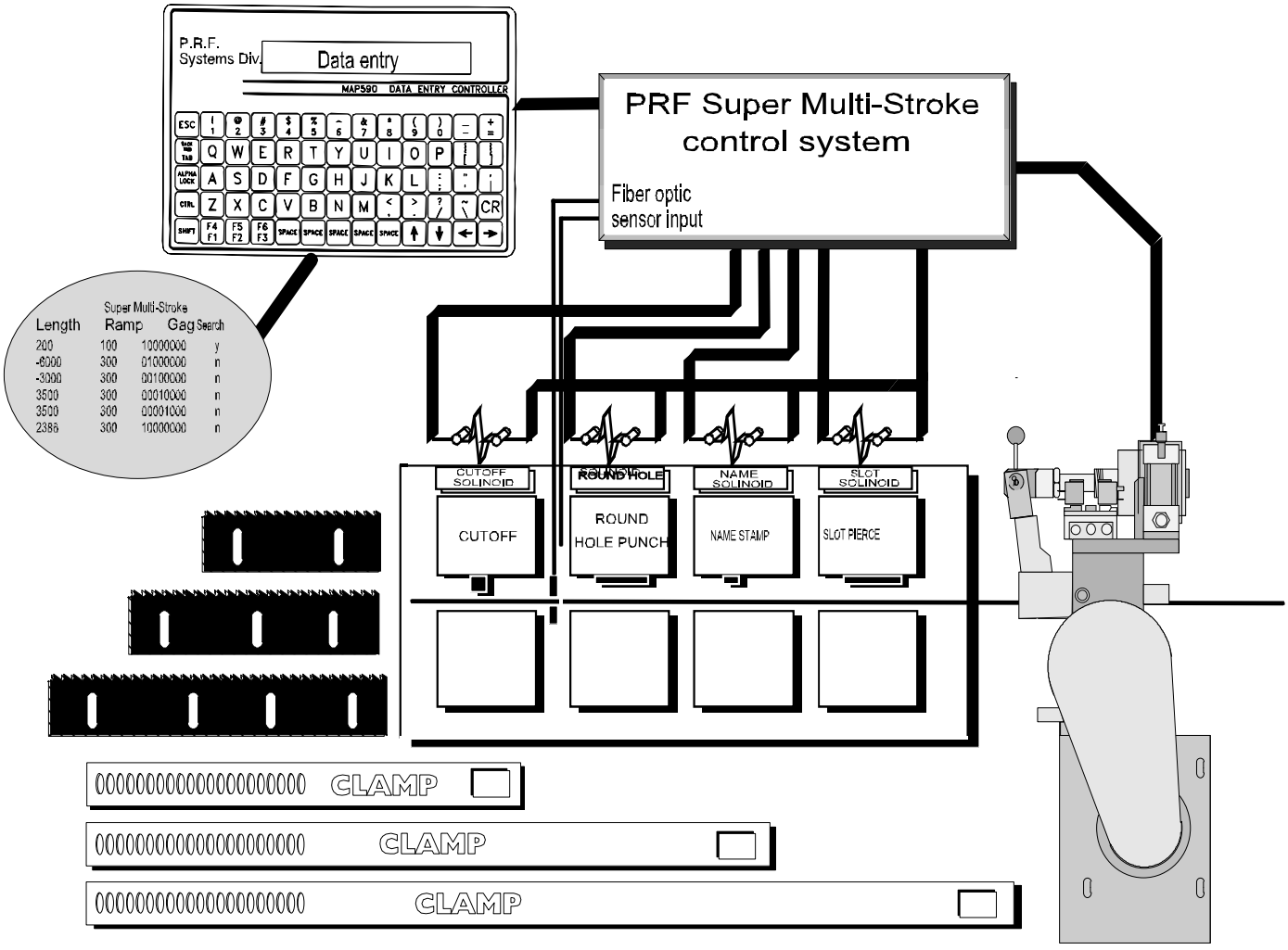
# Waddington Electronics Inc.

## SMS6

Servo feed Programming Manual for Programmable GAG Pattern Capabilities, Registration, and Push/Pull systems.



