

**NASA Contractor Report 178188 - vol. 2**

**FLARED LANDING APPROACH FLYING QUALITIES**

**Volume II - Appendices**

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Hampton, Virginia 23665**

FLARED LANDING APPROACH FLYING QUALITIES  
Volume II - APPENDICES

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Appendix A  
PITCH STEP RESPONSES

This appendix presents the pitch time histories for the experiment configurations. They are responses for a 10 pound step input held in for 5 seconds and then back to zero for 5 seconds. As previously described in Section 2, the command gain was chosen such that the maximum pitch acceleration,  $\dot{q}$ , for a given input would be approximately the same for all configurations (except those where sensitivity was an experiment variable). In these cases  $\dot{q} \approx 5 \text{ deg/sec}^2$  for a 10 pound step input. The 60 ms effective time delay from the model following system has been added. Presented are the following responses:

Q	-	$q$ , pitch rate
Q*	-	$\dot{q}$ , pitch acceleration
DTHETA	-	$\Delta\theta$ , incremental pitch attitude
GAMMA-P	-	$\gamma_p$ , incremental flight path angle at the pilot station
DALPHA	-	$\Delta\alpha$ , incremental angle of attack
ALPHA*	-	$\dot{\alpha}$ , angle of attack rate
DELN ZP	-	$\Delta n_{z_p}$ , incremental normal acceleration at pilot station
DELTA V	-	$\Delta V$ , incremental speed

Also presented after the 10 second time histories are the first 1 second of the responses on an expanded scale to show effective time delay. Presented in these figures are  $q$ ,  $\dot{q}$ ,  $\dot{\alpha}$ , and  $\Delta n_{z_p}$ .

CONFIG 21 - Add 100 msec delay  
 CONFIG 22 - Add 200 msec delay

CONFIG B

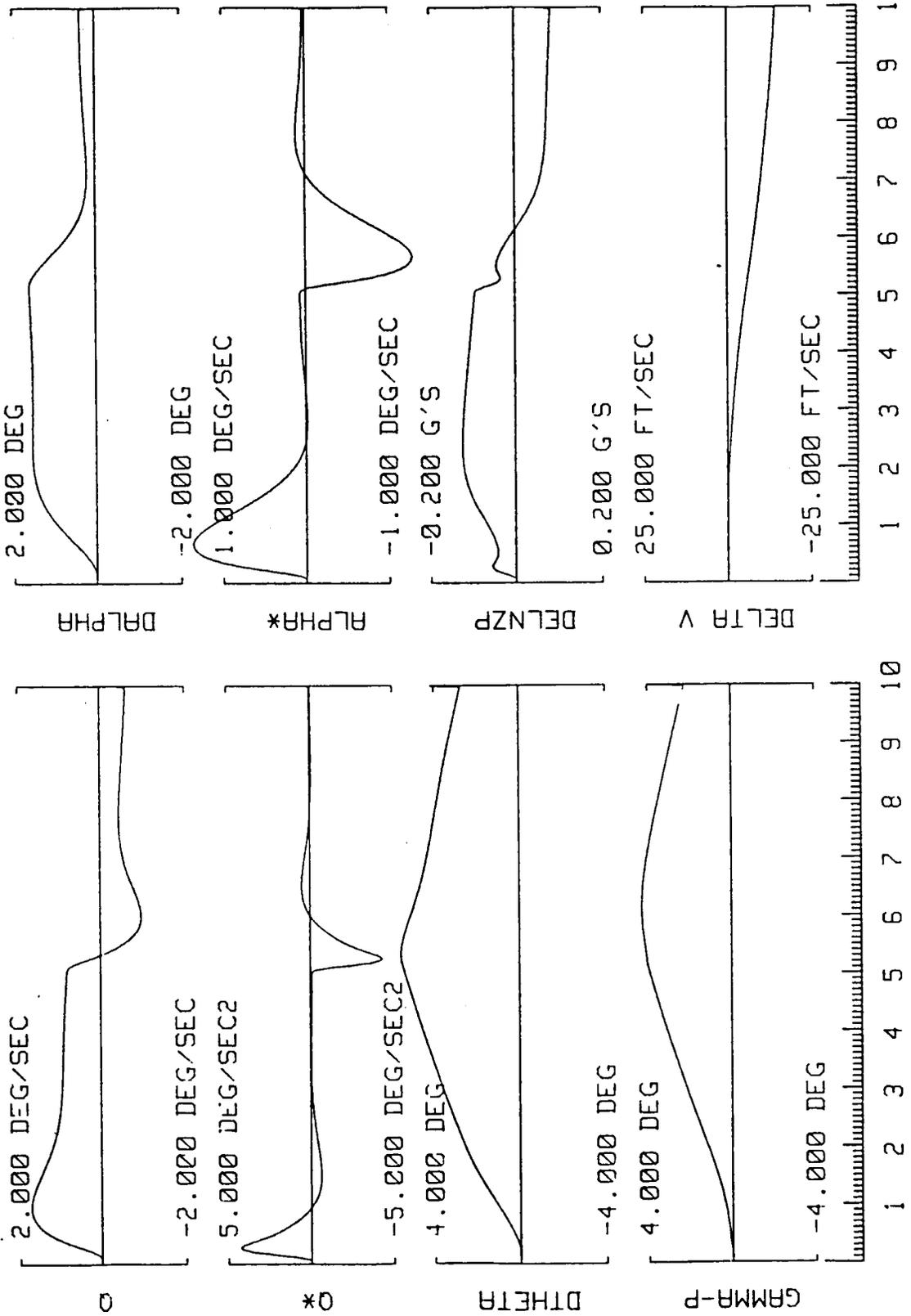


Figure A-1. PITCH STEP RESPONSE - CONFIGURATION B

CONFIG 1

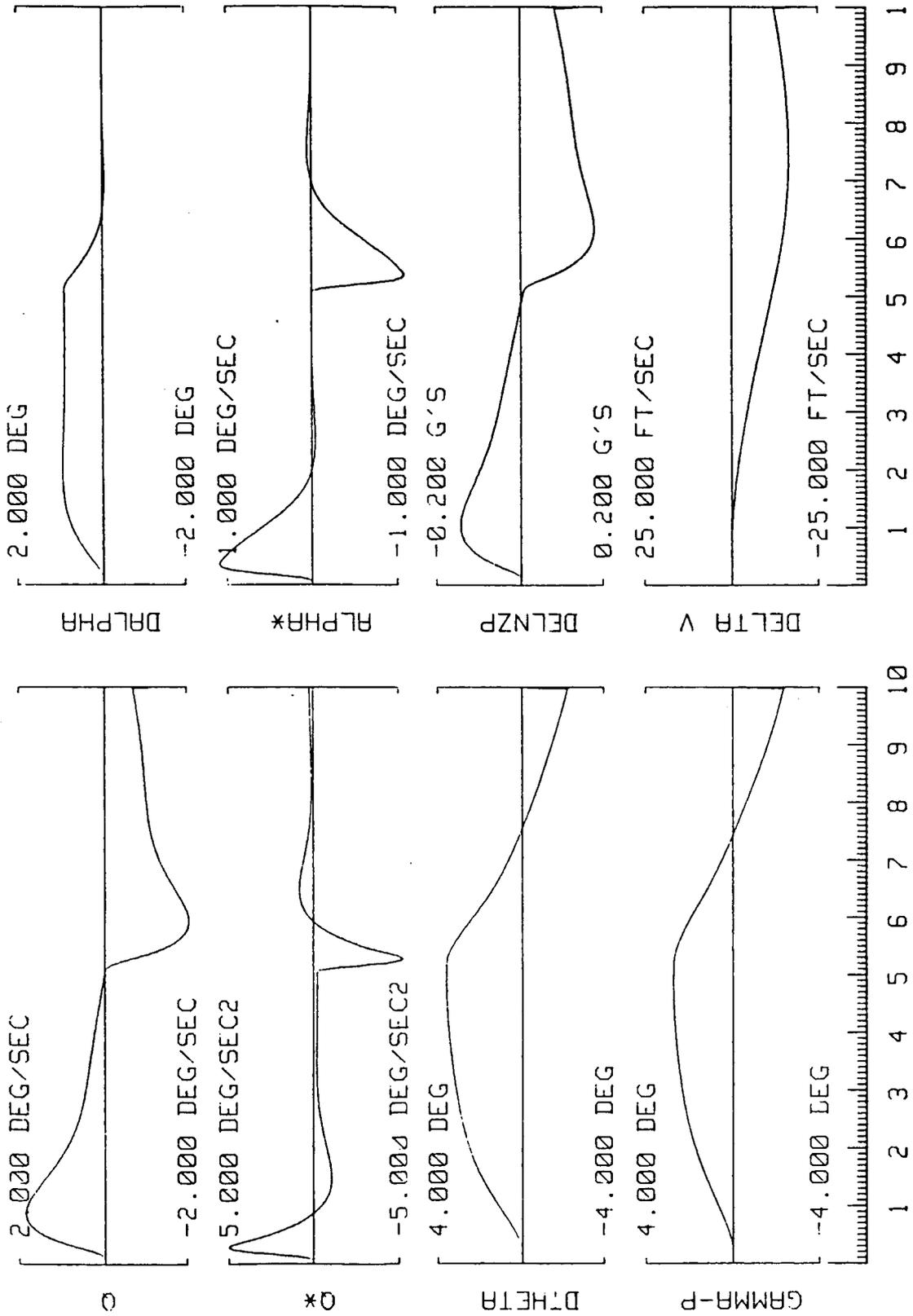


Figure A-2. PITCH STEP RESPONSE - CONFIGURATION 1

CONFIG 2

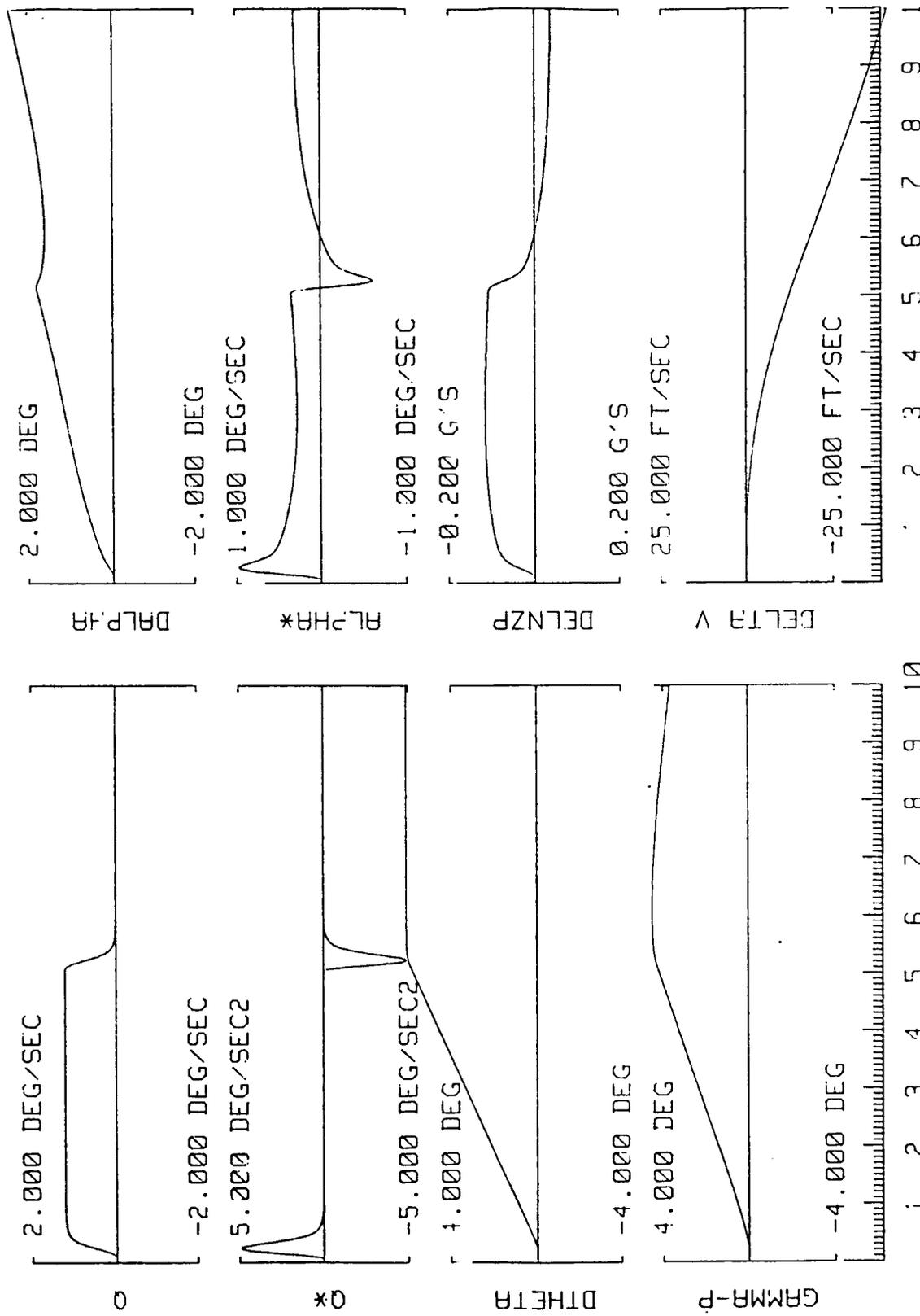


Figure A-3. PITCH STEP RESPONSE - CONFIGURATION 2

CONFIG 3

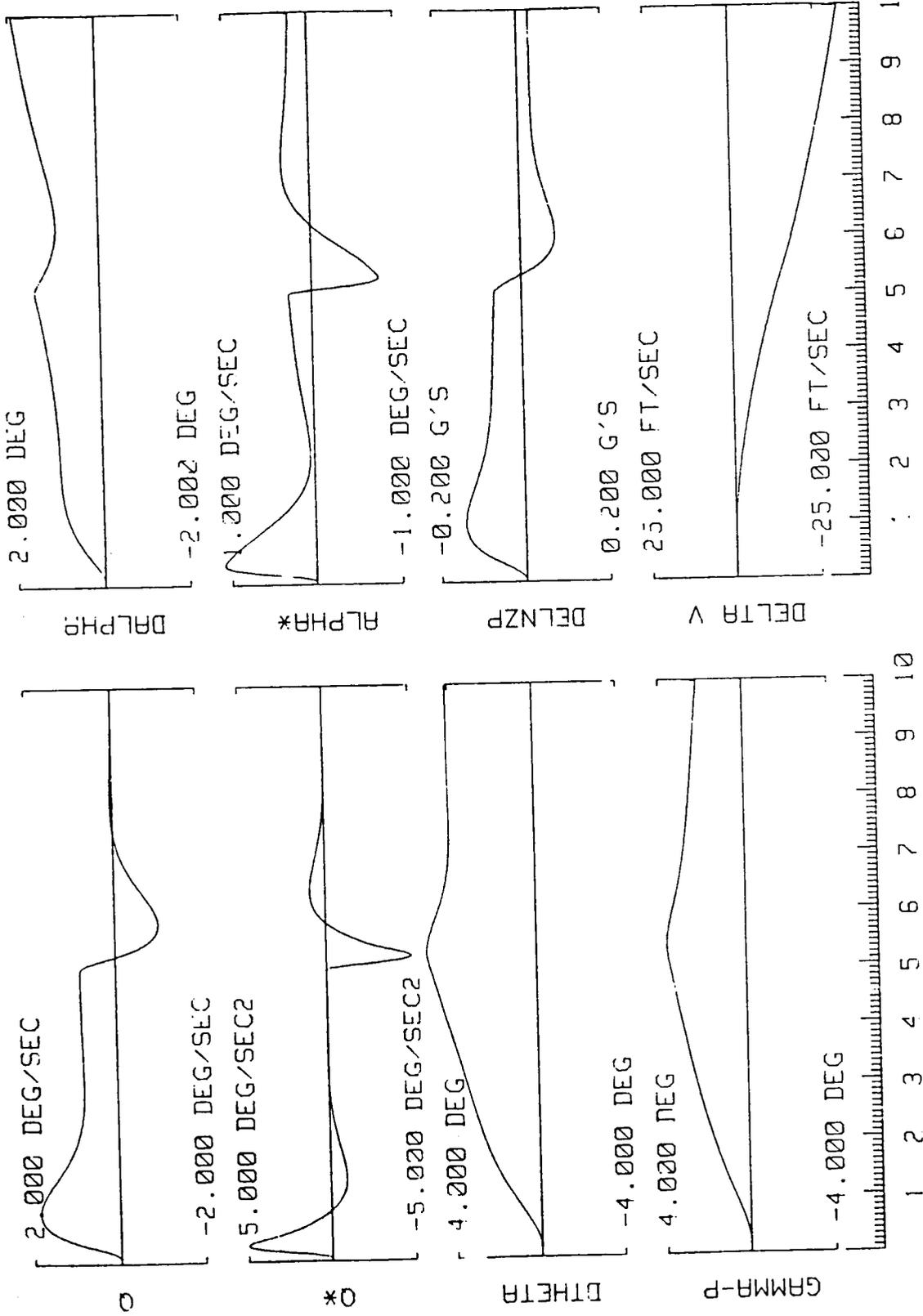


Figure A-4. PITCH STEP RESPONSE - CONFIGURATION 3

CONFIG 4

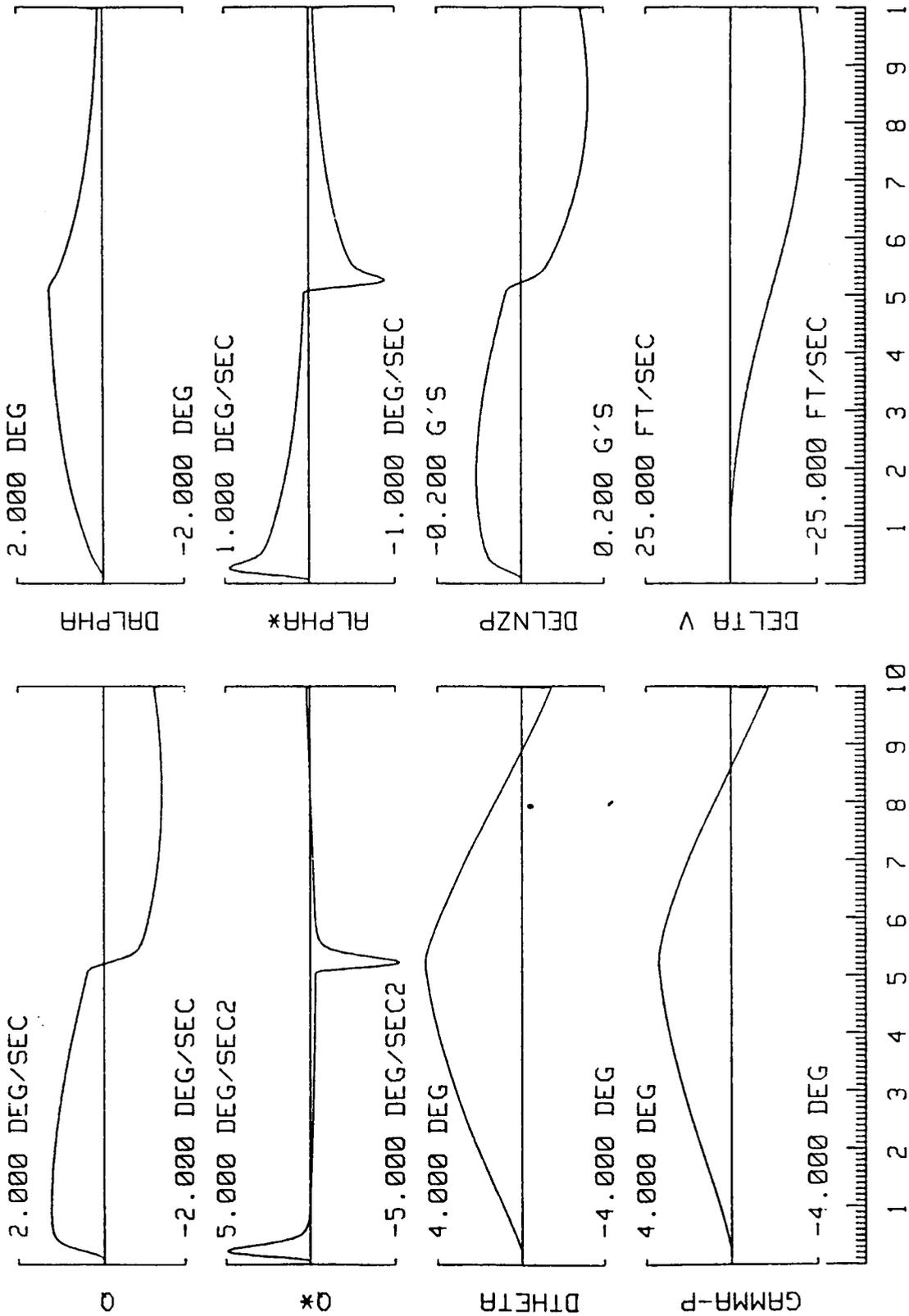


Figure A-5. PITCH STEP RESPONSE - CONFIGURATION 4

CONFIG 5

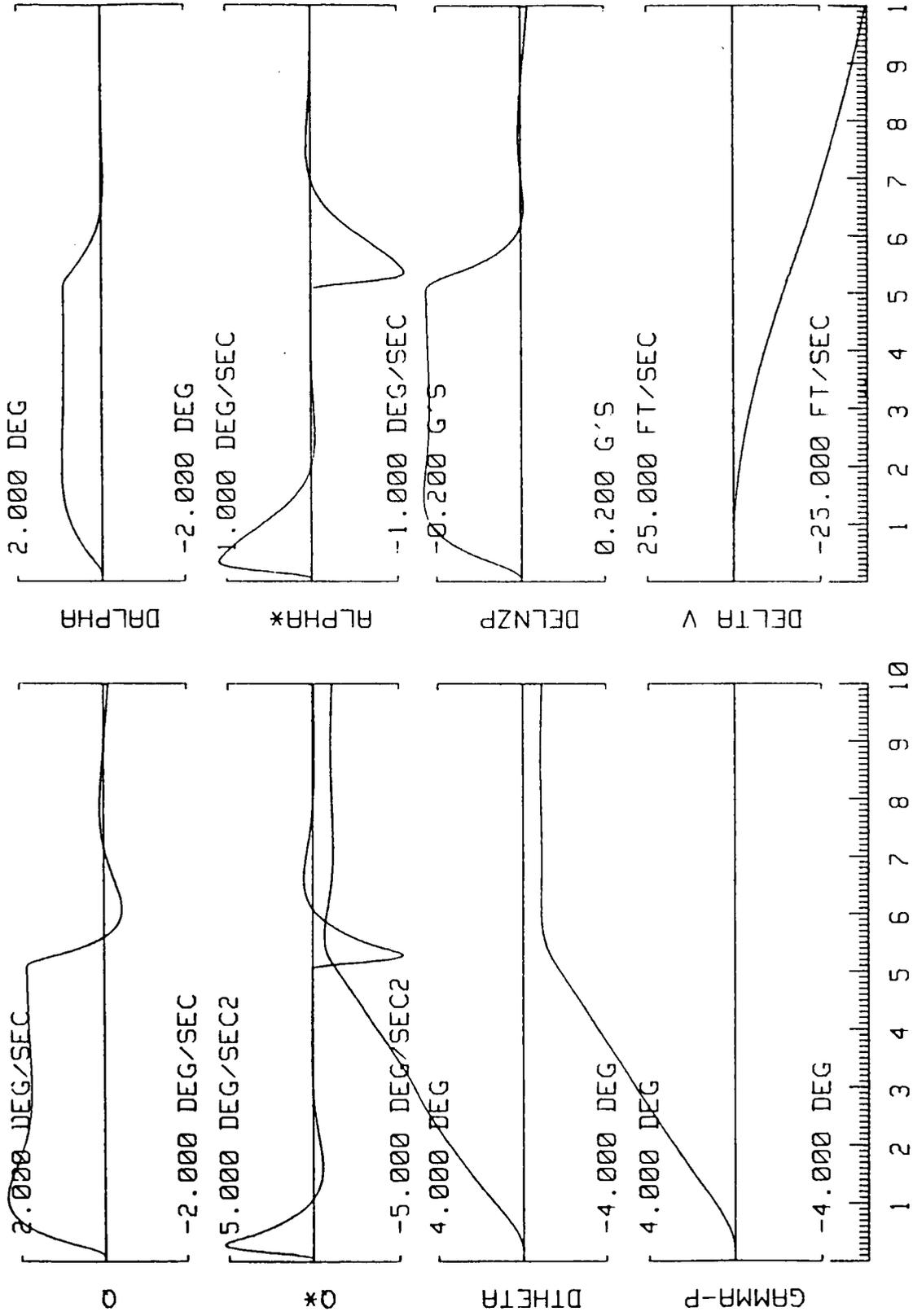


Figure A-6. PITCH STEP RESPONSE - CONFIGURATION 5

CONFIG 6

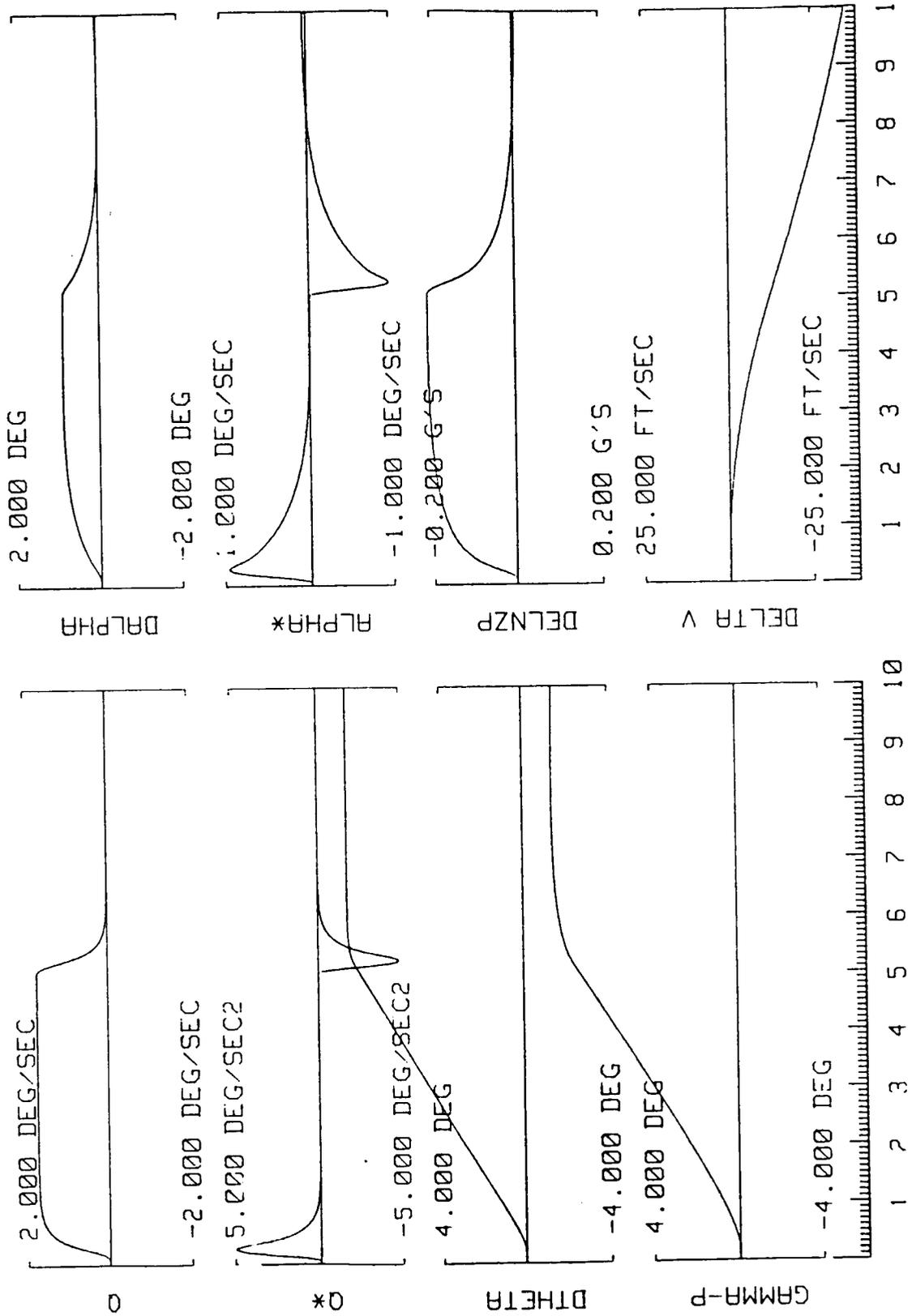


Figure A-7. PITCH STEP RESPONSE - CONFIGURATION 6

CONFIG 7

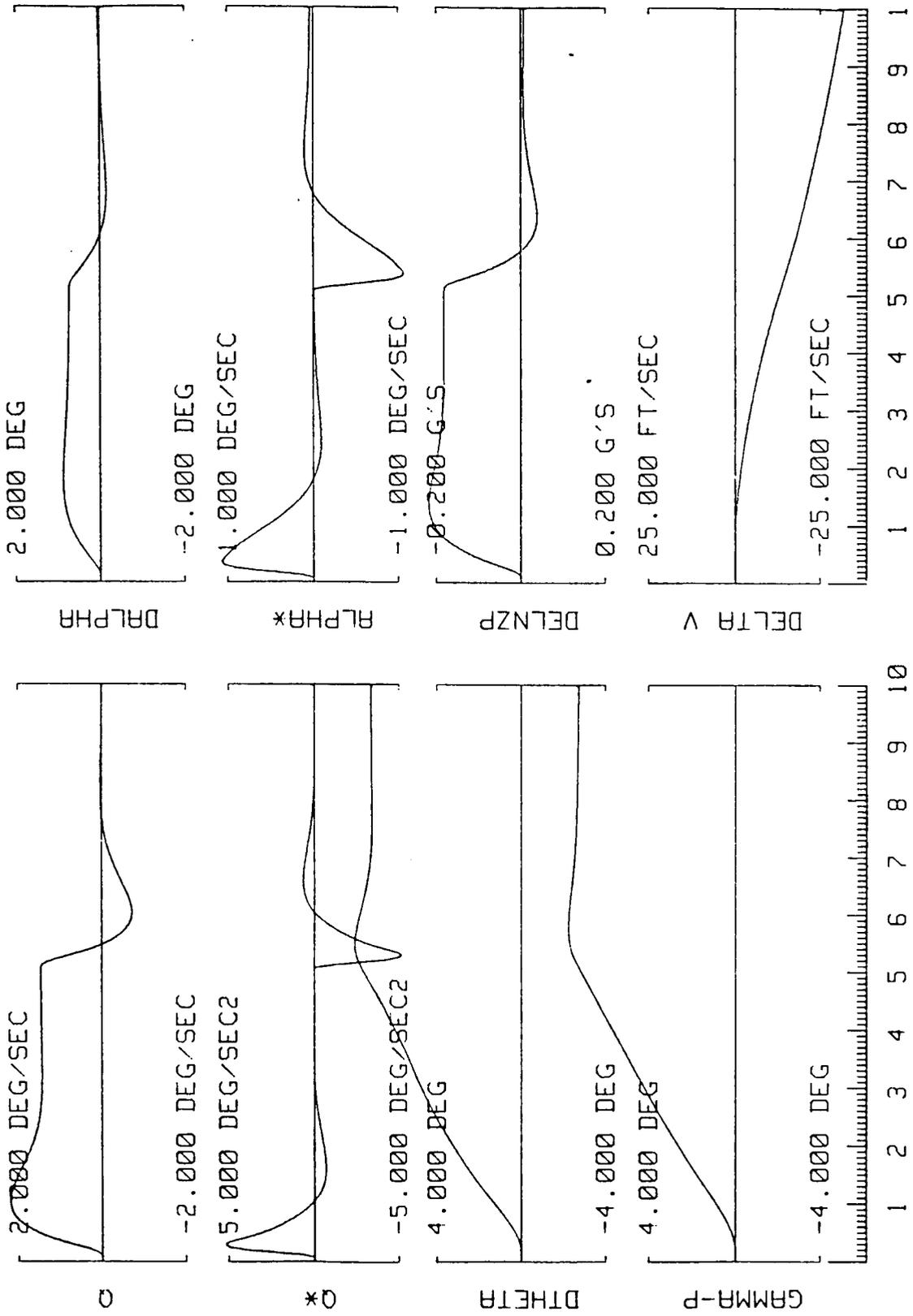


Figure A-8. PITCH STEP RESPONSE - CONFIGURATION 7

CONFIG 8

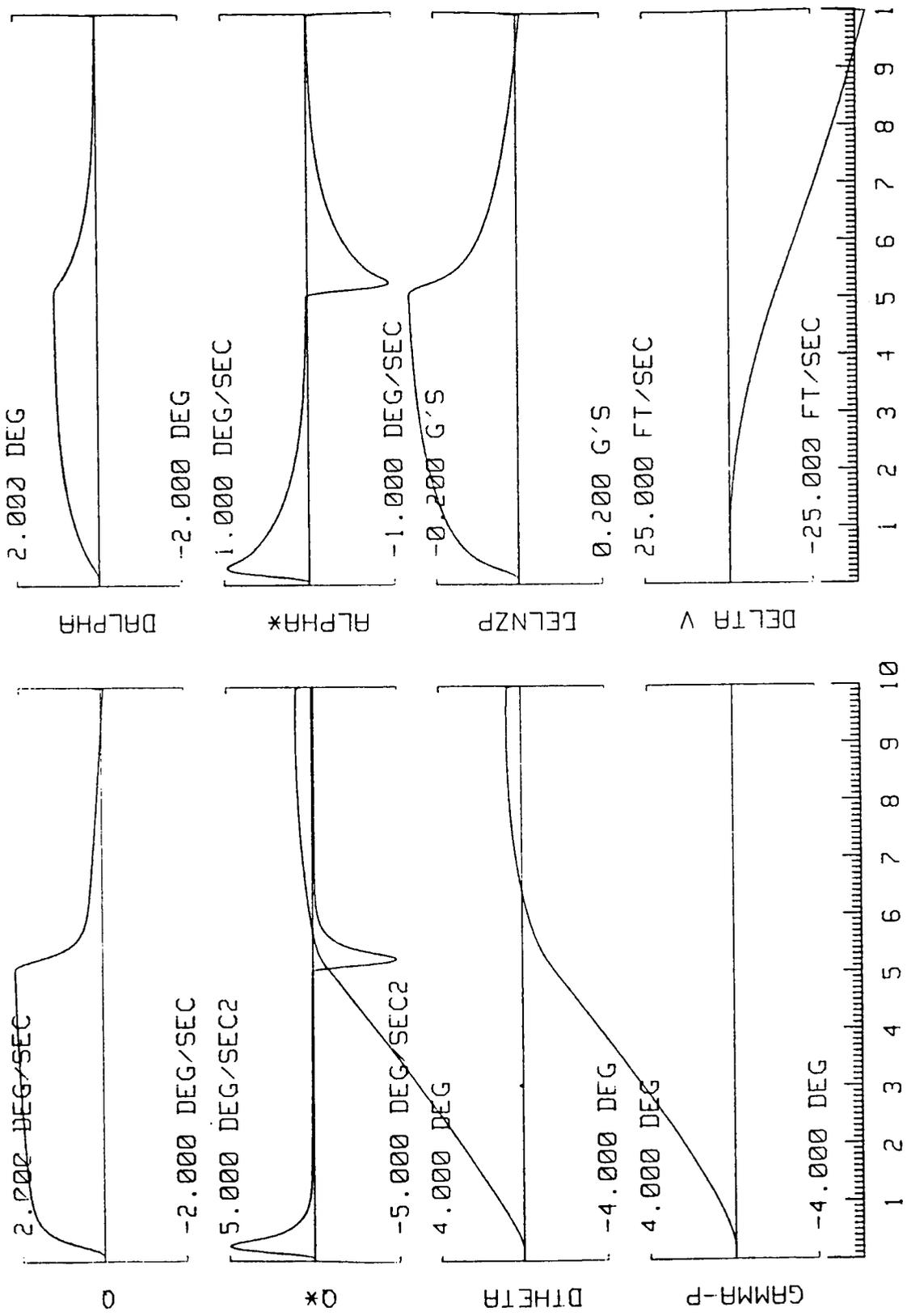


Figure A-9. PITCH STEP RESPONSE - CONFIGURATION 8

CONFIG 9

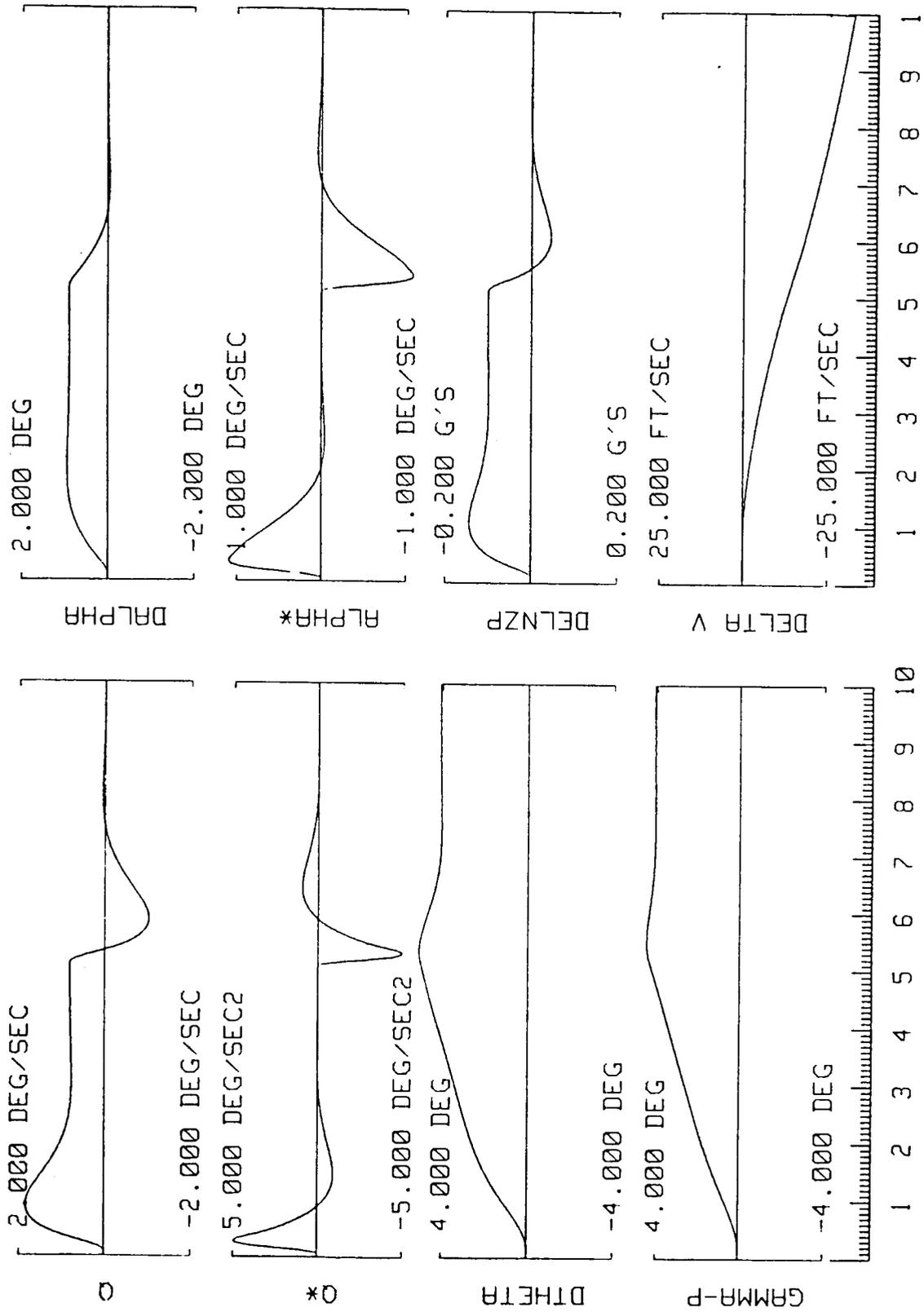


Figure A-10. PITCH STEP RESPONSE - CONFIGURATION 9

CONFIG 10

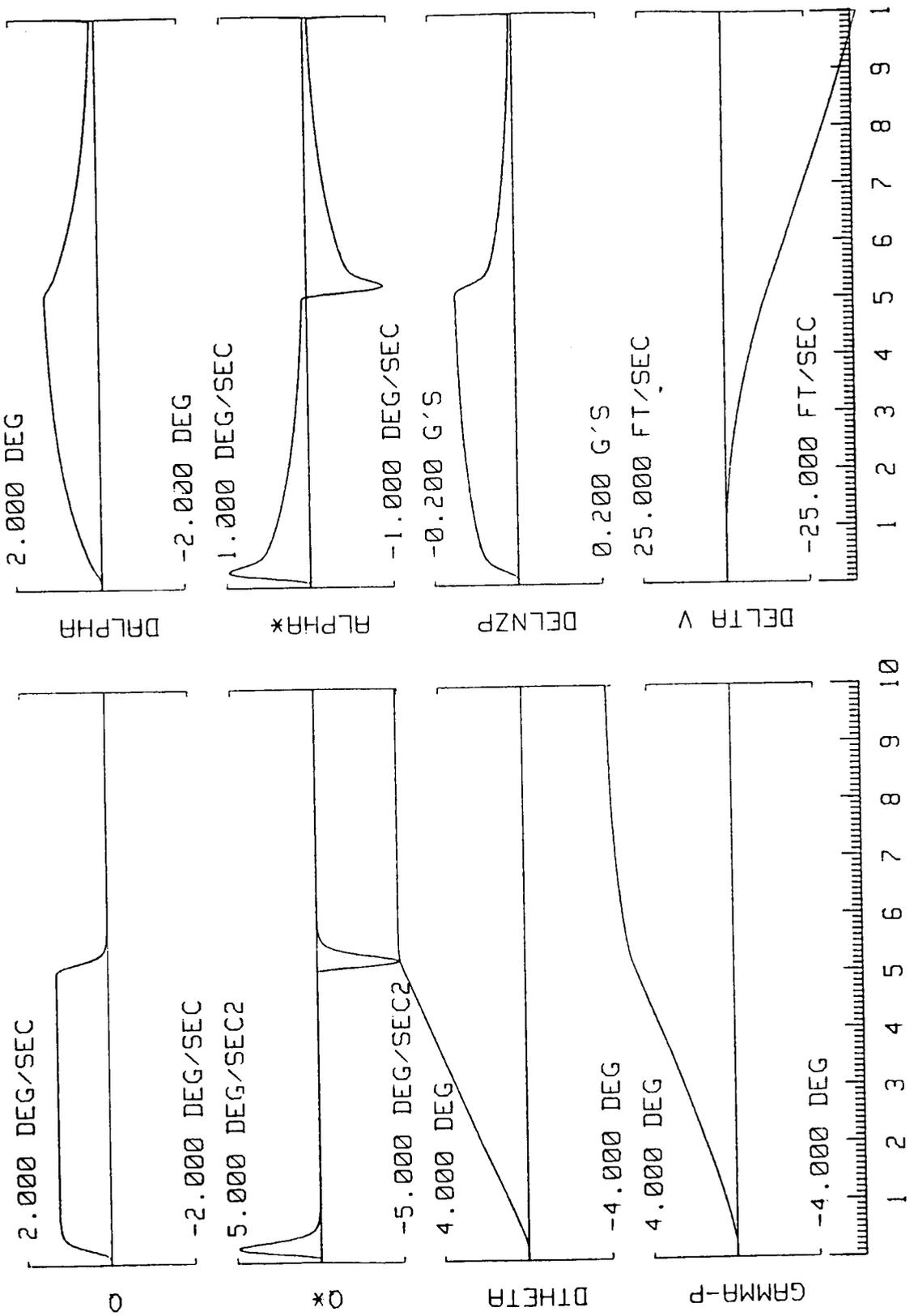


Figure A-11. PITCH STEP RESPONSE - CONFIGURATION 10

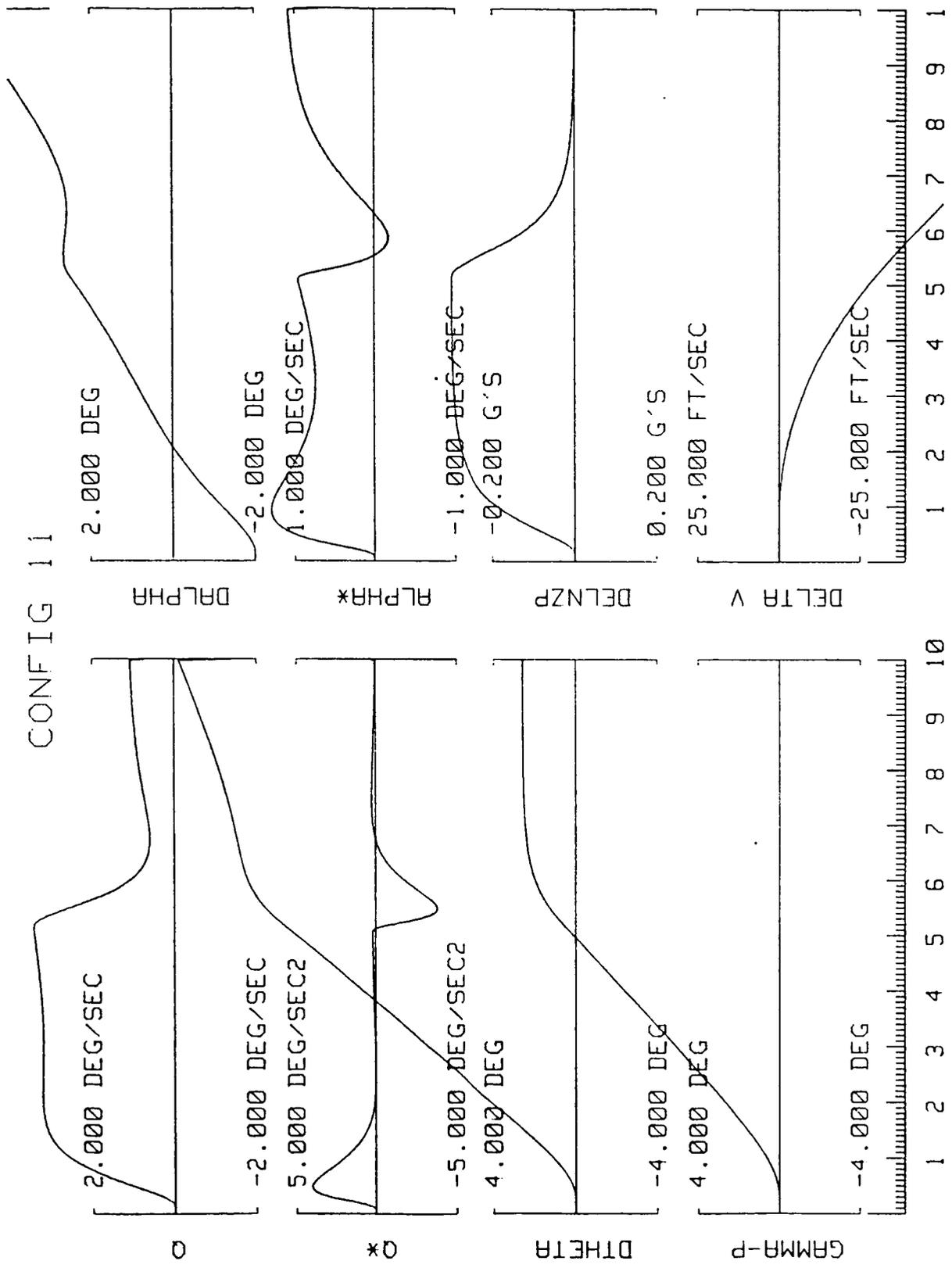


Figure A-12. PITCH STEP RESPONSE - CONFIGURATION 11

CONFIG 12

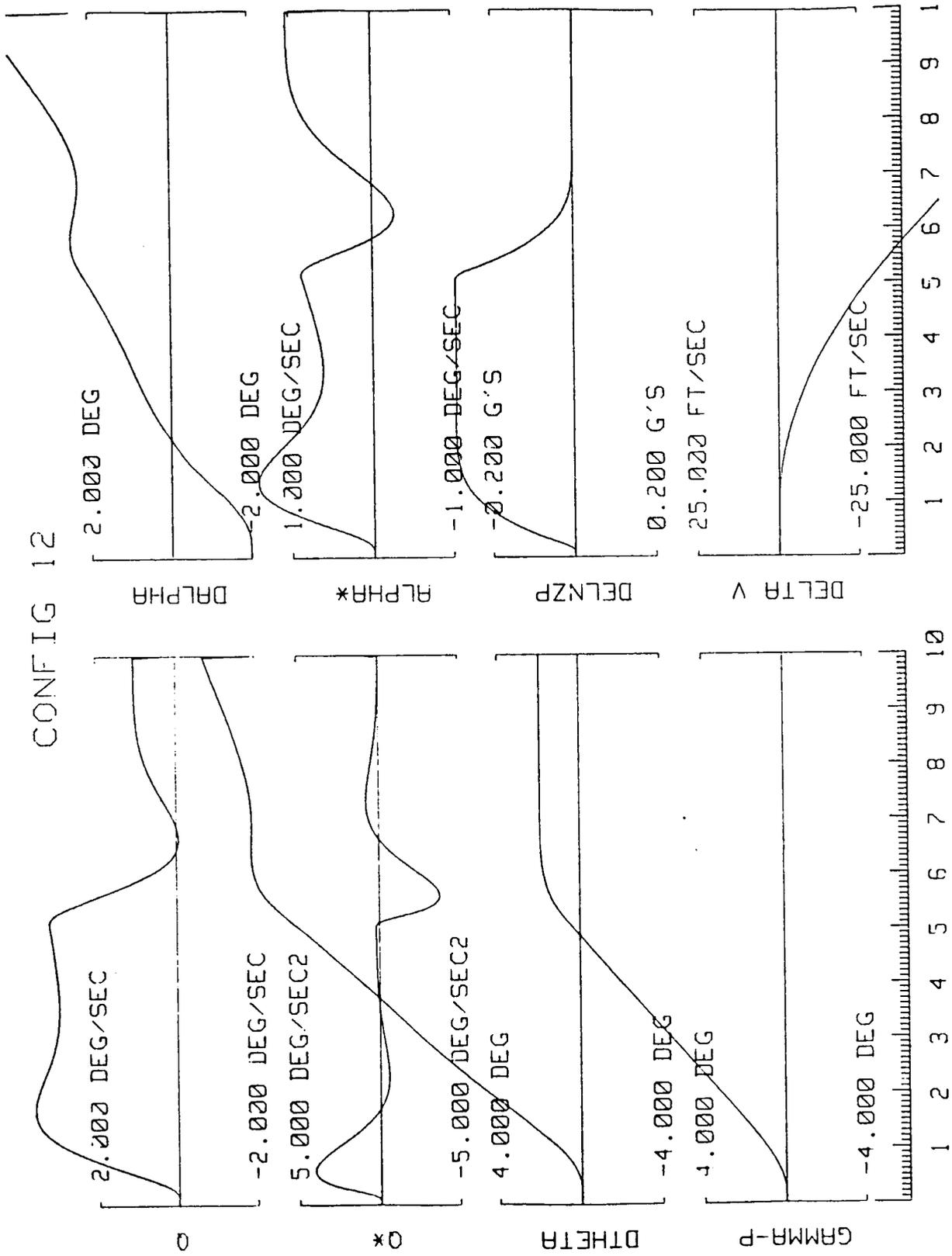


Figure A-13. PITCH STEP RESPONSE - CONFIGURATION 12

CONFIG 13

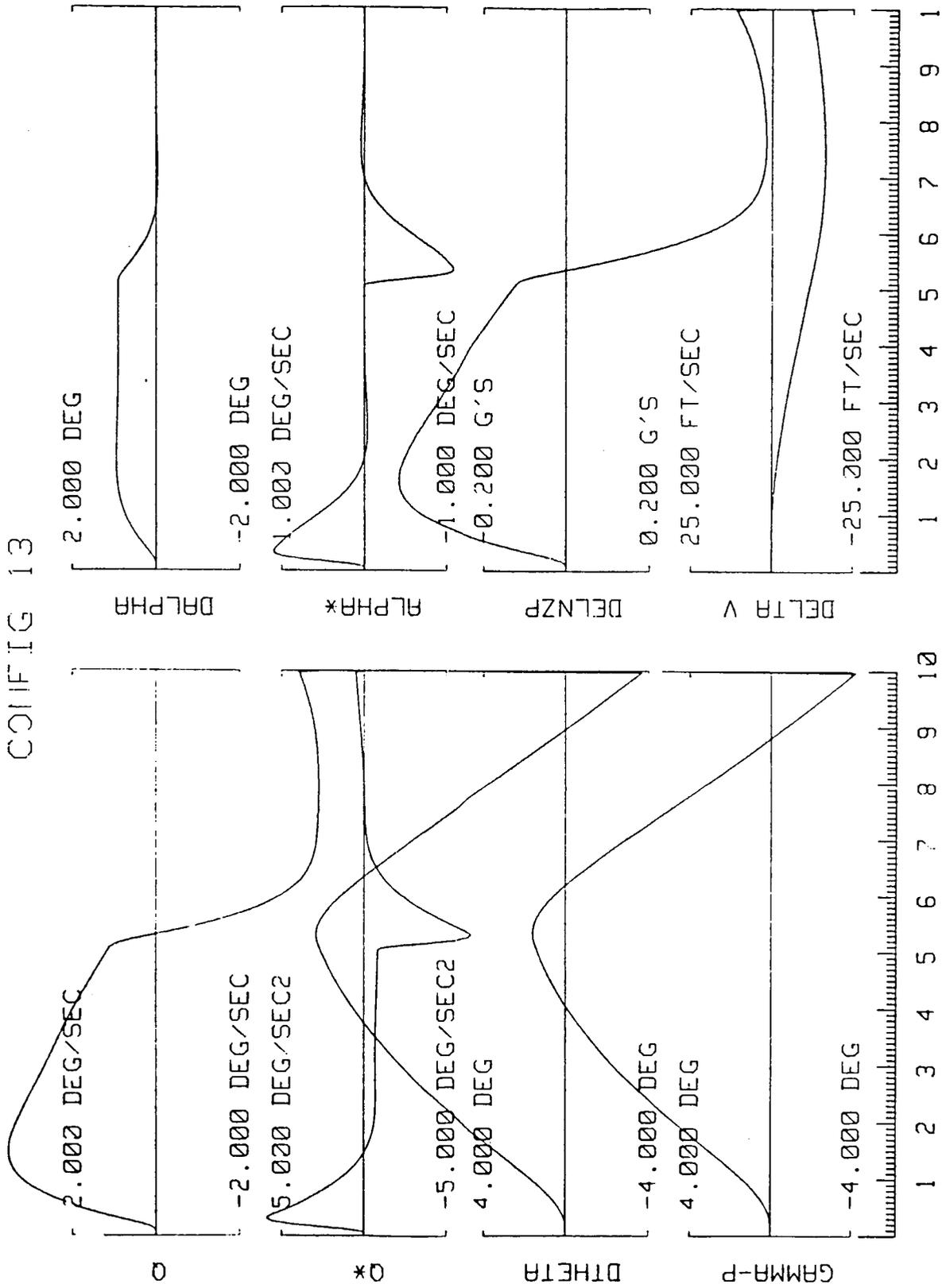


Figure A-14. PITCH STEP RESPONSE - CONFIGURATION 13

CONFIG 14

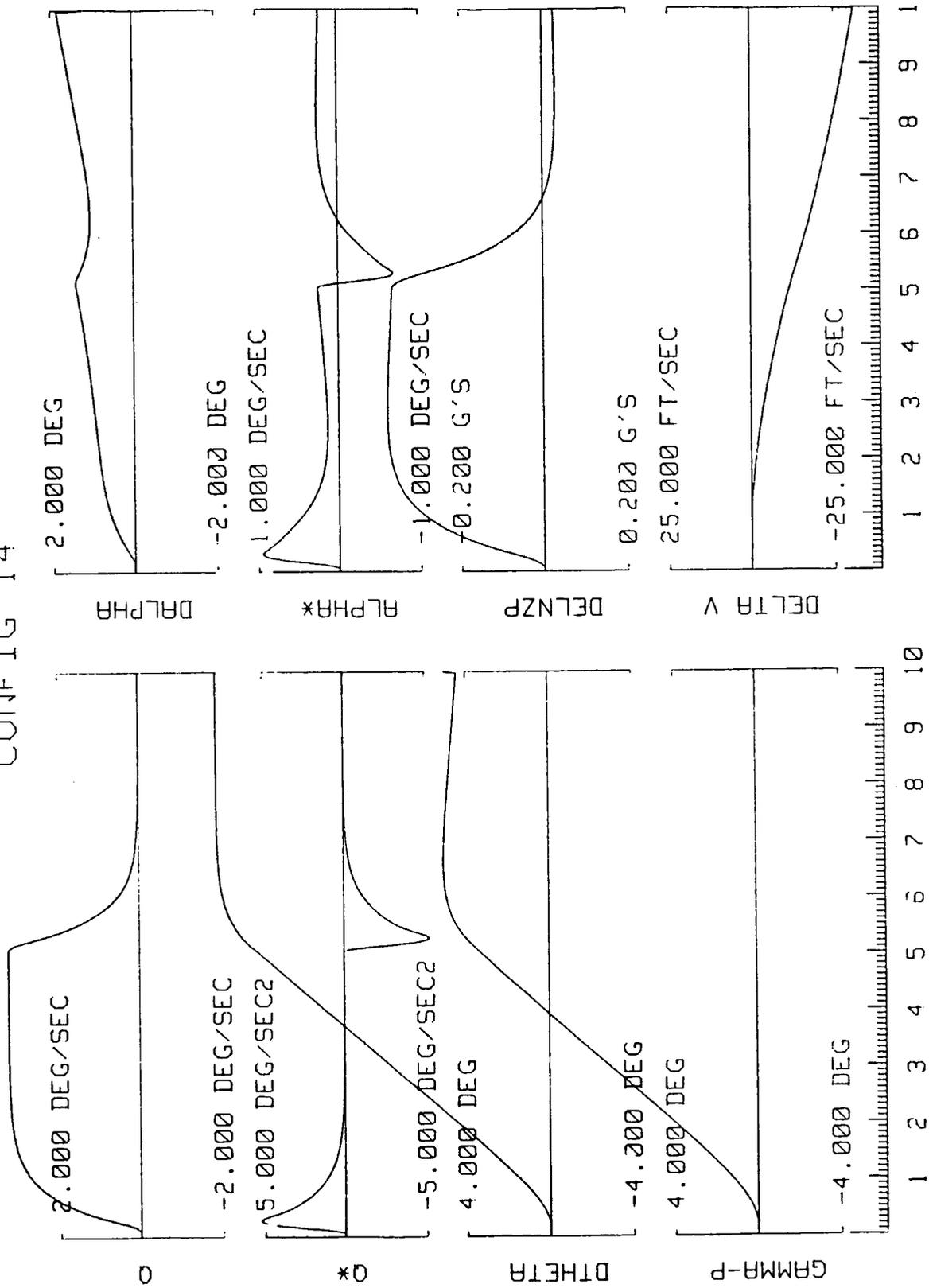


Figure A-15. PITCH STEP RESPONSE - CONFIGURATION 14

CONFIG 16

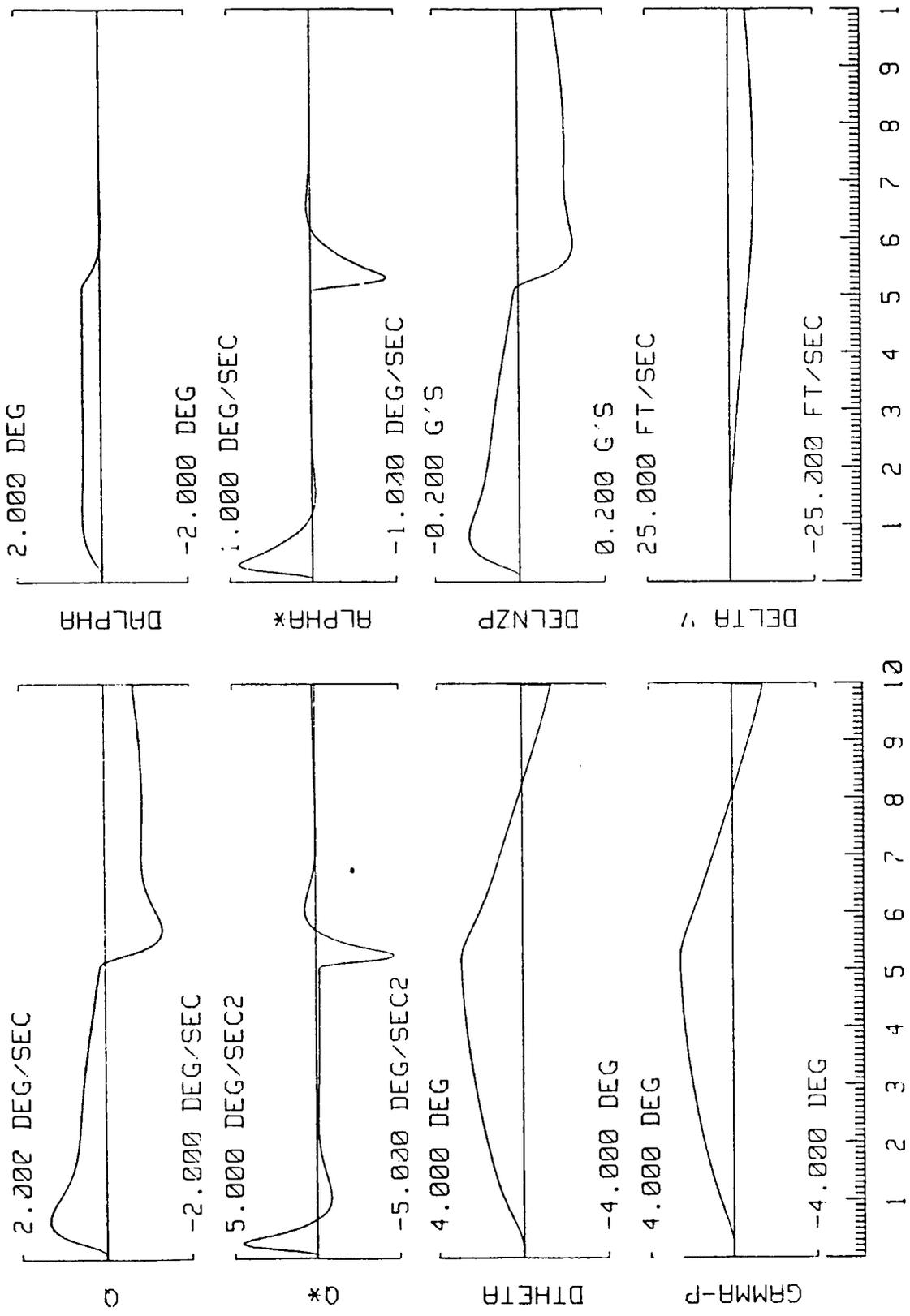


Figure A-16. PITCH STEP RESPONSE - CONFIGURATION 16

CONFIG 17

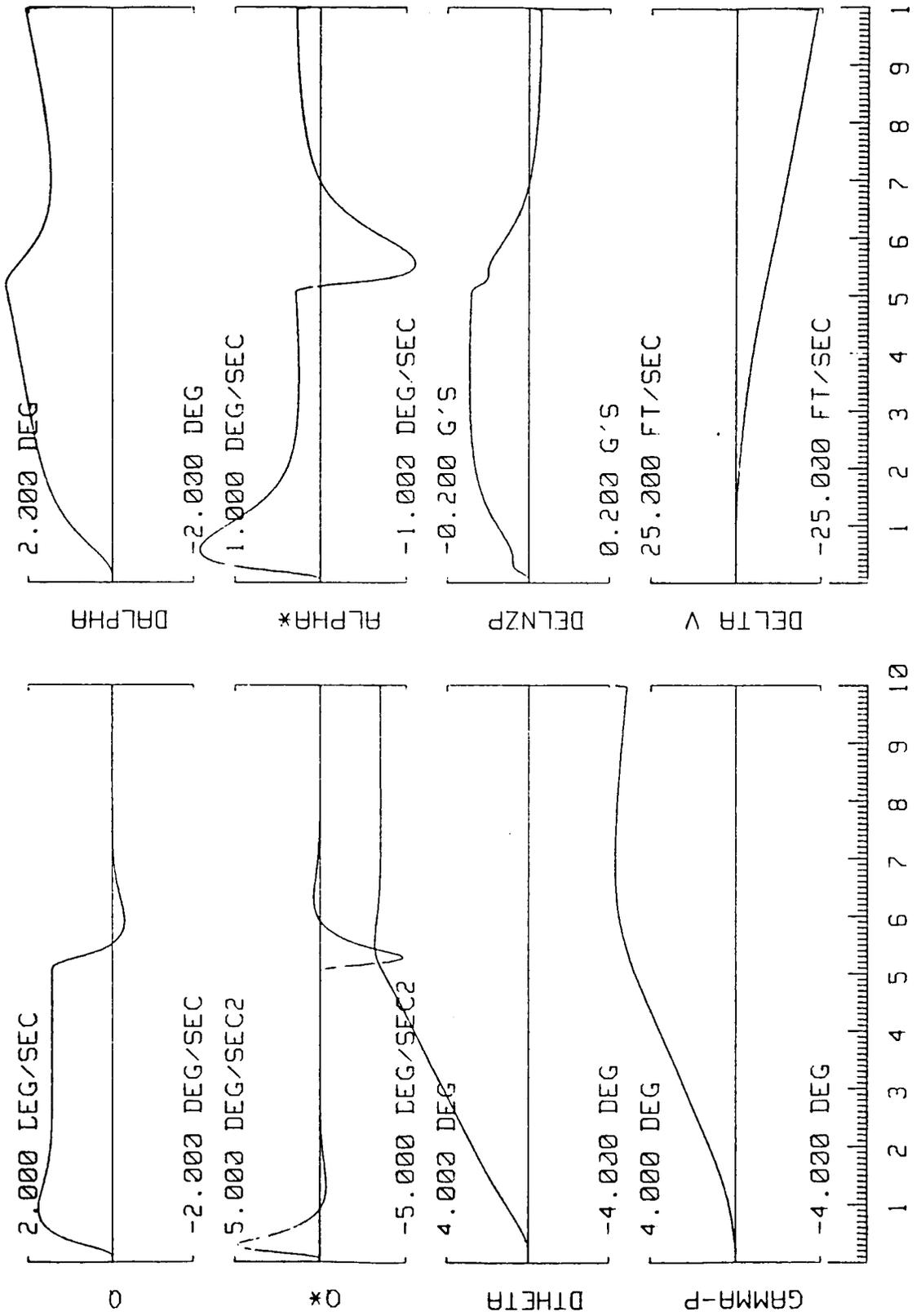


Figure A-17. PITCH STEP RESPONSE - CONFIGURATION 17

CONFIG 21A - Add 100 msec delay  
 CONFIG 22A - Add 200 msec delay

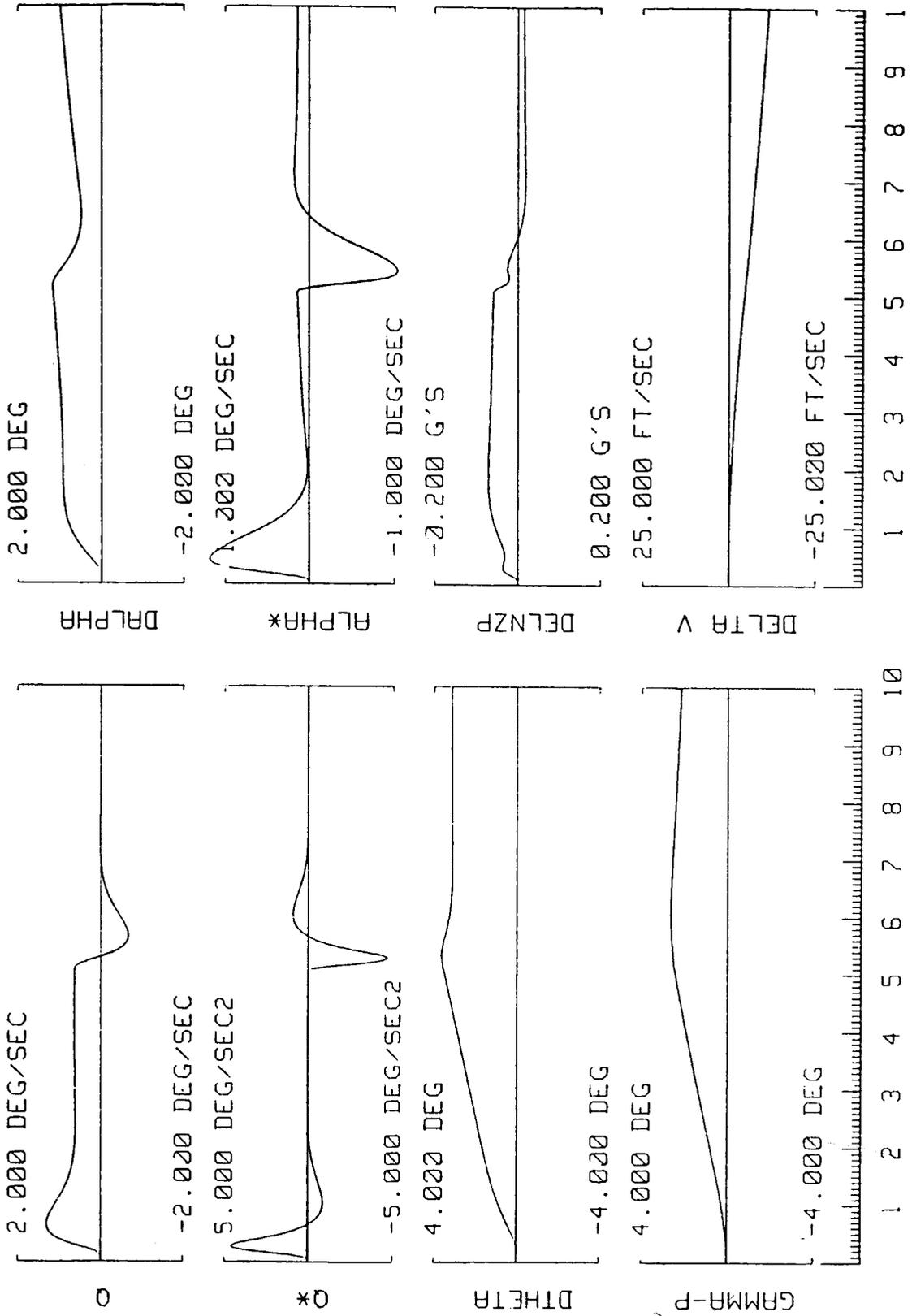


Figure A-18. PITCH STEP RESPONSE - CONFIGURATION 17 + L/L

CONFIG 18

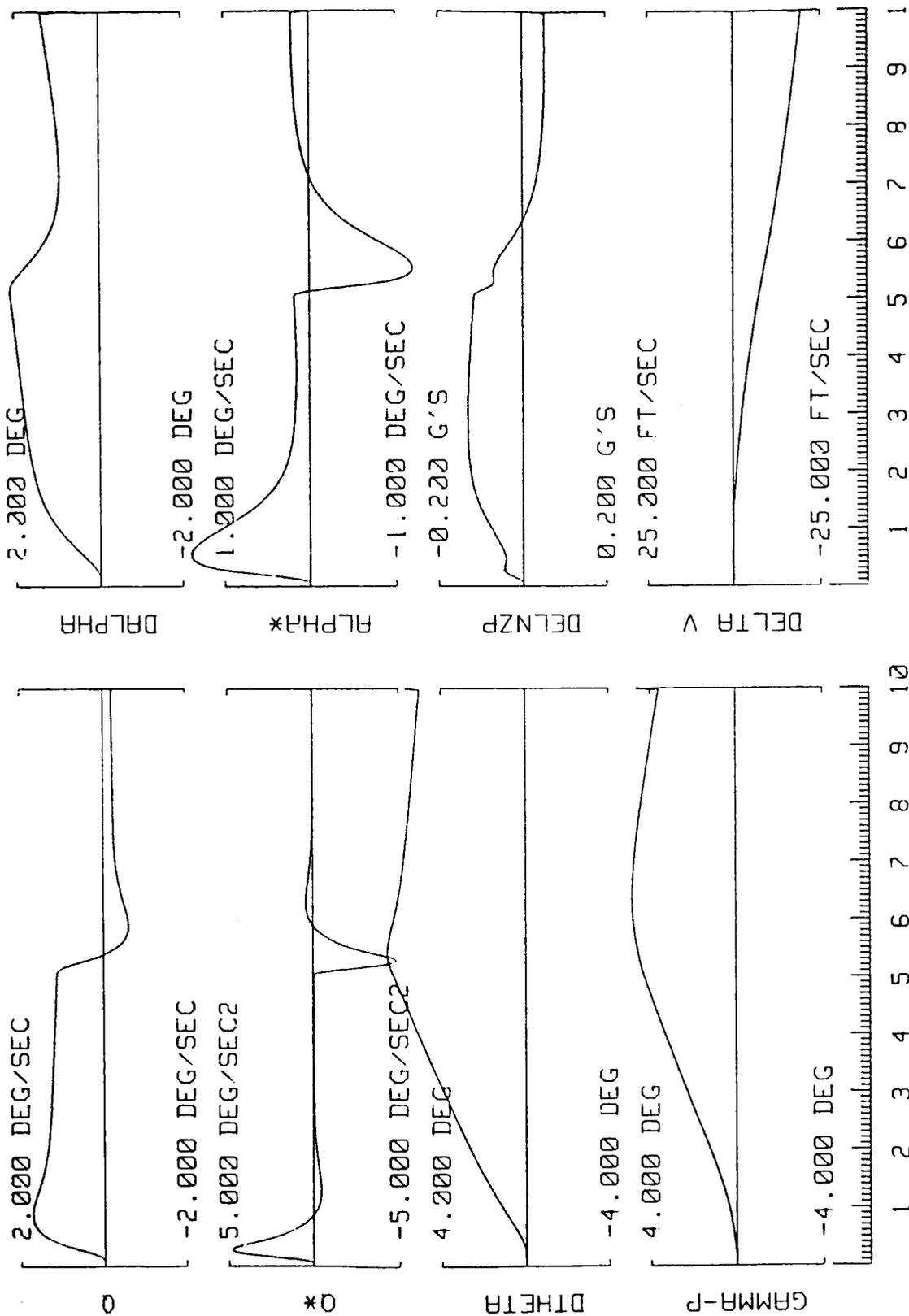


Figure A-19. PITCH STEP RESPONSE - CONFIGURATION 18

CONFIG 19

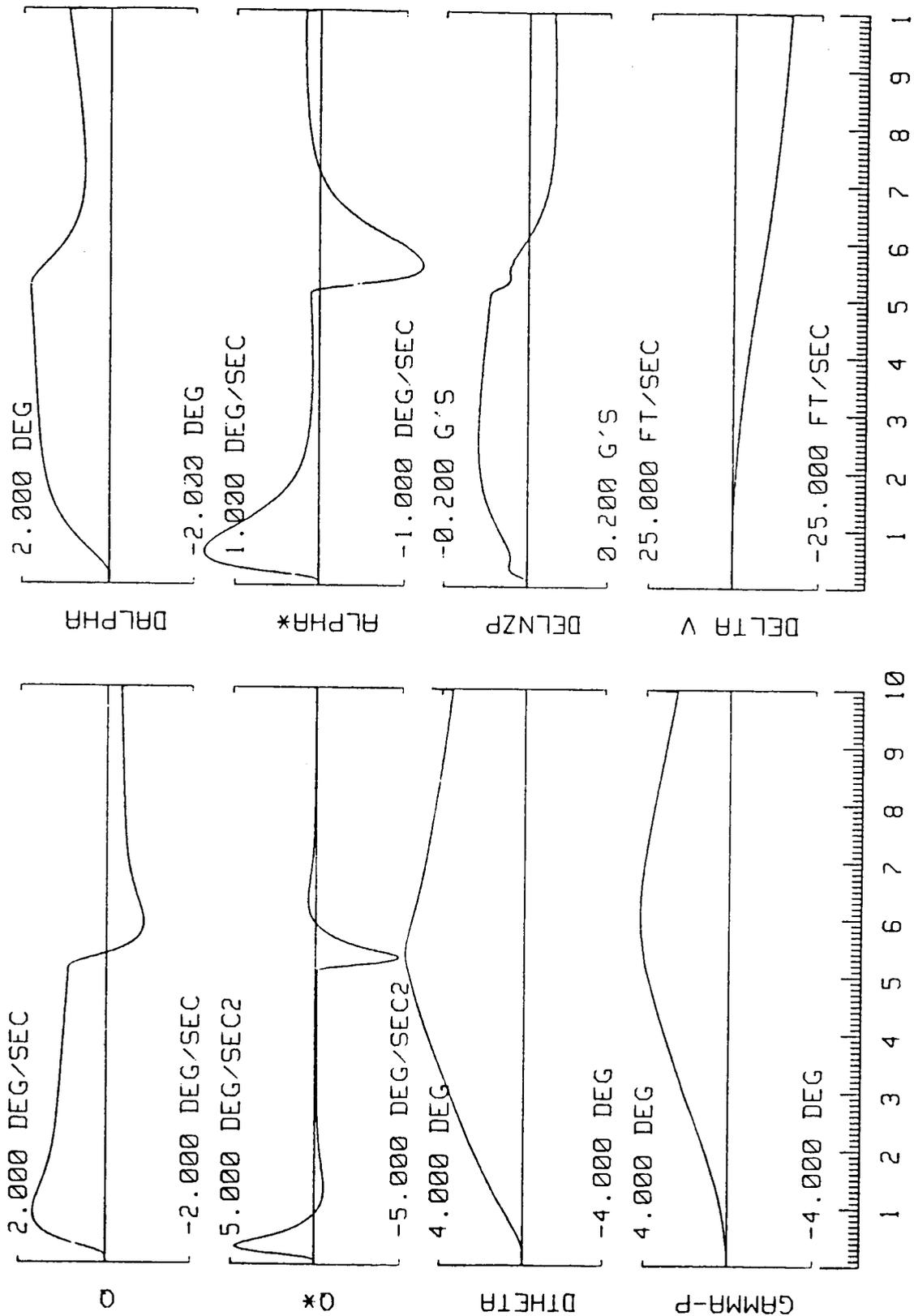


Figure A-20. PITCH STEP RESPONSE - CONFIGURATION 19

CONFIG 20

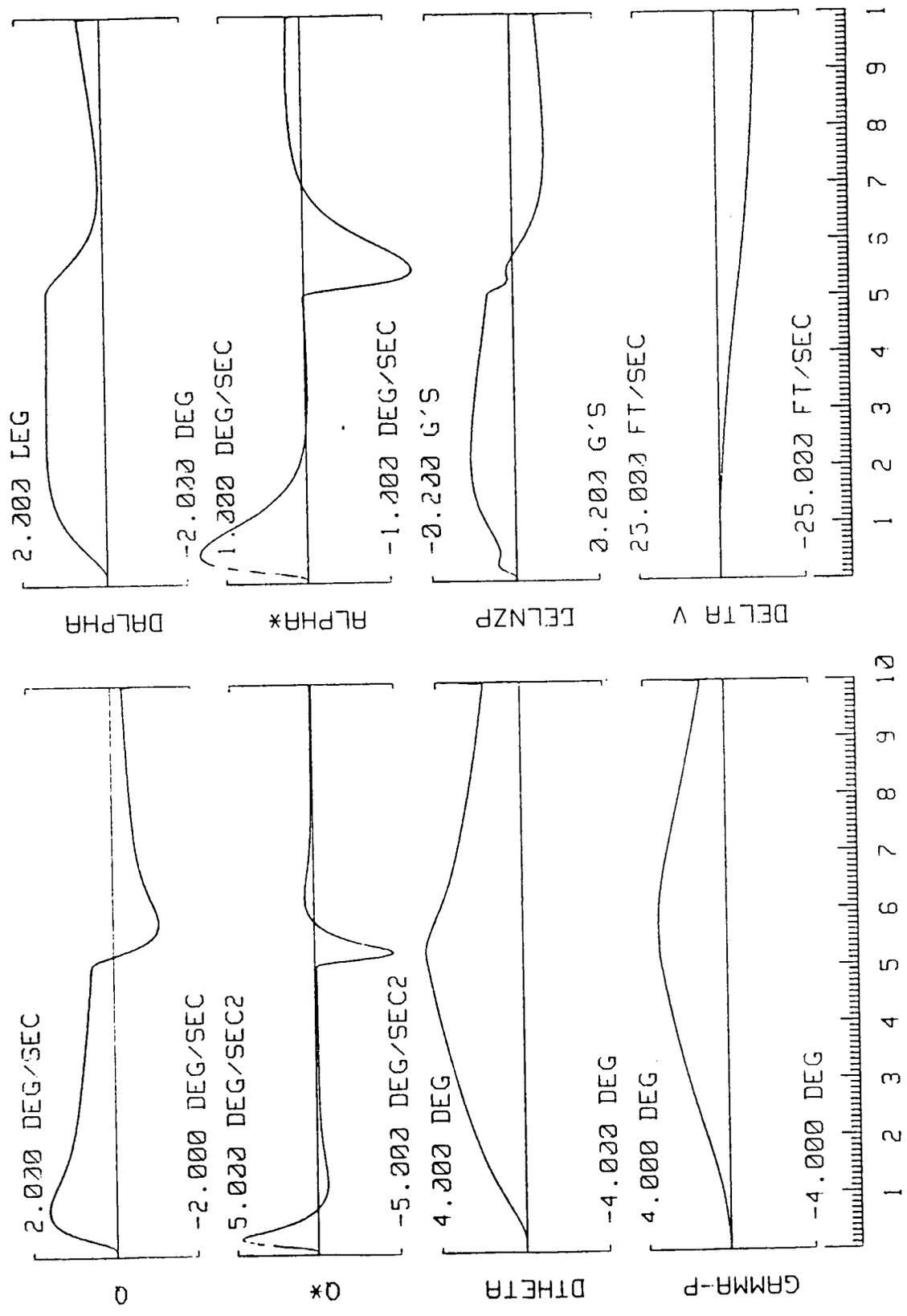


Figure A-21. PITCH STEP RESPONSE - CONFIGURATION 20

CONFIG 24 - Add 100 msec delay  
 CONFIG 25 - Add 200 msec delay

CONFIG 23

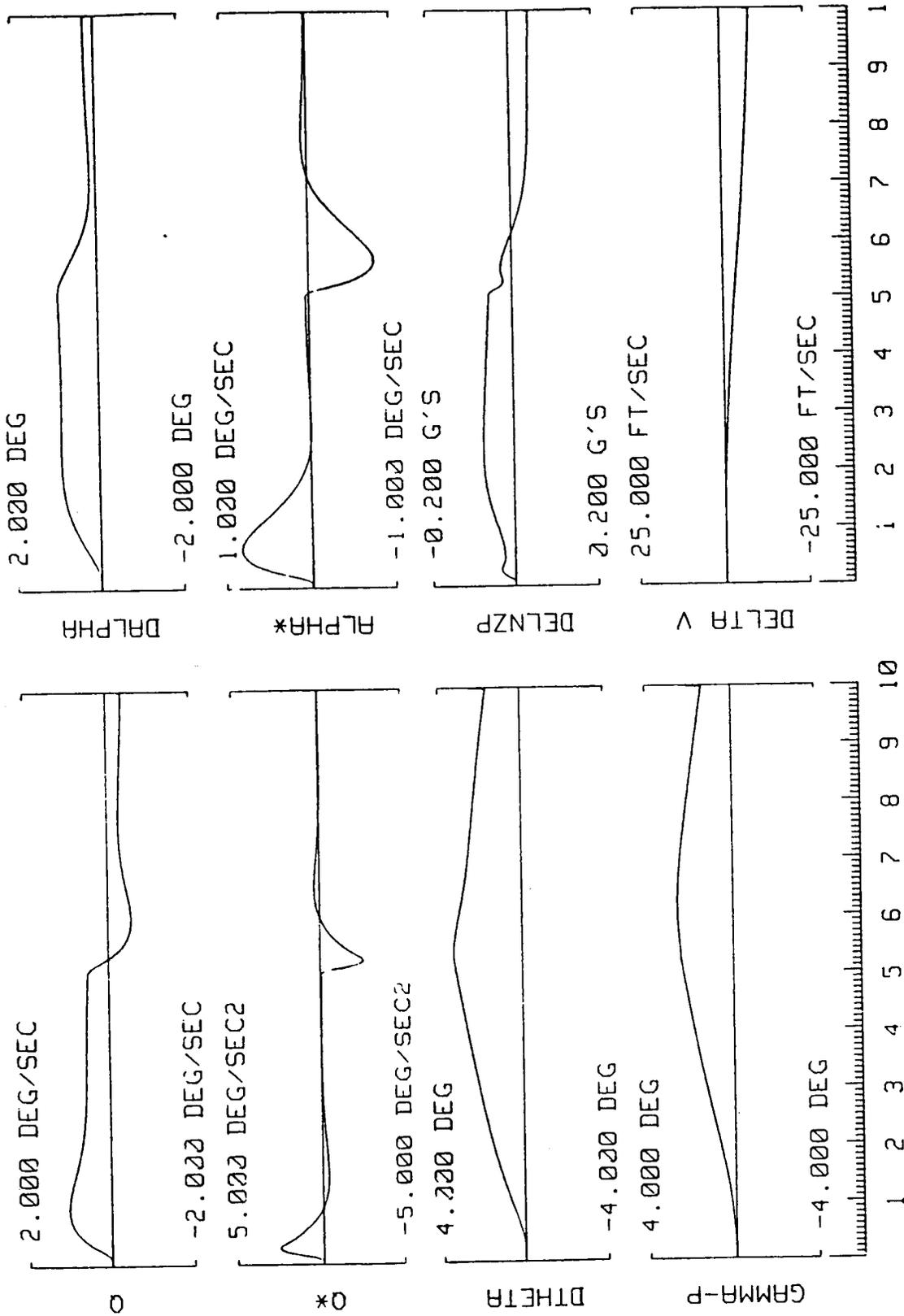


Figure A-22. PITCH STEP RESPONSE - CONFIGURATION 23

CONFIG 27 - Add 100 msec delay  
 CONFIG 28 - Add 200 msec delay

CONFIG 26

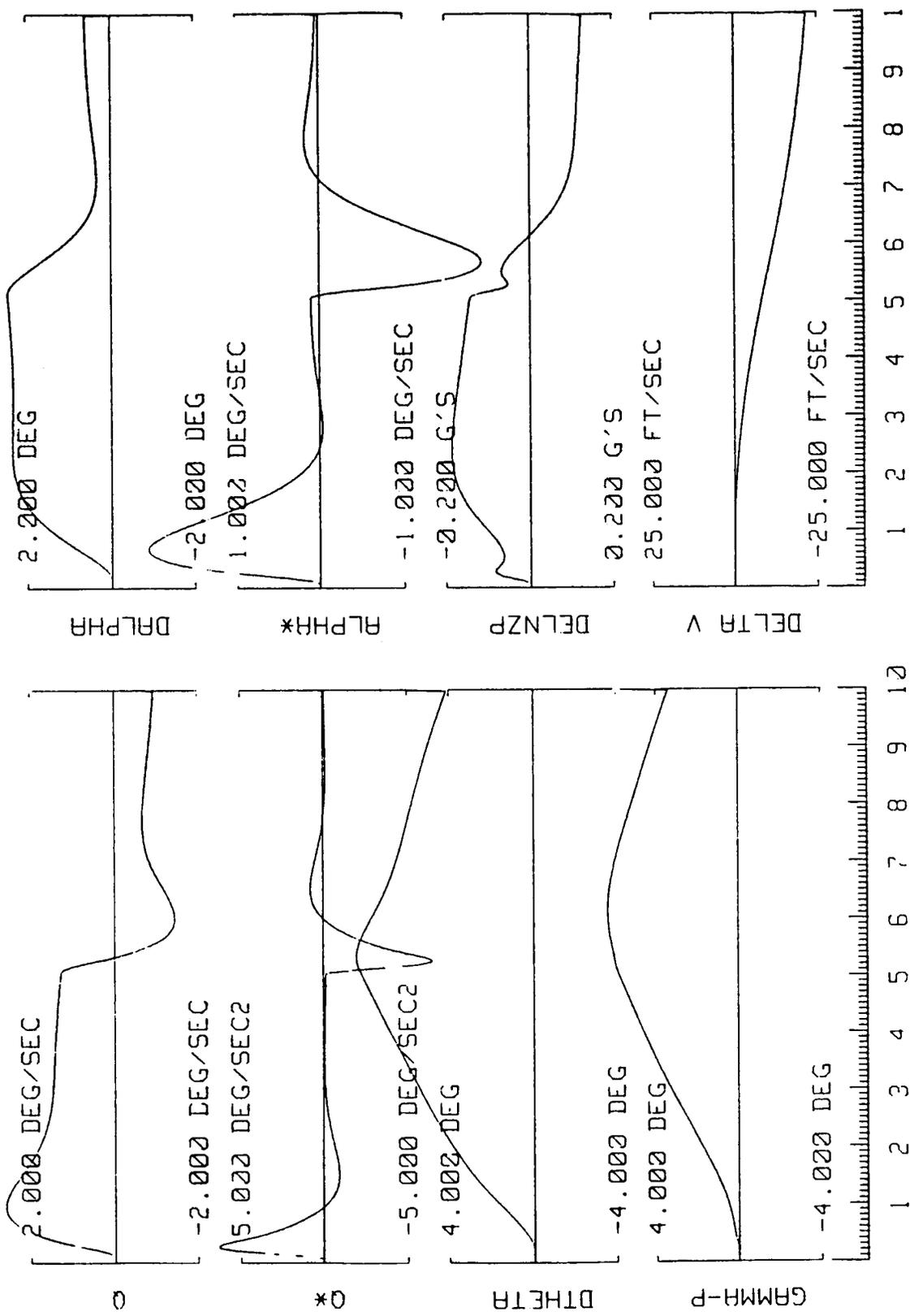


Figure A-23. PITCH STEP RESPONSE - CONFIGURATION 26

CONFIG 24A - Add 100 msec delay  
 CONFIG 23A - Add 200 msec delay

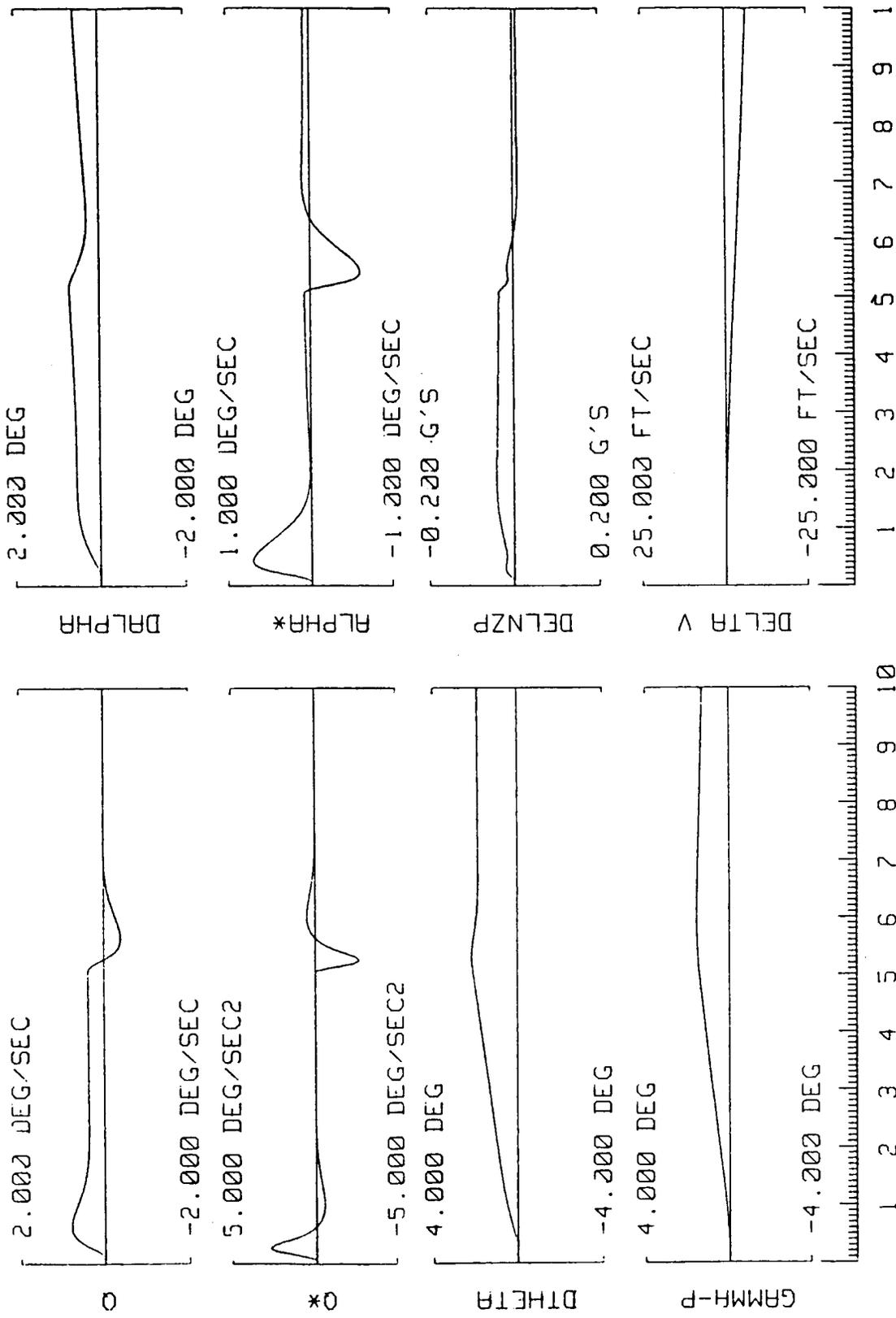


Figure A-24. PITCH STEP RESPONSE - CONFIGURATION 23A

CONFIG 27A - Add 100 msec delay  
 CONFIG 26A CONFIG 28A - Add 200 msec delay

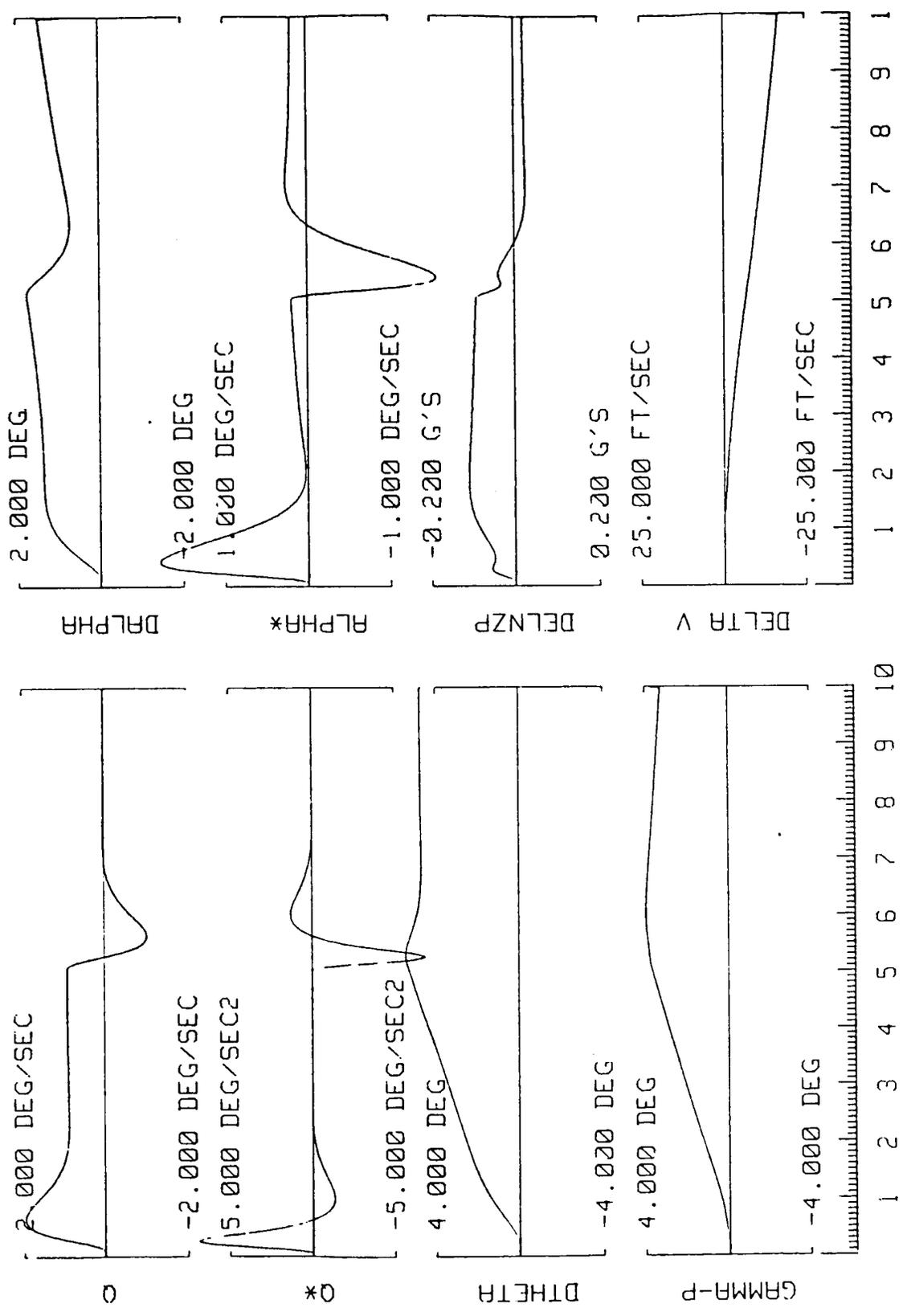


Figure A-25. PITCH STEP RESPONSE - CONFIGURATION 26A

CONFIG 21 - Add 100 msec delay  
 CONFIG 22 - Add 200 msec delay

CONFIG B

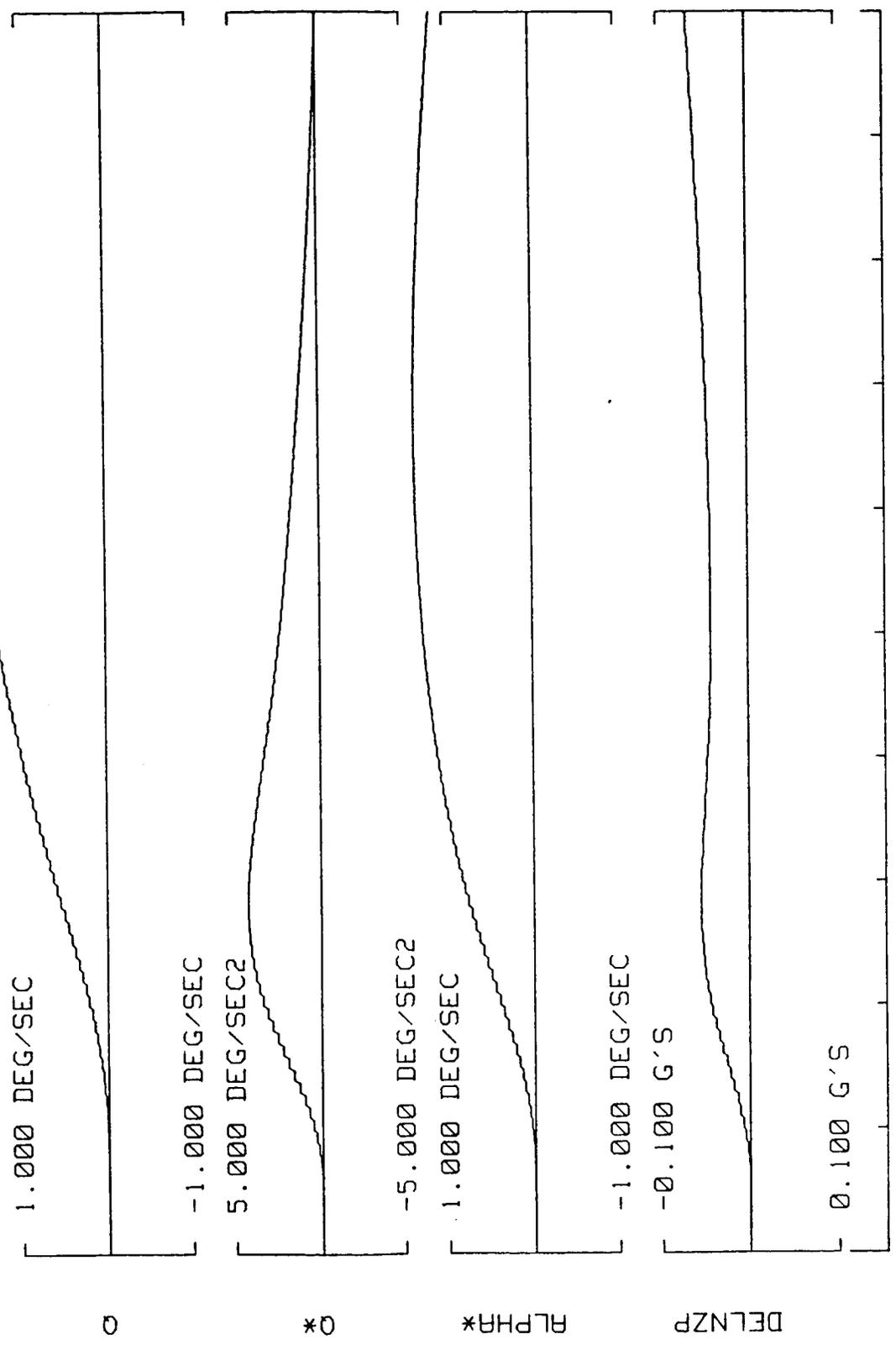


Figure A-26. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION B

CONFIG 1

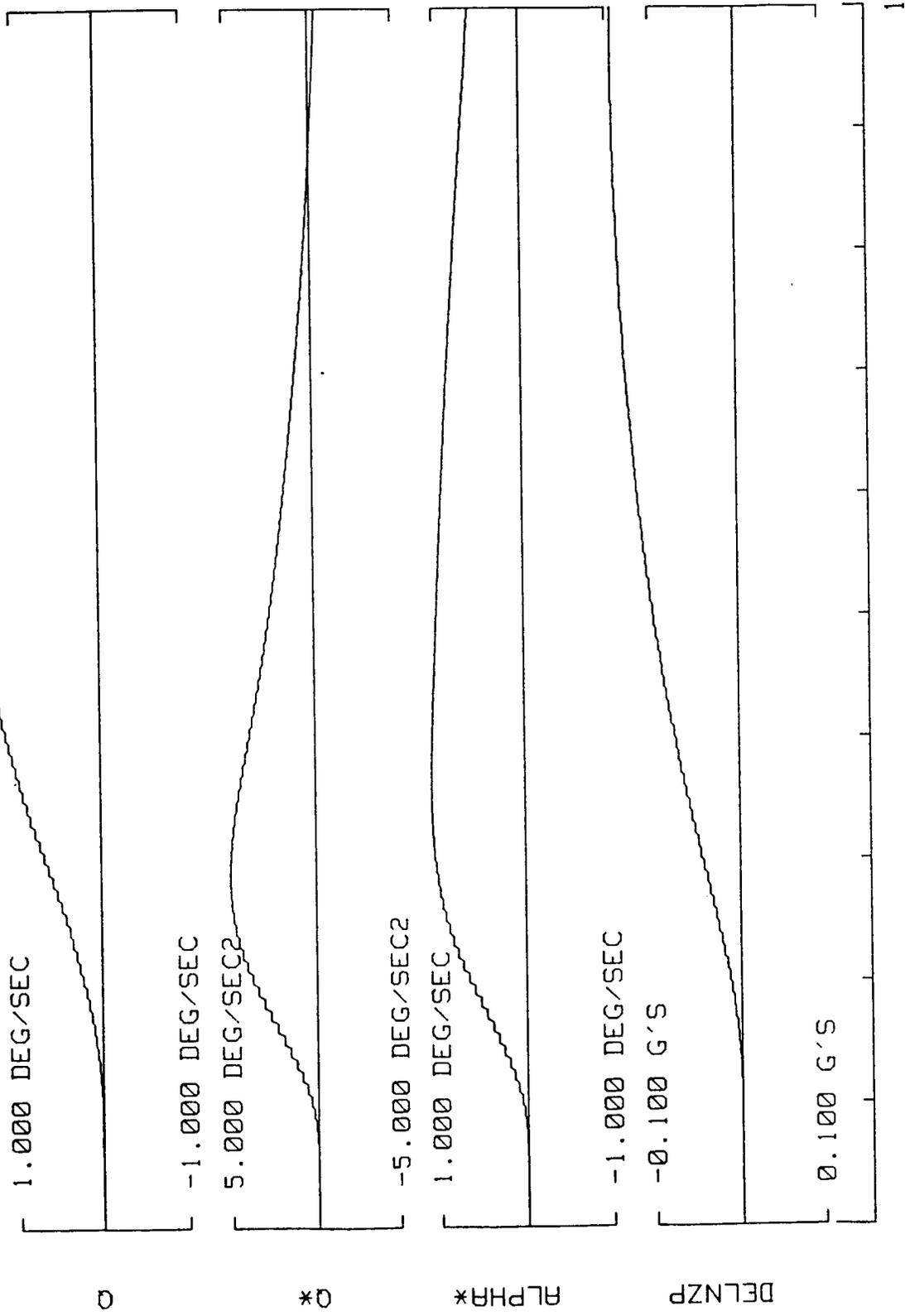


Figure A-27. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 1

CONFIG 2

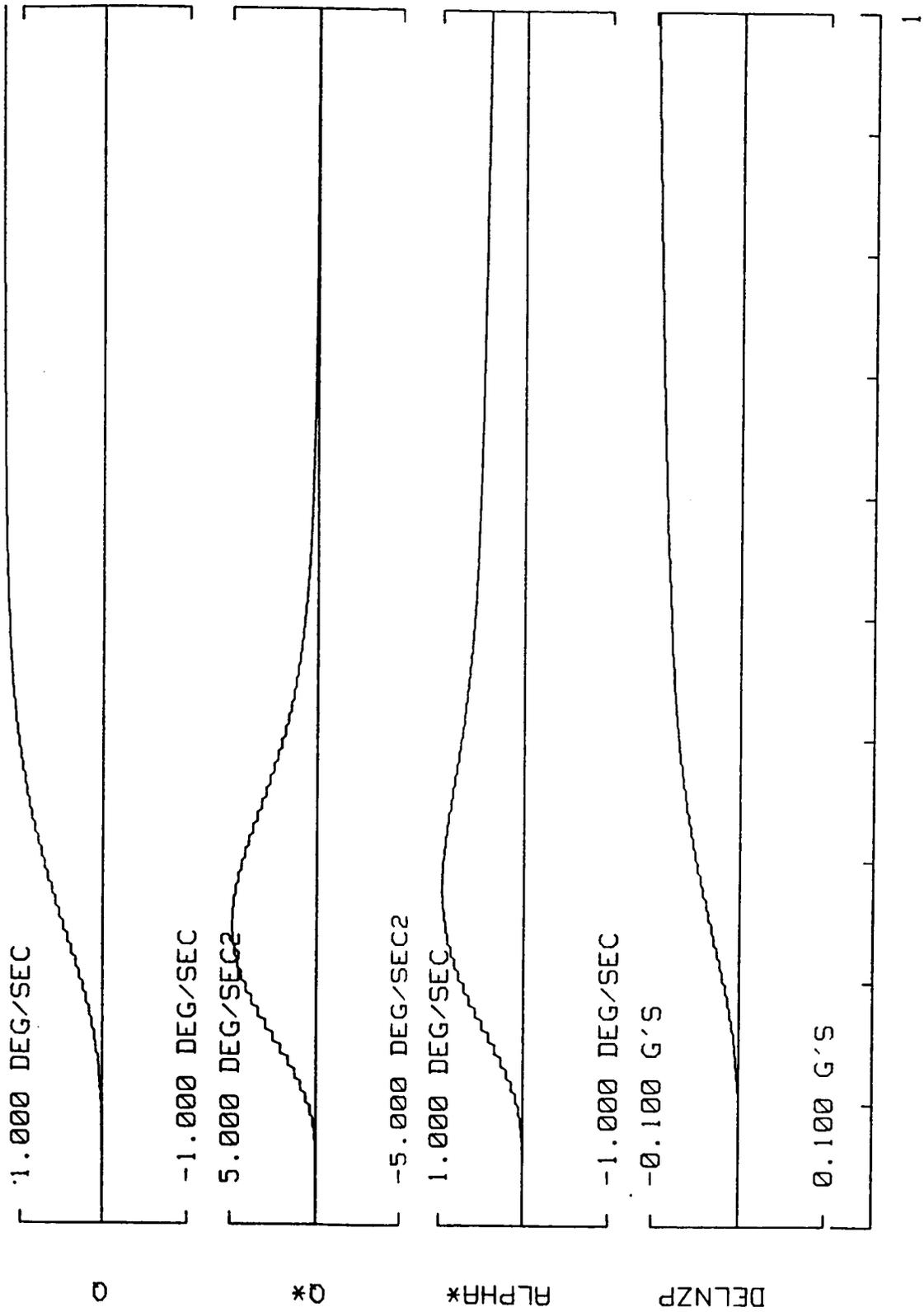


Figure A-28. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 2

CONFIG 3

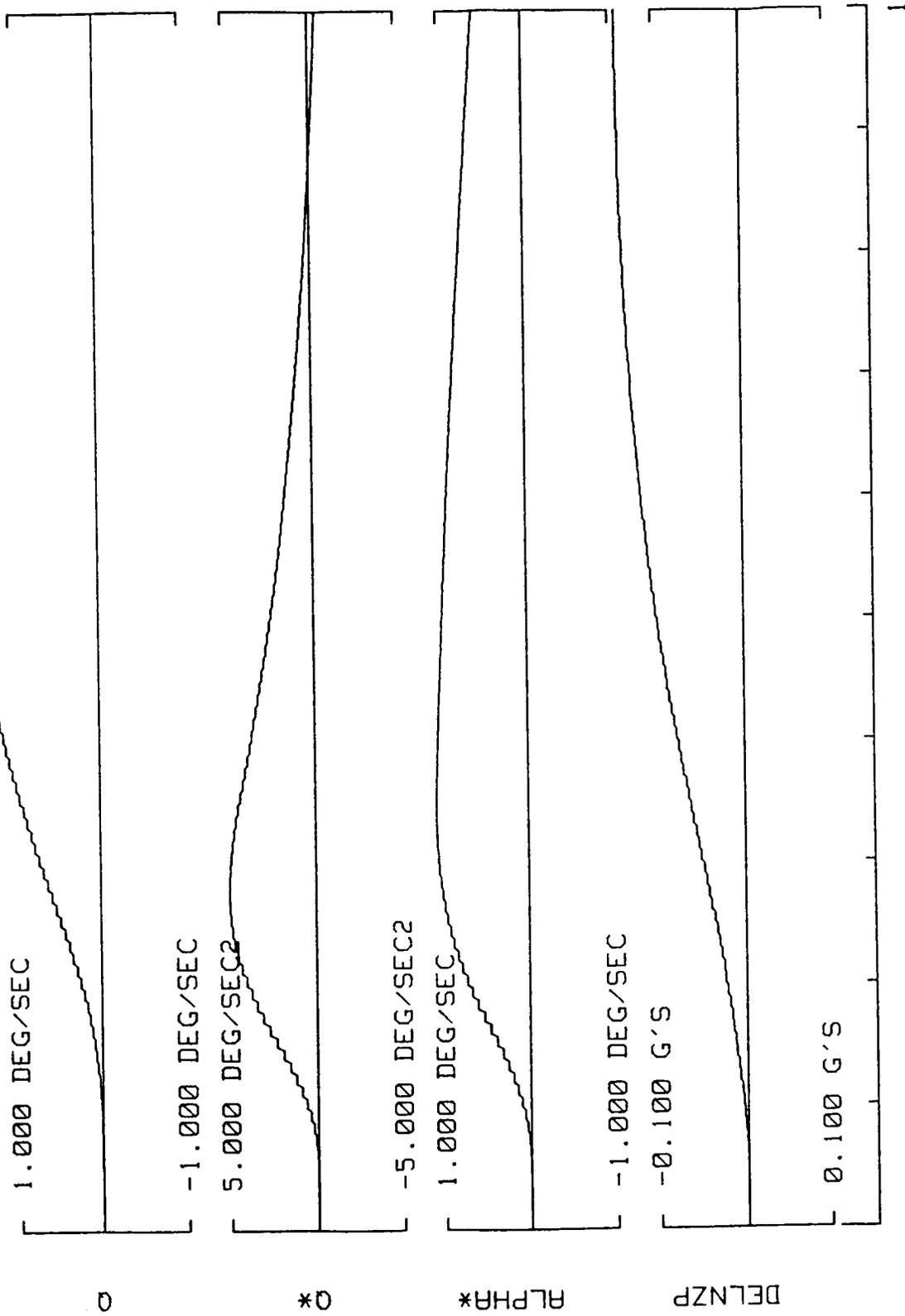


Figure A-29. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 3

CONFIG 4

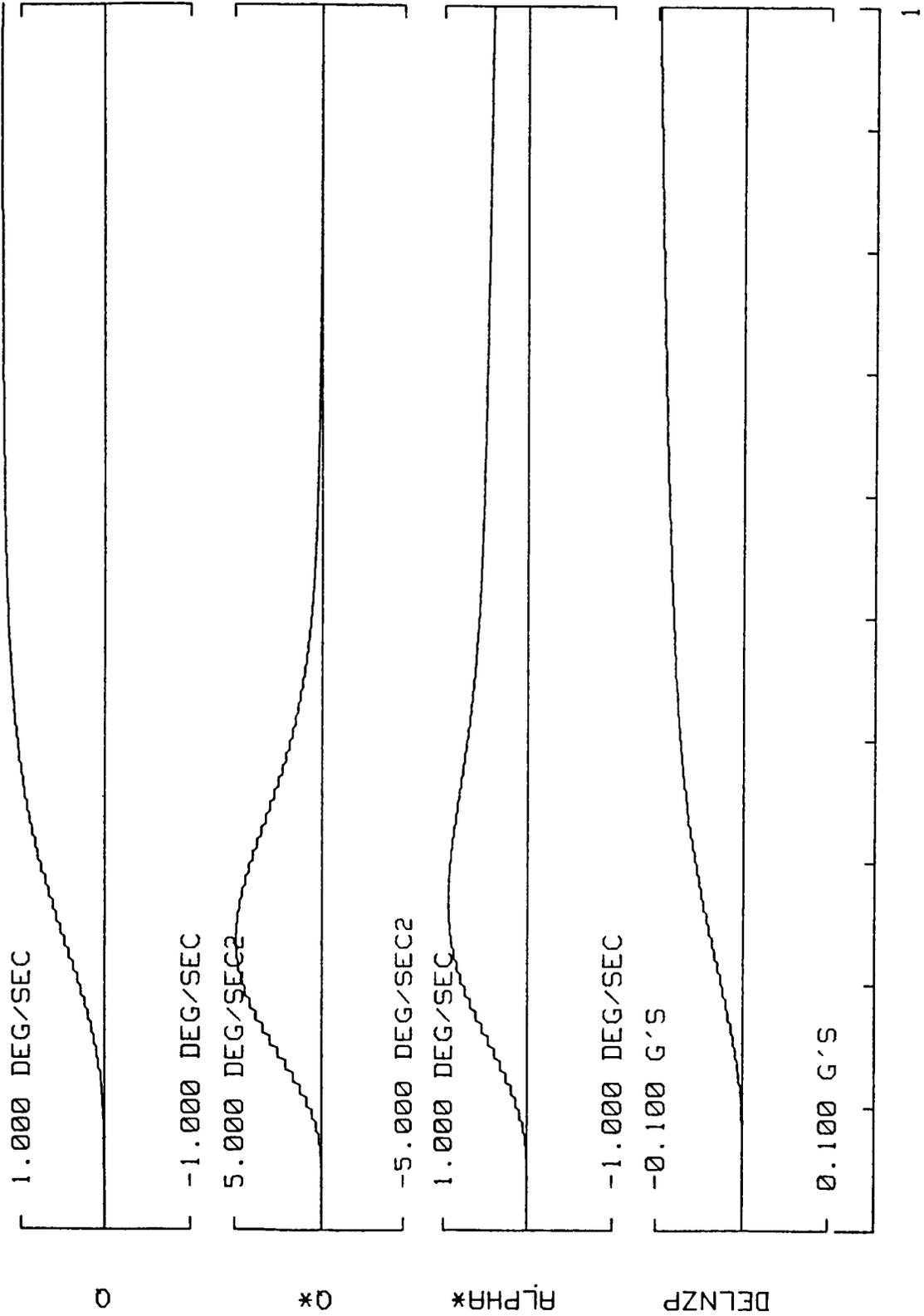


Figure A-30. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 4

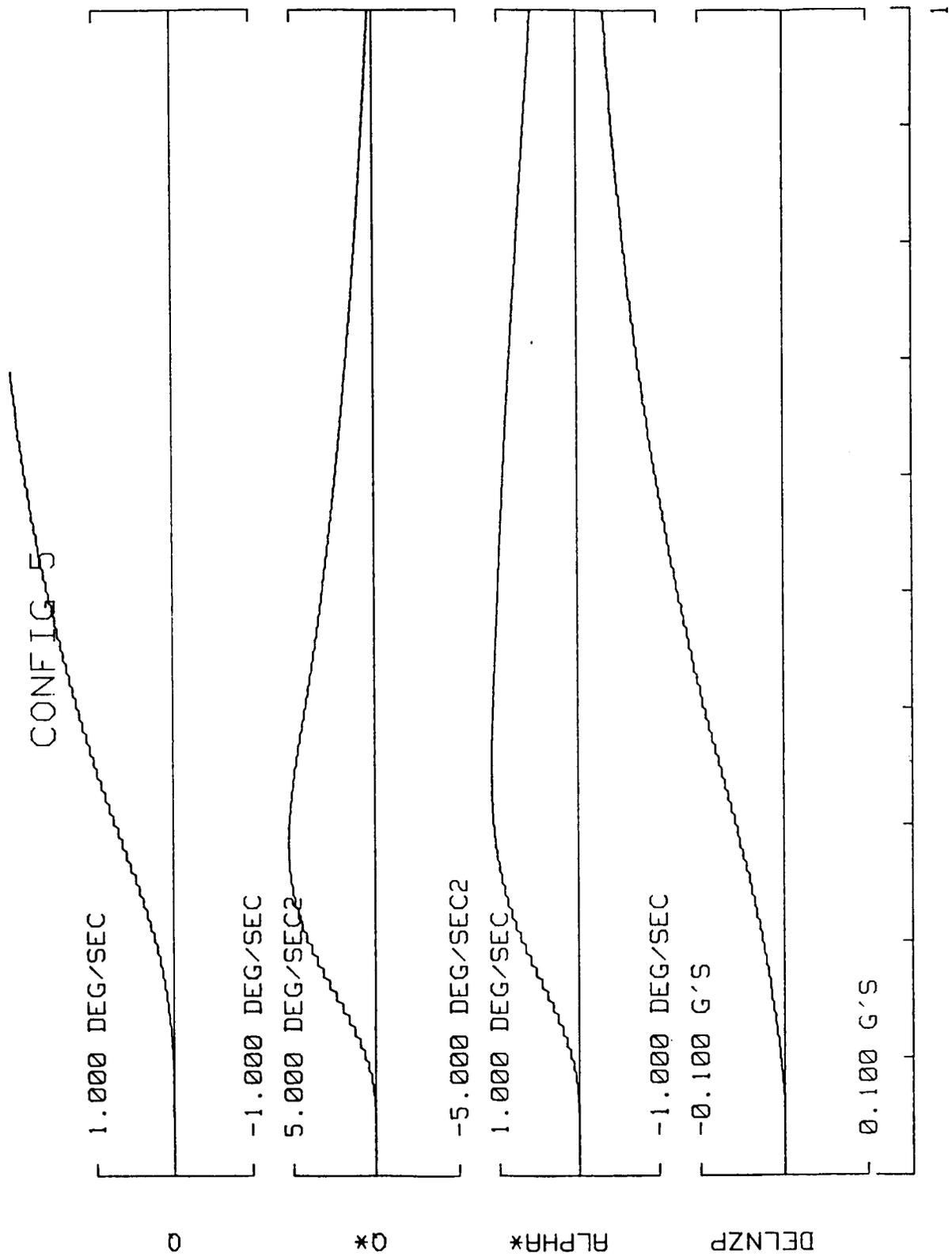


Figure A-31. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 5

CONFIG 6

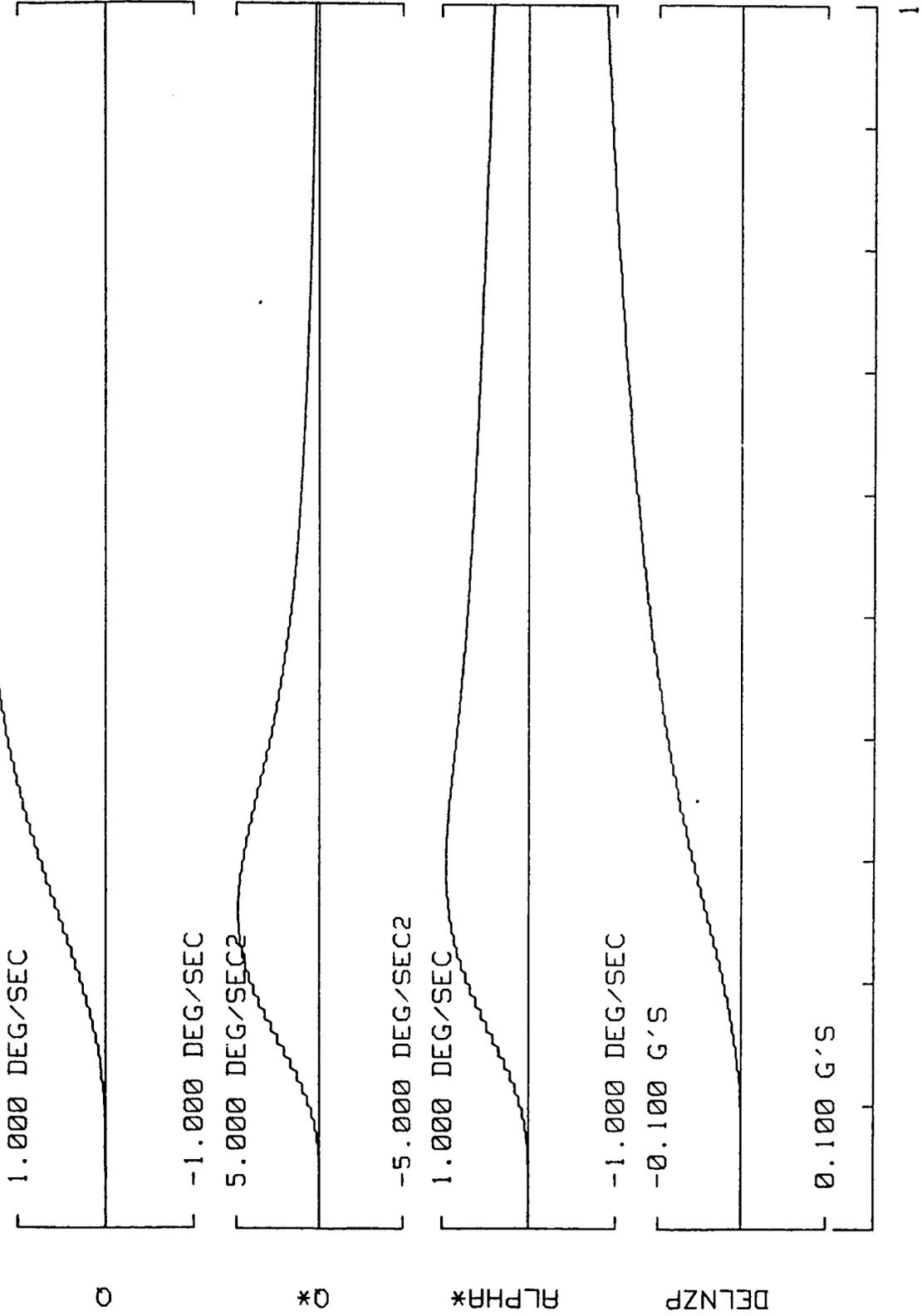


Figure A-32. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 6

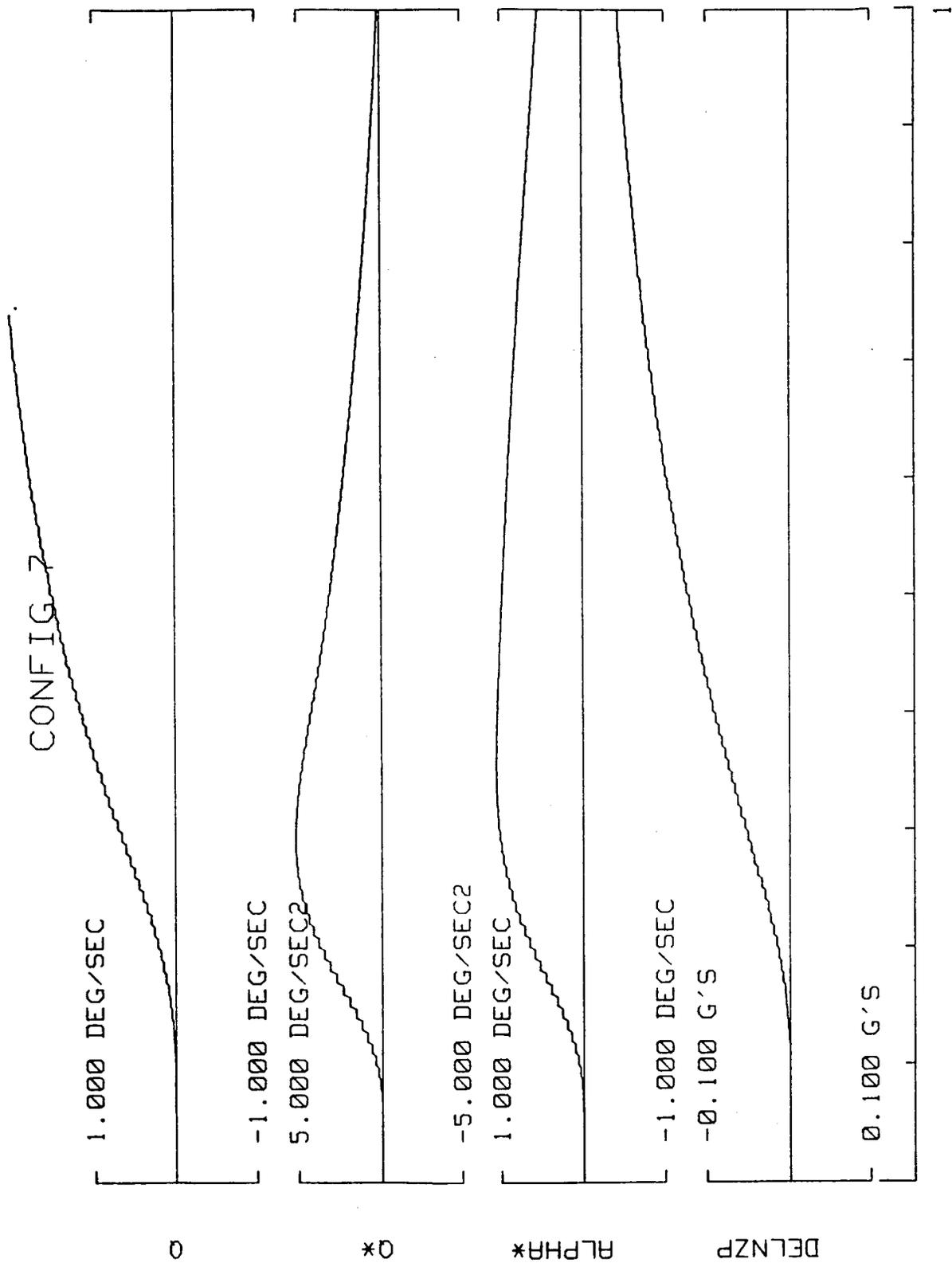


Figure A-33. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 7

CONFIG 8

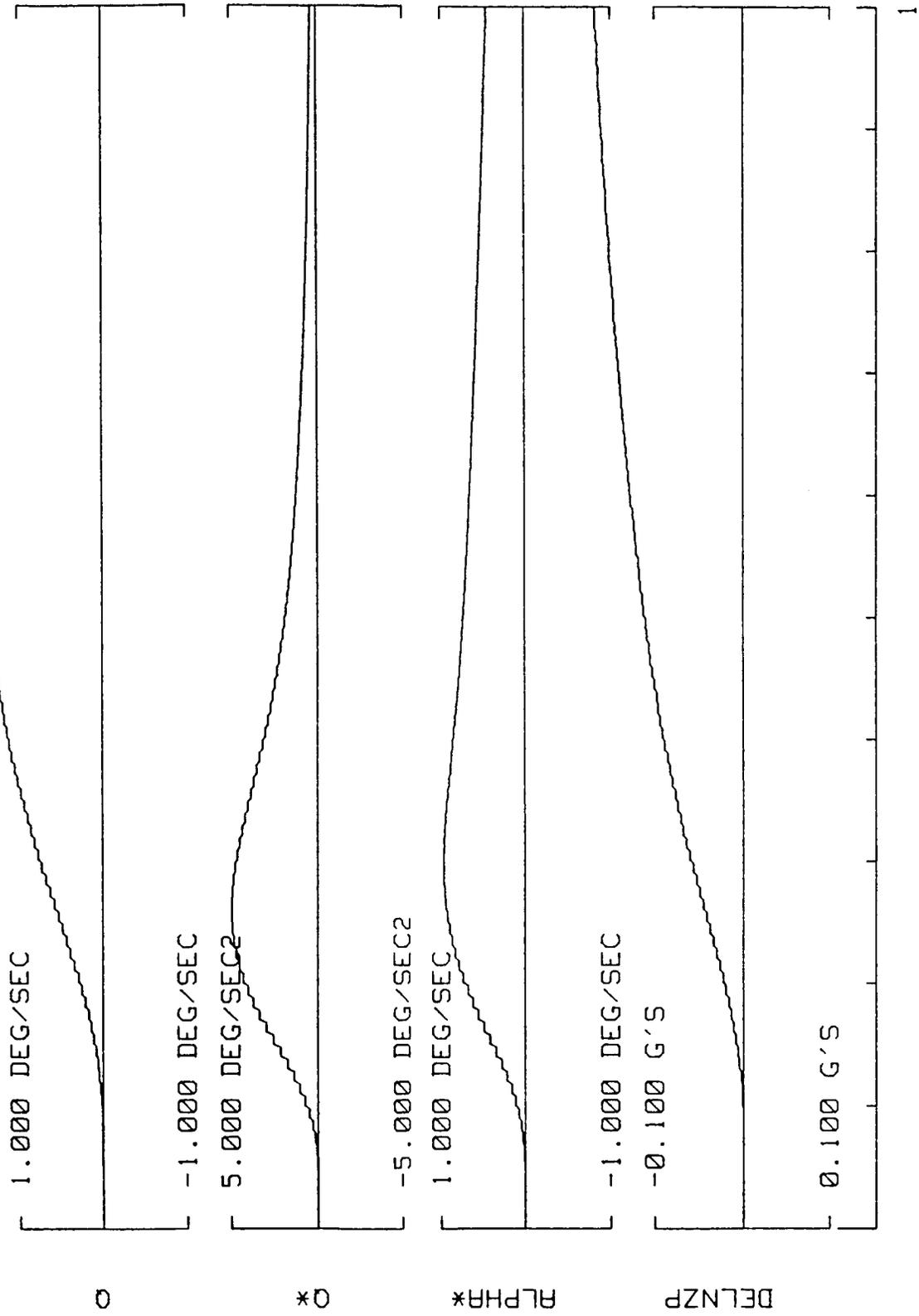


Figure A-34. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 8

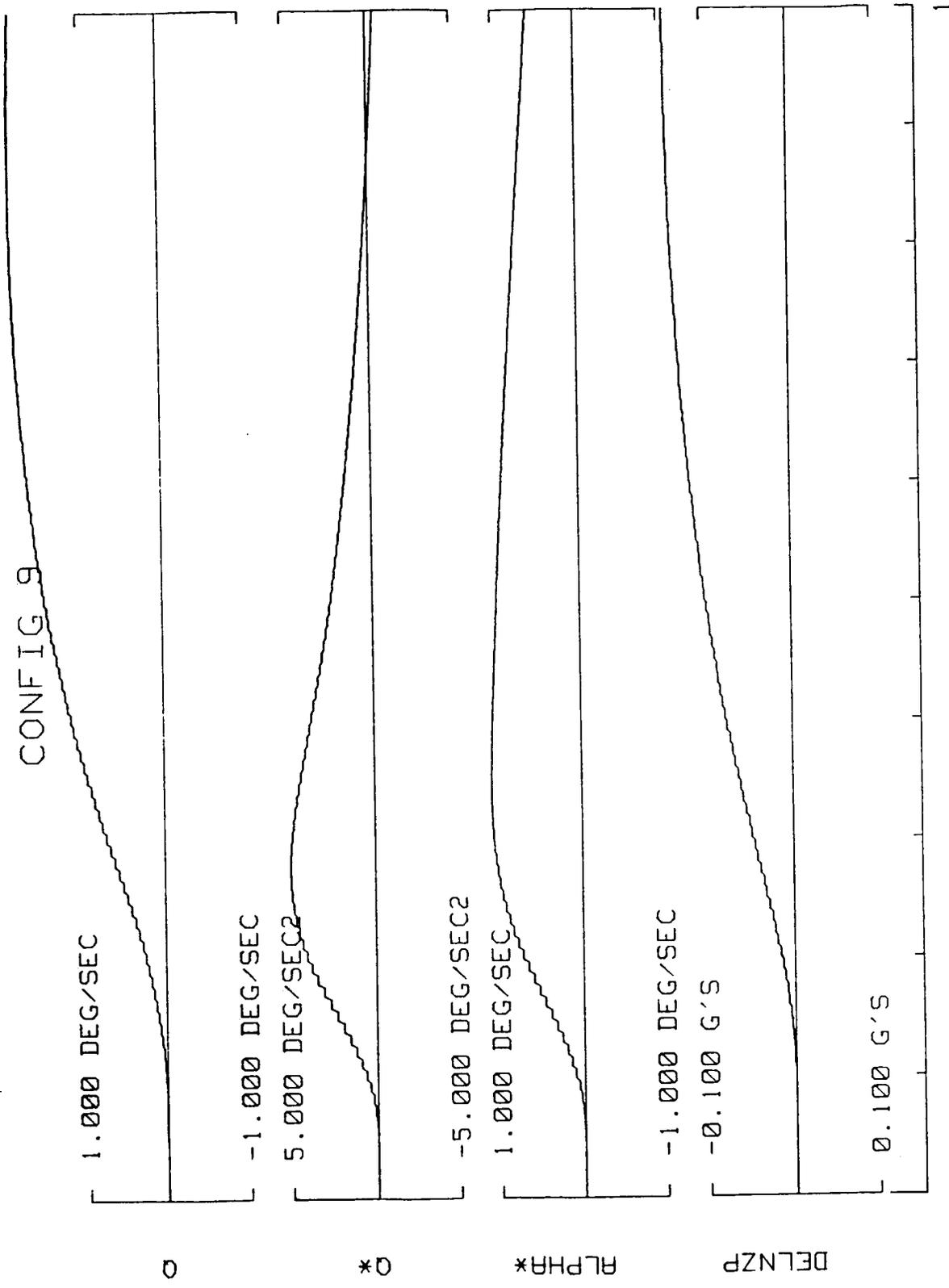


Figure A-35. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 9

CONFIG 10

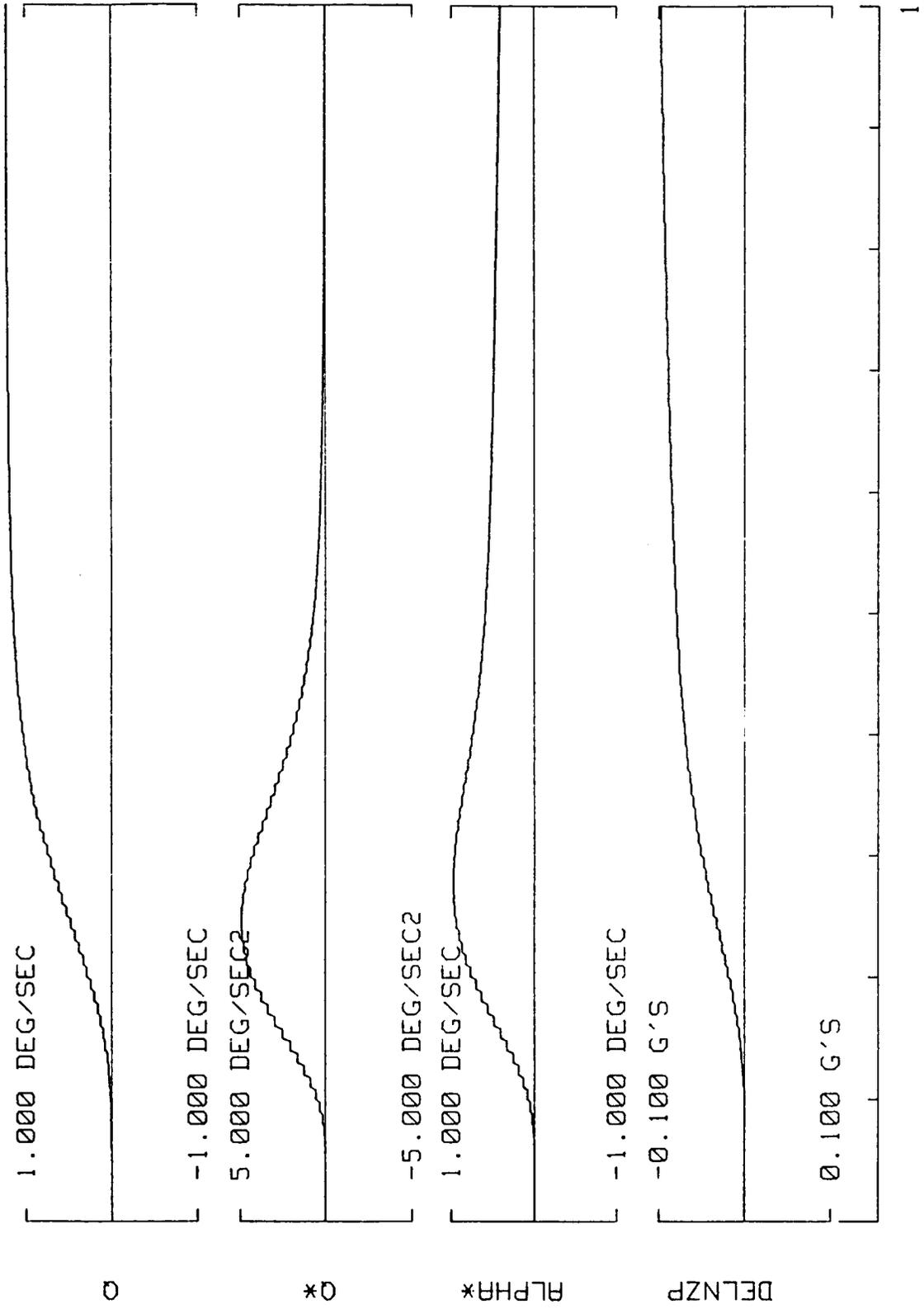


Figure A-36. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 10

CONFIG 11

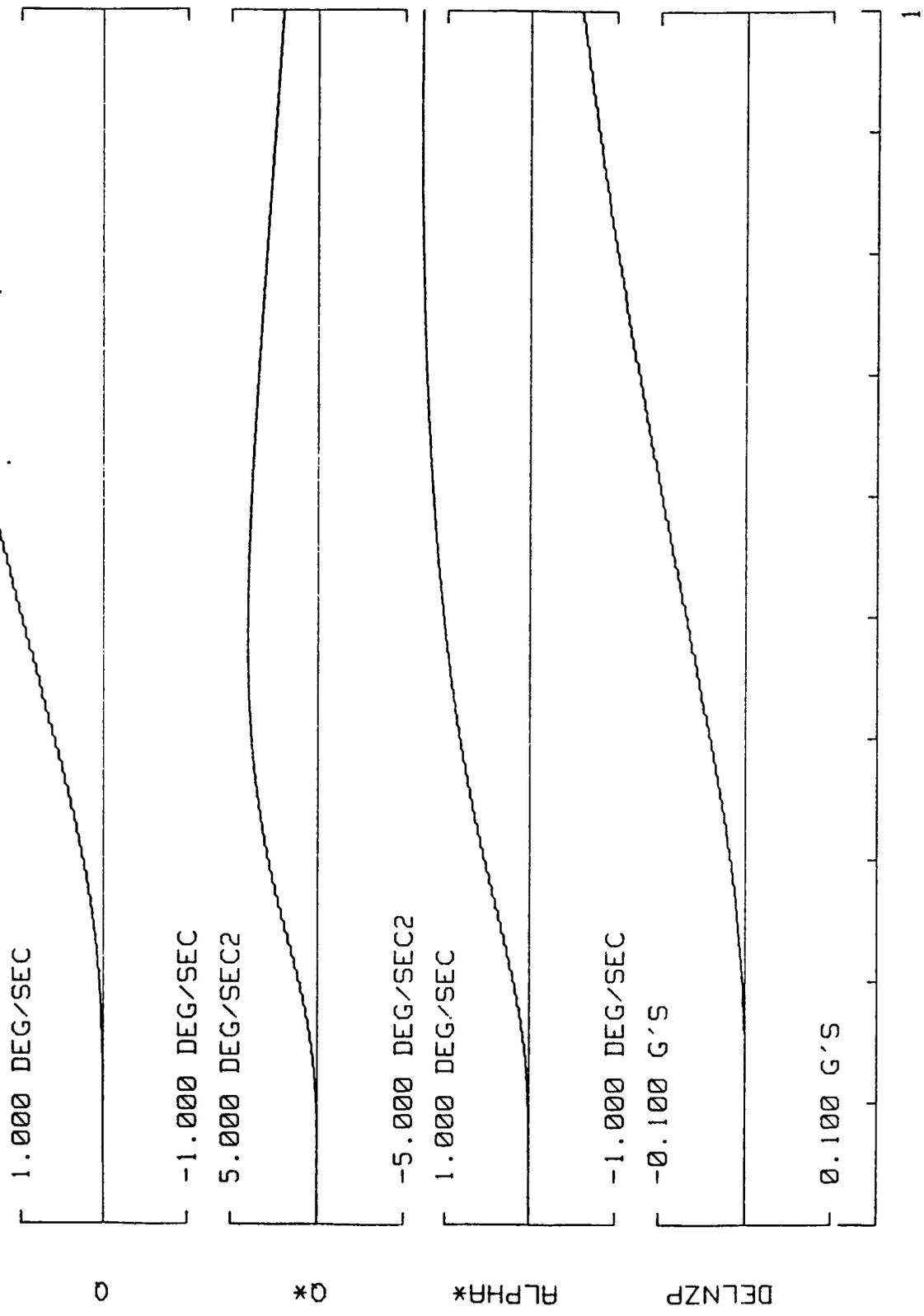


Figure A-37. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 11

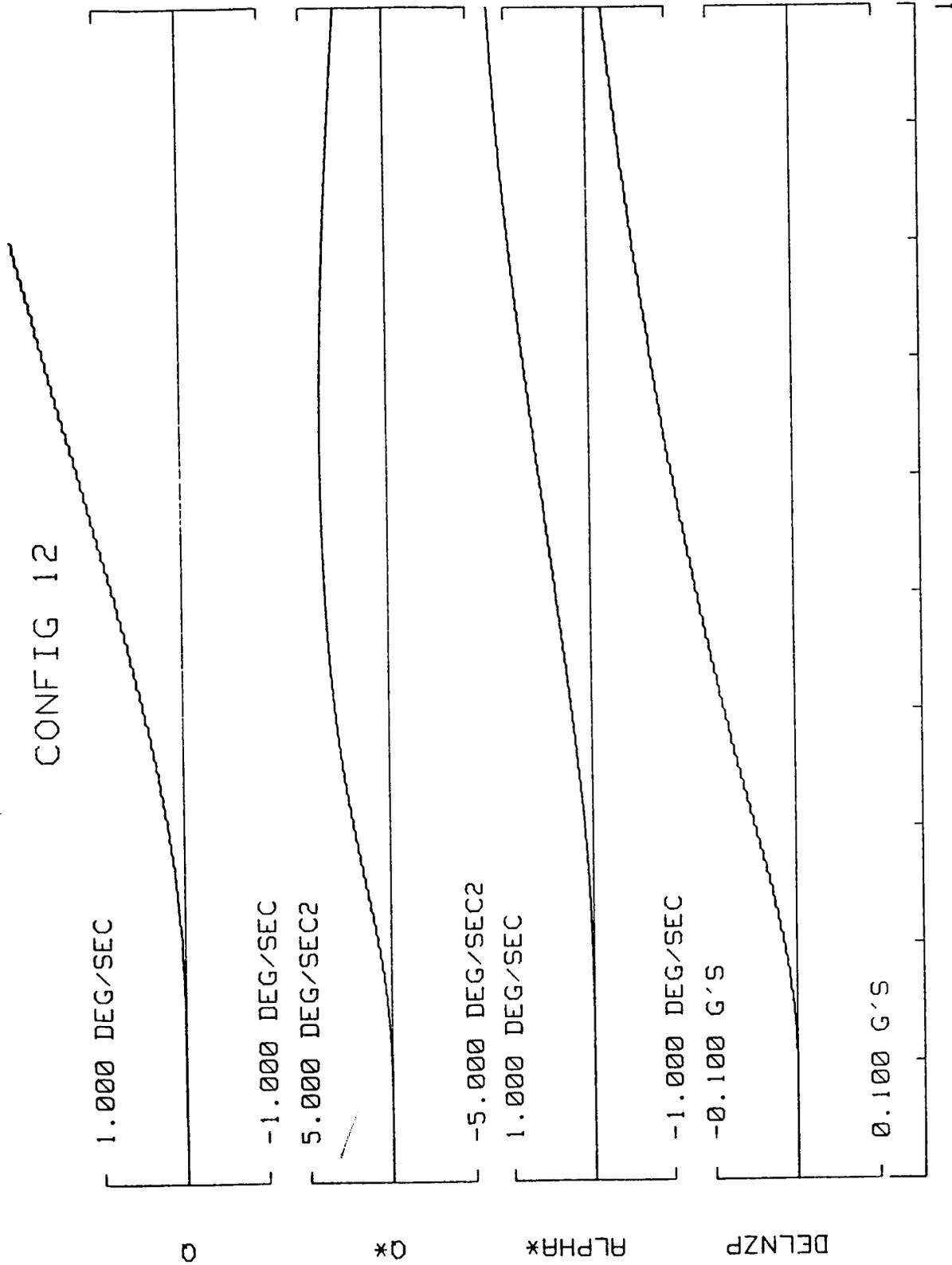


Figure A-38. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 12

CONFIG 13

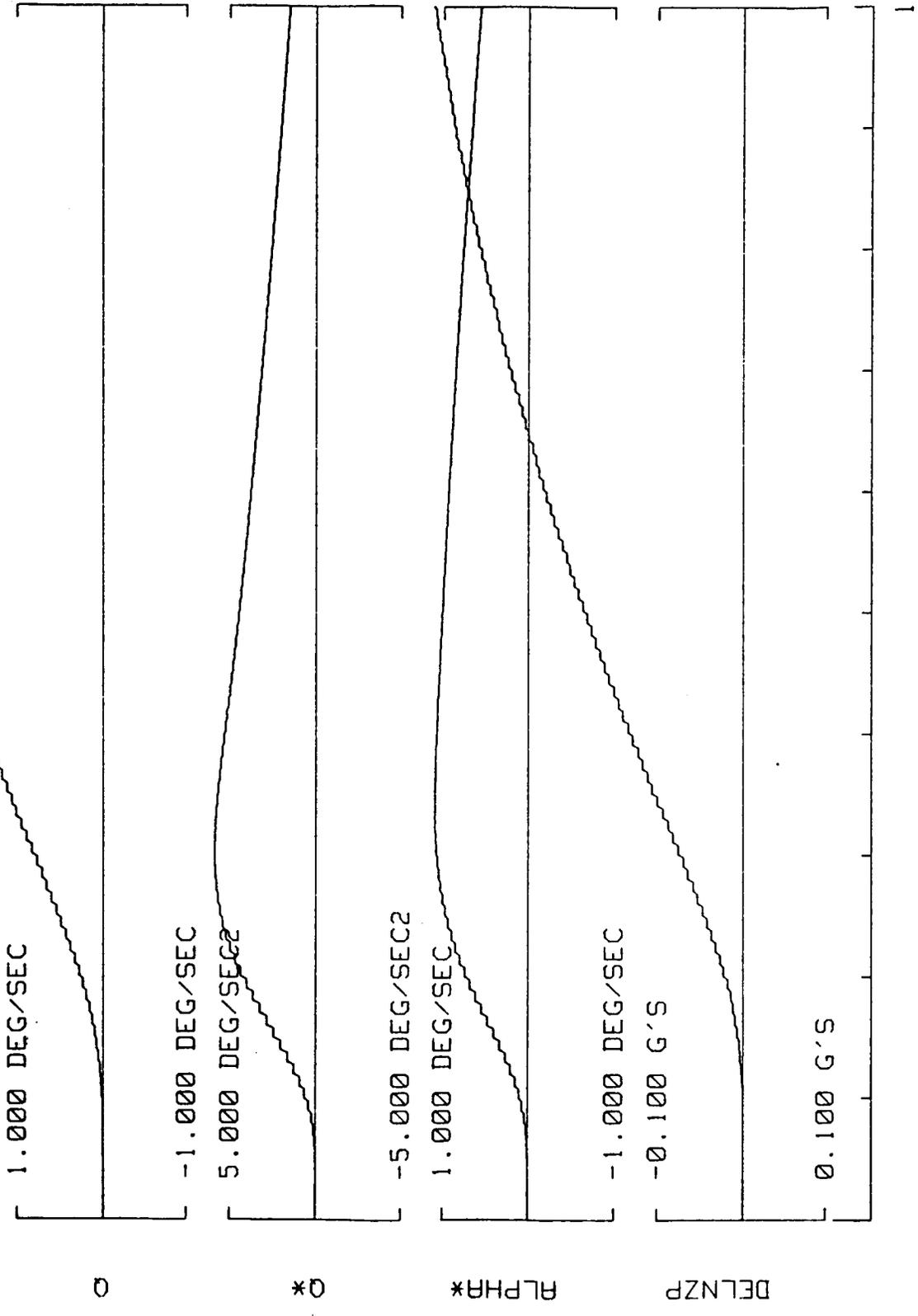


Figure A-39. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 13

CONFIG 14

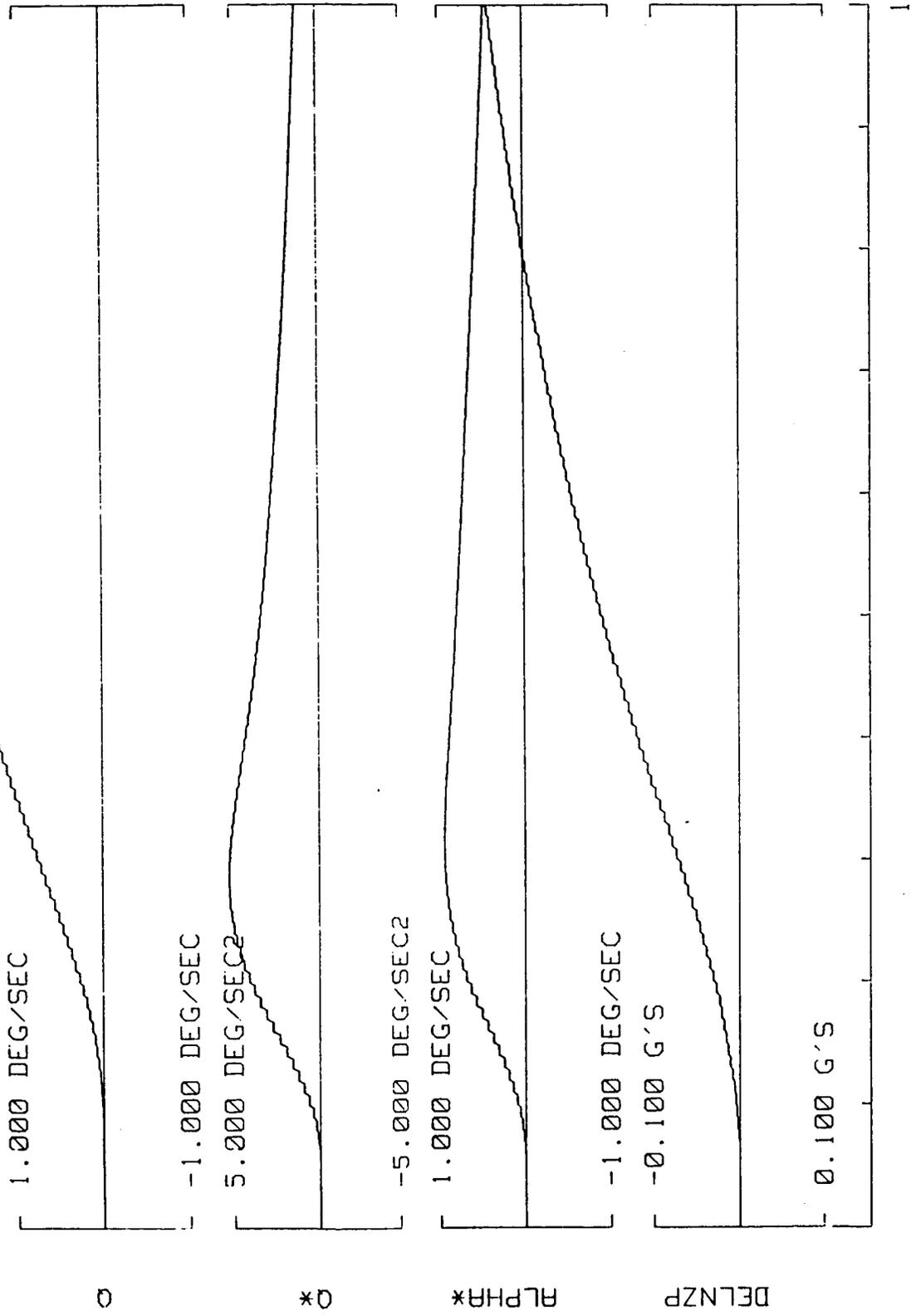


Figure A-40. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 14

CONFIG 16

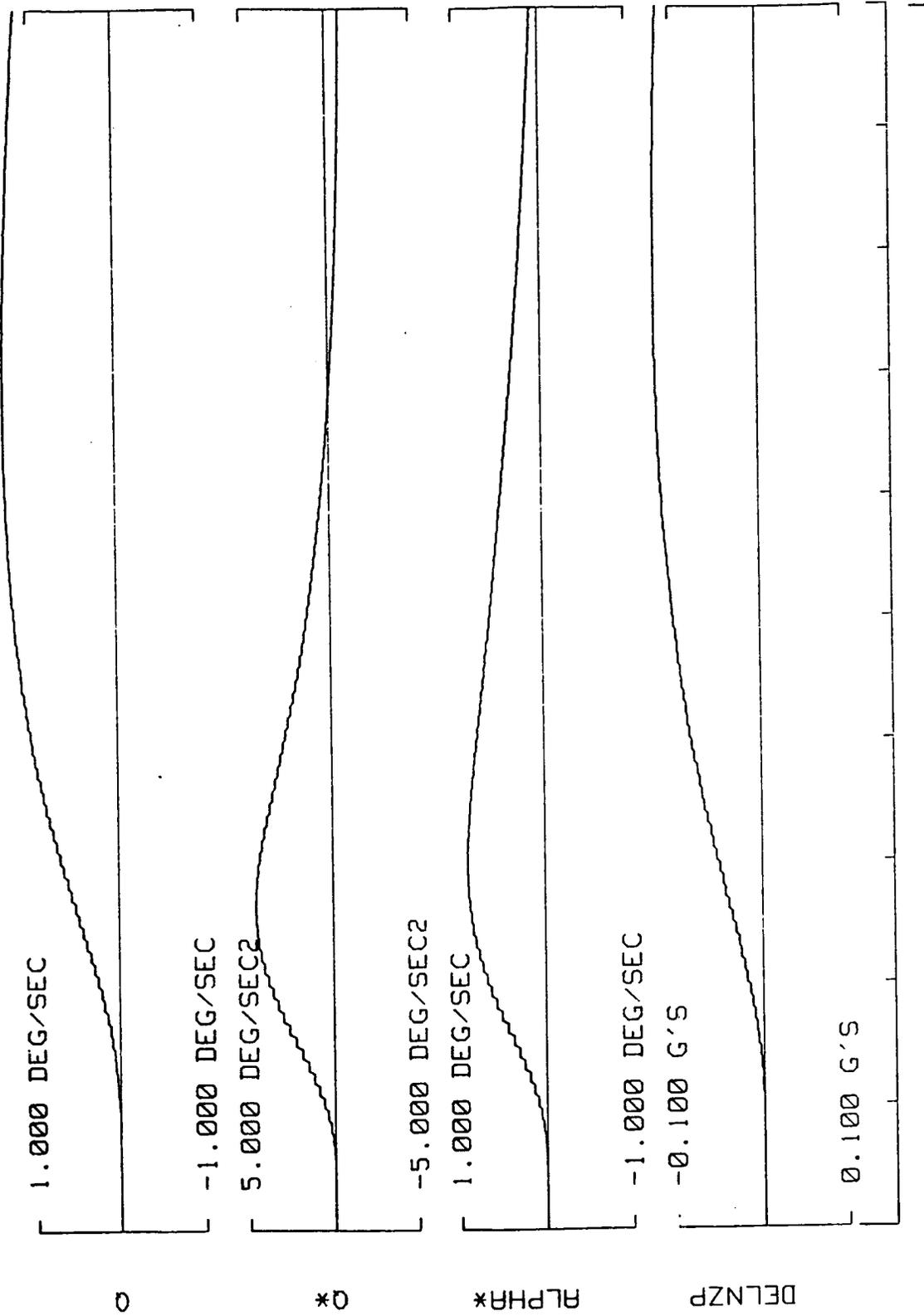


Figure A-41. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 16

CONFIG 17

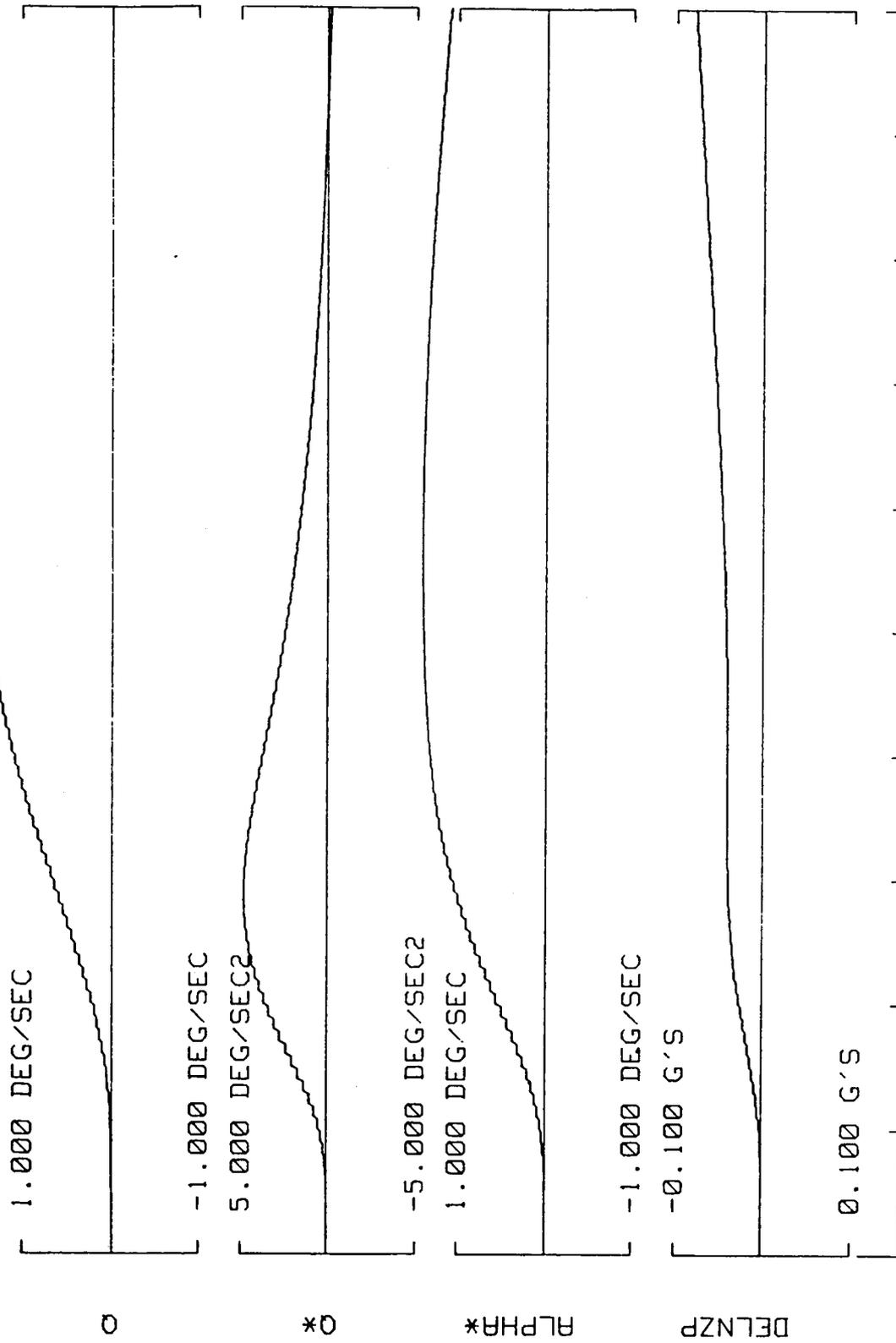


Figure A-42. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 17

CONFIG 17 + LEAD/LAG

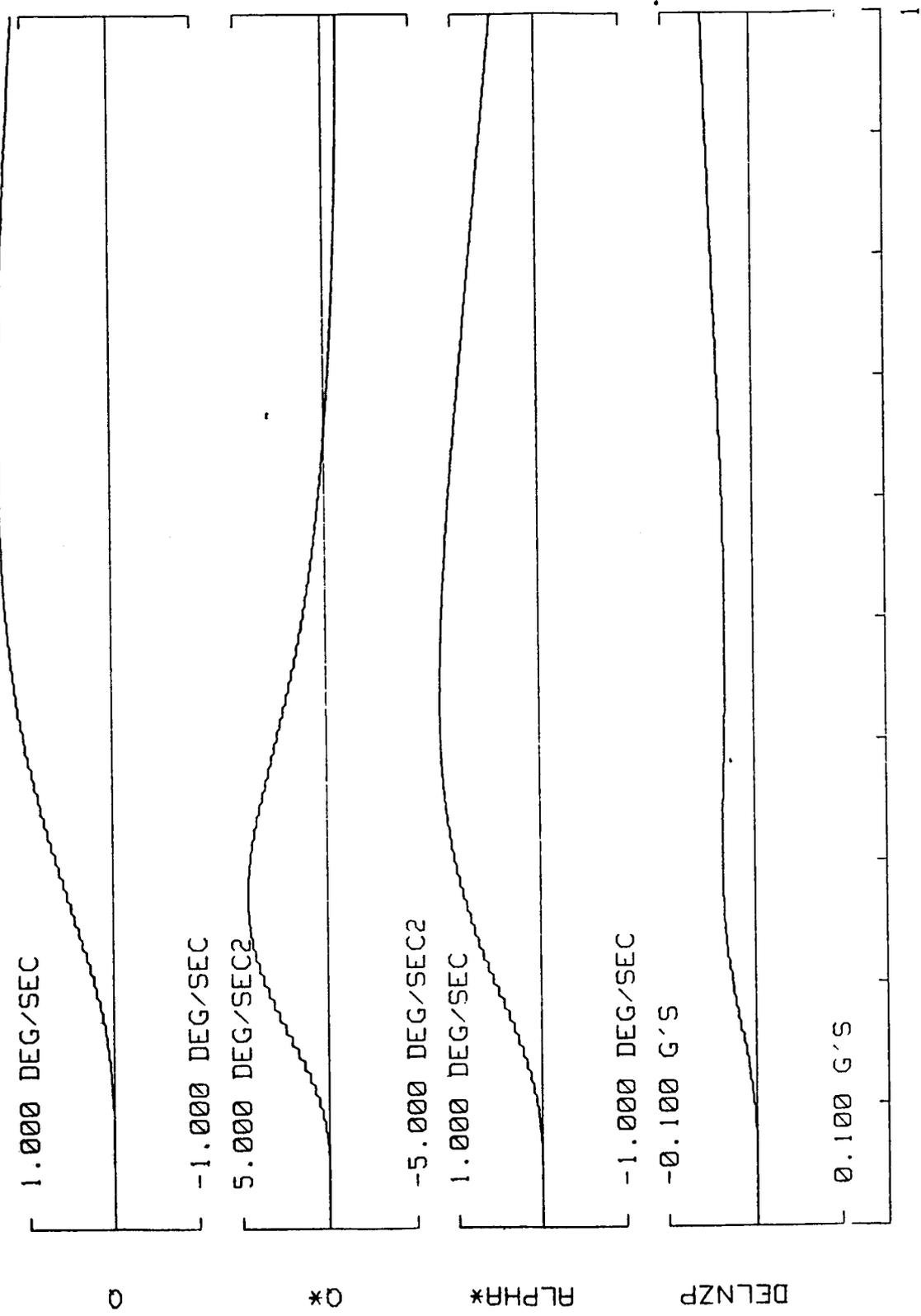


Figure A-43. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 17 + LL

CONFIG 18

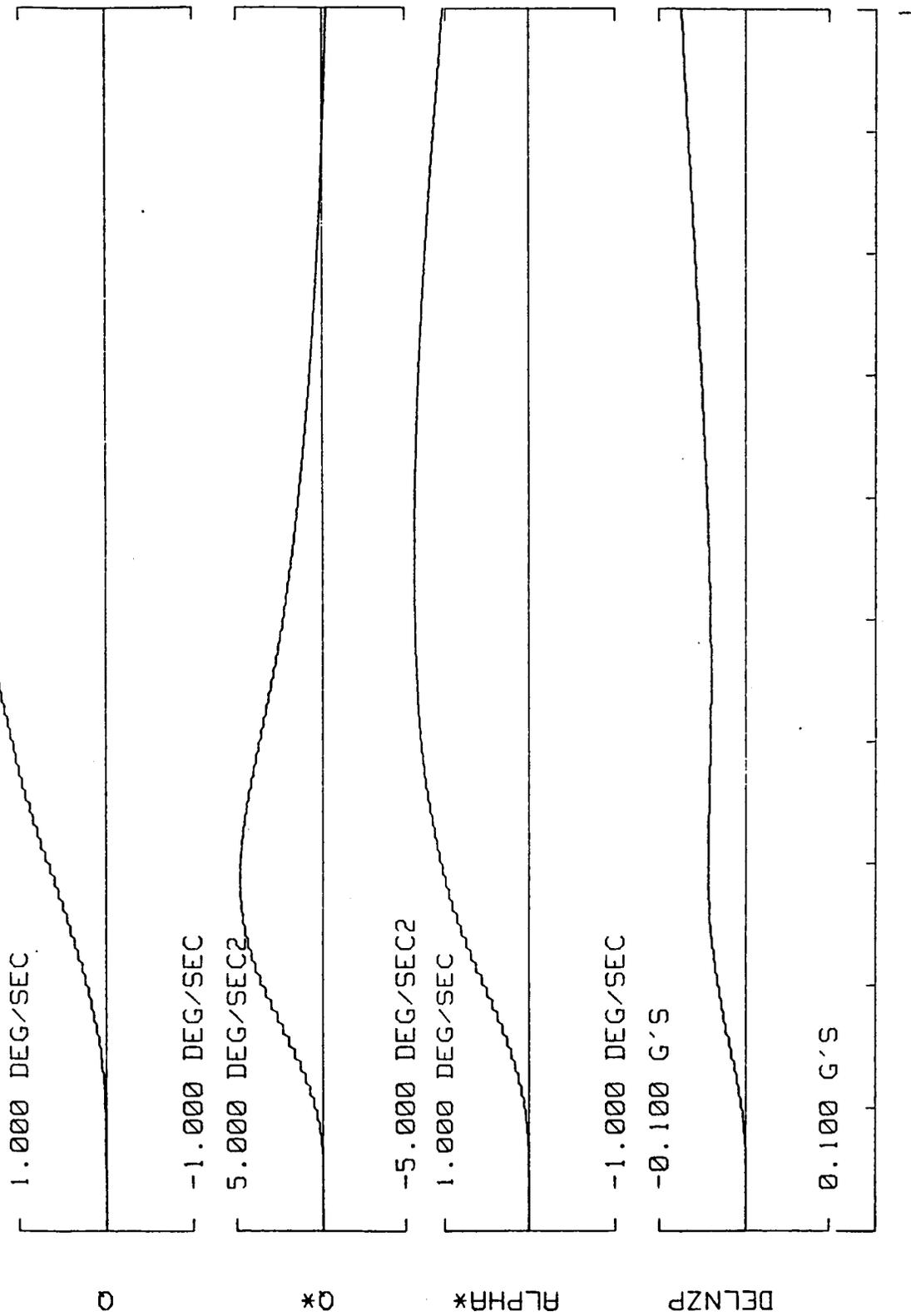


Figure A-44. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 18

CONFIG 19

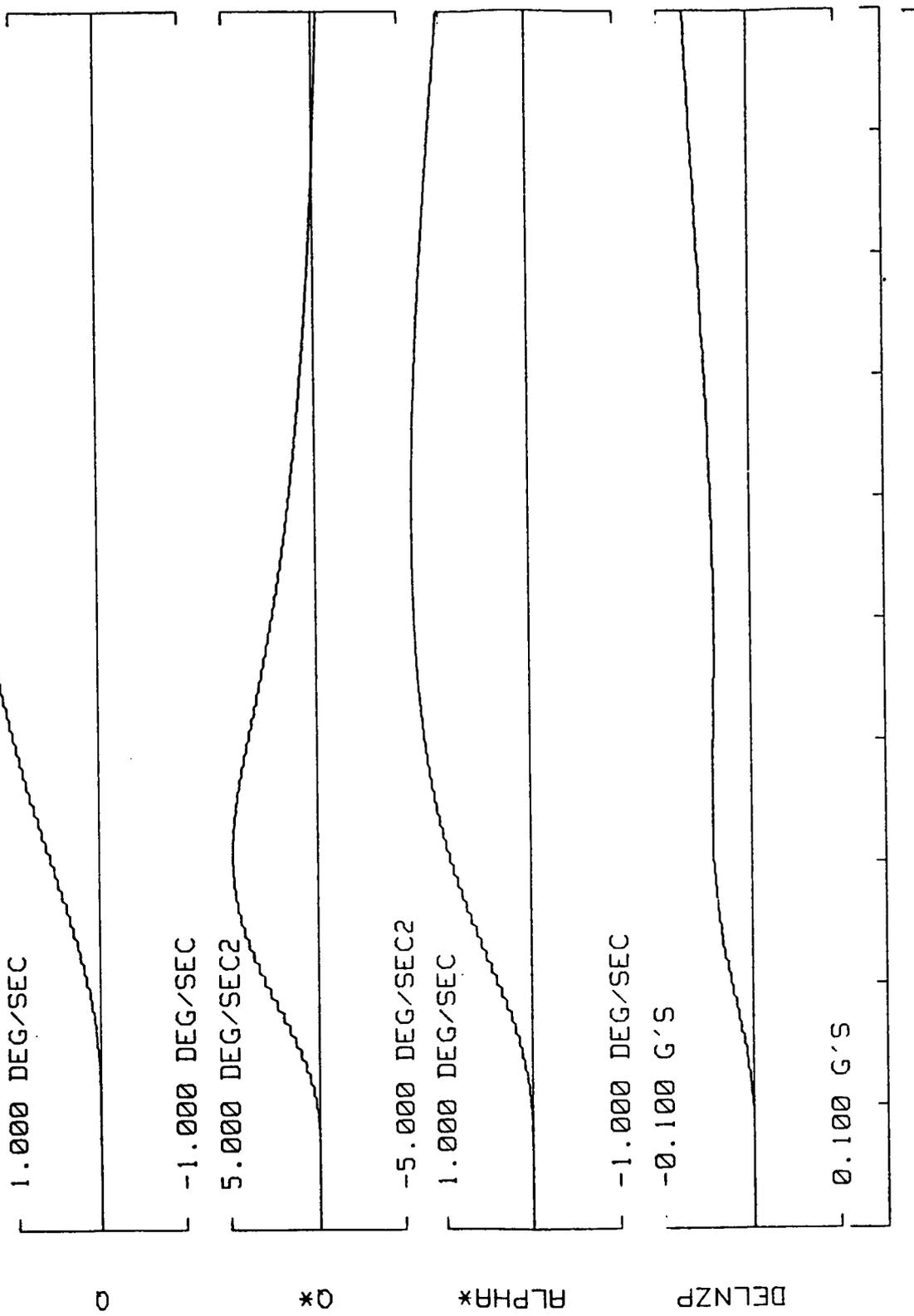


Figure A-45. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 19

CONFIG 20

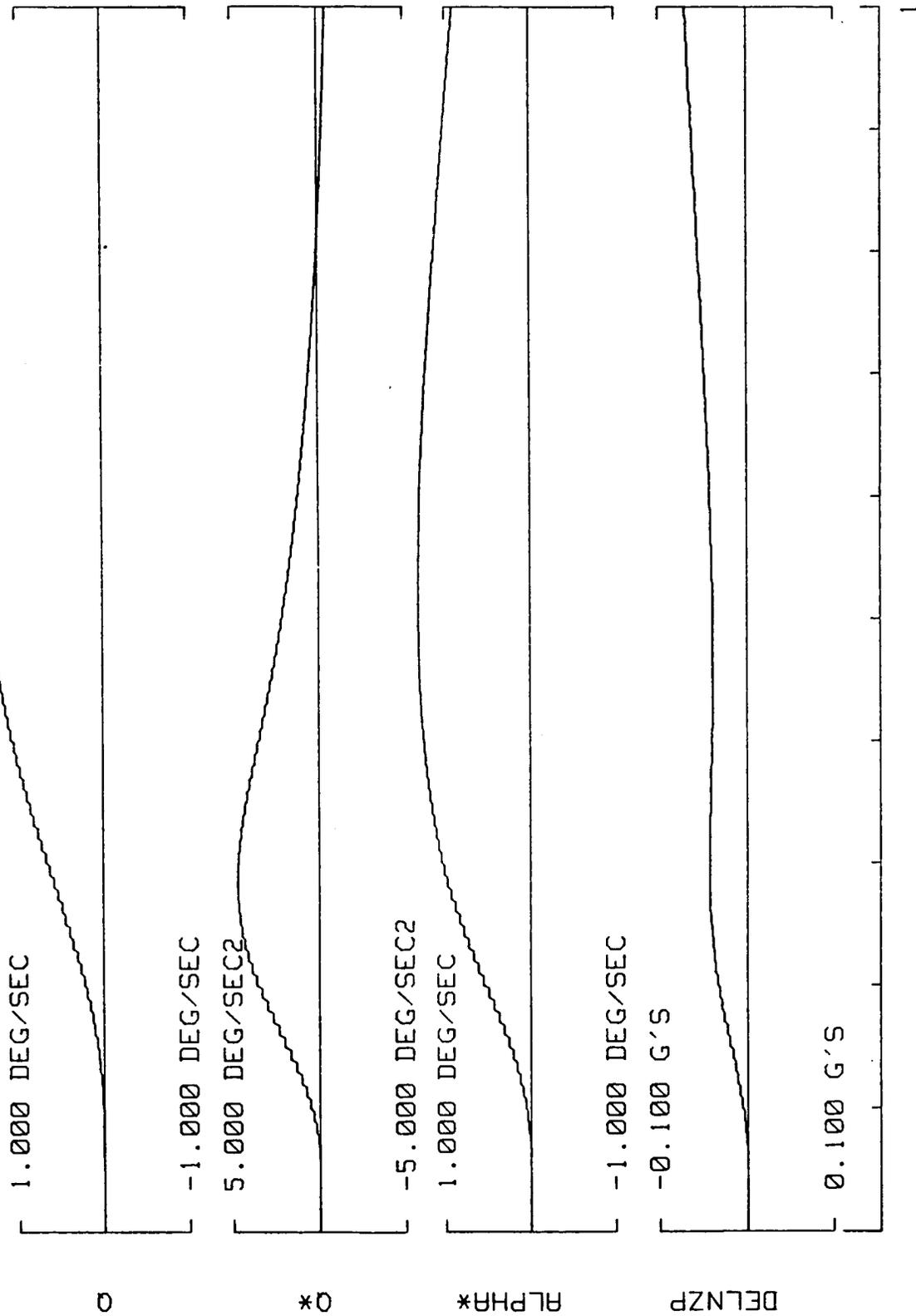


Figure A-46. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 20

CONFIG 24 - Add 100 msec delay  
CONFIG 25 - Add 200 msec delay

· CONFIG 23

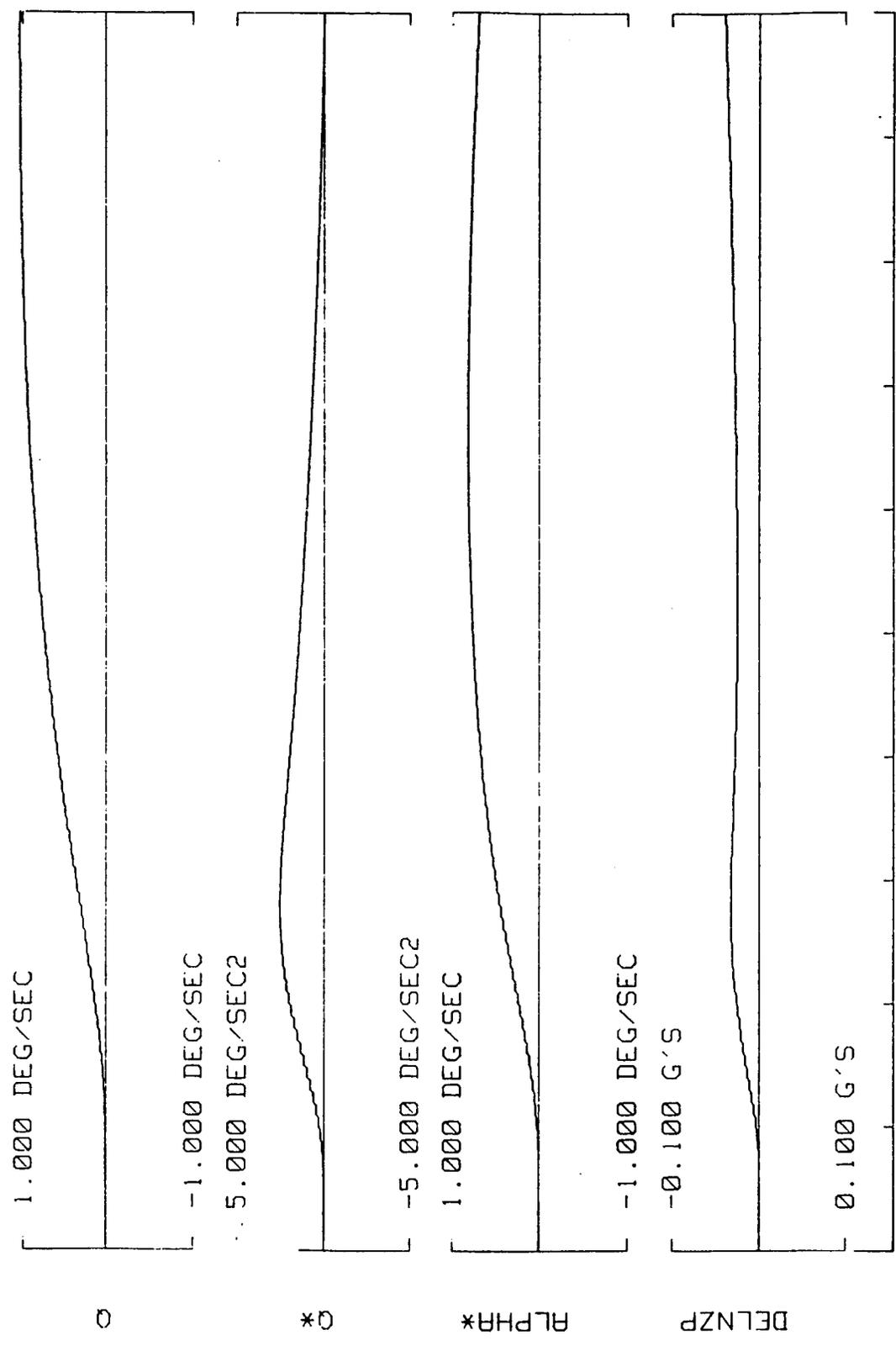


Figure A-47. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 23

CONFIG 27 - Add 100 msec delay  
CONFIG 28 - Add 200 msec delay

CONFIG 26

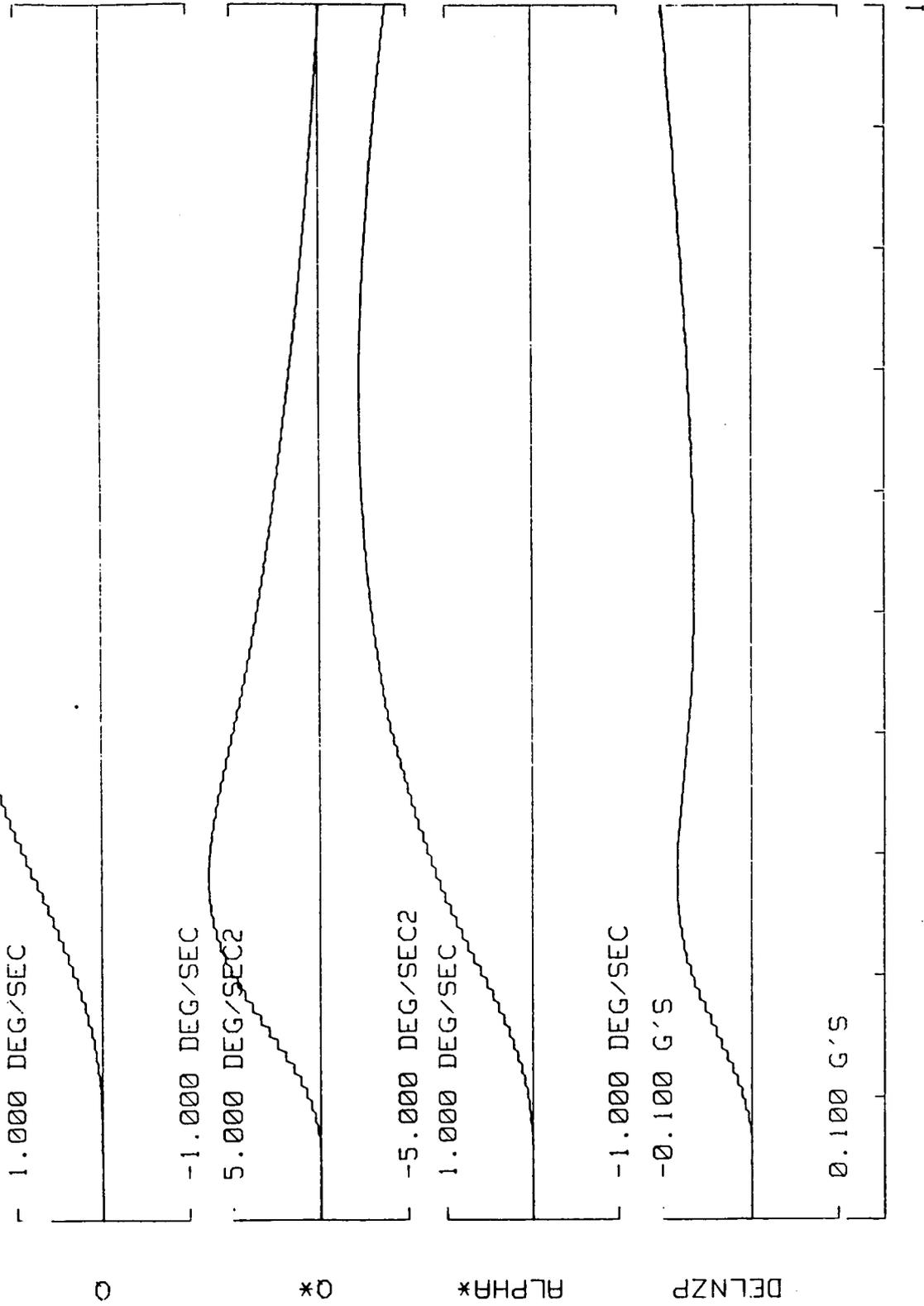


Figure A-48. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 26

CONFIG 24A - Add 100 msec delay  
 CONFIG 25A - Add 200 msec delay

CONFIG 23A

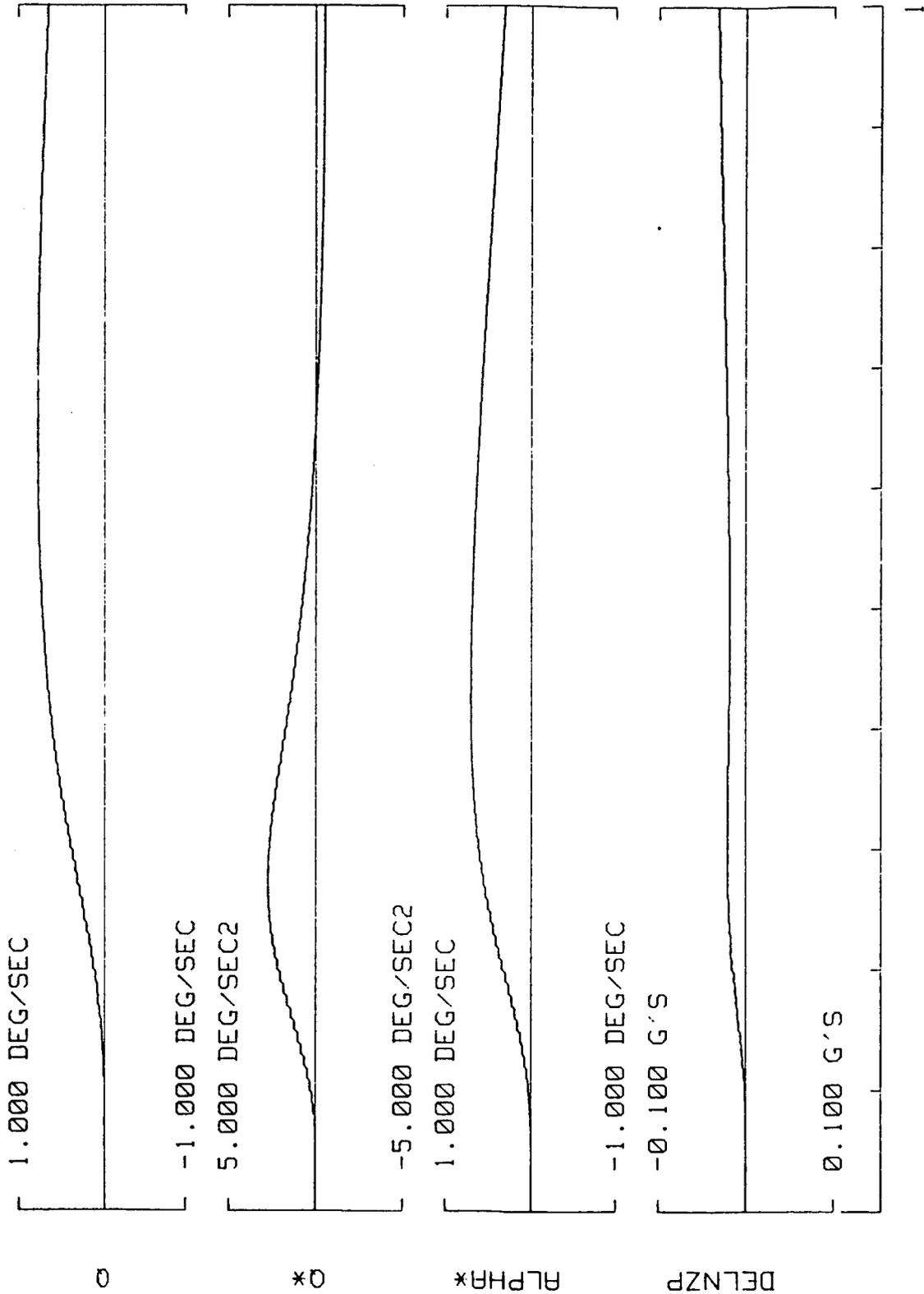


Figure A-49. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 23A

CONFIG 27A - Add 100 msec delay  
CONFIG 28A - Add 200 msec delay

CONFIG 26A

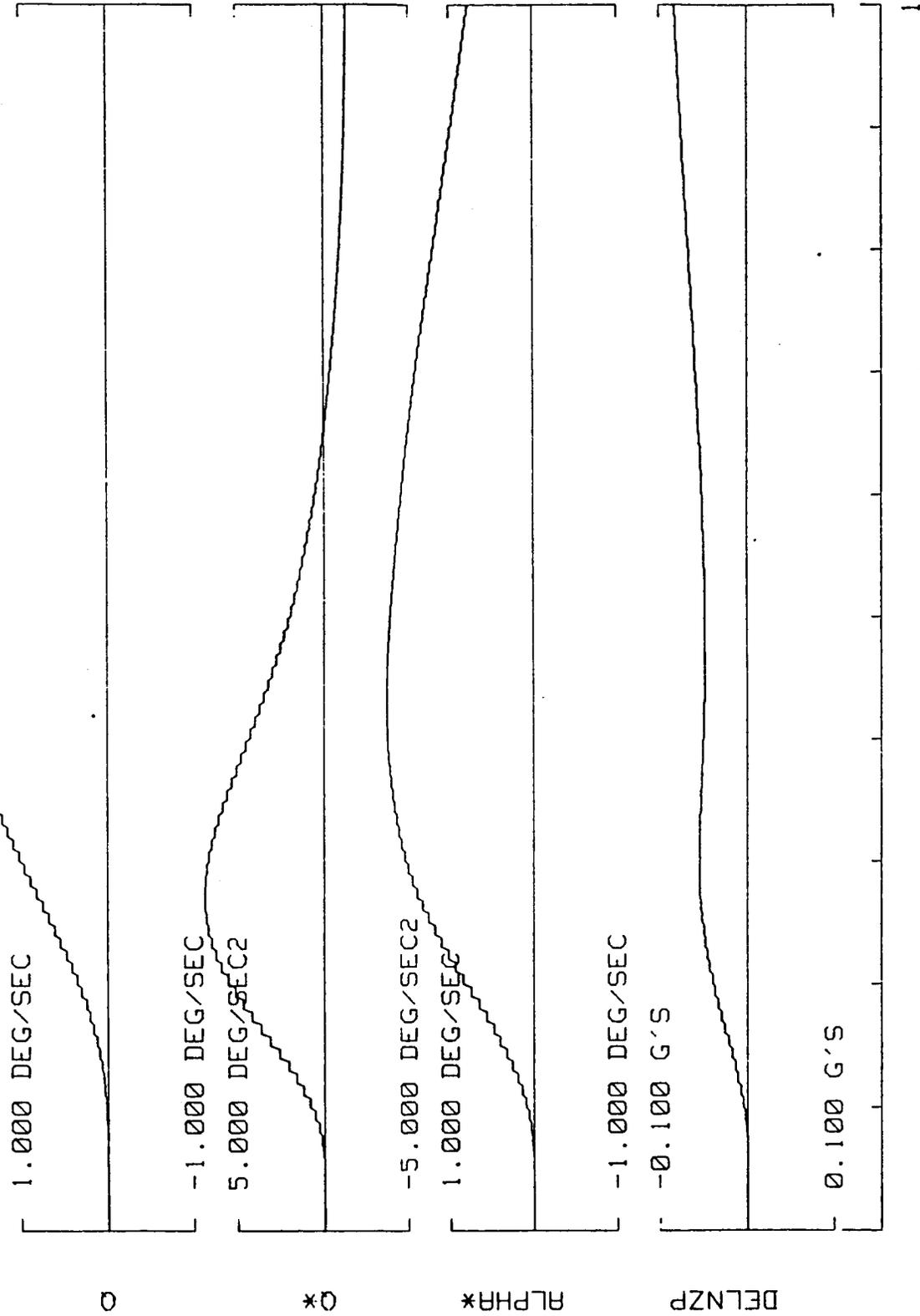


Figure A-50. PITCH STEP RESPONSE (EXPANDED TIME SCALE) - CONFIGURATION 26A

Appendix B  
THROTTLE STEP RESPONSES

This appendix presents the throttle step responses for the experiment configurations. They are responses for a 10% throttle step input held in for 10 seconds and then back to trim for 10 seconds. Presented are the following responses:

Q	-	q, pitch rate
DALPHA	-	$\Delta\alpha$ , incremental angle of attack
DELNZIP	-	$\Delta n_{z_p}$ , incremental normal acceleration at pilot station
PLA	-	power level angle command
DTHETA	-	$\Delta\theta$ , incremental pitch attitude
GAMMA	-	$\gamma$ , flight path angle
DELTA V	-	$\Delta V$ , incremental speed

