SK1453

M-CUT SET-UP GUIDE rev 1.0 1-5-94

This document is designed to make the start-up and programming of the M-Cut as easy as possible by collecting all the pertinent information from the various parts of the manual.

Because the M-Cut can be programmed to perform a general task in various ways, it becomes important that the subtleties of the application and the task at hand are fully understood before proceeding.

WIRING

Wiring of the drive and encoders. (refer to page 2-2 and 3-5 in the manual for a complete explanation).

Speed command signal output:

The M-Cut is designed for standard regenerative DC drives and Servo amplifiers. These types of drives have two types of speed signal requirements. Regenerative DC drives usually expect a three wire control input from a potentiometer. Servo drives usually have a differential input that requires a two wire speed input. Some manufacturers have accommodated both types of input on their drives. If available use the two wire differential input.

Consult the drive manufacturer's manual and ascertain which of the above types of input are required. Compare this with the generic diagrams (Fig. 1 and Fig. 2 on page 3 of this guide) and connect the drive to the M-Cut, as shown. Select jumper placement according to the type of input (Fig. 3).
See Page 2-2 in manual for further explanation, if necessary.

Encoder signal input:

The M-Cut will accept an open collector NPN sinking signal. This must be a quadrature type device. Consult the manufacturers literature for your encoder/feedback device and verify its type.
Quadrature Signal: The device has two channels and hence has two signal lines. Note: The M-Cut cannot accept a single channel type encoder signal.
Refer to Figure 4 to find the physical location of wiring terminals for the drive and encoder. Connect the control pushbuttons as shown.

***** IMPORTANT *****

YOU MUST FOLLOW STANDARD PRACTICES FOR THE WIRING OF MICROPROCESSOR BASED CONTROLLERS AT ALL TIMES. USE APPROPRIATE SHIELDING, ROUTING AND SUPPRESSION TECHNIQUES. REFER TO THE YELLOW SHEET TITLED RECOMMENDED WIRING PROCEDURES FOR SPECIFIC DETAILS.

Motor drive setup:
(See page 4-1 if special requirements exist)

After completing the required wiring (fig. 4) of the M-Cut, follow the procedure below to set up motor drive or servo amplifier.

1) While pressing the "CLEAR" AND "7" buttons on the keypad, apply AC power to the M-Cut (this loads the factory default parameters). CAUTION! ANY EXISTING CODES WILL BE LOST.
2) Enter a "1" into CP-60 (Control Parameter 60), this puts the M-Cut into direct mode. The keypad sequence is "Code Select", "6", "0", "Enter", "1", "Enter".
3) Enter 500 into CP-61. This will produce a positive voltage signal to the drive. If the motor rotates backwards, then rewire the drive/motor to reverse the motor direction.
4) For tuning the drive, CP-61 can be adjusted from 0 to 4095 for different speed commands. The original speed POT could also be used. If using a servo amplifier, tune according to its manual. If using any other type of motor drive, set the ACCEL and DECEL POTS on the drive to the minimum times (maximum rates) and set the IR compensation POT (if present) to its minimum setting.
5) While the motor is rotating in the forward direction, check MV-46 (Monitor Variable 46). This shows the frequency of the feedback, if it is negative, switch the encoder wires on J3 pins 7 and 9.
6) Enter "500" into CP-61. Enter "2" into CP-60. Wait 5 seconds, then change CP-60 to a "0". This step automatically calculates the feedforward.
7) Check CP-64, if it is zero then repeat step 6, using "1000" in CP-61. If it is non-zero the motor drive set up is complete.

SCALING AND PROGRAMMING

(See page 5-6 if special requirements exist.)

After completing the motor drive set-up, follow the procedure below to configure the M-Cut.