# Power Turn On

*This feed contains Patent applied for programming that virtually eliminates roll position error and length accumulation errors associated with less sophisticated machines. In order for this software to do its job, the feed requires a home position. In addition, the main position resolver comutates the motor. If the feed is disassembled, the timing belt is removed or the resolver moved in relation to the rolls or motor a program will have to be run to determine the comm offset number before the feed can be properly be run. In addition, an accuracy re-calibration will be required. This must be performed using special equipment available from Waddington Electronics. Do not disassemble this machine without calling the factory.*

*The feed needs to be homed at power turn on.*

*Open the rolls before homing to prevent stock buckling during the homing procedure.*

## *Mode and Command Summary*

*This software has two modes of operation.*

*Menu driven mode for beginners*

*Expert mode for quick direct entry and for downloading from remote computers*

*All commands need the enter key to be depressed after data entry*

# Operational modes selected by external switches:

## I. Manual

*Editing modes available in manual are as follows:*

1. *Direct access key entry. Commands are listed on following pages*
2. *Step by Step menu by typing "ED"*
3.

## II. Auto mode

*Auto mode simply indexes on command from the auto index input.*

*Job number must be selected in manual mode.*

## III. Jog to Length mode

*When switched into JTL mode, only jog switches are functional and jog is limited to the range of the next profile. After switching to JTL mode press index to activate, Jog buttons.*

*After each JTL cycle press index to reactivate the JTL function for the next feed length.*

*This mode is very useful for threading dies with stock lifters*

## IV. Job EDIT lockout

1. You may select your own **PASSWORD** which may be from **1-5** digits
   a. When unlocked type **PWORD=12345** and unlock password is set to **12345**
   b. Once the menu is locked you will need to enter unlock code to change any job information other than the part counter. Do this by typing **IMFREE=**(*password*)
2. By typing "**LOCK**" (enter) at any time you will lock anyone from changing job information until password is entered
3. If you lose or forget password, please contact our factory for override information.

# Entering the STEP BY STEP MENU

*ED* *Enters menu prompted job edit mode*

*When in menu edit mode*

*'ENTER'* *steps to the next item*

*Z* *steps to previous item (Allows you to backup in the menu)*

*X* *exits menu edit mode (Can be used at any time)*

# The Direct entry mode

*This mode allows for quick program changes without having to step through the menu system. Commands like I1=2.0125 allows for rapid program changes. Additionally parameters of a job can be queried by entering I2= and pressing enter the setting for I2 will then be displayed. Other parameters that can be changed or entered are listed below.*

## Job Edit commands

*To select the job number to edit*

*J=2* *Select active job 2*

*J=1* *Select active job 1*

*Max job number is 50*

*All other edits are to active job only.*

*Selecting a job that has not been programmed copies job 1 to the new job.*

***PWORD=12345*** ***This command will set unlock password to value after equals sign***

***This can only be changed when already unlocked. If you accidentally lock yourself out and do not know the password then contact the factory.***

## Job header (Information that is constant for the job)

*JN = firstjob* *Job name limited to 8 characters*

*If the job exists it will be queued for the next operation. If the job does not exist job 1 will be copied to the next open job. That new job will be queued for the next operation.*

*JC = second* *Change job name.*

*JD = abcde* *Delete job. If exists job is deleted and job 1 is queued.*

*N = 12* *Select number of profiles in job*

*Max is 20*

*D = 1200* *Index complete relay time*

*Max is 65000 milliseconds*

*V = 1200* *Velocity in inches per minute*

*Maximum velocity of your feed depends on model is at least 2400 IPM*

*A = 95* *Acceleration in % of Accel limit*

*Max is 100%*

*T = 0* *Accel type*

*0 = trapezoidal, not zero = S curve adds smoothing to the move in powers of 2 millisecond increments .001, .002, .004, .016, .032, .064 etc. up to .128*

*M = 2* *Master - slave mode select (should be 2 except Single Axis Operation system*

*IF SET TO 1 MASTER AXIS WILL BE ENABLED, 2 MASTER AND SLAVE, 3 SLAVE ONLY. Master and Slave related to Push and Pull systems.*

*1= master only, 2 = master/slave, 3= slave only*

*P = 1.000* *Master slave draw ratio*

*This must be positive for push/pull operation (only used with push pull feeders)*