CONFIG 1

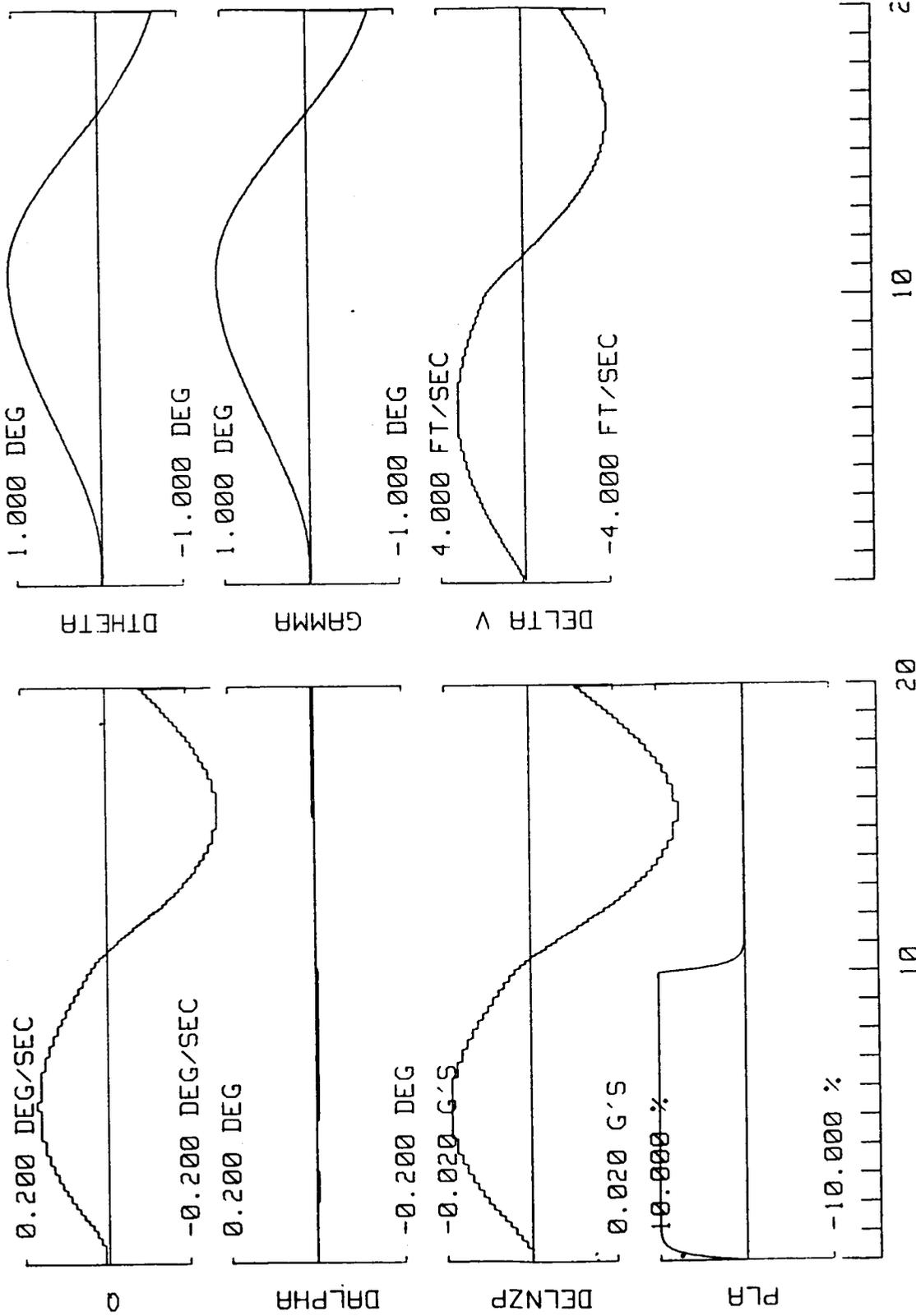


Figure B-1. THROTTLE STEP RESPONSE - CONFIGURATION 1

CONFIG 2

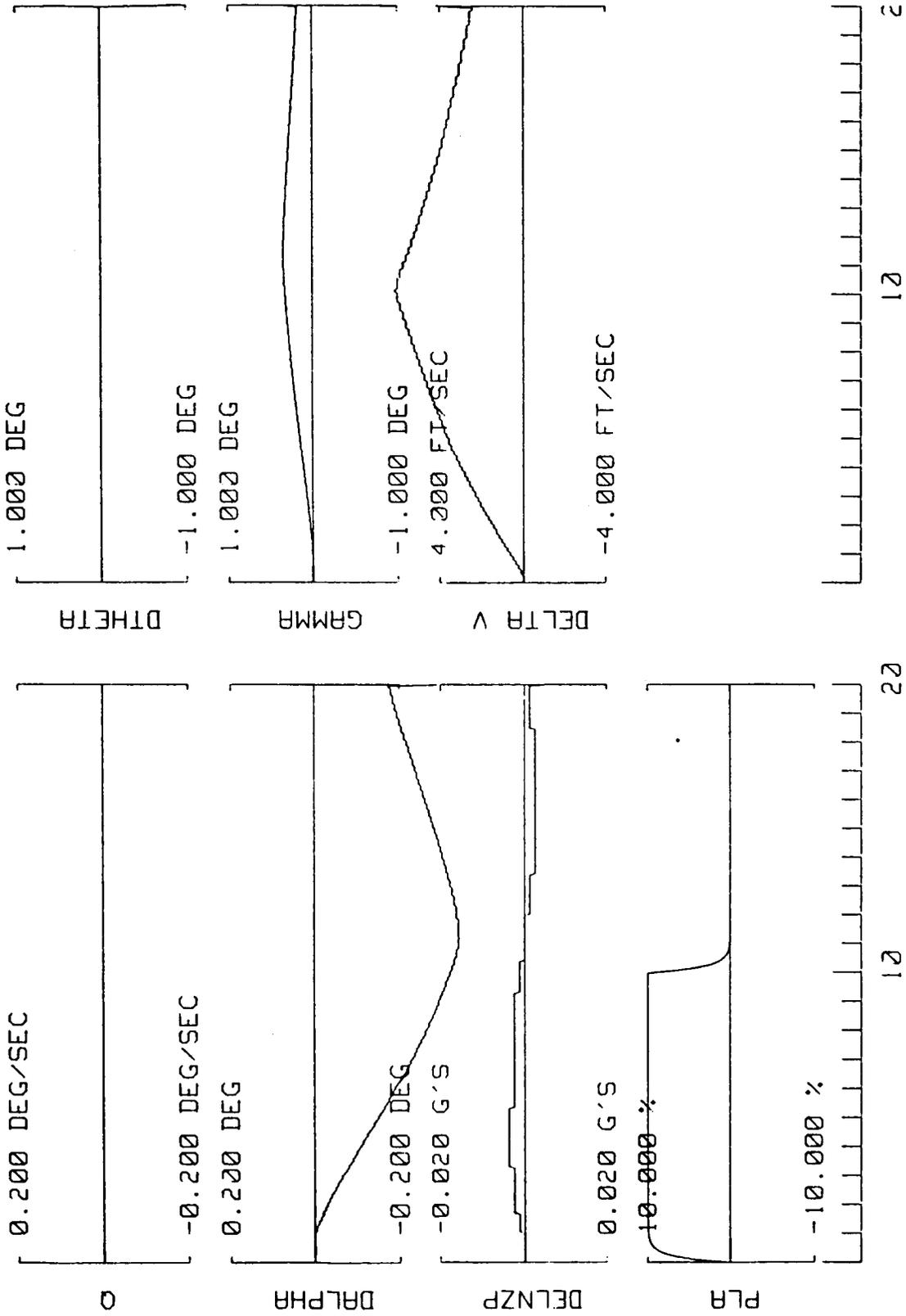


Figure B-2. THROTTLE STEP RESPONSE - CONFIGURATION 2

CONFIG 3

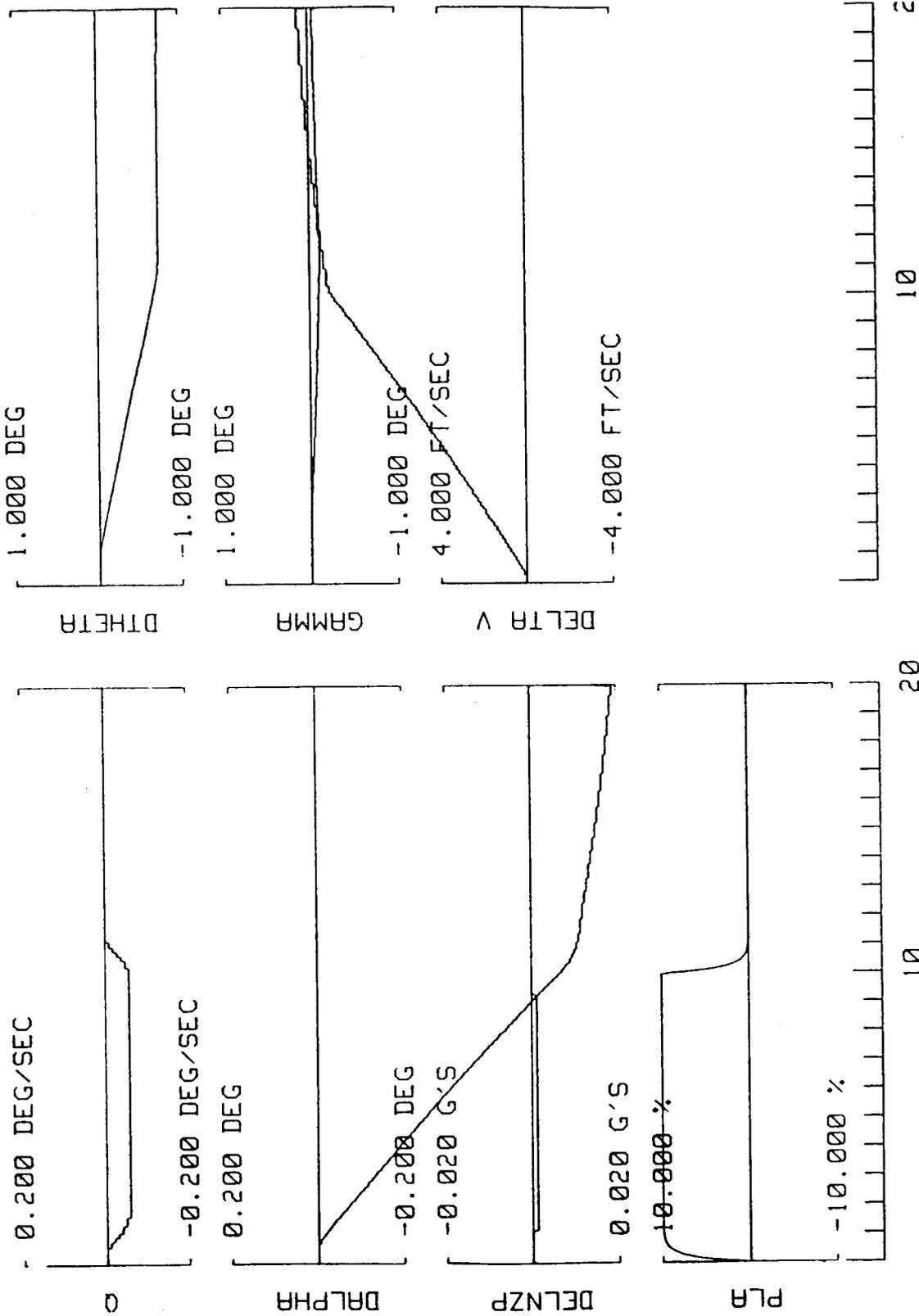


Figure B-3. THROTTLE STEP RESPONSE - CONFIGURATION 3

CONFIG 4

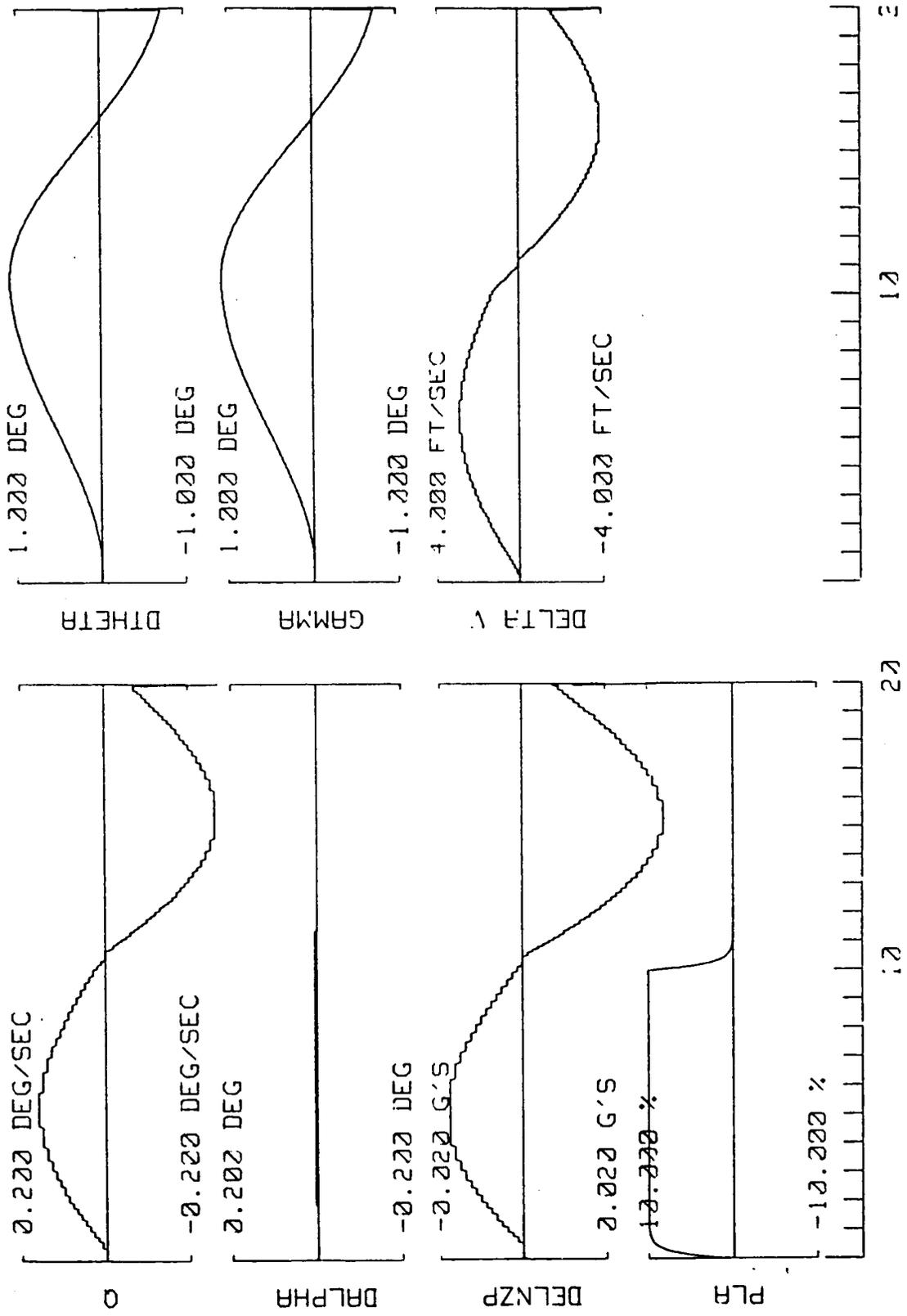


Figure B-4. THROTTLE STEP RESPONSE - CONFIGURATION 4

CONFIG 5

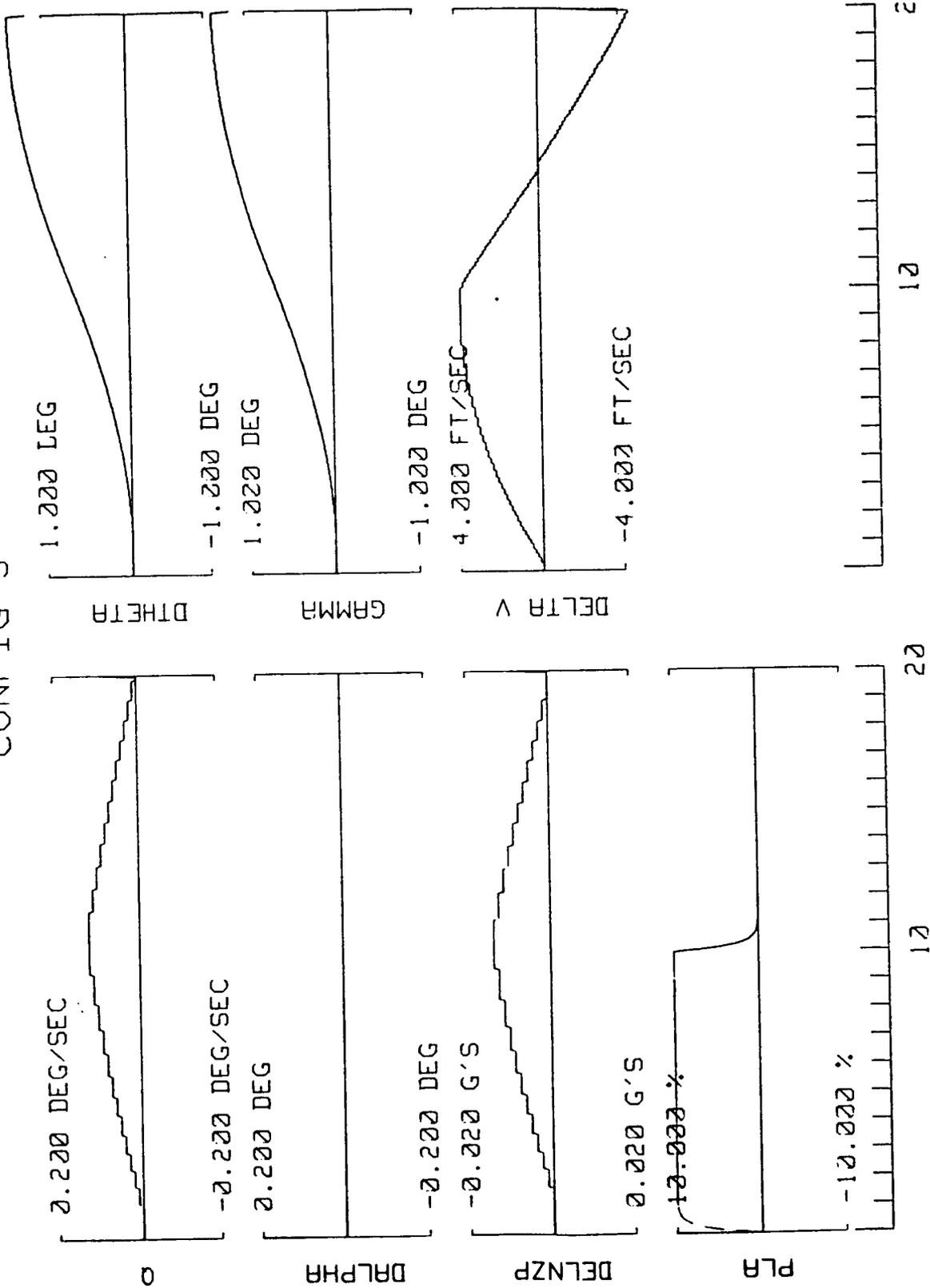


Figure B-5. THROTTLE STEP RESPONSE - CONFIGURATION 5

CONFIG 6

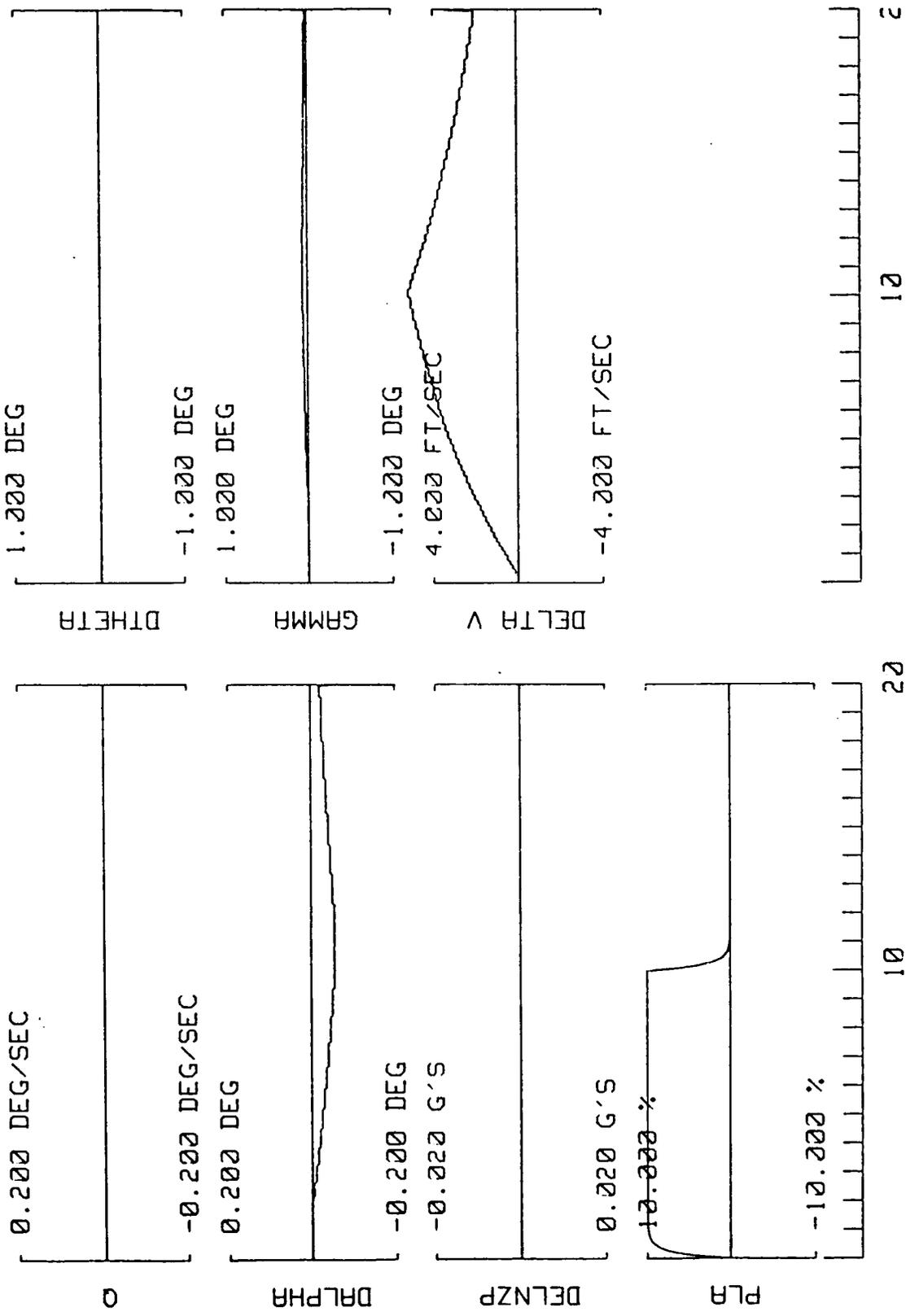


Figure B-6. THROTTLE STEP RESPONSE - CONFIGURATION 6

· CONFIG 7

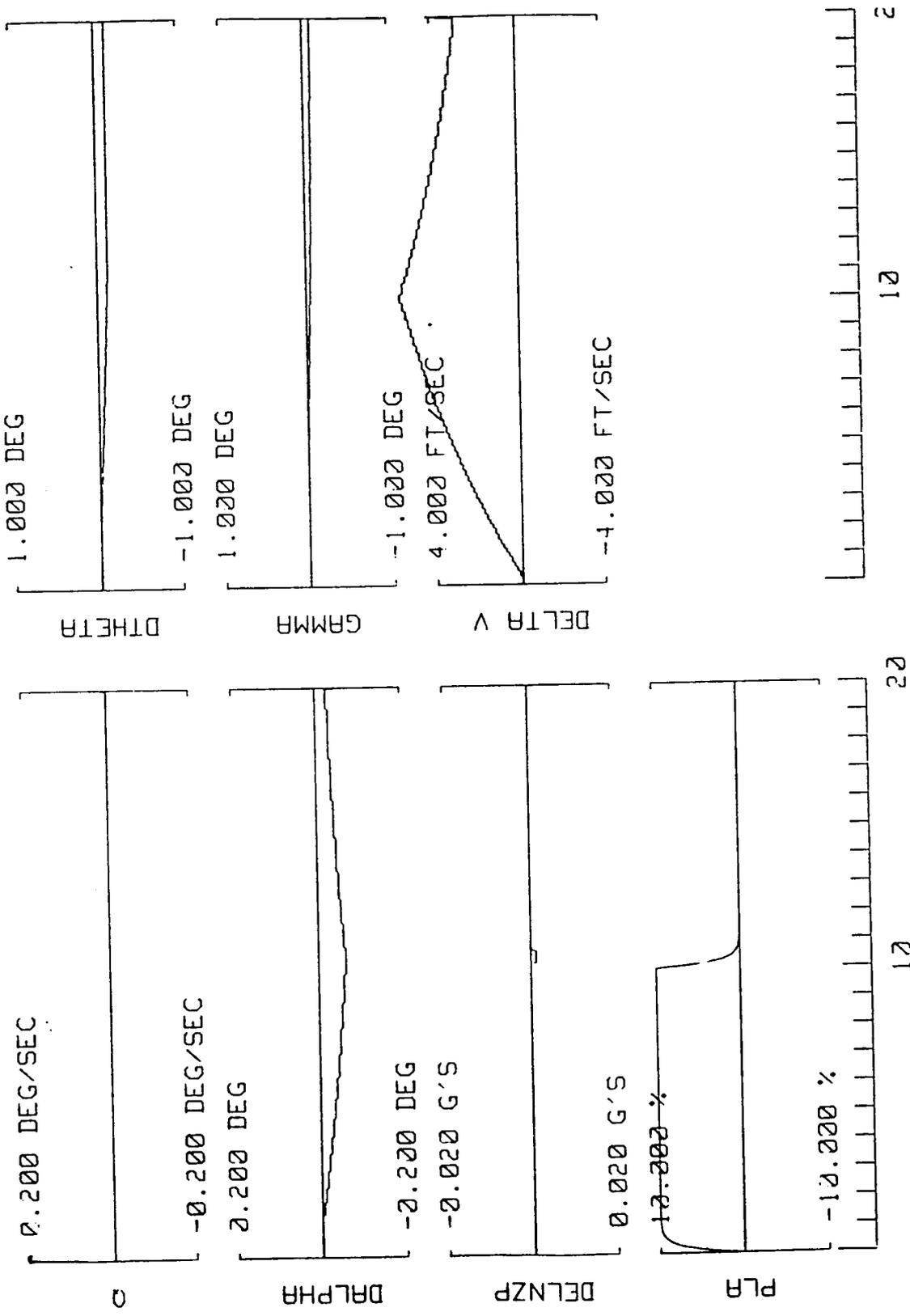


Figure B-7. THROTTLE STEP RESPONSE - CONFIGURATION 7

CONFIG 8

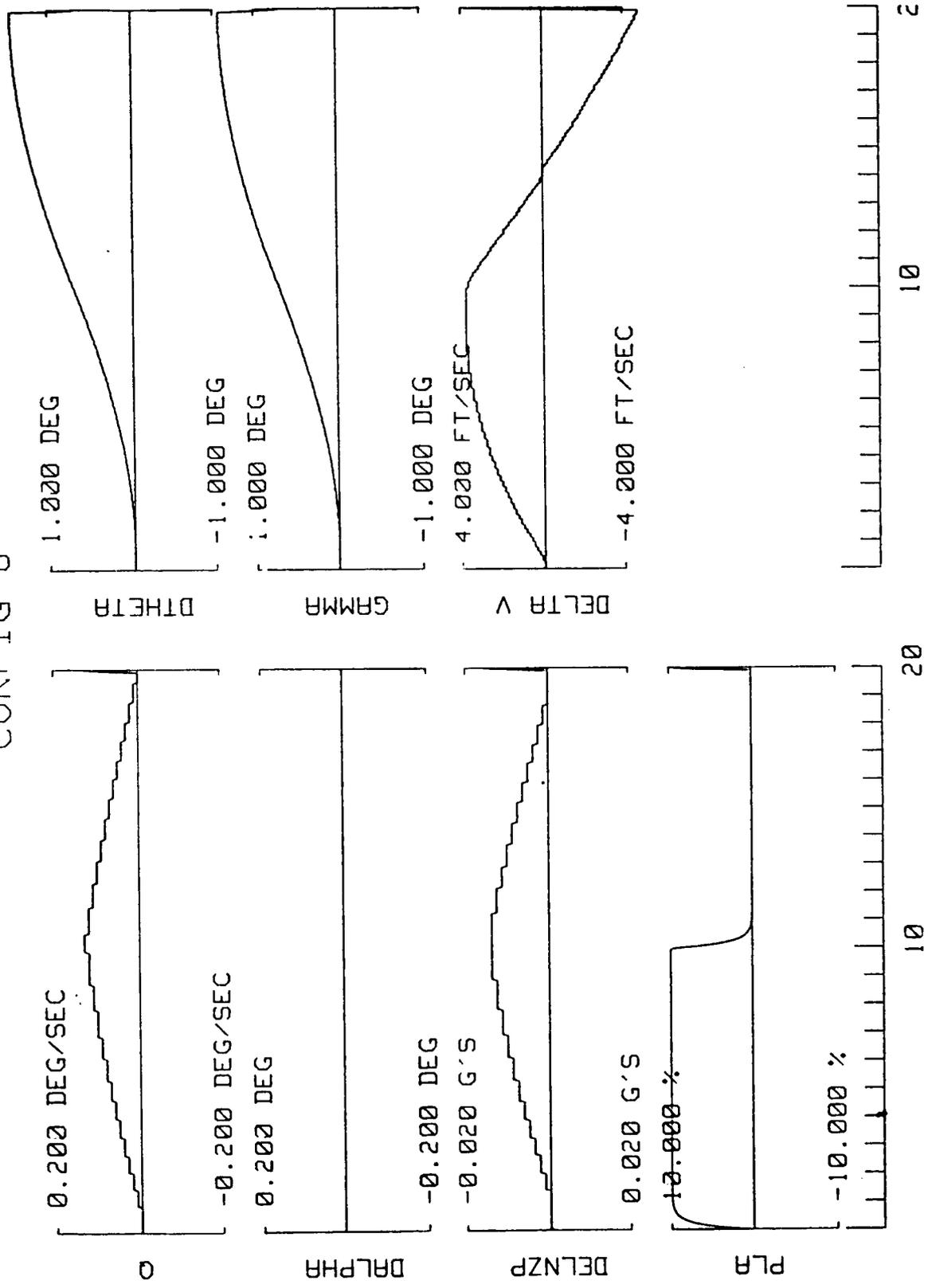


Figure B-8. THROTTLE STEP RESPONSE - CONFIGURATION 8

CONFIG 9

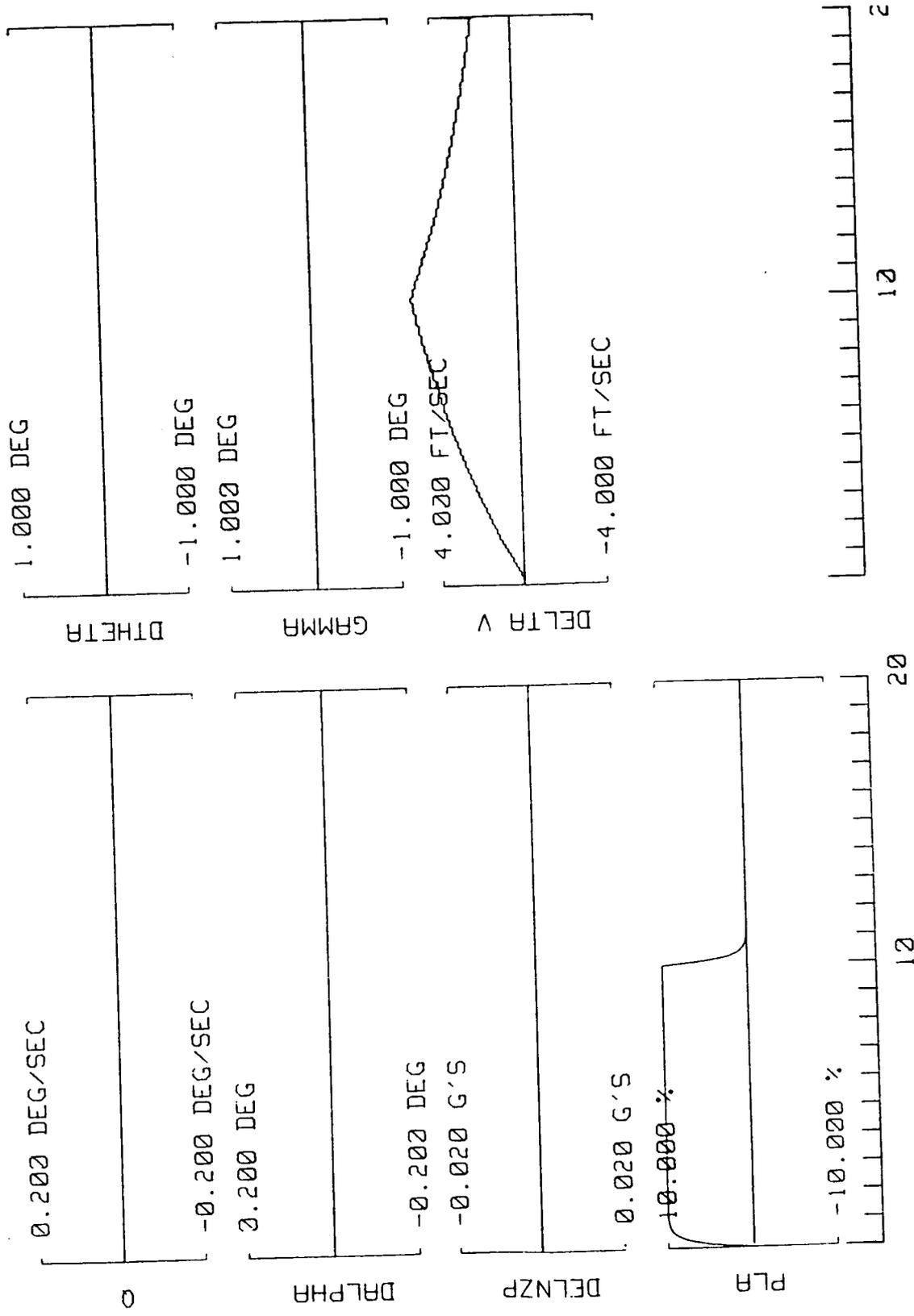


Figure B-9. THROTTLE STEP RESPONSE - CONFIGURATION 9

CONFIG 10

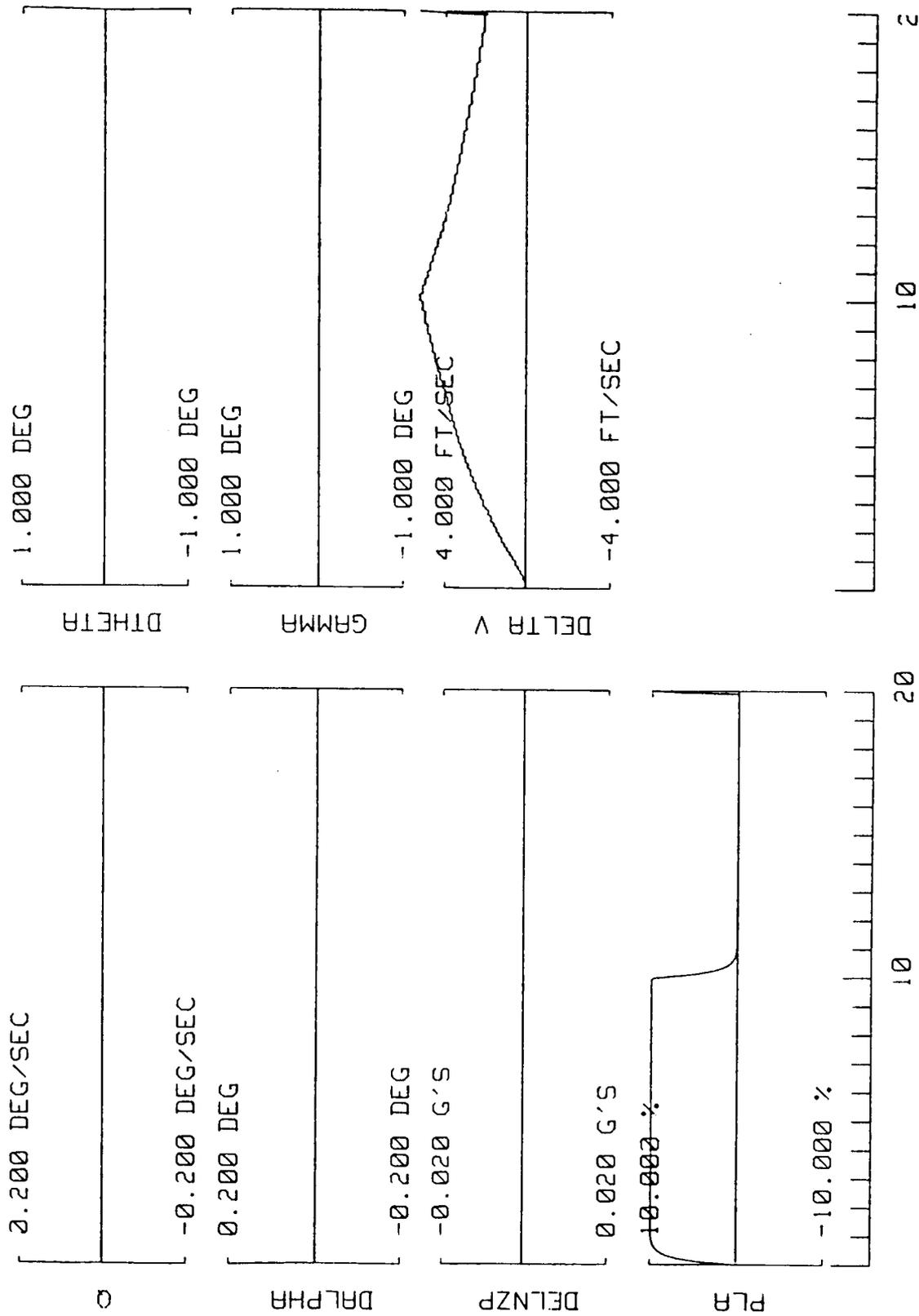


Figure B-10. THROTTLE STEP RESPONSE - CONFIGURATION 10

CONFIG 11

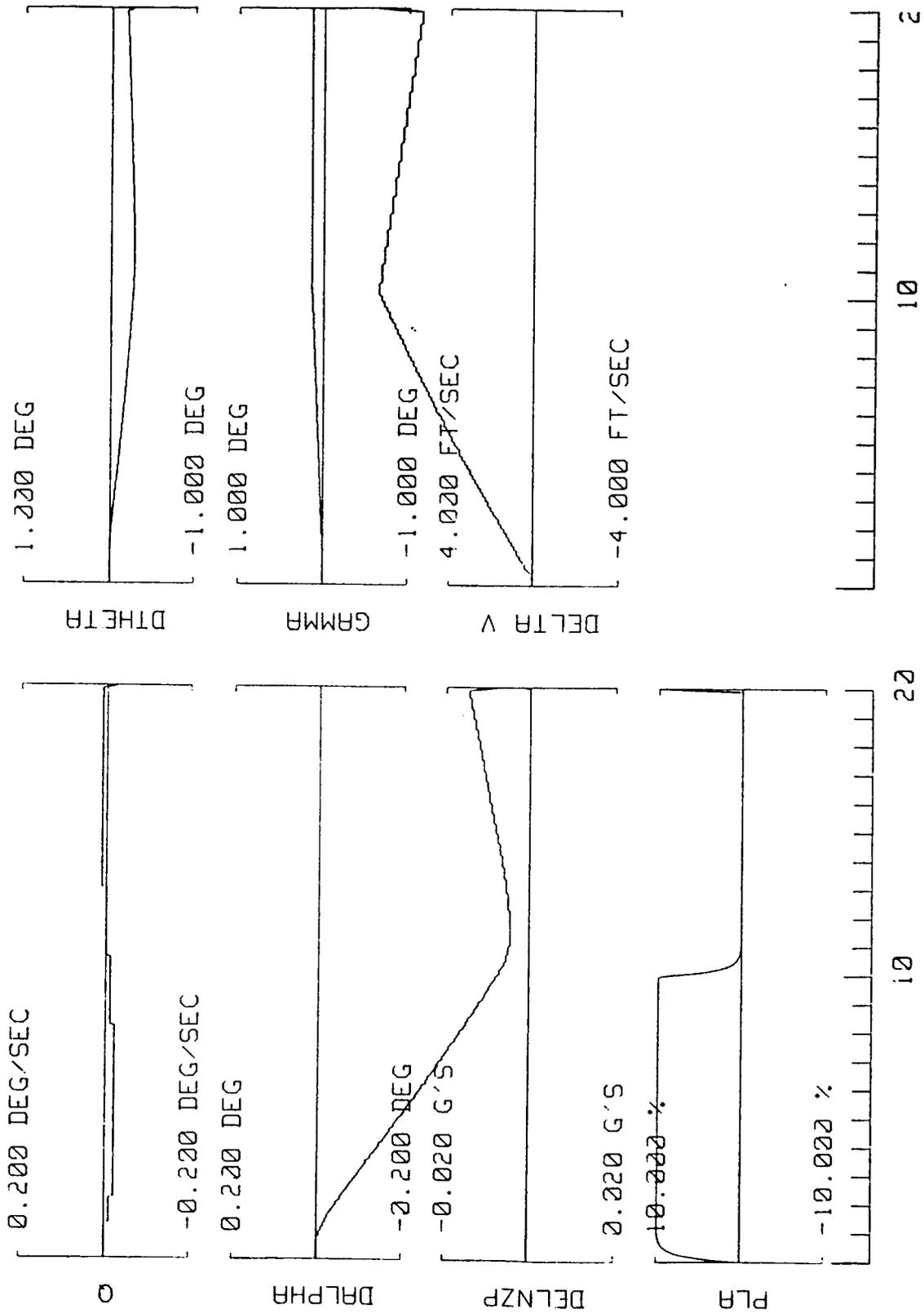


Figure B-11. THROTTLE STEP RESPONSE - CONFIGURATION 11

CONFIG 12

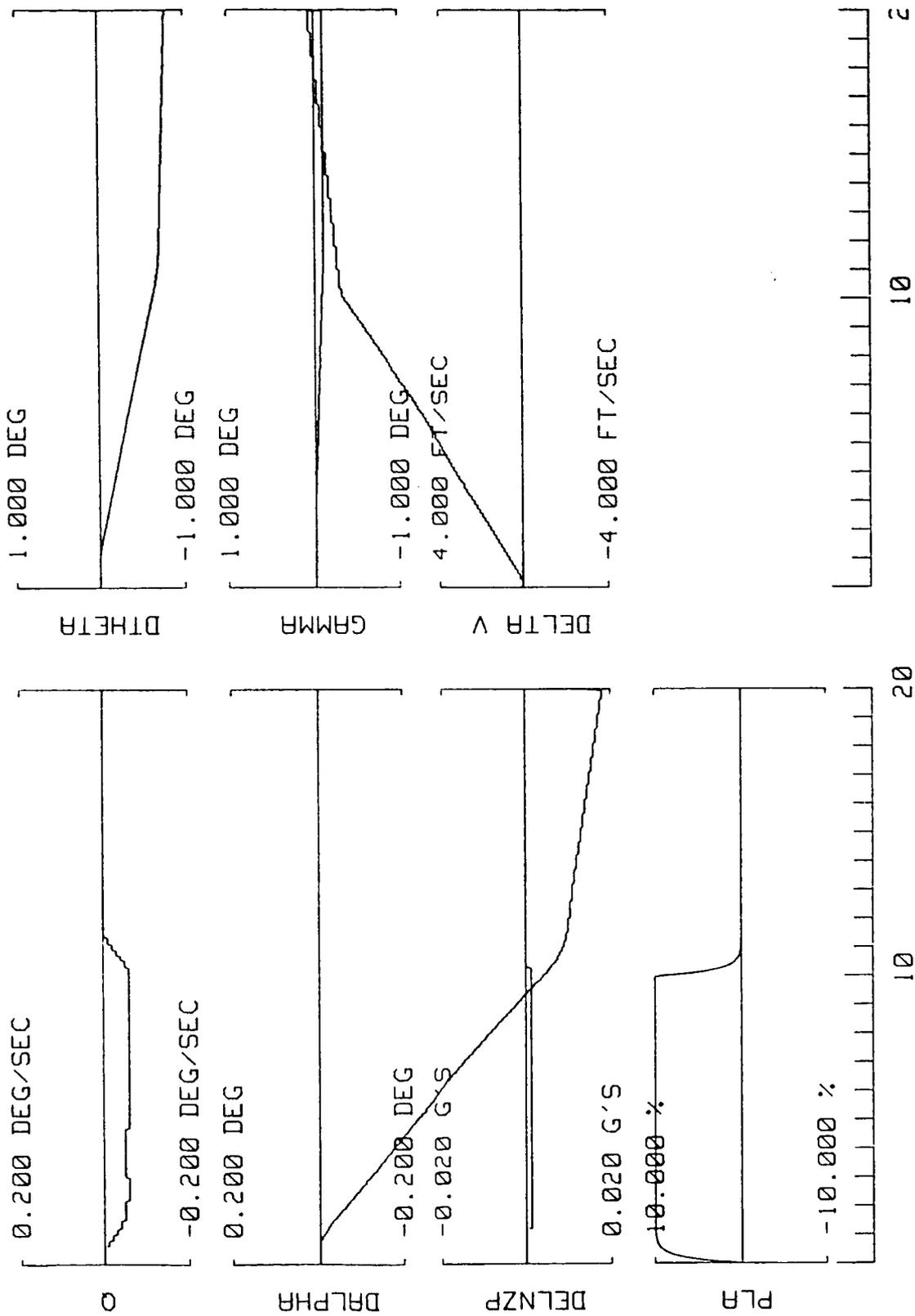


Figure B-12. THROTTLE STEP RESPONSE - CONFIGURATION 12

CONFIG 13

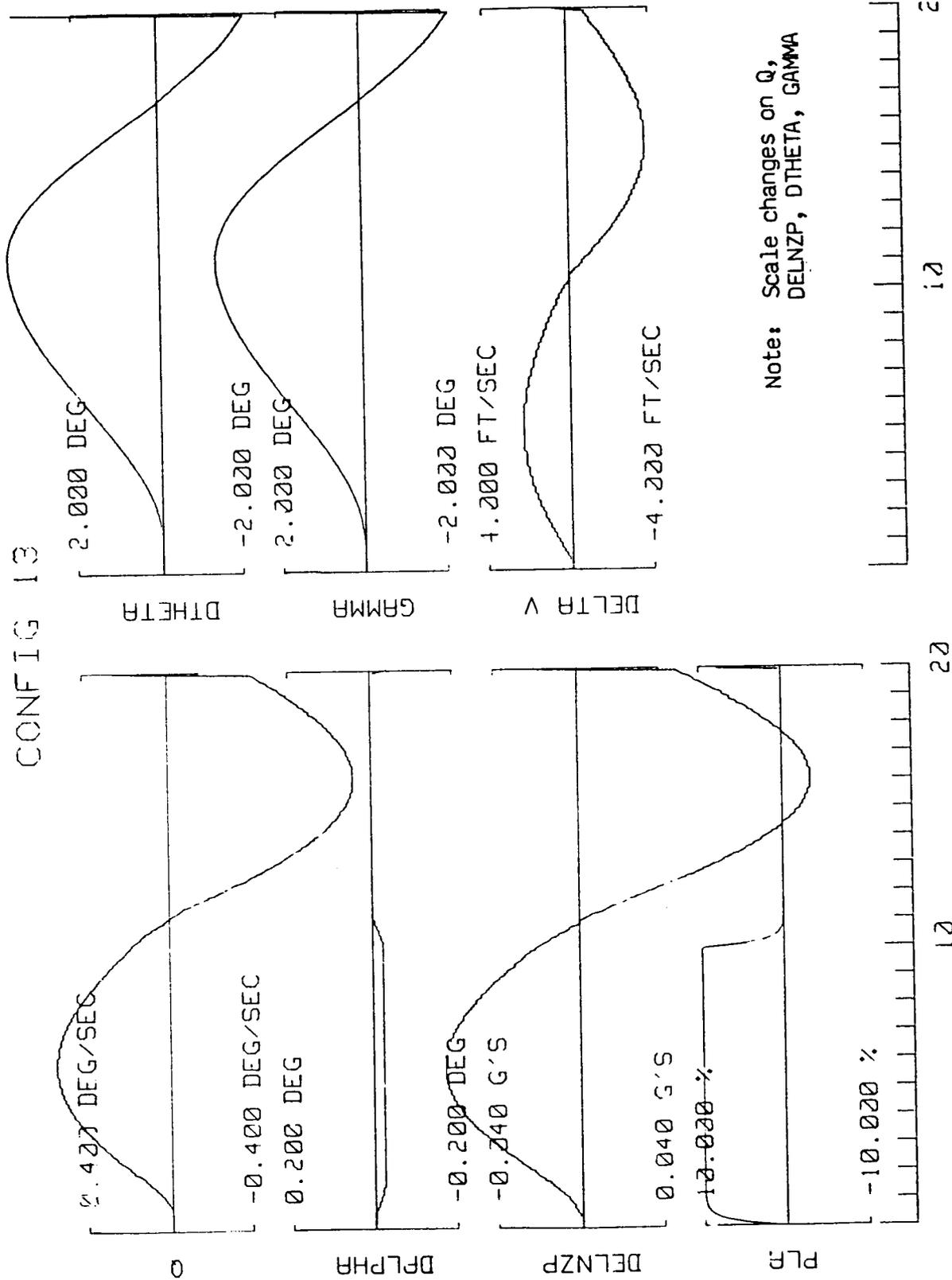


Figure B-13. THROTTLE STEP RESPONSE - CONFIGURATION 13

CONFIG 14

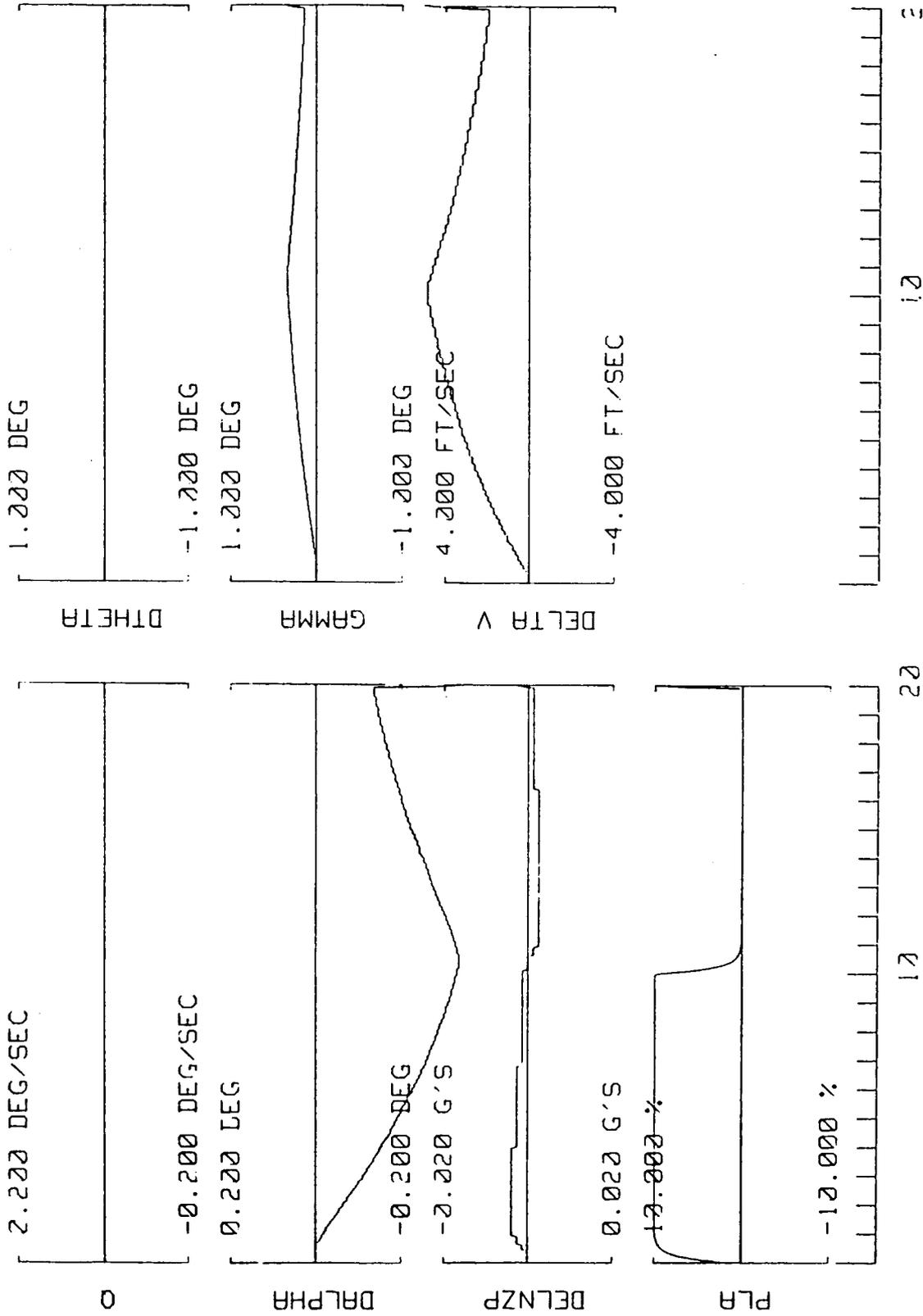


Figure B-14. THROTTLE STEP RESPONSE - CONFIGURATION 14

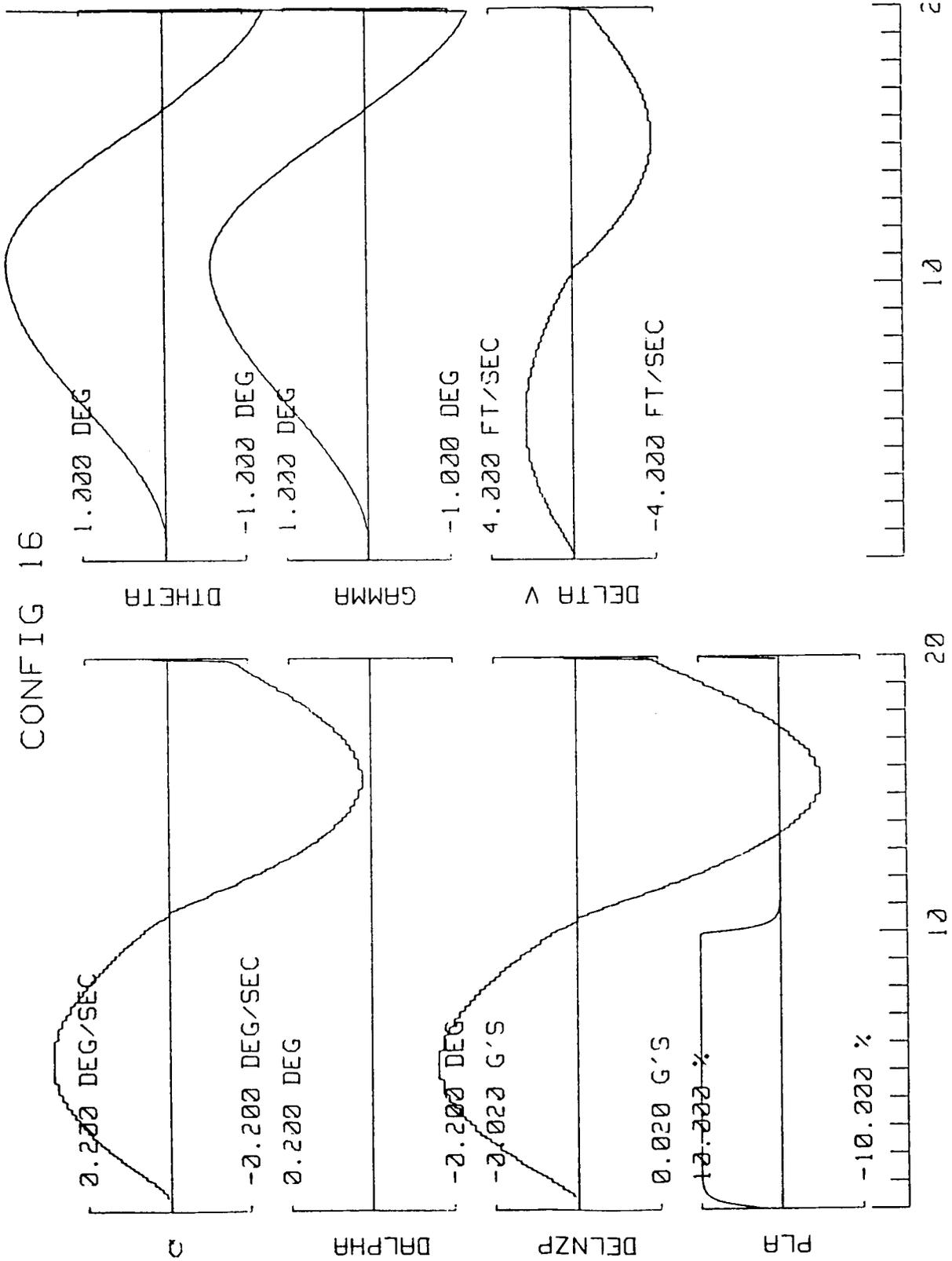


Figure B-16. THROTTLE STEP RESPONSE - CONFIGURATION 16

CONFIG 17-20, 17+LEAD/LAG, 21A-28A

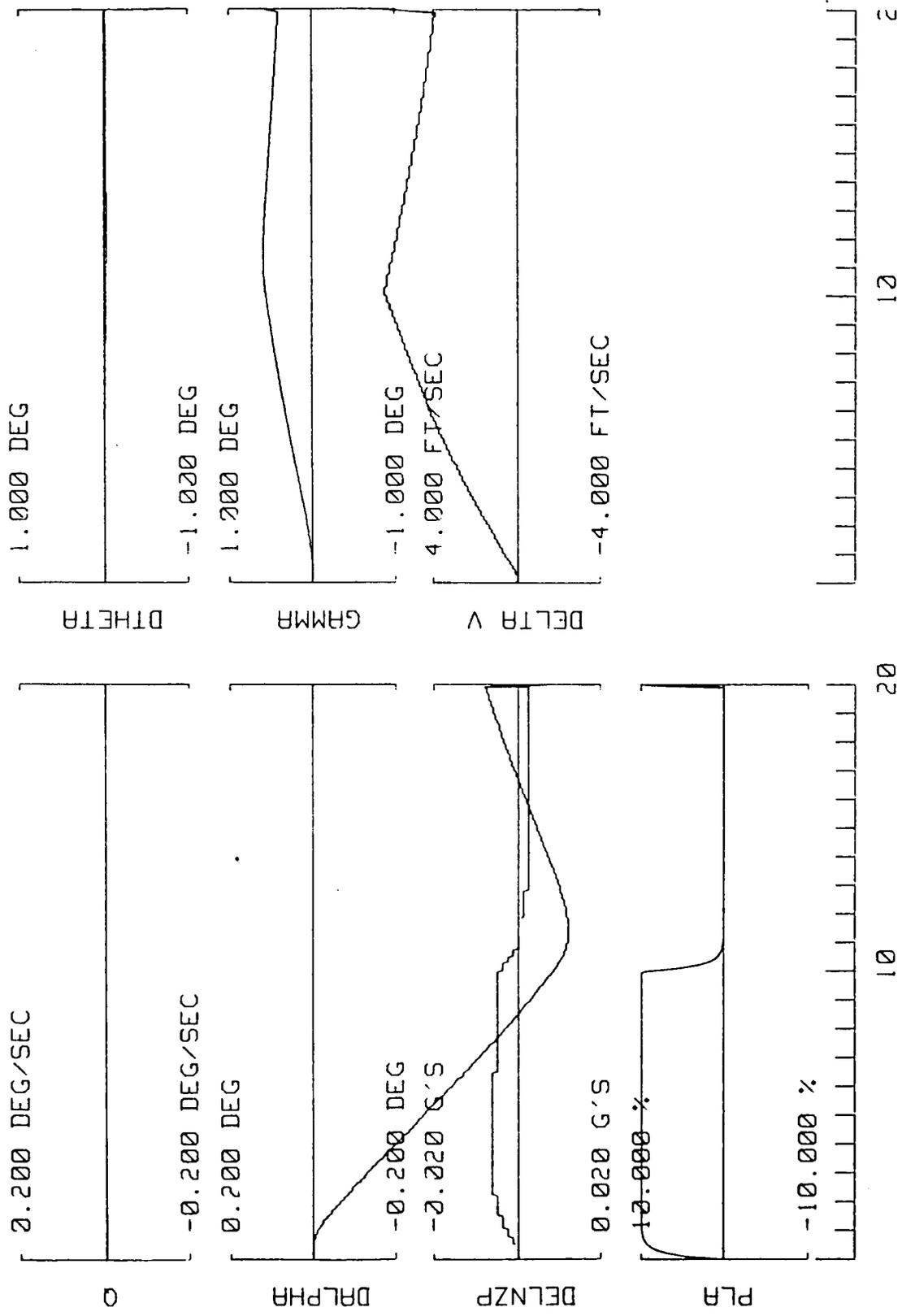


Figure B-17. THROTTLE STEP RESPONSE - CONFIGURATION 17-20, 17 + L/L, 21A-28A

CONFIG B and 21-28

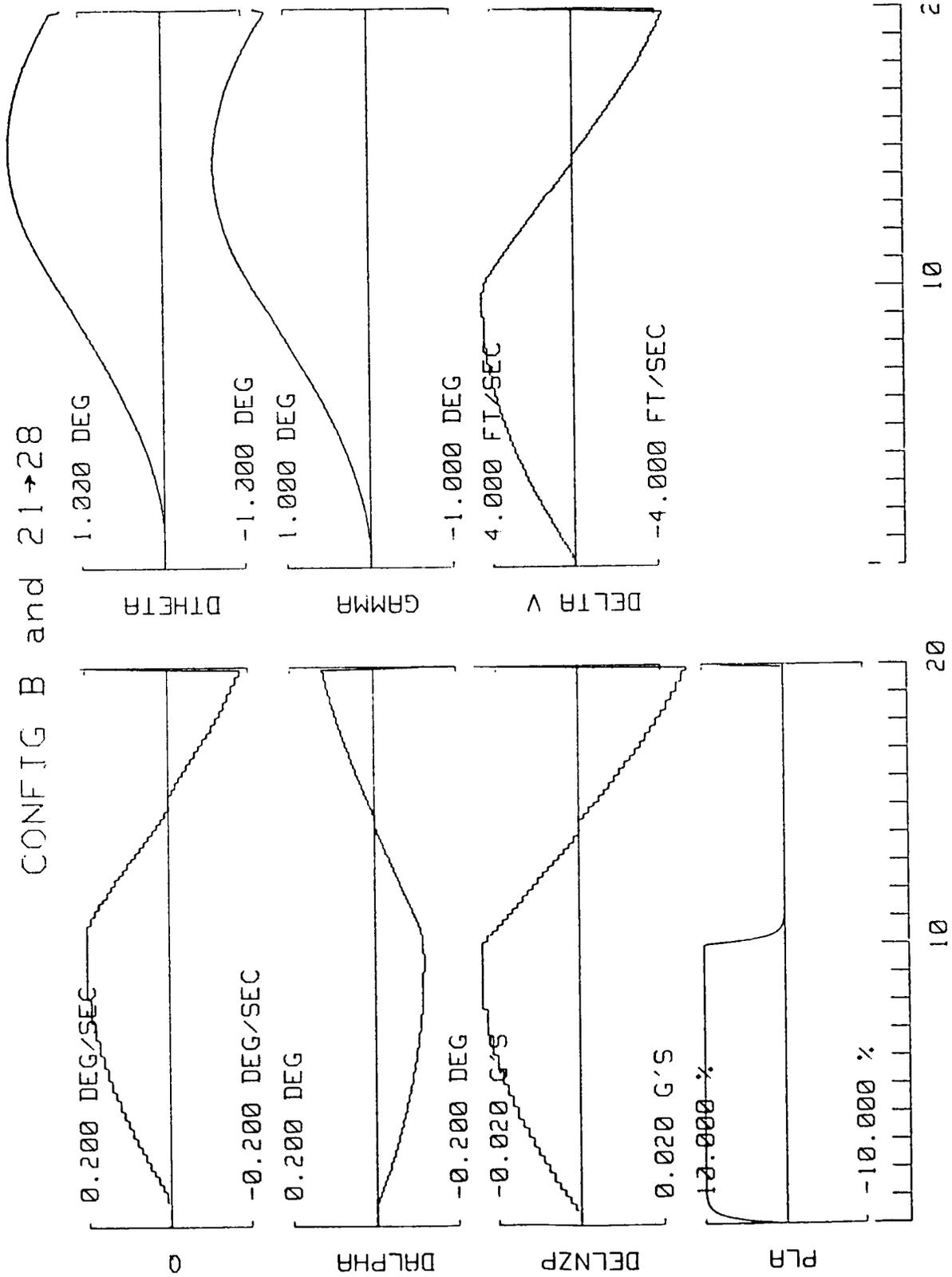


Figure B-18. THROTTLE STEP RESPONSE - CONFIGURATION B AND 21-28

Appendix C  
MODEL FOLLOWING VERIFICATION STEPS

This appendix presents verification step responses of the experiment configurations. Many of the cases were run during the checkout phase before the final sensitivities were chosen for these configurations (1 through 10, and 13 through 20). The command gain used for these TIFS responses were  $1/1.3 = .769$  times the final experiment command gains. For this reason, though the inputs are 10 pounds, as they are for the analytical model, the responses are only  $.769$  times the desired magnitudes. For these configurations the scale factors on the TIFS responses have been increased by a 1.3 factor so proper overlays can be seen. An exception to this is Configuration 1 which used a 11.11 pound input so its responses were  $(1/1.3) (11.11/10) = .855$  times desired. Therefore, the scale factor on the TIFS responses for Configuration 1 have been increased by a  $1/.855 = 1.17$  factor so proper overlays can be seen. Configurations 11 and 12 were run at the proper command gain but used a 5 pound input. Therefore, the scale factor on the TIFS responses for Configurations 11 and 12 have been increased by a factor of two so proper overlays can be seen. Configuration B and 17 + Lead/Lag were run at the same command gain and input as the analytical model.

Presented are the following responses:

FES	-	FES, pitch column force
Q	-	q, pitch rate
DELNZP	-	$\Delta n_{z_p}$ , incremental normal acceleration at pilot station
DALPHA	-	$\Delta \alpha$ , incremental angle of attack

The M refers to the model response which is shown in a dashed line. The TIFS response is shown in a solid line.

Roll and Yaw step verification records are shown following the pitch steps and present the following responses:

DAS	-	$\delta_{AS}$ , aileron wheel deflection
DRP	-	$\delta_{RP}$ , rudder pedal deflection
P	-	$p$ , roll rate
R	-	$r$ , yaw rate
BETA	-	$\beta$ , sideslip

Again the dashed line is the model response and the solid line is the TIFS response.

CONFIG B (FLT 891)

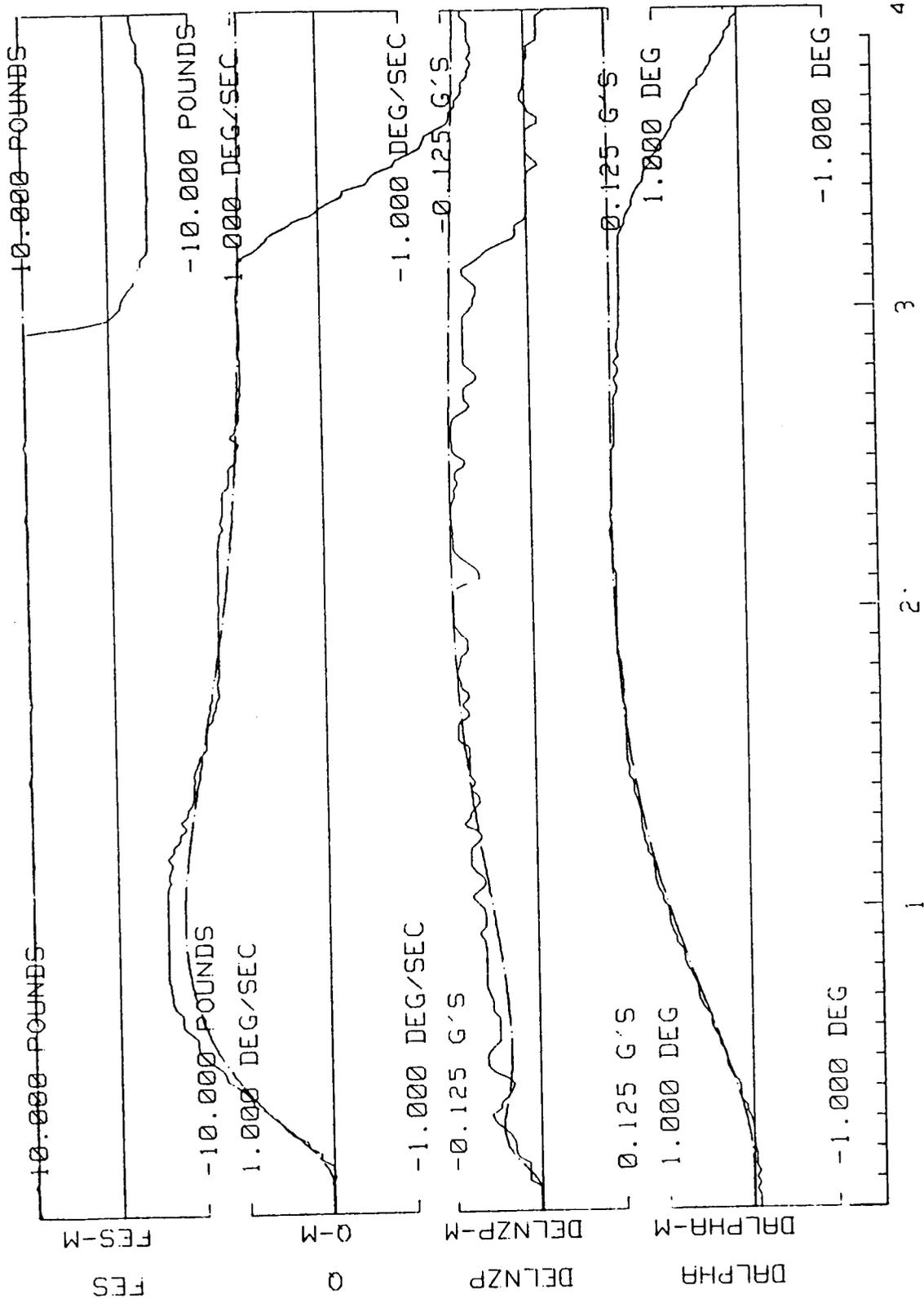


Figure C-1 PITCH STEP RESPONSE - CONFIGURATION B

CONFIG 1 (FLT 890)

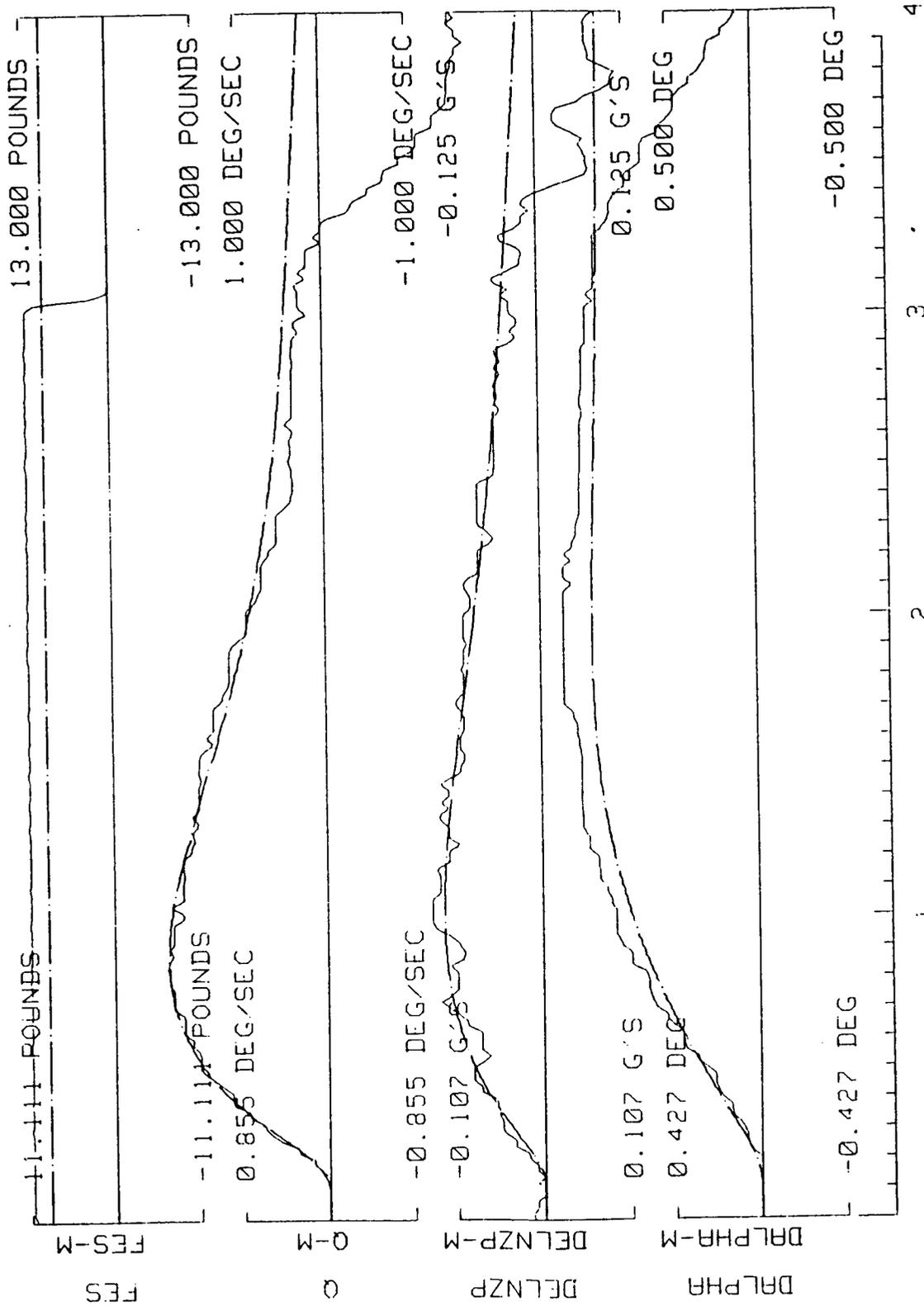


Figure C-2 PITCH STEP RESPONSE - CONFIGURATION 1

CONFIG 2 (FLT 889)

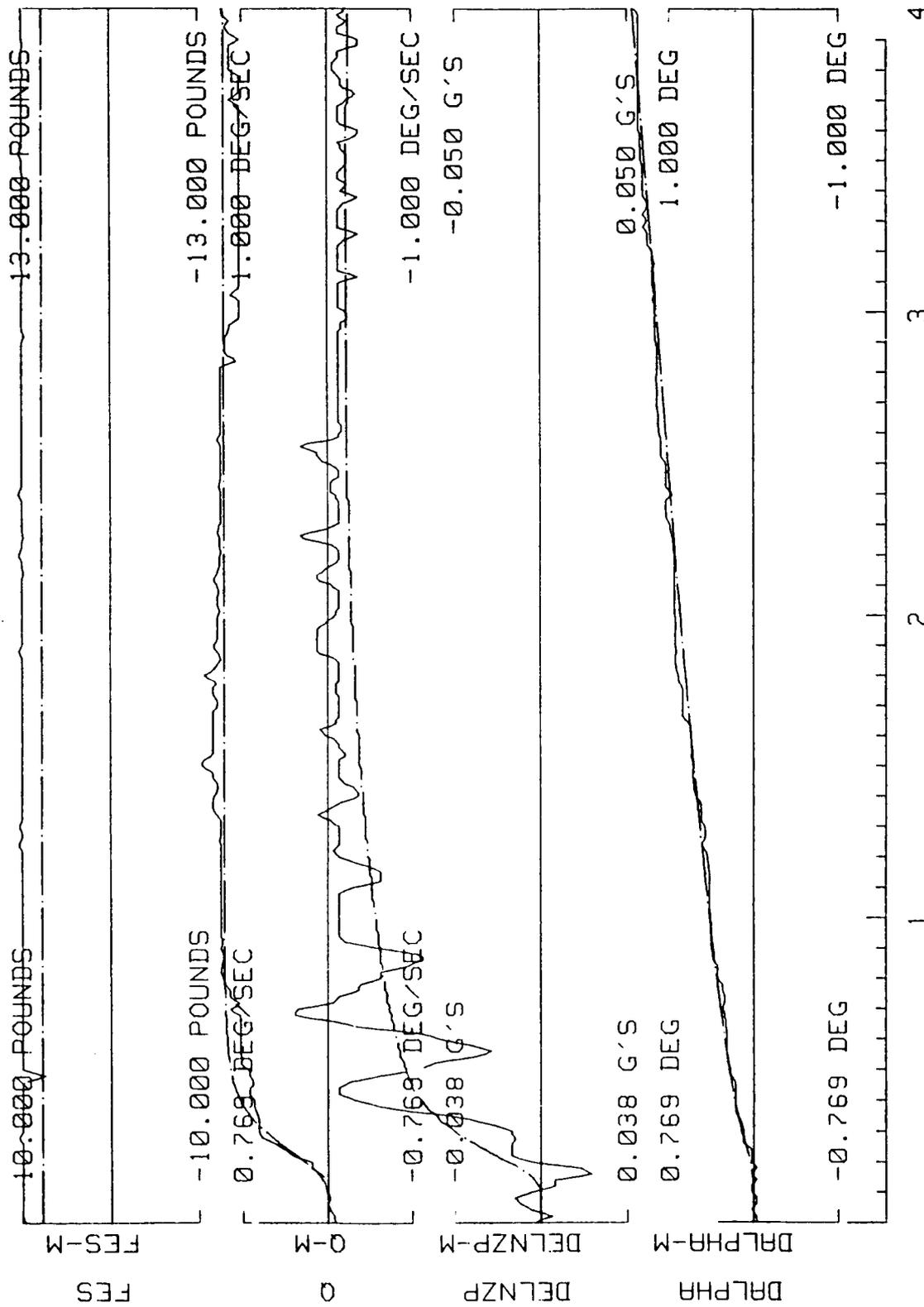


Figure C-3 PITCH STEP RESPONSE - CONFIGURATION 2

CONFIG 3 (FLT 889)

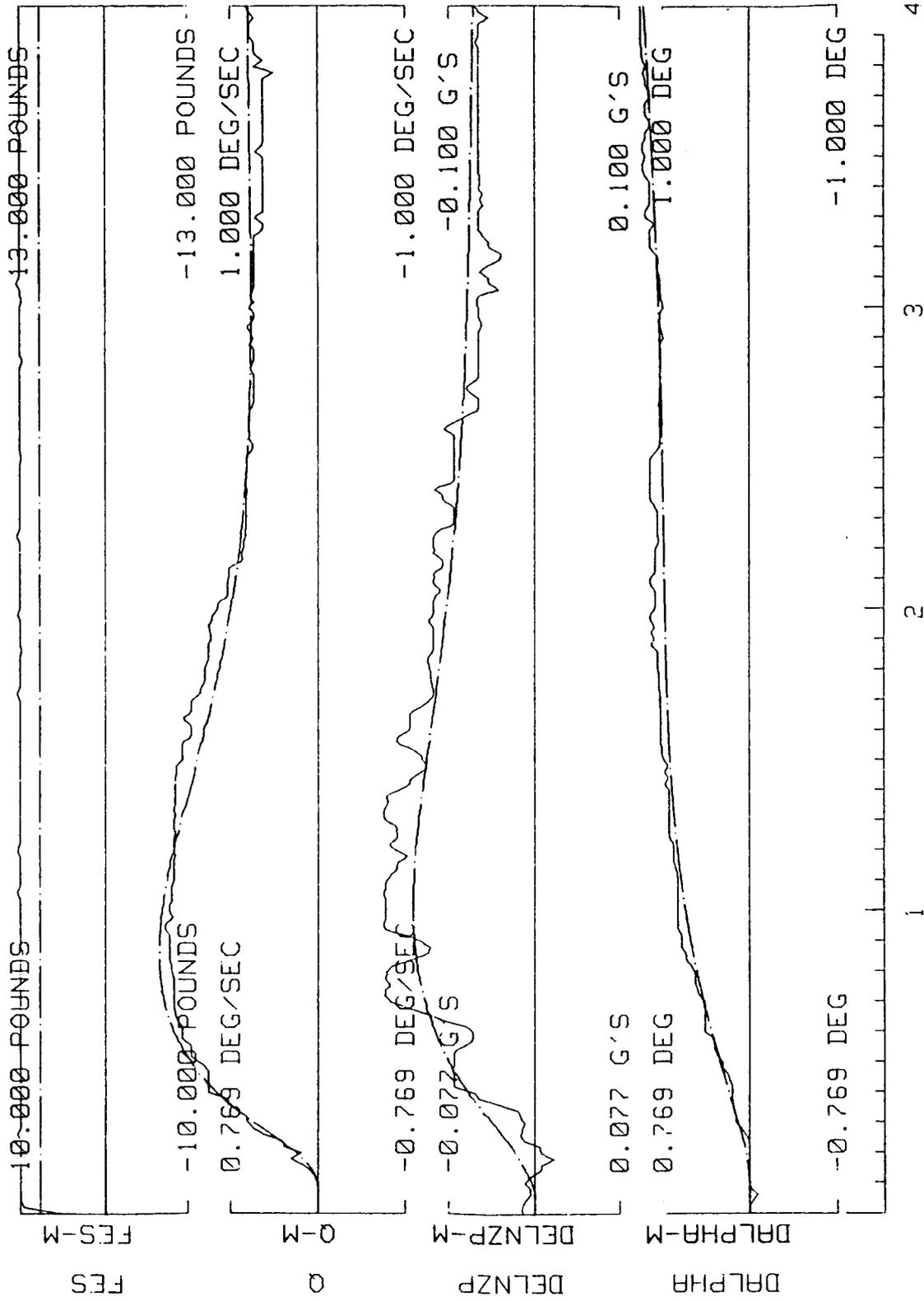


Figure C-4 PITCH STEP RESPONSE - CONFIGURATION 3

CONFIG 4 (FLT 889)

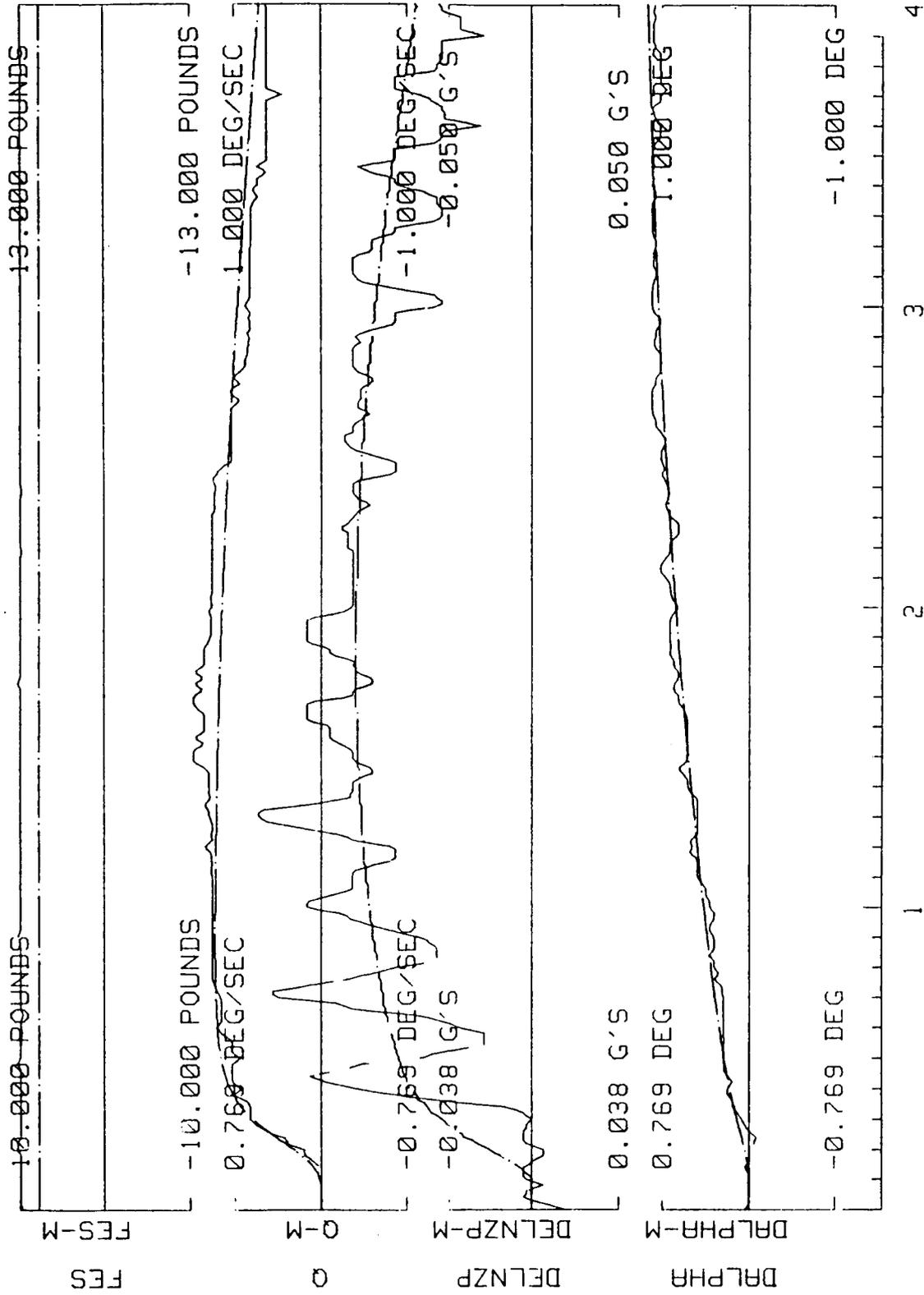


Figure C-5 PITCH STEP RESPONSE - CONFIGURATION 4

CONFIG 5 (FLT 888)

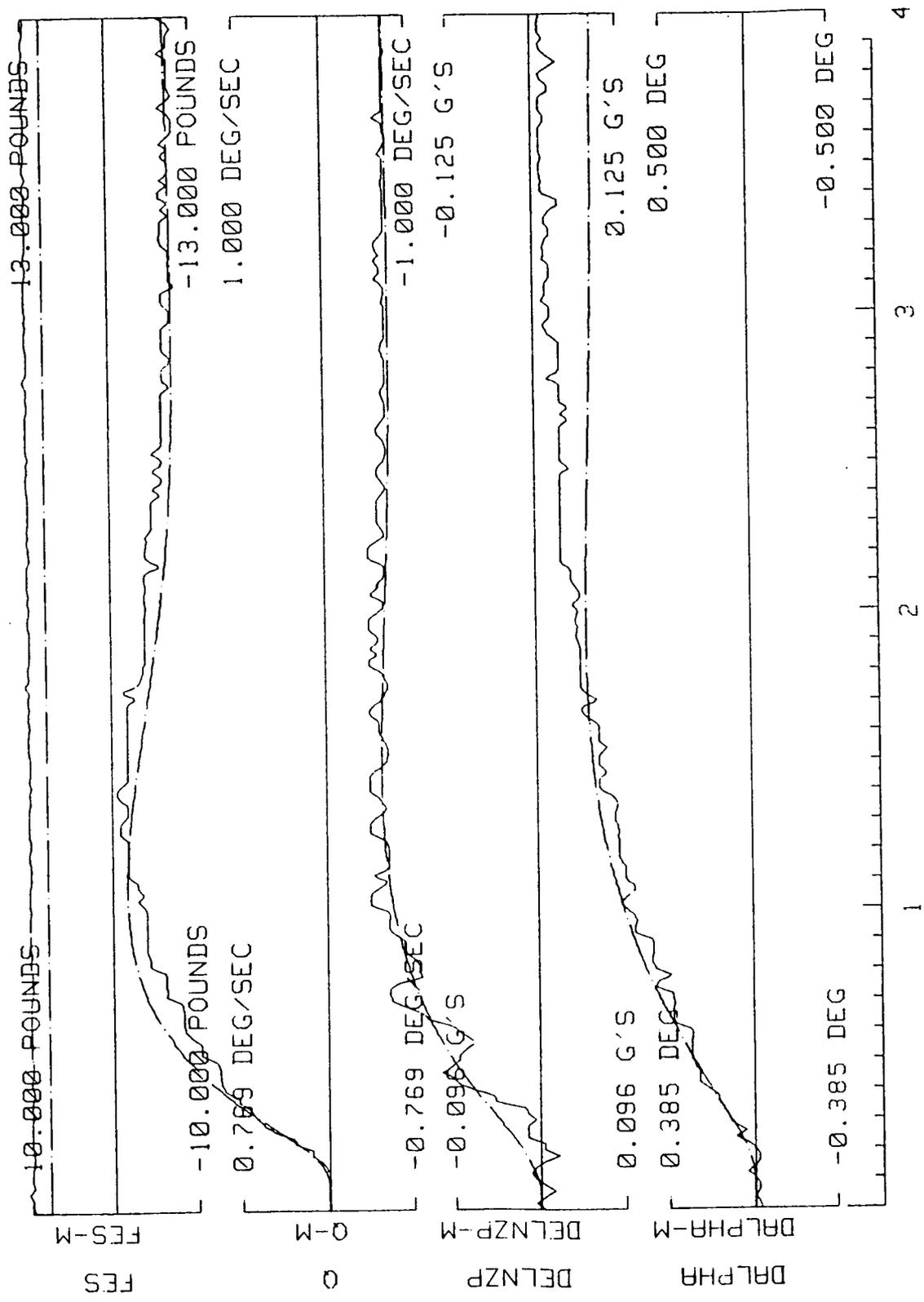


Figure C-6 PITCH STEP RESPONSE - CONFIGURATION 5

CONFIG 6 (FLT 888)

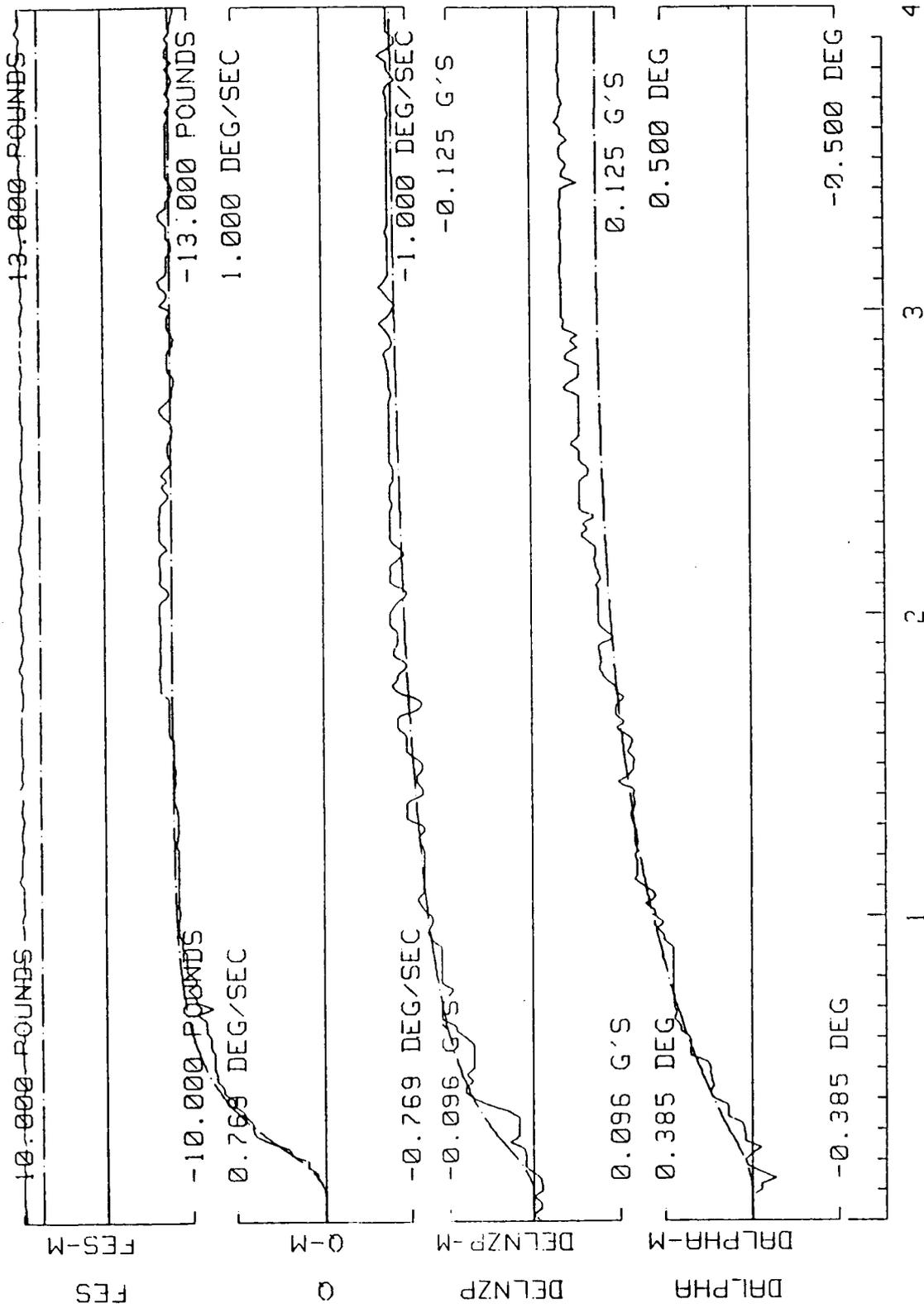


Figure C-7 PITCH STEP RESPONSE - CONFIGURATION 6

CONFIG 7 (FLT 890)

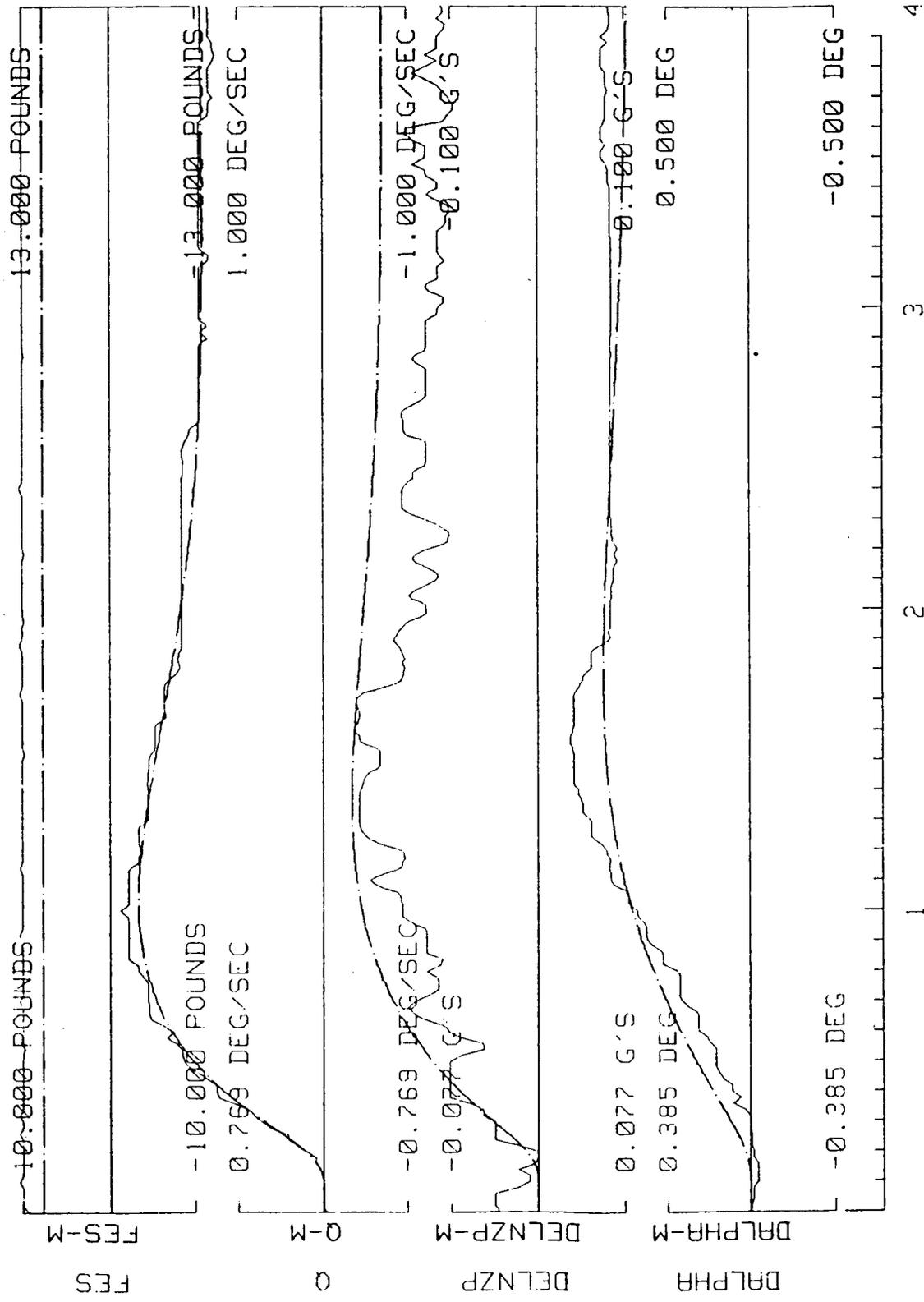


Figure C-8 PITCH STEP RESPONSE - CONFIGURATION 7

CONFIG 8 (FLT 889)

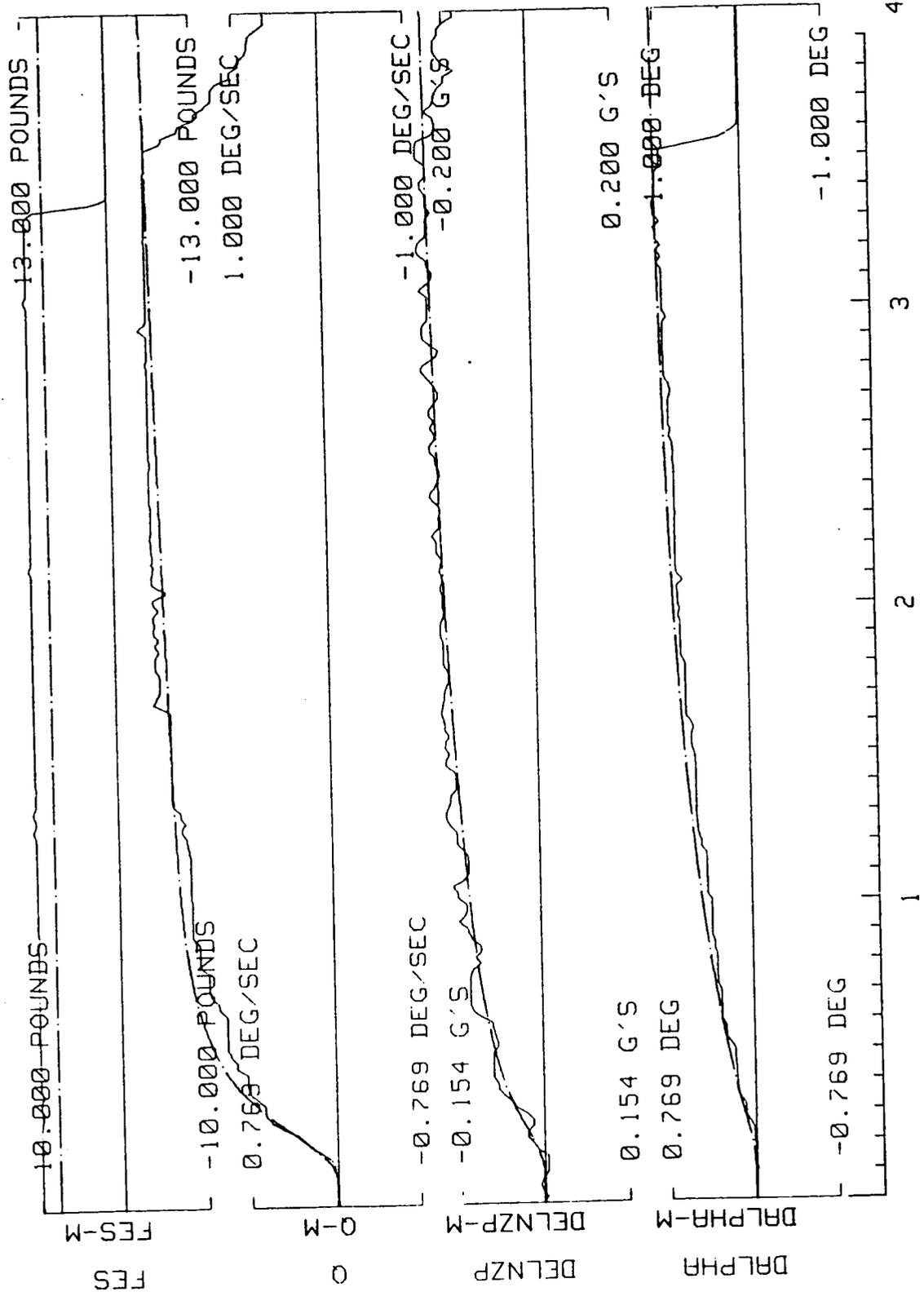


Figure C-9 PITCH STEP RESPONSE - CONFIGURATION 8

CONFIG 9 (FLT 889)

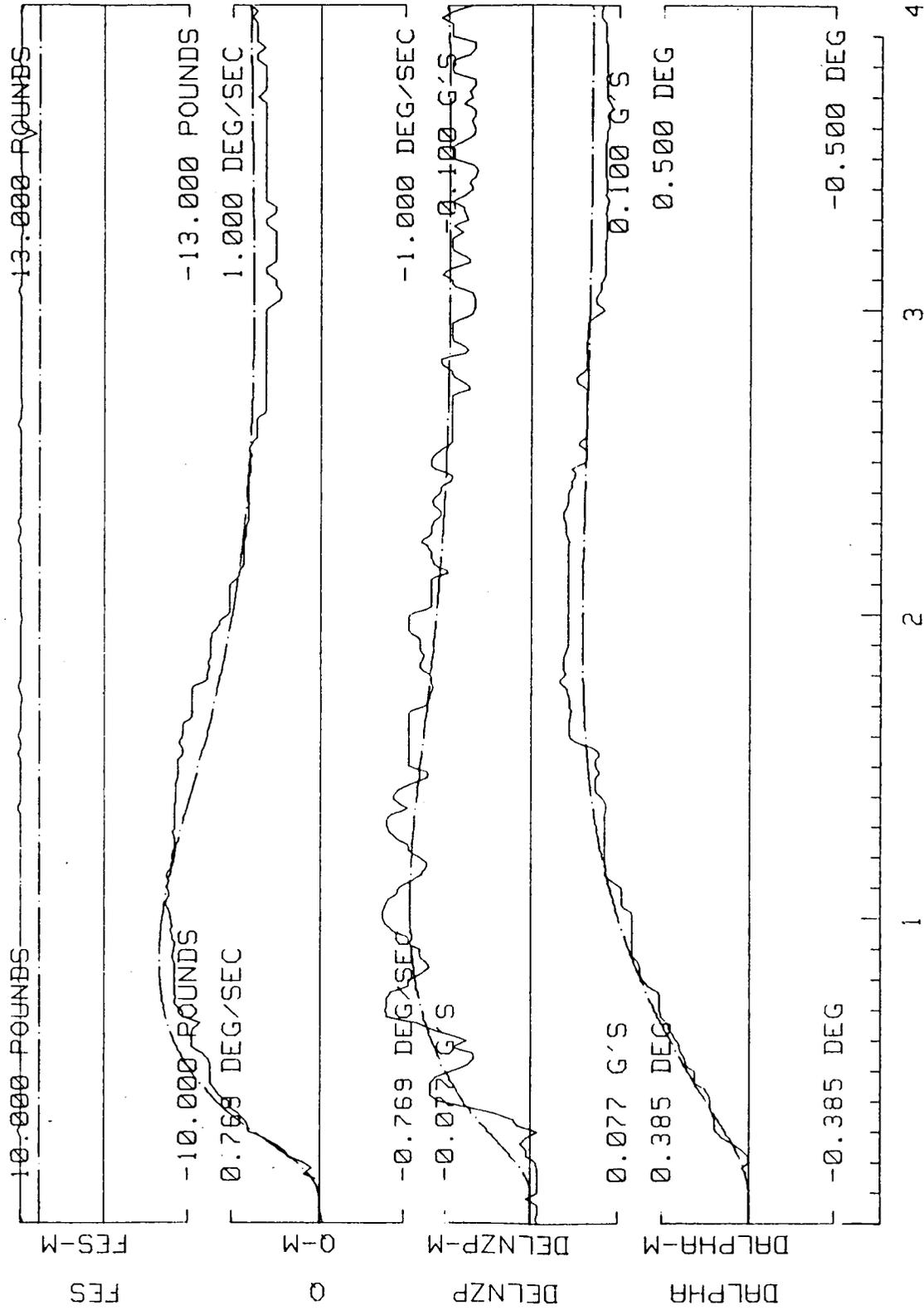


Figure C-10 PITCH STEP RESPONSE - CONFIGURATION 9

CONFIG 10 (FLT 889)

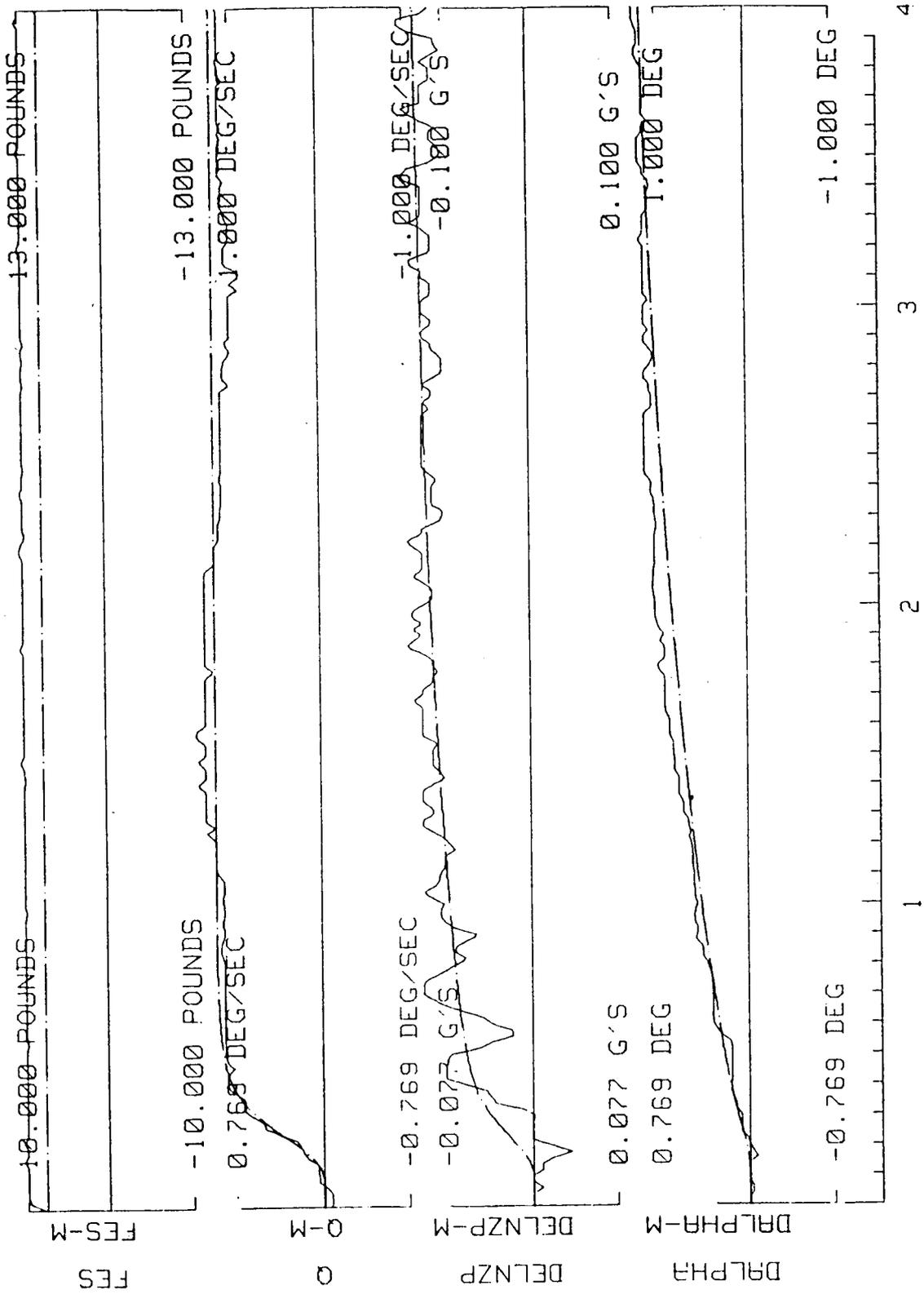


Figure C-11 PITCH STEP RESPONSE - CONFIGURATION 10

CONFIG 11 (FLT 889)

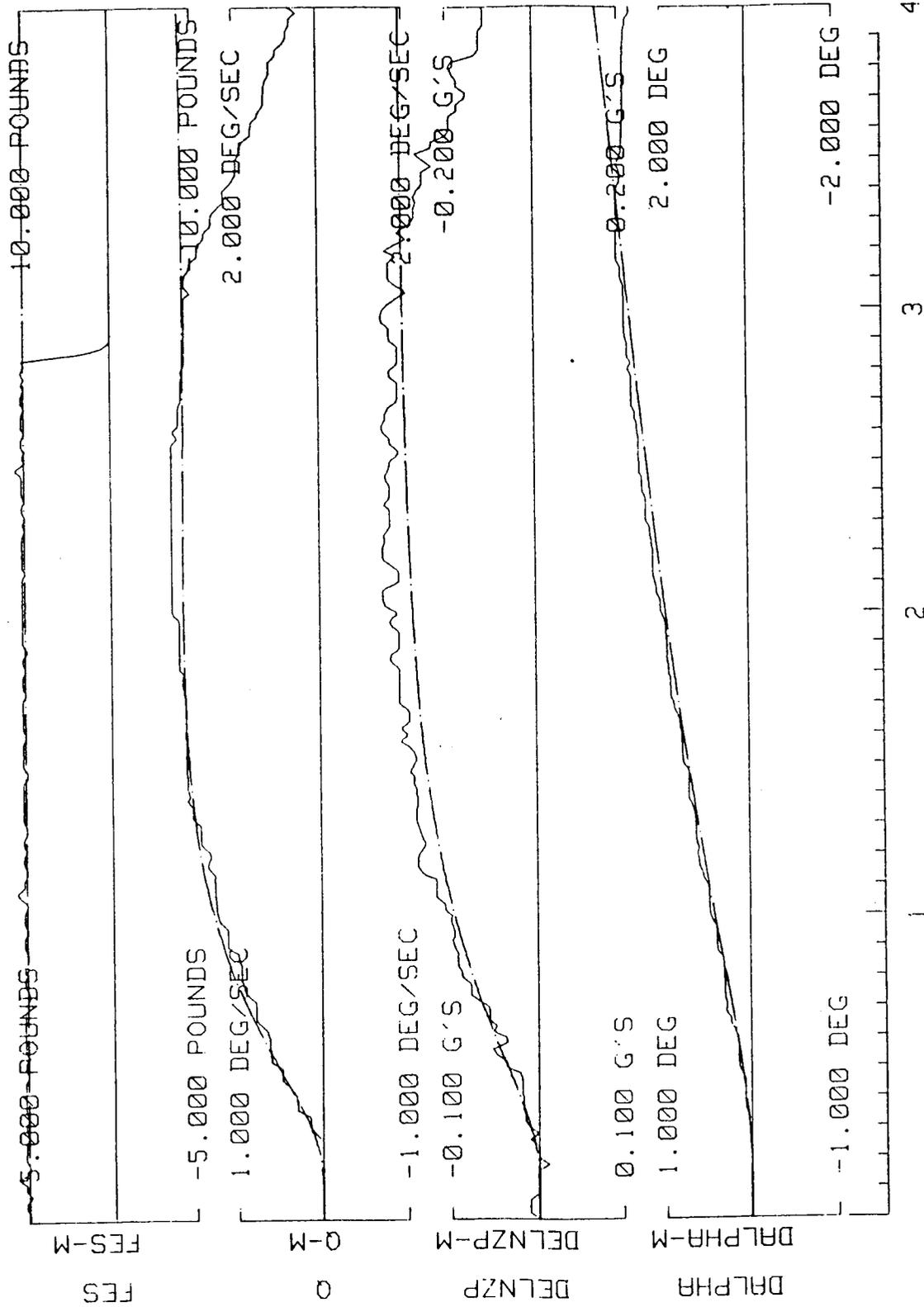


Figure C-12 PITCH STEP RESPONSE - CONFIGURATION 11

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CONFIG 12 (FLT 890)

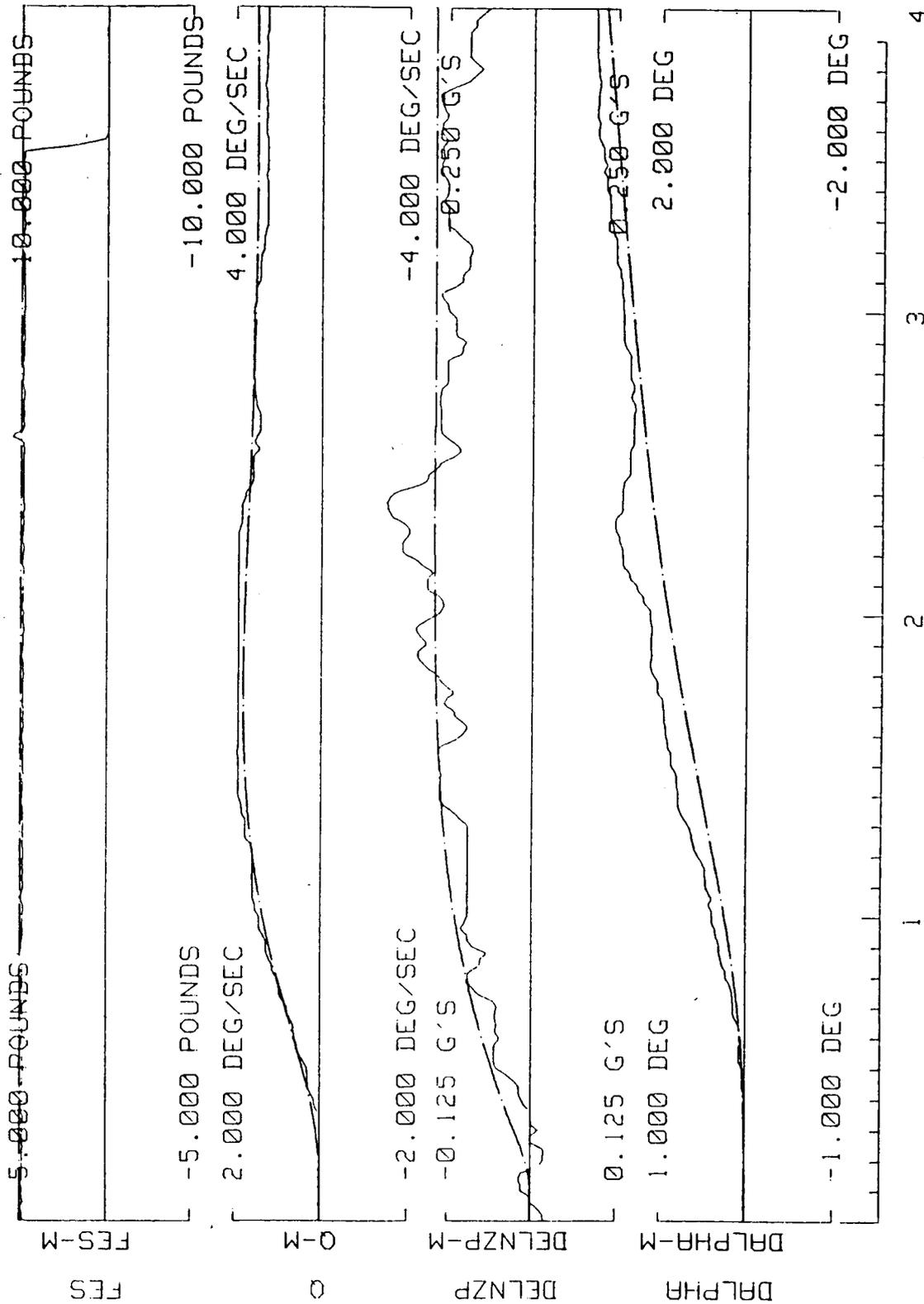


Figure C-13 PITCH STEP RESPONSE - CONFIGURATION 12

CONFIG 13 (FLT 888)

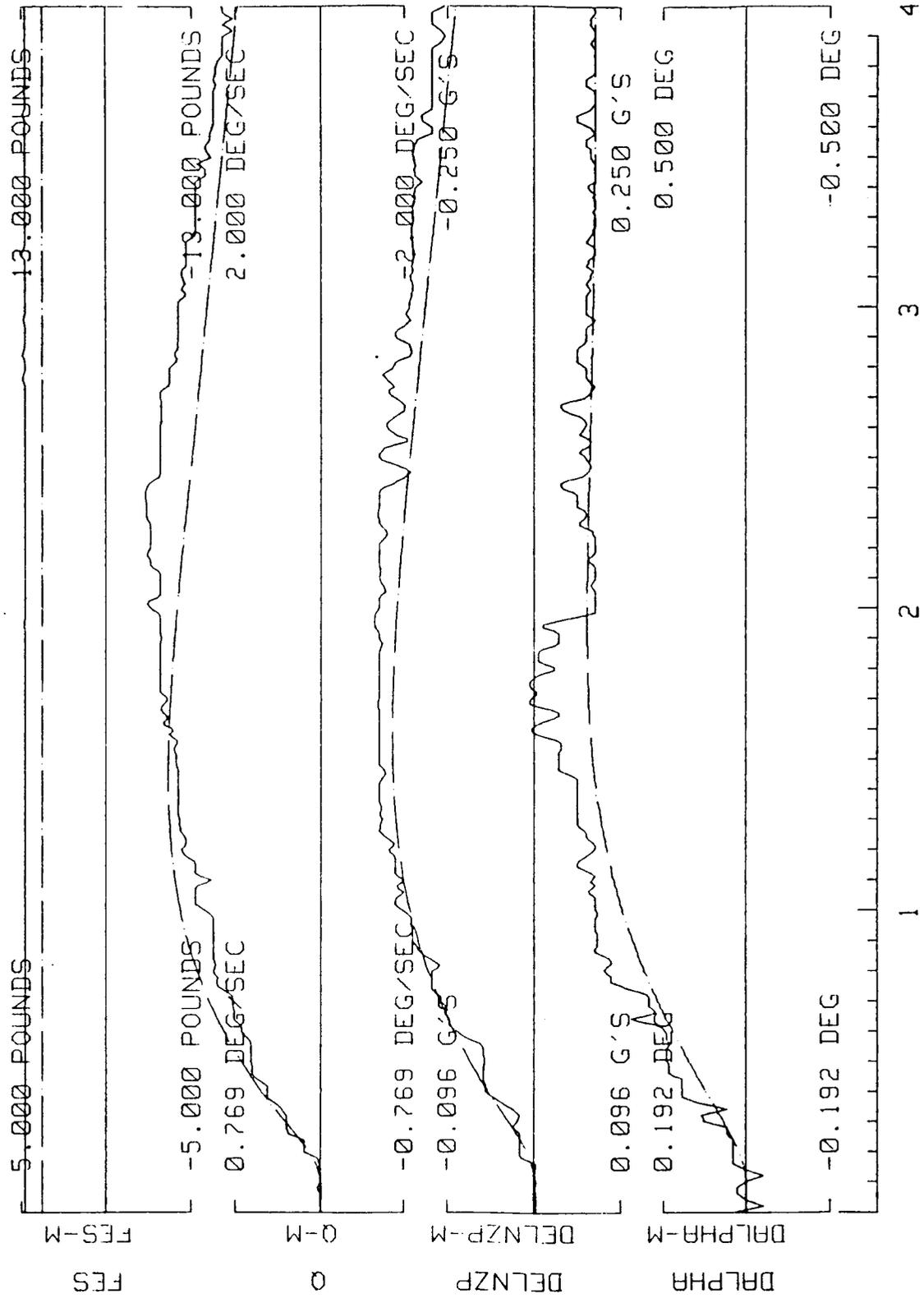


Figure C-14 PITCH STEP RESPONSE - CONFIGURATION 13

CONFIG 14 (FLT 888)

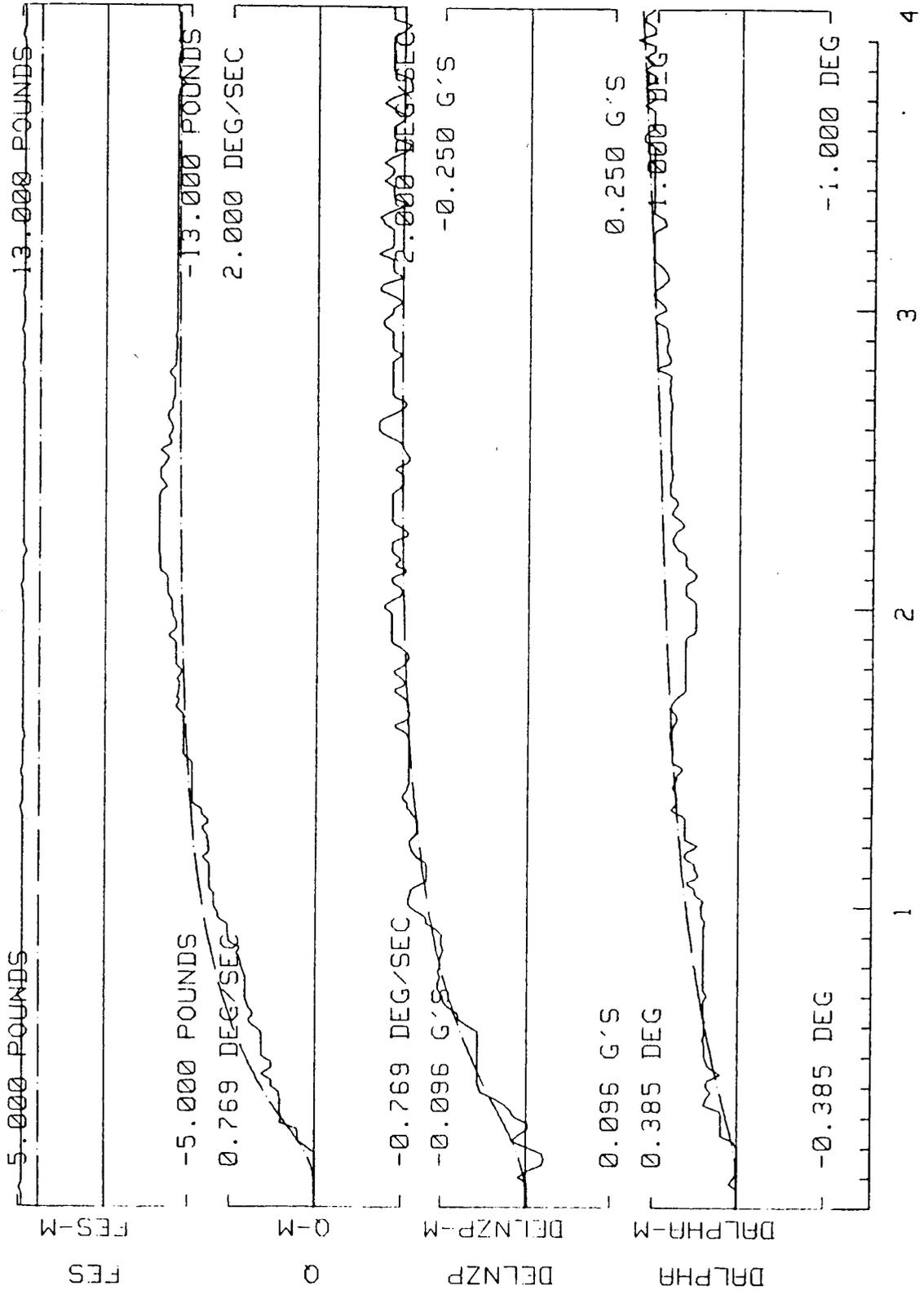


Figure C-15 PITCH STEP RESPONSE - CONFIGURATION 14

CONFIG 16 (FLT 888)

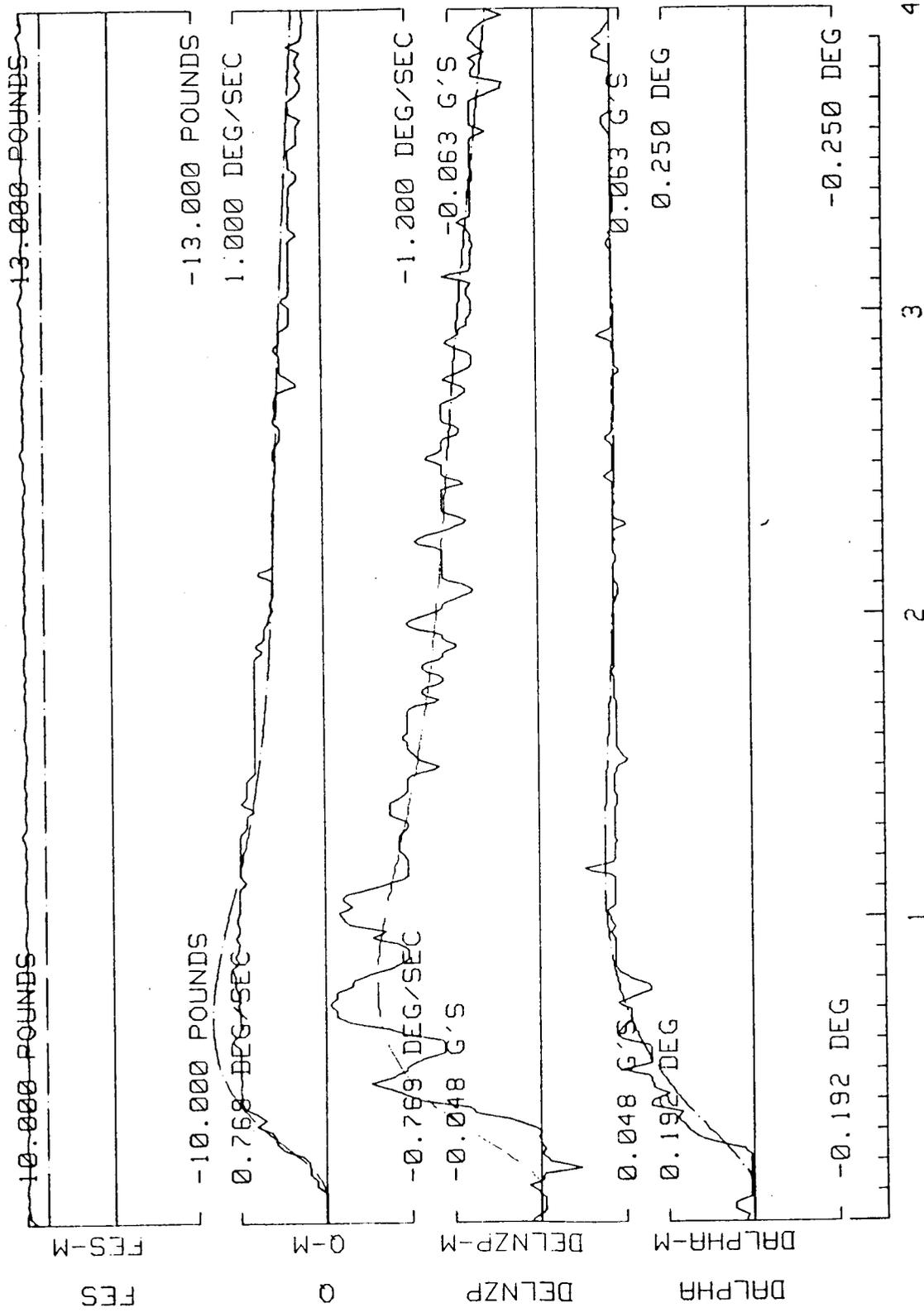


Figure C-16 PITCH STEP RESPONSE - CONFIGURATION 16

CONFIG 17 (FLT 888)

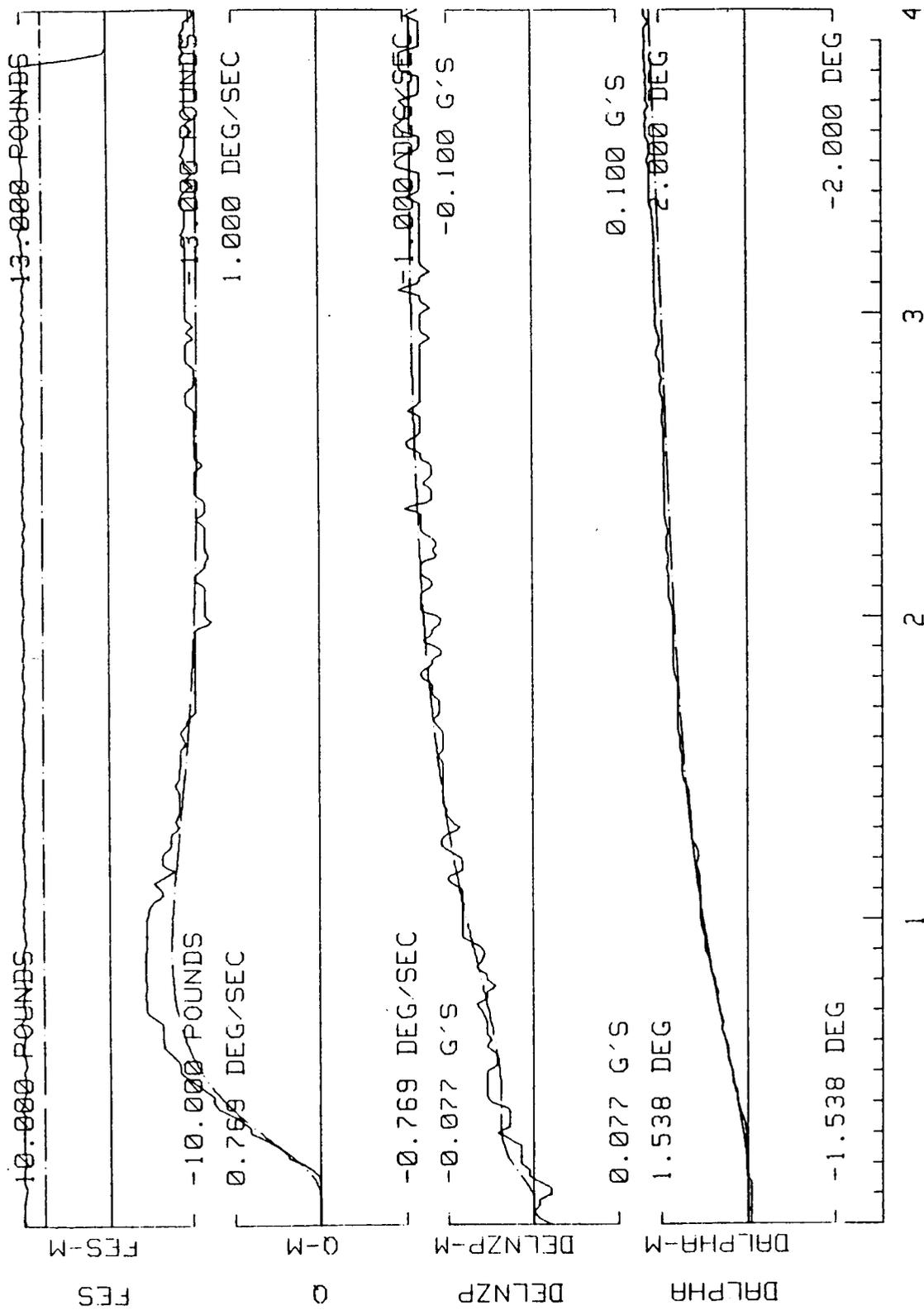


Figure C-17 PITCH STEP RESPONSE - CONFIGURATION 17

CONFIG 17+LEAD/LAG (FLT 904)

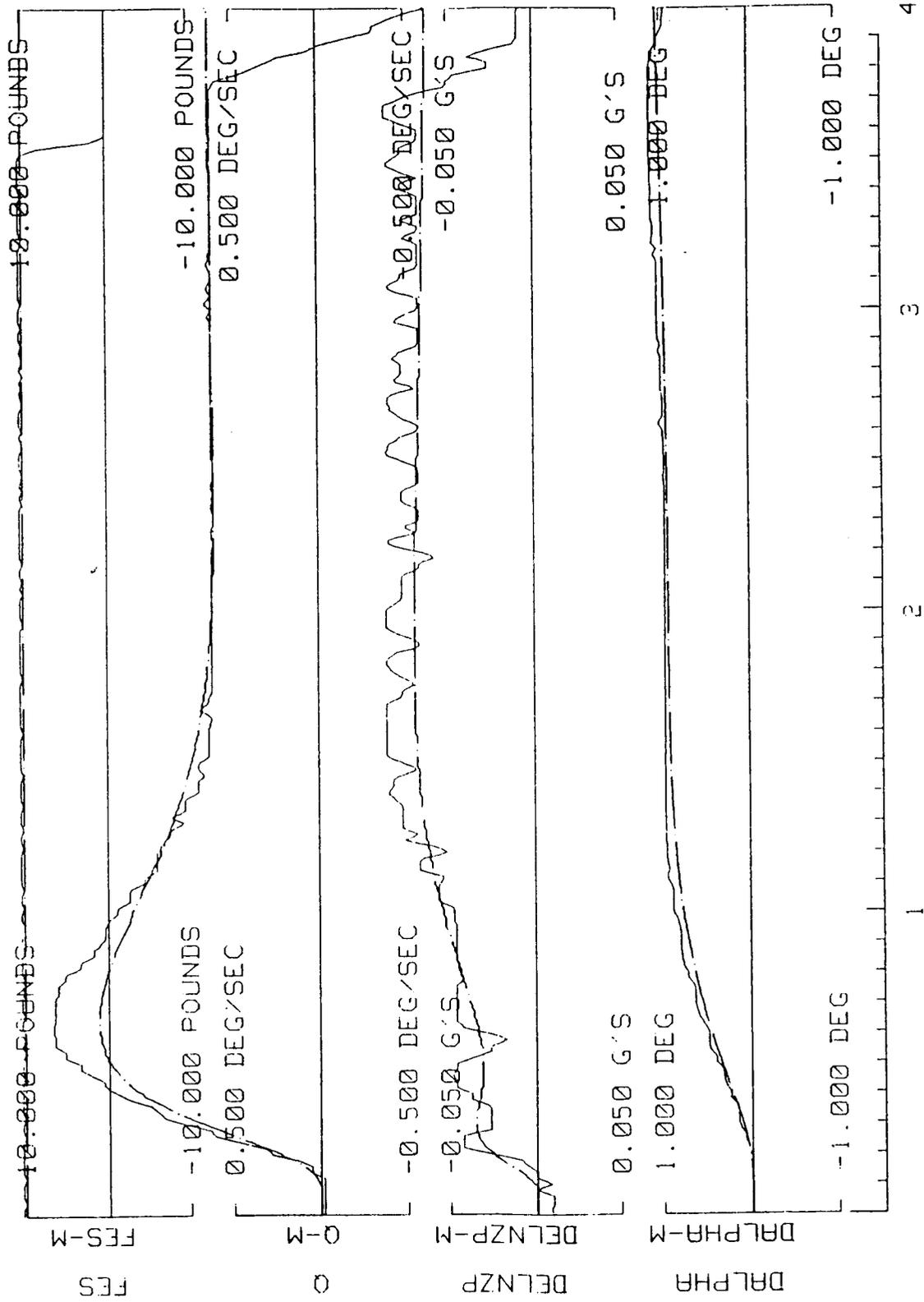


Figure C-18 PITCH STEP RESPONSE - CONFIGURATION 17 + L/L

CONFIG 18 (FLT 889)

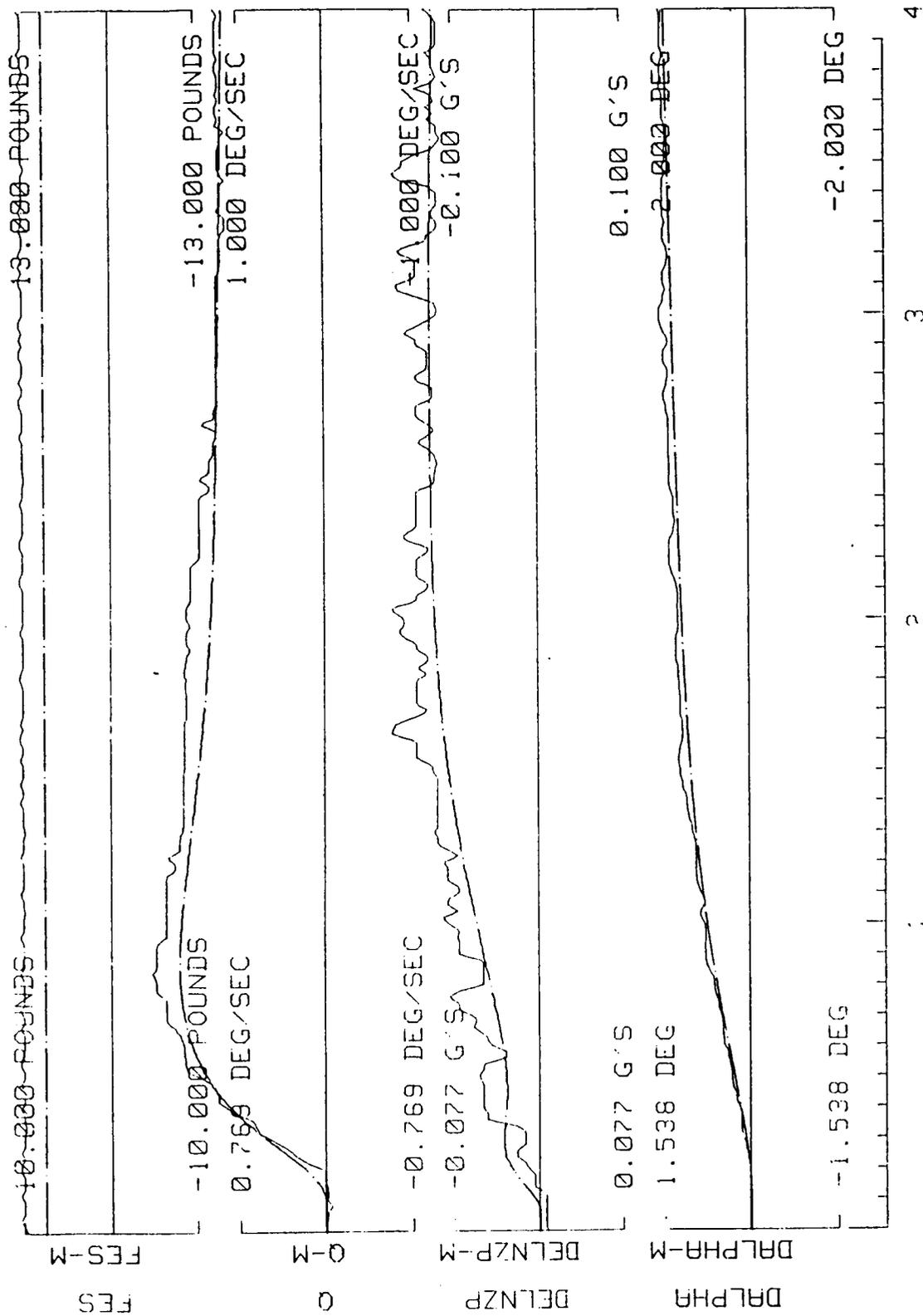


Figure C-19 PITCH STEP RESPONSE - CONFIGURATION 18

CONFIG 19 (FLT 889)

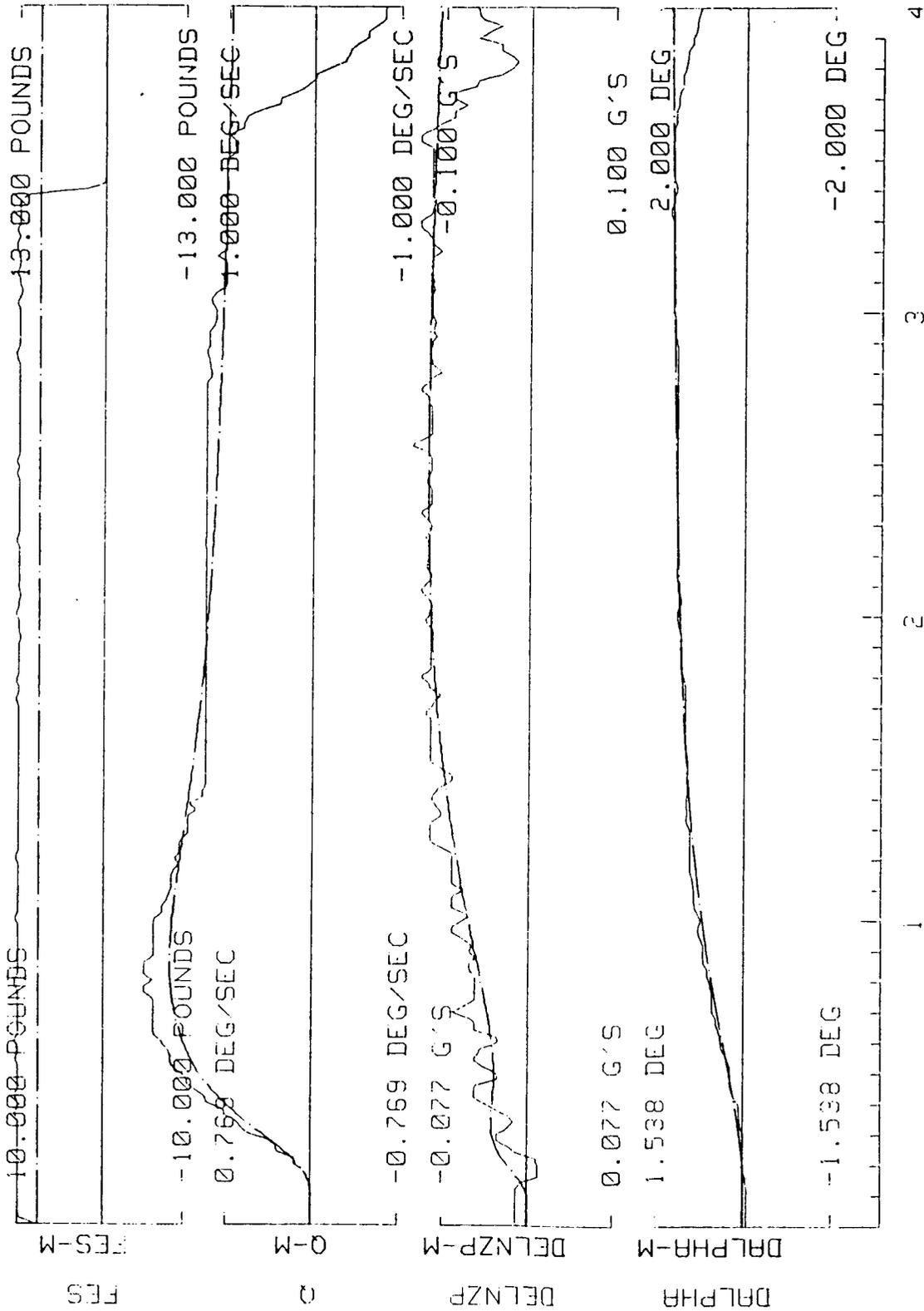
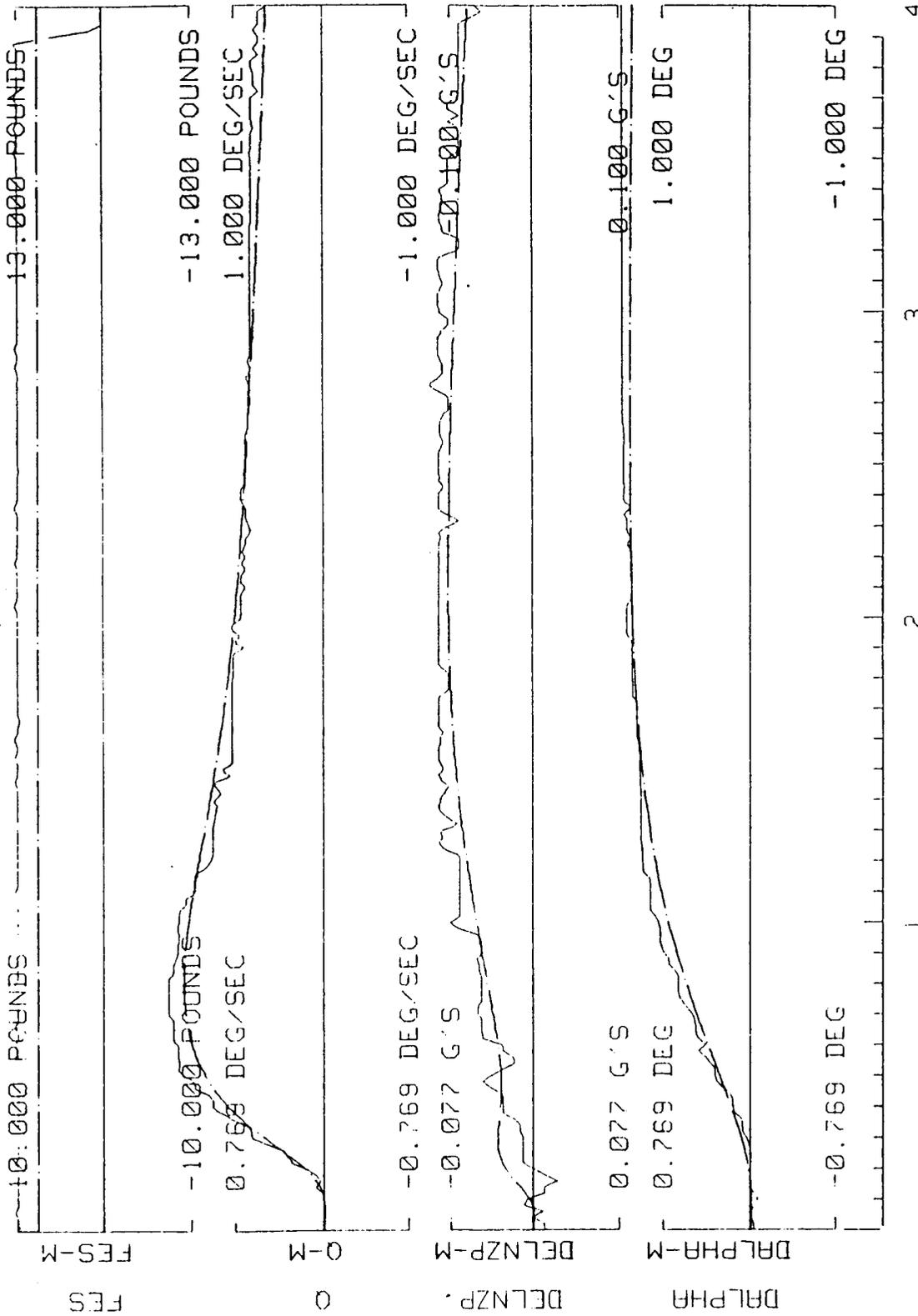


Figure C-20 PITCH STEP RESPONSE - CONFIGURATION 19

CONFIG 20 (FLT 889)



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Figure C-21 PITCH STEP RESPONSE - CONFIGURATION 20

# ROLL STEP FLT 889

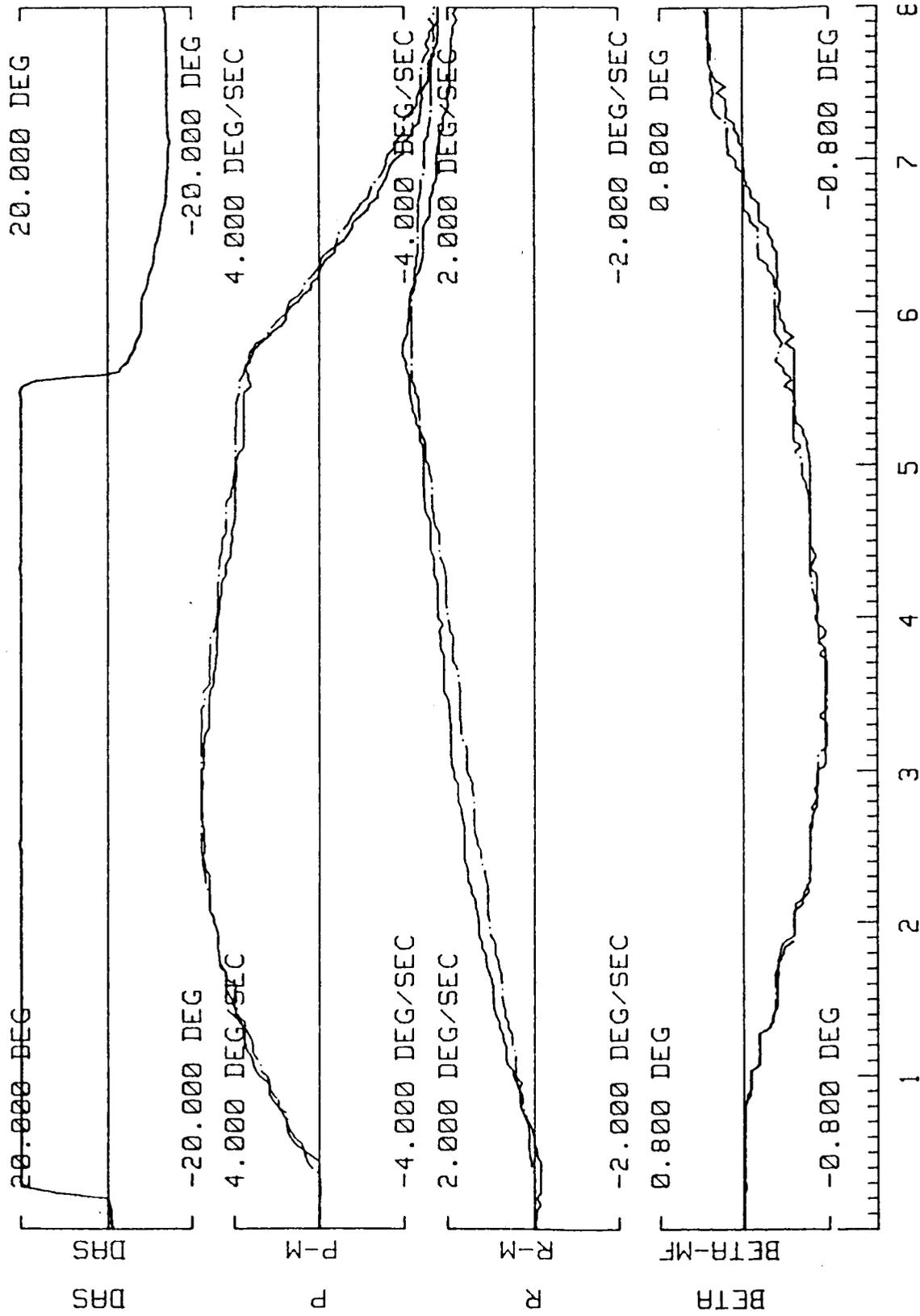
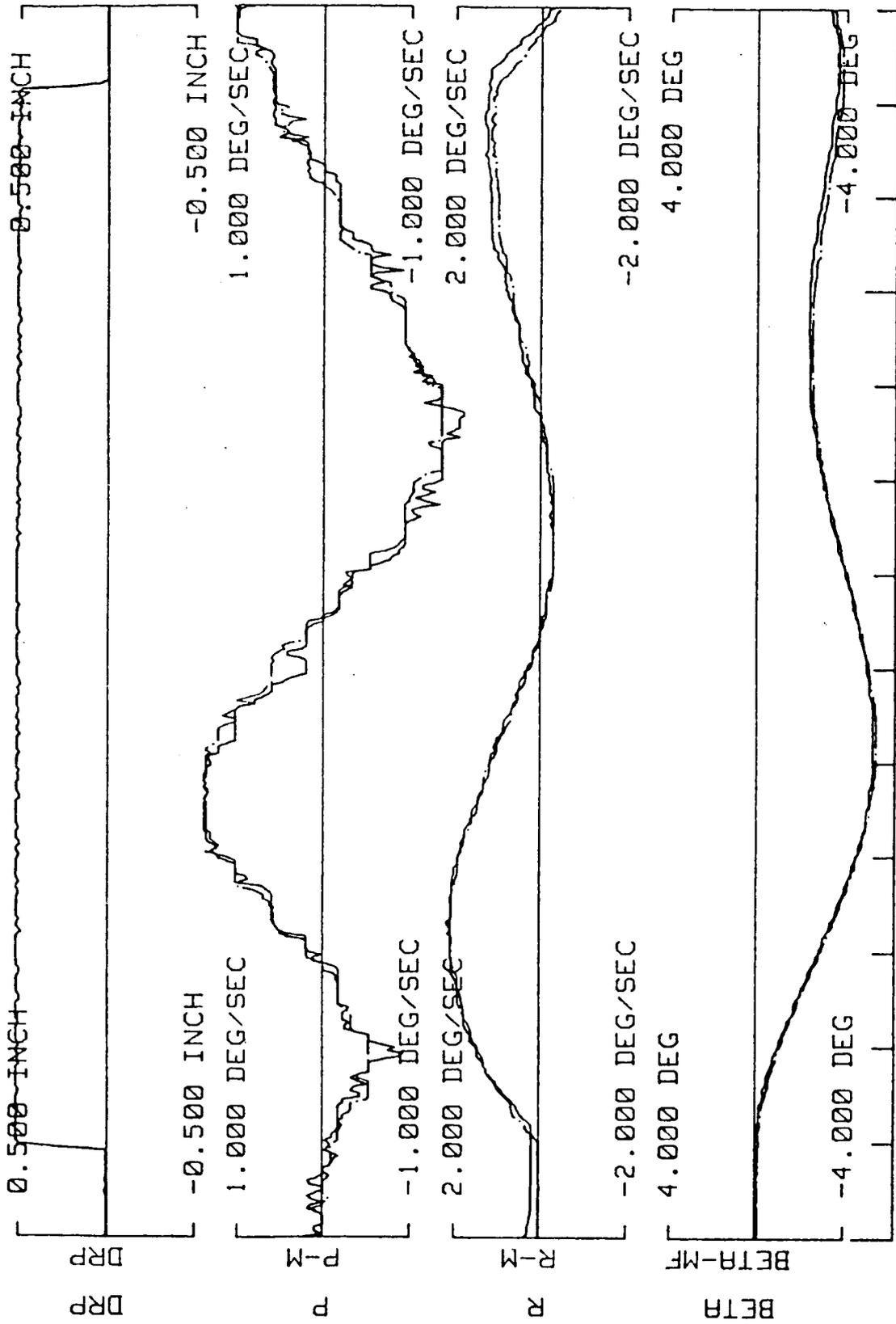


Figure C-22 MODEL FOLLOWING - ROLL STEP RESPONSE

# YAW STEP FLT 889



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Figure C-23 MODEL FOLLOWING - YAW STEP RESPONSE

Appendix D  
PILOT COMMENTS

This appendix presents the complete transcribed pilot comments. They are presented in configuration order.

DATE: 12/4/85  
FLT: 891

TURB: None  
OVERALL PR: 3

PILOT: Person  
CONFIG. #: B

A. Initial Overall Impression - It flies fairly well.

B. Approach

1. Initial/Final response to control inputs - Feels pretty good, but it's not as snappy as I would like it to be. It doesn't exactly feel like a rubber band airplane, but it doesn't feel like I'm really tied too tight to it either.
2. Flight path control - Seems to be adequate.
3. Pitch attitude control - Except for the fact that I would like a little higher gearing in the stick, is adequate.
4. Airspeed control - I think is within +/- 3 knots.
5. Offset correction - No problem.
6. Atmospheric disturbances - Was easily handled.
7. Special pilot techniques - None required, but I do find I seem to be happier if I keep the trim in the approach then to hold the forces on the stick; so I'm trimming in the approach.

C. Flare and Touchdown - Doesn't really apply here, as we did not make touchdowns (still too heavy).

1. Pitch attitude and flight path control - As I come to the point where I really want to change attitude, I feel like I want more gearing in the stick, like the airplane is too heavy for what I want to do.
2. Control of touchdown parameters - Did not make touchdowns.
3. Atmospheric disturbances - Were easy to handle.
4. Special pilot techniques - None.

D. Pitch Ratings

1. Approaches - 3 - The airplane is not as responsive as I would like.
2. Flare and Touchdown - 3 - By extrapolating to T.D.
3. Overall - 3
4. PIO Rating - 1

DATE: 12/5/85  
FLT: 893

TURB: None  
OVERALL PR: 3

PILOT: Ball  
CONFIG. #: B

A. Initial Overall Impression - Seemed very easy to fly, I didn't have any complaints about anything. It seemed to be well balanced all the way around.

B. Approach

1. Initial/Final response to control inputs - It wasn't jerky or sluggish.
2. Flight path control - Quite easy.
3. Pitch attitude control - I like it. It just had that big airplane feel, but it was fine.
4. Airspeed control - The trim worked well, held speed. I had my eyes off it for quite a while and it seemed to stay OK.
5. Offset correction - Was not difficult.
6. Atmospheric disturbances - Didn't bother me.
7. Special pilot techniques - None needed.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Fine, only this being the first evaluation, just getting used to the eye height and things like that.
2. Control of touchdown parameters - Had only one that I touched down on, was due just to getting used to it. The airplane was doing what I wanted was the important thing.
3. Atmospheric disturbances -
4. Special pilot techniques -

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 3
3. Overall - 3
4. PIO Rating - 1

DATE: 12/17/85      TURB:            Light            PILOT:            Smith  
FLT: 906            OVERALL PR: 3            CONFIG. #: B

A. Initial Overall Impression - The thing I notice is pretty high force gradients off trim speed, less than ideal for me.

B. Approach

1. Initial/Final response to control inputs - Satisfactory
2. Flight path control - No difficulties
3. Pitch attitude control - Smooth and predictable
4. Airspeed control - Throttles are quite sensitive, but it's easy to manage. You're making tiny throttle inputs but it's very responsive in the sense that you get immediate airspeed response. So it's easy to control.
5. Offset correction - The lateral/directional, if you are aggressive at all, it doesn't feel like it's ideal. It seems to slosh around the turn a little bit.
6. Atmospheric disturbances - Weren't a factor
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Easy and predictable, satisfactory
2. Control of touchdown parameters - Were achieved OK
3. Atmospheric disturbances - Not a factor
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3 - minor deficiency was off trim forces were noticeable to me. The trim response was fast. So it's just a minor problem.
4. PIO Rating - 1

DATE: 12/12/85  
FLT: 901

TURB: None  
OVERALL PR: 2

PILOT: Ranz (Boeing)  
CONFIG. #: B

- A. Initial Overall Impression - It was very easy. The flight path control was never in doubt. Speed control was easy. During the flare I could feel a back force required but it was entirely normal and forces relatively light, say 5 to 7 pounds.
- B. Approach
1. Initial/Final response to control inputs -
  2. Flight path control - Very stable
  3. Pitch attitude control - Was very solid
  4. Airspeed control - Easy, feels speed stable
  5. Offset correction - No problems, I like the turn compensation (No pitch inputs required for turns - in all of the configurations)
  6. Atmospheric disturbances - Didn't see any
  7. Special pilot techniques - Didn't use any
- C. Flare and Touchdown
1. Pitch attitude and flight path control - Very predictable and good
  2. Control of touchdown parameters - Good
  3. Atmospheric disturbances - Didn't see any
  4. Special pilot techniques - None
- D. Pitch Ratings
1. Approaches - 2
  2. Flare and Touchdown - 2
  3. Overall - 2
  4. PIO Rating - 1

DATE: 12/12/85  
FLT: 902

TURB: Light  
OVERALL PR: 3

PILOT: Higgins (Boeing)  
CONFIG. #: B (Familiarization)

A. Initial Overall Impression -

B. Approach

1. Initial/Final response to control inputs - There seemed to be a little bit of overshoot to the pitch inputs.
2. Flight path control - Flight path seemed to take a lot of attention, but not excessive.
3. Pitch attitude control - A little overshoot in pitch.
4. Airspeed control - It's hard to sort out when you're having problems with the pitch control, but it seemed adequate.
5. Offset correction - Easy
6. Atmospheric disturbances - I noticed it on the second one.
7. Special pilot techniques - I didn't use any

C. Flare and Touchdown

1. Pitch attitude and flight path control -
2. Control of touchdown parameters - It's not as easy to put on a spot as some airplanes I've flown.
3. Atmospheric disturbances -
4. Special pilot techniques - On the first, in the flare I thought I had to push a little bit in order to get it to go where I wanted it to go. On the second one I just pulled off more power.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3
4. PIO Rating - 1

DATE: 12/12/85  
FLT: 902

TURB: Light  
OVERALL PR: 3

PILOT: Higgins (Boeing)  
CONFIG. #: B (repeated)

A. Initial Overall Impression - Takes a fair amount of attention. I had more problem with airspeed control, then with flight path control, although flight path control took a fair amount of attention also. I noticed that more when trying to hold altitude, than on the approach.

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - (see overall)
3. Pitch attitude control - Easy
4. Airspeed control - Took a fair amount of attention, and it seemed to be more difficult to get slowed down once you get high on speed.
5. Offset correction - Adequate
6. Atmospheric disturbances - Took a bit more control input or force than the past ones have
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Good, easy enough overall
2. Control of touchdown parameters - Somewhat more difficult than some but adequate
3. Atmospheric disturbances -
4. Special pilot techniques - I didn't use any

D. Pitch Ratings

1. Approaches - 3 - slight airspeed problem
2. Flare and Touchdown - 2
3. Overall - 3
4. PIO Rating - 1

DATE: 1/7/86  
FLT: 912

TURB: Light to Moderate  
OVERALL PR: 2

PILOT: Hadden (Lockheed)  
CONFIG. #: B

A. Initial Overall Impression -

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - Good, positive
3. Pitch attitude control - Good, well damped
4. Airspeed control - Good
5. Offset correction - No problem
6. Atmospheric disturbances - Didn't see any
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Normal, pretty good to me
2. Control of touchdown parameters - Once we found out where we wanted to touchdown, it was fair. I may still be flaring high (his first evaluation)
3. Atmospheric disturbances - Nothing
4. Special pilot techniques - Nothing

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 12/4/85  
FLT: 891

TURB: None  
OVERALL PR: 2-1/2

PILOT: Person  
CONFIG. #: 1

A. Initial Overall Impression - That was a fairly easy airplane to fly. In the approach I found myself trimming. It appears like an attitude kind of a system to me.

B. Approach

1. Initial/Final response to control inputs - The initial response is pretty good. It seems to give me an attitude in response to the what I put into the stick. It's predictable but I would like a little bit higher gearing.
2. Flight path control - It makes the flight path angle control not too difficult although I find that I don't like to hold forces in the approach, so I trim.
3. Pitch attitude control - Not difficult, the airplane seemed to do what I wanted it to do.
4. Airspeed control - Adequate
5. Offset correction - Easy
6. Atmospheric disturbances - If there was a gust there (on first approach gust was 6 ft/sec) I did not feel it as it came through. (On second approach) was very obvious that time (gust set at 7.6 ft/sec and kept there for the rest of program)
7. Special pilot techniques - Flies pretty much like an airplane, wasn't difficult to do. No special techniques

C. Flare and Touchdown

1. Pitch attitude and flight path control - Reasonable, satisfactory for the job
2. Control of touchdown parameters - Within desired parameters, although the sink speed was higher than what I would like (3 to 4 ft/sec), and there was a tiny cross-track drift rate at touchdown.
3. Atmospheric disturbances - Was obvious (on second approach)
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 2 - though you have to trim through the approach, you don't really fly it, but I trim most everything anyway.
2. Flare and Touchdown - 2-1/2 - after a few approaches I think I could do a better job than I did.
3. Overall - 2-1/2
4. PIO Rating - 1 (Safety pilot noted sink speed was boarder line desired/adequate)

DATE: 12/12/85      TURB:            None            PILOT:        Ball  
FLT: 900            OVERALL PR: 3            CONFIG. #: 1

A. Initial Overall Impression - It takes a lot of back pressure in the flare, much more than in others. Took trimming all the way around the pattern. I would probably learn to flare it more if I did it many more times.

B. Approach

1. Initial/Final response to control inputs - Felt normal
2. Flight path control - Better than previous configuration (#20), and was not a problem
3. Pitch attitude control - Other than higher forces, it wasn't difficult
4. Airspeed control - Quite reasonable, but took quite a few throttle corrections, more than last one
5. Offset correction - Didn't seem to be a problem. I had to spend a little more time watching the airspeed throughout the correction, so I didn't get way off.
6. Atmospheric disturbances - Wasn't any
7. Special pilot techniques - Just requirement to trim more, than what I've been used to in this program.

C. Flare and Touchdown

1. Pitch attitude and flight path control - It was fine, higher forces. That was nice for the flight path control, because when I got where I wanted to be, all I had to do was release a little bit of pressure, but it was only a small percentage of the pressure for it to touchdown.
2. Control of touchdown parameters - The h-dot was super, no problem. It felt quite tight. If I have a complaint, it was the forces being a bit high there. For a big airplane they may not be, but for what I'm used to they feel high.
3. Atmospheric disturbances - Had to pay more attention to the airspeed throughout the gust in close, but didn't upset me. What little flight path variation I got was easy to correct for.
4. Special pilot techniques - None, other than what I talked about

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3 - Due to minimal compensation of trimming and higher forces
3. Overall - 3
4. PIO Rating - 1 - I put in several inputs near the end, but that was just fine tuning.

DATE: 1/9/86      TURB:            Moderate      PILOT:            Hadden (Lockheed)  
FLT: 917            OVERALL PR: 3      CONFIG. #: 1

A. Initial Overall Impression - Pitch was stable

B. Approach

1. Initial/Final response to control inputs - Satisfactory
2. Flight path control - Good, follows the glide path fairly easy considering the turbulence
3. Pitch attitude control - Pitch seems to be relatively stable
4. Airspeed control - A little off because of the turbulence, but not as bad as the last one (#28)
5. Offset correction - No problem
6. Atmospheric disturbances - Definitely turbulent, may have had some effect on the approach.
7. Special pilot techniques - Didn't really use any

C. Flare and Touchdown

1. Pitch attitude and flight path control - I thought it was very good, considering the turbulence, really not much pilot input required to put the nose of the airplane where I wanted it to.
2. Control of touchdown parameters - Best I've seen even though we have the turbulence and crosswind smooth touchdowns.
3. Atmospheric disturbances -
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3 - A little work for the pilot due to the turbulence. In smooth air it would probably be a 1 or 2 in pilot rating.
4. PIO Rating - 1



DATE: 12/4/85      TURB:            None      PILOT:            Person  
FLT: 891            OVERALL PR: 3      CONFIG. #: 2

A. Initial Overall Impression - That's a fairly easy airplane to fly once you figure out what it is doing.

B. Approach

1. Initial/Final response to control inputs - Seems to be predictable, it's what it does after you get out of it, holding the attitude that you have to figure out what it's going to do, and it's not too hard to fly.
2. Flight path control - Very easy
3. Pitch attitude control - Easy
4. Airspeed control - Within the desired range most of the time, once in a while I'd dribble out by a couple of knots, but you have plenty of time to correct it, as you are not screwing around trying to control the attitude.
5. Offset correction - Easy
6. Atmospheric disturbances - Did not feel the disturbance that time.
7. Special pilot techniques -

C. Flare and Touchdown

1. Pitch attitude and flight path control - Fairly easy
2. Control of touchdown parameters - Within the desired range, though floated on first one. I didn't know what I had on first one, but on the second I knew what I had, so I adapted my technique to fly the airplane.
3. Atmospheric disturbances - Did not see any
4. Special pilot techniques - A rate command/attitude hold airplane. You just make a little input and get out of the system, and let it do its thing. I think that during the flare and touchdown, I went both ways on the column. That doesn't bother me. I tend to like these kind of airplanes.

D. Pitch Ratings

1. Approaches - 2 - There's not much that you have to do to it, other than manage the airspeed. You can pick the attitude and put it where you want it.
2. Flare and Touchdown - 3 - Because you have to go both ways on the stick, but that doesn't bother me a lot. I don't mind working through the detent.
3. Overall - 3
4. PIO Rating - 1 - Inputs both ways, but not PIO type inputs.

DATE: 12/12/85  
FLT: 900

TURB: None  
OVERALL PR: 3

PILOT: Ball  
CONFIG. #: 2

A. Initial Overall Impression - This one that I have to watch the instruments quite a bit closer, it doesn't take care of itself quite as nicely. But once you're on, it did seem to hold pretty well.

B. Approach

1. Initial/Final response to control inputs - When I make a correction, and release the pressure, the correction stayed there. The attitude seemed to hold where I left it.
2. Flight path control - Not too difficult, particularly once I got on the glideslope, it tracked along very nicely. But when I was making corrections back, I had to watch, because if I put a correction in, and didn't look back at just the right time to stop it, it would very easily go right on through.
3. Pitch attitude control - No problem
4. Airspeed control - I've just learned to watch certain ones of these closer, so it meant just a little more cross check with the airspeed, but the control itself was not particularly difficult.
5. Offset correction - The second time I was a little more aggressive than the first and it still didn't cause any problem.
6. Atmospheric disturbances - Never saw any throughout the approach and landing
7. Special pilot techniques -

C. Flare and Touchdown

1. Pitch attitude and flight path control - Pitch attitude is no problem. Flight path took a little extra effort to get the desired performance.
2. Control of touchdown parameters - Pretty good. With a little practice I think I could put it on the cable.
3. Atmospheric disturbances -
4. Special pilot techniques - The only thing is, I have to watch it a lot closer, that is the instruments. This was one of those constant descent landings, more than some of the others I've had. That's a technique where I don't hold it off and let it settle, it's an actual fly it right down to the runway.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3 - Due to compensation of checking the airspeed more
3. Overall - 3
4. PIO Rating - 1

DATE: 12/17/85      TURB:            Light            PILOT:            Meyer (Germany)  
FLT: 907            OVERALL PR: 6            CONFIG. #: 2

A. Initial Overall Impression - The aircraft is controllable, the performance is adequate, there are some deficiencies, PR in 4 to 6 range.

B. Approach

1. Initial/Final response to control inputs - OK, no special commands
2. Flight path control - OK
3. Pitch attitude control - OK
4. Airspeed control - Had a little bit of a problem. I had some fluctuations in thrust of about 15%
5. Offset correction - OK
6. Atmospheric disturbances - Some noticed
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Pitch attitude should have been higher but I couldn't get the airplane down (floated). Flight path control is OK.
2. Control of touchdown parameters - Not very exact
3. Atmospheric disturbances - Some turbulence seen
4. Special pilot techniques - Nothing

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 6
3. Overall - 6
4. PIO Rating - 1

DATE: 12/7/85  
FLT: 895

TURB: Light  
OVERALL PR: 3

PILOT: Person  
CONFIG. #: 3

A. Initial Overall Impression - Not a difficult airplane to fly.

B. Approach

1. Initial/Final response to control inputs - Seem to be predictable. I feel a pitch rate in response to my input. It's not a very high pitch rate. It's a fairly low gearing.
2. Flight path control - Relatively easy
3. Pitch attitude control - Easy
4. Airspeed control - Is difficult, and I don't know if it's the turbulence (light) or what, but it looks like if you make a little change in attitude that the speed goes one way or the other very quickly. One degree change in pitch attitude will give you 10 knot airspeed change.
5. Offset correction - Easy
6. Atmospheric disturbances - Exist today, you can see it in the airspeed indicator
7. Special pilot techniques - None required

C. Flare and Touchdown

1. Pitch attitude and flight path control - Relatively easy
2. Control of touchdown parameters - Within the desired zone, the only thing that I found myself concerned with in the final part of the approach was the airspeed, and it bled off that time to a little less than 120 knots at touchdown.
3. Atmospheric disturbances - You can feel the ballooning from the angle of attack gust
4. Special pilot techniques - No special techniques. I did not trim during the approach. I tried just to fly and close the loop with attitude, conventional technique.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3 - Mild unpleasant deficiency was airspeed control
4. PIO Rating - 1

DATE: 12/7/85      TURB:            Light      PILOT:          Ball  
FLT: 896            OVERALL PR: 6      CONFIG. #: 3

A. Initial Overall Impression - The biggest thing that really jumped at me was the airspeed control. It was all over the place. I had to be looking right at it. Even when I was looking at it, it wasn't easy to put it right on an airspeed. It did not have that instinctive feel of a real airplane - Atari game feel.

B. Approach

1. Initial/Final response to control inputs - As far as changes in attitude, I did not have any complaint with that. I could do that fairly tightly.
2. Flight path control - That also was all over the place. I seem to be varying quite a lot on the flight path control without nailing it, and watching airspeed was enough trouble.
3. Pitch attitude control - Was fine
4. Airspeed control - Was the biggest problem
5. Offset correction - That did not seem to trigger anything out of the ordinary
6. Atmospheric disturbances - No problem
7. Special pilot techniques - It was a rate command, so I'd make a change and watch the airspeed closely and then once I got it coming down and had the right approach to the flare, I'd just kind of held what I had. Didn't make any big movements, maybe just a smooth one near the end.

C. Flare and Touchdown

1. Pitch attitude and flight path control - The pitch attitude was no problem. The flight path control seemed to be under control alright near touchdown.
2. Control of touchdown parameters - The biggest thing was trying to get the airspeed right. It looked like the flare was going to work out all right, but the first time I didn't realize how slow I was.
3. Atmospheric disturbances - That might have been what started the airspeed problem
4. Special pilot techniques - Watch the airspeed closely, make very smooth corrections, and a minimum of them close to the ground. It took a different technique and I had a learning curve, so by the second approach I knew what to watch. It didn't have a normal settling feel. Used somewhat of a pulsing technique.

D. Pitch Ratings

1. Approaches - 6 - Velocity and flight path control problems on the approach
2. Flare and Touchdown - 6 - Though I did not have flight path control problems once I got down to where I could see the ground.
3. Overall - 6
4. PIO Rating - 1

DATE: 12/20/85  
FLT: 909

TURB: None  
OVERALL PR: 2

PILOT: Meyer (Germany)  
CONFIG. #: 3

A. Initial Overall Impression - Aircraft was easy to fly, it was a Level I.

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - No problem
3. Pitch attitude control - Good
4. Airspeed control - Good
5. Offset correction - Good
6. Atmospheric disturbances - None
7. Special pilot techniques - None, other than quite a difference in trim (from #11 and 12). This time I had to trim quite more.

C. Flare and Touchdown

1. Pitch attitude and flight path control - No problem
2. Control of touchdown parameters - I would have liked to have touched down earlier on the first one, maybe I should have pushed a little bit. I flared a little bit long on that one.
3. Atmospheric disturbances - None
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 12/7/85  
FLT: 895

TURB: Light  
OVERALL PR: 4

PILOT: Person  
CONFIG. #: 4

A. Initial Overall Impression - It looks like a rate command short term/attitude command long term.

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - Relatively simple. I held the forces for a long time, then beeped them off with the trim, as I don't like to hold them.
3. Pitch attitude control - You're able to make little attitude changes. For little stick inputs you get little attitude changes, it just takes a relatively long time to get there. For bigger attitude changes you use bigger stick inputs. It seems to take about the same time to get there. That part is fairly predictable.
4. Airspeed control - Is more difficult than I would like.
5. Offset correction - Easy
6. Atmospheric disturbances - Didn't cause any problem
7. Special pilot techniques - None except you have to trim the airplane in the approach and you have to pull on it in the flare.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Relatively straight forward
2. Control of touchdown parameters - Desired
3. Atmospheric disturbances - Didn't seem to be as easily disturbed, as some of the other airplanes have been.
4. Special pilot techniques - None. If you look at the traces in the flare, you'll find that there was an overall level of pull and then some relaxing during the pull, not an oscillation, some modulating of force and stick position in the flare. Some relaxing, then continuing of pull.

D. Pitch Ratings

1. Approaches - 4
2. Flare and Touchdown - 2
3. Overall - 4 - But note that for flare and touchdown the attitude control was good
4. PIO Rating - 1

DATE: 12/12/85      TURB:            None            PILOT:        Ball  
FLT: 900            OVERALL PR: 2            CONFIG. #: 4

A. Initial Overall Impression - The nicest feeling of the ones today (others were #20, 1, 2). Felt more natural. It took a little trimming. I'd look away for great periods of time and come back and it was right where I expected it to be.

B. Approach

1. Initial/Final response to control inputs - Felt good, both of them
2. Flight path control - Easy
3. Pitch attitude control - Easy. Forces were just the way I prefer them
4. Airspeed control - When I was off, I knew I was off, as a result it was easy to keep it in the ball park, without staring at the instrument.
5. Offset correction - Was no problem
6. Atmospheric disturbances - None on the approach
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Fine
2. Control of touchdown parameters - It felt like I knew I was right where I wanted to be, and it was a much better feeling airplane.
3. Atmospheric disturbances - Over the overrun I felt a little surge, but no problem to correct for it.
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 1/8/86  
FLT: 915

TURB: Light to moderate  
OVERALL PR: 4

PILOT: Smith  
CONFIG. #: 4

A. Initial Overall Impression - I was not real happy with the initial response. It just didn't seem very responsive. Better than the last one though (configuration #25).

B. Approach

1. Initial/Final response to control inputs - Initial response I felt was a little delayed, but the final response was not really effected by it.
2. Flight path control - Not effected either. You get into controlling the flight path by pumping the stick. The response was fast enough that you don't overcontrol the pumping and effect the flight path, so you can iterate on the flight path quite accurately.
3. Pitch attitude control - Was satisfactory
4. Airspeed control - OK
5. Offset correction - OK
6. Atmospheric disturbances - Commented on in earlier configurations today (realistic but did not bother him)
7. Special pilot techniques - Pulsing techniques on the stick to control flight path

C. Flare and Touchdown

1. Pitch attitude and flight path control - In pitch attitude control, I tended to not quite get the response, so I couldn't fly in a nice smooth linear fashion, I had to kind of pulse the airplane, and I could achieve adequate flight path control in the process.
2. Control of touchdown parameters - I thought was reasonable
3. Atmospheric disturbances - Not a factor
4. Special pilot techniques - Already commented on this (pulsing technique, couldn't fly smoothly)

D. Pitch Ratings

1. Approaches - 4 - I was just a little bothered by the initial pitch response
2. Flare and Touchdown - 4
3. Overall - 4
4. PIO Rating - 2 - Reflects that pulsing technique requirement, really no big overcontrol.

DATE: 12/20/85      TURB:            None            PILOT:            Meyer (Germany)  
FLT: 909            OVERALL PR: 5            CONFIG. #: 4

A. Initial Overall Impression - I preferred the response of the others (#11, 12, 3) concerning the sensitivity. I didn't like this one. It was too sluggish.

B. Approach

1. Initial/Final response to control inputs - Required improvement, they were rather poor
2. Flight path control - Poor
3. Pitch attitude control - Was possible
4. Airspeed control - No problem
5. Offset correction - No problem
6. Atmospheric disturbances - None
7. Special pilot techniques - I needed a lot of elevator travel

C. Flare and Touchdown

1. Pitch attitude and flight path control - Medium, sluggish
2. Control of touchdown parameters - On the second one I was only lucky just to have pulled a little bit and at the right moment. The first one was more typical for this type of control.
3. Atmospheric disturbances - No influence
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 5
2. Flare and Touchdown - 5
3. Overall - 5 - Due to high forces
4. PIO Rating - 1

DATE: 1/10/86  
FLT: 918

TURB: Light  
OVERALL PR: 6

PILOT: Person  
CONFIG. #: 5

A. Initial Overall Impression - That was certainly better than the last two we had (configuration #11 and #12). It was controllable. It's a manageable kind of an airplane, but not one that I'd particularly like. It feels sort of like a rate command/attitude hold with an attitude rebound on it, which keeps you in the control loop a lot more than I like to stay in the control loop.

B. Approach

1. Initial/Final response to control inputs - It seemed to have fairly good initial response but it did seem like I was able to manage the flight path control as well I would like to manage it. I think it was probably because the attitude control wasn't as tight as I'd like it to be. When you get one of those with the attitude rebound in it, you have to keep tickleing it all the time to do what you want it to do. You can't really nail an attitude. You can't stay in it, like a normal airplane, and if you get out of it, it goes somewhere you didn't really want it to be. So you got to keep playing with it all the time. I think this is the same problem that comes up in the control of the touchdown.
2. Flight path control -
3. Pitch attitude control - Loose, is a good term for it. Always had to play with it.
4. Airspeed control - Not too bad once I got on, however, it felt like I had a hard time getting on speed. The corrections were not easy on the airspeed.
5. Offset correction - Not difficult
6. Atmospheric disturbances - Because the attitude system was loose, the airplane would balloon and change pitch attitude
7. Special pilot techniques - (see initial/final response)

C. Flare and Touchdown

1. Pitch attitude and flight path control - Attitude control in the flare wasn't bad. Flight path angle control - I didn't seem to be able to get the airplane to keep coming down like I wanted it to. It was a kind of a push the airplane on to the ground to get it to land where I wanted it.
2. Control of touchdown parameters - The first one was in the desired, but the second was long, and I had to push the airplane to get it on the ground, and my throttle was all the way off for those.
3. Atmospheric disturbances -
4. Special pilot techniques - It's not a nice rate command/attitude hold and not a normal airplane. It's one you could almost do the job with, but not quite. I can't stay in the system, and I can't stay out of the system, I got to keep worrying the airplane to get it to do what I want it to do. You did have to push it to touchdown.

D. Pitch Ratings

1. Approaches - 4
2. Flare and Touchdown - 6
3. Overall - 6
4. PIO Rating - 3 - No tendency to PIO, but a tendency to bobble

DATE: 12/12/85  
FLT: 900

TURB: None  
OVERALL PR: 6

PILOT: Ball  
CONFIG. #: 5

A. Initial Overall Impression - Unnatural, I didn't care too much for this. The approach took a lot of forward pressure to get it down to the glideslope, and I was working fore and aft a lot. On the second one it seemed to hold it fine but on the first, especially when I was correcting back, overshooting, I didn't care for it. Flared both times and landed long. Good touchdowns but long.

B. Approach

1. Initial/Final response to control inputs - This is the first one I noticed, when I'd put in an input and see what that response was, and think that everything was all done, and then it would tend to continue on for a little bit. I'd put in an input and the response would start, but then it would continue longer than I expected it to. Only one that noticeably did that.
2. Flight path control - Not good, was spongy when trying to get back on glideslope.
3. Pitch attitude control - Pitch attitude was not great, but it was flight path that I was having the biggest problem with
4. Airspeed control - Was one that I was watching, and since the forces came in rather strangely, I had to monitor it rather closely
5. Offset correction - No problem
6. Atmospheric disturbances - Coming down final, I don't believe there were any.
7. Special pilot techniques - Probably would take some. I'd have to fly it some more, because none of the normal techniques seem to be getting the job done. I don't know what that special technique might be, but it would require it.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Attitude, I did not notice a problem with. Flight path control. I didn't care for at all. I never really felt where it was going to touchdown. It was kind of a surprise.
2. Control of touchdown parameters - Poor, long both times, I was not connected to the airplane as tightly as I'd like to be. I didn't have a lot of confidence of right where every part of the airplane was.
3. Atmospheric disturbances - Got into the overrun, and the disturbance killed my nice flight path I thought I had going, and I had to recover from it and never really had it squared away the way I like them. I ballooned.
4. Special pilot techniques - I had to just keep working in making the airplane go where I wanted it to. It wouldn't take care of itself. I was having to push and pull and force it to go where I wanted it to, which I didn't care for.

D. Pitch Ratings

1. Approaches - 5
2. Flare and Touchdown - 6
3. Overall - 6
4. PIO Rating - 3

DATE: 12/20/85      TURB:            None            PILOT:            Meyer (Germany)  
FLT: 909            OVERALL PR: 3            CONFIG. #: 5

A. Initial Overall Impression - Easy to control inspite of my performance which was long on first one which could be due to the tail wind component (6 knot).

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - Good
3. Pitch attitude control - Good
4. Airspeed control - No problem
5. Offset correction - No problem
6. Atmospheric disturbances - None
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - No problem
2. Control of touchdown parameters - Expected it to touchdown but it floated and made landings longer than expected.
3. Atmospheric disturbances - No influence
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3 - Even though performance was not desired, felt that was due to tail wind (safety pilot noted tail wind was same for all configurations today and he did not have the trouble on some of the others).
4. PIO Rating - 1

DATE: 1/9/86      TURB:      Light      PILOT:      Person  
FLT: 916      OVERALL PR: 9      CONFIG. #: 5 (plus 200 msec  
extra delay)

A. Initial Overall Impression - It's a rate command/attitude hold airplane with fairly high gain in terms of gearing. It has a time delay in there which is disagreeable.

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - On the approach it's no problem, you can make little jab inputs into the system and stay within a quarter of a dot.
3. Pitch attitude control - Really is not a problem there, just make little jab inputs for changes of half a degree at a time.
4. Airspeed control - Was about 5 knots high in the approach, but with the winds the way they are (22-24 knots headwind) I'm not concerned with what the airspeed's doing. It was stable at about 138 knots.
5. Offset correction - Once again I feel that as I come off the offset that I sink, and then I get the gust that lifts me back up.
6. Atmospheric disturbances -
7. Special pilot techniques - With the very high gain and very tight attitude stability once you get out of the loop, you could almost fly this airplane open loop.

C. Flare and Touchdown

1. Pitch attitude and flight path control - On the first approach I realized I was going to be a little long, and I also realized from the approach that the airplane was going to be very difficult to land. But if I landed it long, and I wasn't terribly concerned about anything other than the sink speed and attitude at touchdown, that I could do the job with it. I realize you can't do it if you try to put it on the spot.
2. Control of touchdown parameters - The first time was OK, because I did not force myself to hit the spot. But as soon as you force yourself to hit the spot like I did on the second one, you induce the tendency to PIO the airplane which is obviously there.
3. Atmospheric disturbances - No problem
4. Special pilot techniques - If you want to let the airplane go beyond the spot, no problem. But if you want to hit the spot you really have to be super tender with it, or you will PIO.

D. Pitch Ratings

1. Approaches - 3 - No problem
2. Flare and Touchdown - 9 - worse than the last one (#28). Even though I don't like heavy airplanes, once it gets that light, crisp, with that time delay, then the tendency to PIO and get in trouble increases.
3. Overall - 9
4. PIO Rating - 6

DATE: 12/7/85  
FLT: 895

TURB: Light  
OVERALL PR: 2

PILOT: Person  
CONFIG. #: 6

A. Initial Overall Impression - This is one that I like. It's a snappy rate command/attitude hold type system, like on autopilot on the approach. Very good open and closed-loop.

B. Approach

1. Initial/Final response to control inputs - Good initial response with very predictable attitude response.
2. Flight path control - The flight path seems to respond to the attitude changes. It's just a nice airplane to fly, so you could fly down the glideslope with little pulse type inputs without much trouble. Generally when I was trying to track there, I was within a 1/2 dot.
3. Pitch attitude control - Very responsive and predictable in terms of its attitude control.
4. Airspeed control - The speed seems to be relatively stable with small changes in attitude and it doesn't drift off speed.
5. Offset correction - Simple
6. Atmospheric disturbances - Some turbulence on the approach, I'd characterize as light, but it still wasn't a problem.
7. Special pilot techniques - It's a rate command/attitude hold system, and you tend to pulse it or make very small inputs in a ramp or step type manner.

C. Flare and Touchdown

1. Pitch attitude and flight path control -
2. Control of touchdown parameters - Very good, probably the first one was the best to date in terms of sink speed and overall control.
3. Atmospheric disturbances -
4. Special pilot techniques - Requires going through the detent. On the last and perhaps the first approach there may have been at least one or two down pulses. I don't consider that a PIO, it's just the technique required to flare that kind of airplane.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 12/13/85  
FLT: 905

TURB: Light  
OVERALL PR: 6

PILOT: Ball  
CONFIG. #: 6

A. Initial Overall Impression - Approach was not easy, the landing seemed quite easy. Forces were high in the approach.

B. Approach

1. Initial/Final response to control inputs - I did not care for it, particularly for the flight path control. Put an input in and it seemed to take a long time before it started to correct. And when I wanted to hold altitude sometimes it didn't, and sometimes when I wanted to initiate a descent, it wanted to hold altitude for a while.
2. Flight path control - So that tells you flight path control was the worst part about that one, it was sluggish.
3. Pitch attitude control - By itself, other than taking higher forces than some of the other ones, it wasn't too bad.
4. Airspeed control - Was more difficult, had to watch it all the time.
5. Offset correction - Didn't notice too much difference on that.
6. Atmospheric disturbances - When I got in close, it changed the flight path a little bit. When I had to make my correction, I felt that real sluggishness.
7. Special pilot techniques - Overdrive more than I would like to, just trying to hurry things along a little bit.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Didn't notice any problems with the pitch attitude. The flight path control turned out both landings to be quite reasonable. Smoother landings than what I anticipated.
2. Control of touchdown parameters - In the middle of desired, so I can't complain about the accuracy of it. It was easy, the flare and touchdown.
3. Atmospheric disturbances -
4. Special pilot techniques - Watching airspeed closely and pushing a little bit to get the flight path the way I wanted it. It took some forward pressure to get it down.

D. Pitch Ratings

1. Approaches - 6 - The worst part due sluggish flight path control. I had to overdrive it so much.
2. Flare and Touchdown - 3 - Forward pressure and had to watch airspeed.
3. Overall - 6 - Due to approach portion
4. PIO Rating - 1

DATE: 12/20/85  
FLT: 909

TURB: None  
OVERALL PR: 3

PILOT: Meyer (Germany)  
CONFIG. #: 6

A. Initial Overall Impression - Quite good flying aircraft.

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - No problem
3. Pitch attitude control - No problem
4. Airspeed control - No problem
5. Offset correction - No problem
6. Atmospheric disturbances - None
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - No problem
2. Control of touchdown parameters - My performance was only on the adequate side. Maybe I paid too much attention to making a smooth touchdown, and I suppose that's why the touchdown point is on the far end of the required performance.
3. Atmospheric disturbances - None
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3 - The performance was not good because I paid too much attention to the touchdown (blamed himself and not the configuration, safety pilot noted that he was able to make more precise landings on some other configurations)
4. PIO Rating - 1

DATE: 1/9/86  
FLT: 916

TURB: Light  
OVERALL PR: 5

PILOT: Person  
CONFIG. #: 7

A. Initial Overall Impression - My first impression with that airplane was that I liked it very much. My final impression of it is I see no real correlation between the flight path control and attitude.

B. Approach

1. Initial/Final response to control inputs - A good rate command/attitude hold type airplane. There doesn't seem to be any time delay to give me any problems. Sensitivity seems about right.
2. Flight path control - I couldn't understand it, the pitch attitude control was OK but the flight path did not go with it.
3. Pitch attitude control - There doesn't seem to be any problem there.
4. Airspeed control - Is no real problem, fairly good.
5. Offset correction - Easy to make.
6. Atmospheric disturbances - On the first one I felt the disturbance, I ballooned up. I made what I'd call a normal flare for the airplane and the airplane floated on down the runway.
7. Special pilot techniques - A good rate command attitude hold type airplane. The approach tracking accuracy was very good, but I had to always be in the loop screwing around with the airplane, because the flight path angle didn't do what it should have done as a function of the attitude.

C. Flare and Touchdown

1. Pitch attitude and flight path control - The pitch attitude control is good. The flight path control on the first one I just completely didn't understand. The throttles were all the way back at idle, the airplane was, in what I thought, a landing attitude, and it just floated on down the runway all by itself. On the second one I learned from the first one, and I decided to fly the airplane all the way down to the runway, and it took a push to get down and it touched down like I wanted it to, and I thought the touchdown on the second one was very good, the best today.
2. Control of touchdown parameters - First floated long, second had a good touchdown but had to push it down.
3. Atmospheric disturbances -
4. Special pilot techniques - Fly it like a rate command/attitude hold, and in addition to that, you have to go back and figure out what to do with the airplane because you've screwed up the flight path response. If they build electric airplanes like that I won't like them, but not because of what you've done to the attitude response, but because of what you've done to the flight path response.

D. Pitch Ratings

1. Approaches - 4
2. Flare and Touchdown - 5
3. Overall - 5 - I like the attitude response but the flight path did not do what it was supposed to.
4. PIO Rating - 1

DATE: 12/7/85  
FLT: 896

TURB: Light  
OVERALL PR: 5

PILOT: Ball  
CONFIG. #: 7

A. Initial Overall Impression - The airspeed control was certainly better than the last one (#3), however, it still took a lot of monitoring. The glide path was not as big a problem, particularly when I got established initially. If I got off and had to get back, then I seemed to be searching around some.

B. Approach

1. Initial/Final response to control inputs - As far as attitude, that was fine. The initial response seemed to be quick, as soon as I put it in I saw the correction.
2. Flight path control - That was adequate, I had no problem with that.
3. Pitch attitude control -
4. Airspeed control - Beared some watching, but it was a little better the one before.
5. Offset correction - Didn't bother me too much.
6. Atmospheric disturbances - It bothered me mostly in getting off airspeed, making me slow. When I'm back trying to get my flight path where I want it, I'm losing track of the speed, and I'm not getting any help at all through the feel.
7. Special pilot techniques -

C. Flare and Touchdown

1. Pitch attitude and flight path control - I could get the attitude I wanted, and sit and hold it fine. Flight path control was not too bad though once you get behind it's hard to get back to correct.
2. Control of touchdown parameters - Airspeed control was difficult, it beared some watching, and that may have caused me to lose the h-dot. Did not get desired performance.
3. Atmospheric disturbances - May have started problems off. With the extra workload there were too many things to watch at once.
4. Special pilot techniques - I did not have any, other than not making many corrections down close and relying more on my instruments than I would if I had a better feeling airplane.

D. Pitch Ratings

1. Approaches - 4
2. Flare and Touchdown - 5 - Airspeed is what threw me off most of the time, no feel of being slow and had to rely on instruments.
3. Overall - 5
4. PIO Rating - 1

DATE: 12/20/85  
FLT: 909

TURB: None  
OVERALL PR: 2

PILOT: Meyer (Germany)  
CONFIG. #: 7

A. Initial Overall Impression - A good flyable aircraft.

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - Good
3. Pitch attitude control - Good
4. Airspeed control - No problem
5. Offset correction - No problem
6. Atmospheric disturbances - None
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Good
2. Control of touchdown parameters - Good
3. Atmospheric disturbances - No problem
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 12/10/85  
FLT: 898

TURB: None  
OVERALL PR: 2

PILOT: Ball  
CONFIG. #: 8

A. Initial Overall Impression - That was a nice flying airplane, no big complaints.

B. Approach

1. Initial/Final response to control inputs - Felt very natural.
2. Flight path control - Quite reasonable. I'm not having a lot of time on final to get set, so my flight path control correction is a more difficult task, so that's probably better (way to evaluate it).
3. Pitch attitude control - Good
4. Airspeed control - All right
5. Offset correction - As easy as I could expect
6. Atmospheric disturbances - No problem
7. Special pilot techniques - Didn't need any

C. Flare and Touchdown

1. Pitch attitude and flight path control - The pitch attitude was fine, went where I wanted it to. The only comment I had on the flight path control was that it took a little forward pressure to put it down where I wanted it. If I had just let it go, we would have drifted a little long. The nice thing putting it forward like that, it just squeaked down both times.
2. Control of touchdown parameters - Quite easy
3. Atmospheric disturbances - Didn't bother me
4. Special pilot techniques - That slight forward pressure to put it right on the spot. Didn't bother me, felt confident about it.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 1/8/86  
FLT: 915

TURB: Light to moderate  
OVERALL PR: 2

PILOT: Smith  
CONFIG. #: 8

A. Initial Overall Impression - (Only one approach, but felt he could give an evaluation). It felt much more responsive, a more predictable airplane (than the previous configuration #4).

B. Approach

1. Initial/Final response to control inputs - The initial response was obvious to me. I could feel like I was getting something, answering my commands. Final response was, therefore, good.
2. Flight path control - Good
3. Pitch attitude control - Good
4. Airspeed control - Not a problem, had a lot of excess workload to concentrate on that.
5. Offset correction - No problem
6. Atmospheric disturbances - None
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Were good
2. Control of touchdown parameters - I thought I could control the touchdown parameters very well. I couldn't really see in the low sun angles exactly where the touchdown zone was, but I controlled the sink rate well.
3. Atmospheric disturbances - Not a factor, was realistic.
4. Special pilot techniques - Found myself pulsing the airplane a little bit there. A real good airplane I wouldn't have to do that. I'd just fly smoothly and linearly.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2 Would still like lighter forces found myself pulsing a little but overall it was a good airplane, significantly better than previous one (#4)
4. PIO Rating - 1

DATE: 12/20/85  
FLT: 910

TURB: None  
OVERALL PR: 2

PILOT: Meyer (Germany)  
CONFIG. #: 8

A. Initial Overall Impression - Good flyable airplane

B. Approach

1. Initial/Final response to control inputs - Nice and smooth, the aircraft is doing what I want.
2. Flight path control - No problem
3. Pitch attitude control - No problem
4. Airspeed control - No problem
5. Offset correction - Easier this time (second approach) as I did it earlier (first time was late due to 8 knot tail wind).
6. Atmospheric disturbances - No influence
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - OK
2. Control of touchdown parameters - Within limits, good
3. Atmospheric disturbances - None
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 1/10/86  
FLT: 918

TURB: Light  
OVERALL PR: 3

PILOT: Person  
CONFIG. #: 9

A. Initial Overall Impression - It's fairly easy to fly. It seems to fly more like a conventional airplane. Initially I thought I was having more trouble with the airspeed but I eventually got it sorted out.

B. Approach

1. Initial/Final response to control inputs - The response to my control input seems to be fairly quick and predictable.
2. Flight path control - Very good
3. Pitch attitude control - Precise
4. Airspeed control - On the first got fast without knowing it. In the second approach it was very good. I had to spend more time making inputs to the throttle to keep the airspeed where I wanted.
5. Offset correction - Easy
6. Atmospheric disturbances - Was really pronounced in this one, that's probably the most disturbance I have felt in terms of actually having to push the airplane through the disturbance to keep it coming back down.
7. Special pilot techniques - The control techniques here was one of trimming because I don't like to hold a force as I make the corrections. It was one where you had to trim to keep the forces out.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Seemed to be very easily controlled both in terms of pitch attitude and flight path angle control.
2. Control of touchdown parameters - Desirable
3. Atmospheric disturbances - Again the disturbance really seemed to balloon the airplane up and it changed attitude.
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3 It doesn't feel as good to me as some of the others have, but it's just a feeling. In terms of control there are no problems. Down graded due to speed control problems. (Safety pilot had to warn of offspeed many times.)
4. PIO Rating - 1

DATE: 12/20/85  
FLT: 910

TURB: None  
OVERALL PR: 5

PILOT: Meyer (Germany)  
CONFIG. #: 9

- A. Initial Overall Impression - There is quite some heave without modification of pitch as would be expected.
- B. Approach
1. Initial/Final response to control inputs - Good
  2. Flight path control - Easy
  3. Pitch attitude control - Easy
  4. Airspeed control - No problem
  5. Offset correction - OK
  6. Atmospheric disturbances - None
  7. Special pilot techniques - None
- C. Flare and Touchdown
1. Pitch attitude and flight path control - I could observe a heave. Flight path control was good.
  2. Control of touchdown parameters - The first one wasn't desired because of this heave.
  3. Atmospheric disturbances - Were not a factor.
  4. Special pilot techniques - None
- D. Pitch Ratings
1. Approaches - 4
  2. Flare and Touchdown - 5
  3. Overall - 5 Heaving without pitch and more heave than expected. I also had to trim quite a lot and used larger pitch commands.
  4. PIO Rating - 1

DATE: 1/10/86  
FLT: 918

TURB: Light  
OVERALL PR: 2-1/2

PILOT: Person  
CONFIG. #: 10

A. Initial Overall Impression - I like the way it flies very much in terms of attitude response but the speed control is funny, I have to watch it more. It looks like one of those rate command/attitude hold. There was never any attempt to trim. It's a heavier airplane than some of the others were, although there doesn't seem to be much in the way of time delay.

B. Approach

1. Initial/Final response to control inputs - For a transport type airplane the response feels pretty good to me. The open loop stability is very good.
2. Flight path control - Glide slope tracking accuracy is very good. The ability to capture either from above or below and get back on was good.
3. Pitch attitude control - Very good
4. Airspeed control - I'm working harder on speed in this configuration than I have in a lot of the others. Speed control was acceptable except I had to work harder on it to do it. Had to spend more time making inputs to the throttle to keep the airspeed where I wanted.
5. Offset correction - No problem
6. Atmospheric disturbances - Absolutely transparent, the airplane's attitude stays right where it was, and there was no tendency for it to float up or bobble up.
7. Special pilot techniques - It's a rate command/attitude hold technique that was applied - make an input then back out. Inputs seemed to be small and the airplane response very predictable.

C. Flare and Touchdown

1. Pitch attitude and flight path control - I would say was very good.
2. Control of touchdown parameters - In terms of sink speed and attitude it would be excellent. I'm sorry we landed short on that first one, but I'm not going to down-rate the airplane because I didn't hit in the desired zone. It was my fault and not the airplane's. I did on the second one (hit in the desired zone).
3. Atmospheric disturbances - Don't seem to disturb the airplane.
4. Special pilot techniques - Rate command/attitude hold technique

D. Pitch Ratings

1. Approaches - 2-1/2
2. Flare and Touchdown - 2-1/2
3. Overall - 2-1/2 - It's better than the last one (configuration #9) and the only deficiency was the airspeed, the little extra attention required to keep the airspeed where I wanted.
4. PIO Rating - 1

DATE: 12/20/85  
FLT: 910

TURB: None  
OVERALL PR: 3

PILOT: Meyer (Germany)  
CONFIG. #: 10

A. Initial Overall Impression - My initial impression was that of a heavy aircraft, and it showed up in the level I area.

B. Approach

1. Initial/Final response to control inputs - It seems to me to be a heavy aircraft.
2. Flight path control - Good
3. Pitch attitude control - Good
4. Airspeed control - I had a drop in airspeed (on the second approach) about 20 seconds prior to touchdown, but it was correctable, without overshoot.
5. Offset correction - No problem
6. Atmospheric disturbances - None
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Good
2. Control of touchdown parameters - No problem
3. Atmospheric disturbances - None
4. Special pilot techniques - This time I pushed the aircraft down (to touchdown) and it worked without increasing the touchdown acceleration.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 3
3. Overall - 3
4. PIO Rating - 1

DATE: 1/10/86  
FLT: 918

TURB: Light  
OVERALL PR: 7

PILOT: Person  
CONFIG. #: 11

A. Initial Overall Impression - I don't like it. It feels to me like an airplane that I get more response out of the system than I want, and it overflies the attitude that I'm looking for. It's as though the damping is too light, although that's probably not it, but that's what it looks like to me. Once I get out of the control system it doesn't stop. It eventually stops, and if I use very little inputs I can make it do what I want it to do. If I try to close the loop tightly around a specific attitude as I did downwind on one, you'll note some definite PIO's as I close the loop quickly and tightly on an attitude which I just can't do.

B. Approach

1. Initial/Final response to control inputs - Tends to oscillate in approach as well as flare with tight control.
2. Flight path control - In the approach using a tiny pulse type technique, I can fly with it, but I don't like it.
3. Pitch attitude control - Overshoots what I want in attitude.
4. Airspeed control - Once I got on, it didn't seem too bad, it seemed to take me a long time to get on airspeed though.
5. Offset correction - Relatively easy
6. Atmospheric disturbances - Not really very obvious, and I guess it's because once you are out of the loop and the airplane settles down, it holds the attitude fairly well.
7. Special pilot techniques - Very tiny inputs and very much out ahead of the airplane and on top of it, I don't like it (In the post flight debrief noted that this configuration and #12 were the only ones that really oscillated in the flare.)

C. Flare and Touchdown

1. Pitch attitude and flight path control - The first approach using the tiny inputs was OK.
2. Control of touchdown parameters - The first approach using the tiny inputs was OK, within the desired parameters, but it's not an acceptable touchdown. On the second one I tried to stay tighter in the loop and be a little more aggressive in flying the airplane and I got into a PIO, as I thought it would.
3. Atmospheric disturbances -
4. Special pilot techniques - Use tiny inputs, pulse technique.

D. Pitch Ratings

1. Approaches - 5
2. Flare and Touchdown - 7
3. Overall - 7
4. PIO Rating - 4 - The oscillation was not divergent, it was just there.

DATE: 1/9/86      TURB:      Moderate      PILOT:      Hadden (Lockheed)  
FLT: 917      OVERALL PR: 8      CONFIG. #: 11

A. Initial Overall Impression -

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - Very good glide slope tracking
3. Pitch attitude control - Considering the turbulence, it was very good, stable
4. Airspeed control - Was poor, as I was having a difficult time getting the airspeed down after I was 15 knots high. Required a lot of throttle motion to do it, and once I get back, the speed control was sloppy.
5. Offset correction - I noticed that during the initiation and rolling out, when I went to change my landing point from the ILS to the visual touchdown point, I overcontrolled in pitch, and seemed to get a little PIO going. But as soon as I backed out of it, it stopped. So it was oversensitive in pitch and that goes through to the flare.
6. Atmospheric disturbances -
7. Special pilot techniques -

C. Flare and Touchdown

1. Pitch attitude and flight path control - Pitch attitude, once you established it, it was OK. The flight path control was poor. I thought it was overly active you might say, I overcontrolled it. I had a difficult time getting the attitude I wanted.
2. Control of touchdown parameters - Was pretty poor, long, not adequate. Got into a very low frequency pitch PIO on both.
3. Atmospheric disturbances - That may have added to the problem.
4. Special pilot techniques - When I did overcontrol, just ease off on the control. I was stairstepping down in the flare. In the one PIO I did get into I thought it was pilot induced but after I let go of the control wheel it kept on nose bobbling, so it was possibly in the airplane.

D. Pitch Ratings

1. Approaches - 5 - Because of the airspeed control, I was doing quite a bit with the throttles.
2. Flare and Touchdown - 8 - The airspeed control wasn't that bad in the flare, it was just the pitch attitude.
3. Overall - 8
4. PIO Rating - 4 - Not divergent, but kept oscillating after I let go.

DATE: 12/20/85  
FLT: 909

TURB: None  
OVERALL PR: 2

PILOT: Meyer (Germany)  
CONFIG. #: 11

A. Initial Overall Impression - Sensitive in pitch, but this is a good response. The pitch trim also had high sensitivity which is good.

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - No problem
3. Pitch attitude control - No problem
4. Airspeed control - No problem
5. Offset correction - Good
6. Atmospheric disturbances - None
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Predictable, and the aircraft did what I wanted it to do.
2. Control of touchdown parameters - OK
3. Atmospheric disturbances - None
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 2 - I had the feeling for a very slight PIO tendency on the approach phase.

DATE: 1/10/86      TURB:            Light            PILOT:            Person  
FLT: 918            OVERALL PR: 9            CONFIG. #: 12

A. Initial Overall Impression - It's a real PIO prone airplane all around, anytime you get into the loop and try to stay in the loop. And I don't mean when you fly it like a conventional airplane, I mean even when you try to fly it like a good rate command/attitude hold airplane. You can't stay in that loop either and do a good job on the airplane.

B. Approach

1. Initial/Final response to control inputs - It's as though you get too much, an overresponse for anything you put in. You get more out of it than you expect to get out of it. I don't know if it's a time delay as you start into it or what, but it's an absolutely unpredictable thing.
2. Flight path control - Not good
3. Pitch attitude control - Not good
4. Airspeed control - Not good
5. Offset correction - No lateral problem, but the pitch problem was always there.
6. Atmospheric disturbances - If you are all the way out of the loop, then the atmospheric disturbance is fairly mild. The ballooning wasn't in there a whole lot.
7. Special pilot techniques - Try to stay out of the loop. (In post flight debrief noted that this configuration and #11 were the only ones that really oscillated in the approach.)

C. Flare and Touchdown

1. Pitch attitude and flight path control - It's a floater. I thought maybe on the last approach I could get it on the ground if I just got into the loop every once in a while but I couldn't do anything with it. Attitude and flight path control during the flare and touchdown - I'm not able to do them.
2. Control of touchdown parameters - We were not able to get it on the ground (in PIO).
3. Atmospheric disturbances - Don't have any bearing.
4. Special pilot techniques - I tried every way I could to make it fly, but I just couldn't make it do what I wanted it to.

D. Pitch Ratings

1. Approaches - 6
2. Flare and Touchdown - 9 - You just could not do the task, but sooner or later you'd come to the ground if you took the thrust off. It would not be on the desired spot, but you could get it on the ground near the end of the runway.
3. Overall - 9
4. PIO Rating - 5 - Depending on how tightly you get into the loop, if you keep on top of it you could just keep it going, but if you get aggressive with it, it will diverge.

DATE: 12/20/85  
FLT: 909

TURB: None  
OVERALL PR: 6

PILOT: Meyer (Germany)  
CONFIG. #: 12

A. Initial Overall Impression - A Level II aircraft for the approach.

B. Approach

1. Initial/Final response to control inputs - There was some type of oscillation, or overshoot.
2. Flight path control - Is possible
3. Pitch attitude control - Not too bad
4. Airspeed control - I had the feeling that I had to have about 10% more thrust this time compared to last one (#11), but airspeed control is not a problem.
5. Offset correction - Good
6. Atmospheric disturbances - Were not felt
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - A little bit tricky or difficult.
2. Control of touchdown parameters - Difficult as well.
3. Atmospheric disturbances - None
4. Special pilot techniques - Didn't find any to make this flare phase better.

D. Pitch Ratings

1. Approaches - 4
2. Flare and Touchdown - 6
3. Overall - 6
4. PIO Rating - 3 - I could observe a tendency for PIO's.

DATE: 1/9/86  
FLT: 917

TURB: Moderate  
OVERALL PR: 5-1/2

PILOT: Hadden (Lockheed)  
CONFIG. #: 13

A. Initial Overall Impression -

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - Good, glide slope tracking better than last one (Configuration #1).
3. Pitch attitude control - Good
4. Airspeed control - Fair because the turbulence was bouncing me off.
5. Offset correction - No problem, except as I did roll out I did notice a little tendency to overcontrol in pitch as I lined up on the runway and started readjusting for the landing point.
6. Atmospheric disturbances - Is a factor today.
7. Special pilot techniques - None on the approach.

C. Flare and Touchdown

1. Pitch attitude and flight path control - I thought there was a slight tendency to overcontrol in pitch. As I started to flare I thought I had the flight path going in the right direction and then I'd start to come back in pitch and I went up more than I wanted to and I'd come back over on the nose.
2. Control of touchdown parameters - One time I think I hit on it, the next time was long and there was a tendency to overcontrol in pitch.
3. Atmospheric disturbances -
4. Special pilot techniques - Ease off back out of loop on the pitch control when you see you are overcontrolling. Slight stair-stepping in flight path on the way down.

D. Pitch Ratings

1. Approaches - 3 - Pretty good considering the turbulence.
2. Flare and Touchdown - 5-1/2 - Due to tendency to overcontrol and the long touchdown (on second approach).
3. Overall - 5-1/2
4. PIO Rating - 1 - No real oscillation, must overcontrol, rate was a little faster than desired.

DATE: 12/17/85  
FLT: 907

TURB: Light  
OVERALL PR: 9

PILOT: Meyer (Germany)  
CONFIG. #: 13

A. Initial Overall Impression - Had more problems, especially in the flare (PIO's). I'd put it somewhere in level III. A big difference between approach and flare and touchdown.

B. Approach

1. Initial/Final response to control inputs - No problems in approach
2. Flight path control - OK
3. Pitch attitude control - OK
4. Airspeed control - No problem
5. Offset correction - No problem
6. Atmospheric disturbances - No influence
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Poor, because of PIO. (Had low frequency PIO in flight path, a heaving rather than a pitch PIO).
2. Control of touchdown parameters - Not adequate
3. Atmospheric disturbances - Didn't seem to be the reason for any of the problems.
4. Special pilot techniques - Couldn't find any to overcome this (PIO).

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 9
3. Overall - 9 - Because of PIO's
4. PIO Rating - 5

DATE: 1/10/86  
FLT: 918

TURB: Light  
OVERALL PR: 4

PILOT: Person  
CONFIG. #: 14

A. Initial Overall Impression - My overall impression is that there's a very short rubber band, in that when I pick up the airplane it makes it difficult for me to get it to do exactly what I want it to do. The ability to do large things doesn't seem to be difficult, like the capture of the glide slope. The ability to do really tight things down near the ground is a little more difficult.

B. Approach

1. Initial/Final response to control inputs - There's something in the response I don't like, maybe very sensitive with a time delay, like a short rubber band and then a hard link.
2. Flight path control - The ability to do large things isn't difficult, like the capture of the glide slope from the high side and getting back on it.
3. Pitch attitude control - I'm having some closed-loop problem with pitch attitude control, but not a whole lot.
4. Airspeed control - Seems to very good on this one (compared to previous configuration #9 and 10). Straight forward.
5. Offset correction - No problem
6. Atmospheric disturbances - Fairly transparent
7. Special pilot techniques - Definitely a rate command/attitude hold response from the airplane and yet it's one that you feel like you always got to be thinking about, because you find during the approach a lot of little cycles that I just put in at my own little sine wave frequency to see if the airplane was responding and it wasn't as if it got that short rubber band. Once I pick it up the angular rate per unit input seems to be too high. And I don't like it. I'm using a rate command/attitude hold technique but using it very tenderly. It didn't seem like there was much of a time delay in it, but there was enough there that I could oscillate the wheel with no apparent response to the airplane.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Maybe I don't have the control over the flight path angle that I'd like. Had some bobbles or reversals, maybe it was too sensitive, could overcontrol it easily.
2. Control of touchdown parameters - On the second one it was time for it to land and I finally pushed it on to the ground, it wasn't going to go down by itself. Even though the parameters were good I didn't like what I did.
3. Atmospheric disturbances -
4. Special pilot techniques - It still is a rate command/attitude hold technique to get it going. But you always have to be thinking about it.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 4 - Due to the initial response to my input
3. Overall - 4
4. PIO Rating - 3 - A tendency to bobble but not to really oscillate.

DATE: 12/17/85      TURB:            Light            PILOT:            Meyer (Germany)  
FLT: 907            OVERALL PR: 5            CONFIG. #: 14

A. Initial Overall Impression - Adequate performance is attainable but some improvements are necessary (had floating tendency). Again there is quite a big difference between approach and flare and touchdown.

B. Approach

1. Initial/Final response to control inputs - OK on approach
2. Flight path control - OK
3. Pitch attitude control - No problem
4. Airspeed control - OK
5. Offset correction - No problem
6. Atmospheric disturbances - No problem
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - That's where my problems were, it has to be improved.
2. Control of touchdown parameters - Not good, there was a long flare. The nose stayed high and did not come down, and I floated long. I had throttles at idle, and normally an aircraft touches down then, but this one was flying and flying. I don't know the reason.
3. Atmospheric disturbances - None
4. Special pilot techniques - Couldn't find any, but maybe a technique would be to push to get down.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 5
3. Overall - 5
4. PIO Rating - 1

DATE: 12/13/85  
FLT: 904

TURB: None  
OVERALL PR: 2

PILOT: Ranz (Boeing)  
CONFIG. #: 16

- A. Initial Overall Impression - The flight path control is good. The stick force is a little bit high, but with a little more trim activity it is easy to handle.
- B. Approach
1. Initial/Final response to control inputs -
  2. Flight path control - Good
  3. Pitch attitude control - Reasonably easy
  4. Airspeed control - No problem
  5. Offset correction - No problem
  6. Atmospheric disturbances - (Discrete gust) More pronounced than in any others that I've seen, but it still seemed to be very controllable through that atmospheric disturbance.
  7. Special pilot techniques - None
- C. Flare and Touchdown
1. Pitch attitude and flight path control - OK, no problem, but forces a little high in flare.
  2. Control of touchdown parameters - They were OK
  3. Atmospheric disturbances - Didn't see any there.
  4. Special pilot techniques - None
- D. Pitch Ratings
1. Approaches - 2
  2. Flare and Touchdown - 2
  3. Overall - 2
  4. PIO Rating - 1

DATE: 12/5/85  
FLT: 894

TURB: None  
OVERALL PR: 2

PILOT: Person  
CONFIG. #: 17 (1-2-2)

- A. Initial Overall Impression - I like the way that airplanes flies. There were no problems in the approach or landing. (In the post flight briefing, he noted that compared to the other configurations on this flight (washouts), that this was the best configuration for the approach portion).
- B. Approach
1. Initial/Final response to control inputs - The response to my input is predicable. The gearing, or sensitivity, angular rate per unit stick inputs seems to be lower than some of the others, which may make it a little easier to fly, and tendency not to overcontrol it.
  2. Flight path control - No problem
  3. Pitch attitude control - Absolutely no problem. What I did on that one was to try and fly in level, as I came to the glide slope I made a 3 degree attitude change, and it just locked right on the glide slope. I locked on 1/4 dot high and it just stayed there, I corrected it back there.
  4. Airspeed control - No problem
  5. Offset correction - No problem
  6. Atmospheric disturbances - Wasn't really obvious
  7. Special pilot techniques - It was a rate command/attitude hold airplane, and you just have to fly it like one. Step in/step out, but I like to think of it more as a ramp to a step, then a ramp out, and try to do it slowly.
- C. Flare and Touchdown
1. Pitch attitude and flight path control - No problem
  2. Control of touchdown parameters - Pretty good on the second one, maybe a little bit harder than I wanted on the first.
  3. Atmospheric disturbances - Didn't upset the airplane too badly.
  4. Special pilot techniques - It tends to require a finger tip kind of input, a tender input to the airplane, and I've got my arms firmly locked on the arm rests so I know what I'm doing to it.
- D. Pitch Ratings
1. Approaches - 2
  2. Flare and Touchdown - 2 - No tendency to float.
  3. Overall - 2
  4. PIO Rating - 1

DATE: 12/10/85  
FLT: 898

TURB: None  
OVERALL PR: 3

PILOT: Ball  
CONFIG. #: 17 (1-2-2)

A. Initial Overall Impression - It was fine, no big complaints

B. Approach

1. Initial/Final response to control inputs - Awful quick but it wasn't any problem. I was able to get it to where I wanted it to be without too much trouble.
2. Flight path control - Fine
3. Pitch attitude control - No problem
4. Airspeed control - I got awful slow there without feeling it, that was the only thing I noticed.
5. Offset correction - No problem
6. Atmospheric disturbances - No problem
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - On the first it wasn't a problem, but on the second by moving the throttles forward to catch a slow airspeed, it came booming through and we ballooned, but the pitch attitude was no problem. The flight path control on the first wasn't anything, and on the second I put that anomaly in (ballooned), but I recovered easily and got it down OK.
2. Control of touchdown parameters - Within desired. The first was very easy and the second was really a different task as far as the touchdown went.
3. Atmospheric disturbances - That may have been the thing that got my airspeed off.
4. Special pilot techniques - Didn't use any.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3
4. PIO Rating - 1

DATE: 12/18/85      TURB: Light to moderate      PILOT:      Smith  
with real gust near overrun.  
FLT: 908      OVERALL PR: 2      CONFIG. #: 17 (1-2-2)

A. Initial Overall Impression - The conditions we are flying in, we got crosswinds and some turbulence, I don't think the turbulence bothers me, and the level of crosswinds we have (5 Kt not canceled) just makes things interesting. The lateral/directional starts to show up, but I'm going to ignore that.

