(ROTARY AXIS) 8050/55 M,T CNC resolution, gain & following error set-up

step1: Get the max. rpms (revolution per minute) of the motor.
Example: **MAX. RPM** =2000 rpms

step2: Get the pitch of the axis (in degrees per revolution of the axis)
Example: **AXIS PITCH** = 360°/rev. axis
and number of lines per revolution of the encoder.
Example: **NPULSES** = 500 lpr

step3: Get the gear ratio between motor **(assuming the encoder is mounted on the motor)** and axis (in revolution of the axis per revolution of the motor)
note: if the encoder is mounted directly to the spindle, assume the gear ratio is 1

Example: **GEAR RATIO** = 1 rev. axis / 80 rev. of motor (encoder)
Calculate the overall pitch as the distance per revolution of the motor (encoder):
PITCH = AXIS PITCH * GEAR RATIO
Example: **PITCH =** 360° * 0.0125 = 4.5°/rev. encoder

step4: Calculate maximum linear feed allowed by the machine:
MAX. FEED = MAX. RPM * AXIS PITCH * GEAR RATIO
Example: **MAX. FEED=** 2000 * 360° * 0.0125 = 9000°/min

step5: Enter the above calculated values into machine parameter for the Axis:
P7 = PITCH = distance per revolution of motor = 4.5°/rev. encoder
P8 = NPULSES = 500 lines per revolutuon of the encoder
P38= G00FEED = 8500°/min (note: less than calculated in step4)

step6: Calculate Proportional Gain for the selceted G00 feedrate:
PROGAIN=(9500mV * 1000°/min) / G00FEED
Example: **PROGAIN =** (9500mV * 1000°/min) / 8500°/min= 1117mV
(9500mV*1000°/min is a **constant**)
Enter this value into the parameter for the axis: **P23= PROGAIN=**1117mV

step7: Using the enclosed program for axis adjustment run each axis separately back and forth and use the Following Error display to monitor the following error. What you are adjusting for is to have:
8.5° of the following error for feedrate equal to 8500°/min.
For more accurate readings start with Feedrate Override Switch set to 10%. When running at 10%what you are looking for is:
.85° of the following error for feedrate of 8500°/min (10% of G00)

Use **SIGNAL POT** of the servo drive to tune the axis for appropriate value of the following error. Also you should monitor the CNC analog output voltage on the signal input to the servo drive. What you look for as far as voltage is to have:
+/-9.50 Volts for max. feedrate (100% of G00) or
+/-0.95 Volts for 10% of G00

step8: Now if the axis is almost adjusted you need to take care of the possible servo-CNC axis offset. In other words to balance (have the same value) the following error in both (+ and -) directions. Use the **BALANCE POT** of the servodrive to do this.

step9: Calculate the resolution (just for your information). Note CNC multipying factor of 4 for

square wave feedback systems: **PITCH** 4.5°/rev. encoder

$$\textbf{RESOLUTION} = \frac{\textbf{PITCH}}{\textbf{NPULSES * 4}} = \frac{4.5°/\text{rev. encoder}}{500\ \text{lpr} * 4} = 0.00225°/\text{pulse}$$