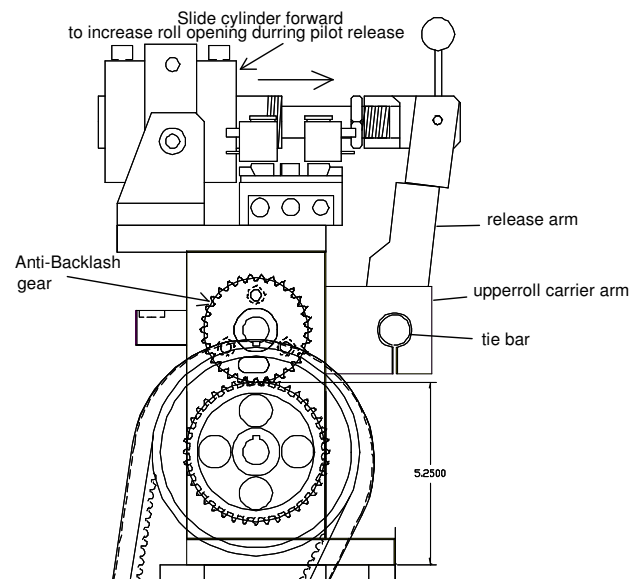
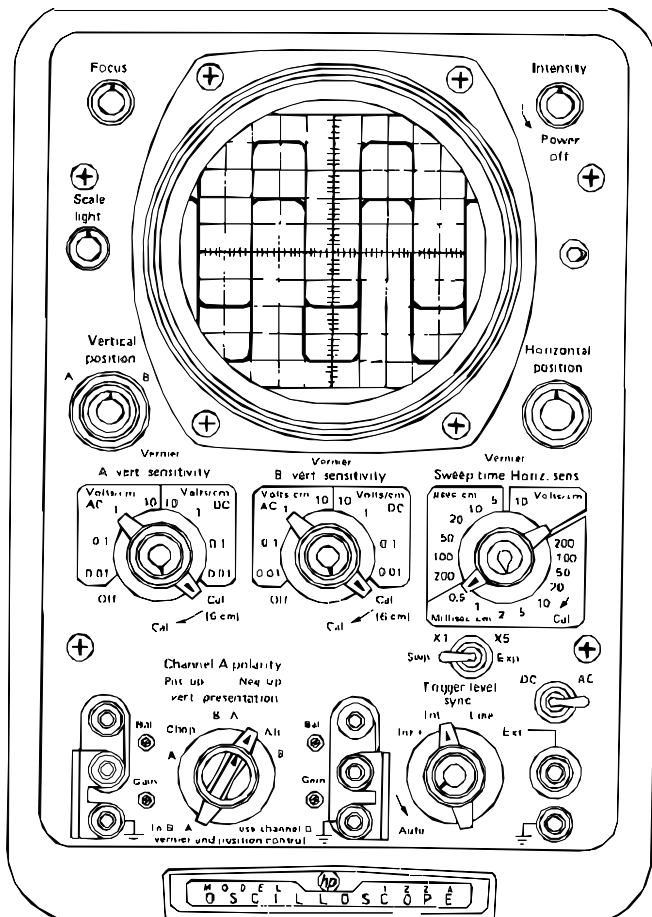
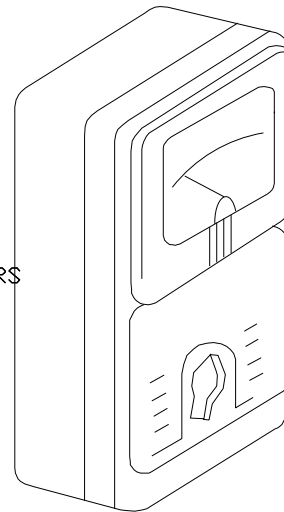
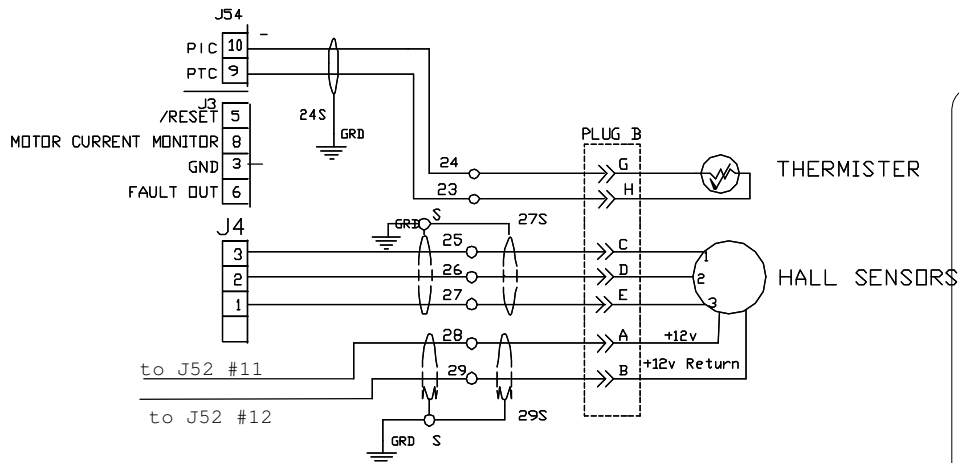


Waddington Electronics Inc.

P.R.F. Systems Div

Servo Feed TROUBLESHOOTING Guide



In order for our service department to help in the trouble shooting of your Servo feed system we need some basic information please complete the procedures on this form before calling for service.

Serial number _____

Model number _____

Mechanical checks

Feed Mounting

Check all feed mounting bolts and brackets

Loose bolts should be removed and replaced with lock-tight on them.

The feed should be checked for squareness with the tooling and press.