B. Approach

1. Initial/Final response to control inputs - The pitch was fine, but the lateral was not as quick or predictable in the crosswinds as I'd like it. But I'm not going to account for that in the ratings, it didn't interfere with my pitch control.
2. Flight path control - Good
3. Pitch attitude control - Good
4. Airspeed control - OK
5. Offset correction - Didn't bother me
6. Atmospheric disturbances - Clearly present, they add realism to the task.
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Good
2. Control of touchdown parameters - I could achieve desired performance, I had good control of touchdown.
3. Atmospheric disturbances - Same as for approach.
4. Special pilot techniques - Same as for approach.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1



DATE: 12/13/85  
FLT: 904

TURB: None  
OVERALL PR: 2

PILOT: Higgins (Boeing)  
CONFIG. #: 17 (1-2-2)

A. Initial Overall Impression - It took very little attention, was very easy to fly on the approach as far as I was concerned.

B. Approach

1. Initial/Final response to control inputs - I liked it.
2. Flight path control - The glide path control was easy enough that you could spend time getting your speed right.
3. Pitch attitude control - Also very easy.
4. Airspeed control - Since you didn't have to work the flight path control that hard, it was also easy.
5. Offset correction - Was good.
6. Atmospheric disturbances - Didn't bother me, just flew right through them.
7. Special pilot techniques -

C. Flare and Touchdown

1. Pitch attitude and flight path control -
2. Control of touchdown parameters - If you accept the descent rate for touchdown it's easy but when trying for a super smooth one you have to push a little bit, and getting a smooth touchdown seemed a little difficult.
3. Atmospheric disturbances -
4. Special pilot techniques - On the first approach in terms of technique for landing, I think all I did was set up a descent rate, or flight path angle that felt comfortable and then just leave it alone. I'm not sure that technique would work for the kind of a landing that an airline pilot tries for, which is a smooth kiss on the ground. Most of them try for a zero rate of descent at touchdown. On the second one I tried for a zero h-dot and floated a bit.

D. Pitch Ratings

1. Approaches - 1
2. Flare and Touchdown - 2 - The flare portion is good and easy and the touchdown, if a person accepts that kind of landing (firm) then it's good.
3. Overall - 2
4. PIO Rating - 1

DATE: 1/8/86  
FLT: 914

TURB: Light  
OVERALL PR: 4

PILOT: Person  
CONFIG. #: 17 + Lead/Lag  
(4-2-2)

A. Initial Overall Impression - None today (17 + Lead/Lag and time delay/sensitivity variations on them) flew as good as ones before holiday break (configurations based on B). It's a rate command attitude hold airplane. The overall gearing between me and the airplane is less than I'd like. It's a non-responsive kind of an airplane.

B. Approach

1. Initial/Final response to control inputs - The initial response to my input seems to be pretty good but it kind of dribbles off fairly quickly to a very low rate, so that I don't like the attitude rate response I get out of it.
2. Flight path control - I don't feel I do as good a job on the flight path that I'd like to do, however, I didn't seem to have trouble in the flare. You don't really have any trouble with it but it's not an airplane that is very nice to fly.
3. Pitch attitude control - Rate builds up then dribbles off.
4. Airspeed control - Very good up and away and on the approach in the acceptable region.
5. Offset correction - No problem
6. Atmospheric disturbances - Not really obvious, the aircraft is fairly solid out of the loop.
7. Special pilot techniques - Because of the response of the airplane, the change in the pitch rate response, you can almost fly it like a regular airplane, but not quite. It doesn't fly like you'd like a rate command/attitude airplane to fly, and yet it doesn't fly like a real airplane.

C. Flare and Touchdown

1. Pitch attitude and flight path control - I didn't have any trouble at all.
2. Control of touchdown parameters - In desired region.
3. Atmospheric disturbances - Wasn't vivid.
4. Special pilot techniques - (See above.)

D. Pitch Ratings

1. Approaches - 4 - Due to poor glideslope tracking.
2. Flare and Touchdown - 3 - Slight bobbles in pitch in first approach but they were gone in the second after I knew what kind of airplane I had. I adapted to it in one approach.
3. Overall - 4
4. PIO Rating - 1 - Slight bobbles in pitch but not a PIO.

DATE: 12/7/85  
FLT: 896

TURB: Light  
OVERALL PR: 3

PILOT: Ball  
CONFIG. #: 17 + Lead/Lag  
(4-2-2)

- A. Initial Overall Impression - I'm still having that Atari game feeling of having to watch the airplane much closer. I don't get as much from the feel of the airplane as I'd like, but it's definitely easy to get the performance that I got.
- B. Approach
1. Initial/Final response to control inputs - No complaints, one to one relationship.
  2. Flight path control - Fairly good, once I got on the glideslope, it held it very well, and it took very little correction to get it back if it did get off.
  3. Pitch attitude control - Fine
  4. Airspeed control - I'm watching it closer. It's still not great but it's reasonable.
  5. Offset correction - It seems like as soon as I start that offset correction I'm getting slow, and don't know why.
  6. Atmospheric disturbances - I'm seeing a little shot in there and it's disturbing what I had set up.
  7. Special pilot techniques - Before I was going down and holding it off and holding it off, and I've clarified my technique this time which may have helped my performance. I'm flying a single approach angle opposed to coming down and holding it off and letting it settle.
- C. Flare and Touchdown
1. Pitch attitude and flight path control - Already mentioned this above.
  2. Control of touchdown parameters - Easy to do, partially due to the technique of making one constant approach as opposed to coming down and holding it off.
  3. Atmospheric disturbances -
  4. Special pilot techniques -
- D. Pitch Ratings
1. Approaches - 3
  2. Flare and Touchdown - 3
  3. Overall - 3
  4. PIO Rating - 1



DATE: 12/13/85  
FLT: 904

TURB: None  
OVERALL PR: 4

PILOT: Higgins (Boeing)  
CONFIG. #: 17 + Lead/Lag  
(4-2-2)

- A. Initial Overall Impression - It was harder to fly (than 17 without lead/lag), I'm having to spend a lot more time inside the airplane.
- B. Approach
1. Initial/Final response to control inputs -
  2. Flight path control - Difficult, took more attention in flight path than previous (configuration #17 without lead/lag).
  3. Pitch attitude control - Was relatively stable, but it took more time. You had to put in the input and hold it for a period of time before you got some response. I found it more difficult.
  4. Airspeed control - May have been a bit more difficult.
  5. Offset correction - Easy
  6. Atmospheric disturbances - Wasn't a problem.
  7. Special pilot techniques - I was using a technique of putting in an input and holding and waiting and then releasing the back pressure.
- C. Flare and Touchdown
1. Pitch attitude and flight path control -
  2. Control of touchdown parameters - Reasonable. On second approach I may have got myself set up better and was more under control on the approach. I had things more stabilized than the first one. The objections weren't as strong as the first one.
  3. Atmospheric disturbances -
  4. Special pilot techniques -
- D. Pitch Ratings
1. Approaches - 4 - I don't like the fact that you have to pull and wait for the response (Doesn't like high steady state forces or the low command gain.)
  2. Flare and Touchdown - 3
  3. Overall - 4
  4. PIO Rating - 1

DATE: 12/5/85      TURB:            None            PILOT:            Person  
FLT: 894            OVERALL PR: 2            CONFIG. #: 18

A. Initial Overall Impression - That one looks a lot like the preceding one (#17). It tends to be as good or better in the flare and touchdown but not quite as good in the approach. The differences that I can see are very subtle, I'm sure I can tell you what they are, except it seems to respond a little bit differently to what I'm doing.

B. Approach

1. Initial/Final response to control inputs - The rate is very predictable and it seems to be linear with my input in terms of force and displacements.
2. Flight path control - I don't feel that in the approach I had as tight a control over the glideslope as I had in the preceding configuration, yet in the flare and landing I think it was every bit as good.
3. Pitch attitude control - Doesn't seem to be a problem.
4. Airspeed control - Adequate all the way through.
5. Offset correction - Easy
6. Atmospheric disturbances - Don't upset the airplane much.
7. Special pilot techniques - It sort of felt like a rate command/attitude hold system, but then sometimes it didn't seem like it quite held the attitude, so I found myself pulsing a little more in the stick perhaps in the approach that I did in the other one (#17).

C. Flare and Touchdown

1. Pitch attitude and flight path control - Exceptionally good.
2. Control of touchdown parameters - Well controlled.
3. Atmospheric disturbances - Easily handled.
4. Special pilot techniques - None required, as a matter of fact, I think I was pulling all the way through the flare on that one.

D. Pitch Ratings

1. Approaches - 3 - Because there's just something in there that didn't feel quite right. I wish I could put my finger on it, but I can't.
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 12/5/85  
FLT: 894

TURB: None  
OVERALL PR: 2-1/2

PILOT: Person  
CONFIG. #: 19

A. Initial Overall Impression - That's a pretty good flying airplane. No problems in the approach or flare and touchdown.

B. Approach

1. Initial/Final response to control inputs - The initial seems to be higher than the steady state response. Up and away, when I'm really trying to pick it apart, I feel that the initial rate is high, then the rate bleeds off. It's not a nice smooth curve like I'd like, but it's not difficult to fly.
2. Flight path control - When I was tracking the glideslope, it was primarily a beep on the trim.
3. Pitch attitude control - The airplane tends to return to trim condition almost, but not quite, when you release it from an input. So I find it flying it there with the trimmer is a littler easier.
4. Airspeed control - OK
5. Offset correction - Fairly easy
6. Atmospheric disturbances -
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Very easy. Just like any (conventional) airplane. You pull on the stick, and flare the airplane and land it.
2. Control of touchdown parameters -
3. Atmospheric disturbances - Easy to cope with.
4. Special pilot techniques - None, a conventional airplane.

D. Pitch Ratings

1. Approaches - 2-1/2
2. Flare and Touchdown - 2-1/2
3. Overall - 2-1/2
4. PIO Rating - 1

DATE: 12/5/85      TURB:            None            PILOT:            Person  
FLT: 894            OVERALL PR: 2            CONFIG. #: 20

A. Initial Overall Impression - It flies fairly well, pretty good. In the approach I find myself beeping the trim. My impression of it is, that it's kind of a rate command/attitude hold, only it really doesn't hold attitude too tight so it tends to go back where you left it in the short term. In the long term, the final response seems to be an attitude is a function of displacement. It makes an easy airplane to flare and touchdown. And all you have to do is beep the trim in the approach to put the attitude where you want. I know that eventually if I hold it along enough, I develop a change in attitude and to hold that change in attitude I have to hold a force. I don't like to hold that force, so I trim that force out. So instead of making the input and trimming it out, I tend to fly it with the trim, because it responds very nicely to the trim. (In the post flight briefing he noted that compared to the other configurations on this flight (less washout), that this was the best configuration for the flare and touchdown portion).

B. Approach

1. Initial/Final response to control inputs - (See overall impression).
2. Flight path control -
3. Pitch attitude control - (See overall impression).
4. Airspeed control -
5. Offset correction - No problem.
6. Atmospheric disturbances -
7. Special pilot techniques - (See overall impression).

C. Flare and Touchdown

1. Pitch attitude and flight path control - Good
2. Control of touchdown parameters - Within desired limits.
3. Atmospheric disturbances - I made my own disturbances on the second one, because I was in close making aggressive maneuvers. I had more bank angle than I would normally have down that close to the ground.
4. Special pilot techniques - As it came time to correct and do my duck under maneuver, I didn't trim, but I actually had to push on the column and hold the column forward to force the airplane down toward the ground, and then relax coming into the flare, and then pull. So there was a push in there that I'm not used to. But it was a very well controlled flare, no problem flaring the airplane.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2
3. Overall - 2
4. PIO Rating - 1

DATE: 12/12/85  
FLT: 900

TURB: None  
OVERALL PR: 4

PILOT: Ball  
CONFIG. #: 20

- A. Initial Overall Impression - The flare and landing felt quite natural, fairly good. In the approach and glideslope the biggest complaint I would have would be airspeed control, I tended to get slow all the time.
- B. Approach
1. Initial/Final response to control inputs - As most of them have, it had a large airplane feel, it may have been a little bit spongy, but no real complaints about it.
  2. Flight path control - I found myself off glide path several times when I didn't expect to be.
  3. Pitch attitude control - Didn't seem to be a problem.
  4. Airspeed control - It was a little problem on the approach, but mostly I noticed it when you got down to the offset.
  5. Offset correction - The offset started my airspeed control problem.
  6. Atmospheric disturbances - None on the approach part.
  7. Special pilot techniques - None
- C. Flare and Touchdown
1. Pitch attitude and flight path control - Pitch attitude was fine and the flight path wasn't bad. In the first one in order to make sure I got down I put a little forward in it, and pumped it a shade, but it didn't seem to be difficult.
  2. Control of touchdown parameters - Was quite good.
  3. Atmospheric disturbances - I didn't think that bothered me too much.
  4. Special pilot techniques - I had to put the nose down, or we would have been a little bit longer than I wanted to be (on first one).
- D. Pitch Ratings
1. Approaches - 5 - My biggest complaint is airspeed control, with a little bit of flight path control problems on the approach. Once I got down where I could see the ground, it didn't seem to be a problem.
  2. Flare and Touchdown - 4 - Primarily due to airspeed control.
  3. Overall - 4
  4. PIO Rating - 1

DATE: 12/13/85  
FLT: 904

TURB: None  
OVERALL PR: 4

PILOT: Ranz (Boeing)  
CONFIG. #: 20  
(17 + Washout = .2)

A. Initial Overall Impression - It feels like I'm pushing against a big spring in the approach. I can put it some place but it seems like it bounces back, so it's rather spongy. It's kind of a gorrilla to fly in the pattern. The flare is not all that bad because you can control it fairly accurately in the flare.

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - There's excessive work because you're pushing against a spring, and it requires trim and the trim rate is a little slow.
3. Pitch attitude control - Very similar to flight path control.
4. Airspeed control - Wasn't all that bad.
5. Offset correction - Didn't give me a problem.
6. Atmospheric disturbances - No problem.
7. Special pilot techniques - I didn't use any other than you do have to hold more forces.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Better than in the approach.
2. Control of touchdown parameters - Adequate
3. Atmospheric disturbances -
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 4 - Due to high forces
2. Flare and Touchdown - 3
3. Overall - 4
4. PIO Rating - 1

DATE: 12/13/85  
FLT: 904

TURB: None  
OVERALL PR: 3

PILOT: Higgins (Boeing)  
CONFIG. #: 20  
(17 + Washout = .2)

A. Initial Overall Impression - I don't like the approach portion, because you had to push and hold and it seemed to be a big force, I had to use trim more. Although once you get it set, it's pretty easy to fly. Flare and touchdown was easier and liked better.

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - Easy, but I don't like the higher forces, and I don't like the fact that you had to push and hold.
3. Pitch attitude control - Good.
4. Airspeed control - Reasonable.
5. Offset correction - Easy
6. Atmospheric disturbances - Easy to handle.
7. Special pilot techniques - Push and hold, and wait for it to happen, and then it works out OK.

C. Flare and Touchdown

1. Pitch attitude and flight path control - That may be easier than approach portion.
2. Control of touchdown parameters -
3. Atmospheric disturbances -
4. Special pilot techniques -

D. Pitch Ratings

1. Approaches - 3 - Due to the higher forces
2. Flare and Touchdown - 2
3. Overall - 3
4. PIO Rating - 1

DATE: 12/5/85  
FLT: 892

TURB: None  
OVERALL PR: 4

PILOT: Person  
CONFIG. #: 21

A. Initial Overall Impression - It's not too bad. Second approach better than first, and second flare better than first, as I trimmed into the second flare which reduced that tendency of the airplane to bobble - just two or three beeps of trim.

B. Approach

1. Initial/Final response to control inputs - It's very predictable, though a little sluggish coming in, it built up to a steady state pitch rate after awhile. Initially I thought it would bounce back to the trim position, but it seems to stay off trim in the new attitude. It doesn't come back to trim as readily as I would thought it would.
2. Flight path control - Easy, held within 1/4 dot on glideslope.
3. Pitch attitude control - Not difficult.
4. Airspeed control - If you make thrust inputs it responds in the proper direction. Increase speed and the nose comes up and the nose comes down when you take speed off.
5. Offset correction - Easy
6. Atmospheric disturbances - Obvious, but not difficult to control.
7. Special pilot techniques - None, straight in glide path control, just a few blips on the trim and tiny changes to the thrust.

C. Flare and Touchdown

1. Pitch attitude and flight path control -
2. Control of touchdown parameters - The first one had a pitch bobble or a PIO in it, but T.D. parameters within desired limits. On the second approach, I came into the flare and beeped the trim twice, and held the rest of it with aft column. Maybe I should have used more aft column to get a softer T.D. No tendency to bobble on second approach.
3. Atmospheric disturbances - Easy to see.
4. Special pilot techniques -

D. Pitch Ratings

1. Approaches - 2-1/2 to 3 - I don't see a whole lot of difference between this configuration and the last one (#24), except I did tend to bobble when I made inputs through the column.
2. Flare and Touchdown - 4 - Due to the PIO on the first one, but not a had PIO, just annoying. It is still a little sluggish to my liking.
3. Overall - 4
4. PIO Rating - 4

DATE: 12/7/85  
FLT: 897

TURB: Light  
OVERALL PR: 6

PILOT: Ball  
CONFIG. #: 21

- A. Initial Overall Impression - In the approach, I saw no problems there. With airspeed there was some wander to it. It was in the flare where I saw a problem with this configuration. It was mostly a nodding in the nose, at looks like a little PIO.
- B. Approach
1. Initial/Final response to control inputs - I lost a little bit of the one to one in other words a quick input if I really went for something, there was a little pause then it went.
  2. Flight path control - Quite easy.
  3. Pitch attitude control - No problem
  4. Airspeed control - Had a small wander in it, but just a little extra concentration kept it OK.
  5. Offset correction -
  6. Atmospheric disturbances - The little chop isn't bothering things at all, and the angle of attack gust wasn't a problem either.
  7. Special pilot techniques - None used
- C. Flare and Touchdown
1. Pitch attitude and flight path control - Flight path control, at least on the first one was better than second one. That wasn't a problem. But the pitch attitude I could see was beginning to oscillate, and soon the flight path control would be in there.
  2. Control of touchdown parameters - Desired parameters but it was moving (slight PIO) and it could have smacked down a little harder than it did.
  3. Atmospheric disturbances - Started the nose nod. I didn't notice it until we were in over the overrun where the gust was inserted.
  4. Special pilot techniques - I didn't let go of the stick (in PIO) because I was too close to the ground. Self preservation kept me from doing that. The PIO did not seem to be growing and I didn't feel like I had a tight a control as I'd like.
- D. Pitch Ratings
1. Approaches - 3
  2. Flare and Touchdown - 6 - Due to nose nodding, PIO tendency.
  3. Overall - 6
  4. PIO Rating - 4 - Oscillates but not divergent.

DATE: 12/17/85  
FLT: 906

TURB: light  
OVERALL PR: 3

PILOT: Smith  
CONFIG. #: 21

A. Initial Overall Impression - I did not notice a whole lot of difference (from configuration B). The force gradients out of trim seemed high to me.

B. Approach

1. Initial/Final response to control inputs - Satisfactory
2. Flight path control - Predictable
3. Pitch attitude control - Good
4. Airspeed control - Sensitive throttle but you can control the airspeed quite precisely with it.
5. Offset correction - The lateral/directional doesn't track its nose as smartly as I'd like to see. But it may not be unreasonable for this size airplane. It didn't interfere with the task.
6. Atmospheric disturbances - Not a factor
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Pitch attitude predictable and flight path control was good
2. Control of touchdown parameters - Good
3. Atmospheric disturbances - No comments
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 2 - quite predictable in close
3. Overall - 3 - The minor complaint is the high force gradient out of trim.
4. PIO Rating - 1

DATE: 1/7/86  
FLT: 912

TURB: Light to moderate  
OVERALL PR: 5

PILOT: Hadden (Lockheed)  
CONFIG. #: 21

- A. Initial Overall Impression - That's almost back to the first one (Configuration B) except for that little bit of a tendency for the nose to go up and down more, not as tight a control.
- B. Approach
1. Initial/Final response to control inputs - The airplane was not responding as it should. I felt I had more control input than the airplane responded with. I was pumping on the column but nothing was happening with the airplane. The airplane was coming down without the attitude changing much.
  2. Flight path control - I had trouble down low, probably in the flare mode more than the approach mode.
  3. Pitch attitude control - I didn't see the nose moving as it should for the motion I was putting in the stick.
  4. Airspeed control - No problem
  5. Offset correction - No problem
  6. Atmospheric disturbances - Nothing there
  7. Special pilot techniques - I really didn't use any
- C. Flare and Touchdown
1. Pitch attitude and flight path control - I was having a little difficulty down there near the end. The last 100 feet or so. Probably floating a little bit. It seems like I'm pitching over and then I'm coming back out, almost into a PIO, where I'm causing it.
  2. Control of touchdown parameters - They were barely adequate, it was long
  3. Atmospheric disturbances - No comment
  4. Special pilot techniques - Nothing here
- D. Pitch Ratings
1. Approaches - 5
  2. Flare and Touchdown - 5
  3. Overall - 5 - I'm overcontrolling or the airplane is not responding, one of the two.
  4. PIO Rating - 3

DATE: 12/7/85  
FLT: 895

TURB: Light  
OVERALL PR: 7

PILOT: Person  
CONFIG. #: 22

A. Initial Overall Impression - Perceptible lag in response, tend to overcontrol, can't get to a precise point quickly, must do it slowly.

B. Approach

1. Initial/Final response to control inputs - It's not a sluggish airplane in terms of pitch rate response per unit input on the stick, but it's sluggish in terms of initial response. So there's a lag, and then a fairly high rate of build up.
2. Flight path control -
3. Pitch attitude control - If you fly the airplane tight, close, tender - you can fly it very well. And you can land it without too much trouble. If you're aggressive, if you want to close the loop quickly on a 5 degree attitude change or so, then it's oscillatory.
4. Airspeed control - Pretty good
5. Offset correction - Not a problem
6. Atmospheric disturbances -
7. Special pilot techniques - You have to be your own damper, not that the configuration is lightly damped, but you have to cancel that rate once you get it going, or you get too much. So it's a pulsing kind of an input to the stick for large changes. For small changes, it doesn't fly too much different than a normal airplane, except that there was a perceptible lag.

C. Flare and Touchdown

1. Pitch attitude and flight path control - On the one where I touched down there was a bobble. On the others where I purposely overcontrolled, the airplane tripped off the system (looked like high rates in a PIO).
2. Control of touchdown parameters - Out of the desired zone, lateral performance degraded due to pitch problems.
3. Atmospheric disturbances - You can see, though it wasn't big enough to screw it up completely.
4. Special pilot techniques - You have to be really careful not to overcontrol the airplane. You could overcontrol it and have a problem. I wish I had PIO'd it, to see what I could do with it. The overcontrol near the ground was intentional, not a PIO.

D. Pitch Ratings

1. Approaches - 5
2. Flare and Touchdown - 7
3. Overall - 7
4. PIO Rating - 4 - if tenderly flown, 6 - if aggressively flown.

DATE: 12/5/85  
FLT: 893

TURB: None  
OVERALL PR: 9

PILOT: Ball  
CONFIG. #: 22

- A. Initial Overall Impression - It was completely unexceptable. Even on the approach I noticed oscillations coming in there just making small corrections, and when I got down low it was completely unflyable, couldn't avoid PIO.
- B. Approach
1. Initial/Final response to control inputs - I put in an input and it felt kind of spongy with lots of overshoots.
  2. Flight path control - Just constantly trying to correct back to glide slope.
  3. Pitch attitude control - The oscillations were fast enough that the flight path didn't change so much but pitch attitude was all over the place.
  4. Airspeed control - If I didn't have to touch anything it was fine, but when I had to work at it (pitch), even that was difficult, as I was worried so much correcting the pitch attitude that I just let the airspeed go.
  5. Offset correction - The offset correction started the oscillation, so it was not easy.
  6. Atmospheric disturbances - When we got into the gust in close, that triggered the oscillation and made it unflyable.
  7. Special pilot techniques - On the second approach I hardly touched things and as a result didn't get into big oscillations but the touchdown was firm (4 ft/sec).
- C. Flare and Touchdown
1. Pitch attitude and flight path control - When the attitude is changing like that (PIO), your wheel height is changing a lot so it's difficult to get a nice smooth flare.
  2. Control of touchdown parameters - Very difficult. If I tried to do it tightly things went bananas.
  3. Atmospheric disturbances - The disturbance is the thing that really triggered it (PIO).
  4. Special pilot techniques - Getting out of the loop helped the oscillation, but didn't help the performance very much.
- D. Pitch Ratings
1. Approaches - 7
  2. Flare and Touchdown - 9 - Sooner or later you could bang it up. It took intense pilot compensation to avoid a PIO.
  3. Overall - 9
  4. PIO Rating - 6 - Had to freeze control to stop the PIO.

DATE: 1/8/86  
FLT: 915

TURB: Light to moderate  
OVERALL PR: 5

PILOT: Smith  
CONFIG. #: 22

A. Initial Overall Impression -

B. Approach

1. Initial/Final response to control inputs - The initial response in pitch seemed a little sluggish, the airplane seemed to be a little slow and have a little tendency to wallow in terms of the final response. So it wasn't as precise as I'd like.
2. Flight path control - Nothing noted there
3. Pitch attitude control - Slow, but you could do the job in the approach satisfactory.
4. Airspeed control - Not a factor
5. Offset correction - No real problems there
6. Atmospheric disturbances - None noted
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Pitch attitude control was sluggish and flight path control was affected by that, so I was a little behind the power curve on the flight path control and it did effect the prediction of the control of touchdown parameters.
2. Control of touchdown parameters - I could only achieve at best in my view, adequate performance.
3. Atmospheric disturbances - Not a real factor, but a good, realistic workload.
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 4 - Due to the sluggish pitch.
2. Flare and Touchdown - 5 - Sluggish pitch and some lack of predictability.
3. Overall - 5
4. PIO Rating - 2 - I didn't have precise control so I tended to overcontrol a little bit in flare and touchdown.

DATE: 1/8/86  
FLT: 913

TURB: None  
OVERALL PR: 6

PILOT: Hadden (Lockheed)  
CONFIG. #: 22

A. Initial Overall Impression - It felt like this one had less response than the previous one (#25). It looked good on the approach and capture but the flare is where I had problems.

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - Initial glide path capture and tracking was good.
3. Pitch attitude control -
4. Airspeed control -
5. Offset correction - Good
6. Atmospheric disturbances -
7. Special pilot techniques -

C. Flare and Touchdown

1. Pitch attitude and flight path control - When I got into the flare mode and it felt like I got a little bit of heave when I corrected back to centerline. When I put a correction into it to get the nose over the touchdown point it was too much. Then coming back on correction I overcontrolled and PIO'd. The nose went with it. Whatever got me started I overcontrolled.
2. Control of touchdown parameters -
3. Atmospheric disturbances -
4. Special pilot techniques - I felt like I was going to hit short, so I added power to get back up to the point.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 6 - Due to oscillation tendency in flare and long touchdown.
3. Overall - 6
4. PIO Rating - 4 - Slight oscillation, I felt out of phase with it.

DATE: 12/7/85  
FLT: 895

TURB: Light  
OVERALL PR: 4

PILOT: Person  
CONFIG. #: 23

A. Initial Overall Impression - I just don't like the way that airplane flies. I wish I could pin down exactly what it is, I think that I have trouble controlling the flight path angle of the airplane. It's a sluggish kind of an airplane, it doesn't respond very quickly to what I want it to do.

B. Approach

1. Initial/Final response to control inputs - It's not predictable in terms of flight path performance as a function of what I get in the way of attitude changes. It's one of those airplanes you shove around through the sky and you never really feel that you are communicating with the airplane, at least the airplane is not listening to what you are telling it to.
2. Flight path control - I was never really stable on glide slope, always oscillating through it.
3. Pitch attitude control - I felt I could control pitch attitude. The thing I couldn't seem to get sorted out was why it didn't do what I wanted it to in terms of glide slope tracking.
4. Airspeed control - Not too bad
5. Offset correction - Easy
6. Atmospheric disturbances -
7. Special pilot techniques - None, except that it's an airplane that requires a lot of your time, attention to stay on top of it. It's not that it diverges, it's just that the flight path angle doesn't seem to be doing what I want it to do.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Relatively easy, much easier in the flare and touchdown than in the glide slope control.
2. Control of touchdown parameters - In desired range, touchdown where I wanted, everything was under control, no tendency to bobble or oscillate. It's not a snappy airplane. You have to be a little out ahead of it.
3. Atmospheric disturbances -
4. Special pilot techniques - None other than you have to pull further than some of the other configurations.

D. Pitch Ratings

1. Approaches - 6 - Because of the fact I cannot control the flight path angle the way I'd like to.
2. Flare and Touchdown - 3
3. Overall - 4
4. PIO Rating - 1 - There wasn't any tendency to PIO.

DATE: 12/10/85  
FLT: 898

TURB: None  
OVERALL PR: 3

PILOT: Ball  
CONFIG. #: 23

A. Initial Overall Impression - Felt like a natural feeling airplane, it felt good throughout.

B. Approach

1. Initial/Final response to control inputs - The initial was fine, and didn't see anything out of the ordinary on final response.
2. Flight path control - Good, stabilized nicely on glide slope
3. Pitch attitude control - Good
4. Airspeed control - No problem
5. Offset correction - Easy
6. Atmospheric disturbances - Didn't see very much.
7. Special pilot techniques - Didn't need any

C. Flare and Touchdown

1. Pitch attitude and flight path control - Pitch attitude was fine and flight path was good, even on the one that I only got adequate performance on. (Poor visibility and not set up right). I had the airplane where I wanted it to be, but unfortunately it wasn't in the right place.
2. Control of touchdown parameters - Good
3. Atmospheric disturbances - No problem
4. Special pilot techniques - None required, the forces were in the direction I'm used to having them on the flare.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 3
3. Overall - 3
4. PIO Rating - 1

DATE: 1/7/86  
FLT: 911

TURB: Light  
OVERALL PR: 5

PILOT: Smith  
CONFIG. #: 23

A. Initial Overall Impression - For both the approach and flare and touchdown I had the same complaint, I had no problem achieving the flight path control or pitch attitude in terms of precision, but I just had to use heavy forces to do it, and fly almost with the trim. It seems like a heavier version of the first one (#26).

B. Approach

1. Initial/Final response to control inputs - The flight control suffered because of the initial response being slow or the forces heavy.
2. Flight path control -
3. Pitch attitude control -
4. Airspeed control -
5. Offset correction - Not a problem
6. Atmospheric disturbances - None, crosswind was canceled.
7. Special pilot techniques - Use a little more from the stick than what I'm used to.

C. Flare and Touchdown

1. Pitch attitude and flight path control - You tend to get behind the flight path control in the flare and touchdown. So the flight path control suffered because of the initial response being slow or the heavy forces.
2. Control of touchdown parameters - I was able to get it, but I wasn't able to come down smoothly like I'd like to into the touchdown.
3. Atmospheric disturbances - Not a factor
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 5
2. Flare and Touchdown - 5
3. Overall - 5 - Mainly due to the forces.
4. PIO Rating - 1

DATE: 12/5/85  
FLT: 892

TURB: None  
OVERALL PR: 4

PILOT: Person  
CONFIG. #: 24

A. Initial Overall Impression - That's not too bad a flying airplane.

B. Approach

1. Initial/Final response to control inputs - There seems to be quite a lag between the time I make my input and the time I get what I want, so I have to think a little further out ahead of the airplane. Low initial response.
2. Flight path control - Very easy
3. Pitch attitude control - Seemed to go with the inputs and a little beep on the trim.
4. Airspeed control - Very good
5. Offset correction - No problem
6. Atmospheric disturbances - Can feel it as a bobble in the airplane.
7. Special pilot techniques - You have to think a little bit out ahead of the airplane. It's not as though you are tied directly to the response of the airplane.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Felt sluggish near touchdown. On the first one there was kind of a panic input near the end, I wasn't really happy with the first one. On the second, I was much happier with the flare, because I started earlier, didn't tend to overcontrol.
2. Control of touchdown parameters - Within desired limits
3. Atmospheric disturbances - Were there
4. Special pilot techniques - None other than being out ahead of the airplane.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 4
3. Overall - 4
4. PIO Rating - 1

DATE: 12/7/85  
FLT: 896

TURB: Light  
OVERALL PR: 3

PILOT: Ball  
CONFIG. #: 24

A. Initial Overall Impression - Among the ones I've seen today, I like this the best (others were #3, 7, 17 + Lead/Lag).

B. Approach

1. Initial/Final response to control inputs - It was a little more sluggish getting started, I had that feeling when I did anything quickly. I didn't notice it too much until I got off the glide slope and then went for it kind of quickly on purpose. It seemed to be more sluggish, noticeably but not objectionably.
2. Flight path control - Much better than before (other on flight) both getting it on and holding it.
3. Pitch attitude control - No problems
4. Airspeed control - Much easier than others of the day. It was easy.
5. Offset correction - No problem
6. Atmospheric disturbances - There was a noticeable amount, but not any that would trigger any gyrations.
7. Special pilot techniques - Not aware of any.

C. Flare and Touchdown

1. Pitch attitude and flight path control - It felt a bit more normal than the other ones (on this flight). Not a problem. I had a better feel of what the airplane was going to do with my input, and as a result was able to control the flight path better.
2. Control of touchdown parameters - Considerably better. I may have hurried the touchdown on the last one which means I may have hit a little harder than I'd like.
3. Atmospheric disturbances - It's noticeable, you have to work through it but it didn't create anything special.
4. Special pilot techniques - In this one I felt more like a normal technique. I didn't have quite the looking at a movie show landing that I did with the other ones.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3
4. PIO Rating - 1

DATE: 12/17/85  
FLT: 906

TURB: Light  
OVERALL PR: 5

PILOT: Smith  
CONFIG. #: 24

A. Initial Overall Impression - It was easy to control but I didn't like the high forces. It was different to me in the force gradients. Really high forces in the flare. I hit the desired area but found the force levels high. You could use the trim button to relieve them, but I'm not used to using the trim in the flare. I did in the approach.

B. Approach

1. Initial/Final response to control inputs - It felt heavy initially, but the final response is accurate.
2. Flight path control - Was influenced in the side step by the heavy forces.
3. Pitch attitude control - No problems
4. Airspeed control - Suffered a little with the forces, in not getting with the throttle and getting the speed organized.
5. Offset correction - I was surprised by the force gradient in the offset correction. I was anticipating what I had seen before (Configurations B, 21, 27), pulling back I really had to tuck back and I ended up getting behind it, and then I had to control the attitude accurately to skate up to the landing area.
6. Atmospheric disturbances - Didn't see anything.
7. Special pilot techniques - I didn't use any (in the one approach flown), but you'd have to use the trim more.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Pitch attitude was precise, but it was hard to move the airplane. Heavy forces but no tendency to overcontrol. Flight path control was not as precise as I wanted due to forces, wound up skating in.
2. Control of touchdown parameters - We ended up getting low and skated on down, but I could control the attitude in the touchdown precisely.
3. Atmospheric disturbances - None there
4. Special pilot techniques - Would need to use trim more.

D. Pitch Ratings

1. Approaches - 5
2. Flare and Touchdown - 5
3. Overall - 5 - Due to high force gradients
4. PIO Rating - 1

DATE: 12/12/85      TURB:              Light              PILOT:              Higgins (Boeing)  
FLT: 902              OVERALL PR: 3              CONFIG. #: 24

A. Initial Overall Impression - I may be getting used to flying the airplane (his second evaluation), so you have to temper it with that. But the pitch control is much easier (than last configuration B). I wasn't taking as much attention on the glide path.

B. Approach

1. Initial/Final response to control inputs - With the kind of inputs I'm making I don't think I can comment on this, as there's not much required.
2. Flight path control - Much easier (than last configuration)
3. Pitch attitude control - Pitch control easier, nose moved slower, not as abrupt.
4. Airspeed control - Also seemed easier.
5. Offset correction - Didn't notice any difference.
6. Atmospheric disturbances - Easily handled
7. Special pilot techniques - Didn't do anything special.

C. Flare and Touchdown

1. Pitch attitude and flight path control -
2. Control of touchdown parameters - Seemed easier in this configuration. It didn't seem to take as much attention to the flight path.
3. Atmospheric disturbances -
4. Special pilot techniques -

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 3
3. Overall - 3
4. PIO Rating - 1

DATE: 1/7/86  
FLT: 912

TURB: Light to moderate  
OVERALL PR: 3-1/2

PILOT: Hadden (Lockheed)  
CONFIG. #: 24

- A. Initial Overall Impression - Felt like heavier forces (than last one-configuration B).
- B. Approach
1. Initial/Final response to control inputs - About the same (as previous).
  2. Flight path control - The heavier control force interfered with flight path and attitude control.
  3. Pitch attitude control -
  4. Airspeed control - OK
  5. Offset correction - No problem
  6. Atmospheric disturbances - Nothing noted here.
  7. Special pilot techniques - I ended up trimming a little faster, trying to relieve the forces.
- C. Flare and Touchdown
1. Pitch attitude and flight path control - Good
  2. Control of touchdown parameters - In the box but on the long side.
  3. Atmospheric disturbances - Nothing noted here.
  4. Special pilot techniques - None
- D. Pitch Ratings
1. Approaches - 3-1/2
  2. Flare and Touchdown - 3-1/2
  3. Overall - 3-1/2 - Because you constantly have to trim but it's not what I'd consider a moderate workload.
  4. PIO Rating - 1

DATE: 12/5/85  
FLT: 892

TURB: None  
OVERALL PR: 3

PILOT: Person  
CONFIG. #: 25

A. Initial Overall Impression - Sluggish, not much gain, I have to tug a lot. It's just a big heavy sluggish tub, but it flies pretty well. I don't tend to like sluggish airplanes, but you can manage it pretty well, even though it is something you don't like, it is certainly very flyable. It is probably worse in the approach than in the flare and touchdown, because it is difficult to get it changed to where you want it. It takes time to change the attitude and it takes large control inputs. It may not be an effect for precise corrections. Like on the approach it's not quite as easy to manage as it's in the flare, where you already have a bit hefty input in and you may only have to relax a little bit to let the nose drop.

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - Satisfactory, though the workload is high.
3. Pitch attitude control - Not as precise as I would like it to be.
4. Airspeed control - Reasonably good.
5. Offset correction - Very easy.
6. Atmospheric disturbances - Is just about right. It upsets the airplane enough so I have something to do.
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Very good
2. Control of touchdown parameters - Within desired range. It has the general feel of off with the throttle, up with the nose, and hold the column back, and it flies good.
3. Atmospheric disturbances -
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3 - Forces were a little high in flare.
3. Overall - 3
4. PIO Rating - 1

DATE: 1/9/86  
FLT: 916

TURB: Light  
OVERALL PR: 4

PILOT: Person  
CONFIG. #: 25

A. Initial Overall Impression - It's got a fair amount of time delay and a sort of a rubber band response to my input, although it's predictable once you get through the time delay.

B. Approach

1. Initial/Final response to control inputs - Once you get through the time delay, the rate per unit input seems to be fairly predictable.
2. Flight path control - Was very easy. The approach tracking in this configuration is better than any I did the other day (1/8/86 - configurations 17 + Lead/Lag, 25A, 22A, 28A). It has a very low workload.
3. Pitch attitude control - Certainly predictable. I could change it a half degree with no problem at all.
4. Airspeed control - No problem, stable.
5. Offset correction - Simple, though I had the feeling that I was going low, then going high.
6. Atmospheric disturbances - Between what the wind is over the end of the runway and what you're putting in I wasn't able to sort out where I wanted the touchdown spot.
7. Special pilot techniques - It was a rate command/attitude hold, or a loose attitude hold. It didn't seem to be quite as tight as some of them have been. No trimming was required throughout the approach or touchdown.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Because it is stable on the flight path, the flight path is not quite that easy to change. I don't feel that I got it shallowed out quite as much as I wanted. With two or three more approaches I think I could have done a pretty good job.
2. Control of touchdown parameters - Were on the short side (adequate) and on the harder side than I would like (4 to 5 ft/sec).
3. Atmospheric disturbances - Were there, affected the touchdown spot. The high head winds may have effected this.
4. Special pilot techniques - It's a pull and release, it's a rate command/attitude hold type technique rather than anything else.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 4 - Because I couldn't manage the touchdown parameters that I wanted.
3. Overall - 4
4. PIO Rating - 1

DATE: 12/5/85  
FLT: 893

TURB: None  
OVERALL PR: 5

PILOT: Ball  
CONFIG. #: 25

- A. Initial Overall Impression - The forces felt a little bit higher (than Configuration B) and the nose didn't follow my input quite as well on a one-to-one basis. It didn't feel as tight a control.
- B. Approach
1. Initial/Final response to control inputs - The initial response was more sluggish. It didn't seem to follow as tightly.
  2. Flight path control - It was OK, as I didn't have to make any quick correction.
  3. Pitch attitude control - Same comments as above.
  4. Airspeed control - Was not a problem. Once I got it set, it held, and if off was not difficult to get back.
  5. Offset correction - Was easy
  6. Atmospheric disturbances - Saw a little gust over the overrun, and I kind of waited it out, and then made the correction.
  7. Special pilot techniques - I didn't have time to generate any, though I probably would have if I flew it much longer.
- C. Flare and Touchdown
1. Pitch attitude and flight path control - It looked OK until my last input when I wanted to bring the nose up, and the nose didn't come up when I brought my control back.
  2. Control of touchdown parameters - I was really concentrating on the pitch and I apparently had moved to the side, I didn't realize it.
  3. Atmospheric disturbances - None that I saw after the flare.
  4. Special pilot techniques - None, I didn't have any time to generate one.
- D. Pitch Ratings
1. Approaches - 3
  2. Flare and Touchdown - 5 - Sink rate was borderline and left of centerline and I was working hard at it.
  3. Overall - 5
  4. PIO Rating - 3 - Undesirable motion was lack of motion when I put an input in and didn't get anything.

DATE: 1/8/86  
FLT: 915

TURB: Light to moderate  
OVERALL PR: 8

PILOT: Smith  
CONFIG. #: 25

A. Initial Overall Impression - In general, the airplane was very sluggish in the initial response, felt like I had to use a lot of force, very slow responding, affected by flight path control. My fears were worse than what was seen but I just was very apprehensive about the airplane in general.

B. Approach

1. Initial/Final response to control inputs - The initial response in pitch was poor, and the final response was affected and not predicatable.
2. Flight path control - Affected by my inability to get the pitch response that I wanted.
3. Pitch attitude control - I've already talked about, sluggish, felt behind it, like flying with a rubber band.
4. Airspeed control - Was affected as things cascade downstream.
5. Offset correction - Was likely approached more gingerly in deference to my feelings about the airplane.
6. Atmospheric disturbances - Didn't play a part, though realistic.
7. Special pilot techniques - I approached this with some caution.

C. Flare and Touchdown

1. Pitch attitude and flight path control -. Pitch attitude control was poor, slow, lacking in initial response. Flight path control was affected. I had moments in that one where I felt like I wasn't really getting the response, and wonder if I really was going to get it.
2. Control of touchdown parameters - Worked out very near desired performance parameters, but I didn't feel like I was really in charge for parts of the final flare and touchdown. Worked out but I really had to work at it.
3. Atmospheric disturbances - Realistic winds and turbulence, but I wasn't bothered by them.
4. Special pilot techniques - If you didn't have to make any large corrections, if you could make incremental corrections all around, and, maybe use the trim a little bit, it wouldn't be a problem.

D. Pitch Ratings

1. Approaches - 6
2. Flare and Touchdown - 8 - There were moments there where controllability may have been in question.
3. Overall - 8
4. PIO Rating - 3 - It's more that I didn't get what I wanted when I wanted it, than an oscillating thing, both in approach and flare and touchdown.

DATE: 12/12/85  
FLT: 901

TURB: None  
OVERALL PR: 4

PILOT: Ranz (Boeing)  
CONFIG. #: 25

A. Initial Overall Impression - The workload is definitely higher than the last one (Configuration B), but it's not all that bad for the approach. The flare part of the flight path control requires a bit more workload, even to the point where it looks like I have to end up doing a little pushing down in there. It doesn't feel speed stable.

B. Approach

1. Initial/Final response to control inputs - The stick forces are good.
2. Flight path control - More workload than before.
3. Pitch attitude control - I have to work the pitch axis little more to get it where I want it.
4. Airspeed control - No problem, speed control was easy.
5. Offset correction - OK
6. Atmospheric disturbances - Felt like I felt a gust at 50 feet or so, it was controllable.
7. Special pilot techniques -

C. Flare and Touchdown

1. Pitch attitude and flight path control - Seems a little bit harder than the last configuration.
2. Control of touchdown parameters - I got it in the box, but touched down on the high sink rate side (3 to 4 ft/sec). (Boaderline desired/adequate).
3. Atmospheric disturbances - (See above in approach).
4. Special pilot techniques - Felt like in the last part I had to kind of go for the runway.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 4
3. Overall - 4
4. PIO Rating - 1

DATE: 1/8/86      TURB:            None      PILOT:            Hadden (Lockheed)  
FLT: 913            OVERALL PR: 7      CONFIG. #: 25

A. Initial Overall Impression -

B. Approach

1. Initial/Final response to control inputs - Very slow response, felt like I didn't have enough elevator. I'd put in an input and nothing would happen, a little more, nothing happened, and finally it did show. It was either a lag or I'd have to put in a lot of elevator to make the aircraft respond.
2. Flight path control - Was within a half dot of glide slope and constantly moving. Marginal, I should be able to hold it within a half needle width.
3. Pitch attitude control - Looked like it was lagging behind what I was doing with the control column.
4. Airspeed control - Was a little bit sloppy.
5. Offset correction - No problem.
6. Atmospheric disturbances - I don't know if I had a little bit of heave in there or not but it did seem like I had to put in there a very large input and then come out. The airplane did not respond like I wanted it to. Almost like there was not enough elevator to do it. So I was possibly overcontrolling.
7. Special pilot techniques - Adding a little bit more elevator in the direction I wanted to go, because it didn't respond fast enough.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Again, I was short and it felt like when I'd try to pitch up to get back up to the glide path, and the airplane did not respond. So it was a lagging attitude response or less elevator power than what I wanted. The inner glide path tracking was marginal and the flare, because I was changing attitude quite a bit, was poor.
2. Control of touchdown parameters - Short and hit hard (4 to 5 ft/sec).
3. Atmospheric disturbances -
4. Special pilot techniques -

D. Pitch Ratings

1. Approaches - 5
2. Flare and Touchdown - 7 - I got into a PIO that was very visible.
3. Overall - 7
4. PIO Rating - 4 - Saw a little bit of a PIO in the flare. I felt out of phase with it.

DATE: 12/5/85  
FLT: 892

TURB: None  
OVERALL PR: 2-1/2

PILOT: Person  
CONFIG. #: 26

A. Initial Overall Impression - That's a good flying configuration.

B. Approach

1. Initial/Final response to control inputs - Predictable
2. Flight path control - Very easy
3. Pitch attitude control - No problems
4. Airspeed control - Right on
5. Offset correction - Simple
6. Atmospheric disturbances - Obvious, but did not upset the airplane too bad.
7. Special pilot techniques - As much as I don't like heavy airplanes, I have the feeling there's a slight stretch between the input and output, and I have to compensate for that.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Was the best of day.
2. Control of touchdown parameters - Far and away better than previous approaches (Configurations #24, 21, 27, 28).
3. Atmospheric disturbances - Was there
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 2-1/2 - Because of that little rubber bandy feeling.
3. Overall - 2-1/2
4. PIO Rating - 1

DATE: 12/10/85  
FLT: 898

TURB: None  
OVERALL PR: 4

PILOT: Ball  
CONFIG. #: 26

A. Initial Overall Impression - A quite nice flying airplane, didn't see any gross problems with it.

B. Approach

1. Initial/Final response to control inputs - On downwind I'm not making many quick ones to check that out, but as just flying goes the initial and final response was fine.
2. Flight path control - Good
3. Pitch attitude control - Good
4. Airspeed control - had to watch it closer, but it wasn't difficult particularly when I got it on. It seemed to hold alright. It was one of those that wouldn't completely take care of itself.
5. Offset correction - No problem
6. Atmospheric disturbances - No problem
7. Special pilot techniques - Did not require any

C. Flare and Touchdown

1. Pitch attitude and flight path control - Was good
2. Control of touchdown parameters - Good, got desired
3. Atmospheric disturbances - No problem
4. Special pilot techniques - I used a different technique for flight path control. I flew it with steps if you look at the traces. I put quite a few small ones in there to get it coming down. Was feeling for the runway.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 4
3. Overall - 4
4. PIO Rating - 1

DATE: 1/7/86  
FLT: 911

TURB: Light  
OVERALL PR: 3

PILOT: Smith  
CONFIG. #: 26

A. Initial Overall Impression - (First flight after three weeks and noted heaviness initially, but this got better as the flight went along).

B. Approach

1. Initial/Final response to control inputs - Pitch response was a little sluggish initially but controllability and precision was good.
2. Flight path control - Was good.
3. Pitch attitude control - The airplane just feels a little heavy to me in pitch. So the pitch response is a little slow, and tend to get pumping the stick a little bit, but I can get the desired flight path control that I want.
4. Airspeed control - As long as you pay attention, you can do it. You have to make small movements with the throttle. In this task it's not a problem.
5. Offset correction - The airplane is on the slow side laterally. It kind of wallows, but you can do this task satisfactorily.
6. Atmospheric disturbances - None
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Was good
2. Control of touchdown parameters - I could touchdown where I wanted on conditions.
3. Atmospheric disturbances - Not a factor, the crosswind was canceled out.
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 3
3. Overall - 3 - Just the pitch seems heavy to me, but I go through this each time, it gets better as we go along.
4. PIO Rating - 1

DATE: 12/5/85  
FLT: 892

TURB: None  
OVERALL PR: 5

PILOT: Person  
CONFIG. #: 27

A. Initial Overall Impression - It doesn't fly too bad up and away and in the approach. It feels like the response is a little on the rubber bandy side, like I'm not quite tied to the airplane. I tend to fly the approach with trim beeps and tiny inputs.

B. Approach

1. Initial/Final response to control inputs - There's some delay in building up the initial pitch rate then the pitch rate builds up predictably to a state state.
2. Flight path control - Very good
3. Pitch attitude control - If I pull and hold, I get a predictable pitch rate response, the damping is good and it settles down where I let it go.
4. Airspeed control - Easy
5. Offset correction - No problem
6. Atmospheric disturbances - You feel it, it bobbles the airplane up and down a little.
7. Special pilot techniques - I have to be tender with the airplane, because I tend to overcontrol it in the pitch axis.

C. Flare and Touchdown

1. Pitch attitude and flight path control - The flight path was oscillating on the last one, though not divergent.
2. Control of touchdown parameters - Fairly close to what I wanted.
3. Atmospheric disturbances - I saw them.
4. Special pilot techniques - You have to be gentle with the airplane. It's not one you want to make a big horsey input with, as you're going to get more than you want.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 5 - Worse than the last two configurations (#21 and #24).
3. Overall - 5
4. PIO Rating - 4 - Not divergent.

DATE: 12/7/85  
FLT: 897

TURB: Light  
OVERALL PR: 8

PILOT: Ball  
CONFIG. #: 27

- A. Initial Overall Impression - I like it less the second time than the first and I wasn't crazy about it the first approach. I was getting a nose bobble, while trying to step it down, but the glide path wasn't coming down like I expected, and we landed along. The second time I got the flight path right but the attitude as changing and that was a PIO. I could tell by the phasing of my inputs.
- B. Approach
1. Initial/Final response to control inputs -
  2. Flight path control - For the gross glide slope control was no problem.
  3. Pitch attitude control - Even on the approach I noticed it had a spongy feel. I put an input in and it would be a little bit before anything came around. It just had a rubber band kind of a feel.
  4. Airspeed control - No problem
  5. Offset correction - I had that spongy feel in pitch when I made the large correction.
  6. Atmospheric disturbances - It's right over the end of the runway where I noticed the nose beginning to move around in pitch. The little bit of chop is no problem.
  7. Special pilot techniques - None
- C. Flare and Touchdown
1. Pitch attitude and flight path control - The first time I thought it was a flight path control problem in that I couldn't step it down and landed long. And the second time the pitch attitude was all over, even though it would have touched in the desired zone, it had the right angle, but it was moving around too much (in PIO), it tripped off.
  2. Control of touchdown parameters - Poor for above reasons.
  3. Atmospheric disturbances -
  4. Special pilot techniques - I was trying to fly it in a closed-loop way, in a normal sense and did not let it land it self.
- D. Pitch Ratings
1. Approaches - 5
  2. Flare and Touchdown - 8
  3. Overall - 8
  4. PIO Rating - 5

DATE: 12/17/85  
FLT: 906

TURB: Light  
OVERALL PR: 6

PILOT: Smith  
CONFIG. #: 27

- A. Initial Overall Impression - I achieved desired characteristics in terms of the landing, but I really don't think overall it was desired. There was a tendency to oscillate, that was controllable.
- B. Approach
1. Initial/Final response to control inputs - Satisfactory, I didn't notice anything in terms of the response on the approach.
  2. Flight path control - Good
  3. Pitch attitude control - Good
  4. Airspeed control - Not a problem
  5. Offset correction - A bit of a ponderous airplane-lateral/directionally; but in the context of this task it's not a problem.
  6. Atmospheric disturbances - Nothing noticed
  7. Special pilot techniques - None
- C. Flare and Touchdown
1. Pitch attitude and flight path control - The attitude control, final response, there was a tendency if you tried to be aggressive with the airplane, or exact, to get into a small amplitude PIO, that was an overcontrol that was controllable in the sense that you could enter and exit the loop and keep it from getting to be a problem and really upsetting the flight path control. It's certainly not satisfactory. The PIO did not affect the flight path that much.
  2. Control of touchdown parameters - Because of the control technique I was talking about (exiting the loop), you could control the attitude within bounds sufficiently to get the touchdown within the desired parameters.
  3. Atmospheric disturbances - Not a factor
  4. Special pilot techniques - I have to exit the loop to stop the PIO tendency.
- D. Pitch Ratings
1. Approaches - 3 - The force levels are still high out of trim.
  2. Flare and Touchdown - 6 - I don't think you should have an airplane that oscillates like that, but you could get the job done.
  3. Overall - 6
  4. PIO Rating - 4 - It definitely had a tendency to PIO if you got into the loop, but the character of the airplane and PIO was such that it didn't affect the flight path. You'd get a burst, you'd stop and it would go away.

DATE: 12/12/85  
FLT: 902

TURB: Light  
OVERALL PR: 8

PILOT: Higgins (Boeing)  
CONFIG. #: 27

A. Initial Overall Impression - In the push directions it bounces back at you unpleasantly. It gives you problems and you end up having to descend.

B. Approach

1. Initial/Final response to control inputs - If you put an input in, it comes back to where it was, almost abruptly. If you put in a large input it would be very abrupt, but I didn't put in a large input.
2. Flight path control - If you don't screw with it, it's OK, but it's more difficult than the others (#24 and B) I've seen.
3. Pitch attitude control - Reasonably easy
4. Airspeed control - Took a lot of attention, took a lot of time.
5. Offset correction - Easy
6. Atmospheric disturbances - Didn't notice
7. Special pilot techniques - On the second one I tried to leave it alone, and as long as you left it alone, it seemed OK. But the minute you tried to put in a very light input you had make it as gently as possible.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Same comments as above apply.
2. Control of touchdown parameters - The second one I felt fairly comfortable with, but that's because I was set up better at the initial outset of the touchdown.
3. Atmospheric disturbances - Didn't notice
4. Special pilot techniques - Same as for the approach, don't screw with it very much.

D. Pitch Ratings

1. Approaches - 4
2. Flare and Touchdown - 8 - On the first one I got into a PIO near the ground, but not as bad on approach. On the second one I was able to control it by not messing with it.
3. Overall - 8
4. PIO Rating - 5

DATE: 1/7/86  
FLT: 912

TURB: Light to moderate  
OVERALL PR: 3

PILOT:  
CONFIG. #:

Hadden (Lockheed)  
27 (Partial  
evaluation-one short  
approach - wanted  
to see again - see  
next page for com-  
plete evaluation on  
next day)

- A. Initial Overall Impression - Basically felt pretty good, felt better than the last one (Configuration 21) with the short look at it. I may have been rushed on it.
- B. Approach
1. Initial/Final response to control inputs -
  2. Flight path control - I took it a dot and half high on glide slope and with the offset and it was easy to bring back down.
  3. Pitch attitude control - Easy to control
  4. Airspeed control - No problem
  5. Offset correction - Easy to correct
  6. Atmospheric disturbances - Didn't notice them
  7. Special pilot techniques - None
- C. Flare and Touchdown
1. Pitch attitude and flight path control - Looked OK
  2. Control of touchdown parameters - I may have been on the limit of sink rate (3 ft/sec).
  3. Atmospheric disturbances -
  4. Special pilot techniques -
- D. Pitch Ratings
1. Approaches - 3
  2. Flare and Touchdown - 3 - (only one approach - have to see again)
  3. Overall - 3
  4. PIO Rating - 1

DATE: 1/8/86  
FLT: 913

TURB: None  
OVERALL PR: 4-1/2

PILOT: Hadden (Lockheed)  
CONFIG. #: 27

A. Initial Overall Impression -

B. Approach

1. Initial/Final response to control inputs - Good
2. Flight path control - Excellent
3. Pitch attitude control - Very good
4. Airspeed control - Good
5. Offset correction - No problem
6. Atmospheric disturbances - I had the one set that pushed me up, and a little forward stick took that right out.
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - On the first one it was excellent, on the second one I developed a little bit of a pitch input, a little more stick motion than what I like.
2. Control of touchdown parameters - Between desired and adequate.
3. Atmospheric disturbances - The one near flare heaved me up a little bit.
4. Special pilot techniques -

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 4-1/2 - Due to the second one that gave me the heave motion that I really didn't get into the touchdown zone. The performance is what hurt me.
3. Overall - 4-1/2
4. PIO Rating - 4 - The correction on that heave motion caused a PIO, not divergent.

DATE: 12/5/85  
FLT: 892

TURB: None  
OVERALL PR: 3

PILOT: Person  
CONFIG. #: 28

A. Initial Overall Impression - I still have the feeling I have a rubber band between me and the airplane response. You can move the column too far without a response from the airplane.

B. Approach

1. Initial/Final response to control inputs - If you measure your input, the final response is predictable. A nice steady pitch rate, then when you get out of the system it tends to hold where you left it in the short term.
2. Flight path control - Very easy on the approach in glide slope tracking. I made an aggressive capture from above, without more than a 1/4 dot overshoot.
3. Pitch attitude control -
4. Airspeed control - No problem
5. Offset correction - No problem
6. Atmospheric disturbances - None on the approach.
7. Special pilot techniques - None, other than I tend to beep the trim.

C. Flare and Touchdown

1. Pitch attitude and flight path control - I bobbed the control input a few times there. I'm not sure why, maybe it was from the correction from the disturbance. These were some control reversals in the flare. Generally, I like the way it flies. I didn't back out of the loop, I just quit pulling and pushing.
2. Control of touchdown parameters - Desired T.D. parameters, better than previous configurations today (#24, 21, 27). I was happy with the parameters.
3. Atmospheric disturbances -
4. Special pilot techniques - You have to be conscious of the fact that you don't want to pull the stick too far, too fast to keep from bobbling, though not really a PIO.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 3
3. Overall - 3
4. PIO Rating - 2 - I had a little tendency to bobble, especially in the first approach.

DATE: 1/9/86  
FLT: 916

TURB: Light  
OVERALL PR: 8

PILOT: Person  
CONFIG. #: 28

A. Initial Overall Impression - There's a little time lag, then a fairly crisp rate command type response with a good tight attitude hold in the system. In the approach there is no problem but is PIO prone in flare and touchdown.

B. Approach

1. Initial/Final response to control inputs - The approach was no problem.
2. Flight path control - No problem. You will find there was little jab type inputs, then out.
3. Pitch attitude control - No problem. Linear and very predictable after the delay.
4. Airspeed control - No problem
5. Offset correction - No problem
6. Atmospheric disturbances - No problem
7. Special pilot techniques - The little input then out of the system. The thing that gets you with this one is that you could make the little input and nothing happens and then when you get totally out of the system the airplane responds and follows you up. So it's a pilot input, blip, then an airplane response later with a blip. And that's where you can get into trouble with it.

C. Flare and Touchdown

1. Pitch attitude and flight path control - The first attempted landing ended up in a PIO, the second you'll see some reversals but not a PIO. I changed my pilot technique to compensate for what is going on in the airplane. I didn't have quite the control on flight path that I wanted because I was trying hard not to overcontrol attitude.
2. Control of touchdown parameters - Was not within the desired parameters and had the tendency to PIO the airplane.
3. Atmospheric disturbances - May have affected landings. On a calm day you might not have seen as much of that as I saw with the disturbances we had today.
4. Special pilot techniques - Was to get your knuckles white.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 8 - If you're not concerned about where you land the airplane on the runway you can still land it without any trouble.
3. Overall - 8
4. PIO Rating - 6

DATE: 12/5/85  
FLT: 893

TURB: None  
OVERALL PR: 10

PILOT: Ball  
CONFIG. #: 28

A. Initial Overall Impression - It's just unflyable, you couldn't do anything with it, any part of that task.

B. Approach

1. Initial/Final response to control inputs - The initial response would come in, then the final response just oscillated. The only time I'd get it stopped would be when I let go of it.
2. Flight path control - Without any disturbances I could ultimately get it settled down.
3. Pitch attitude control - When it got disturbed I'd go through mostly attitude oscillations.
4. Airspeed control - Because I was concentrating so much on other things, I noticed I was off on speed.
5. Offset correction - This really triggered it (PIO). Any sudden input, and away it went.
6. Atmospheric disturbances - I really didn't notice it that time, I was busy enough that I didn't see the gust. On others I usually saw the gust.
7. Special pilot techniques - Just had to let go. I couldn't even bring myself to freeze the control (as he did on #22). I had to actually let go of the thing to get the oscillation to stop.

C. Flare and Touchdown

1. Pitch attitude and flight path control - Unattainable
2. Control of touchdown parameters - Pure luck to get anything there.
3. Atmospheric disturbances - Same as I said before.
4. Special pilot techniques - That close to the ground I couldn't bring myself to let go and by having my hand on it, there was an oscillation that just kept going, and it would have until we either impacted or they took it.

D. Pitch Ratings

1. Approaches - 7
2. Flare and Touchdown - 10 - There wasn't anything there that I could land in those two approaches.
3. Overall - 10
4. PIO Rating - 6

DATE: 1/7/86  
FLT: 911

TURB: Light  
OVERALL PR: 7

PILOT: Smith  
CONFIG. #: 28

A. Initial Overall Impression - It had a high frequency, small amplitude PIO tendency in the flare and touchdown.

B. Approach

1. Initial/Final response to control inputs - If felt quick, responsive initially but like I had a fairly stiff spring in the airplane.
2. Flight path control - Good
3. Pitch attitude control - Good
4. Airspeed control - Not a problem
5. Offset correction - Easy to do
6. Atmospheric disturbances - Not a factor
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - Was different than approach. The pitch attitude control I tended to get into an overcontrol. High frequency, small amplitude PIO, and superimposed on the flight path. So I could control the flight path but I was just hunting all the while coming down. The second time I approached it a little more cautiously but you still had that tendency to small amplitude PIO. The pitch attitude control suffered there. The flight path control was not really influenced too much by that overcontrol, since the mean value of that tended to go where you wanted it to go.
2. Control of touchdown parameters - Controlled fairly well. The actual touchdown sink rate suffered a little bit by the lack of precision.
3. Atmospheric disturbances -
4. Special pilot techniques - Didn't develop any in my brief exposure.

D. Pitch Ratings

1. Approaches - 3
2. Flare and Touchdown - 7
3. Overall - 7 - Due to PIO
4. PIO Rating - 4

DATE: 12/12/85  
FLT: 901

TURB: None  
OVERALL PR: 8

PILOT: Ranz (Boeing)  
CONFIG. #: 28

A. Initial Overall Impression - Workload has gone way up, both on the approach and flare and touchdown. It was squirrely in pitch. On the approach and when you are trimmed and reasonably stable, it seems to hold that without too much problem, but there is definitely a tendency to PIO anytime you make a pitch input.

B. Approach

1. Initial/Final response to control inputs - I get a kind of a springy, spongy feeling whenever I pulse the elevator trying to make a small input, tendency to overshoot.
2. Flight path control - Is a fairly significant workload, OK once trimmed, but if off, hard to get back on.
3. Pitch attitude control - About the same (as flight path control).
4. Airspeed control - Didn't seem to be a problem.
5. Offset correction - Didn't seem to be a problem.
6. Atmospheric disturbances - Seemed like I had one there between 50 and 80 feet.
7. Special pilot techniques - None required.

C. Flare and Touchdown

1. Pitch attitude and flight path control - It felt like you were kind of behind the airplane, and you have to luck out in the sine wave to get a good touchdown. Easy to get into a PIO.
2. Control of touchdown parameters - Questionable
3. Atmospheric disturbances - The first one gave me a bad time. The second one I was able to compensate for.
4. Special pilot techniques - None

D. Pitch Ratings

1. Approaches - 5
2. Flare and Touchdown - 8
3. Overall - 8
4. PIO Rating - 3

DATE: 1/9/86  
FLT: 917

TURB: Moderate  
OVERALL PR: 5

PILOT: Hadden (Lockheed)  
CONFIG. #: 28

A. Initial Overall Impression -

B. Approach

1. Initial/Final response to control inputs - Satisfactory
2. Flight path control - Satisfactory, but it was affected by turbulence. Intercept was OK, but the tracking was somewhat on the sloppy side. I was a little over half a dot either way, with very little movement in the controls.
3. Pitch attitude control - Good
4. Airspeed control - I think the turbulence resulted in sloppy airspeed because there was 4-5 knots of variation.
5. Offset correction - No problem
6. Atmospheric disturbances - It is turbulent.
7. Special pilot techniques - None used

C. Flare and Touchdown

1. Pitch attitude and flight path control - Pretty good I thought. On the first approach I bobbed a little bit in the pitch attitude but not on the second one. The flight path control was loose in the flare, like I was not in full control.
2. Control of touchdown parameters - Probably within the desired zone but the sink rate on both were on the high side (4 to 5 ft/sec).
3. Atmospheric disturbances - Maybe the turbulence was affecting my performance.
4. Special pilot techniques - Stopped attitude bobble by letting go. Not out of phase with it, but more like overcontrolling.

D. Pitch Ratings

1. Approaches - 3 - Minimum compensation required due to the turbulence.
2. Flare and Touchdown - 5 - Because of the touchdown sink rate, may have been caused by the bobble.
3. Overall - 5
4. PIO Rating - 3 - I had the one slight bobble only on the first approach but on the second didn't notice it.

DATE: 1/8/86  
FLT: 914

TURB: Light  
OVERALL PR: 4-1/2

PILOT: Person  
CONFIG. #: 22A

- A. Initial Overall Impression - It's one of those airplanes I really don't like. It's a kind of a rate command attitude hold with a bounce back, it's a little vague as you go and do it.
- B. Approach
1. Initial/Final response to control inputs -
  2. Flight path control - The flight path control was good, so there wasn't any trouble with the approach.
  3. Pitch attitude control - Used a jab type input more than a smooth input. It's not predictable if I'm tight in the control loop. Rate overshoots and then drops back.
  4. Airspeed control - Doesn't seem to be as tight in this configuration as it has been in others.
  5. Offset correction - Not difficult
  6. Atmospheric disturbances - Not any problem.
  7. Special pilot techniques - Use the little jab type inputs. I did not fly with the trim.
- C. Flare and Touchdown
1. Pitch attitude and flight path control - The first was pretty good, the second one, the disturbance seemed to get more into the loop than it had been on the preceding one or I overcontrolled it a little bit. I didn't feel like control in the flare and touchdown was very good in that one. The flight path control wasn't as good as what I'd like.
  2. Control of touchdown parameters - It was outside of desired in terms of sink speed (4 ft/sec) and I had just made a fairly large nose up input to arrest the sink rate there. My guess is if we had been another 10 feet in the air we would have had a PIO out of it.
  3. Atmospheric disturbances -
  4. Special pilot techniques - Little jab type things like a rate command/attitude hold technique.
- D. Pitch Ratings
1. Approaches - 3-1/2
  2. Flare and Touchdown - 4-1/2 - Due to bobbling tendency.
  3. Overall - 4-1/2
  4. PIO Rating - 3 - I felt toward the end I might have been on the fuzzy edge of oscillating the control system.

DATE: 12/7/85  
FLT: 897

TURB: Light  
OVERALL PR: 9

PILOT: Ball  
CONFIG. #: 22A

A. Initial Overall Impression - It was kind of a loose spongy airplane that had some PIO tendencies of course most noticeable in the flare. I didn't like it, not a nice flying airplane at all.

B. Approach

1. Initial/Final response to control inputs - Loose and spongy. Pull it and it was that rubber band effect, not much happens and then it comes swinging in a fair amount.
2. Flight path control - Was not a very tight flight path control, but was sufficient for the approach.
3. Pitch attitude control - Kind of wandered around on that one, more in slow motions than in fast ones.
4. Airspeed control - Not a problem, faster maybe due to steeper glide slope (Buffalo is 3 degrees vs Niagara 2.5 degrees).
5. Offset correction - I didn't like as well on this one, as I would roll into the bank and to move the nose over there just seemed to take a while to get around there, and it didn't follow it as quickly as I'd like.
6. Atmospheric disturbances - Not a problem.
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - There was definitely a PIO tendency in pitch attitude, particularly on the second one. It was divergent. Flight path control due to that (PIO) was poor.
2. Control of touchdown parameters - Extremely poor
3. Atmospheric disturbances - There was some crosswind. On the first approach I was so busy in pitch I didn't notice the drift. On the second one, in trying to kill that drift, I ended up working the pitch more too. (Safety pilot noted that nose was pointed off runway heading, so drift wasn't all due to crosswind).
4. Special pilot techniques - None other than I would try to back out of the loop next time in order to stop the PIO.

D. Pitch Ratings

1. Approaches - 5 - Due to sponginess.
2. Flare and Touchdown - 9
3. Overall - 9
4. PIO Rating - 5 - As soon as I initiated an abrupt maneuver or a tight control there was a divergent oscillation.

DATE: 1/8/86  
FLT: 914

TURB: Light  
OVERALL PR: 4

PILOT: Person  
CONFIG. #: 25A

- A. Initial Overall Impression - I like it less than the one before (17 + Lead/Lag). Sluggish, non-responsive I can't quite sort out what it's doing. It looks to be like a rate command system but it looks like it kind of wants to hold attitude but not quite wants to hold. I can fly it in the approach with the trim without too much trouble. I can trim the airplane and get it to do what I want it to.
- B. Approach
1. Initial/Final response to control inputs -
  2. Flight path control -
  3. Pitch attitude control - Seemed to be predictable in terms of attitude rate response per unit input on the stick. It seemed to be linear. May have been more linear than previous one, but the forces were so high that it's hard to tell.
  4. Airspeed control - No real problem.
  5. Offset correction - Fairly easy to make.
  6. Atmospheric disturbances - Wasn't obvious.
  7. Special pilot techniques - I don't really feel like I'm connected to this airplane, one of those things I'd put in the category of a rubber band airplane. Connected to it, but not very tightly.
- C. Flare and Touchdown
1. Pitch attitude and flight path control - Doesn't really give you any problems. The only thing that I really don't like about it is that the gearing is much too low. The airplane's response is not as predictable as I'd like it to be. The funny thing is you could make the flare and touchdown without any real trouble. The first touchdown was done after a short time with the airplane and it wasn't terribly bad and the second was pretty well controlled.
  2. Control of touchdown parameters -
  3. Atmospheric disturbances -
  4. Special pilot techniques - You can adapt to it, but I don't know what it really was.
- D. Pitch Ratings
1. Approaches - 4 - Due to poor glide slope tracking.
  2. Flare and Touchdown - 3-1/2 - Because of the forces and the initial response. I don't think I'd like it more if you'd change the gearing.
  3. Overall - 4
  4. PIO Rating - 1 - No PIO tendency.

DATE: 12/7/85  
FLT: 897

TURB: Light  
OVERALL PR: 5

PILOT: Ball  
CONFIG. #: 25A

A. Initial Overall Impression - The flight control wasn't too pure on that one. It seemed to be more influenced when I got in close. I didn't notice the attitude change, but the glide path did. I hadn't gotten to the flare yet so that's on the approach.

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - So the flight path control wasn't too terrific on that one, especially on the second approach.
3. Pitch attitude control - Didn't notice anything on the approach.
4. Airspeed control - Reasonable
5. Offset correction - Didn't notice anything.
6. Atmospheric disturbances -
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - I was long and that was a flight path control problem in that I landed longer than I expected to. The pitch attitude was a little spongy.
2. Control of touchdown parameters - Not good
3. Atmospheric disturbances -
4. Special pilot techniques - Had to push forward to touchdown.

D. Pitch Ratings

1. Approaches - 4
2. Flare and Touchdown - 5 - Flight path control problems.
3. Overall - 5
4. PIO Rating - 1

DATE: 1/8/86  
FLT: 914

TURB: Light  
OVERALL PR: 5

PILOT: Person  
CONFIG. #: 28A

A. Initial Overall Impression - It's a lot more responsive rate command/attitude hold with perhaps a little less attitude rebound than the last one (#22A).

B. Approach

1. Initial/Final response to control inputs -
2. Flight path control - The flight path control in the approach was very good. It probably was the best glide slope control today (out of 17 + Lead/Lag, 25A, 22A). I don't know if it's learning curve or the configuration being better. The gearing was up.
3. Pitch attitude control - Crisp and responsive, I could make the attitude go where I wanted it to go.
4. Airspeed control - Also better than some of the preceding configurations today.
5. Offset correction - No problem
6. Atmospheric disturbances - Could see it, as the aircraft bobbed up above the glide slope, but I didn't seem to be disturbed as much as on the others. On the others I found myself with a much higher offset after the correction. This one seemed to stay on the glide slope through the correction turn.
7. Special pilot techniques - None

C. Flare and Touchdown

1. Pitch attitude and flight path control - On the fuzzy edge of a PIO in attitude not flight path. I saw a cycle and a half just prior to touchdown. Wasn't the kind of a thing that I felt was on the verge of being divergent, yet it wasn't the kind of a thing that I felt I had complete control over. Maybe the sensitivity is a lot more, I got too much. The trouble was in pitch attitude where I wanted very tight control over the pitch attitude and I got more than I wanted. I was making reversals. The flight path control was still good.
2. Control of touchdown parameters - Sink rate was adequate.
3. Atmospheric disturbances - I could see it that time.
4. Special pilot techniques - It's just a rate command/attitude hold airplane. But there's something about the attitude response or damping. A little input and out, pull and relax, push and relax. It would have diverged with a normal technique.

D. Pitch Ratings

1. Approaches - 2
2. Flare and Touchdown - 5 - Due to the bobble in pitch. I probably would like to see this again.
3. Overall - 5
4. PIO Rating - 4 - Had control reversals, had to be careful.

DATE: 12/10/85  
FLT: 898

TURB: None  
OVERALL PR: 10

PILOT: Ball  
CONFIG. #: 28A

A. Initial Overall Impression - Airplane was spongy, did not follow my inputs at all, and a real PIO producer.

B. Approach

1. Initial/Final response to control inputs - Even out on the approach, making fairly benign inputs, I could feel that not much was happening, then it came through with an overcontrol, it went more than what I expected. It felt like the g stayed on longer. It was a very strange feeling airplane.
2. Flight path control - Not good, I had to spend much more time keeping track of the glide slope because everytime I took my eyes off it, it would go quite a ways off.
3. Pitch attitude control - Also very bad
4. Airspeed control - Also difficult, it was one of those airplanes you have to watch instruments all the time.
5. Offset correction - Started the nose bobbing up and down as soon as I made the offset, and I was watching that and almost overshot the offset.
6. Atmospheric disturbances - I really didn't see too much because I was already in the beginning of a PIO when we got down close to the ground.
7. Special pilot techniques - Didn't have a chance to try anything out of the ordinary.

C. Flare and Touchdown

1. Pitch attitude and flight path control - The pitch attitude was the thing that was bothering me, thought we were going to hit a nose gear before we would flare unless we were lucky. Flight path control, had no feel for it at all.
2. Control of touchdown parameters - Terrible, where we would have touched would be a matter of luck (disengaged before T.D. on both).
3. Atmospheric disturbances - Didn't notice
4. Special pilot techniques - Didn't have time to try any.

D. Pitch Ratings

1. Approaches - 7 - Would not exceed a limit on the airplane out there.
2. Flare and Touchdown - 10
3. Overall - 10
4. PIO Rating - 6 - Even out on downwind I was getting an oscillation and in the flare it was divergent.

Appendix E  
APPROACH TIME HISTORIES

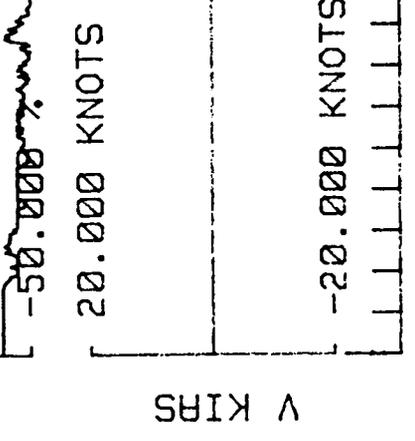
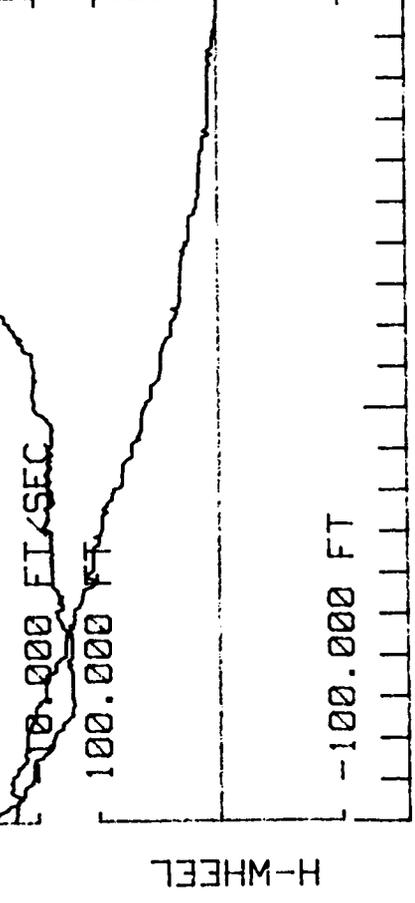
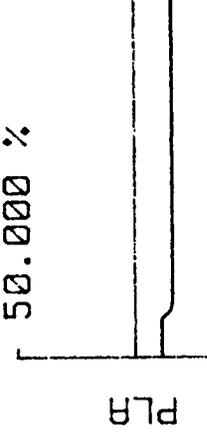
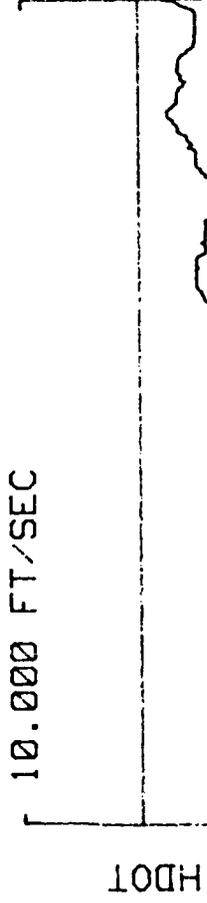
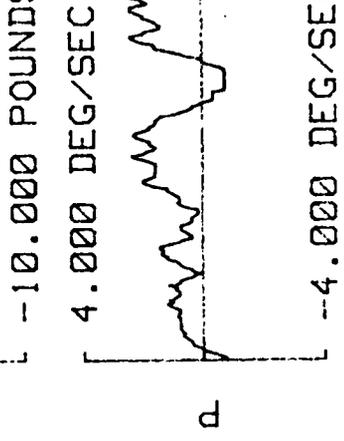
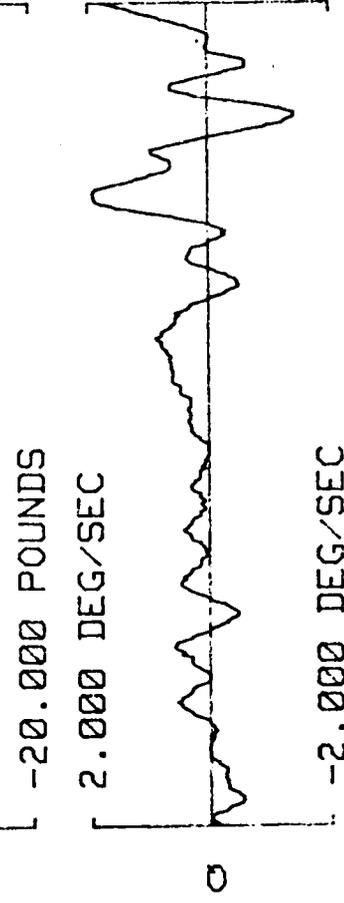
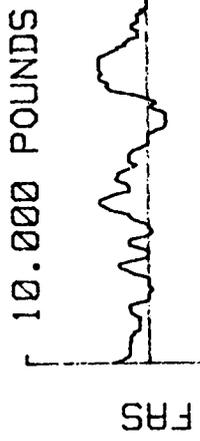
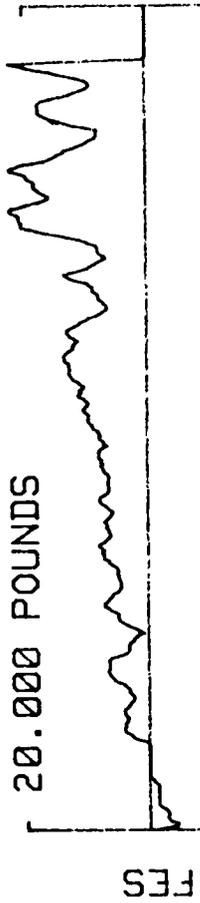
This appendix presents approach time histories. The final 20 seconds of the approaches are shown. They are presented in chronological order. A cross reference between configuration, flight number, and pilot is presented on the following page. The following responses are shown:

- FES -  $F_{ES}$ , pitch column force
- Q -  $q$ , pitch rate
- HDOT -  $\dot{h}$ , altitude rate
- H-WHEEL -  $h_{WH}$ , wheel height plus pulse at touchdown
- FAS -  $F_{AS}$ , roll wheel force
- P -  $p$ , roll rate
- PLA - power lever angle
- V KIAS - indicated airspeed (biased by 100 knots)

Table 8  
 CONFIGURATION - FLIGHT NUMBER/PILOT CROSS REFERENCE

<u>CONFIGURATION</u>	<u>FLIGHT/PILOT</u>
B	891/A, 893/B, 906/C, 901/D, 902/E, 912/F
1	891/A, 900/B, 917/F, 907/G
2	891/A, 900/B, 907/G
3	895/A, 896/B, 909/G
4	895/A, 900/B, 915/C, 909/G
5	918/A, 900/B, 909/G, (916/A - with +200 ms delay)
6	895/A, 905/B, 909/G
7	916/A, 896/B, 909/G
8	898/B, 915/C, 910/G
9	918/A, 910/G
10	918/A, 910/G
11	918/A, 917/F, 909/G
12	918/A, 909/G
13	917/F, 907/G
14	918/A, 907/G
16	904/D
17	894/A, 898/B, 908/C, 904/D, 904/E
17 + L/L	914/A, 896/B, 904/D, 904/E
18	894/A
19	894/A
20	894/A, 900/B, 904/D, 904/E
21	892/A, 897/B, 906/C, 912/F
22	895/A, 893/B, 915/C, 913/F
23	895/A, 898/B, 911/C
24	892/A, 896/B, 906/C, 902/E, 912/F
25	892/A, 916/A, 893/B, 915/C, 901/D, 913/F
26	892/A, 898/B, 911/C
27	892/A, 897/B, 906/C, 902/E, 912/F, 913/F
28	892/A, 916/A, 893/B, 911/C, 901/D, 917/F
22A	914/A, 897/B
25A	914/A, 897/B
28A	914/A, 898/B

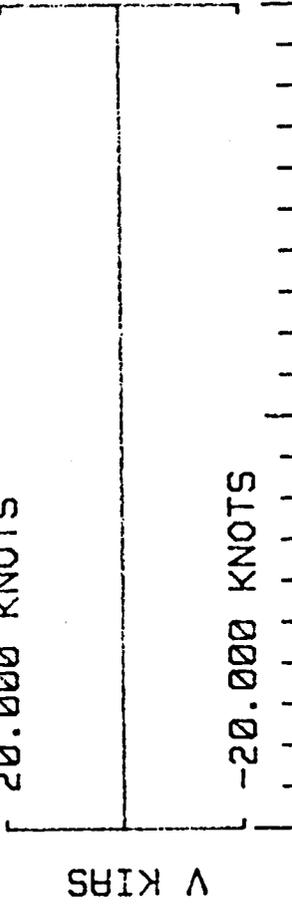
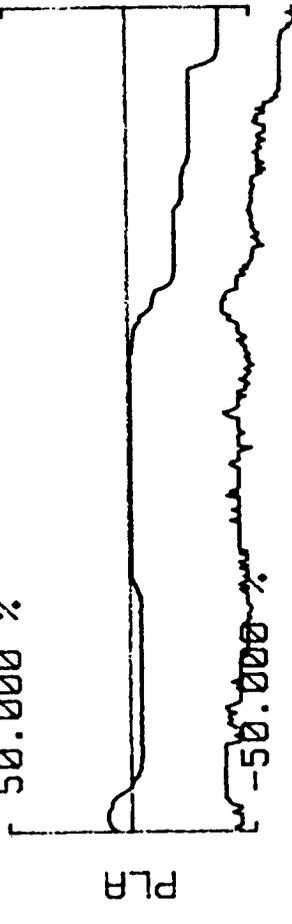
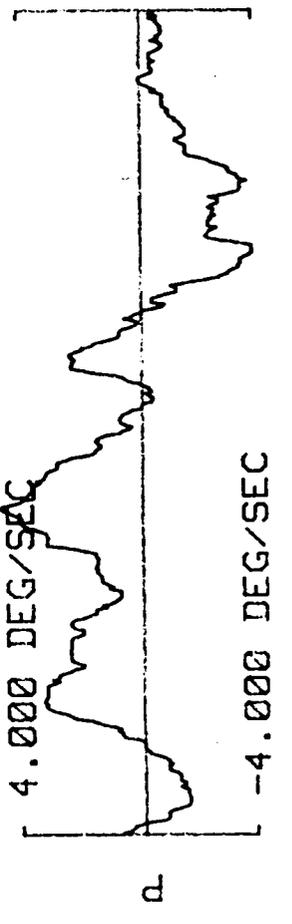
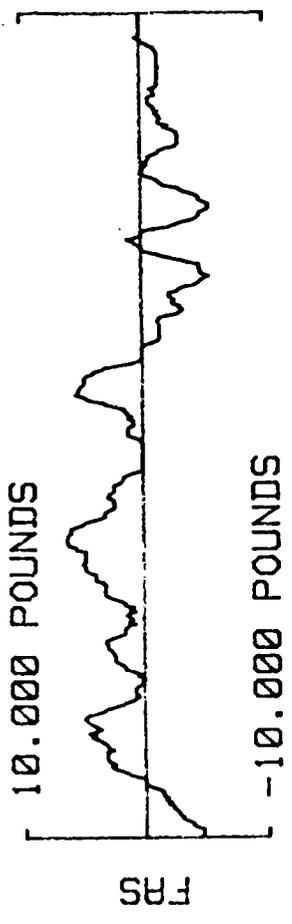
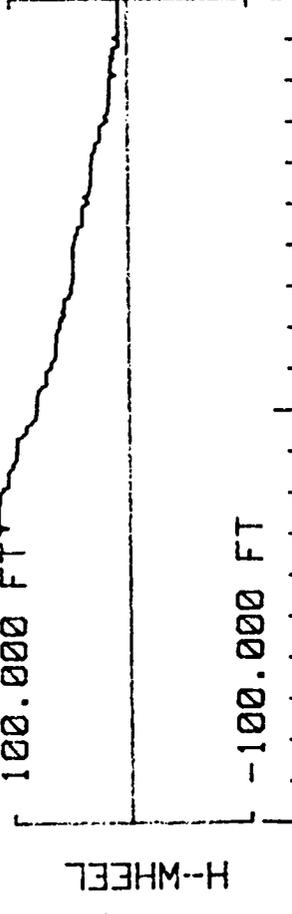
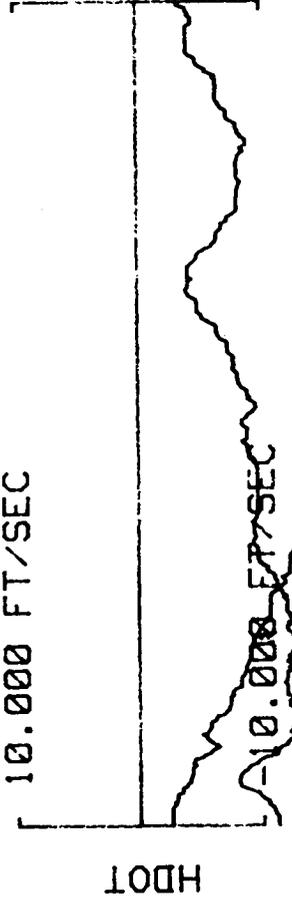
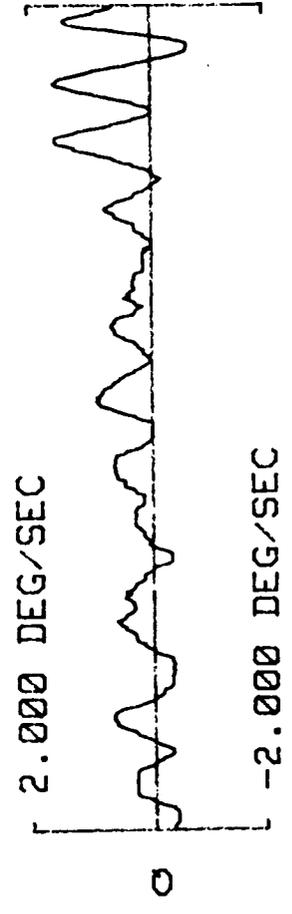
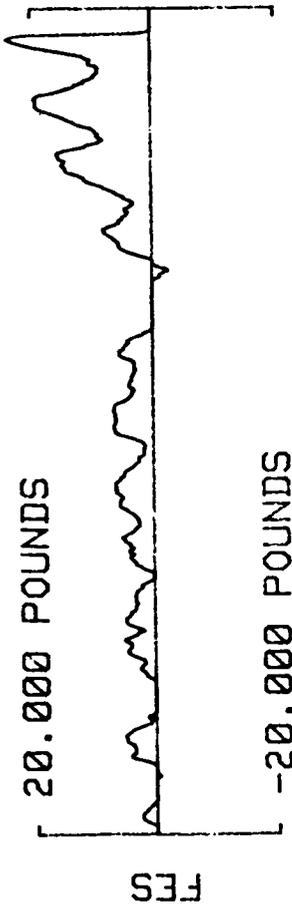
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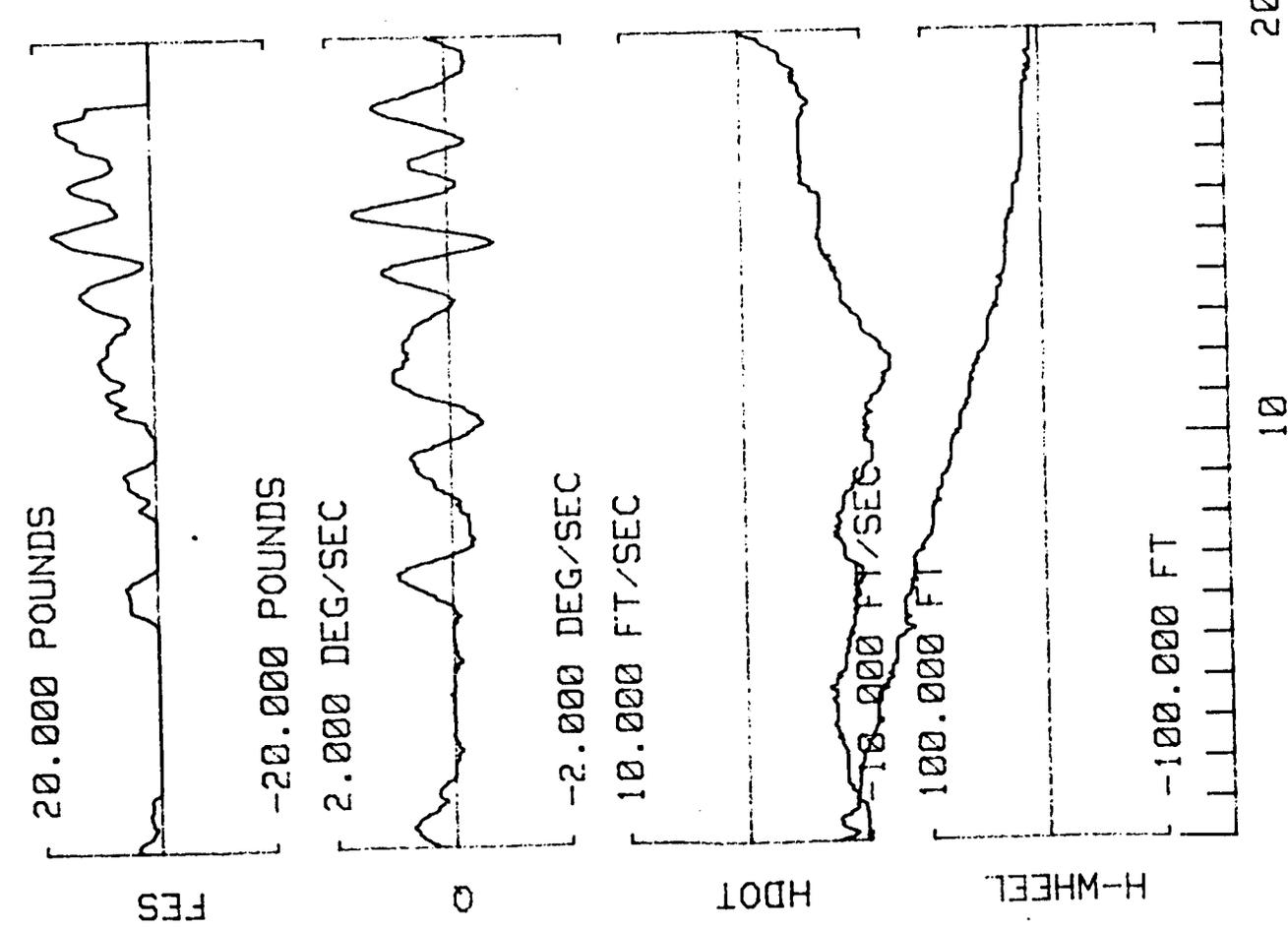
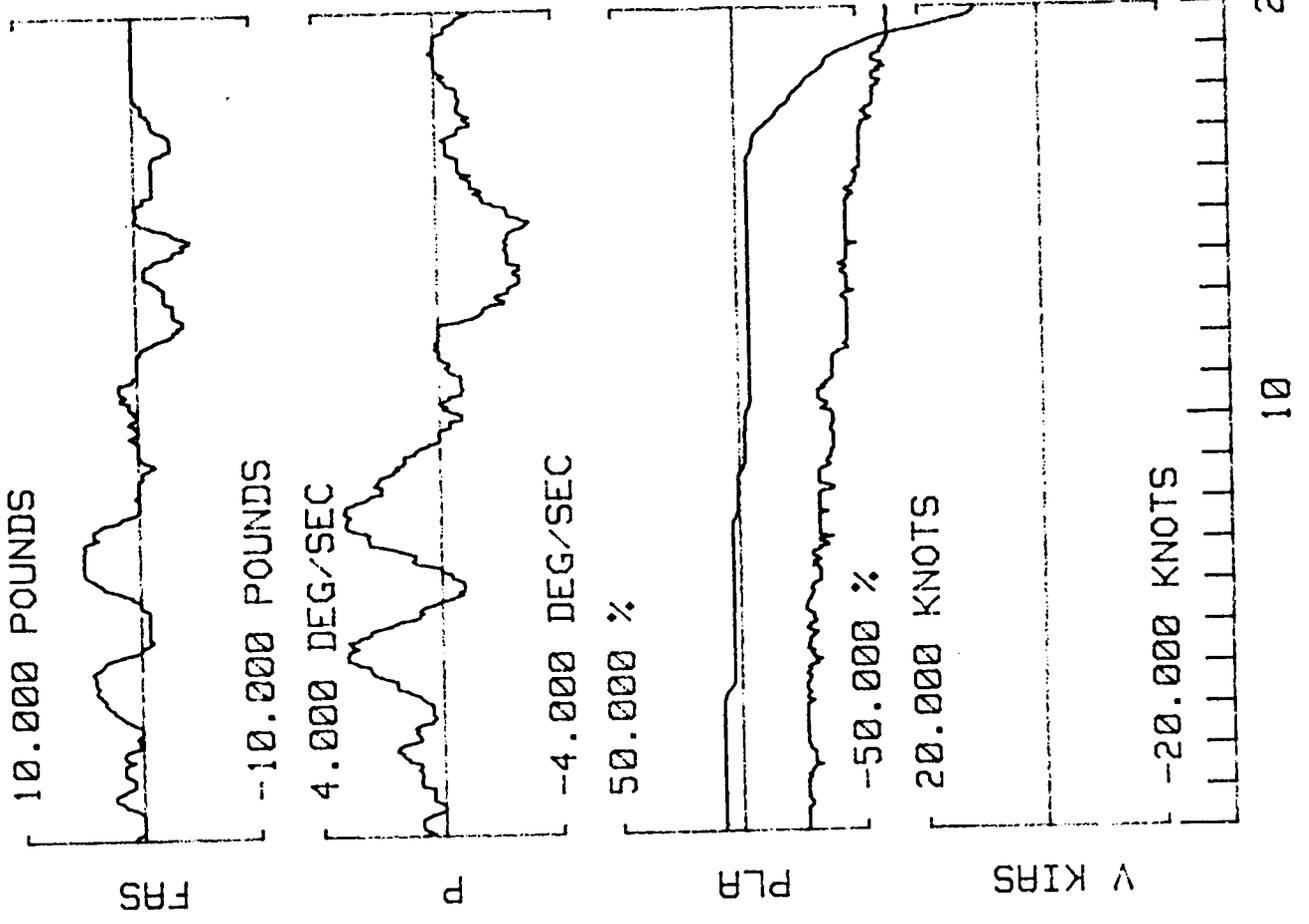
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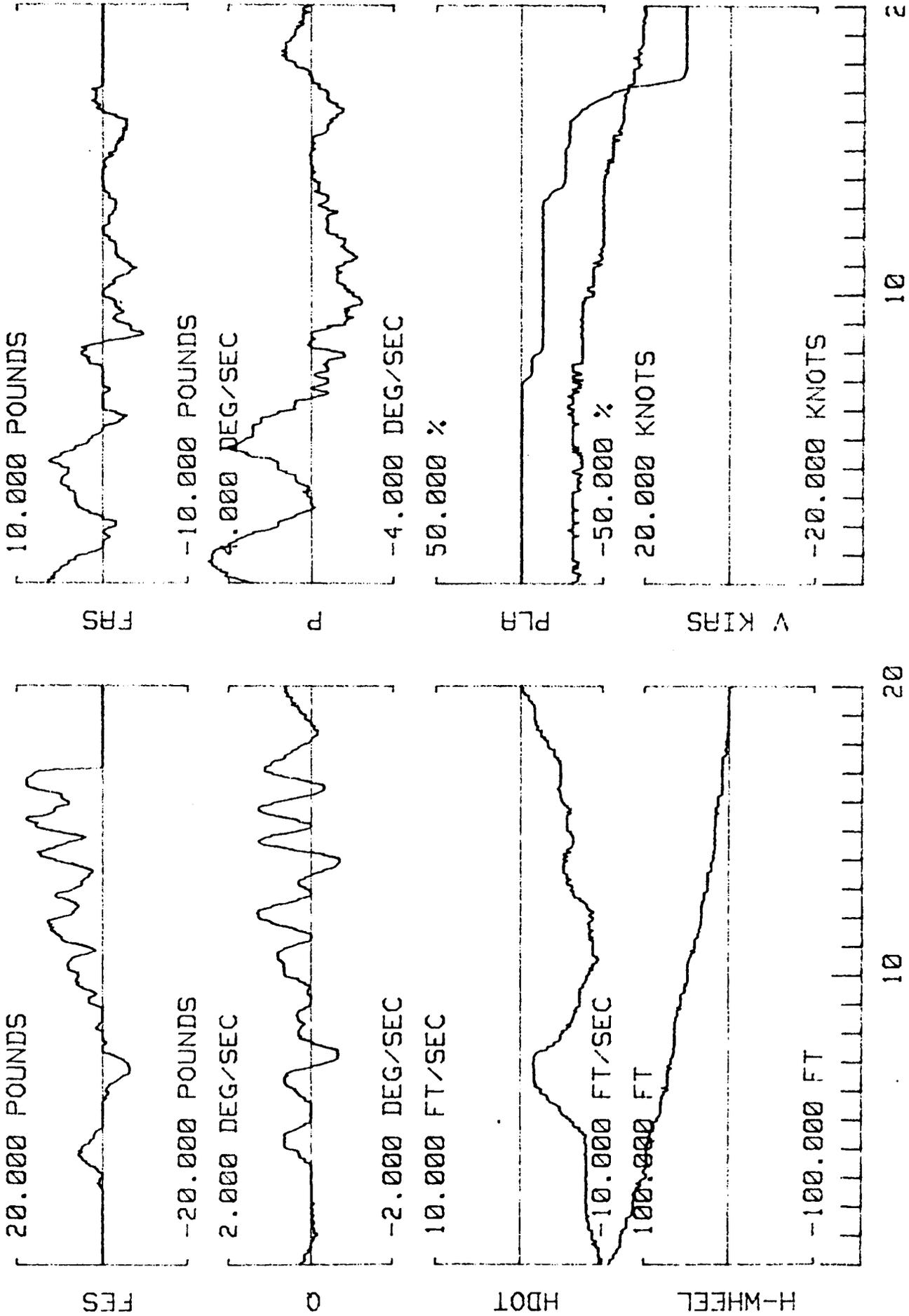
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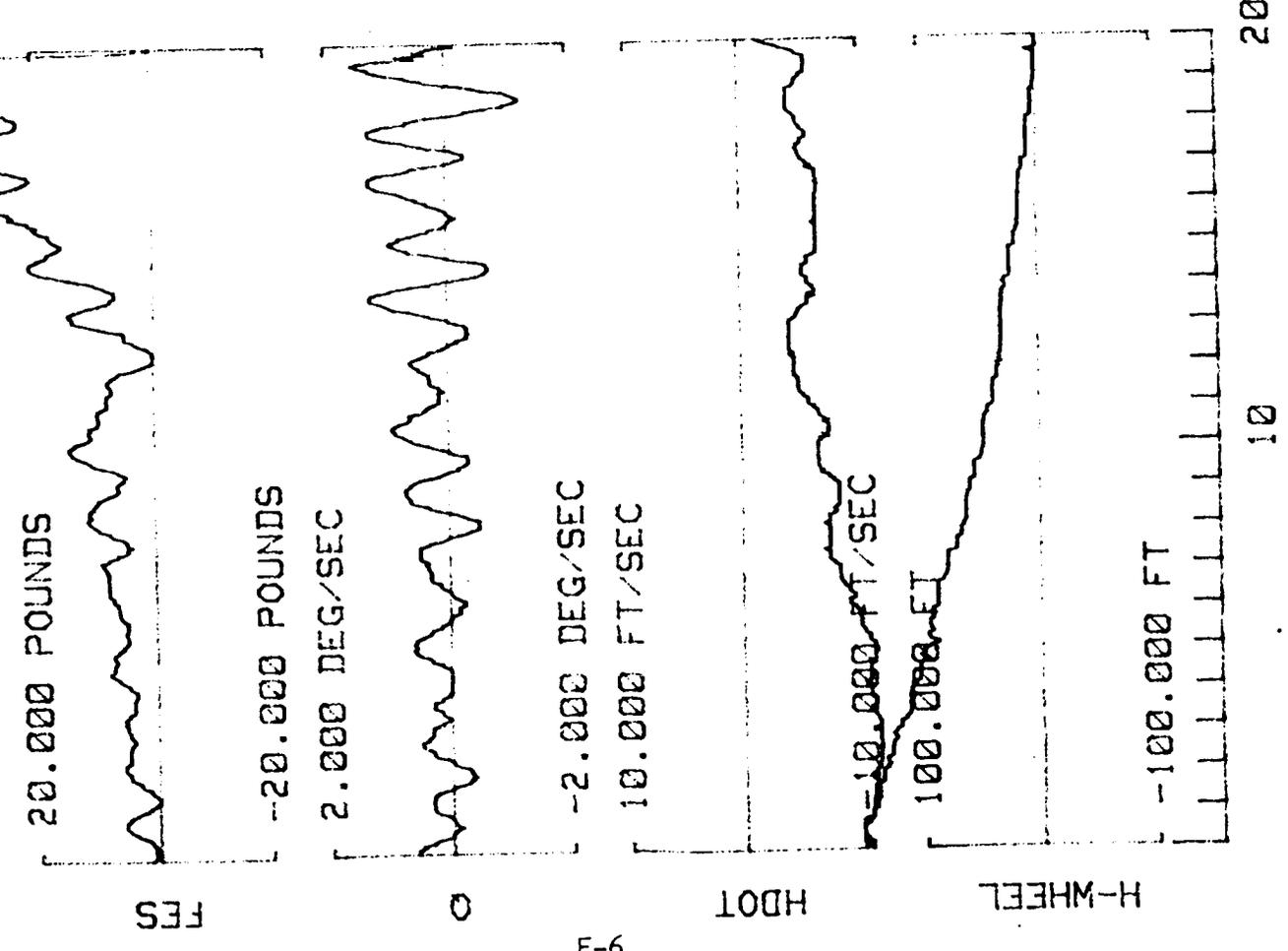
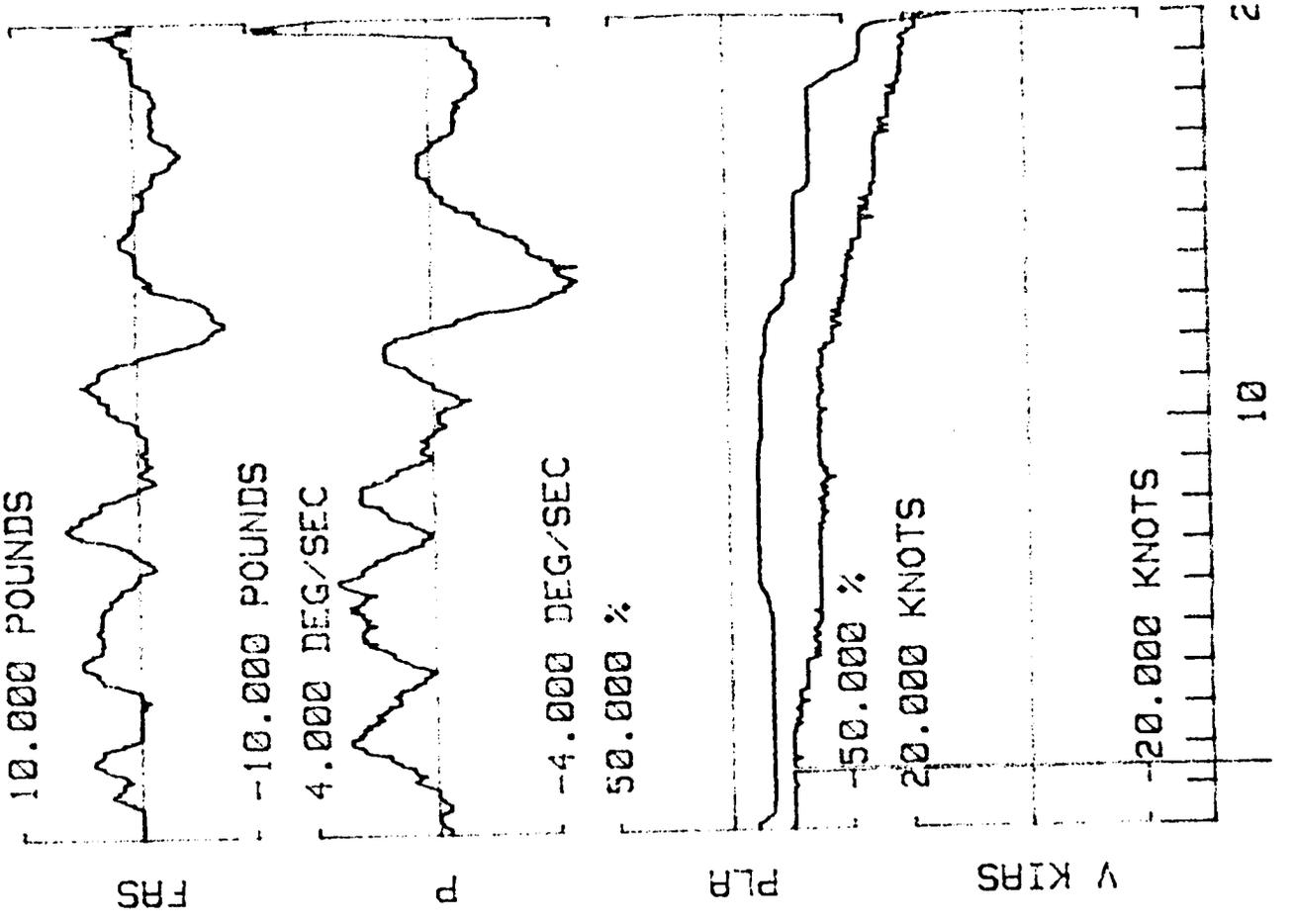
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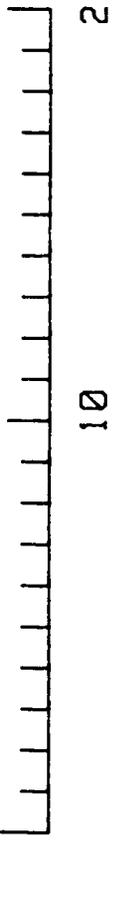
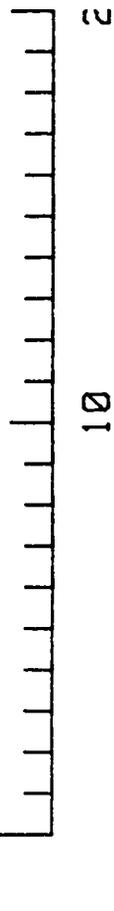
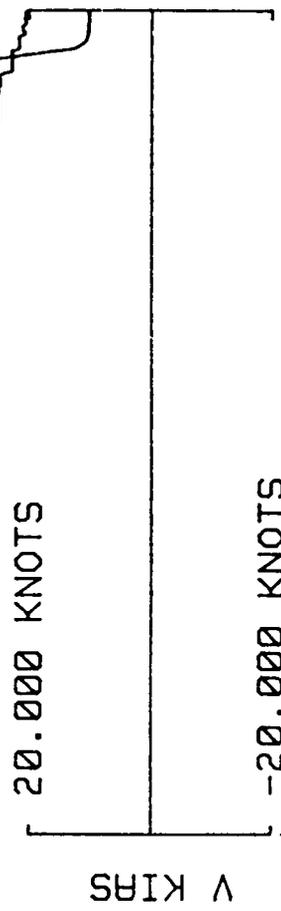
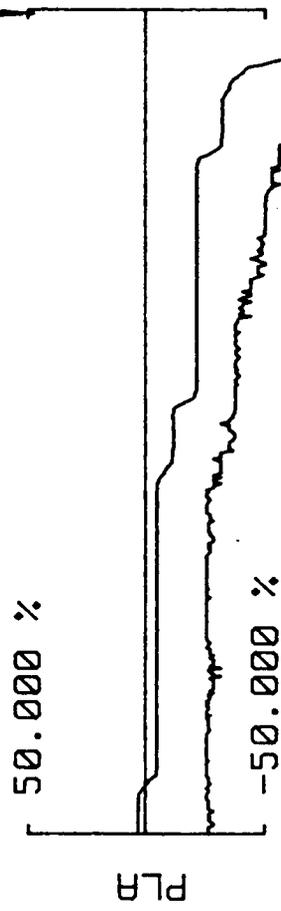
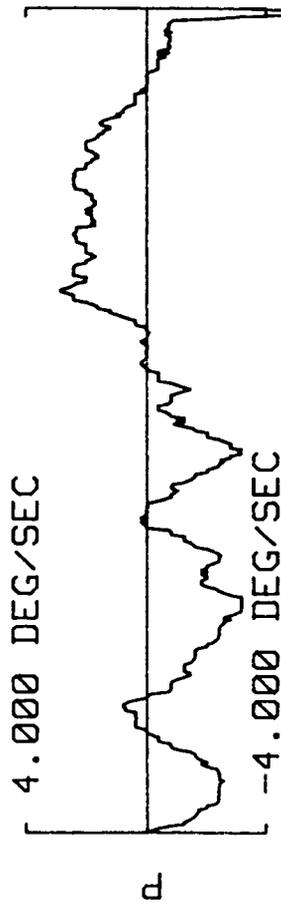
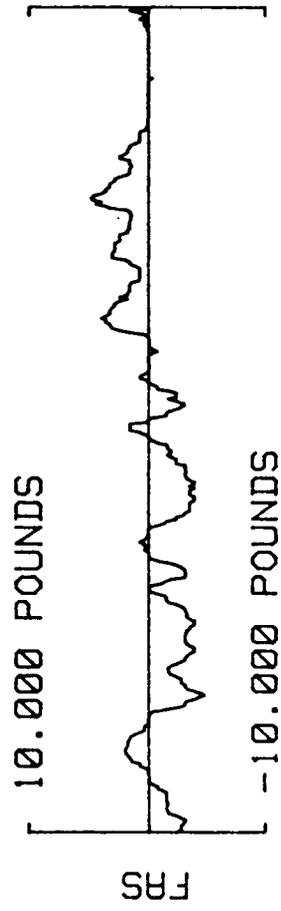
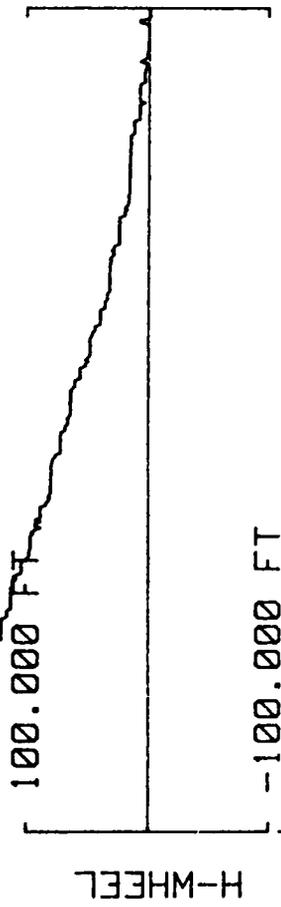
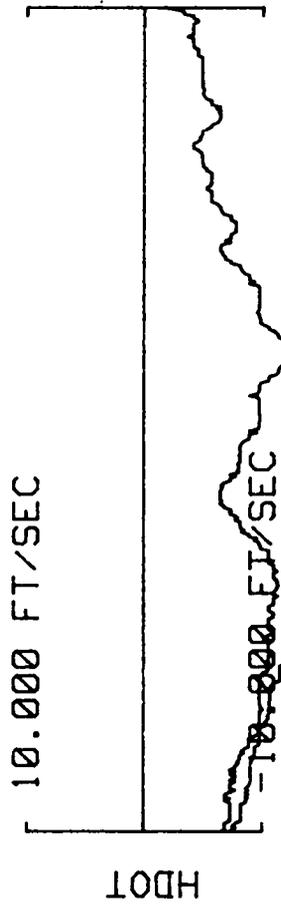
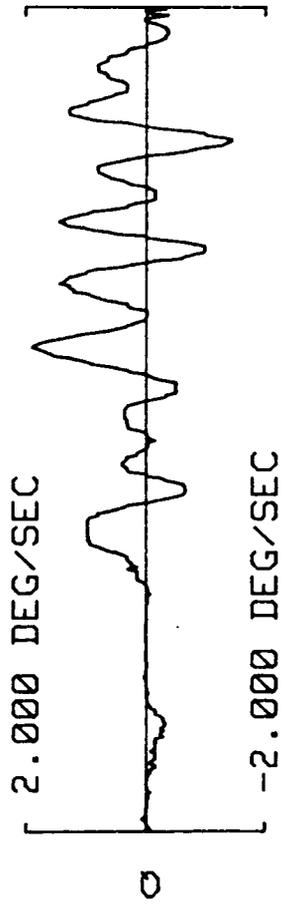
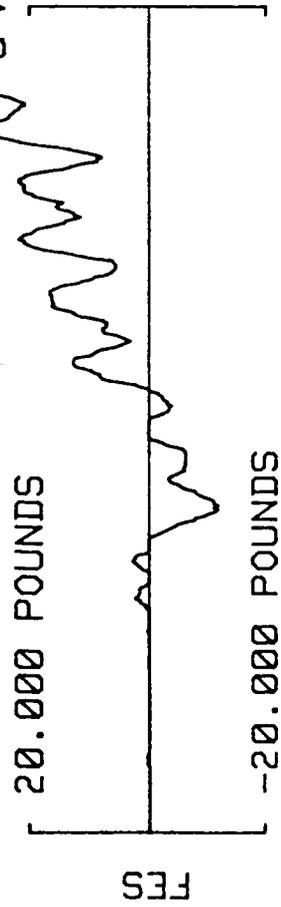
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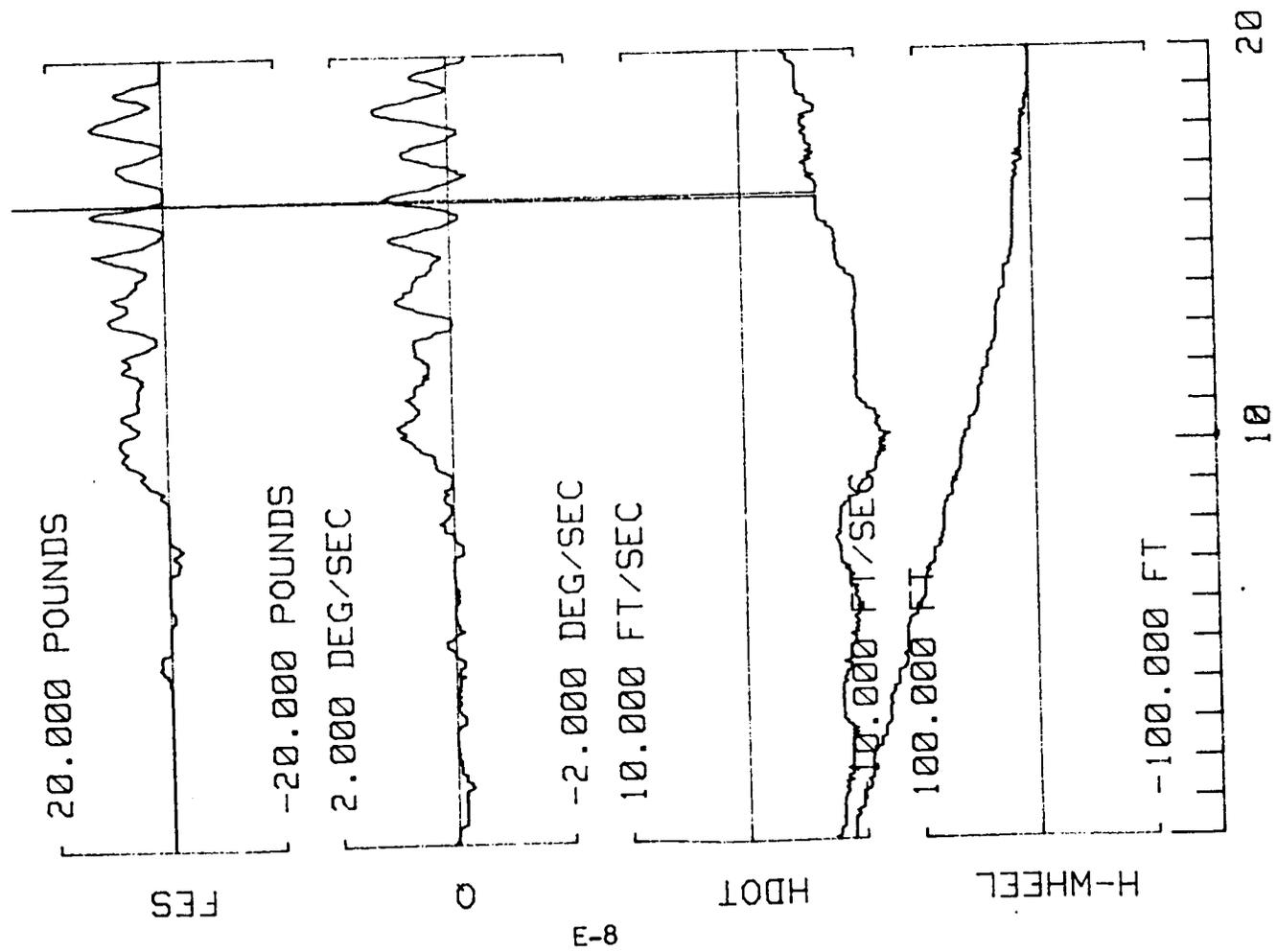
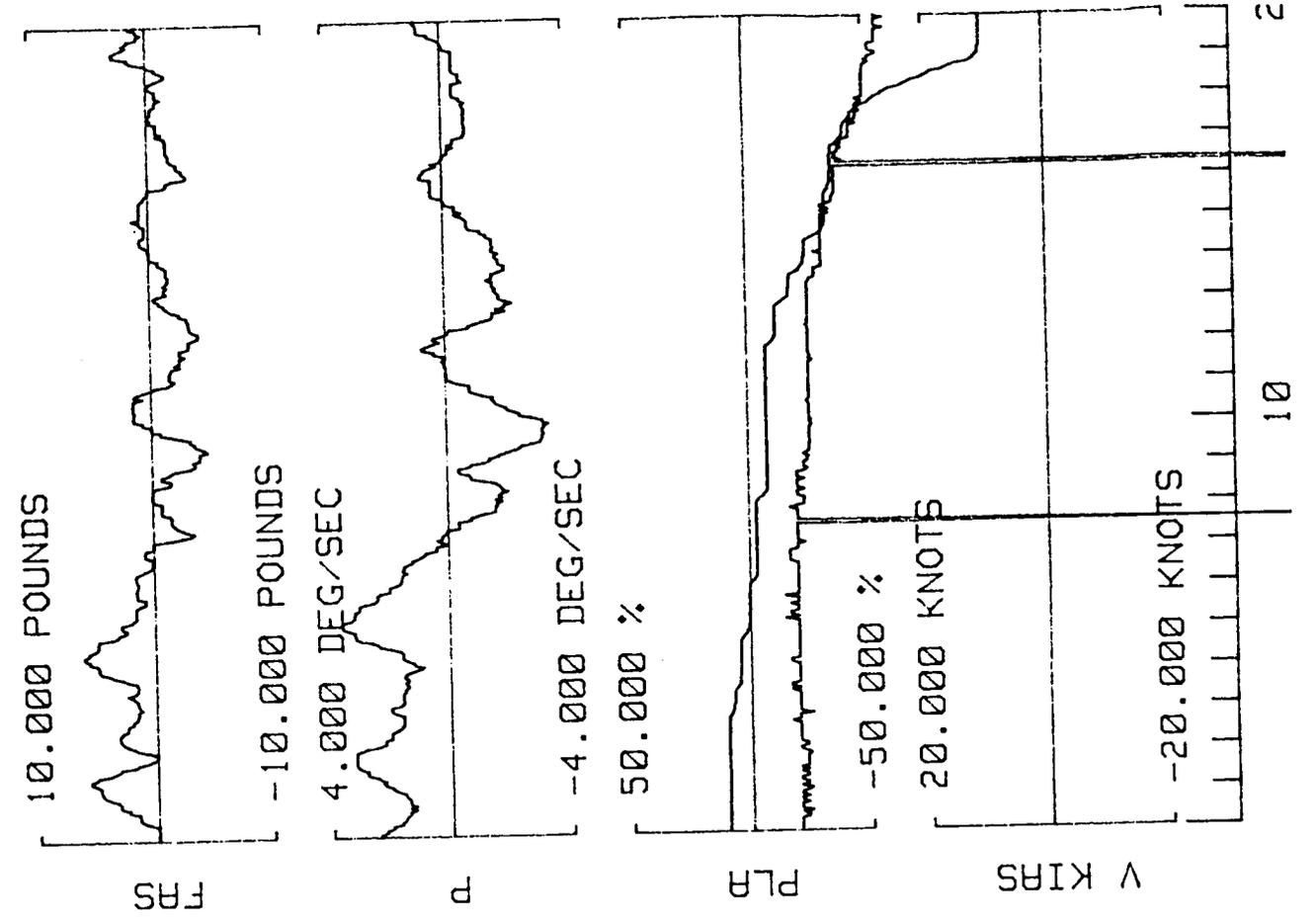
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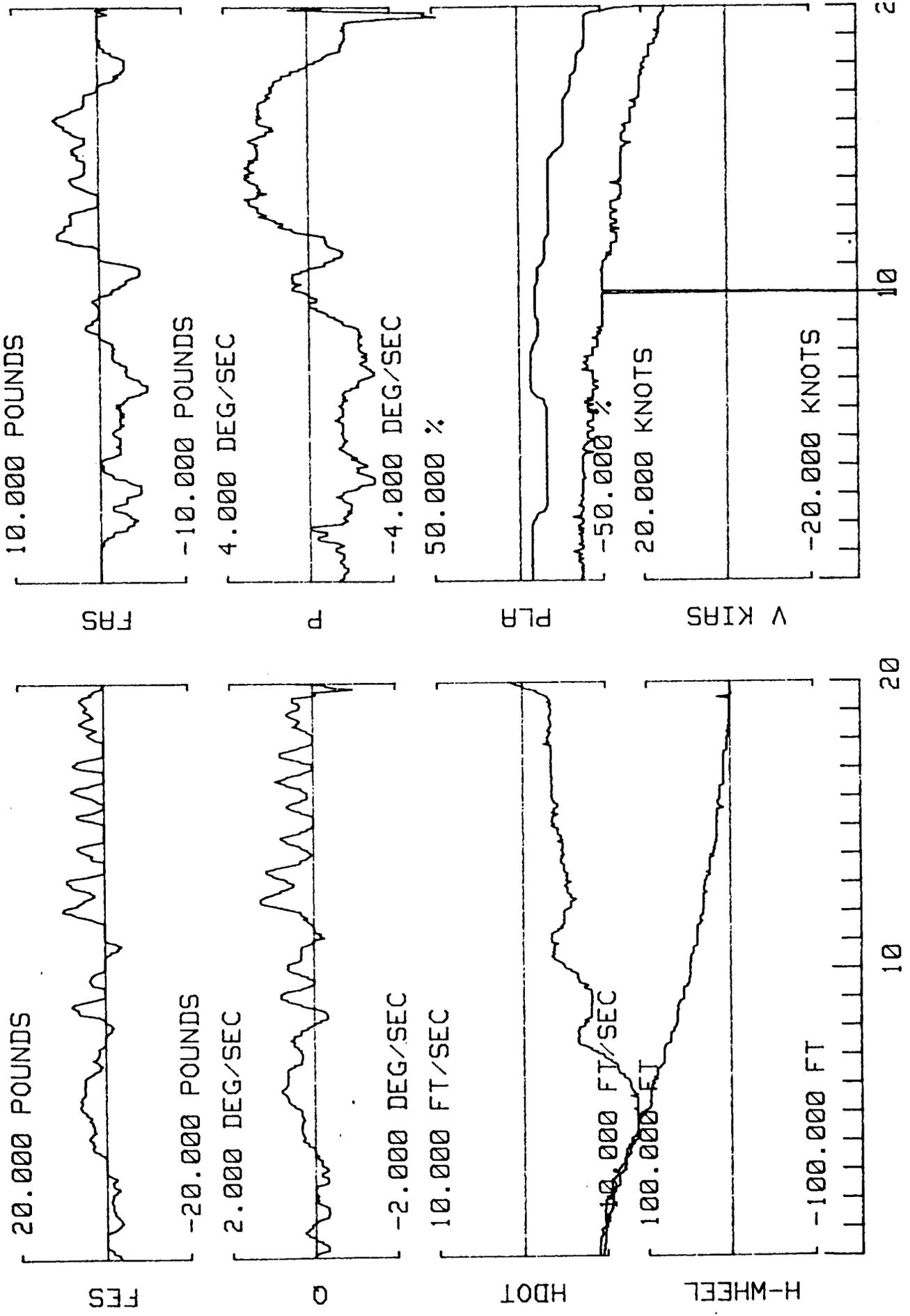
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APP 7

FLT 891



FLT 891 APP 8 CONF 2



FLT 892M APP 2

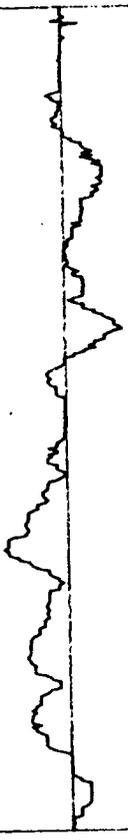
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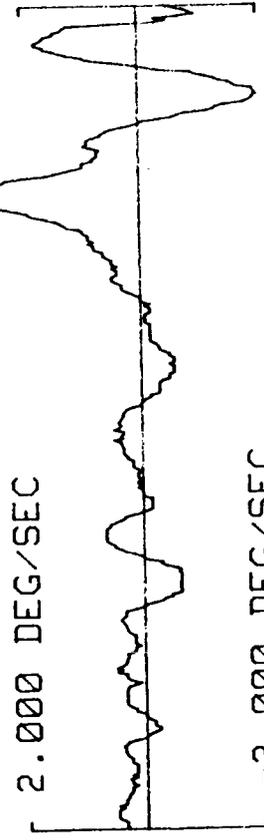
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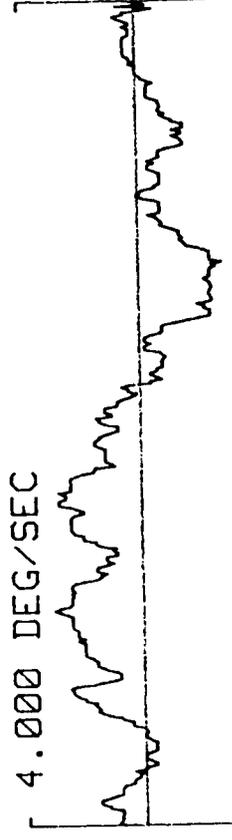
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-20.000 POUNDS



P

-10.000 POUNDS



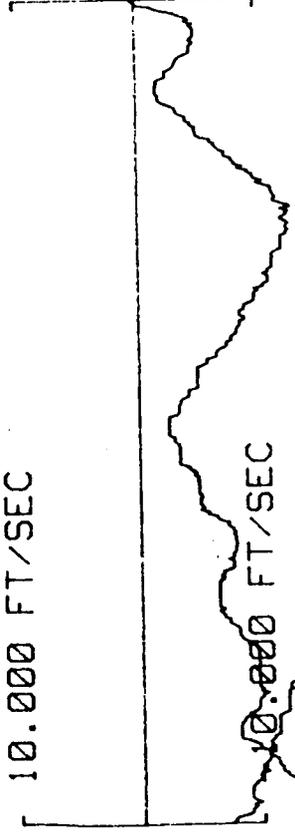
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-2.000 DEG/SEC

10.000 FT/SEC

HDOT



PLB

-4.000 DEG/SEC

50.000 %

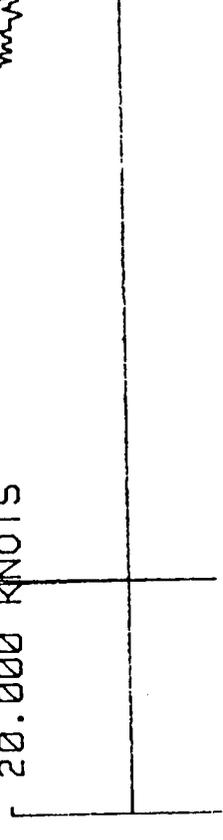


10.000 FT/SEC

100.000 FT

20.000 KNOTS

H-WHEEL



V KIRS

-100.000 FT

-20.000 KNOTS



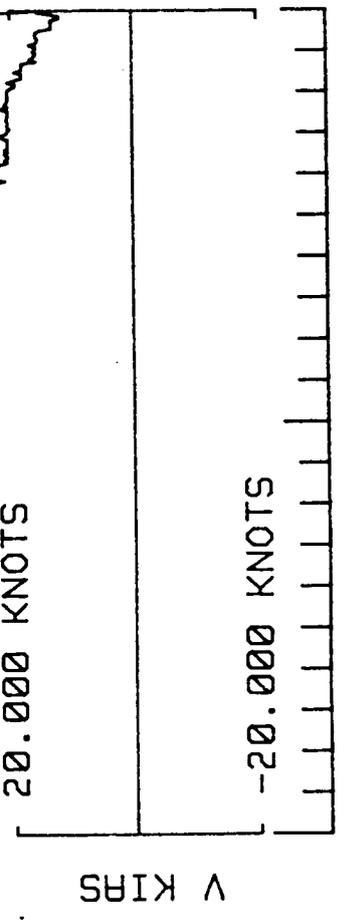
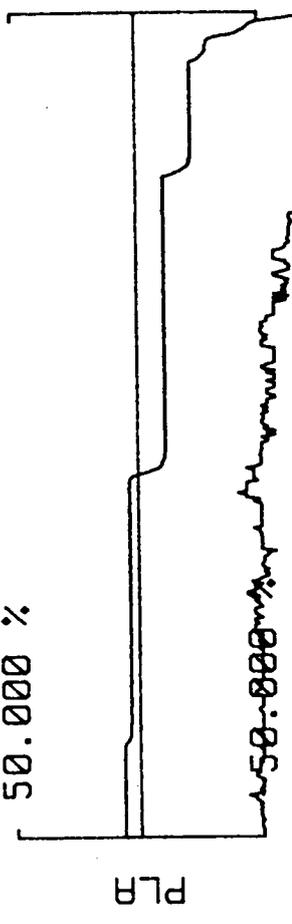
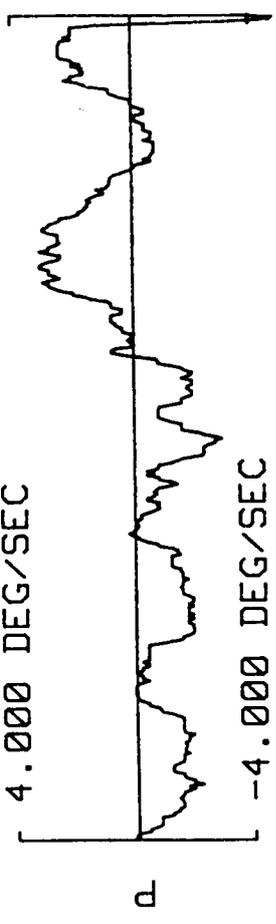
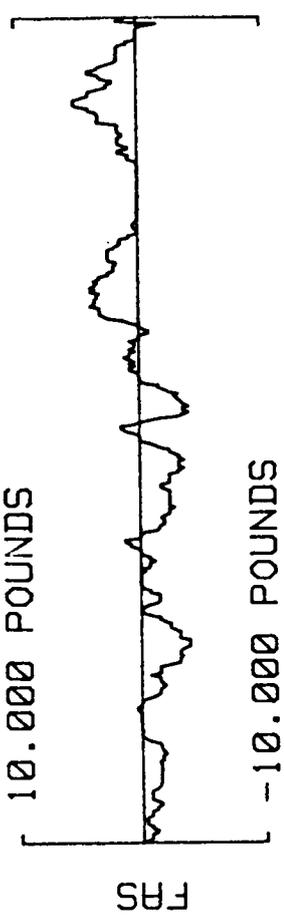
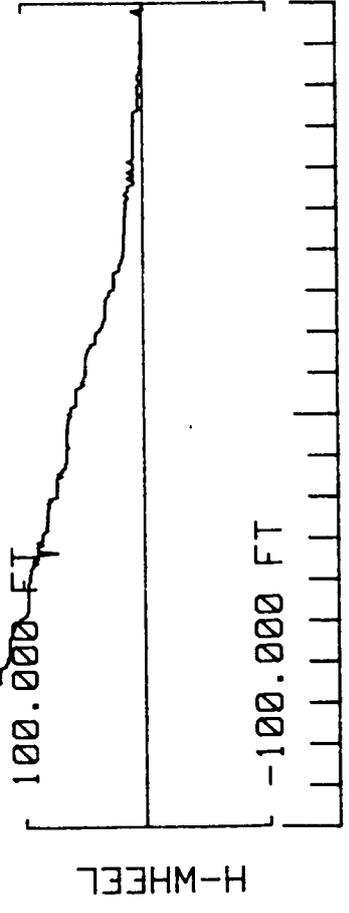
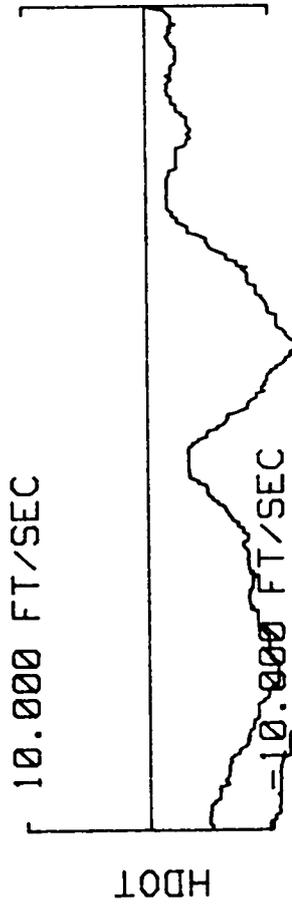
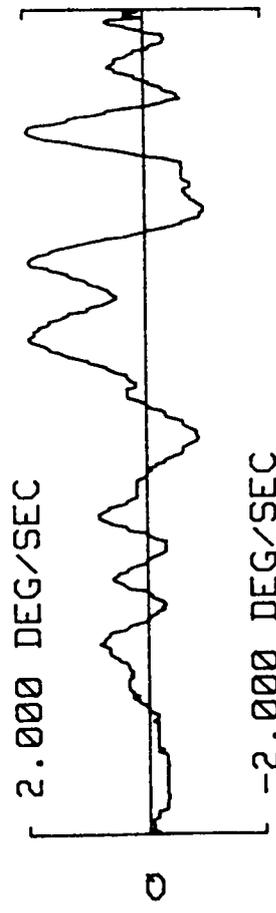
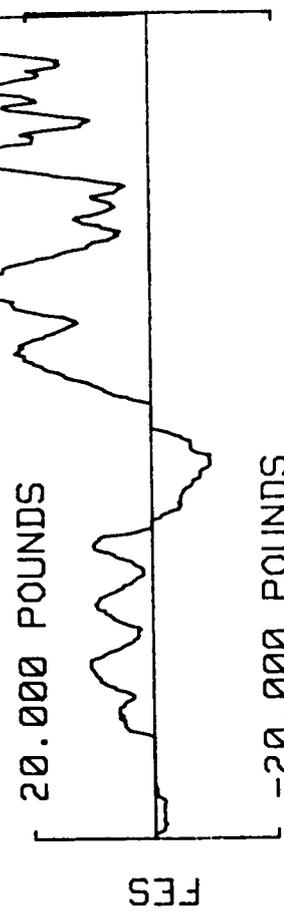
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FLT 892

APP 3

CONF 24



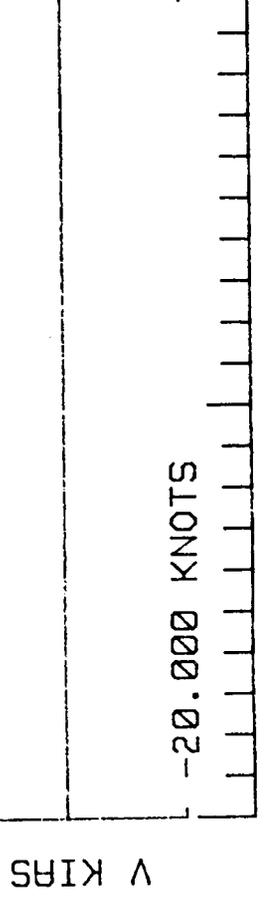
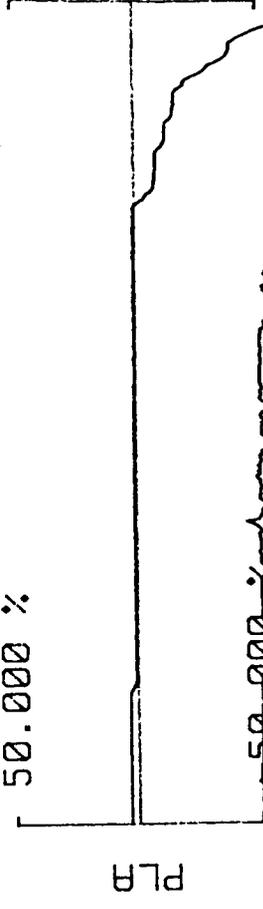
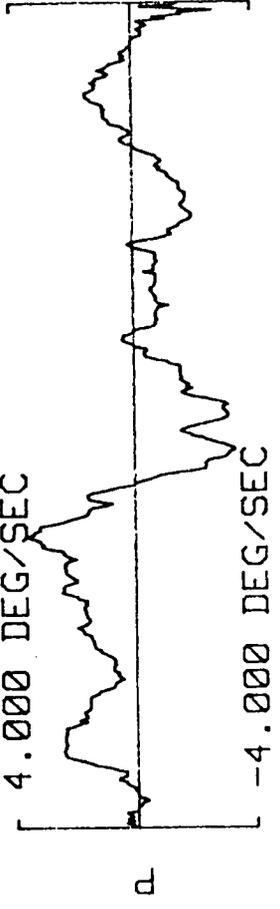
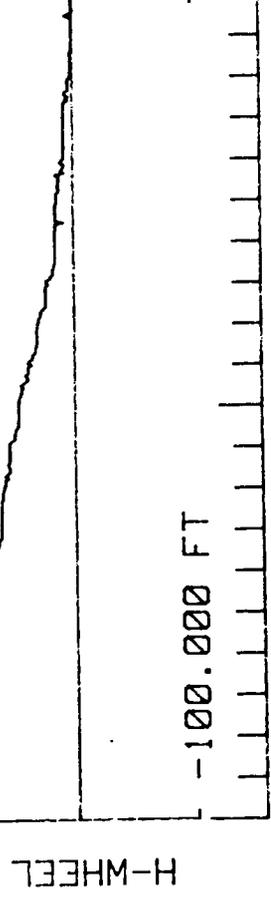
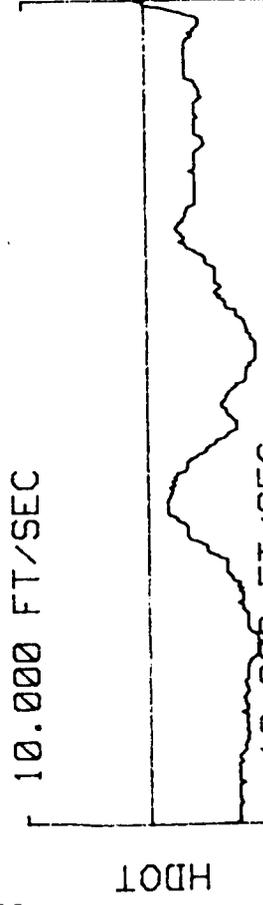
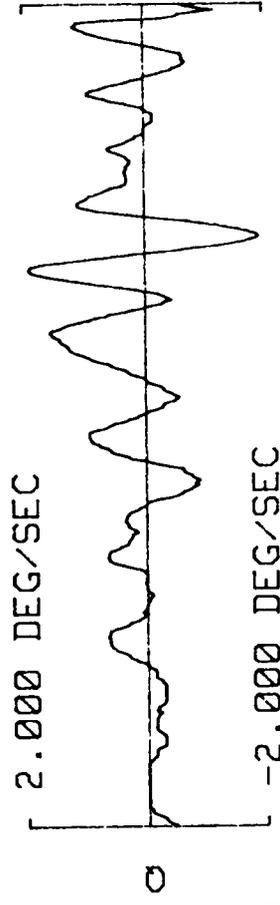
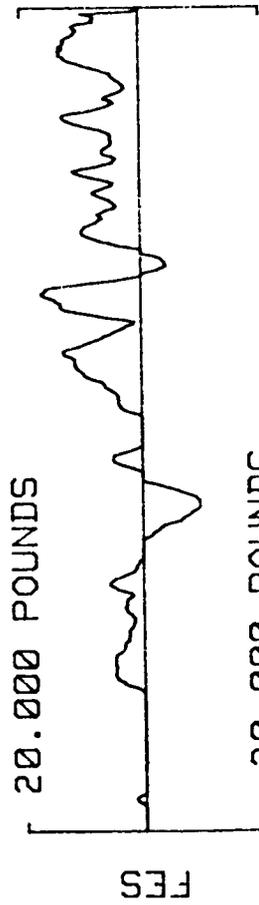
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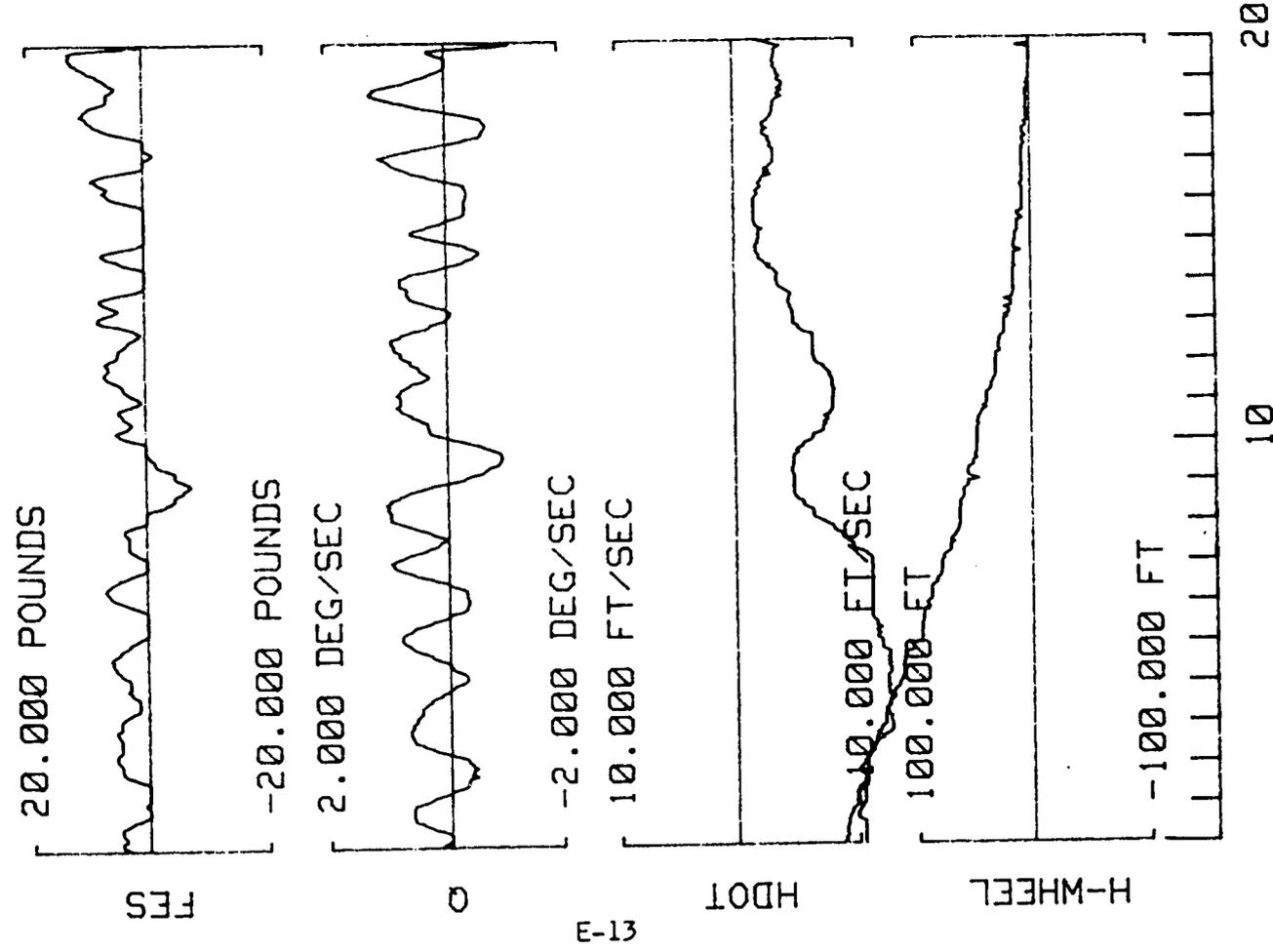
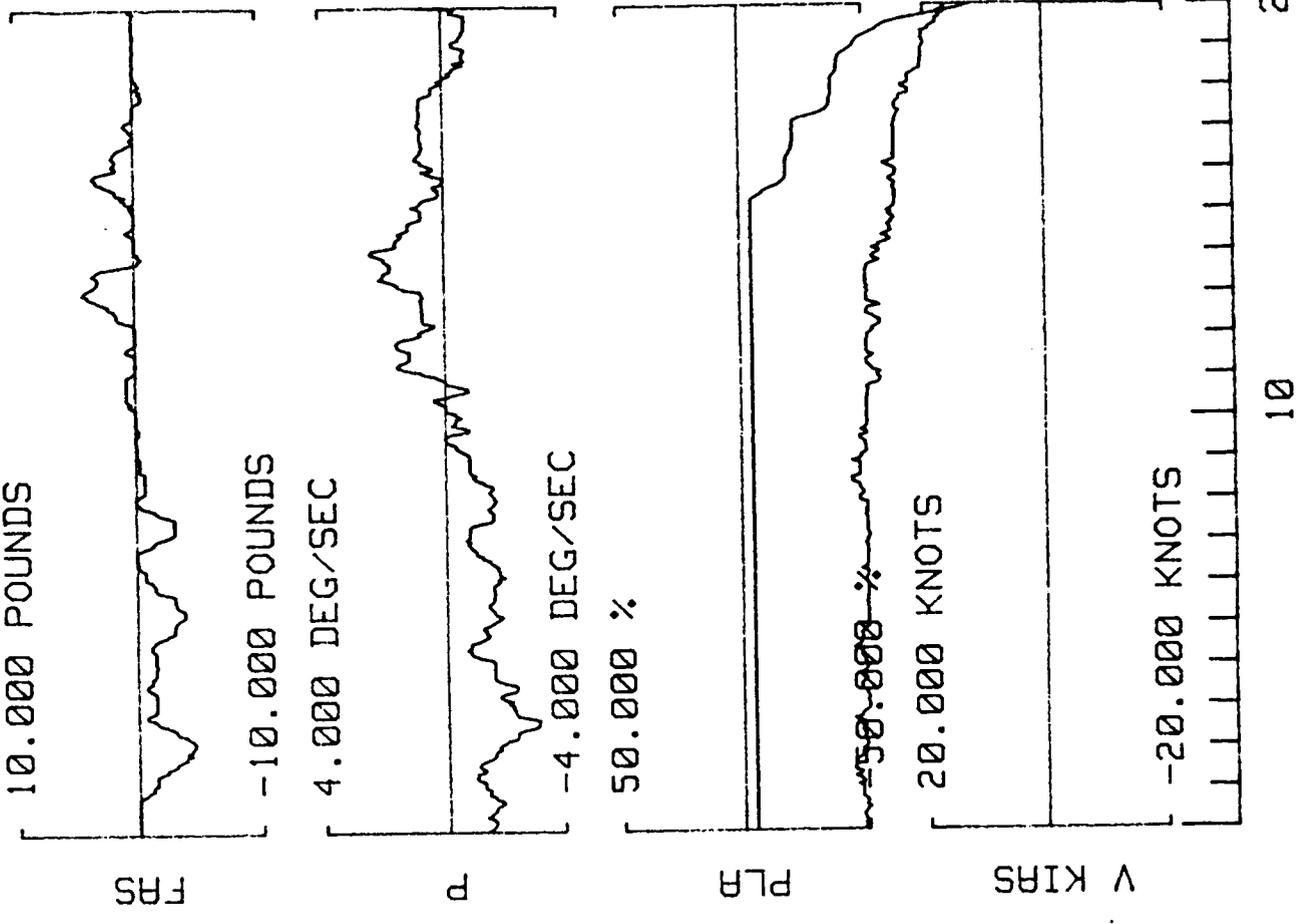
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FLT 892 APP 5 CONF 21



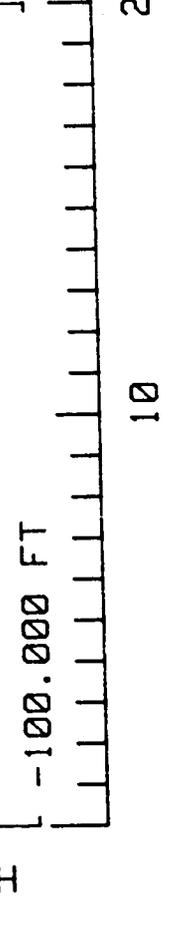
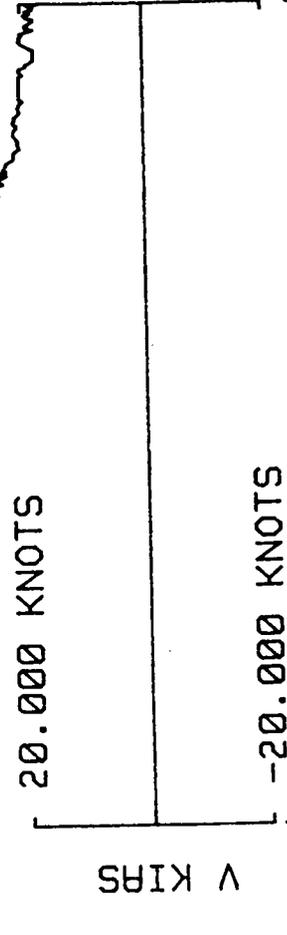
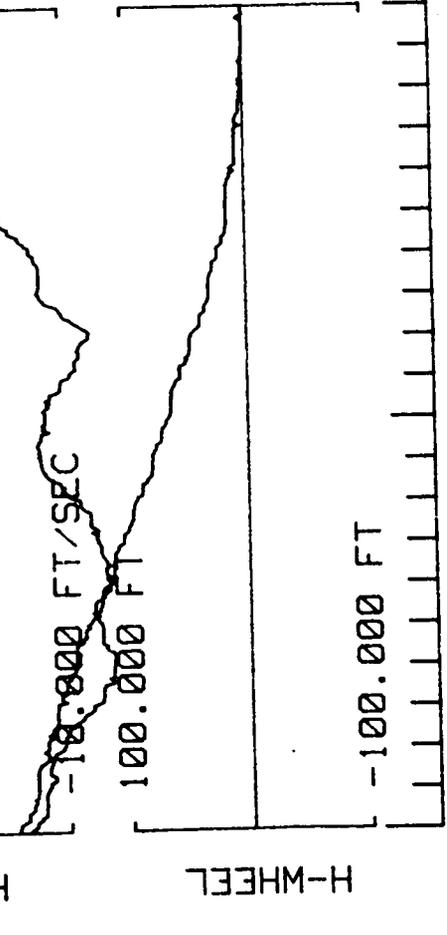
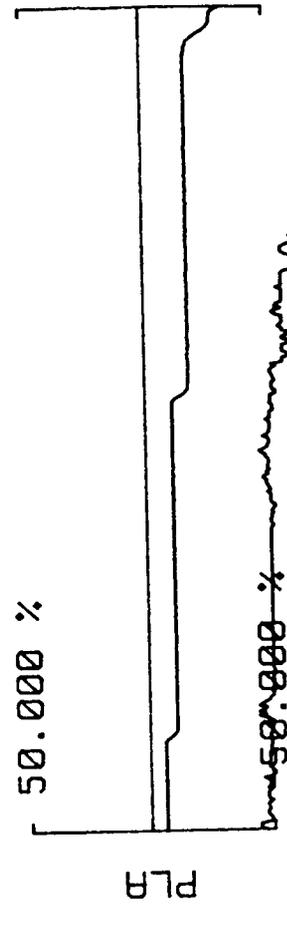
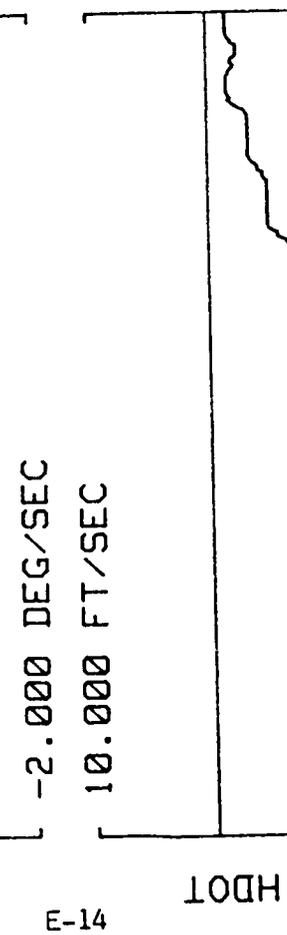
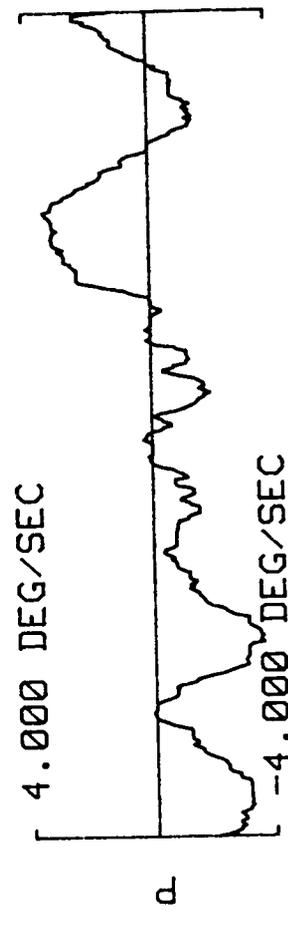
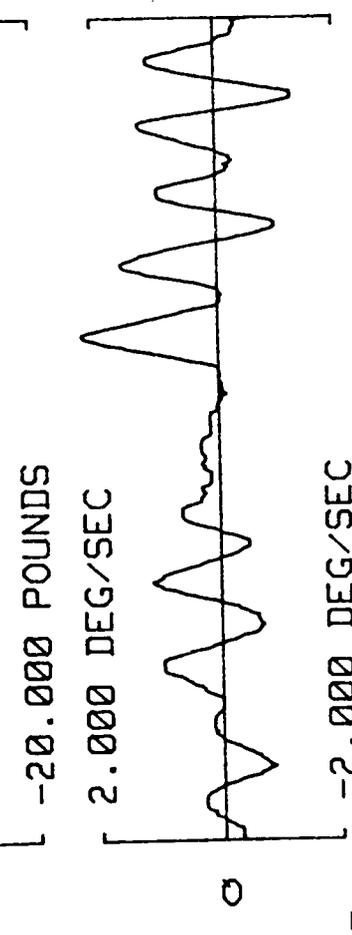
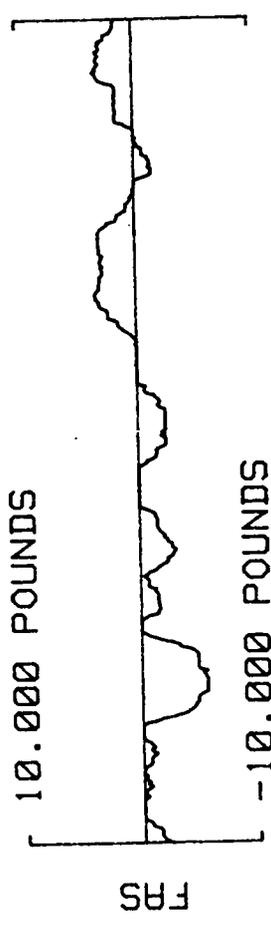
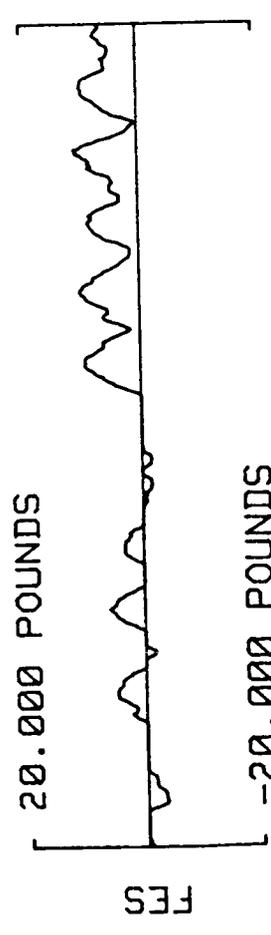
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10 20 2

FLT 892

APP 6

CONF 27



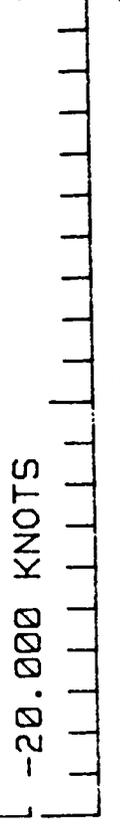
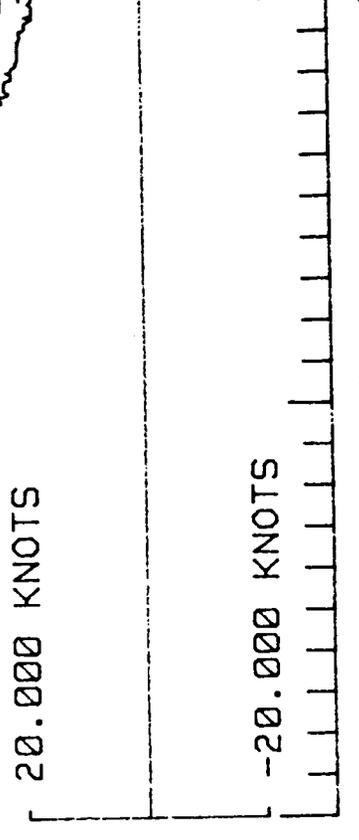
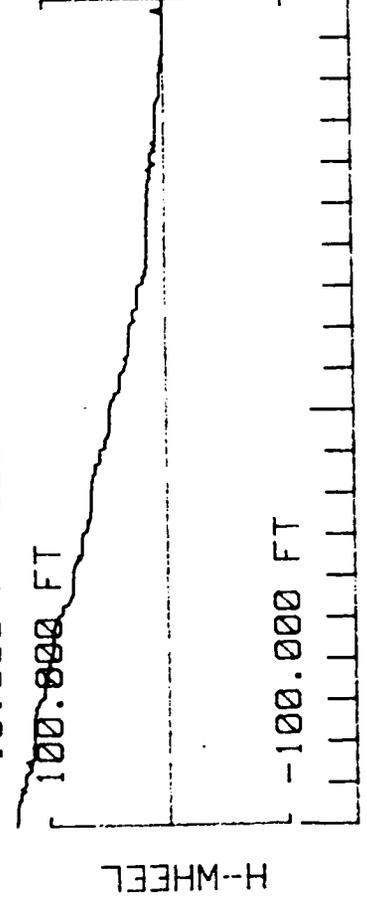
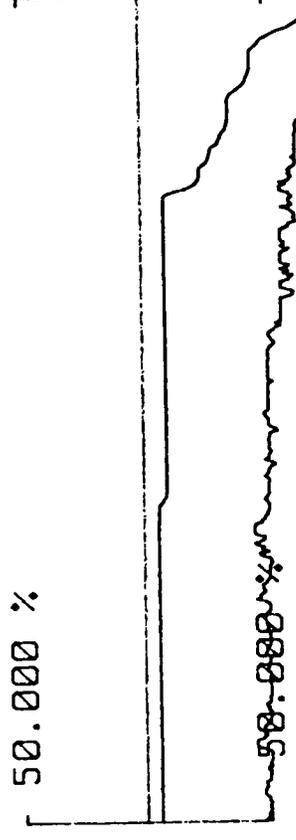
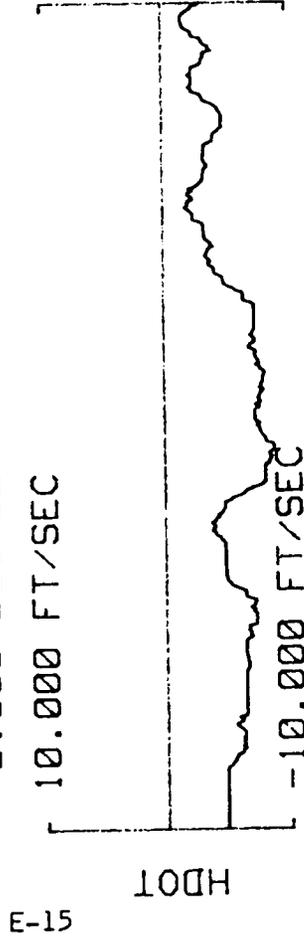
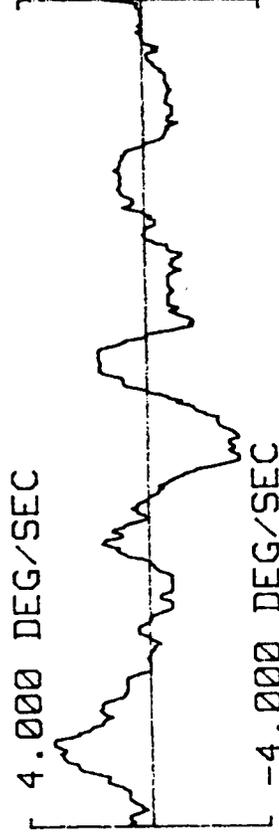
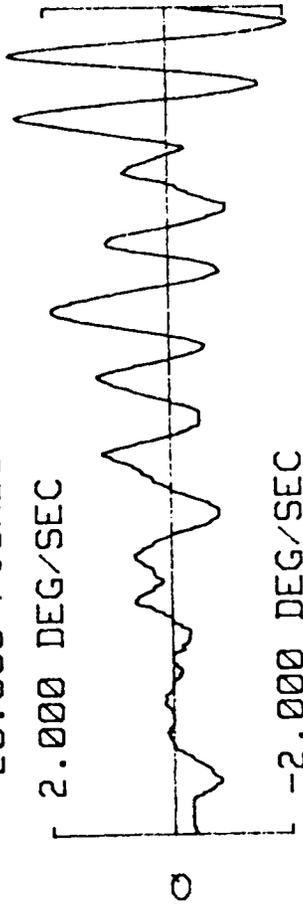
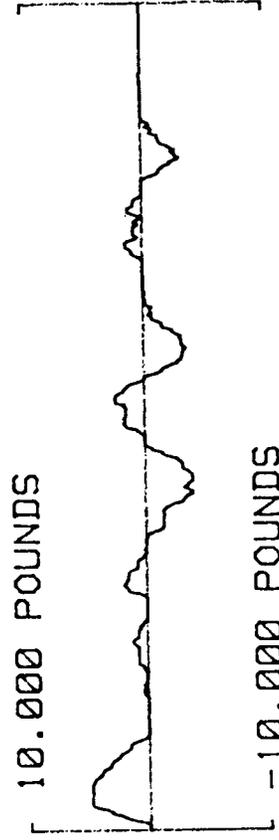
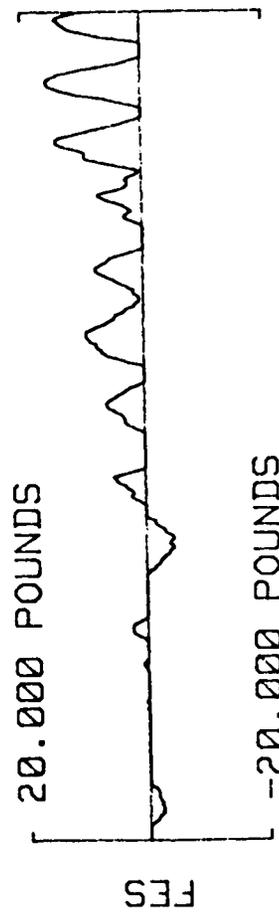
10 20

E-14

FLT 892

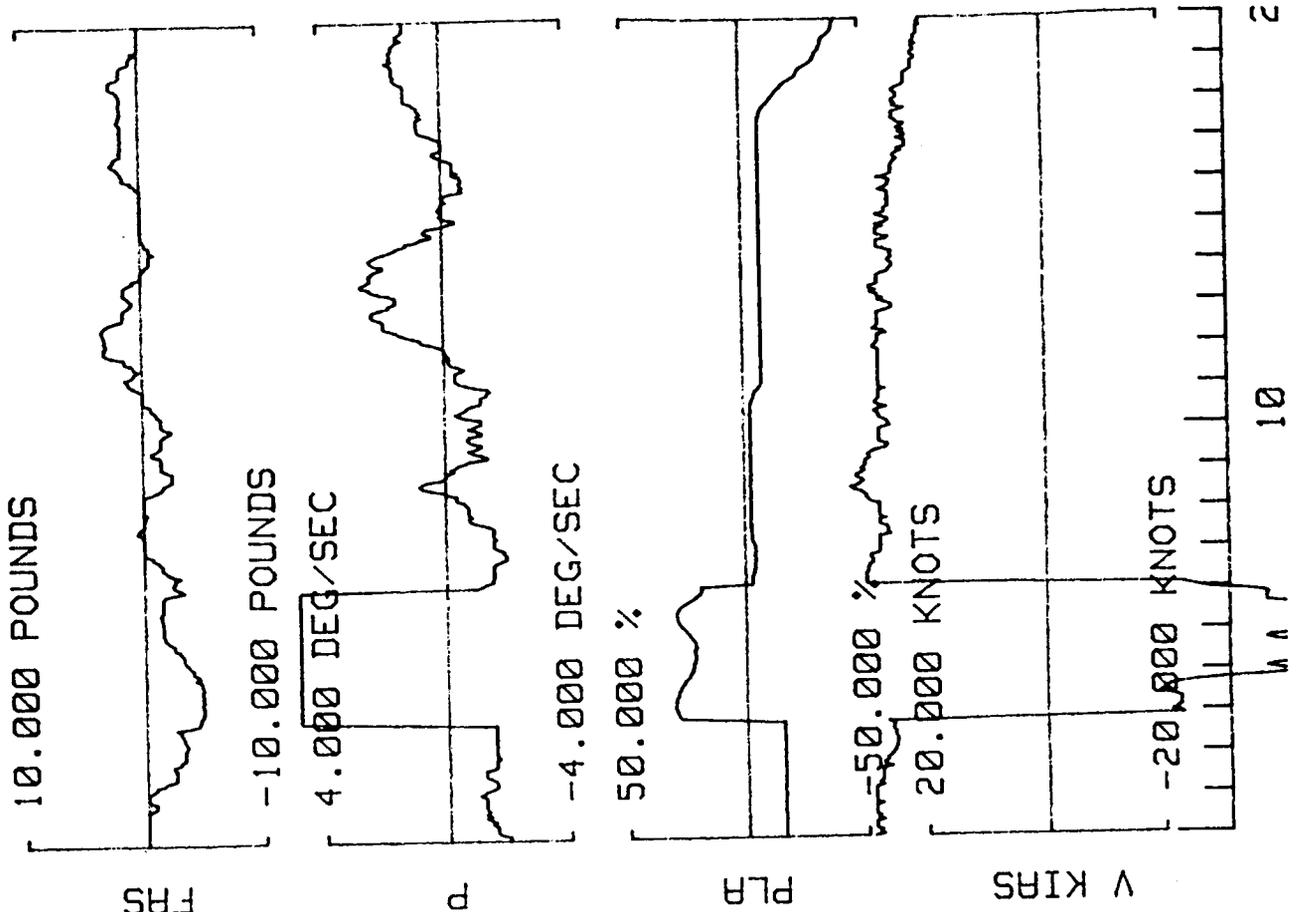
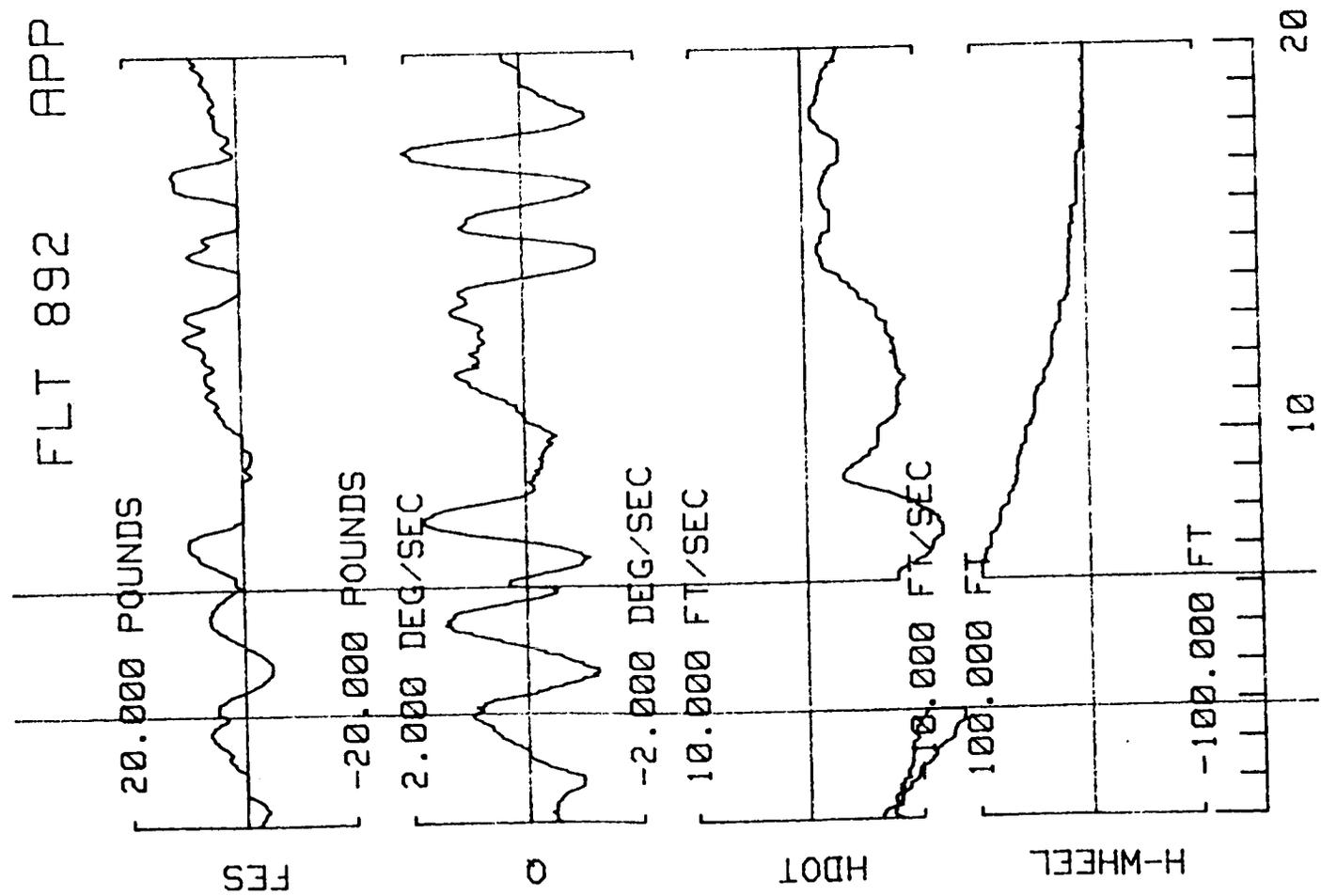
APP 7

CONF 27

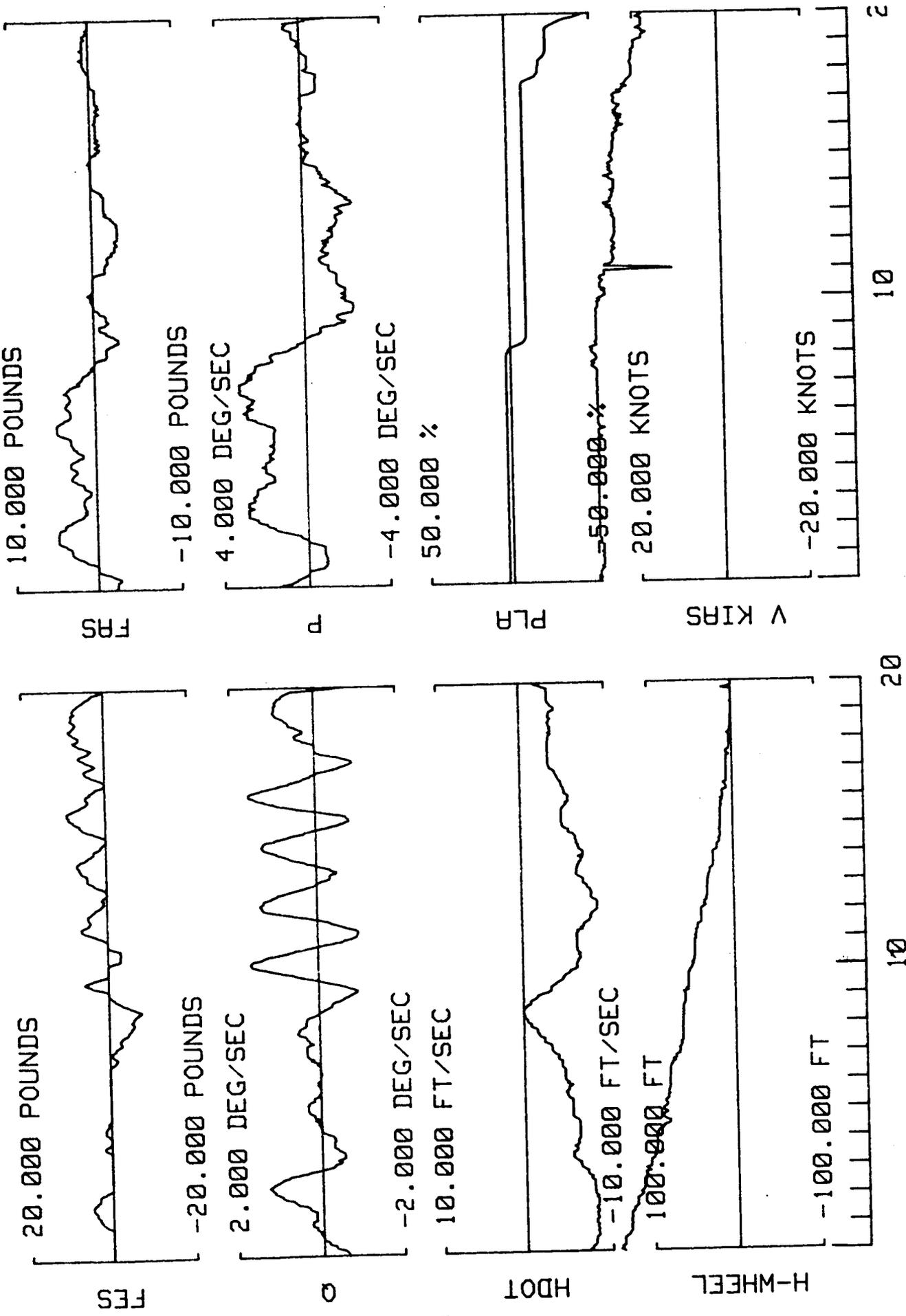


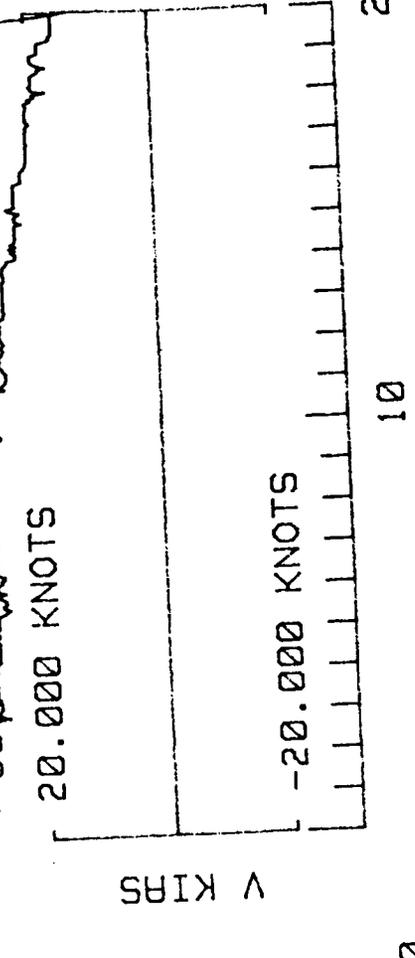
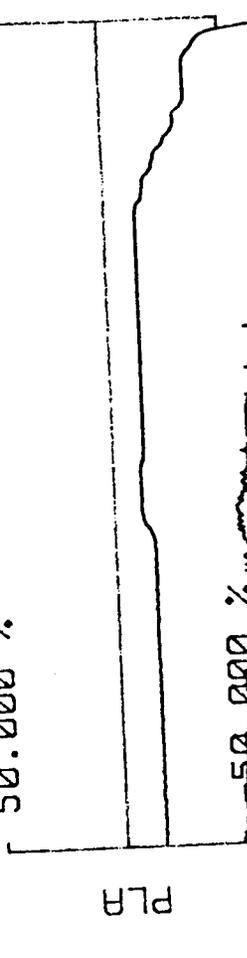
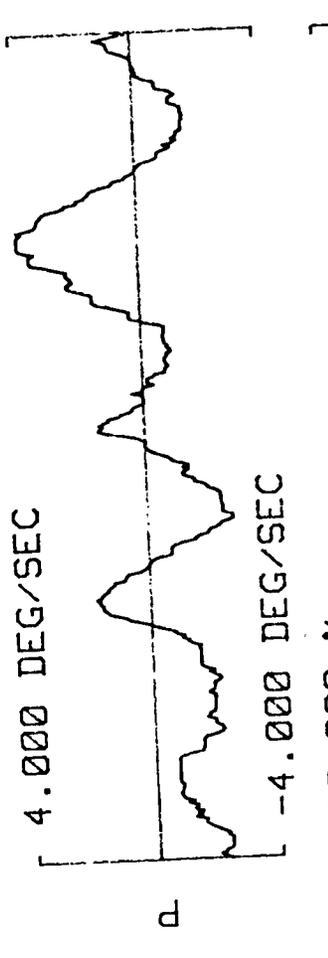
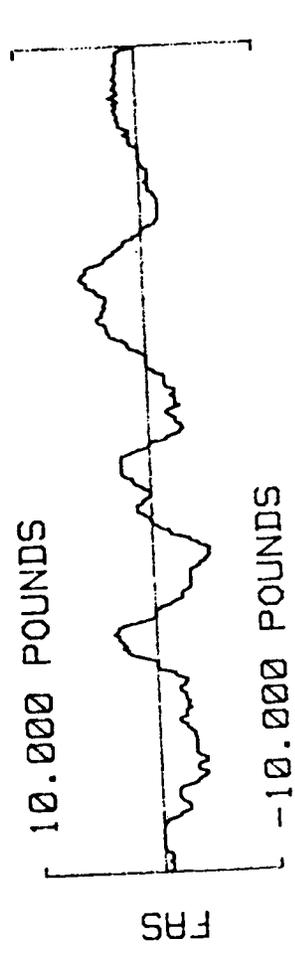
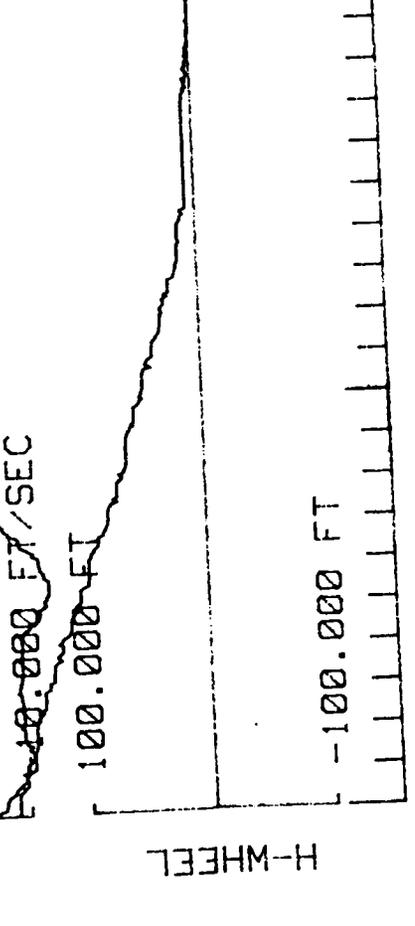
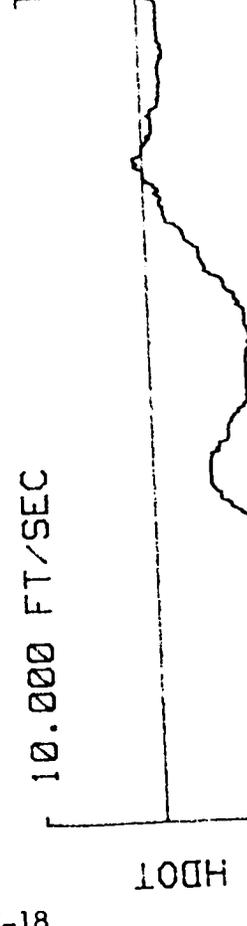
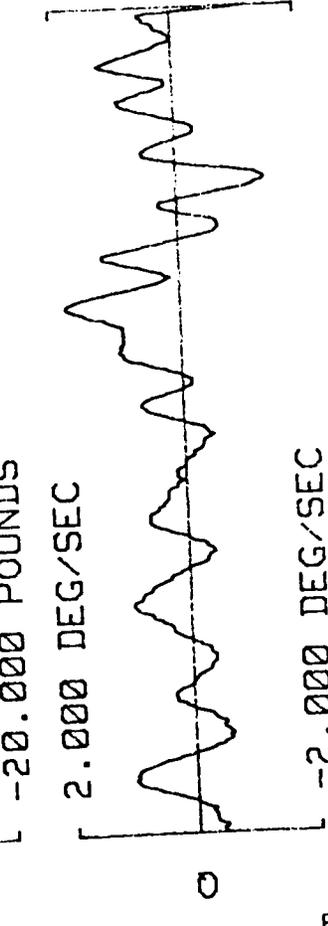
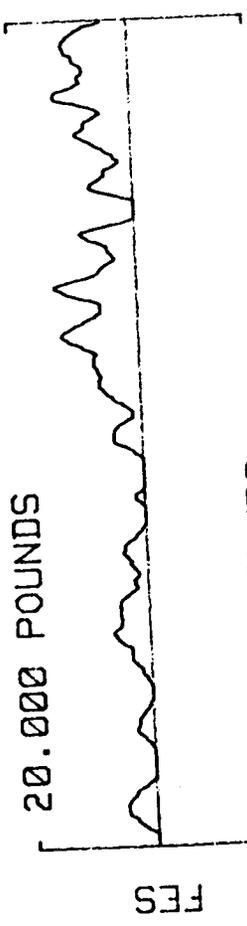
51-3

FLT 892 APP 8 CONF 28



FLT 892 APP 9 CONF 28

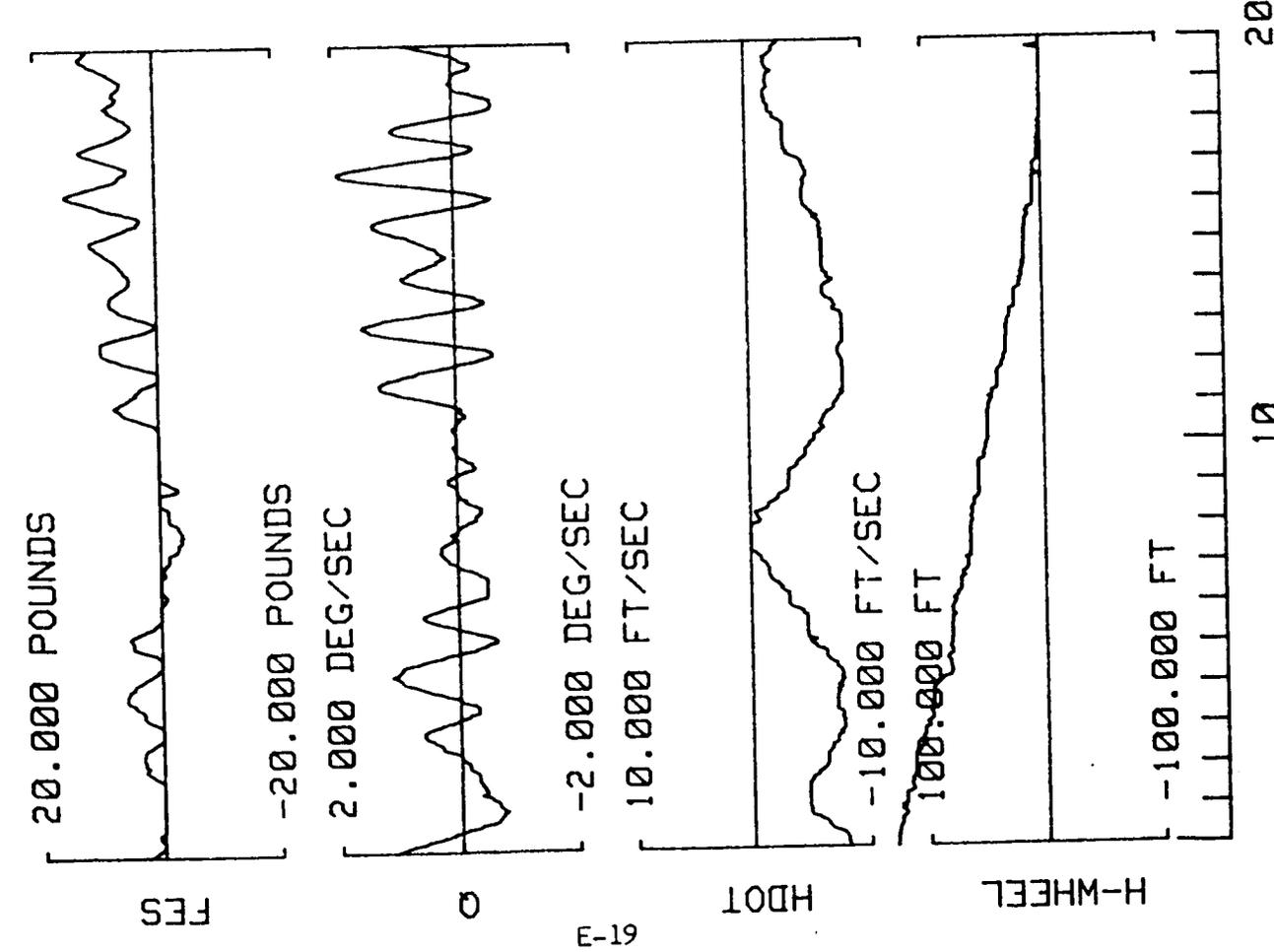
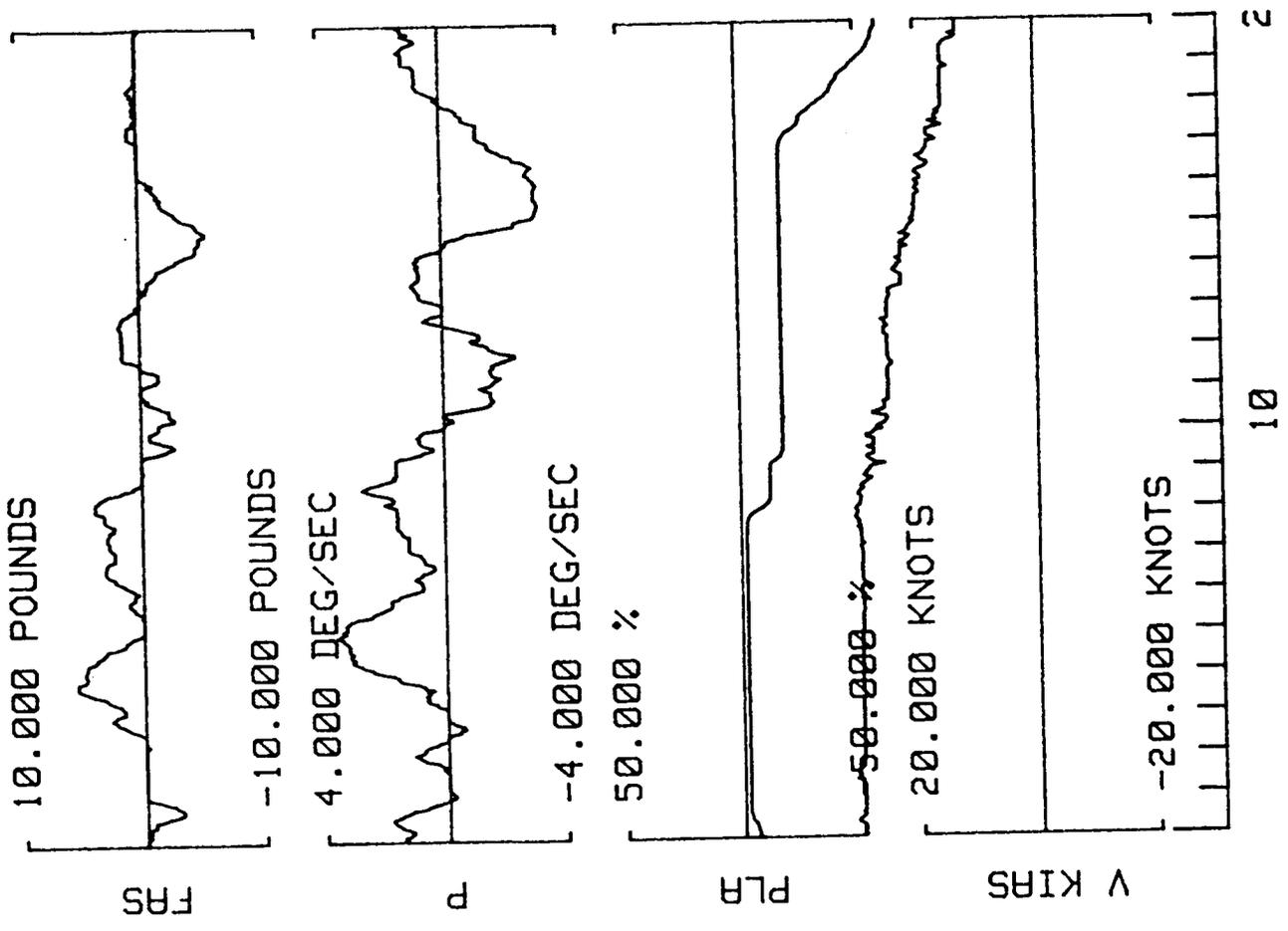




81-3

10 20

10 20



CONF 25

12

ARP

892

FLT

10.000 POUNDS

FPS

20.000 POUNDS

FES

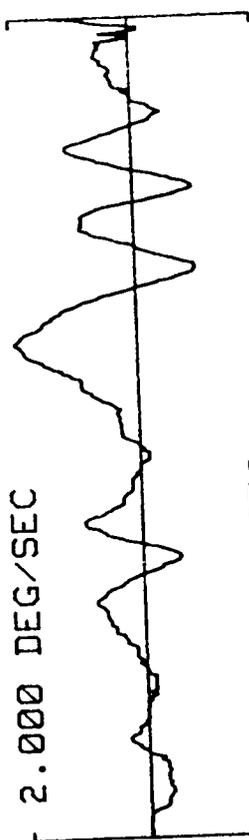


-10.000 POUNDS

4.000 DEG/SEC

-20.000 POUNDS

2.000 DEG/SEC



-4.000 DEG/SEC

50.000 %

-2.000 DEG/SEC

10.000 FT/SEC

PLP



-50.000 %

20.000 KNOTS

-10.000 FT/SEC

100.000 FT

V KIRS



-20.000 KNOTS

-100.000 FT

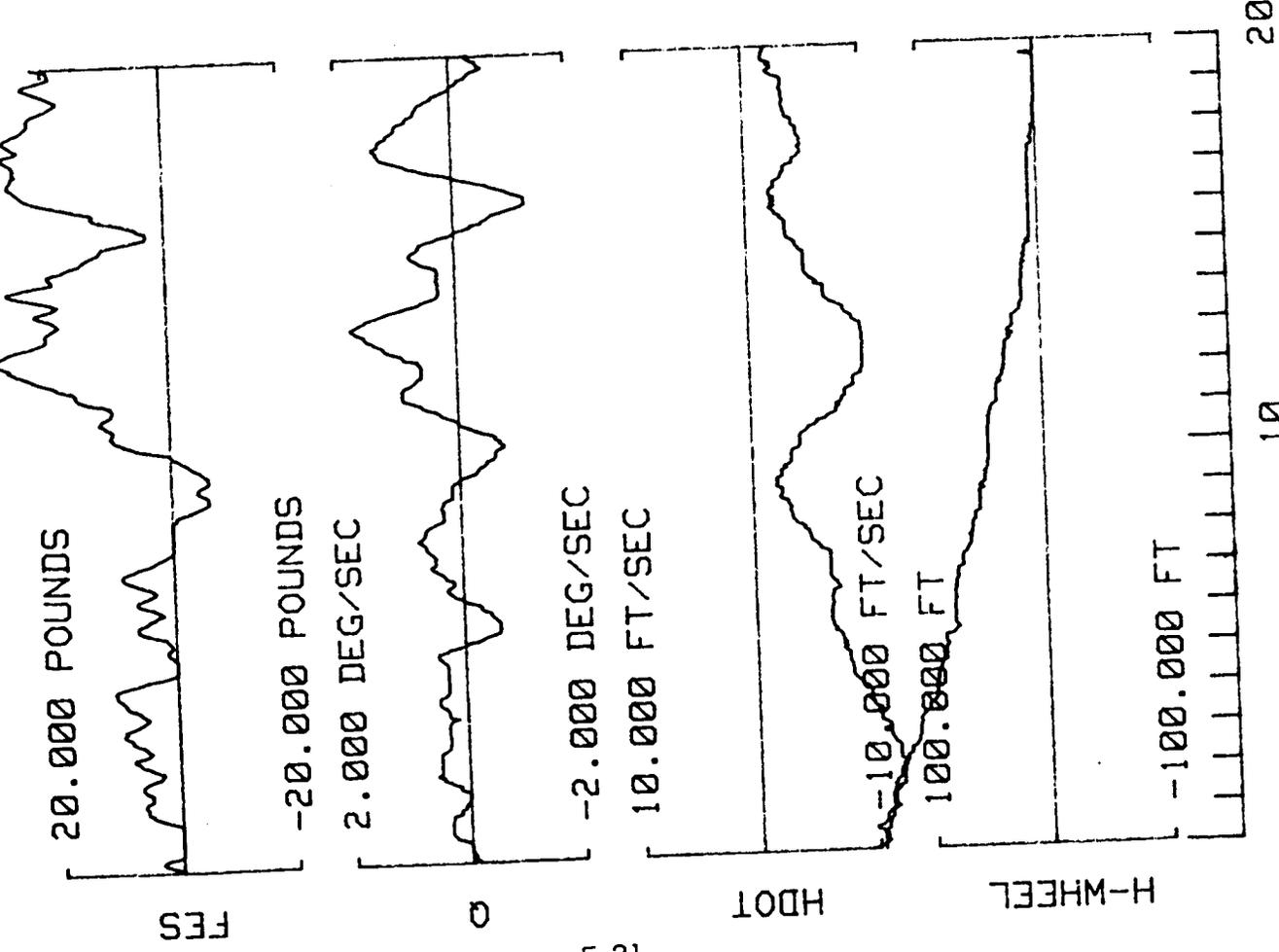
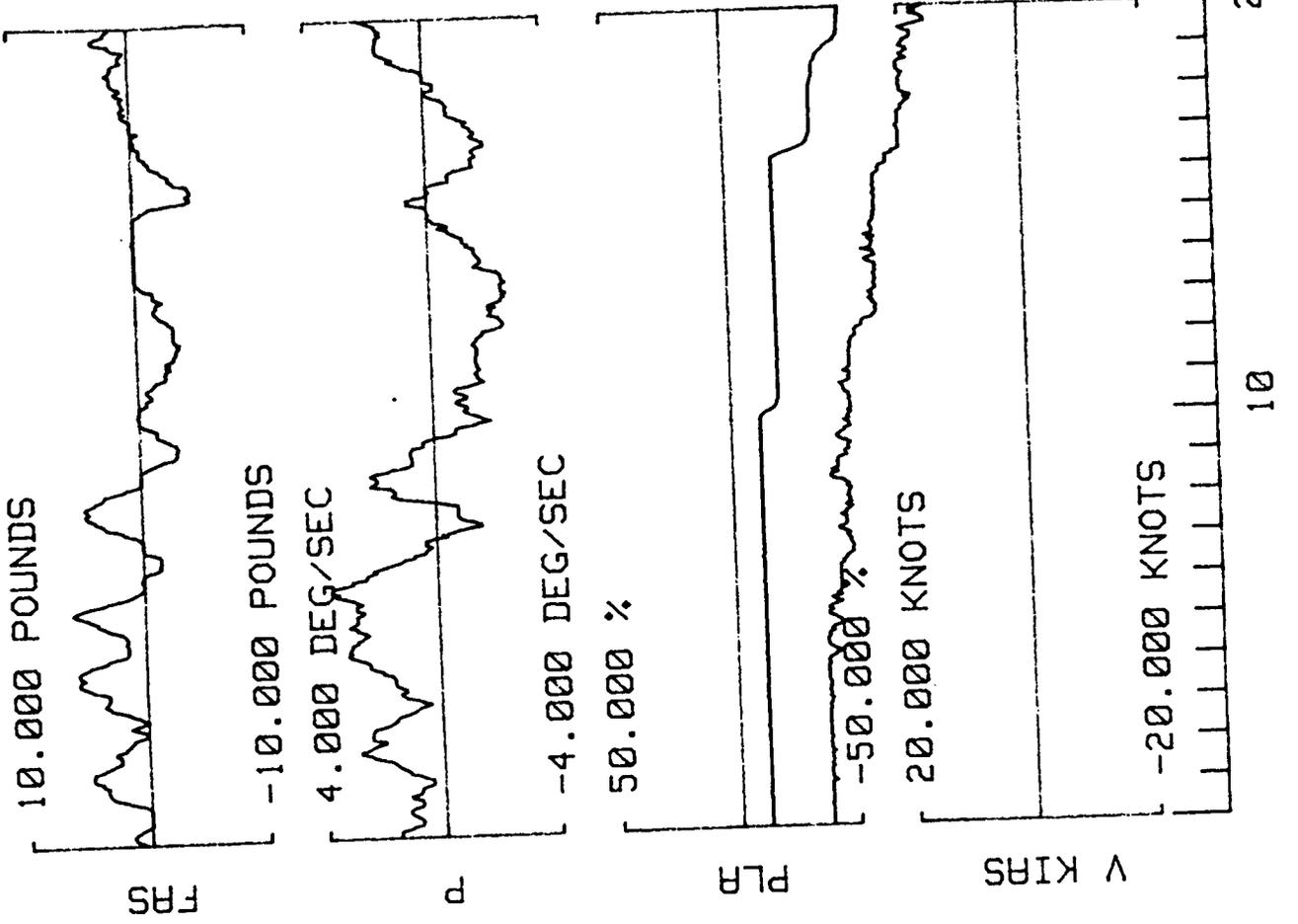
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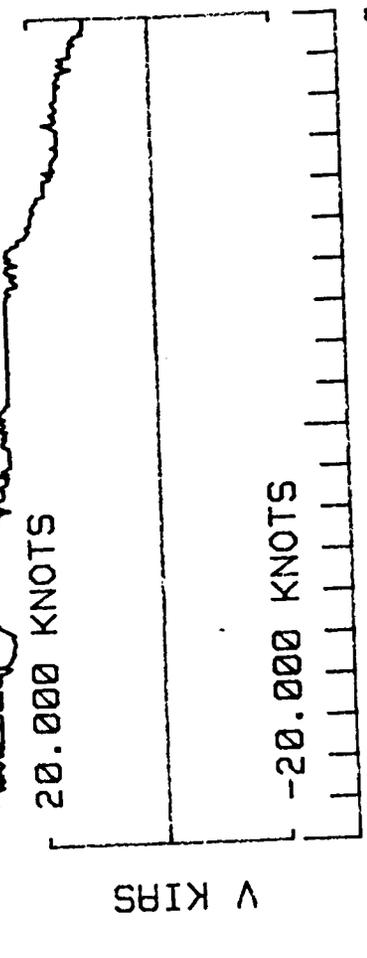
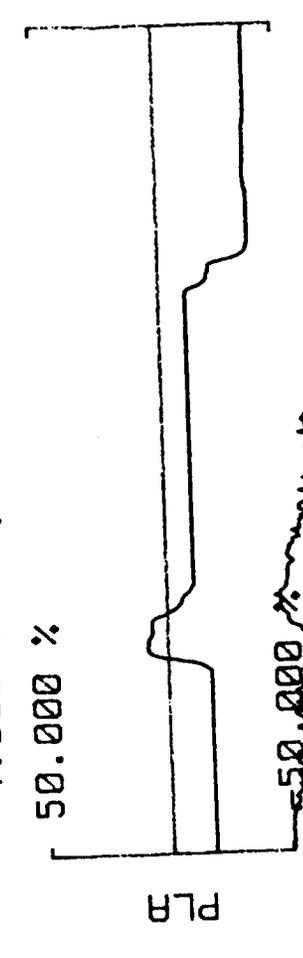
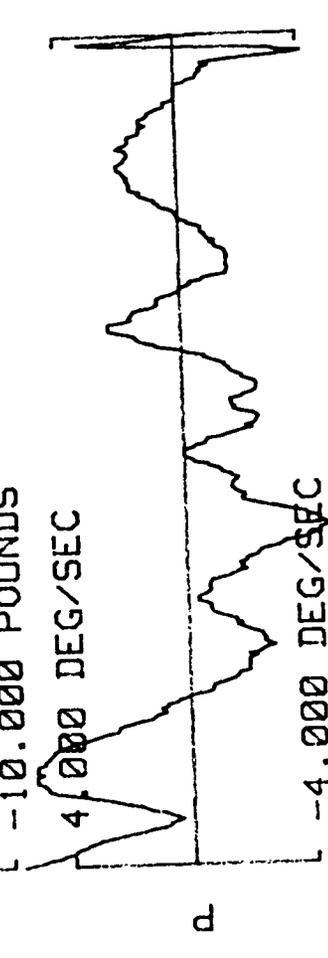
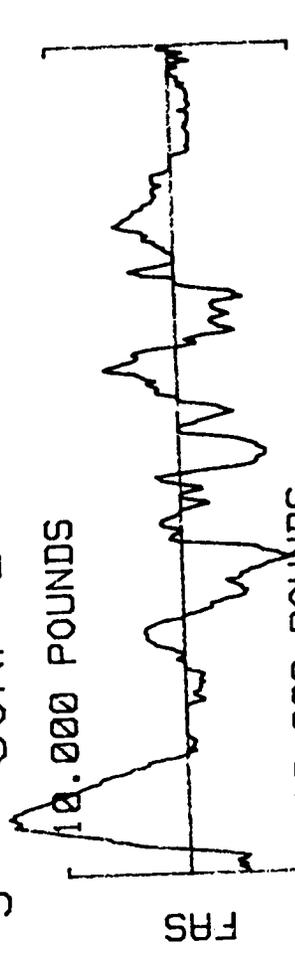
FLT 892 APP 13 CONF 25