*AA = 120* *Feed advisor angle in degrees of feed time*

*(0-359)*

*AR = 300* *Feed advisor rate IN STROKES PER MINUTE*

*OP = 1* *Job option - Feed advisor select 1 = ON*

*Job option – Acceleration and speed in profile 2 = ON*

*Job option- 3 = BOTH*

*SKVFF = 0* *This command will control the velocity feed forward command gain of the slave system.*

*Range is 0-200 the higher the value the sharper the response of the slave system*

## Profile data (Information changes for each Profile)

*n* *is the profile number of the profile you want to change*

*I1=* *index length 1*

*I2 =* *index length 2*

*PAn = 50%* *Acceleration in % of accel limit*

*Max is 100%*

*PSn = 1000* *Profile velocity in inches per second*

*Consult factory for maximum velocity of your feed*

*In = 1.001* *Index distance*

*Max is 1200 in, min. is .001 in*

*Rn = 100* *Repeat count - total number of indexes for this profile*

*Max is 65000*

*Ecn = 0.0* *Early Index Complete (0.0 active at end of index)*

*Example: If I1 = 6.0000 set EC1 = 3.0000 to have index complete come on half way through the move.*

*Gn = 10101010101010 the 1st digit is gag 1 the last digit is gag 14*

*Max is 14 bits*

*GBn =* *Timed Gags to come on at beginning using the "O" command for set time.*

*GBSn =* *Gags to come on at beginning and stay on until the feed stops. The "S" means Static.*

*GEn =* *Timed Gags to come on at the End of the move.*

*GESn =* *Gags to come on at end and stay on until next feed signal. The "S" means Static*

*Note: To have a gag come on at the beginning and stay on until the next move starts BOTH the BEGINNING and END STATIC GAGS need to be programmed.*

*EXAMPLE:* *To have GAG 1 come on and stay on until the next move.*

*GB1 = 00000000000000*

*GBS1 = 10000000000000*

*GE1 = 00000000000000*

*GES1 = 10000000000000*

*On =1 Gag on time for GBn= and GEn= (Max is 65000 millisecs, 0= no timeout)*

*End is usually used with air and hydraulic gagable presses Beginning is usually used with gagable tooling in a punch press*

## Registration

Three new registration moves have been added to job programming. Each profile now includes a registration state variable that controls Reg Mode Index, Move to Reg sensor, and Move to Edge sensor. The Registration State also includes master or slave feed selection, and continues to next profile without external index.

Reg state is programmed using RGMn = state command where n is profile number and M indicates master feed move. Note that RGSn = state would be for slave feed move and RGBn = state would be for both master and slave move.

Reg State values are:
0 = normal Index
1 = Reg Mode Index
2 = Move to Reg sensor
3 = Move to Edge sensor
4 = Move to Reg sensor, then Reg Mode Index
5 = Reg Mode Index, then Move to Reg sensor
6 = Move to Reg sensor, then Reg Mode Index, then Move to Reg sensor

The feature to continue from one move to the next without external index is turned on by adding the character “C” to the command as follows:

RGMCn = state

The feature to RESTART profile 1 on the following move before finishing the last is turned on by adding the character “R” to the command as follows: (used in master slave mode when strip feeding)

RGMRn = state

Example:

| | |
|---|---|
| N = 3 | 3 profiles |
| RGM1 = 3 | MASTER FEED FIND EDGE |
| RGMR 2 = 0 | MASTER FEED NORMAL INDEX and RESTART profile 1 on next move |
| RGS3 = 0 | SLAVE FEED NORMAL INDEX |

This will cause the slave feed to index and the master feed to find edge on the same index command.
This feature is primarily used when feeding precut strips of material. It allows you to start the next strip when ejecting the previous strip allowing the press to run in continuous and not be stopped after each strip.
Each profile can have its own Move to Reg and Move to Edge velocity. This is programmed using the RVn = velocity command.

Note: Reg states with Move to Reg or Move To Edge must have Reg Velocity (RVn=) programmed. Reg states with Reg Mode Index must have Feed length (In=) programmed.

## Job Utilities

| | |
|---|---|
| F2, 3 | Forces profile 2,repeat step 3 |
| C2, 4 | Copies job 2 to job 4 |

## PART Counter

| | |
|---|---|
| SC = xx | Set part counter preset (max count value is 999999) |
| PCNT | Recalls present count |
| RC | Reset part count to Zero |

The part counter counts 1 each time the pattern is repeated. When Job count = presetOCIO14 turns on.