The feed should be square with the stock path through the tooling within .001 inches across the width of the feed rolls.

The feed and mounting bracket should be pinned when proper alignment is obtained.

Tooling and press-line alignment

Stock should move freely through the tooling.

Index stock through the tool several times

Shut off the servo feed and try to push the stock through the system by hand (do not open feed rolls)

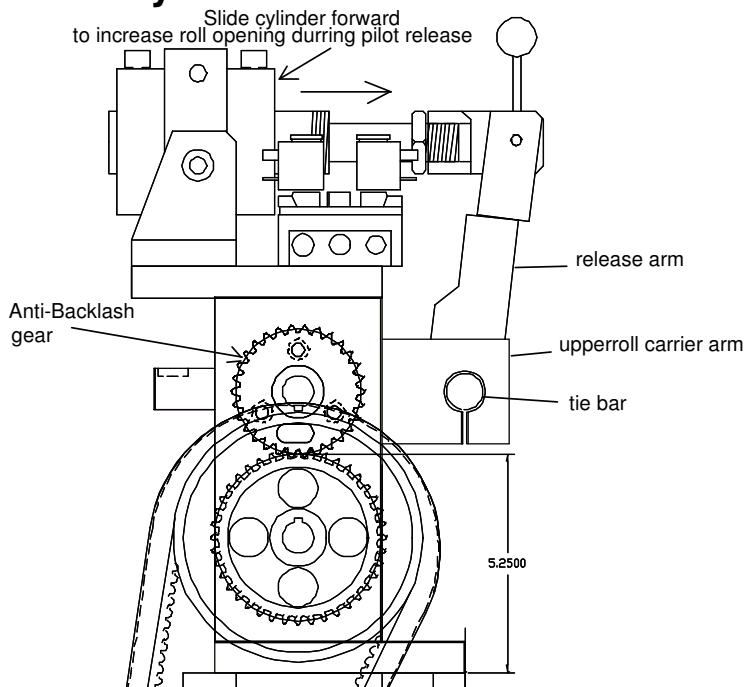
stock should move without any binding

Straightner and reels should be square with the feed

Run a piece of wire through the line and square all equipment that the stock runs through.

Machinery should be lagged to the floor when proper position is obtained.

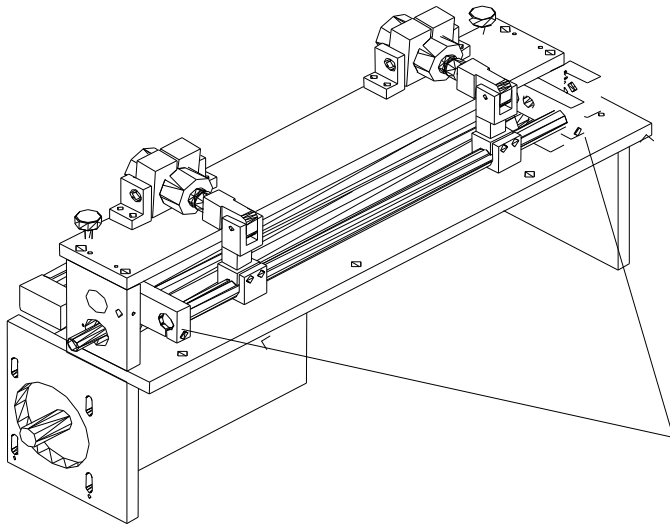
Feed body



Pilot release

The Pilot release mechanism should be set for the minimum amount of travel required to release the material being fed. For speeds under 200 SPM setting the travel for the thickest stock to be run is usually acceptable, However for speeds above 200 SPM setting too much travel can cause timing problems, therefore the mechanism should be set for the minimum required travel. (Roll opening.)

Setting pilot release on systems with two pilot release cylinders



Roll pressure Springs

Old worn out and broken springs should be replaced

To little pressure causes slippage

Too much pressure can aggravate tracking problems due to bad stock (camber, cross bow, ect.).

Pressure should be even although slight tracking problems can be compensated for by adjusting pressure on either side to cause material to track straight.

Roll pressure Air

To little pressure causes slippage

Too much pressure can aggravate tracking problems due to bad stock (camber, cross bow, ect.)

Stock Guides

Stock guides should be used at the input side of the feed. Stock that is being guided only in the tool will bind up and cause mis-feeds. If stock guides are set too tight and material slit width varies jams can occur because the material will no longer fit through the guides.

Motor cables

Resolver cables

Set selector switch to closed position.

Loosen Screws here, push cylinders in to set desired pilot release travel. The further in the more rolls will open when pilot is activated.

Alternate method:

place stock and .015 thk. shim between rolls. Set cylinder travel all the way out. Tighten screws very tight. Rolls will now open .015 over stock thickness.

Cables should be inspected for mechanical damage (crushed, cut, broken) as well as connectors being firmly attached at both the resolver and motor. Motor connectors should be very tight and should not be exposed to a steady stream of coolant, lubricant or other liquids.

When tightening motor cables be sure to keep pushing them into the motor connector as you tighten the locking ring to insure full depth insertion.

Electronic or mechanical cam switch

Switch linkage or resolver should be inspected for loss of rotation due to belt or chain breakage.

Check parallelism of rolls

Clean rolls

Loosen locking screws on anti backlash gear.

Close rolls and look at gap where they meet with light behind rolls.

Rolls should touch at both ends, if one side is held open rolls are not parallel.

Bearing Failure

Bearings should be checked for slop and / or seizing. Upper roll carrier arm bearings included.

To parallel rolls

Loosen bolts that hold tie bar in upper roll carrier arms.