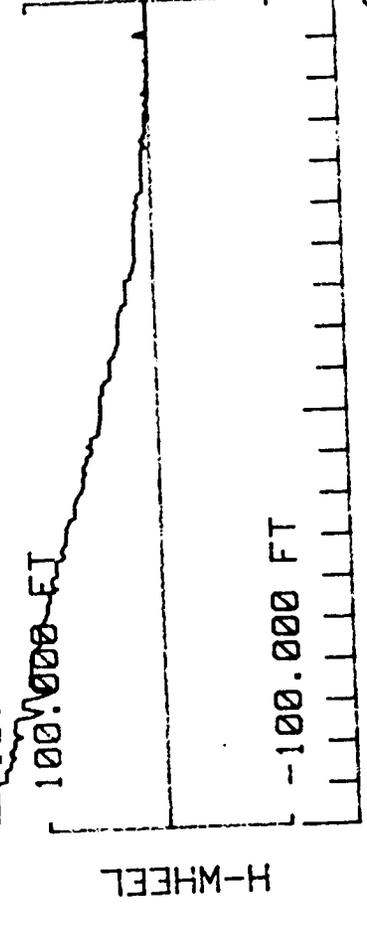
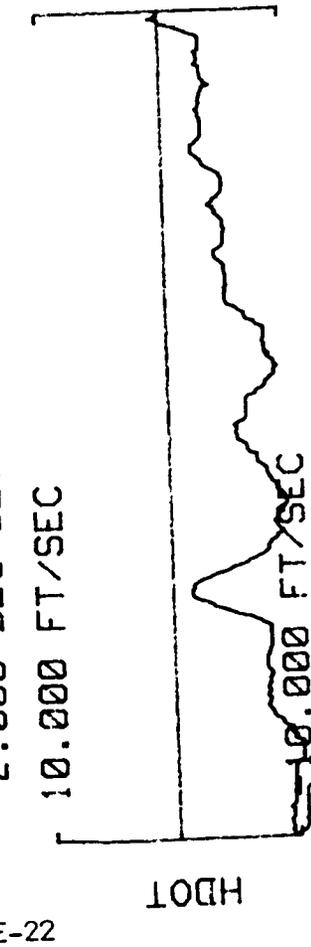
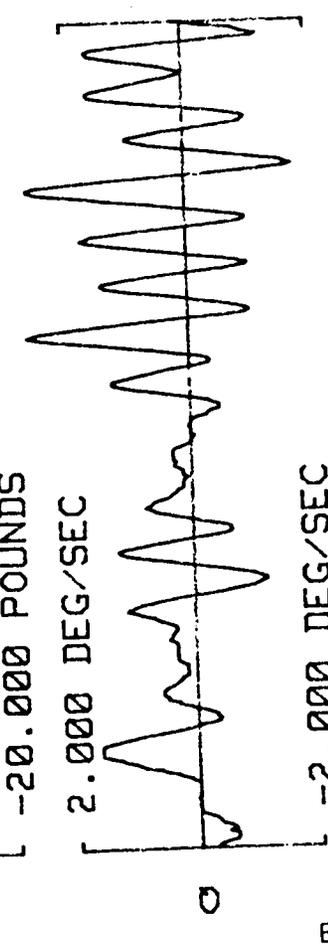
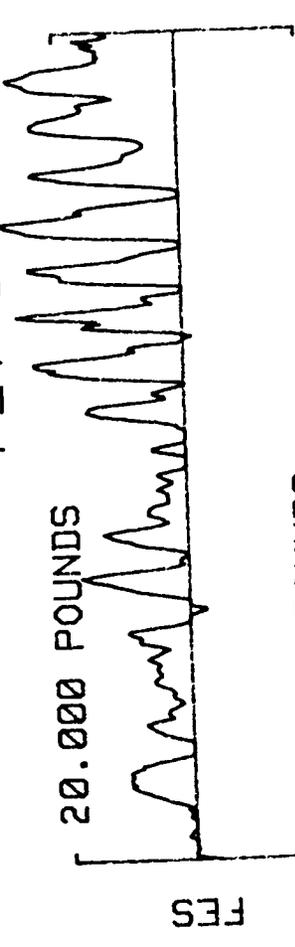
CONF B

APP 3

FLT 893

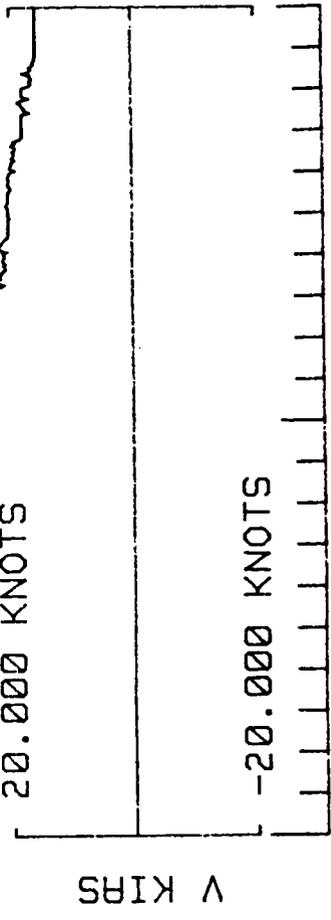
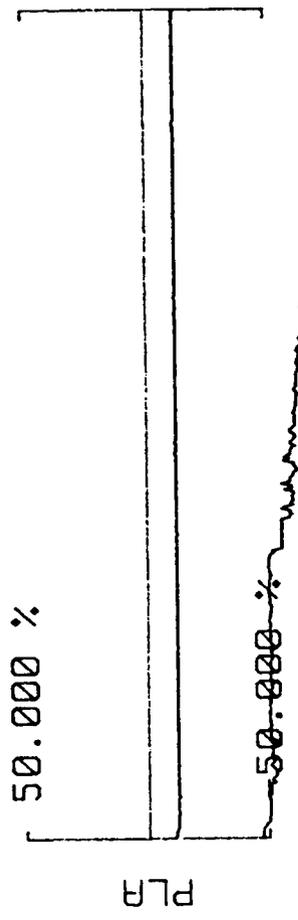
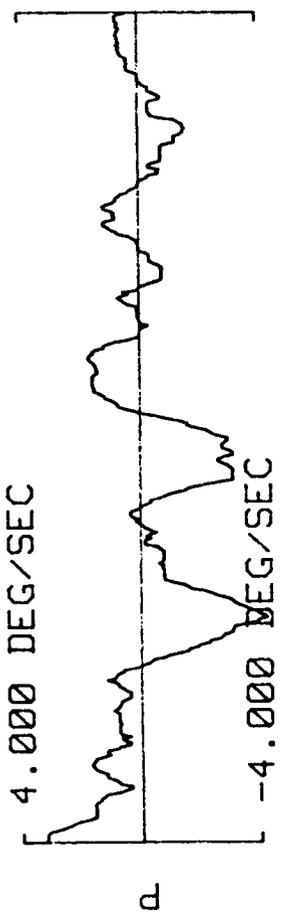
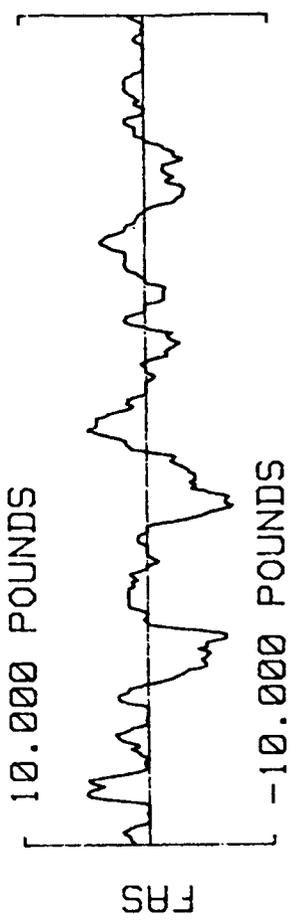
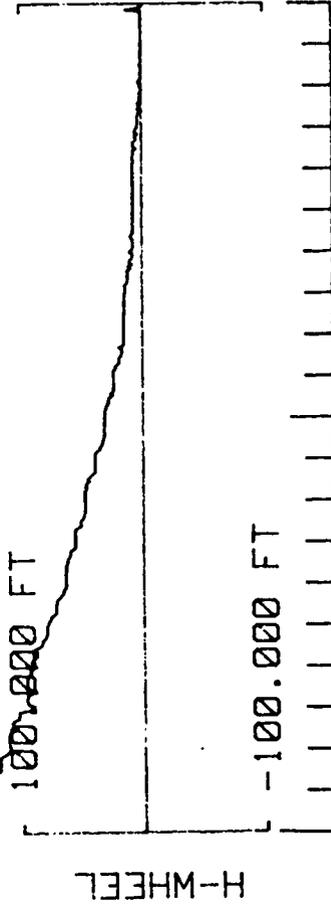
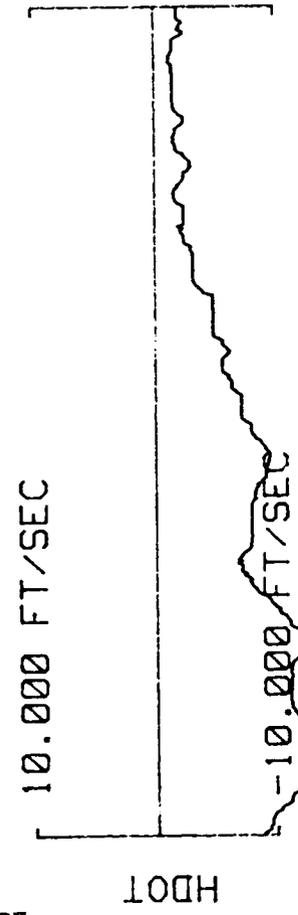
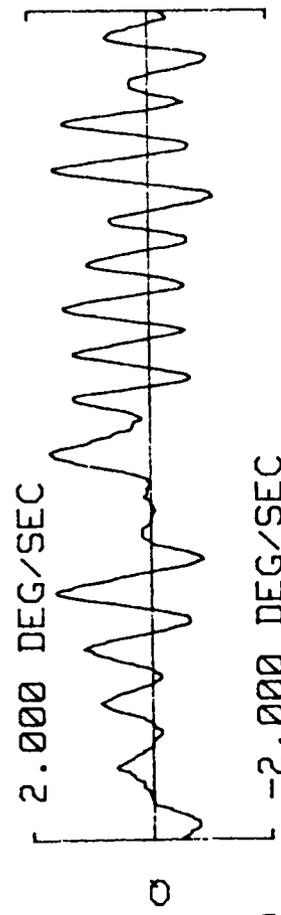
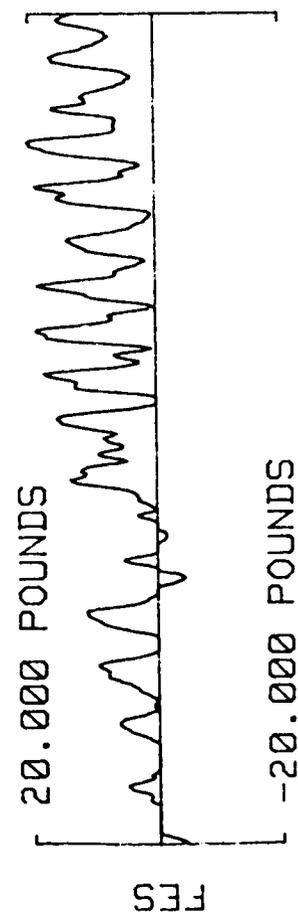


10 20



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FLT 893 APP 4 CONF B



52-3

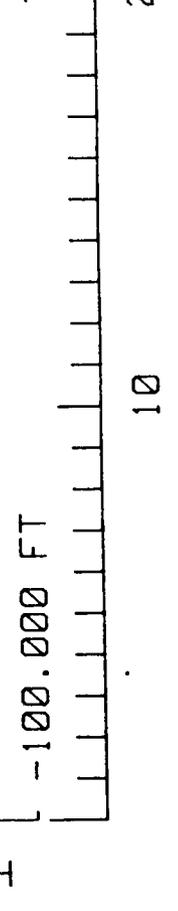
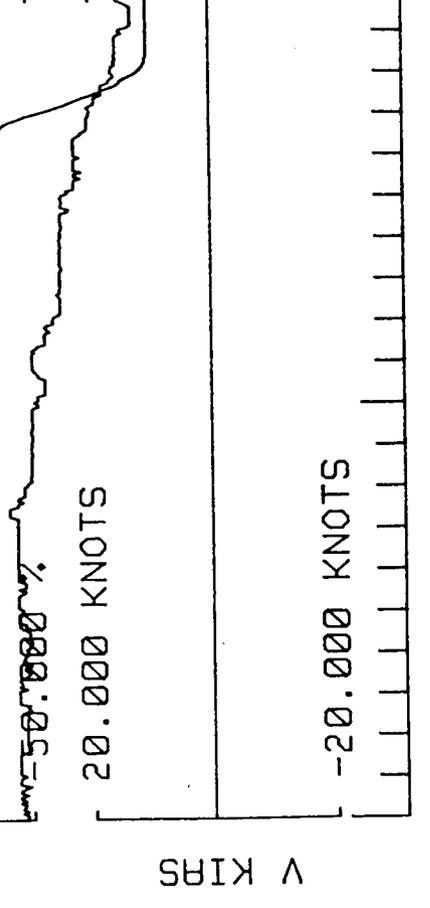
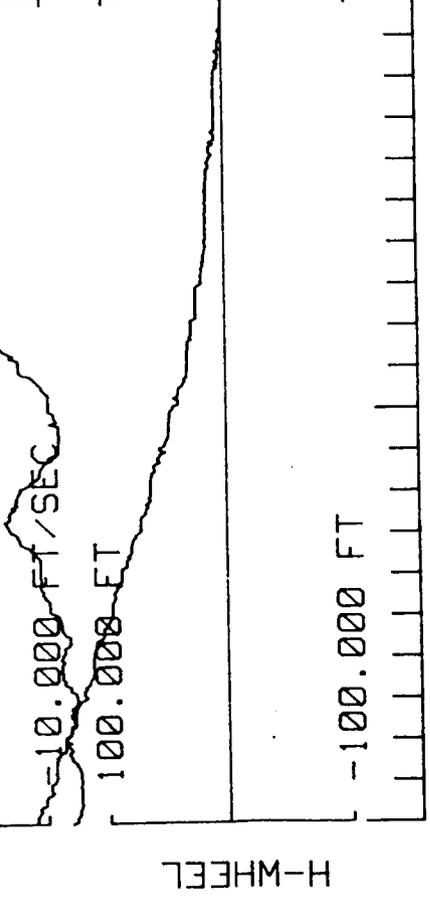
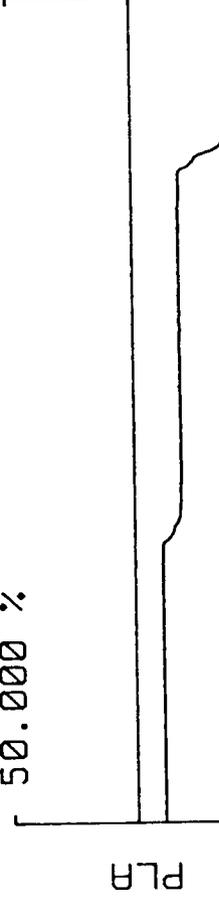
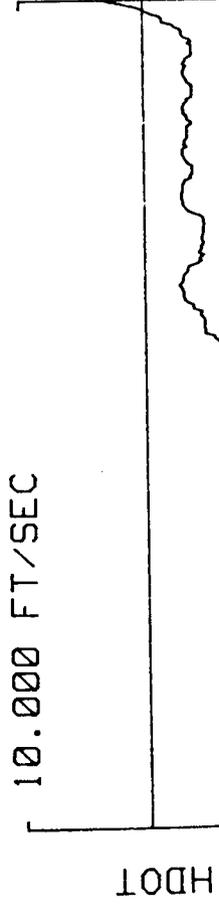
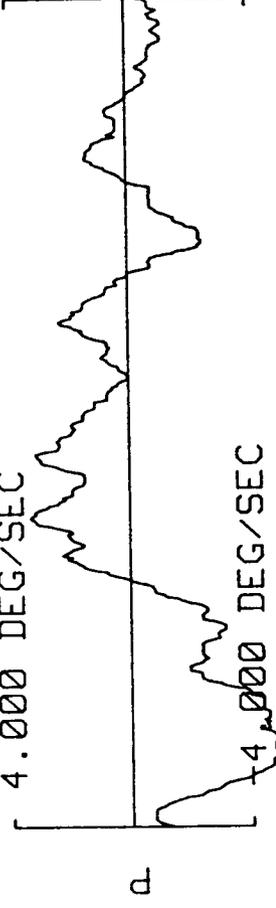
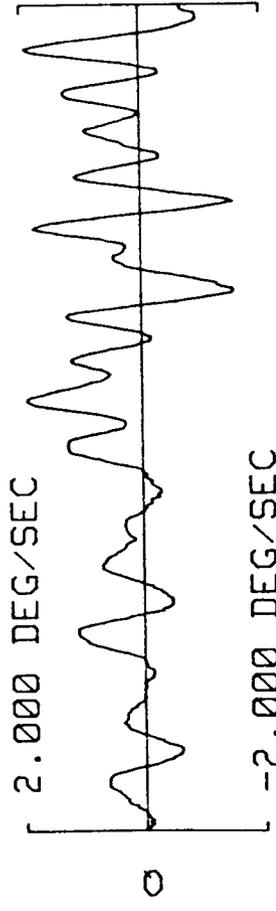
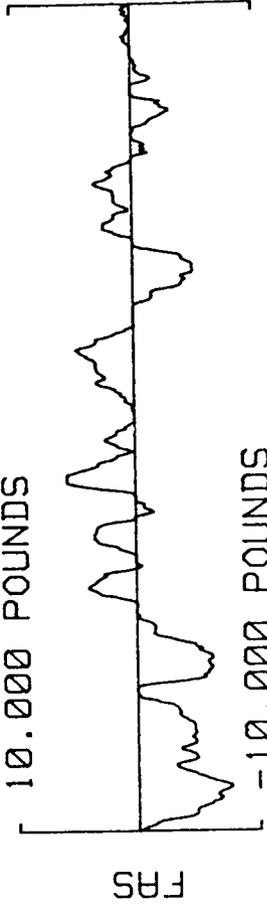
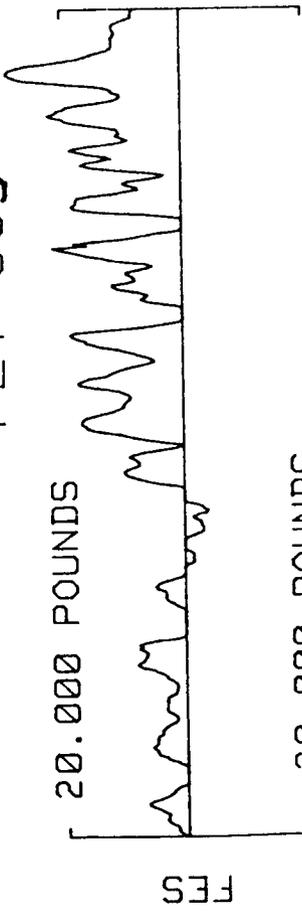
10 20

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FLT 893

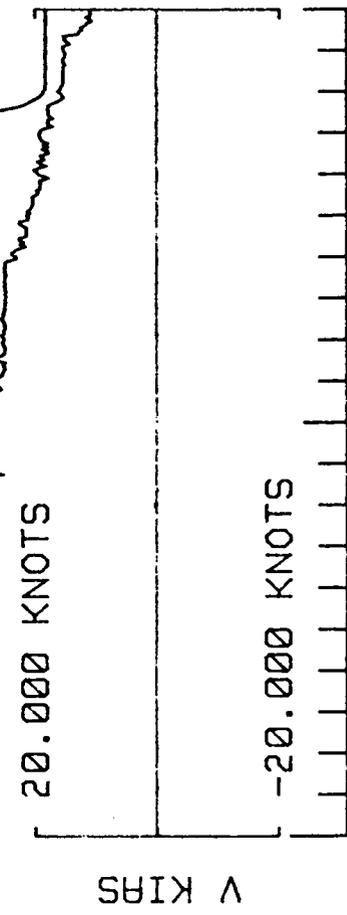
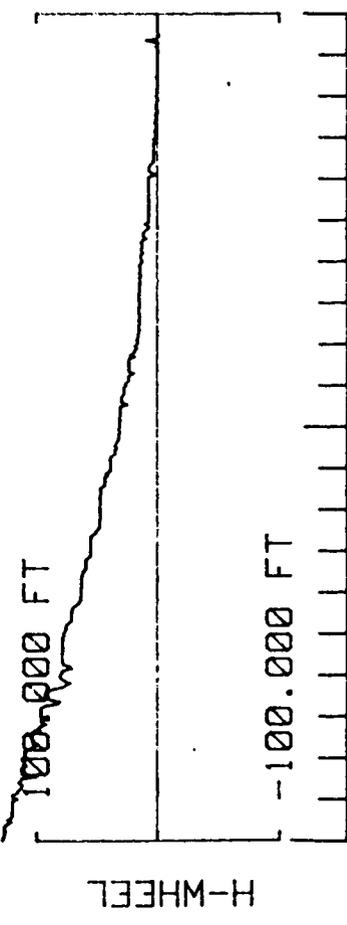
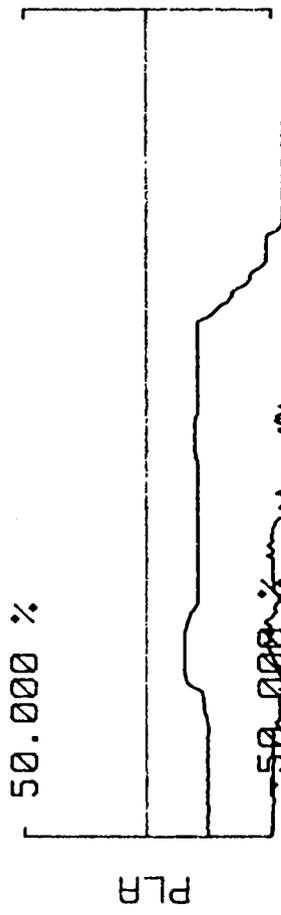
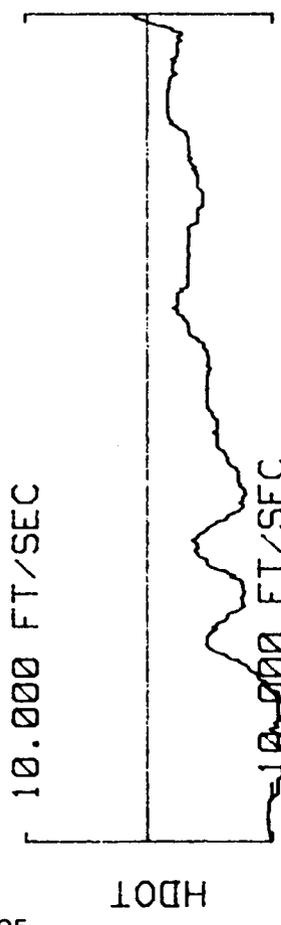
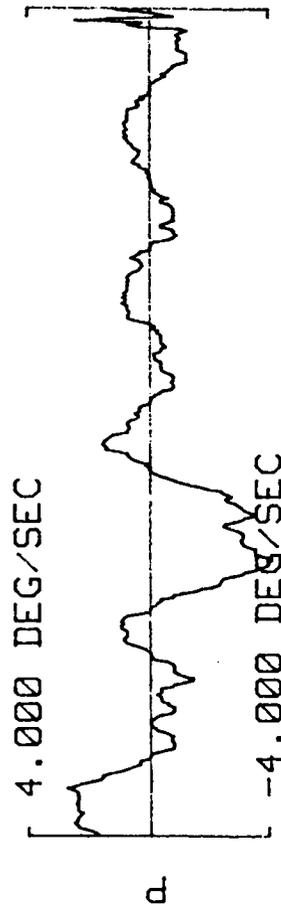
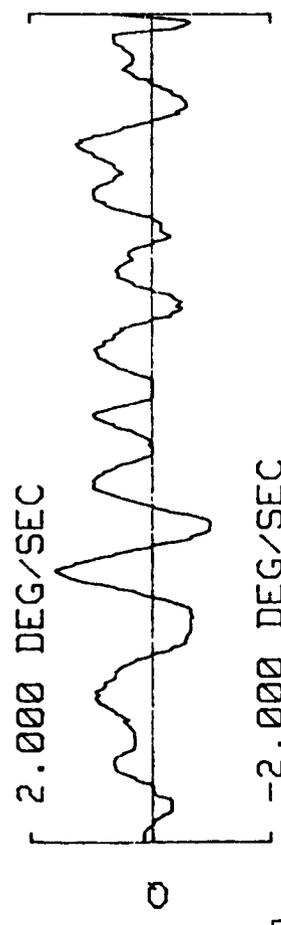
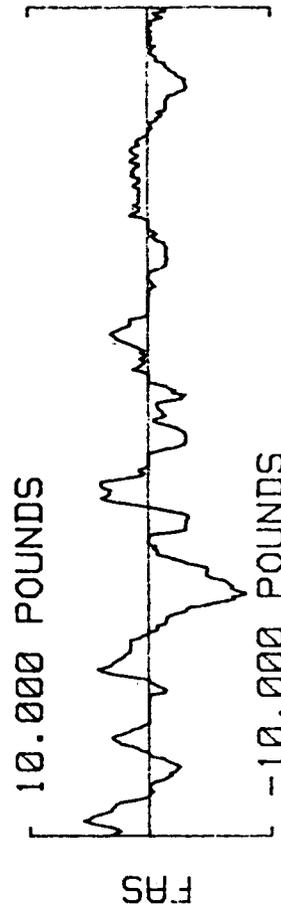
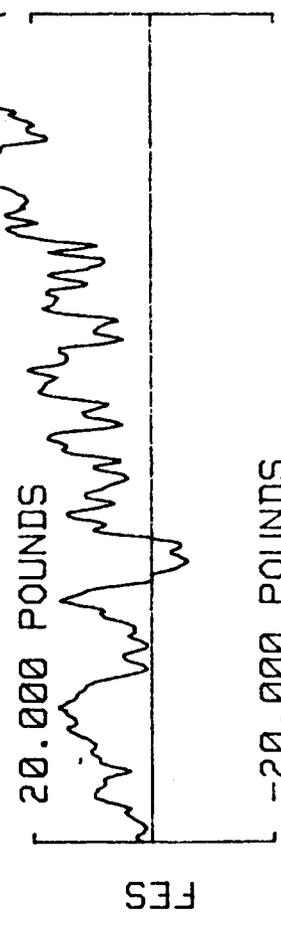
APP 5

CONF B



FLT 893 APP 6

CONF 25

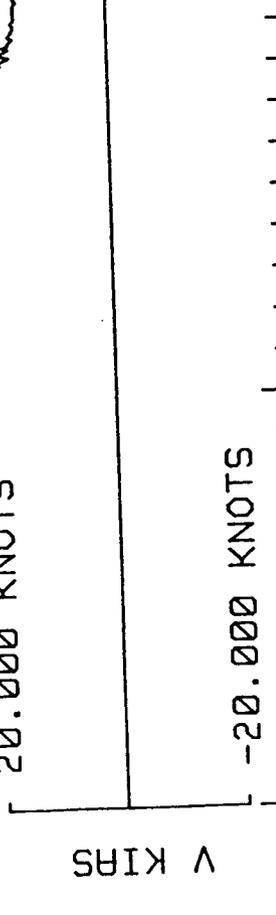
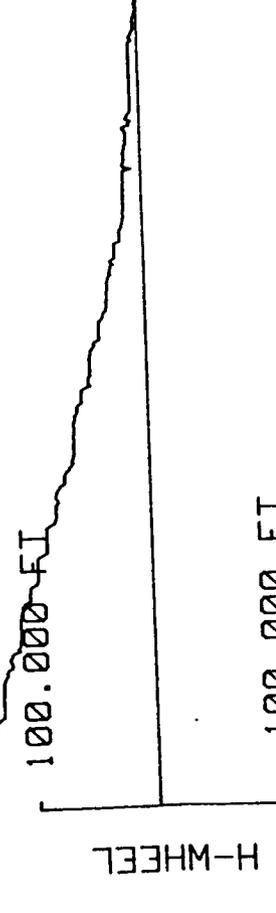
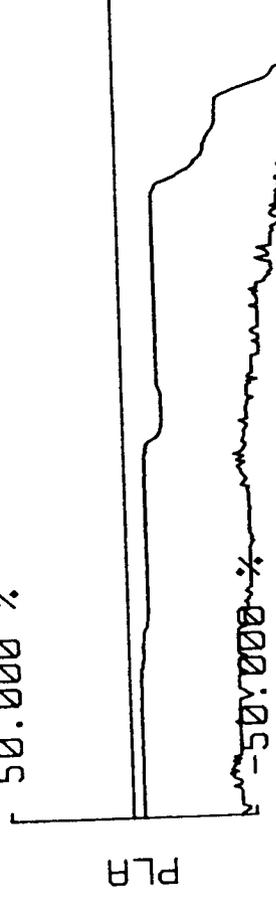
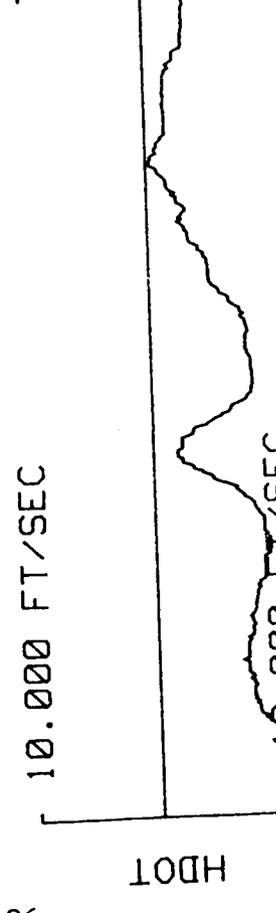
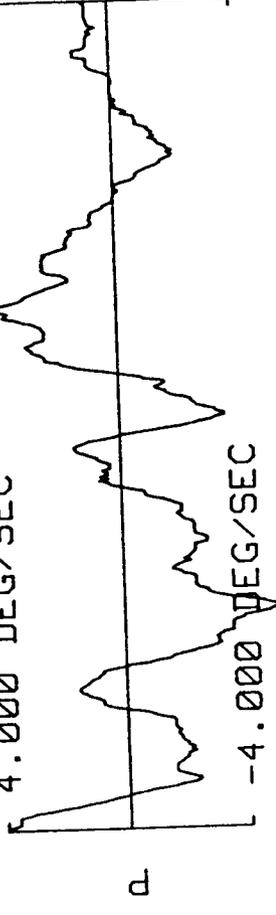
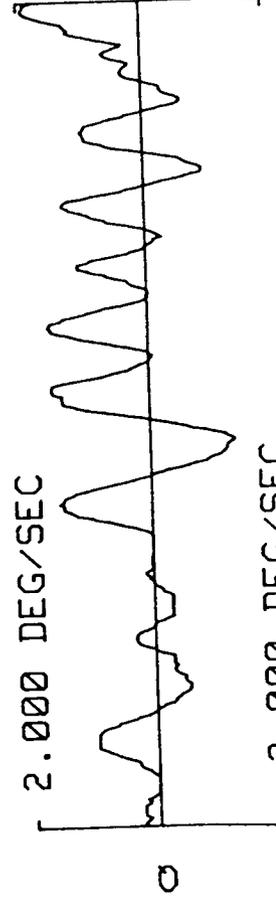
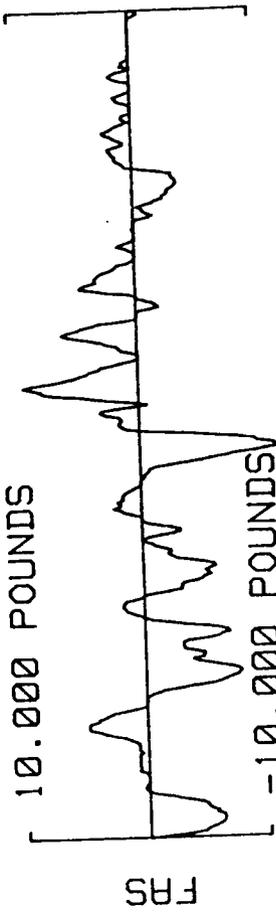
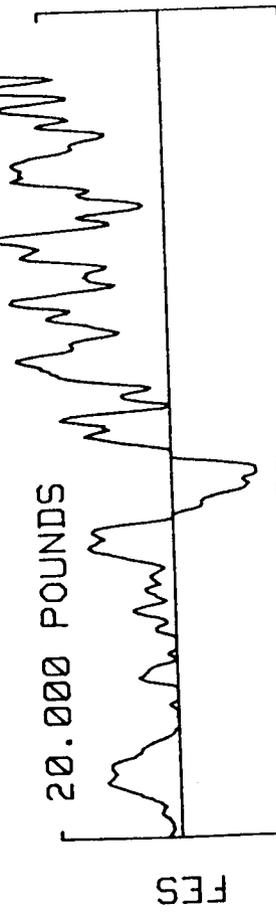


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FLT 893 APP 7

CONF 25



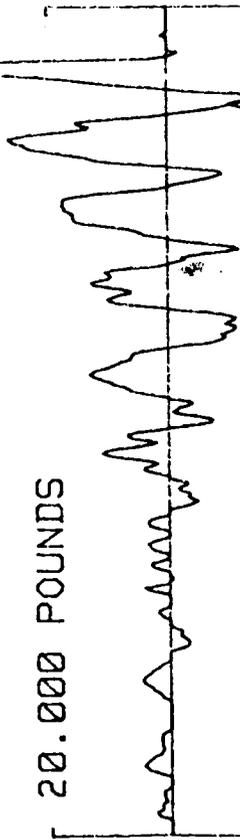
FLT 893

APP 8

CONF 22

20.000 POUNDS

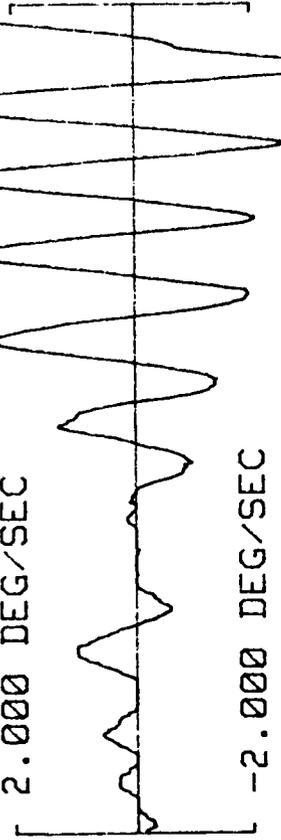
FES



-20.000 POUNDS

2.000 DEG/SEC

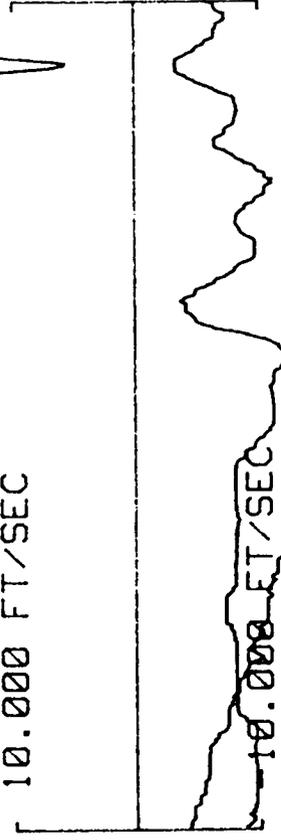
Q



-2.000 DEG/SEC

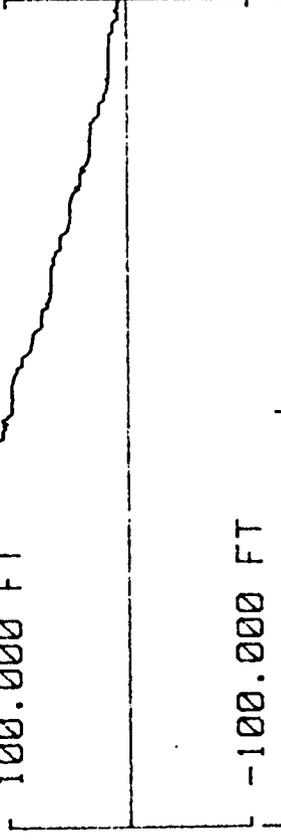
10.000 FT/SEC

HDOT



100.000 FT

H-WHEEL



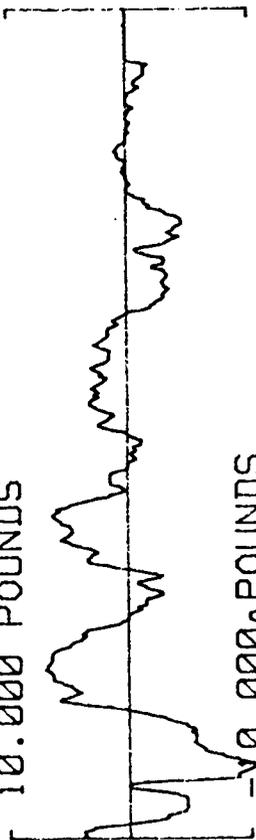
-100.000 FT

10

20

10.000 POUNDS

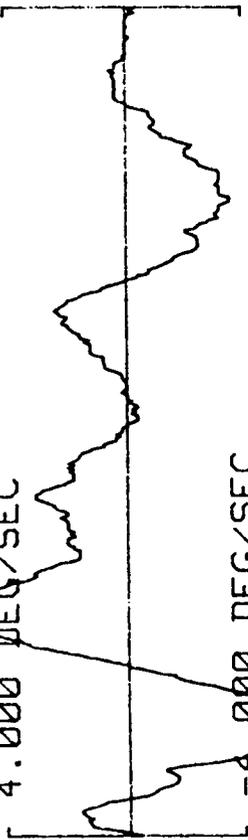
FBS



-10.000 POUNDS

4.000 DEG/SEC

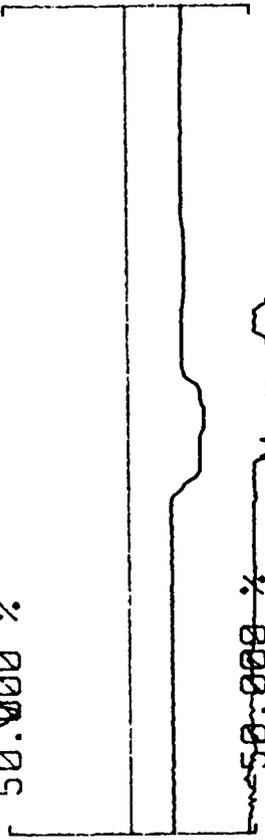
P



-4.000 DEG/SEC

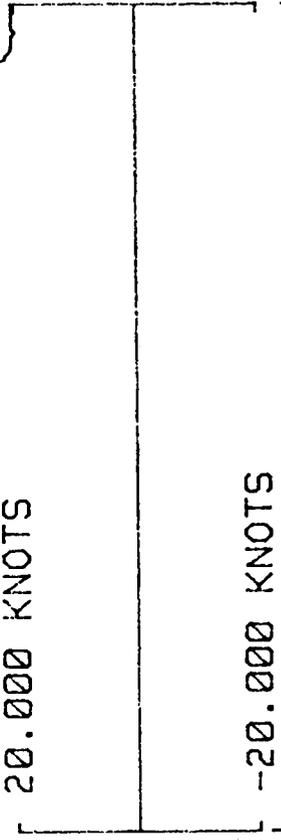
50.000 %

PLA



20.000 KNOTS

V KIRS



-20.000 KNOTS

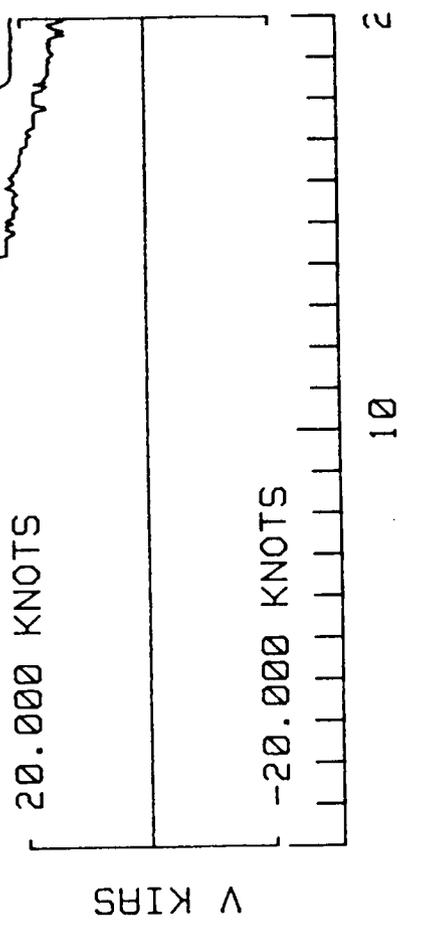
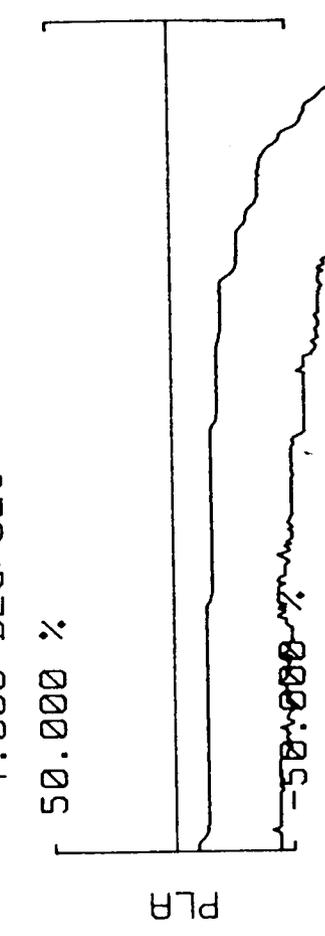
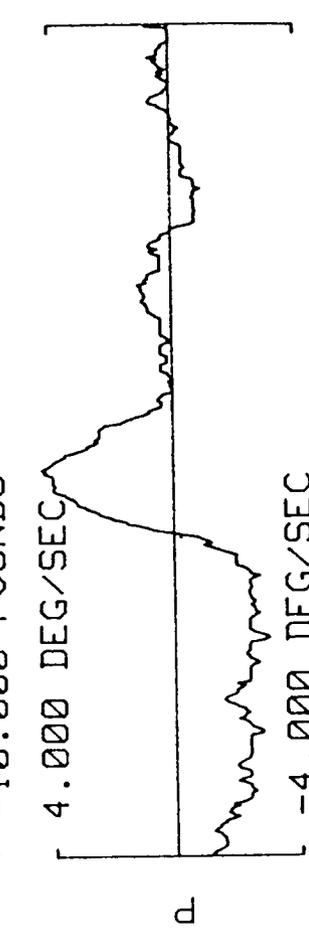
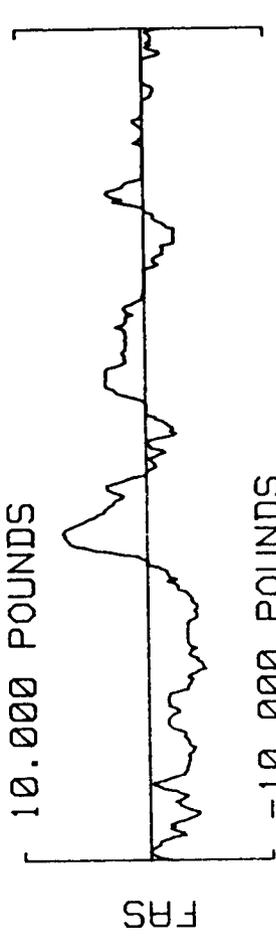
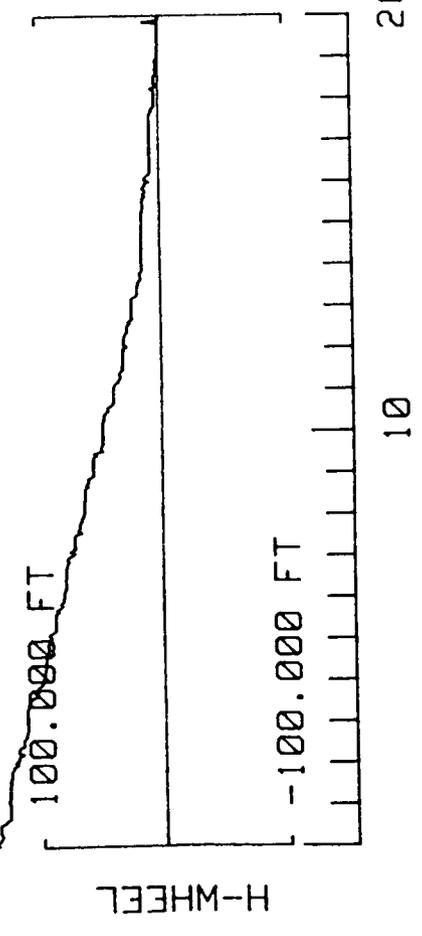
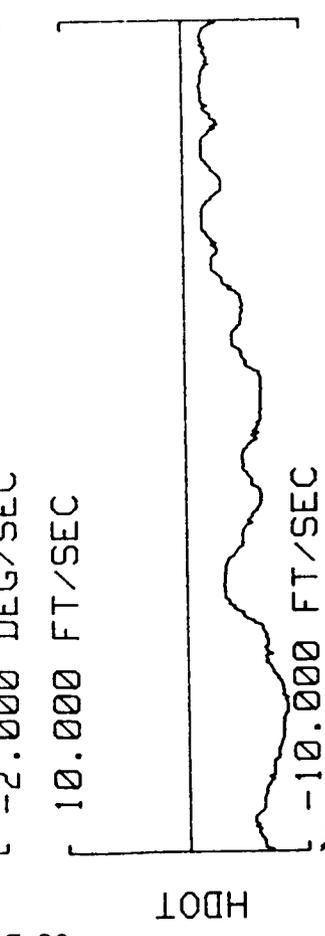
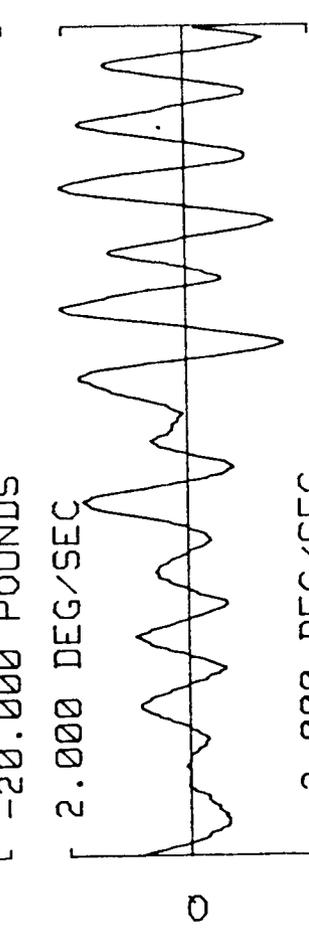
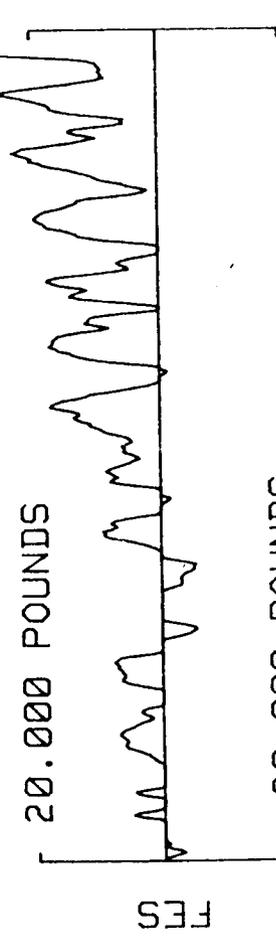
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FLT. 893

APP 9

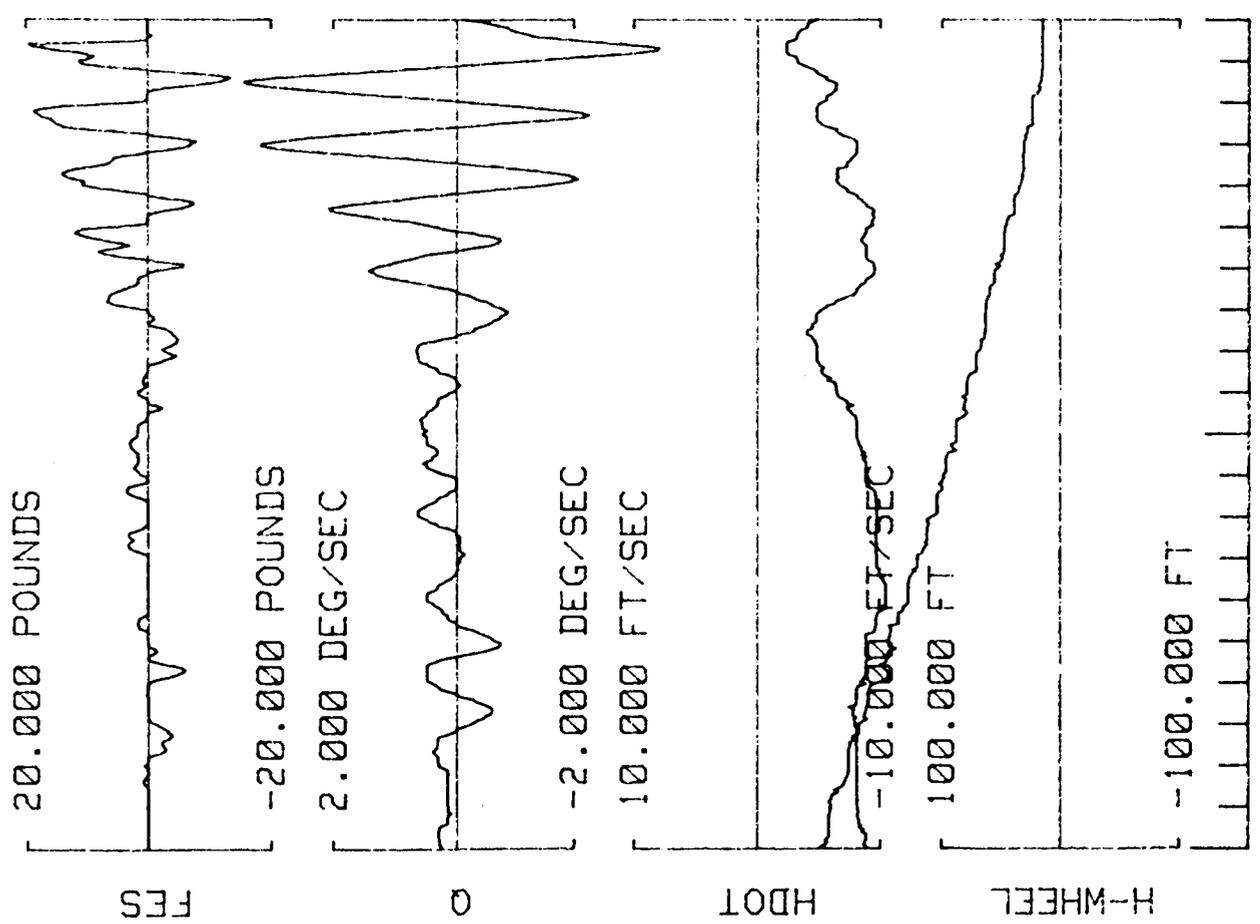
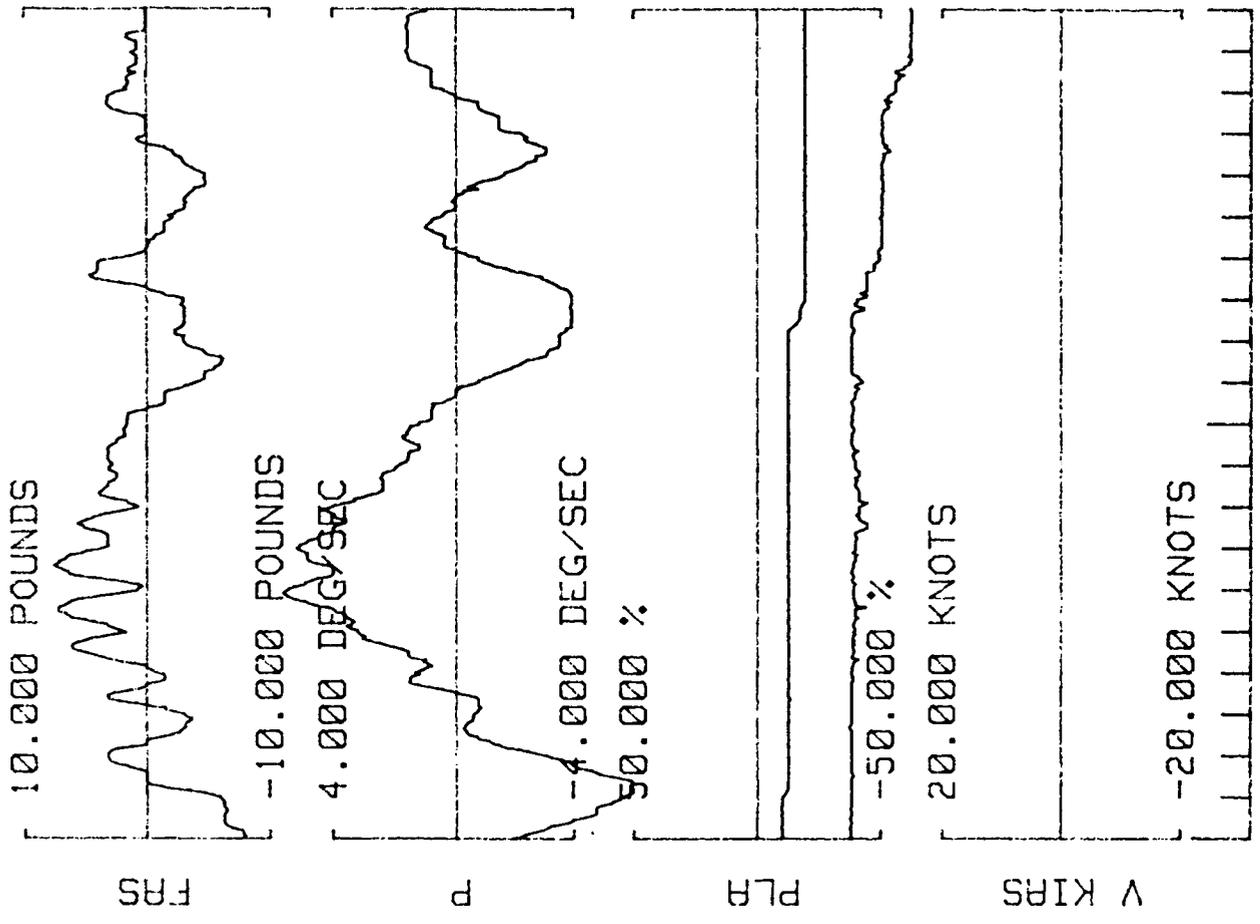
CONF 22



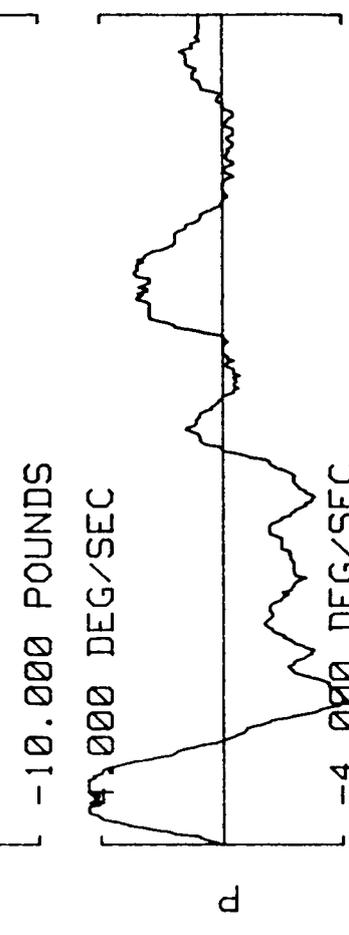
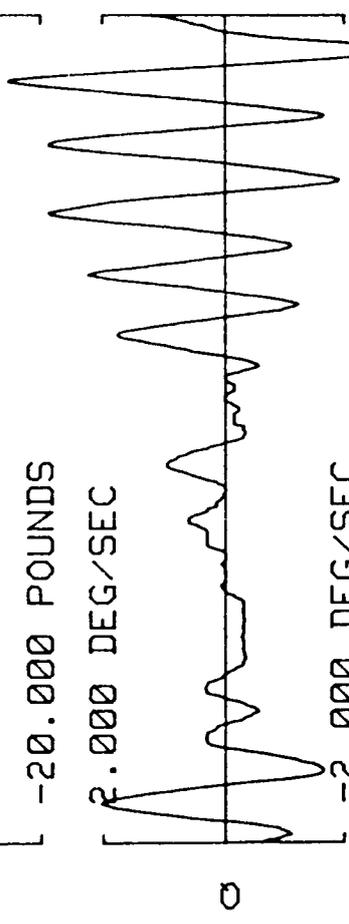
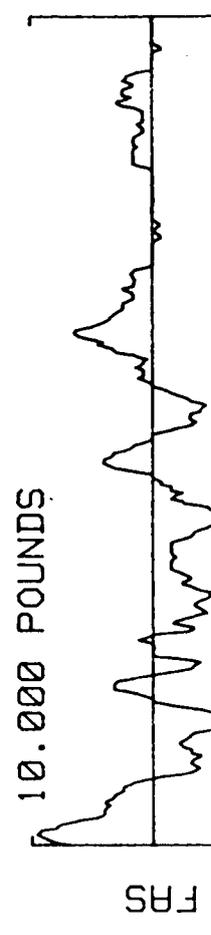
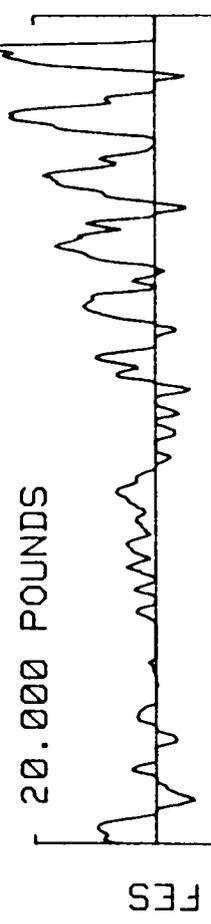
10 20

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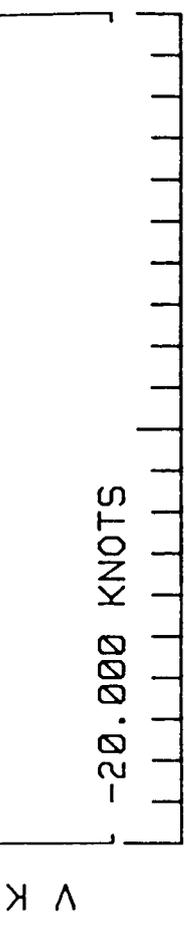
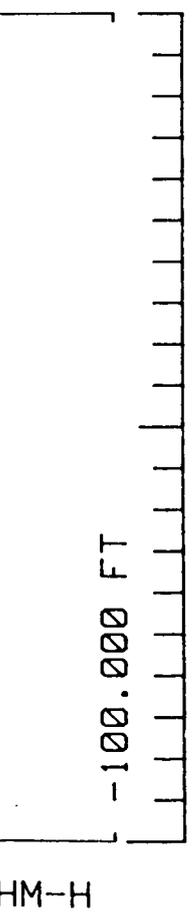
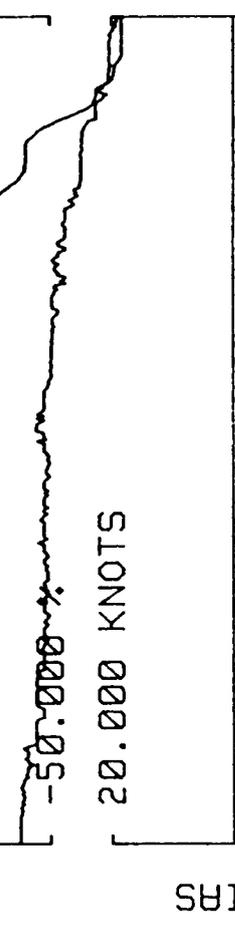
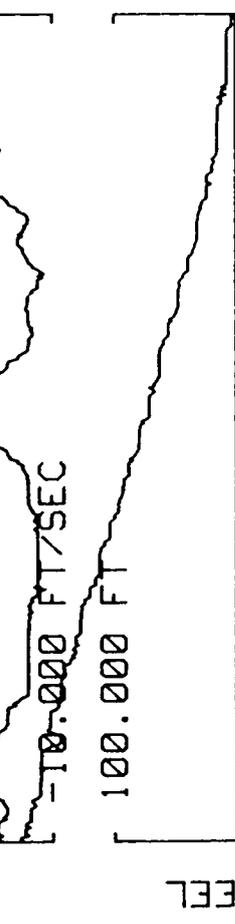
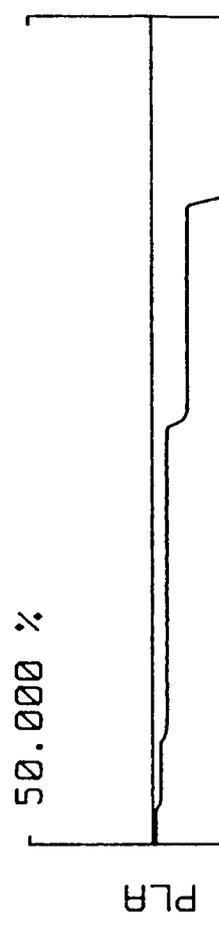
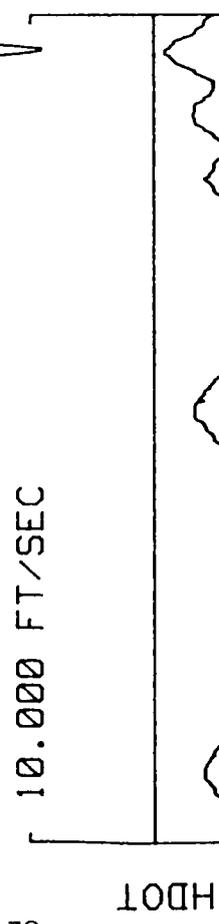
FLT 893 APP 10 CONF 28



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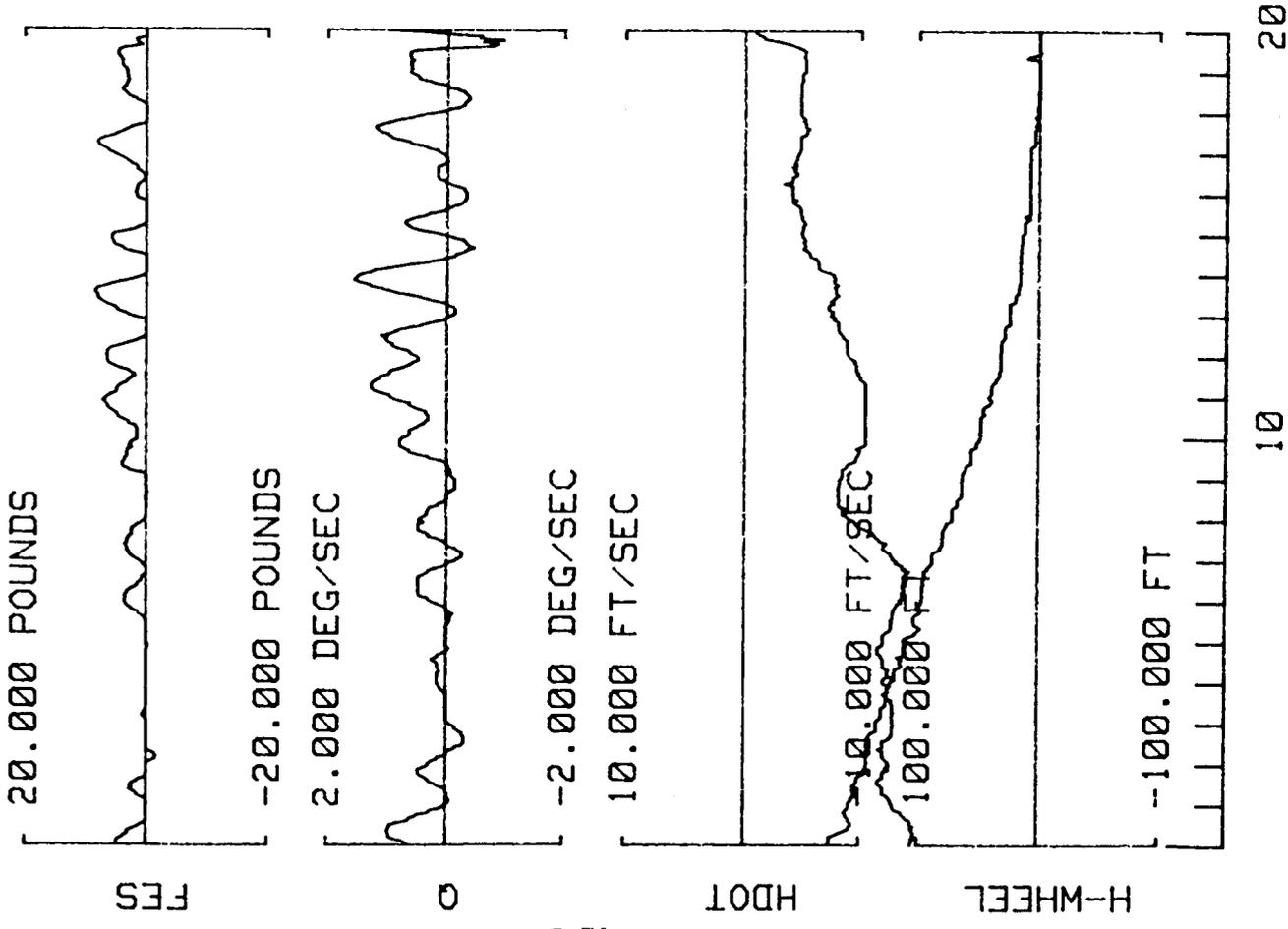
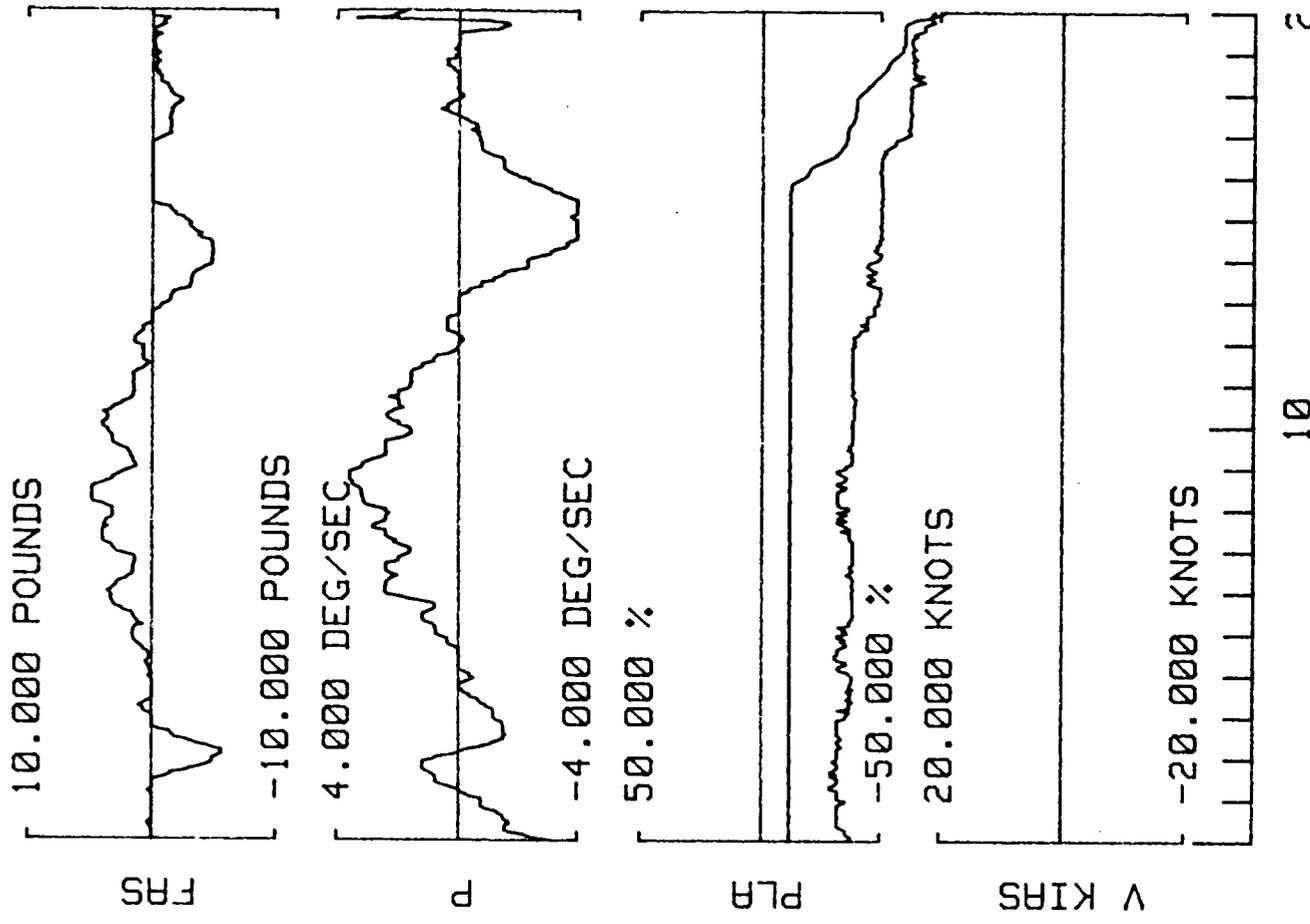
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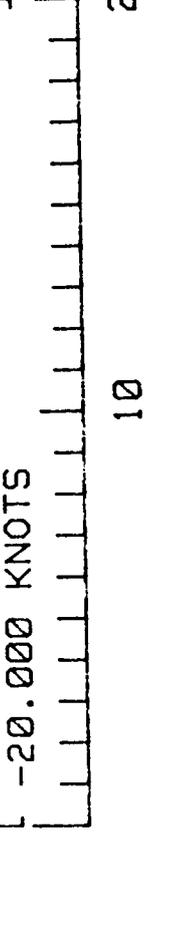
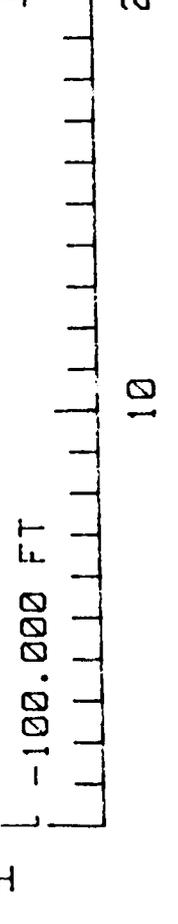
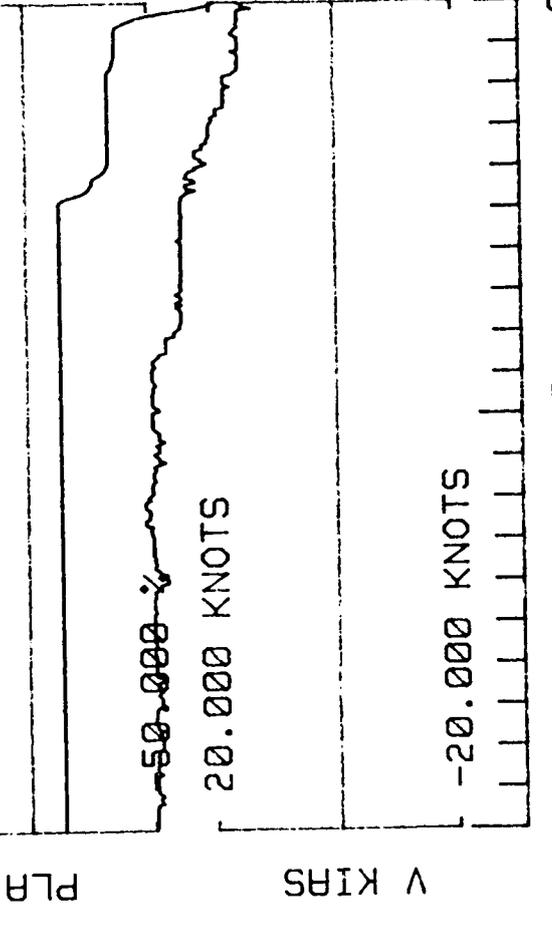
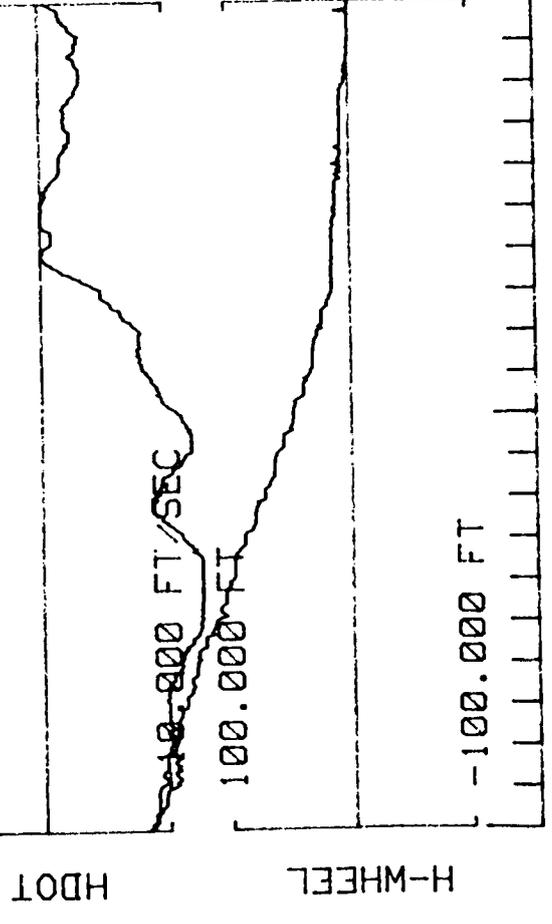
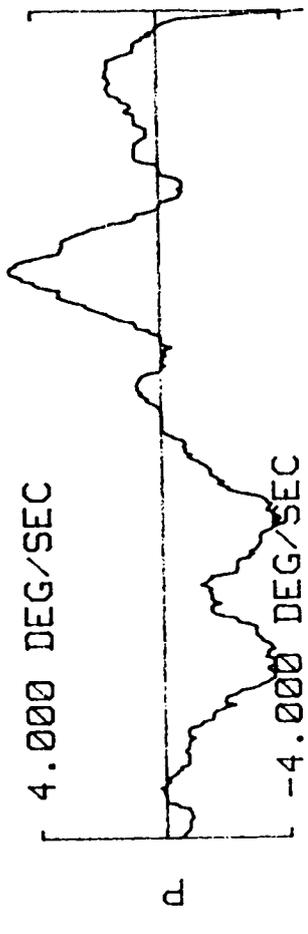
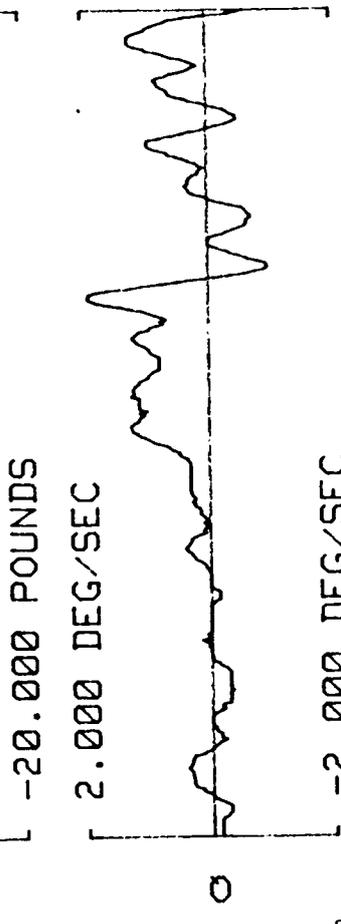
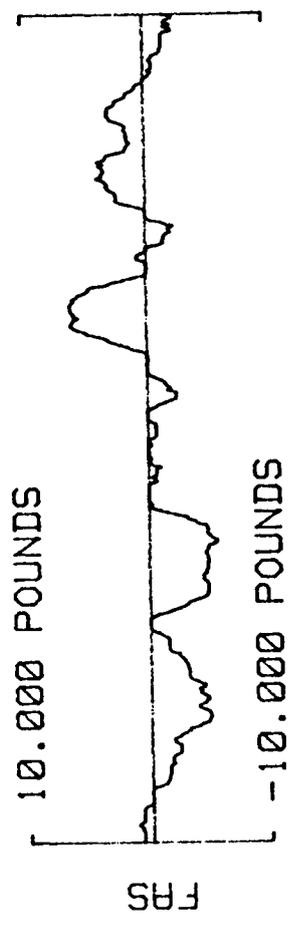
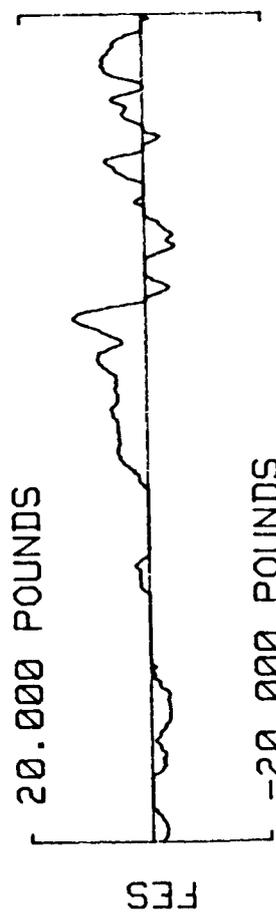
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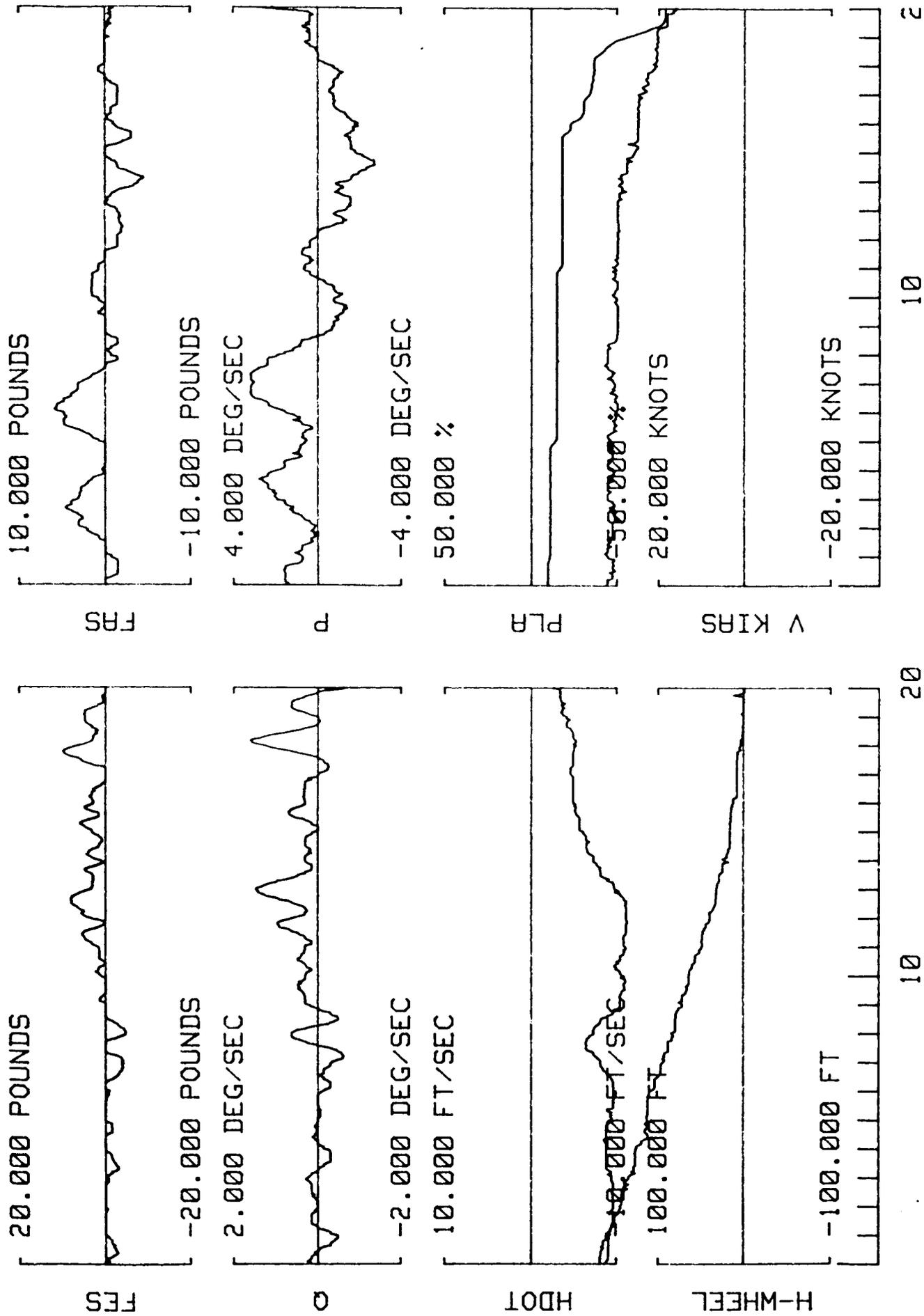
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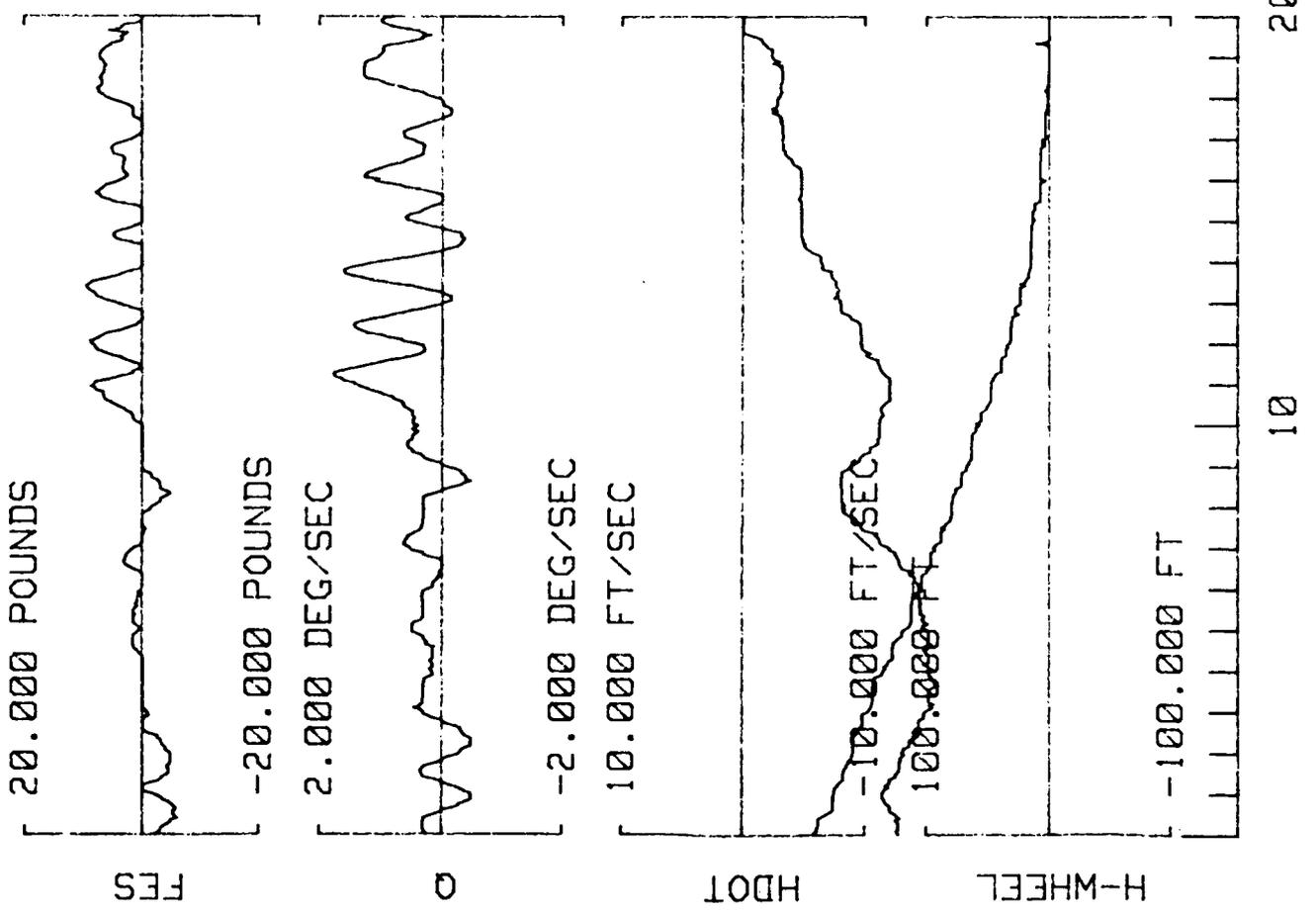
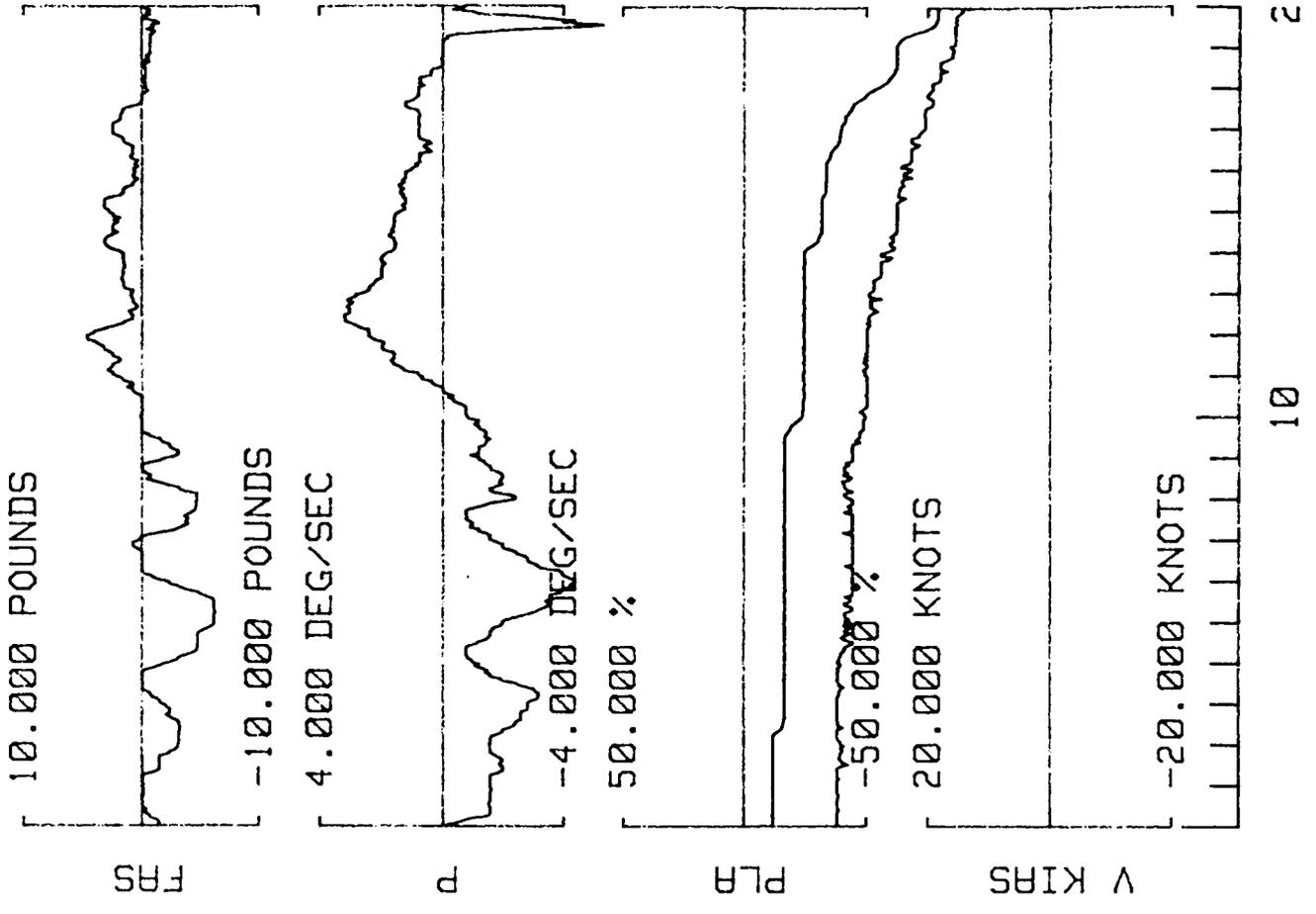
FLT 894 APP 1 CONF 17



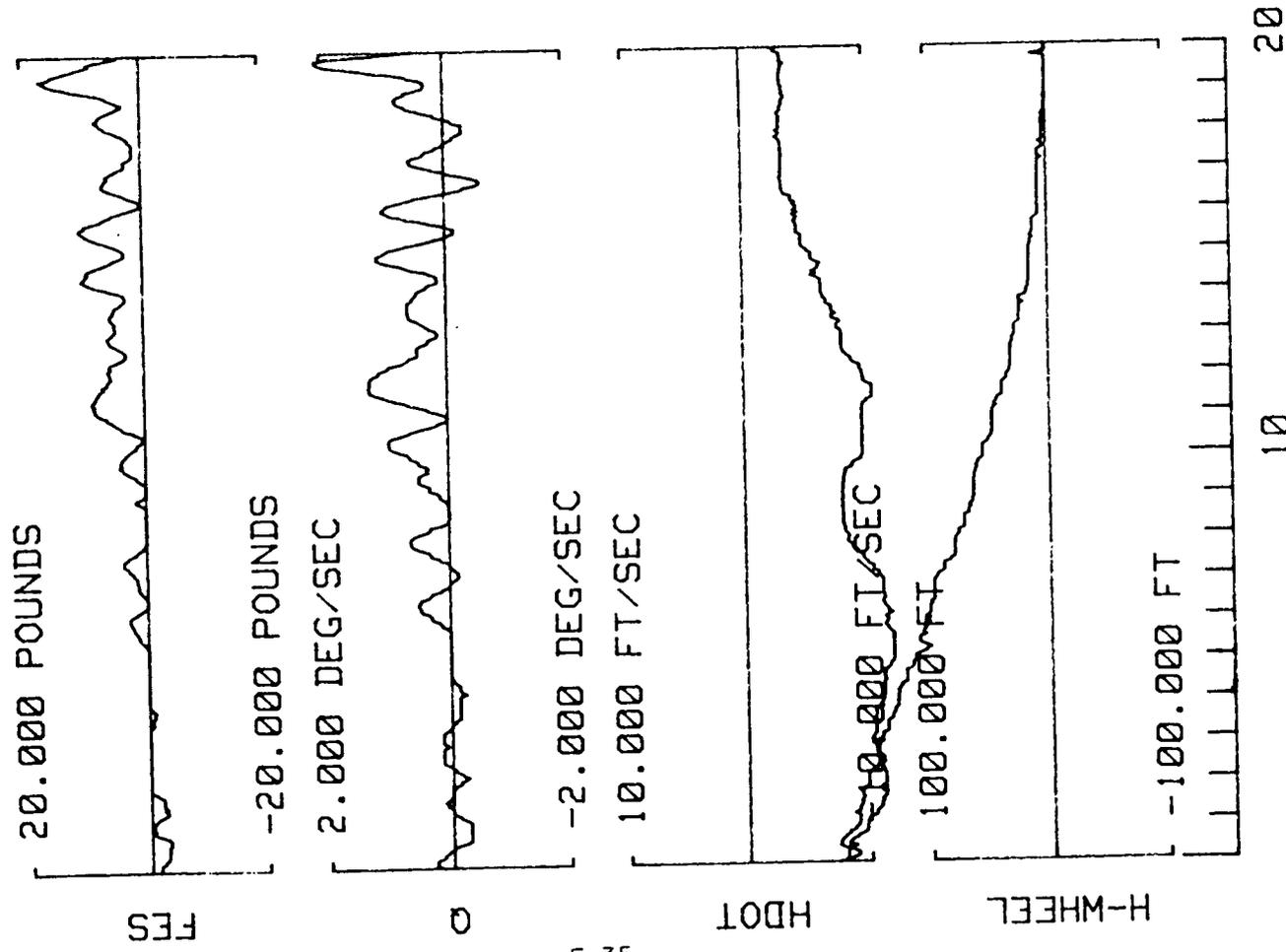
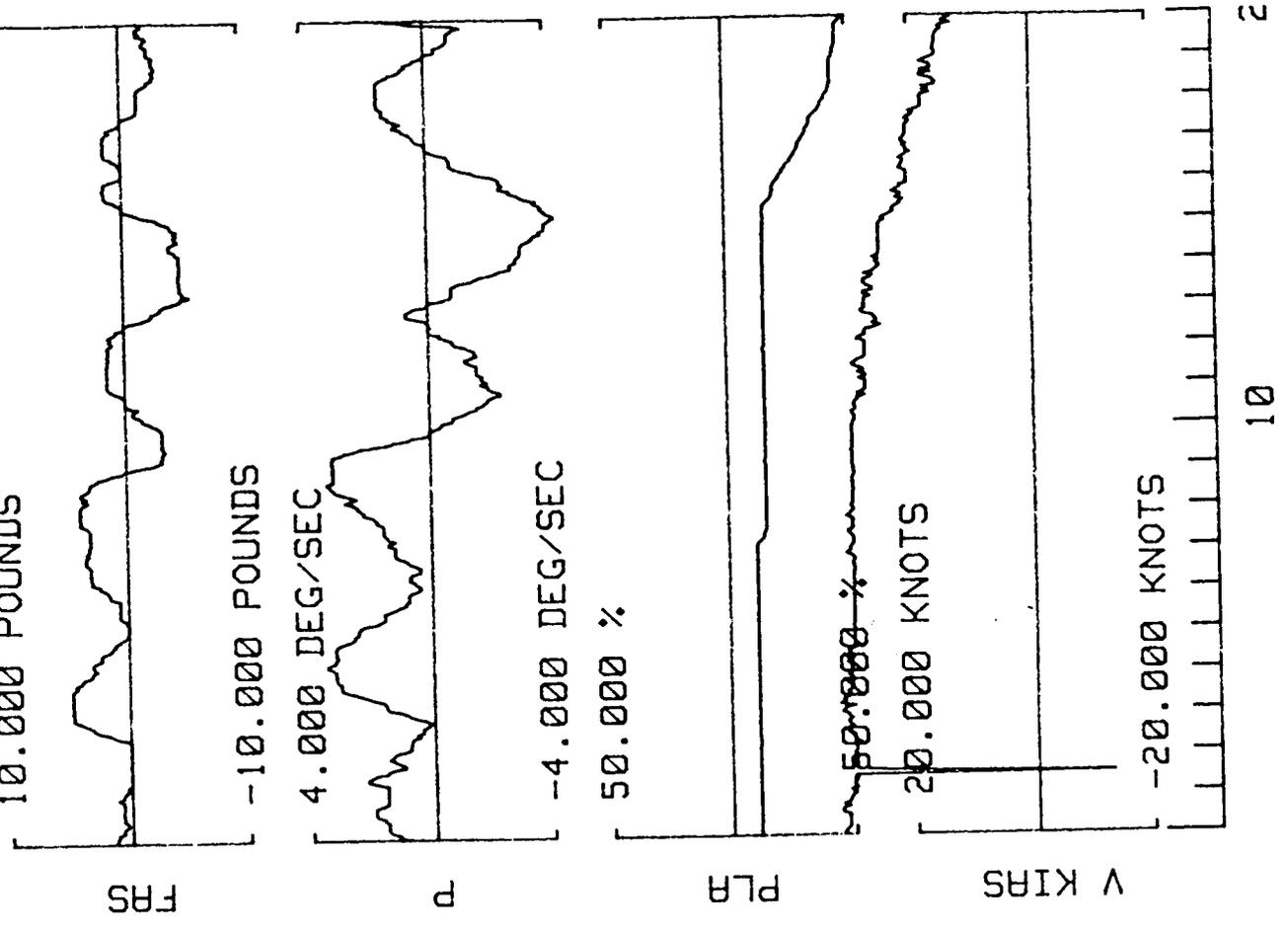
FLT 894 APP 2 CONF 17

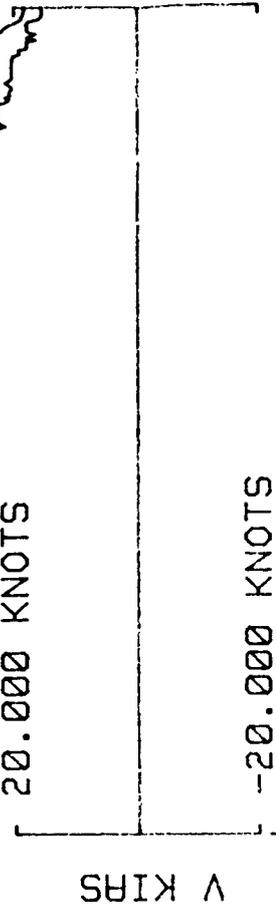
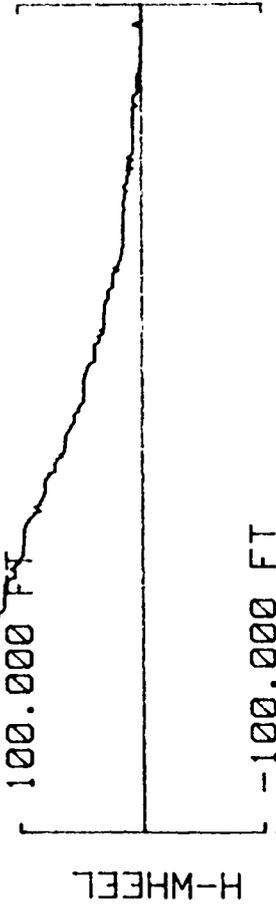
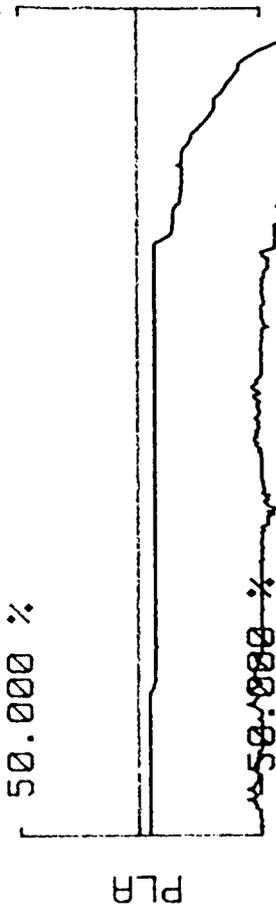
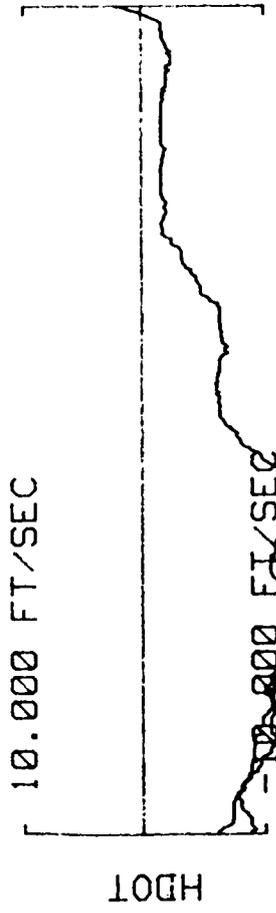
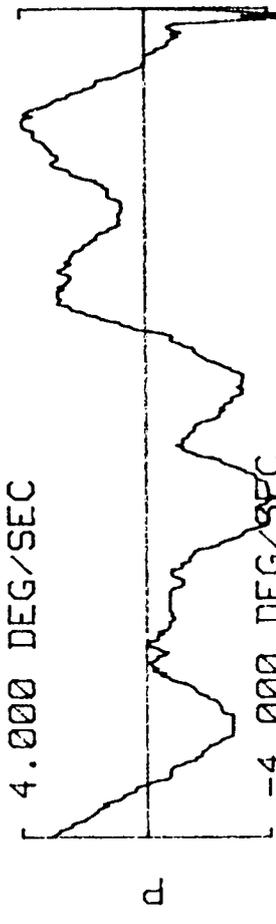
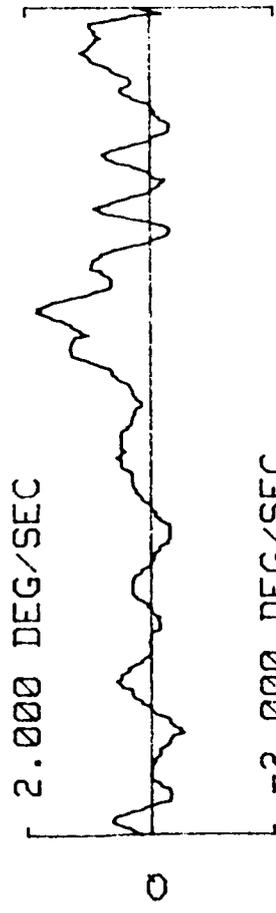
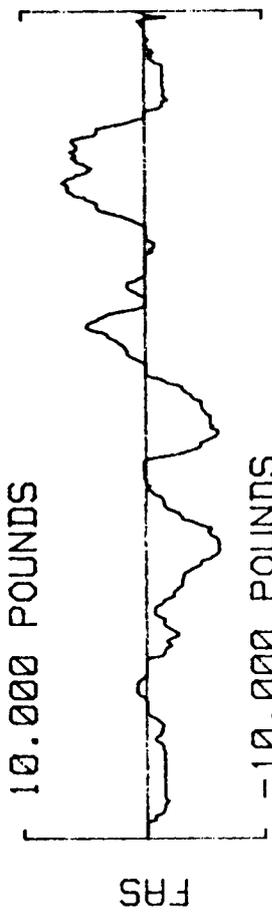
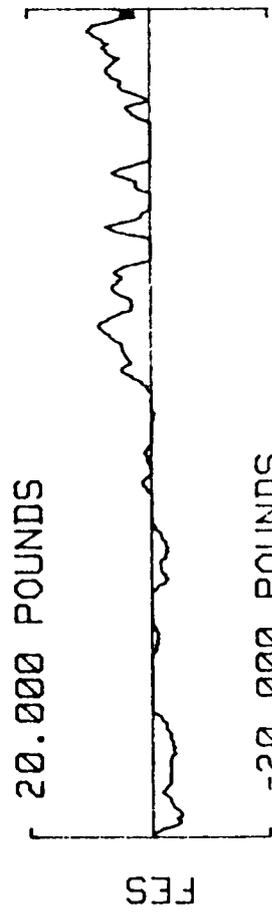






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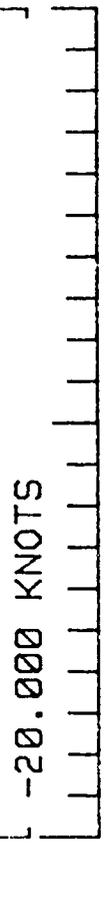
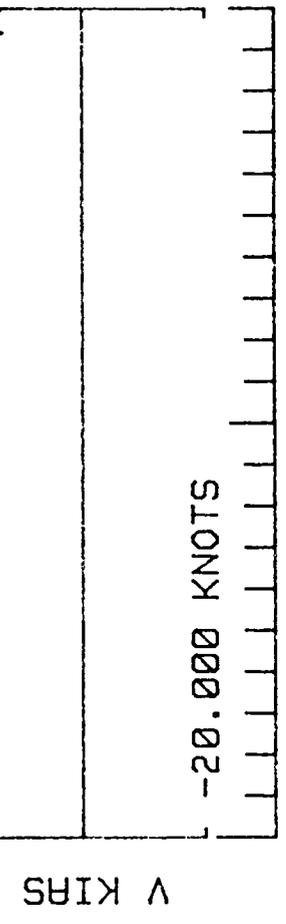
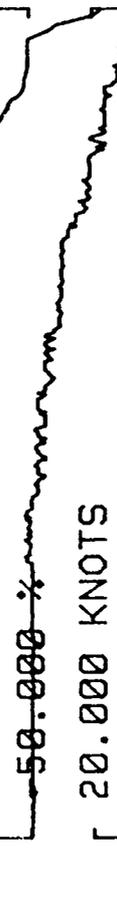
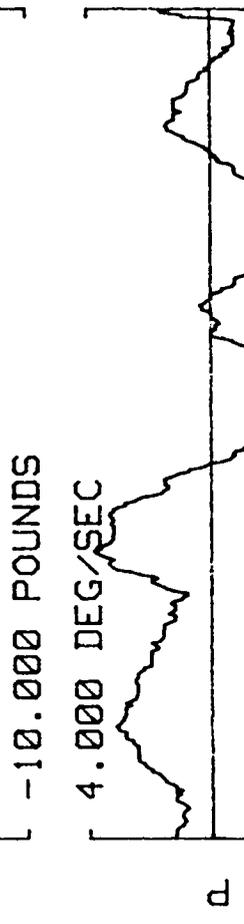
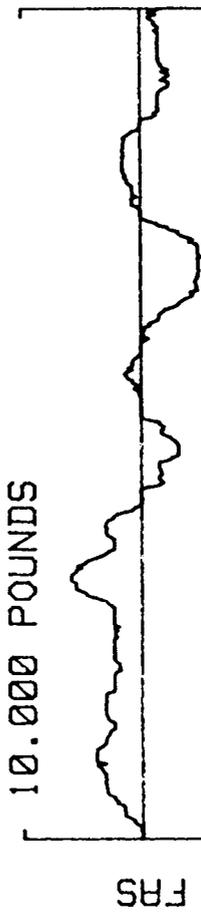
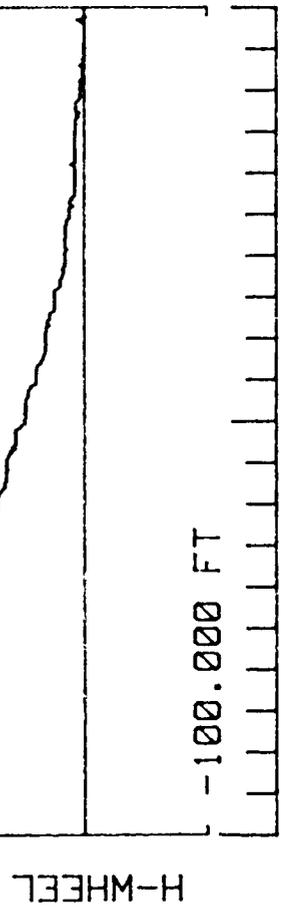
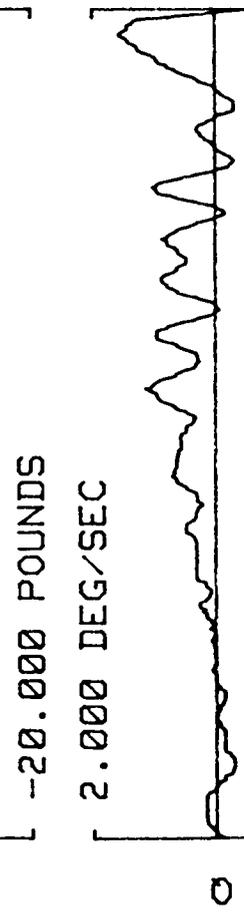
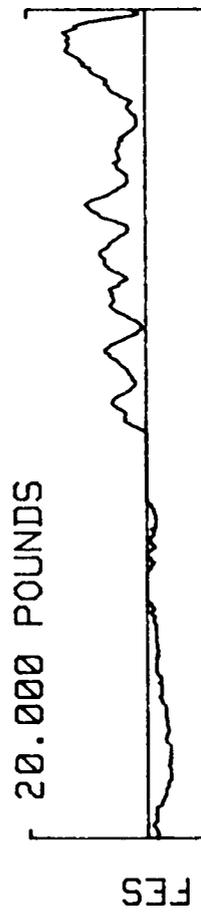




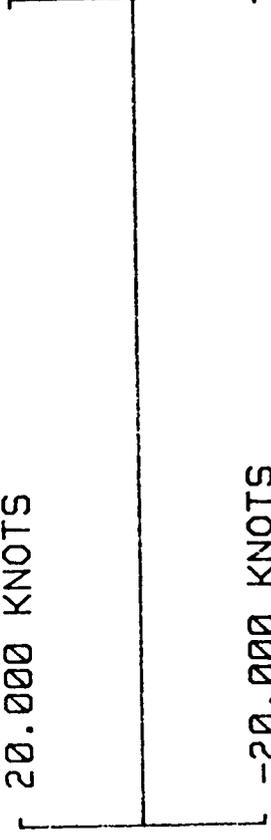
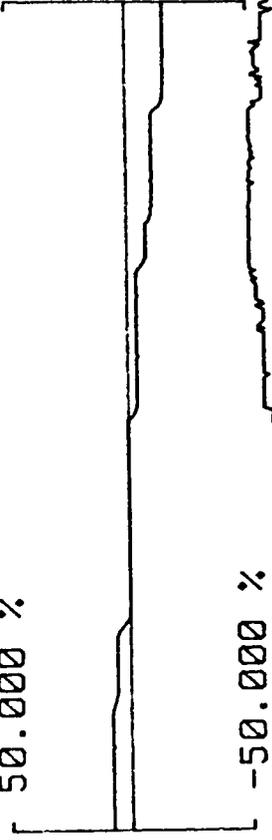
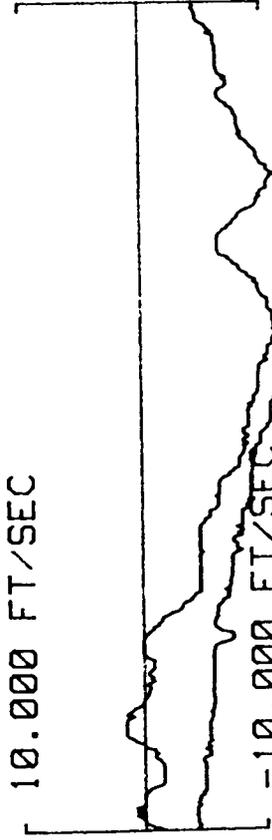
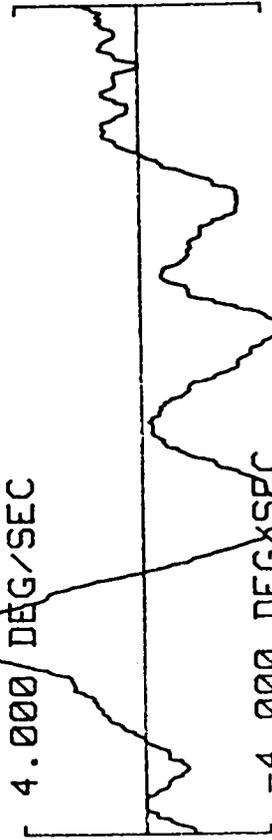
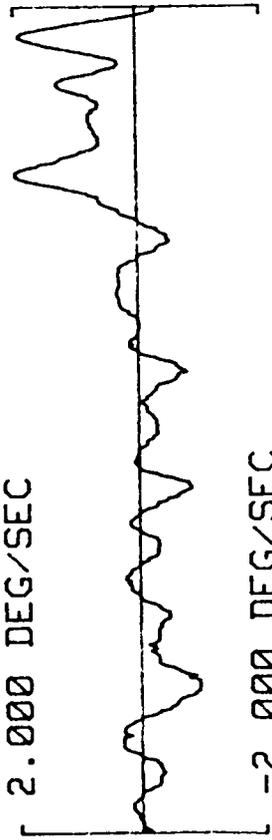
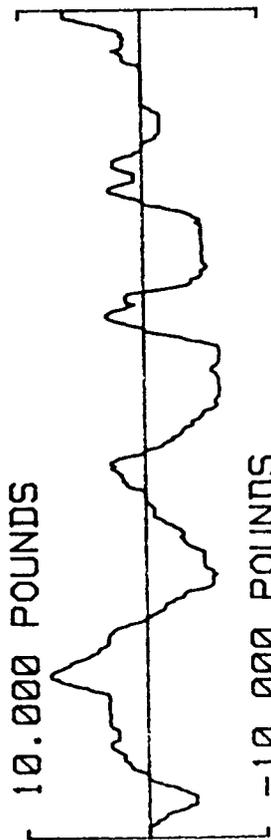
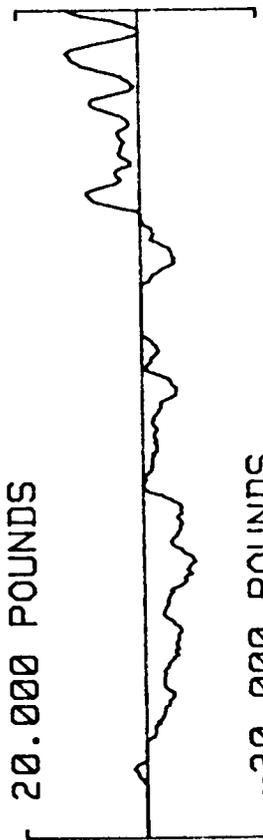
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FLT 894 APP 7

CONF 20



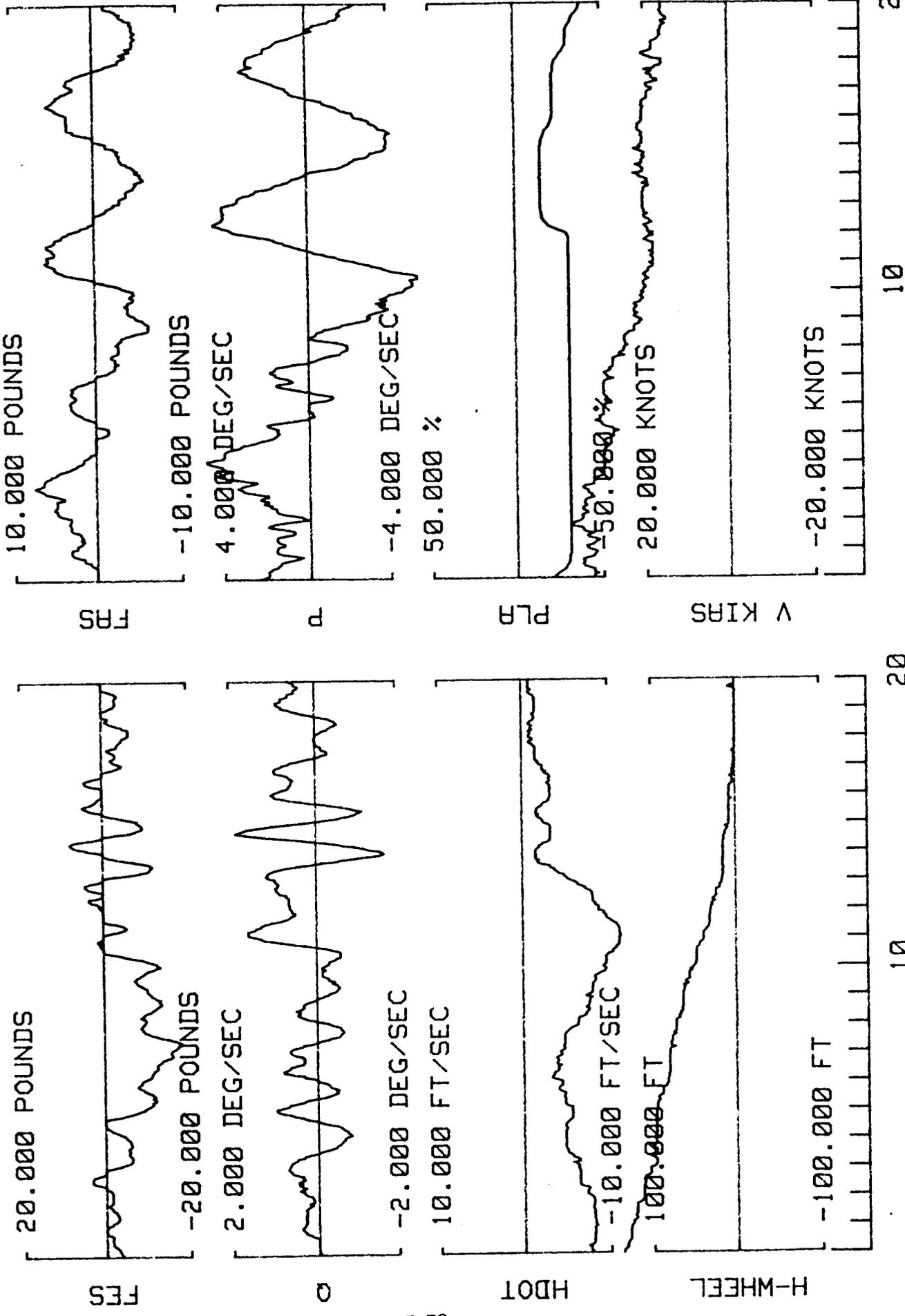
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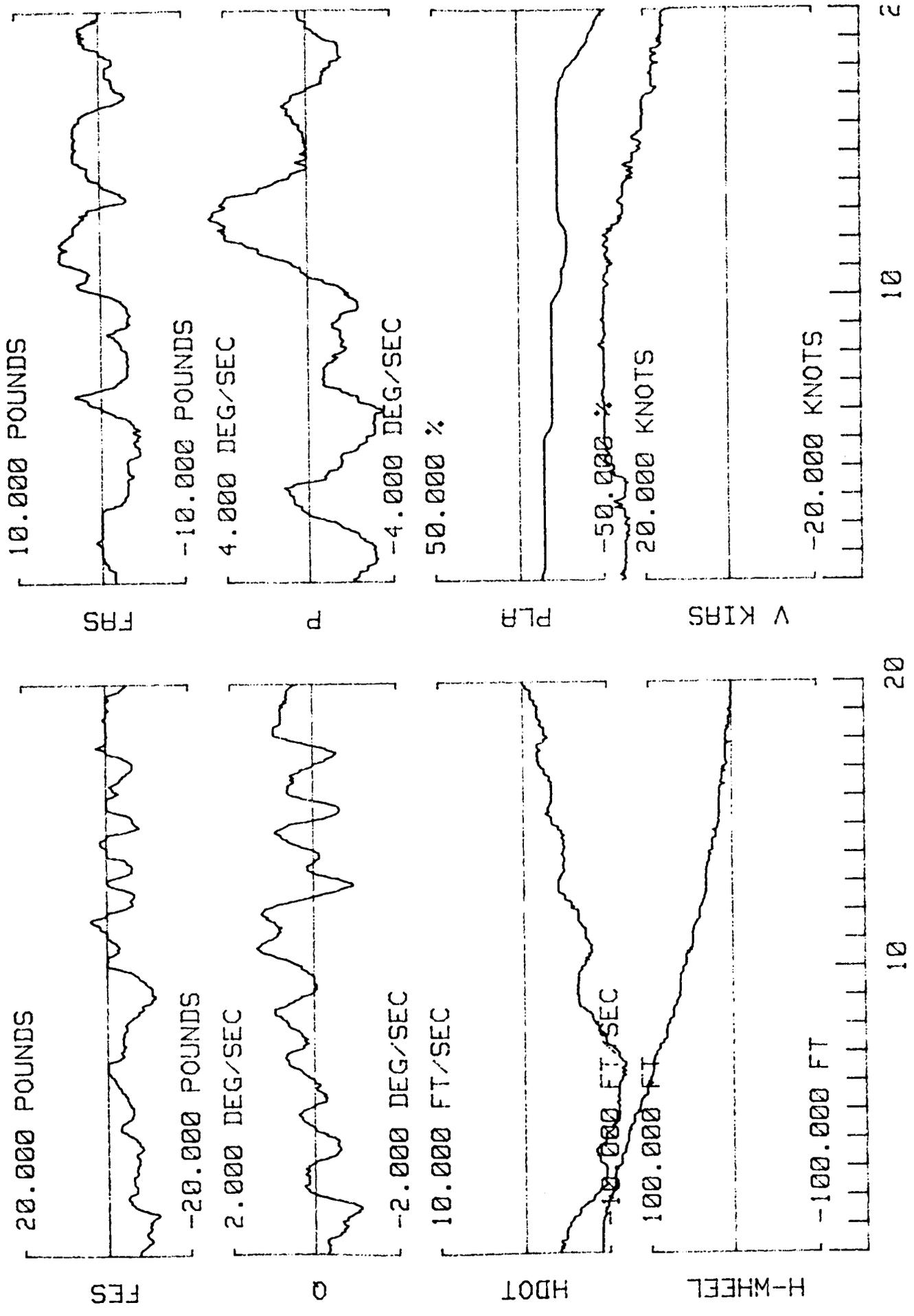
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FLT 895 APP 1 CONF 3



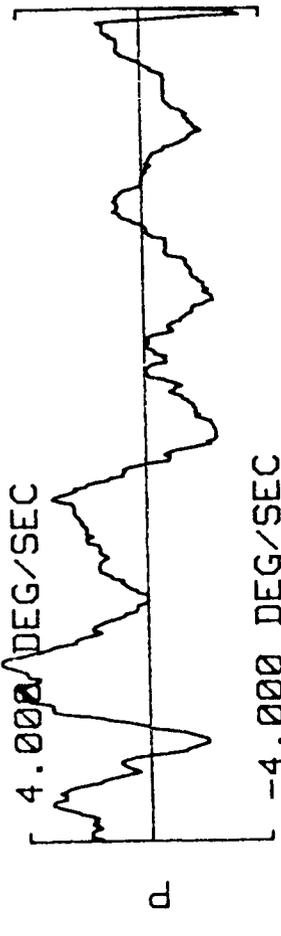
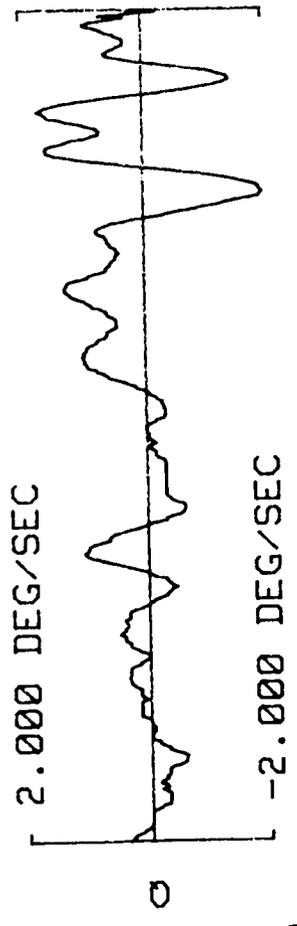
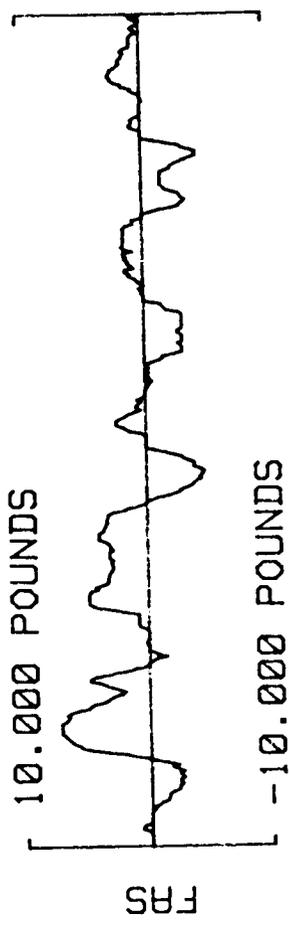
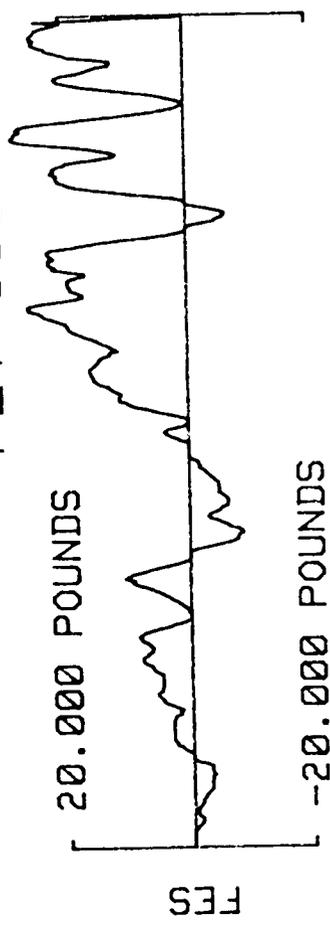
FLT 895 APP 2 CONF 3



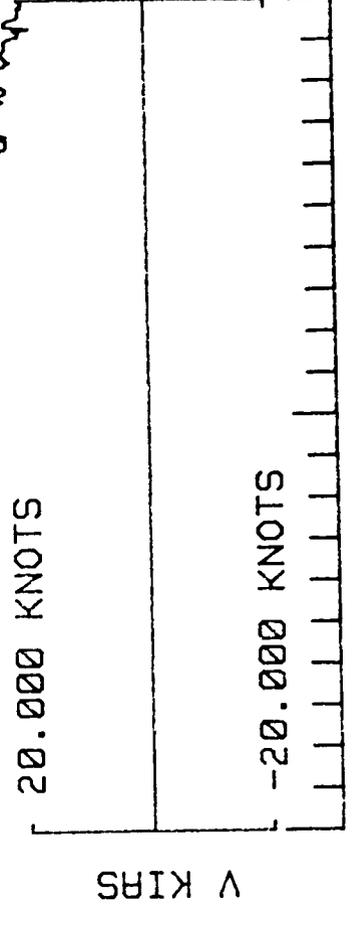
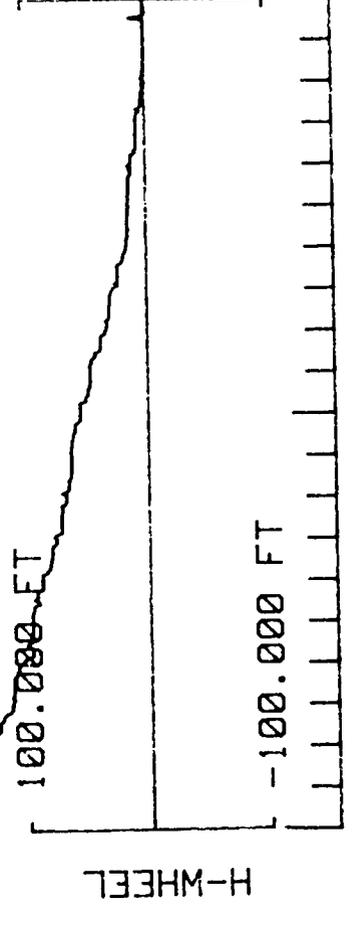
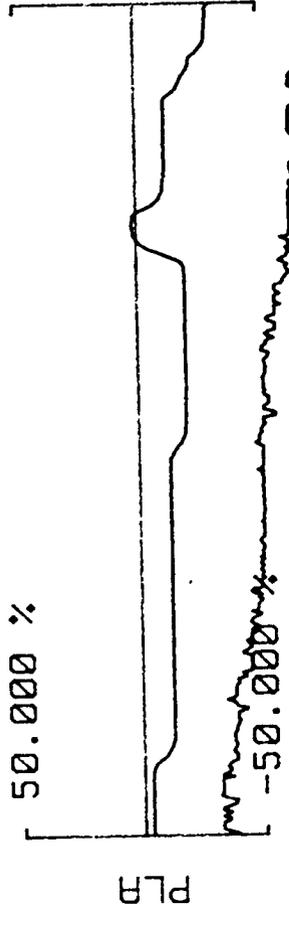
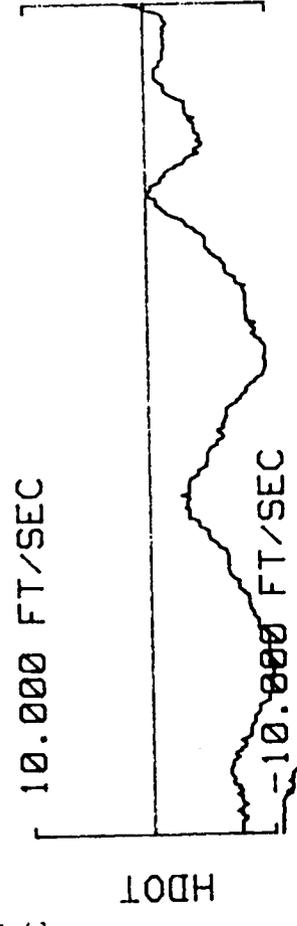
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APP 3

CONF 23



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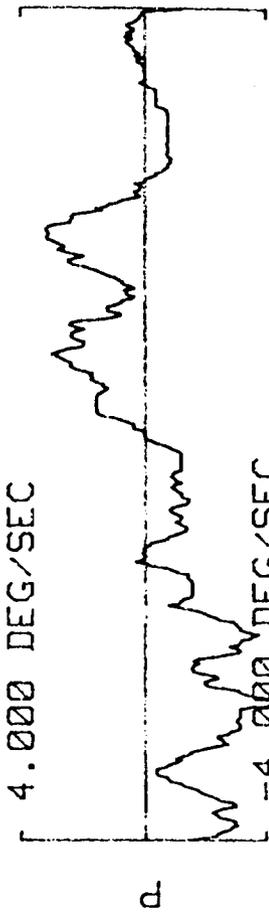
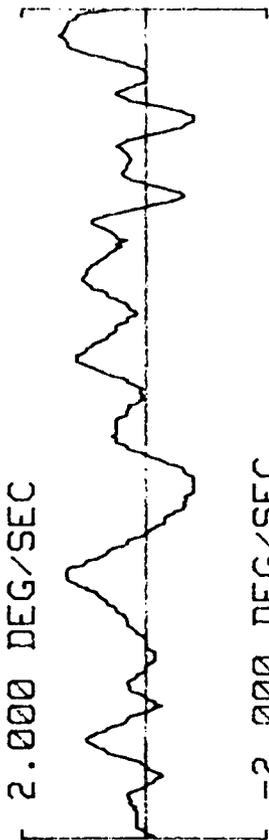
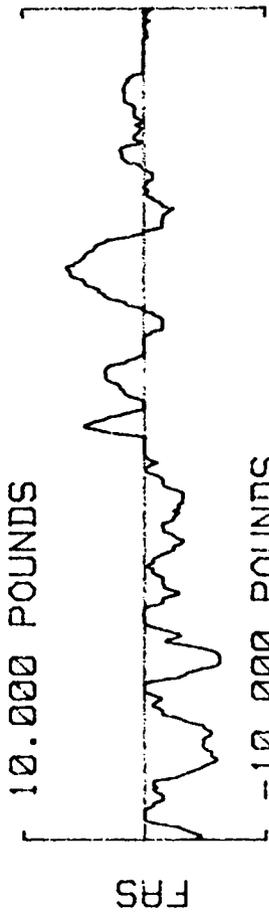
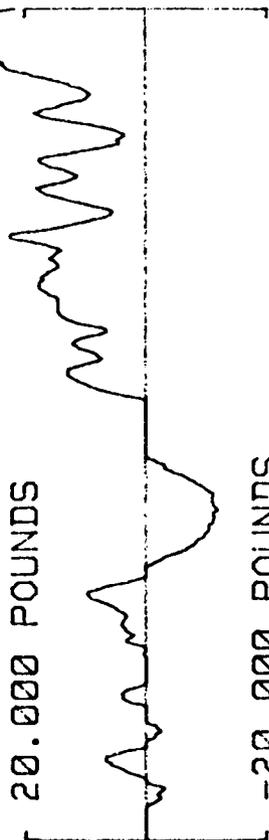


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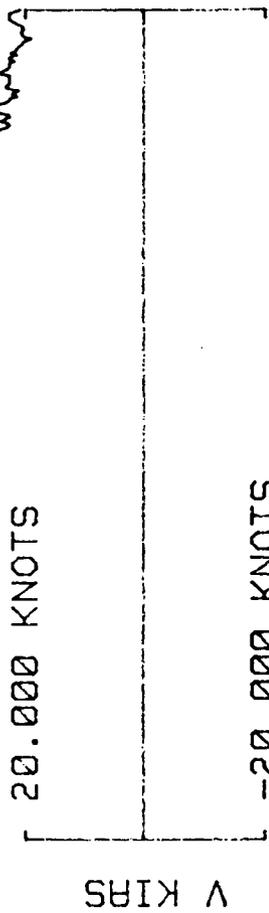
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CONF 23



E-42



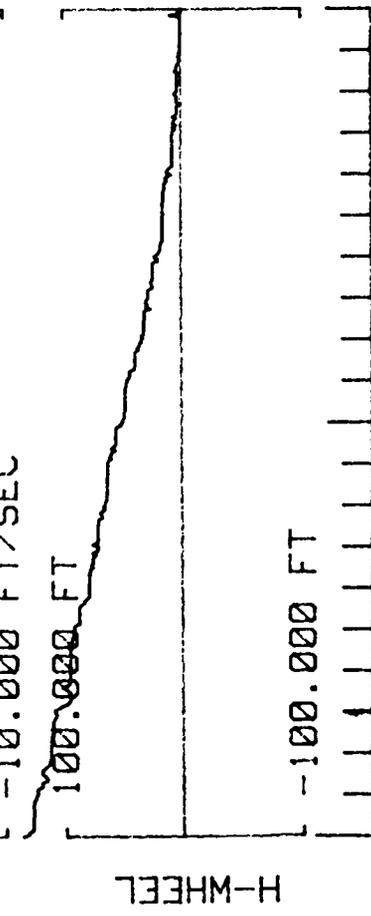
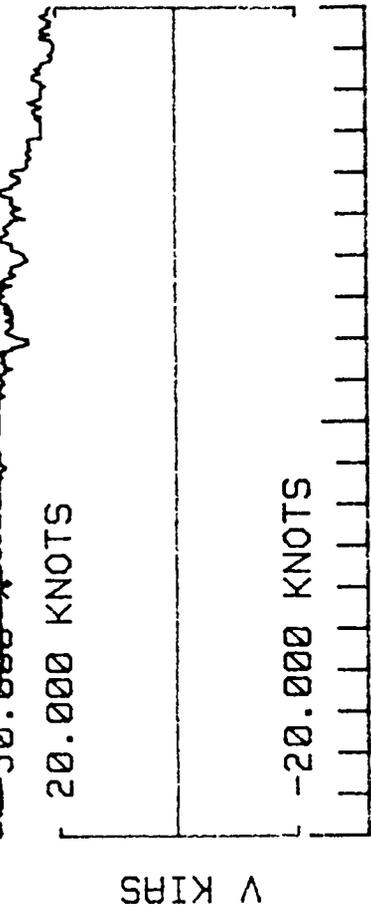
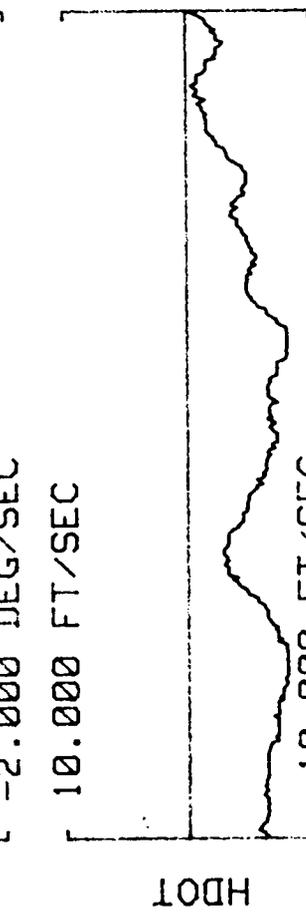
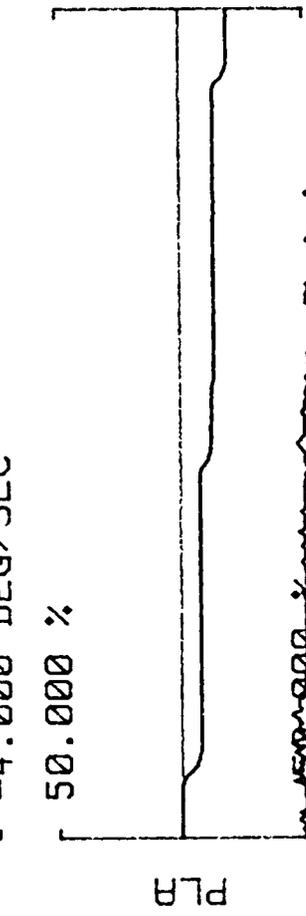
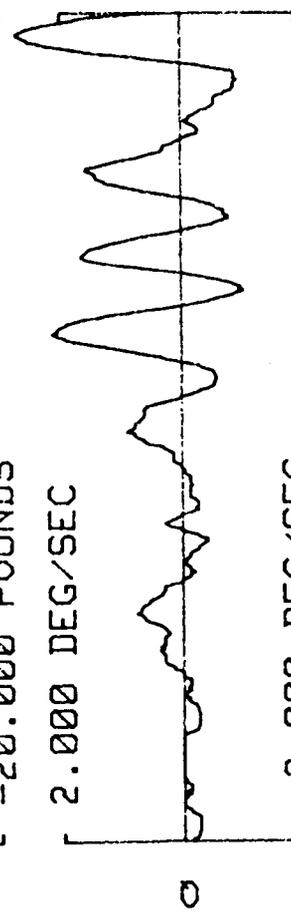
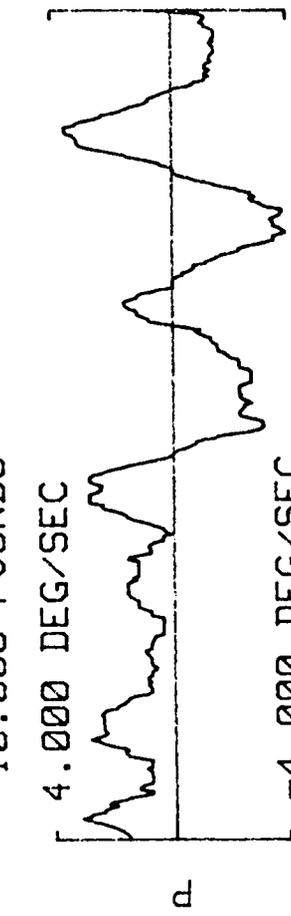
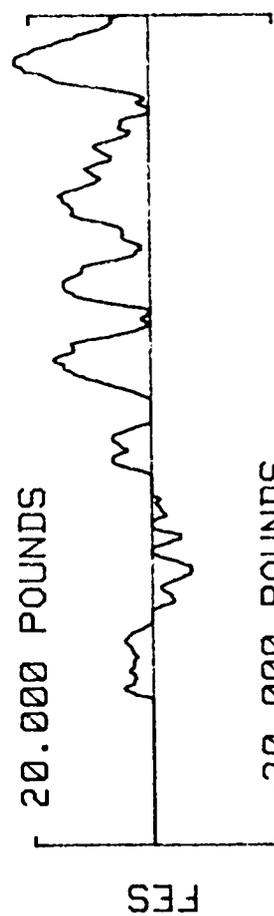
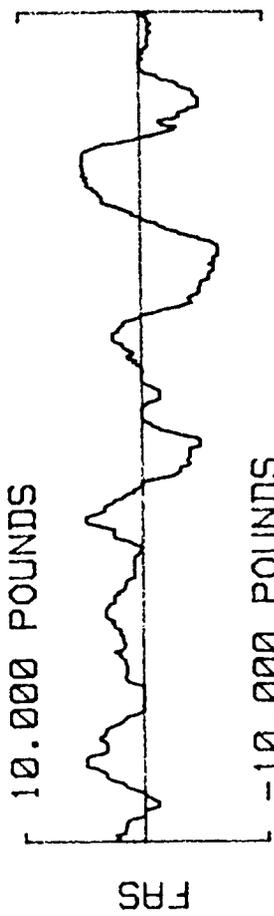
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CONF 22

APP 5

FLT 895



FLT 895

APP 6

CONF 22

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10.000 POUNDS

FES

FPS

-20.000 POUNDS

-10.000 POUNDS

2.000 DEG/SEC

4.000 DEG/SEC

0

0

-2.000 DEG/SEC

-4.000 DEG/SEC

10.000 FT/SEC

50.000 %

HDOT

PLB

-10.000 FT/SEC

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20.000 KNOTS

H-WHEEL

V KIRS

-100.000 FT

-20.000 KNOTS

10

20

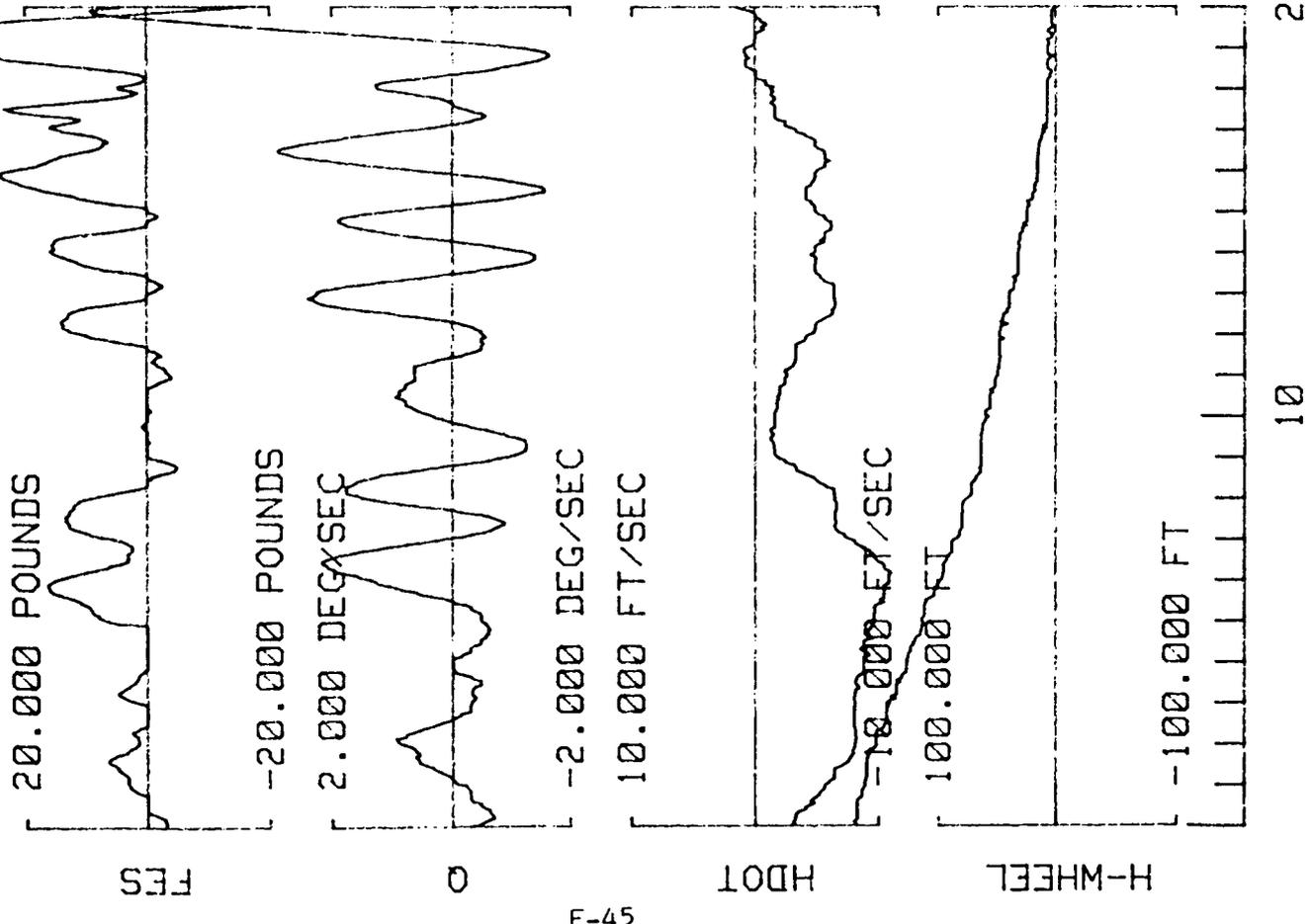
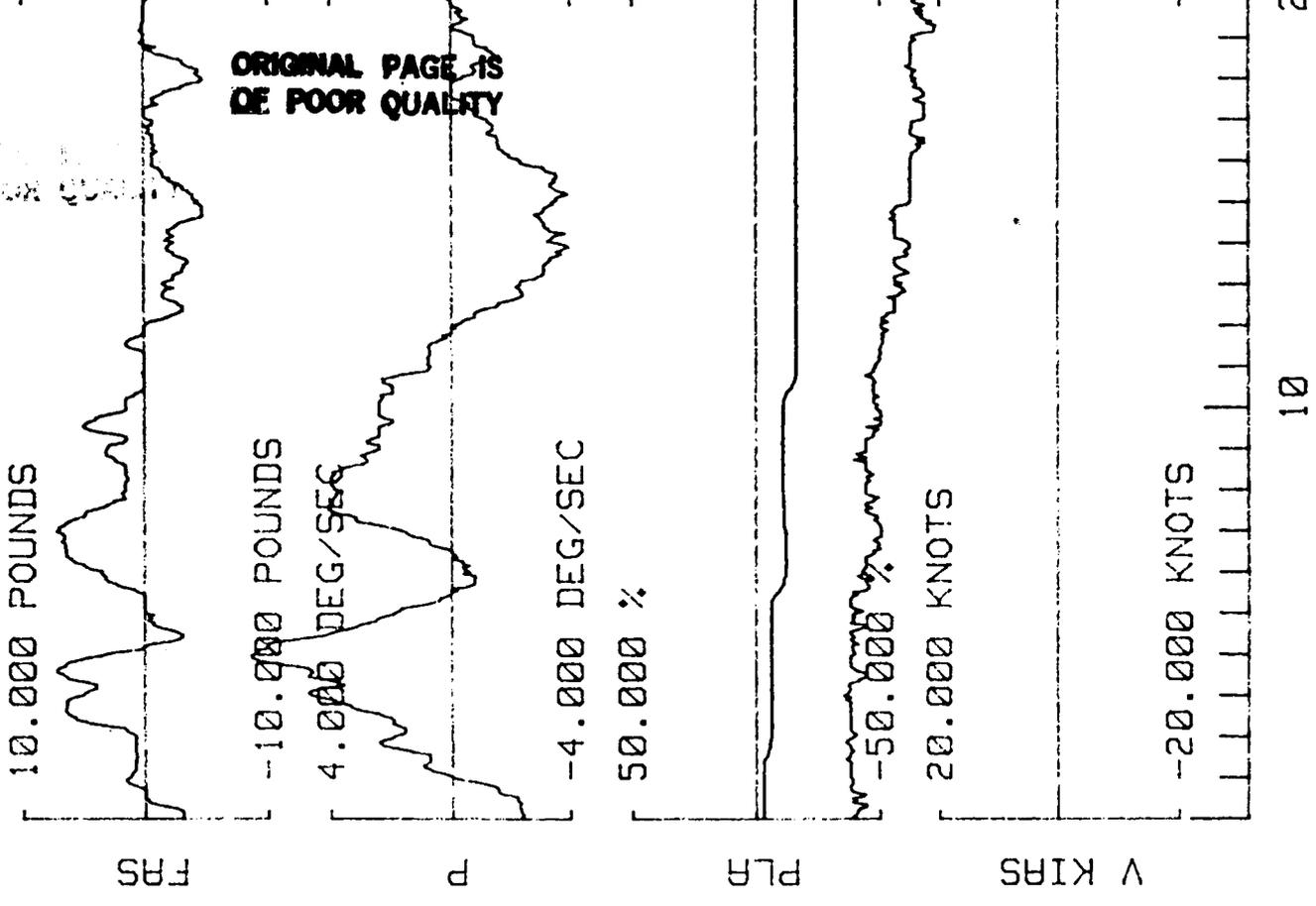
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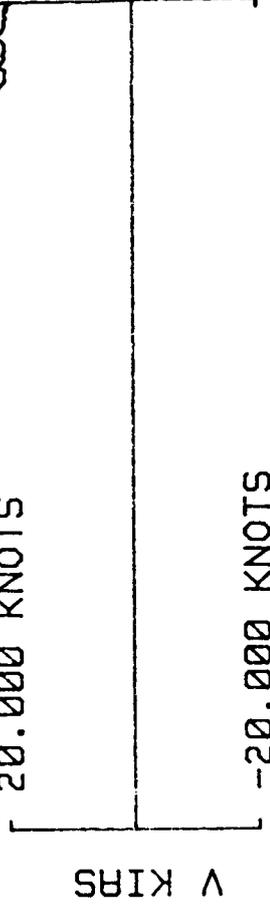
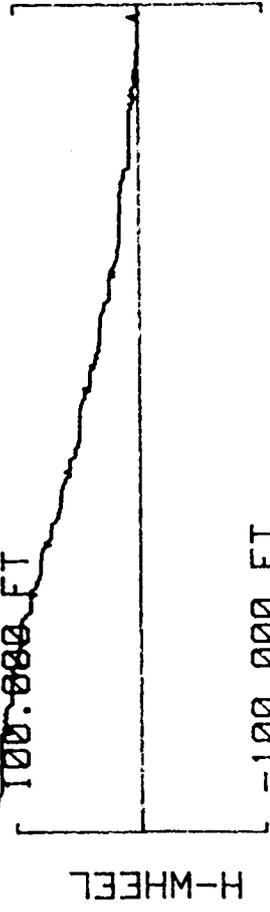
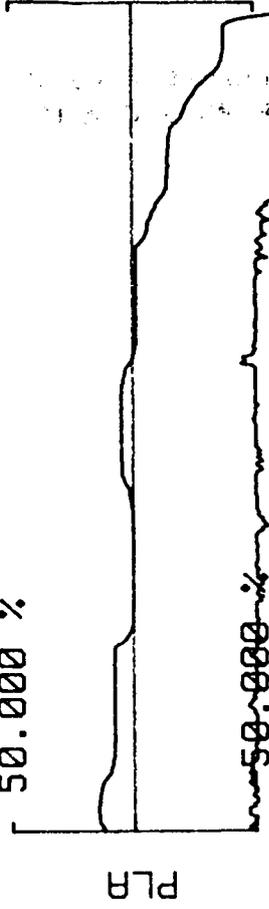
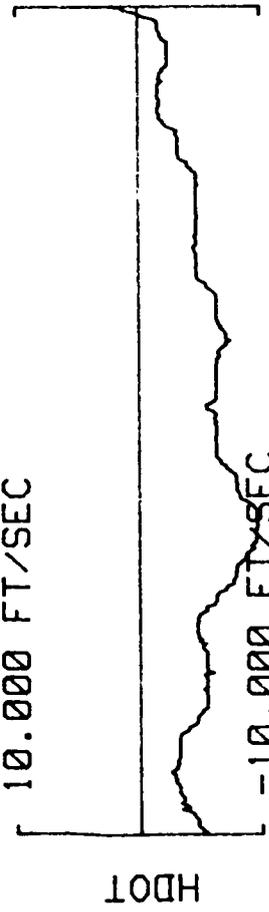
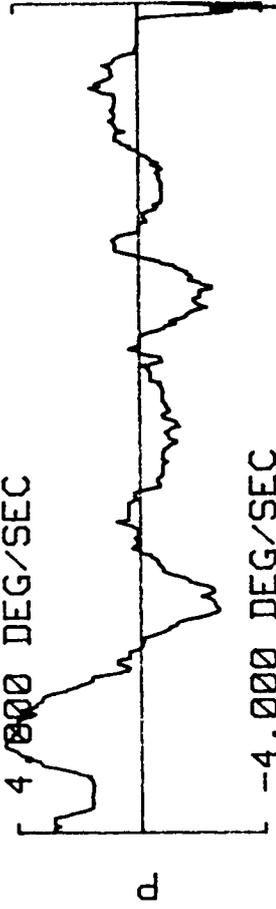
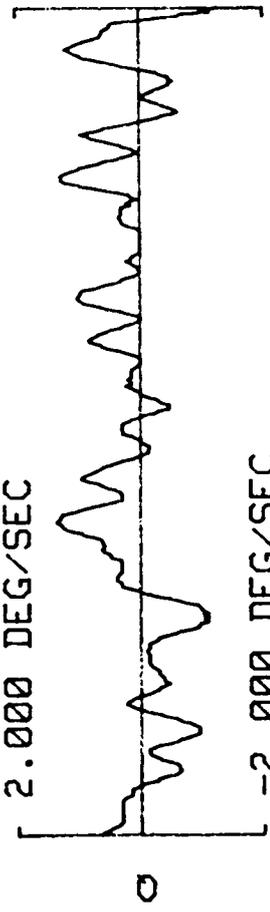
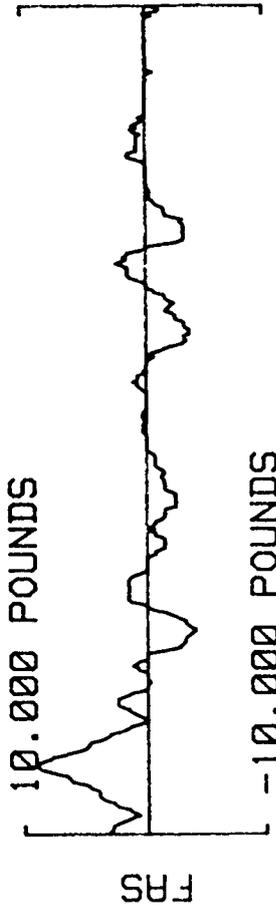
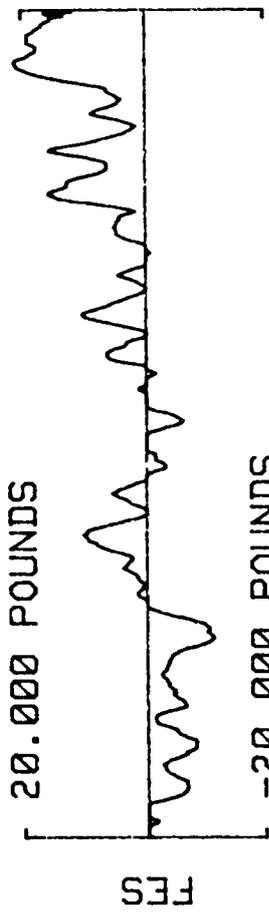
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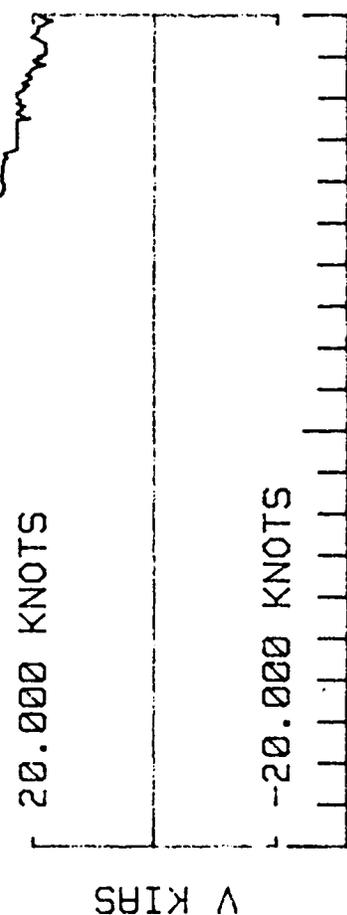
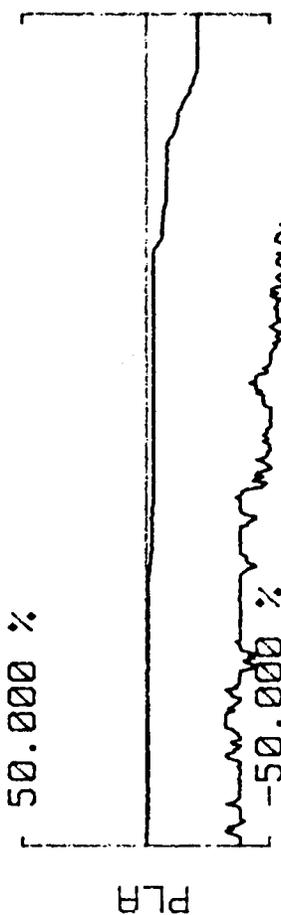
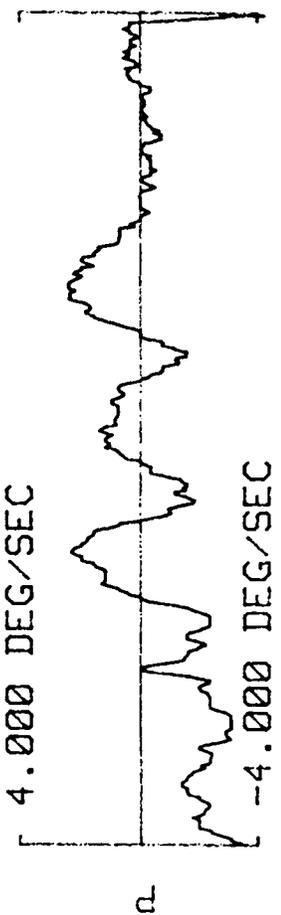
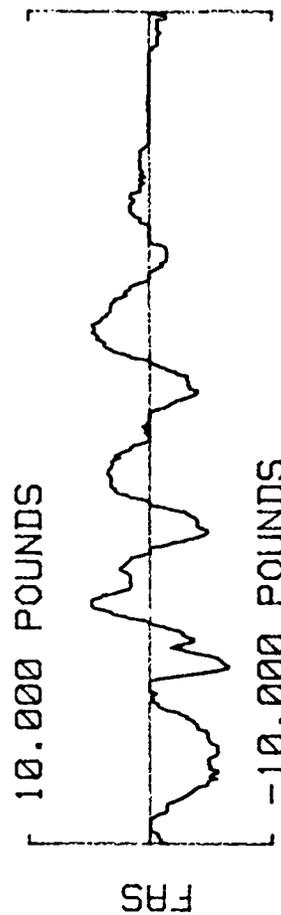
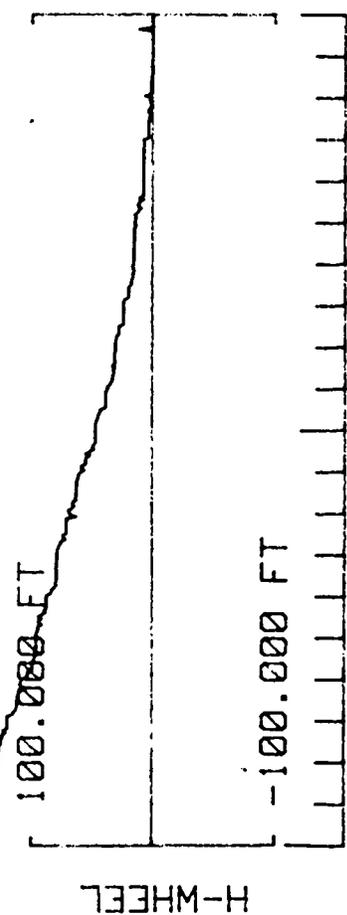
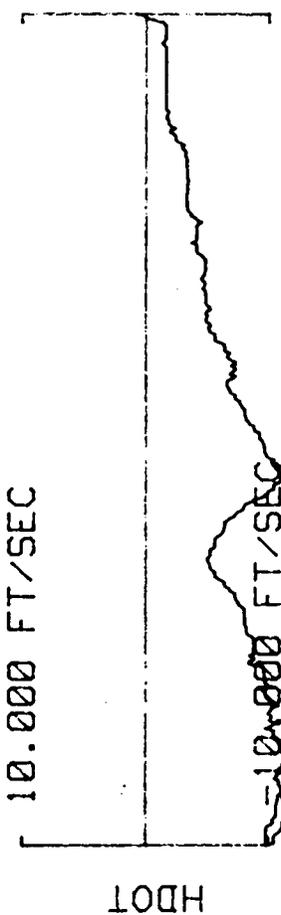
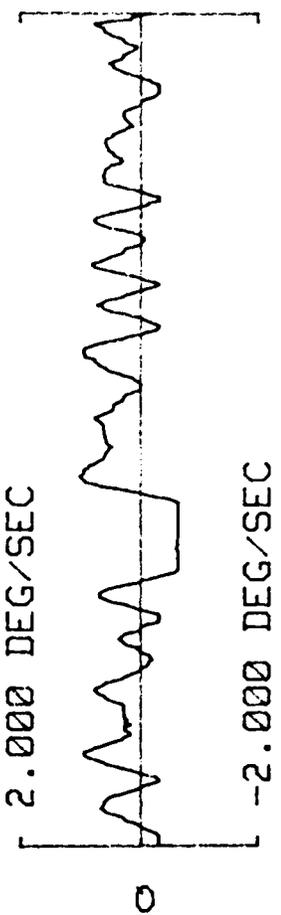
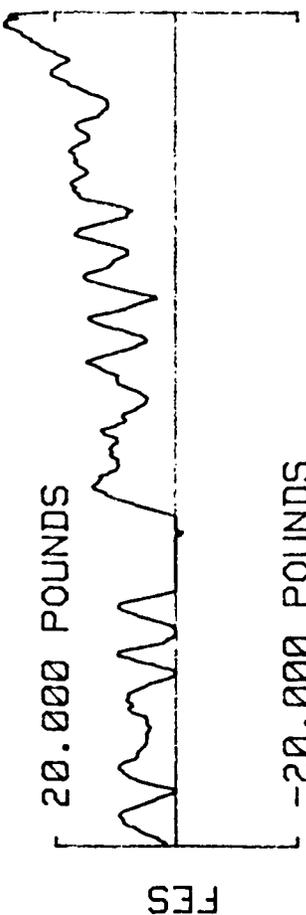
CONF 22

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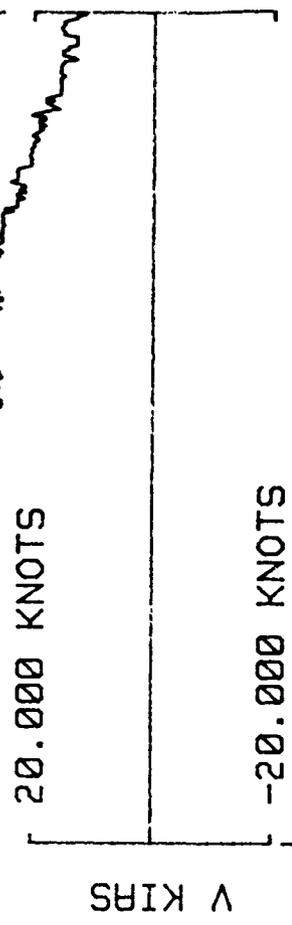
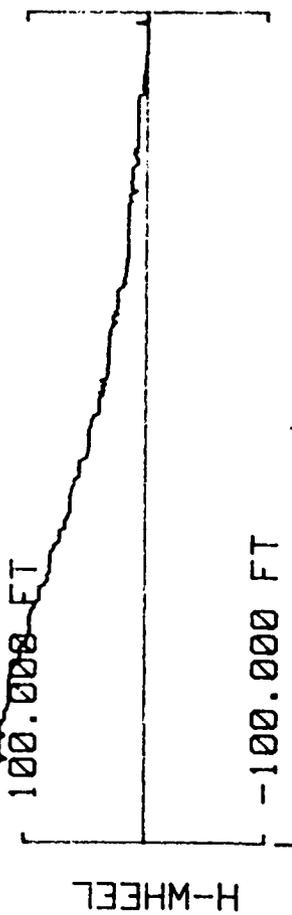
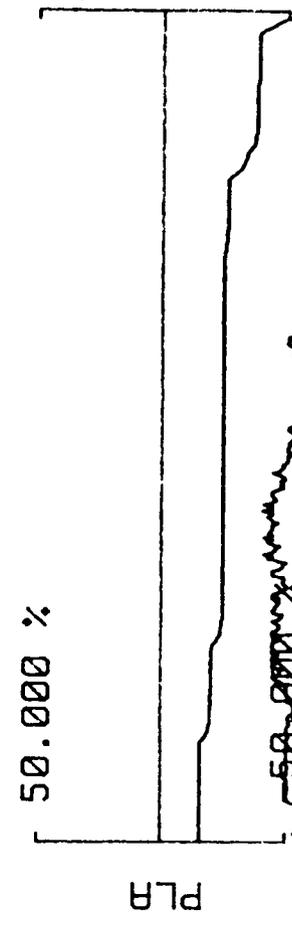
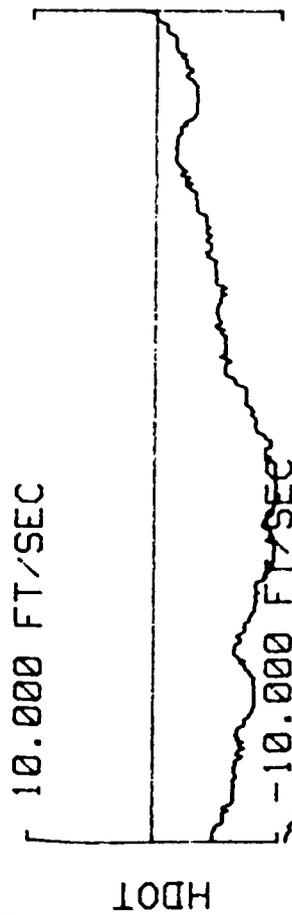
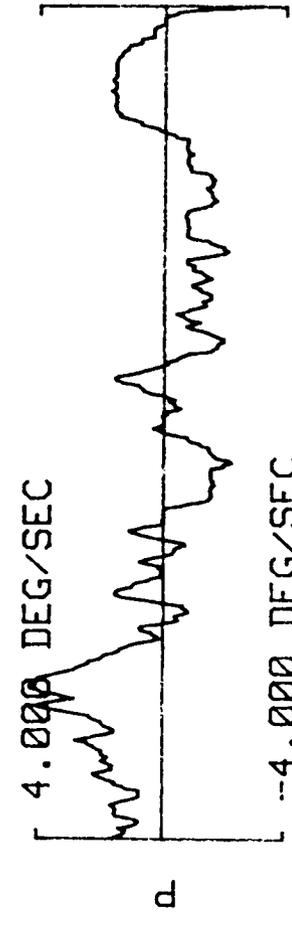
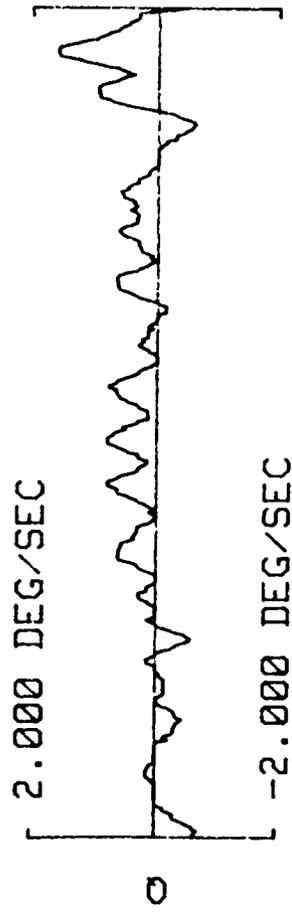
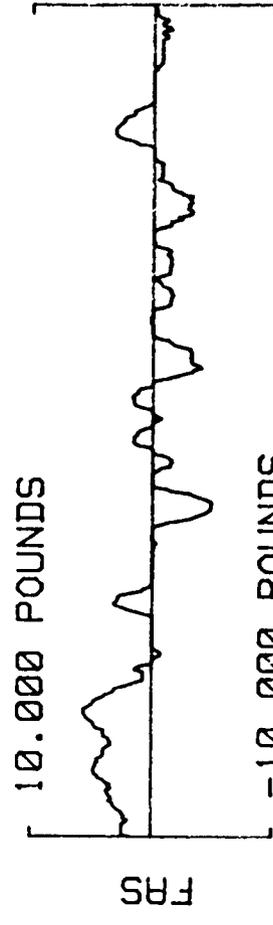
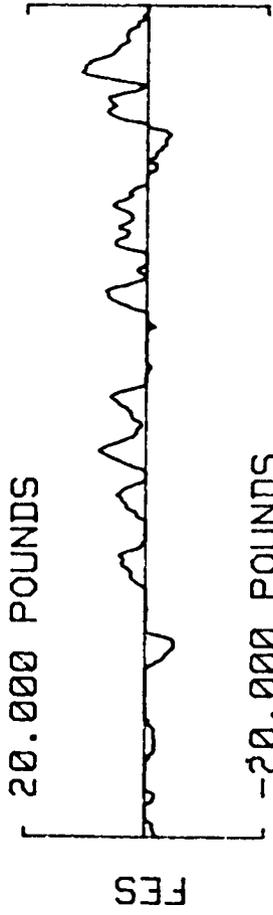




FLT 895 APP 10 CONF 4

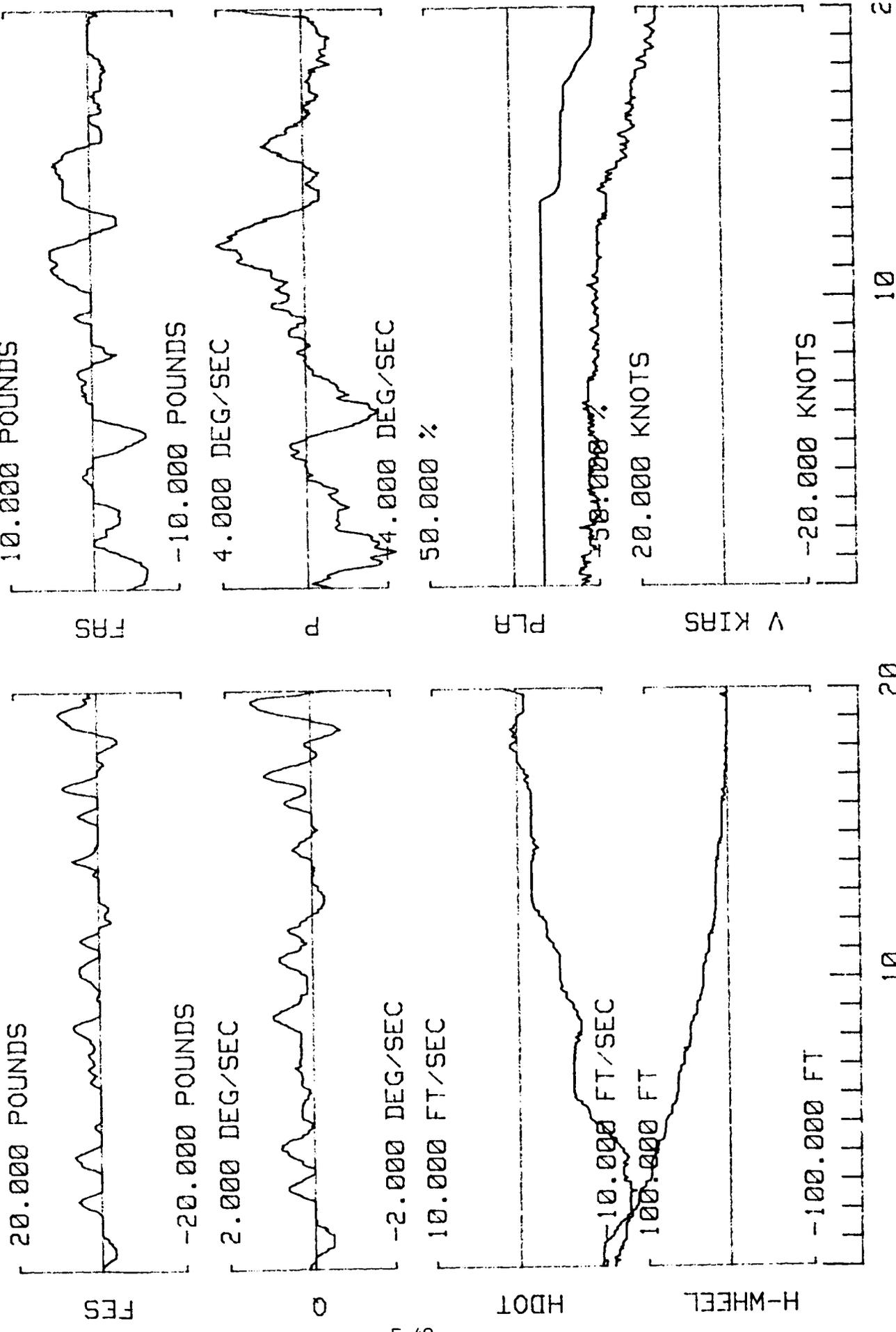


FLT 895 APP 11 CONF 6



10 20 10 20

FLT 895 APP 12 CONF 6

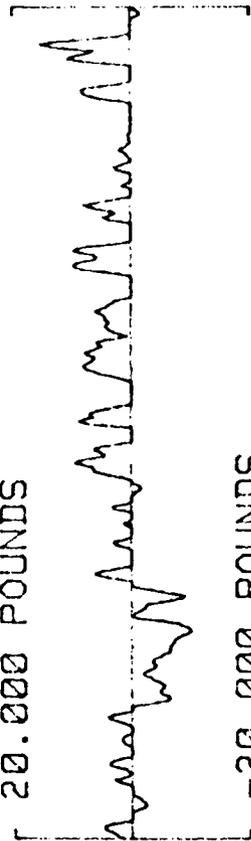


FLT 896

RPP 1

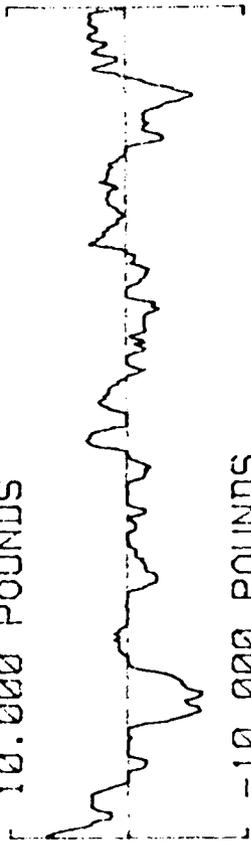
CONF 3

20.000 POUNDS



FBS

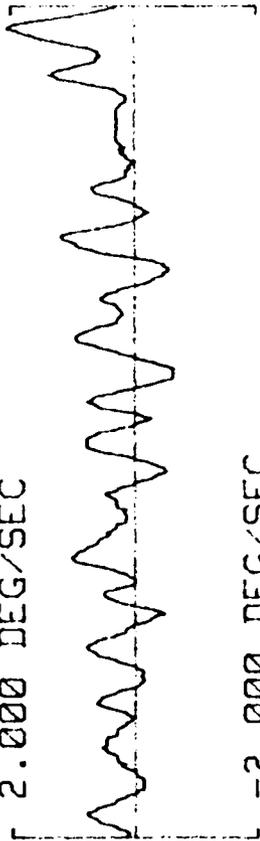
10.000 POUNDS



FBS

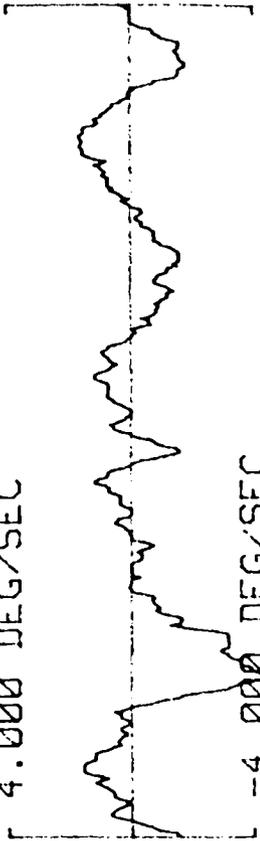
-20.000 POUNDS

2.000 DEG/SEC



Q

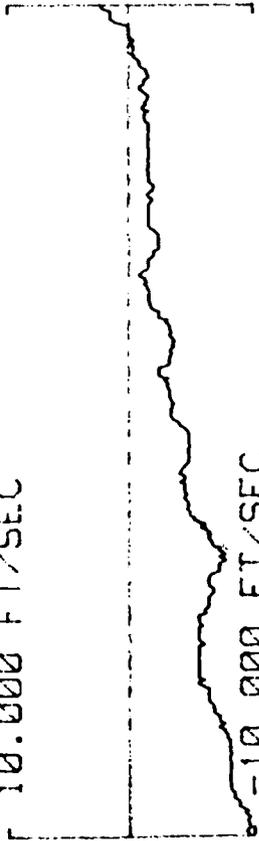
4.000 DEG/SEC



Q

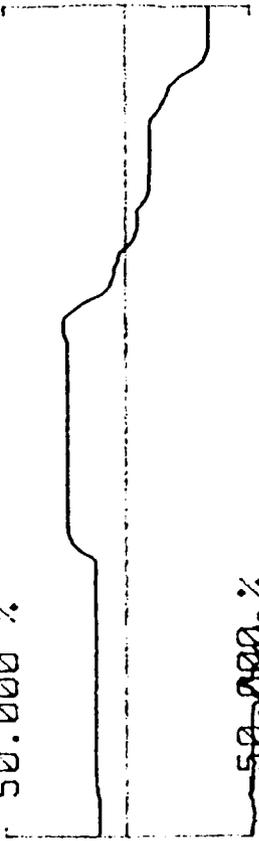
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10.000 FT/SEC



HDOT

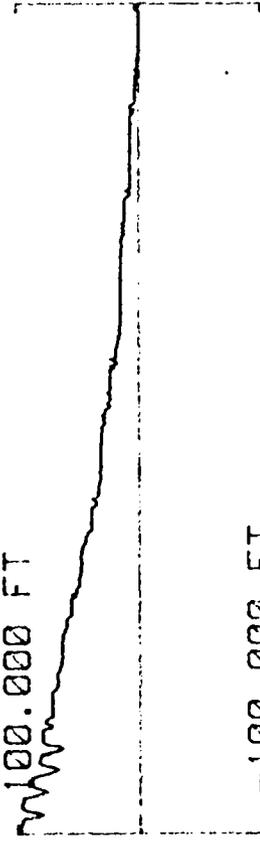
50.000 %



PLP

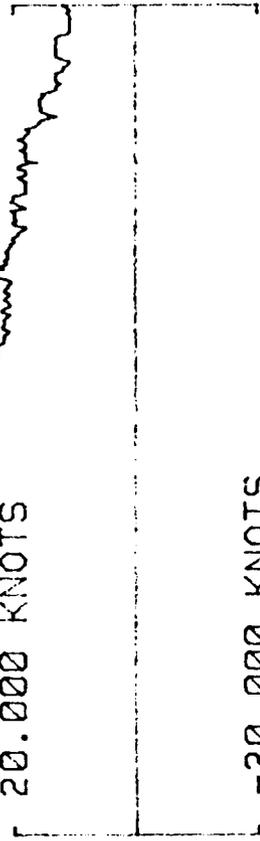
-10.000 FT/SEC

100.000 FT



H-WHEEL

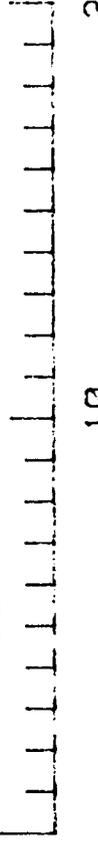
20.000 KNOTS



V KIRS

-100.000 FT

-20.000 KNOTS



-20.000 KNOTS

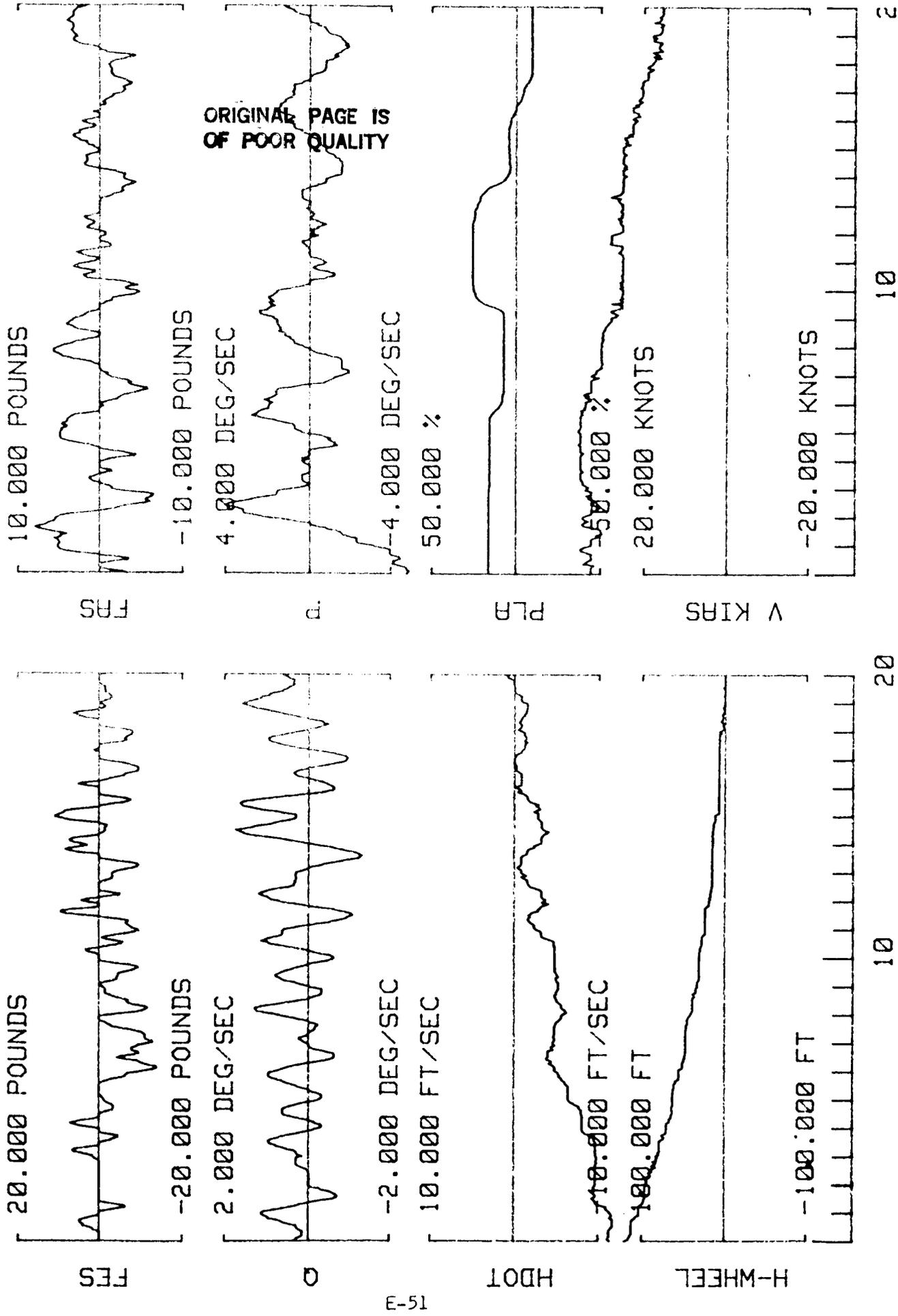
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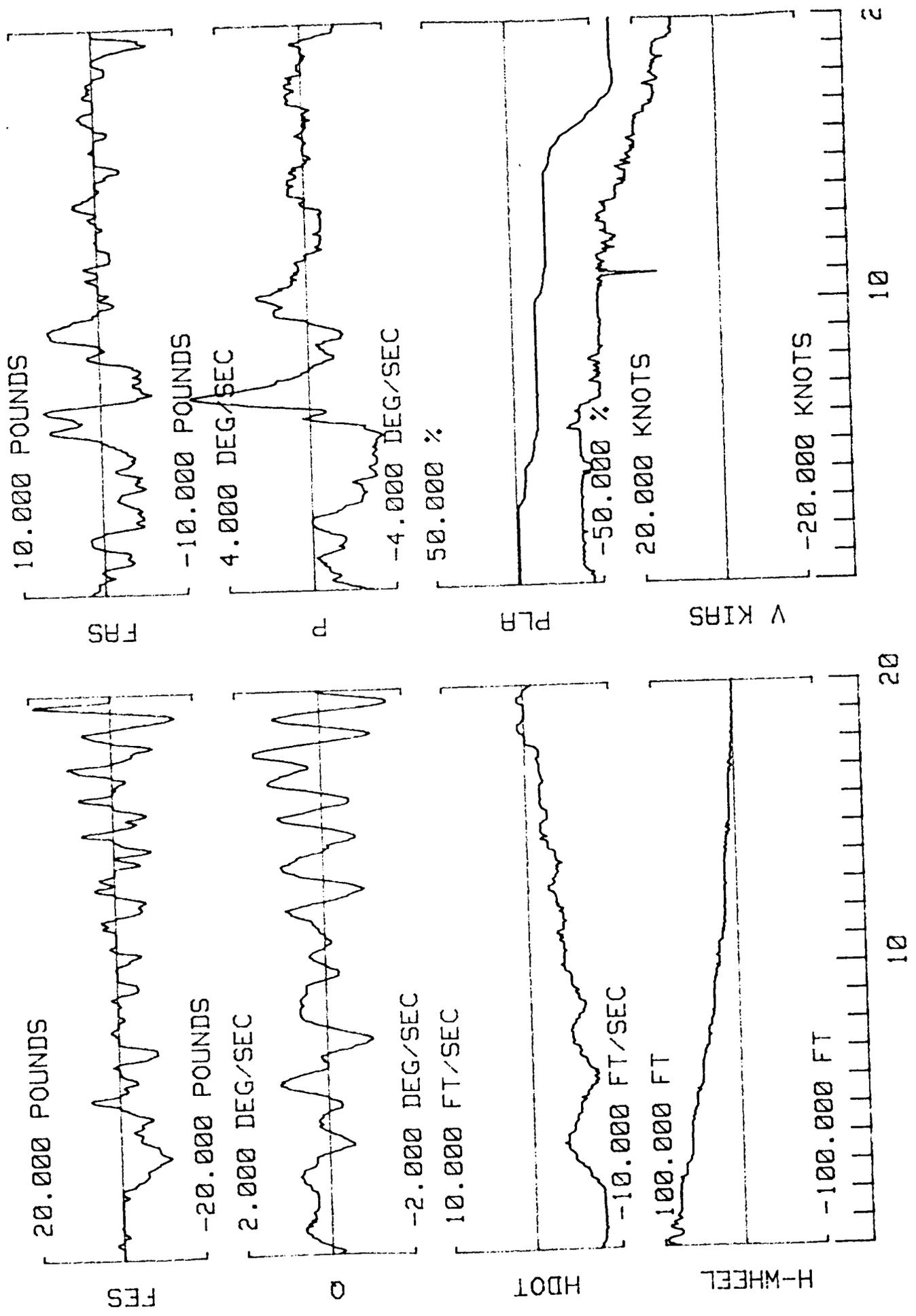
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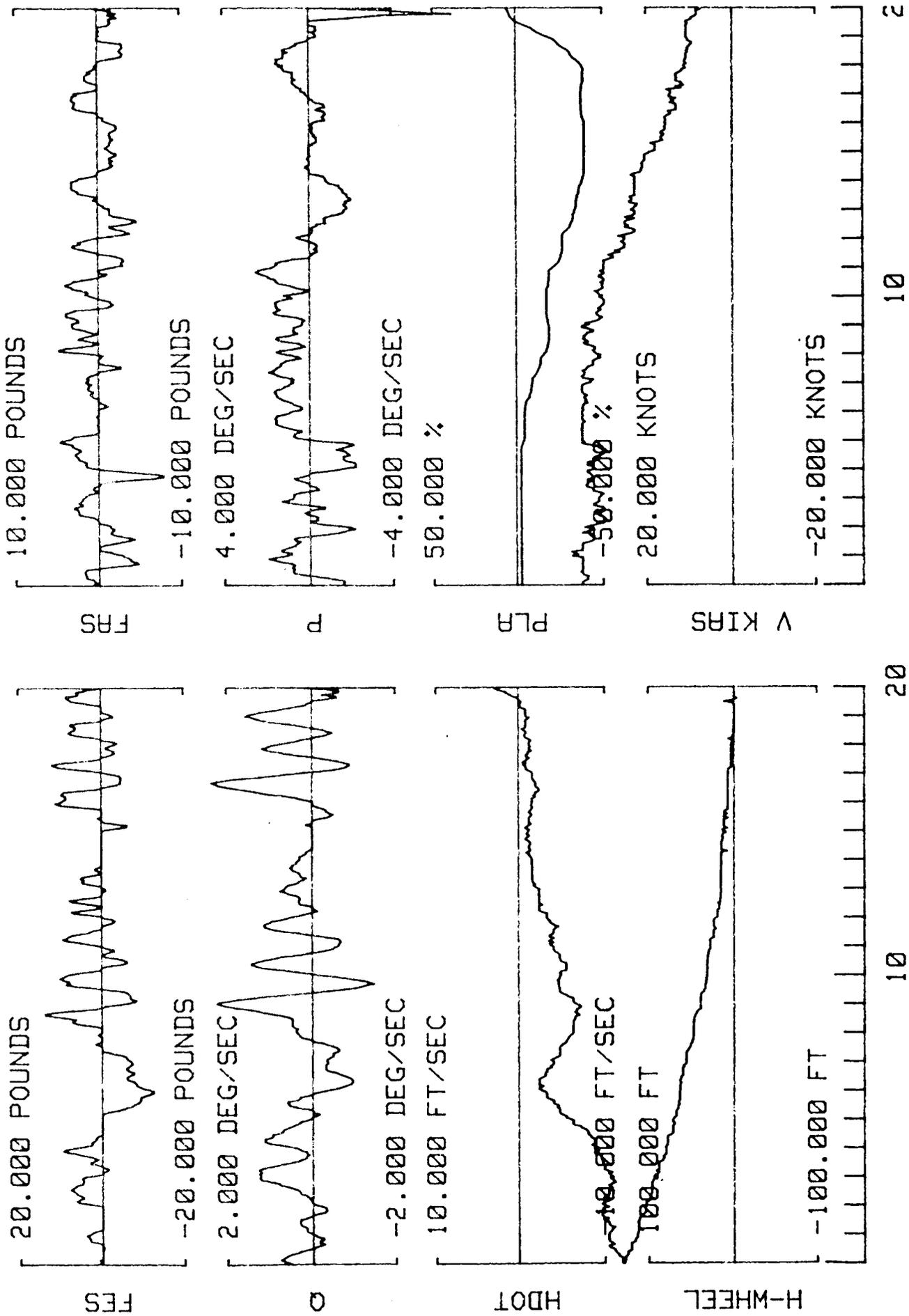
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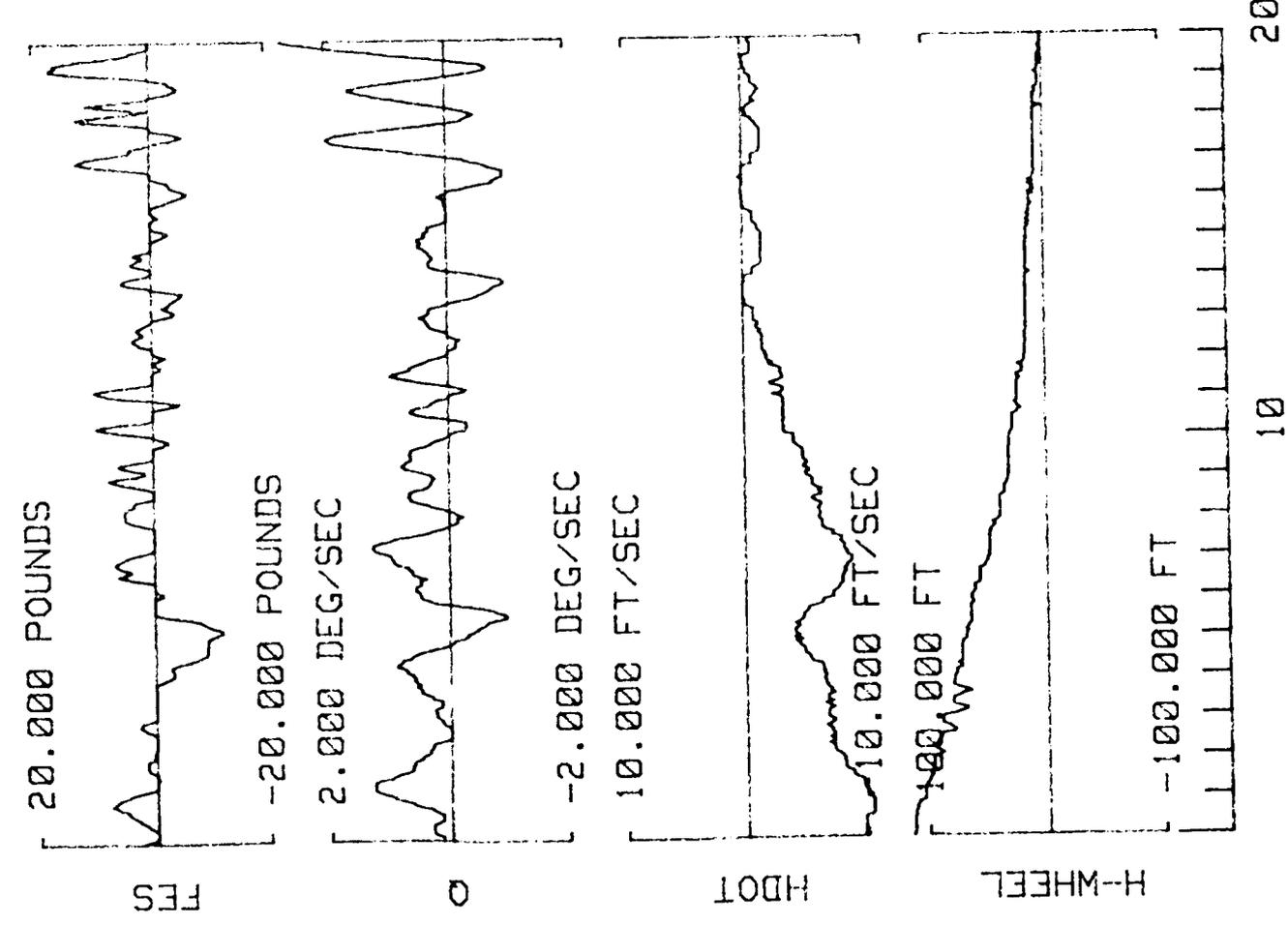
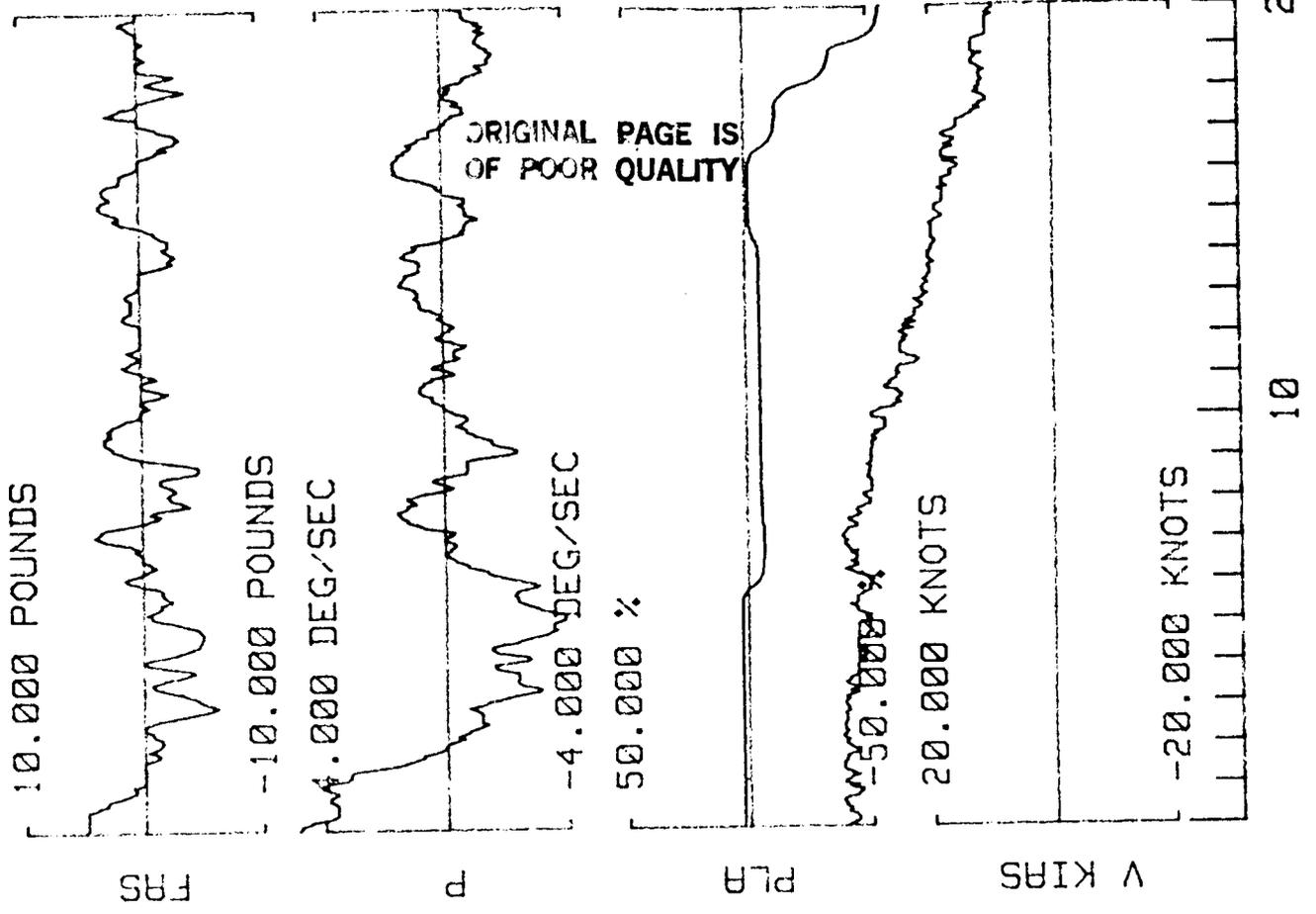
FLT 896 APP 2 CONF 3





FLT 896 APP 4 CONF 7

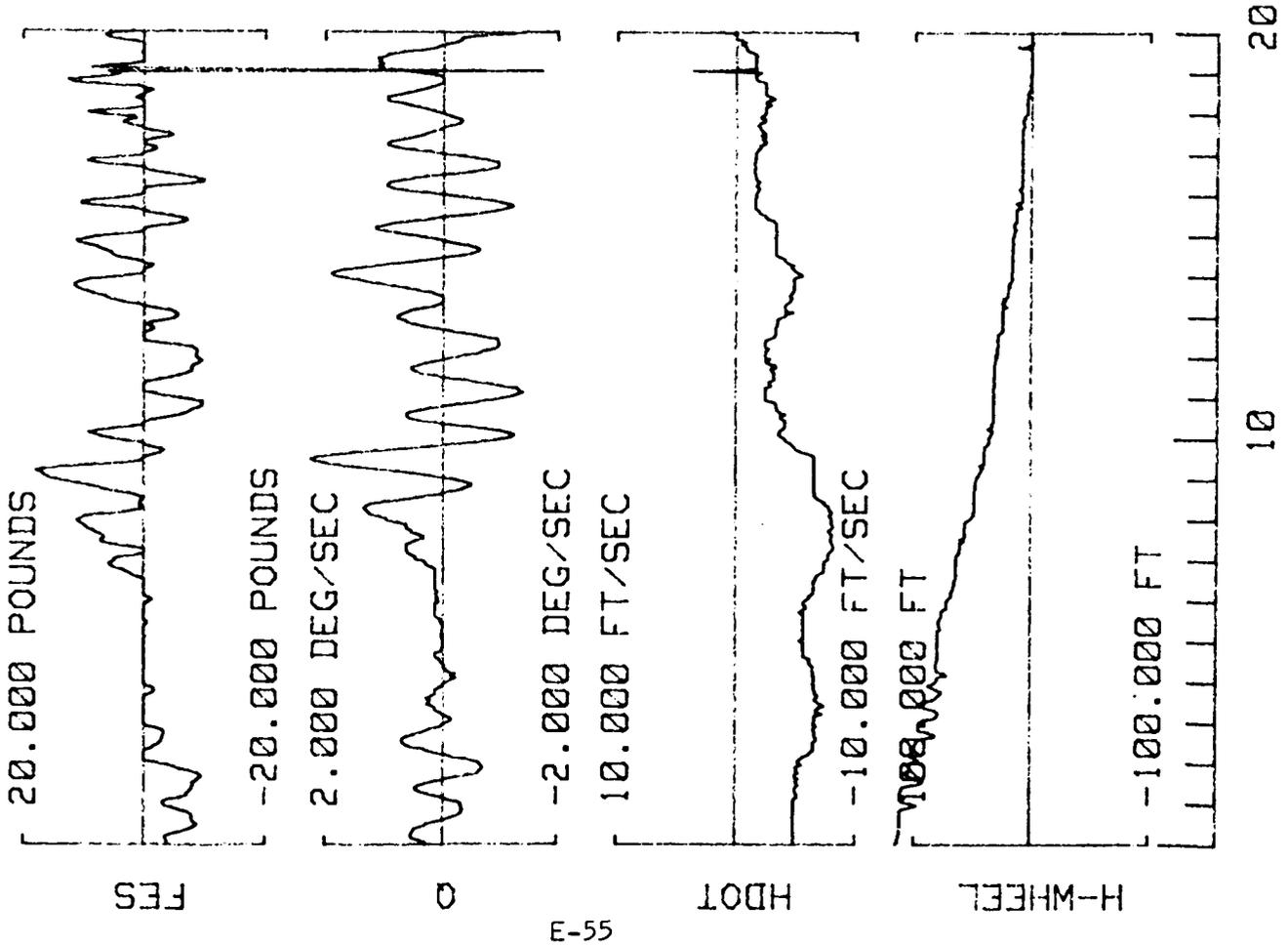
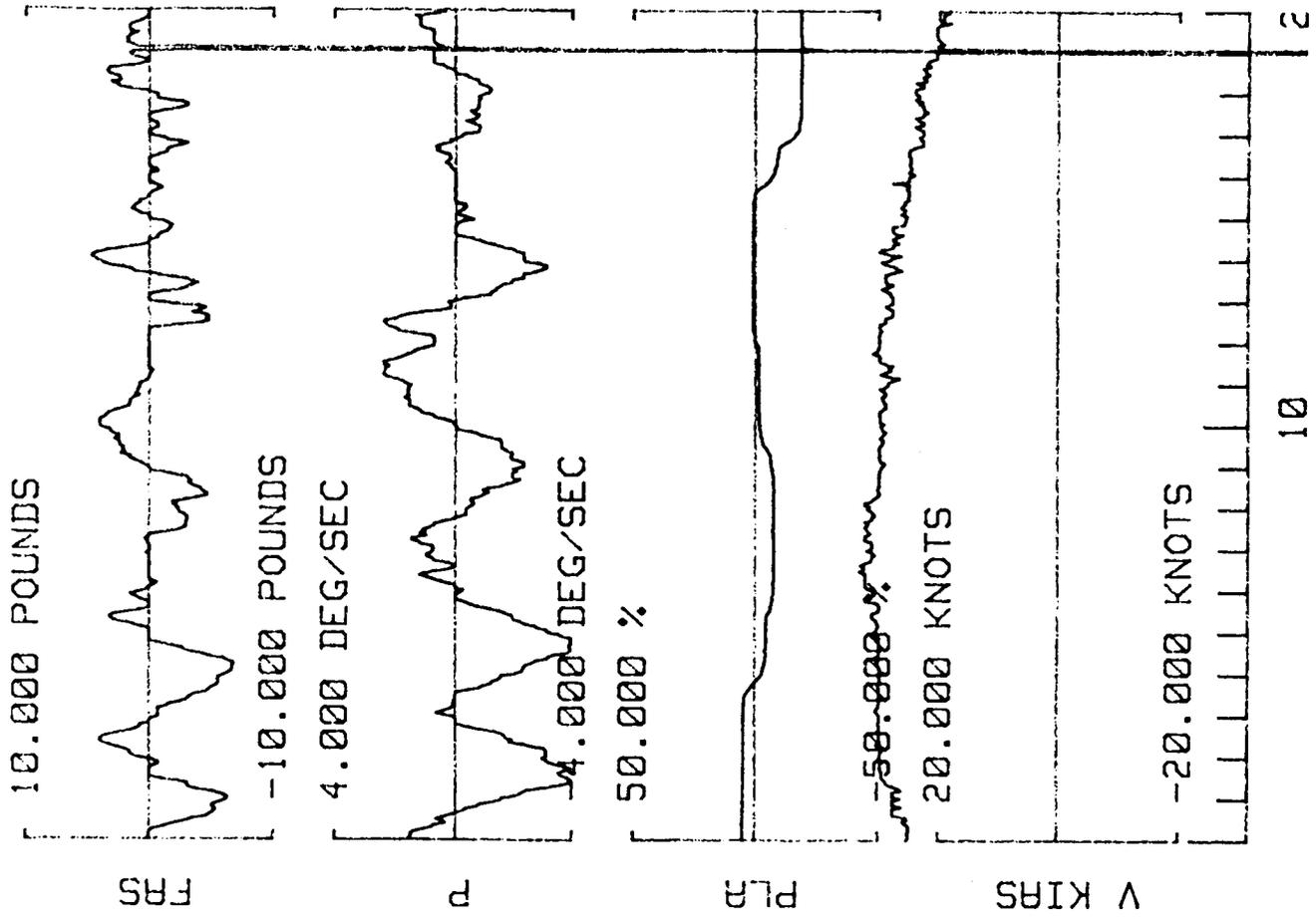




