

Tip Dressing by Length of Cut

Subject: **Tip Dressing Spot Welding Tips**

Controller: YRC1000

Product: Tip Dresser

Application: Spot Welding

Robot: SP and GP

Summary: The tip dressing function can utilize either a standard IO controlled unit (electric or pneumatic) or a Servo Tip Dresser. Normally the tip dress is a time based function allowing the motor to remove material while the electrodes maintain a specified pressure. It is possible to define a length of the cut on the tips in the tip dress file as an alternate to a time setting. The controller will monitor the electrode position and advance when the length of cut is achieved. This is the total cut length; it would be reasonable to assume similar depth was removed from the Moving and Fixed electrodes.

Programming: Time based tip dressing can be programmed with a Servo Gun Closed instruction with a pressure file. There are provisions for the robot to activate non-servo tip dresser motors by output. Multiple steps and output control could be set to change the speed of the motor if equipped to do so. However, the Tip Dress File provides more control.

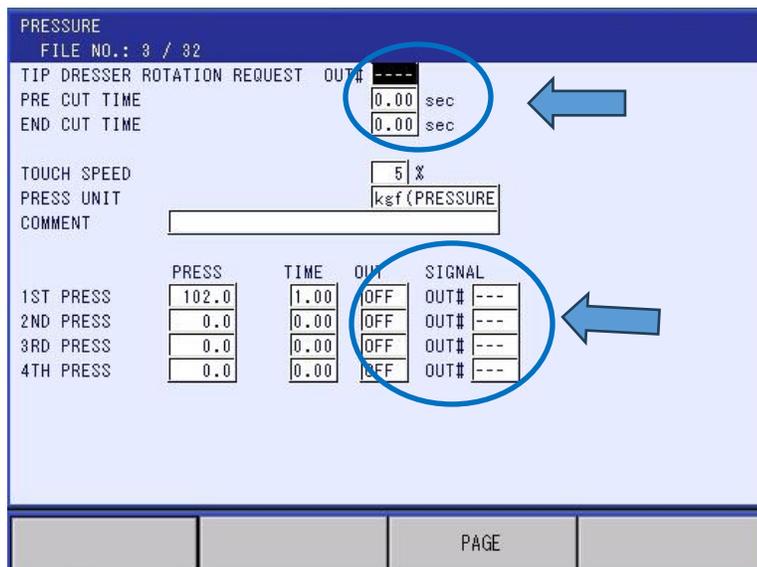


Figure 1-Pressure File can control tip dressing.

The Tip Dress operation is commanded by a Tip Dress Condition file called from the Servo Gun Closed command. The Dress File is specified by pull down for the SVGUNCL instruction. The file settings can be displayed by using the Direct Open key with cursor on the instruction.

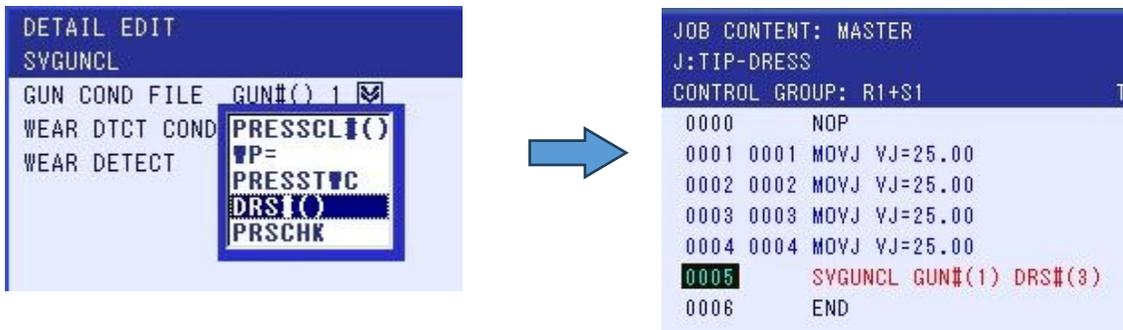


Figure 2-Dress File is specified as a TAG on SVGUNCL instruction.