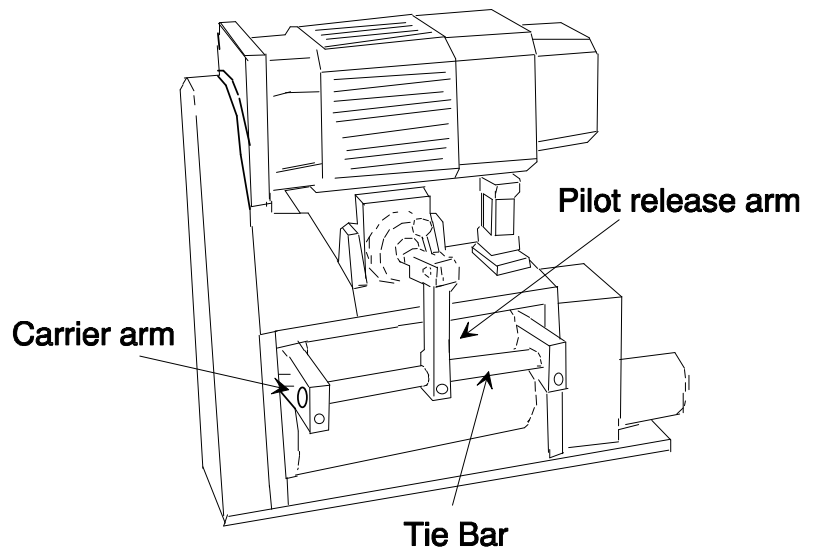
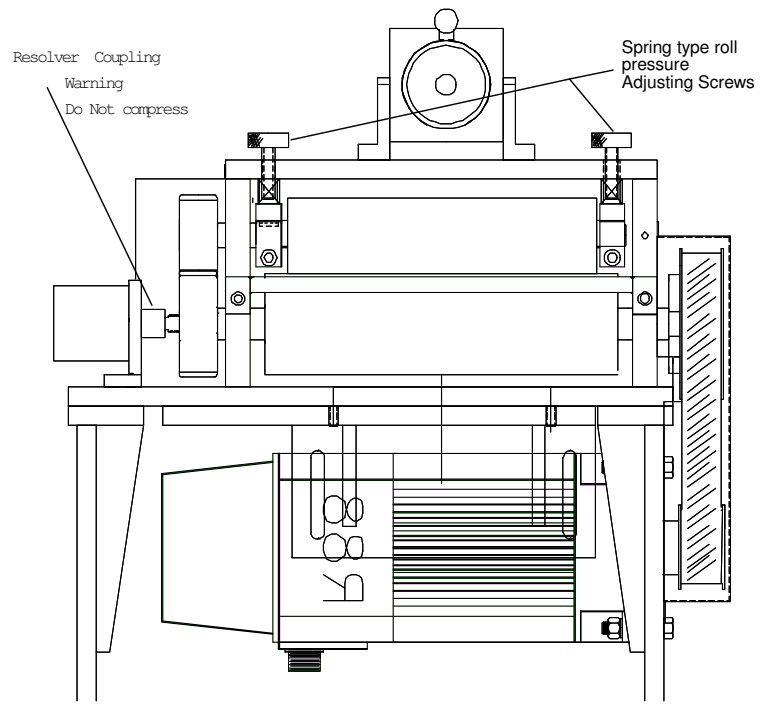
Loosen bolts to pilot release arm.

Apply maximum pinch pressure to rolls.

Rotate tie bar 90 degrees.

Re-tighten all bolts. (very tight)

Check pilot release travel before using feed. Check setting of Anti-Backlash gear



Control Panel

On systems with cancel move buttons make sure the cancel move button is not pushed in.

Reseat all electrical connectors

Look for Broken or damaged buttons

Inspect connectors and cables for damage, Cuts or crushed conditions.

Cam Switch

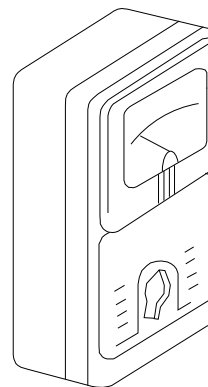
Inspect linkage from crankshaft to cam switch or rotation sensor (resolver)

Electrical checks

Volt-Ohm meter test(s)

When performing these checks no material should be between the feed rolls.

The standard Anti-Backlash gear must be installed in the feed and should be set for no material. (Close rolls with no stock in feed then loosen and re-tighten the three bolts on the gear.)



Line voltage

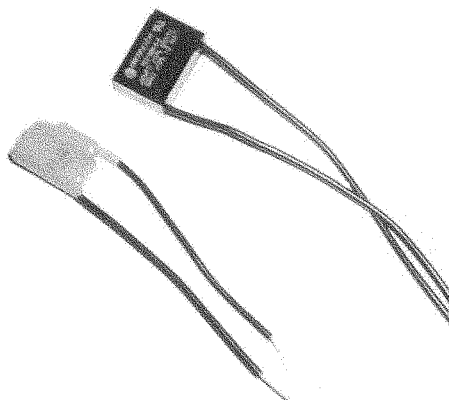
Line voltage must be 230 vac +/- 10% ***The feed must not be operated on 208v mains***

Check all line connections for loose wires

Ground

A good ground must be connected to the ground buss in the electrical enclosure. It must be a true earth ground (not conduit or water pipe ground) and must be made with number 10 or larger wire depending on how long the wire is. (Longer runs require larger wire.)

Check ground connections all the way to the earth ground. They should be tight and clean.



Suppressors

Surge Suppressors **must be** installed the solenoids, coils, contactors, motor starters, relays and all other switched inductive loads on all equipment that comes in contact with the strip or press.

This includes:

Uncoilers, Straighteners, stackers, strip feeders, welders, presses, motors, oilers, Ect.

R-C type suppressors must be used on all AC loads and diode suppressors must be used on DC loads.