CONF 17+L/L

APP 6

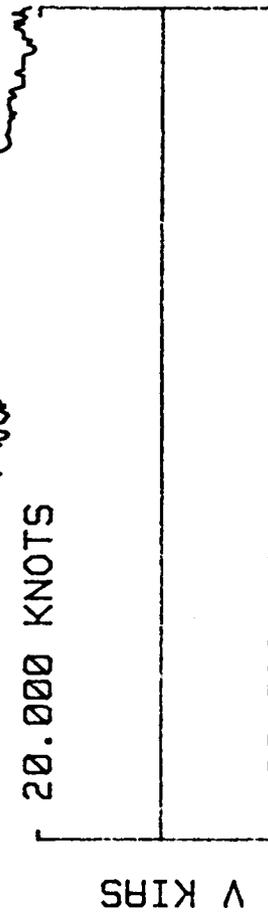
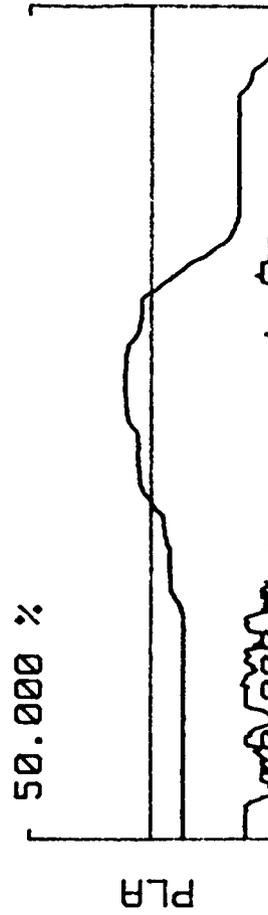
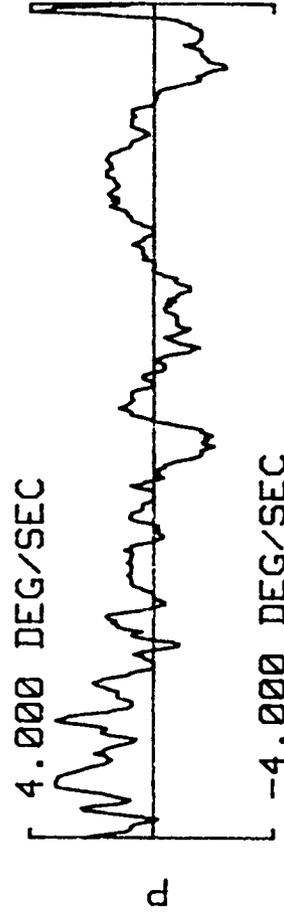
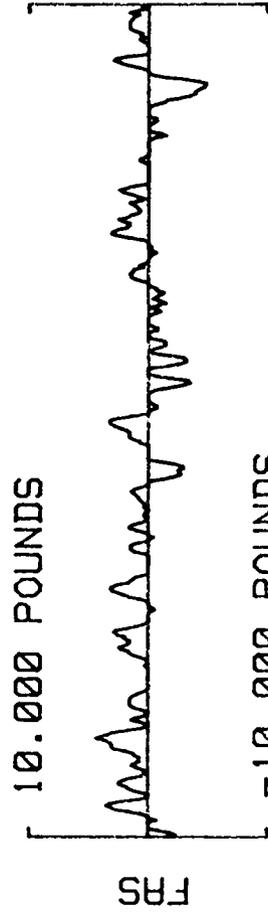
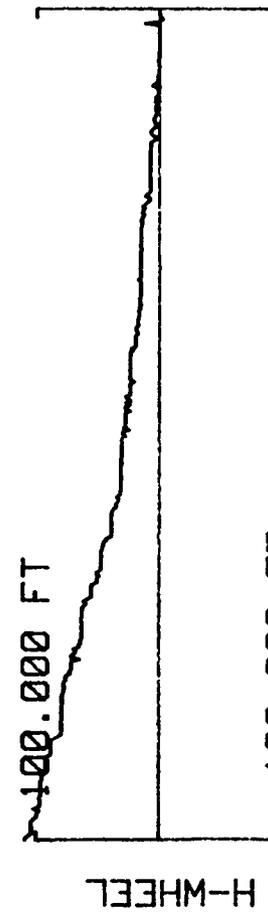
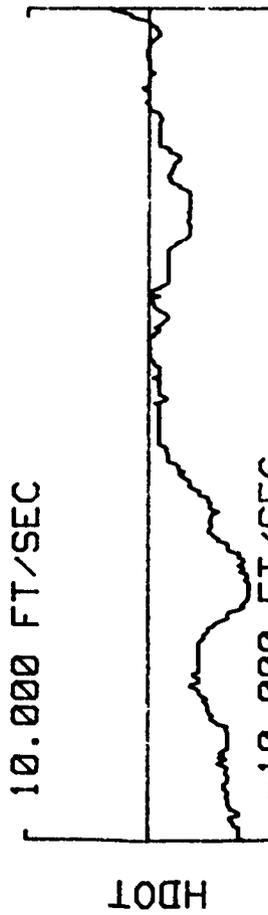
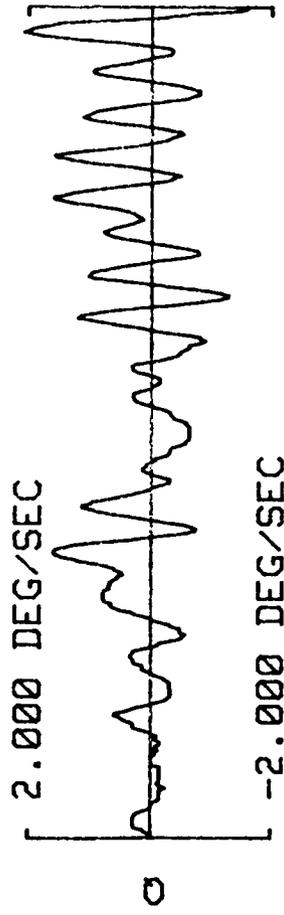
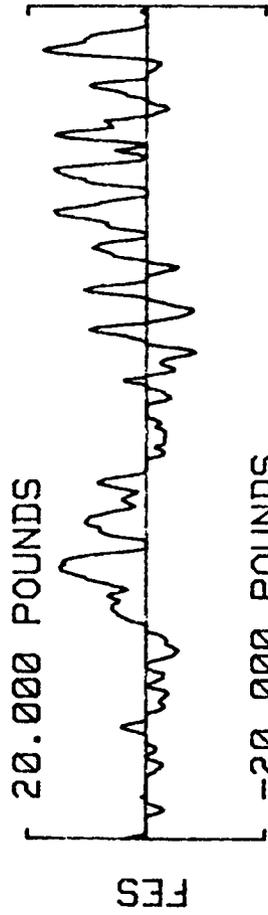
FLT 896



FLT 896

APP 7

CONF 17+L/L



9-56

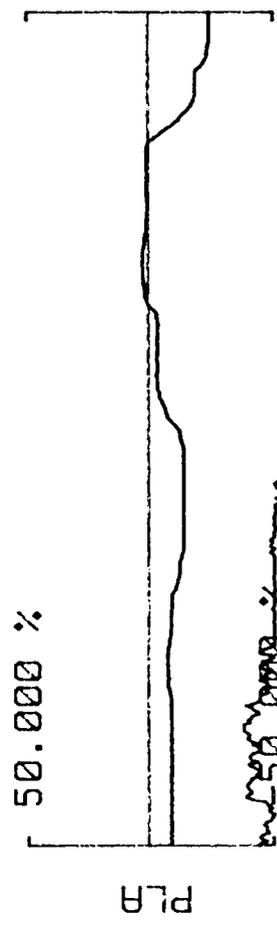
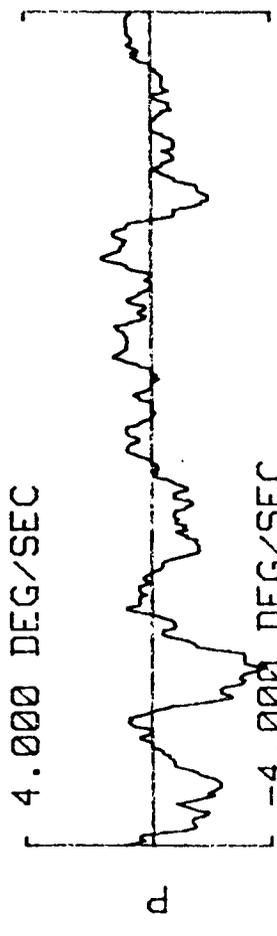
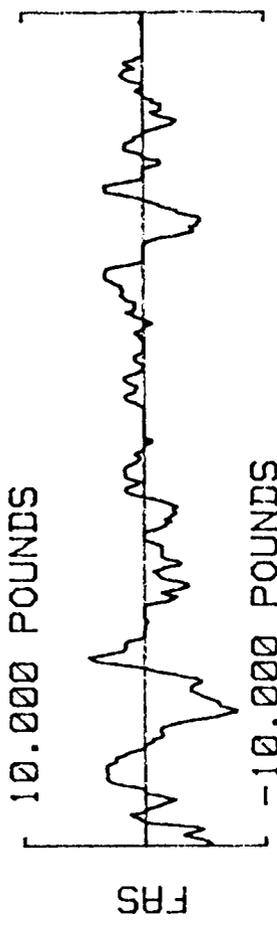
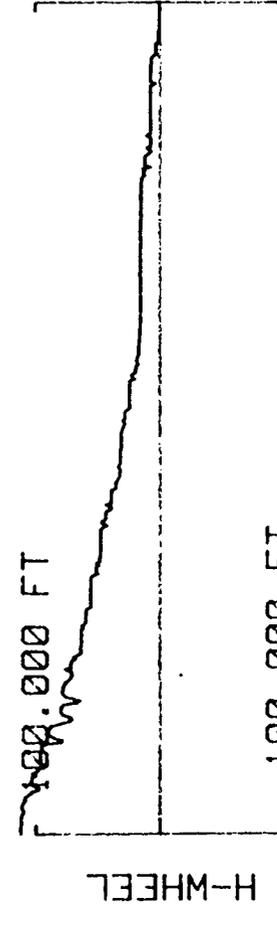
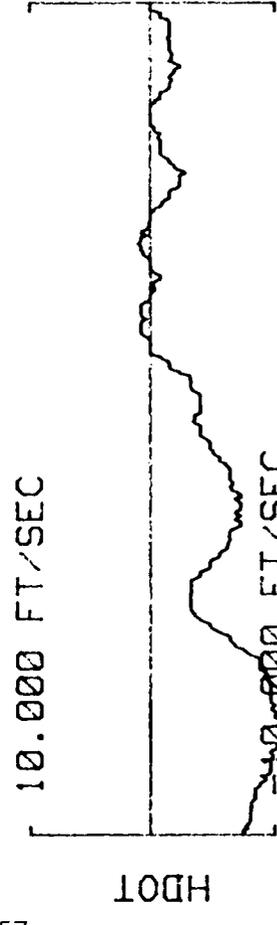
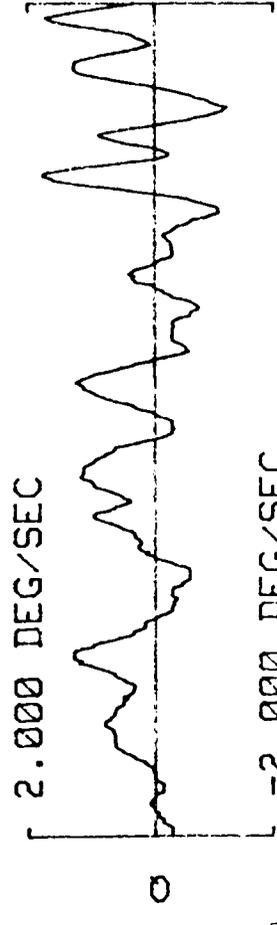
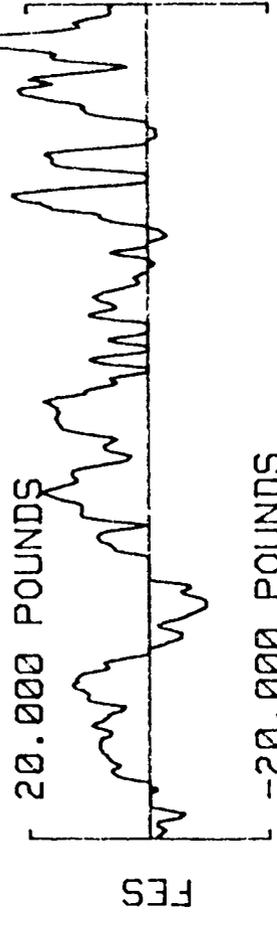
10 20

10 20

FLT 896

APP 8

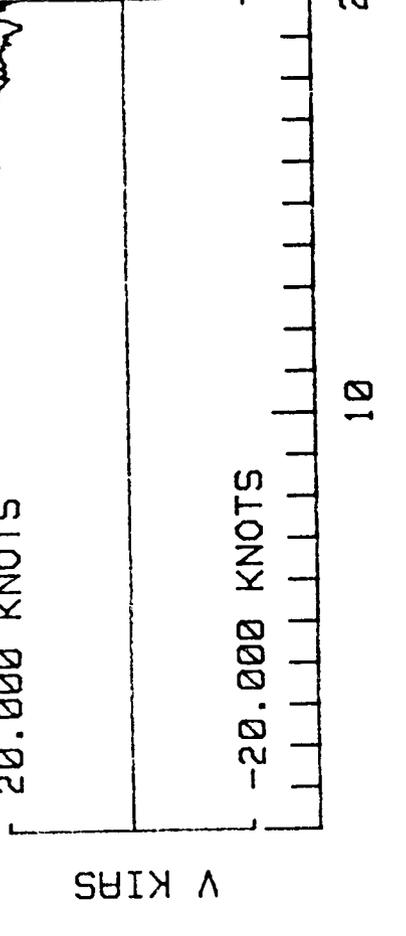
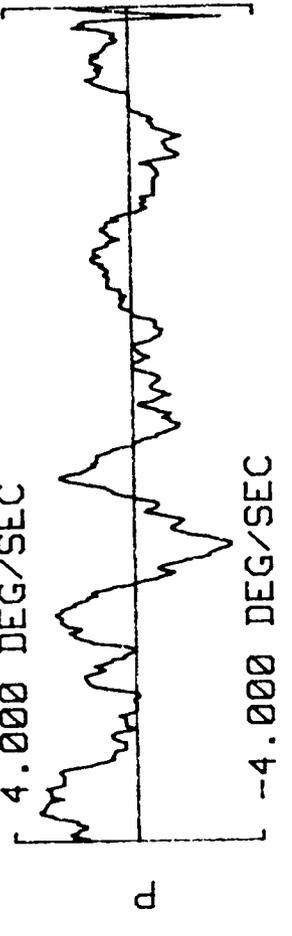
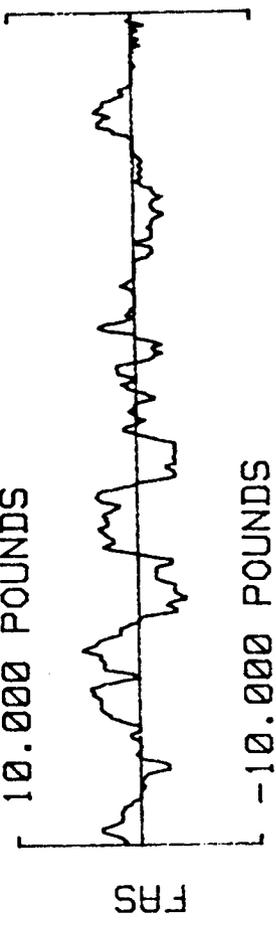
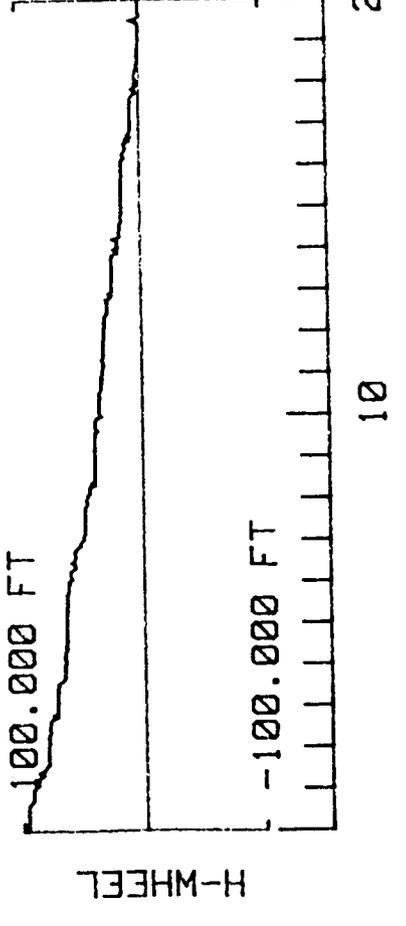
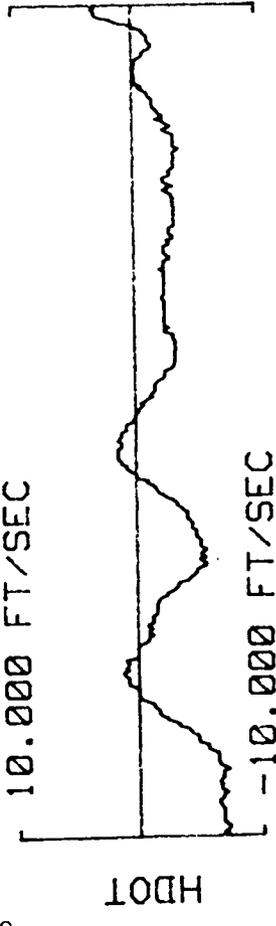
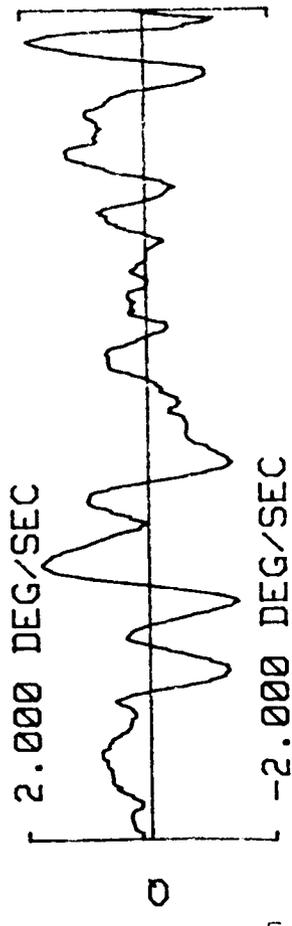
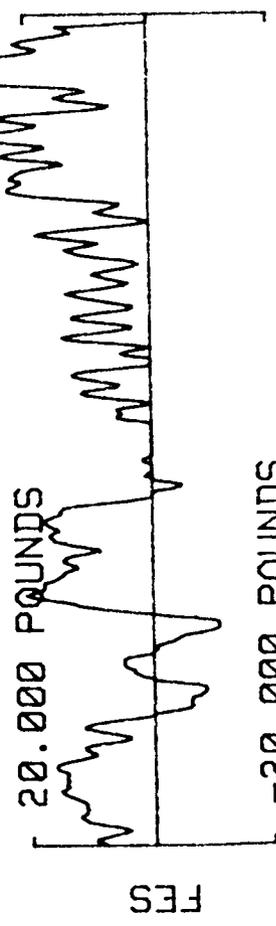
CONF 24



FLT 896

APP 9

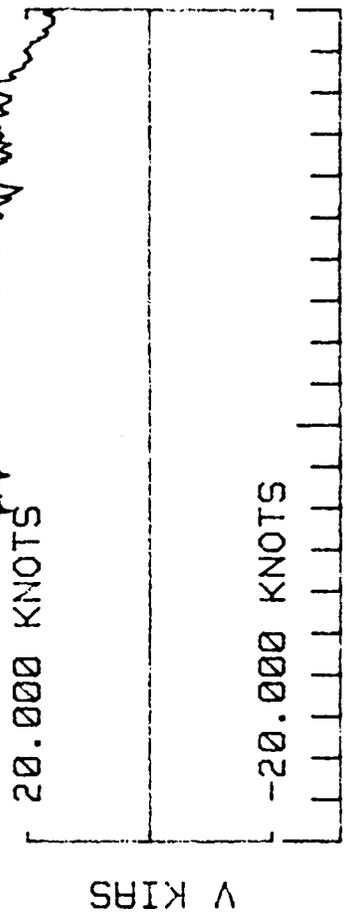
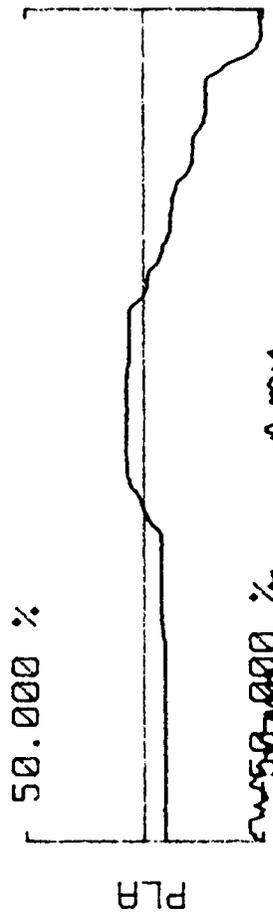
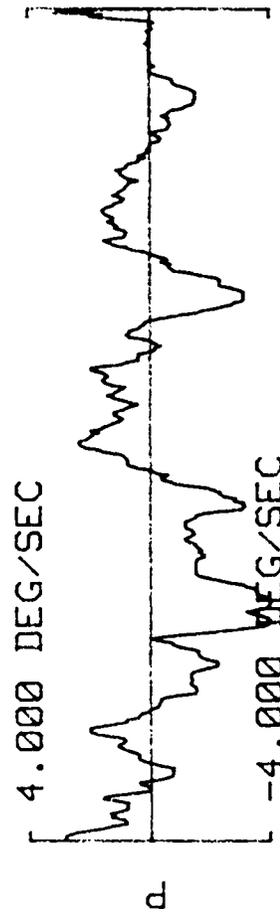
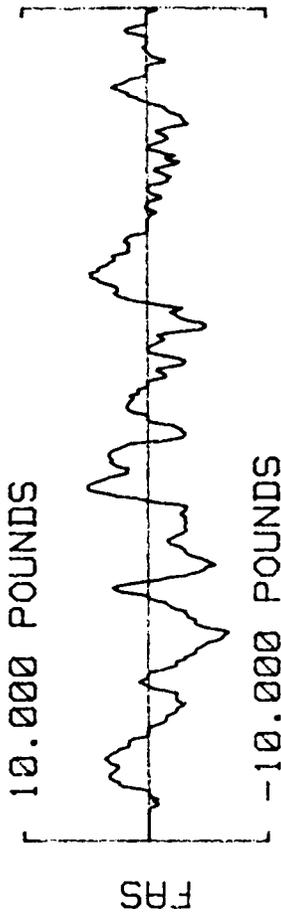
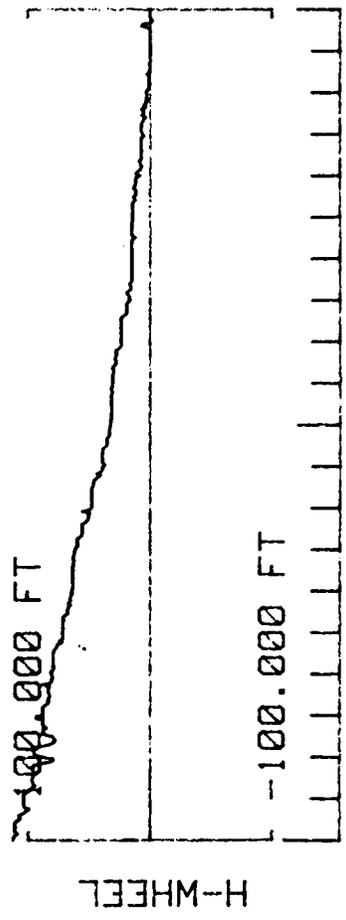
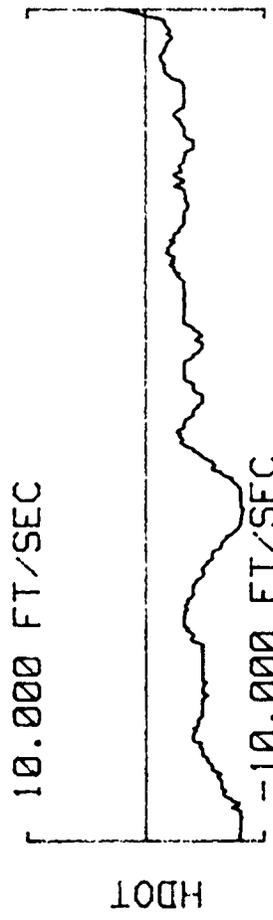
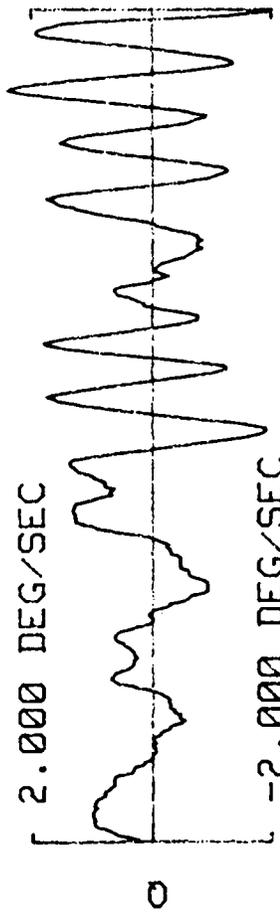
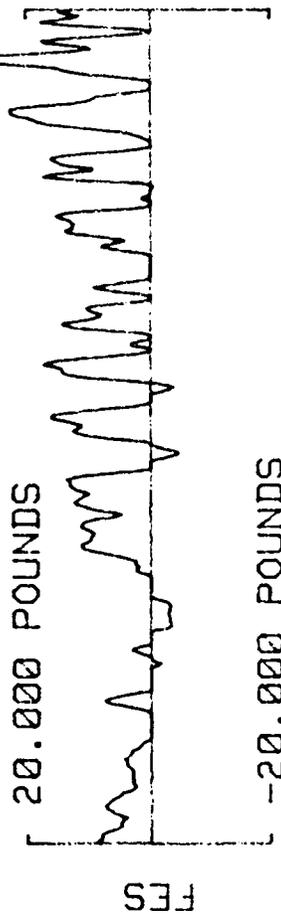
CONF 24



FLT 897

APP 1

CONF 21



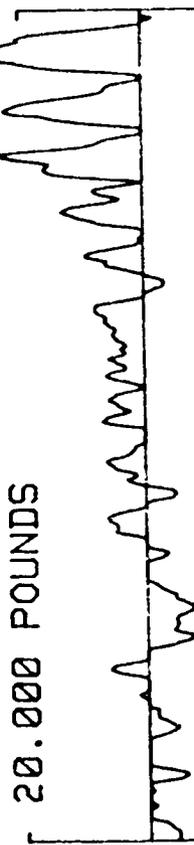
FLT 897

APP 2

CONF 21

20.000 POUNDS

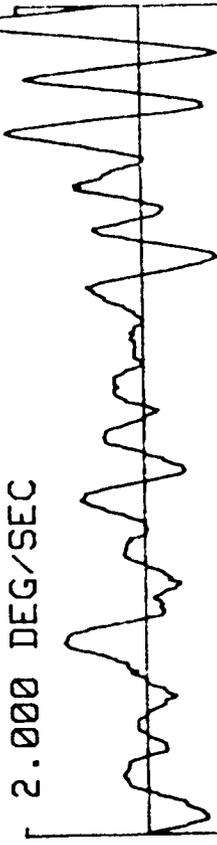
FES



-20.000 POUNDS

2.000 DEG/SEC

Q

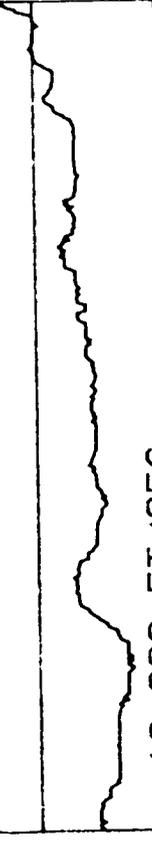


-2.000 DEG/SEC

10.000 FT/SEC

09-3

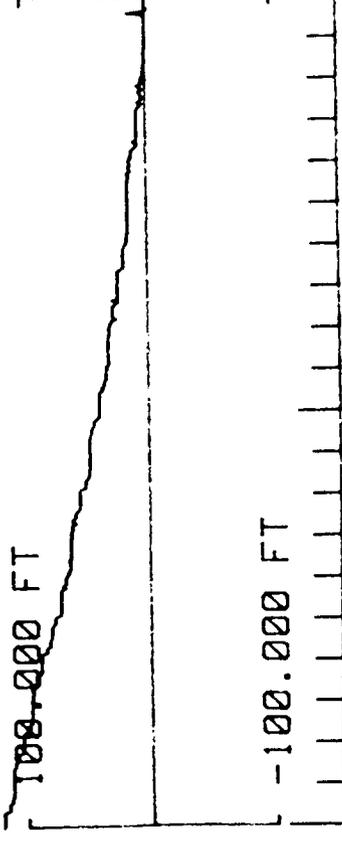
HDOI



-10.000 FT/SEC

100.000 FT

H-WHEEL



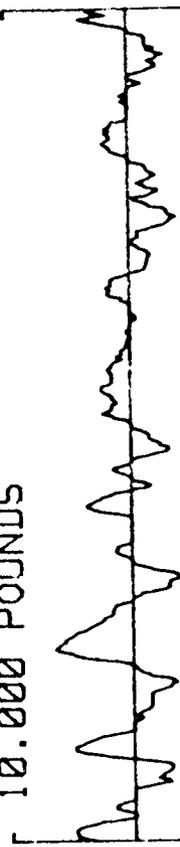
-100.000 FT

10

20

10.000 POUNDS

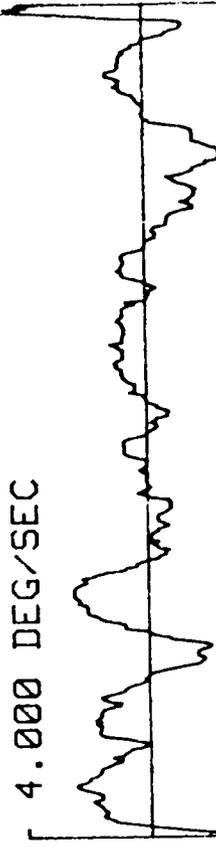
FBS



-10.000 POUNDS

4.000 DEG/SEC

Q



-4.000 DEG/SEC

50.000 %

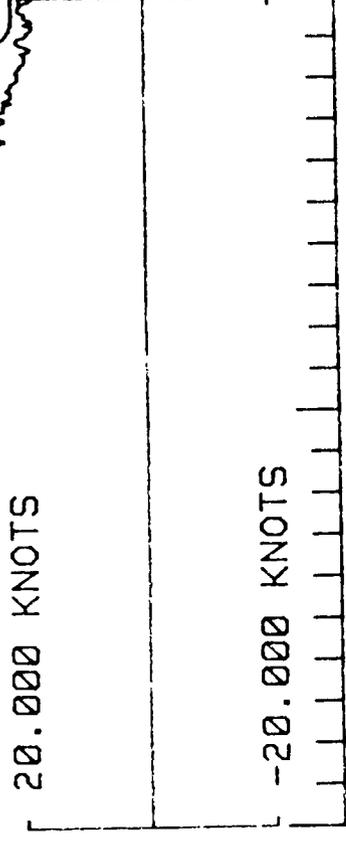
PLB



-50.000 %

20.000 KNOTS

V KIRS



-20.000 KNOTS

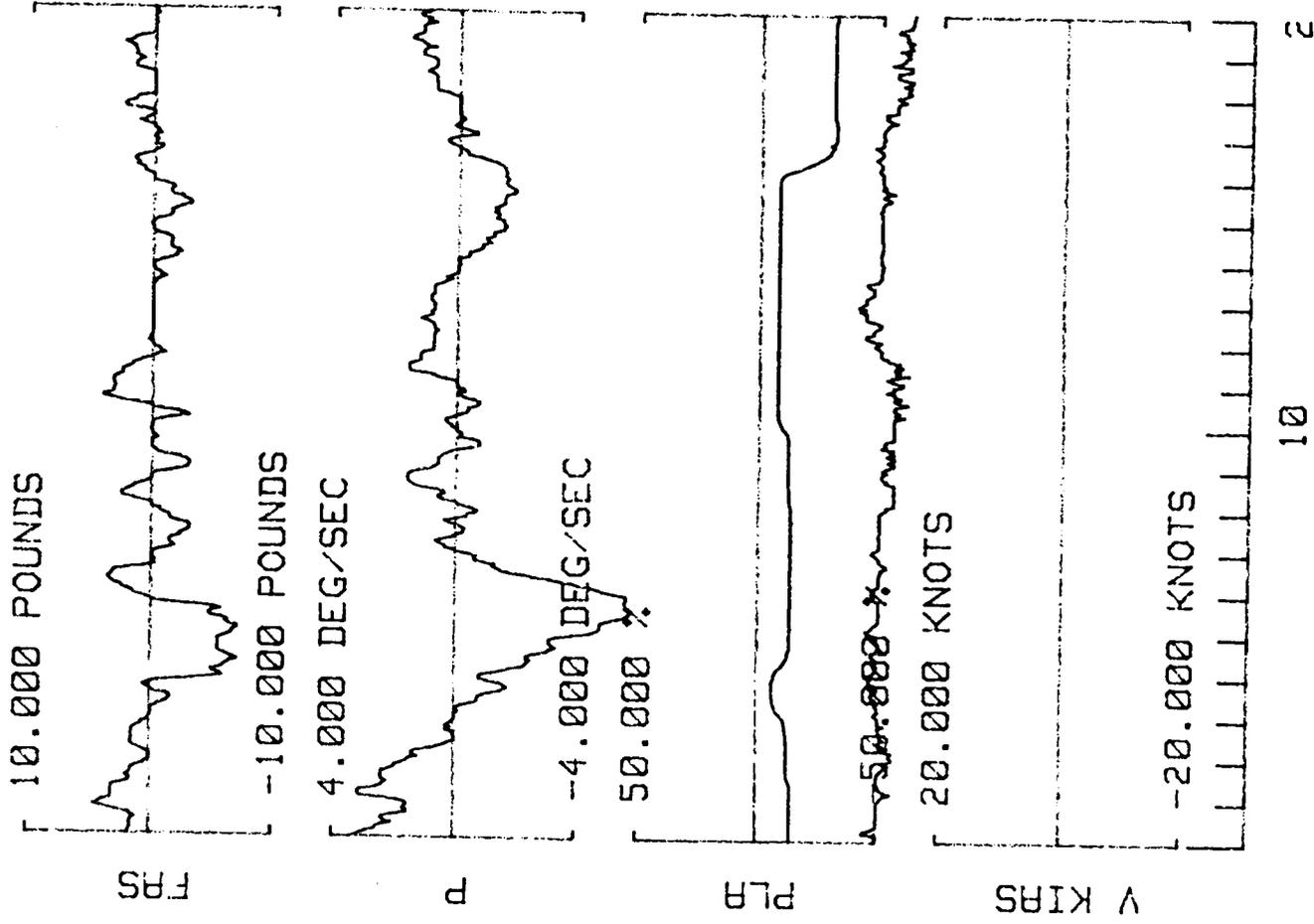
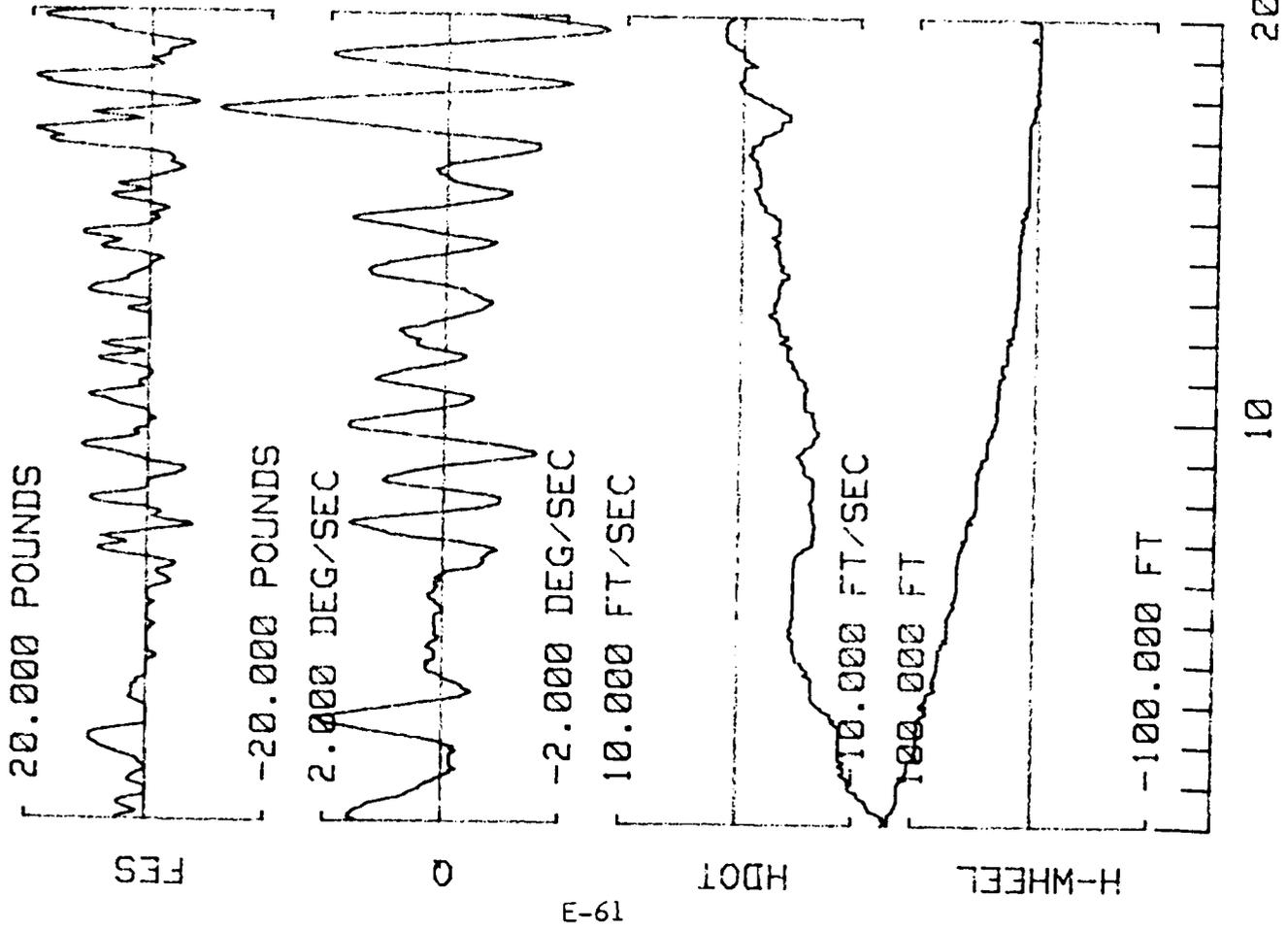
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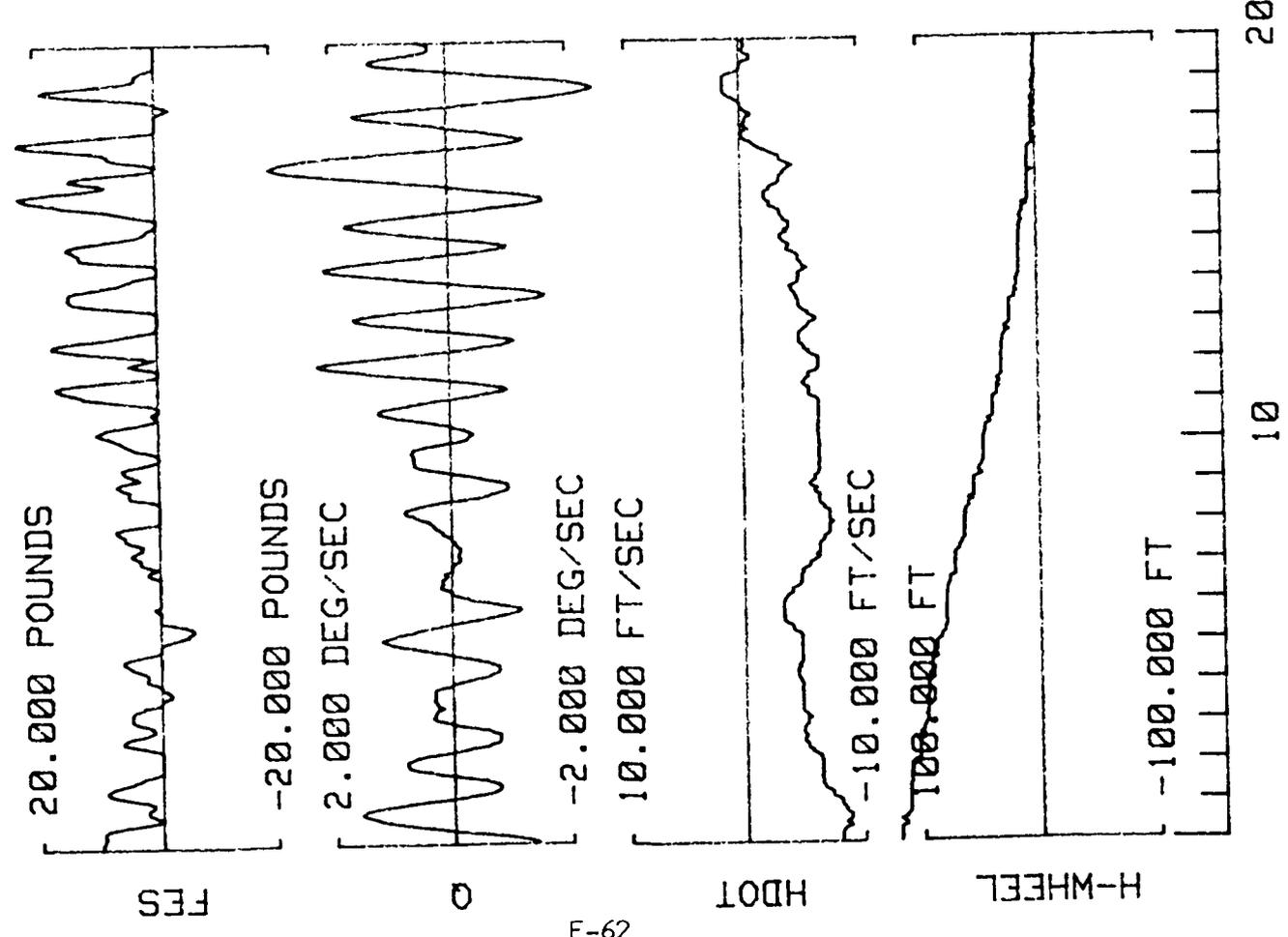
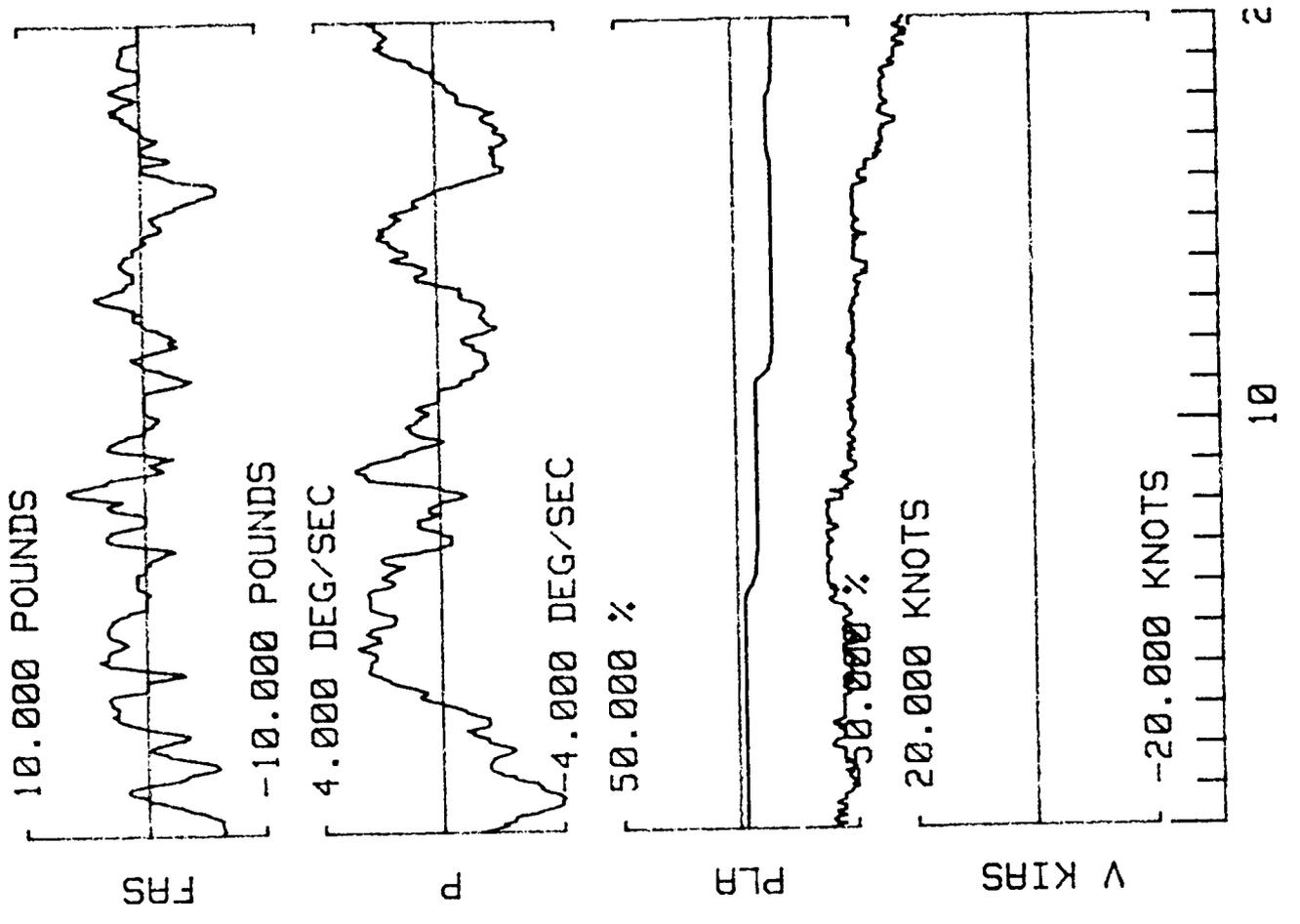
20

FLT 897

APP 3

CONF 27

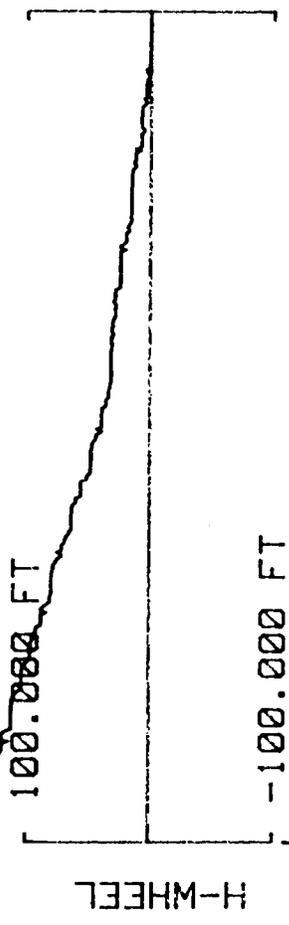
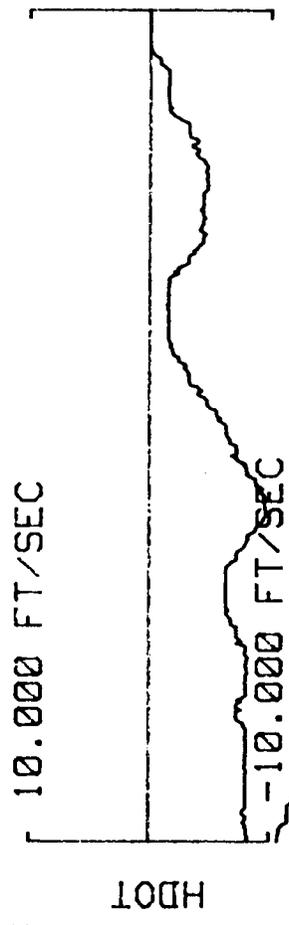
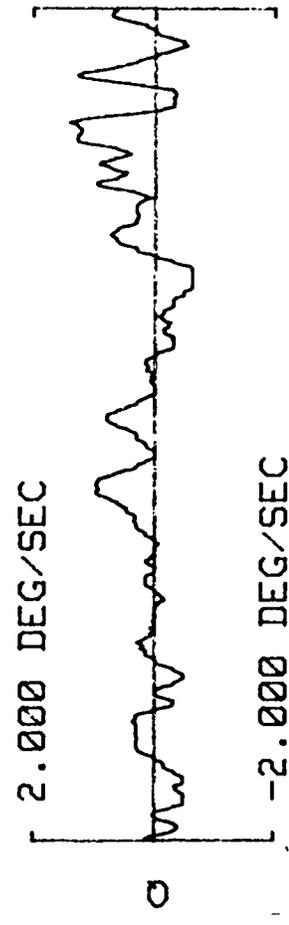
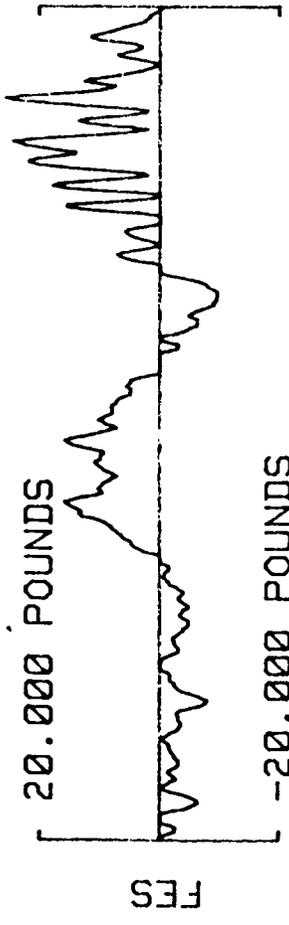




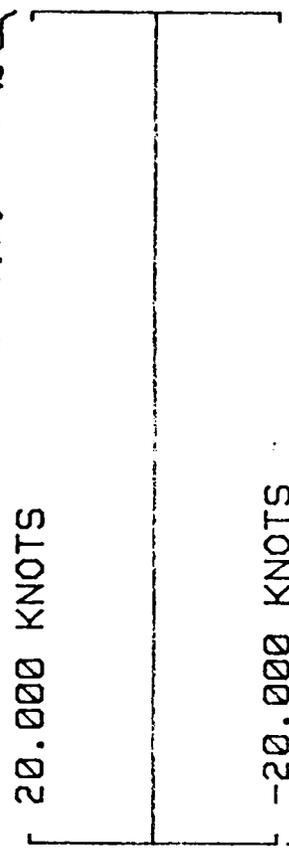
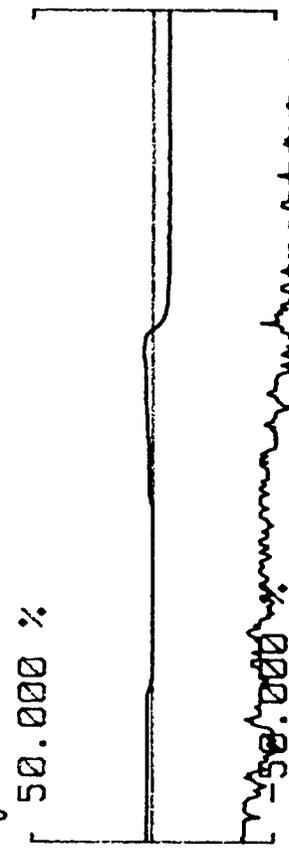
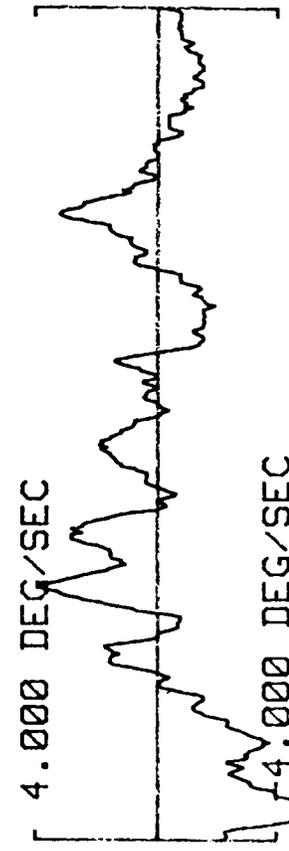
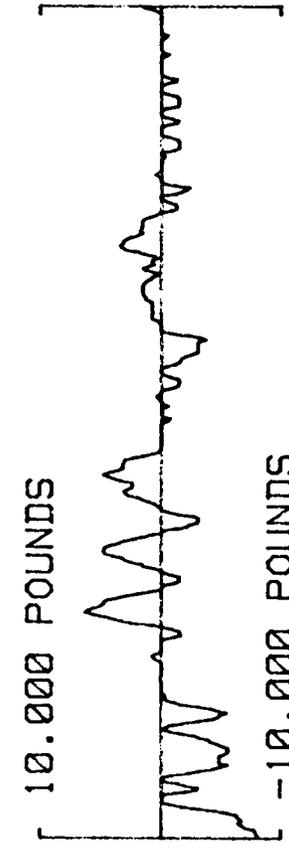
FLT 897

APP 5

CONF 25A



10 20

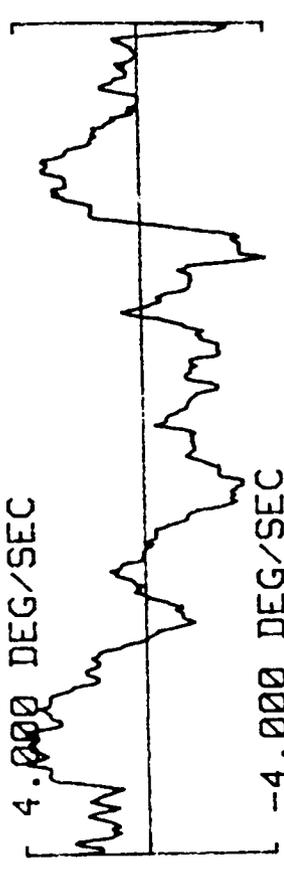
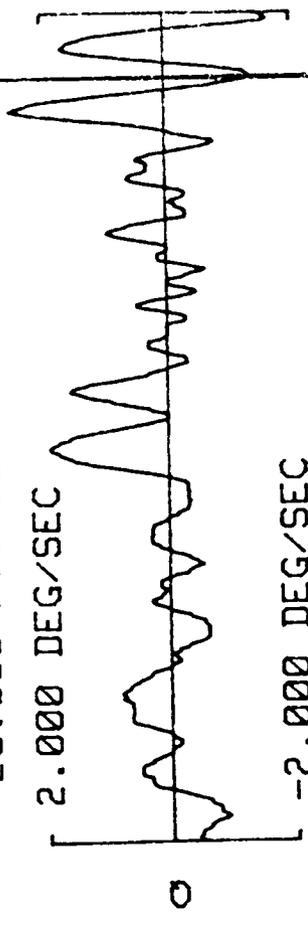
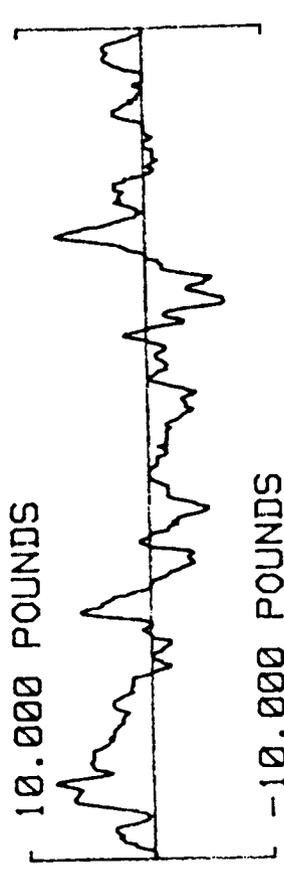
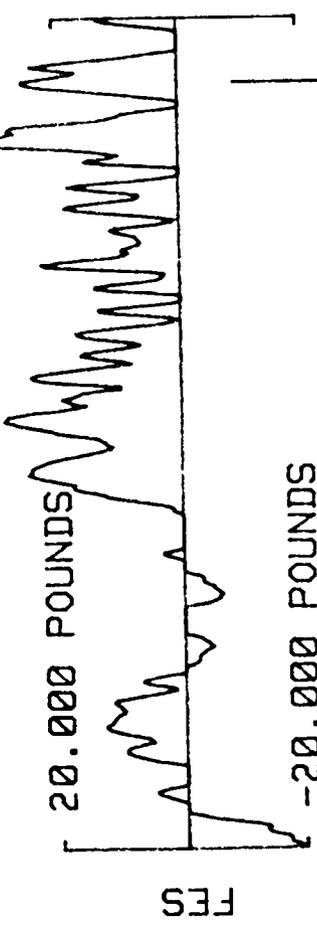


10 20

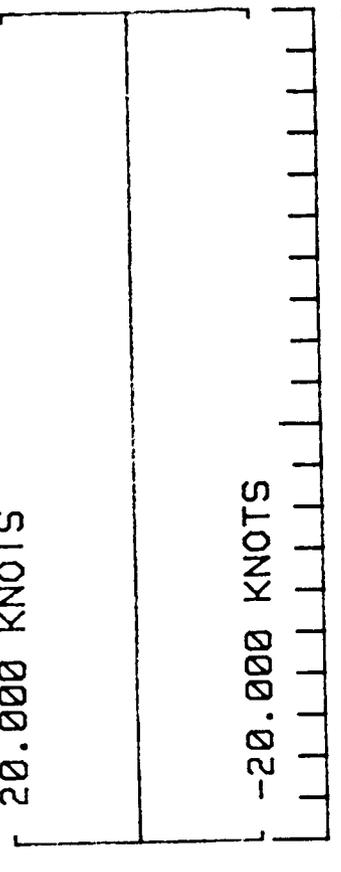
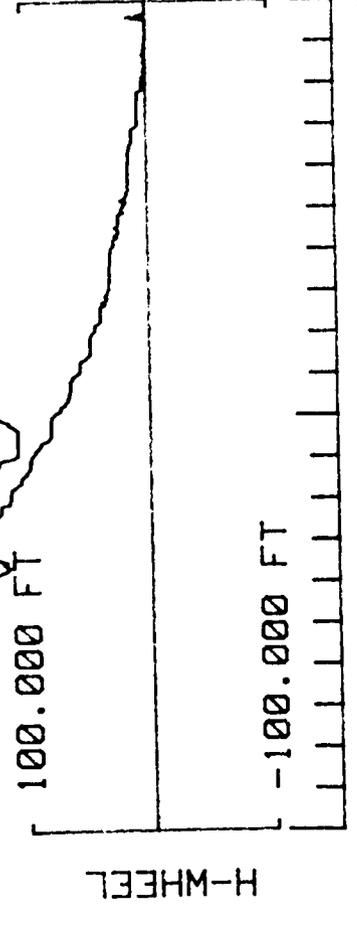
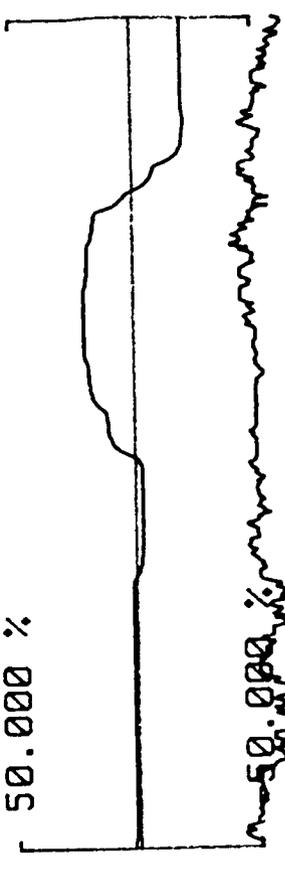
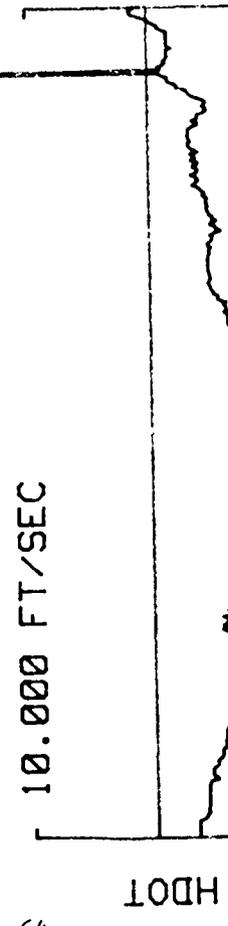
FLT 897

APP 6

CONF 25A



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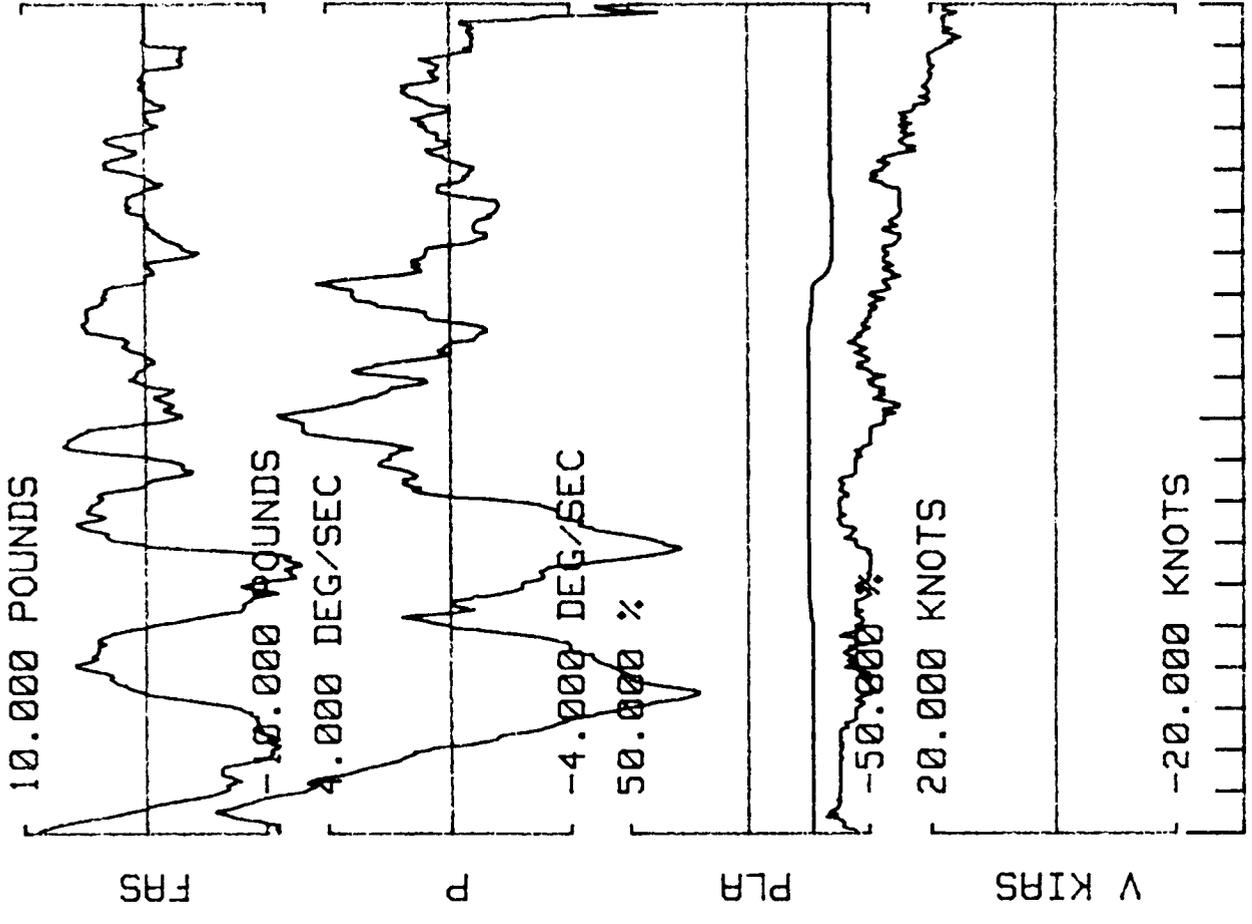
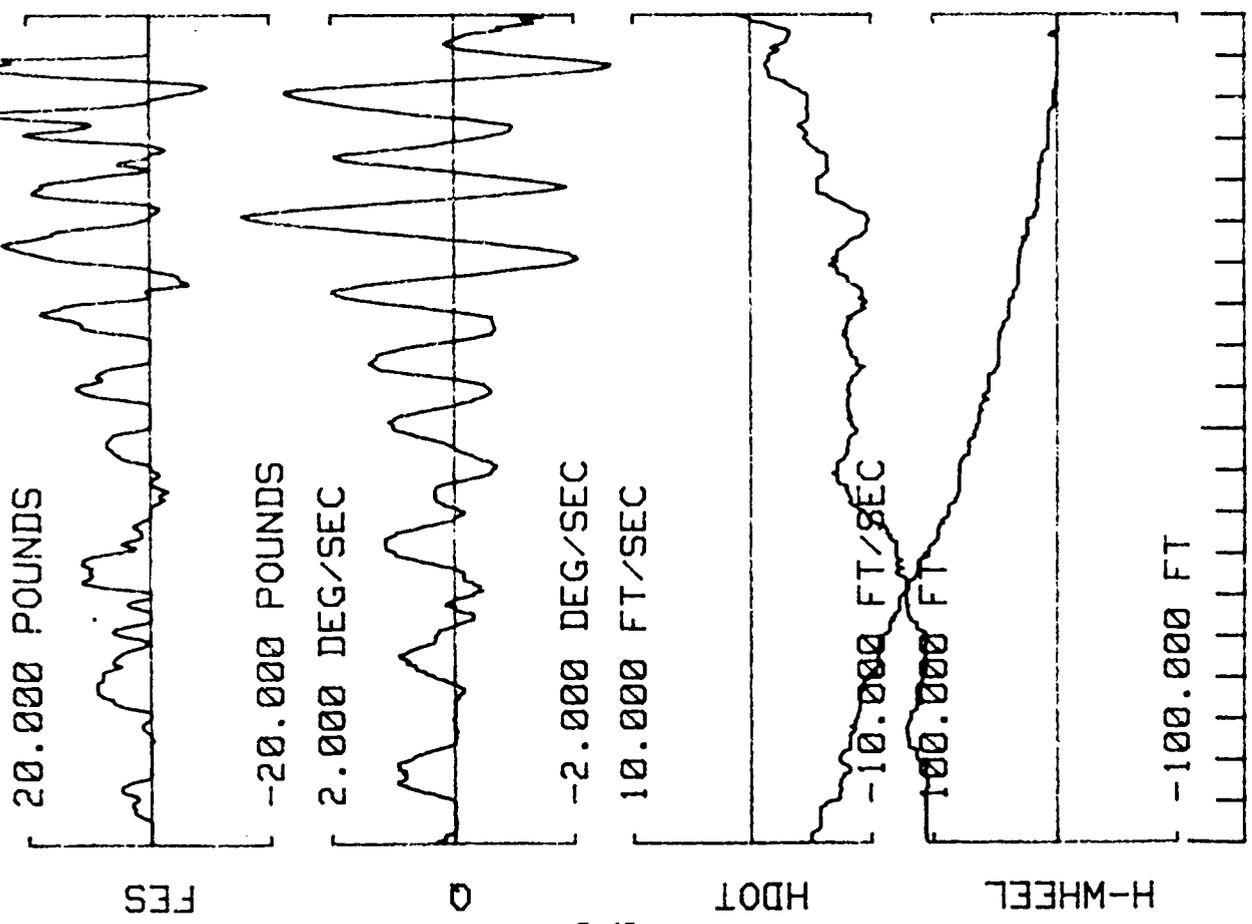
10 20

10 20

FLT 897

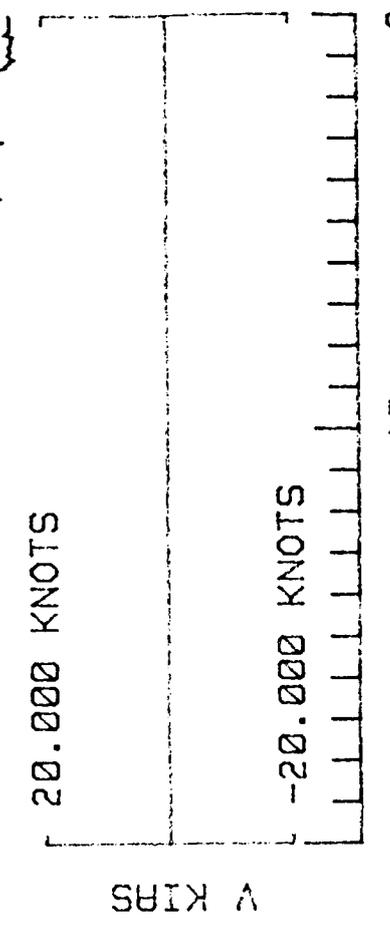
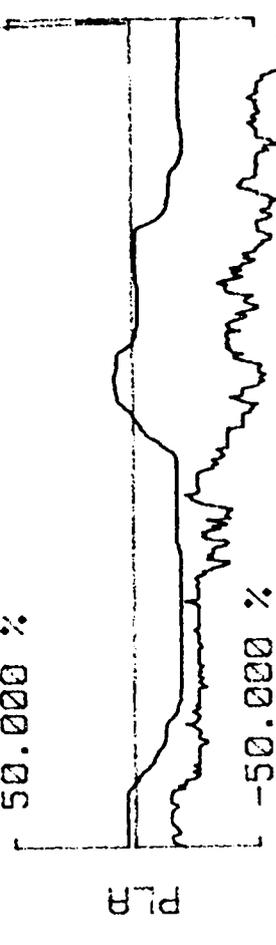
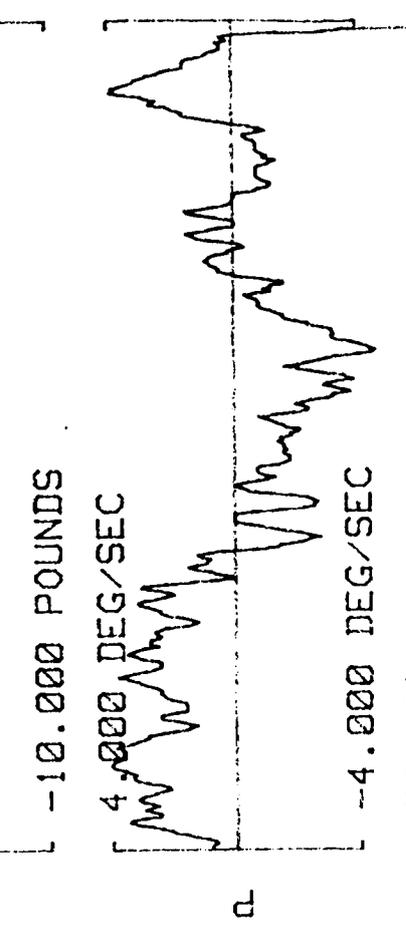
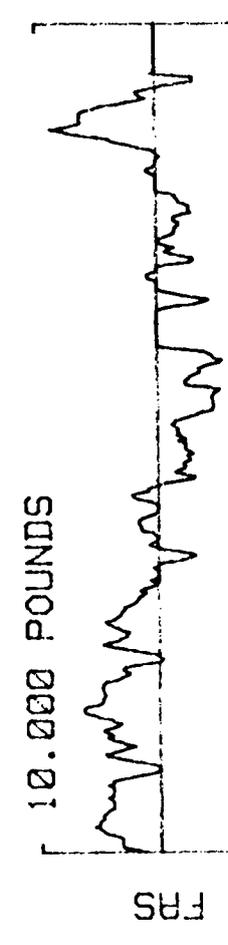
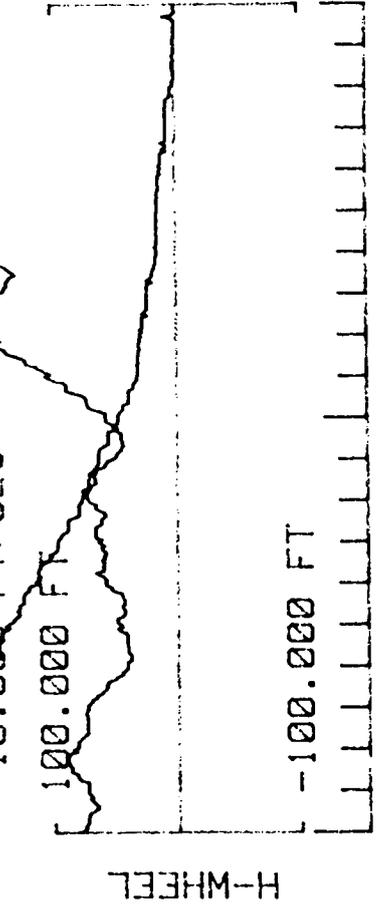
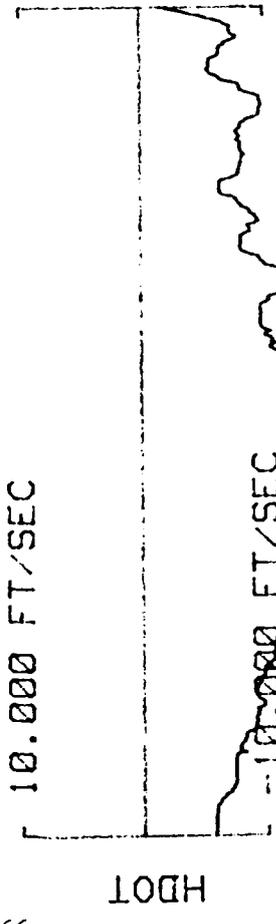
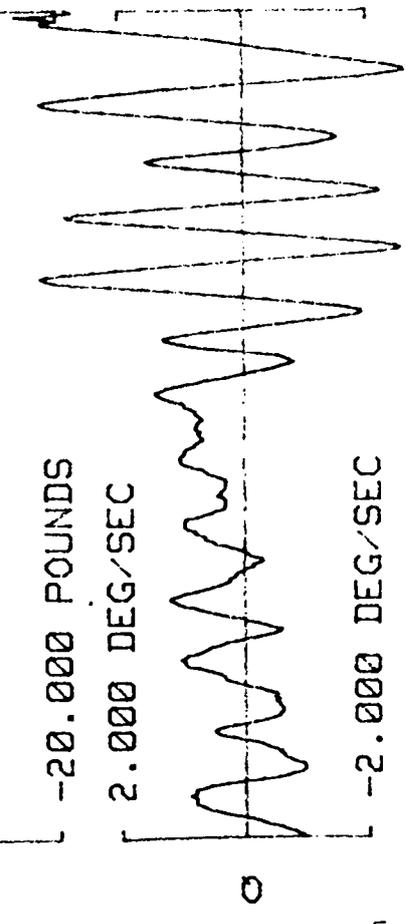
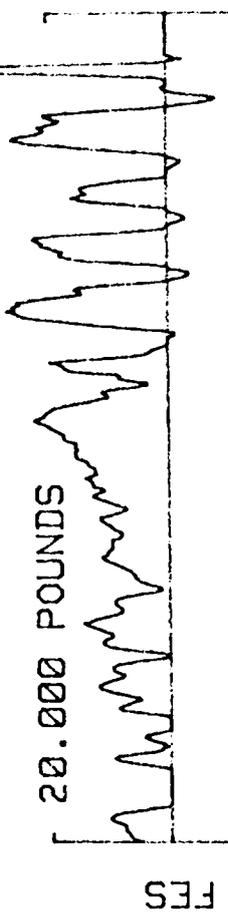
APP 7

CONF 22A



FLT 897 APP 8

CONF 22A



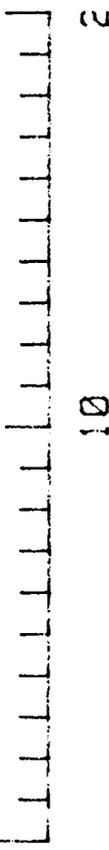
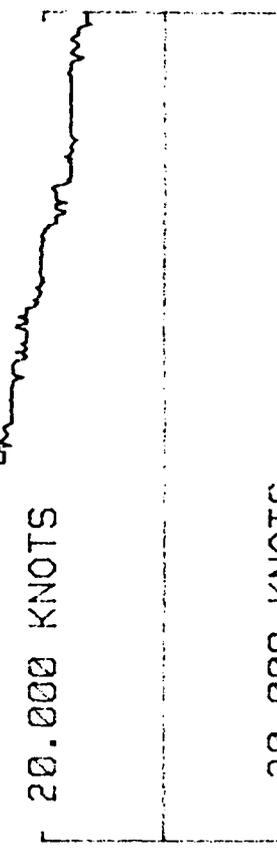
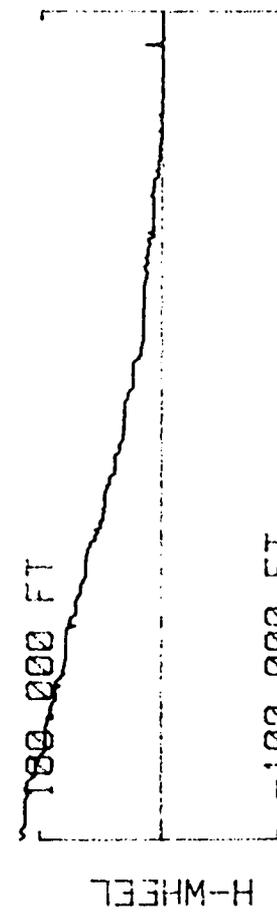
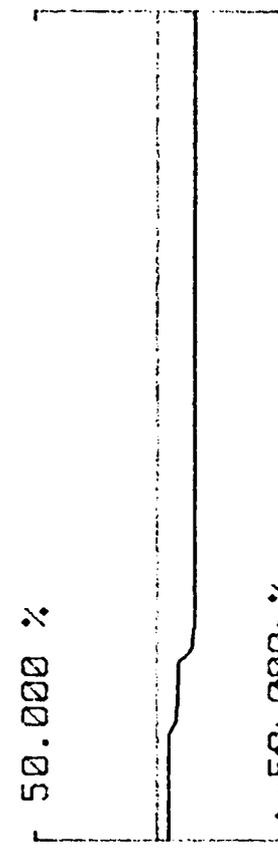
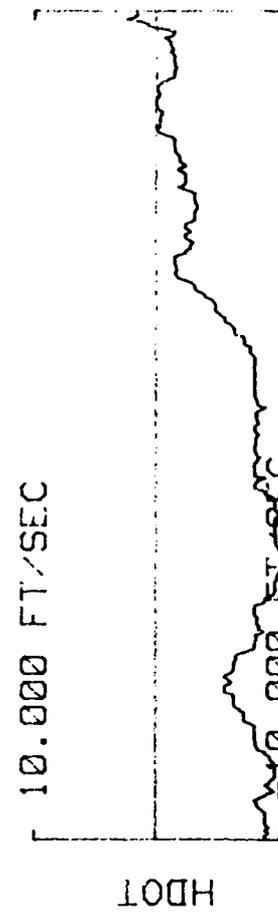
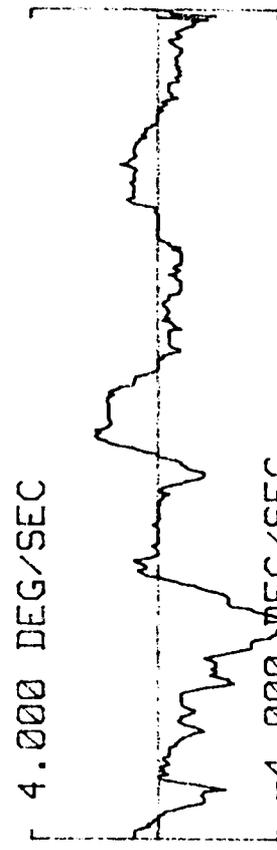
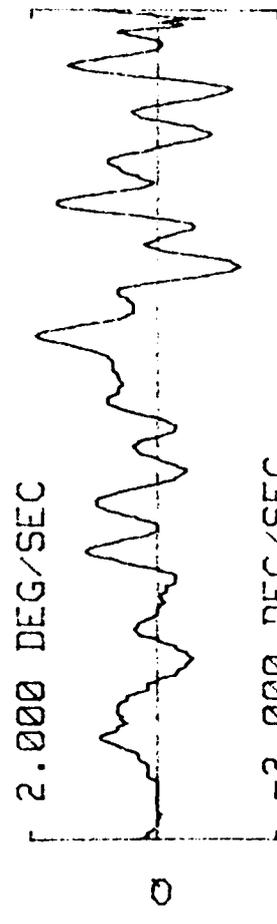
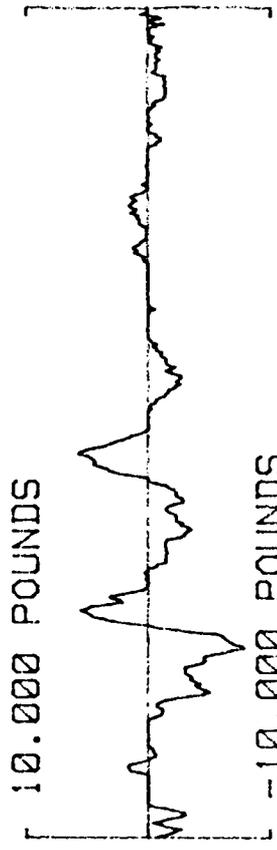
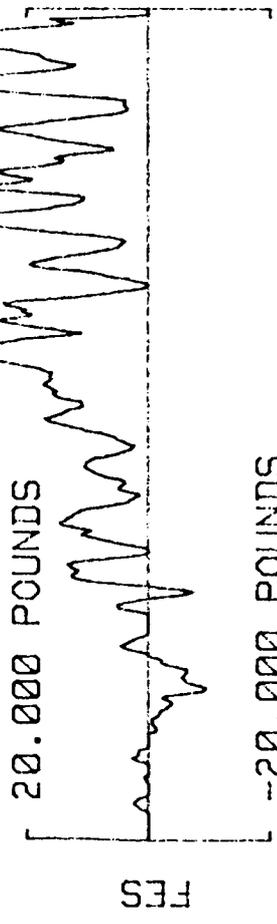
E-66

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FLT 898 APP 1

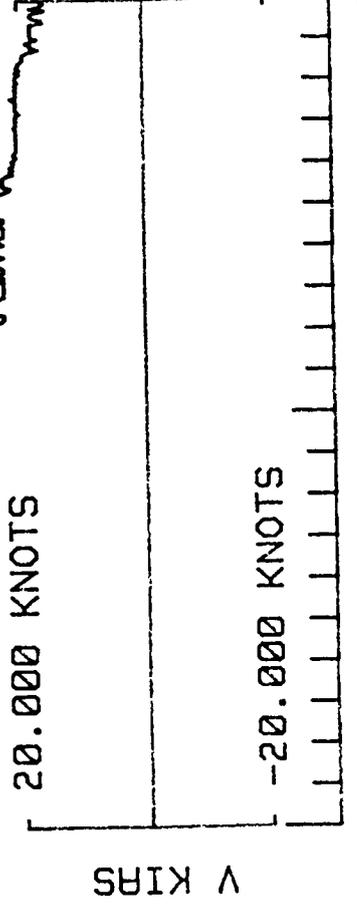
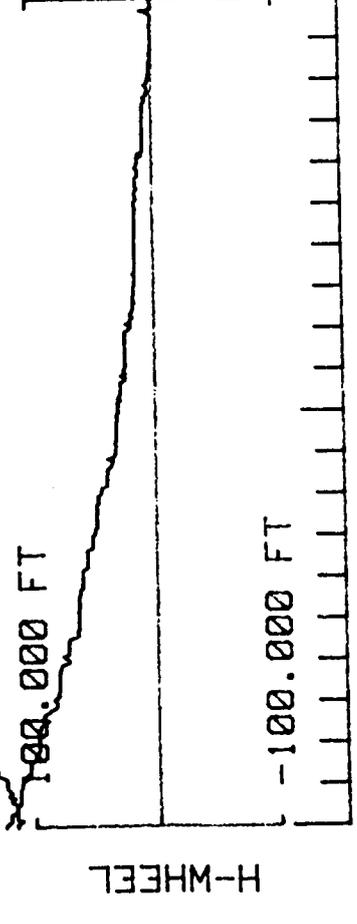
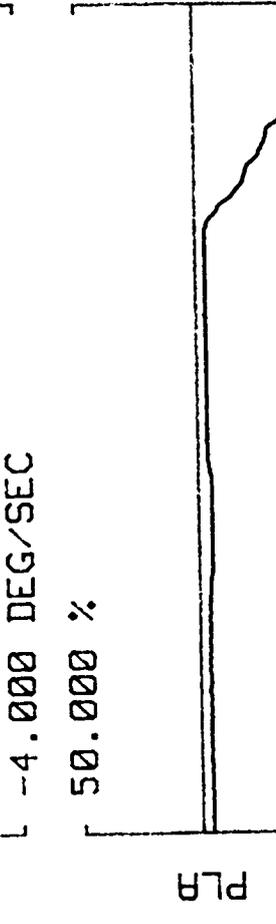
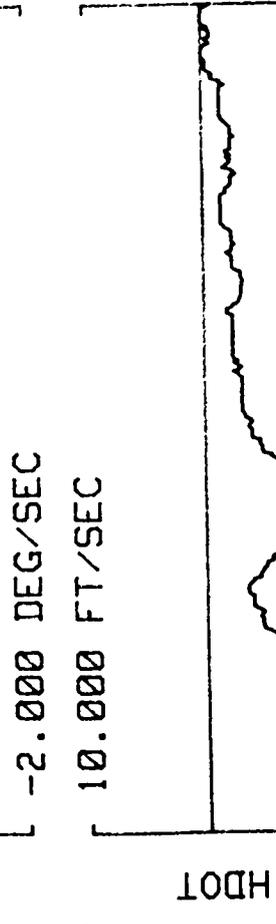
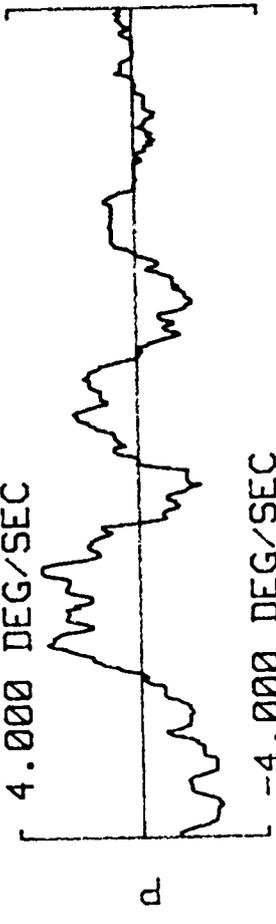
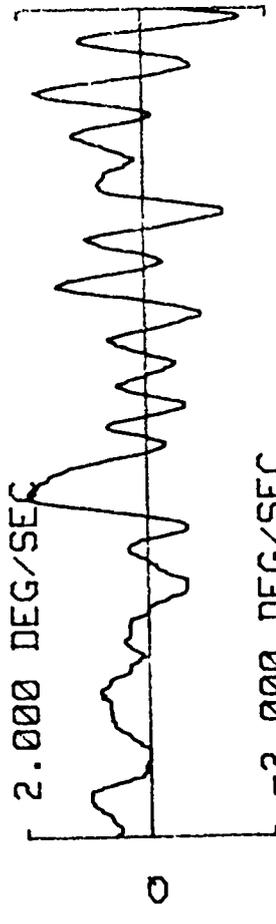
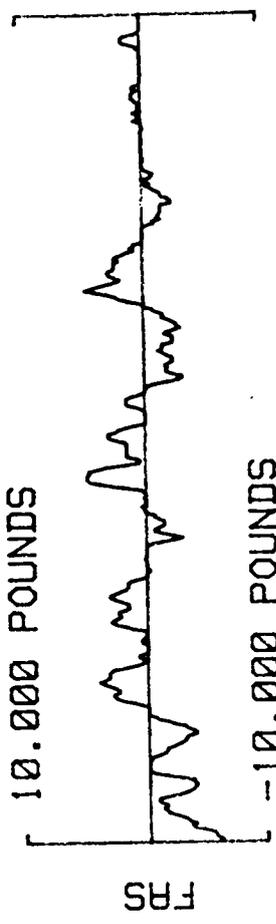
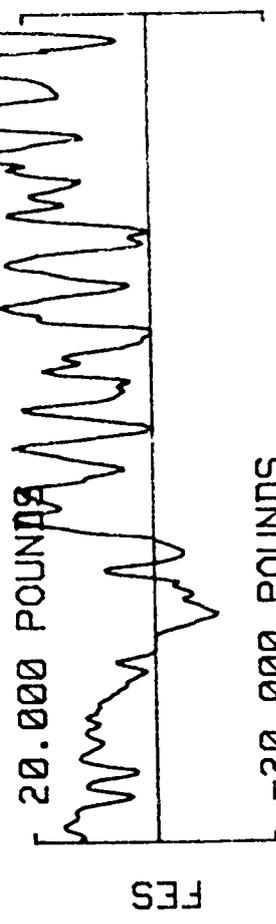
CONF 23



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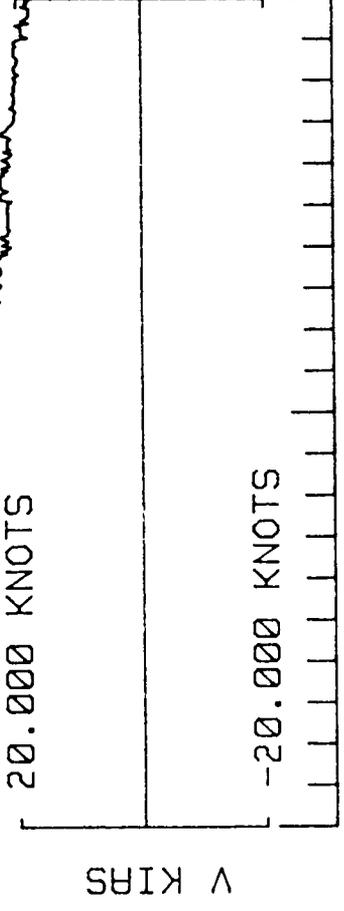
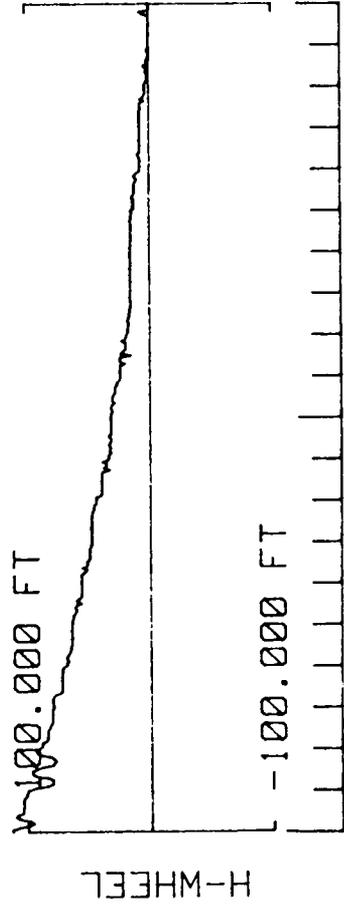
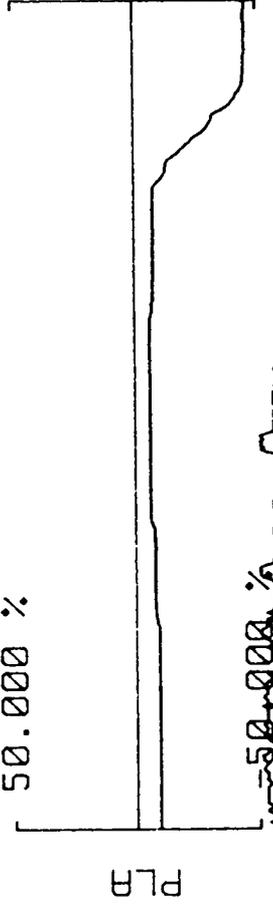
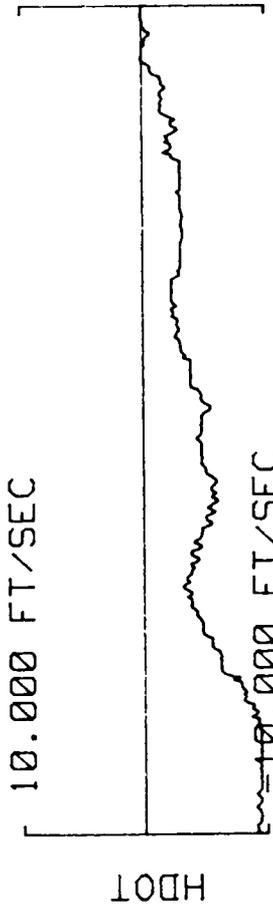
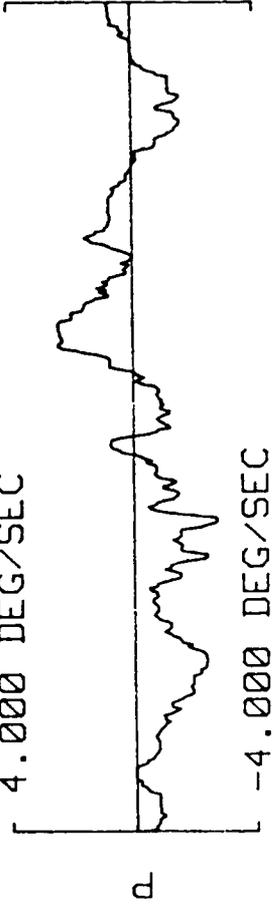
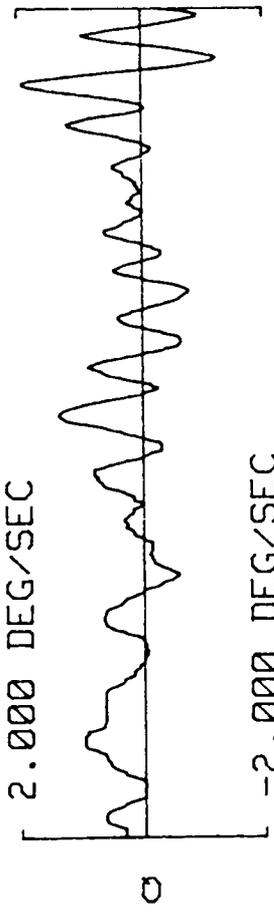
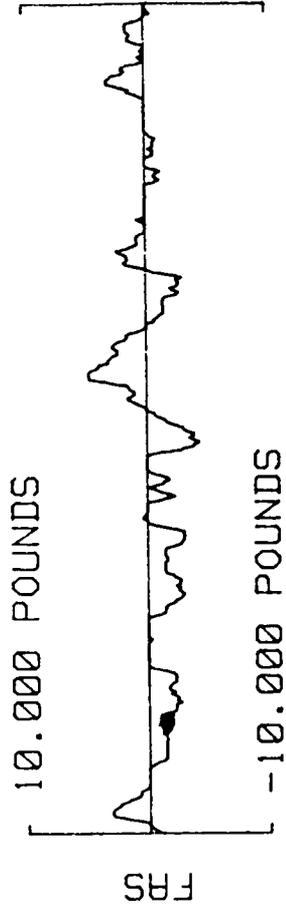
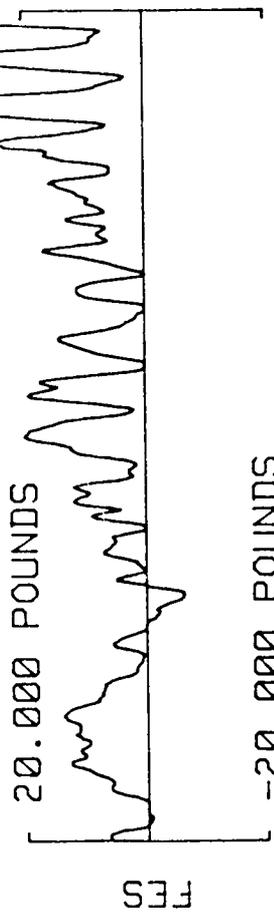
APP 2

CONF 23



FLT 898 APP 3

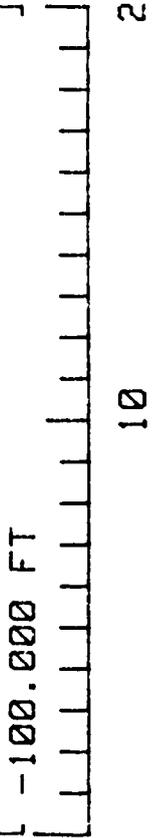
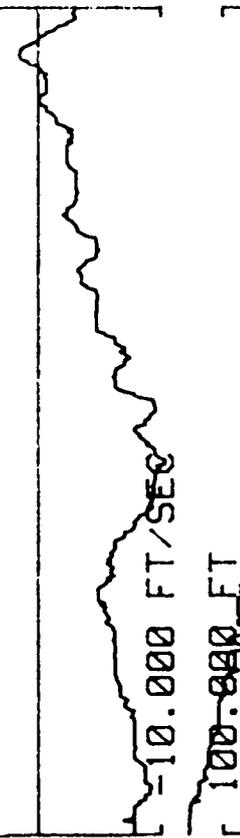
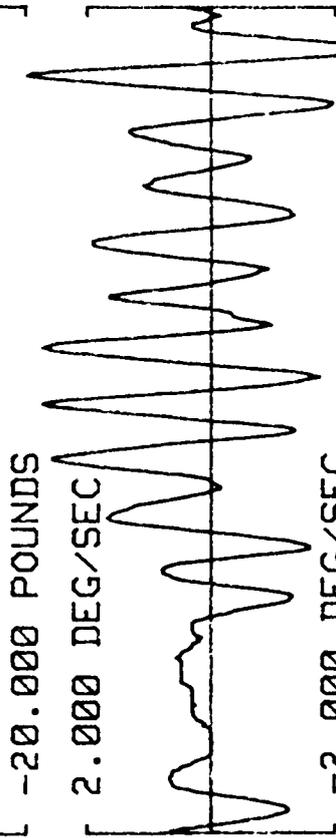
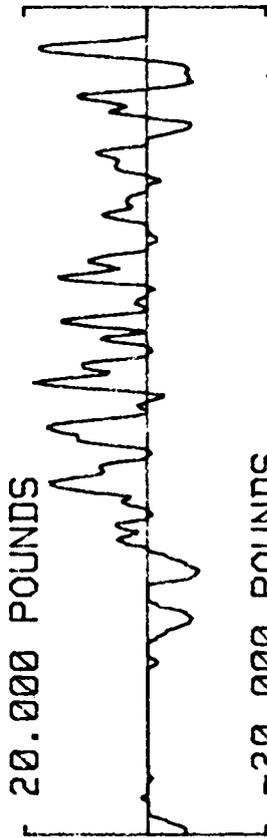
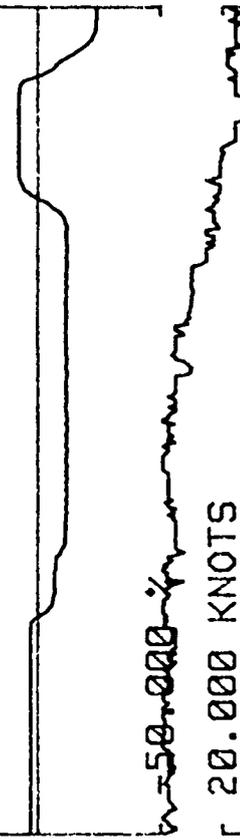
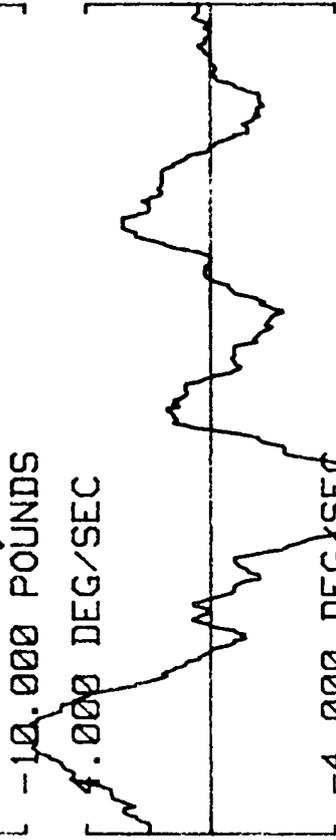
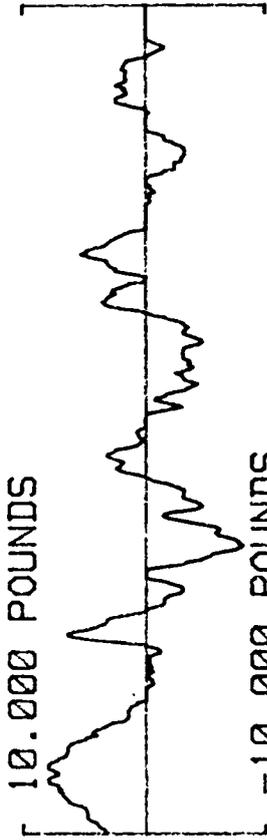
CONF 23



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APP 5

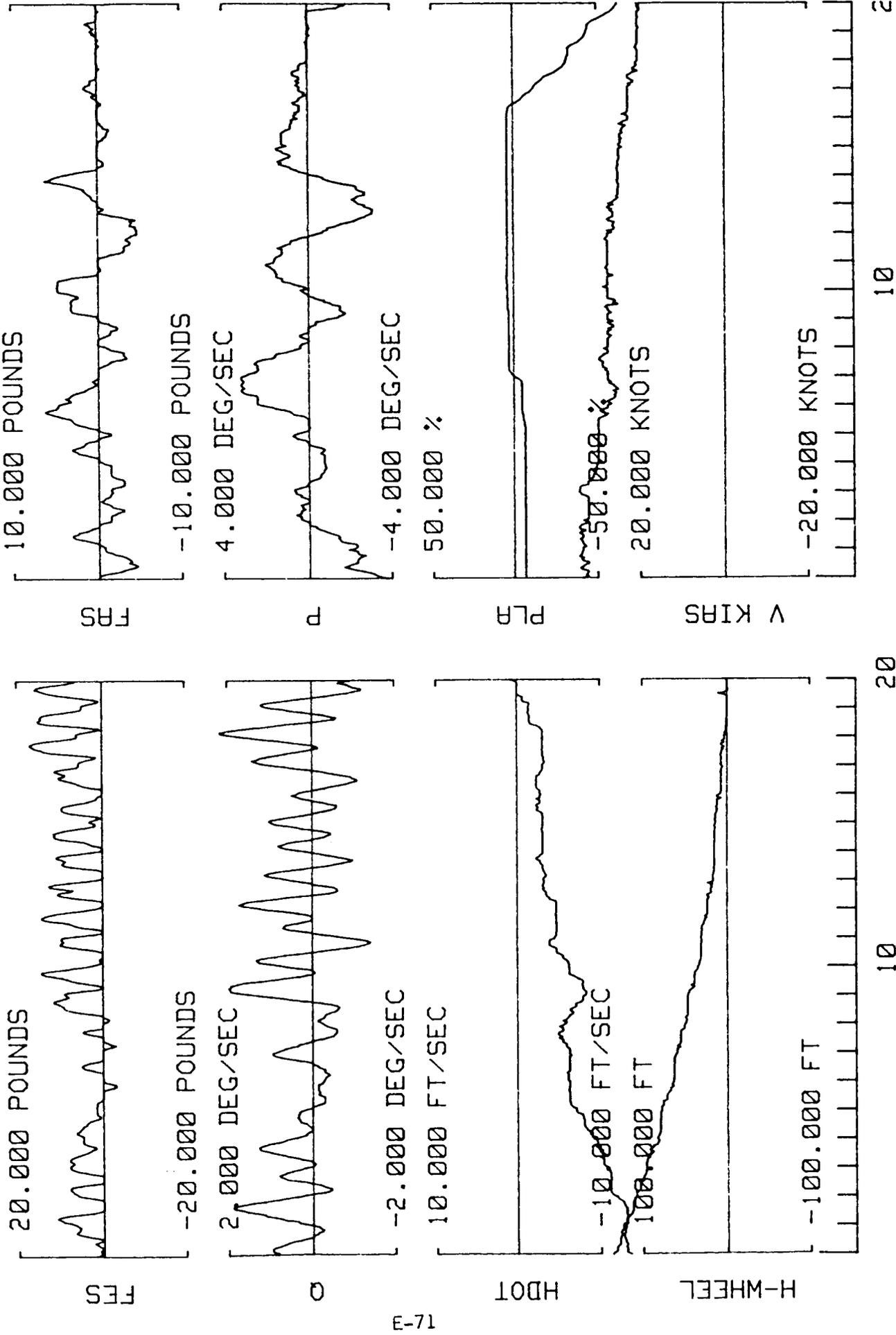
FLT 898

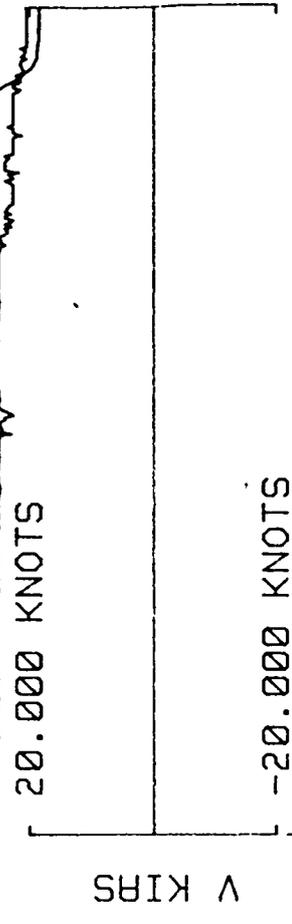
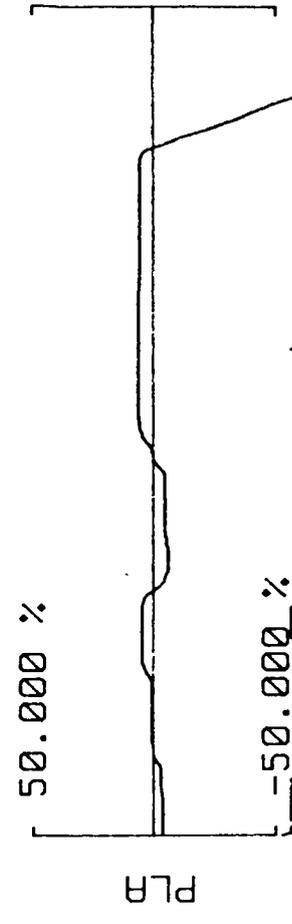
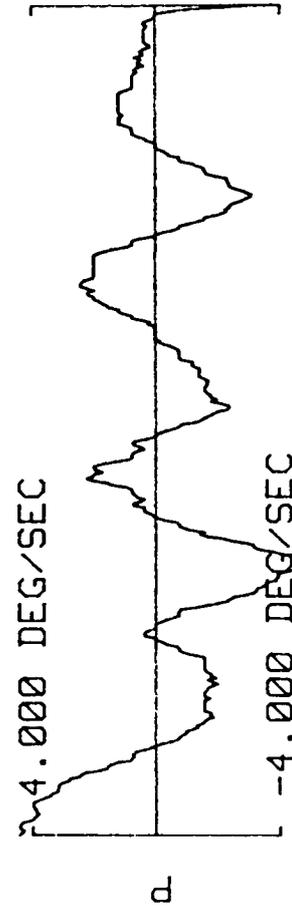
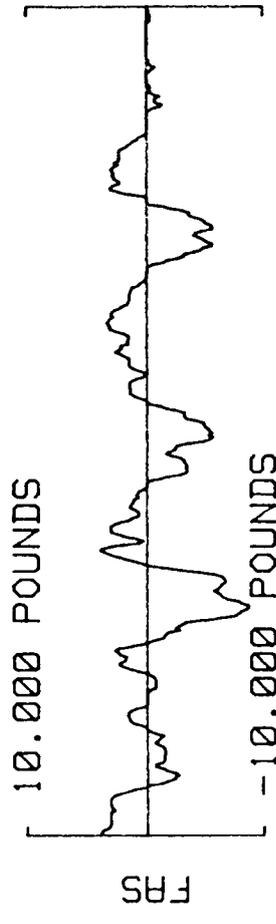
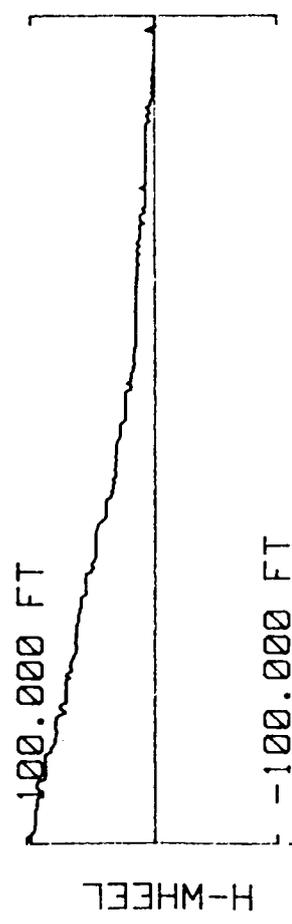
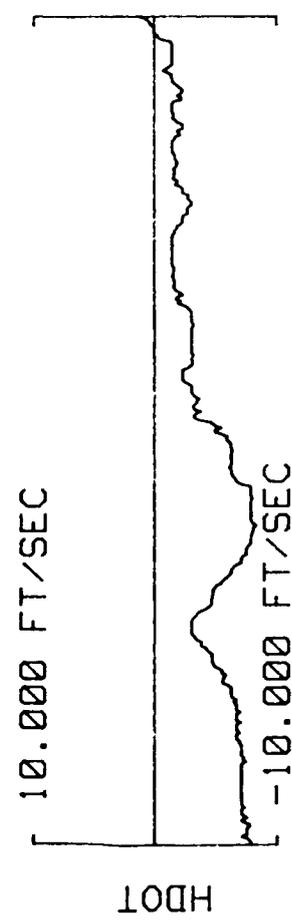
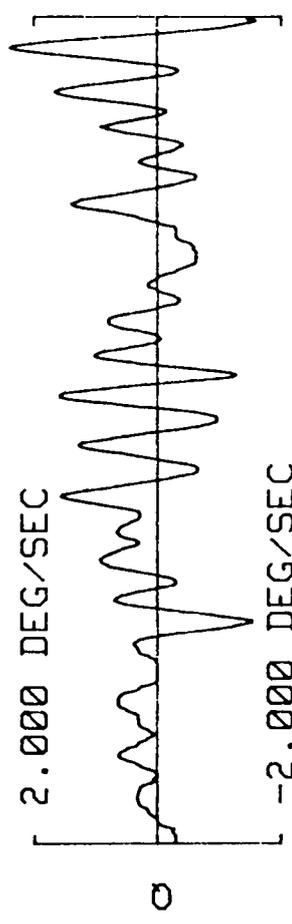
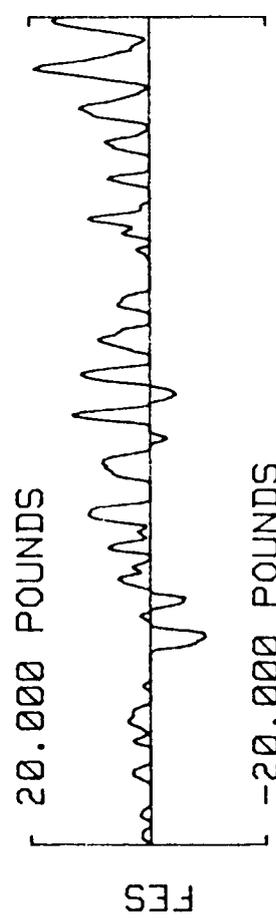


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FLT 898 APP 6 CONF 26

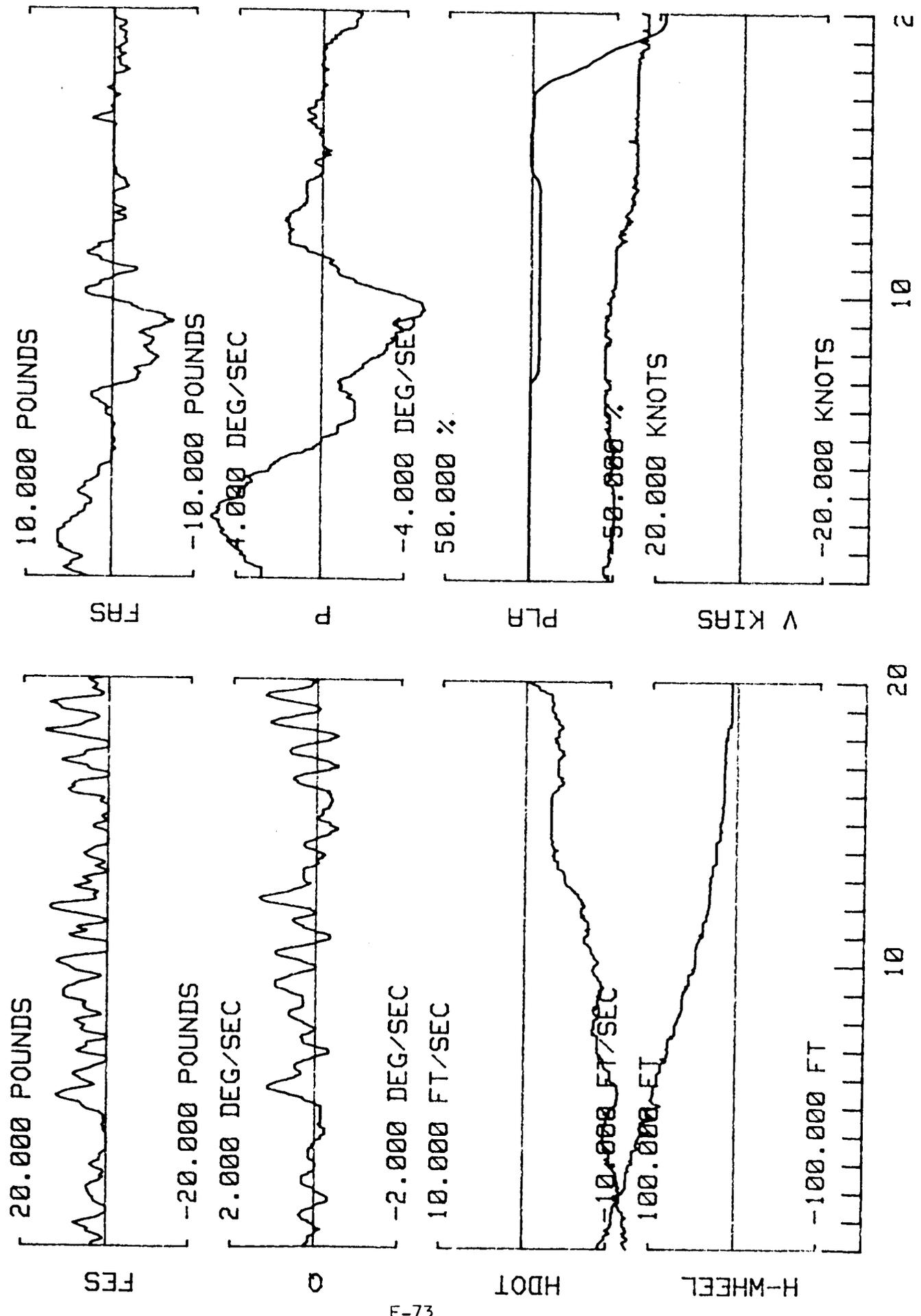




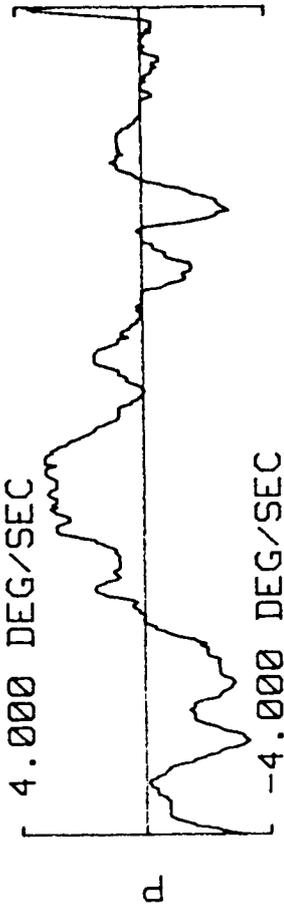
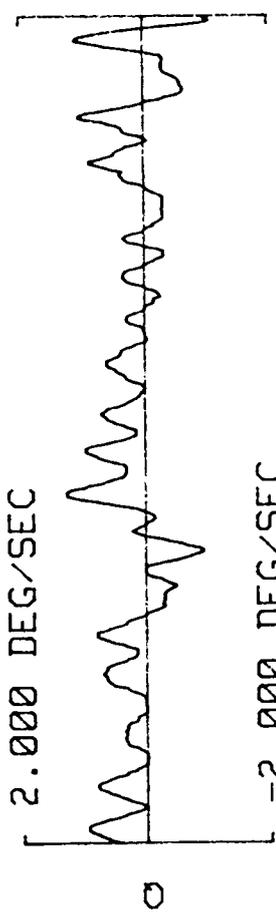
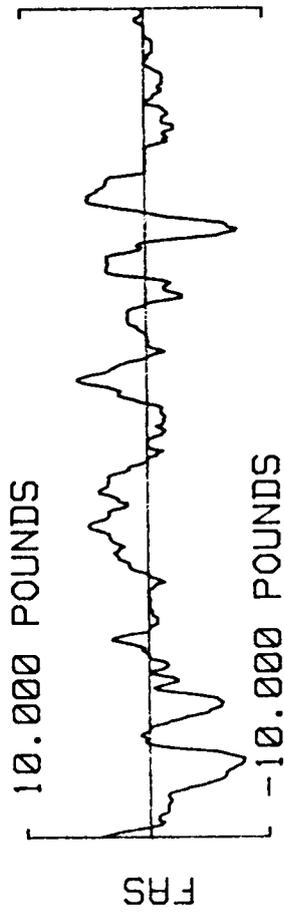
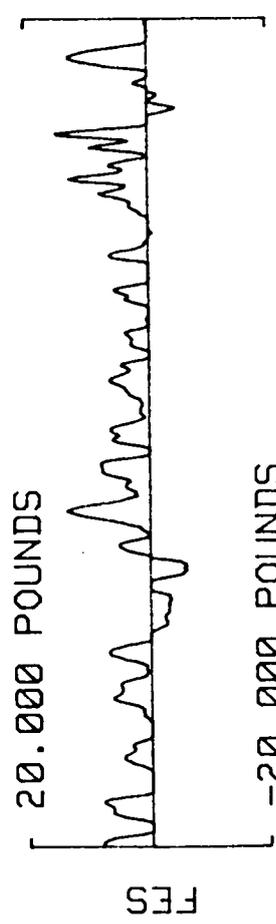
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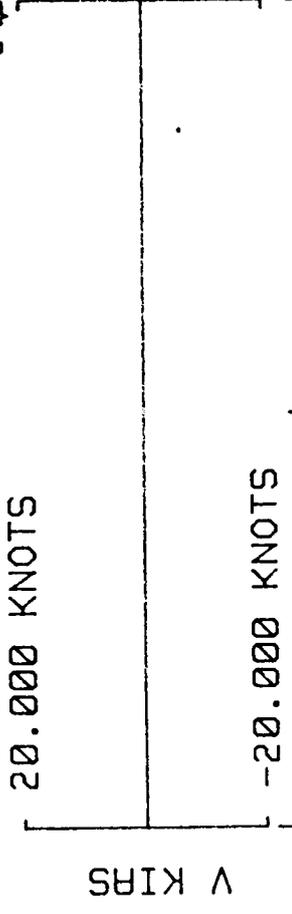
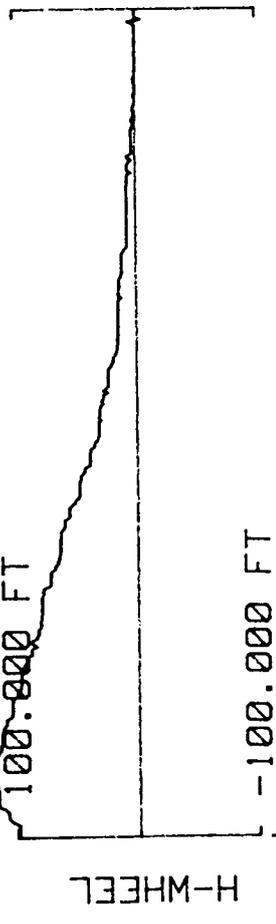
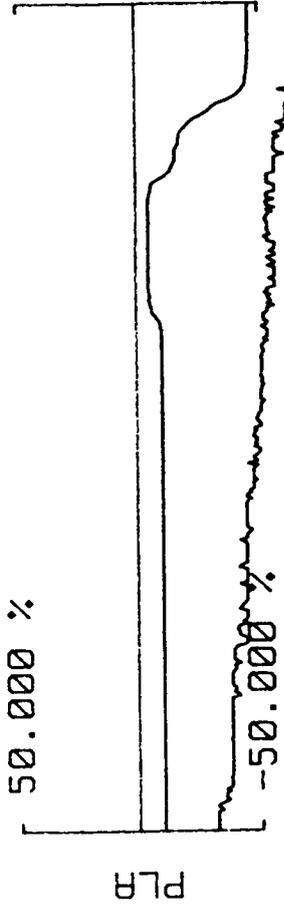
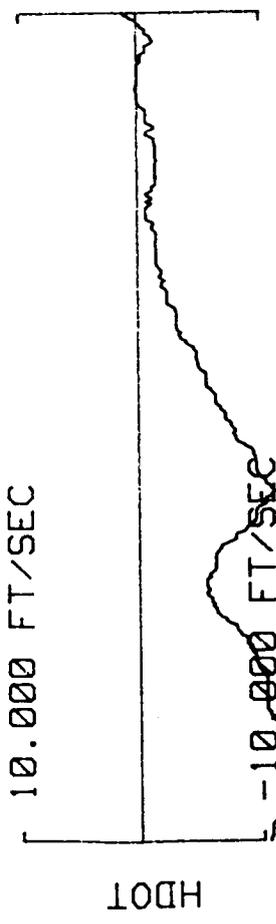
FLT 898 APP 8 CONF 8



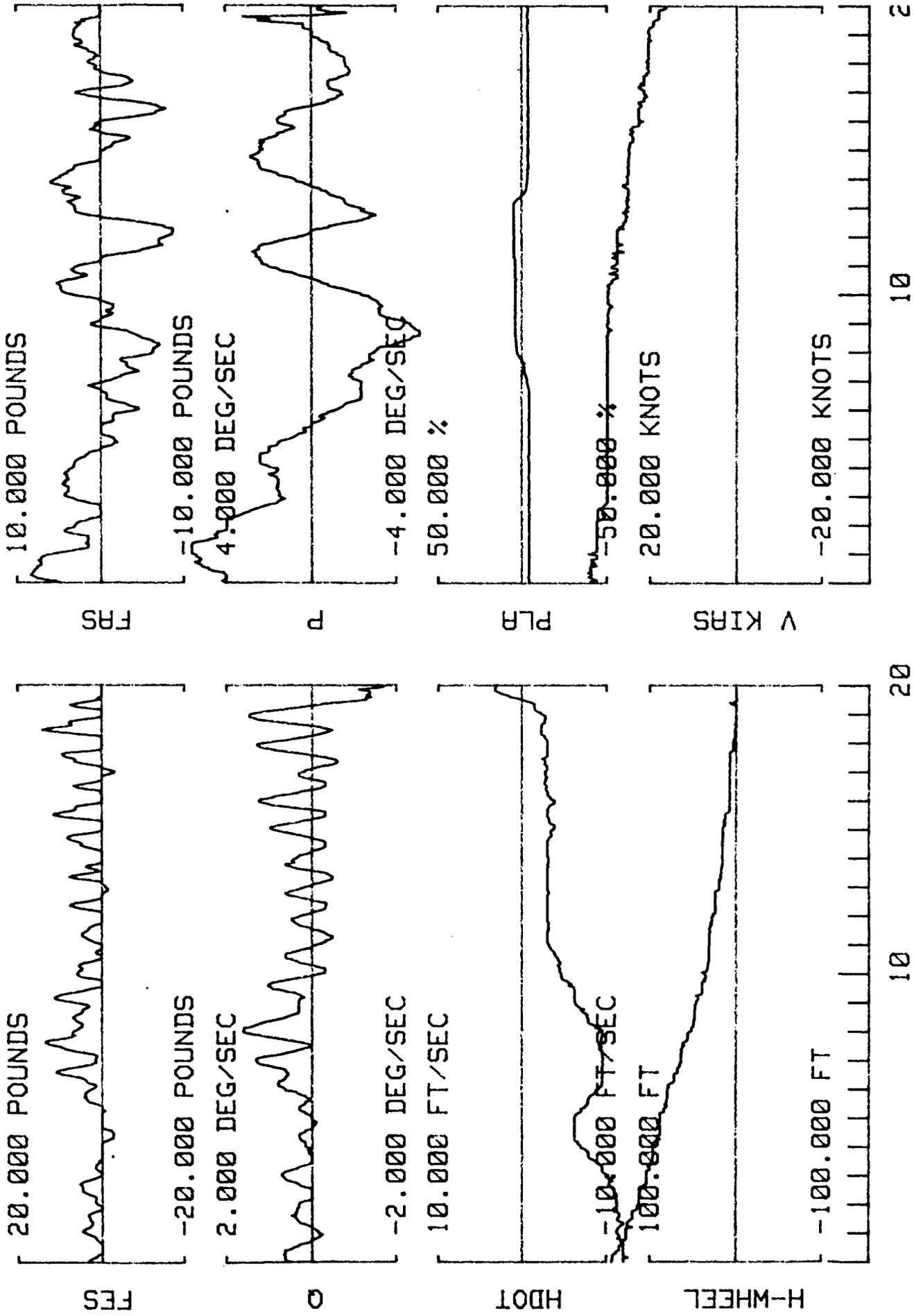
FLT 898 APP 9 CONF 8

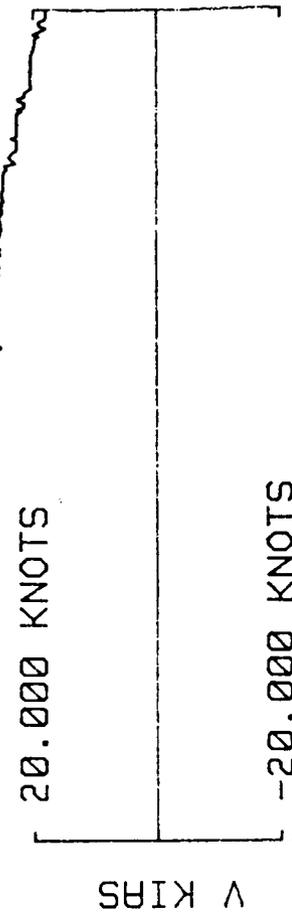
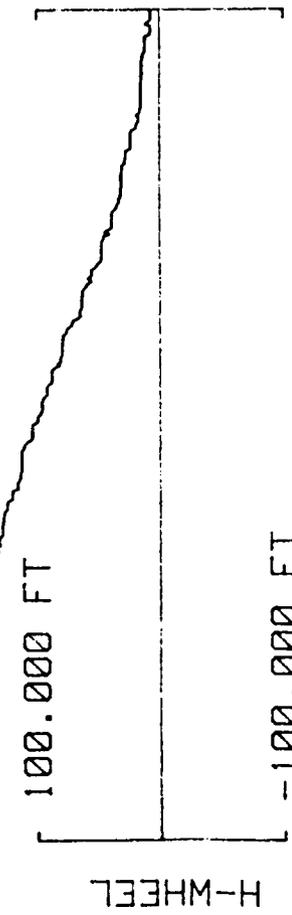
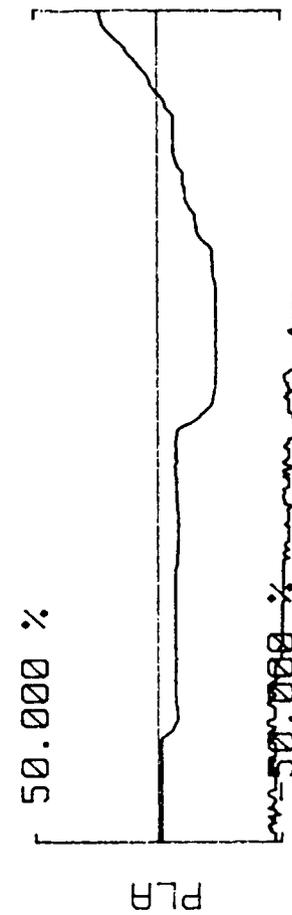
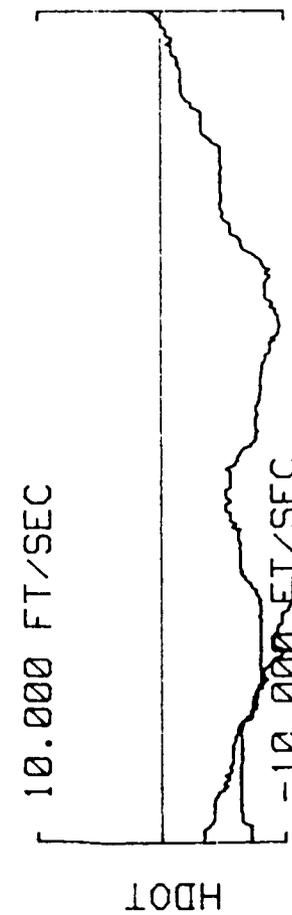
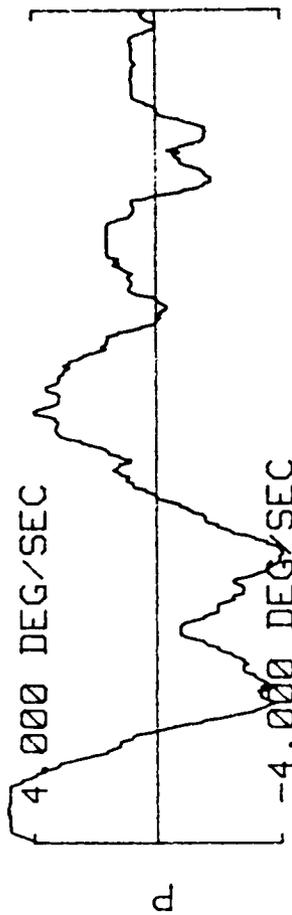
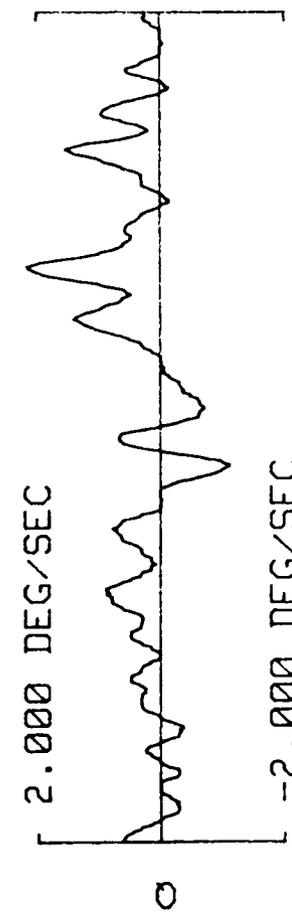
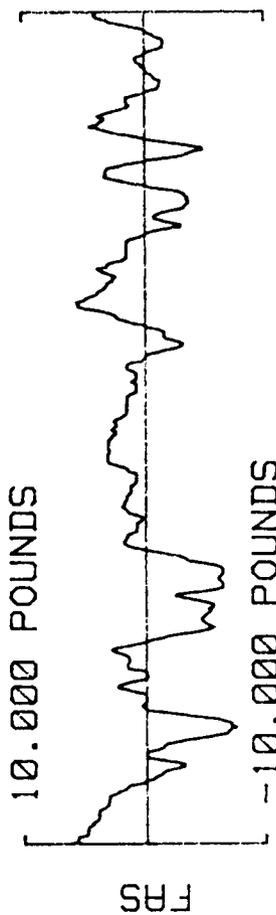
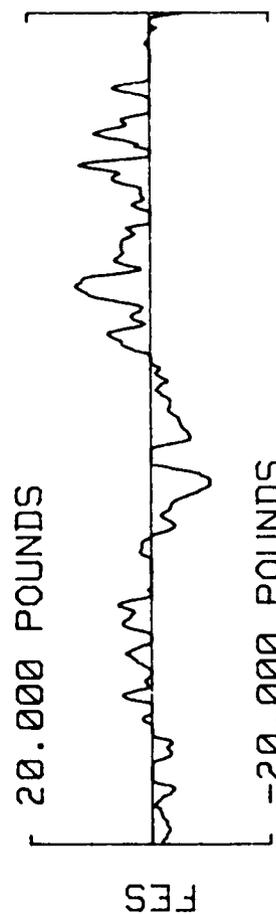


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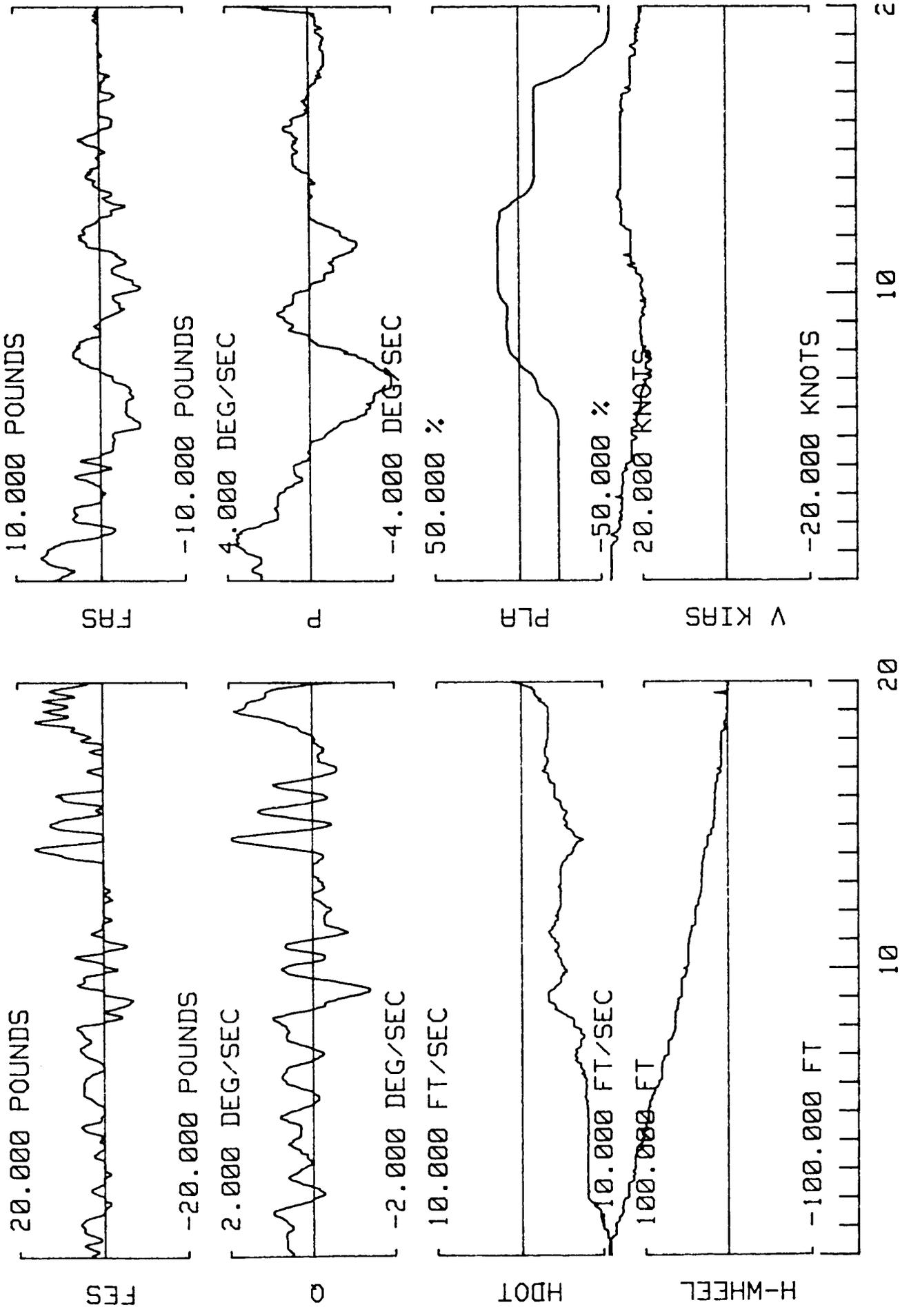
FLT 898 APP 10 CONF 17





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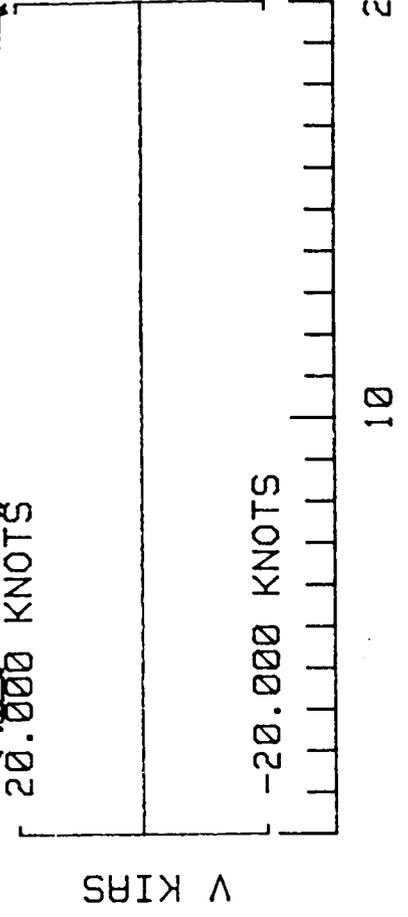
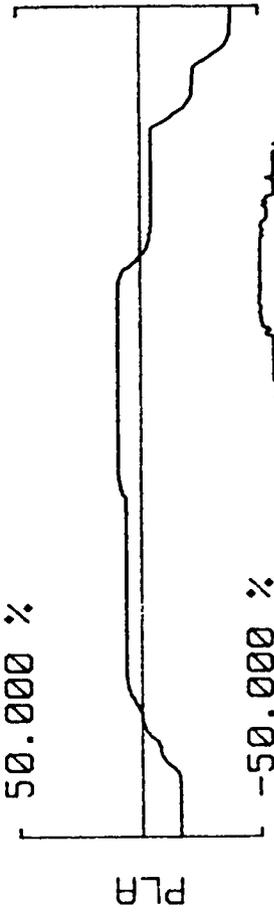
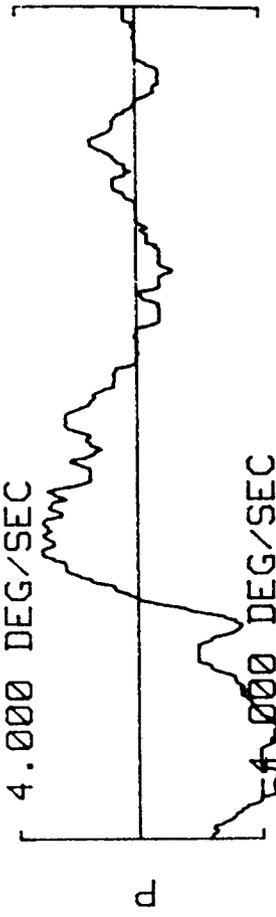
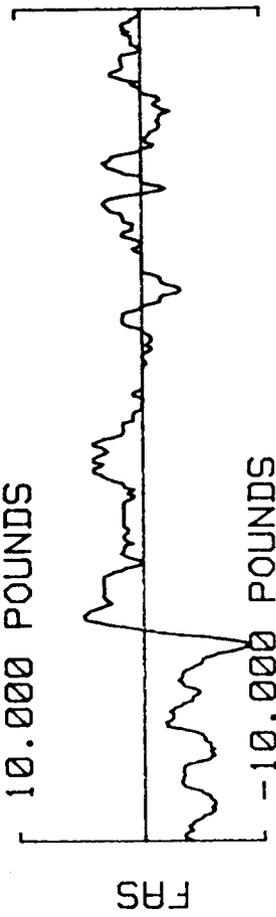
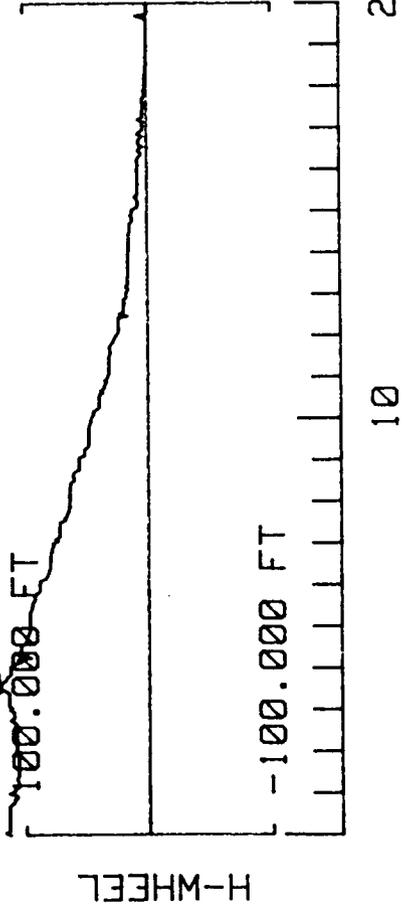
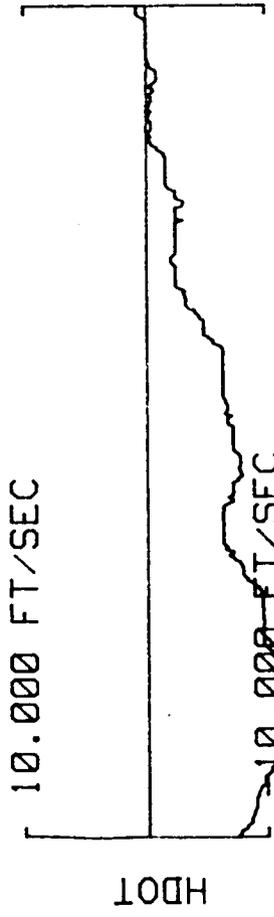
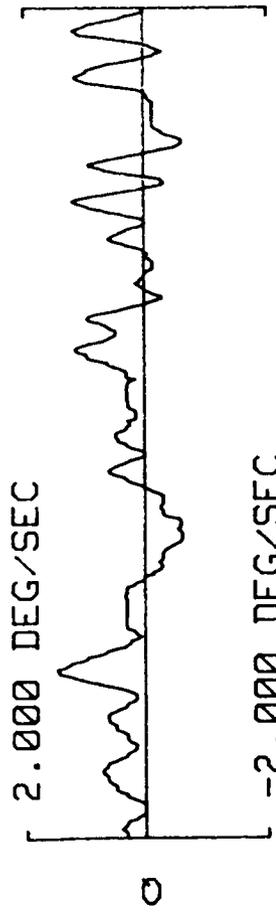
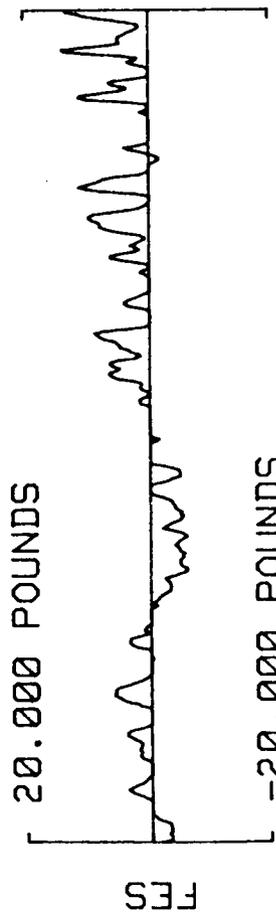
FLT 900 APP 1 CONF 20



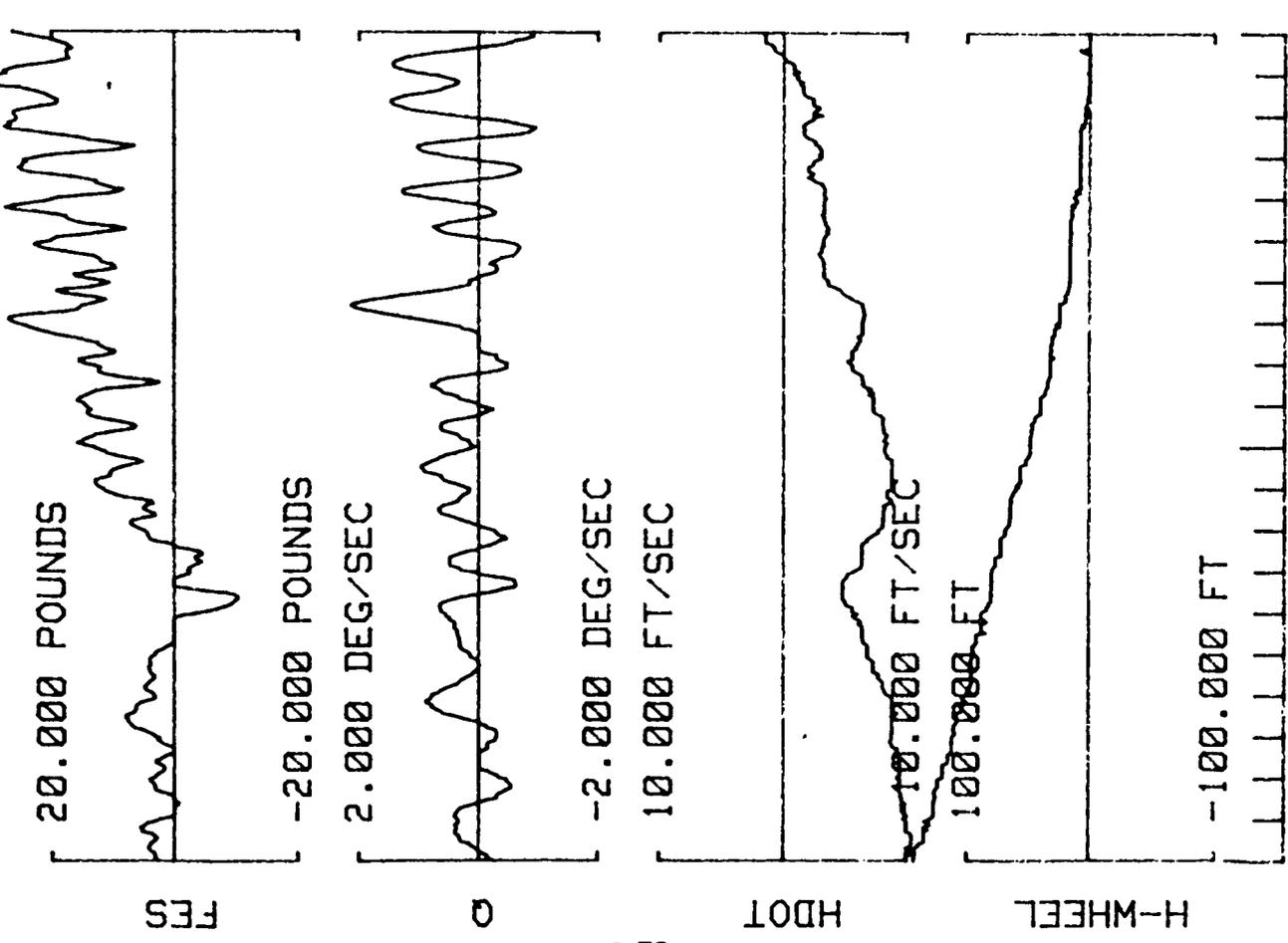
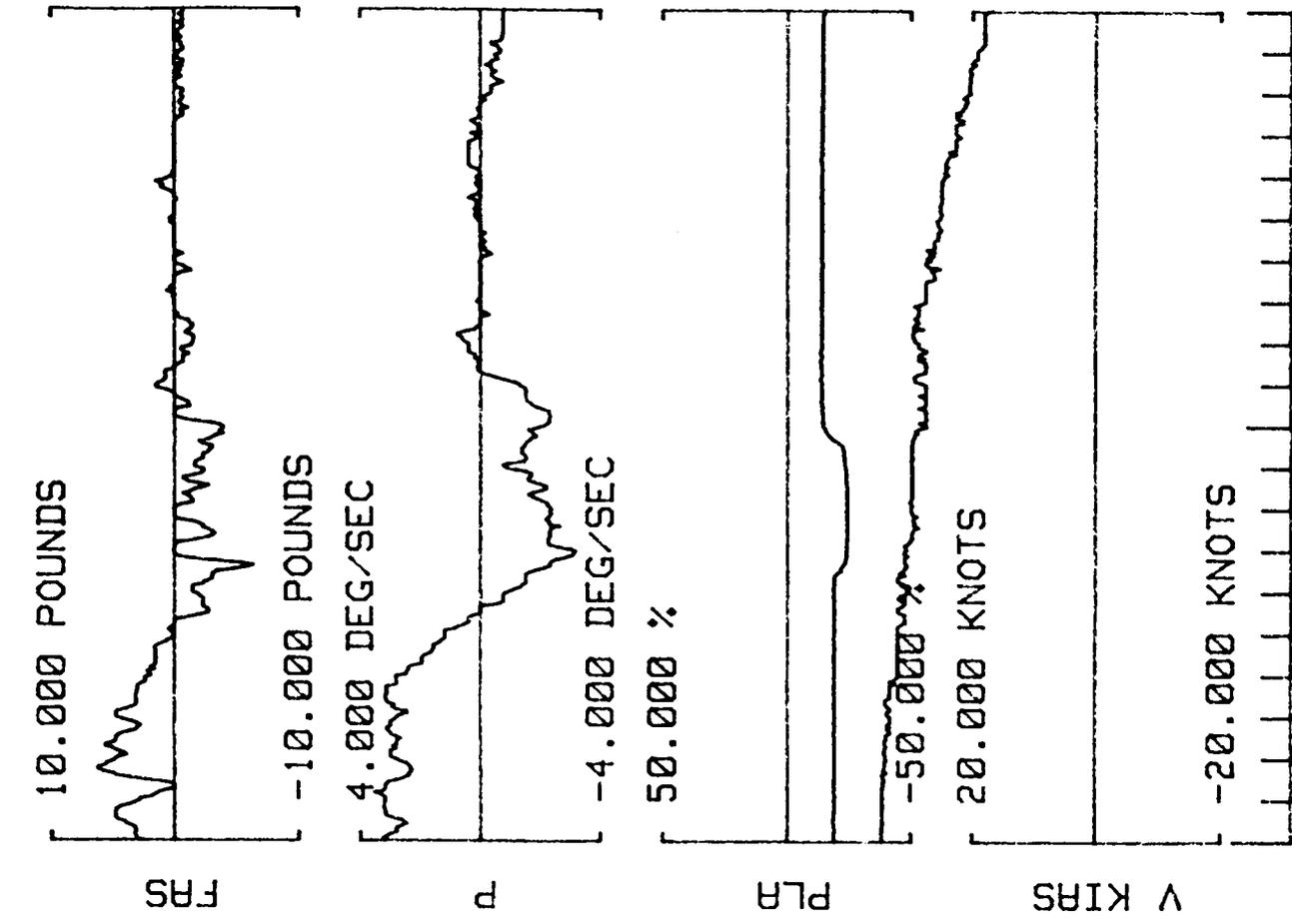
FLT 900

APP 2

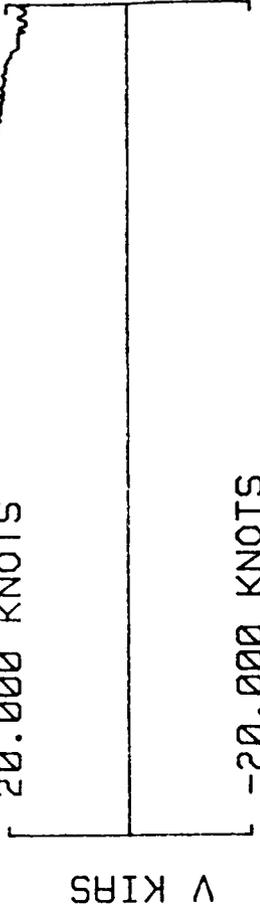
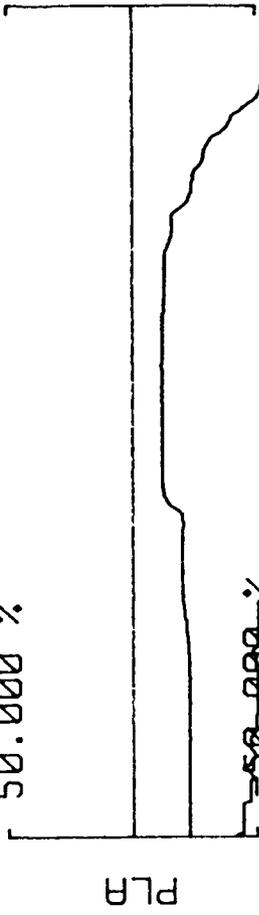
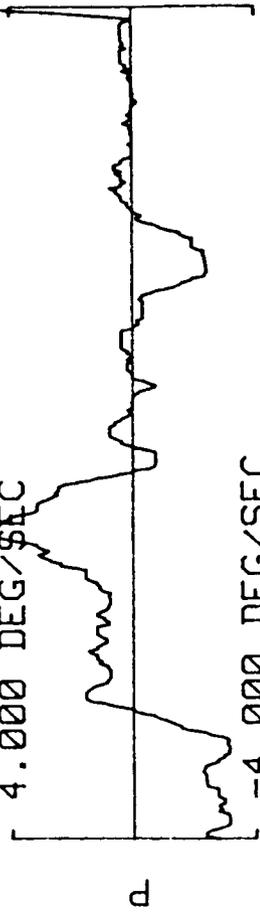
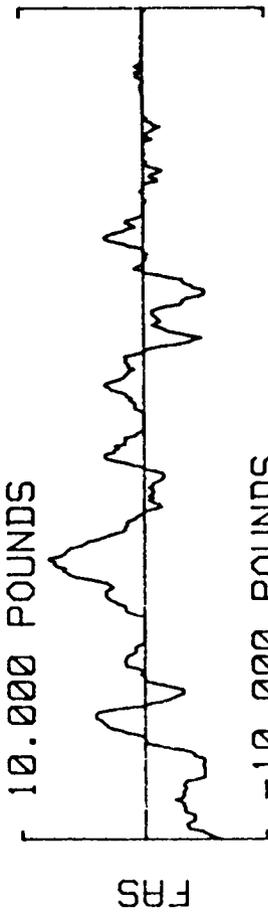
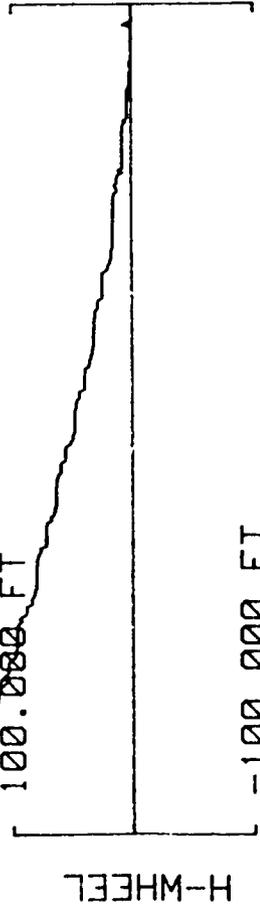
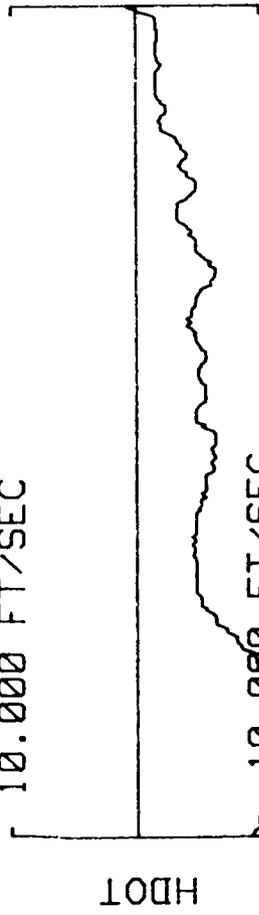
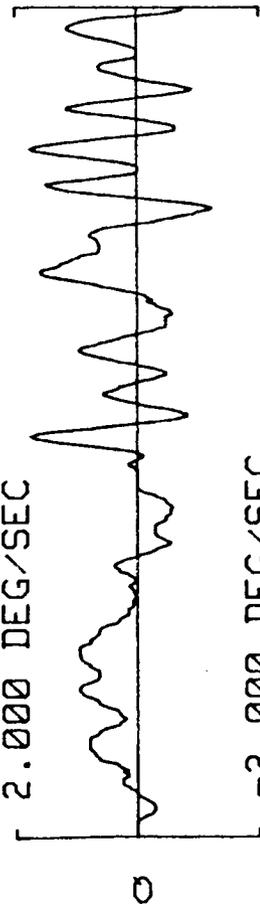
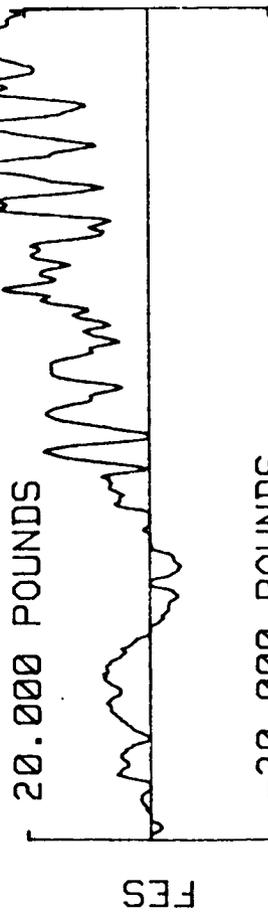
CONF 20



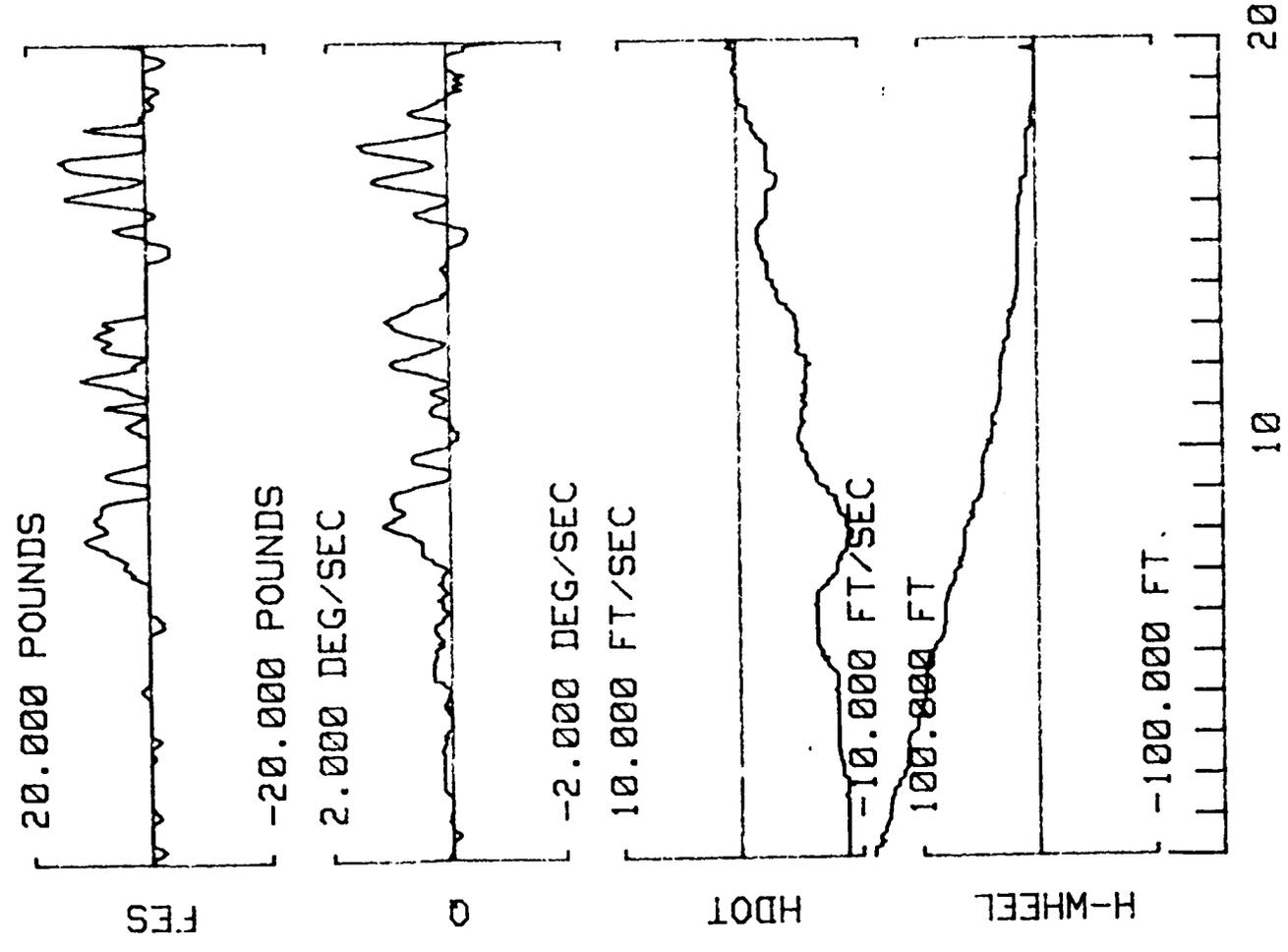
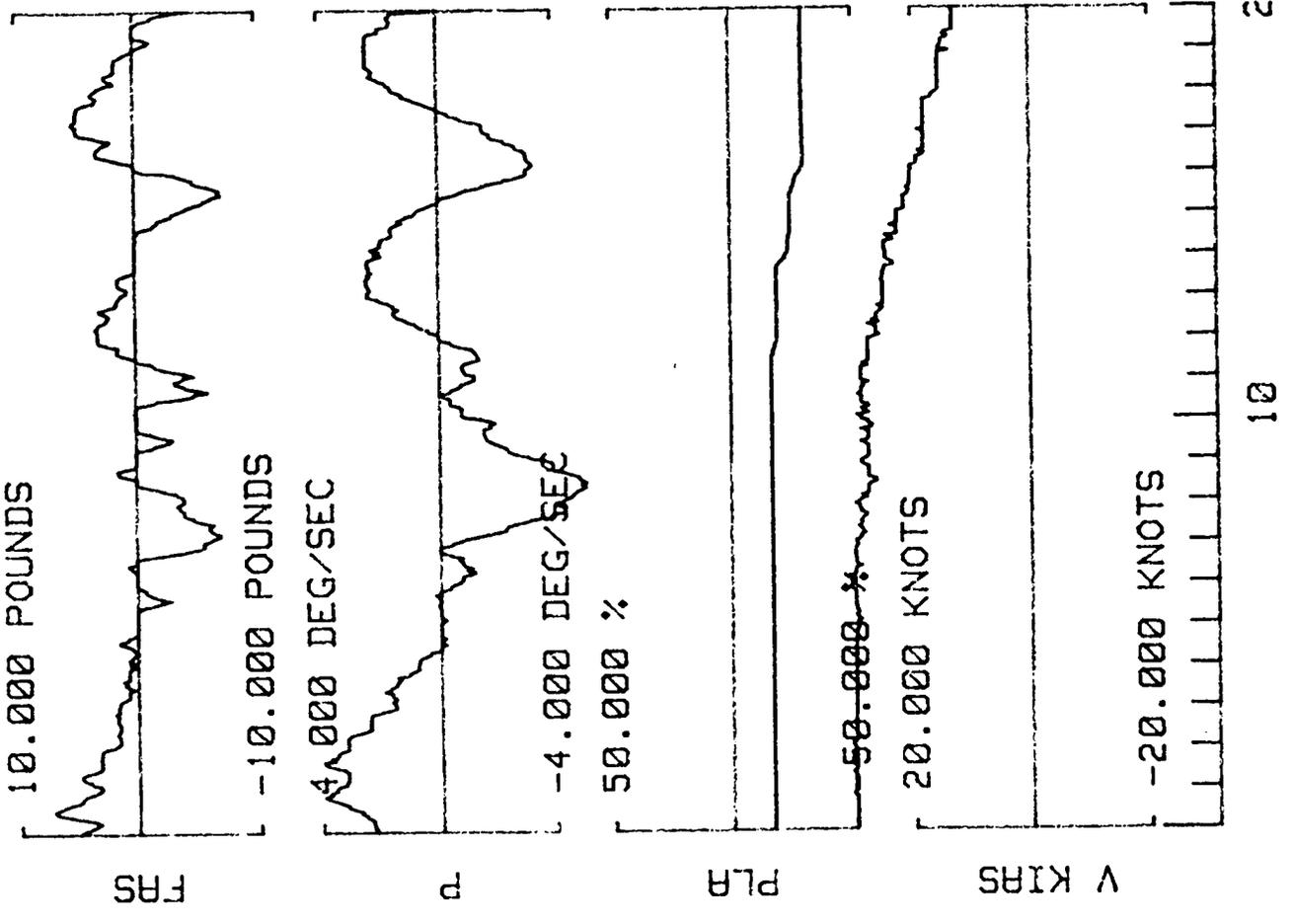
FLT 900 APP 3 CONF 1

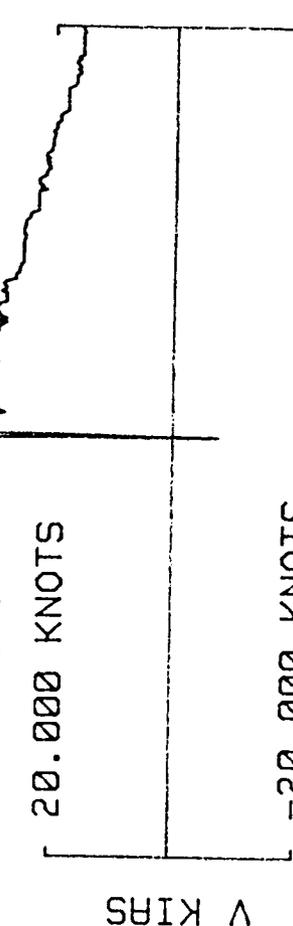
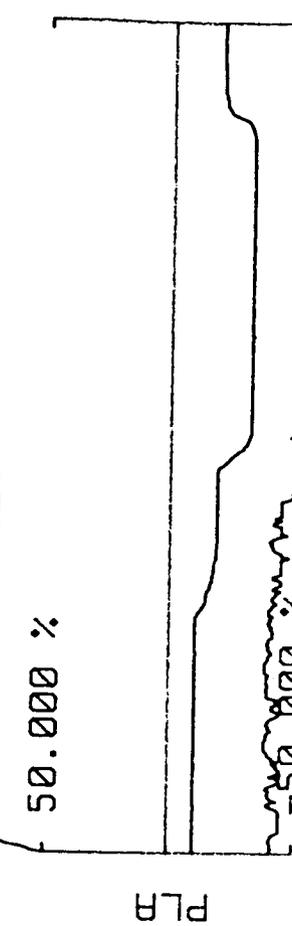
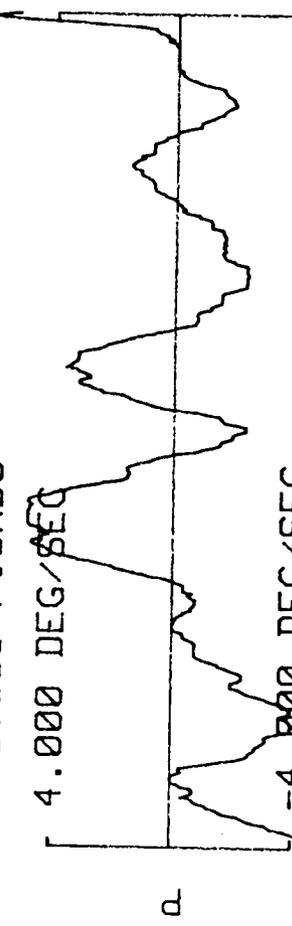
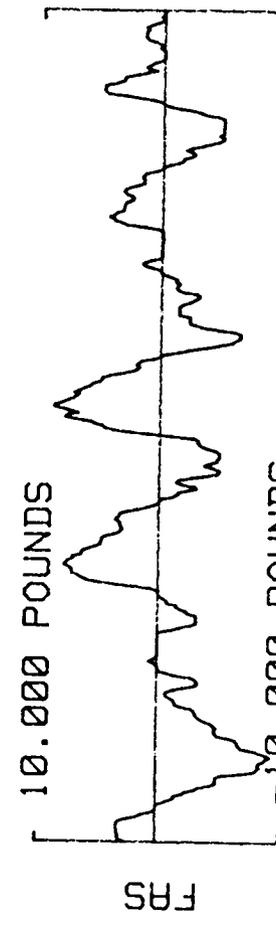
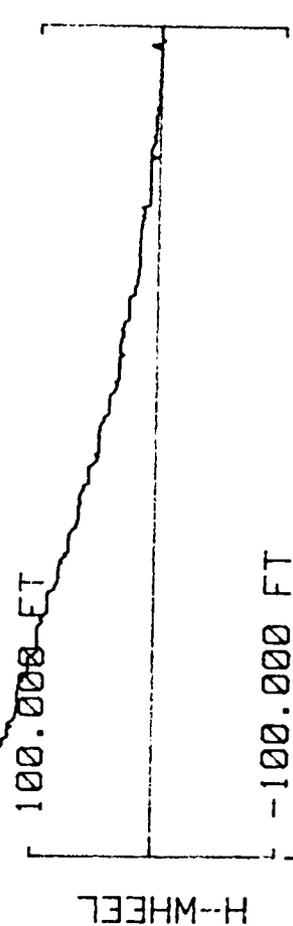
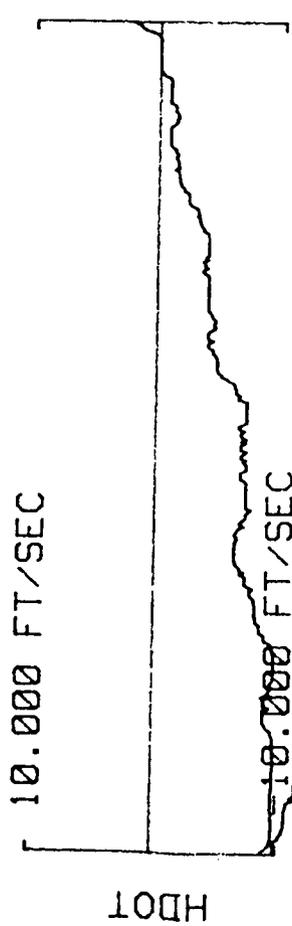
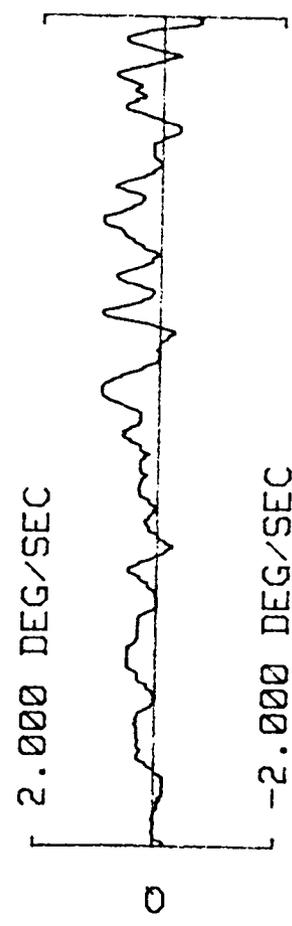
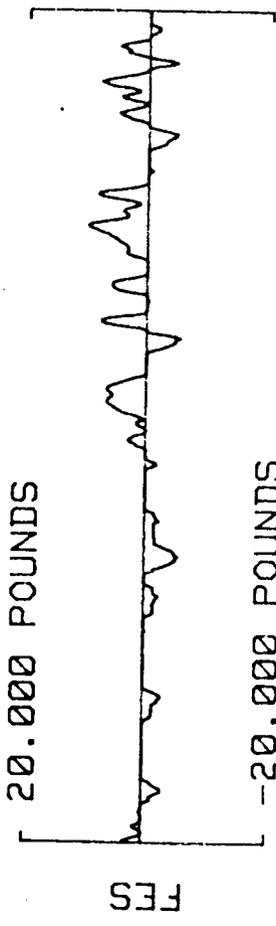


FLT 900 APP 4 CONF 1



FLT 900 APP 5 CONF 2

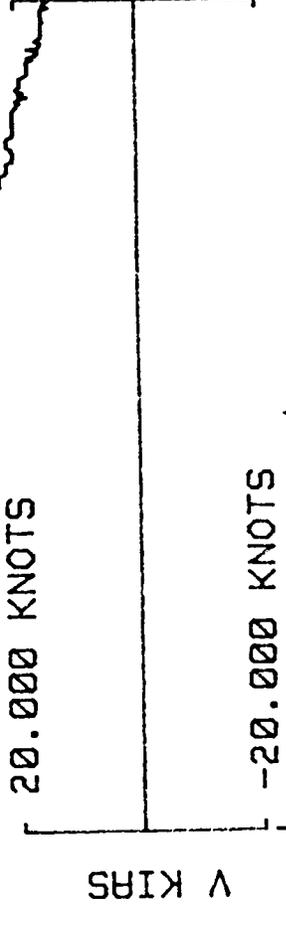
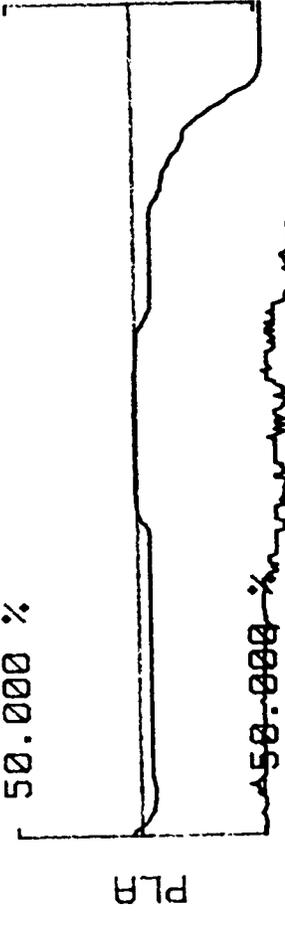
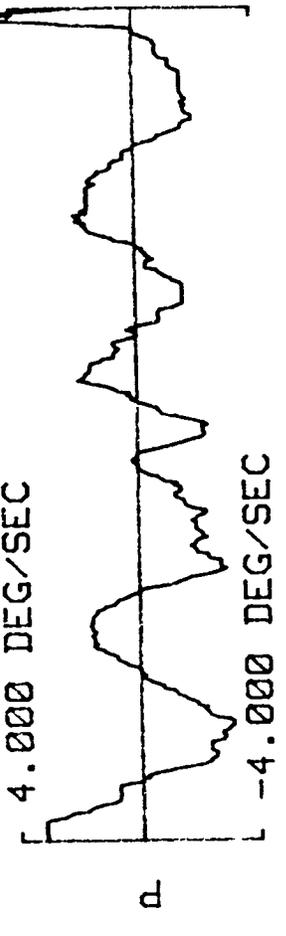
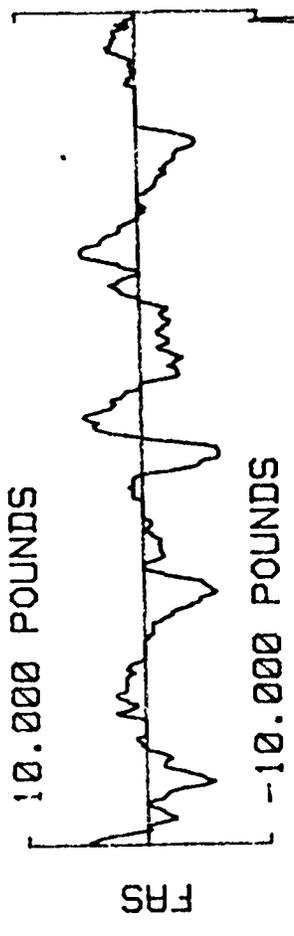
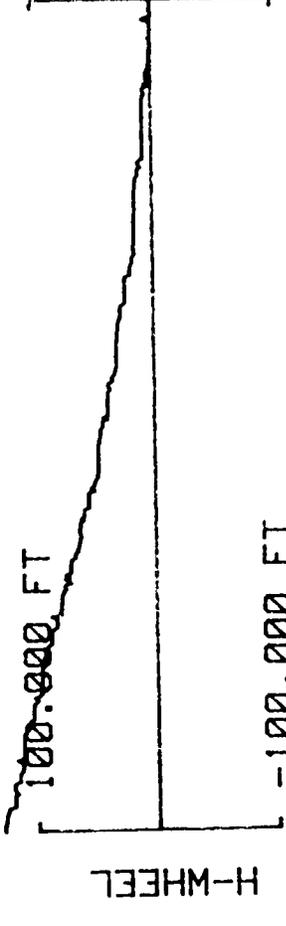
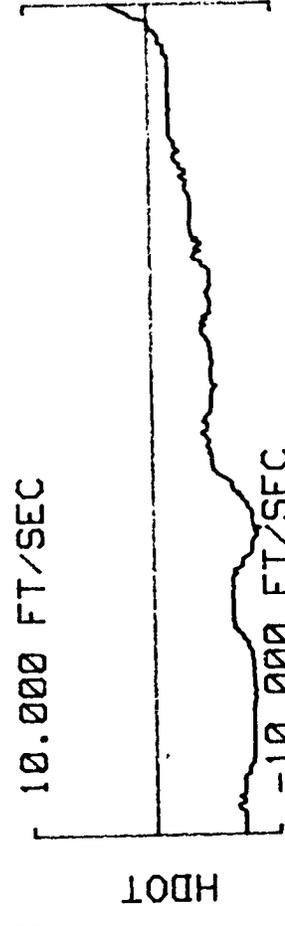
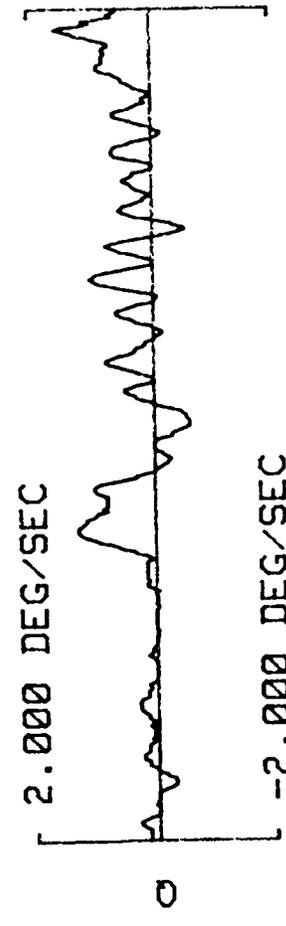
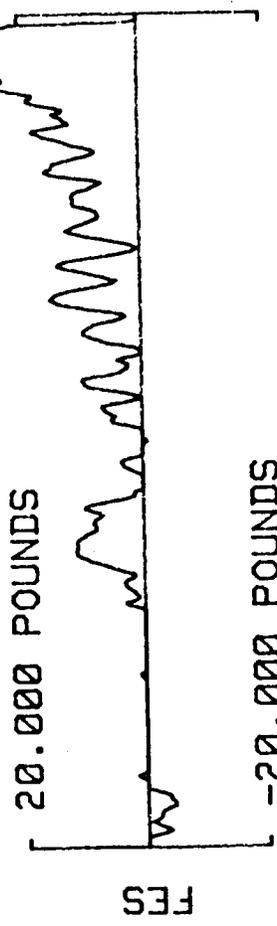




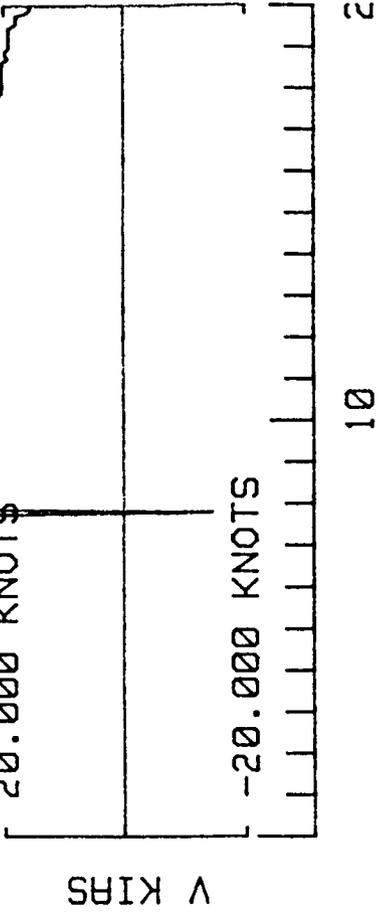
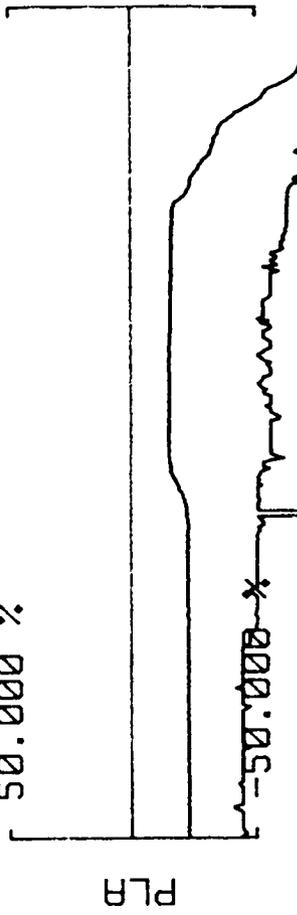
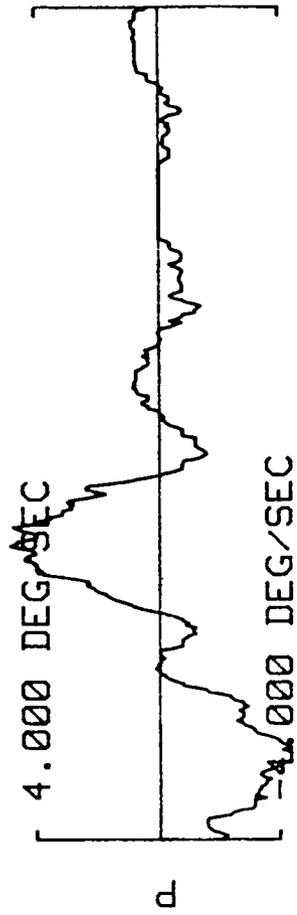
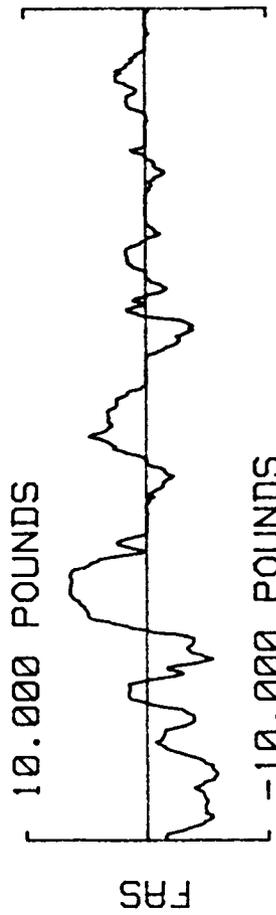
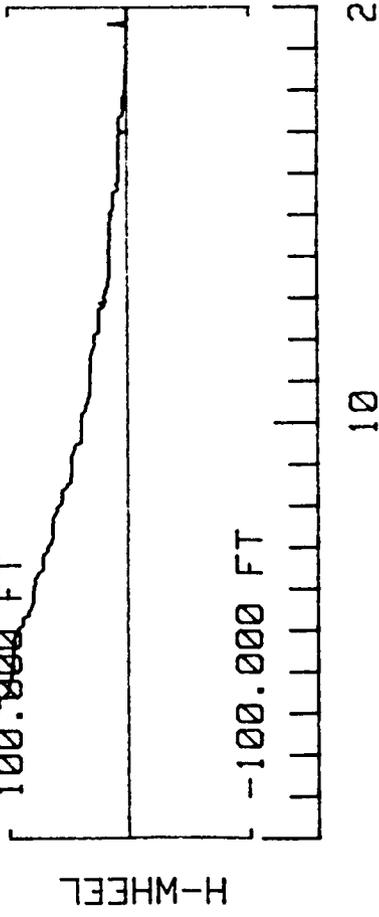
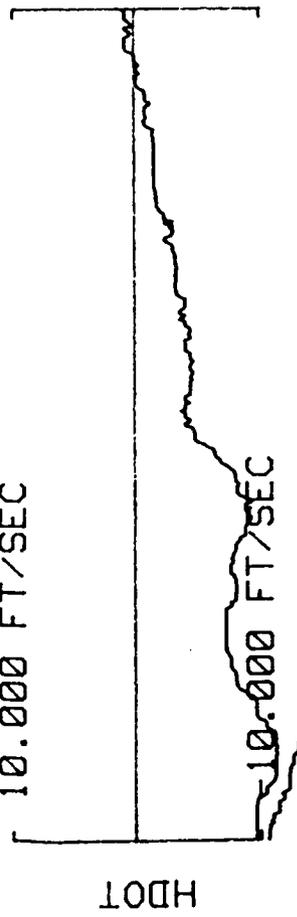
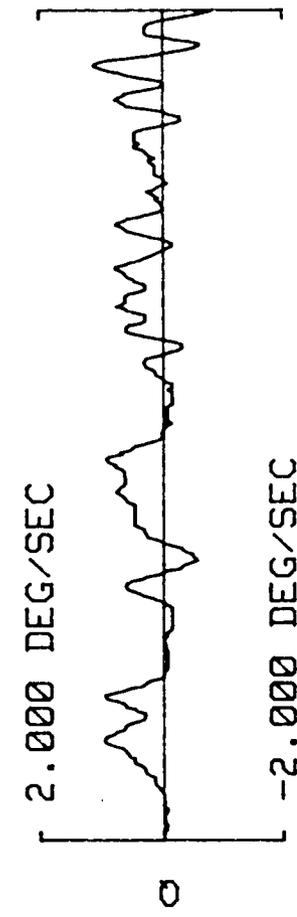
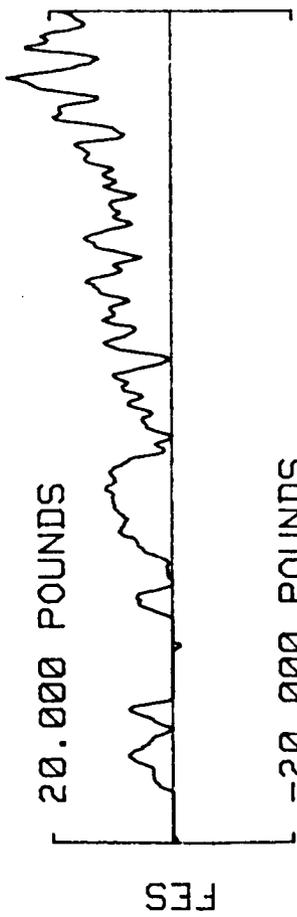
FLT 900

APP 7

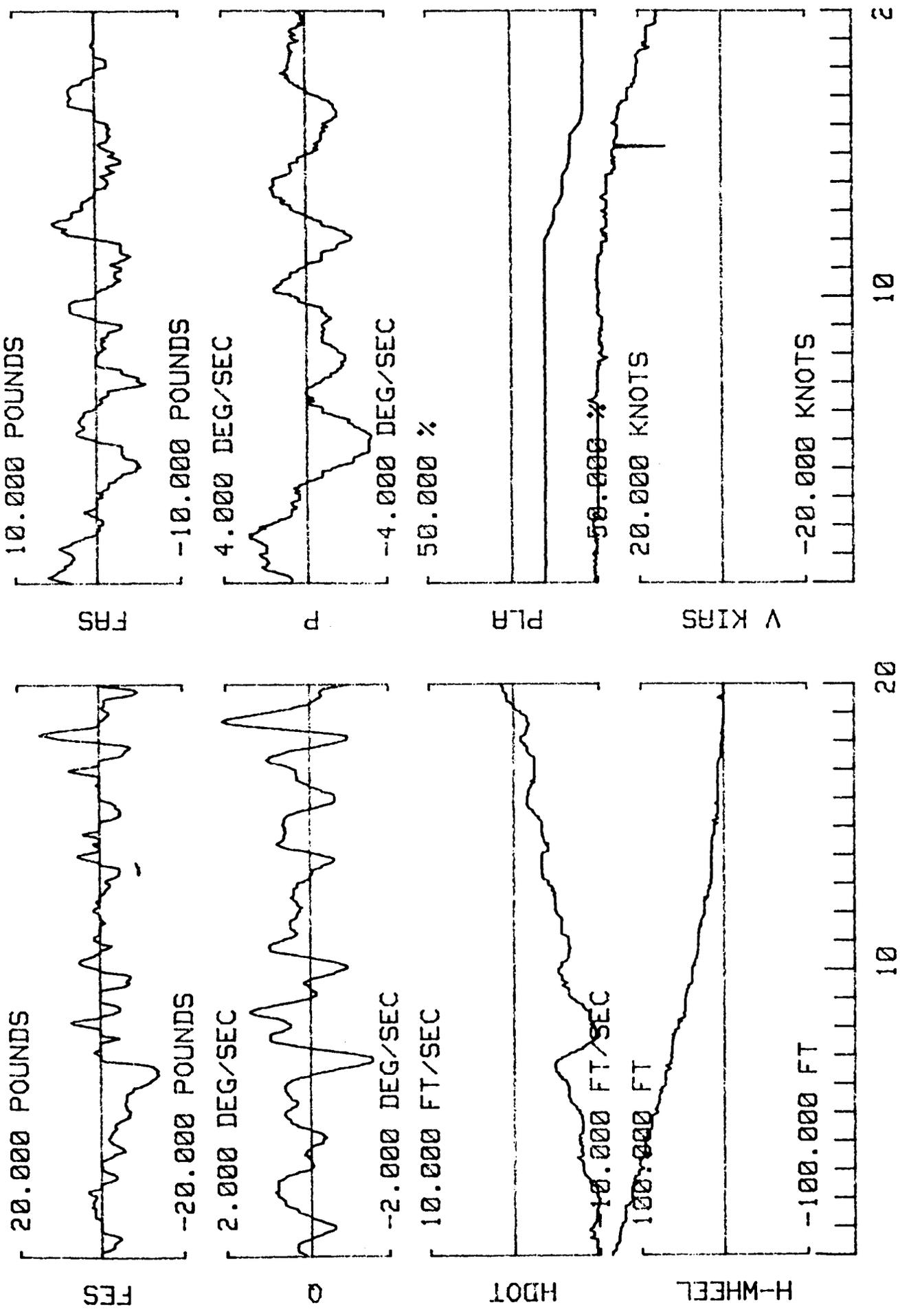
CONF 4

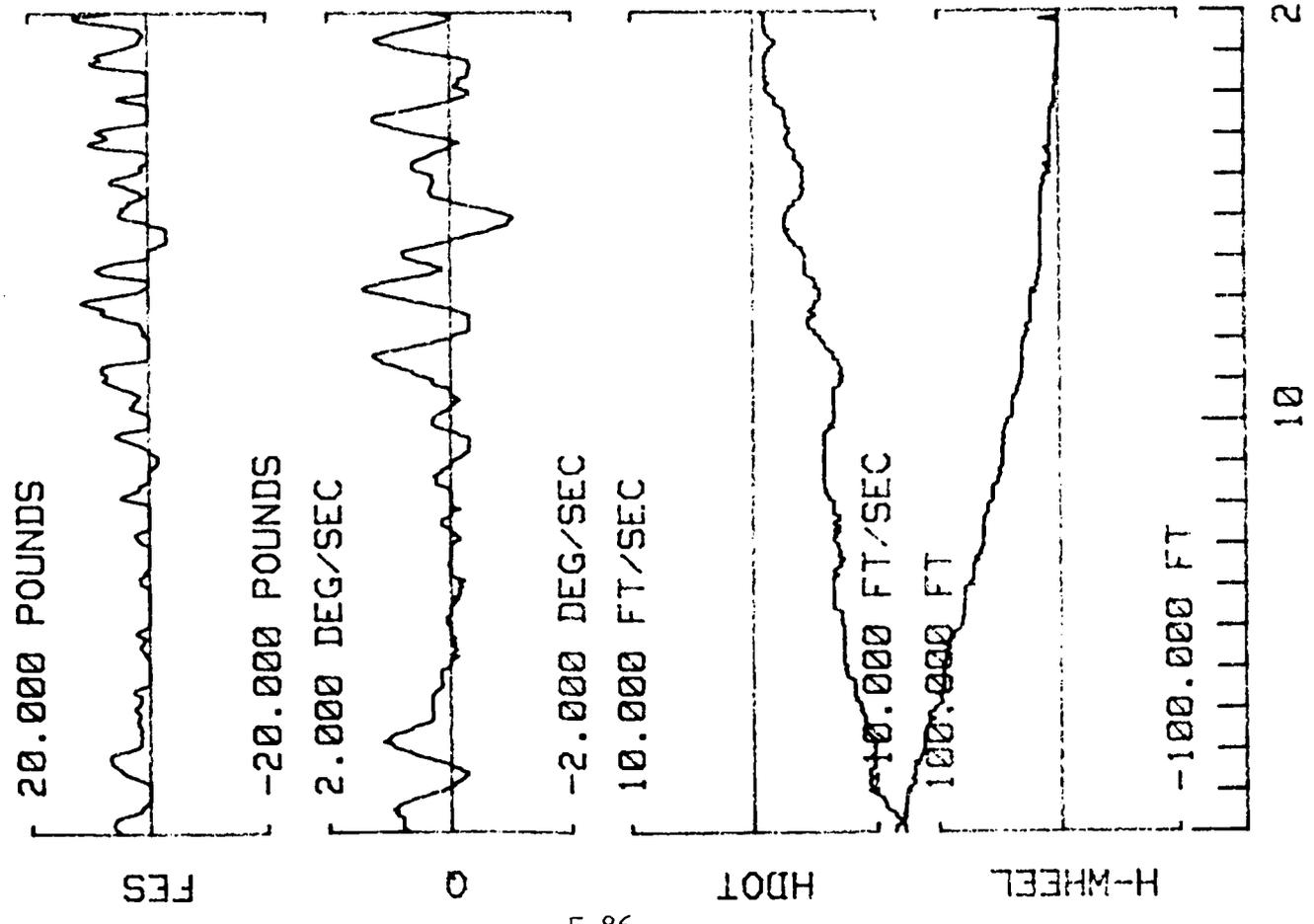
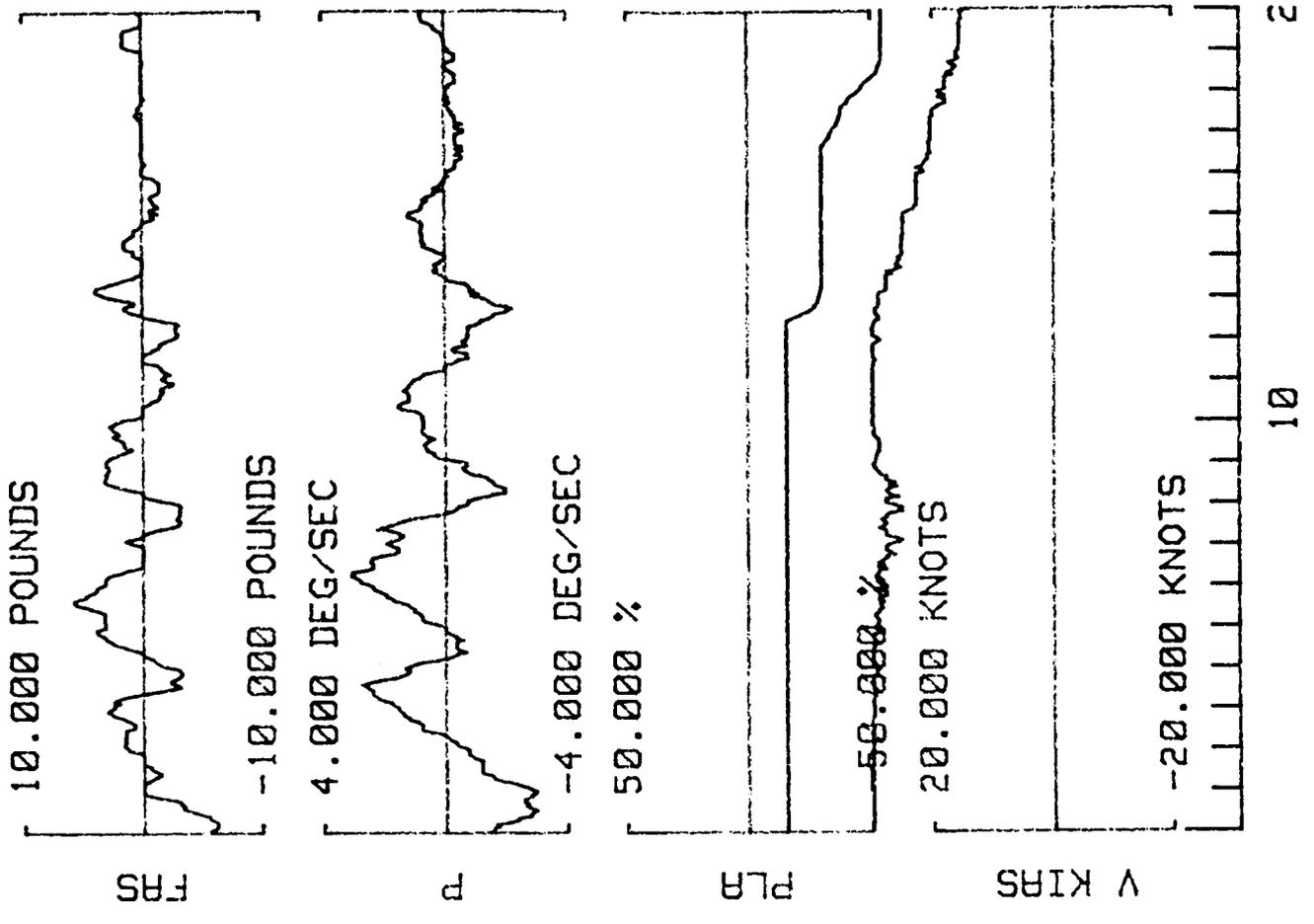


FLT 900 APP 8 CONF 4

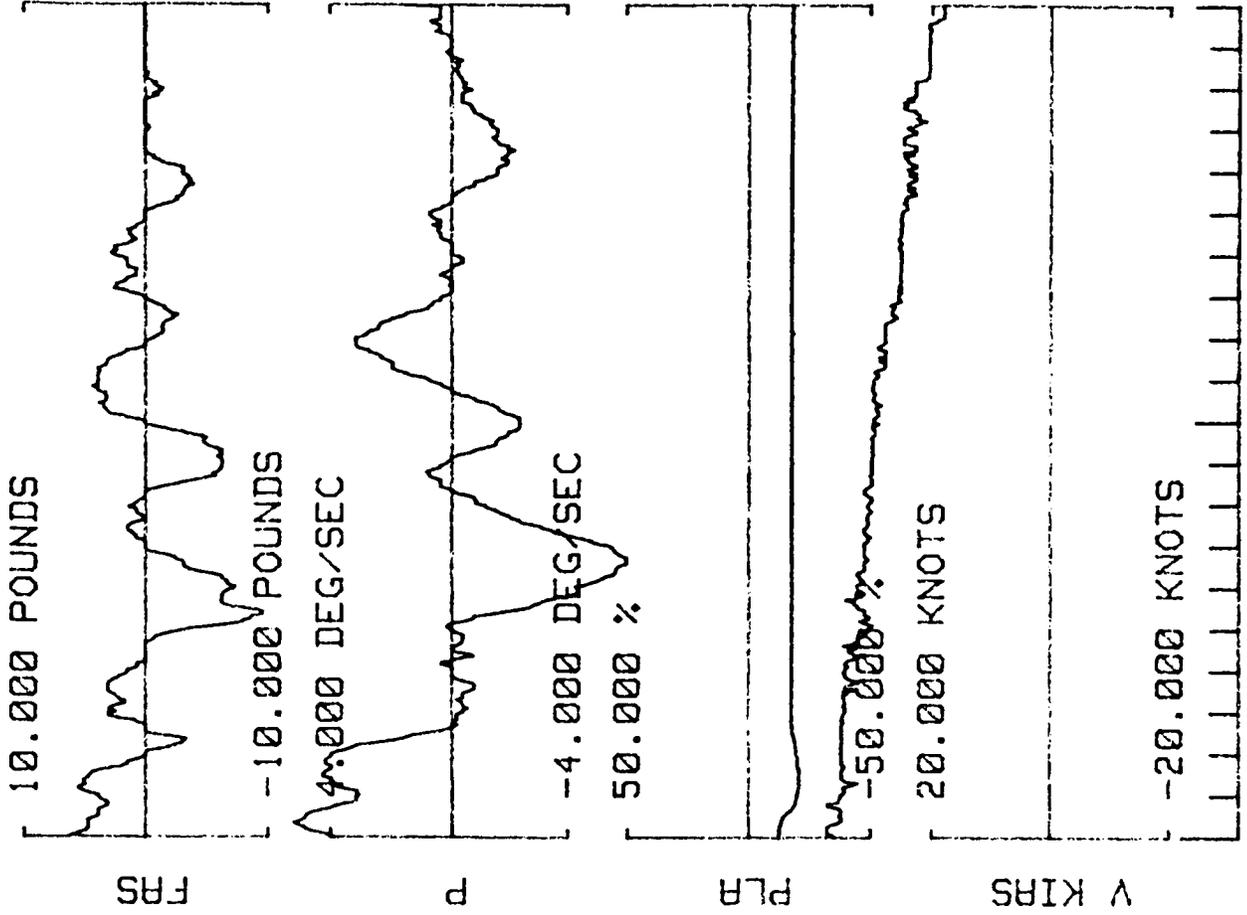
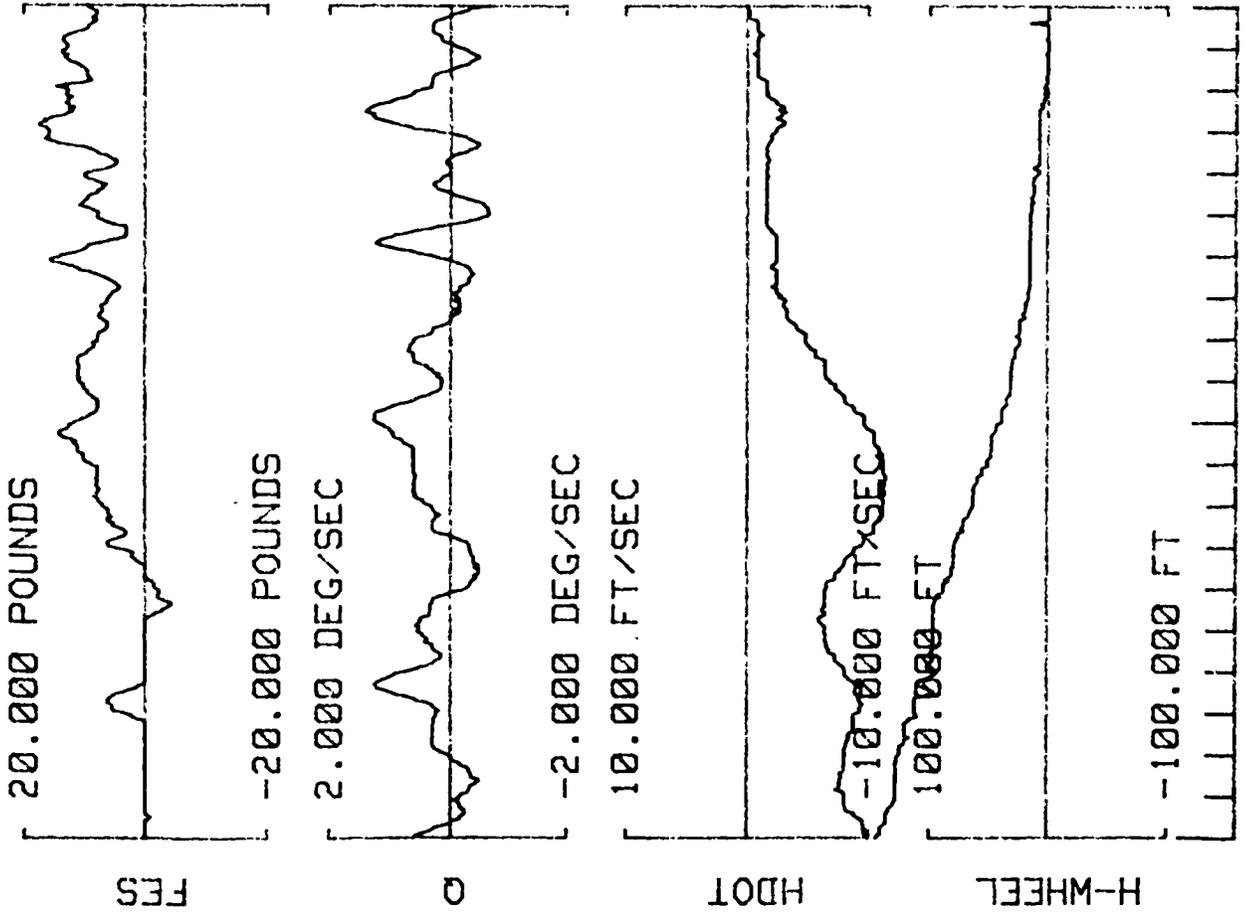