# MENU EXAMPLE:

```
Waddington Electronics Ver 3.8
 ANCILLARY EQUIPMENT MAY OPERATE
'ENTER' TO CONTINUE - 'CLEAR' TO ABORT
BE SURE THAT ROLLS ARE OPEN
PRESS JOG TO HOME FEED
ENTERING MANUAL MODE
JOB= 1:
ENTER DATA ED
J1- OPT - 0=NO, 1=ADV, 2=ACCinPROF, 3=BOTH [2] 3
     Option =  [3]
J1- NUMBER OF PROFILES [2]
J1- INDEX COMPLETE IN MS [100]
J1- FEED ADVISOR ANGLE [90]
J1- FEED ADVISOR RATE [300]
J1- VELOCITY IN IPM [4085]
J1- MASTER SLAVE MODE (1,2,3) [1]
J1- ACCEL TYPE [0.000000]
J1- DRAW RATIO [1.000000]
P1- NUMBER OF REPEATS [1]
P1- BEGIN TIMED GAGS [00000000000000]
P1- BEGIN STATIC GAGS [00000000000000]
P1- END TIMED GAGS [00000000000000]
P1- END STATIC GAGS [00000000000000]
P1- GAG TIME IN MS [100]
P1- REGISTRATION PROCESS [0]
P1- REGISTRATION VELOCITY [0]
P1- INDEX IN INCHES [0.750000] 2
      INDEX LENGTH = [2.000000]
P1- EARLY INDEX COMPLETE [0.000000]
P2- NUMBER OF REPEATS [1]
P2- BEGIN TIMED GAGS [00000000000010]
P2- BEGIN STATIC GAGS [00000000000000]
P2- END TIMED GAGS [00000000000000]
P2- END STATIC GAGS [00000000000000]
P2- GAG TIME IN MS [20]
P2- REGISTRATION PROCESS [0]
P2- REGISTRATION VELOCITY [0]
P2- INDEX IN INCHES [-1.000000] 4.25
     INDEX LENGTH = [4.250000]
P2- EARLY INDEX COMPLETE [0.000000]
```

*I. This is the JOB HEADER. Here the first thing done Is choosing which OPTIONS are going to be active, 1 for Feed Advisor, 2 for individual Accel and Velocity per profile, or 3 for both. Then a # of profiles is chosen, profiles are generally different lengths or may be the same length if you want different GAGS to be active with the material at another position. GAGS are programmable OUTPUTS, which can be used to change punches in a Die or maybe tell the press to GO.*

*II. FEED ADVISOR ANGLE is measured in DEGREES of feed time desired.*

*III. FEED ADVISOR RATE is measured in Strokes Per Minute (SPM).*

*IV. VELOCITY in Inches Per Minute (IPM).*

*V. Now the rest of the JOB HEADER should be left at the DEFAULT setting which is 1 for MASTER/SLAVE MODE, 0 for ACCEL TYPE, 1 for DRAW RATIO. Changing these settings will affect the system and for further definition LOOK in the SMS6 PROGRAMMING MANUAL.*

*VI. After the JOB HEADER comes the profile programming information. This is where you program the # of REPEATS, for a PROFILE , FEED LENGTH and GAG pattern.*

```
JOB= 1:
ENTER DATA DN

-=-=-=-=-=-=-=-=-=-=
```

**I.** *Here with a computer plugged into the main system controller running HyperTerminal you are able to download the Job information and save it as a text file for future reference or to make changes to and upload back into the controller.*

**OP=3**
**N1=2**
**AA1=90**
**AR1=300**
**A1=8**
**D1=100**
**V1=4000**
**T1=0.000000**
**M1=1**
**I1=2.000000**
**R1=1**
**GB1=00000000000000**
**GBS1=00000000000000**
**GE1=00000000000000**
**GES1=00000000000000**
**O1=100**
**PA1=20**
**PV1=0**
**EC1=0.000000**
**I2=4.250000**
**R2=1**
**GB2=00000000000010**
**GBS2=00000000000000**
**GE2=00000000000000**
**GES2=00000000000000**
**O2=20**
**PA2=42**
**PV2=0**
**EC2=0.000000**