1. Determine what the engineering units will be. For example, inches, meters, feet, revolutions. Calculate how many encoder edges will occur for one engineering unit. Because the M-Cut uses quadrature encoders, there are 4 encoder edges for every encoder pulse. Enter the number of encoder edges into CP-30. For example, if there are 120 encoder pulses per inch, enter 480 into CP-30.
2. Enter into CP-62 the number of encoder pulses that occur per one revolution of the motor. If the feedback encoder is on the motor this number will be the ppr (pulses per revolution) of that encoder. If there is gear reduction between the motor and encoder, the number will be the ppr of the encoder divided by the gear reduction. With a 4:1 reduction and a 1000 ppr encoder on the slow speed side of the gearbox, a value of 250 would be entered in CP-62.
3. Select a move distance, in engineering units, and enter its value in CP-1, e.g. 10.0 inches. From the factory the M-Cut is setup for the more common "Relative" position type moves, see page 5-8 in the manual if "Absolute" positioning is required.
4. Select a move speed in engineering units per minute and enter it into CP-2. Start with a low value, e.g. 5 inches/minute.
5. CP-3 is the acceleration time in seconds to get from zero speed to the speed in CP-2. CP-4 is the deceleration time in seconds to get from the speed in CP-2 down to zero speed. Change either of those codes as required.
6. Pressing the "move" button should now cause the motor to move the distance in CP-1. If this does not happen go to the trouble-shooting section. The distance moved can be observed by pressing the "position" key.
7. For specialized programming see the pages in the manual noted for an expanded explanation.
   - ► Using the other 3 profiled moves. . . . . .Page 5-5
   - ► Scaling in seconds instead of minutes . . . . . " 5-6
   - ► Using batch functions . . . . . " 5-7
   - ► Stopping at a registration mark . . . . . " 5-7
   - ► Relative vs Absolute moves, direction . . . . . " 5-8
   - ► Kerf, Profile sequencing, backstep. . . . . " 5-8
   - ► Jog . . . . . " 5-10
   - ► Using the 3 timed outputs 5-10, 5-21
   - ► Setting a "home" position . . . . . " 5-17
   - ► Interrupting and resuming the move 5-23, 24
   - ► Backstep . . . . . " 5-25
8. Many other functions are possible. Consult the manual and/or the factory for details.

TUNING

After completing the MOTOR DRIVE SETUP the M-Cut and the drive should perform reasonably well. If more aggressive control is required, increase the Kp (Proportional Constant) value in CP-65. Instability can also be caused by CP-3 and CP-4 (accel and decel times, respectively) being too small. Try entering longer times (larger numbers) into CP-3 and CP-4 to improve stability.
Many systems perform better with S-curve Accel/Decel enabled (CP-63=1). See page 5-13 in the manual for details. See page 5-15 for a more detailed discussion of tuning.

TROUBLE-SHOOTING

This section is intended to help solve the most common problems that occur with the M-Cut. Check appendix C for complete explanation of codes. If satisfactory performance is not achieved, fill out a copy of the next page and fax to Contrex.

1.0 Motor will not run with "Move" command.
  1.1 Check MV-47 (Monitor Variable 47). If it is "0" go to next step (1.2).
    If non-zero check: - the voltage between J1 pin 9 and pin 10
    - wiring to drive speed command input
    - drive enable and current limit
    - wiring between drive and motor
  1.2 Check MV-53 while pressing "Move", if it is:
  - 000000, 000001 or 000010 check Move, Halt and F-Stop wiring. These input signals can be monitored in MV-55 and MV -56
  - 100010 check the cut length in CP-1, (possibly 8, 15, 22), the move speed in CP-2, (possibly 9, 16, 23) and make sure CP-30 (scaling) is not still 1.
  - 000100,001000,010000 or 100100 check wiring, the wrong input is being actuated.
  1.3 If using absolute positioning, change active cut length (CP-1) and press "Move".
2.0 Motor will not run with "Jog" or "Home-to-Index" command.
  2.1 Do step 1.1 above.
  2.2 Check jog speed, CP-37.
3.0 Motor will not stop.
  3.1 Check MV-53 to determine control state.
  3.2 Check MV-46 for presence of feedback signal, check wiring and/or encoder if zero.
  3.3 Check MV-47, if zero check drive.
  3.4 Repeat motor drive setup.

