Time	0	0	0
Stopping BW	0	0	0

**F6 – Mill System – STD Contour Standard Parameters**

<b>Axis Tune Parameters</b>	<b>X Axis</b>	<b>Y Axis</b>	<b>Z Axis</b>
Integral	50	50	50
Proportional	2500	2500	2500
Feed Fwd Vel	350 <sup>E1</sup>	350 <sup>E1</sup>	350 <sup>G4</sup>
Derivative	250	250	250
Integral Limit	12	12	12
Output Loop Gain	1	1	1
Integral BW	200	200	200
Feed Fwd Accel	0	0	0
Max. Rapid Accel	4064000	4064000	4064000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
S-Curve T1 Time	0	0	0
Stopping BW	0	0	0

**F7 – Mill System – STD Contour Performance Parameters**

<b>Axis Tune Parameters</b>	<b>X Axis</b>	<b>Y Axis</b>	<b>Z Axis</b>
Integral	50	50	50
Proportional	2500	2500	2500
Feed Fwd Vel	350 <sup>E1</sup>	350 <sup>E1</sup>	350 <sup>G4</sup>
Derivative	250	250	250
Integral Limit	12	12	12
Output Loop Gain	1	1	1
Integral BW	200	200	200
Feed Fwd Accel	0	0	0
Max. Rapid Accel	4064000	4064000	4064000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
S-Curve T1 Time	0	0	0
Stopping BW	0	0	0



## SYSTEM TUNING – MILL SYSTEM AVC CONFIGURATION

### F1 – Mill System – AVC Spindle Parameters

Spindle Tune Parameters	Standard	Alternate
Integral	50	0
Proportional	1200	1
Feed Fwd Vel	1280 <sup>G2</sup>	0
Derivative	250	0
Integral Limit	12	0
Output Loop Gain	1	1
Integral BW	1024	NA
Max. Acceleration	250000	1
Max. Deceleration	250000	1
Maximum Abort Accel	250000	NA
Following Error Halt	3000.0	0
Z/S Tap Error	4.0	NA
In Position Tol	1024	NA
Enc Phase Ferror Tol	3000.0	0

### F2 – Mill System – AVC Standard Parameters

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Integral	50	50	50
Proportional	2500	2500	2500
Feed Fwd Vel	725	725	735 <sup>G9</sup>
Derivative	250	250	250
Integral Limit	12	12	12
Output Loop Gain	1	1	1
Integral BW	200	200	200
Max. Rapid Accel	4064000	4064000	4064000
Max. Contour Accel	4064000	4064000	4064000
Maximum Abort Accel	6096000	6096000	6096000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
Enc Phase Ferror Tol	0.635 <sup>F1</sup>	0.635 <sup>F1</sup>	0.635 <sup>F1</sup>

### F3 – Mill System – AVC Jog Parameters

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Integral	50	50	50
Proportional	300 <sup>D1</sup>	300 <sup>D1</sup>	425
Feed Fwd Vel	0	0	0
Derivative	0	0	0
Integral Limit	10	10	10
Output Loop Gain	1	1	1
Max. Rapid Accel	4445000 <sup>D2</sup>	4445000 <sup>D2</sup>	4445000 <sup>D2</sup>
Following Error Halt	19.05 <sup>D3</sup>	19.05 <sup>D3</sup>	19.05 <sup>D3</sup>

**F4 – Mill System – AVC Rapid Parameters**

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Integral	50	50	50
Proportional	2800	2800	2500
Feed Fwd Vel	701	710	773 <sup>G5</sup>
Derivative	150	150	250
Integral Limit	10	10	10
Output Loop Gain	1	1	1
Integral BW	200	200	200
Feed Fwd Accel	2000	2000	3150
Max. Rapid Accel	4064000	4064000	4064000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
S-Curve T1 Time	60	60	60
Stopping BW	2000.0	2000.0	1000

**F5 – Mill System – AVC Contour Precision Parameters**

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Integral	50	50	50
Proportional	2800	2800	2500
Feed Fwd Vel	475 <sup>E3</sup>	475 <sup>E4</sup>	570 <sup>E5,G6</sup>
Derivative	150	150	250
Integral Limit	10	10	10
Output Loop Gain	1	1	1
Integral BW	200	200	200
Feed Fwd Accel	2000	2000	3150
Max. Rapid Accel	3048000	3048000	3048000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
S-Curve T1 Time	60	60	60
Stopping BW	2000.0	2000.0	1000

**F6 – Mill System – AVC Contour Standard Parameters**

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Integral	50	50	50
Proportional	2800	2800	2500
Feed Fwd Vel	320 <sup>E6</sup>	320 <sup>E7</sup>	425 <sup>E2,G7</sup>
Derivative	150	150	250
Integral Limit	10	10	10
Output Loop Gain	1	1	1
Integral BW	200	200	200
Feed Fwd Accel	2000	2000	3150
Max. Rapid Accel	4064000	4064000	4064000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
S-Curve T1 Time	60	60	60
Stopping BW	2000.0	2000.0	1000

**F7 – Mill System – AVC Contour Performance Parameters**

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Integral	50	50	50
Proportional	2800	2800	2500
Feed Fwd Vel	50	50	190 <sup>G8</sup>
Derivative	150	150	250
Integral Limit	10	10	10
Output Loop Gain	1	1	1
Integral BW	200	200	200
Feed Fwd Accel	2000	2000	3150
Max. Rapid Accel	4064000	4064000	4064000
Following Error Halt	6.35	6.35	6.35
Tuning Feedrate	3810.0	3810.0	3810.0
In Position Tol	3	3	3
S-Curve T1 Time	60	60	60
Stopping BW	2000.0	2000.0	1000



**F7 – Mill System - STD Contour Cornering Feedrate Table**

Angle	F5 - Precision Feedrate Delta (mmpm)	F6 – Standard Feedrate Delta (mmpm)	F7 - Performance Feedrate Delta (mmpm)
0 deg	243.0	357.0	572.0
5 deg	243.0	357.0	572.0
10 deg	243.0	357.0	572.0
15 deg	243.0	357.0	572.0
20 deg	243.0	357.0	572.0
25 deg	243.0	357.0	572.0
30 deg	243.0	357.0	572.0
35 deg	243.0	357.0	572.0
40deg	243.0	357.0	572.0
45 deg	243.0	357.0	572.0

**F7 – Mill System - AVC Contour Cornering Feedrate Table**

Angle	F5 - Precision Feedrate Delta (mmpm)	F6 – Standard Feedrate Delta (mmpm)	F7 - Performance Feedrate Delta (mmpm)
0 deg	342.9	685.8	952.5
5 deg	322.6	647.7	889.0
10 deg	302.3	609.6	825.5
15 deg	281.9	571.5	762.0
20 deg	261.6	533.4	698.5
25 deg	243.8	495.3	635.0
30 deg	223.5	431.8	571.5
35 deg	203.2	393.7	508.0
40deg	182.9	330.2	444.5
45 deg	162.6	292.1	381.0

**F6/F2 – Mill System STD and AVC - Reversal Spike Parameters**

Axis Tune Parameters	X Axis	Y Axis	Z Axis
Reversal Spikes at 1000 mmpm	0.000000	0.000000	0.000000
Reversal Spikes at 10000 mmpm	0.000000	0.000000	0.000000