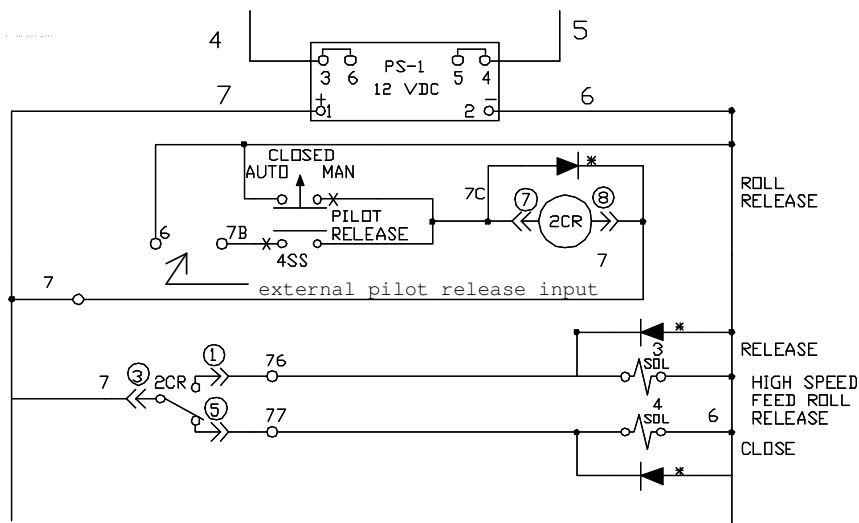
MOV type suppressors can also be used but only in conjunction with R-C and diode type suppressors.

Pilot Release

The Air operated pilot release mechanism requires an external input from the press cam switch. This signal should be a contact closure between terminals 6 and 7B.

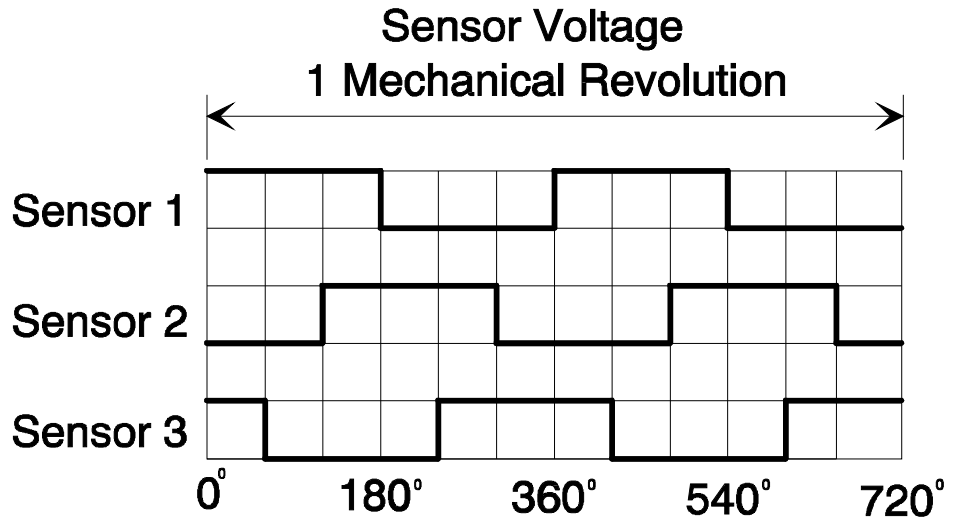
Relay 2CR is a mercury whetted reed type and directly controls the open and close solenoid valve on the feed.

High Speed pilot release signals should be auto-advanced using an electronic cam switch for speeds over 150 SPM.



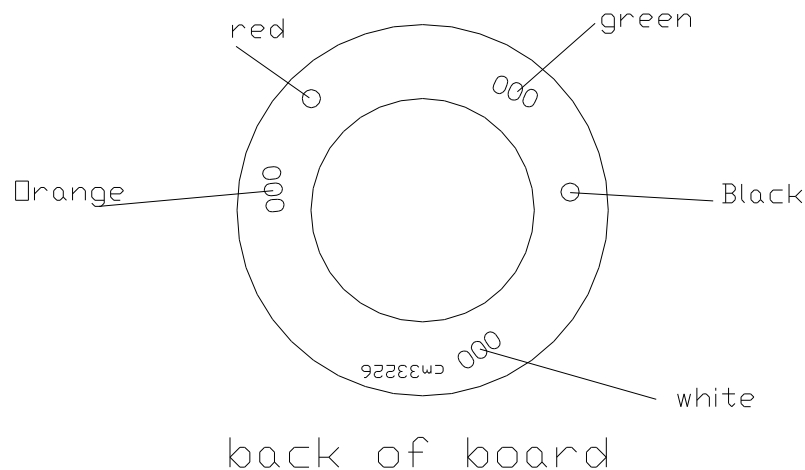
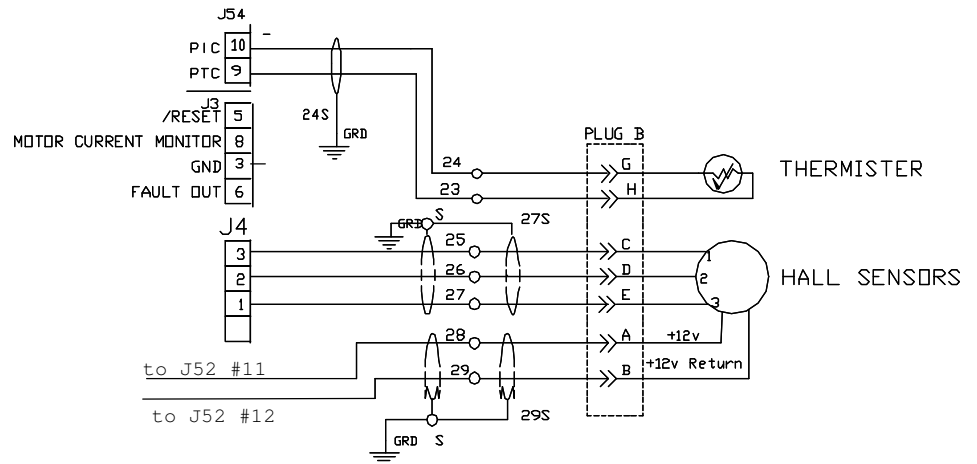
Hall Sensors

Do this for each wire.