FLT 900 APP 9 CONF 5



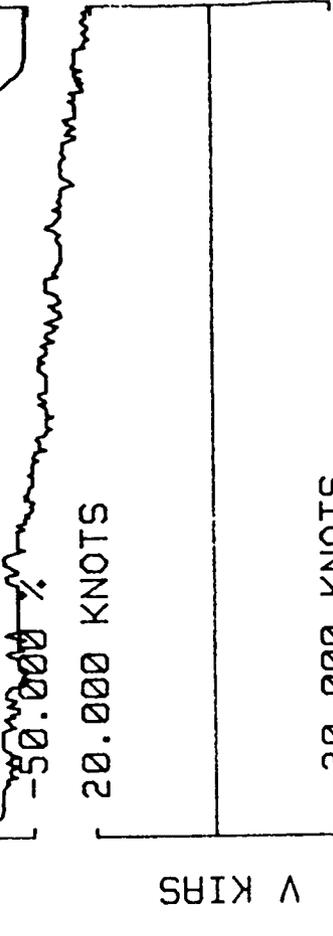
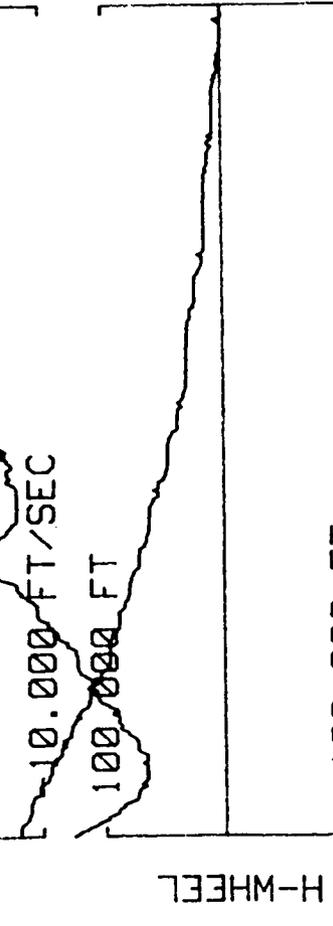
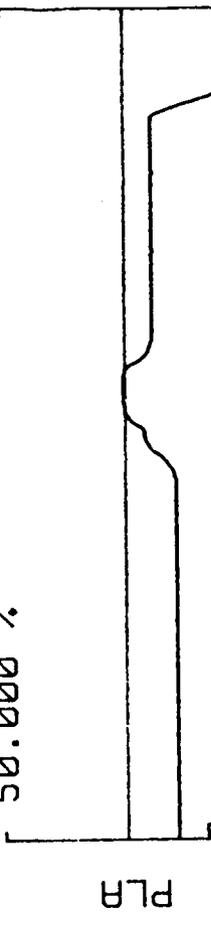
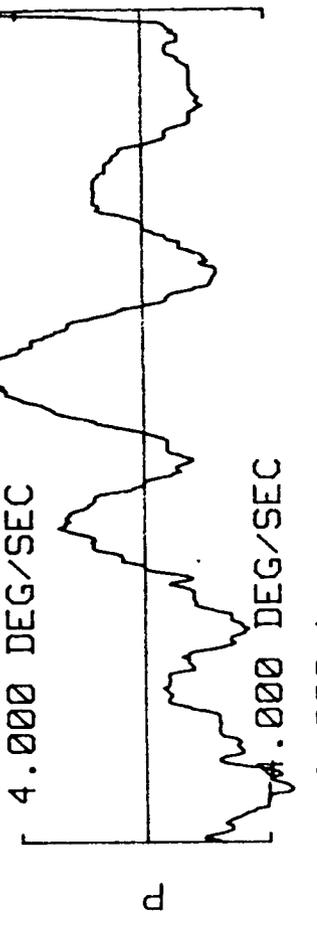
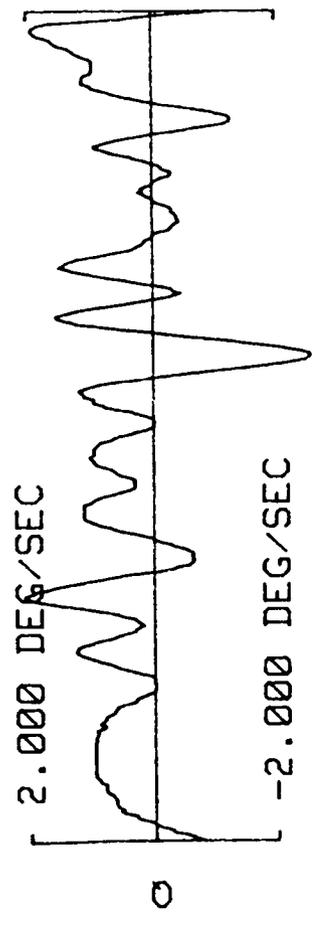
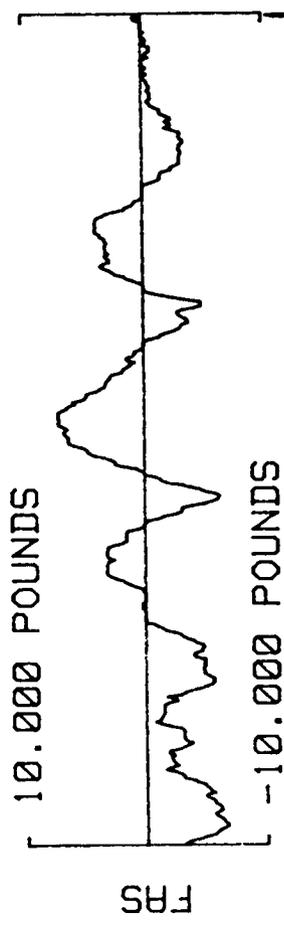
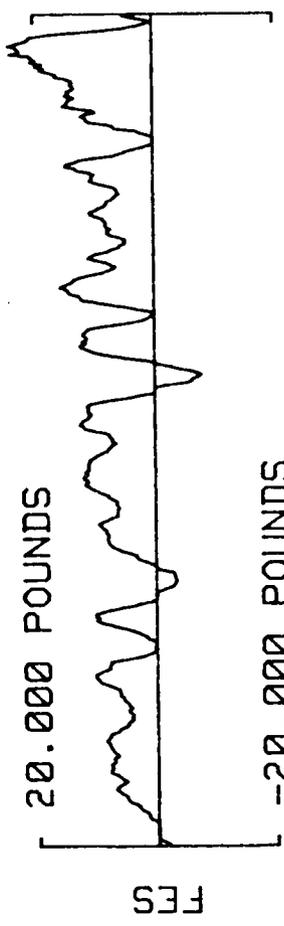


FLT 901 APP 1 CONF B



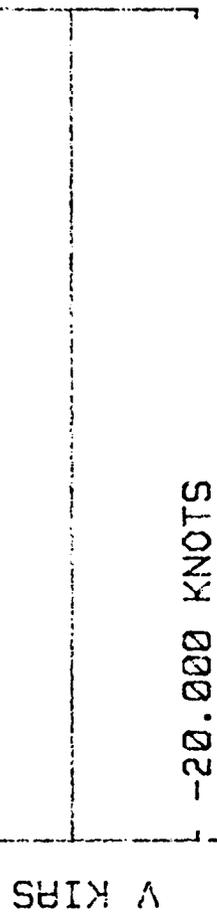
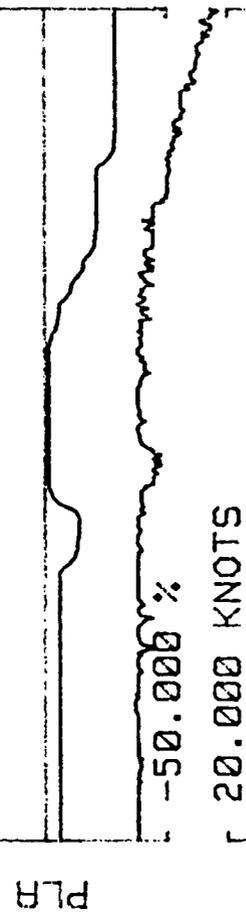
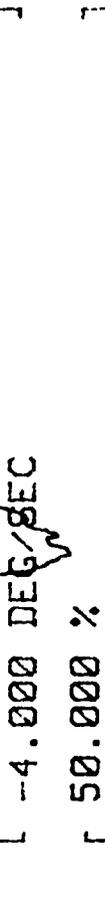
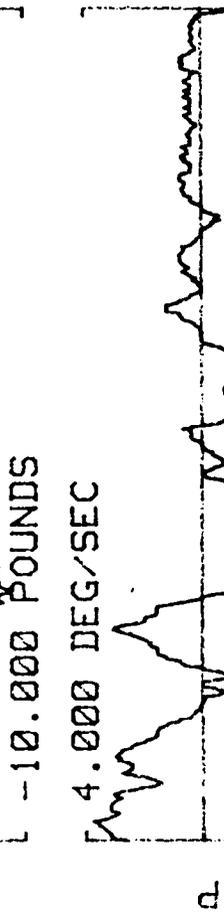
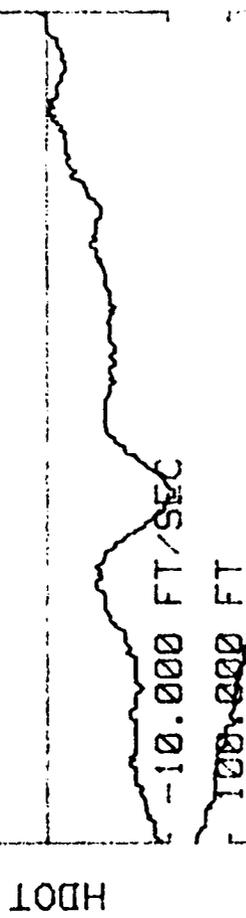
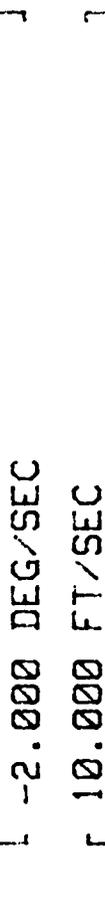
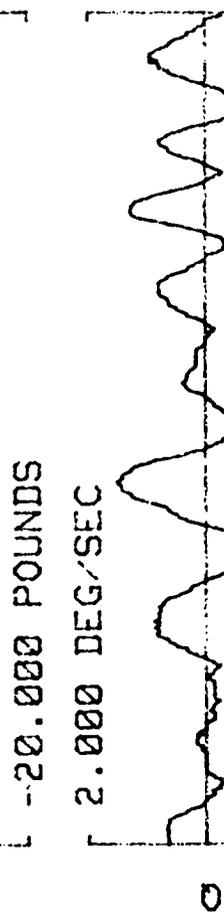
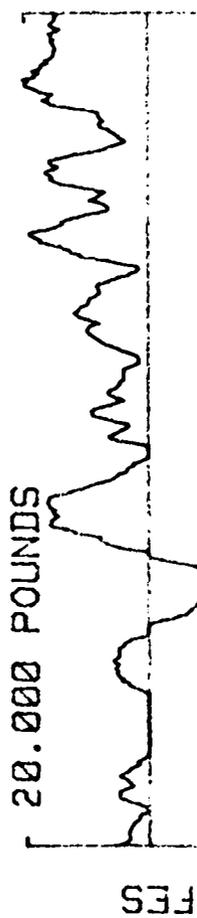
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FLT 901 APP 2 CONF B



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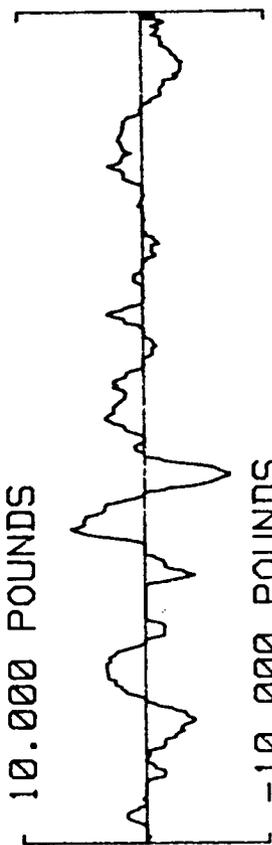
FLT 901 APP 4 CONF 25



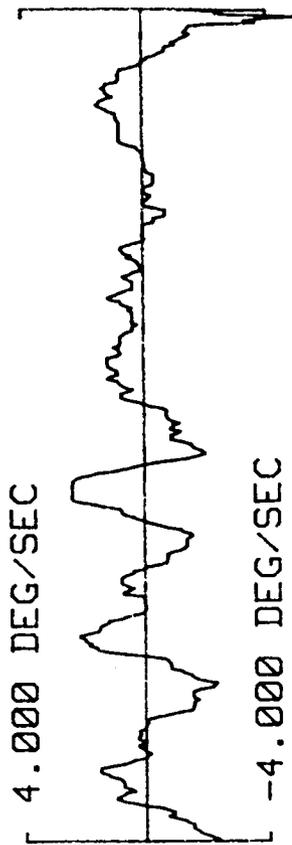
CONF 25

APP 5

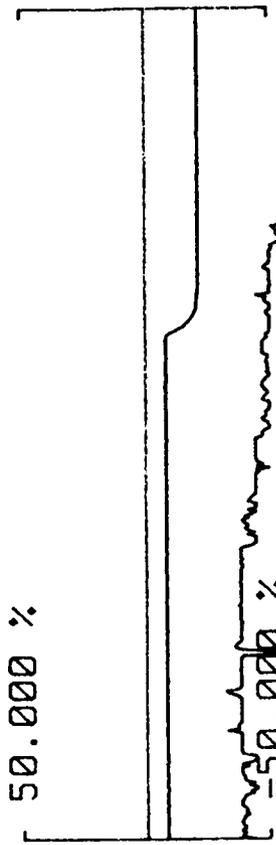
FLT 901



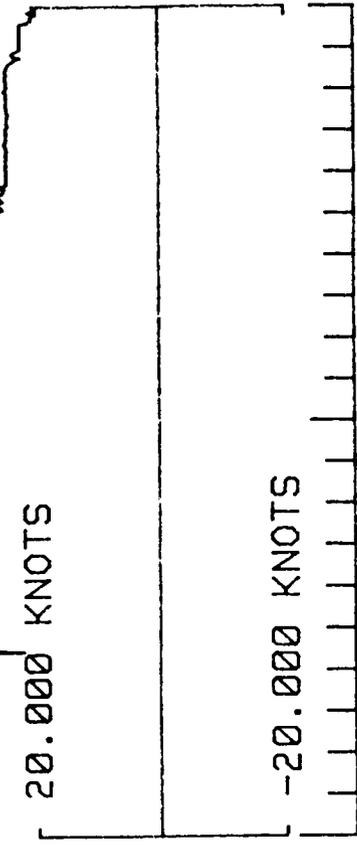
FFS



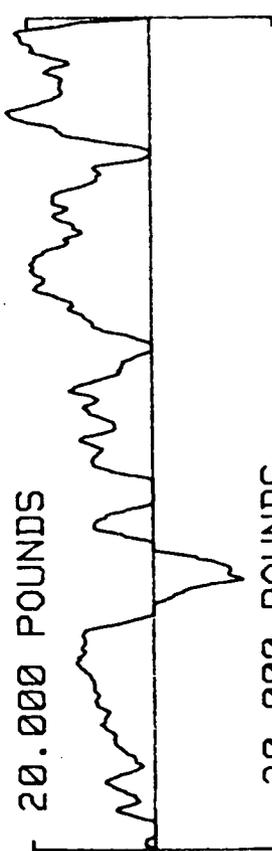
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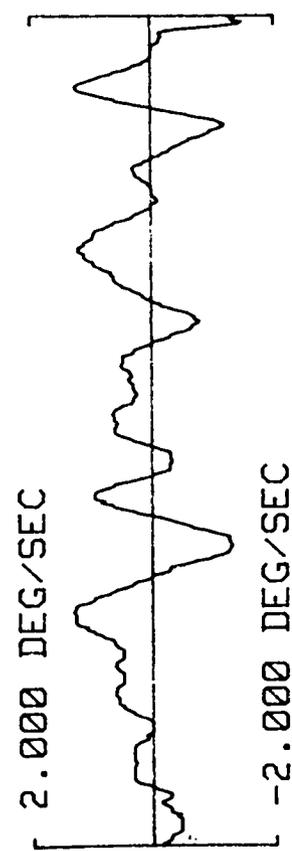
PLR



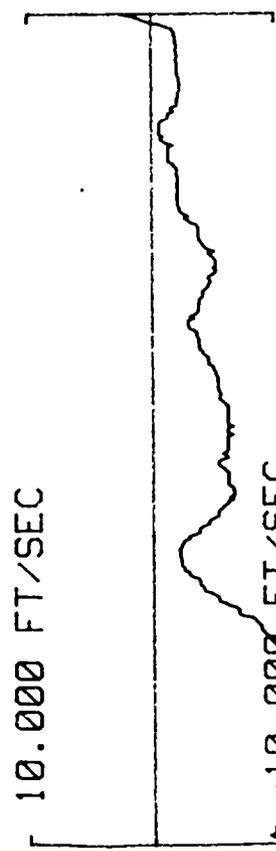
V KIRS



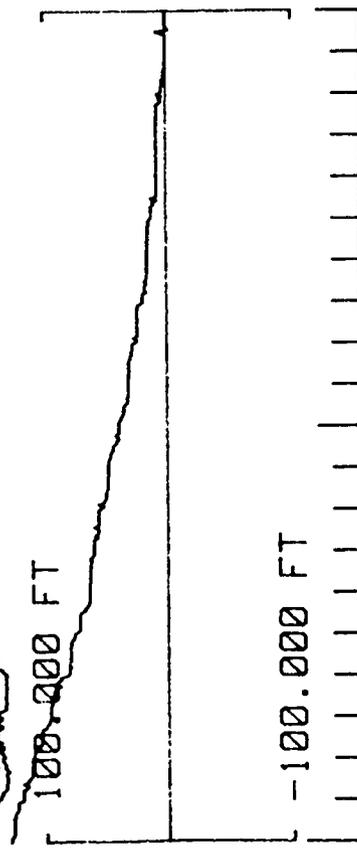
FES



Q



HDOT



H-WHEEL

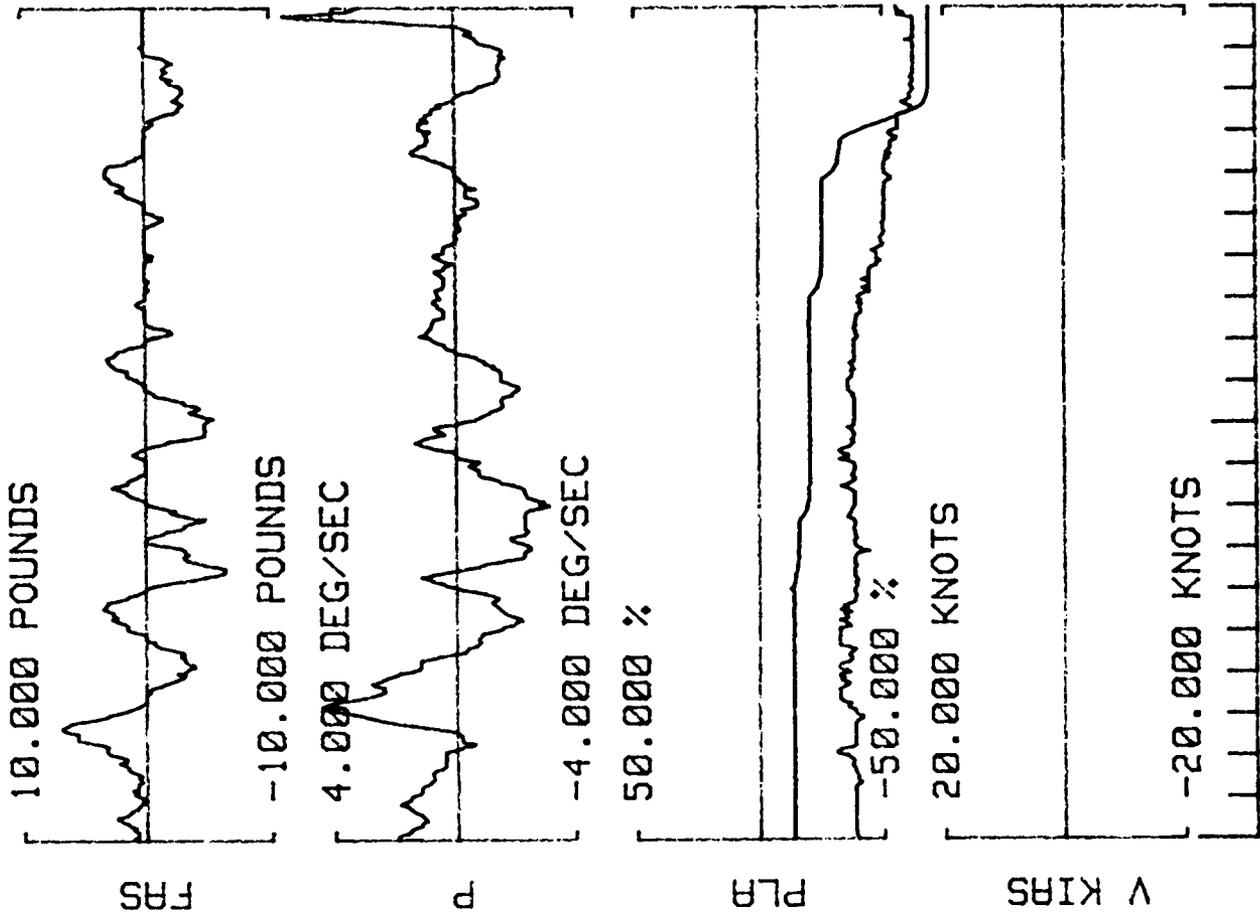
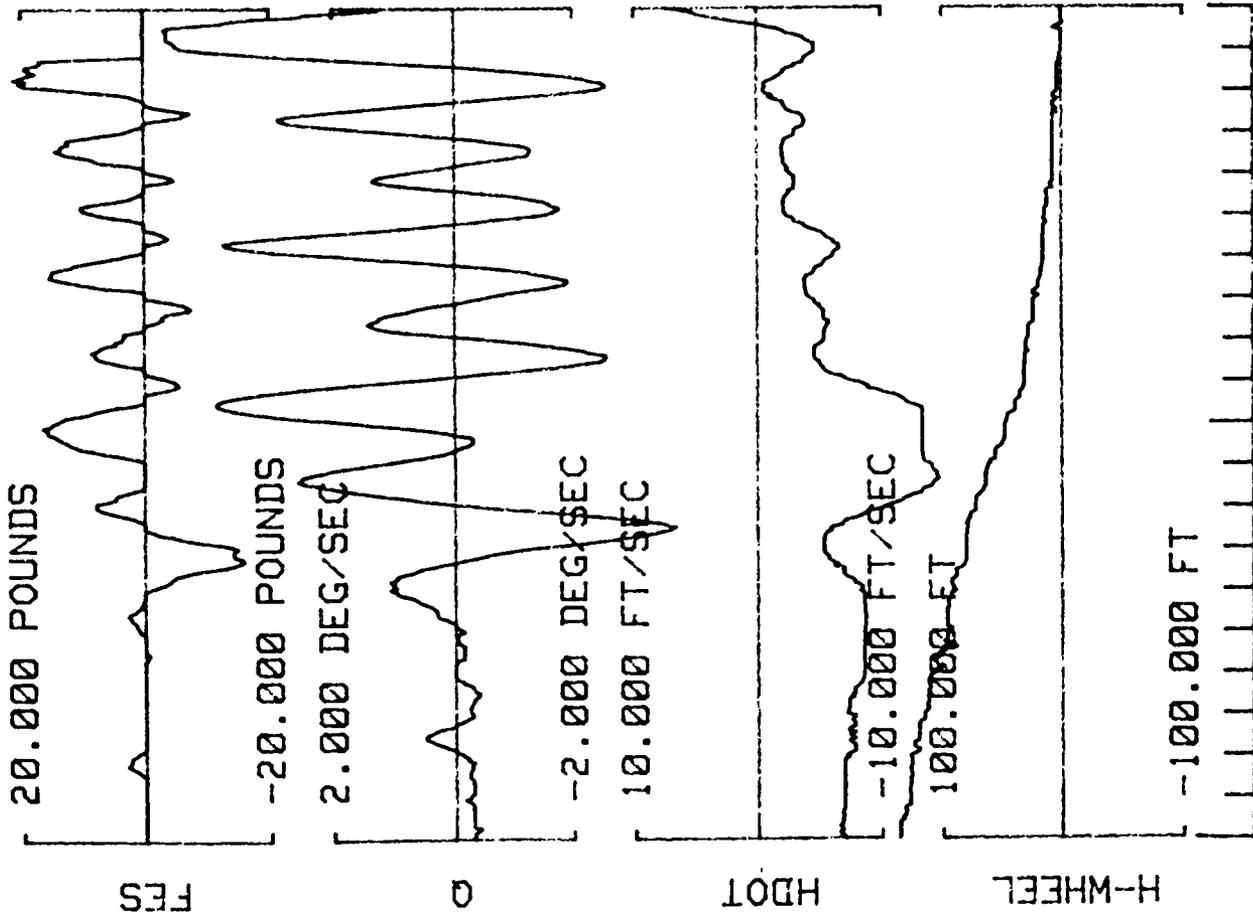
06-E

10 20

10 20

FLT 901. APP 6

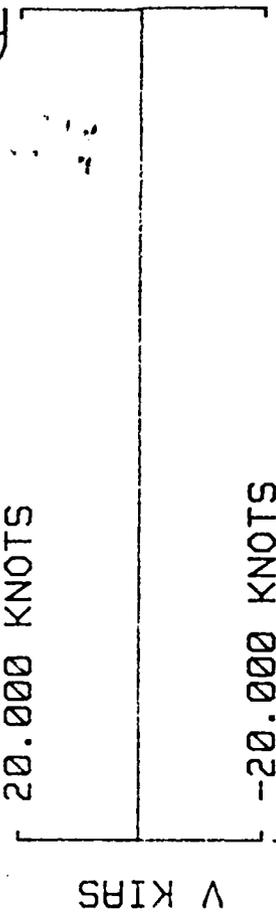
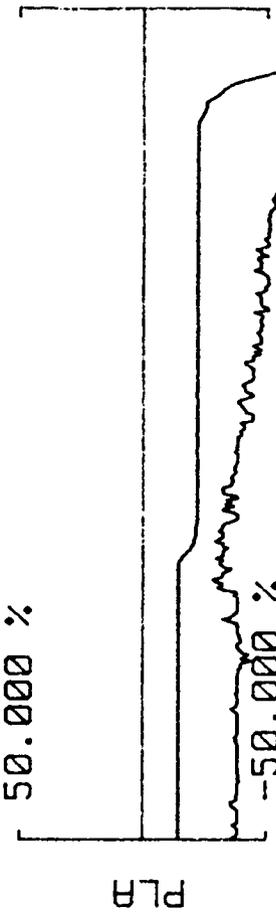
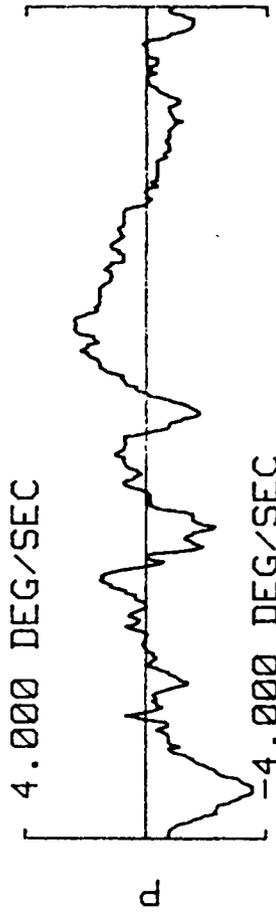
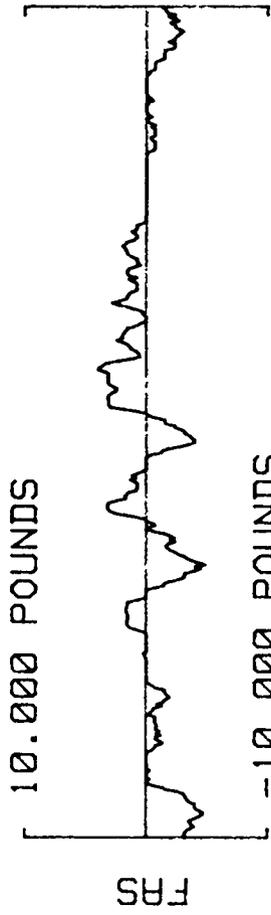
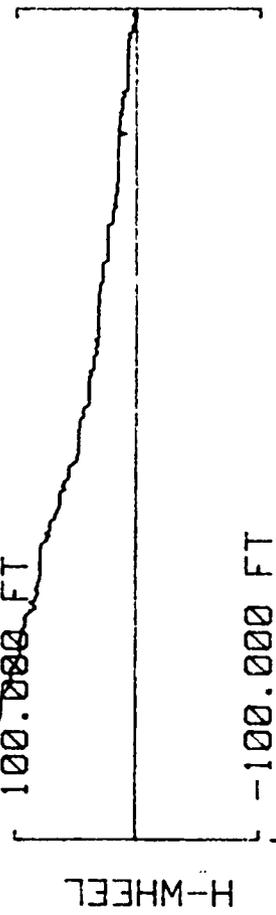
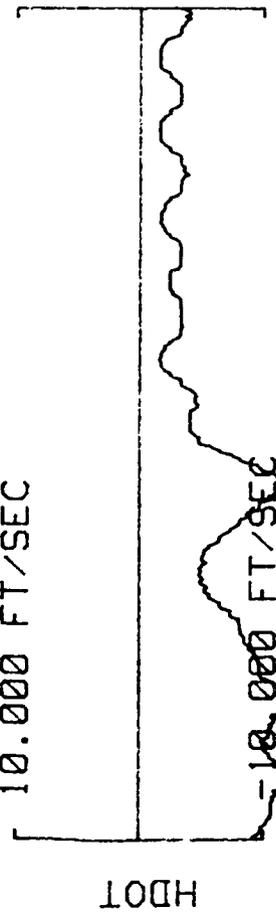
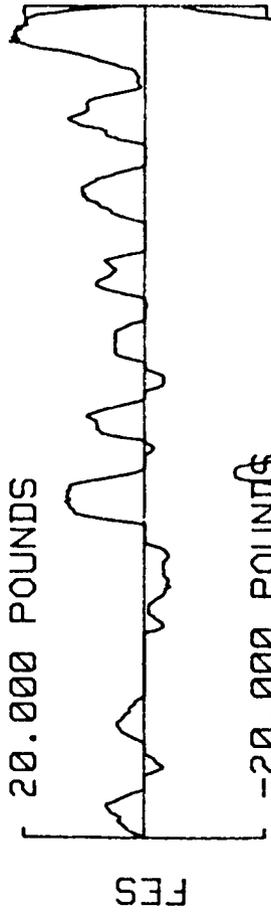
CONF 28



1-6-E

10 20

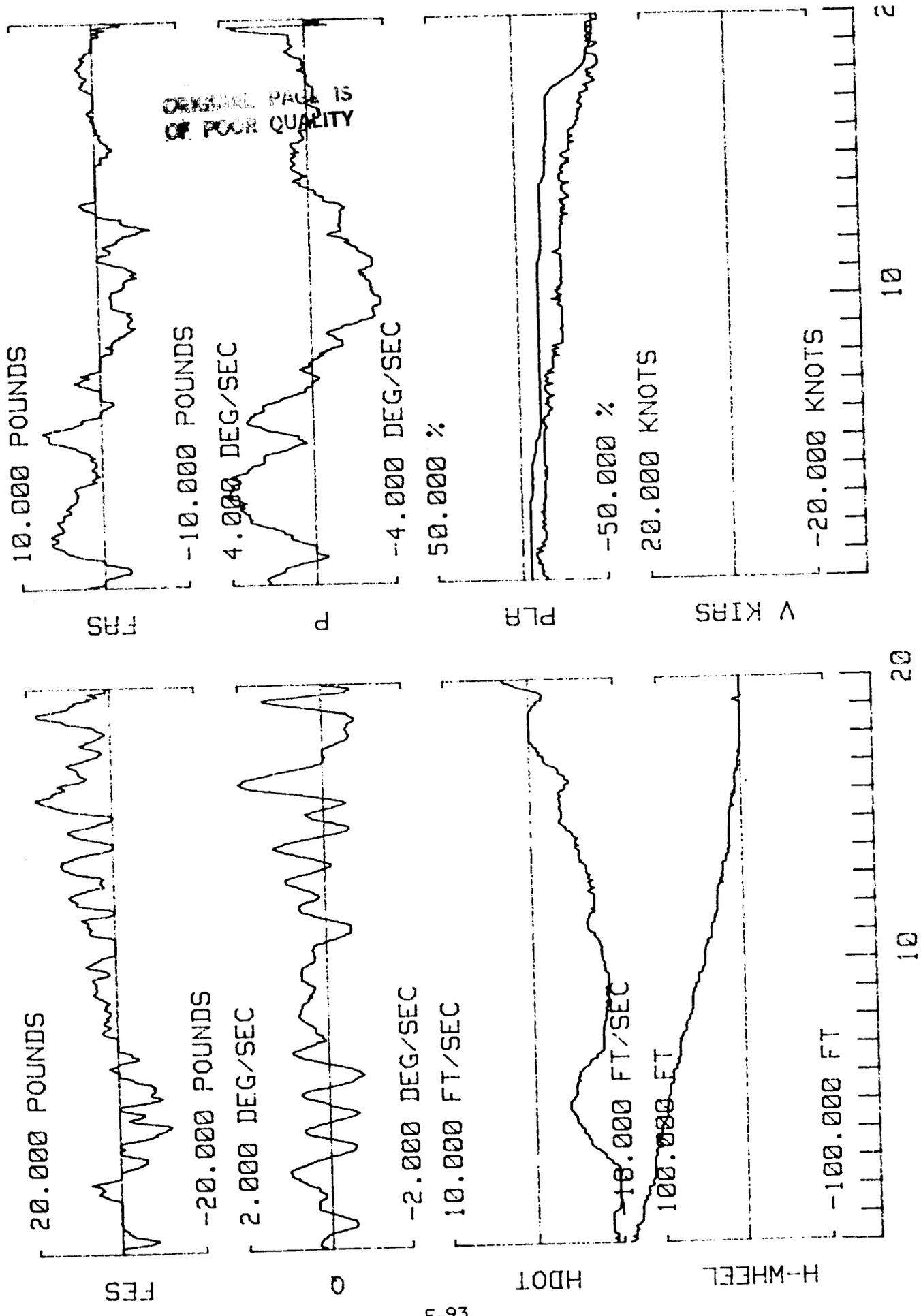
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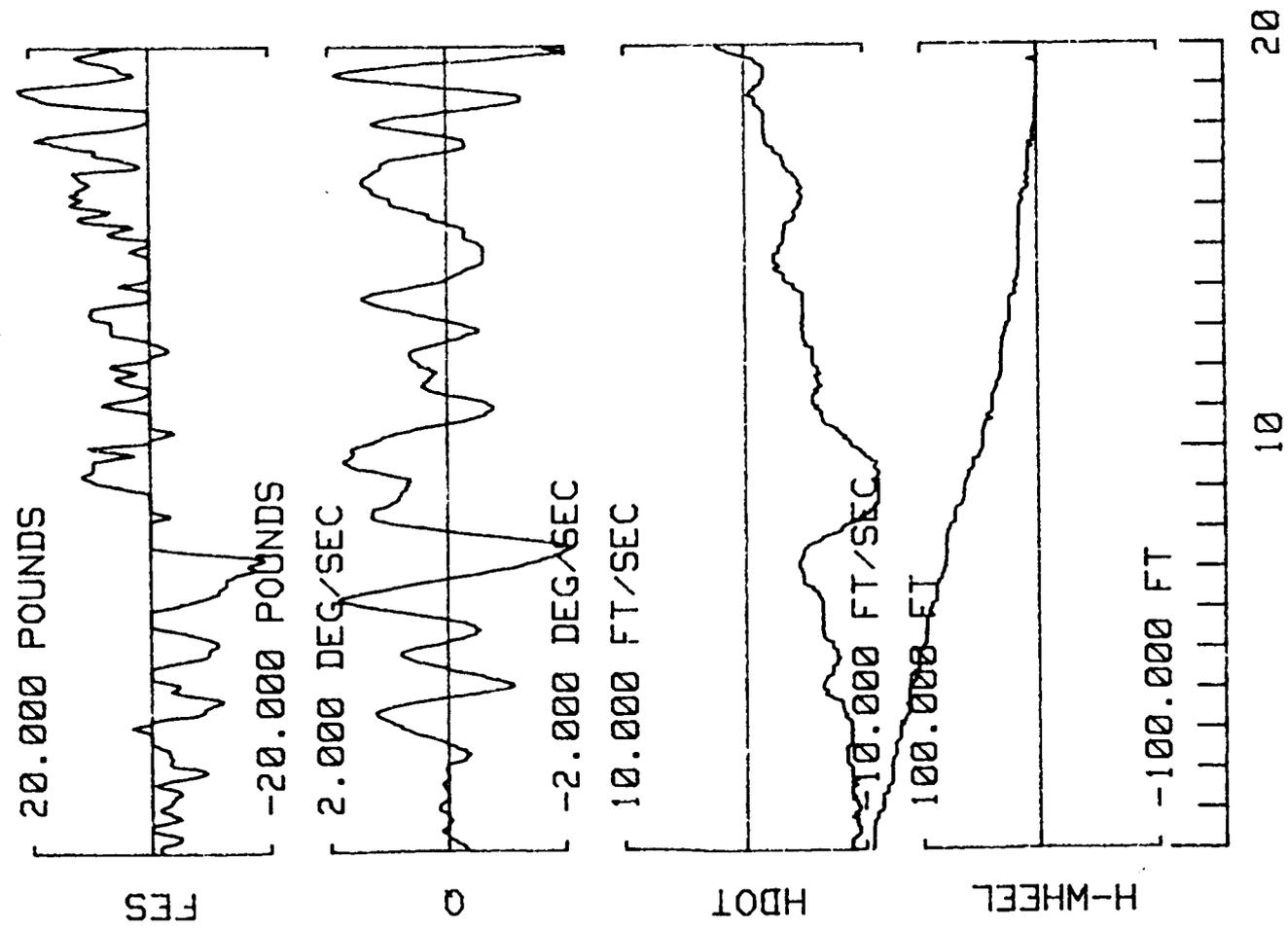
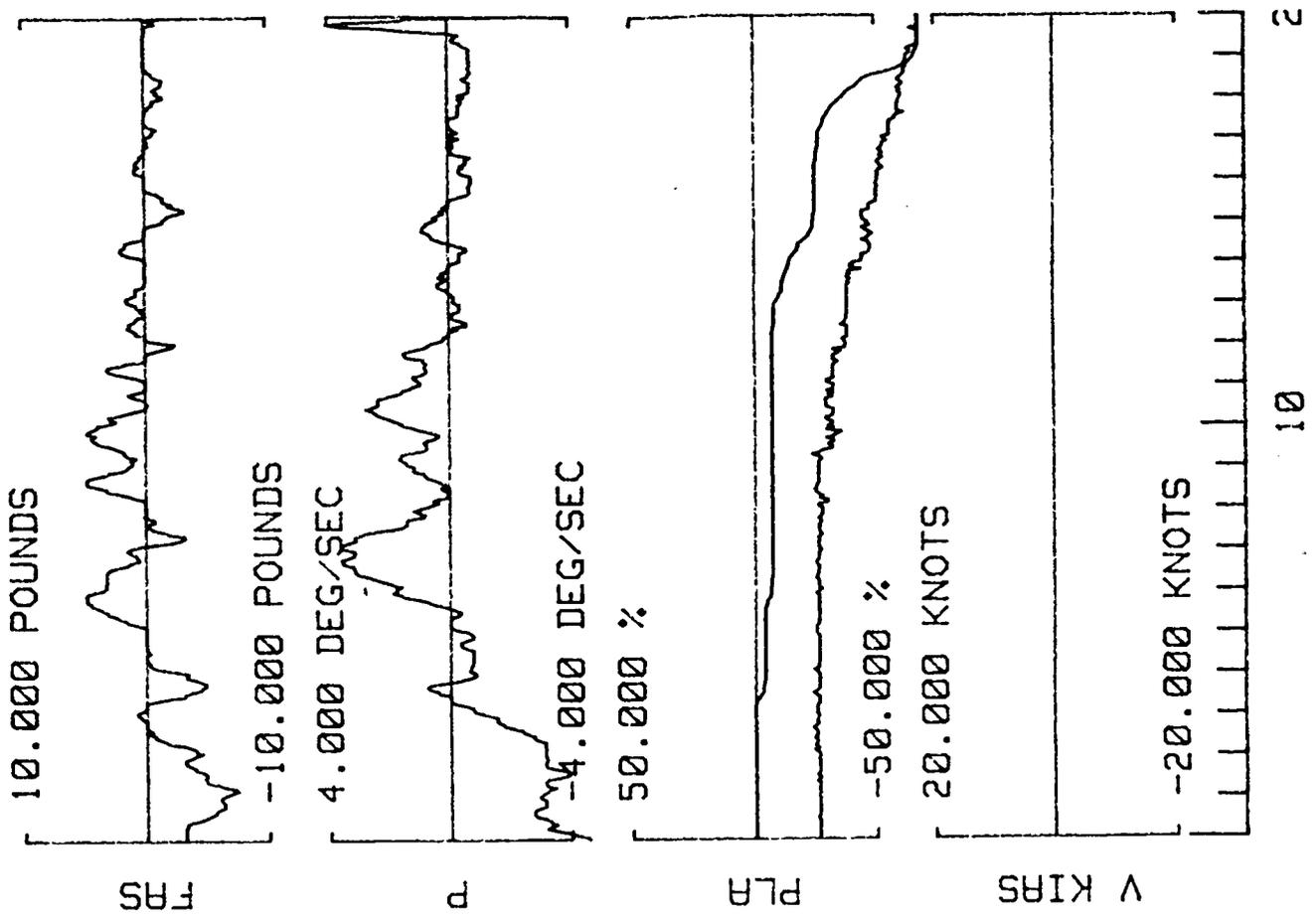
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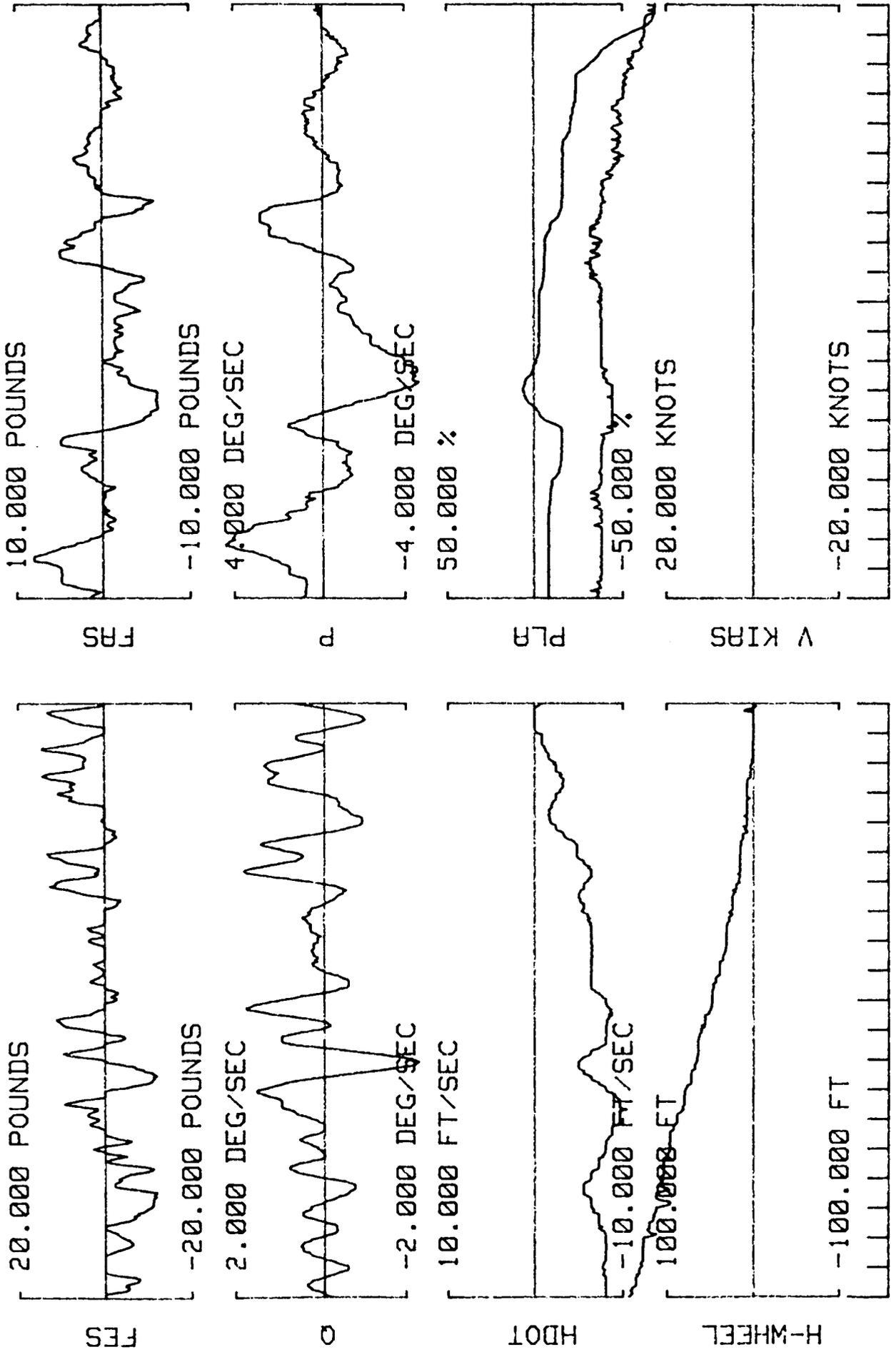
FLT 902 APP 1 CONF B



FLT 902 APP 2 CONF B



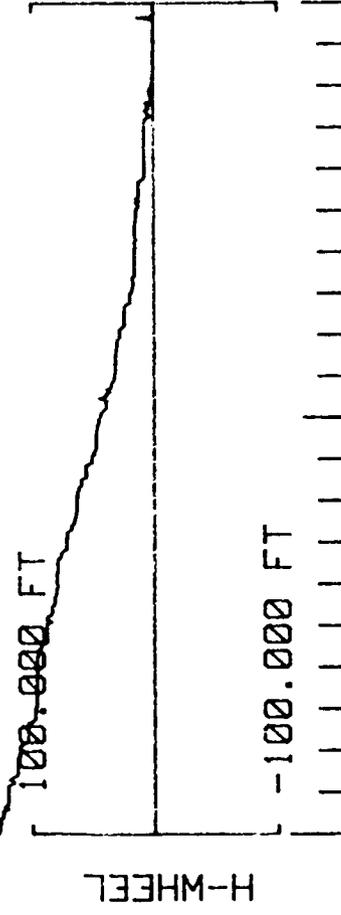
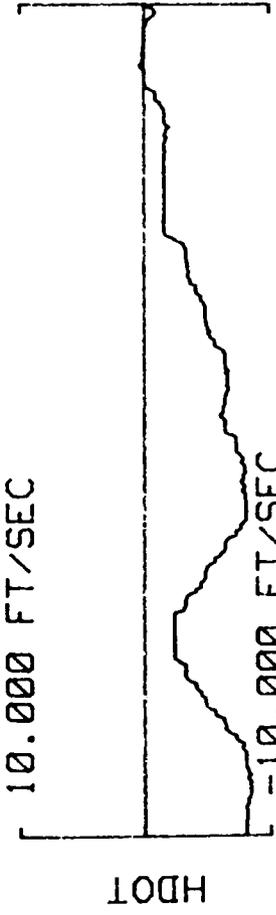
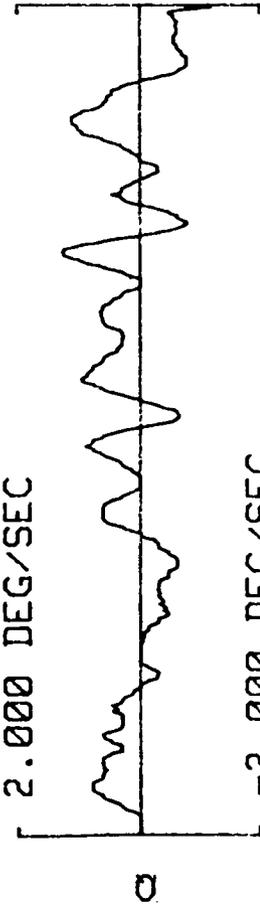
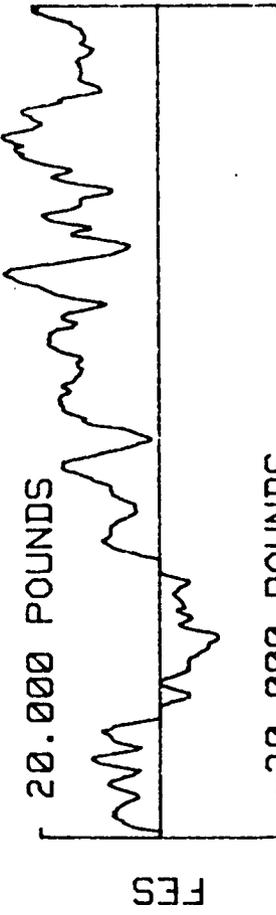
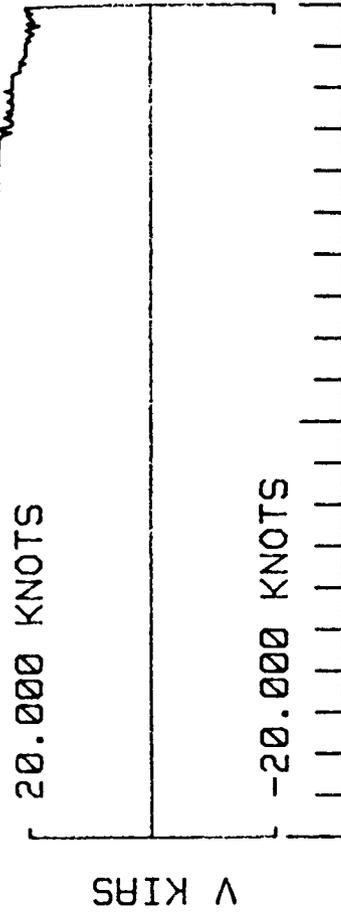
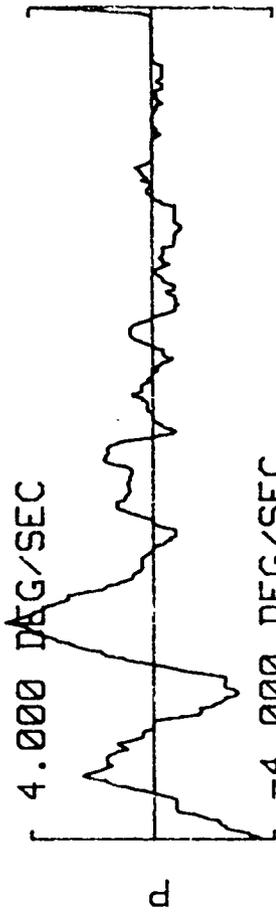
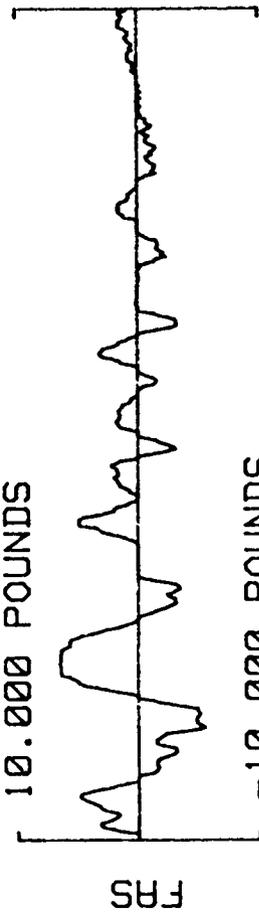
FLT 902 APP 3 CONF B



CONF 24

APP 4

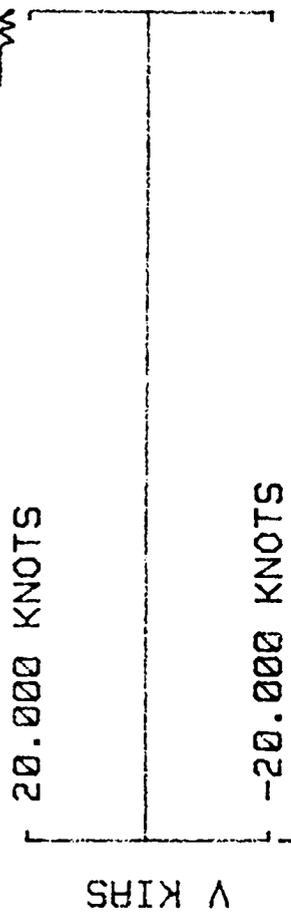
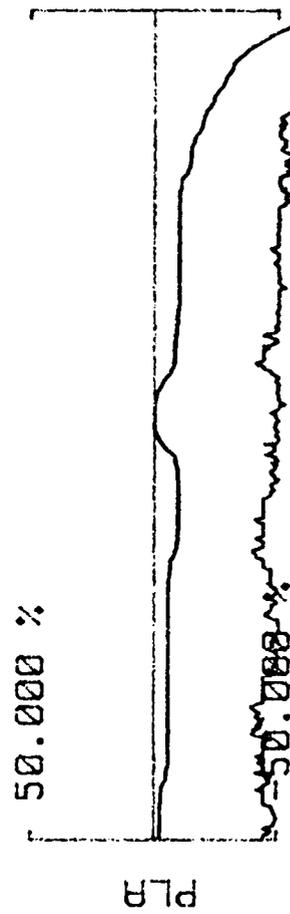
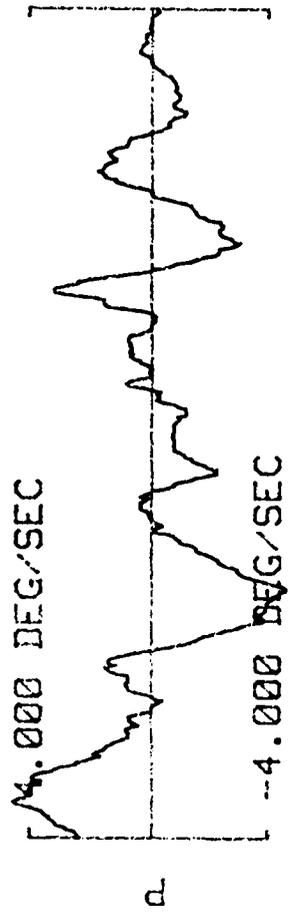
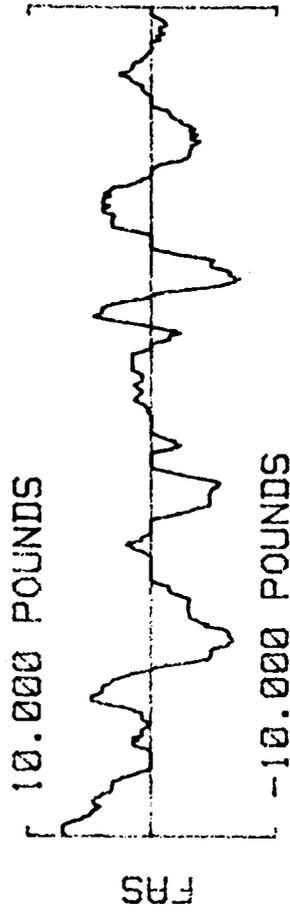
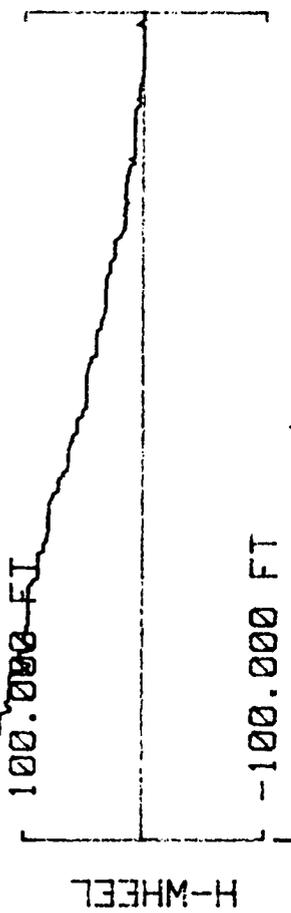
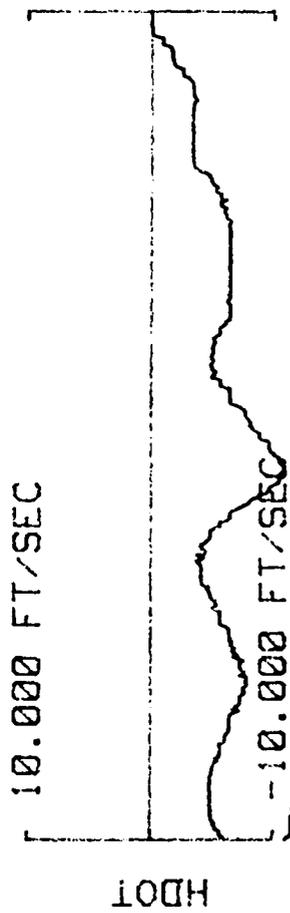
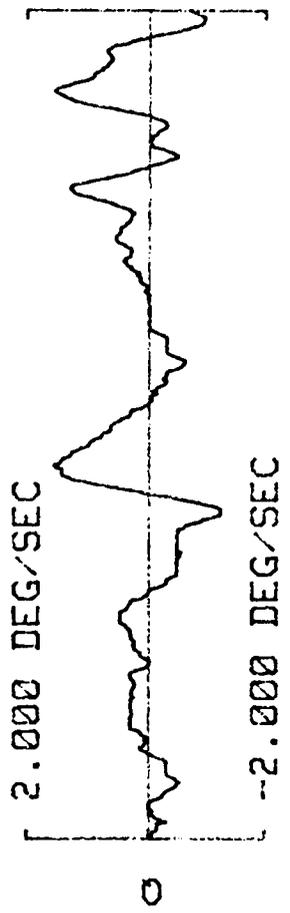
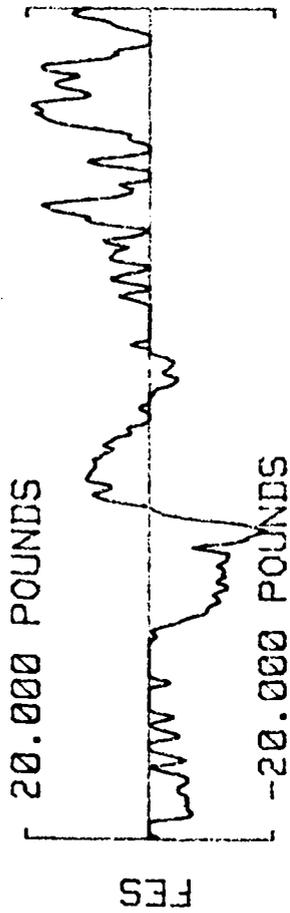
FLT 902



10 20

10 20

FLT 902 APP 5 CONF 24



FLT 902

APP 6

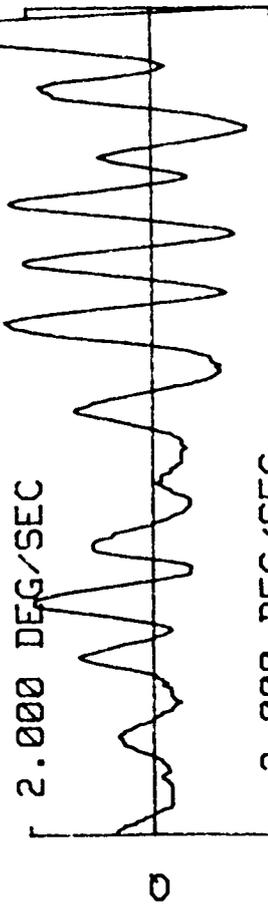
CONF 27

20.000 POUNDS



FES

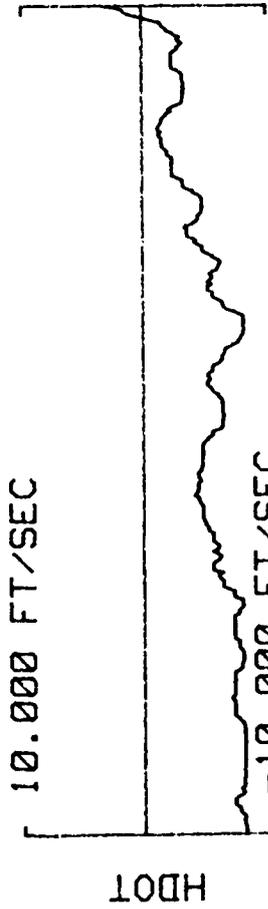
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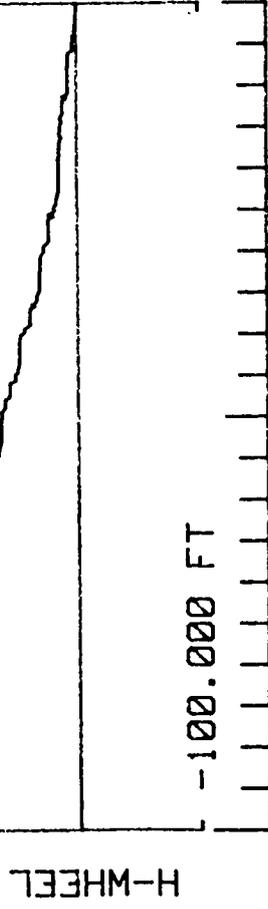
-2.000 DEG/SEC



HDOT

-10.000 FT/SEC

100.000 FT

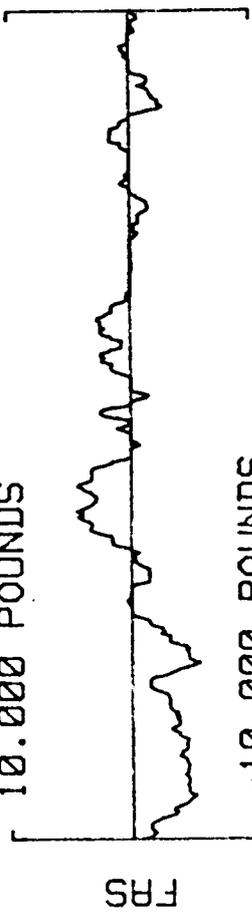


H-WHEEL

-100.000 FT

10 20

10.000 POUNDS



FBS

-10.000 POUNDS

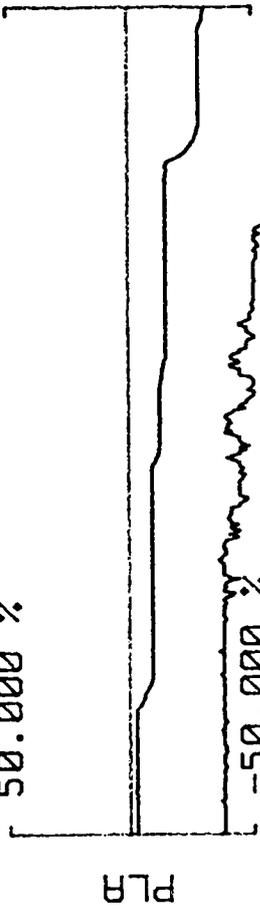
4.000 DEG/SEC



P

-4.000 DEG/SEC

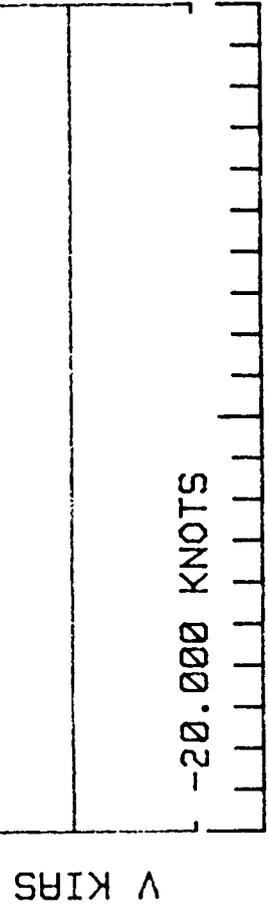
50.000 %



PLR

-50.000 %

20.000 KNOTS



V KIRS

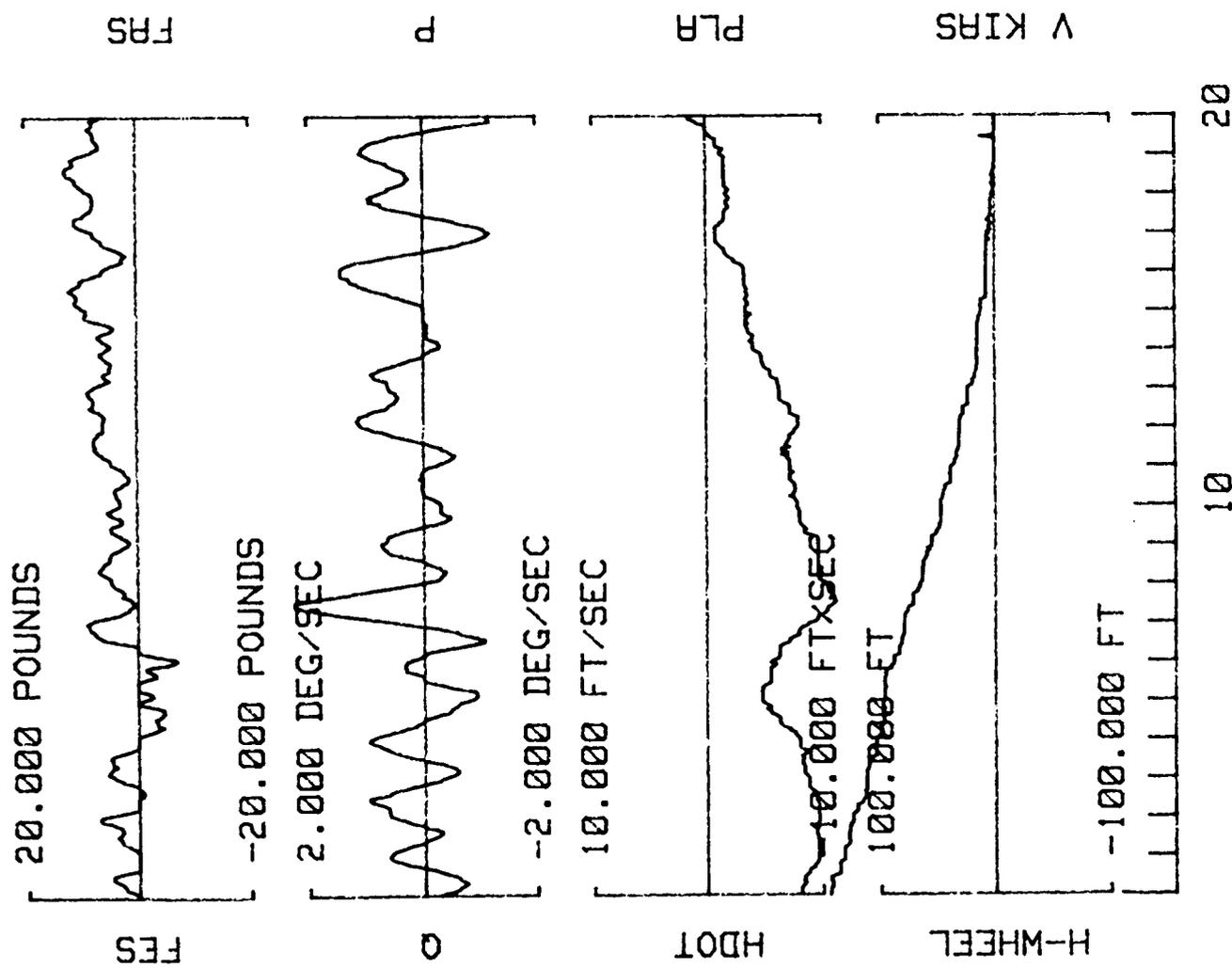
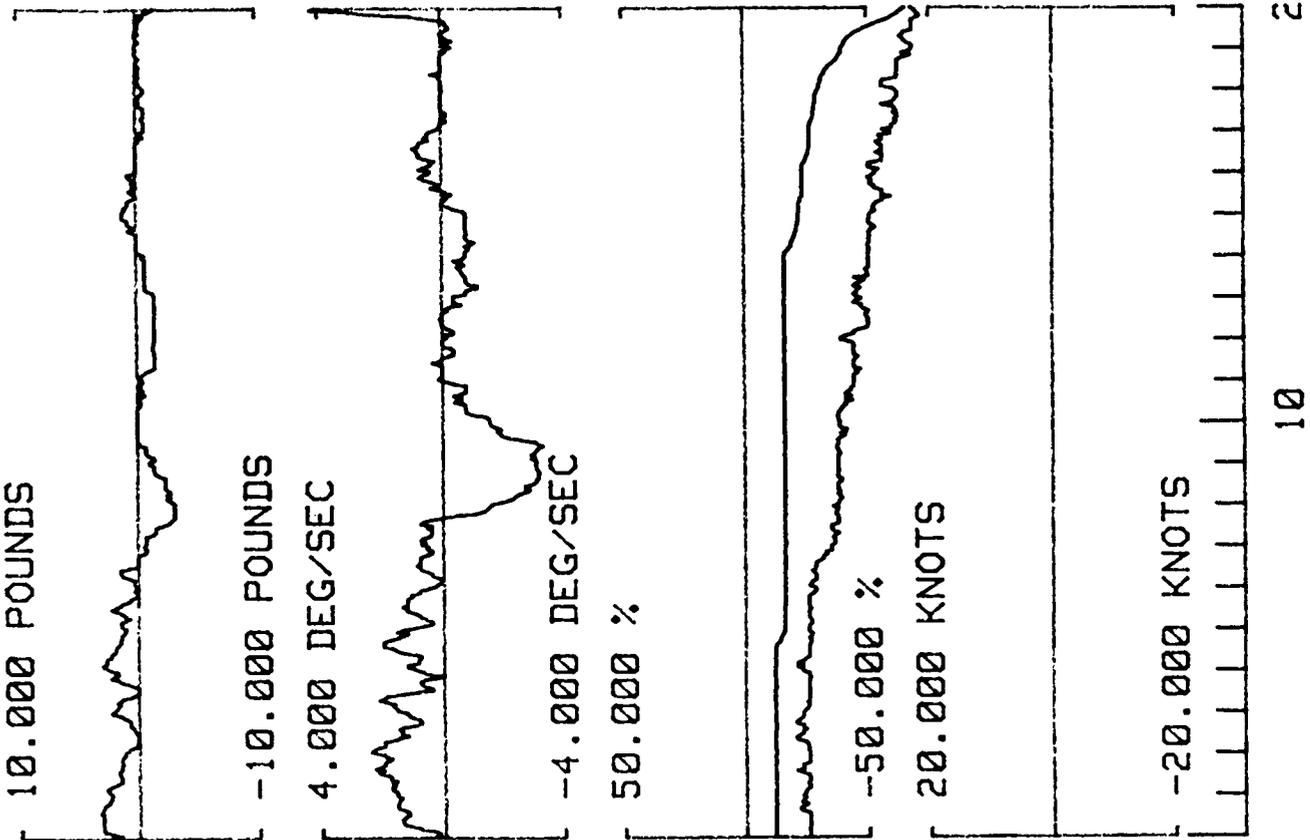
-20.000 KNOTS

10 20

CONF 27

APP 7

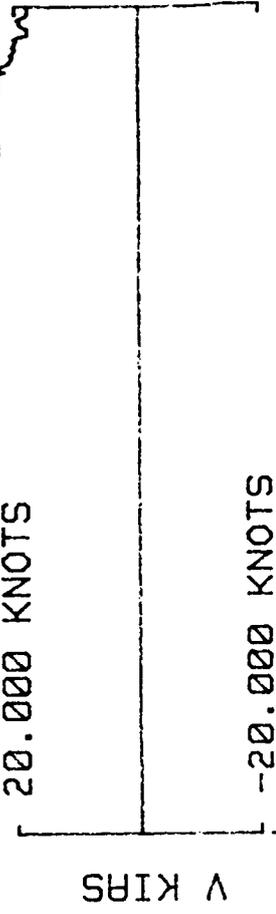
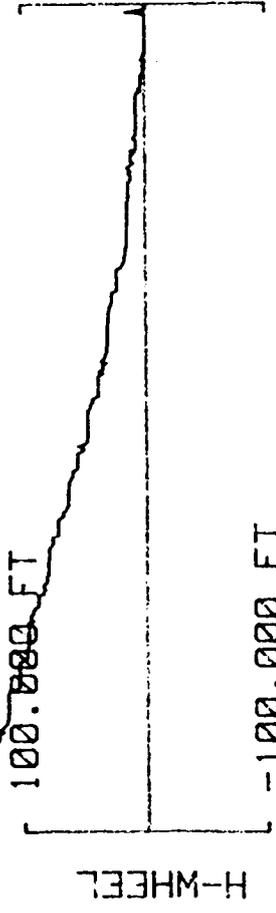
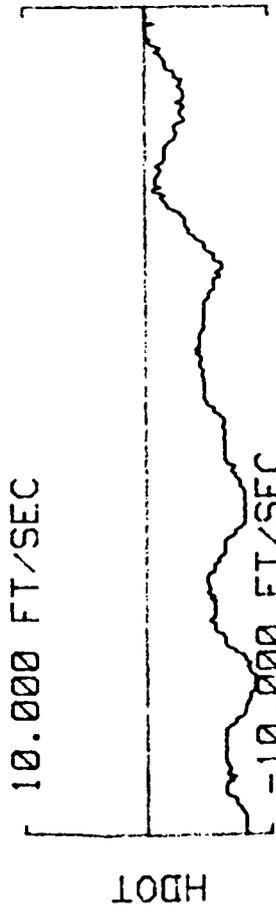
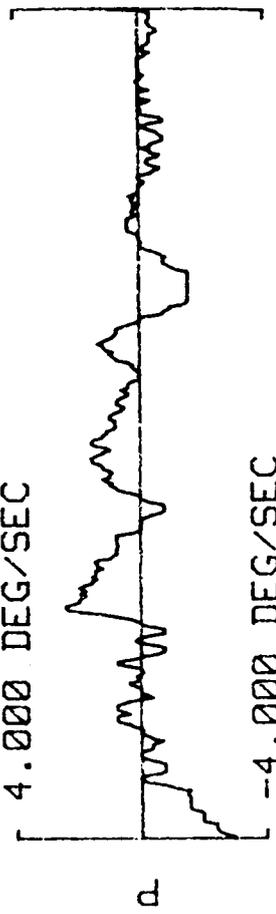
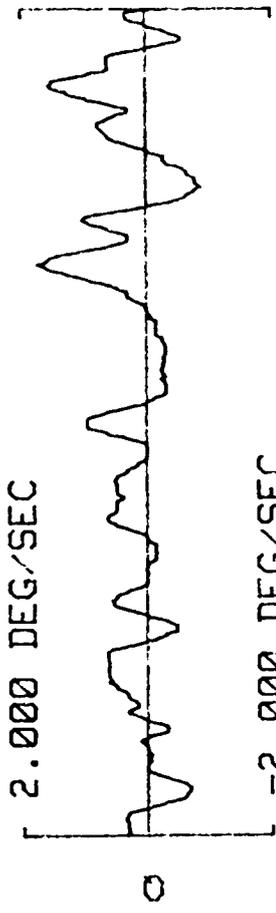
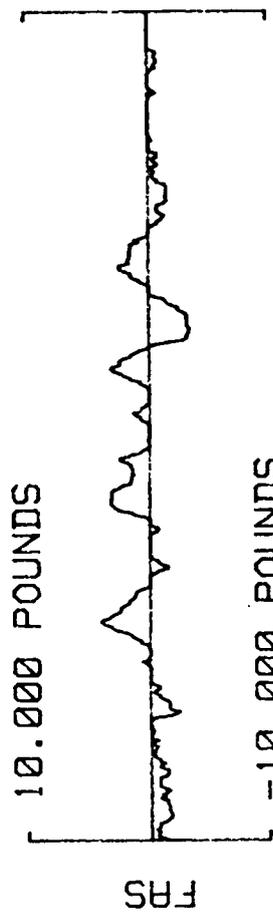
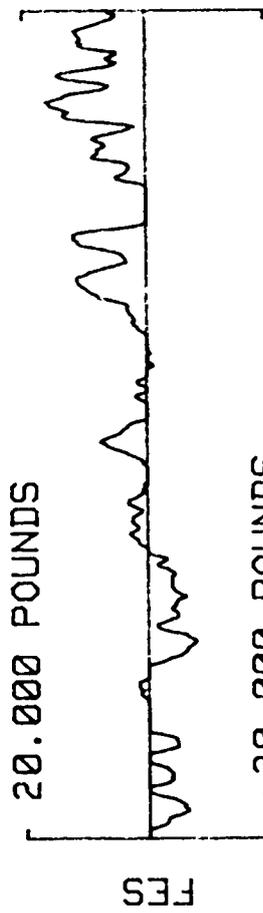
FLT 902



FLT 902

APP 8

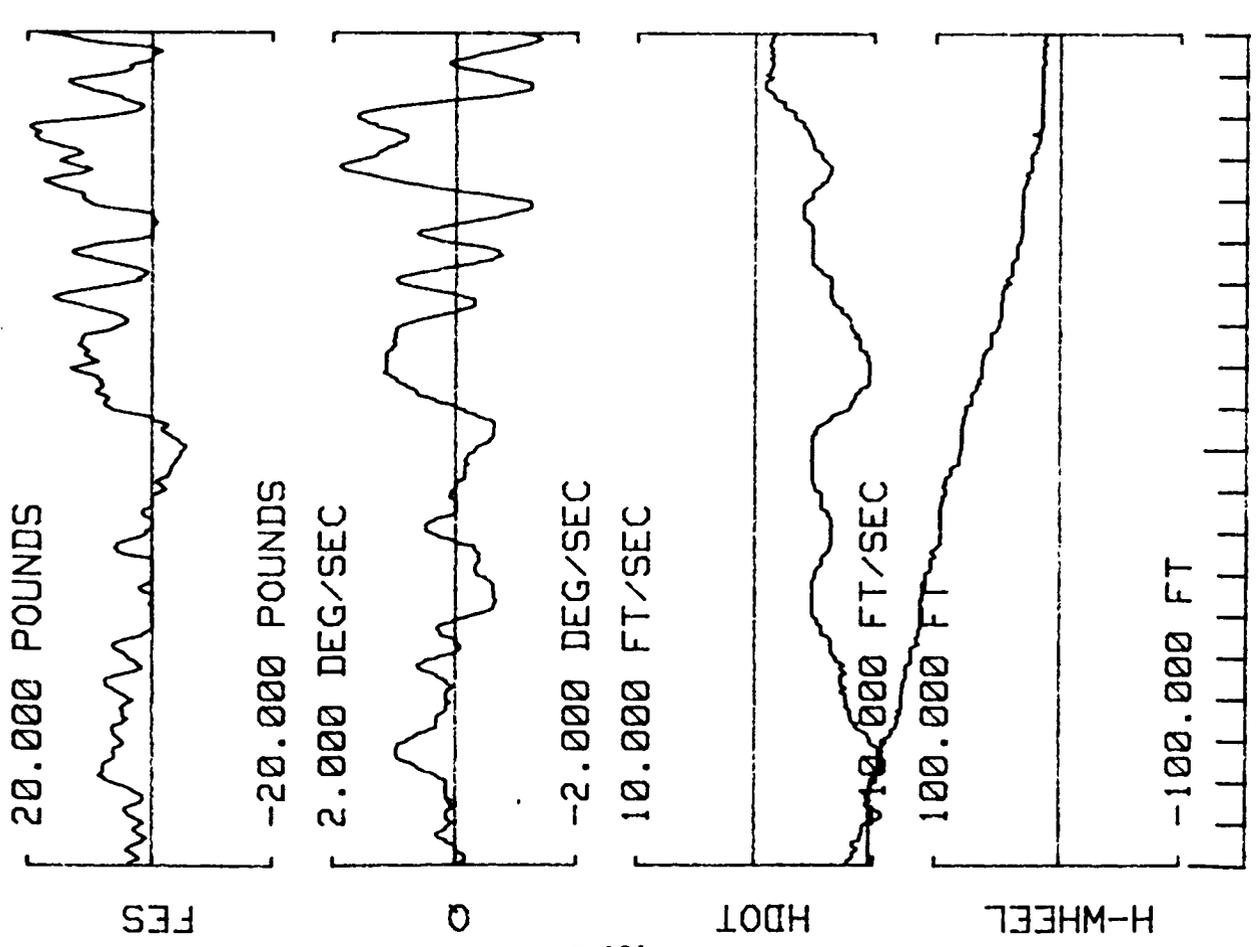
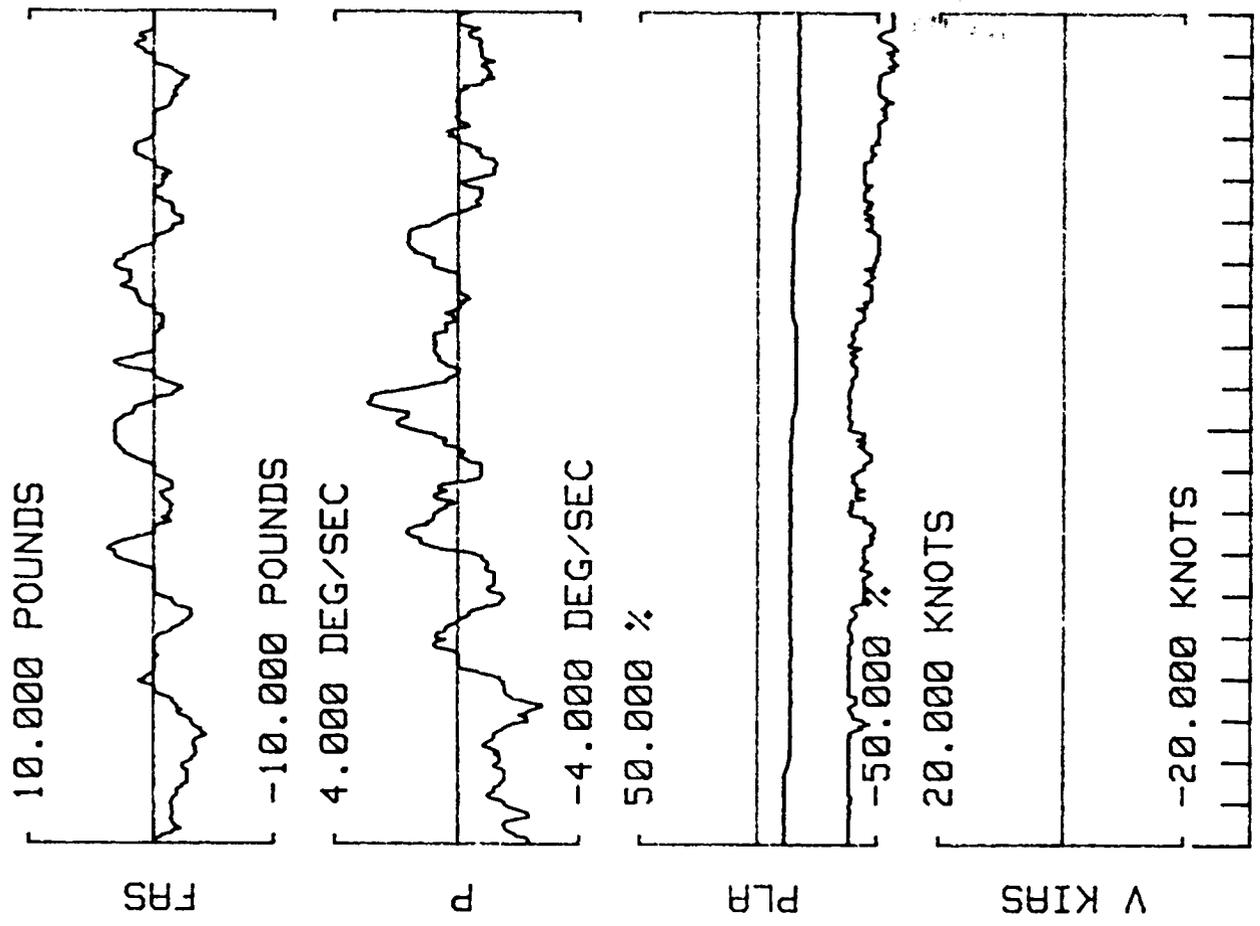
CONF B



001-3

20 10 0 10 20

FLT 902 APP 9 CONF B



101-F

ORIGINAL PAGE IS  
OF POOR QUALITY

CONF 17+L/L

10.000 POUNDS



FBS

-10.000 POUNDS

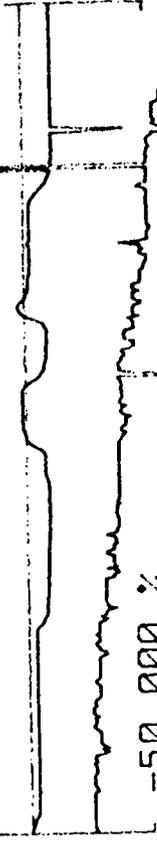
4.000 DEG/SEC



D

-4.000 DEG/SEC

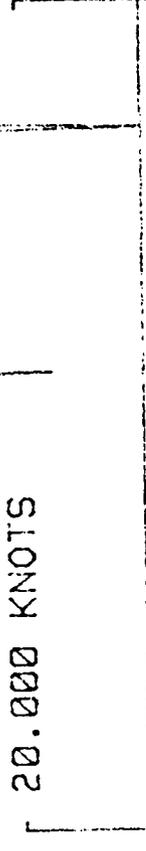
50.000 %



PLB

-50.000 %

20.000 KNOTS



V KIPS

-20.000 KNOTS

10

20

FLT 904

APP 3

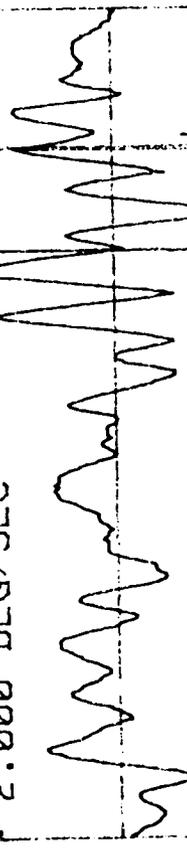
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FES

-20.000 POUNDS

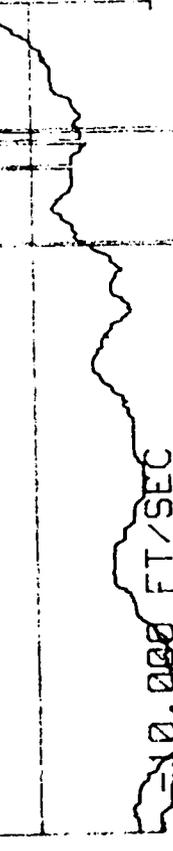
2.000 DEG/SEC



O

-2.000 DEG/SEC

10.000 FT/SEC



HDOT

-10.000 FT/SEC

100.000 FT



H-WHEEL

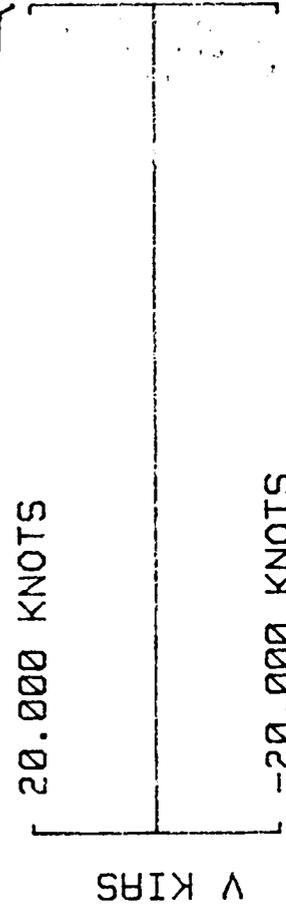
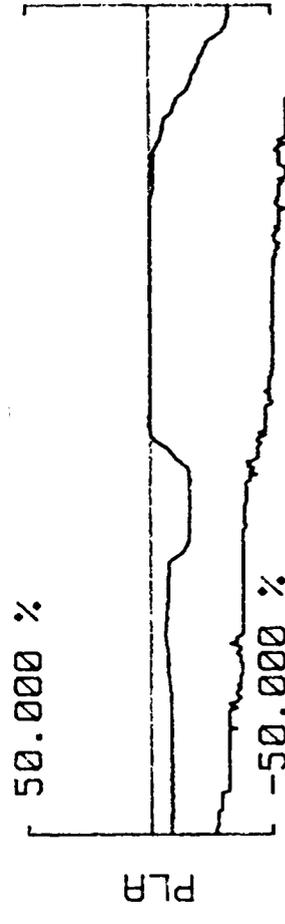
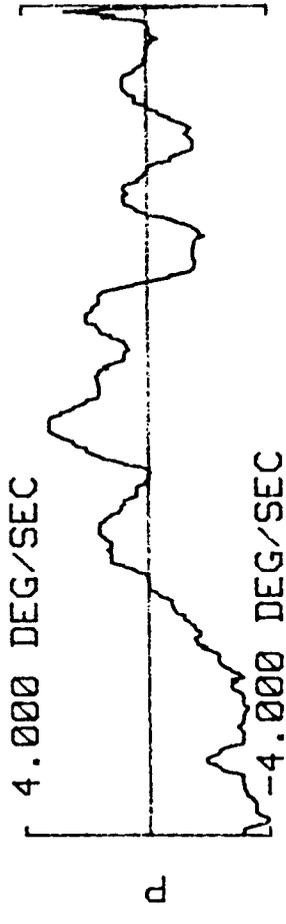
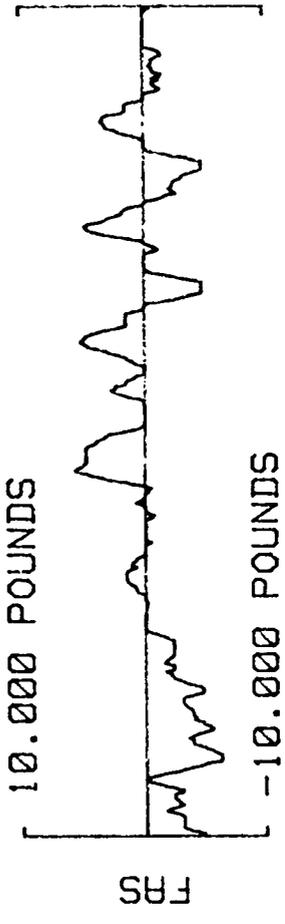
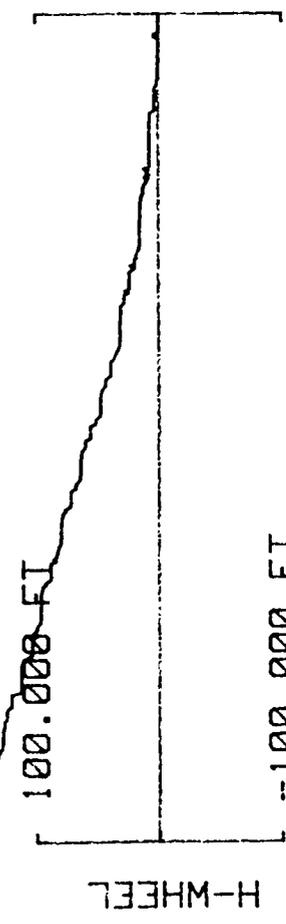
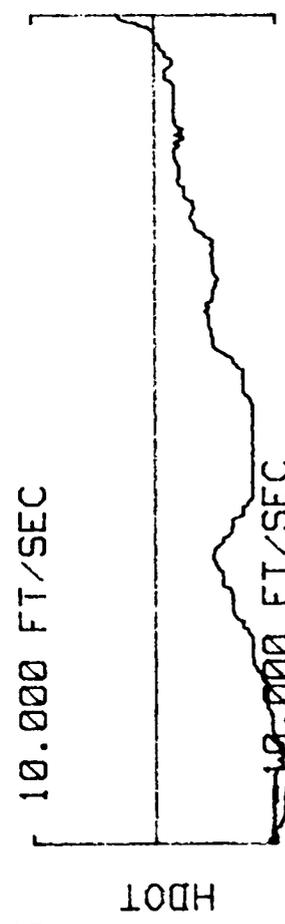
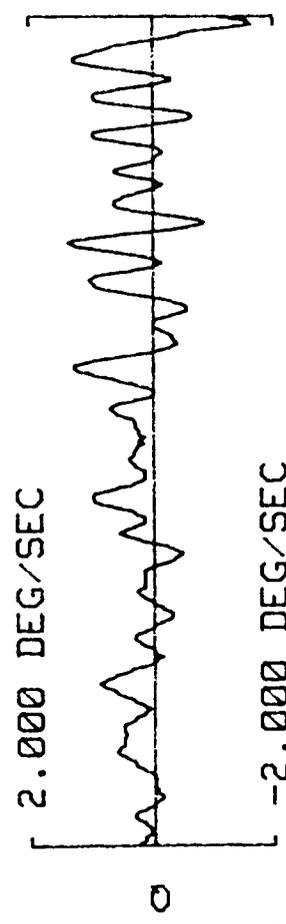
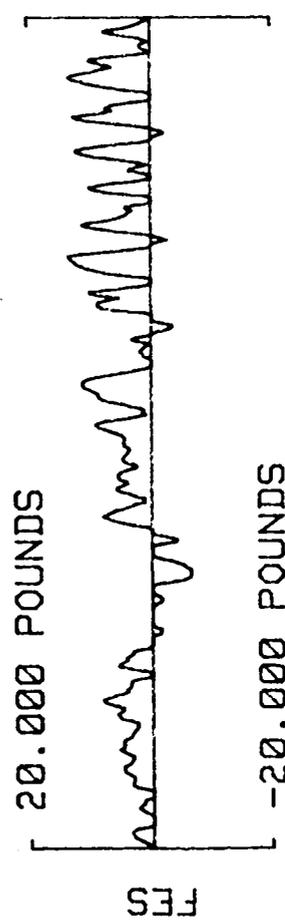
-100.000 FT

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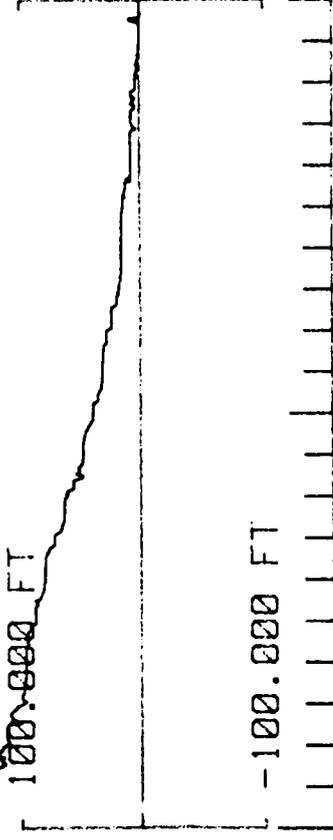
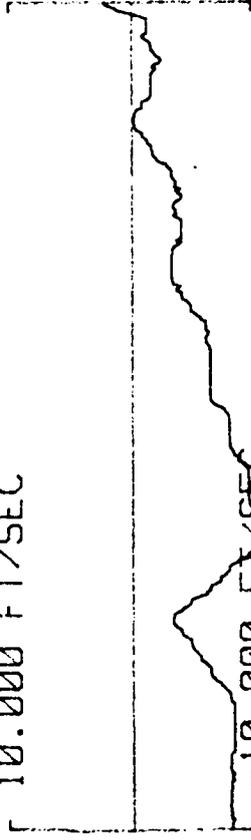
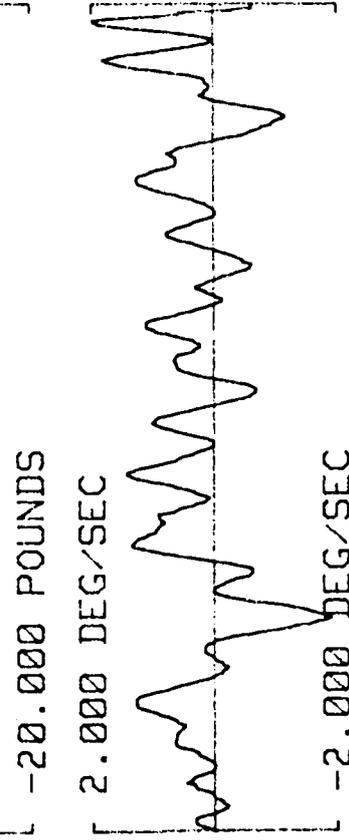
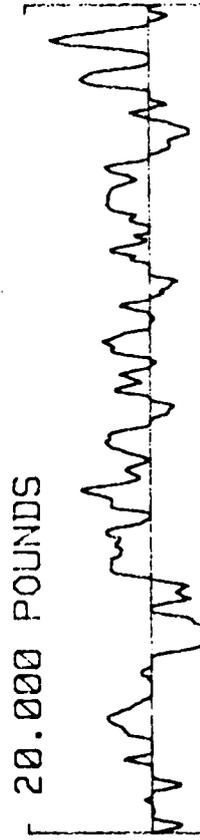
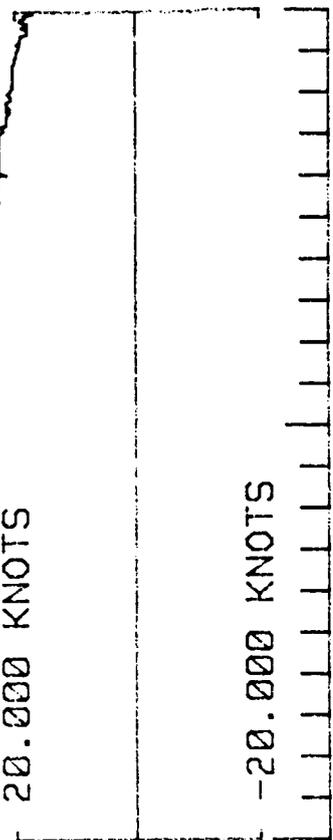
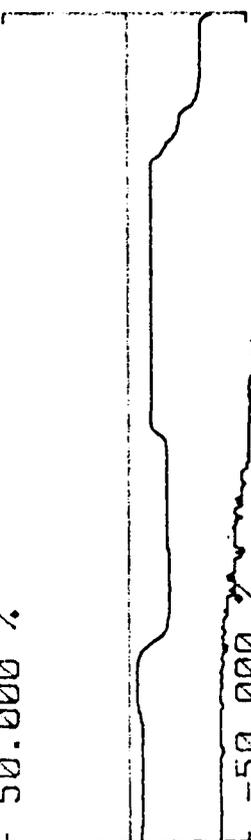
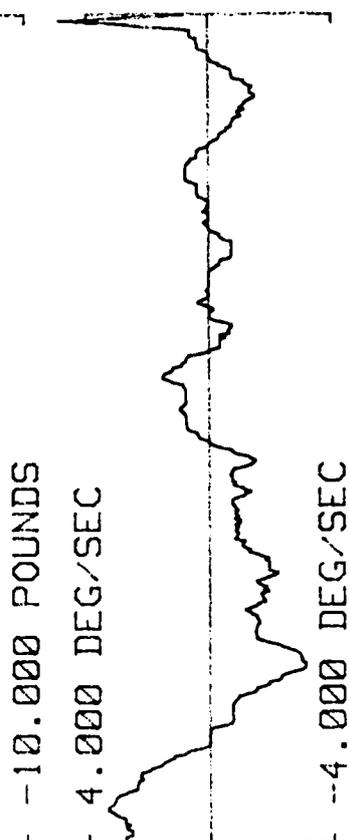
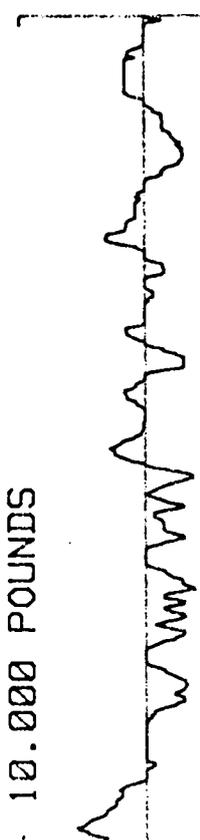
FLT 904 APP 4

CONF 17+L/L

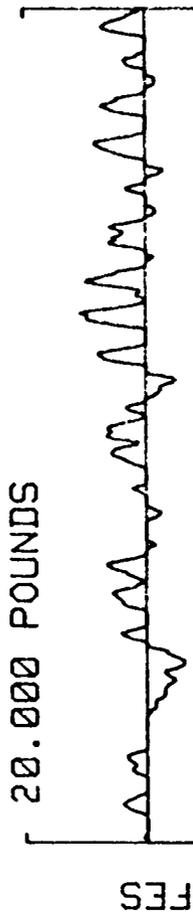


101-3

10 20 10 2

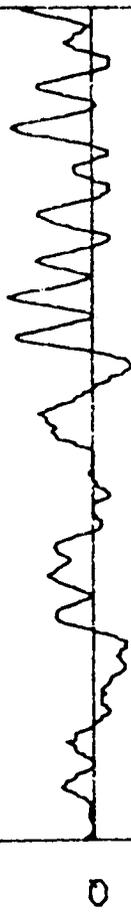


FLT 904 APP 6 CONF 17



-20.000 POUNDS

2.000 DEG/SEC



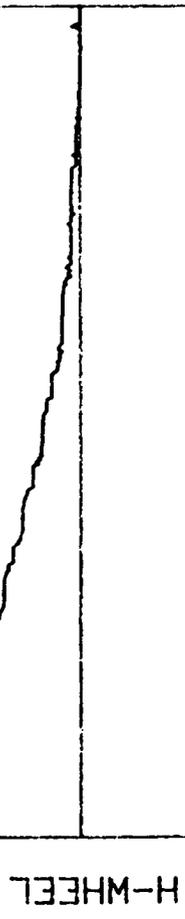
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10.000 FT/SEC

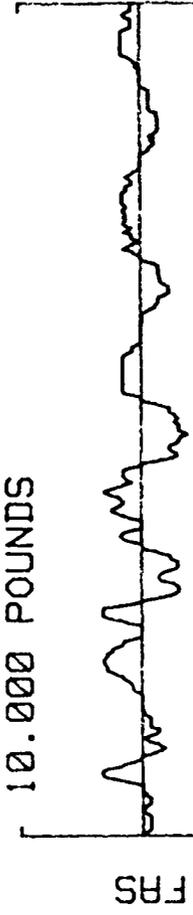


-10.000 FT/SEC

100.000 FT



-100.000 FT



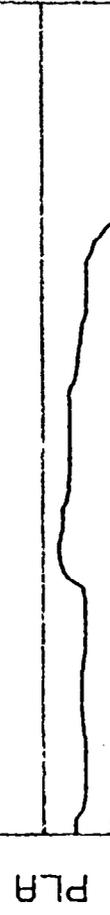
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4.000 DEG/SEC



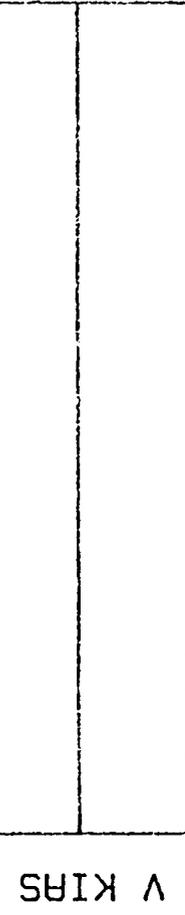
-4.000 DEG/SEC

50.000 %



-50.000 %

20.000 KNOTS



-20.000 KNOTS

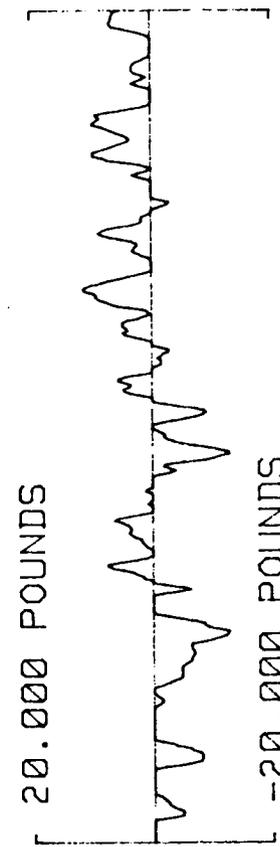
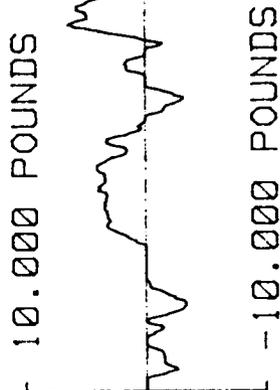
CONF 20

APP 7

FLT 904

10.000 POUNDS

20.000 POUNDS

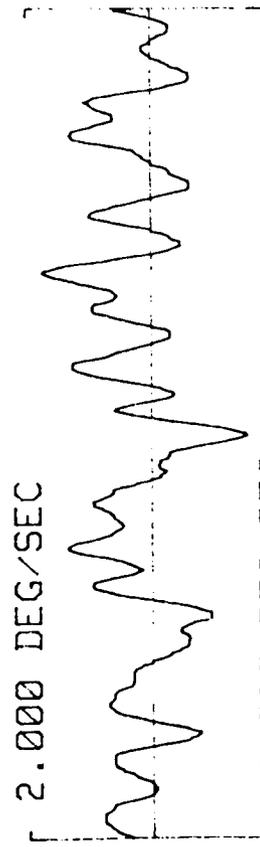
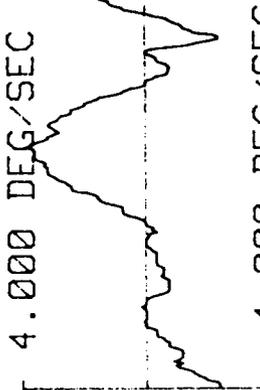


-10.000 POUNDS

-20.000 POUNDS

4.000 DEG/SEC

2.000 DEG/SEC



-4.000 DEG/SEC

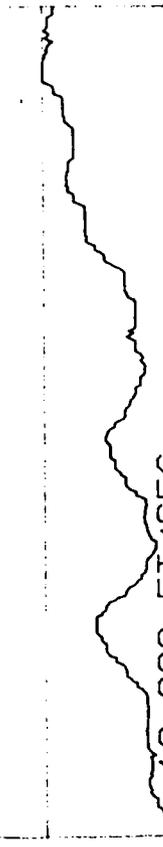
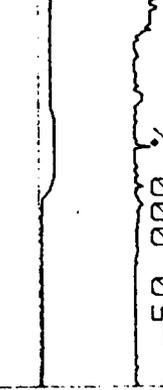
-2.000 DEG/SEC

50.000 %

10.000 FT/SEC

PLB

HDOT



-50.000 %

-10.000 FT/SEC

20.000 KNOTS

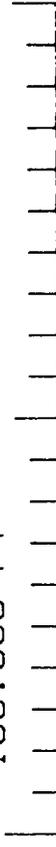
100.000 FT

V KIRS

H-WHEEL

-20.000 KNOTS

-100.000 FT



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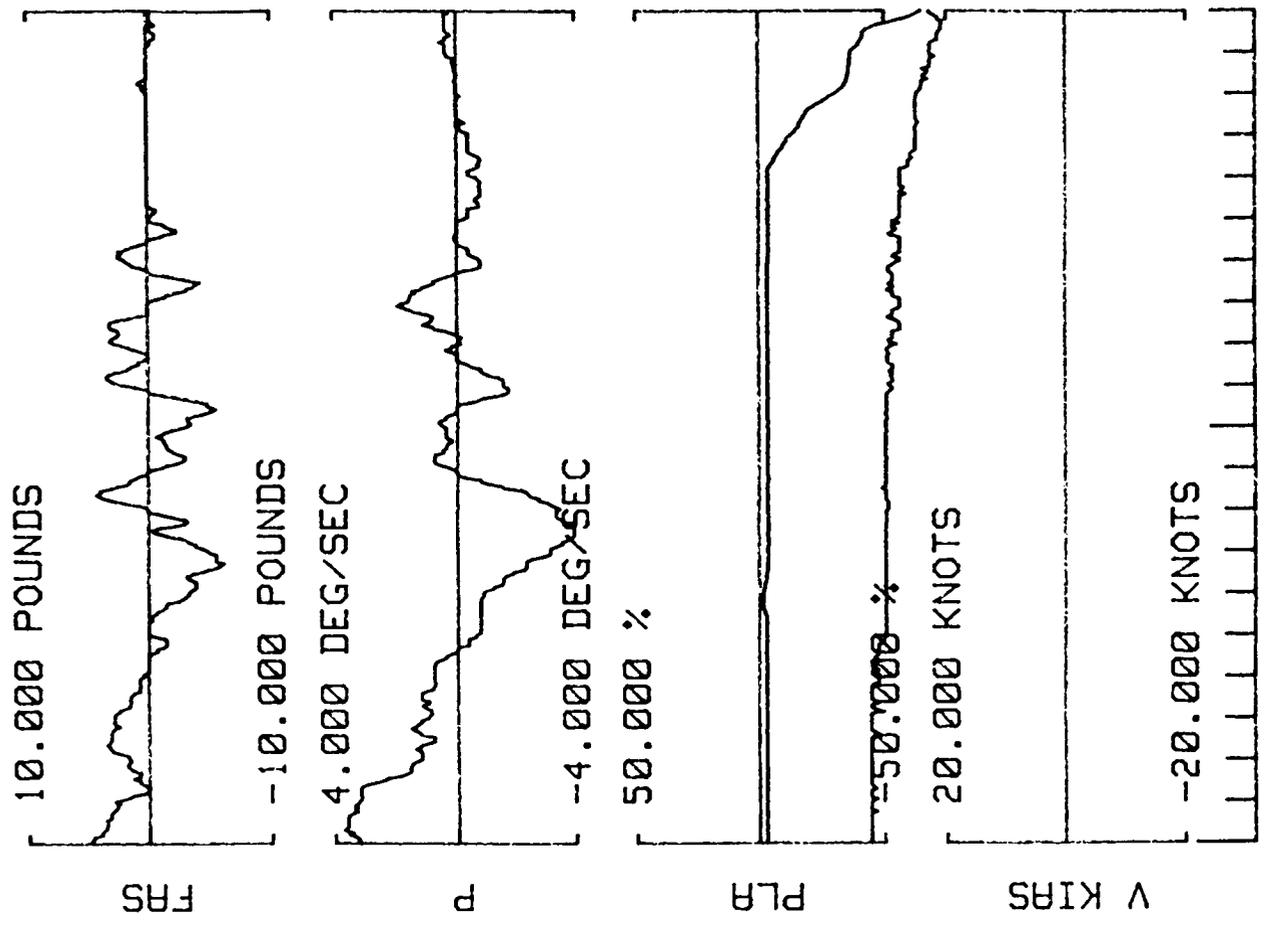
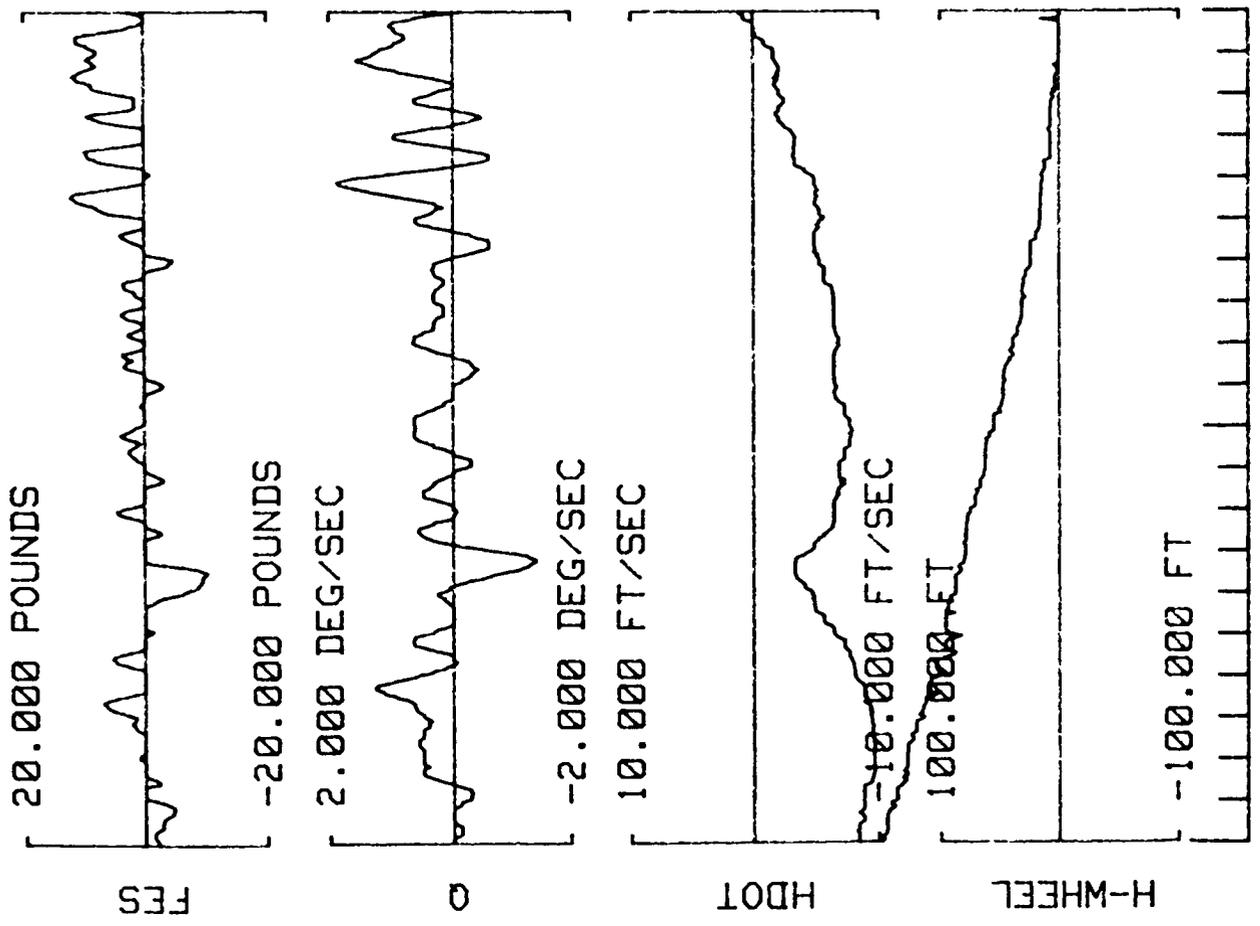
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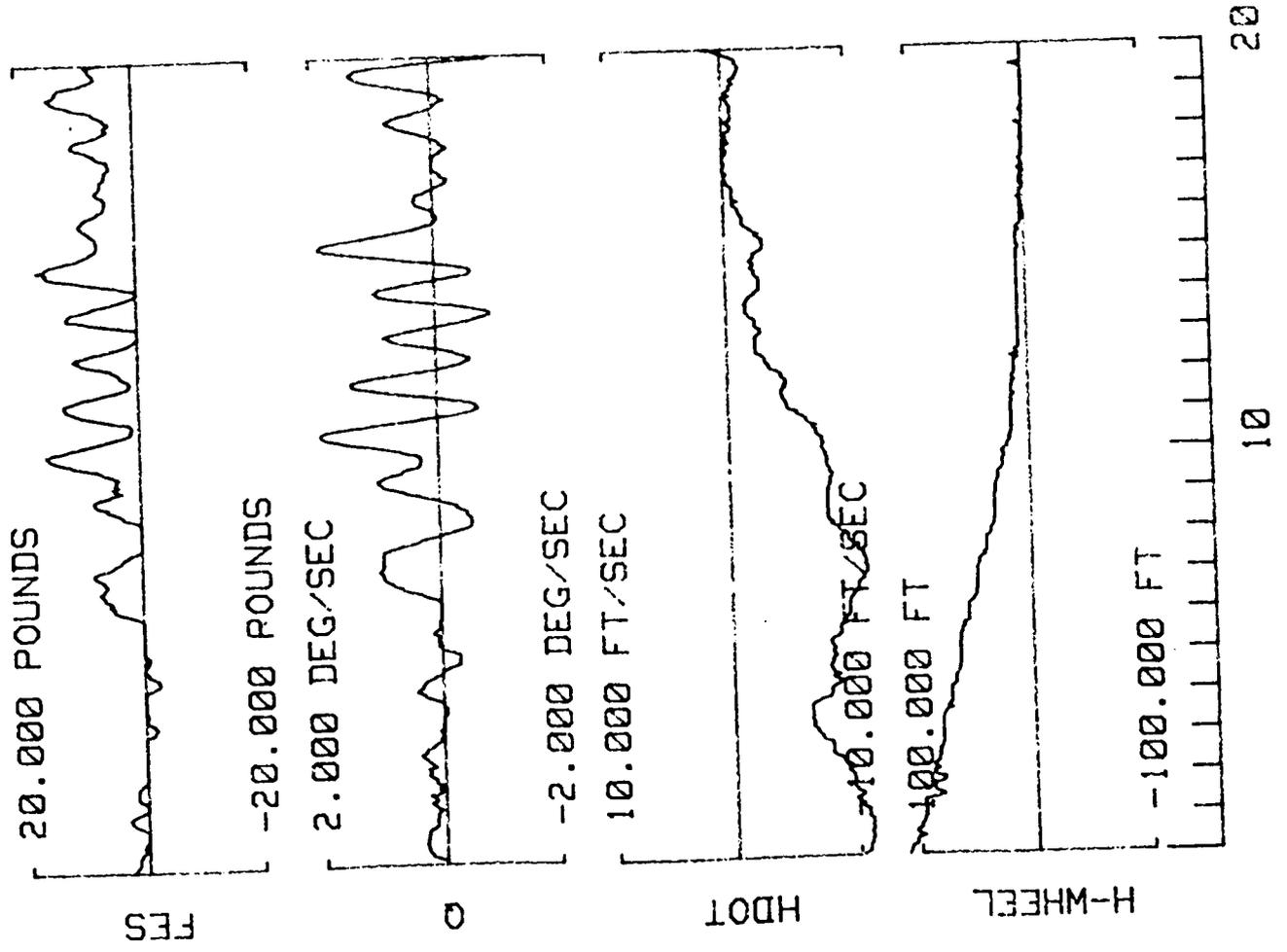
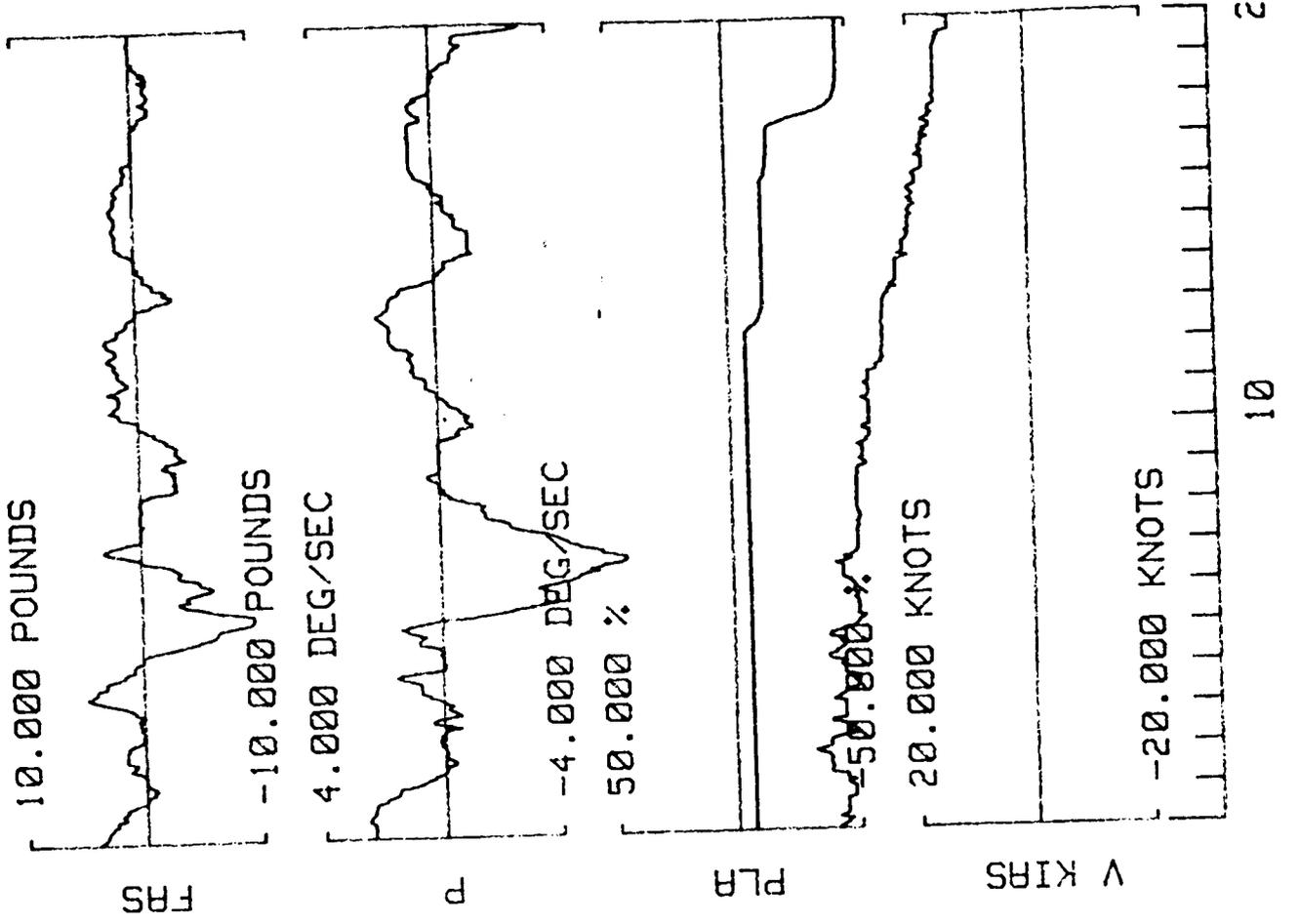
FLT 904 APP 8

CONF 20

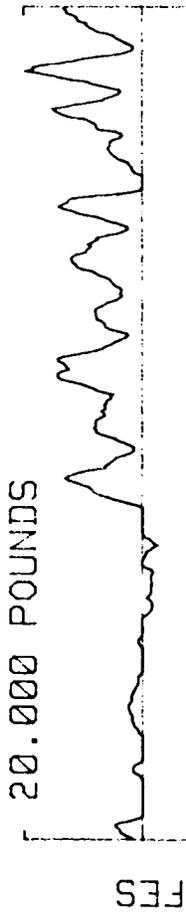


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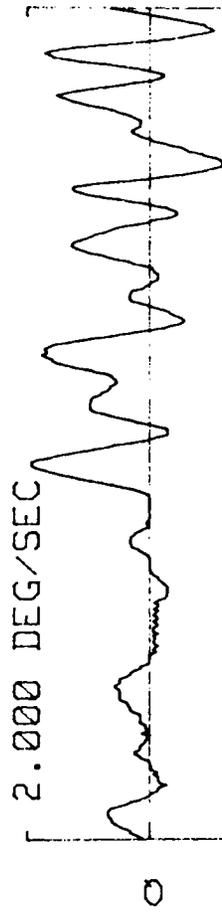
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FLT 904 APP 10 CONF 20



-20.000 POUNDS



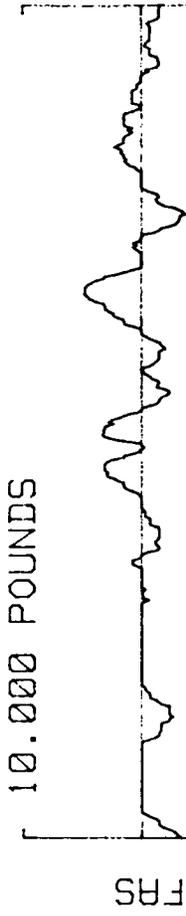
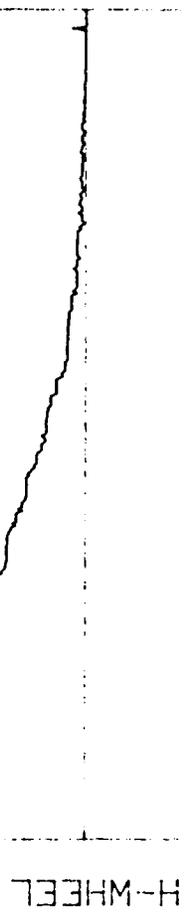
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10.000 FT/SEC

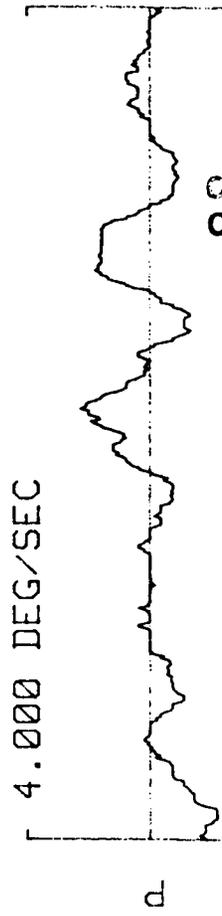


-10.000 FT/SEC

100.000 FT



-10.000 POUNDS

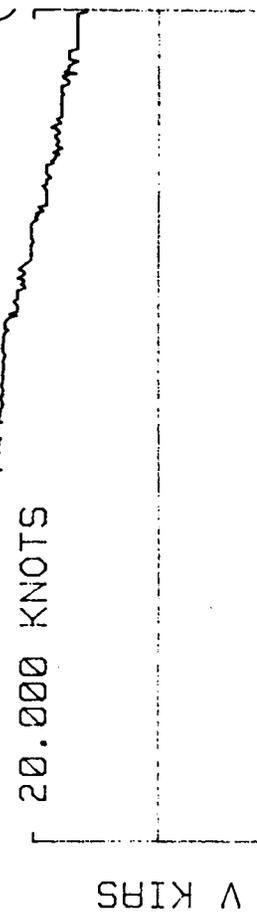


-4.000 DEG/SEC

50.000 %



20.000 KNOTS



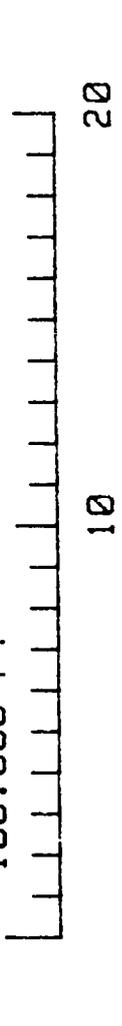
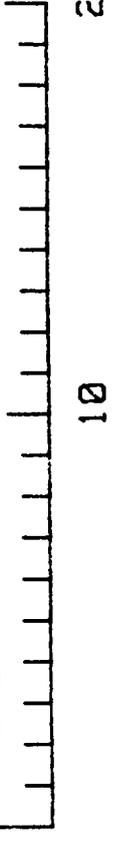
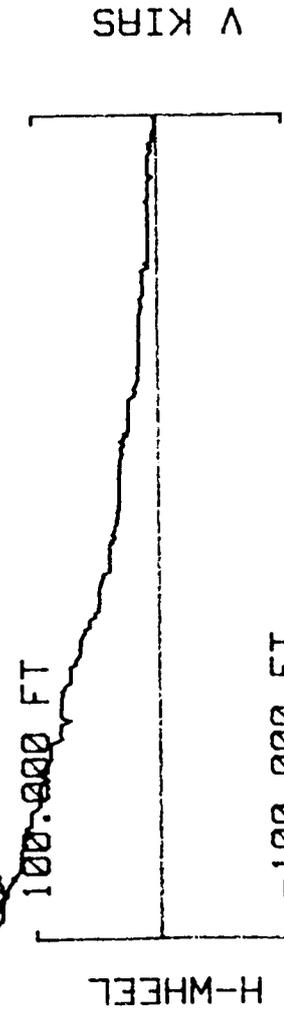
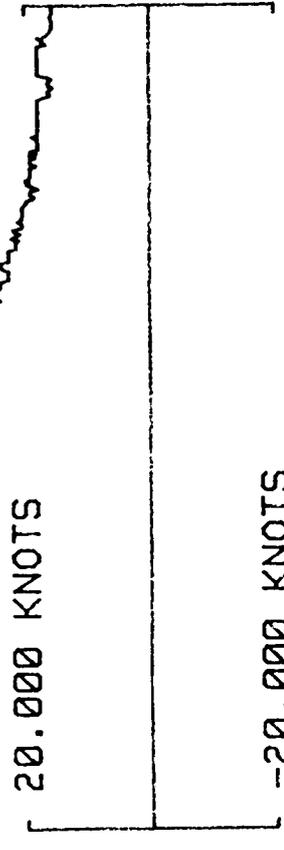
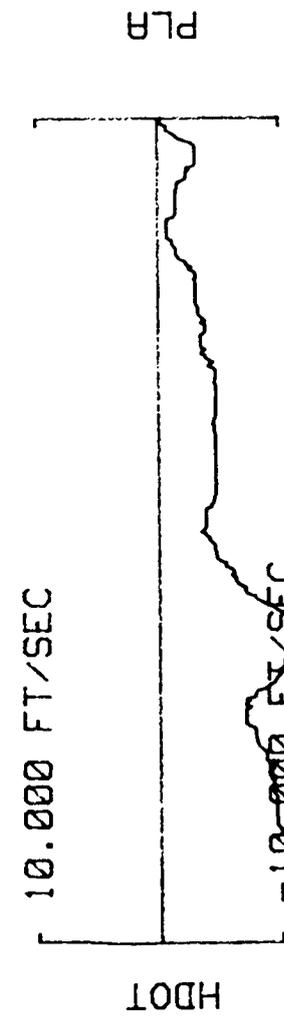
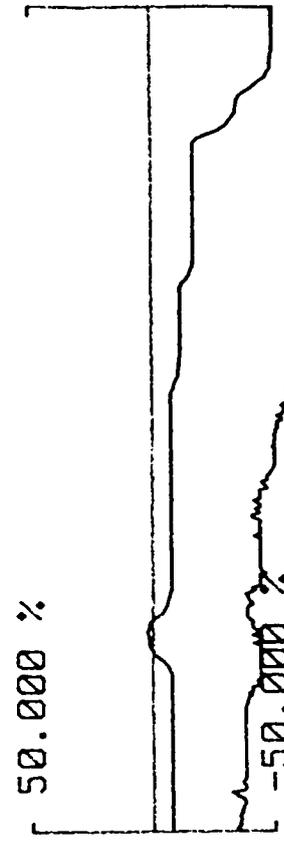
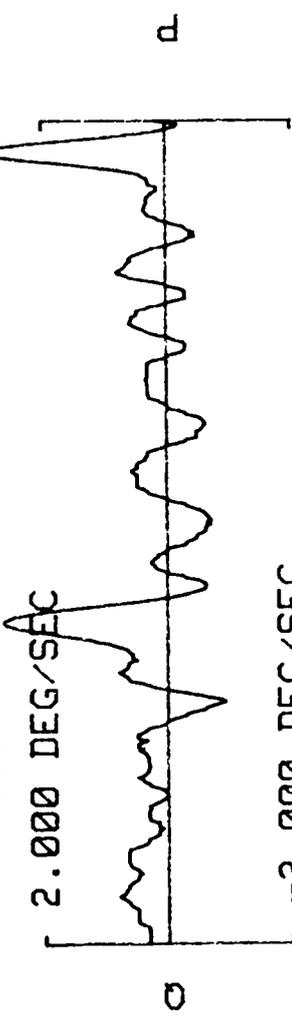
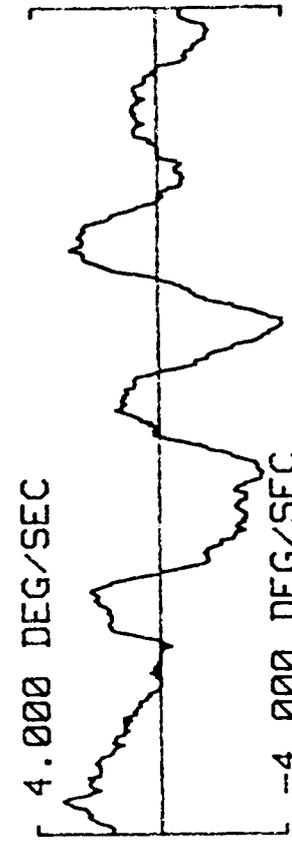
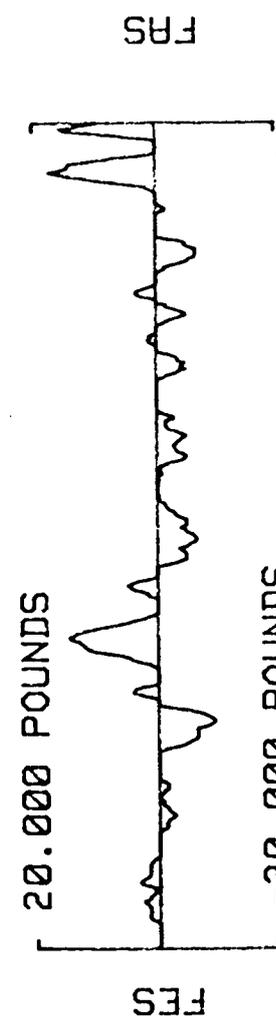
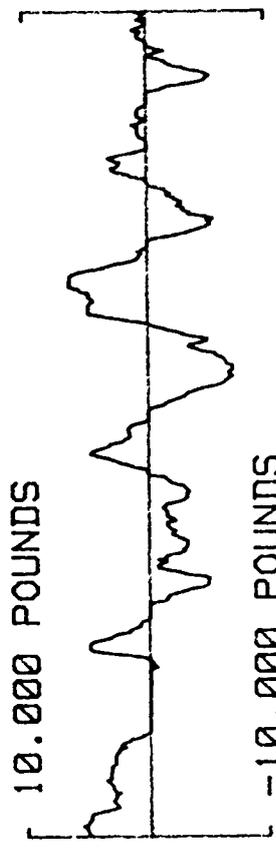
-20.000 KNOTS

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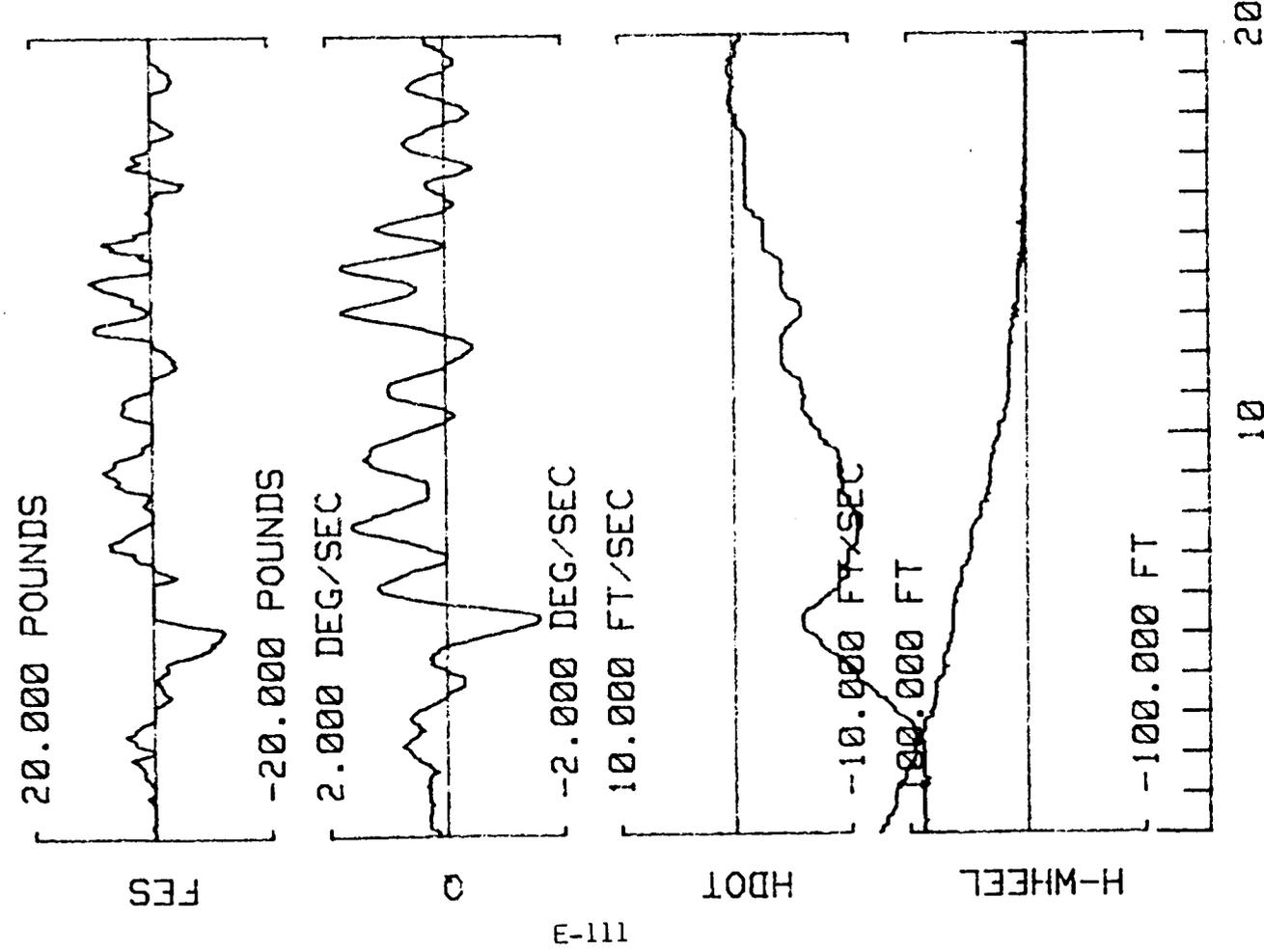
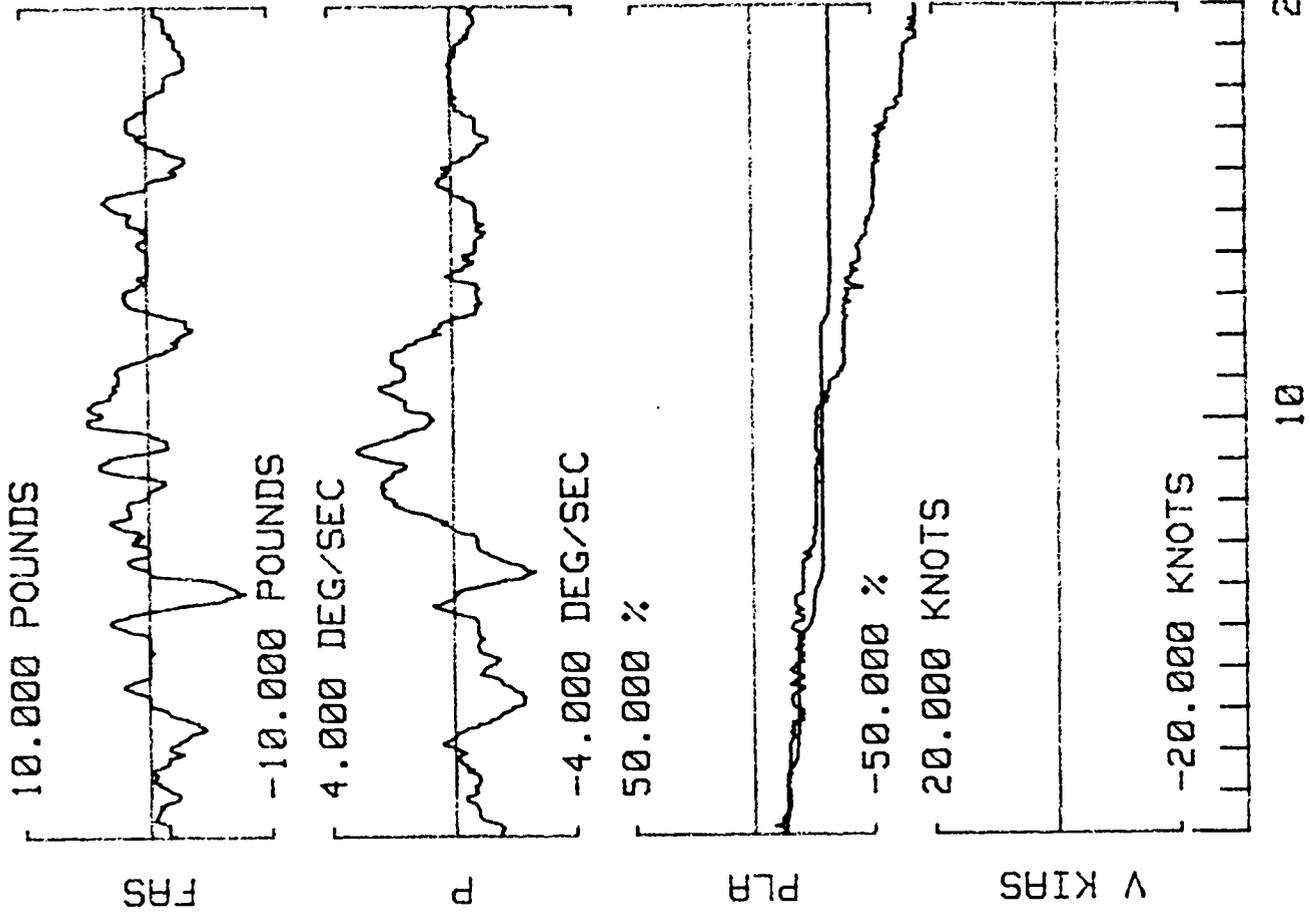
CONF 17

APP11

FLT 904



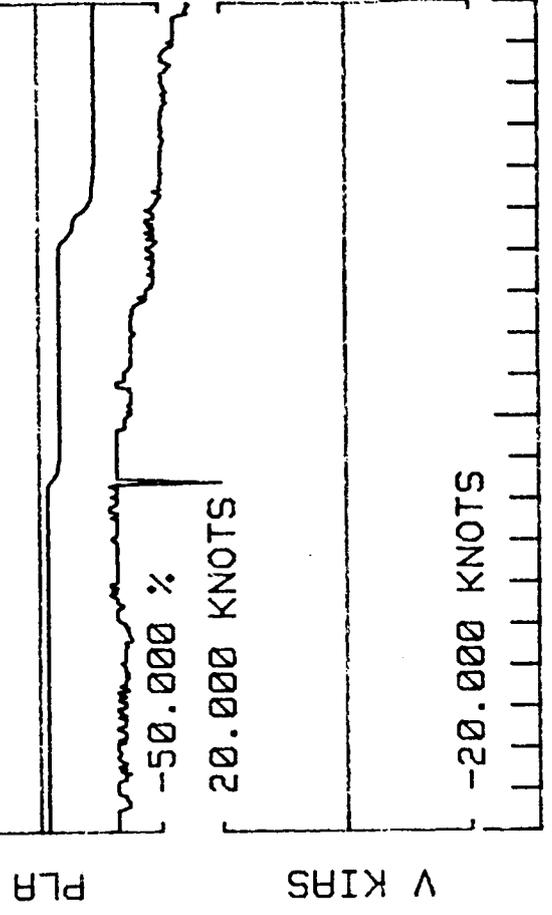
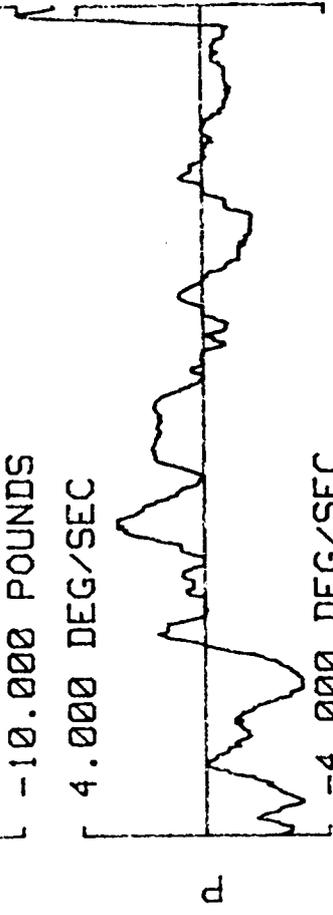
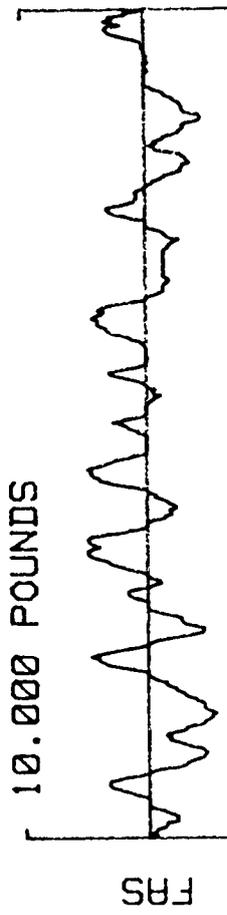
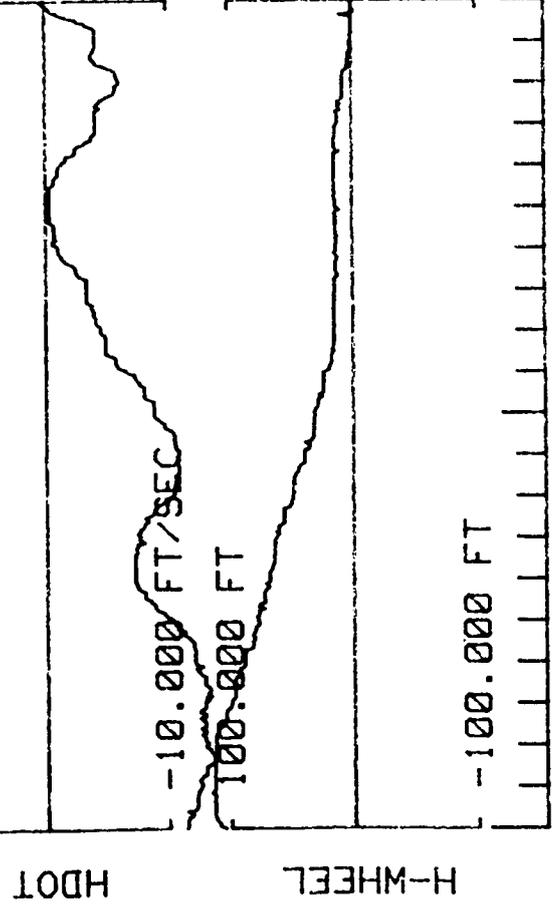
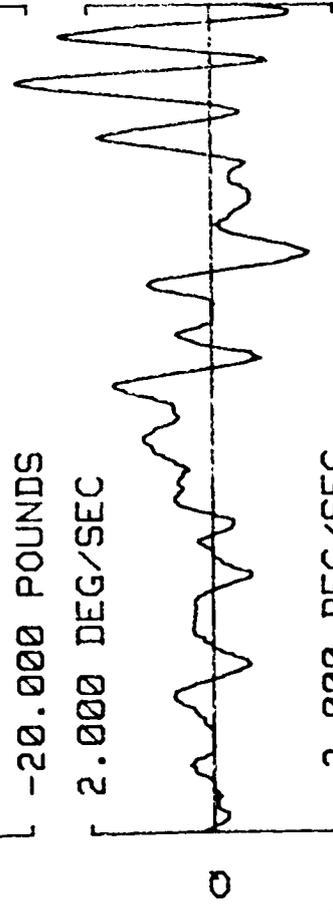
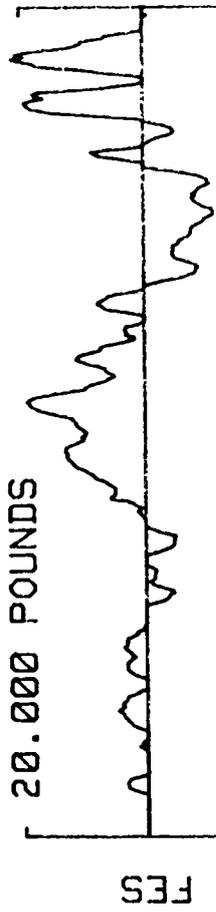
FLT 904 APP 12 CONF 17



1113

FLT 904 APP 13

CONF 17+L/L



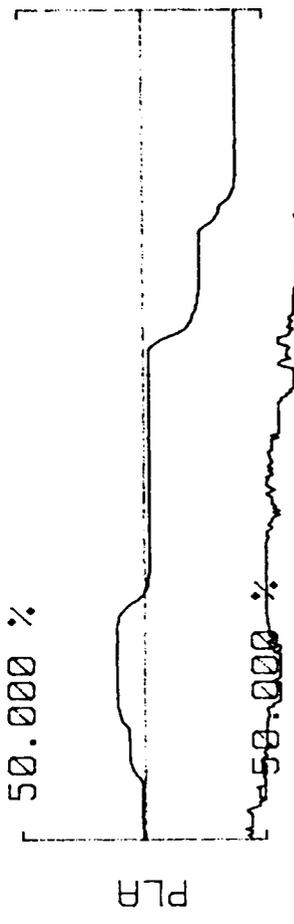
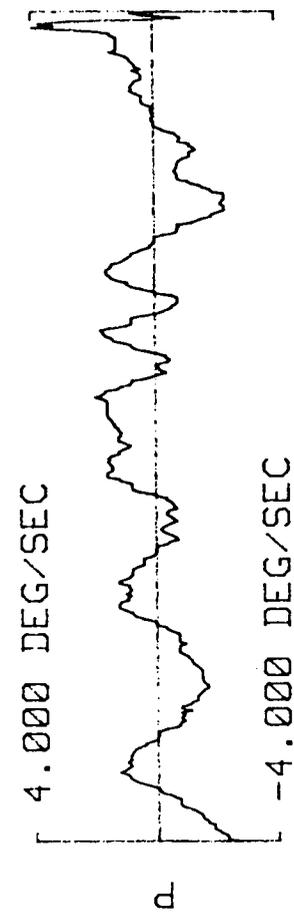
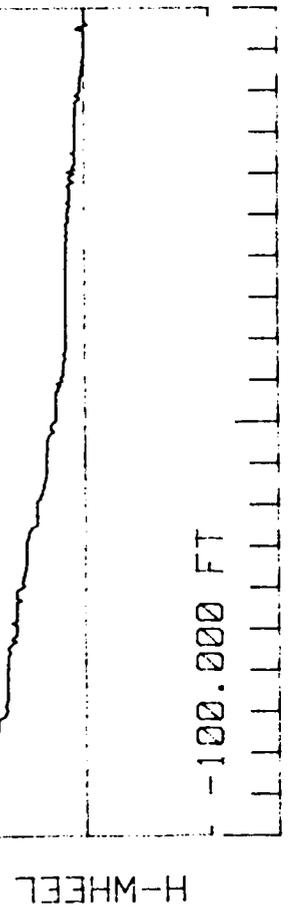
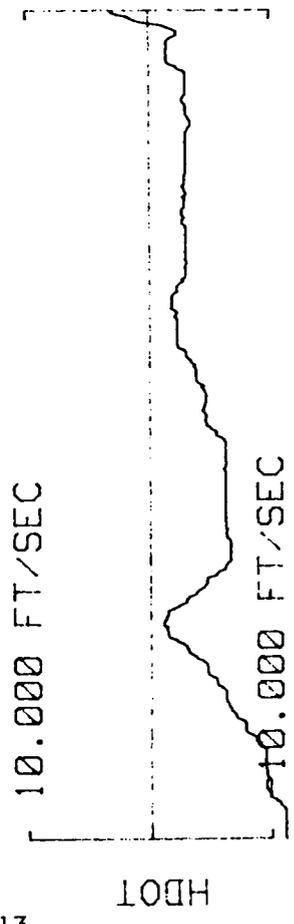
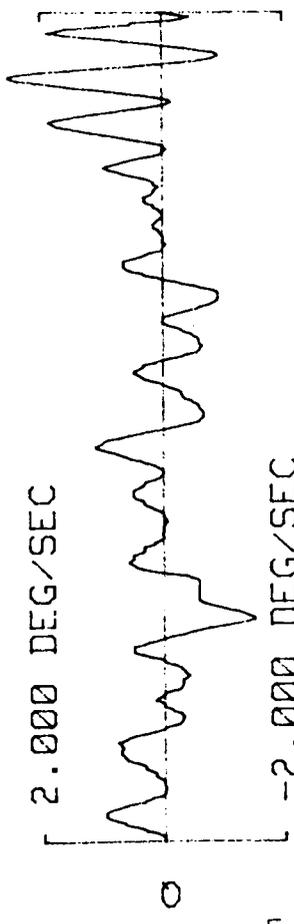
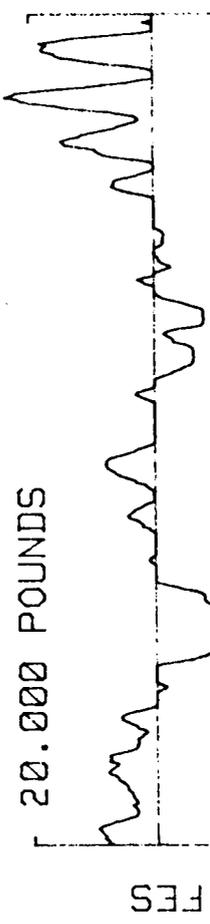
211-3

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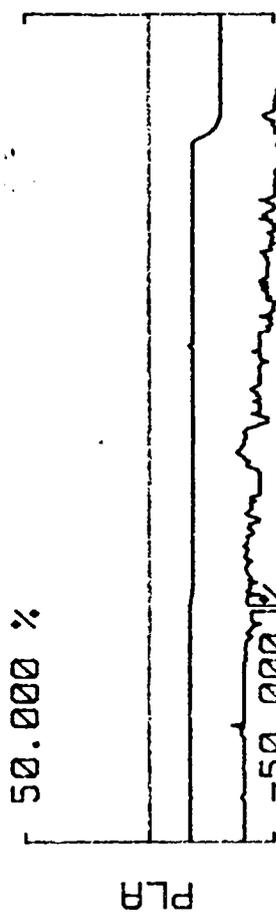
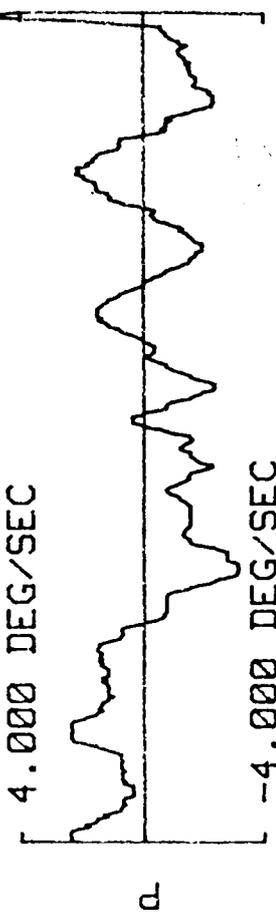
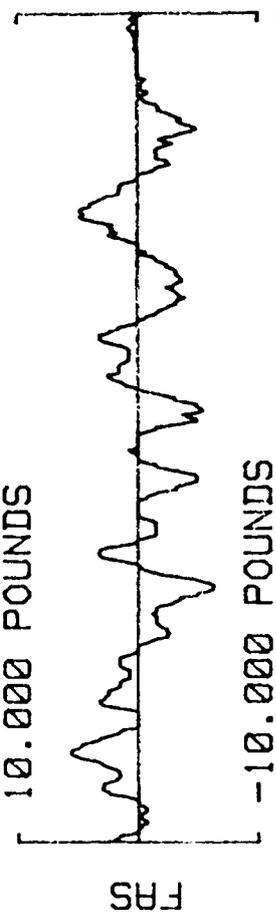
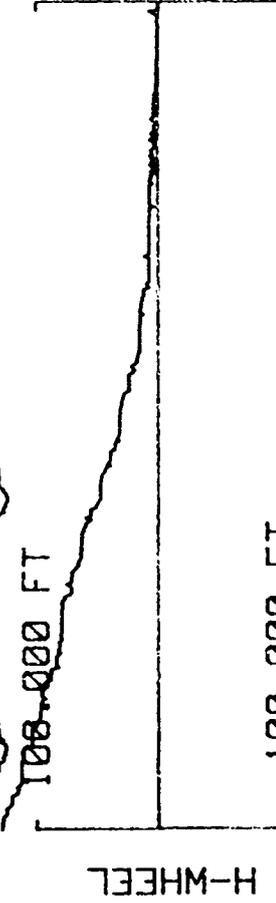
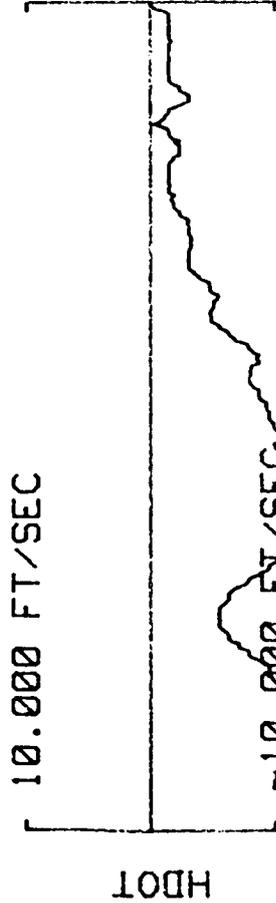
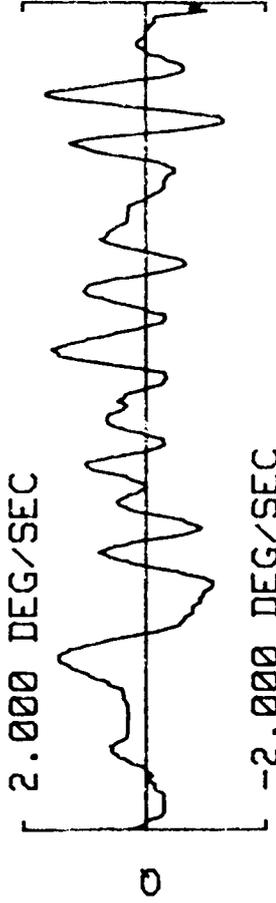
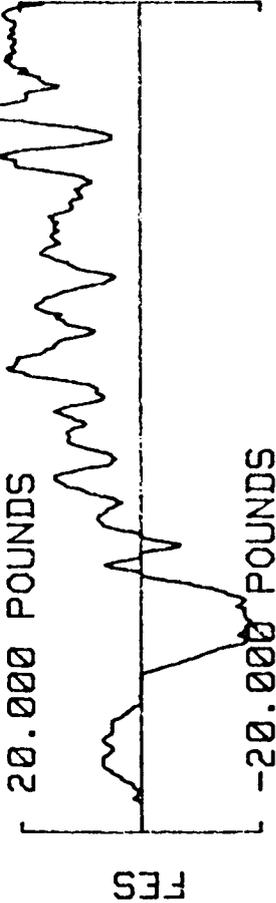
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FLT 904 APP 14

CONF 17+L/L

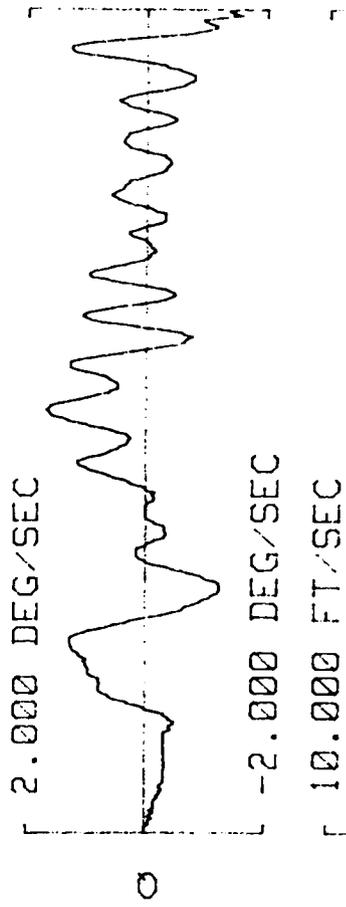
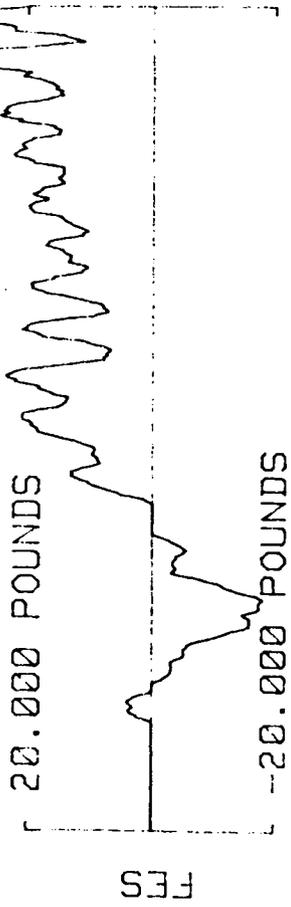


211-3

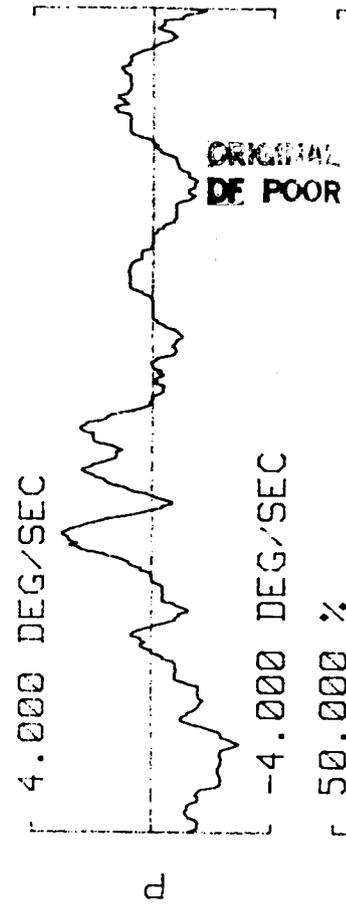
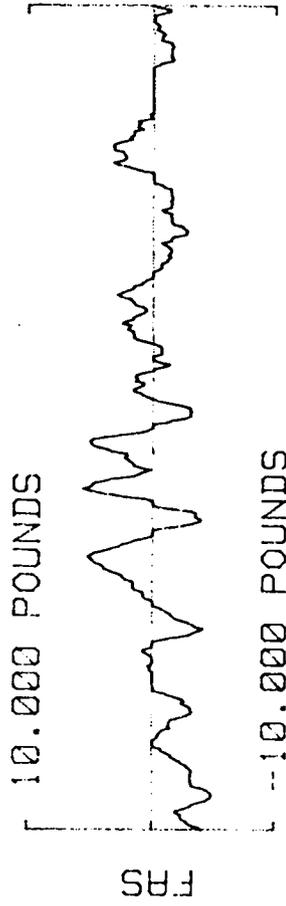
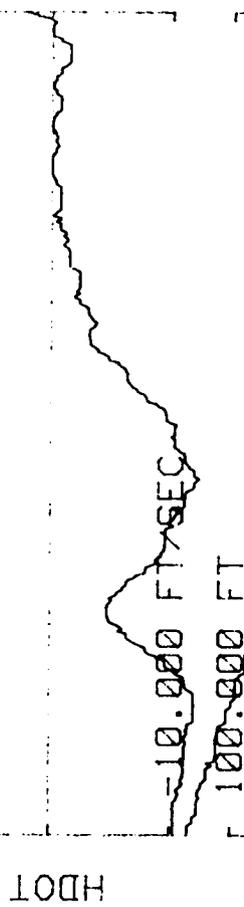


FLT 904 RPP

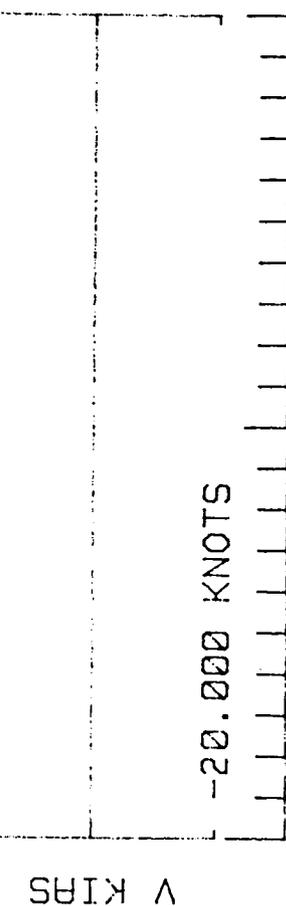
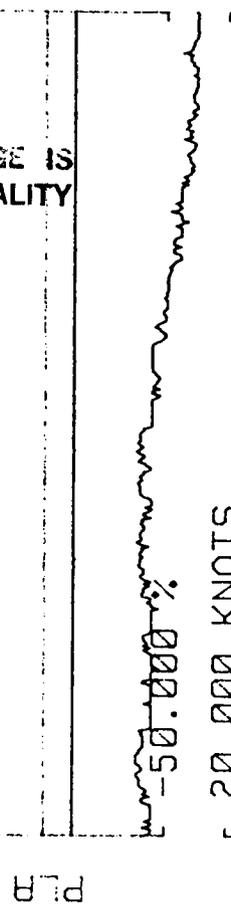
CONF 16



511-3



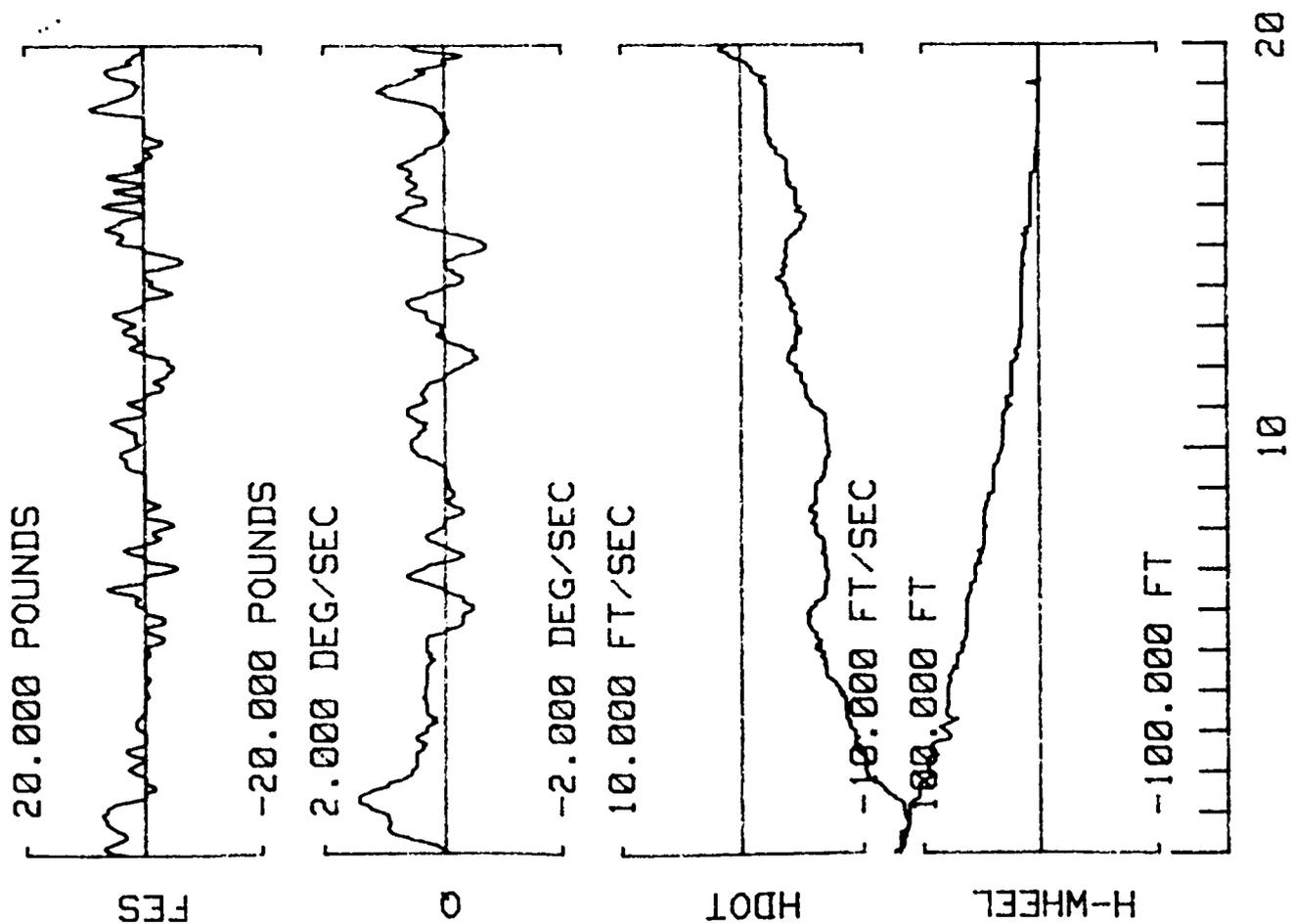
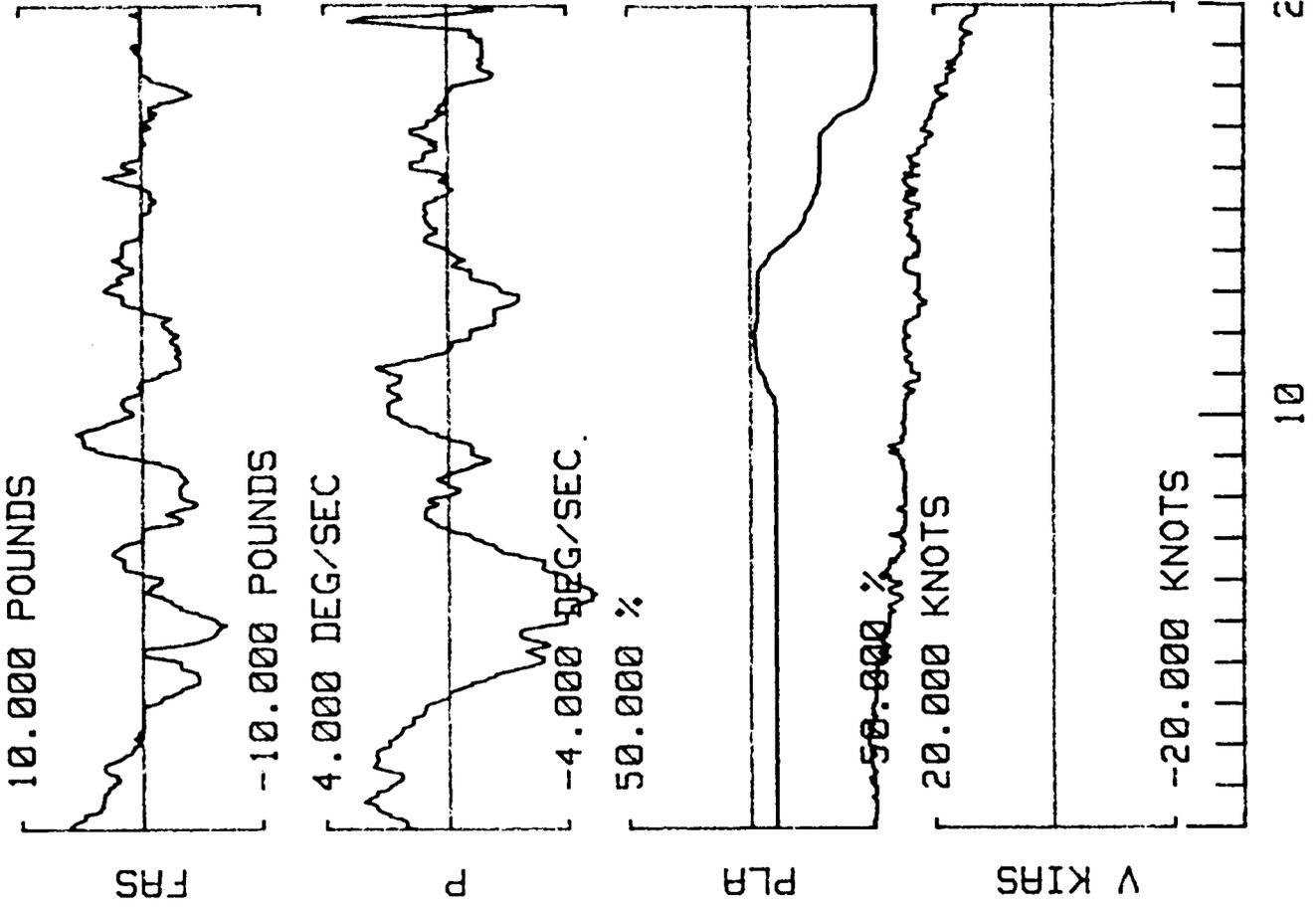
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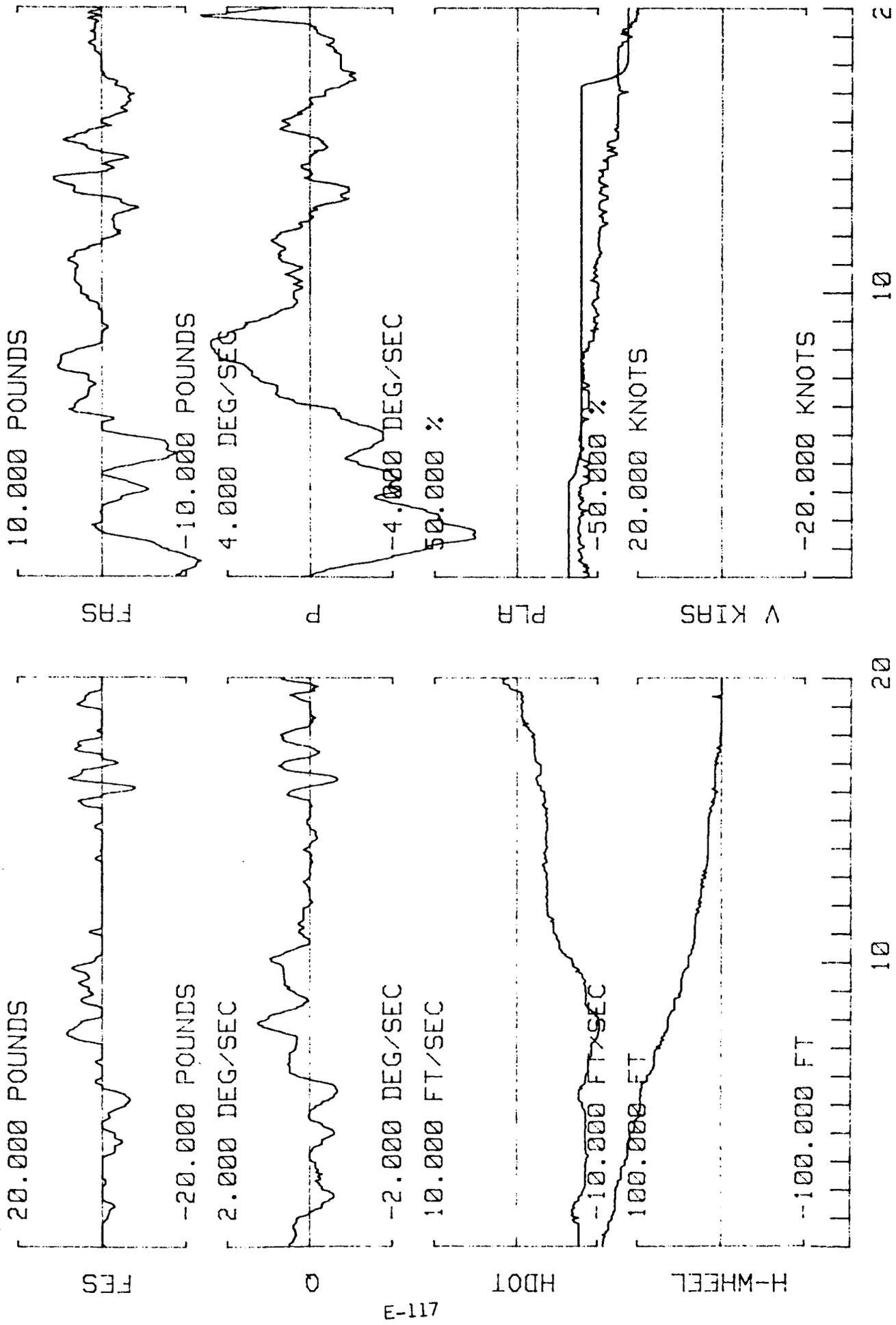
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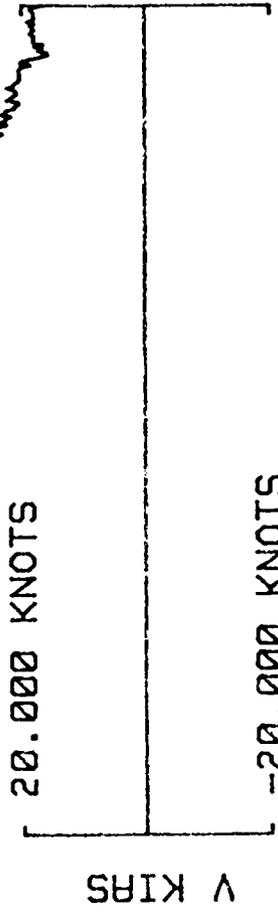
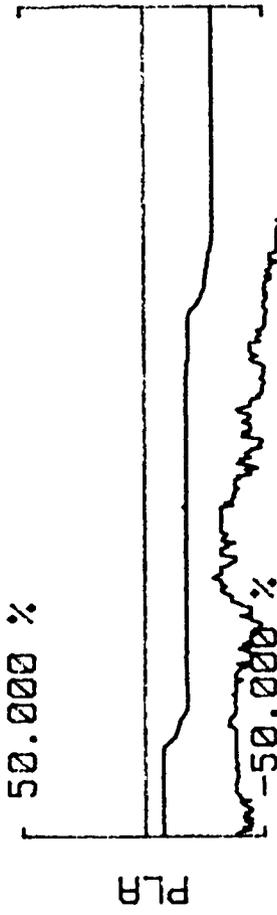
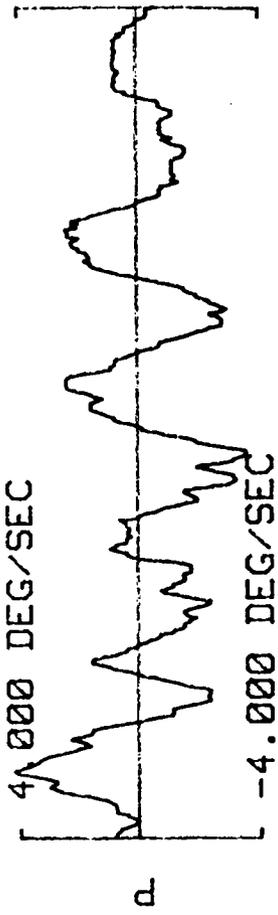
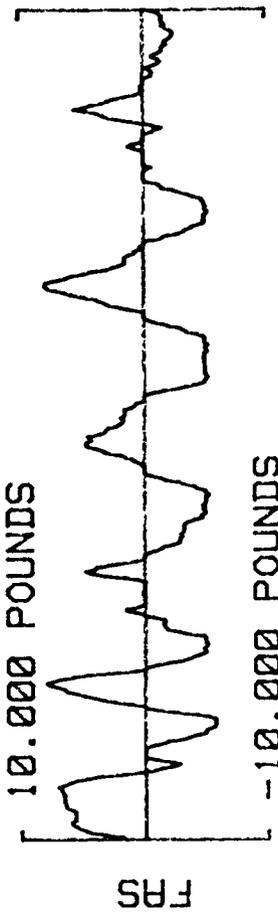
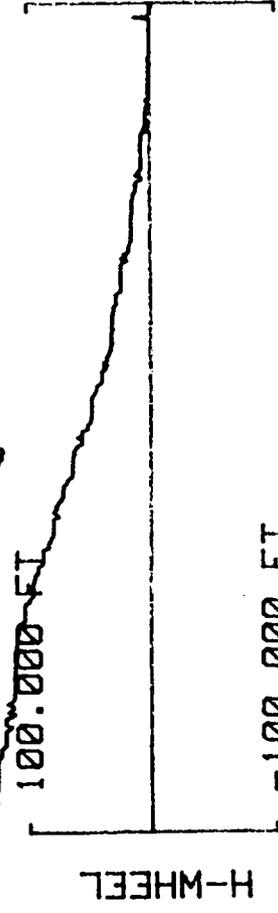
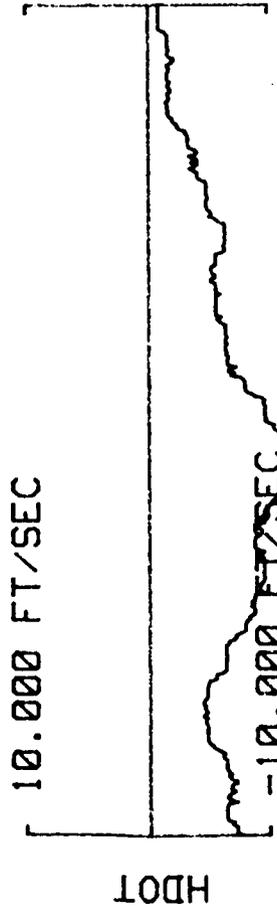
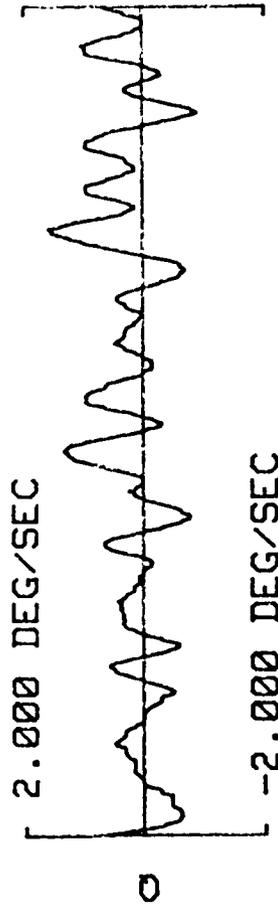
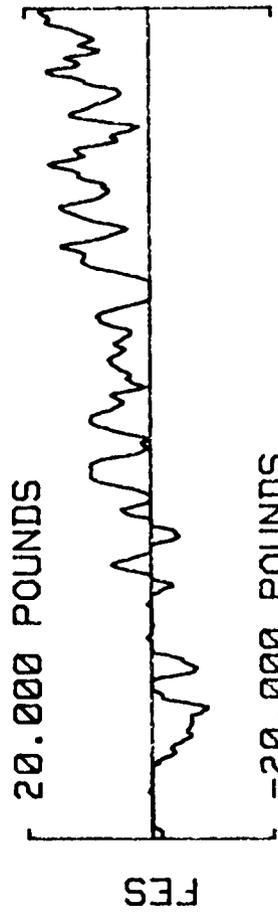
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FLT 905 APP 2 CONF 6

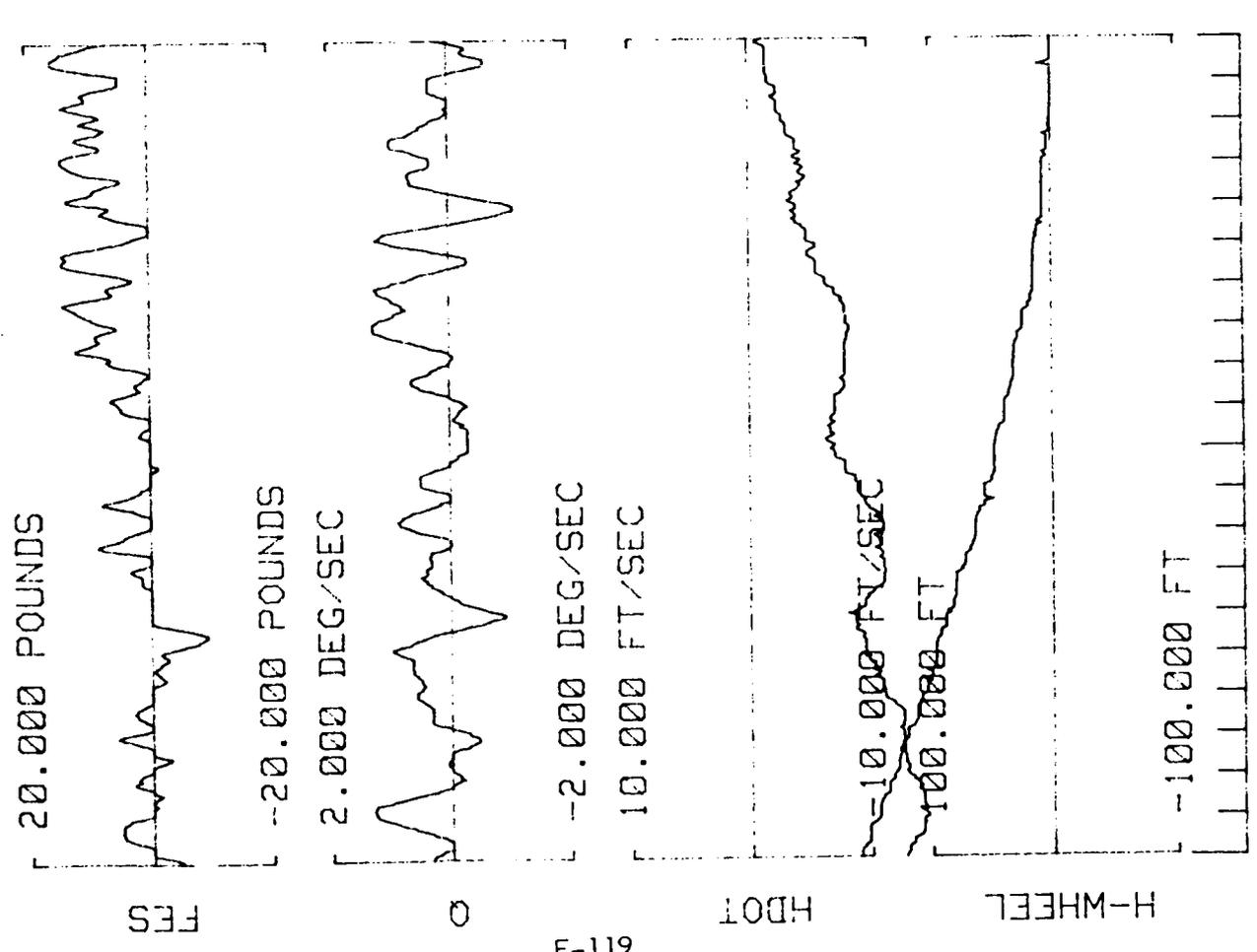
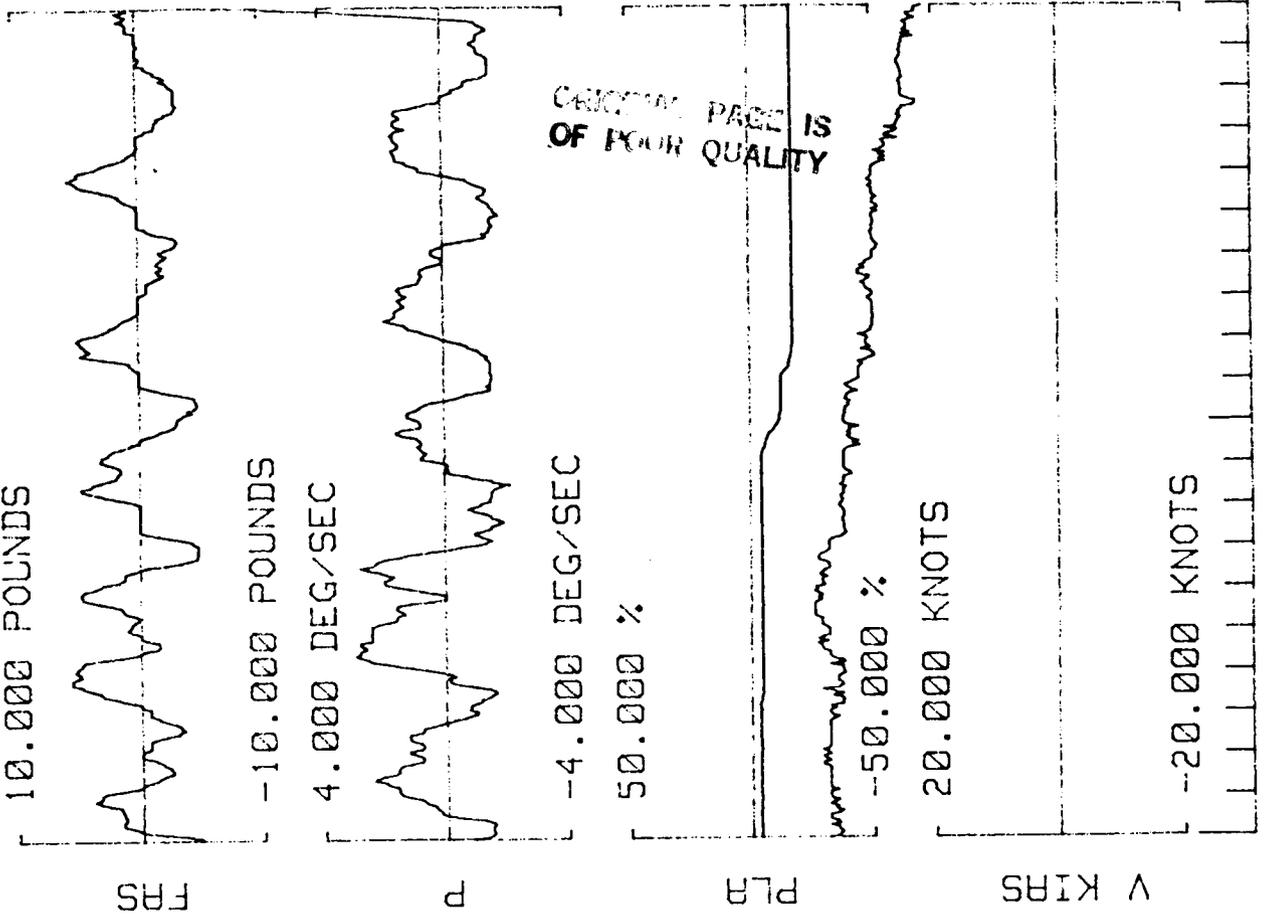


FLT 905 APP 4 CONF 6





FLT 906 APP 2 CONF B



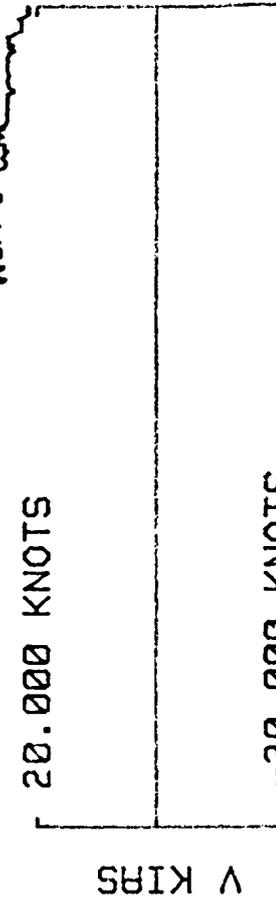
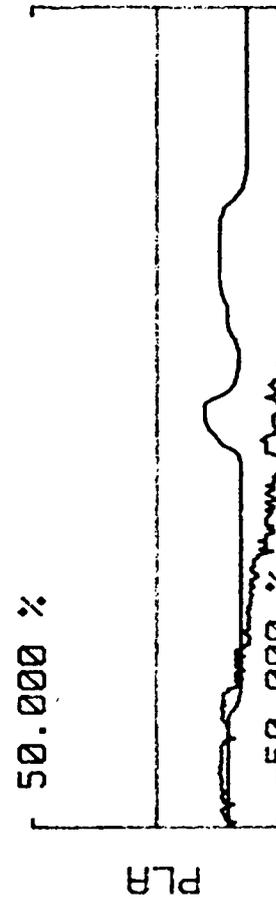
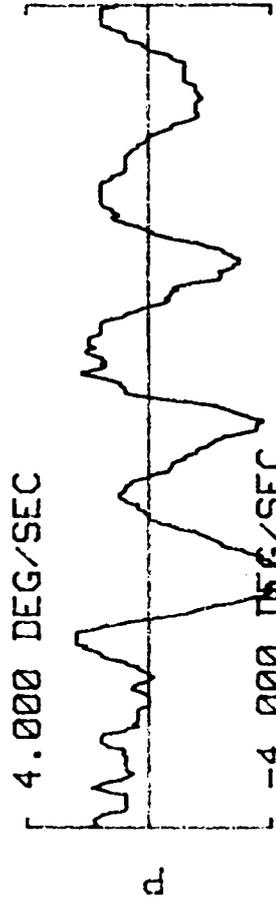
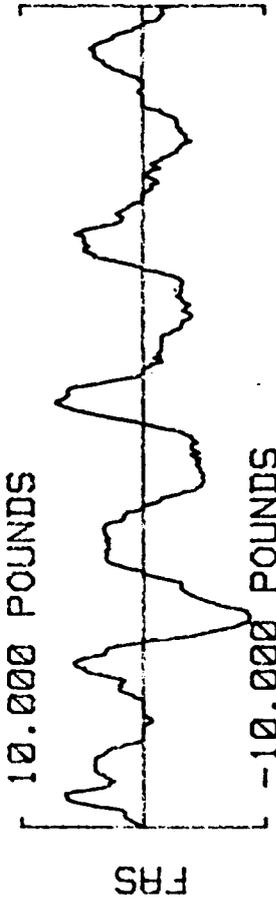
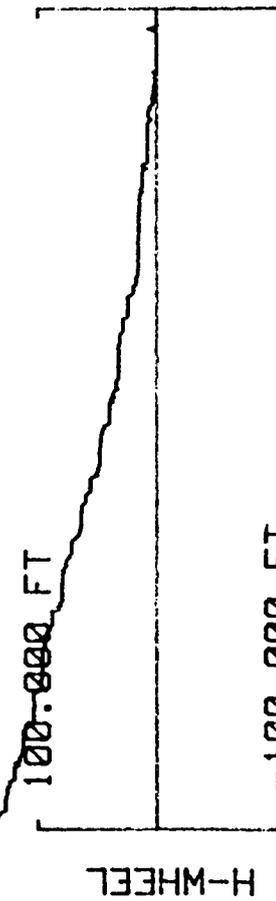
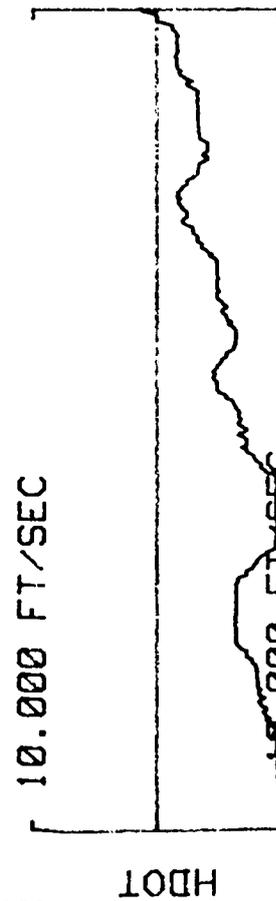
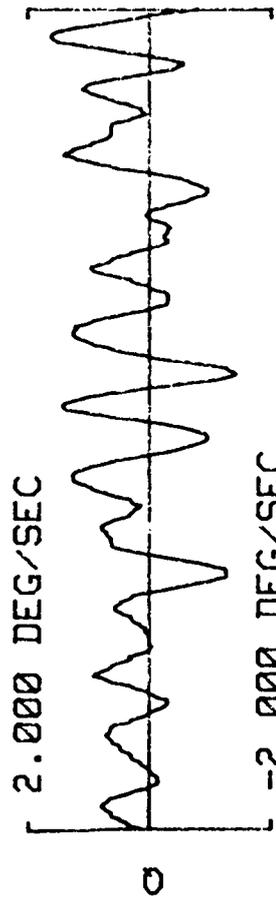
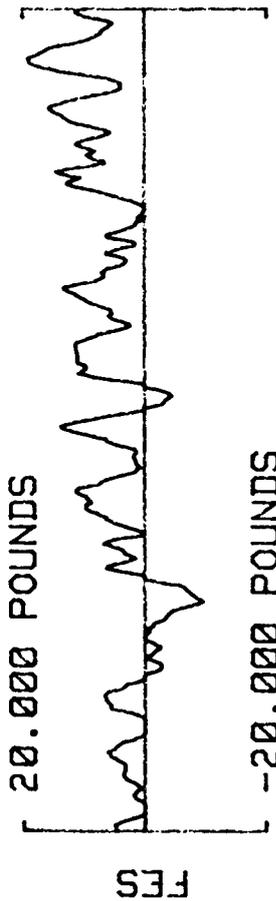
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CONF 21



E-120

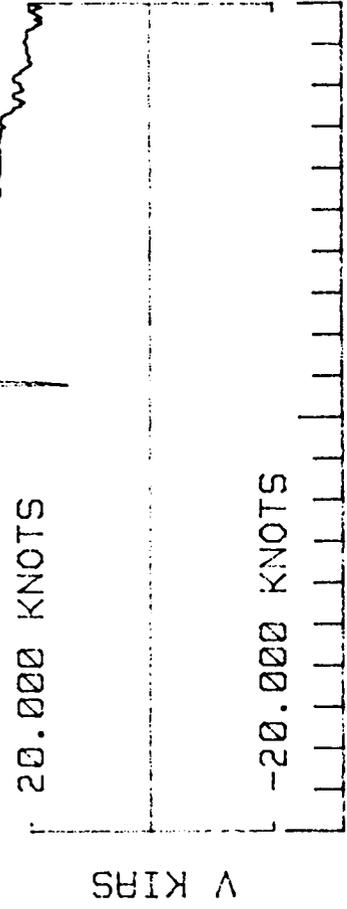
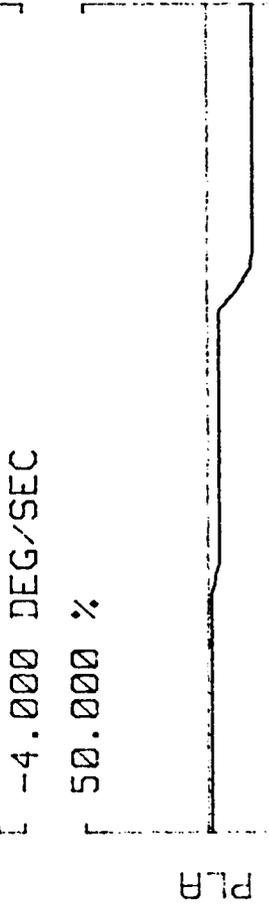
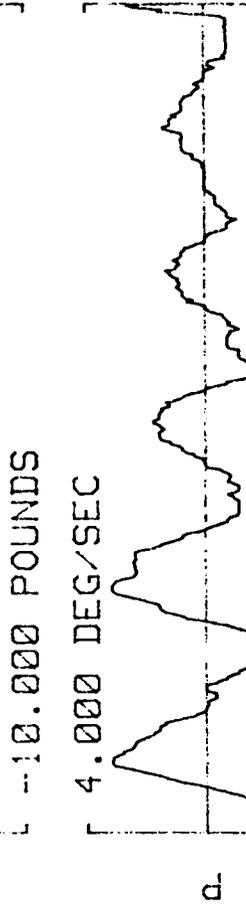
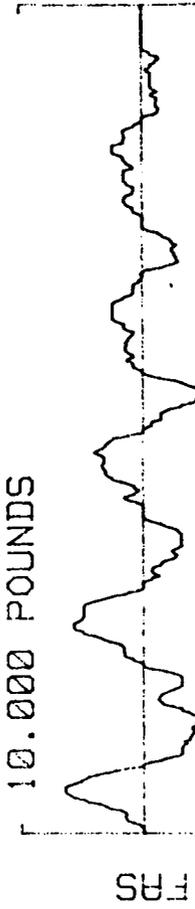
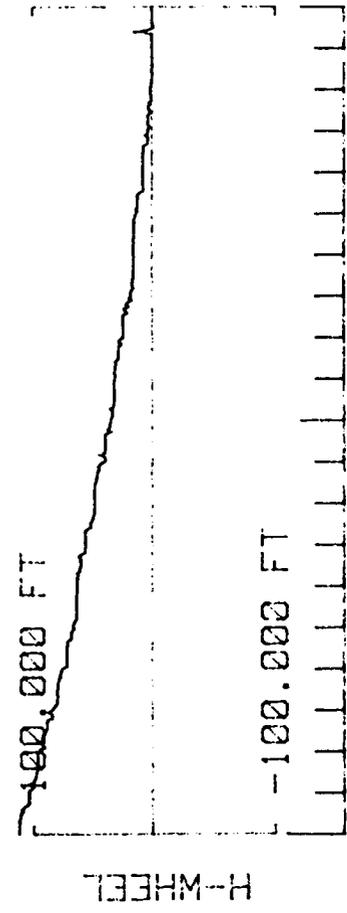
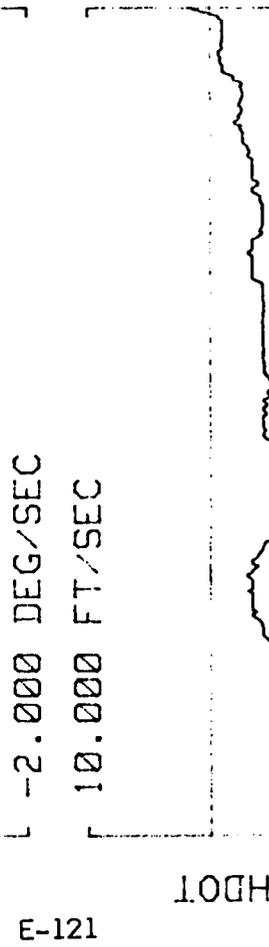
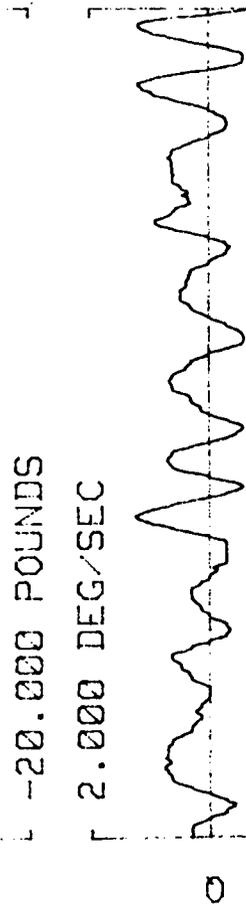
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CONF 21

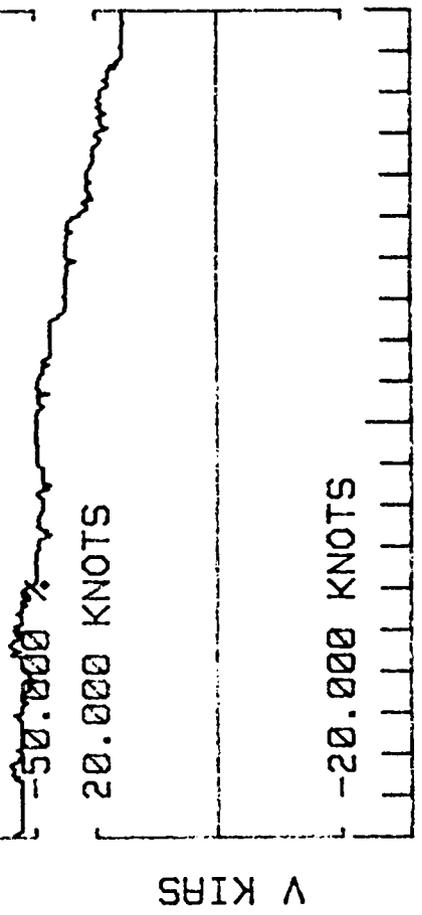
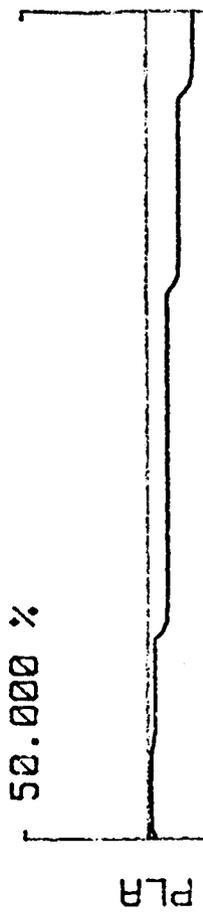
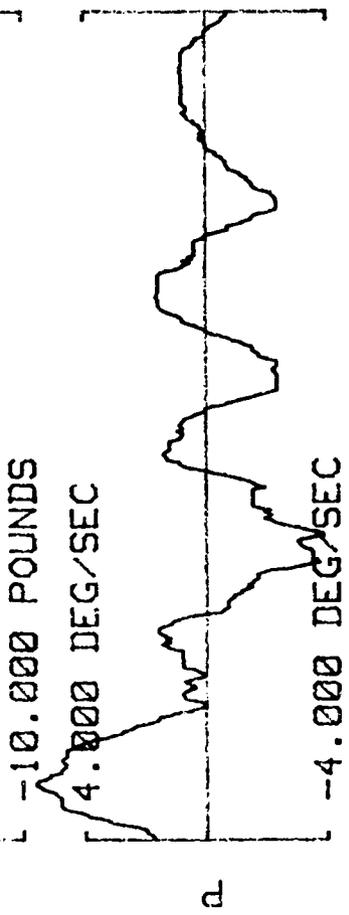
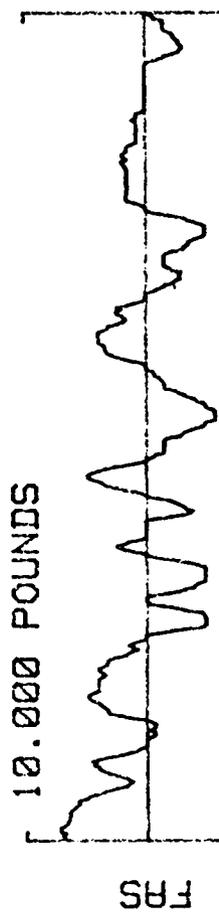
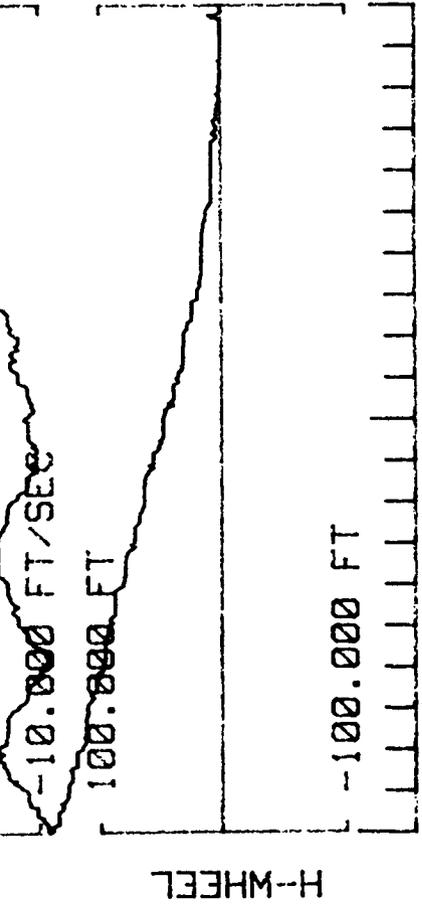
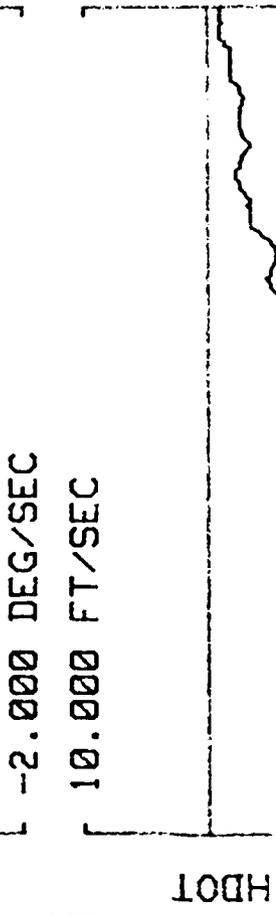
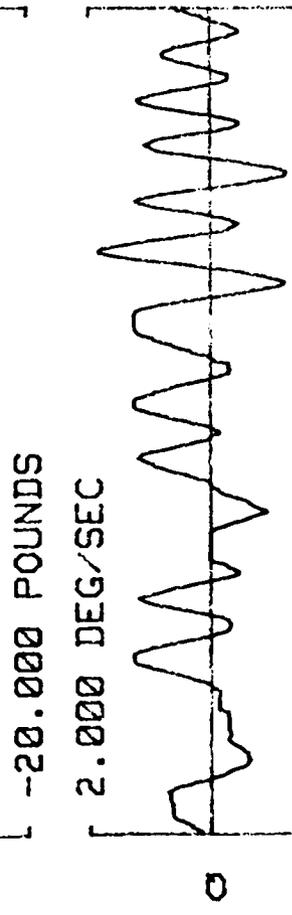
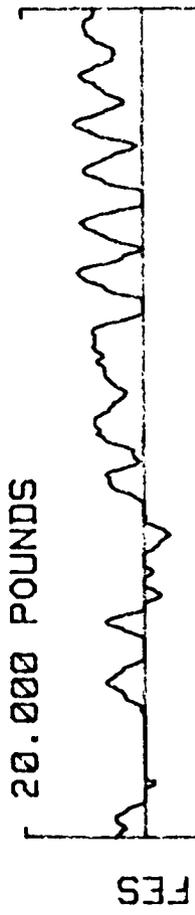