# RS-232 Communications

*Jobs can be stored as txt files on a computer and can be uploaded and downloaded via the rs-232 port on the drive. Use the DN and UP commands from the terminal program (win95/98 HyperTerminal) on the computer.*

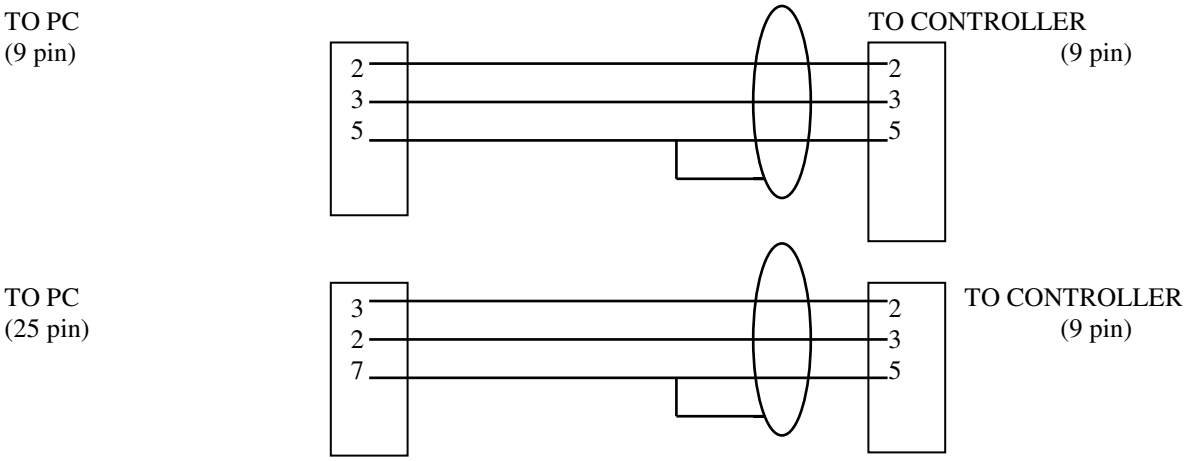
| | |
|---|---|
| DN | Down load job |
| UP | Up load job to controller - Disables terminal output until EOT (CTRL+D) |
| INITALL | Zeros all jobs Erases memory |

**Terminal settings should be as follows:**

| | |
|---|---|
| Bits per second | 19200 |
| Data bits | 8 |
| Parity | None |
| Stop Bits | 1 |
| Flow control | None |

Go to the FILE drop down menu select PROPERTIES. Then select SETTINGS (at the top) and then go to ASCII setup. FILE:
Properties:
Settings:
ASCII setup:
ASCII Sending:
Character delay: 100 milliseconds
Line delay: 100 milliseconds
ASCII Receiving:
Wrap lines that exceed terminal width

# RS-232 wiring




# Tuning commands

Please do not use tuning commands unless you call the factory 1st

TUNEM Master axis main tuning mode

TUNES Slave axis main tuning mode

After selecting TUNEM or TUNES, the following parameters can be edited.

KVP
KVI
KPP
KIP
ARF0
ARF1
ACCLIM

X returns to job edit mode

S enters keyboard inc/dec mode

| | |
|---|---|
| A | KVP + 0.001 |
| H | KVP - 0.001 |
| B | KVI + 0.1 |
| I | KVI - 0.1 |
| C | KPP + 0.1 |
| J | KPP - 0.1 |
| D | KIP + 1 |
| K | KIP - 1 |
| E | ARF0 + 10 |
| L | ARF0 - 10 |
| F | ARF1 + 10 |
| M | ARF1 - 10 |
| G | ACCLIM + 10 |
| N | ACCLIM – 10 |

X Returns to main tuning mode

## Linearization (Compensation) not used on push pull feeds

| | |
|---|---|
| AUTOSTEP | Executes a 128 step calibrations run using 512 counts per step<br>This function uses time between steps from job 1, gag 1 gag duration (O1=200 for 200ms between steps). Gag 2 is strobe to the data logger. |
| LININIT | Zeros the comp table |
| LINDUMP | Dumps the comp table to the RS-232 |
| LINMAN | Starts manual comp input<br>This function prompts with the table position<br>Use S = nnn to change table position<br>Use X to exit manual input |
| LINDATA | Use this to start comp table load from terminal |
| **LINCOMP** | Checks the comp by stepping 128 steps of engunits/128 inches each. This function uses time between steps from job 1, gag 1 gag duration (O1=200 for 200ms between steps). Gag 2 is strobe to the data logger. |