If all three hall sensors are ever the same (All high or all low) the amplifier system will shut down and the motor will no longer produce torque.

Do not remove the hall sensor assembly from the motor it is factory adjusted and is not easily realigned.



r46gena-hs hall connections

Alignment of motor Halls

The factory procedure is automated so there are no formal procedures that we can supply.

Motor should be back driven in the CW direction, when looking at the face of the motor. Using an oscilloscope to monitor the hall state and compare it to the motor phases as follows:

Hall # 1 on channel A, channel B should monitor phase T (+) and the probe ground should be on motor phase R (-).

Hall # 2 on channel A, channel B motor phase R (+) and S (-) for ground.

Hall # 3 on channel A, channel B motor phase S (+) and T (-) for ground.

Ohm resolver leads

What your looking for:

Resolver ohm readings should be the same for the sin and cos signals.

Differences in these readings could indicate a bad resolver connection, or cable.

In rare cases it can also indicate a bad resolver. Usually resolver problems are characterized by servo system run away on power turn on.

Resolvers themselves are quite rugged and failures are rare. Cable and connector failures are much more likely.

Measure sin to sin ret

_____ OHMS

Cos to cos ret

_____ OHMS

Rotor lo to rotor high

_____ OHMS

Unplug the resolver connector from the positioning system.

Sin and Cos readings should be 40 ohms.

The rotor should read 80 ohms.

Also check each wire to the shield connection on the cable.

It should read open circuit.

Record all OHM meter readings.

Ohm motor leads

What you're looking for:

Motor winding resistance should be balanced.

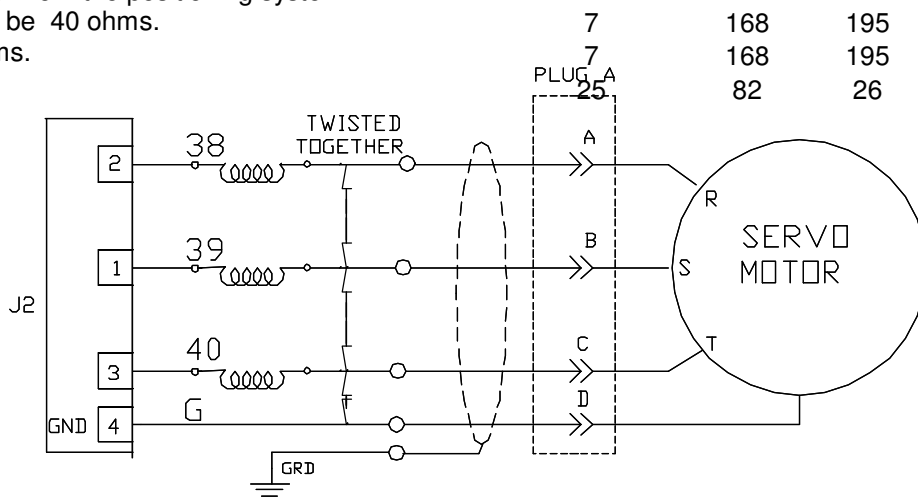
The winding resistance of the motor is noted on the motor name plate.

Ohm meter readings for
LD/LC/HD SD/SM SF

S

SF

7	168	195
7	168	195
25	82	26



All three readings should be the same.
All three connectors should be open to ground.
also

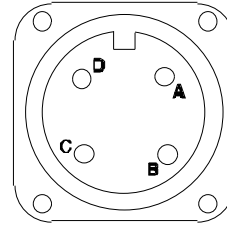
Measurements must be made with the motor disconnected from the amplifier through the motor cable.

If measurements are not correct through the cable they should be checked at the motor connector on the motor.

If they check OK there then the cable is

suspect. If they still do not check out, check the connections to the motor connector plug inside the motor by removing the cover on the end of the motor.

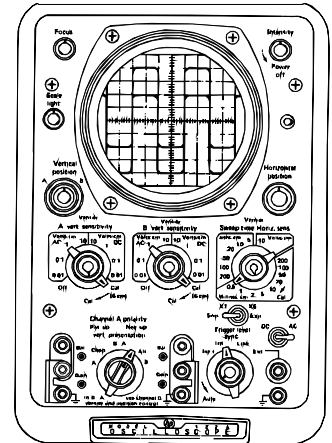
Pin D is Ground



Measure from phase to phase on each motor winding

	Ohm meter readings of motor windings					
	R84S	R46G	R88G	R88S	R33	R8AS R8AG
Example						
measure from 38-39	5.4	3.9		2.5	6.5	.46
and 39-40 and 38-40	5.4	3.9		2.5	6.5	.46
	5.4	3.9		2.5	6.5	.46

_____ OHMS
_____ OHMS
_____ OHMS



Oscilloscope checks

Resolver Wave forms

Rotor voltage wire numbers 21 & 22

The Signal on the rotor should be a SIN wave with an amplitude of 4 volts and a frequency of 4 KHz