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CONF 27

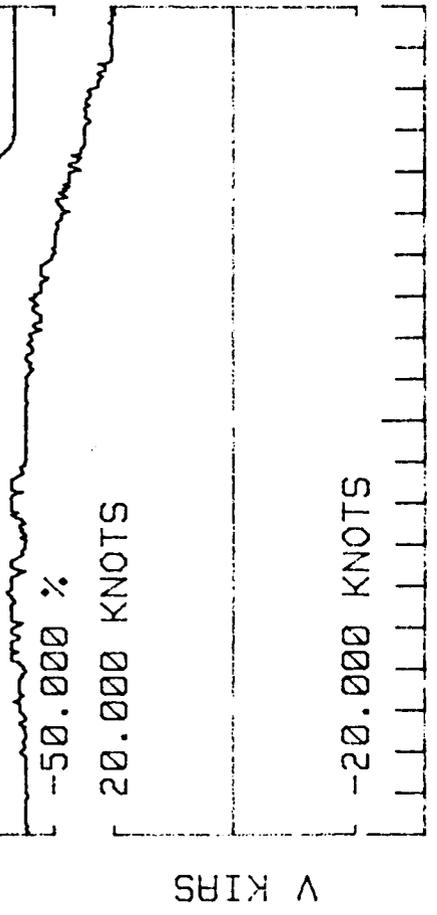
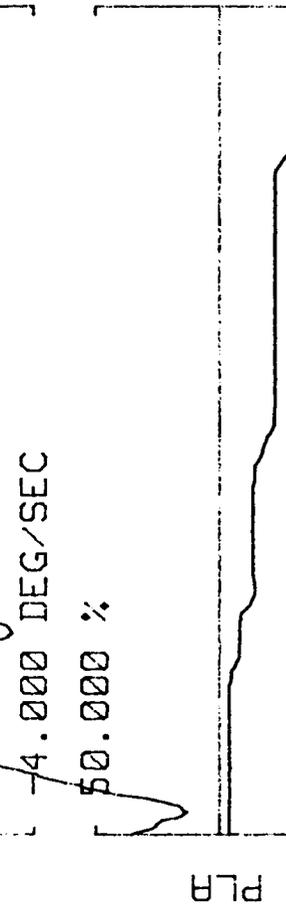
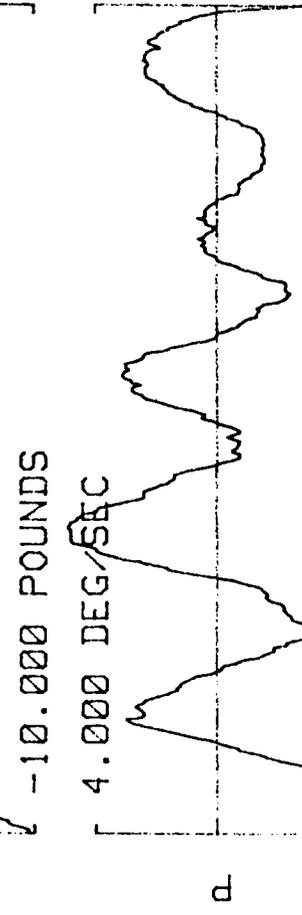
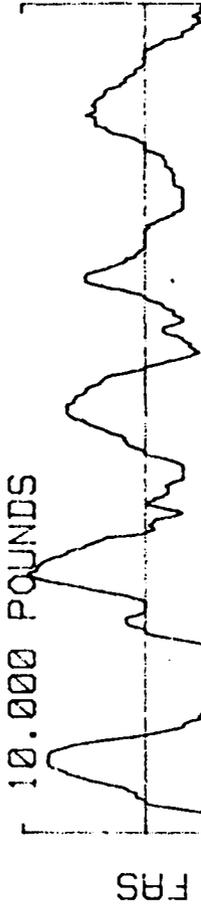
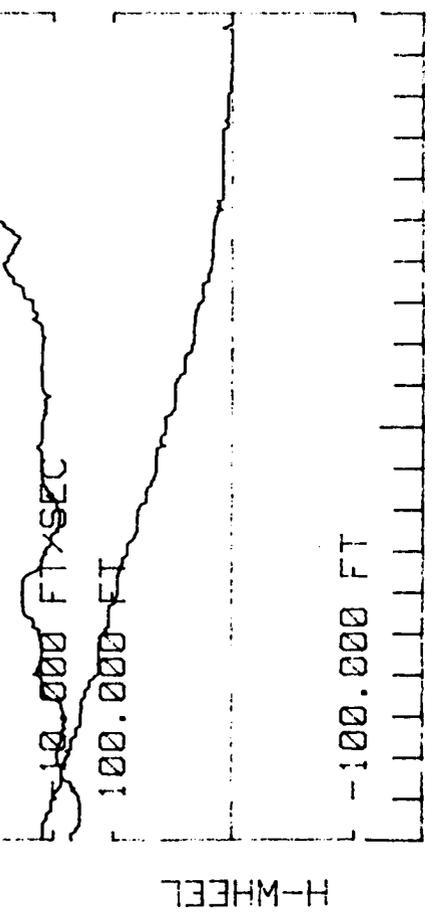
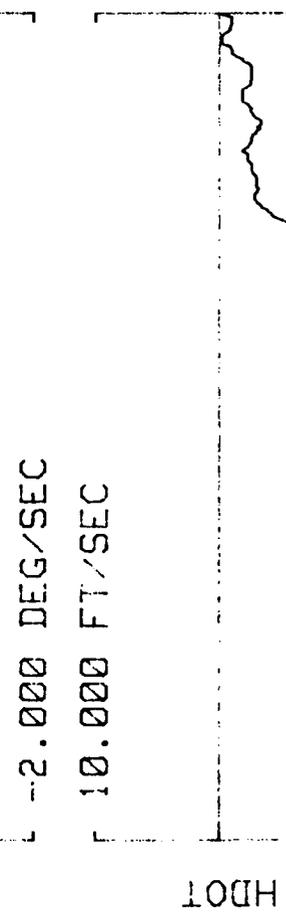
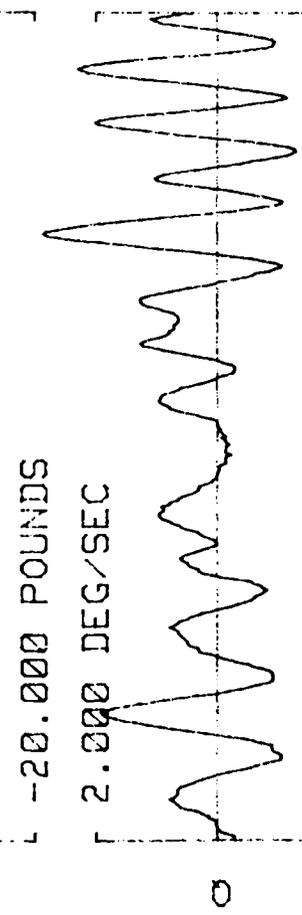
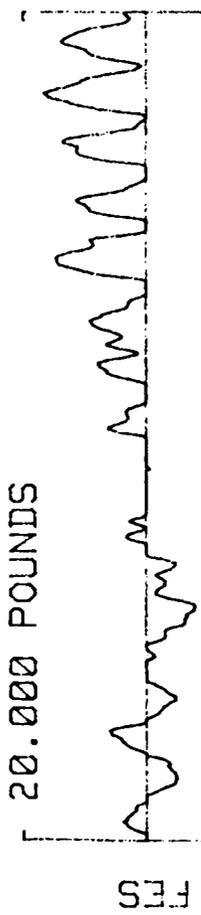


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APP 6

CONF 27



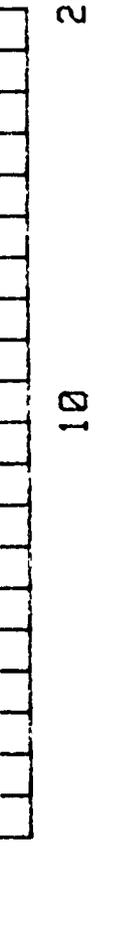
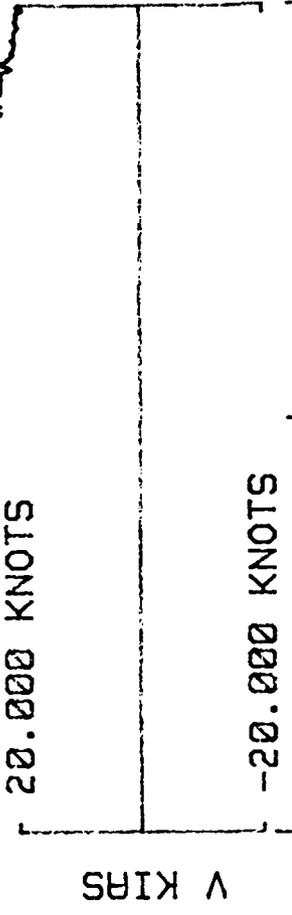
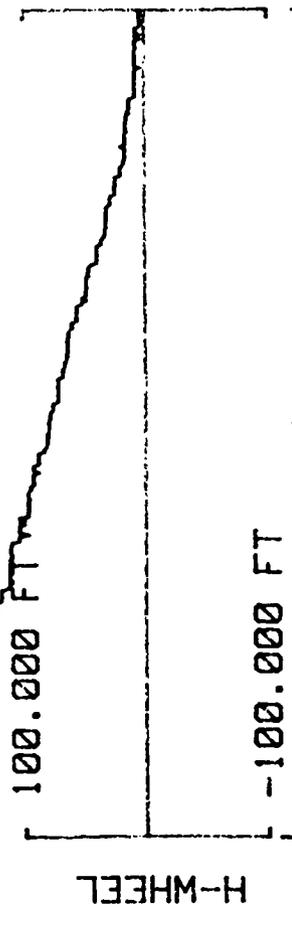
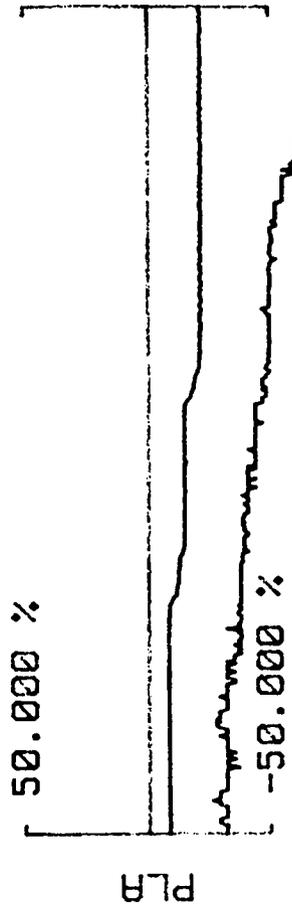
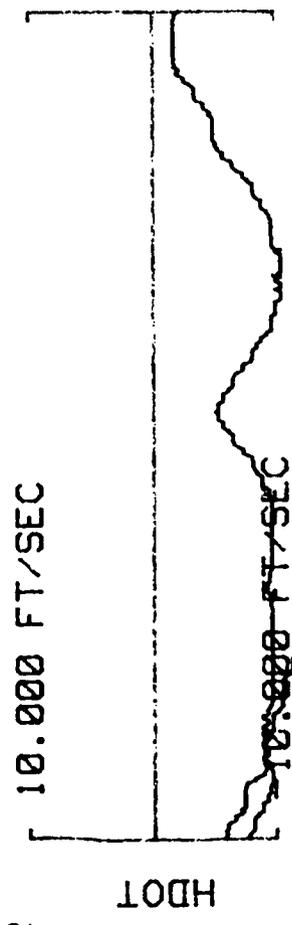
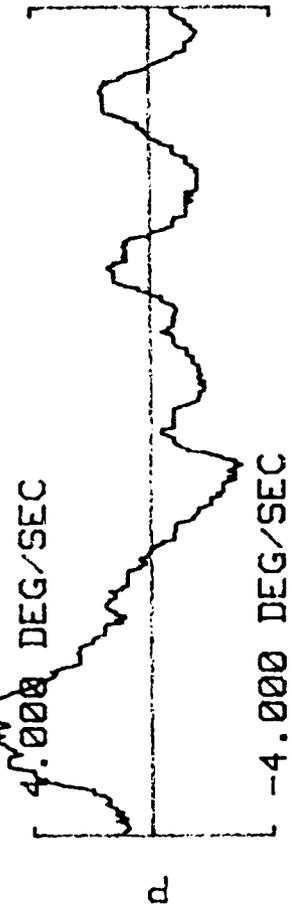
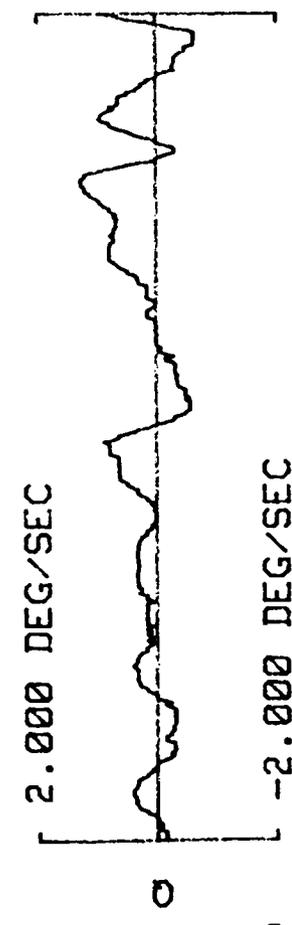
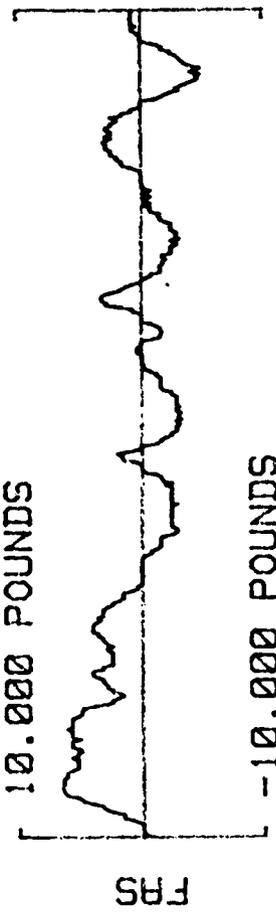
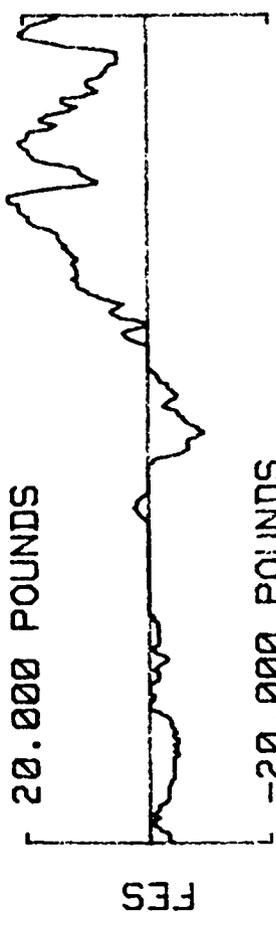
321-E

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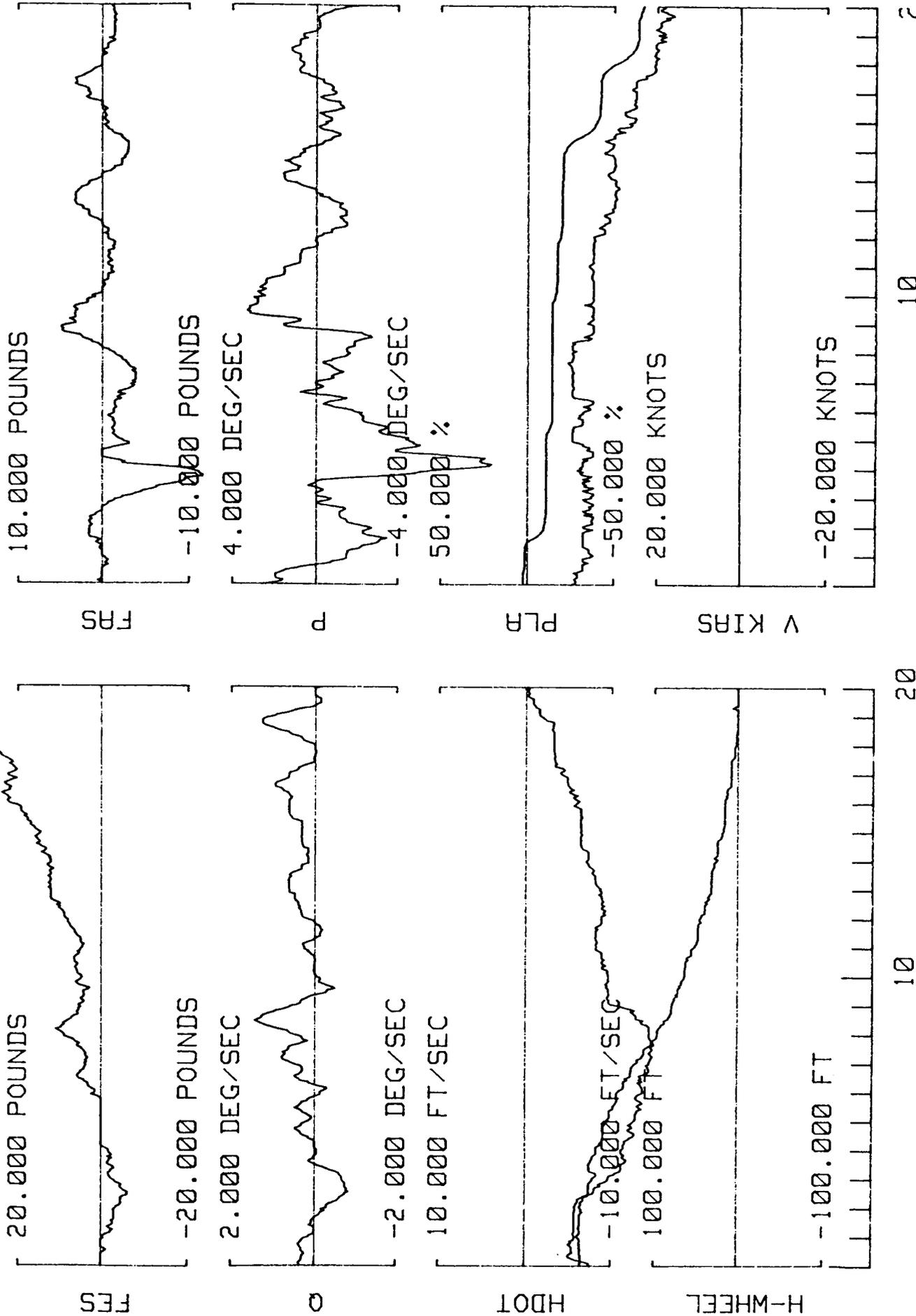
FLT 906

APP 7

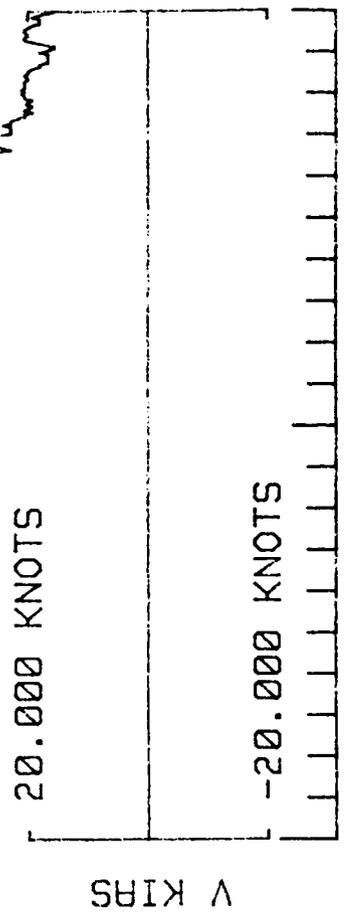
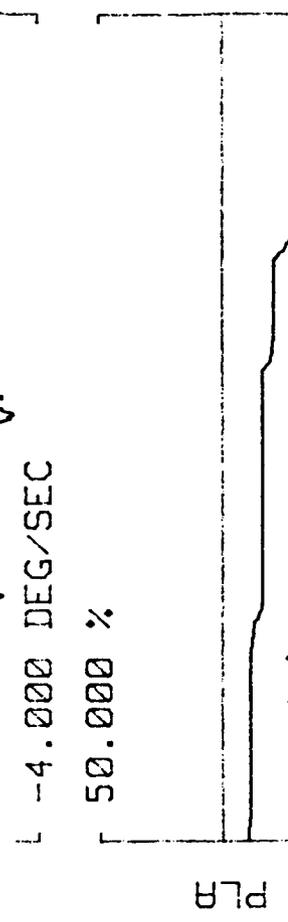
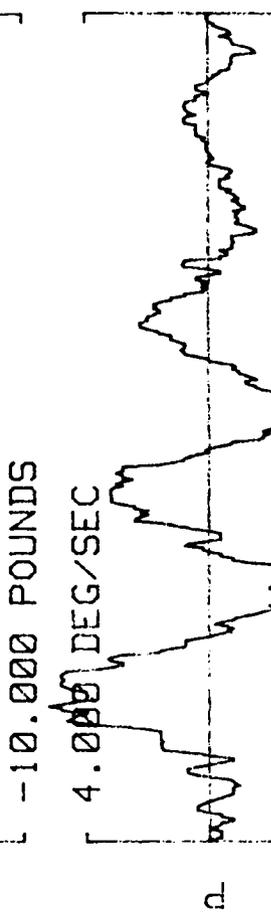
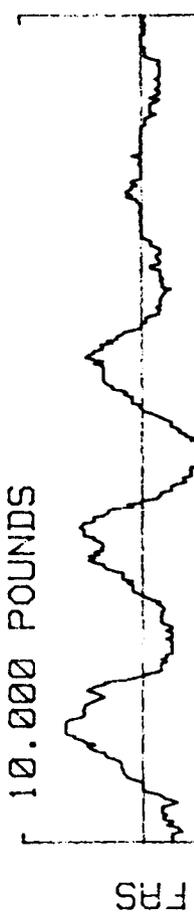
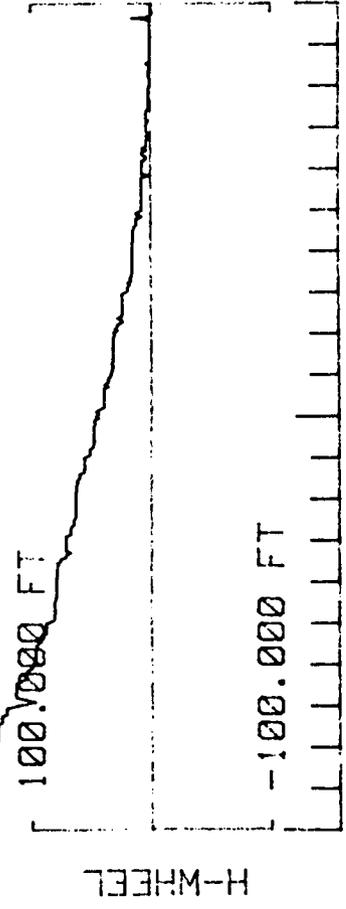
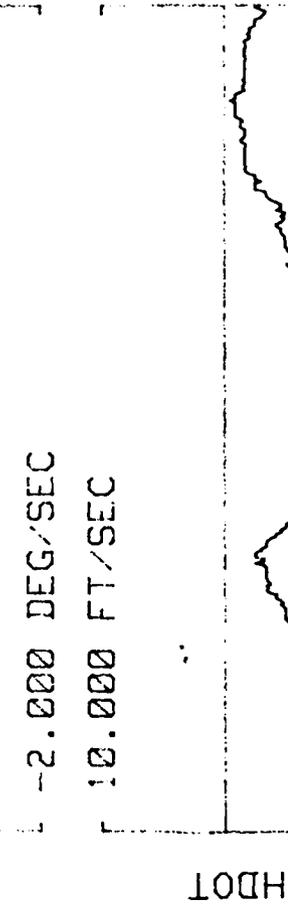
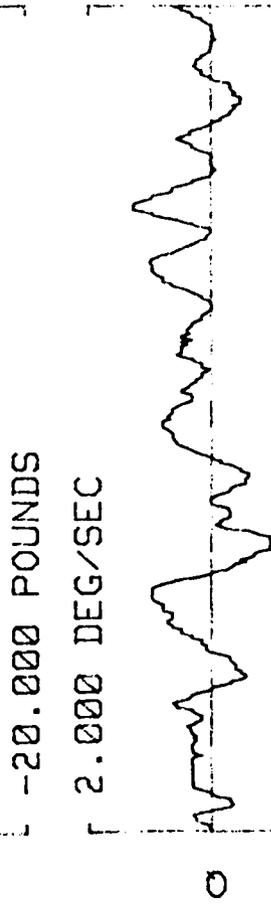
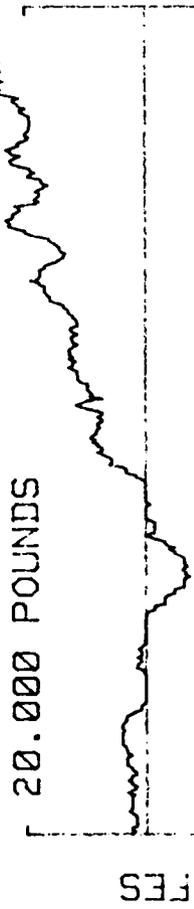
CONF 24



FLT 907 WPP 1 CONF 1



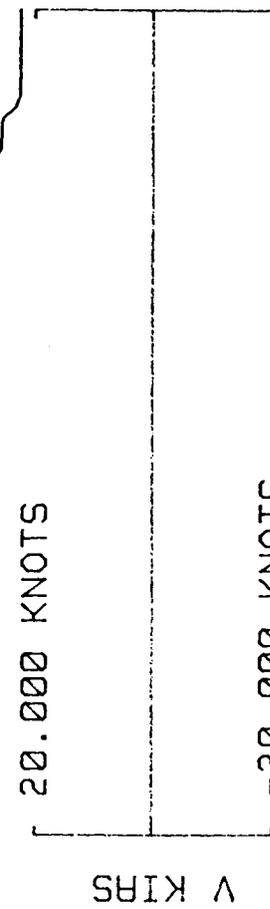
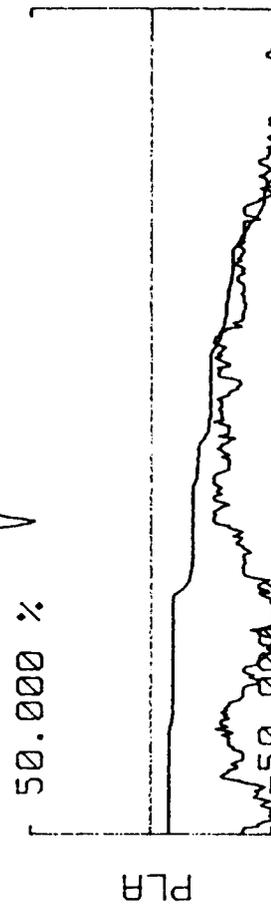
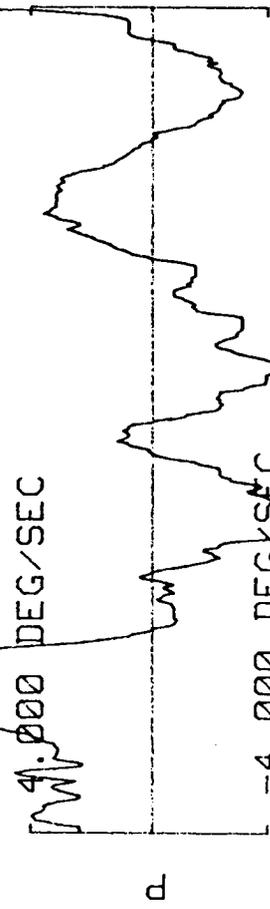
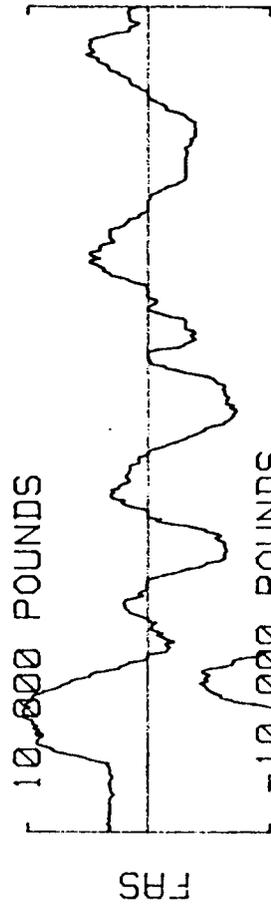
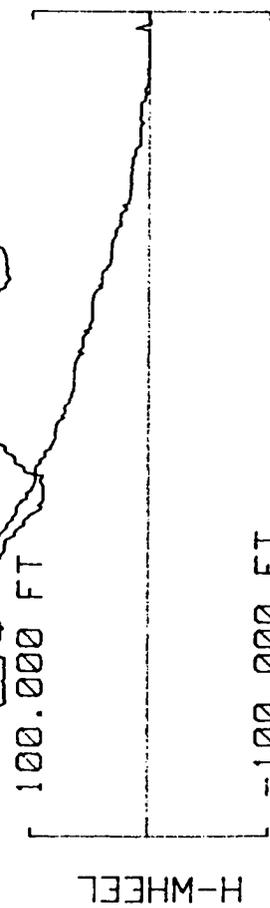
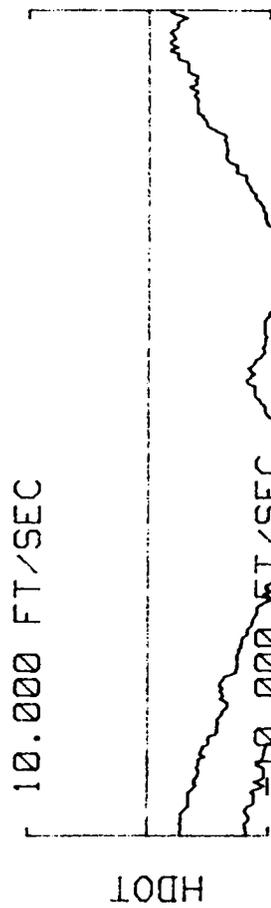
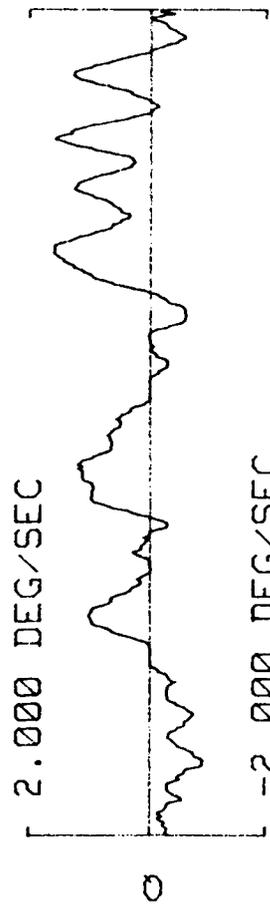
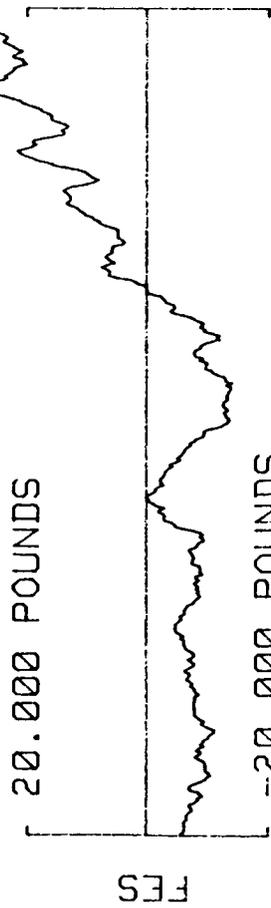
FLT 907 RPP 2 CONF 1



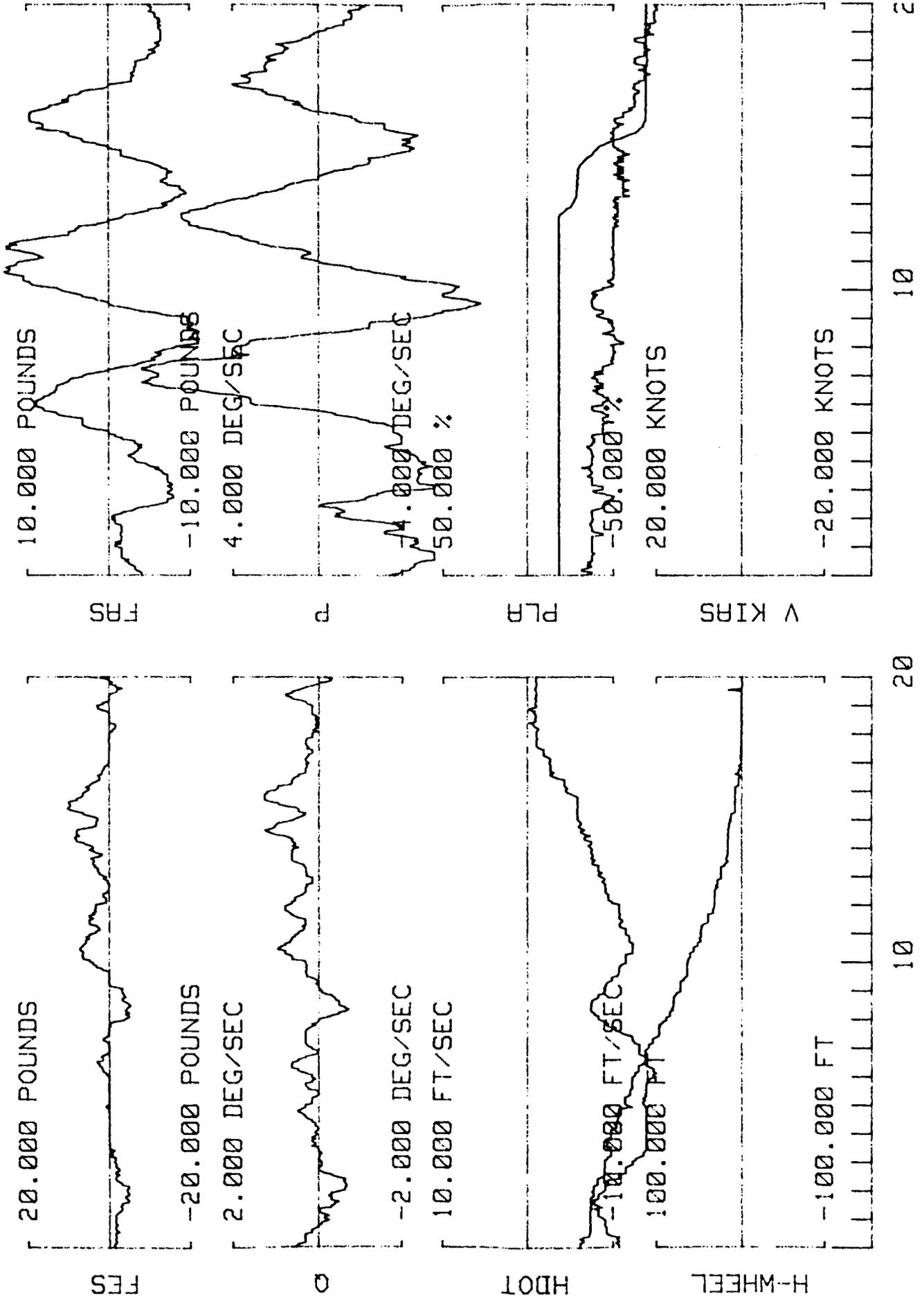
FLT 907

APP 3

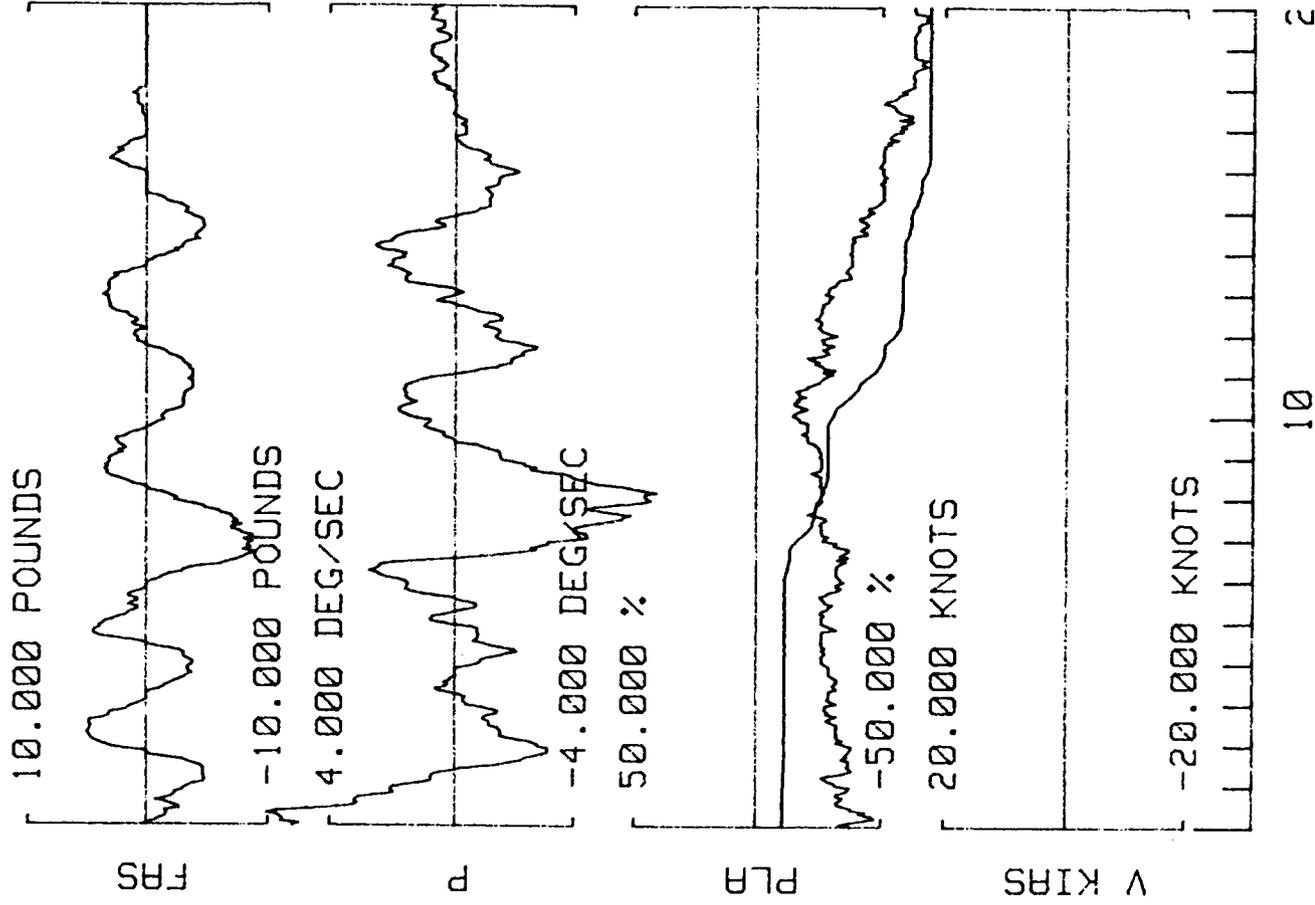
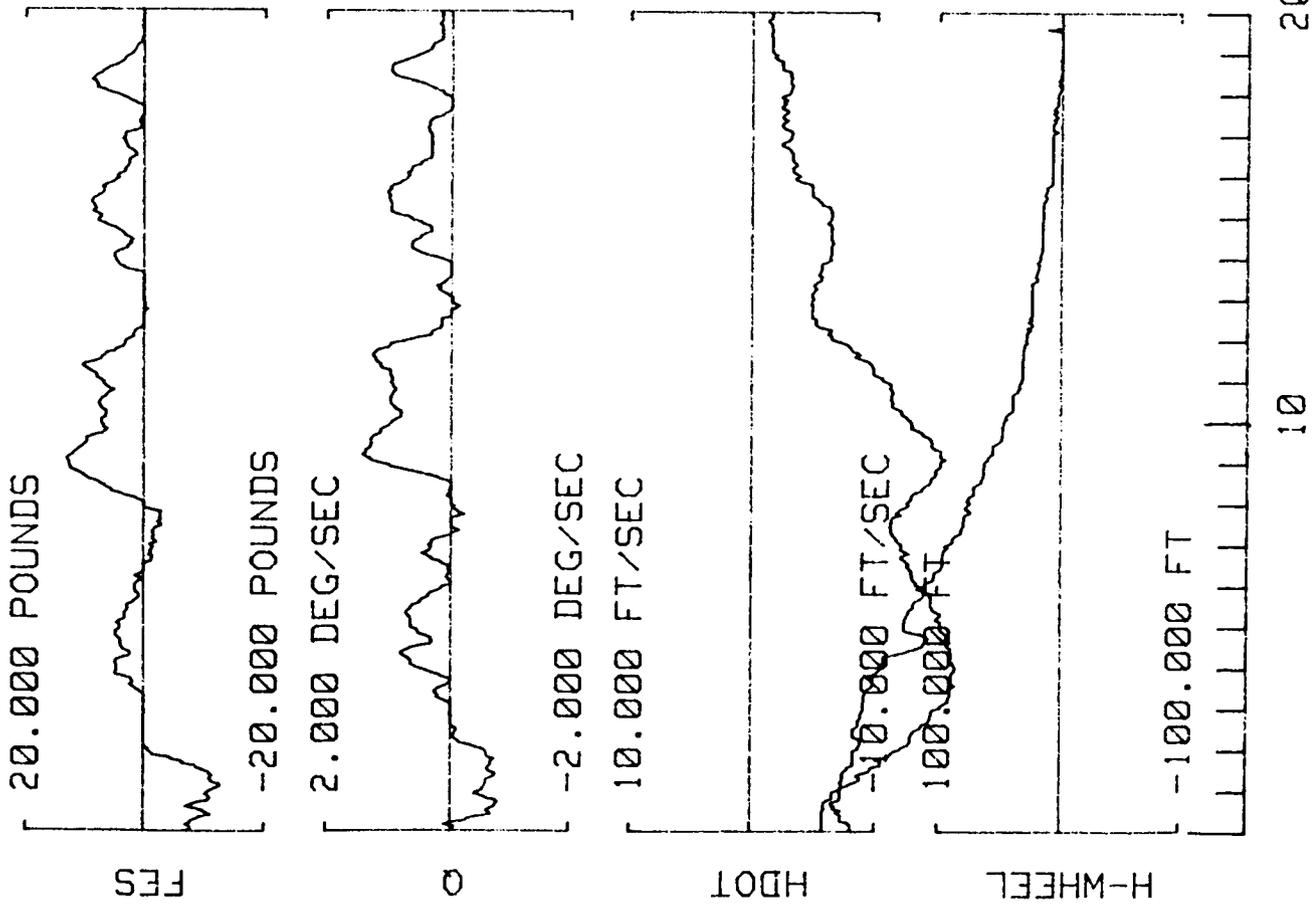
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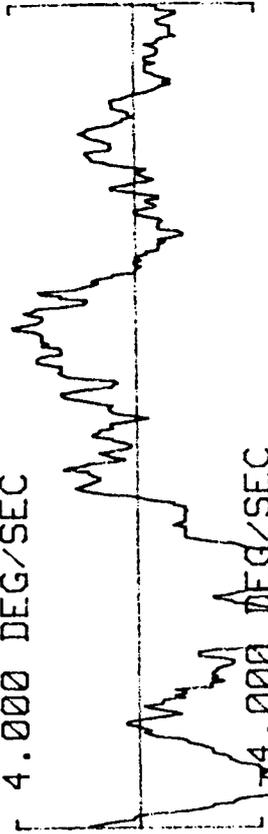
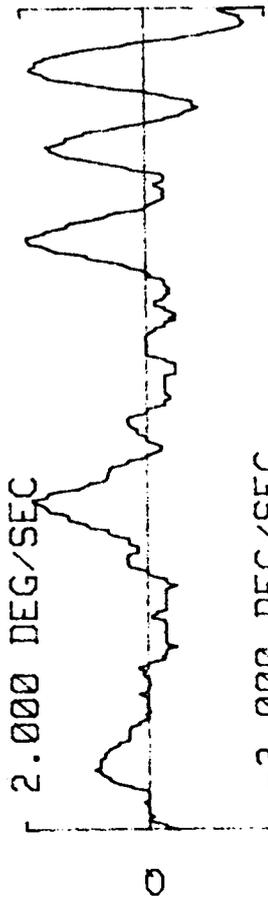
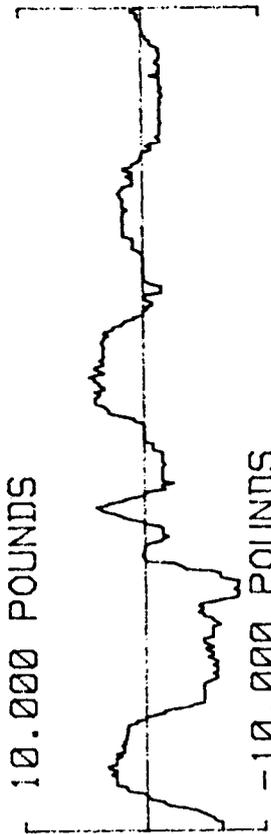
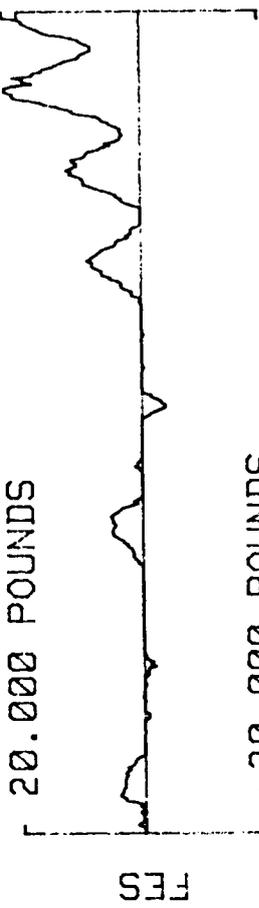


FLT 907 APP 4 CONF 2

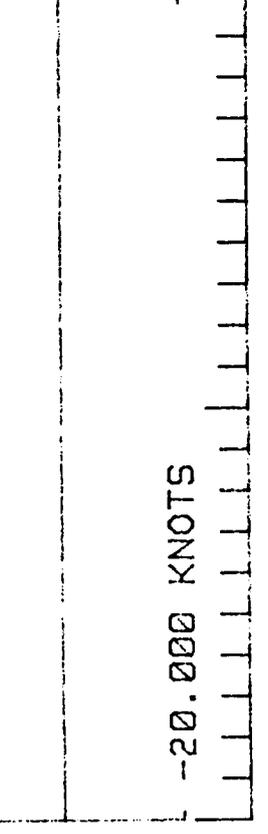
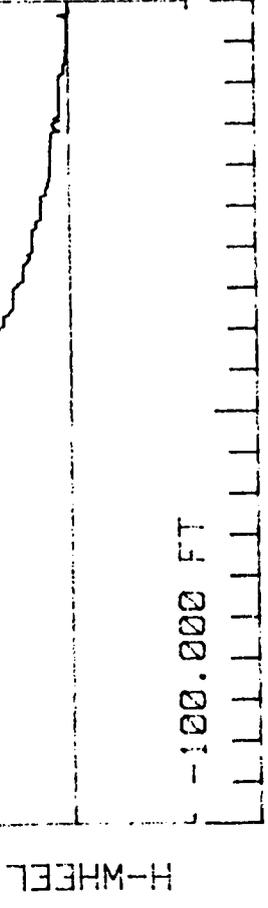
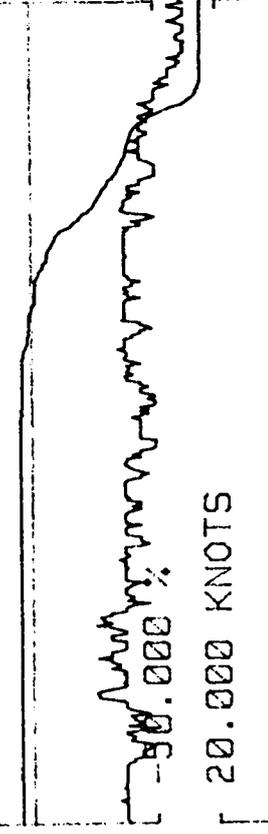
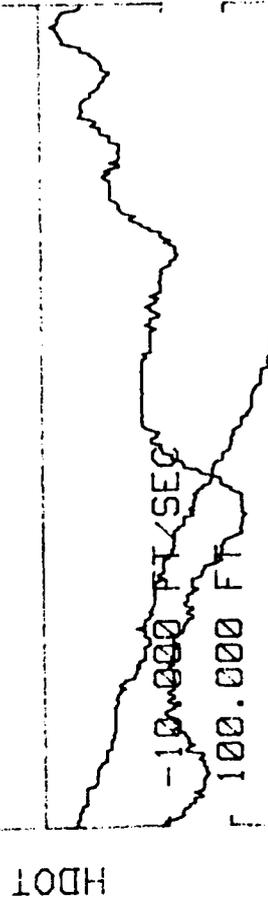
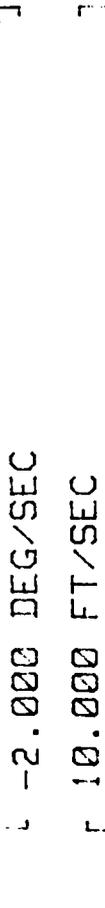


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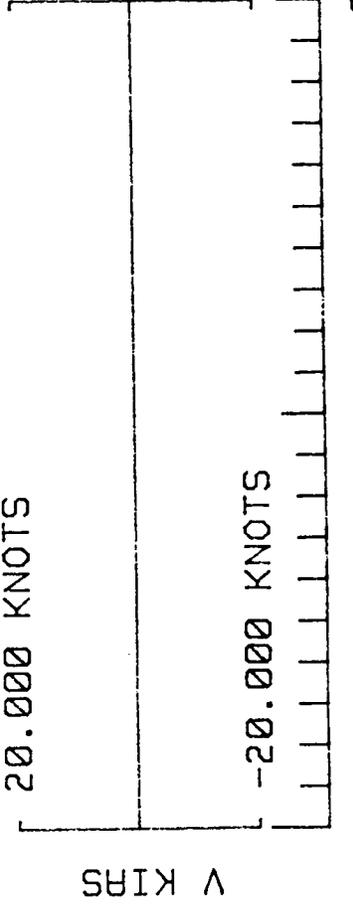
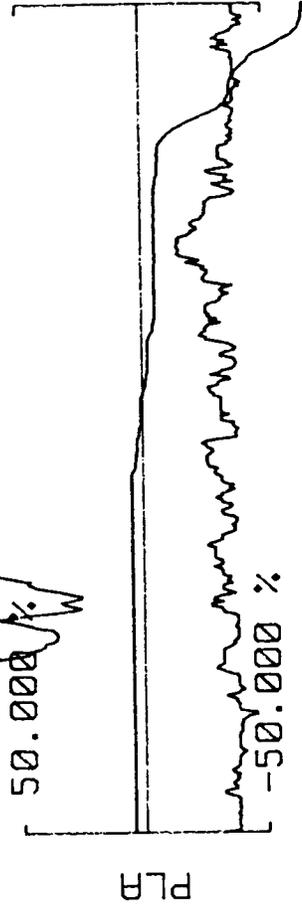
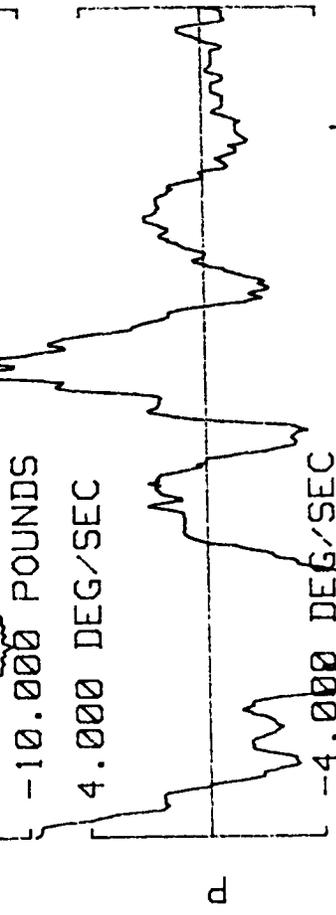
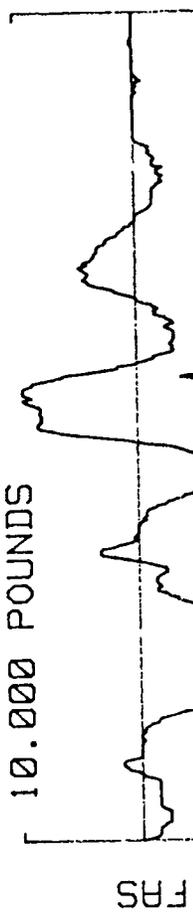
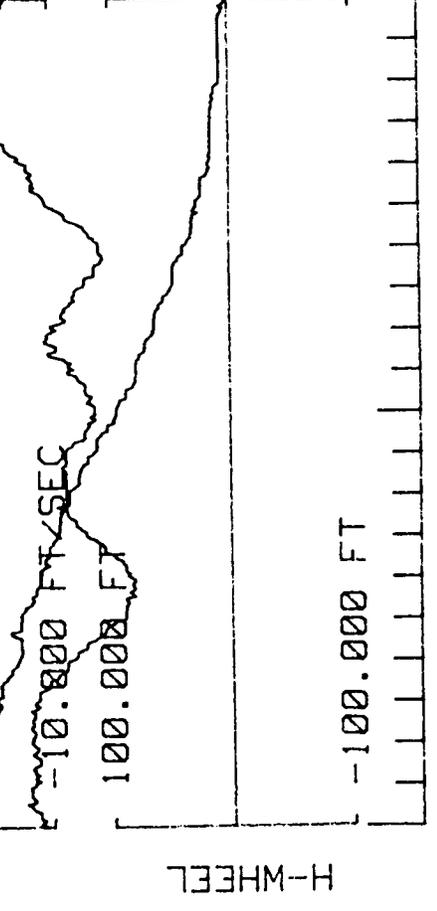
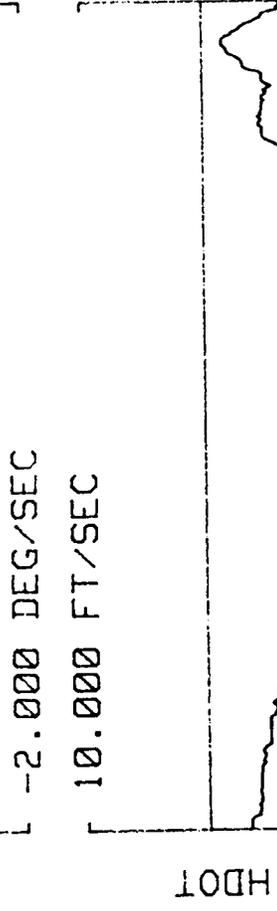
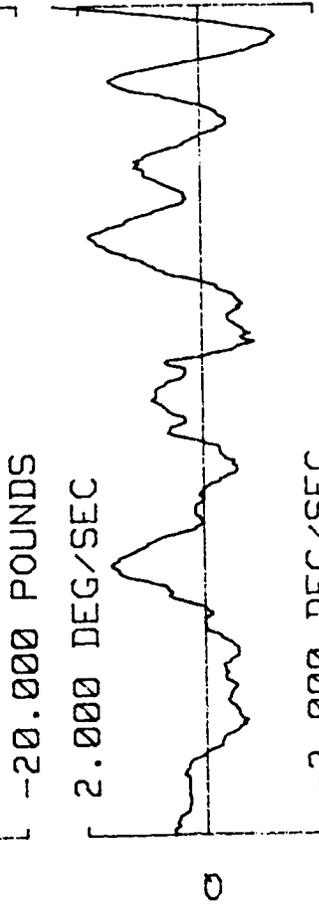
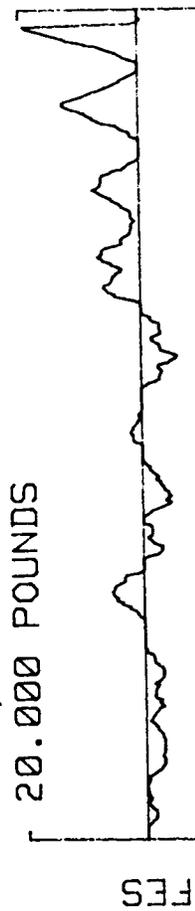


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FLT 907 APP 7

CONF 13



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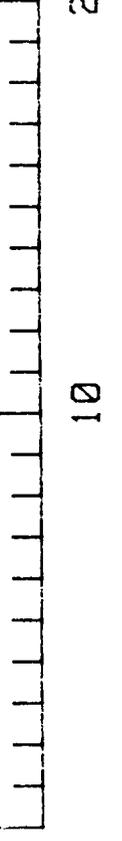
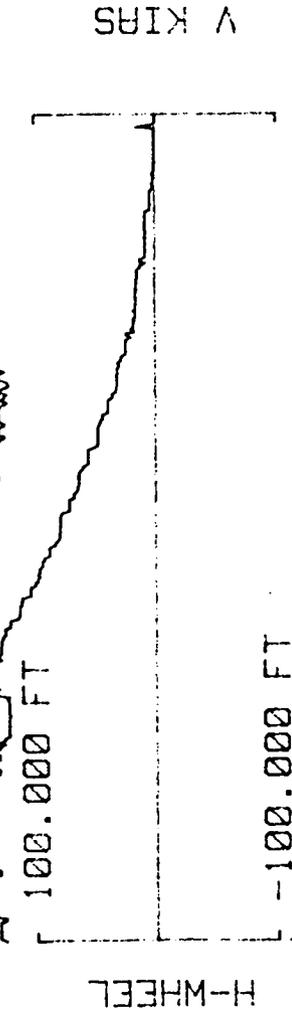
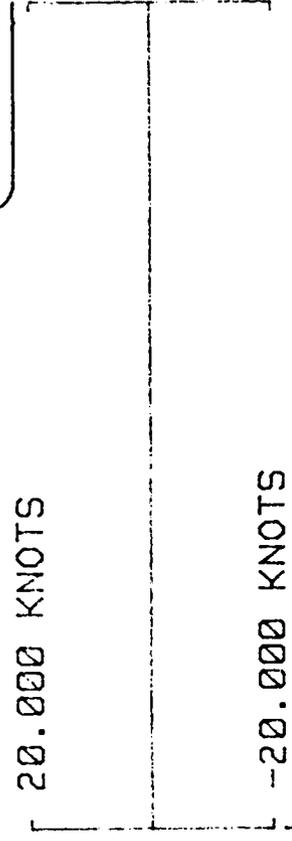
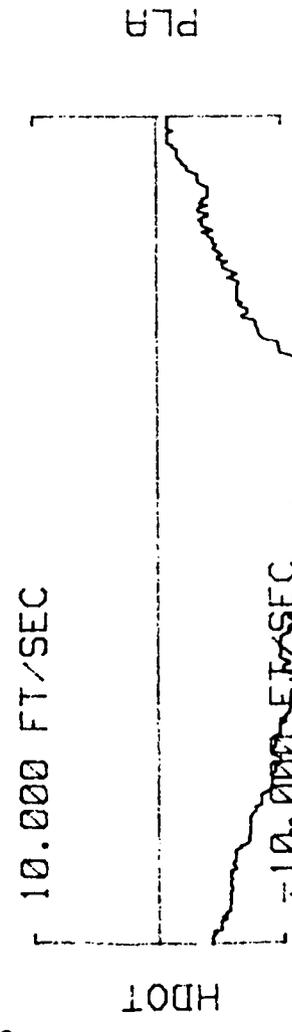
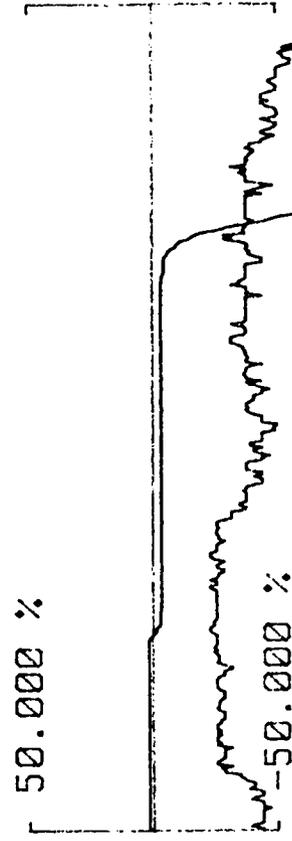
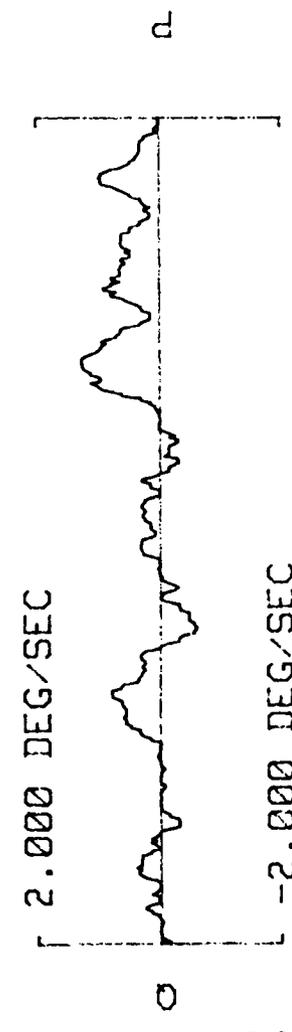
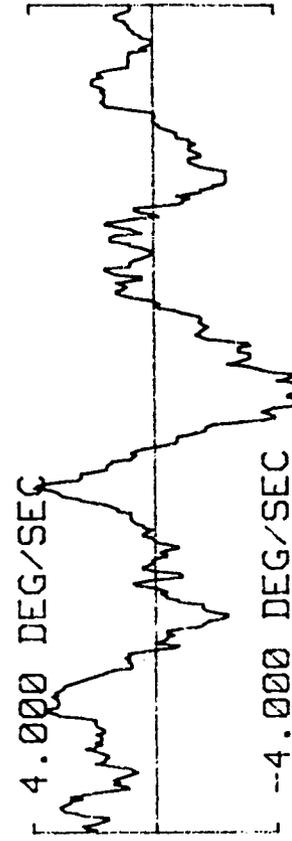
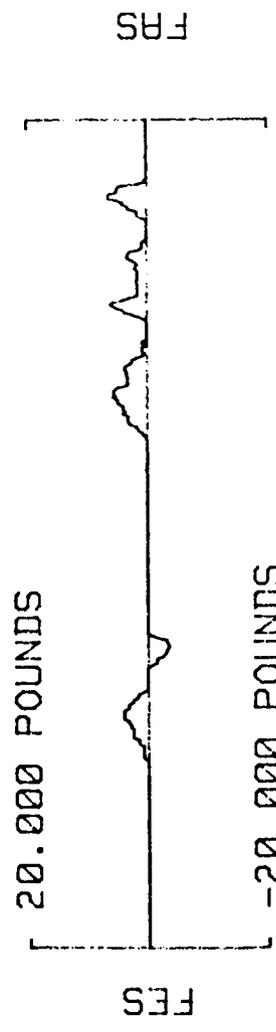
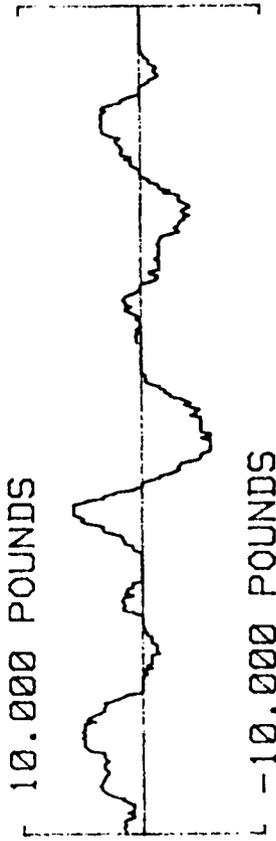
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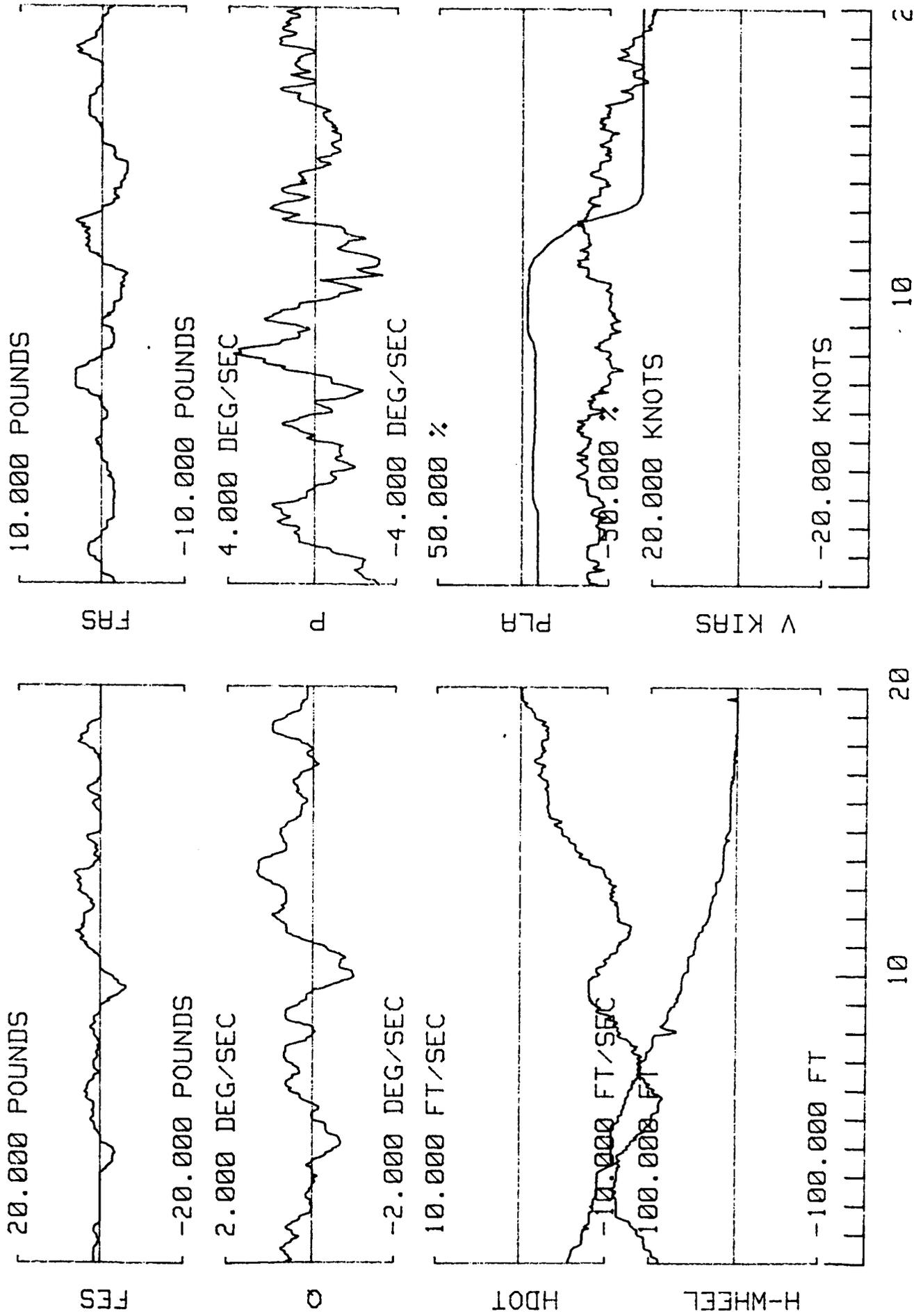
FLT 907

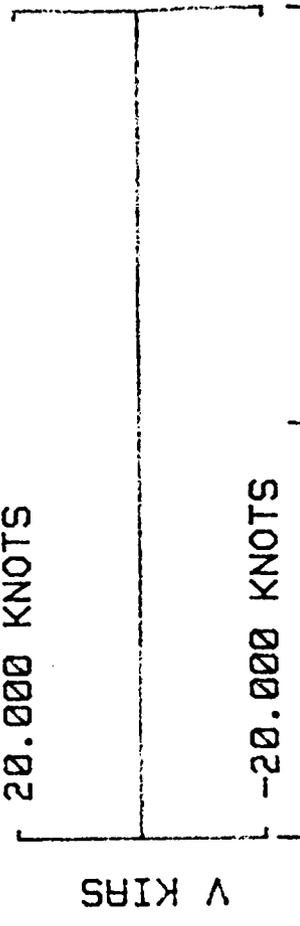
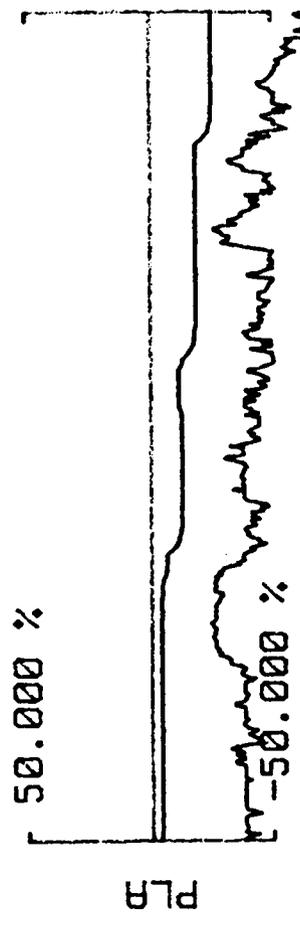
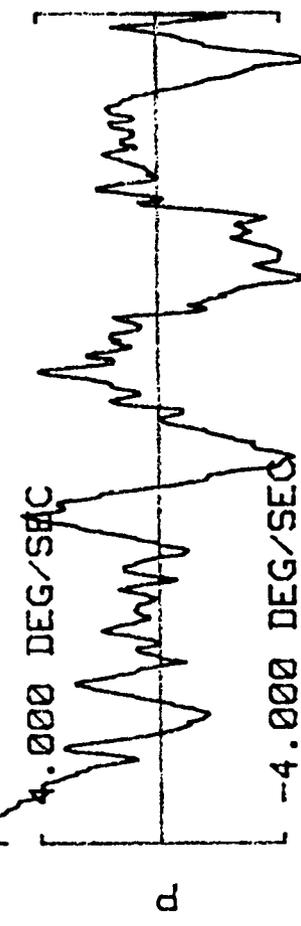
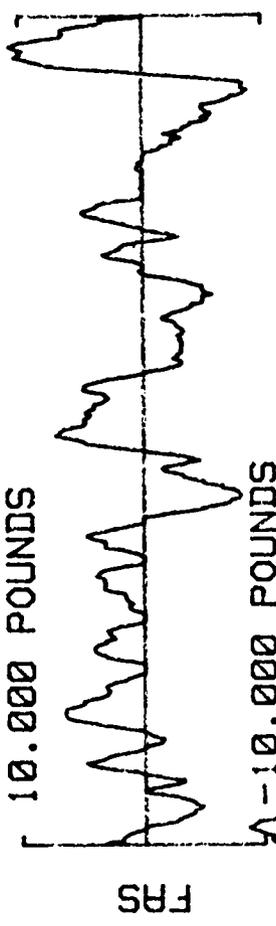
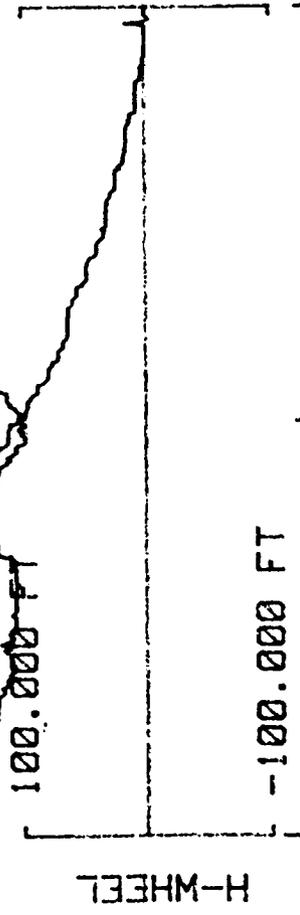
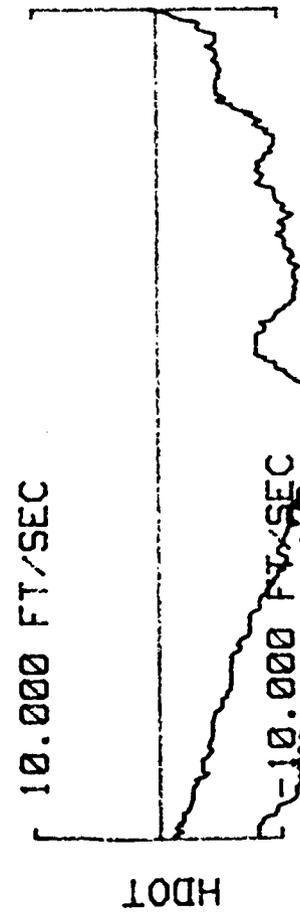
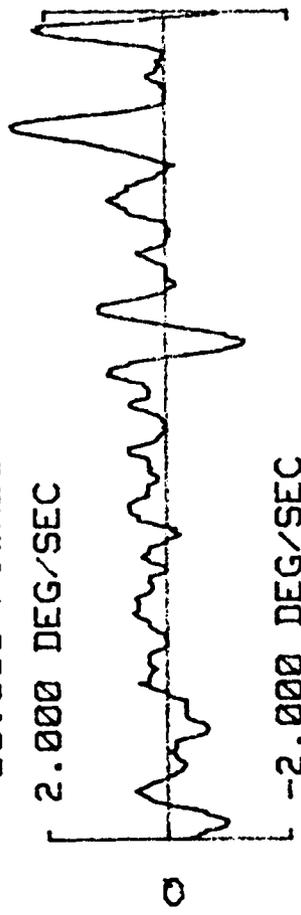
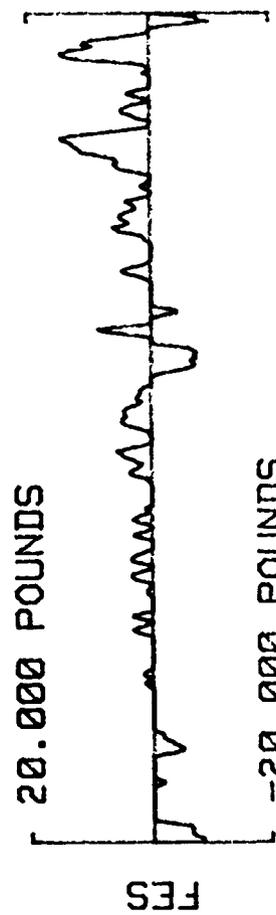
APP 8

CONF 14



FLT 907 APP 9 CONF 14

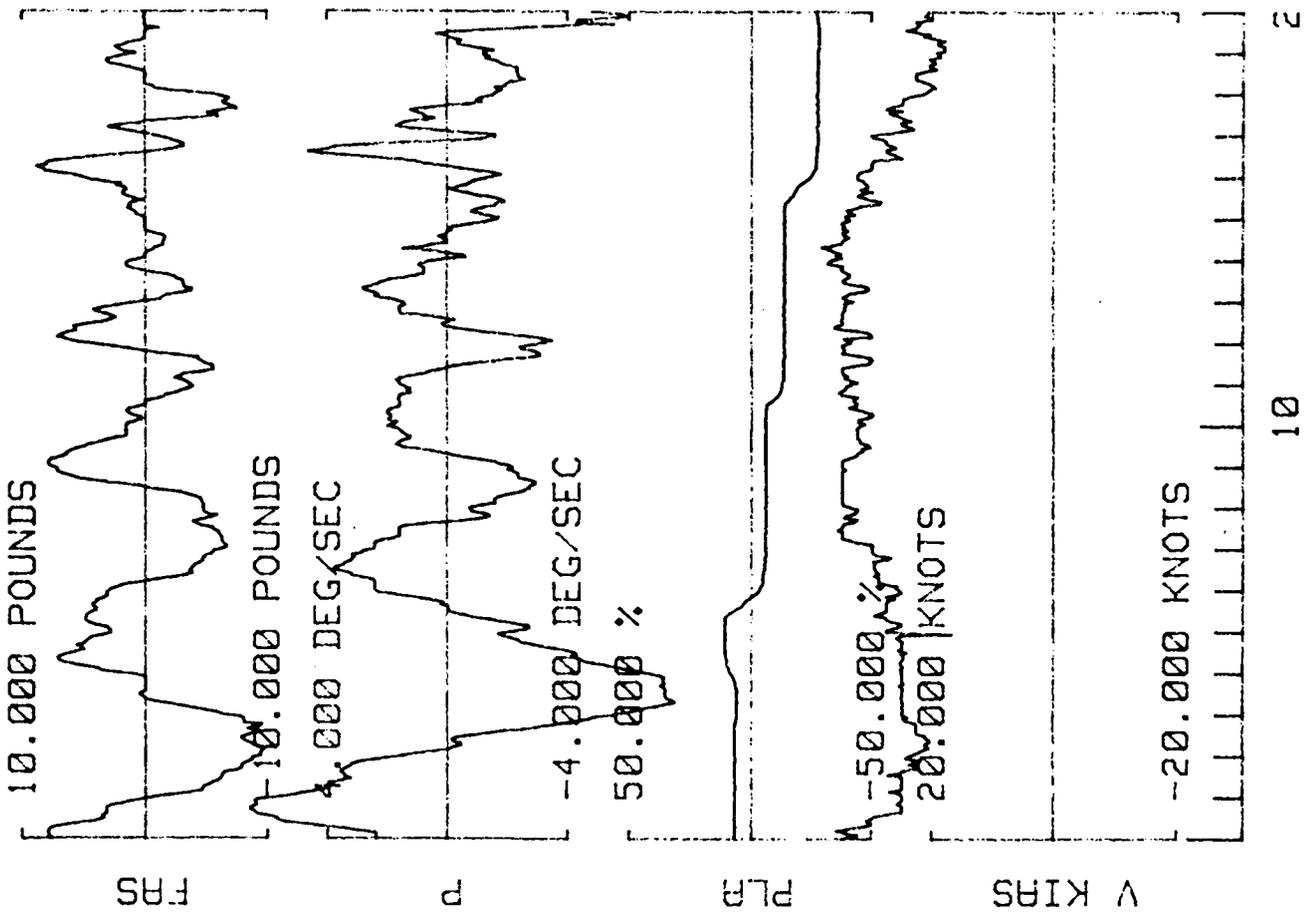
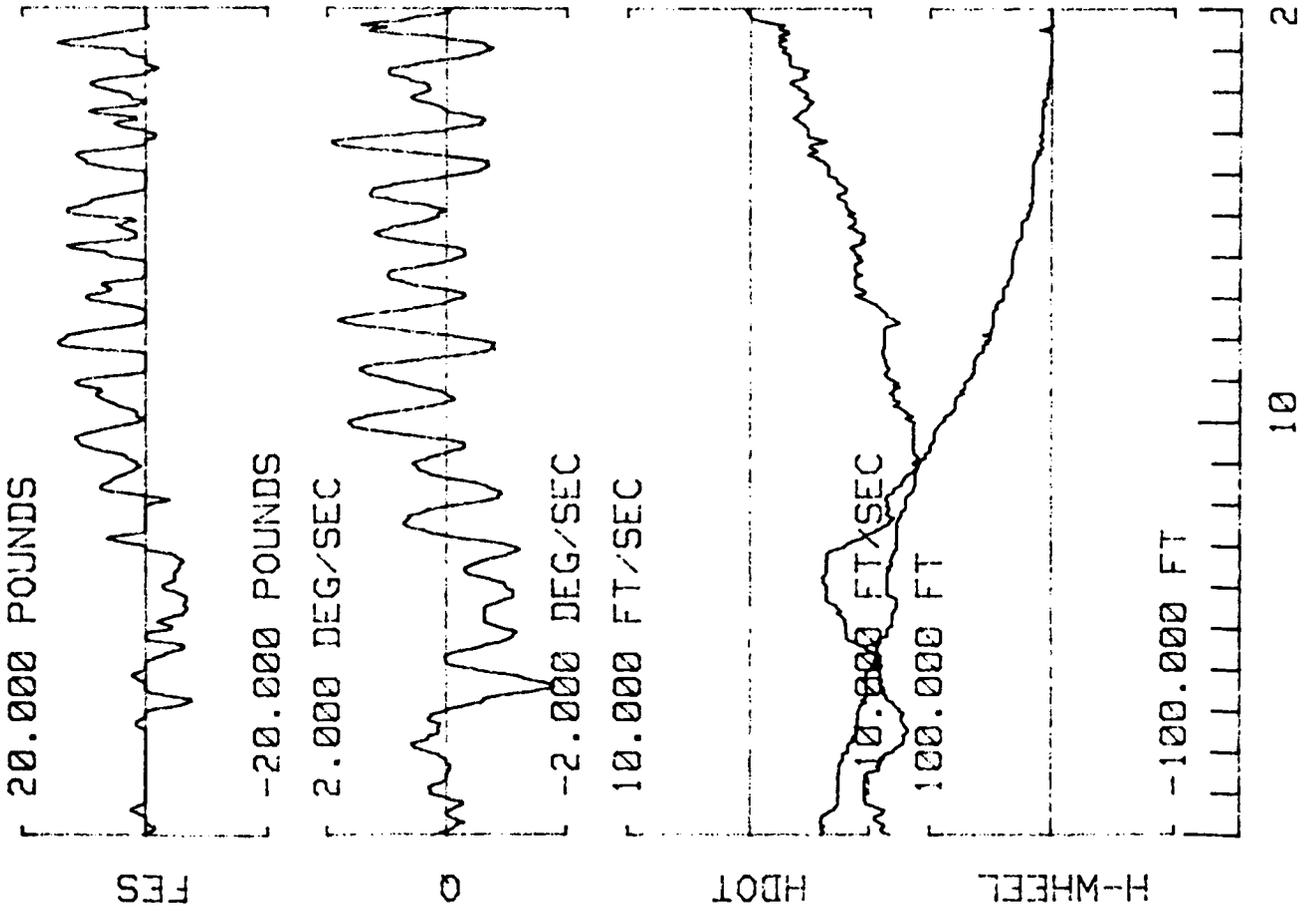


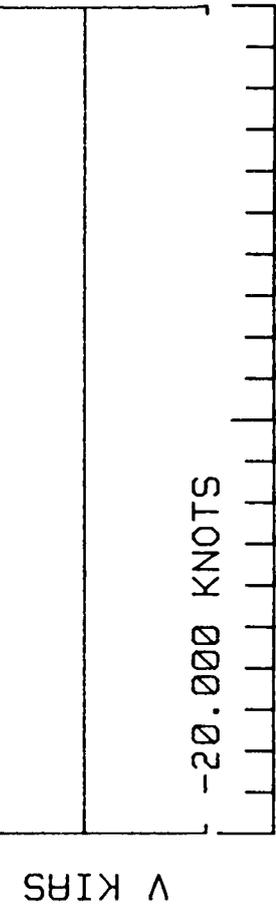
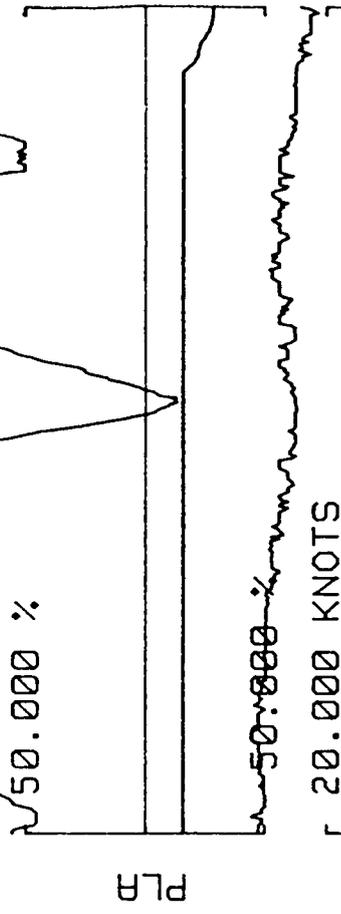
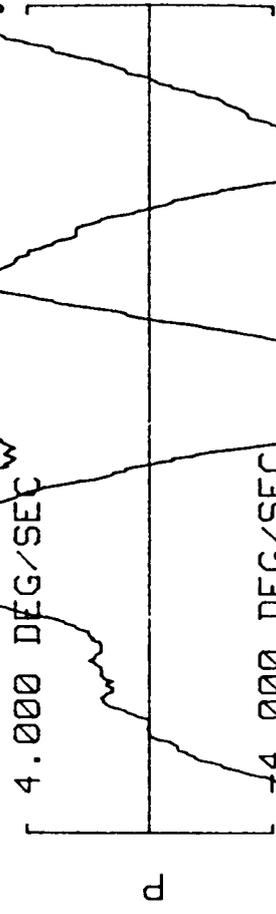
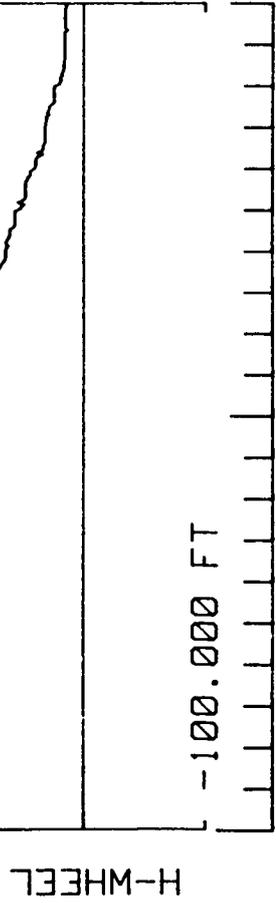
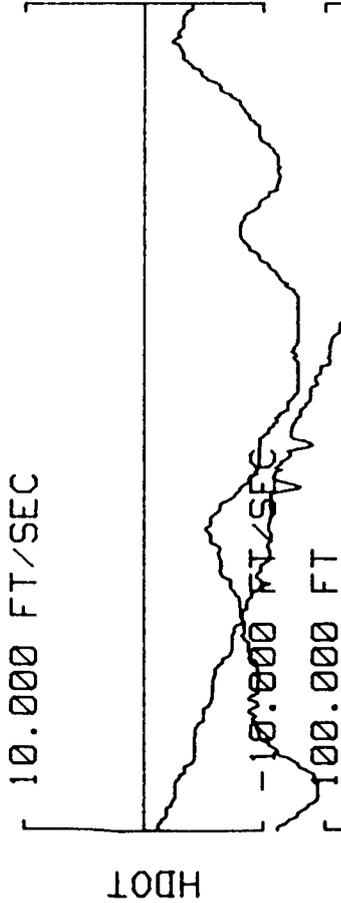
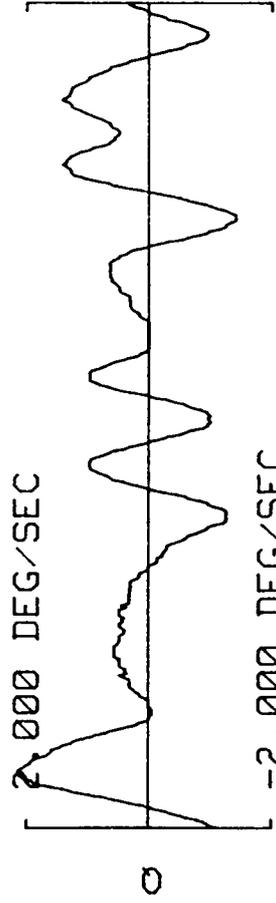
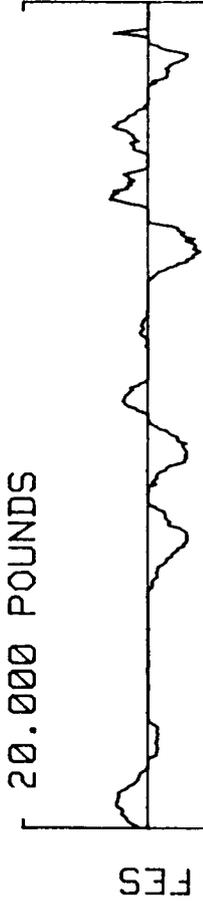


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FLT 908 APP 2 CONF 17

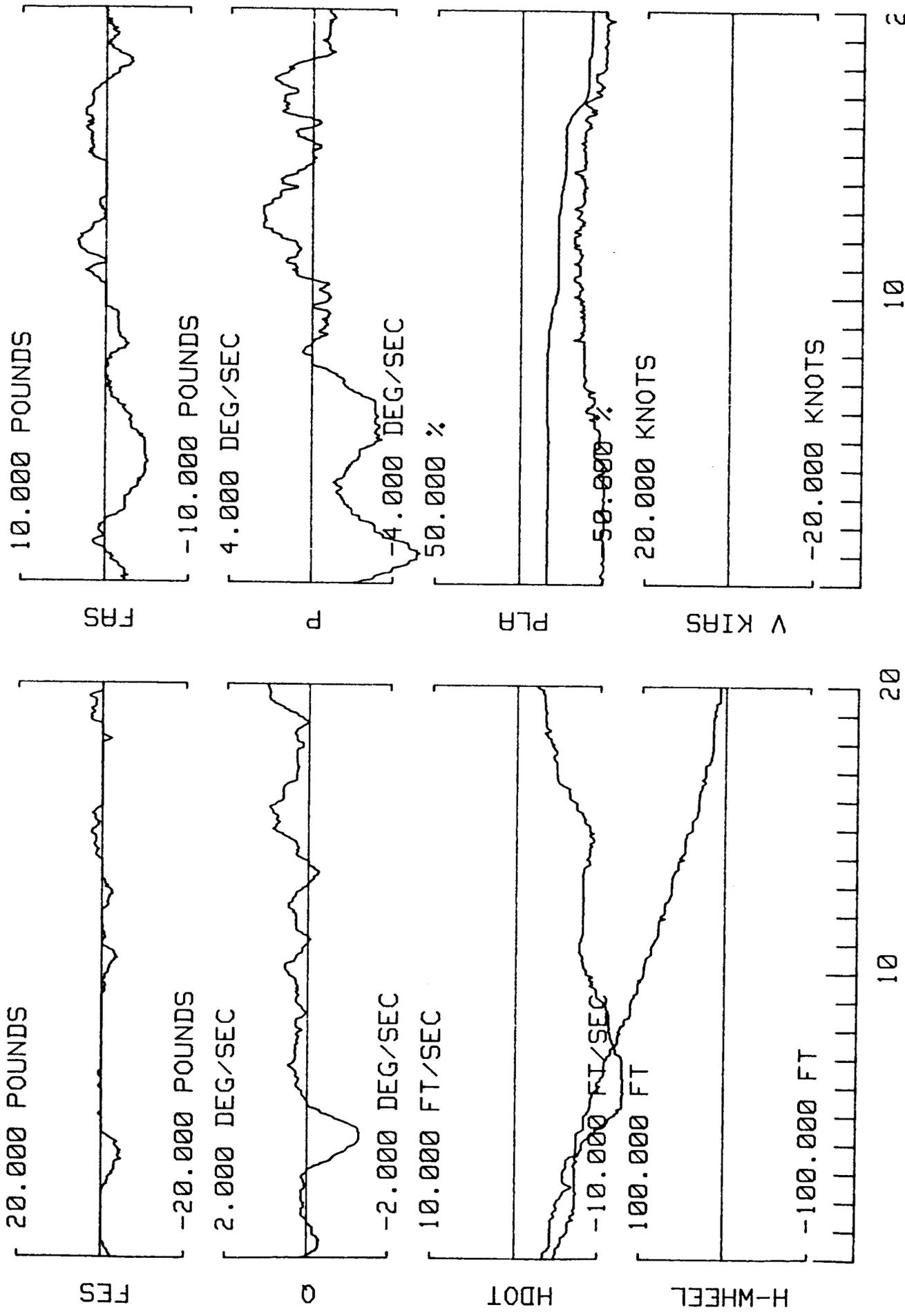




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FLT 909 APP 2 CONF 11



FLT 909

APP 3

CONF 12

20.000 POUNDS

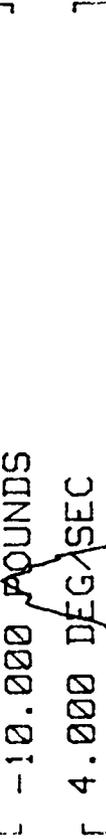
FES



-20.000 POUNDS

2.000 DEG/SEC

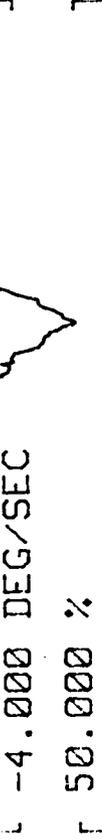
Q



-2.000 DEG/SEC

10.000 FT/SEC

HDOT



10.000 FT/SEC

100.000 FT

H-WHEEL



-100.000 FT

10

20

10.000 POUNDS

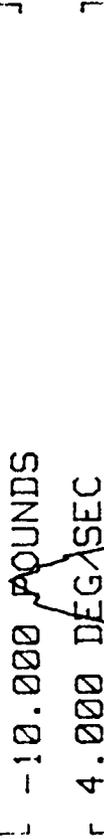
FPS



-10.000 POUNDS

4.000 DEG/SEC

P



-4.000 DEG/SEC

50.000 %

PLP



-50.000 %

20.000 KNOTS

V KIRS

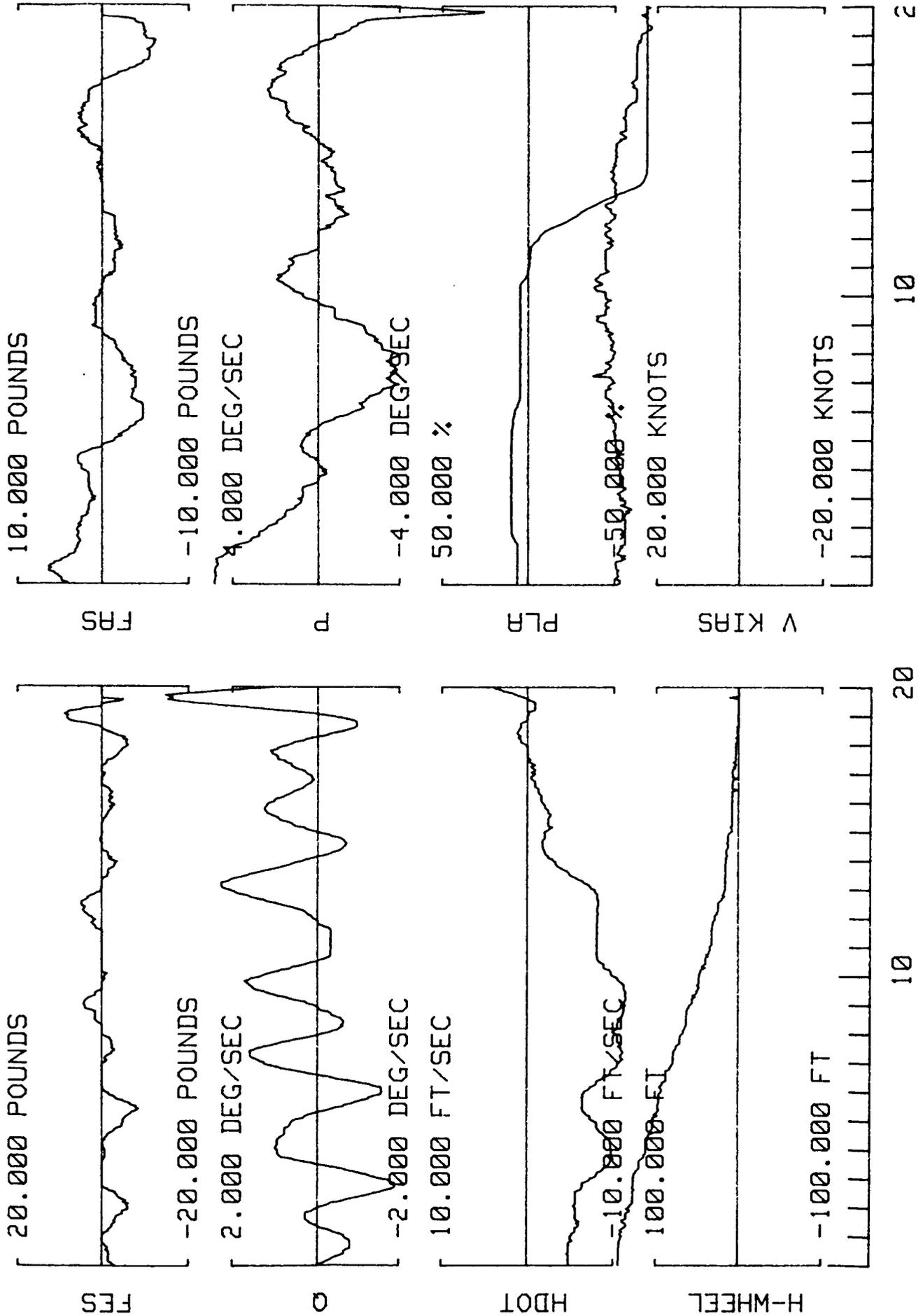


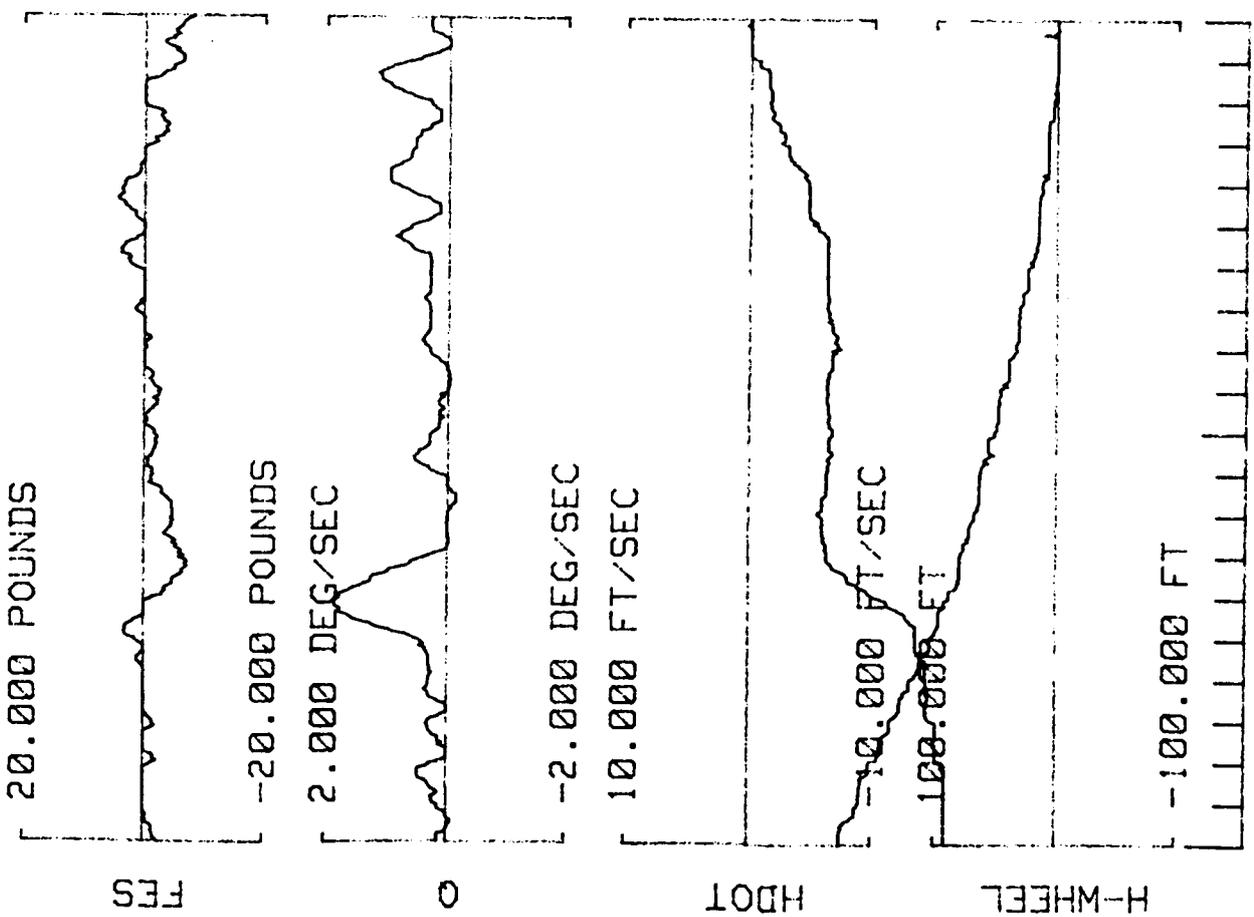
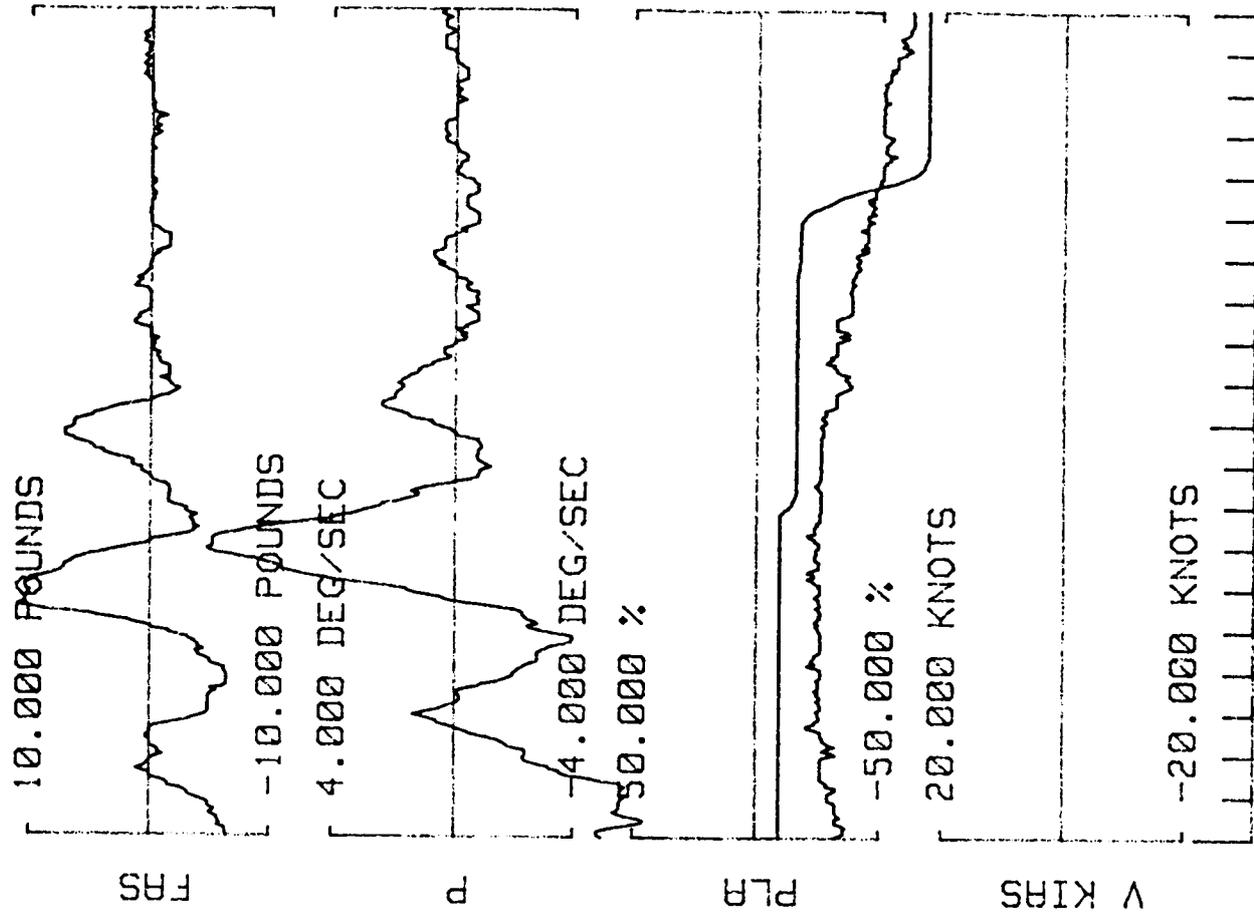
-20.000 KNOTS

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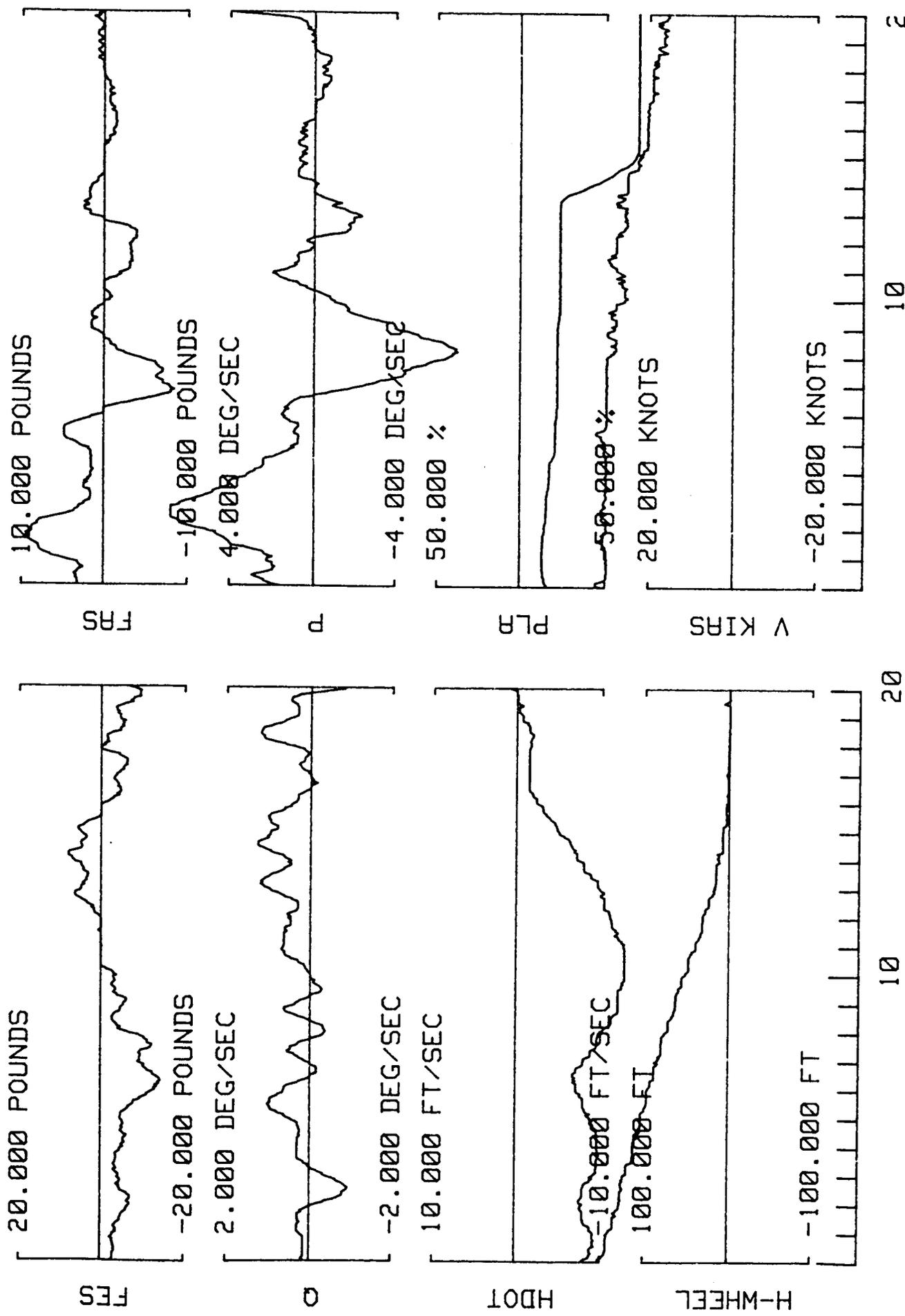
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FLT 909 APP 4 CONF 12





FLT 909 APP 6 CONF 3



FLT 909

APP 7

CONF 4

20.000 POUNDS

FES

-20.000 POUNDS

2.000 DEG/SEC

0

-2.000 DEG/SEC

10.000 FT/SEC

HDCT

10.000 FT/SEC

100.000 FT

H-WHEEL

-100.000 FT

10

20

10.000 POUNDS

FBS

-10.000 POUNDS

4.000 DEG/SEC

0

-4.000 DEG/SEC

50.000 %

PLP

-50.000 %

20.000 KNOTS

V KIRS

-20.000 KNOTS

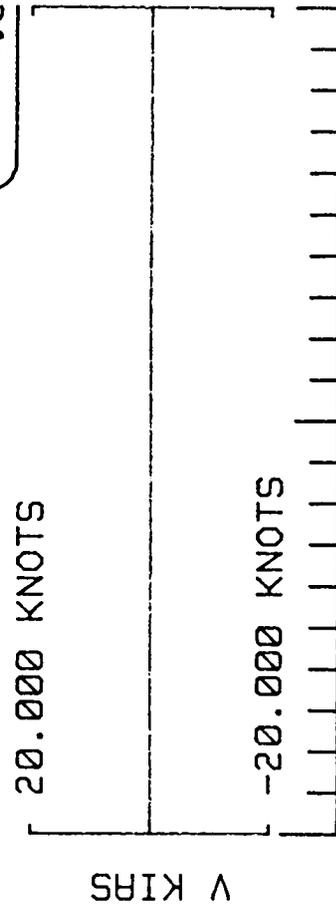
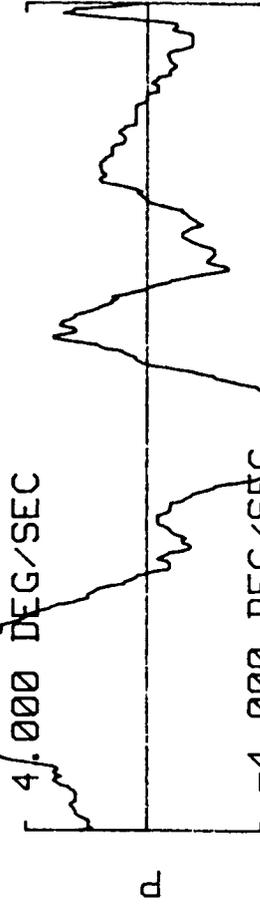
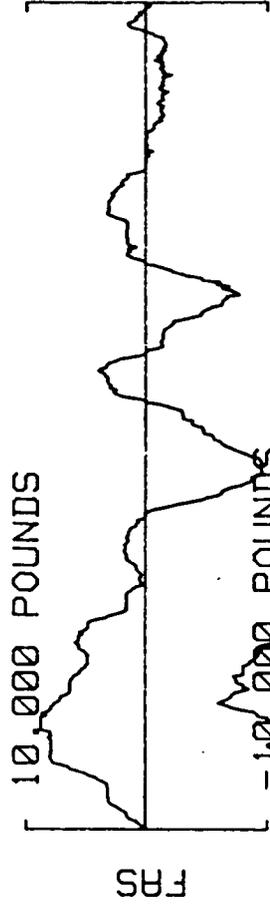
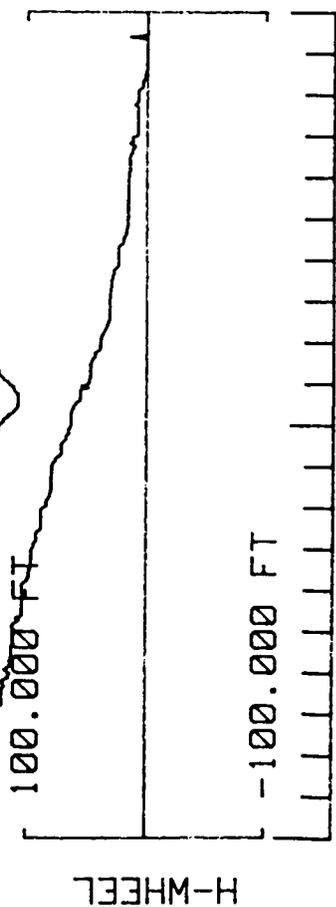
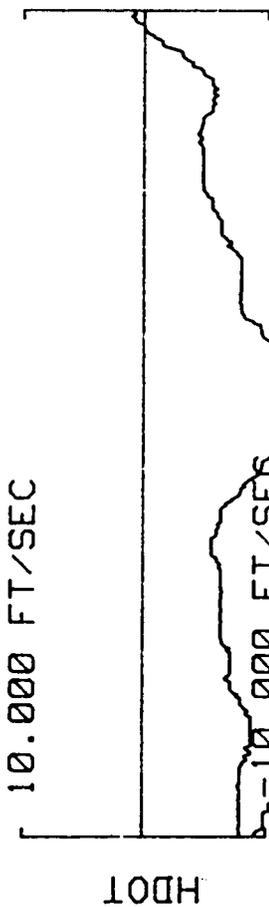
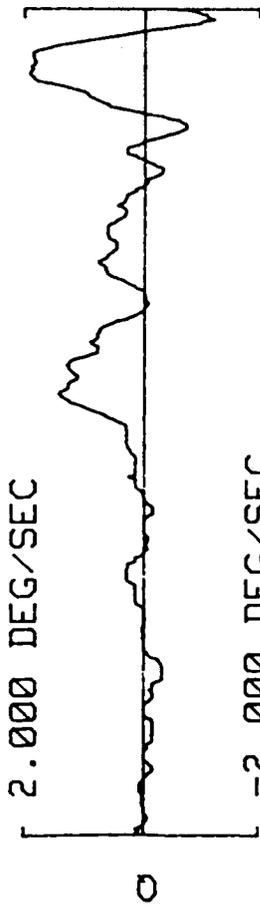
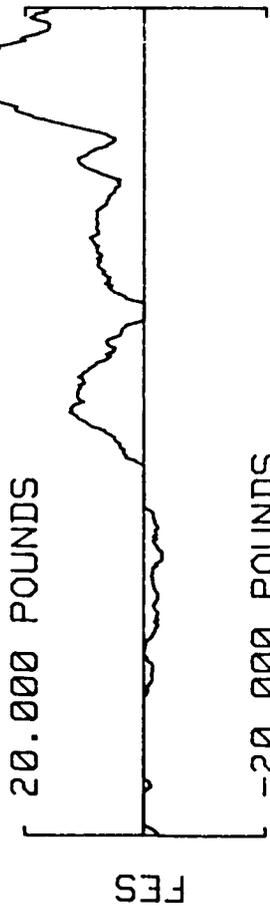
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FLT 909

APP 8

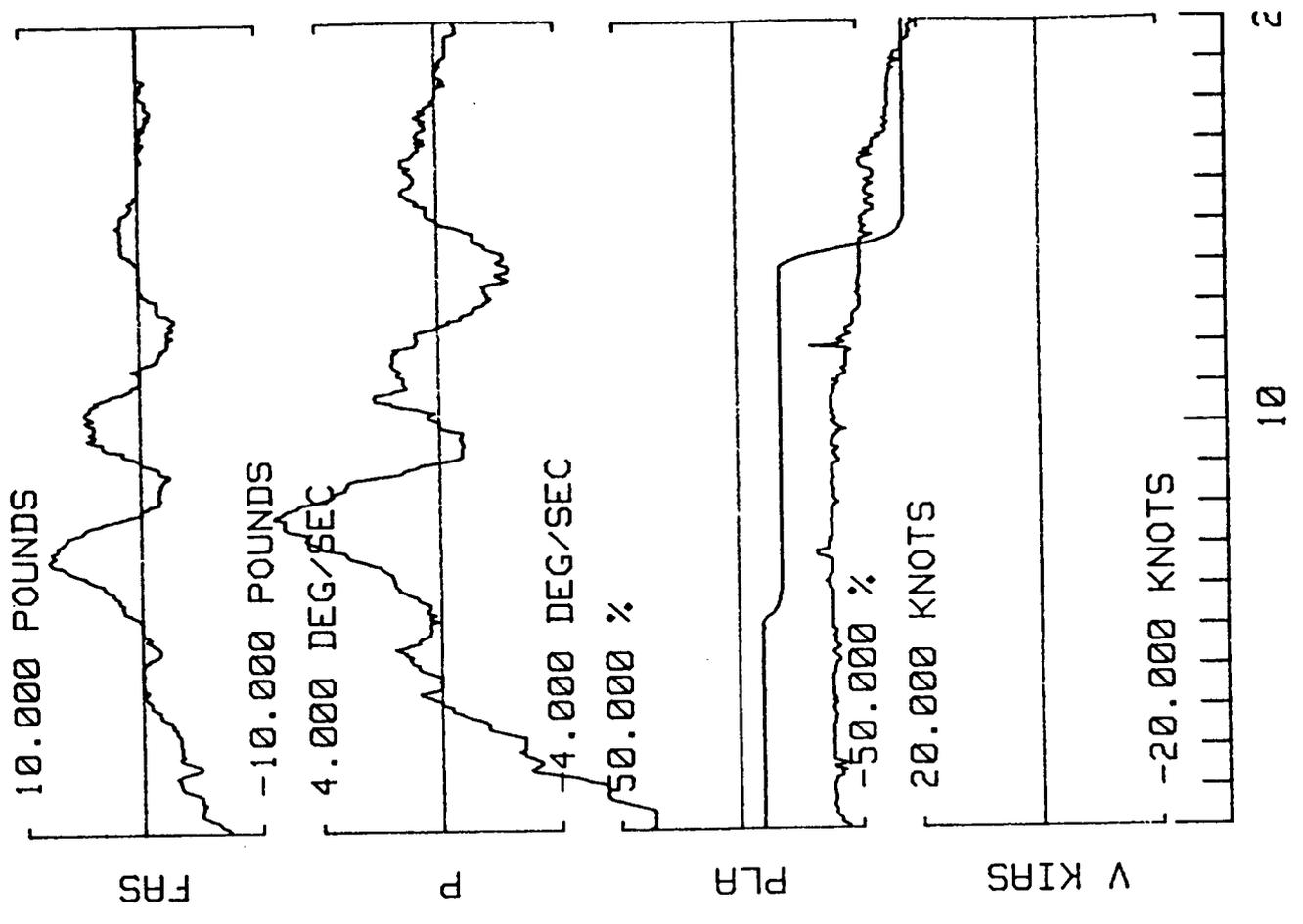
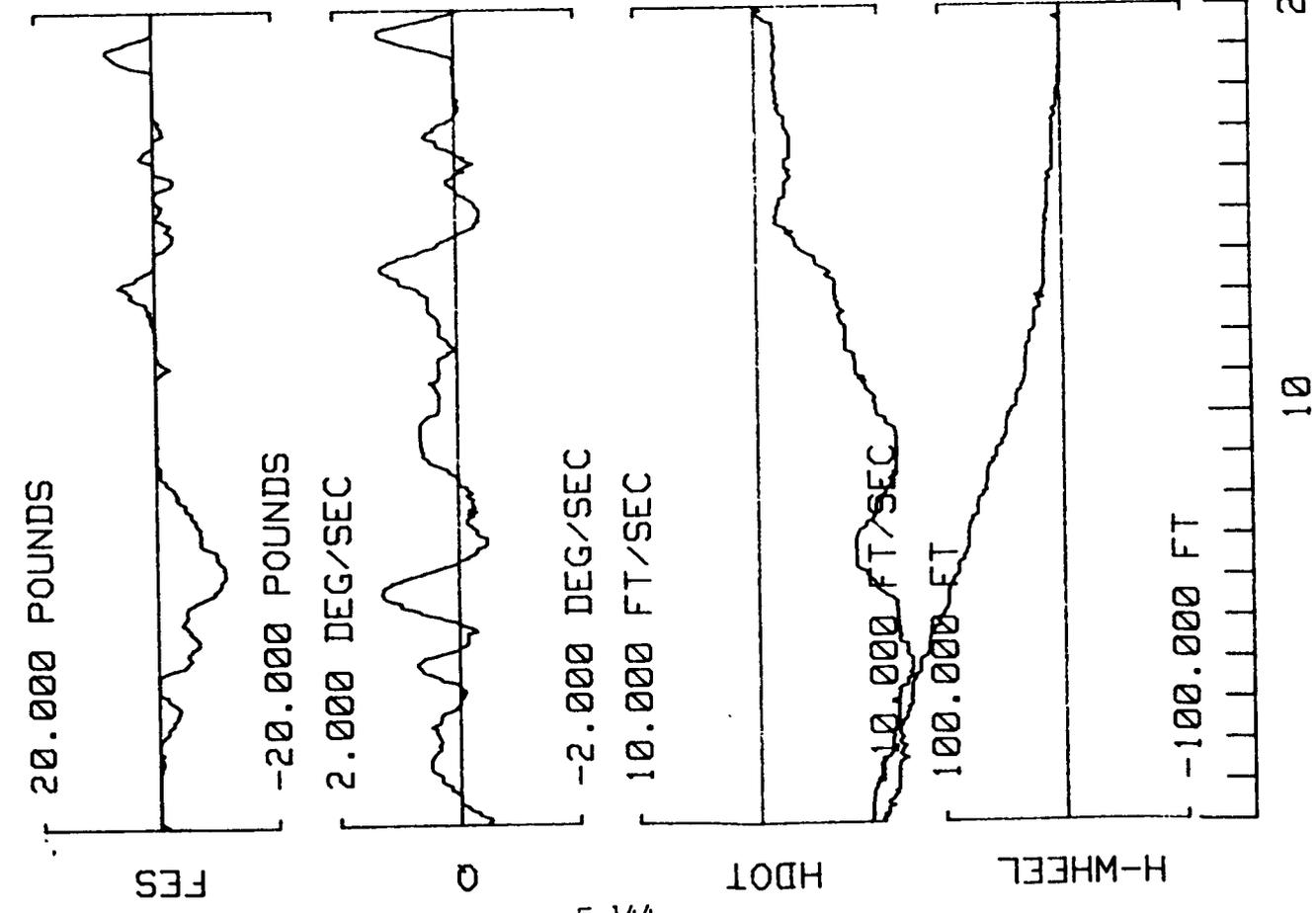
CONF 4



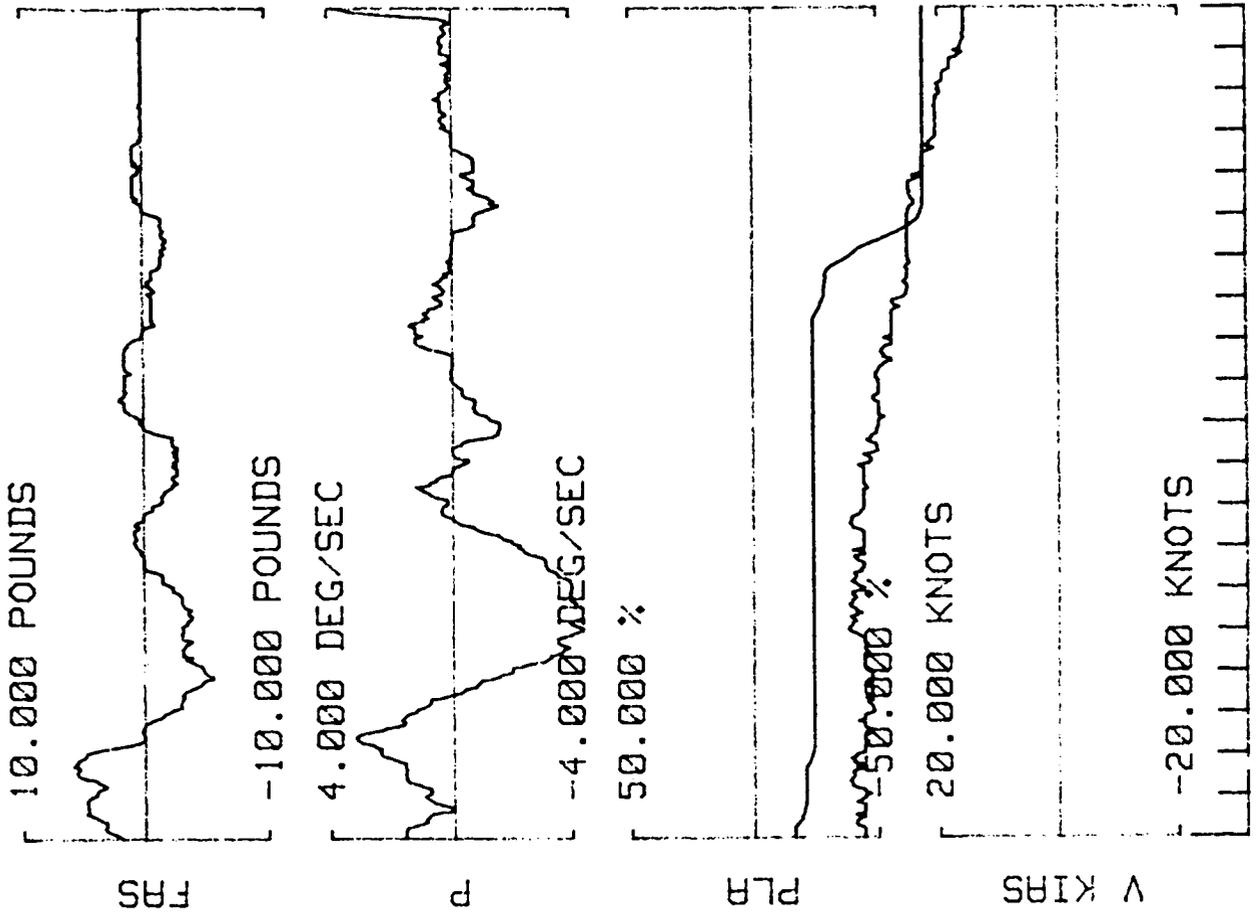
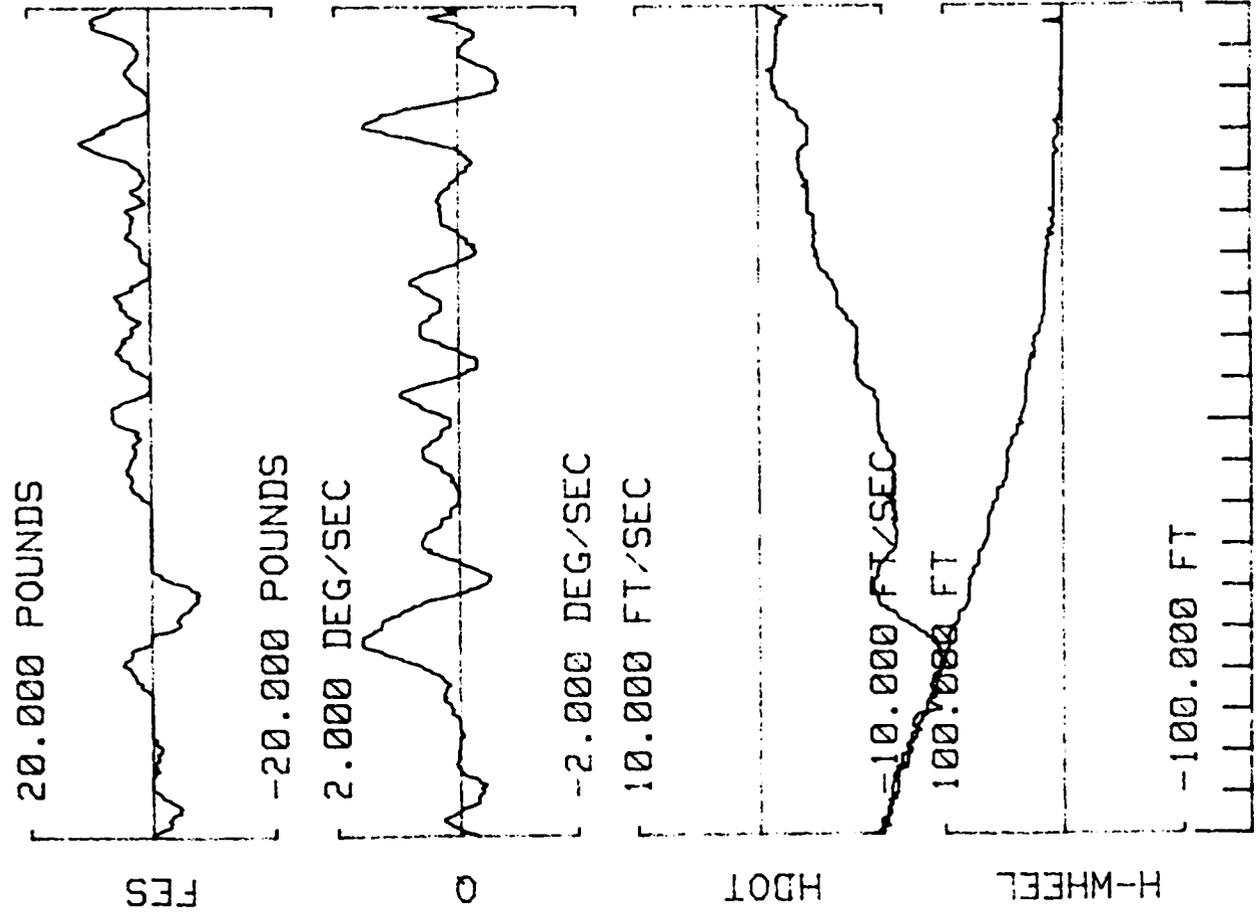
FLT 909

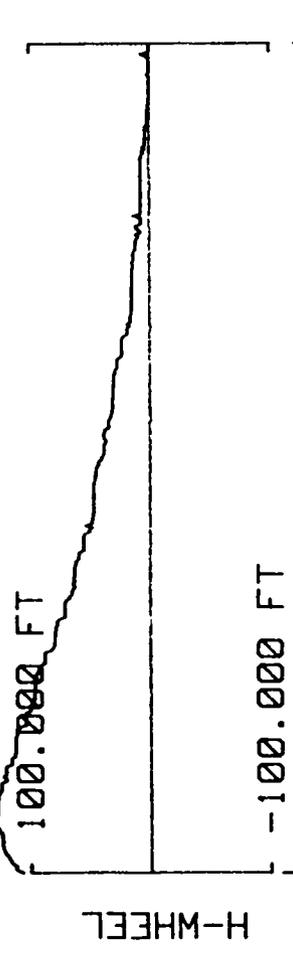
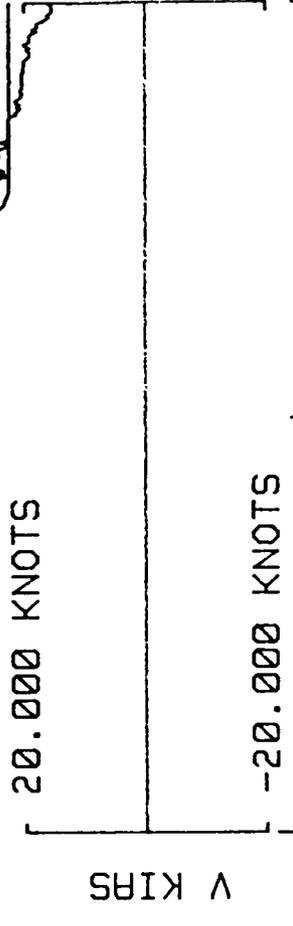
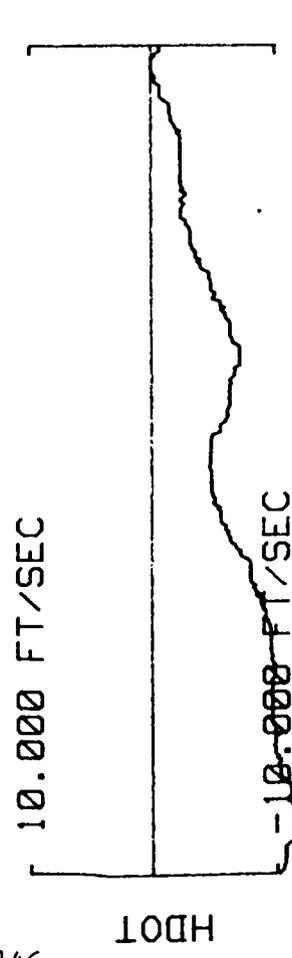
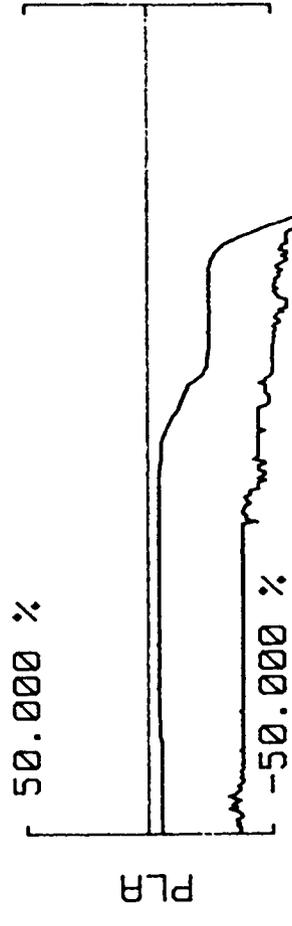
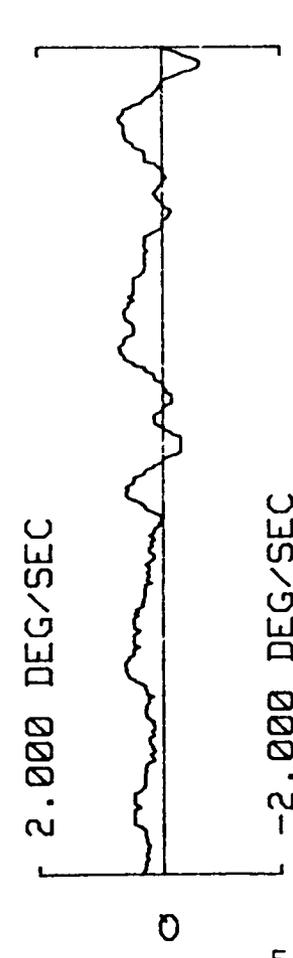
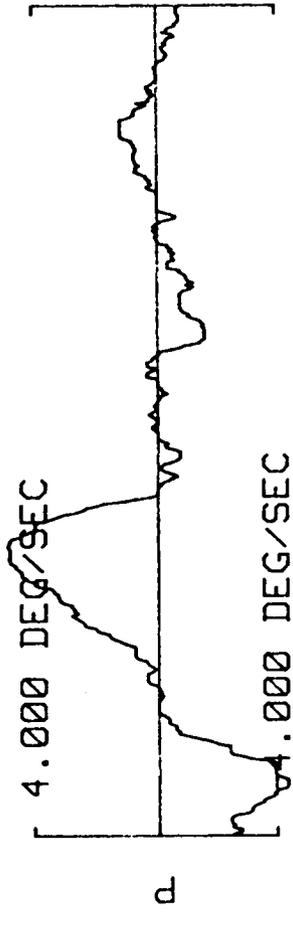
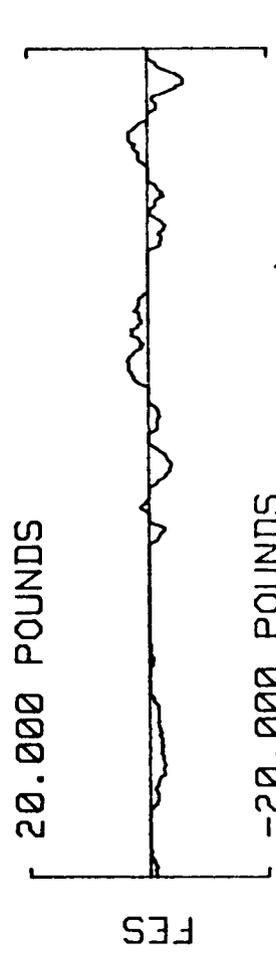
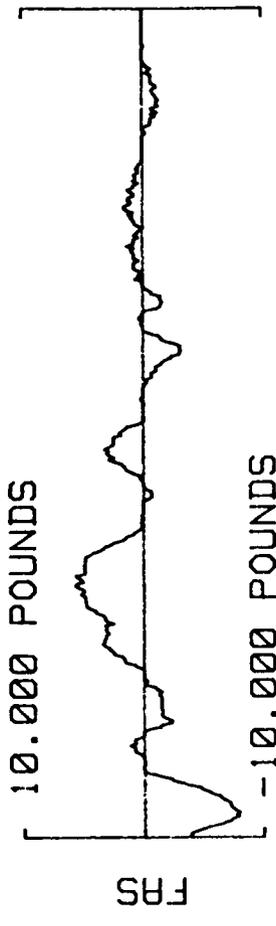
APP 9

CONF 5



FLT 909 APP 10 CONF 5

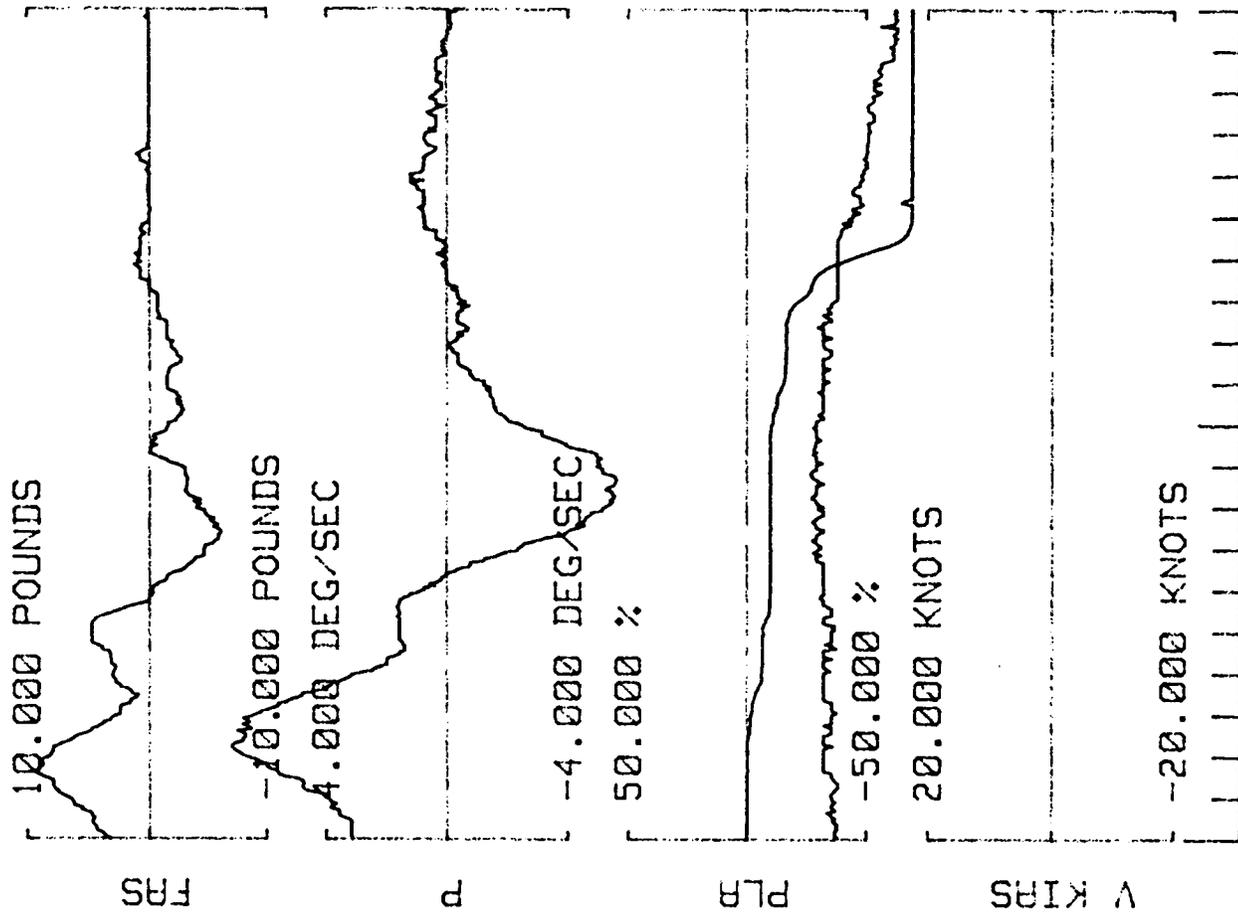
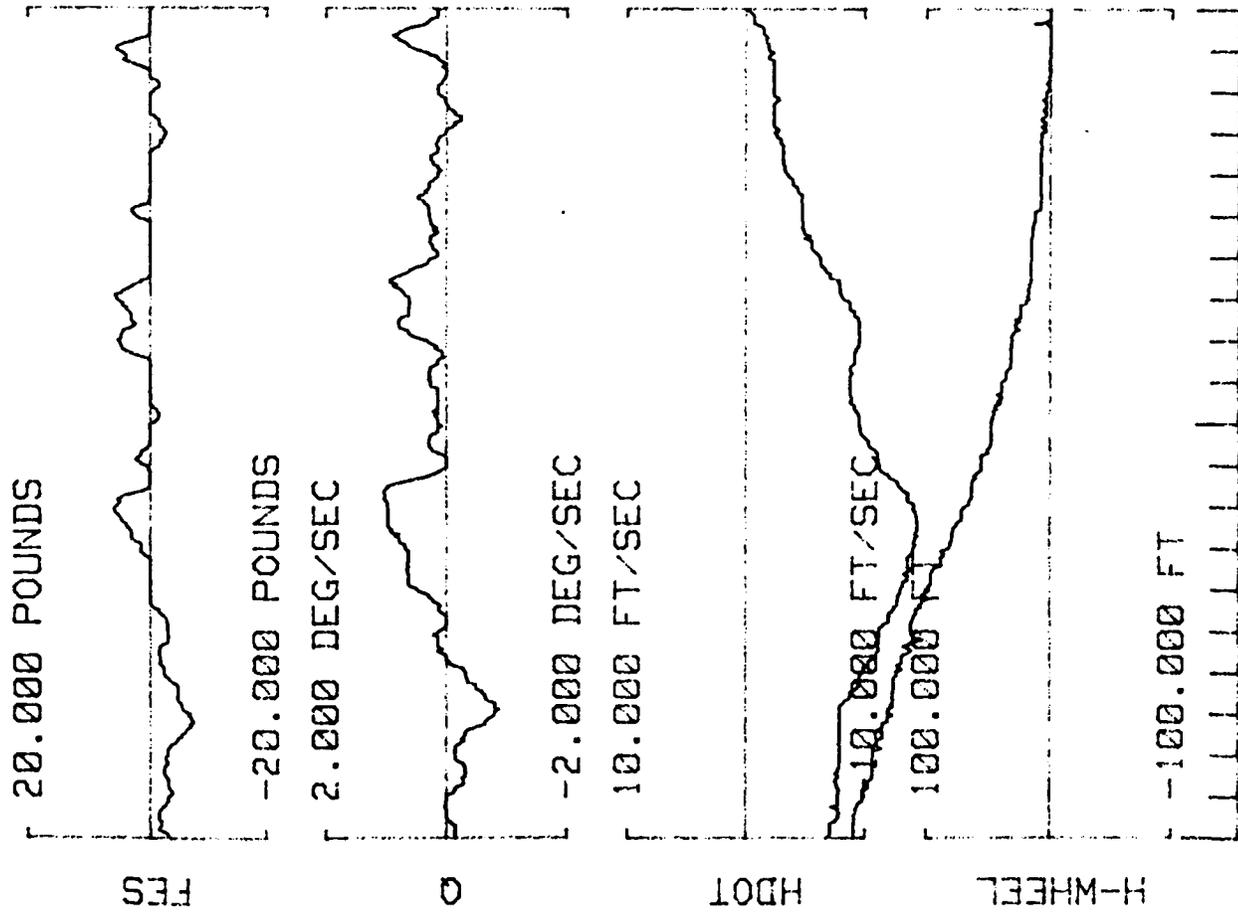




941-E

10 20 10 20

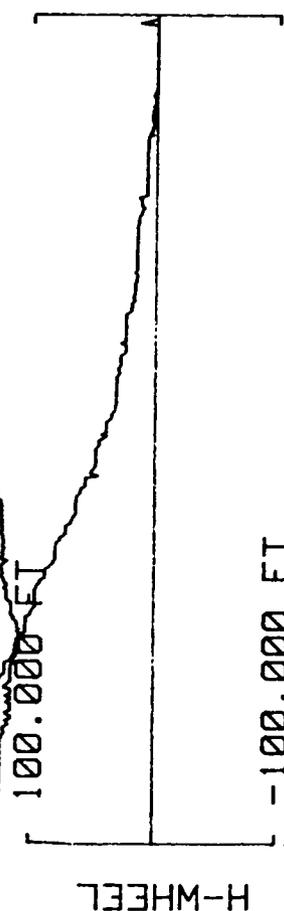
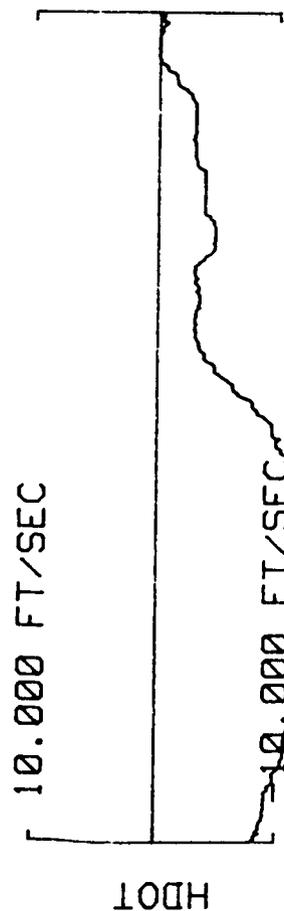
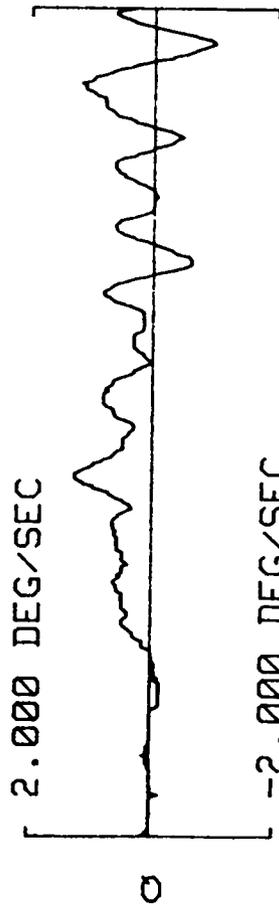
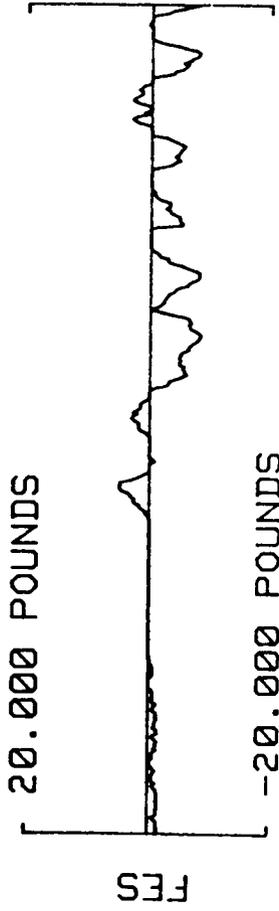
FLT 909 APP 12 CONF 6



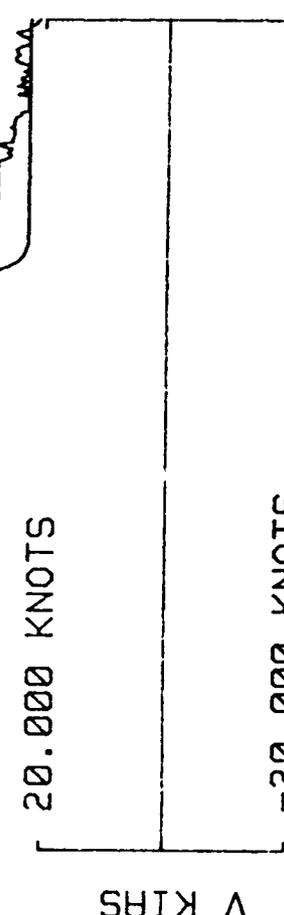
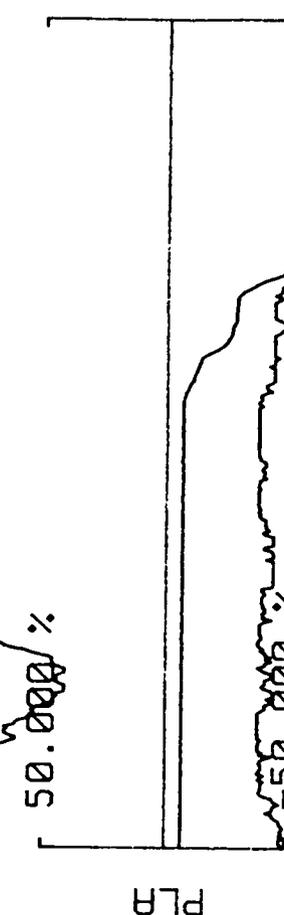
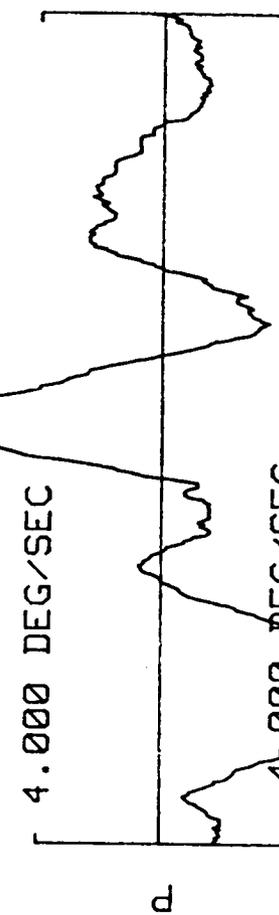
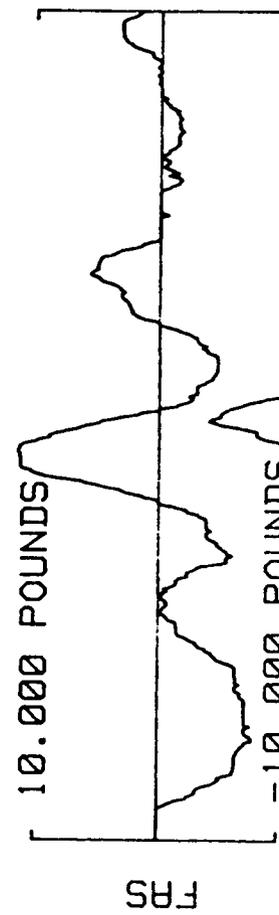
E-147

10 20

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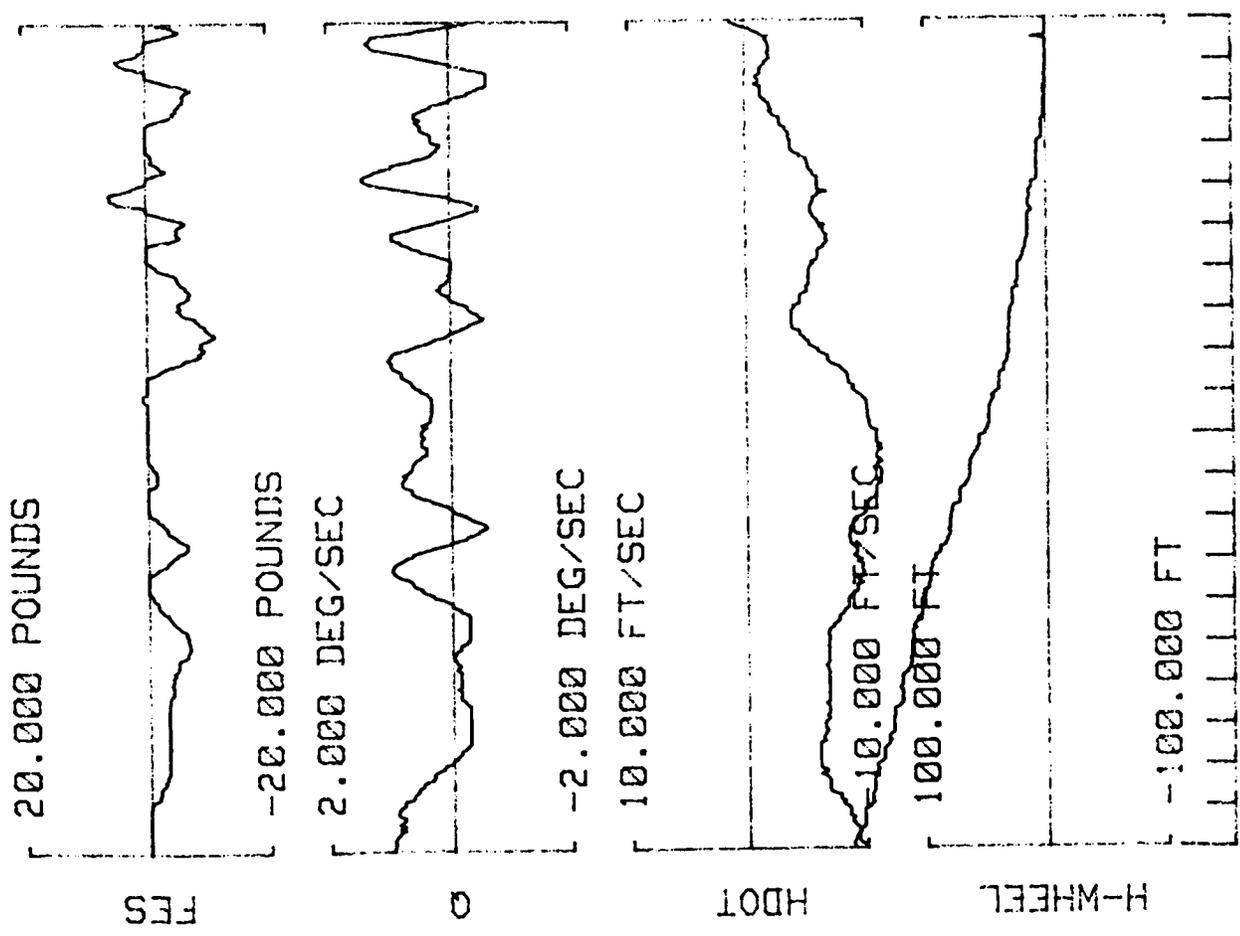
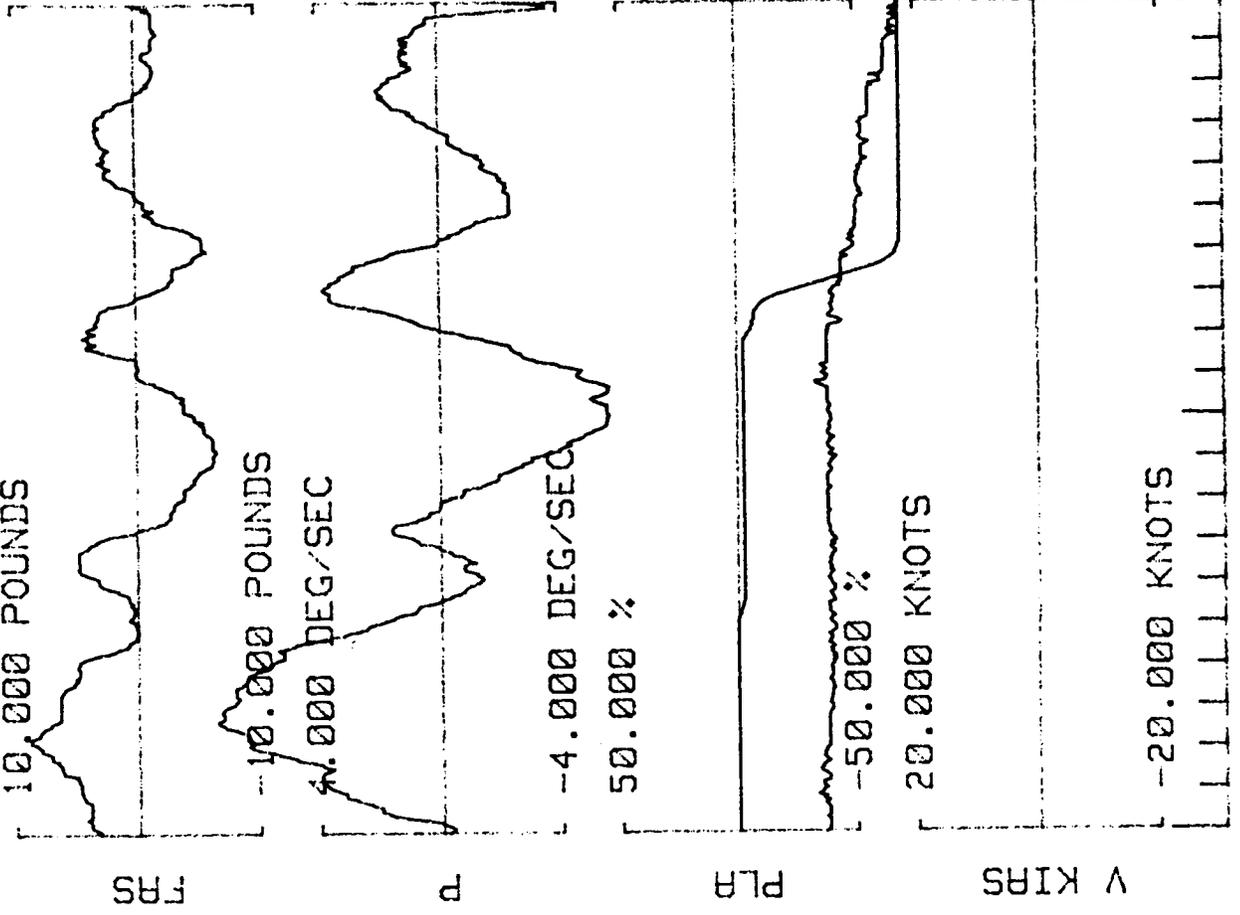


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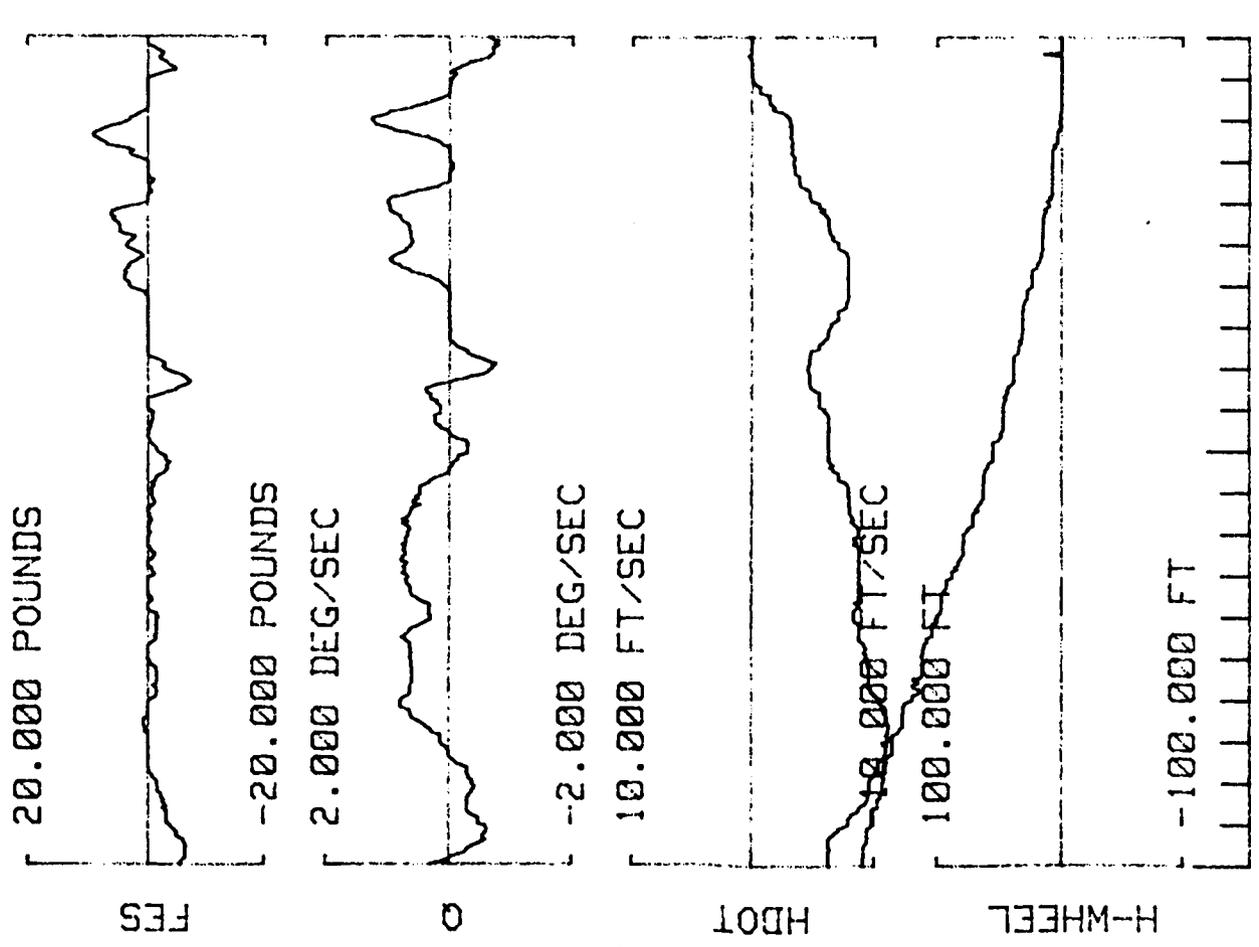
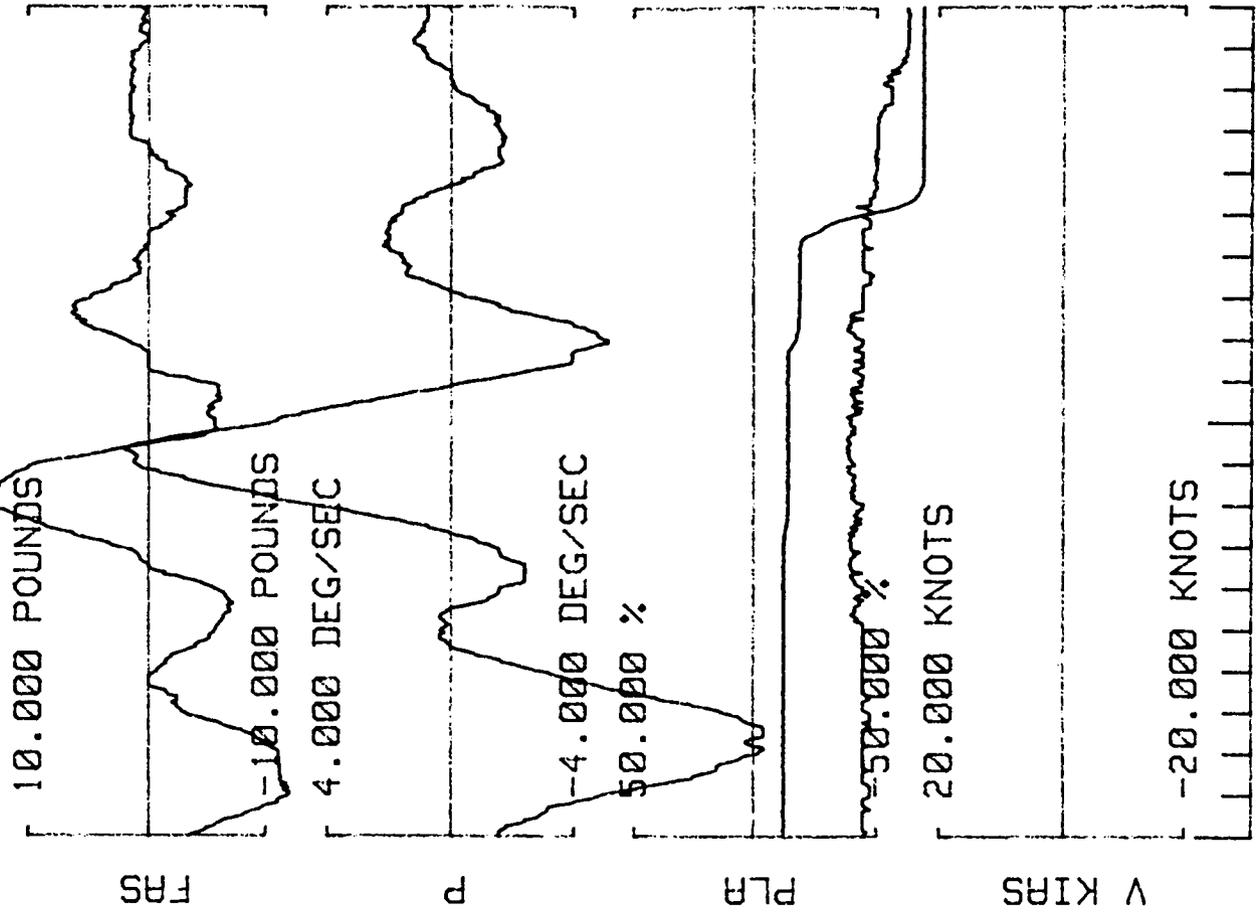


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FLT 909 APP 14 CONF 7



641-3

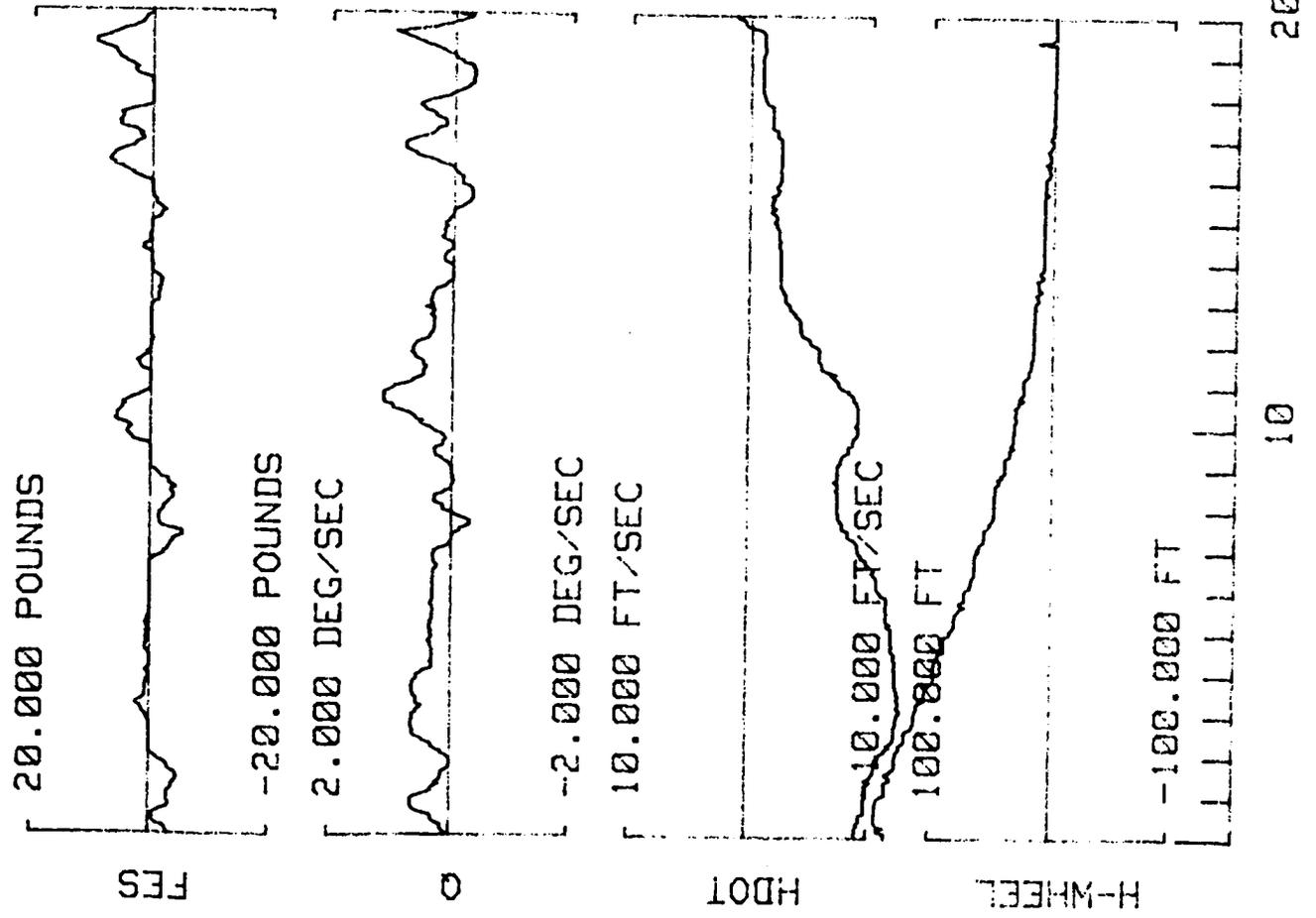


051-E

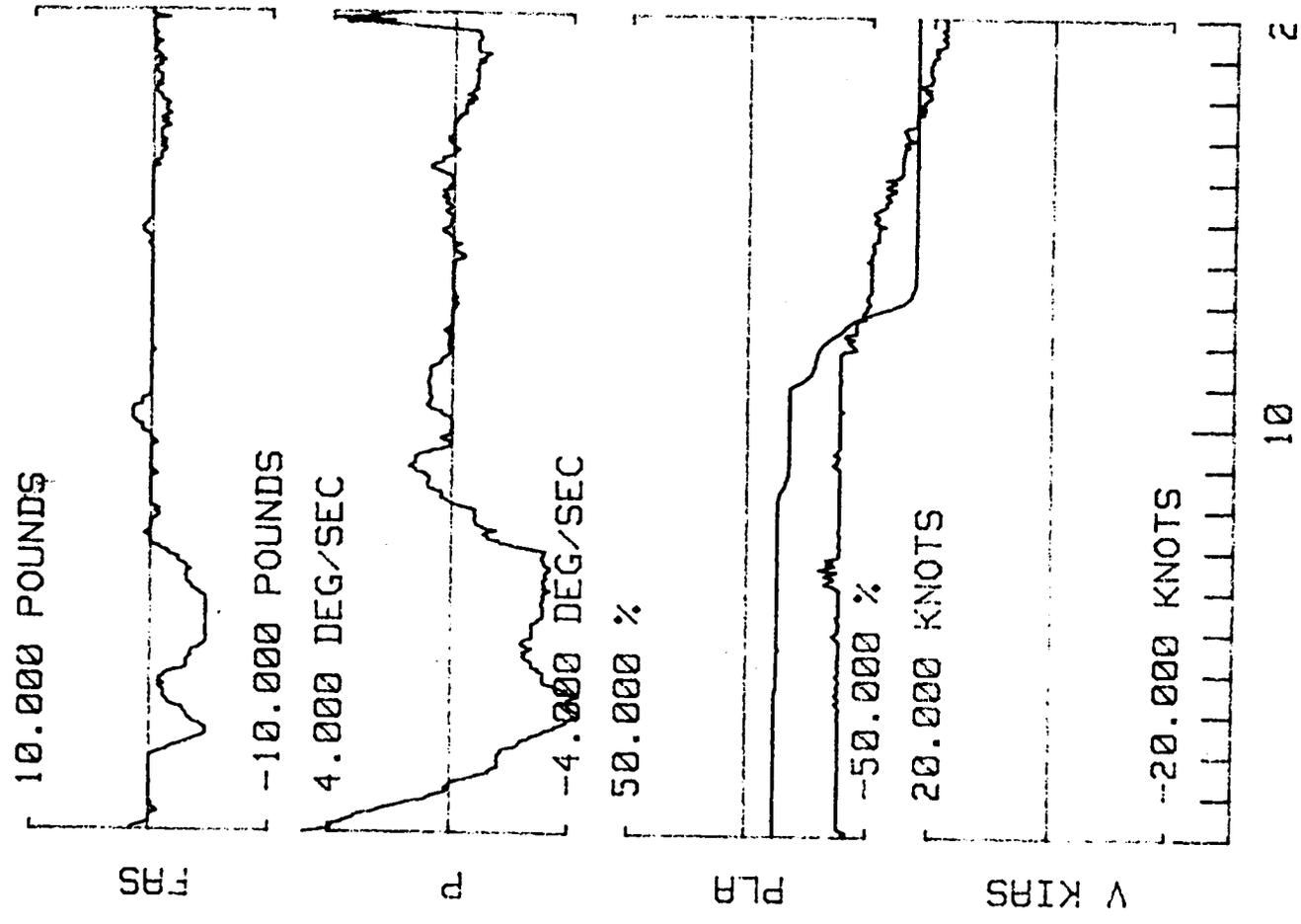
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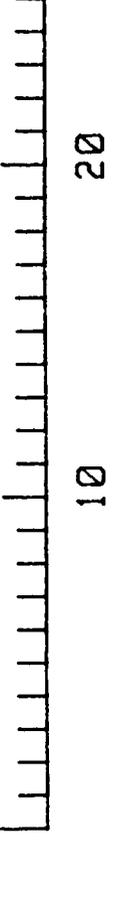
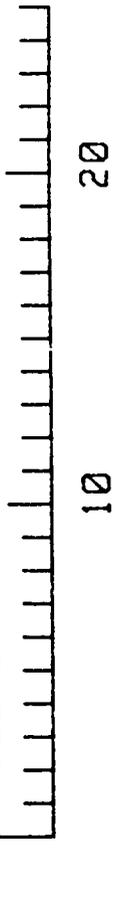
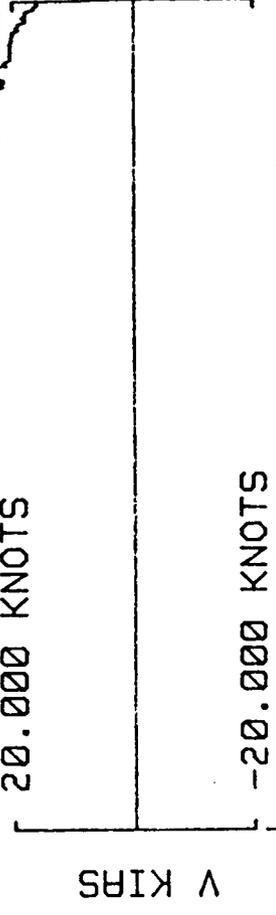
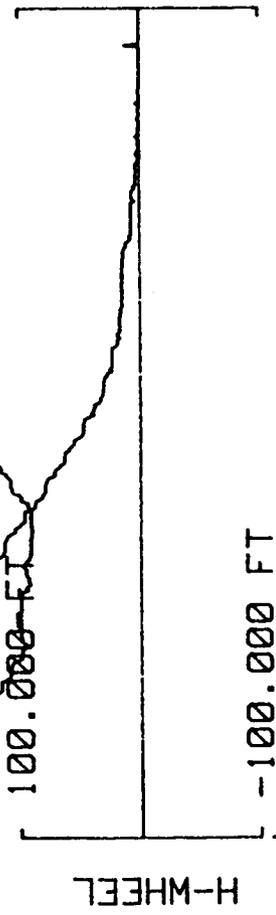
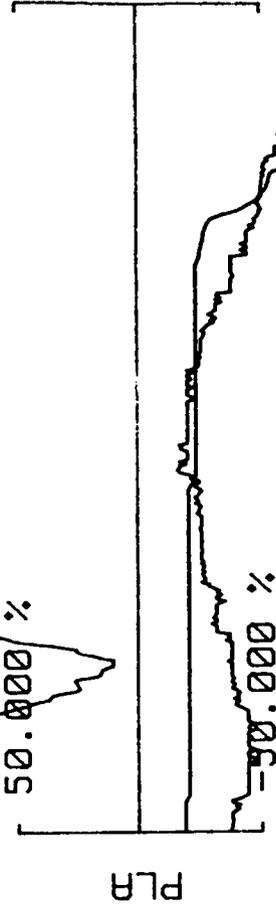
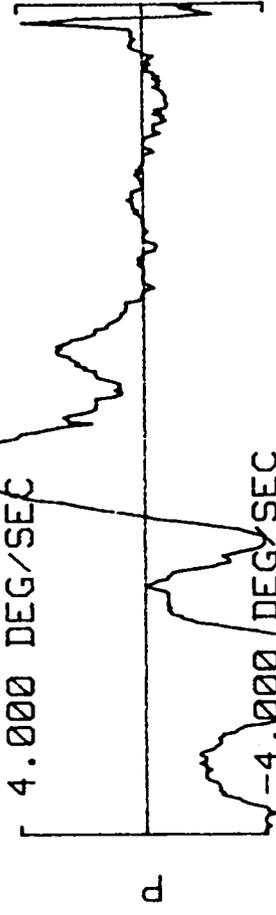
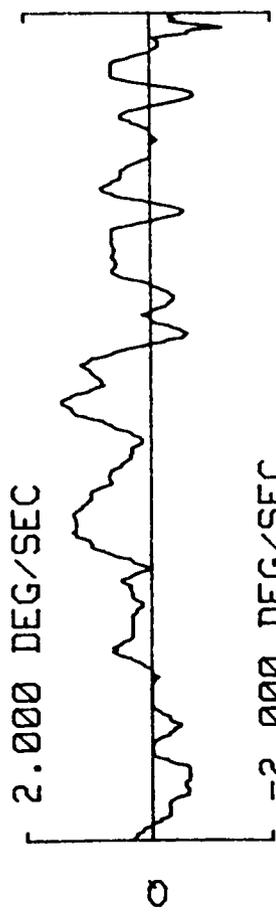
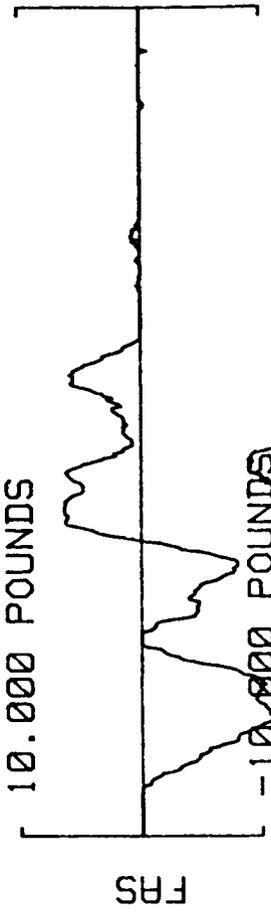
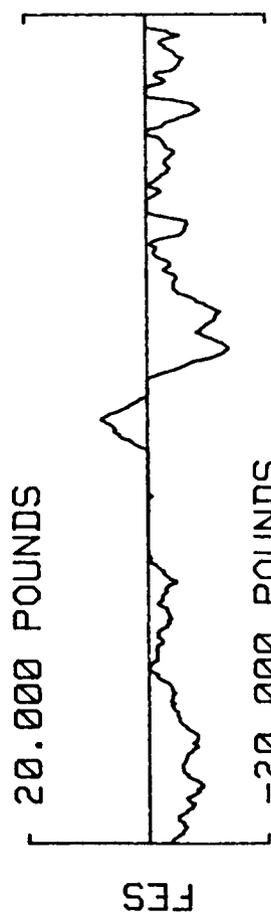
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FLT 910 APP 2 CONF 8

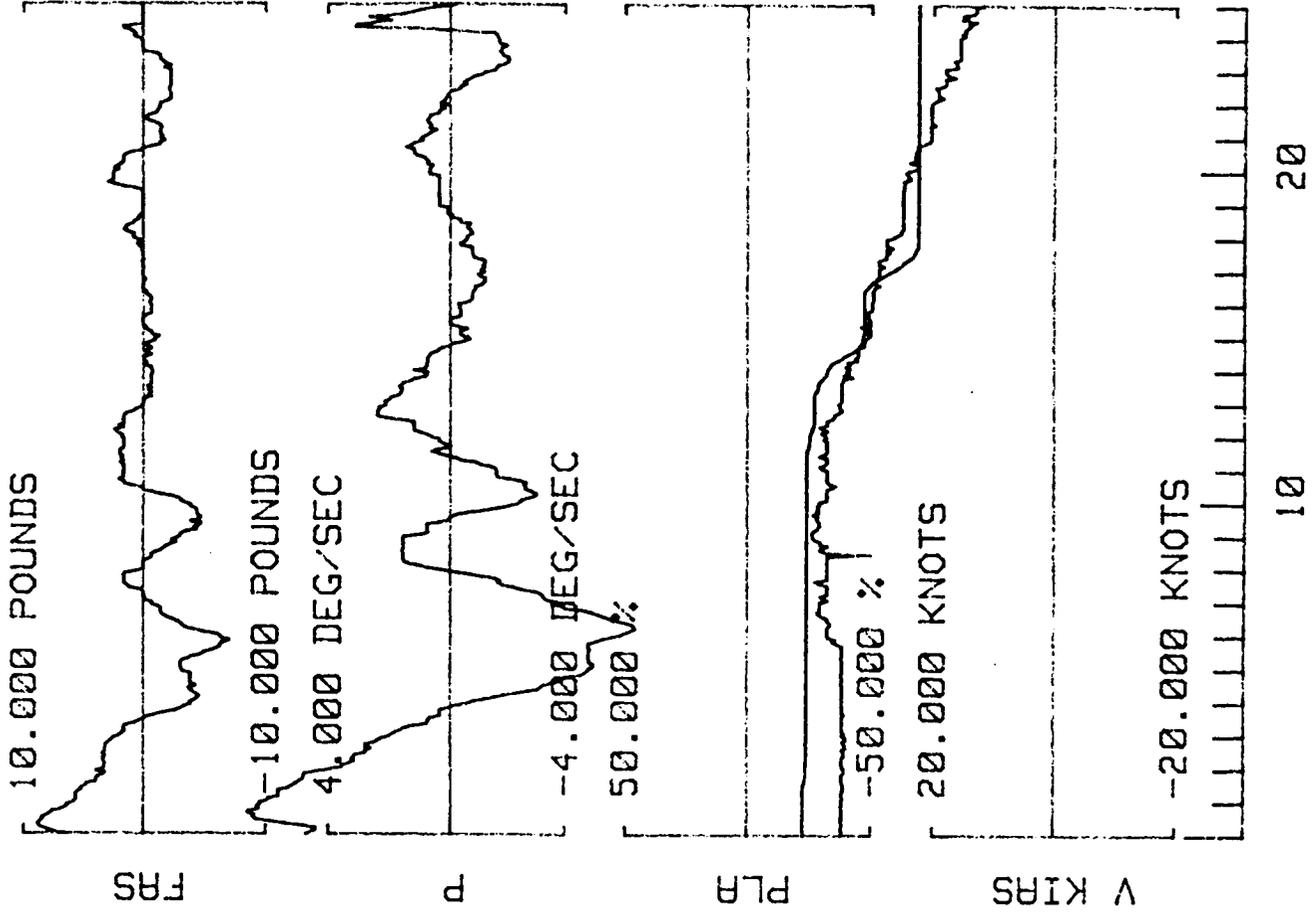
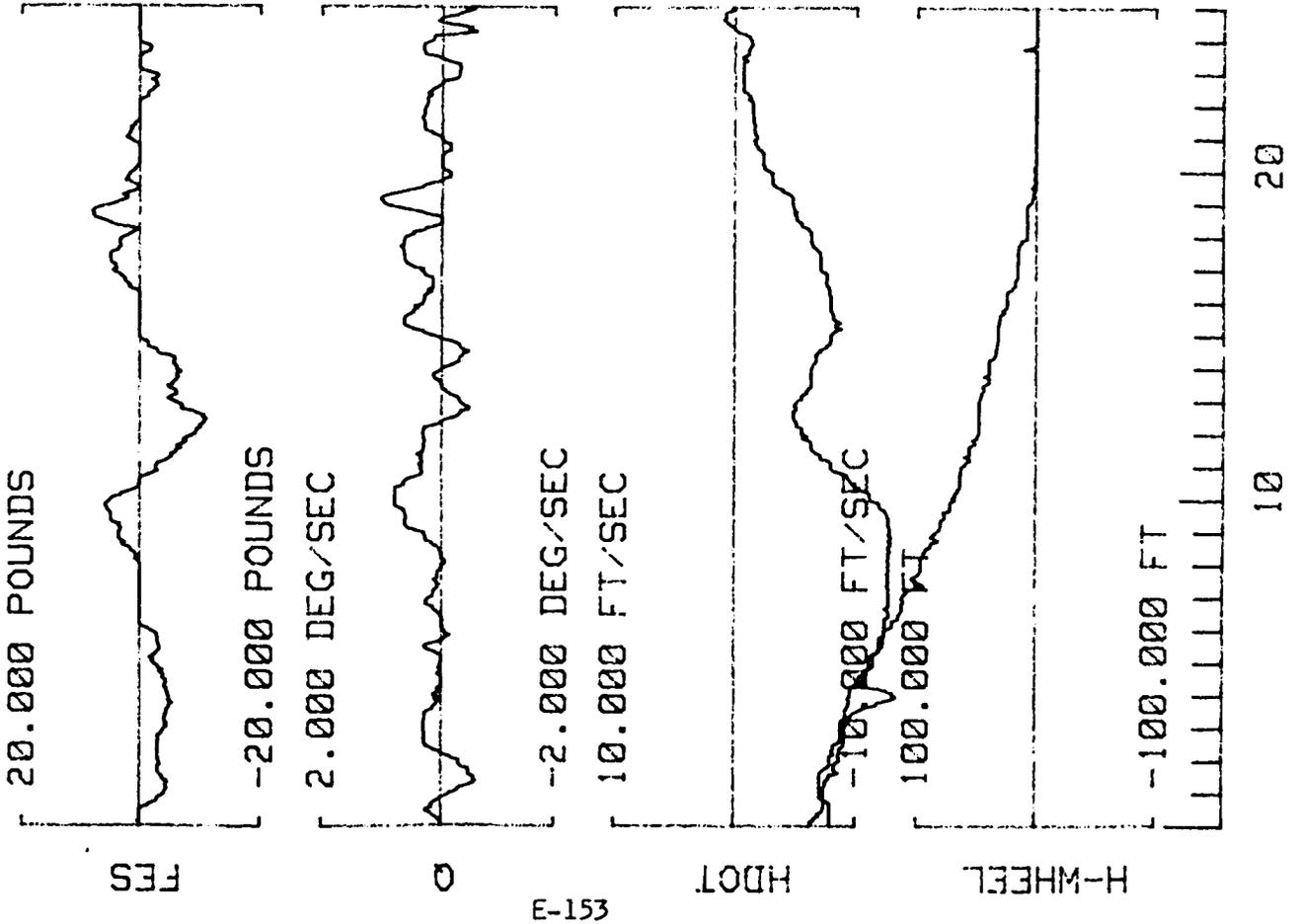


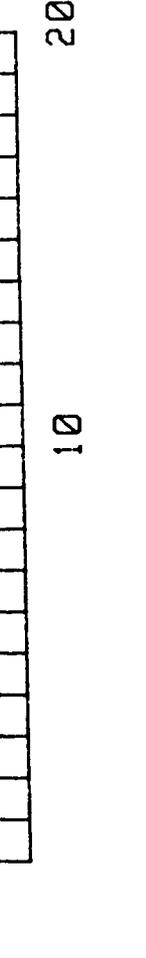
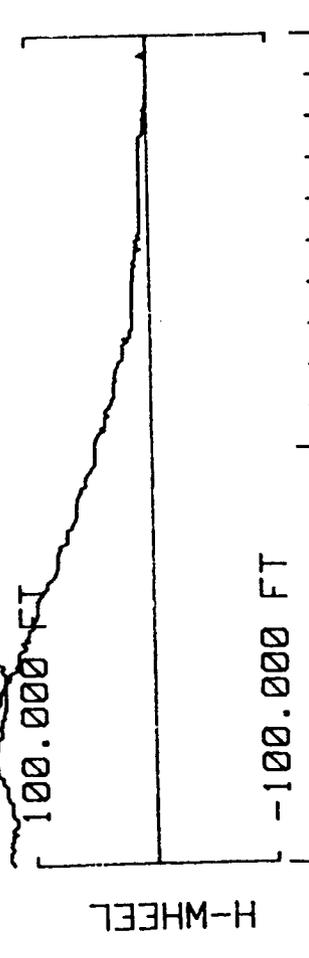
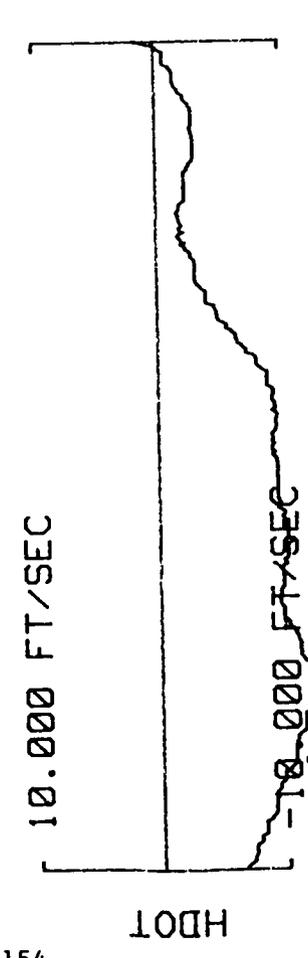
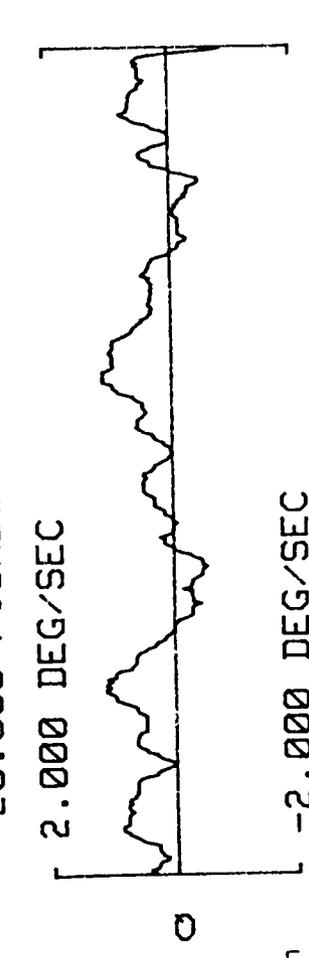
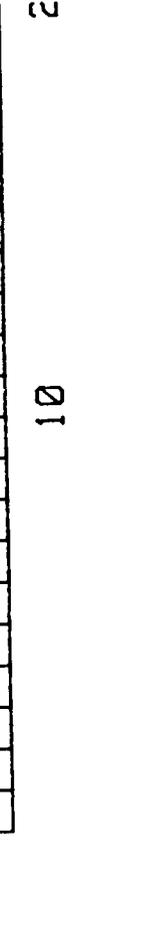
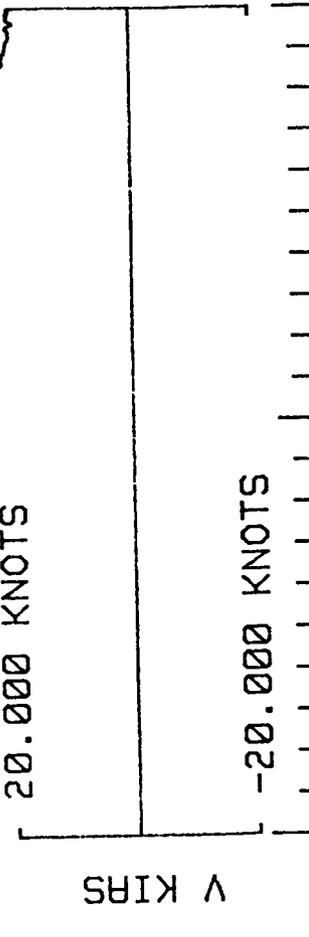
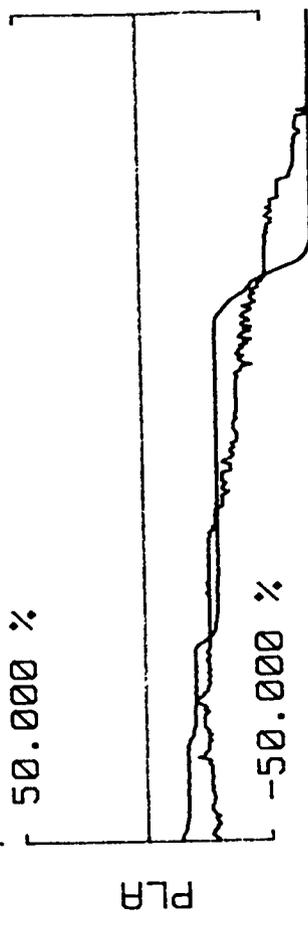
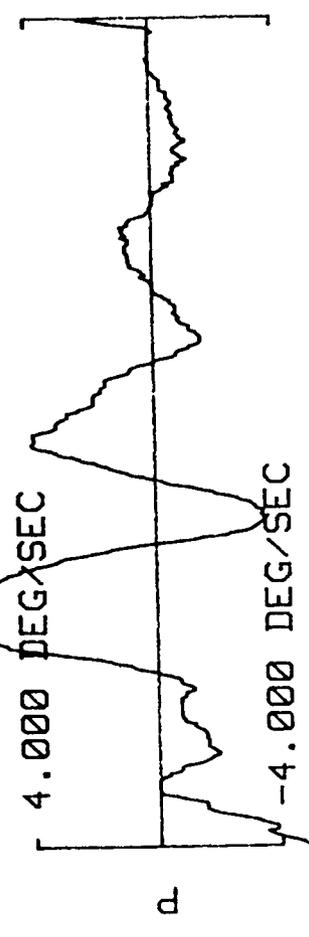
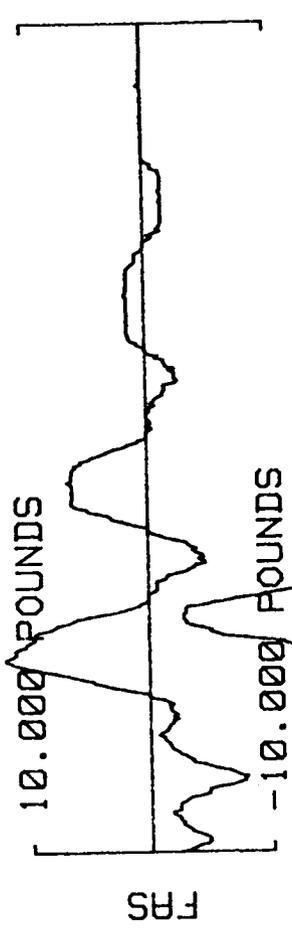
E-151



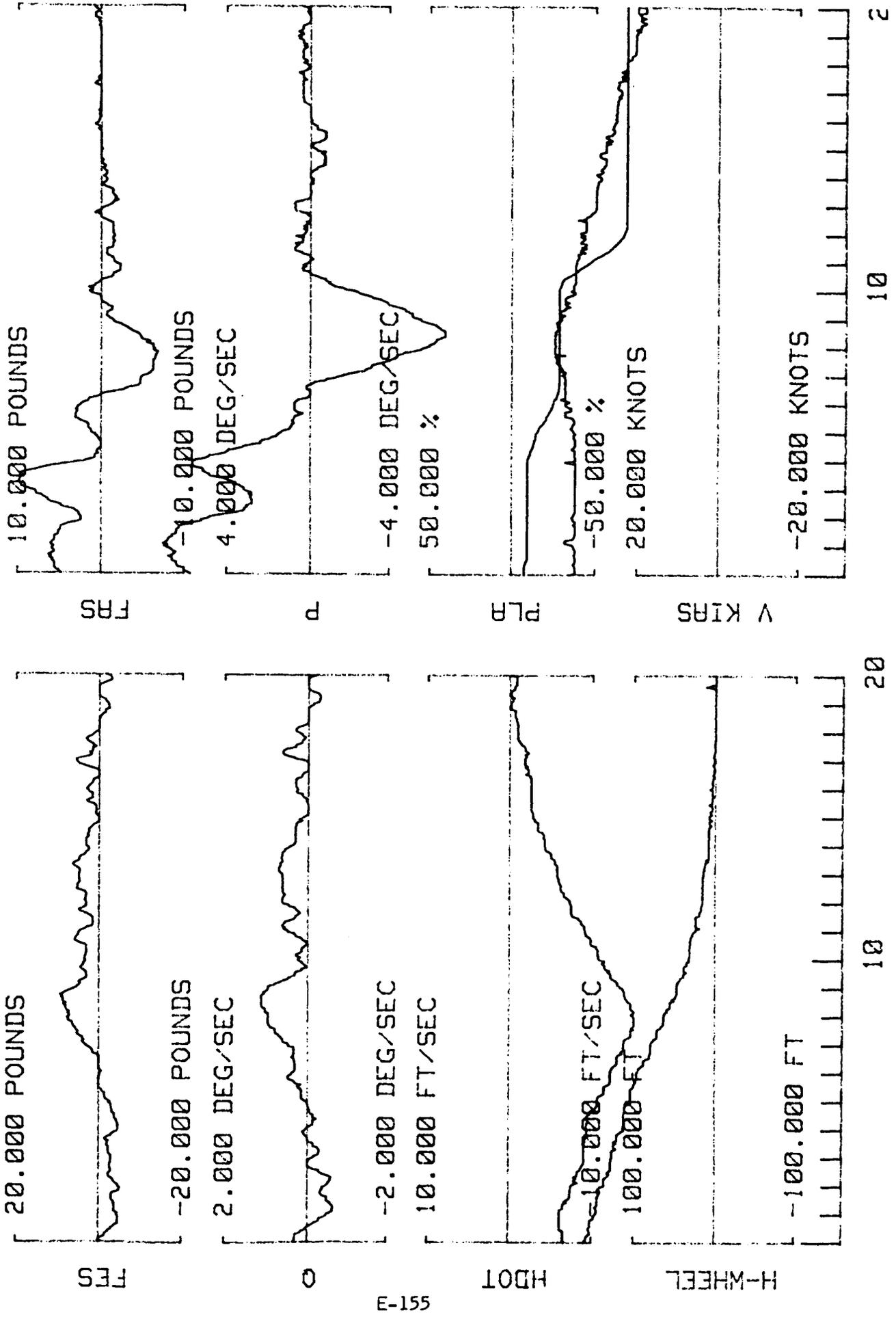


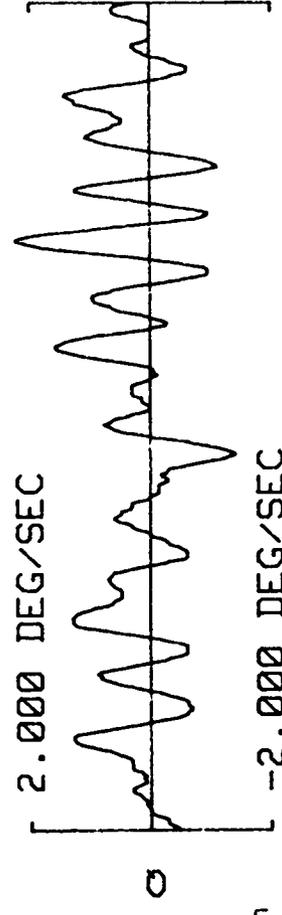
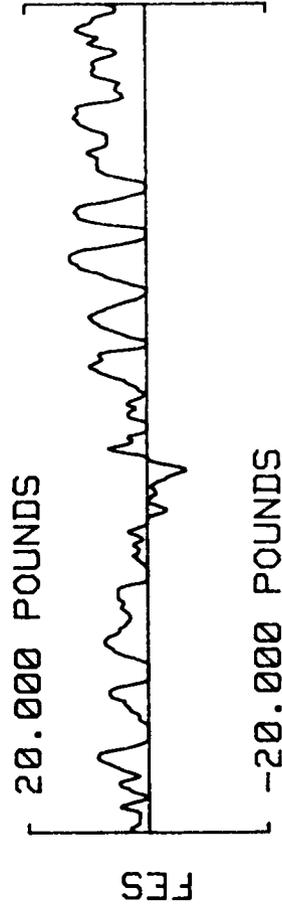
FLT 910 APP 4 CONF 9



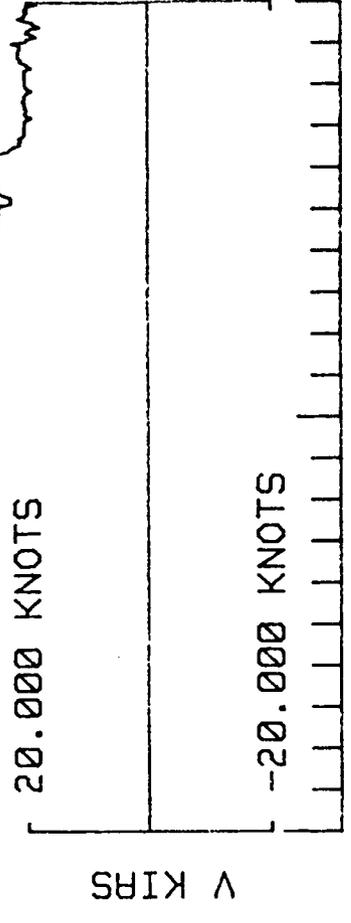
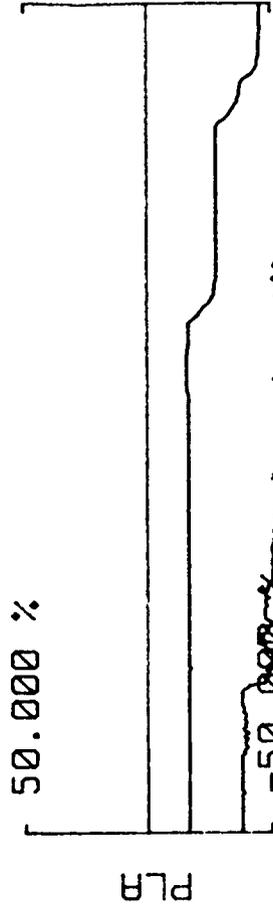
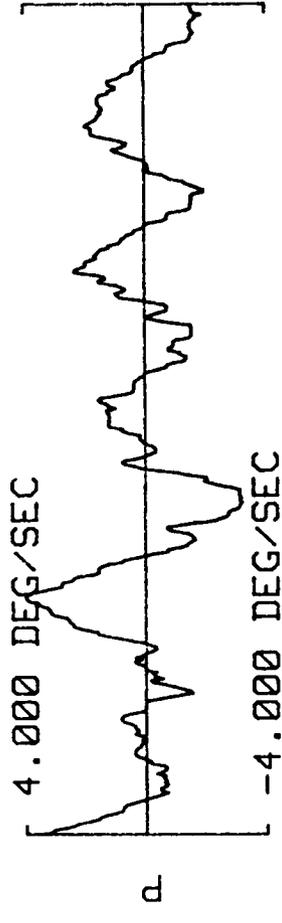
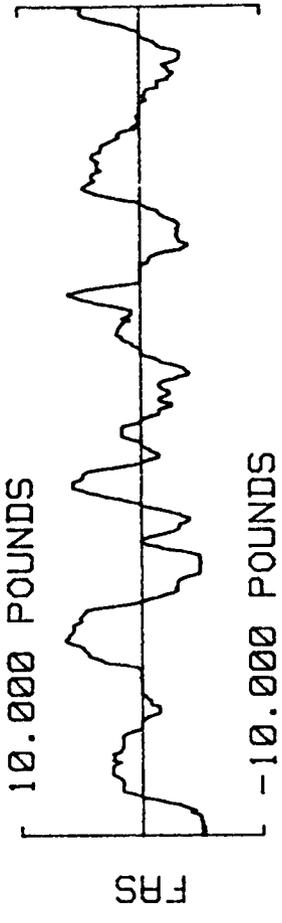
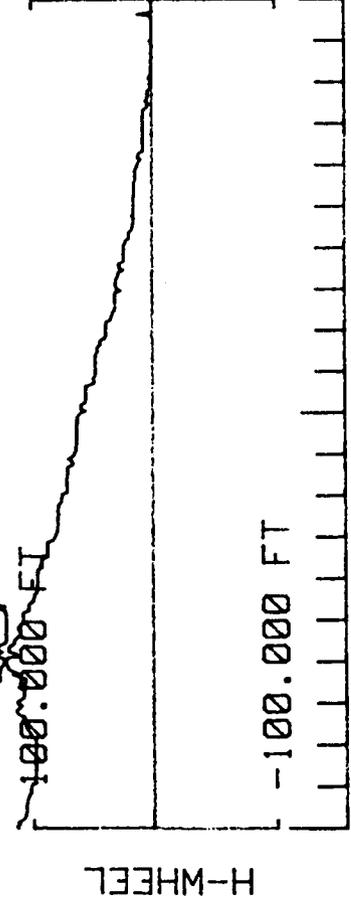
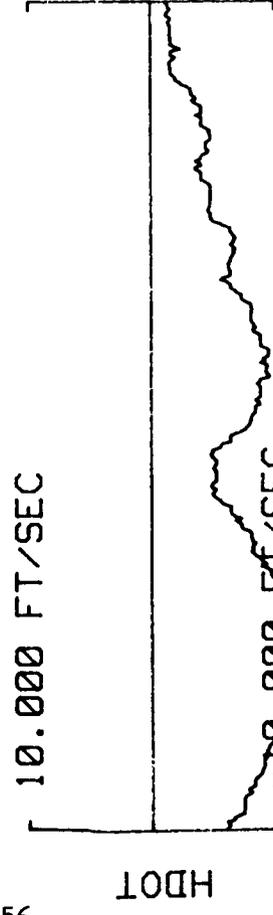


FLT 910 APP 6 CONF 10





911-E



10 20

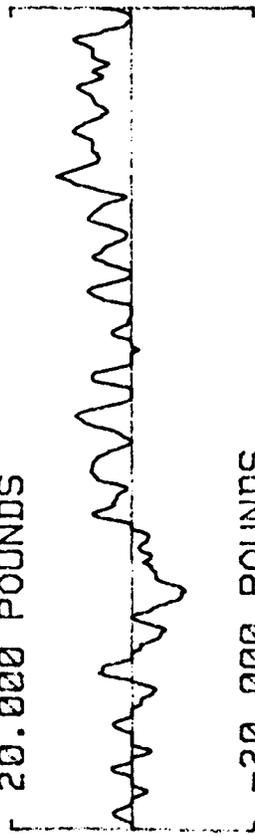
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FLT 911