## Calibration Mode

**PASS** Selects calibrate data mode

| | |
|---|---|
| EM = 6.282 | Master engineering units |
| ES = 6.282 | Slave engineering units |
| S = 100 | Jog Speed In revs per minute |
| MPOL= | 1 for pull operation, 0 for push operation |
| SPOL= | 1 for pull operation, 0 for push operation |
| X | returns to job edit mode |

## Status LED Code List

| Status Code | | Description |
|---|---|---|
| 0 | | No faults, power stage disabled, control voltage OK. |
| 8 | | No faults, power stage enabled, control voltage OK. |
| 8 | Alternating | No faults, power stage enabled CcwInh active preventing CCW motion. |
| 8 | Alternating | No faults, power stage enabled, CwInh active preventing CW motion. |
| 8 | Alternating | No faults, power stage enabled, CwInh and CcwInh both active preventing motion. |
| 1 | Blinking | Velocity feedback (VelFB) over speed<br>To further identify this fault see software variable ExtFault:<br>ExtFault = 1 \|VelFB\| > 21038 RPM<br>ExtFault = 2 \|VelFB\| > max (VelLmtxx)*1.5 |
| 2 | Blinking | Motor over temperature |
| 3 | Blinking | Drive over temperature |
| 4 | Blinking | Drive I*t |
| 5 | Blinking | SC9x3: Line-neutral over current |
| 6 | Blinking | Control ±12 V under voltage |
| 7 | Blinking | Output over current or Bus over voltage |
| 9 | Blinking | Shunt regulator overload |
| A | Blinking | Bus over voltage detected by DSP |
| | Blinking | Auxiliary +5V low |
| C | Blinking | Not assigned |
| | Blinking | Not assigned |
| *E | | Processor throughput fault |
| *E | Blinking | Control power ac line dip or power up self test failure |

To further identify this fault see software variable ExtFault:
ExtFault = 1 Calibration data corrupted
ExtFault = 2 Excessive dc offset in current feedback sensor

| | | |
|---|---|---|
| | | ExtFault = 3 DSP incompletely reset by line power dip<br>ExtFault = 6 Excessive dc offset in Analog Command A/D<br>ExtFault = 7 Unable to determine option card type<br>ExtFault = 8 DSP stack overflow<br>ExtFault = 10 Software and control card ASCI incompatible<br>ExtFault = 11 Actual Model not same as stored in NV memory<br>ExtFault = 12 Unable to determine power stage<br>ExtFault = 15 RAM failure<br>ExtFault = 16 Calibration RAM failure |
| E 1 | Alternating | Bus under voltage, bus voltage VBusThresh* |
| E 2 | Alternating | Ambient temperature too low |
| E 3 | Alternating | Encoder commutation alignment failed (Only for CommSrc = 1) |
| E 4 | Alternating | Software and non-volatile memory versions not compatible |
| *E 5 | Alternating | Control card hardware not compatible with software version |
| E 6 | Alternating | Two AInNull events too close together |
| F 1 | Alternating | Position following error fault |
| F 3 | Alternating | Parameter memory error<br>To further identify this fault see software variable ExtFault:<br>ExtFault = 13 Control card non-volatile parameters corrupt<br>ExtFault = 14 Option card non-volatile parameters corrupt |
| U C | Alternating | Unconfigured drive |

*These fault states can not be reset with the Fault Reset function and require the line Control power to be cycled.