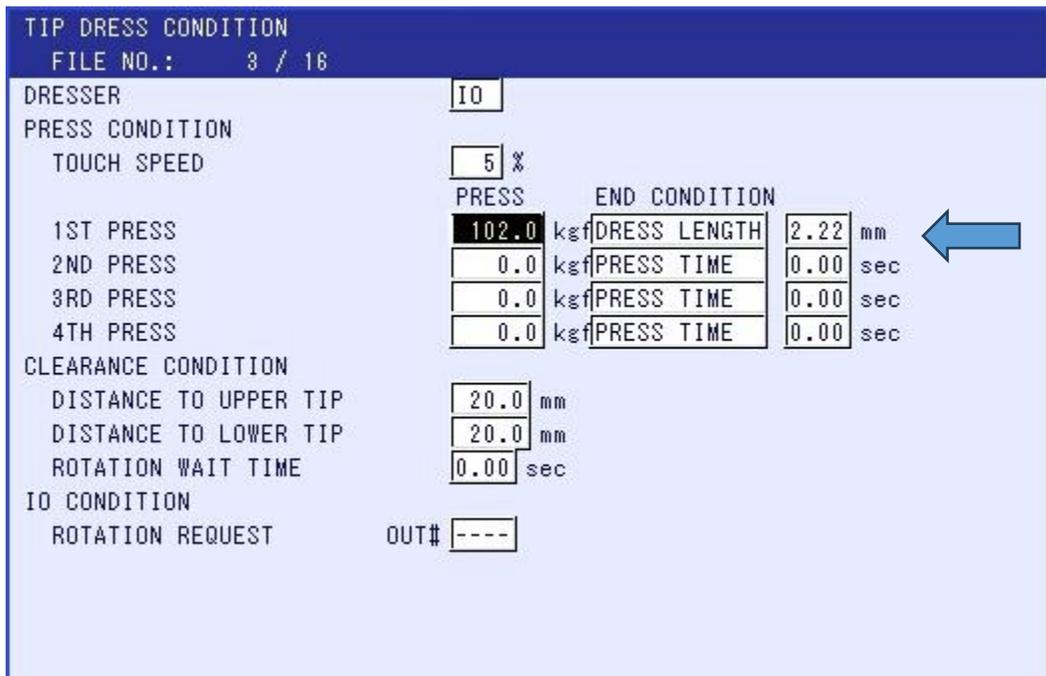


Figure 3-Tip Dress Condition File Settings

The setting of the Dress Length can be combined with different pressures and times to achieve a cut and then polish finish. The IO control can fire the output for the dresser motor. Servo Dressers have a different selection at the top and will provide additional controls for motor torque, speed, and rotation settings. The Clearance distances are for the SVDRESMOV instruction which combines robot and dresser operation in a single move instruction.

To use the Tip Wear Compensation with Dressing TAG it is important to make sure the Dresser Thickness is specified in the Spot Supervision menu. This can be done by keying in the value of the cutter thickness. It can be recorded by applying pressure (use same as dressing pressure) with the manual gun close (INTRLK+8) and selecting the DATA menu in the upper left of the Spot Supervision menu to pick DRESSER THICKNESS REGISTER. (see 1.11.5.4 Wear Detection with Tip Dressing Instruction in Motor Gun Operators Manual 182903-1CD).