The signal should be clean and free of distortion

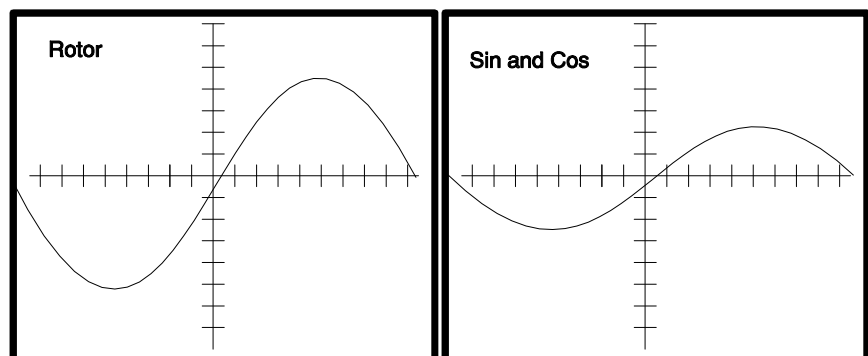
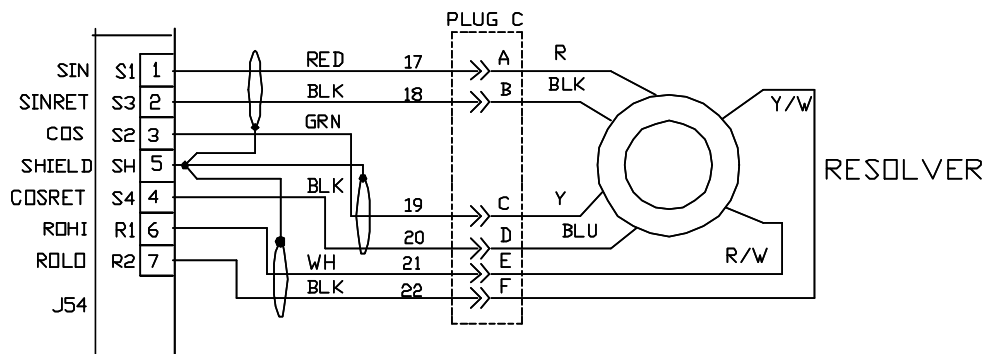
Cos to Cos return

wire numbers 19 & 20

This Signal should be a sinusoidal wave form that varied in amplitude as the motor is rotated

Sin to SIN return wire numbers 17 & 18

This Signal should be a sinusoidal wave form that varied in amplitude as the motor is rotated.



Velocity Signal and Servo Tuning

Servos come setup at the factory but can drift with time and Temperature. These settings should be checked every 6 months in order to maintain proper servo performance.

Using the programming terminal set OEM parameter PGAI to 0
Adjust offset pot of front of amplifier so that the motor is at zero speed.

Reset PGAI to its previous setting.

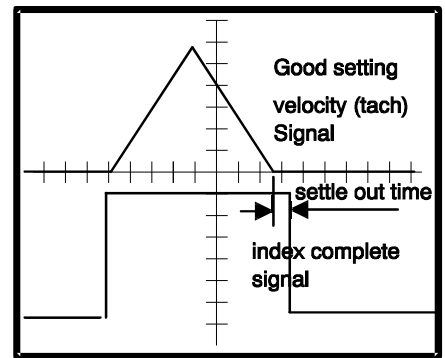
Set Acc1 to 100 %

Set IND1 to .5 inches

Set ICW1 to .003 inches

Monitor the Tachometer and index complete signal using an oscilloscope

Adjust the loop gain pot until best positioning performance is obtained.



Index complete signal

Should return low 10-15 ms after the end of a move.

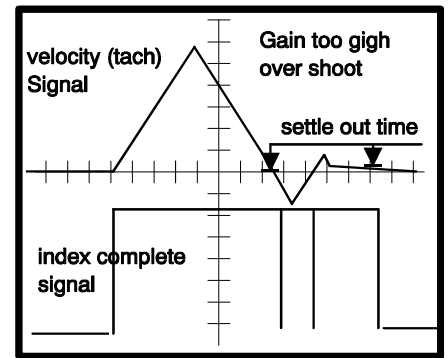
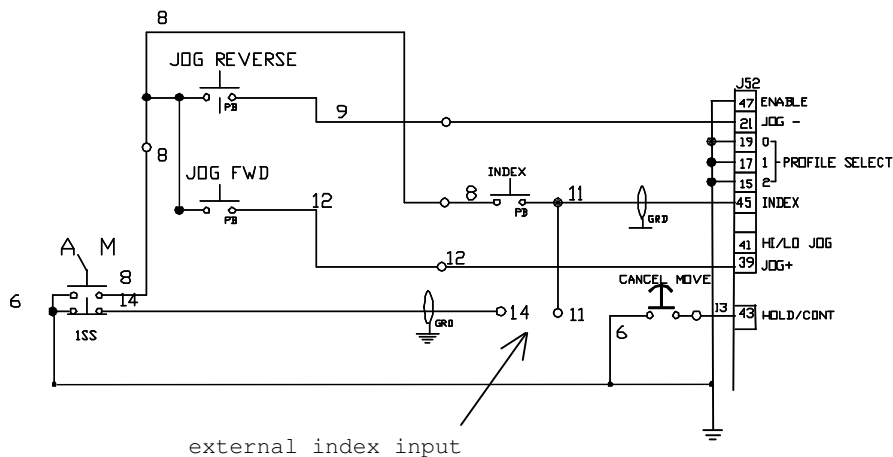
Reset icw1 to .030 inches after tuning servo

Index input

Bringing the index input low causes the feed to start moving at the pre-programmed distance and speed. The signal must be brought high again before another index will start.

This signal should be clean and must be wired with shielded cable.

For users of electronic cam switches a time output event should be used to trigger the feed.