| Status Code | | Possible Cause |
|---|---|---|
| 1 | Blinking | Loose or open circuit wiring to the resolver feedback connector J3.<br>Actual motor speed exceeded 1.5 * (Max Of \|VelLmtLo\| or \|VelLmtHi\|) or 21,038 RPM which is the over speed trip level.<br>For Encoder velocity feedback (RemoteFB = 2) check that EncIn is Set properly to correctly scale the VelFB units. |
| 2 | Blinking | Loose or open circuit wiring to motor PTC thermal sensor (J3-8 & J3-9).<br>High ambient temperature at motor.<br>Insufficient motor heat sinking from motor mounting.<br>Operating above the motor's continuous current rating.<br>Inoperative cooling fan. |
| 3 | Blinking | High drive ambient temperature.<br>Restriction of cooling air due to insufficient space around unit.<br>Operating above the drive's continuous current rating.<br>Inoperative cooling fan.<br>Note: See HSTemp, ItFilt, and ItF0 for information on measuring thermal margin in an application. |
| 4 | Blinking | Mechanically jammed motor.<br>Motion profile accelerations too high.<br>Machine load on the motor increased perhaps by a friction increase.<br>Problem with wiring between drive and motor yielding improper motion.<br>Drive and/or motor under sized for application.<br>Note: See HSTemp, ItFilt, and ItF0 for information on measuring thermal margin in an application. |
| 5 | Blinking | Motor power wiring (J2-2, 3, or 4) short circuit line-to-ground/neutral.<br>Motor power cable length longer than the data sheet specification to cause excessive motor line to earth ground/neutral capacitance. |
| 6 | Blinking | Insufficient control ac voltage on J1-5 to J1-6.<br>External short on signal connector.<br>Internal drive failure. |
| 7 | Blinking | Motor power wiring (J2-2, 3, or 4) short circuit line-to-line or |

| | | |
|---|---|---|
| | | line-to-ground/neutral.<br>Internal motor winding short-circuit.<br>Insufficient motor inductance causing output over current faults.<br>KIP or KII improperly set causing excessive output current overshoots.<br>Motor ac power input voltage too high.<br>Disconnected regeneration resistor on J5.<br>External regeneration resistor ohmage too large yielding Bus Over Voltage fault. |
| 9 | Blinking | Excessive regen in application.<br>Improper external regen wiring or components on J5. |
| A | Blinking | Actual bus over voltages are usually, but not always, detected and displayed as a blinking 7 fault. See that entry for more information.<br>Blinking Short-circuited wiring on the output (J4-25).<br>Load exceeds the current rating of this supply. |
| E | Solid | Drive hardware failure or drive software bug. |
| E | Blinking | See the status variable ExtFault for further information about the exact failure. |
| E 1 | Alternating | Check the measured bus voltage VBus and the fault threshold VBusThresh to make sure they are consistent. |
| E 2 | Alternating | Ambient temperature is below drive specification.<br>Drive's internal temperature sensor has a wiring problem. |
| E 3 | Alternating | Problems with encoder feedback wiring to J4 when CommSrc = 1.<br>Load inertia more than 100 times the motor inertia leading to settling times long compared to the 2-second encoder commutation alignment; artificially extend the alignment time by pulsing the hardware enable (J4-6). |
| E 4 | Alternating | OC930-001-01 (drive software upgrade card) was used to set up an old drive. Then either no or a standard OC930-001-00 (no software upgrade option card) is installed, resulting in the old software being used in the drive. |
| E 5 | Alternating | Attempt to upgrade the drive's software will not work<br>Contact factory for upgrade details. |
| E 6 | Alternating | Unconfigured drive (Status LED alternates U, C after power up) was fully configured with the drive motor power enable active. This fault can be reset or the control ac power cycled to get the drive-motor operating. |
| E 7 | Alternating | The AInNull function was re-activated too soon after going inactive. This can be caused by switch bounce on the input pin mapped to activate AInNull. |
| F 1 | Alternating | The motor is either stalled or partially jammed or the value for PosErrorMax is set too sensitive for the loop tuning and commanded motion profiles. |
| F2 | | Program corrupt re-install. |
| F3 | Alternating | Glitch while last saving the NV parameters.<br>Swapped option card has corrupted NV memory contents.<br>Hardware problem with the NV memory. |

