NEW VERSION

RECEIVED
NOV 25 1996

Span control on bottom

screw driver slot

INSTRUCTION MANUAL

CHART RECORDERS

Models

80550-00 **80550-10**
80550-20 **80550-30**

Cole Parmer

Cole-Parmer Instrument Company
625 East Bunker Court, Vernon Hills 60061

GENERAL

This manual describes the single pen recorders with references to the very minor differences with the 2 pen units.

BASIC PERFORMANCE

Total inaccuracies, from any source (non-linearity, dead-band, gear mesh, et.Al.), are less than 0.05%. The 12 selectable input sensitivities, plus attenuator, allow you to set full scale ranges anywhere from 1 mV to 20V. The 12 selectable chart speeds, 1cm/hr to 30cm/min, are crystal controlled for optimum accuracy.

FEATURES

The 200mm Recorders have an internal calibration voltage that not only allows you to check full scale calibration but also accurately set special custom ranges. All models have override event marker input.

SPECIFICATIONS

Full Scale Span	1,2,5,10,20,50 mV,.1,.2,.5,1,2,5 V
Chart Speeds	1,2,5,10,20,30 cm/hr and cm/min
Full Scale Response	Less than 0.5 seconds
Power Requirement	12VAC/0.5A (115VAC wall adapter supplied)
Pen Type	Disposable fiber tip
Paper Length	50 Feet/15 Meters

TABLE of CONTENTS

ILLUSTRATIONS

INTRODUCTION

Your new recorder should be complete with : power pack, roll of paper*, pen(s) and manual. If anything is missing or damaged, please call the 800# on the back cover of this manual. Save shipping box for returning instrument.

The 100 mm and 200 mm chart recorders described herein have been designed for reliable long life and simple operation. This manual contains basic information for quick reference and easy reading. If you have additional questions, please call the toll free number on the back cover of this manual.

The only difference between the two models, other than physical width, is the CALibrate feature in the 20 mm recorder(s). All explanations, technical discussions, calibration procedures, et al, will generically apply to all models.

*Be sure to remove packing material from chart paper before operating recorder.

PAPER LOAD-PEN LIFT

PEN LIFT - Use to lift pen from paper when not "charting". Also must be lifted when loading paper.

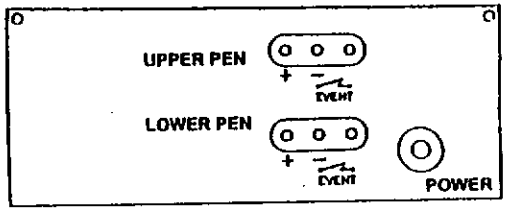
PAPER HOLD-DOWN RELEASE - Holds paper firmly in place over the sprockets. When loading paper, this must be pushed back as it also allows writing platen to be tipped forward.

PAPER LOADING - This is undoubtedly the most cussed and discussed operation connected with ANY chart recorder! With these recorders its as easy as:

1. Remove pen from pen holder
2. Lift PEN LIFT
3. Push back (lift) PAPER HOLD-DOWN release
4. Lightly grasp paper TEAR BAR and pull writing platen forward.
5. Feed paper under and around sprockets (watch the alignment)
6. Drop paper into chamber
7. Close (push back) writing platen
8. Pull back (drop) PAPER HOLD-DOWN RELEASE

INPUT: SCREW TERMINALS

REAR PANEL



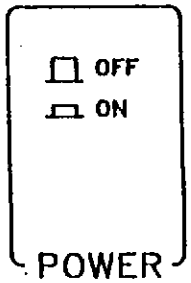
\+ Signal Input - Positive

\- Signal Input - Negative

Override Event Marker - see Page 7

12 VAC .5 Amps

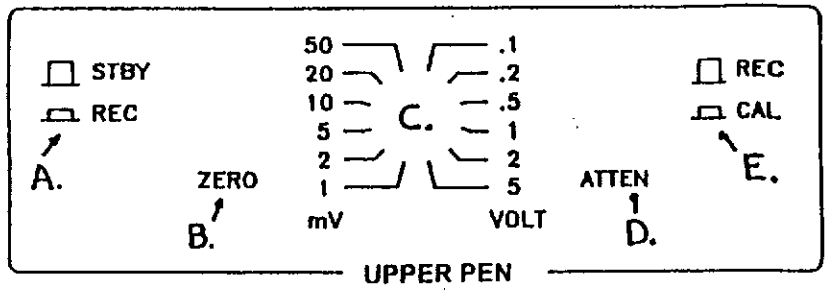
POWER



Switches ON & OFF the 12 VAC from power pack. Input current depends primarily on pen speed (slewing rate) -----nominally 150 mA.

NOTE: When power is first turned on, there will be approx. 1 second delay to allow power supplies to settle before power is applied to the pen. Pen will then jump to appropriate position.

PEN DRIVE



A. STBY - REC LOWER PEN

In STANDBY position the internal input circuit is grounded to allow accurate setting of ZERO. THE INPUT signal is not grounded ---- can be left connected.

B. ZERO

Adjusts true ZERO (ground reference) anywhere on chart.

C. FULL SCALE SENSITIVITY

Sets the full scale chart reading with the ATTEN fully CCW.

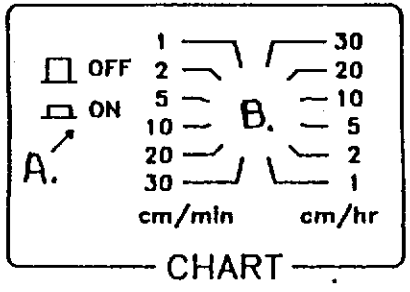
D. ATTEN

Has no effect in fully (switched) CCW position. Smoothly reduces sensitivity of fixed full scale range to overlap the next less sensitive position.