Instructions for Zeroing VEL Offset

1. Set PGAI = 0 if you have a maple terminal. If you are using a Data Instruments terminal enter the INITIALIZATION MENU and select FEED CONTROL, GROUP 1, POS. LOOP GAIN = 0
2. Remember the number that POS. LOOP GAIN or PGAI is set to because you will need to reset this value.
3. Once this parameter is set to 0 the motor should be still however it may move.
4. If the motor is moving then ZERO OUT the MOTION with the Vel Offset potentiometer.
5. Now if the motor suddenly stops after it was moving DO NOT BE ALARMED. What happened was the drive built up too much following error and disabled automatically.
6. If this happens simply cycle the power and be prepared to adjust the Offset potentiometer on POWER UP.
7. Continue doing this until you are able to power up the unit without the motor turning.
8. Now you can go back and set PGAI or INITIALIZATION MENU and select FEED CONTROL, GROUP 1, POS. LOOP GAIN and reset to the original value.

Instructions for reprogramming Maple 450 terminal.

1/ In order to get into the program mode it will be necessary to turn off the power on the feed control console. Turn the power on to the feed while holding down the “S” key on the terminal. Continue to hold the key down for 5 seconds after The terminal beeps. You are now in the program mode.

2/ The values in your terminal must exactly match those listed below. Change the values in the terminal by pressing the “9” key until it matches the value on this list. Then press “ENTER” and the next value will be displayed. At the end of the list you will be asked if all values are correct and to press enter to save settings.(note: most of these values will not have to be changed)

LCD VIEWING ANGLE.....0
SERIAL MODE.....RS-232
BAUD RATE.....9600
PARITY.....NONE
DATA/STOP BITS.....8/1
HANDSHAKING.....NONE
TURN AROUND.....NO DELAY
OP MODE.....INTERACTIVE
LINE TERMINATOR.....CRLF
LOCAL ECHO.....ENABLED
DELAYED LF.....DISABLED
TAB WIDTH.....1 SPACE
CURSOR.....BLOCK
KEYBOARD.....ENABLED
LOWER CASE.....DISABLED
KEY CLICK.....ENABLED
LOCAL SETUP.....ENABLED
SETUP CORRECT?.....YES
SAVE SETUP.....YES

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. To find HyperTerminal on a WINDOWS PC goto *START MENU-RUN*, type *hypertrm* (enter) or *START MENU – PROGRAMS – ACCESSORIES – COMMUNICATIONS – HYPERTERMINAL*

Select the proper com port

Use upper case only (put on the caps lock)

Terminal settings should be as follows:

Bits per second	9600
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: 75 milliseconds

Line delay: 25 milliseconds

ASCII Receiving:

Wrap lines that exceed terminal width

Quick Instructions for tuning a 450 series drive Use when replacing a drive:

- 1/ Remove all material from the feed. Close the rolls.
- 2/ Type "O" (the letter) enter. The machine will respond "LOCK". Type "4800" enter. The machine should respond with an O: prompt.
- 3/ Type "PGAI" enter. the machine will respond "PGAI=XXX" **REMEMBER THIS NUMBER.**
- 4/ Type "C" enter machine will respond "PGAI ="
- 5/ Type 0 (the number)
- 6/ The roll feed will now start to turn. Adjust the velocity Offset pot until the rolls stop turning. Note: if the rolls turn more than 1/4 turn the feed will disable. If this happens you must cycle the power and try again.
- 7/ Type "C" enter the machine will respond "PGAI=" type in the value from step 3. Note: if you had to cycle the power in step 6, you must first repeat step 2 in order to unlock the feed.
- 8/ Turn the Velocity Loop Gain pot clockwise until the feed starts to vibrate and oscillate. Now turn it CCW until the feed stops vibrating. Continue to turn it CCW 1 1/2 more turns.

REVERSING the direction of an LD or an MD or an LC Feed With a 450 series Amplifier

1. On J2 switch numbers 38 and 39
2. On J4 switch numbers 25 and 27
3. On J54 switch 17 with 19 and 18 with 20

Your feeder will now be traveling in the opposite direction that it was traveling.

Pm Scheduling

Every 4-5 years you should replace the bearings.

Gears should be lubricated with Dow Corning 1121 gear grease once a month per shift.
Feeds with grease fittings on the upper roll carrier arms need lubrication every 6 months

Rolls should be kept clean steel rolls can be cleaned with mineral sprits or other mild solvent.

Urethane rolls should be cleaned with LOR 326 this is available from Lith-o-ROLL @ 1-818-579-0340

Never use vanishing oil or solvents on urethane rolls as this will cause them to swell and change the feed length. When the solvent evaporates from the roll it will remove the plastisizers and cause the rolls to harden and crack. (Swollen and cracked rolls damaged from solvents are not covered by warranty)

Feed Programing and operation LC3 type 450 and 150 drives

1 -PB- PUSHBUTTON

Applies Electrical Power to the Console.

2-PBL- LIGHTED PALMBUTTON

Emergency stop.

NOTE: Always restart in "MANUAL" after an Emergency Stop.

1-SS-THREE POSITION SELECTOR SWITCH

Selects Automatic, Manual, or jog to length (JTL operation)

3-PB-"INDEX" PUSHBUTTON

When 1SS is in "man" position, pushing index feeds out the selected index length. When 1SS is in the "JTL" position, pushing index will enable the jog forward and reverse push buttons to jog to the next length.

Index must be pushed each time you want to jog to length to the next progression.

4-PB-"JOG FORWARD" PUSHBUTTON (REMOTE)

When 1SS is in "man " position, pushing jog forward results in continuos feeding until released. When 1SS is in "JTL" position and index has been pushed, jog forward will feed forward only as far as the selected index length at jog speed.

This mode is used for threading progressive dies.