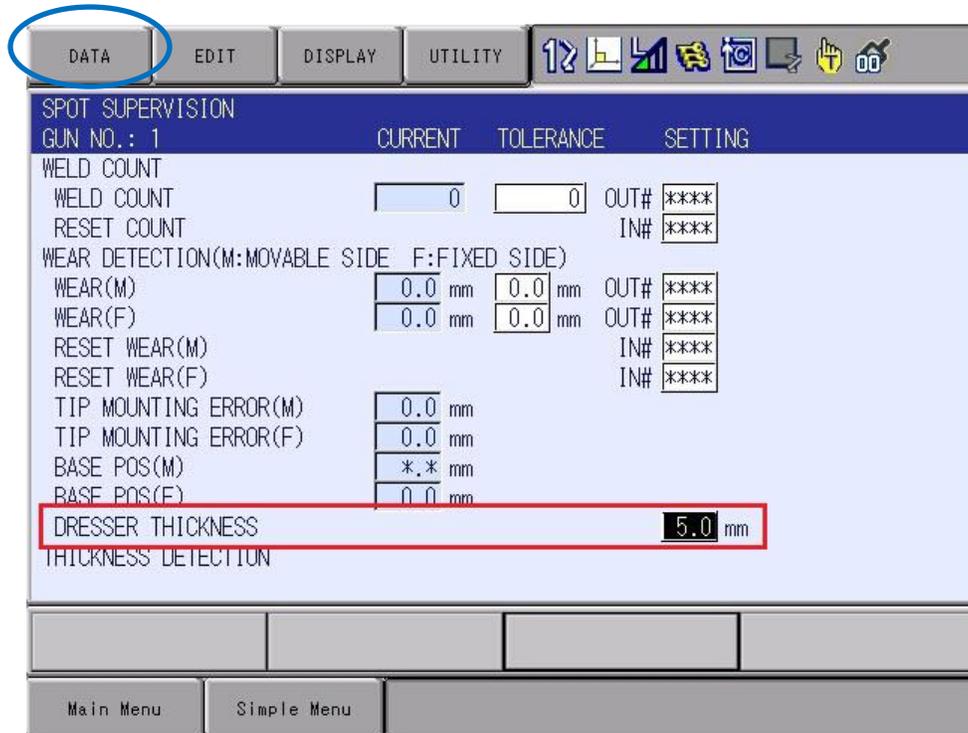


Figure 4-Set the thickness of the dresser from the Spot Supervision menu

The results of the tip dress operation can be viewed in the Tip Dress Supervisory display. While it allows for the setting of tolerance on the cut, logic would have to be added to act on it. The robot will turn on the specified output if the cut is within tolerance. INFORM programming or CIO logic would need to be added if it is desired to perform an action based on the result being within or outside of tolerance.



Figure 5-Tip Dress Condition and Supervision Menus

Tip Wear Compensation (TWC): With the tips dressed it is important to perform tip wear measurement even if they are dressed to a specific length. The tip wear compensation tag can be added to the SVGUNCL command along with the DRS tag. This will be done at the pressure in dress file and with the tips in the cutter, that is why the Dresser Thickness must be programmed in the Supervisory display.

It is desired to use the same clamping conditions when performing the tip wear measurement. This can be done by using a Pressure File specifically for tip wear with the touch speed and force specified in a file# used with the SVGUNCL command and the TWC tag added. A tip wear condition can also be set in the Spot Supervision Menu. These are Global settings for measuring tip wear and can be called by specifying the PRESSTWC tag in the SVGUNCL command. There are also settings to bias the Wear Ratio between the Fixed and Moving electrodes (TWC-C) or add a fixed offset to the fixed electrode (negative values can be used).

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JOB CONTENT: MASTER
J:TIP-DRESS                               S:0000
CONTROL GROUP: R1+S1                       TOOL: **
0000    NOP
0001 0001 MOVJ VJ=25.00
0002 0002 MOVJ VJ=25.00
0003 0003 MOVJ VJ=25.00
0004 0004 MOYL V=100
0005    SVGUNCL GUN#(1) DRS#(3)
0006    *TIP WEAR COMP AFTER DRESS
0007    SVGUNCL GUN#(1) PRESSCL#(3) TWC-C
0008    *OR
0009    SVGUNCL GUN#(1) PRESSTWC TWC-C
0010 0005 MOVJ VJ=25.00
0011 0006 MOVJ VJ=25.00
0012 0007 MOVJ VJ=25.00
0013    END

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Figure 6-SVGUNCL with DRS and TWC tags for Dressing and Tip Wear Measurement

| SPOT SUPERVISION | | | |
|------------------|---------|-----------|-----------|
| GUN NO.: | CURRENT | TOLERANCE | SETTING |
| WEAR(F) | 0.0 mm | 0.0 mm | OUT# **** |
| RESET WEAR(M) | | | IN# **** |

| THICKNESS DETECTION | |
|--------------------------------------|--------------|
| DETECTED THICKNESS | 0.0 mm M 000 |
| WEAR DETECT CONDITION | |
| TOUCH SPEED | 50 % |
| DETECT PRESSURE | 102.0 ksf |
| WEAR RATIO(FIXED SIDE) | 50 % |
| WEAR COMPENSATION OFFSET(FIXED SIDE) | 0.00 mm |
| PRESSURE(CURRENT) CHANGE RATE(MAX) | JUDGE A |

Figure 7-Global Tip Wear Measurement Condition in Spot Supervision Menu