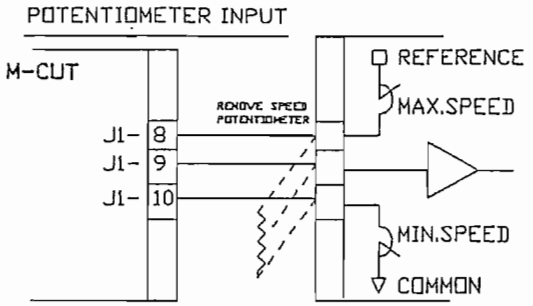


FIG 1

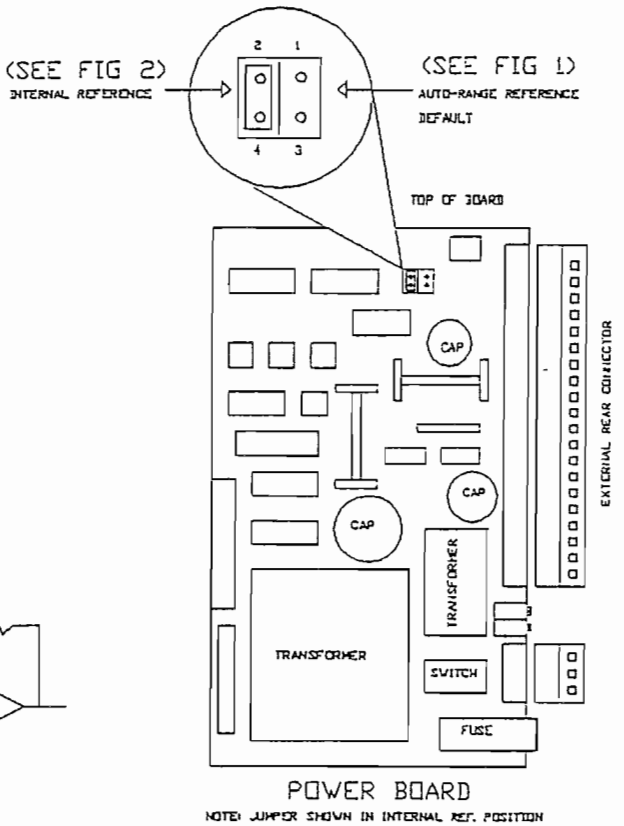


FIG 3

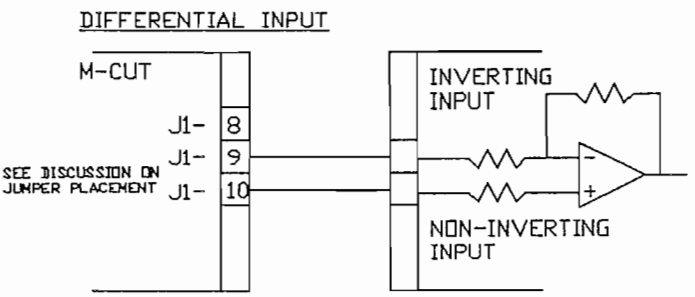
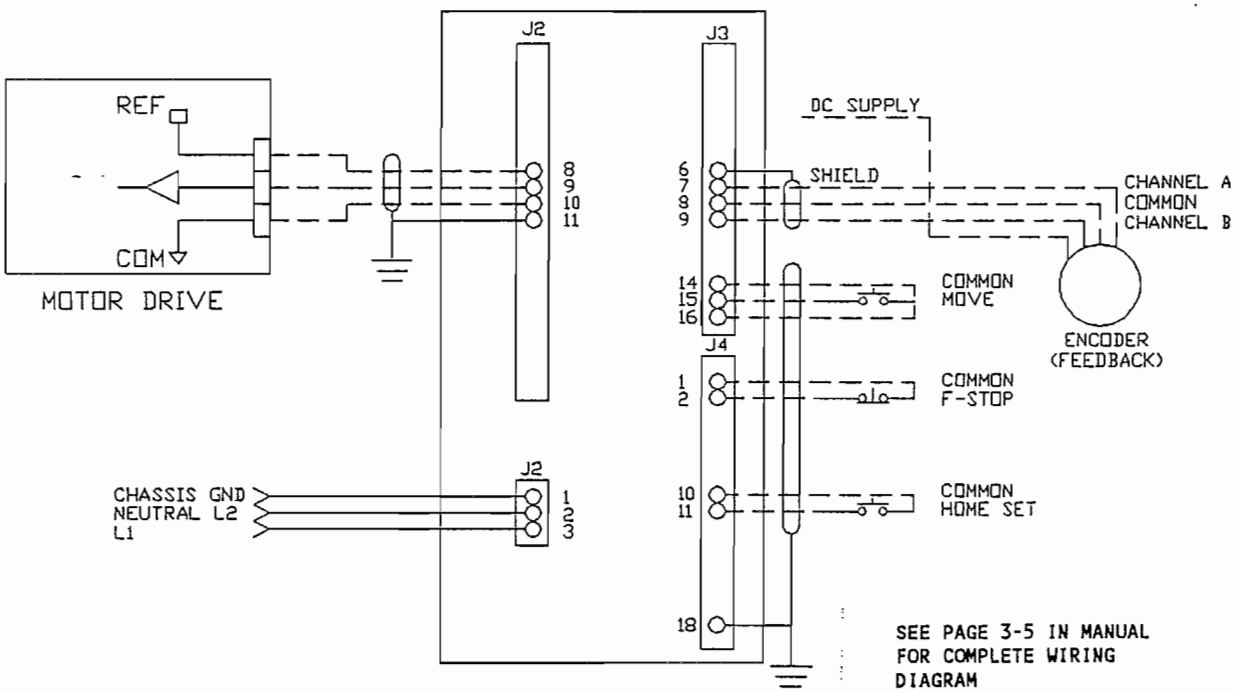


FIG. 2

SIMPLIFIED CONNECTION DIAGRAM



M-CUT

FIG. 4