5-PB-"JOG REVERSE" PUSHBUTTON (REMOTE)

When 1SS is in "man" position, pushing jog reverse results in continuos reverse feeding until released. When 1SS is in "JTL" position and index has been pushed, in jog to length mode reverse jogging can only be accomplished after the stock has been jogged forward from the original position. In jog to length mode jog buttons only operate within the currently programmed index length.

This mode is used for threading progressive dies.

1-PPB-"CANCEL MOVE" PALMBUTTON

When this pushbutton is depressed, the feeding will immediately stop; when the pushbutton is pulled out the feeding will continue. The feeding is reset if the feed is jogged before pulling out the pushbutton.

4-SS- THREE POSITION SELECTOR SWITCH

Selects between automatic pilot release, closed rolls, and or open rolls.

2-SS- TWO POSITION SELECTOR SWITCH

Sets anti-backup roll release option on or off (open or closed).

SERIAL INTERFACE TERMINAL

The Alphanumeric terminal has forty two keys, including 26 letters, a numeric keypad, and an enter key. All data is entered through this terminal and stored in non volatile memory.

Data can be entered by a remote computer or any other terminal with a RS232 Serial Interface

Full Duplex

Baud Rate:9600

Parity:none

Data Wrd:10 bit (8 data, 1 stop, 1 start)

MODES OF OPERATION

There are two modes of operation, Run and User. The system defaults to the Run mode upon power up. In this mode, the system will jog or index upon command. Data can be interrogated but not changed in this mode. Data is interrogated or changed in the user mode. In this mode, the system will not jog or index; power is removed from the motor. Modes can be changed by entering the appropriate R or U key followed an ENTER.

PROGRAMMABLE PARAMETERS

ParameterAbbreviationRange

Index Distance IND1 625.00-+ in.

Acceleration Rate ACC1 10 -100

Deceleration Rate DEC1 10 100

Run SpeedSPD135 - 4700 in/min

Registration SpeedREG132 - 3100 in.min

Index Complete Window ICW 001 - .600 rev.

Following Error Window FEW101 60 rev.

Distance From EndEND1.0064 5 rev.

PARAMETER DEFINITION

Index Distance:

This is the desired length to be indexed. Values are entered in inches only and can be positive or negative. (ie. 5 1/8 inch is entered as 5.125 and -2 inch is entered as -2)

Acceleration Rate:

This parameter specifies the rate at which the feed accelerates to the programed Run Speed. A value of 100 corresponds to the maximum or 100% acceleration capability, while 10 is the minimum allowable acceleration.

Deceleration Rate:

This parameter specifies the rate at which the feed decelerates to zero or Registration speed. A value of 100 corresponds to the maximum or 100% deceleration capability, while 10 is the minimum allowable deceleration.

Run Speed:

This parameter specifies the maximum speed attained when indexing. The values are entered in inches per minute.

Registration Speed:

This parameter, used when an overdraw is desired, specifies the speed at which the overdraw is made. There are three types of indexing operation; Index, Index Distance from Registration Mark, and Index to Registration Mark. The Index simply indexes to programmed distance and ignores the Registration Mark input. The Index Distance from Registration Mark accelerates to run speed and runs at run speed until the Registration Mark input goes from high to low, then indexes the programmed distance. The Index to Registration Mark indexes the programmed distance then runs at registration speed until the Registration Mark input goes from high to low and then stops. The Registration Mark operation is only enabled by the manufacturer upon request.

Index Complete Window:

This parameter sets the window size inside which an Index Complete signal will be given at the end of the index. The value programmed is + or - around the final position. It is best to leave this at factory setting.

Following Error Window:

This is the maximum error allowed between the actual and command position before the Following Error output is activated. It is best to leave this at factory setting.

Distance From End:

This parameter specifies the distance from the end of a move at which point the Distance Flag Reached output will be activated. It is best to leave this at factory setting.

Typical Job Set Up

Step 1: Turn selector switch to manual.

Step 2: Depress START button.

Step 3: Go to user mode . Note: (ENTER) means press the ENTER key

TYPE **(ENTER)**

Display Responds:U:

Step 4: To enter Length

TYPE **I N D 1 (ENTER)**

Display RespondsU:IND1 = 0.500

TYPE **C (ENTER)**

Display RespondsU:IND1 =

TYPE **3 . 2 5 (ENTER)**

The length is now 3.25 inches

Step 5: To enter Acceleration

TYPE **A C C 1 (ENTER)**

Display RespondsU:ACC1 = 30.00

TYPE **C (ENTER)**

Display RespondsU:ACC1 =

TYPE **4 0 (ENTER)**

The acceleration is now 40%

Step 6: To enter Deceleration

TYPE **D E C 1 (ENTER)**

Display RespondsU:DEC1 = 30.00

TYPE **C (ENTER)**

Display RespondsU:DEC1 =

TYPE **4 0 (ENTER)**

The Deceleration is now 40%

Step 7: To enter Run Speed

TYPE **S P D 1 (ENTER)**

Display RespondsU:SPD1 = 900.00

TYPE **C (ENTER)**

Display RespondsU:SPD1 =

TYPE **4 0 0 (ENTER)**

Speed is now set to 400 rpm

Step 8: Switch to run mode

TYPE **R (ENTER)**

Display responds R:

Step 9: Turn selector switch to AUTO.

Run Mode

All data entered can be interrogated in this mode.

TYPE **R (ENTER)**

Display RespondsR:

TYPE **I N D 1 (ENTER)**

Display responds (stored length)

Similarly, acceleration, deceleration, and speed can be interrogated in the Run mode.

The display will respond "UNRECOGNIZED ABBREVIATION" if an unrecognized command is entered. If this happens, try again.

Lc3 programing manual.doc