E. REC / CAL (200 mm only)

Permits periodic calibration of any full scale range and/or customizing full scale range. See page 7.

CHART DRIVE



A. ON - OFF

Permits zeroing signal calibration and any other PEN DRIVE adjustments before running paper.

B. CHART DRIVE RANGES

Chart speeds are accurately crystal controlled over a range great enough to give you as little as 24 cm of paper in a 24 hour period or .5 cm of paper per second.

OPERATING TIPS

1. Although the recorder is "overange protected", it is not a good idea to apply a high input voltage with the range switch in a millivolt position.

2. If you have a small amount of hum on your input signal and can tolerate a bit of sluggishness in pen movement, adjust the GAIN (page 8) to reduce servo sensitivity.

3. When in doubt as to real ZERO, just go to STBY ----this will temporarily disconnect your input signal while grounding the recorders internal input.

4. Remember you can make ZERO anywhere on the chart you want: center ZERO for AC signals, full scale ZERO for negative going signals.

SPECIAL FEATURES

1. CAL - INTERNAL CALIBRATION * (200 mm model only). At any INPUT RANGE a precision voltage is internally applied equal to the full scale sensitivity. This is convenient for occasional calibration checking. In addition, this can be used to custom calibrate a full scale range. Example:

   - need to have full scale = 12.ppm DO (120 mv)
   - set INPUT RANGE to 100 mv
     push REC/CAL to CAL
     Adjust ATTEN until pen is at 83% of full scale

     $$\frac{100\%\ fs}{120\ mv} : \frac{X\%}{100\ mv} = 83\%\ (166\ mm)$$

2. EVENT MARKER - OVERRIDE
   Shorting the EVENT terminal (rear panel) to ground (push button or electronic switch) will put a small spike on the pen trace.

3. AUTO OVERANGE PROTECTION
   Regardless of input voltage, the pen will only travel a small % below ZERO and above Full scale. This protects the pen, cable and other moving parts from damage.

* NOTE: For extremely critical applications an external calibration voltage source is recommended.

CARE and MAINTENANCE

1. Cover pen when not in use
2. Do NOT oil or lubricate ANY moving/sliding parts
3. Clean/dust dirt with alcohol or water only
4. Fresh ink and small particles can get under plastic paper tear bar. Remove thumb screws at each end and clean with alcohol or water.
5. After 10 or 12 rolls of paper are used, blow or wipe out "paper lint" from paper chamber.
6. The pen cable should never break with normal wear and tear. If it is cut, or breaks, call 800# on back cover.

CALIBRATION

All adjustments are clearly labeled on Bottom Panel. The adjustments and procedure are identical for all recorder models, with the exception of the CAL function/adj., which is in the 200mm recorders only.

Load paper -- install pen -- switch ATTEN off (full CCW) -- STBY/REC in STBY -- REC/CAL in CAL -- chart switch OFF -- Range Switch to 10 mV ----- turn Power ON

*** ALLOW 10 min. WARM-UP ***

Turn ZERO full ccw (off scale left side) - turn LOW LIMIT full sw - Turn ZERO full cw (off scale right side) - turn HI LIMIT FULL ccw --- Auto overange is now disabled so other adjustments can be made.

GAIN — Set ZERO to approx. mid scale and adj. GAIN cw until pen "buzzes", then turn ccw until "buzzing " quits --- then a few degrees more. Run ZERO over full range. If there is "buzzing" at any point, back GAIN ccw until it stops.

OFFSET — ZERO pen to zero on chart paper. Adjust OFFSET for minimum shift while switching Input Range switch between 50 mV and .1 Volt. At optimum setting it is normal to have a small shift (0.5%) at lowest mV ranges.

CALIBRATION (cont.)

Zero Recorder
Connect accurate (0.5% or better) Voltage Source to input -- set Source to 1mV or lowest range -- Set Input Range Switch to match Voltage source -- change from STBY to REC.

SPAN — Adjust SPAN until Pen is at full scle. Change back to STBY and readjust zero if necessary. Recheck full scale and readjust SPAN if necessary (easier to observe if chart drive turned on). All ranges are now calibrated.

_____200 Model only _____
Remove input signal --- go to STBY -- Set Input Range Switch to 10 mV -- Set REC/CAL to CAL

CAL — Adjust CAL for full scale reading

LOW LIMIT — Go to STBY and turn Zero fully ccw. Adjust LOW LIMIT until pen is approx. Half way between sprocket holes and paper zero.

HI LIMIT — Turn Zero fully cw (off scale right). Adjust HI LIMIT until pen is approx. Half way between sprocket holes and paper full scale.

REPEAT FOR CHANNEL 2 IF REQUIRED.

Your recorder should now be fully calibrated.

TROUBLE TIPS

PEN DRIFTS &/OR "BUZZES'

No input --- input is open circuit

PEN "BUZZES" WITH STABLE INPUT &/OR IN STBY

Servo GAIN too sensitive --- refer to page 8

PEN "PEGS' AT EITHER END

Switch input to STBY --- if ZERO adjust works OK, input signal is too large or has a voltage "offset". If ZERO won't adjust, call 800# on back cover.

PAPER "JAMS" - DOESN'T FEED

Check under tear-off bar

Writing platen is bent and pinching paper

PAPER RUNS AT ANGLE

Paper is not on sprockets properly. Release chart hold down, shift chart on sprockets.