# Instructions for downloading new software

1. ***READ ALL DIRECTIONS BEFORE DOING ANYTHING TO THE PROGRAM IN YOUR SERVO FEED SYSTEM***
2. *Install **950IDE** software onto your **PC***
3. *Click the **STOP** Button at the top of the screen*
4. *Go to the **OPTIONS** dropdown menu and select **UNCONFIGURE OC950** then*
5. *Go to the **COMPILE** dropdown menu and select **DOWNLOAD PROGRAM**. The program will then ask you to select a file with **.BIN** for the extension.*
6. *The computer will then ask you to choose an active **AXIS #** between **1 & 255.** The computer should then show a list of available Axis's your system is running on. Click **OK** at the bottom of the window. If the program says that the program contains software that has features, which are not supported, by the firmware. DO you wish to download anyway? Select YES, the features mentioned should be disabled in the program. Now your computer will be processing the information being downloaded to the drive and the screen on your computer will be frozen until the program is downloaded completely into the drive. When the program is finished downloading a window will pop-up on your screen reading **DOWNLOAD COMPLETE** then click the **OK** button.*
7. *Now go to the **COMPILE** dropdown menu and **select RESTART (SHIFT,F5).** The system should now restart with the effects of the new software that you just downloaded.*
8. *When the system restarts your screen will display:*
   "Waddington Electronics Ver. 3.8" at this time key in a "." (Older versions of software use "?")
   You will then be asked if the motor and the resolver spin in the same direction?
   Answer with "1"(FOR YES) "." (Older versions of software use "Y")
   This will spin the motor and then prompt you to cycle power to the feed.
9. Now click the **STOP** button and then go to the Compile dropdown menu and select **VARIABLES.**
10. Here key in **AUTOSTART**, press **ENTER, press TAB,** enter **1** for new value then **ENTER.** After doing this you can disconnect the computer and restart the system normally.

# Using a SmartPAC with a Waddington SMS series SERVO FEED

## STARTUP:

1. SmartPAC should have **Ver. 7.56** firmware installed.
2. Apply power to the SmartPAC.
3. The SmartPAC should scan for the installed options then open the **Waddington SMS Terminal**.
4. Now apply power to the feed system with the **AUTO/MAN/JTL** switch in **MAN** position.
5. The terminal should then display " **Waddington Electronics Ver. #** "followed by "**Warning Ancillary Equipment May Operate "ENTER" to Continue "CLEAR" to ABORT**. Here you will need to press **ENTER**.
6. Now you should be prompted to **OPEN THE ROLLS** and then **PRESS JOG TO HOME FEED**.
7. When you see this **PRESS** the **Forward JOG** button. Now the rolls will move to their home location.
8. After the feed is homed the display should read:
   **JOB=1**
   **ENTER DATA**
9. Now press **RESET**. The SmartPAC should now return to the **MAIN MENU** where you can select a Tool Number.

## INTIALIZATION MENU:

1. You will not be able to read any of the feed information under the **FEED CONTROL MENU** if you have not **HOMED** the **FEED** or if you are in **JTL MODE.**
2. After homing the feed system you will be able to enter the **FEED CONTROL MENU** and read all parameters listed as long as the **AUTO/MAN/JTL** switch remains in the **MAN** position.

## NORMAL JOB SETUP:

1. Follow **STARTUP** procedure listed above.
2. Select Tool number or NEW to create new tool.
3. Program **CAM SWITCH**, which should be connected to **#6** and **#14** on the terminal strip in the **FEED Control cabinet**. Connections should be made to a Solid STATE Relay and should be on the **N/O** and **COM** terminal on the **PROCAM OUTPUT BOARD**.
4. Now program the **CAM** channel that is connected to the AUTO feed for a **TIMED OUTPUT**. This is the **PREFERED METHOD** of programming this output. Programming a TIMED OUTPUT will allow you to specify a START ANGLE and a specific amount of ON TIME. Set your **START ANGLE** where you want to start feeding and specify an **ON TIME of 20mS**.
5. Next, you will need to program **FEED Length, Speed, and Acceleration %**. This can be done in the **FEED CONTROL MENU**.
6. Here you have 2 ways to program the FEED Length, Speed, and Acceleration %:

1. You and enter FEED Length, Speed, and Acceleration % manually. This way you need to come up with your own values for Speed and Acceleration %.
2. You can use the **FEED ADVISOR**. This way you will need to program **Feed Length, Feed ARC (this is how many degrees you can feed for), and Strokes/Per/Minute**. Then the SmartPAC will calculate the Accel rate and Speed for the feed.

7. Now you can LOAD the TOOL Information into the feed. This can be done with the **AUTO/MAN/JTL** switch in **AUTO** or **MAN**.
8. Load the tool information, put the FEED in AUTO MODE, put the key switch on the SmartPAC in the RUN mode and Begin making parts.