APP 2

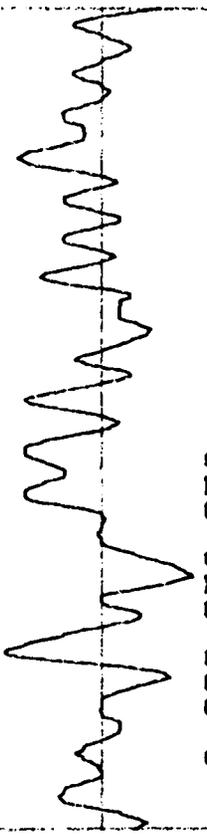
CONF 26

20.000 POUNDS



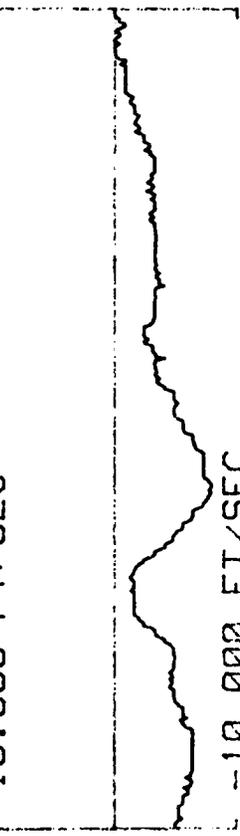
-20.000 POUNDS

2.000 DEG/SEC



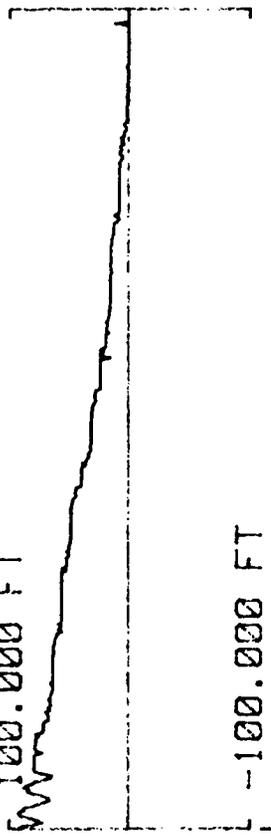
-2.000 DEG/SEC

10.000 FT/SEC



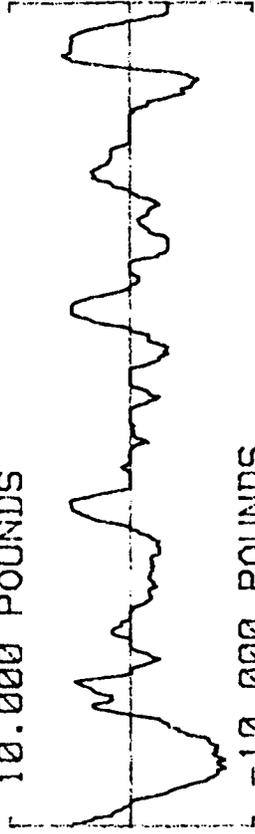
-10.000 FT/SEC

100.000 FT



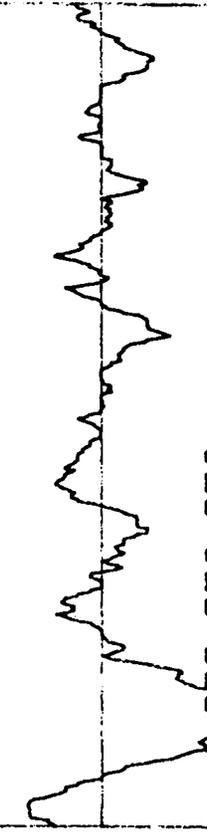
-100.000 FT

10.000 POUNDS



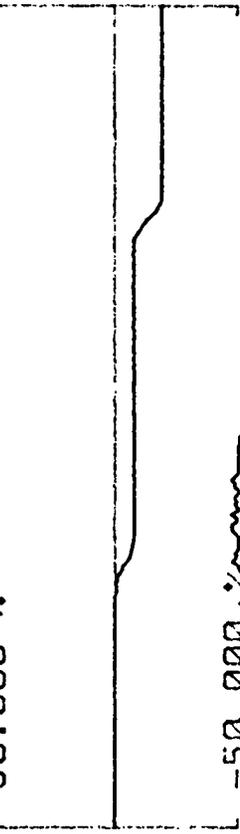
-10.000 POUNDS

4.000 DEG/SEC



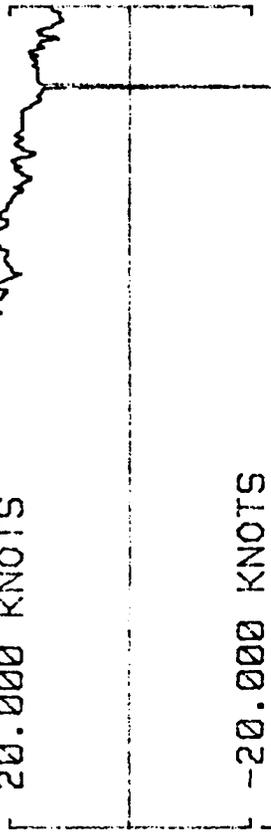
-4.000 DEG/SEC

50.000 %



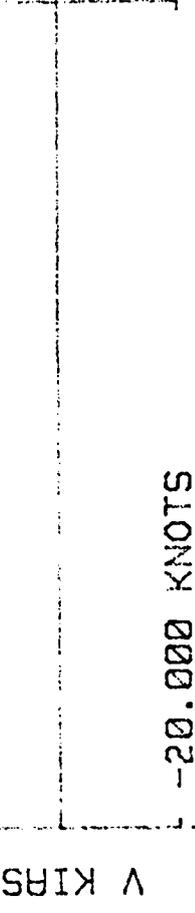
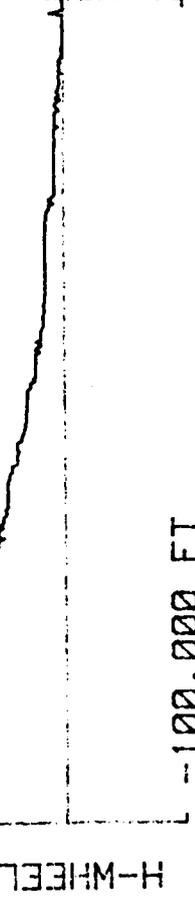
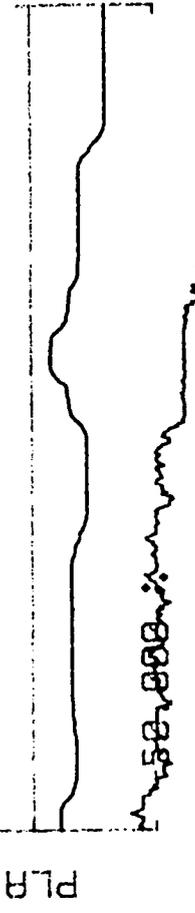
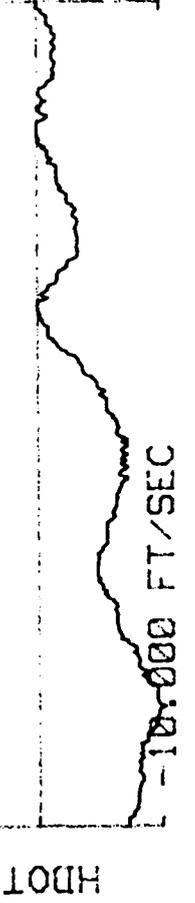
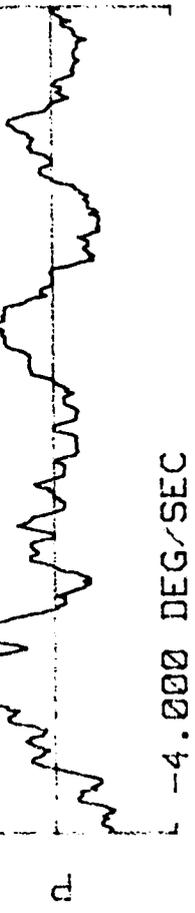
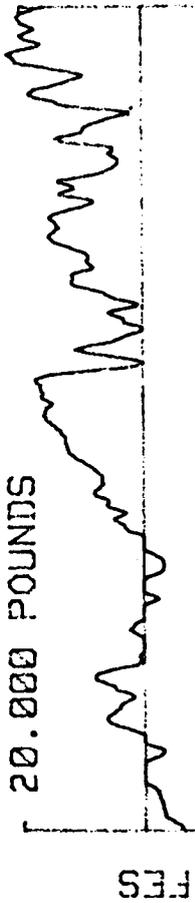
-50.000 %

20.000 KNOTS

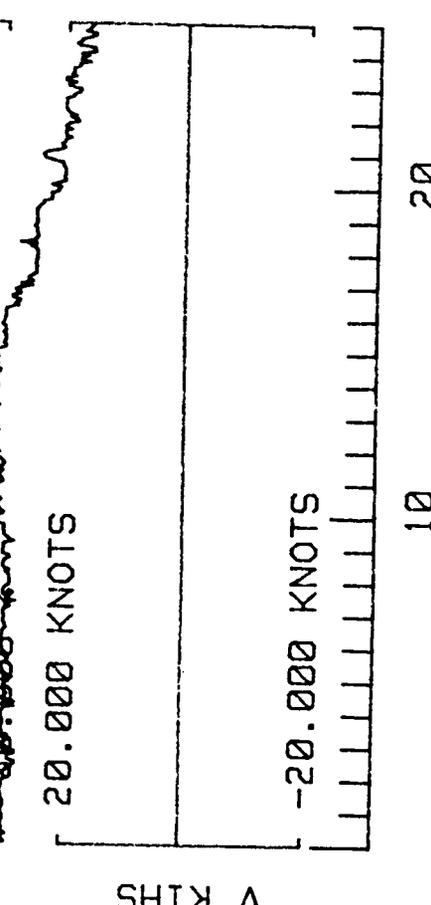
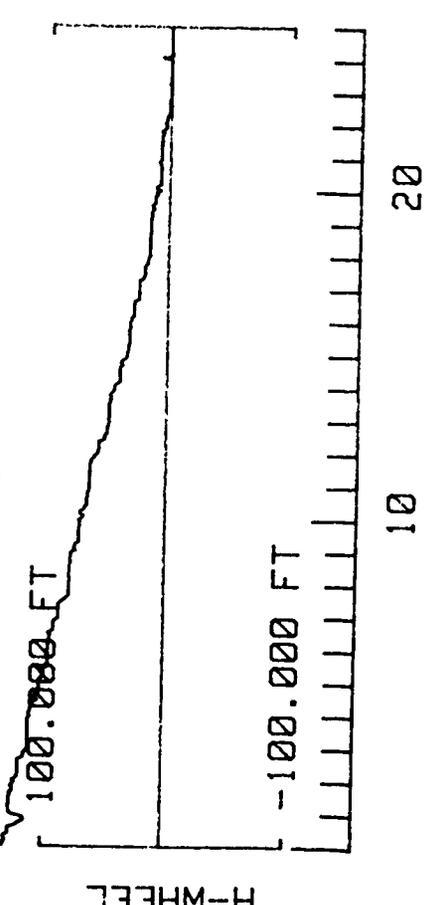
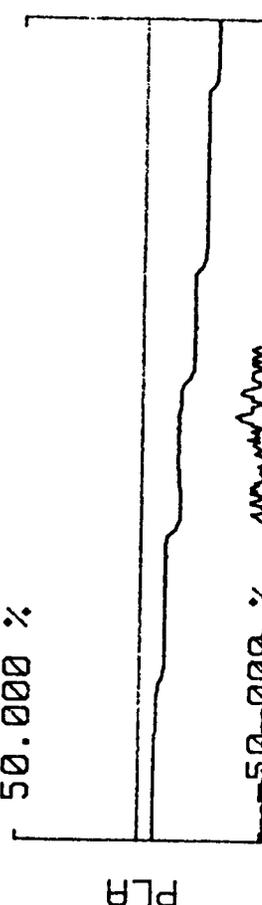
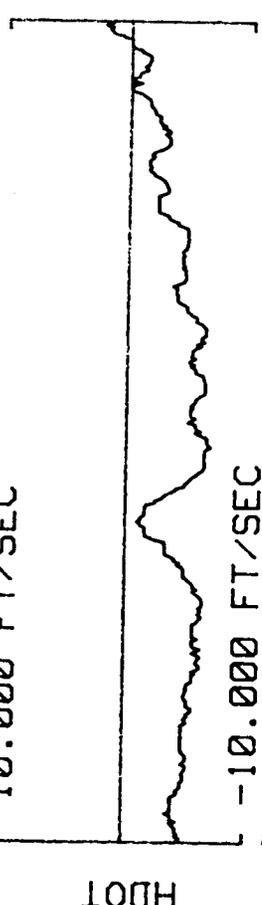
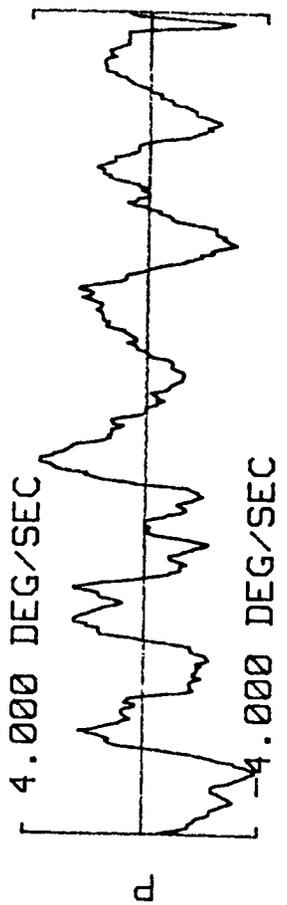
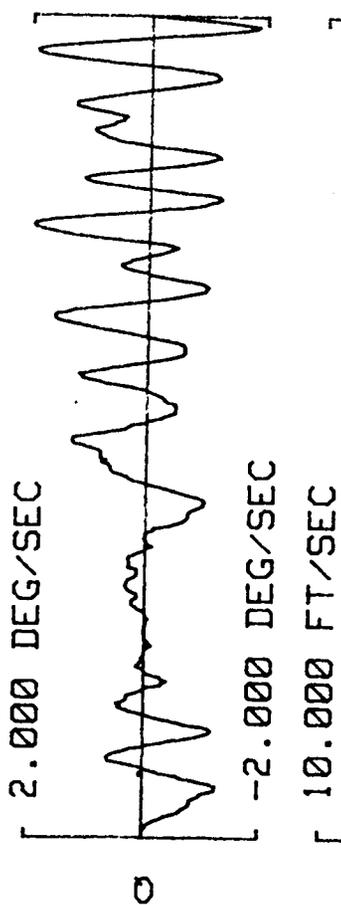
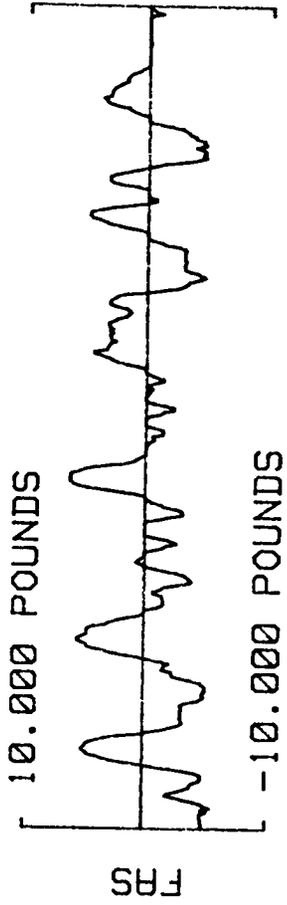
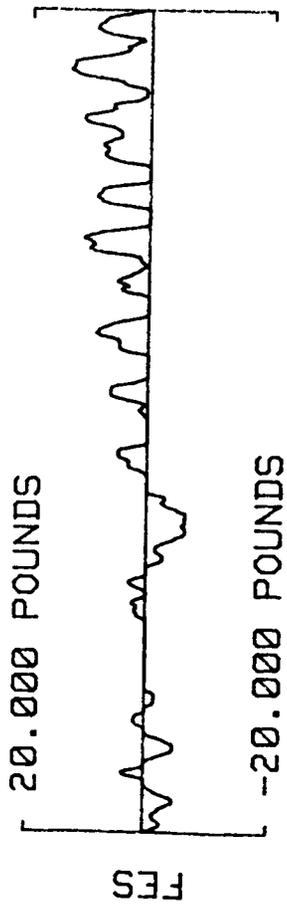


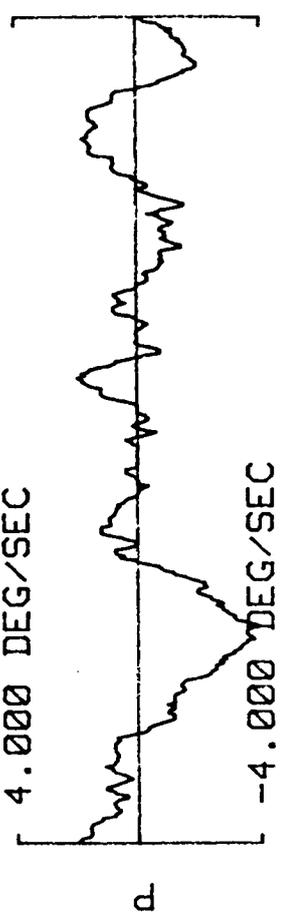
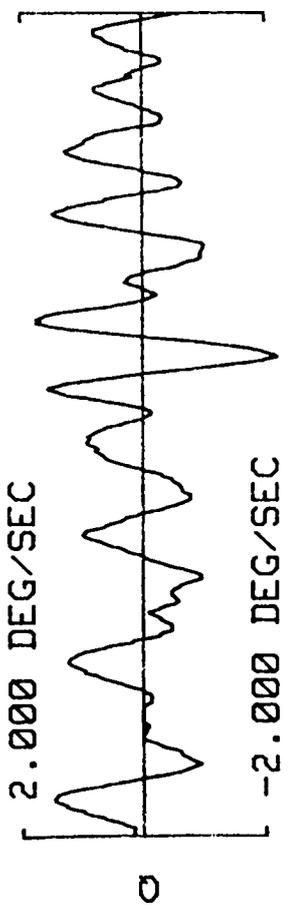
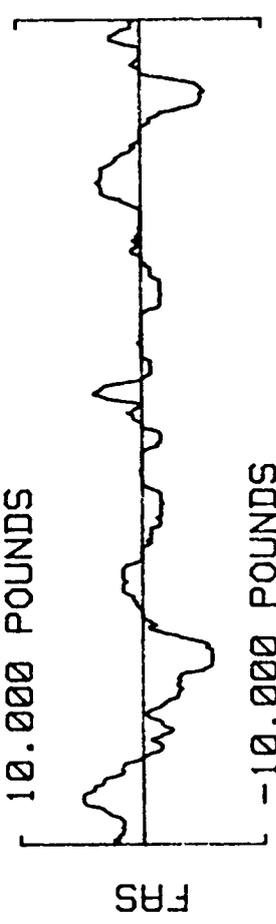
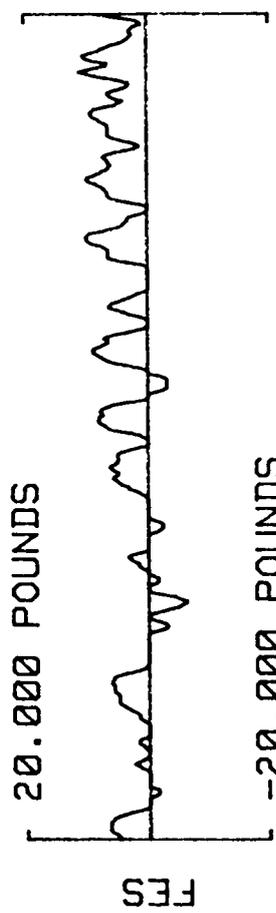
-20.000 KNOTS

10 20 10 2

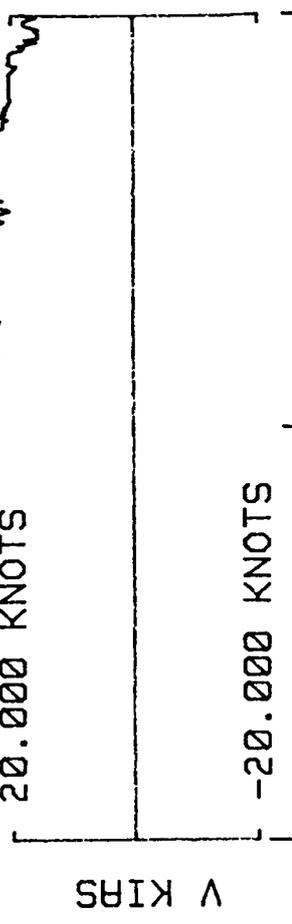
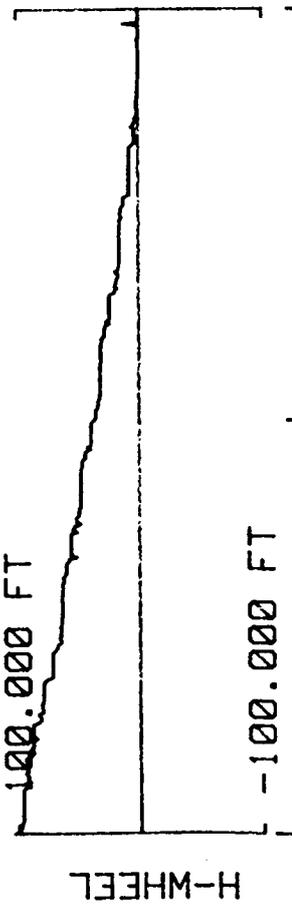
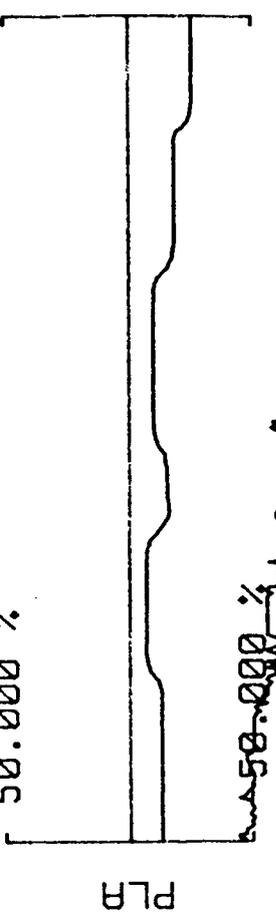
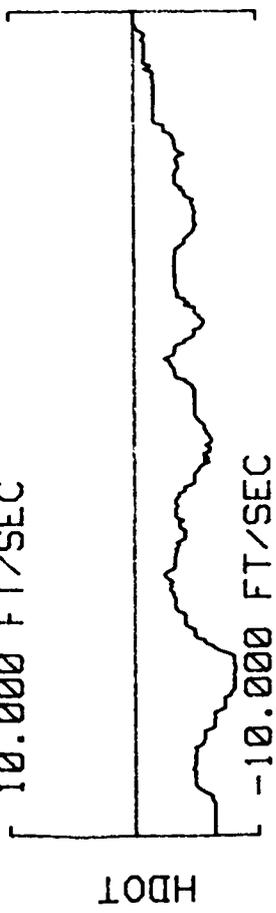


FLT 911 APP 4 CONF 28



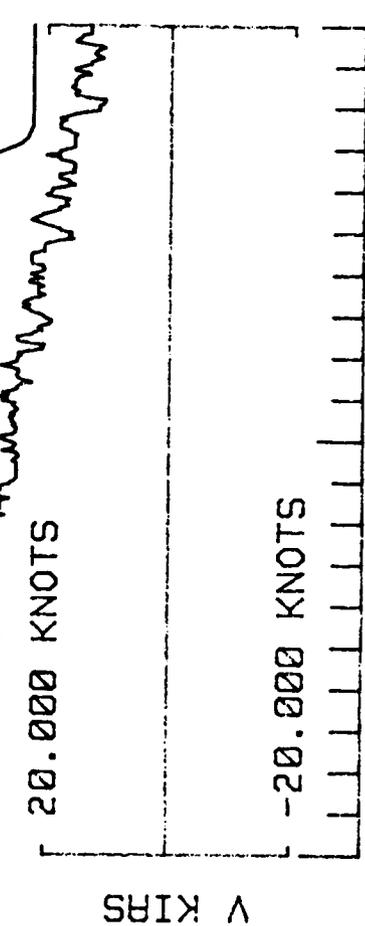
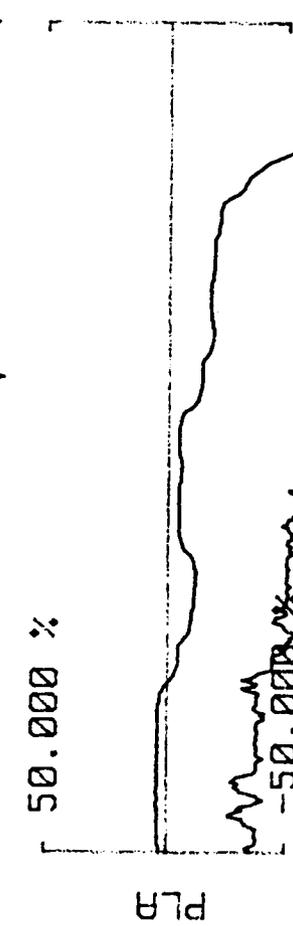
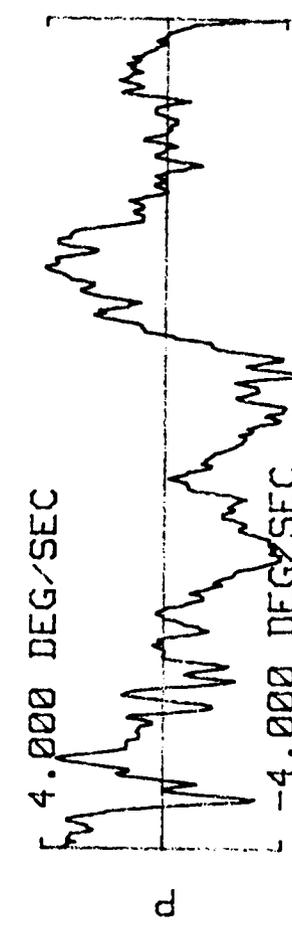
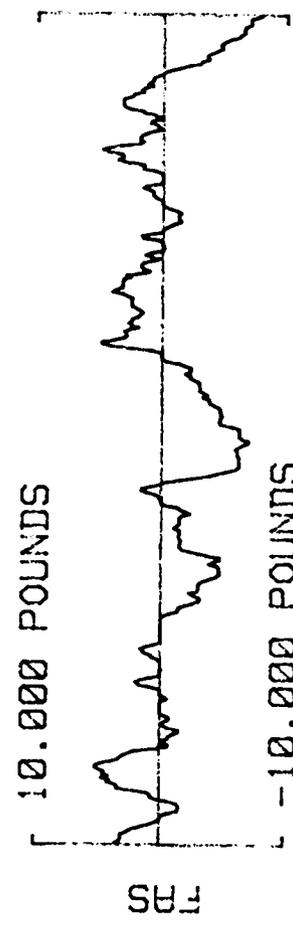
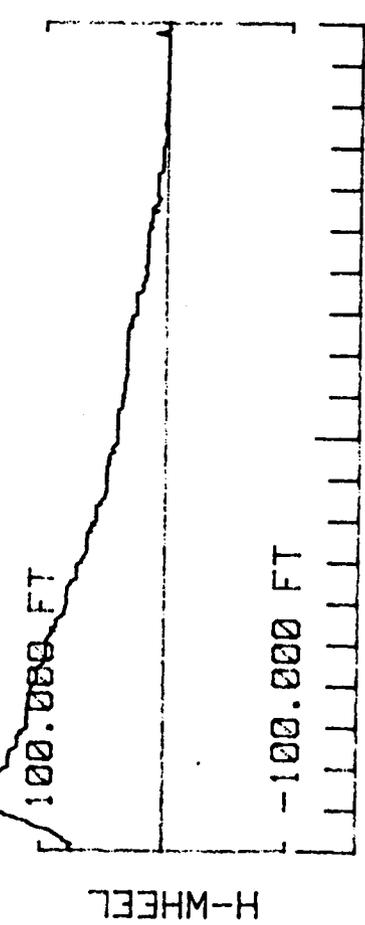
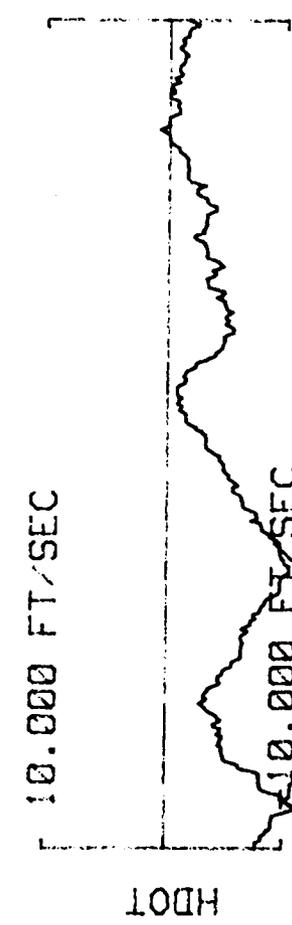
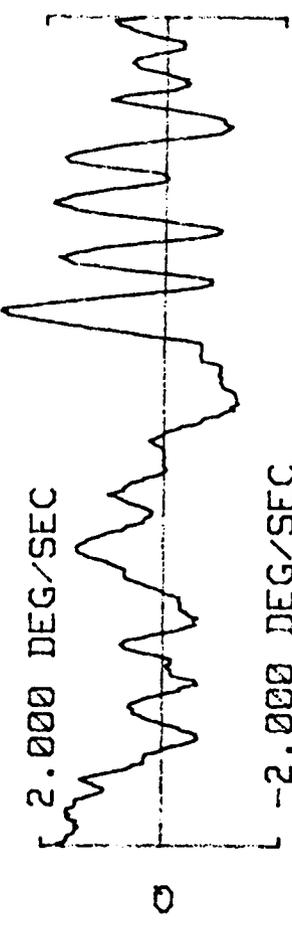
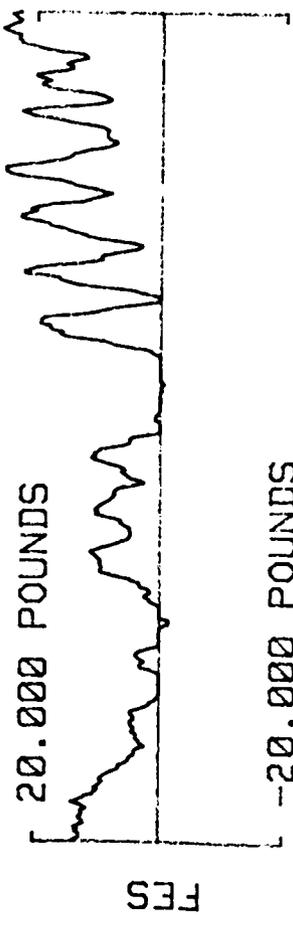


91-160

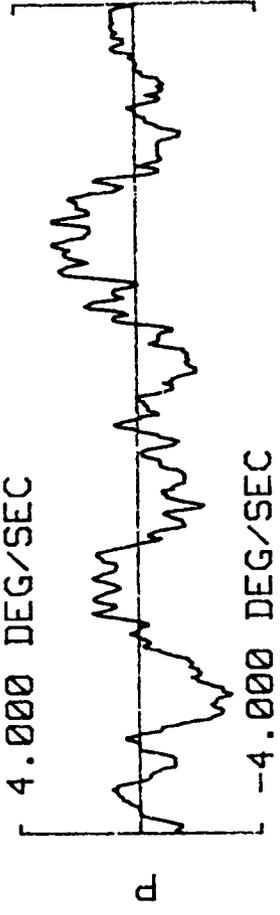
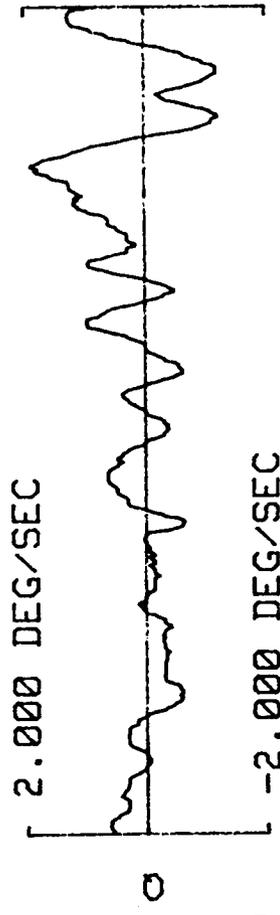
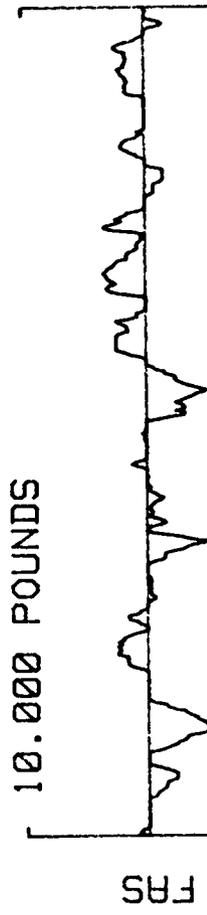
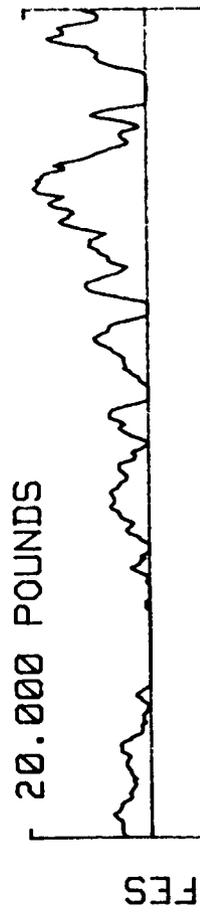


20 10 0 10 20

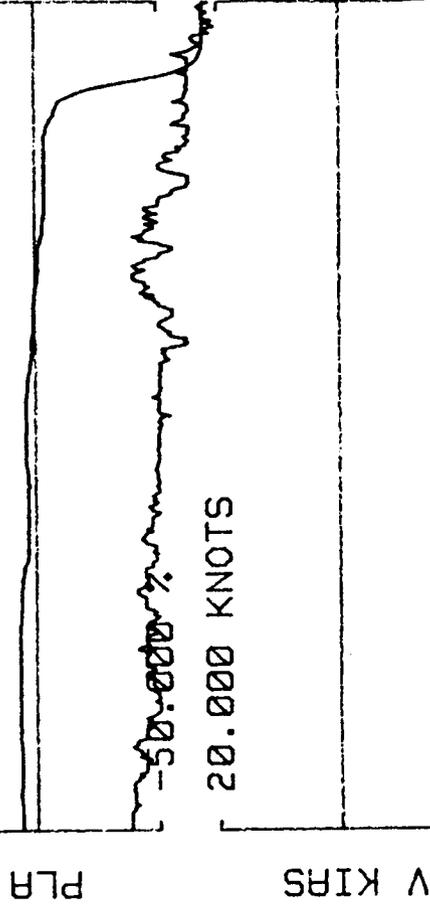
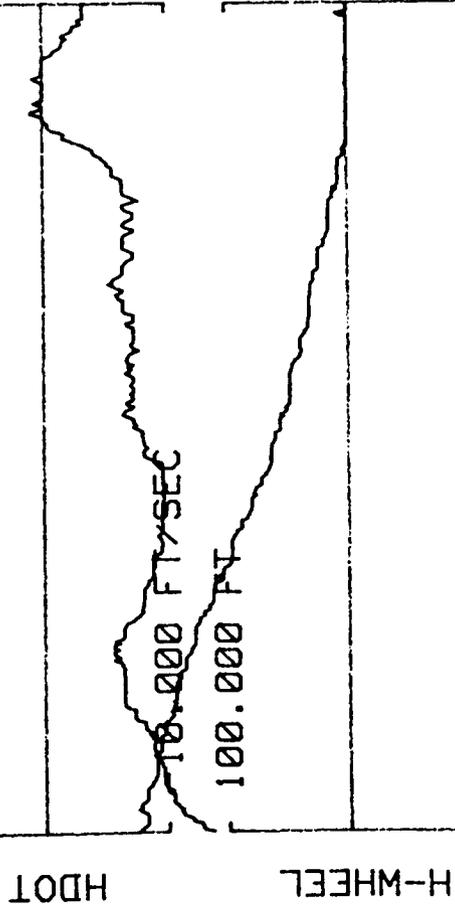
FLT 912 APP 1 CONF B



FLT 912 APP 2 CONF B



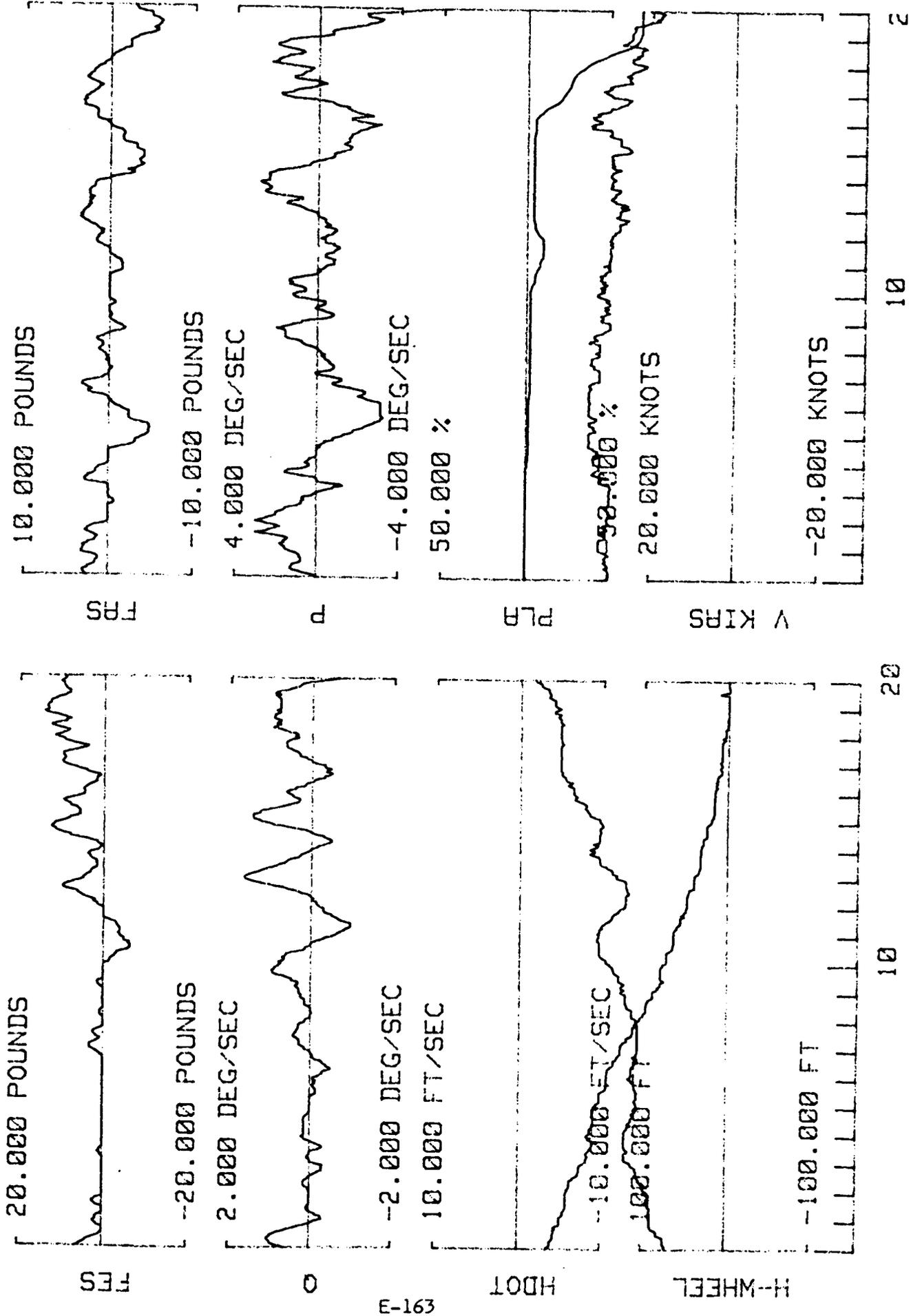
E-162



10 20

10 20

FLT 912 APP 3 CONF B



91-3

10 20

10 20

FLT 912

APP 4

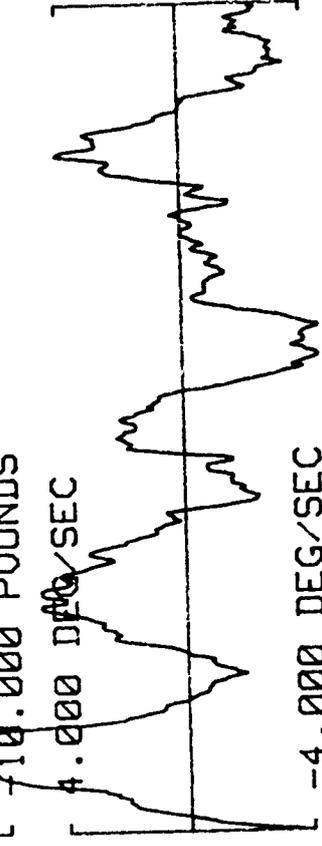
CONF 24

20.000 POUNDS



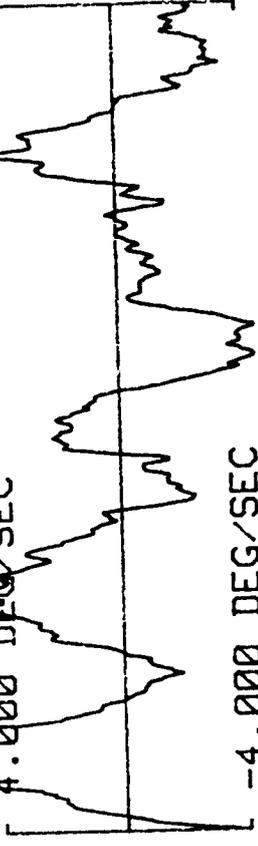
FFS

-20.000 POUNDS



P

2.000 DEG/SEC

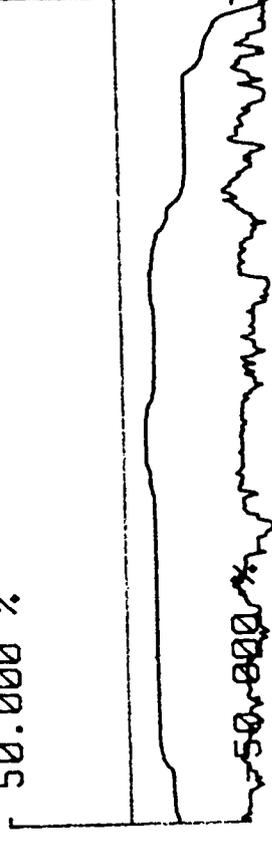


-2.000 DEG/SEC



E-164

10.000 FT/SEC



HDOT

-10.000 FT/SEC



H-WHEEL

100.000 FT



PLP

20.000 KNOTS



V KIRS

-100.000 FT



-20.000 KNOTS

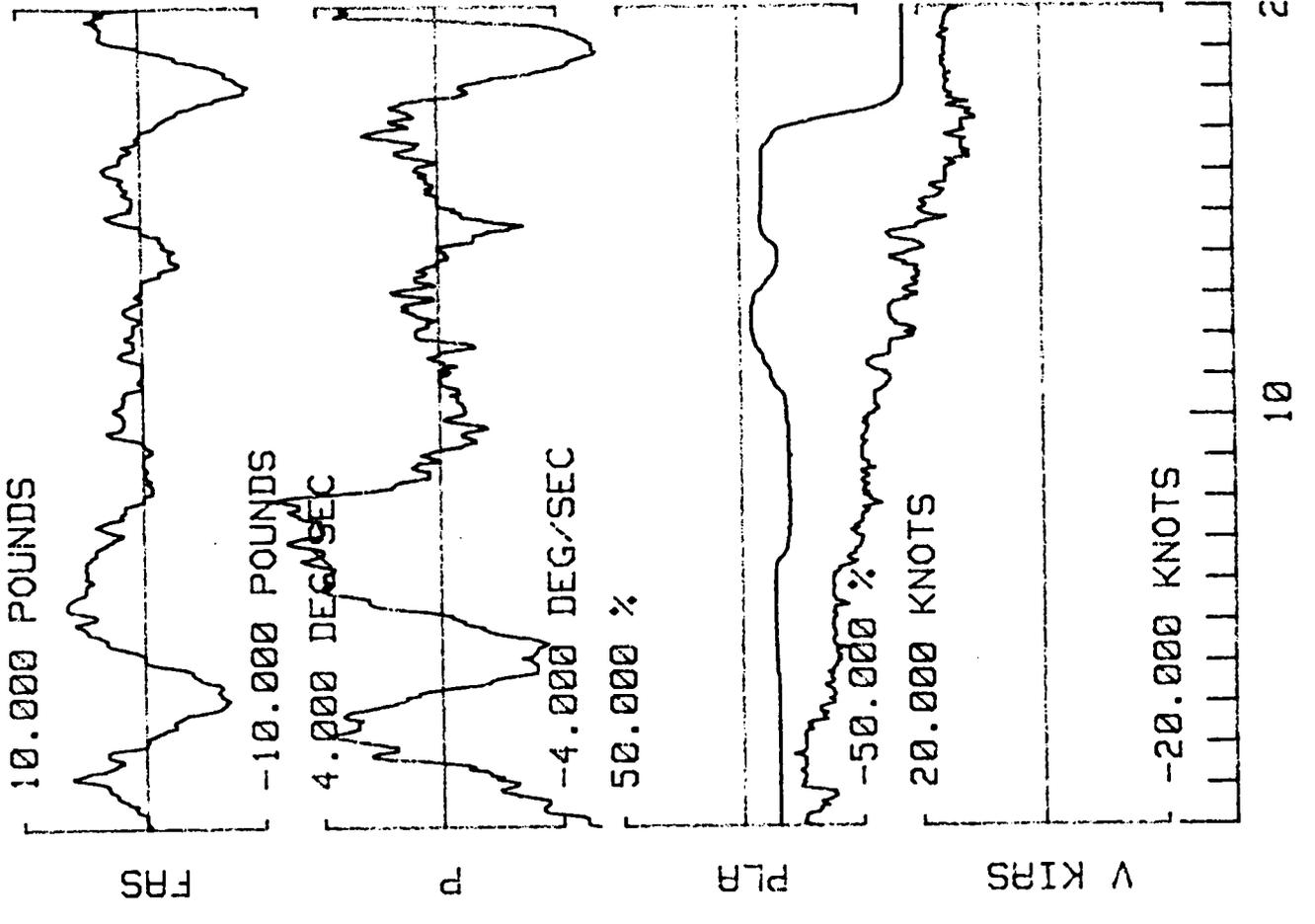
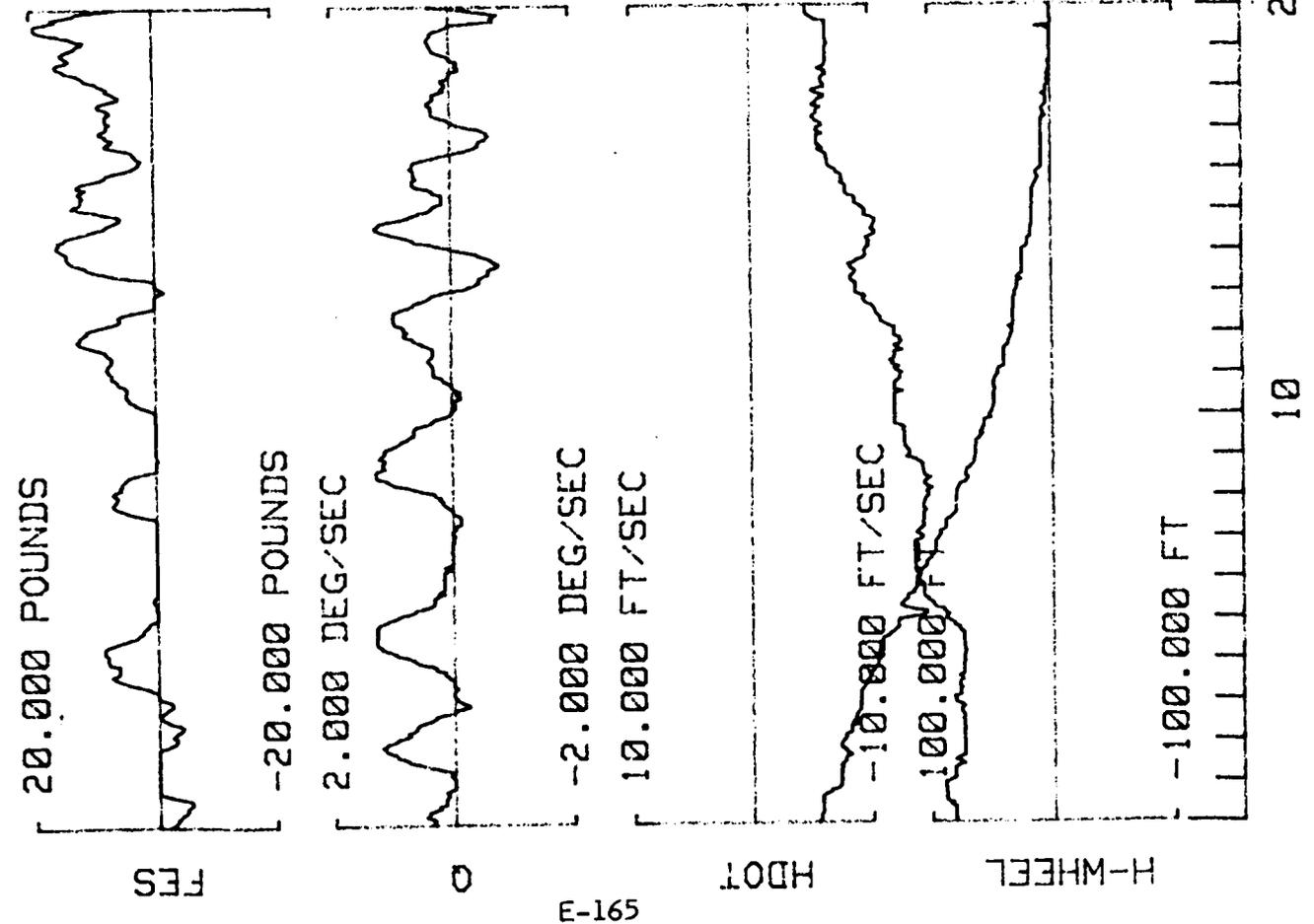


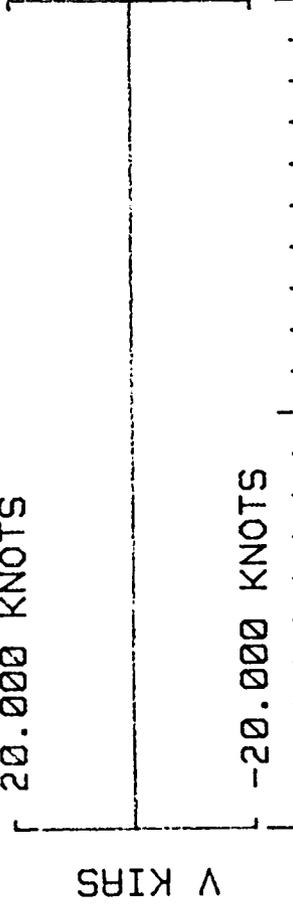
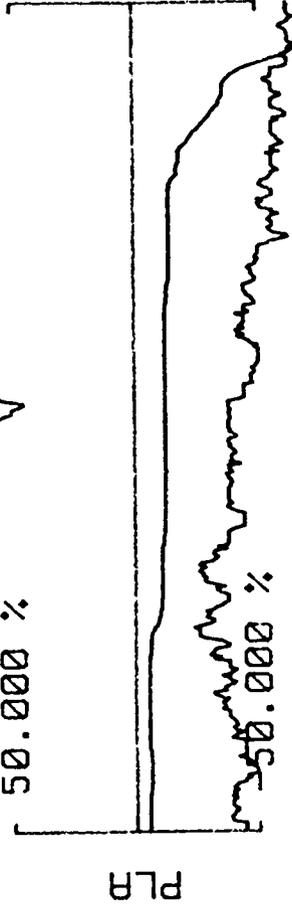
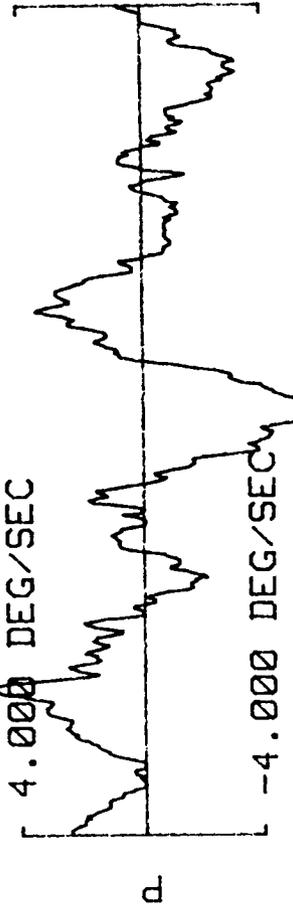
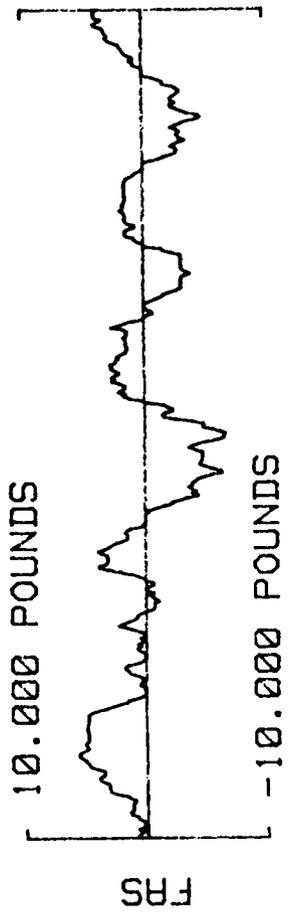
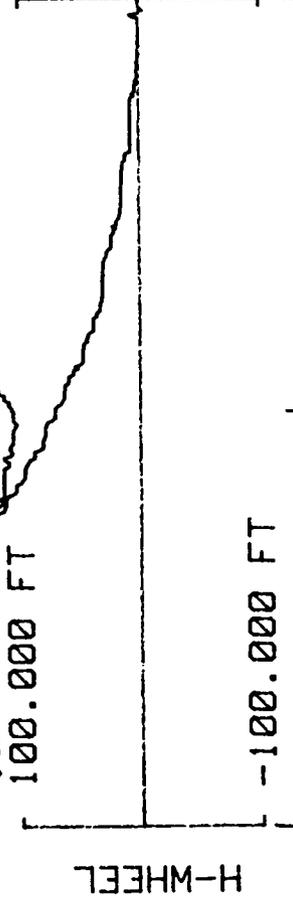
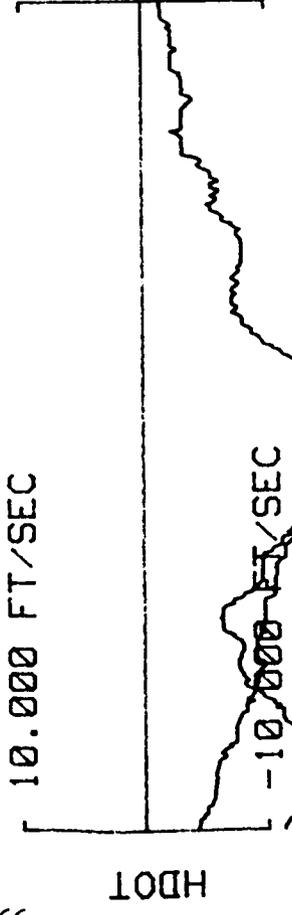
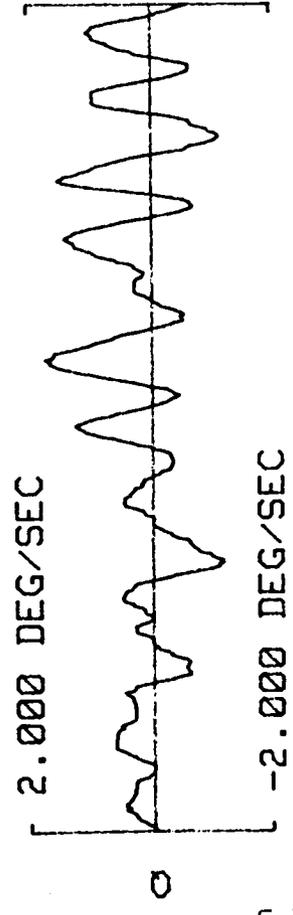
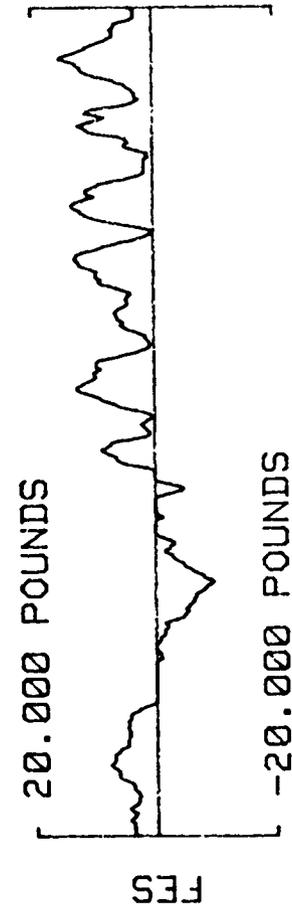
2

10

20

FLT 912 APP 5 CONF 24





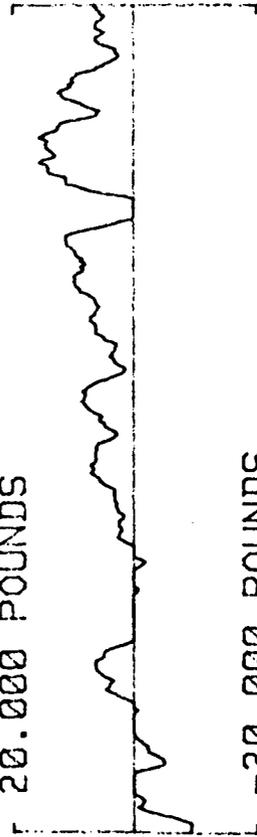
20 10 2

FLT 912

APP 7

CONF 21

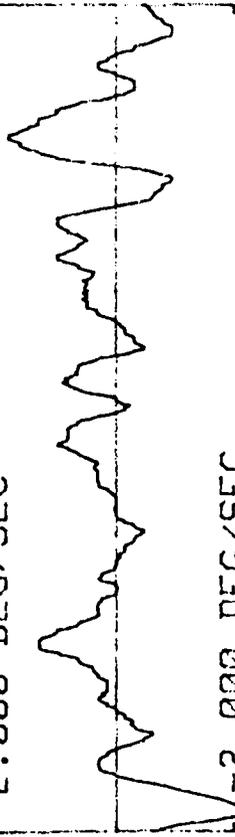
20.000 POUNDS



FES

-20.000 POUNDS

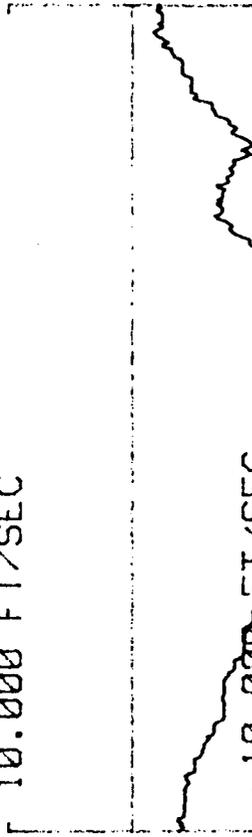
2.000 DEG/SEC



0

-2.000 DEG/SEC

10.000 FT/SEC



HDOT

-10.000 FT/SEC

100.000 FT



H-WHEEL

-100.000 FT



10

20

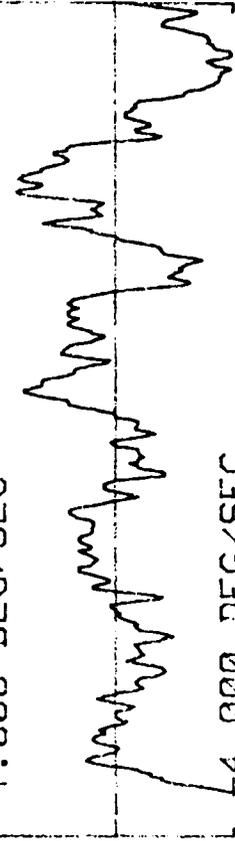
10.000 POUNDS



FES

-10.000 POUNDS

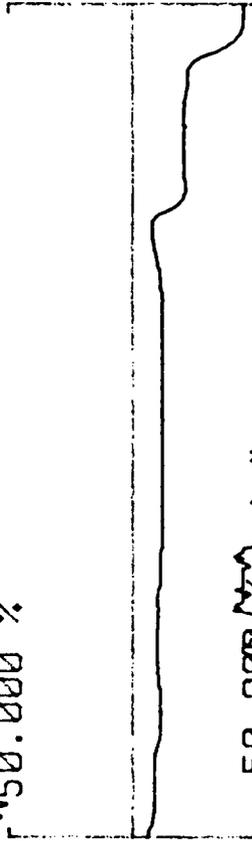
4.000 DEG/SEC



0

-4.000 DEG/SEC

50.000 %



PLB

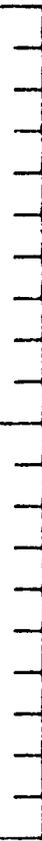
-50.000 %

20.000 KNOTS



V KIRS

-20.000 KNOTS



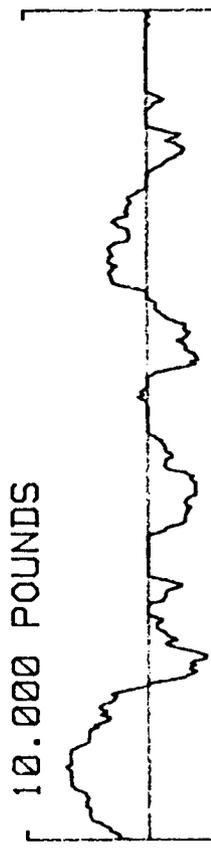
10

20

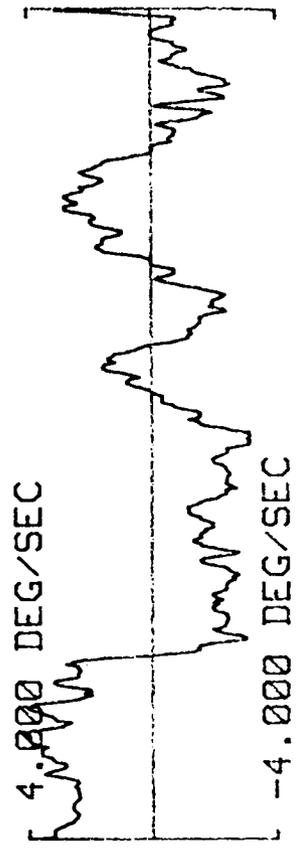
CONF 27

APP 8

FLT 912



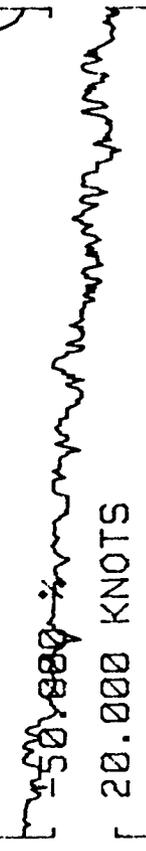
FFS



ROLL

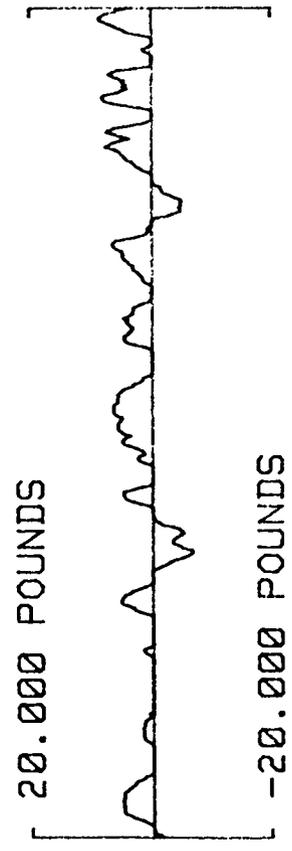


PLB

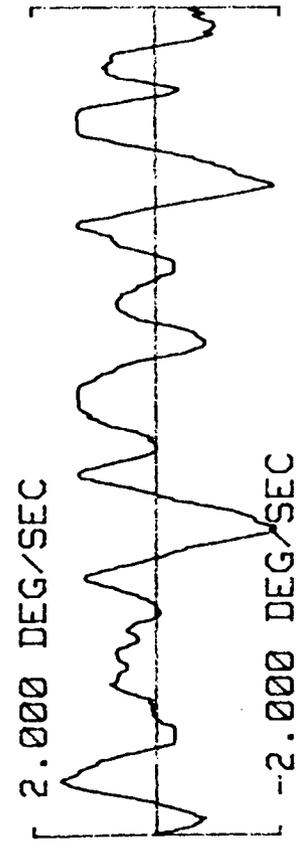


V KIRS

10 20



FES



ROLL



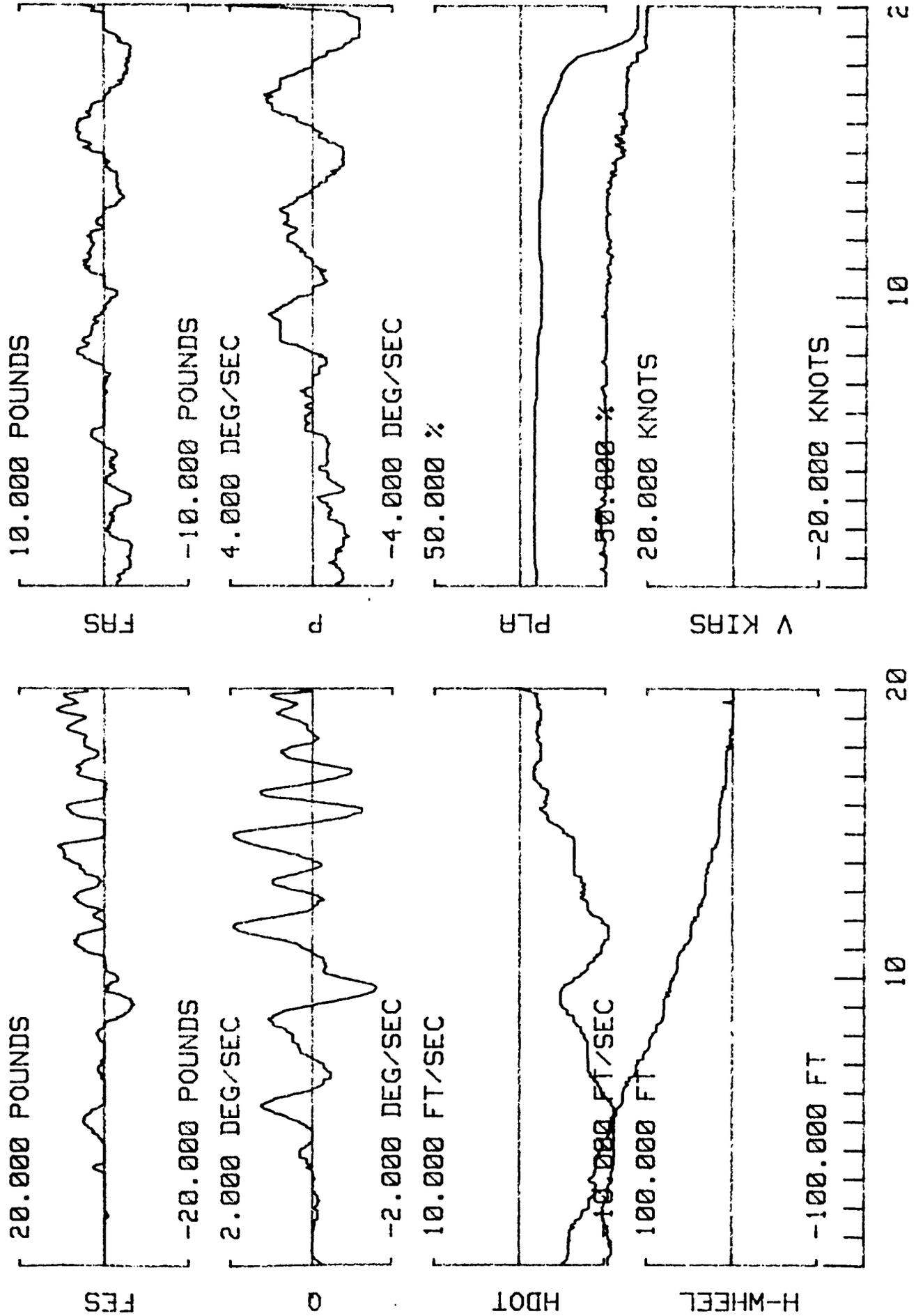
HDOT

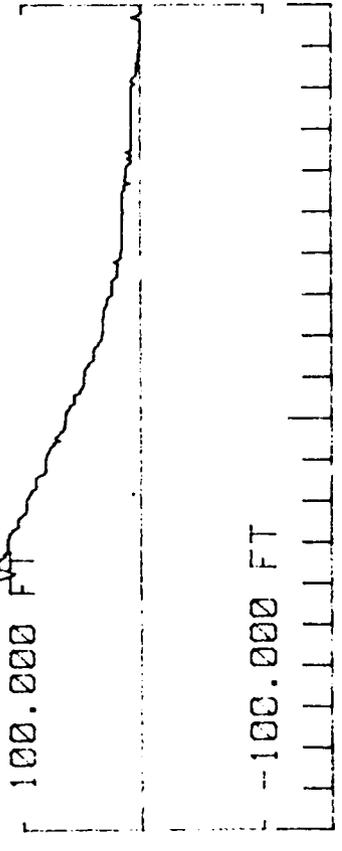
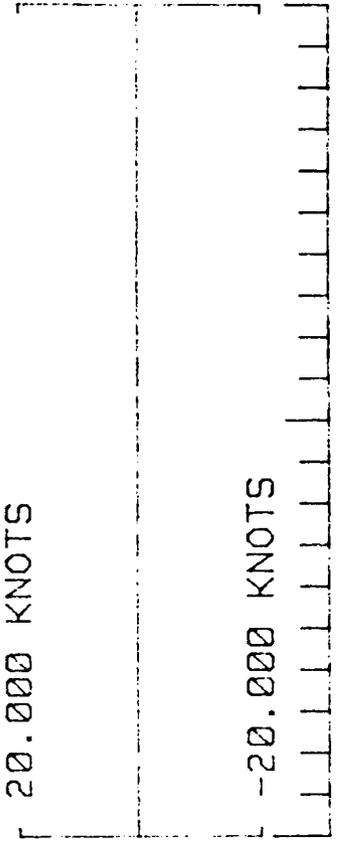
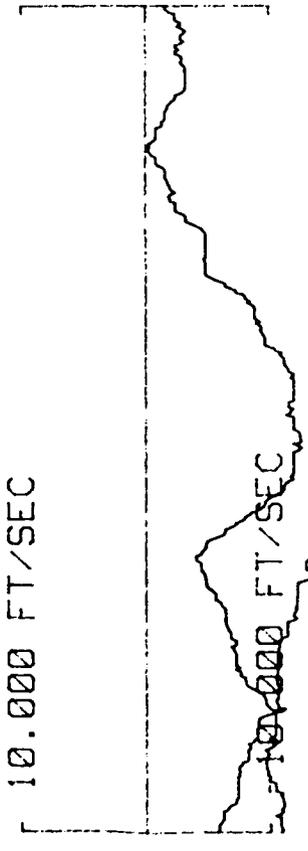
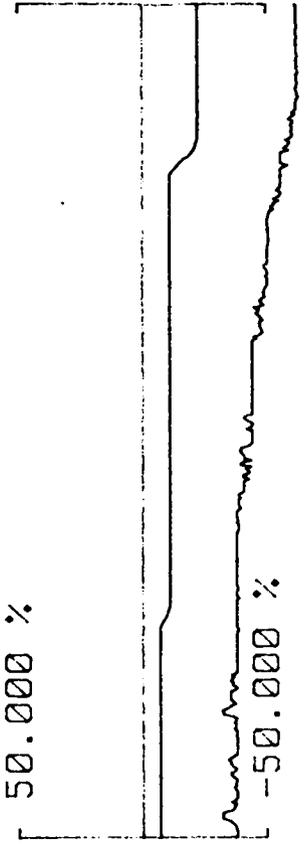
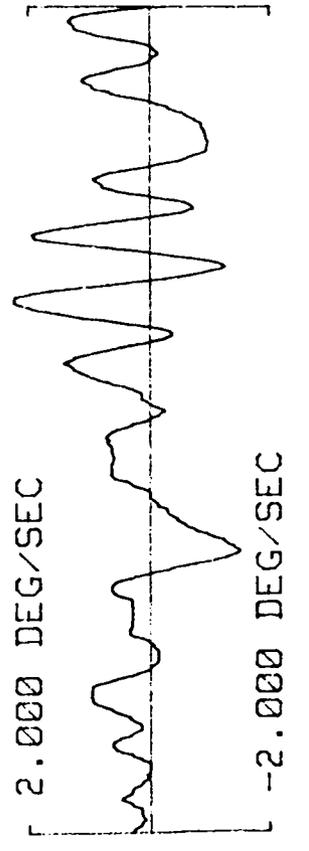
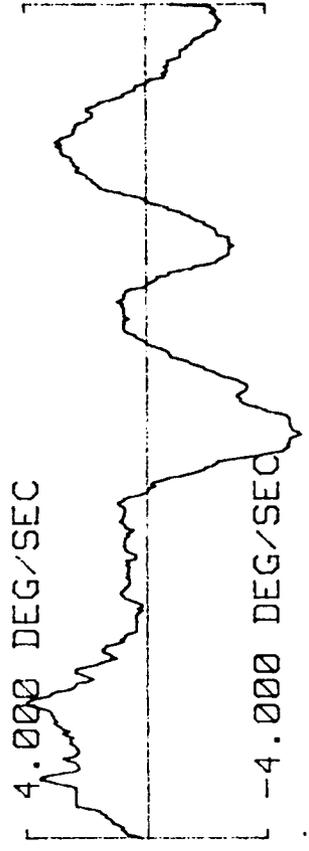
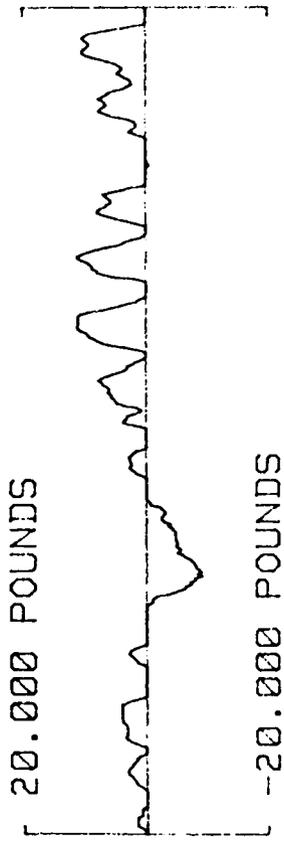
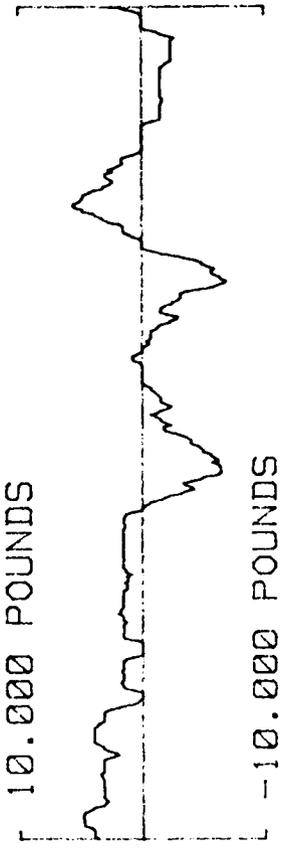


H-WHEEL

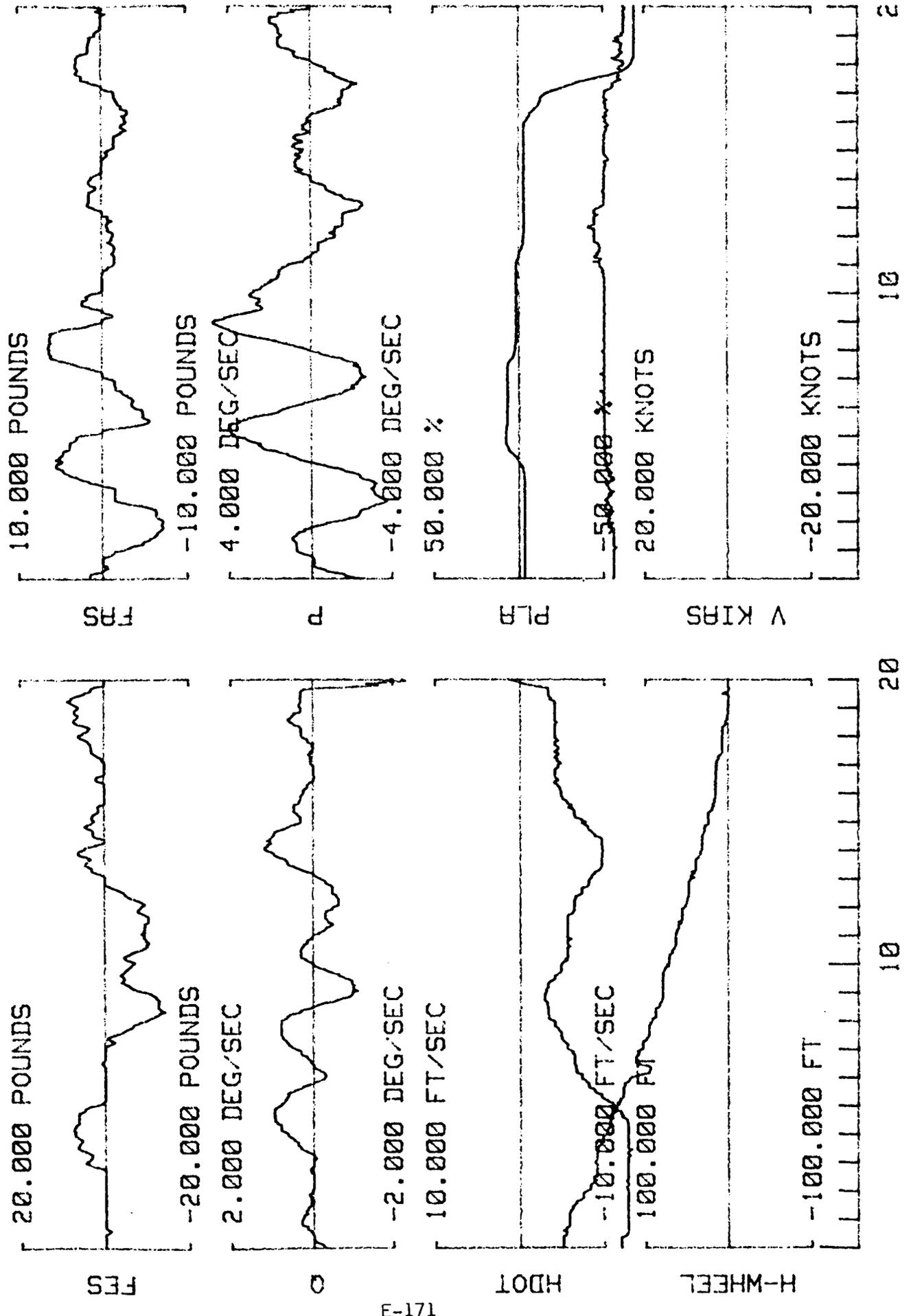
10 20

FLT 913 APP 1 CONF 27





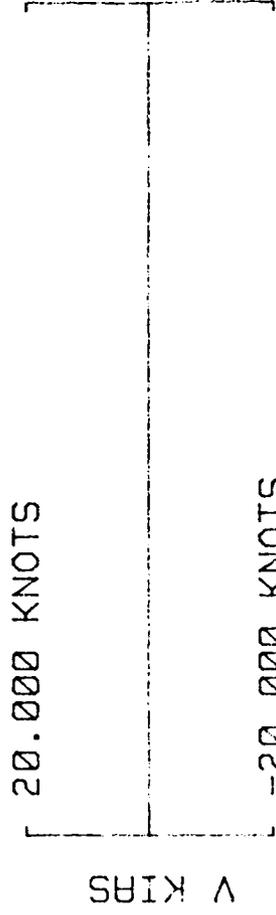
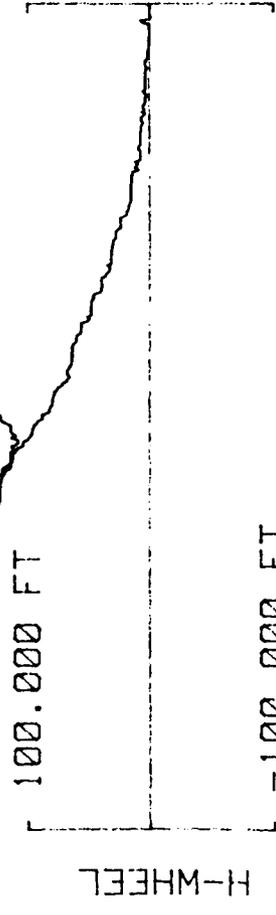
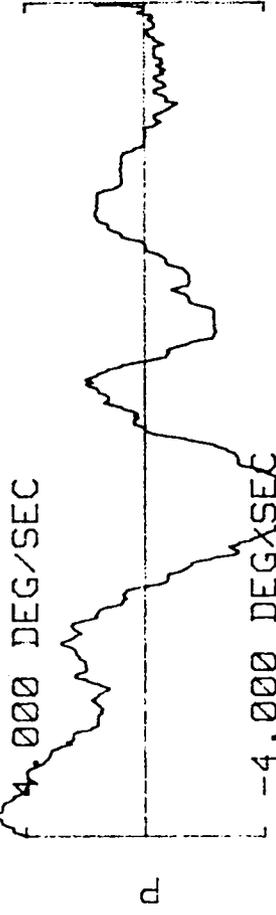
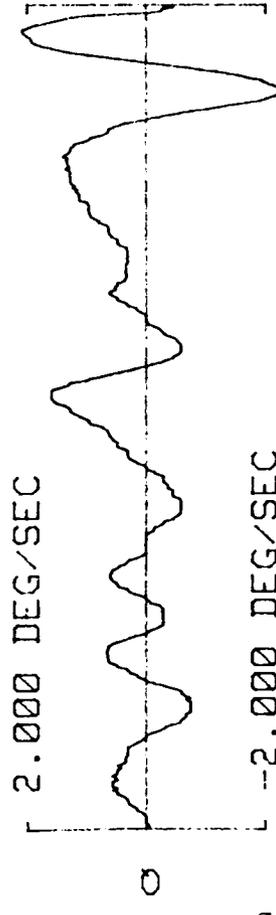
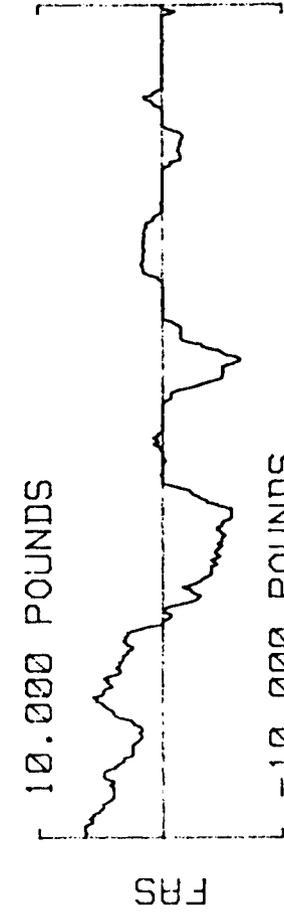
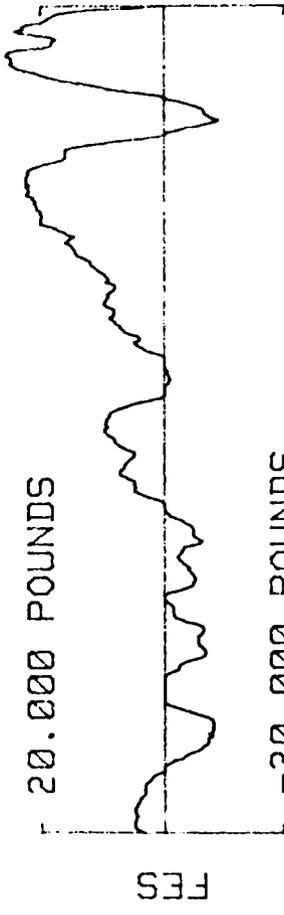
FLT 913 APP 3 CONF 25



FLT 913

APP 4

CON 25



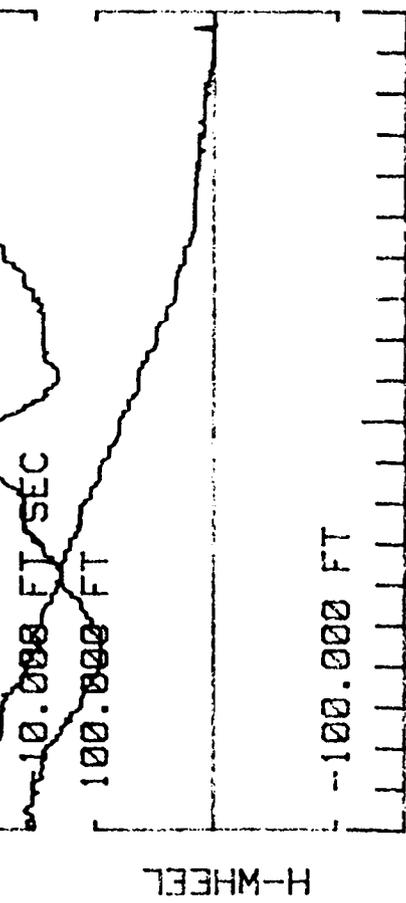
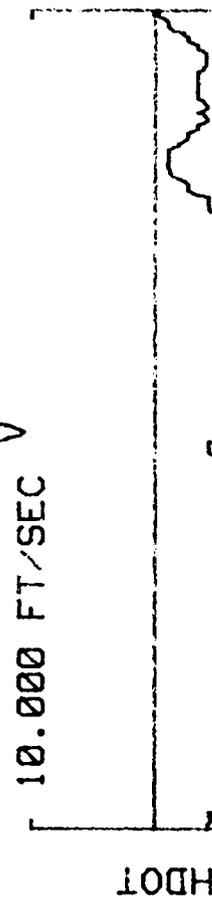
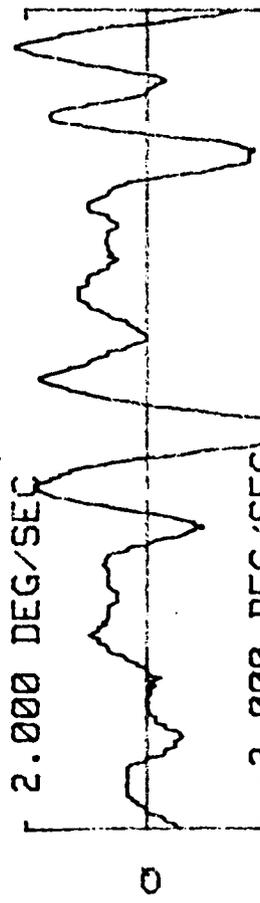
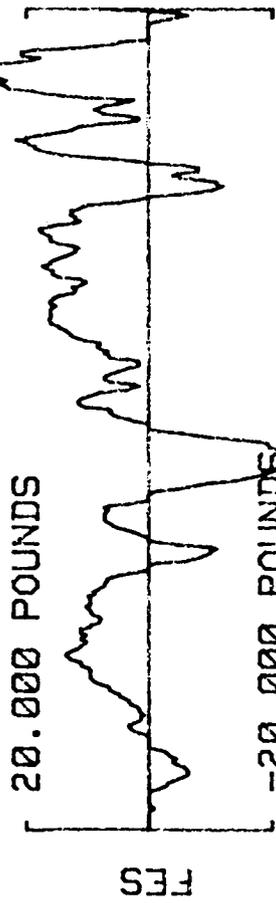
10 20

10 2

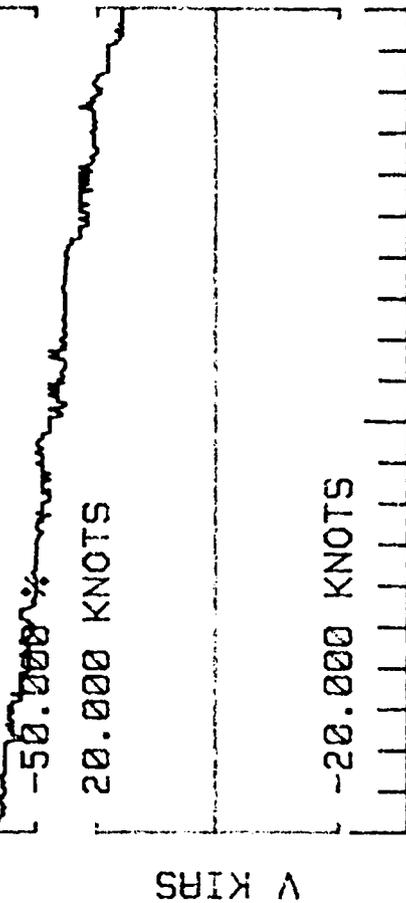
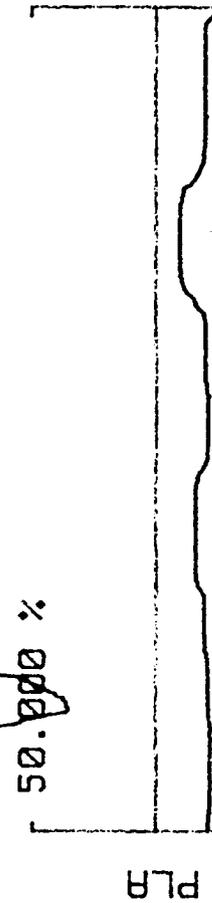
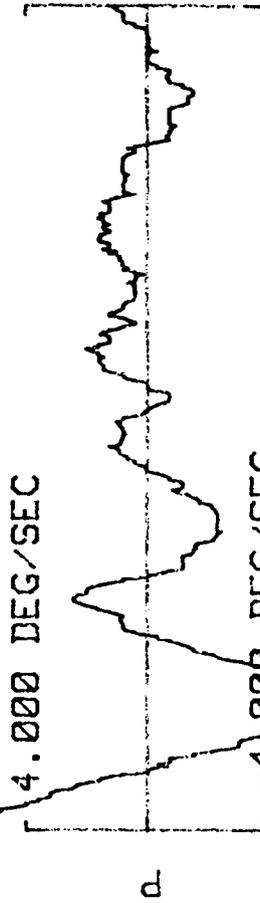
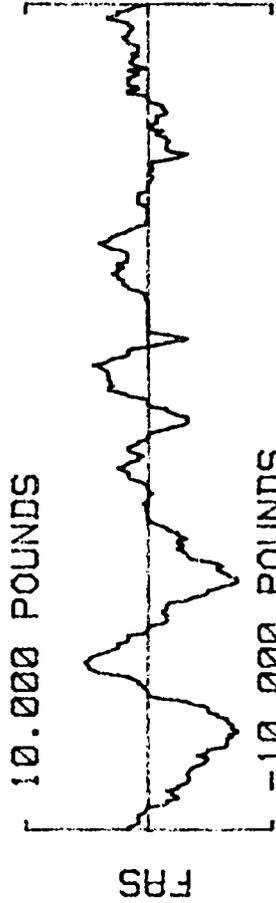
FLT 913

APP 5

CONF 25

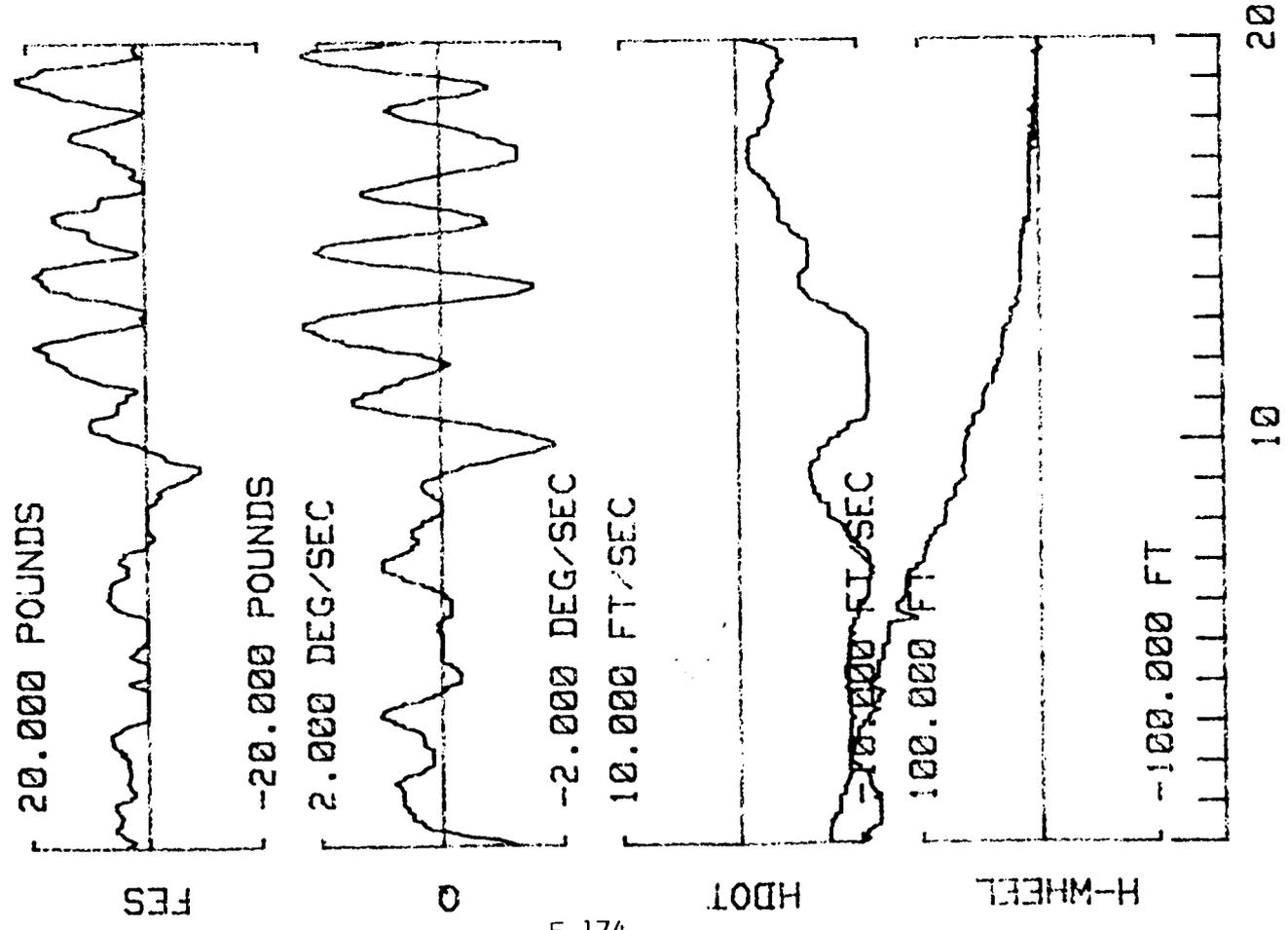
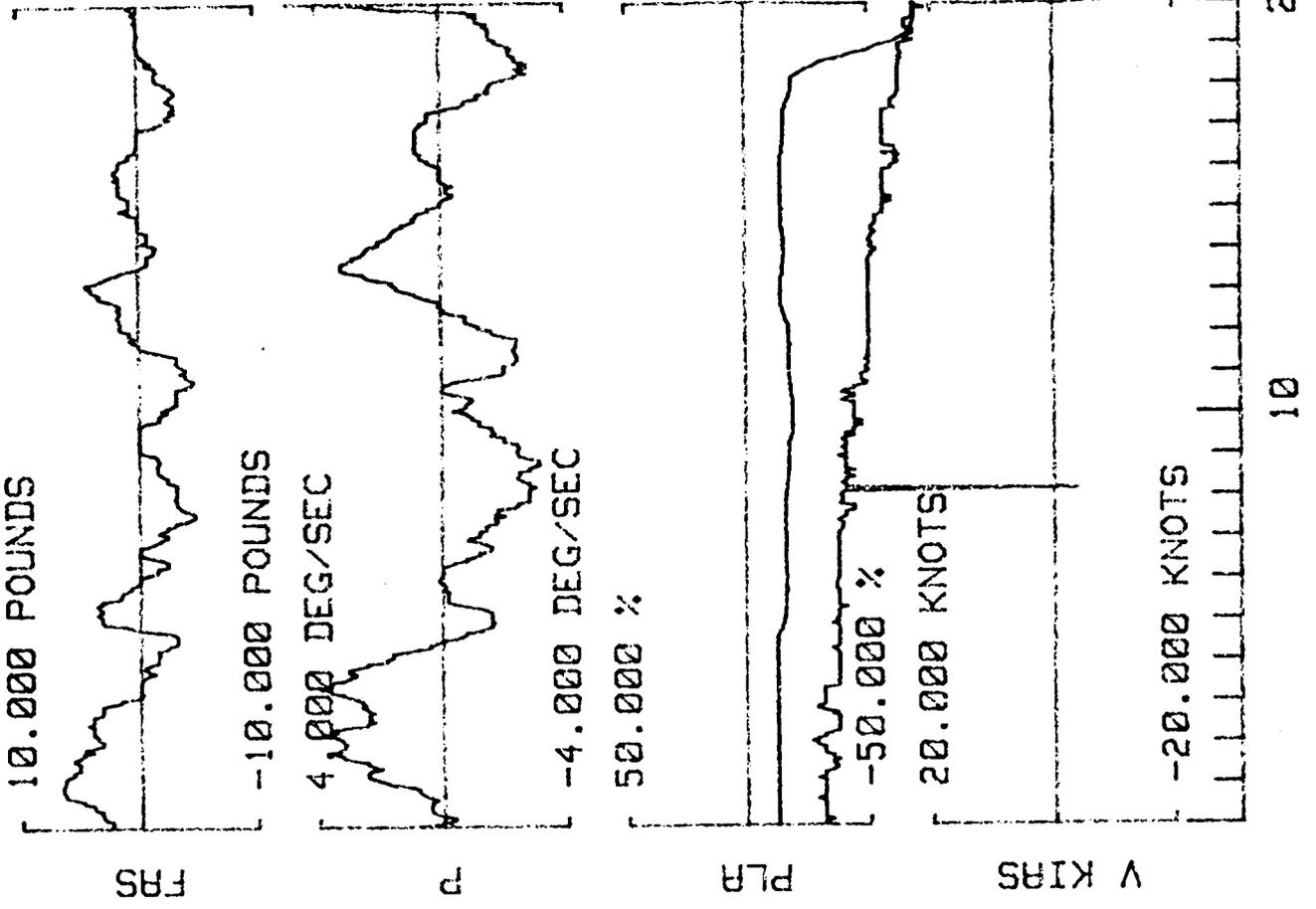


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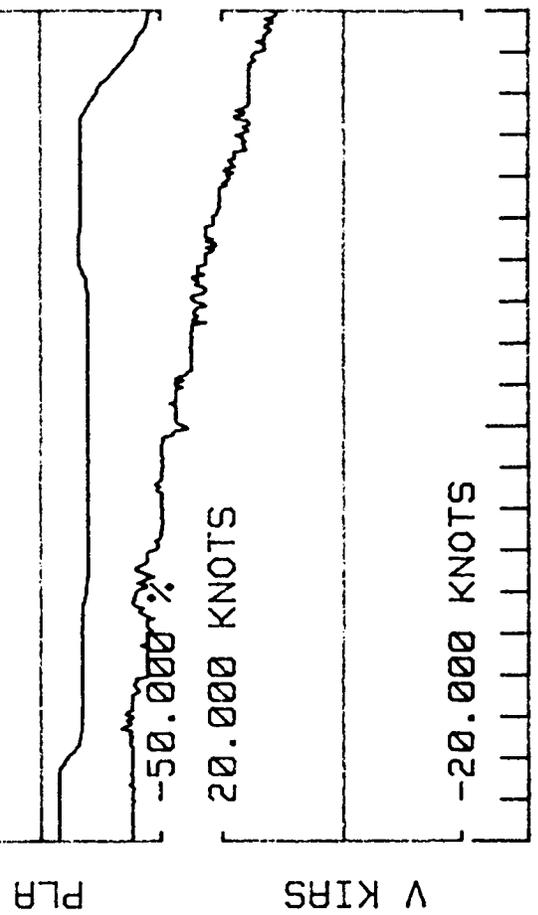
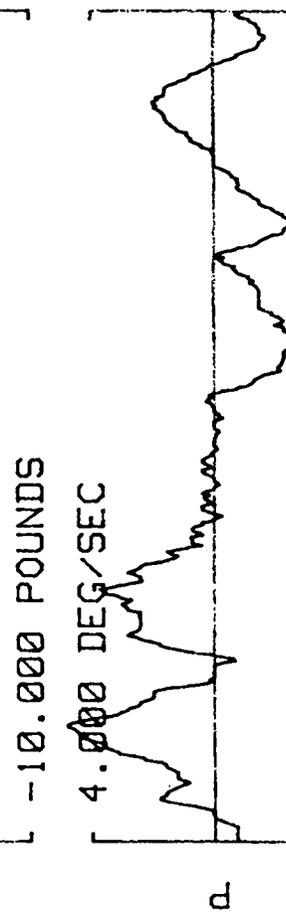
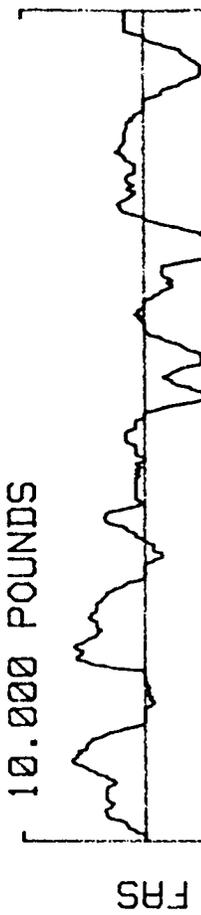
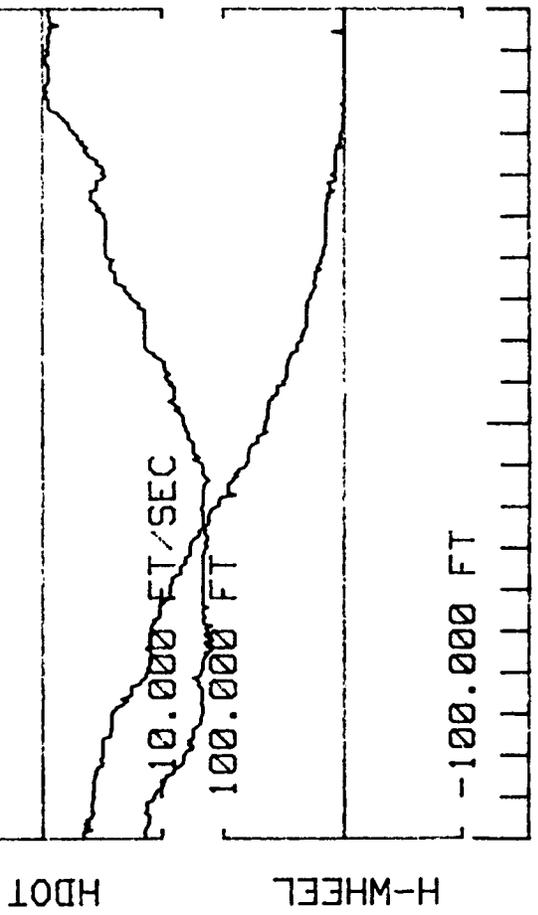
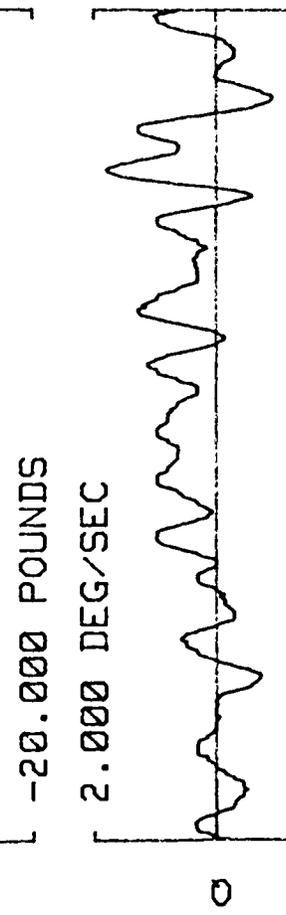
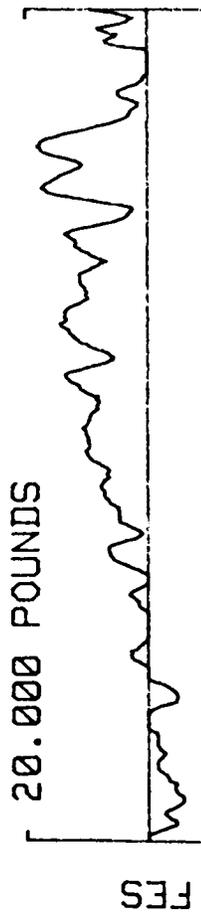
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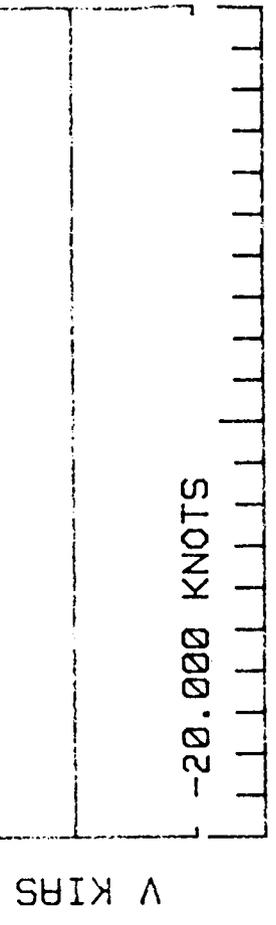
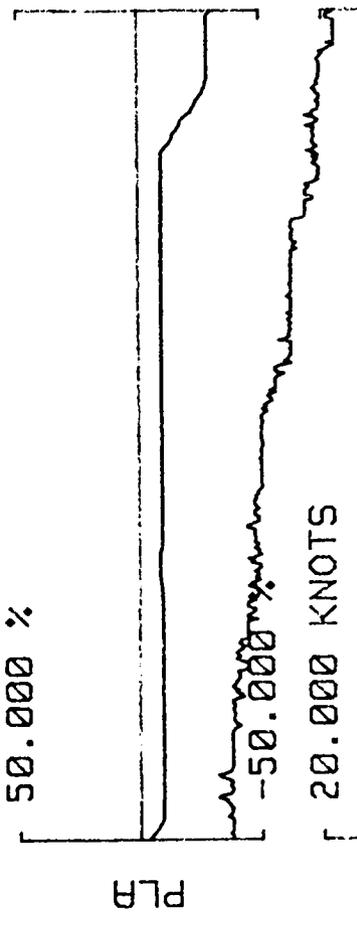
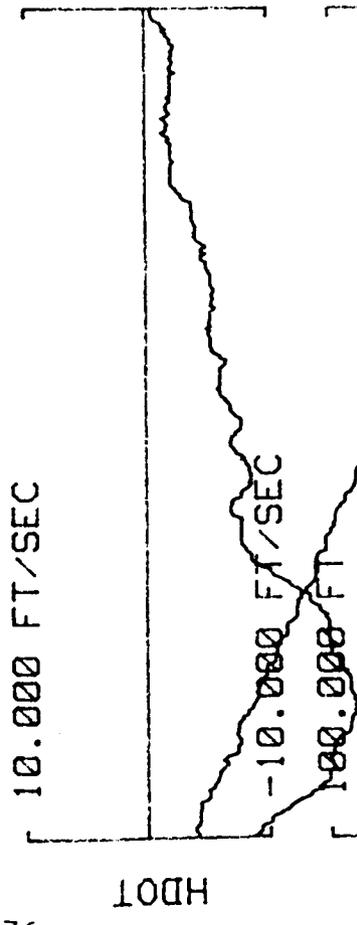
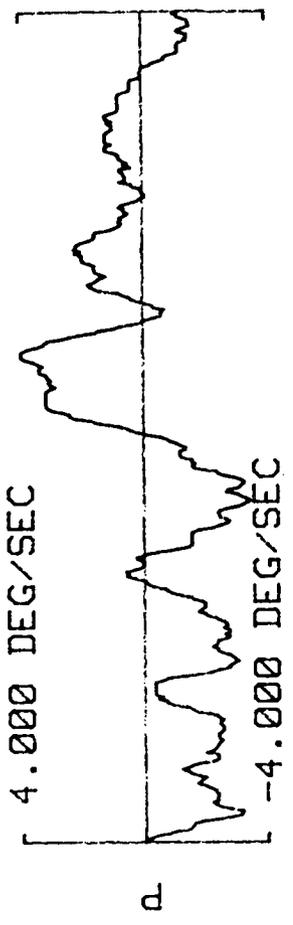
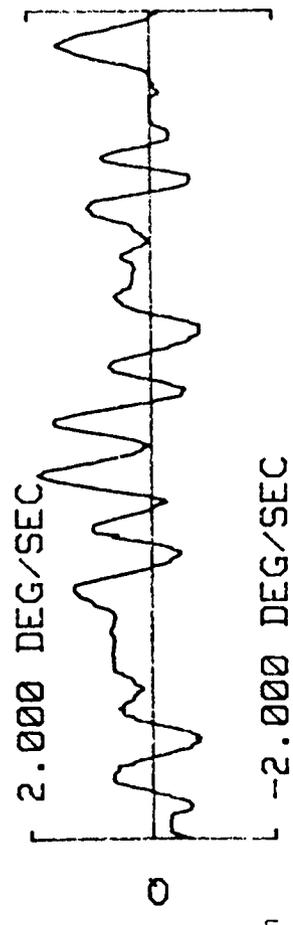
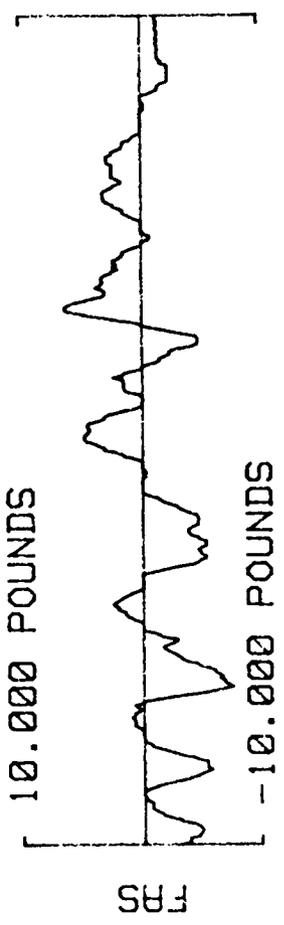
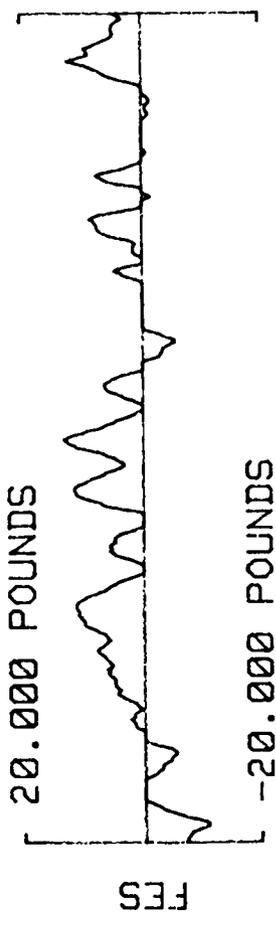
FLT 913 APP 6 CONF 22



FLT 914 APP 1

CONF 17+L/L



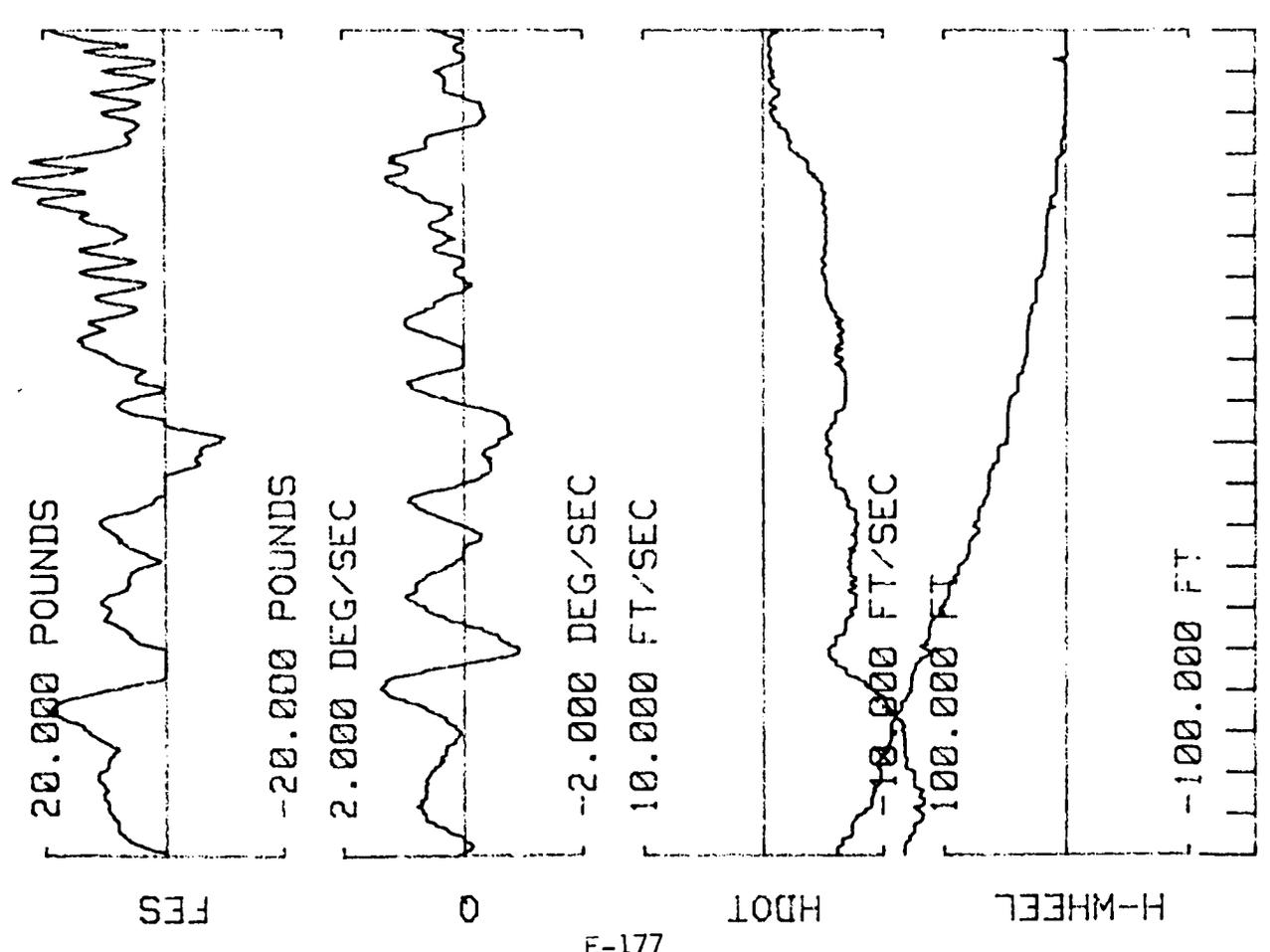
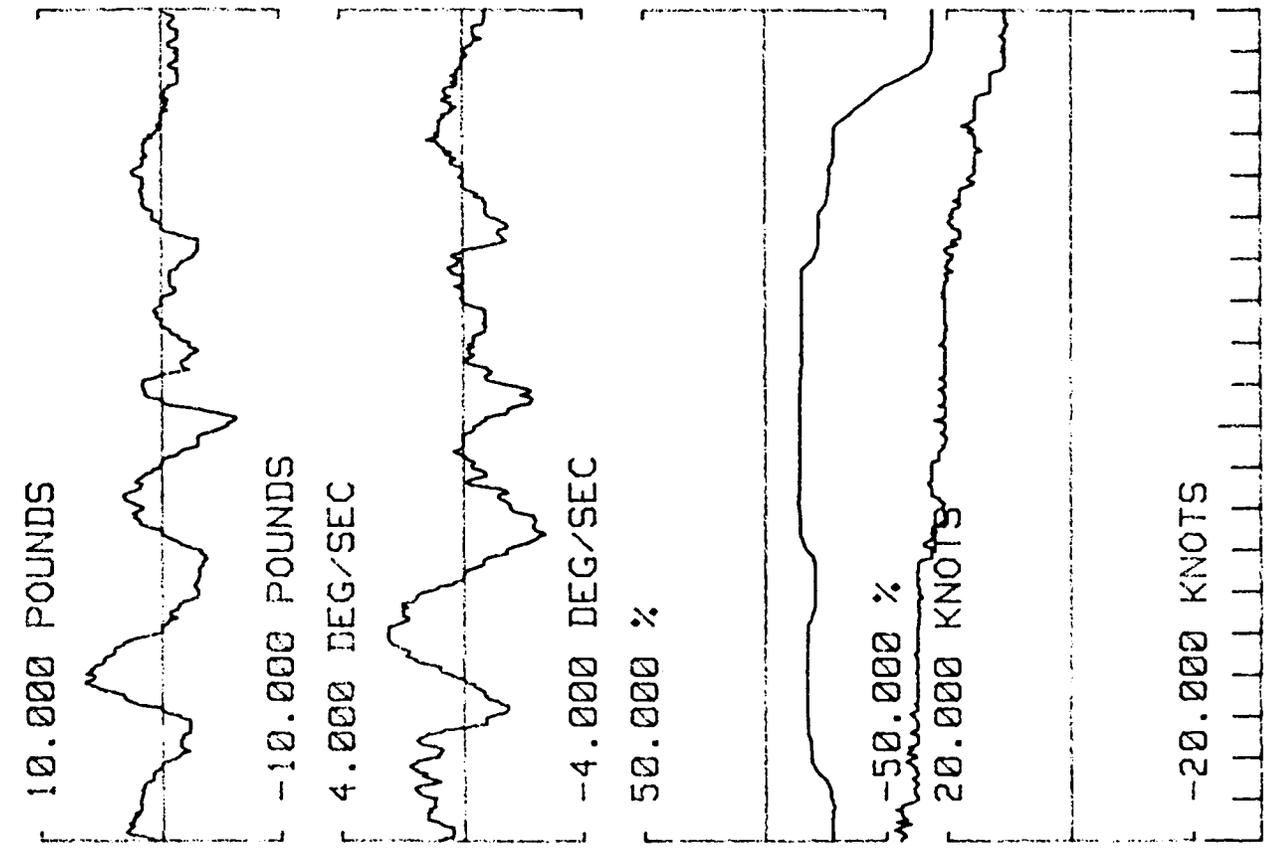


CONF 25A

APP 3

FLT 914

APP 3



471-E

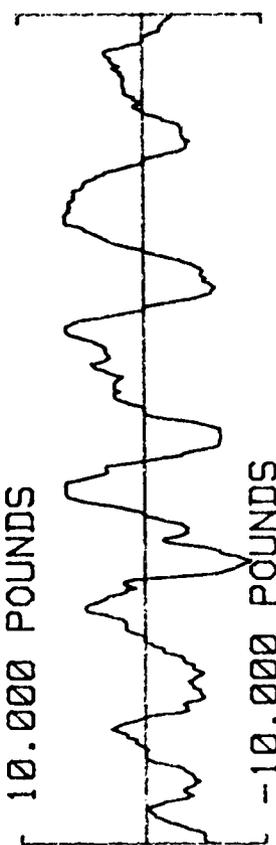
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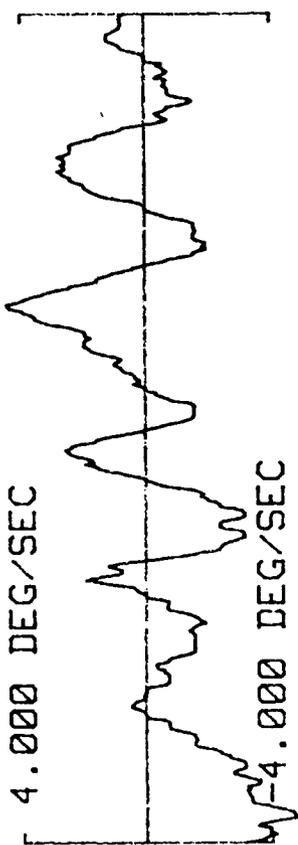
CONF 25A

APP 4

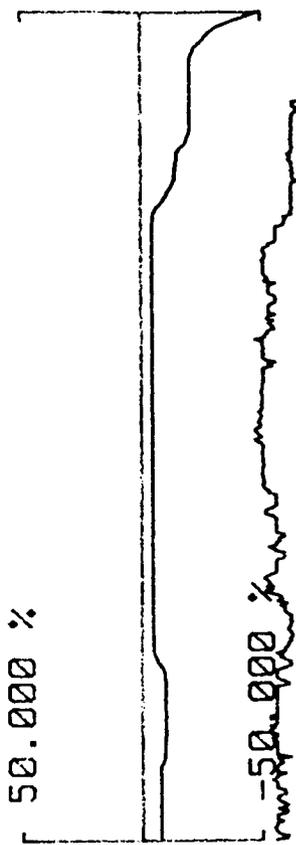
FLT 914



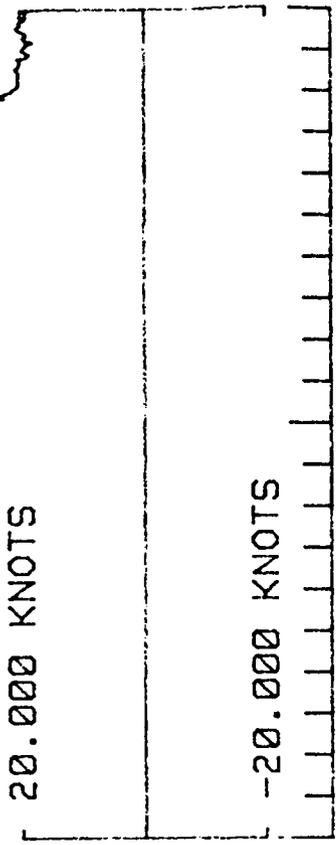
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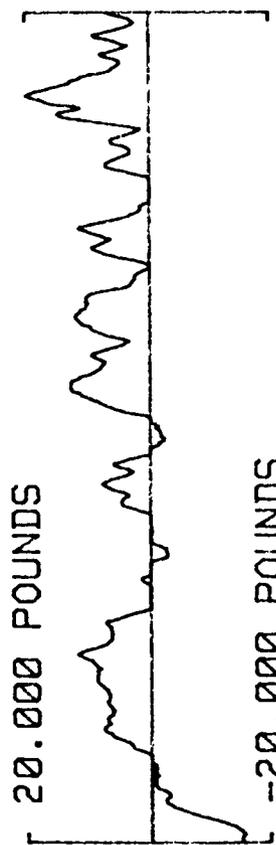
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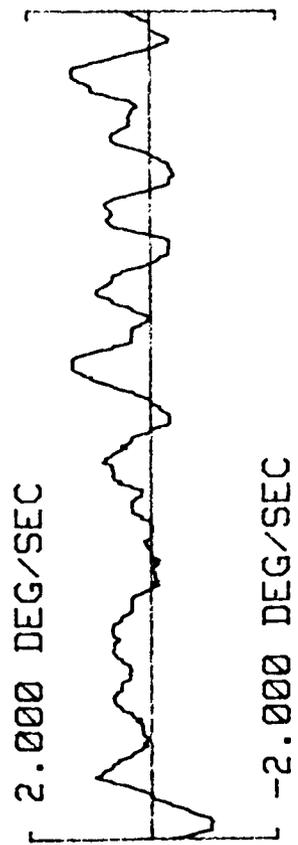
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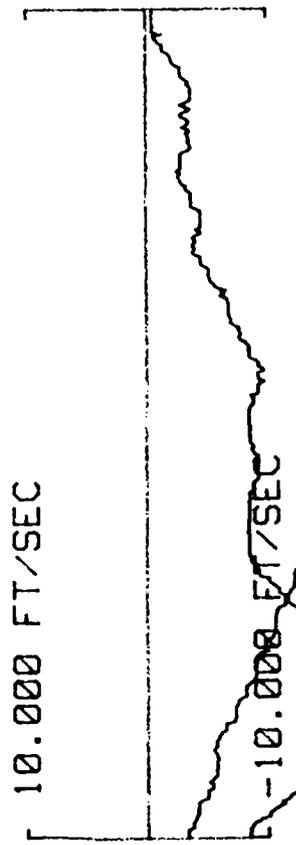
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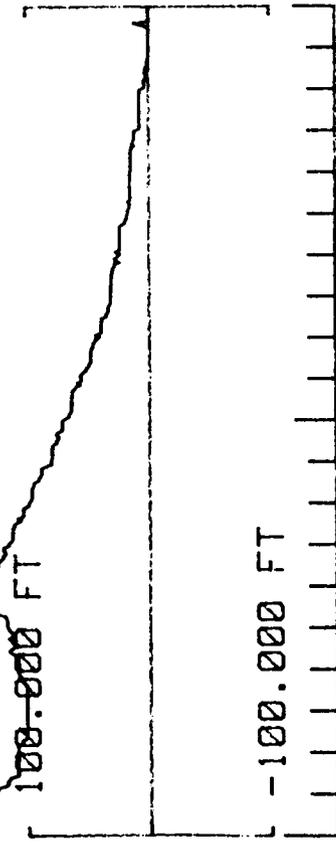
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Q



HDOT



H-WHEEL

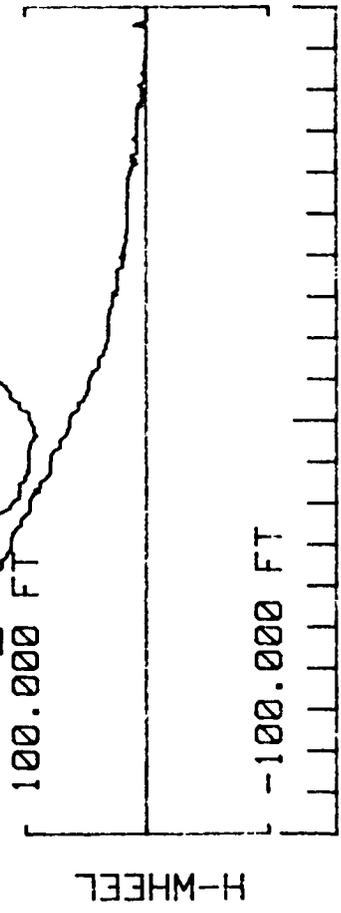
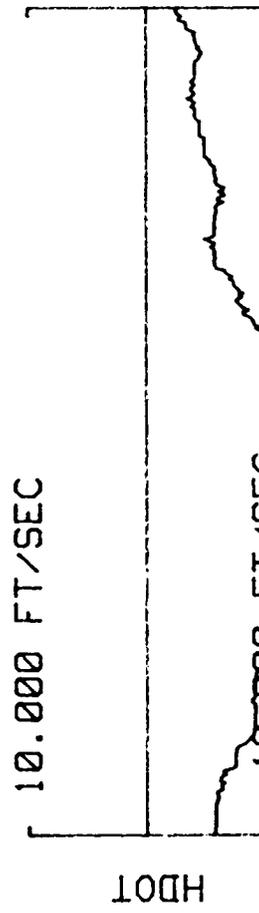
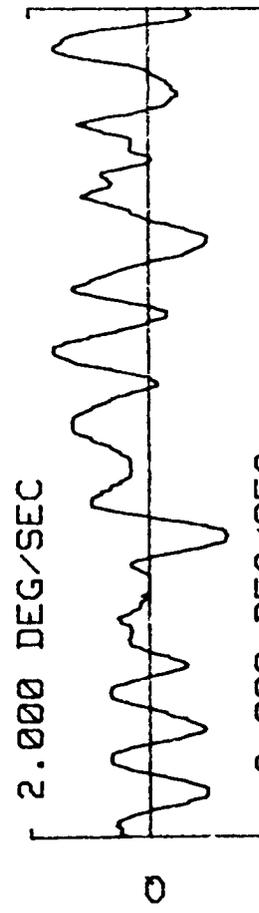
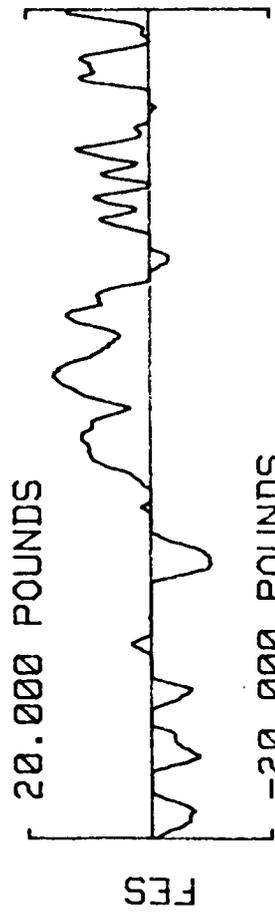
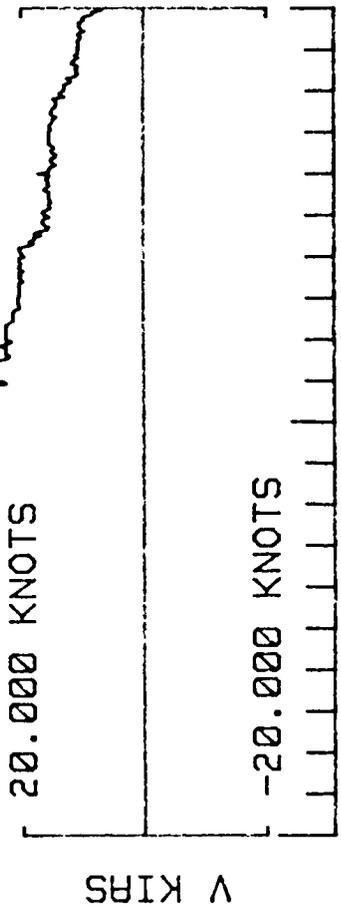
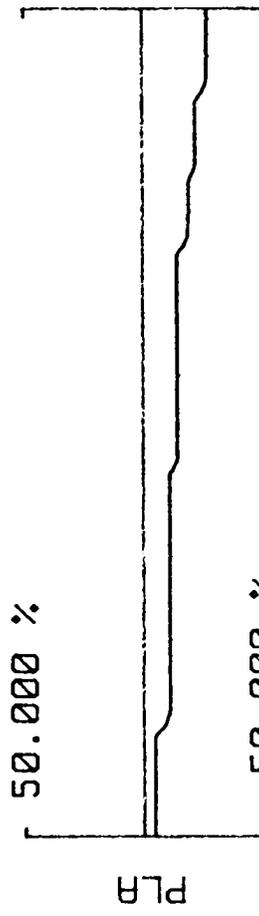
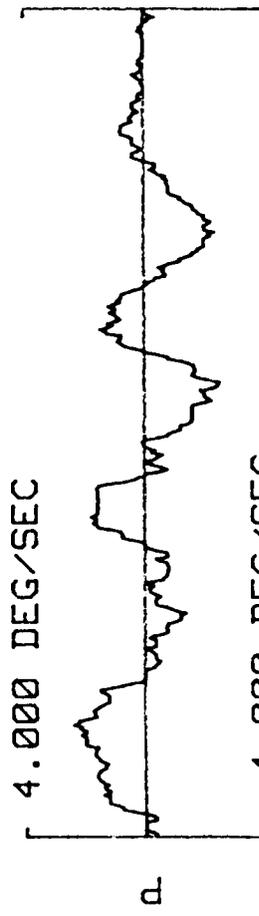
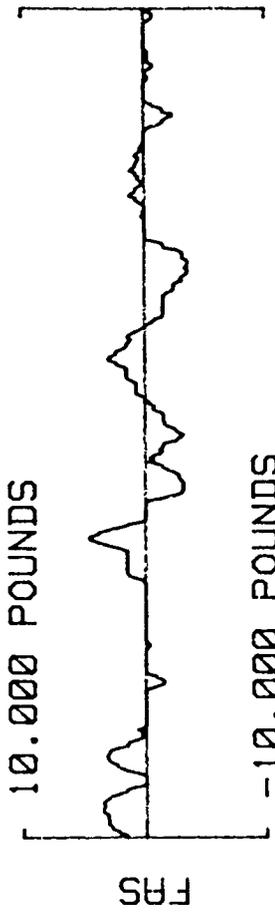
10 2

10 20

CONF 22A

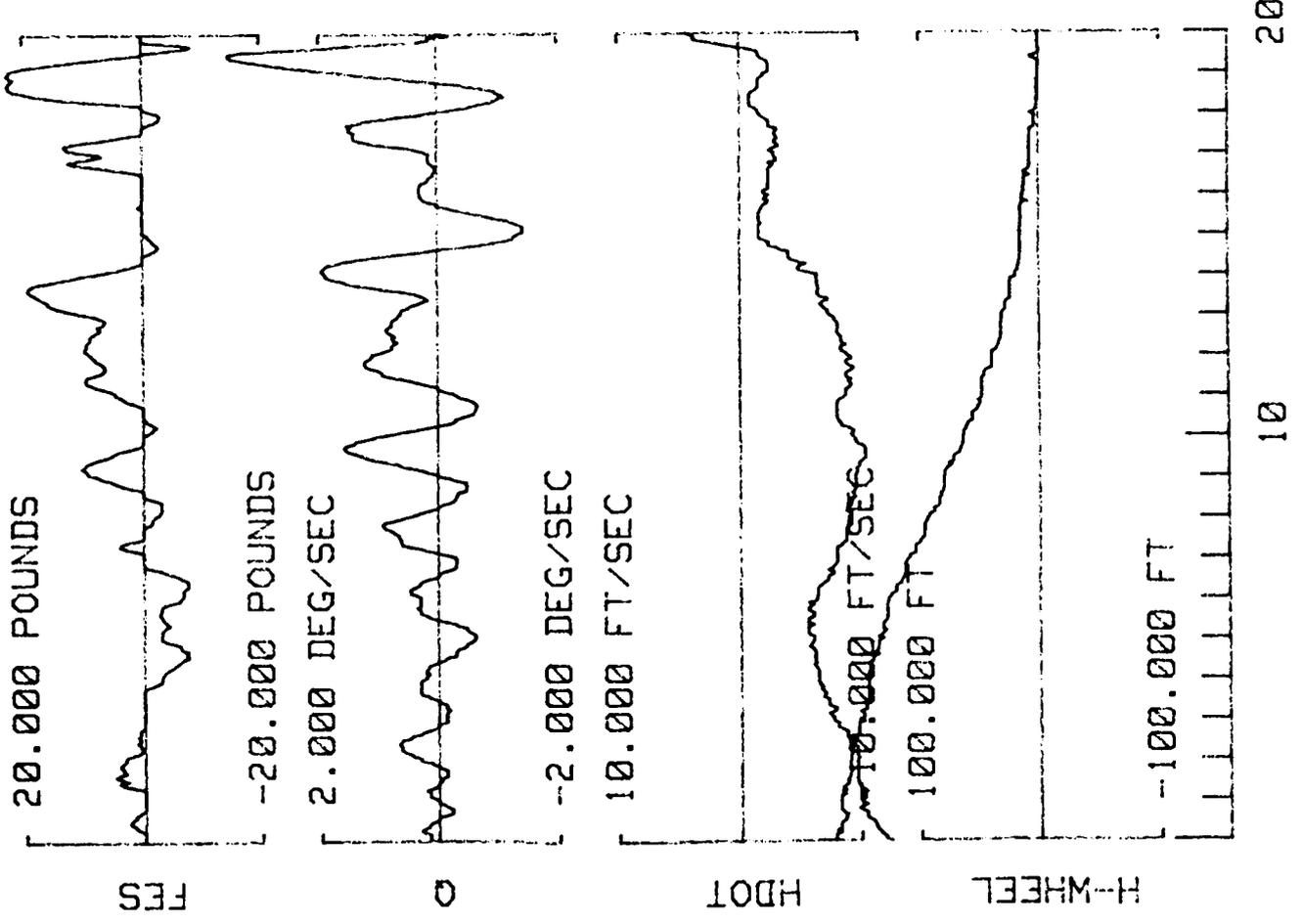
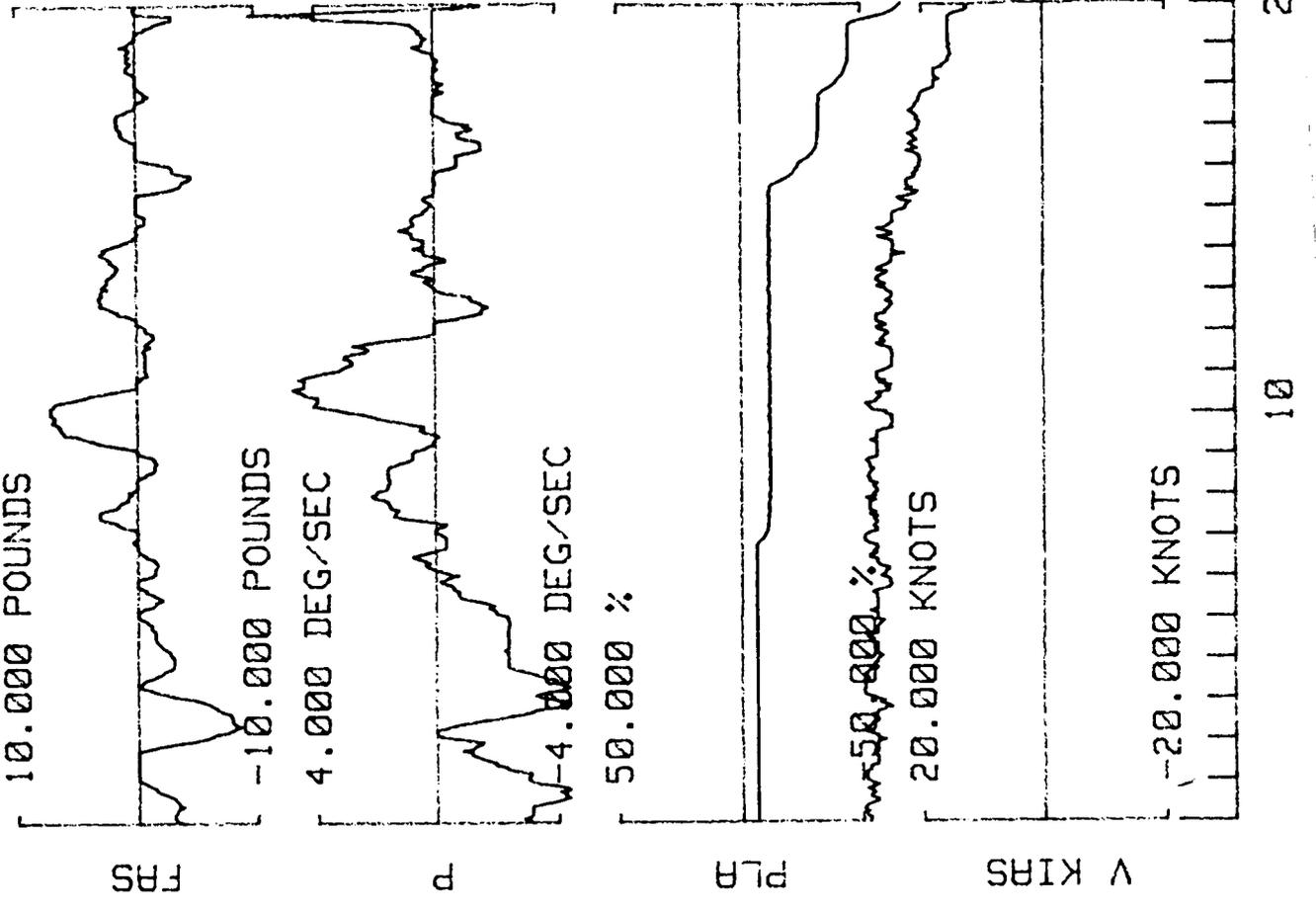
APP 5

FLT 914



20 10 2

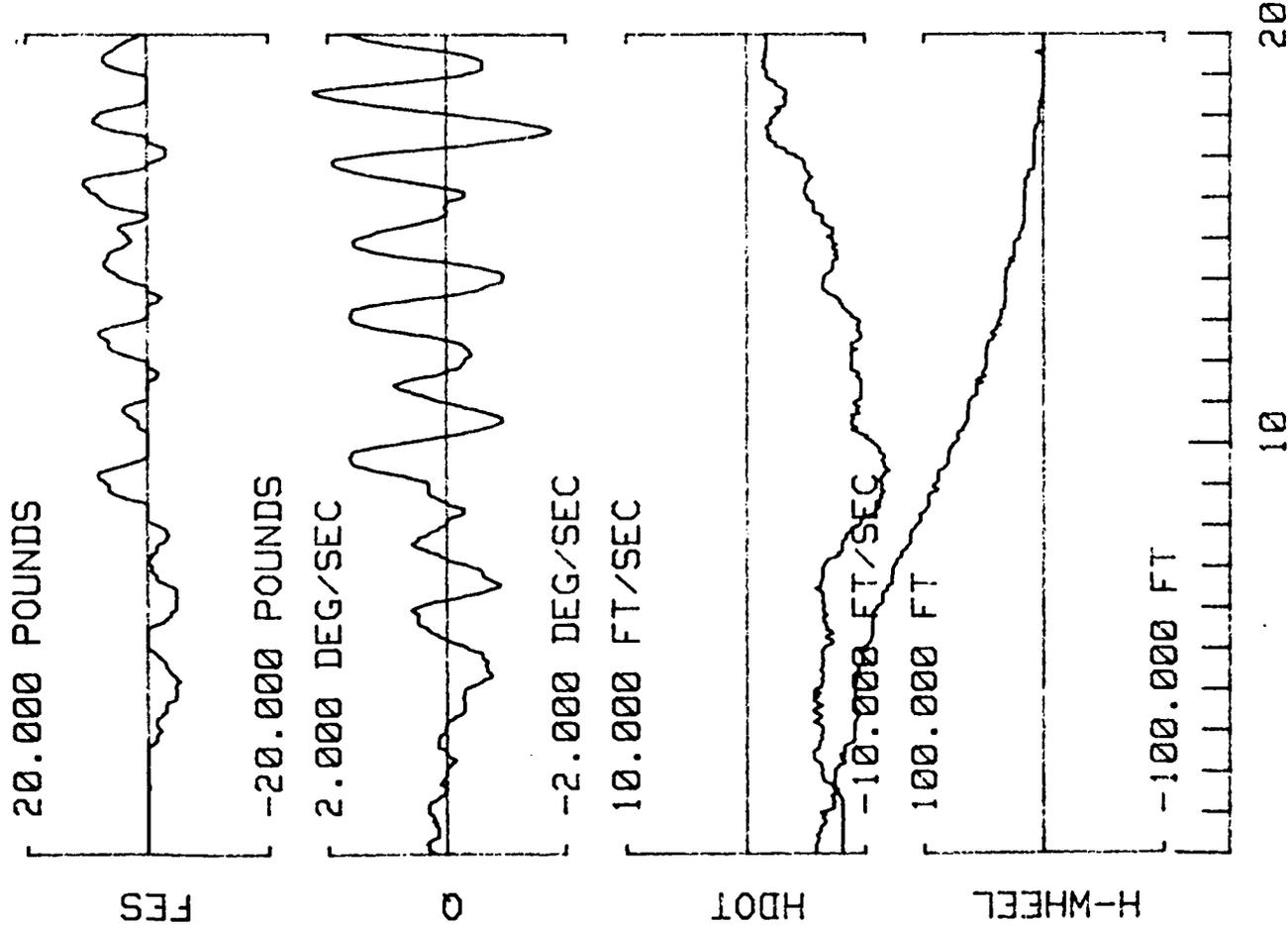
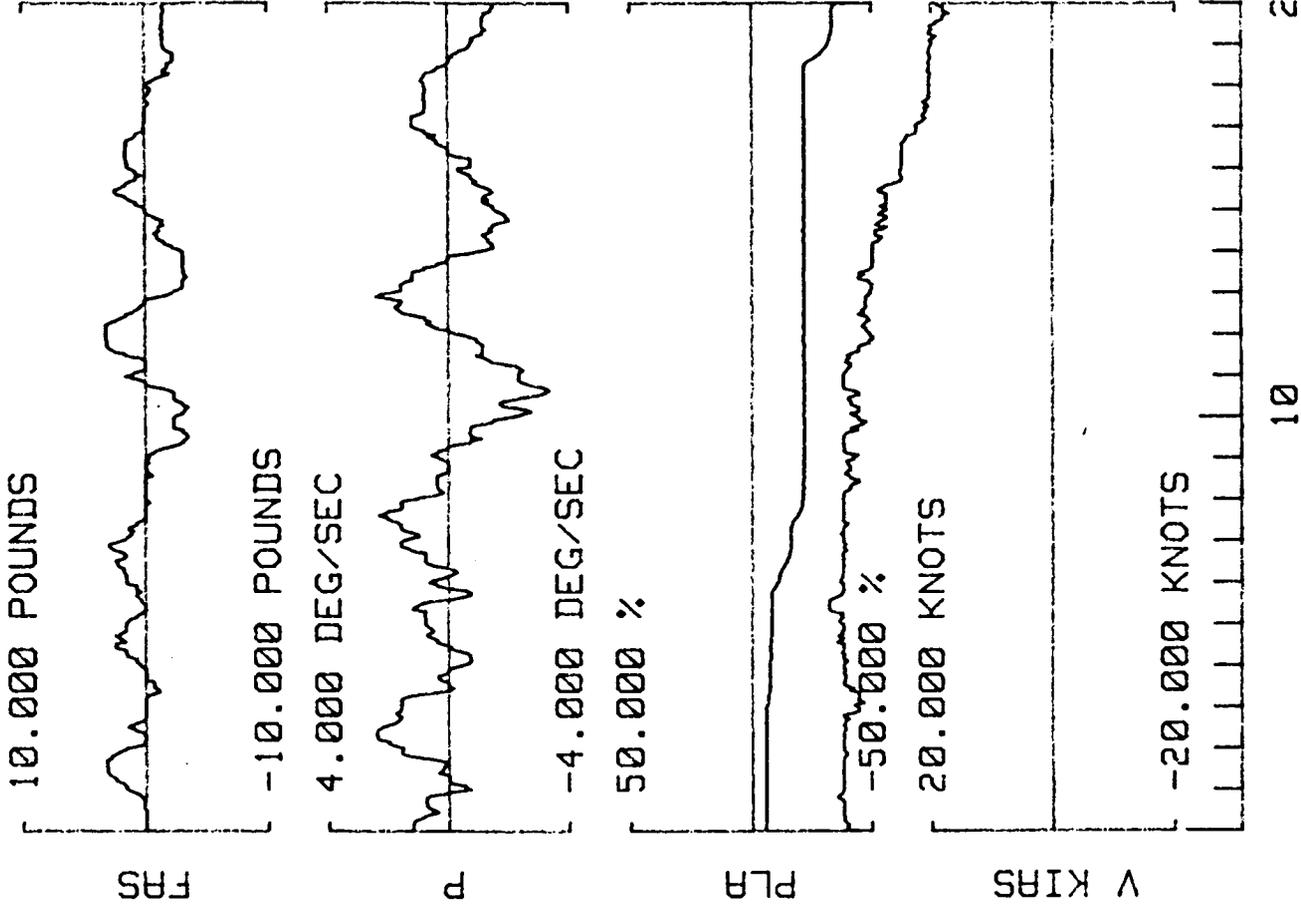
FLT 914 APP 6 CONF 22A



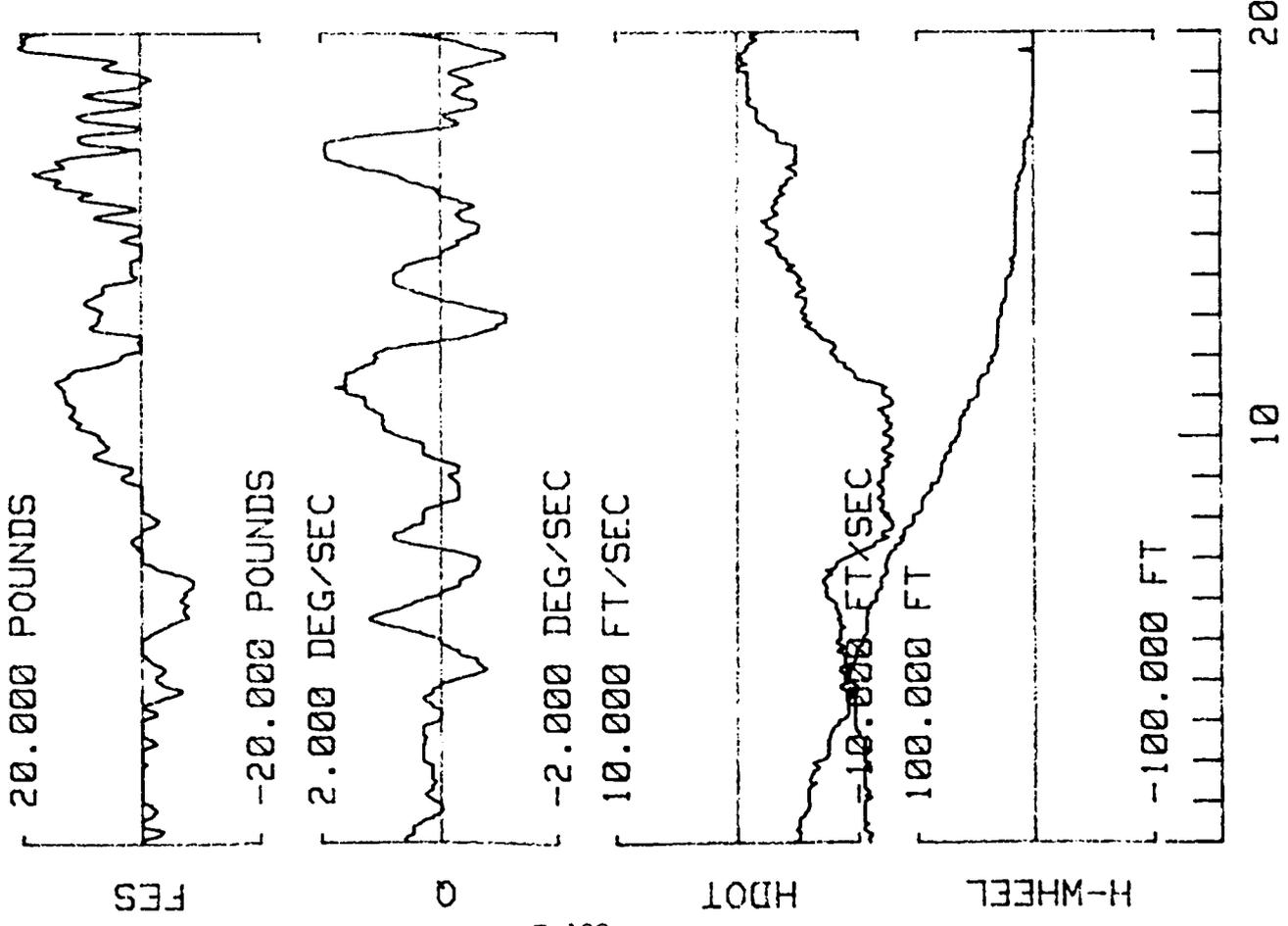
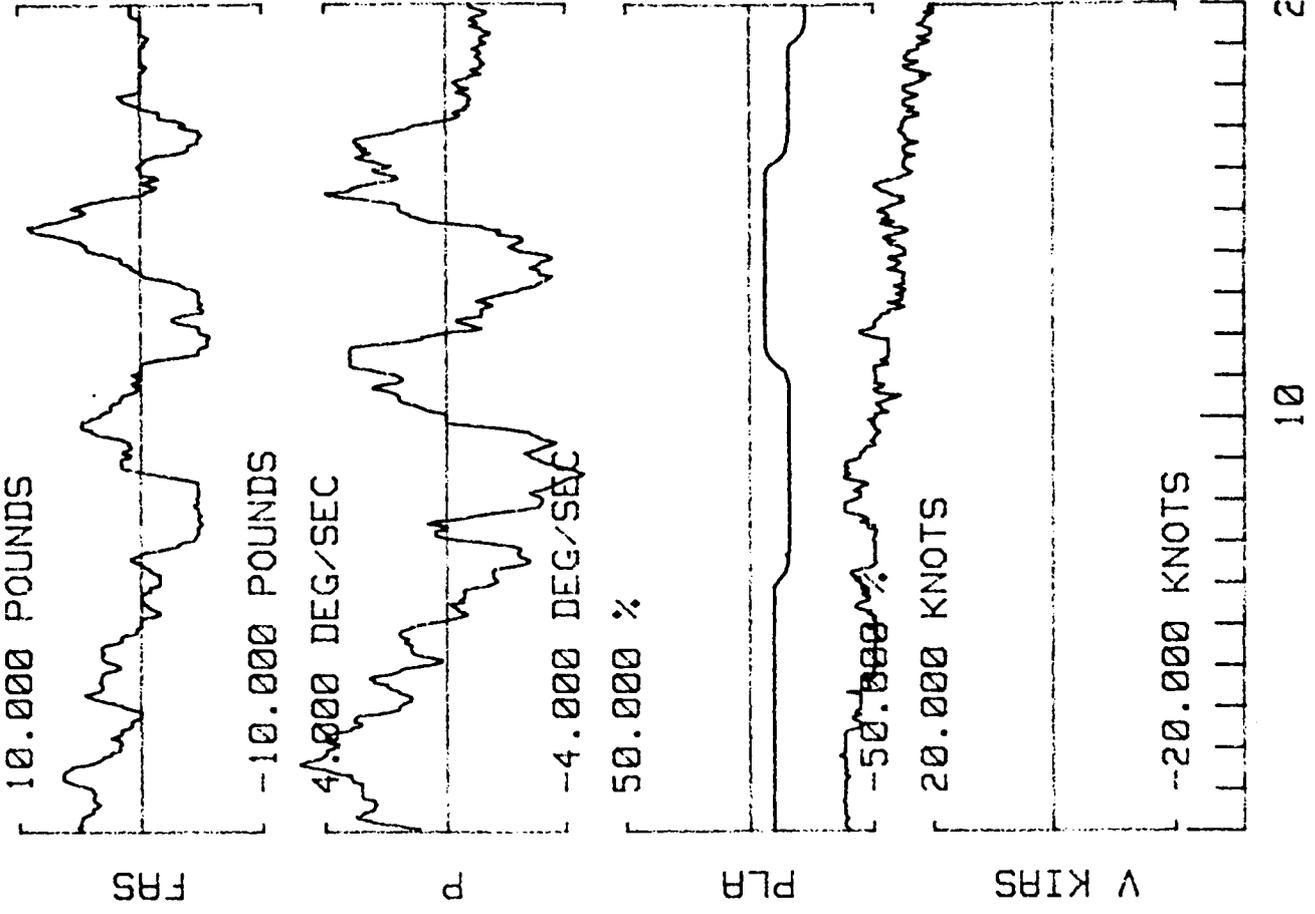
CONF 28A

APP 7

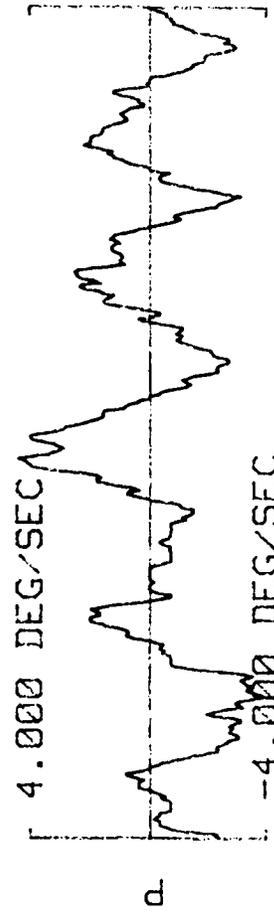
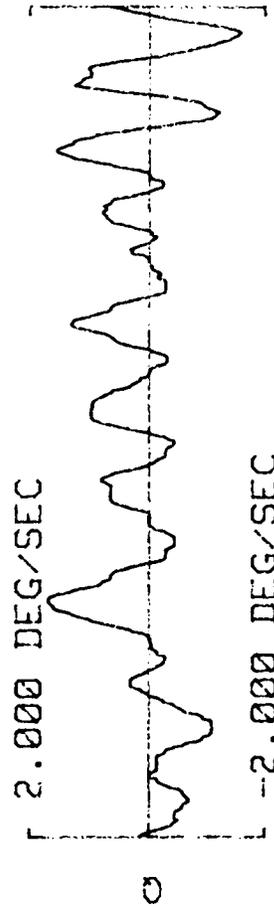
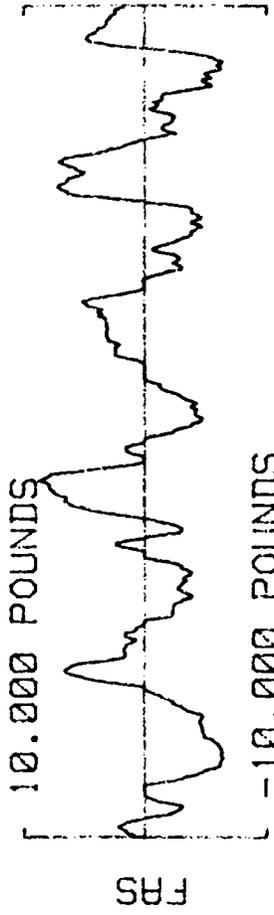
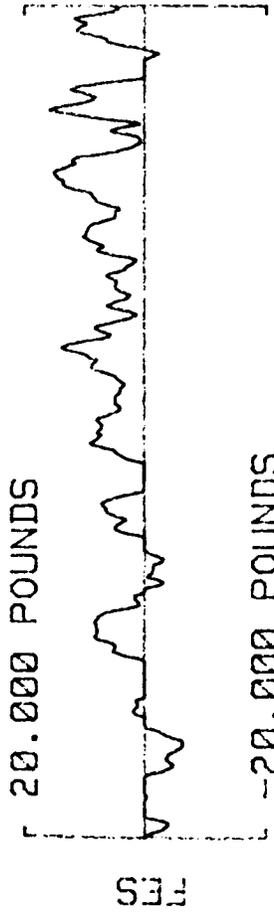
FLT 914



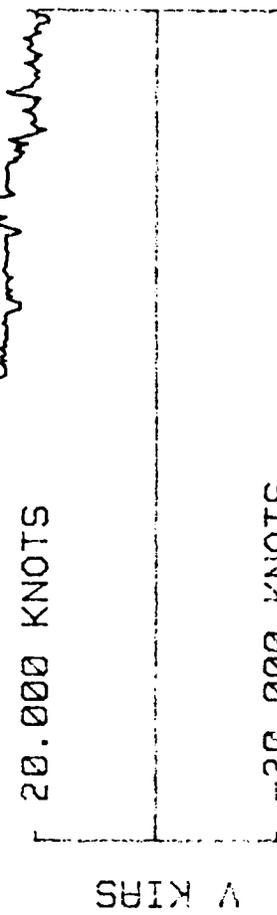
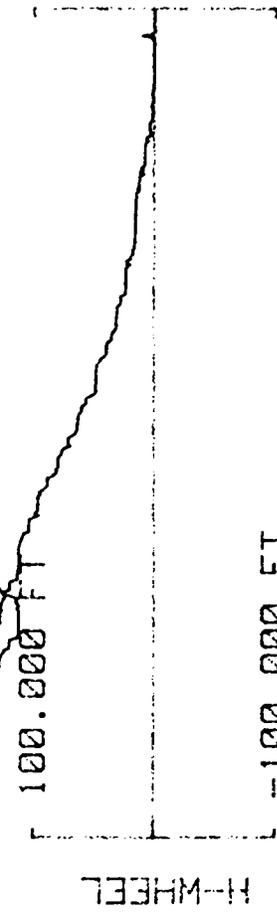
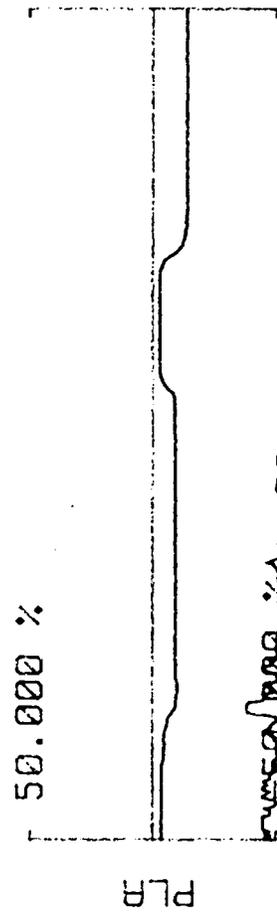
FLT 915 APP 1 CONF 22



FLT 915 APP 2 CONF 22



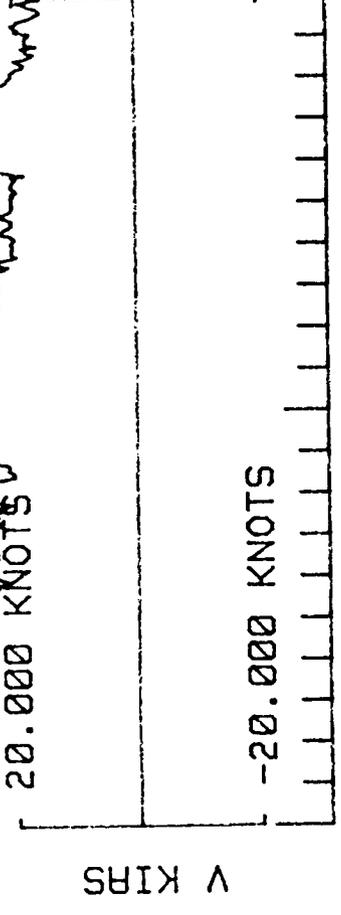
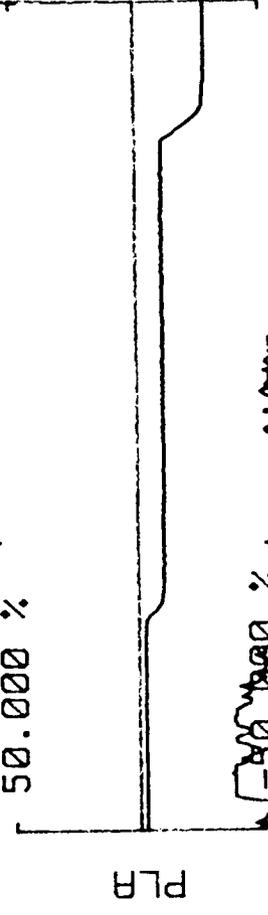
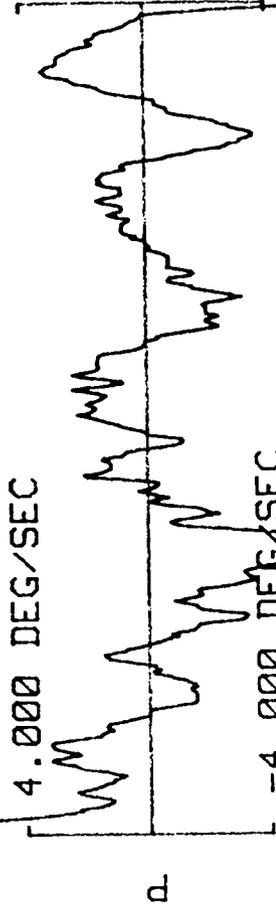
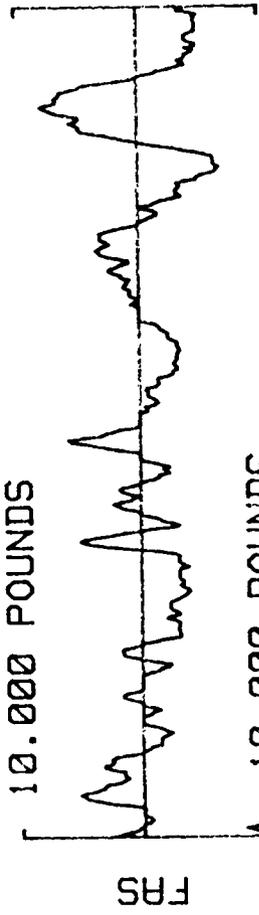
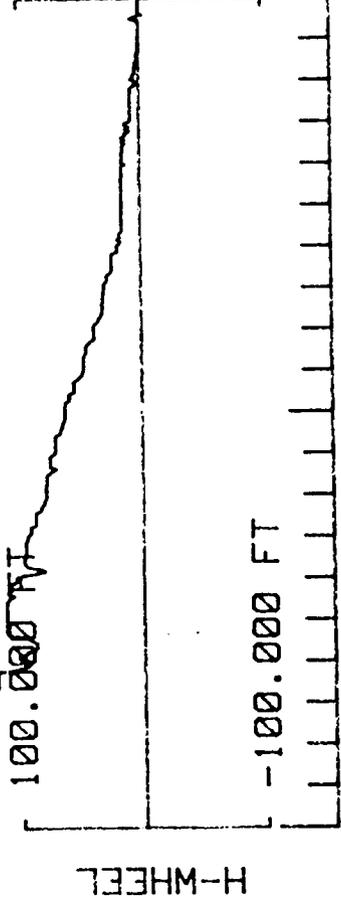
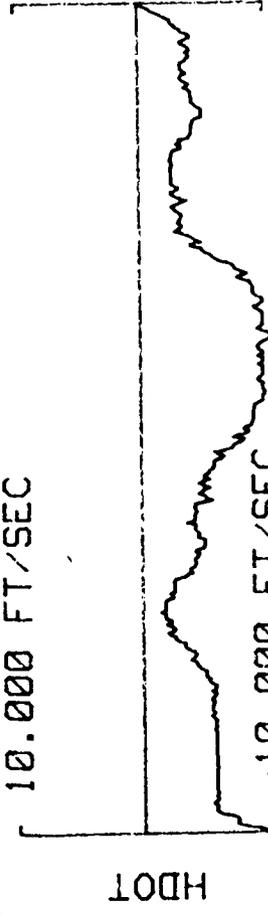
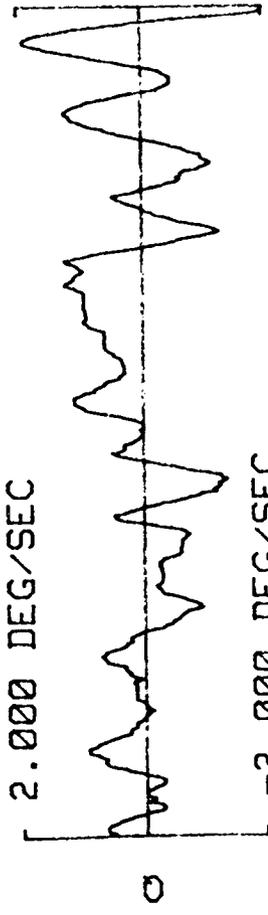
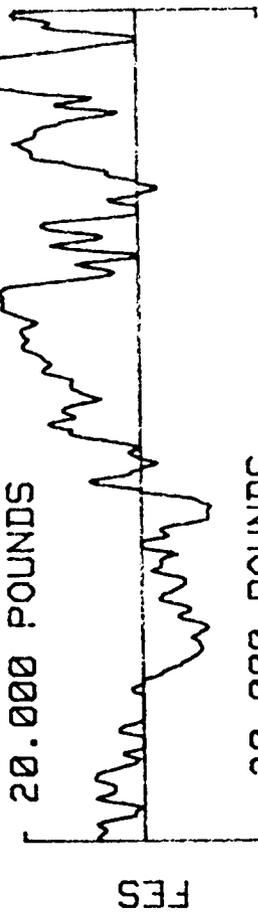
81-E



FLT 915

APP 3

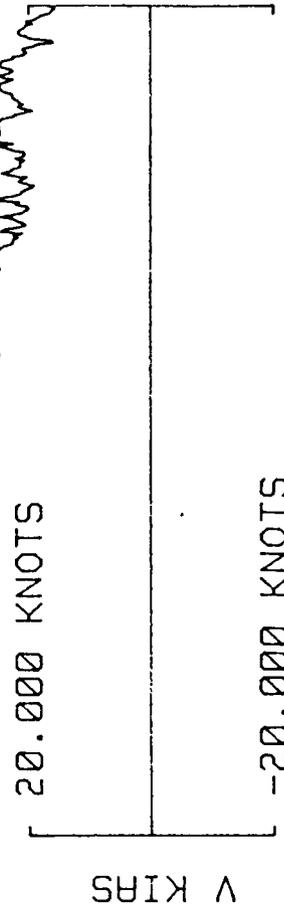
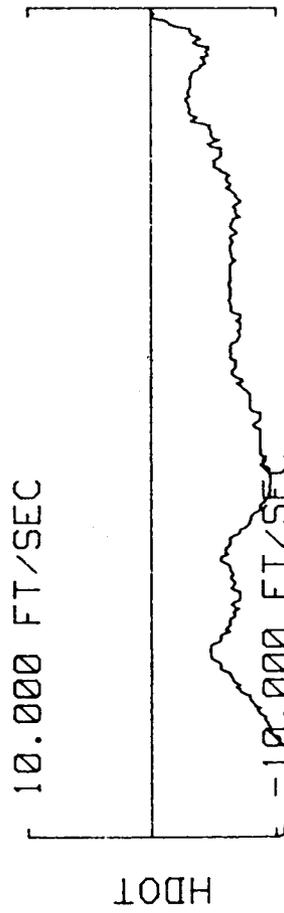
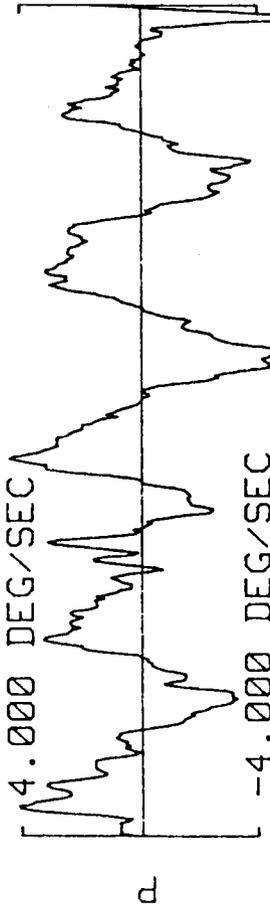
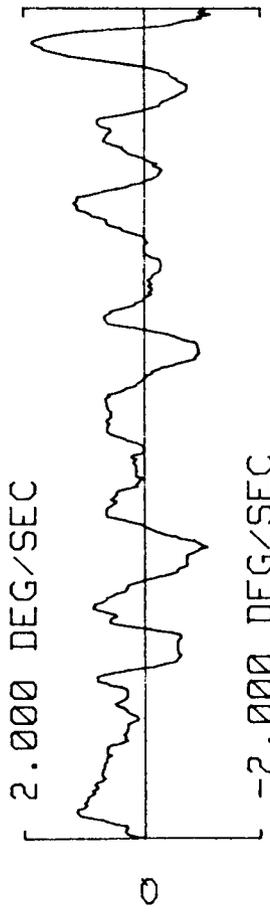
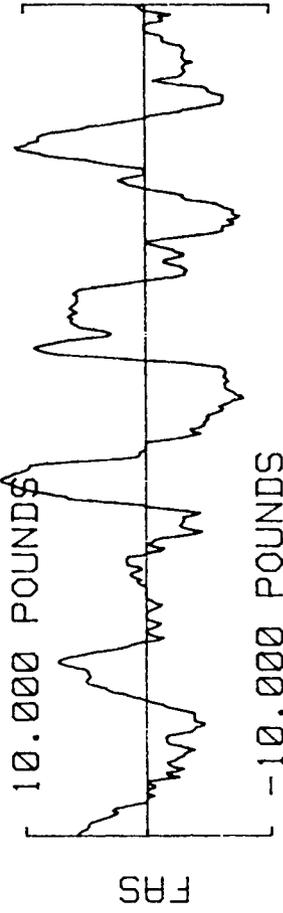
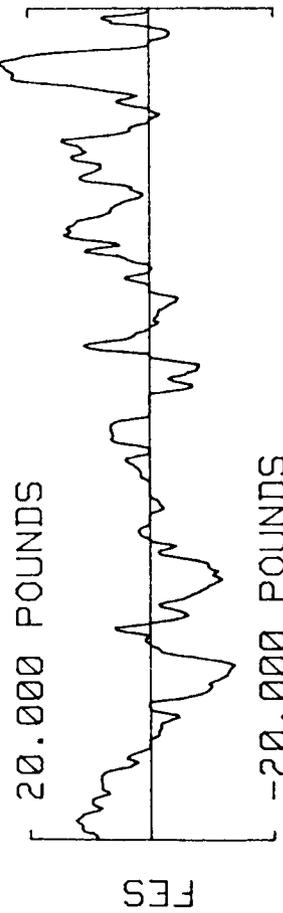
CONF 25



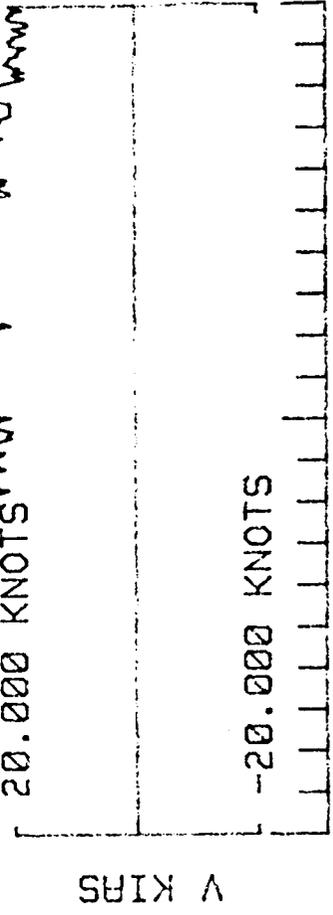
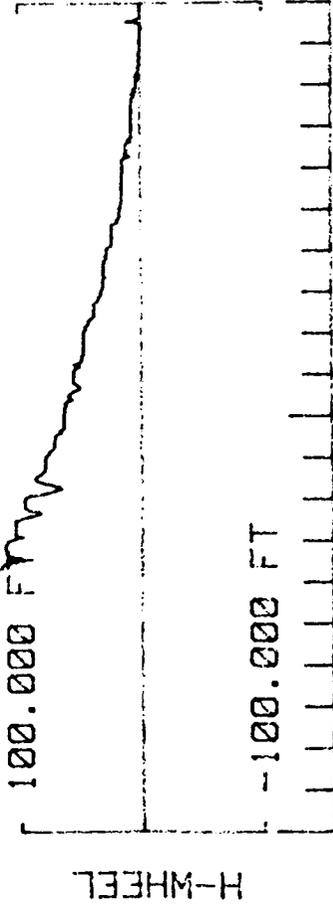
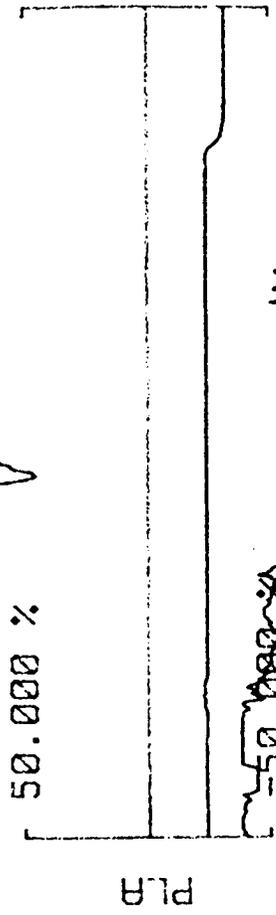
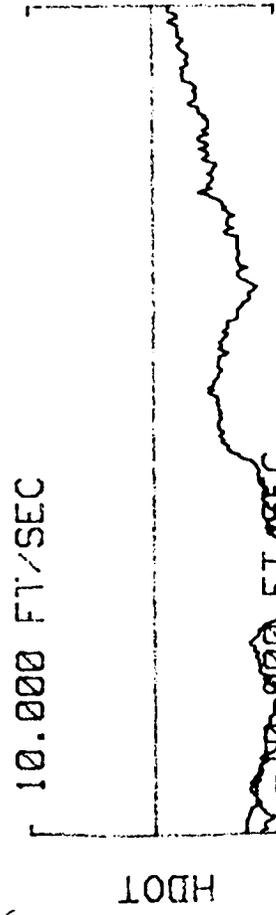
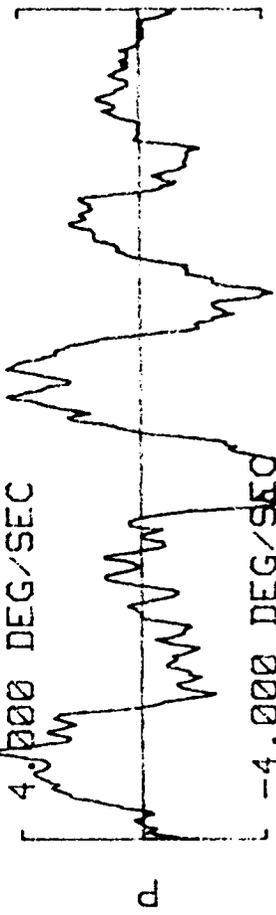
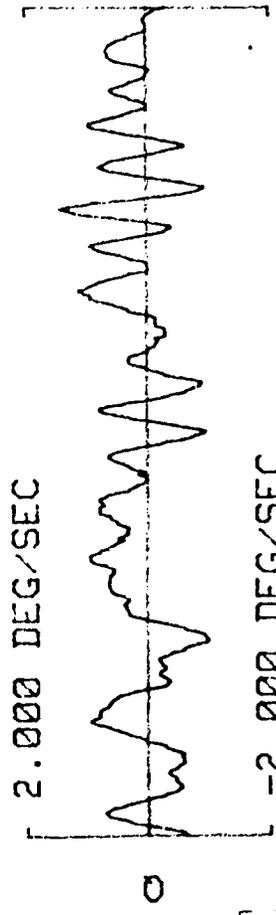
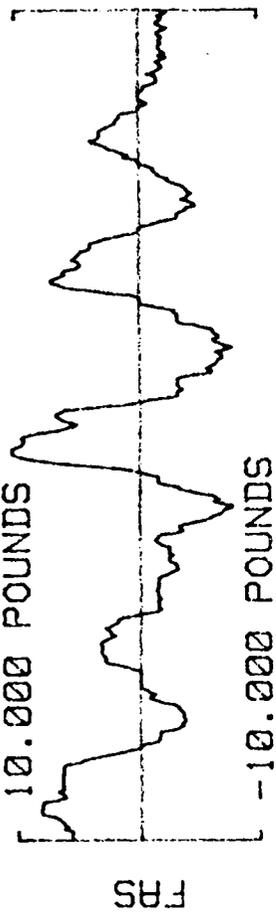
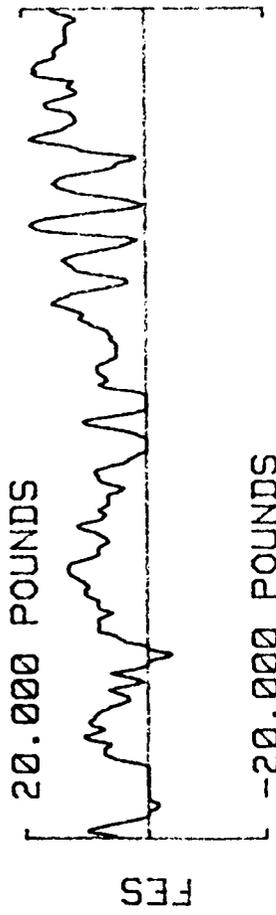
5-1

FLT 915 APP 4

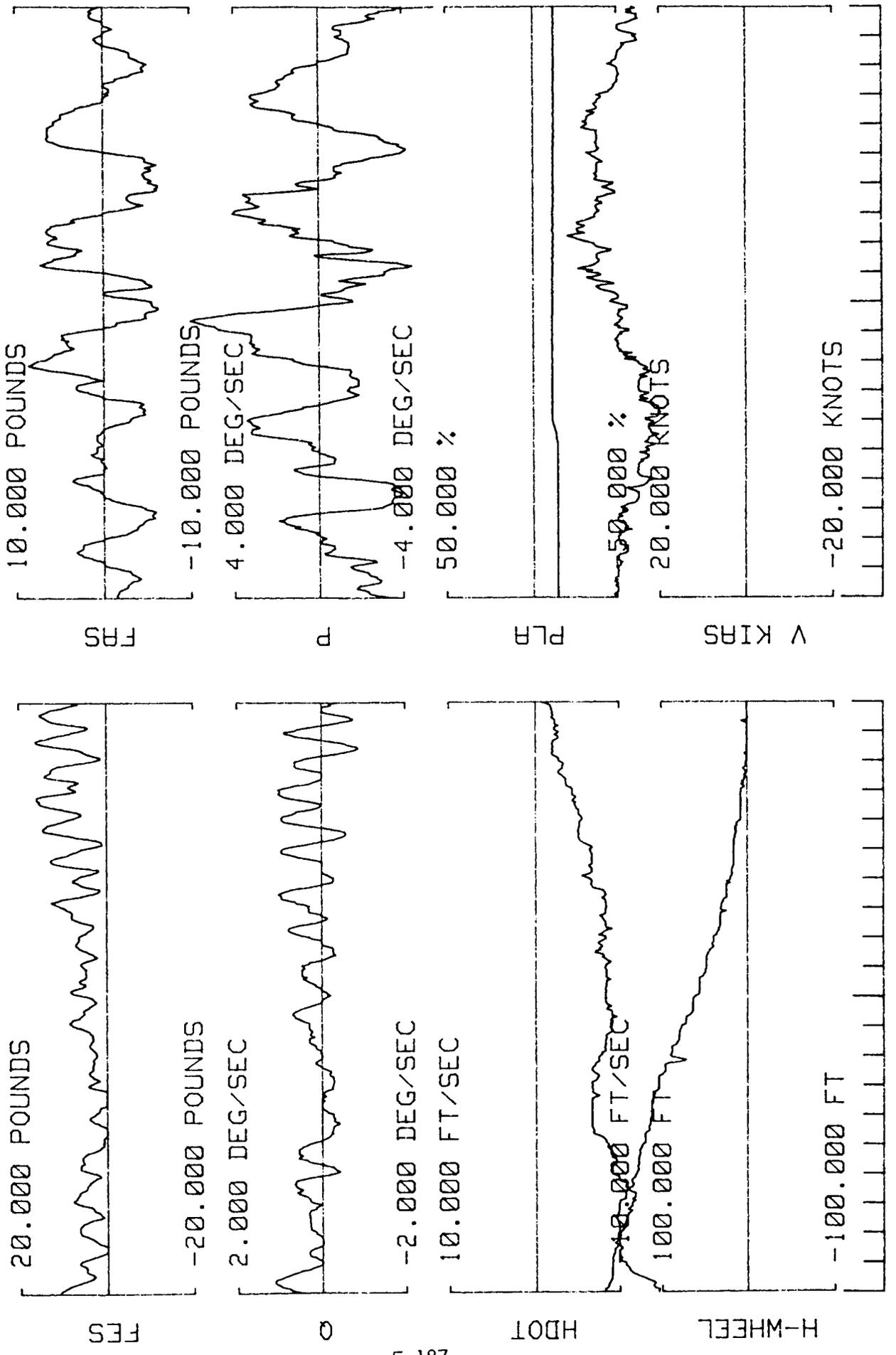
CONF 25



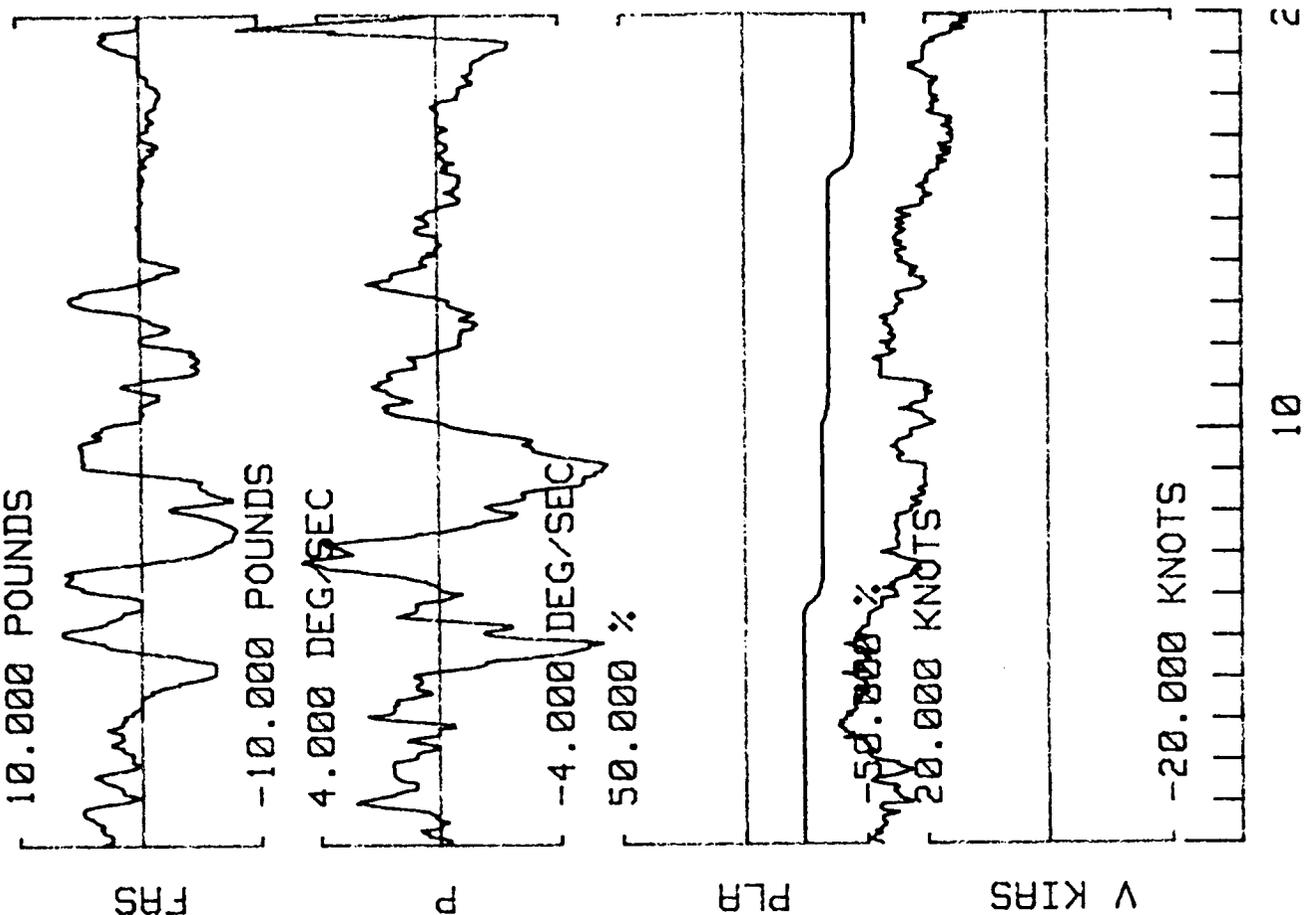
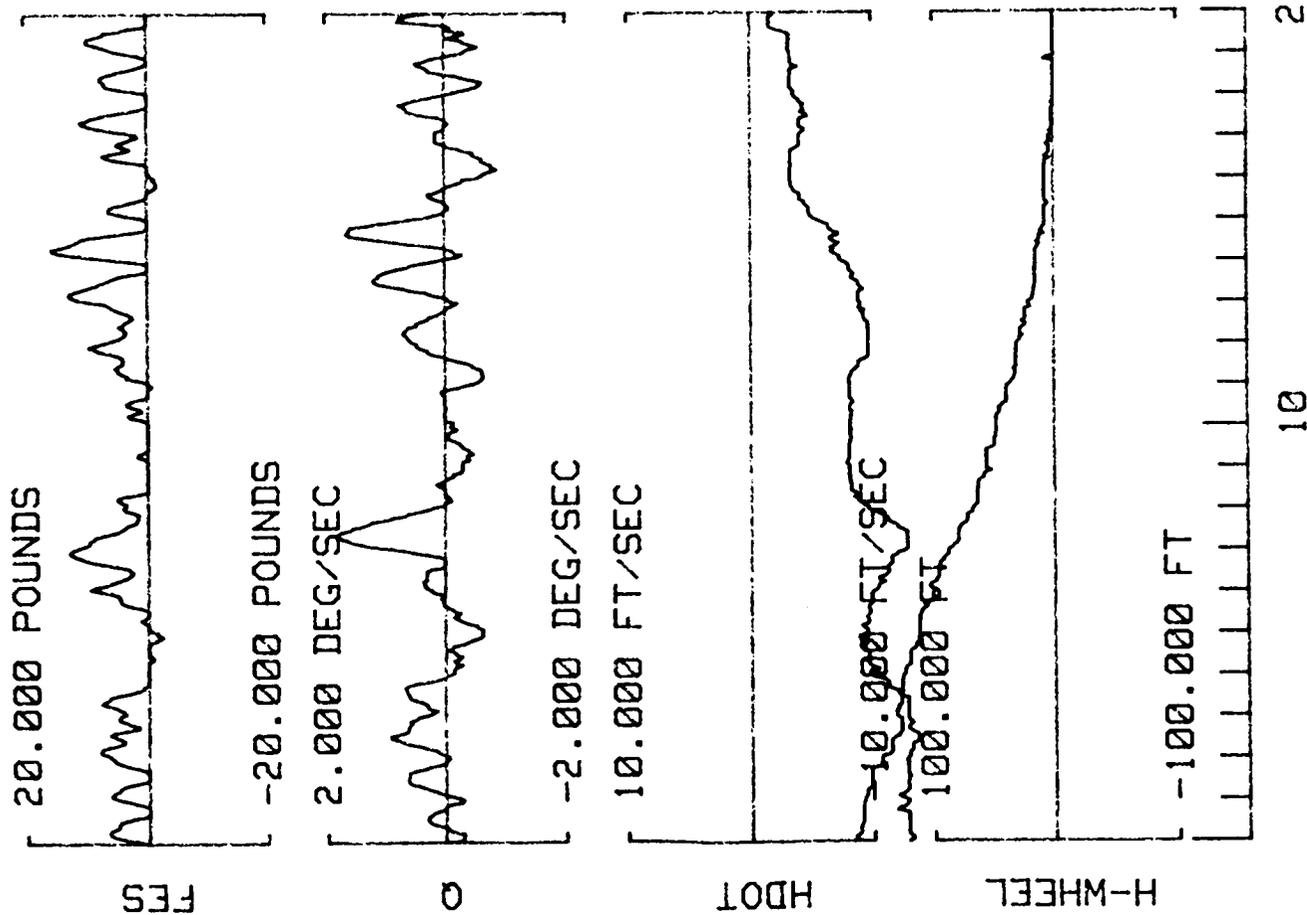
FLT 915 APP 5 CONF 4



FLT 915 APP 6 CONF 4

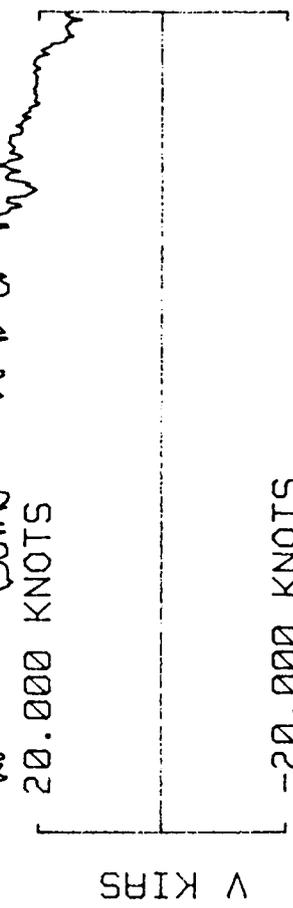
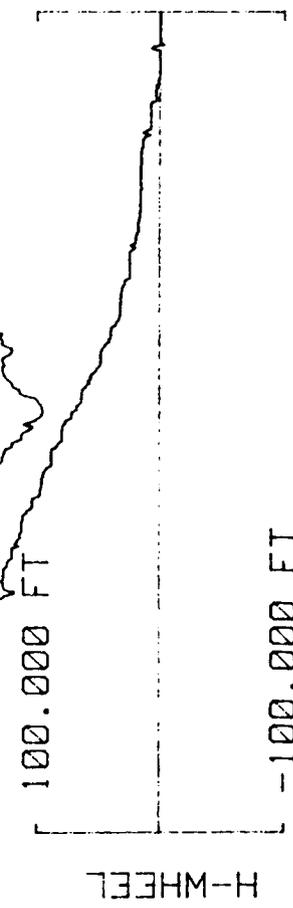
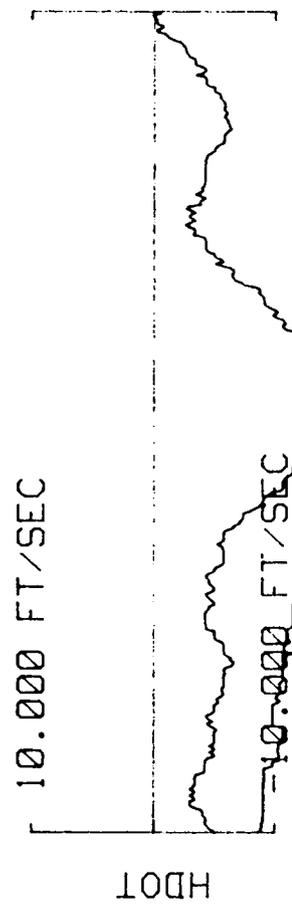
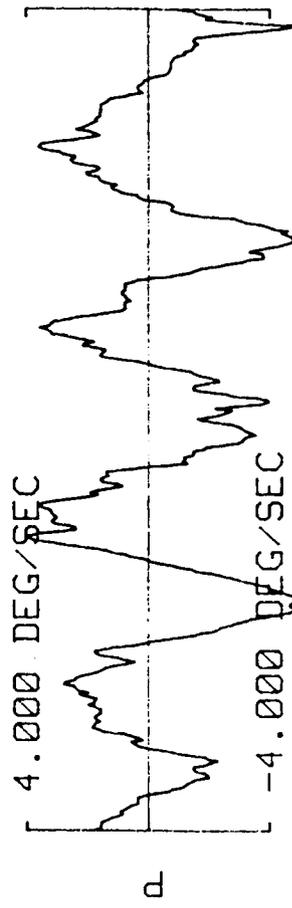
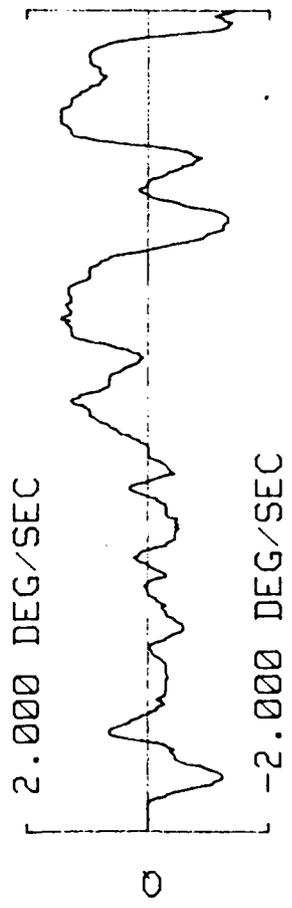
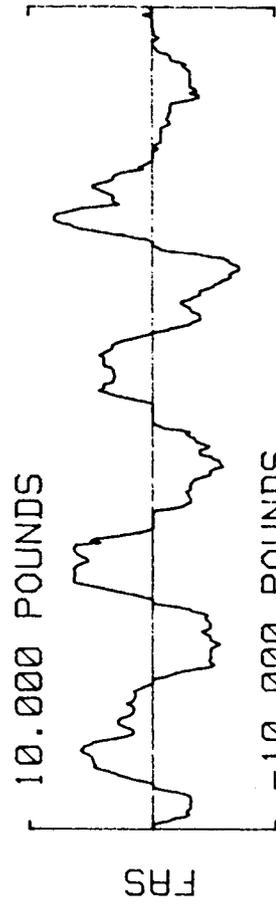
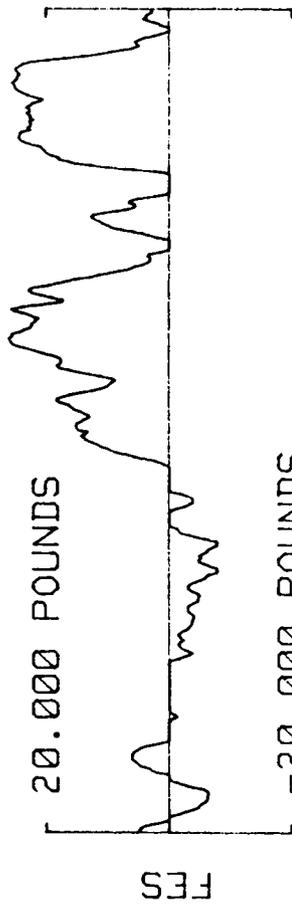


FLT 915 APP 7 CONF 8



FLT 916 APP 1

CONF 25



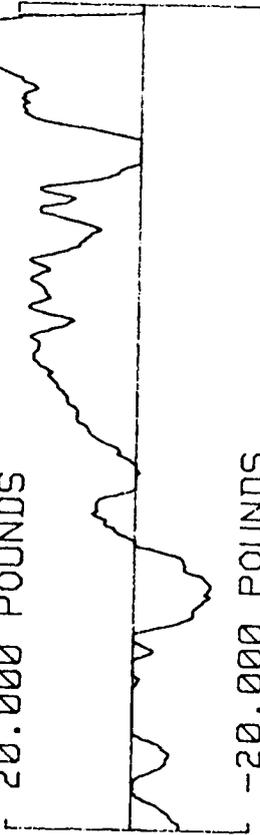
FLT 916

APP 2

CONF 25

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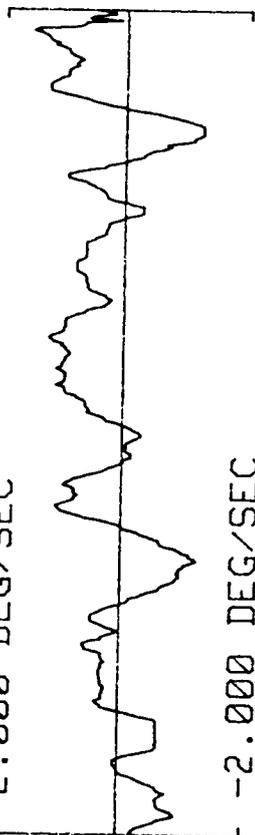
FES



-20.000 POUNDS

2.000 DEG/SEC

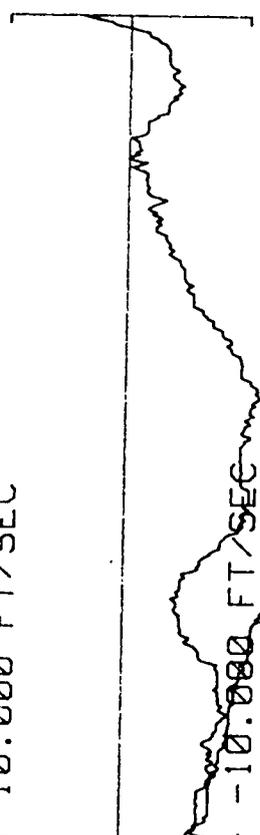
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-2.000 DEG/SEC

10.000 FT/SEC

HDOT



-10.000 FT/SEC

100.000 FT

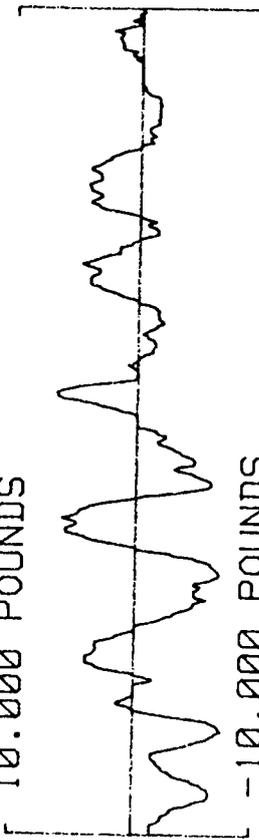
H-WHEEL



-100.000 FT

10.000 POUNDS

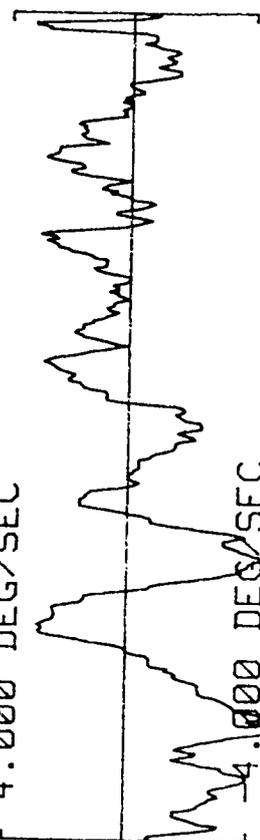
FBS



-10.000 POUNDS

4.000 DEG/SEC

0



-4.000 DEG/SEC

50.000 %

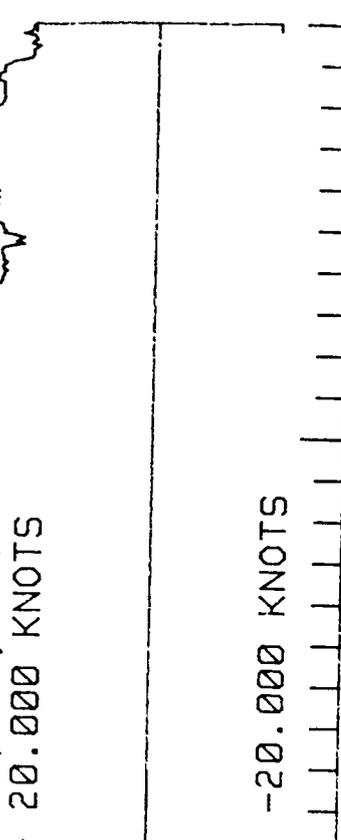
PLR



50.000

20.000 KNOTS

V KIRS



-20.000 KNOTS

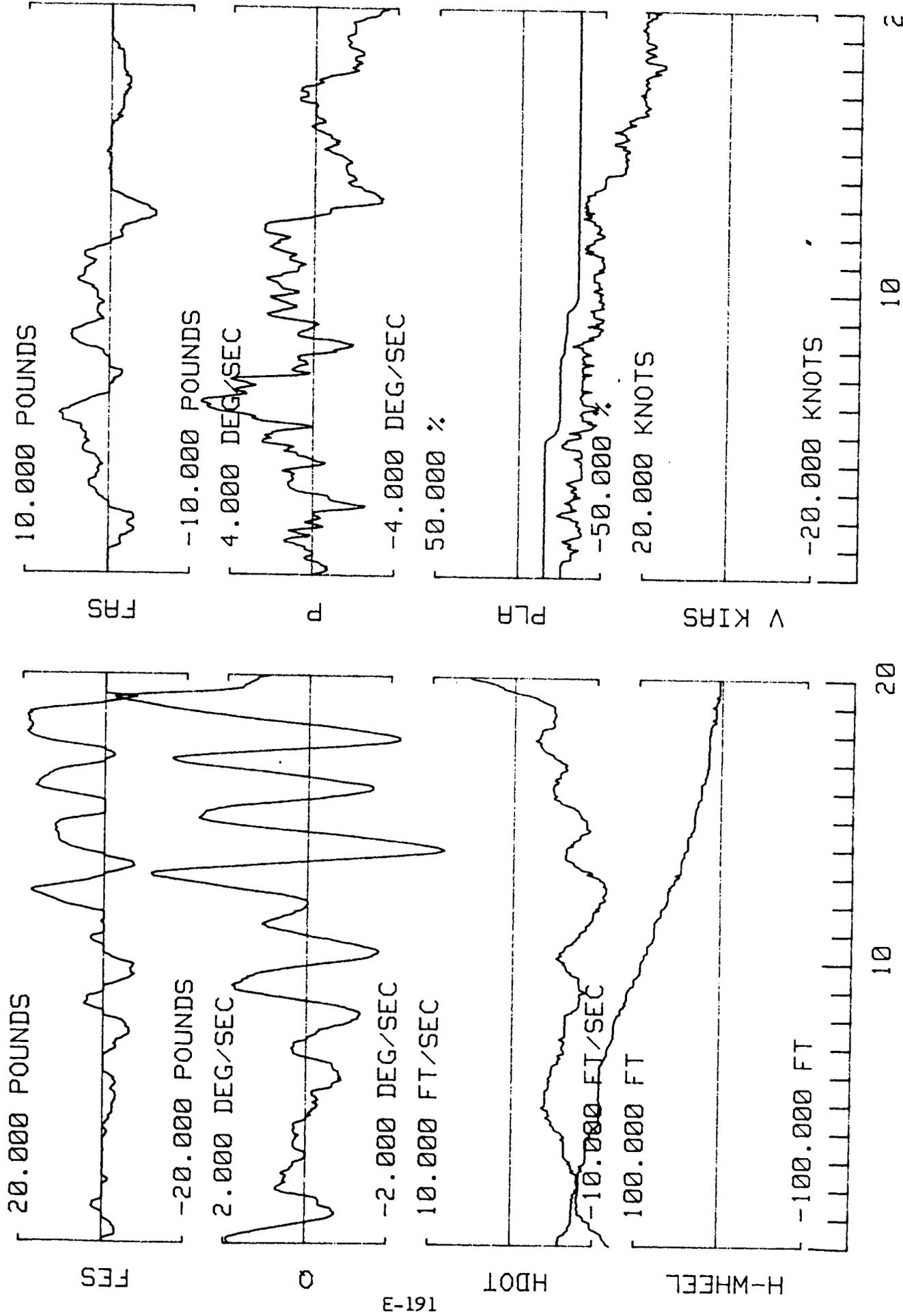
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10

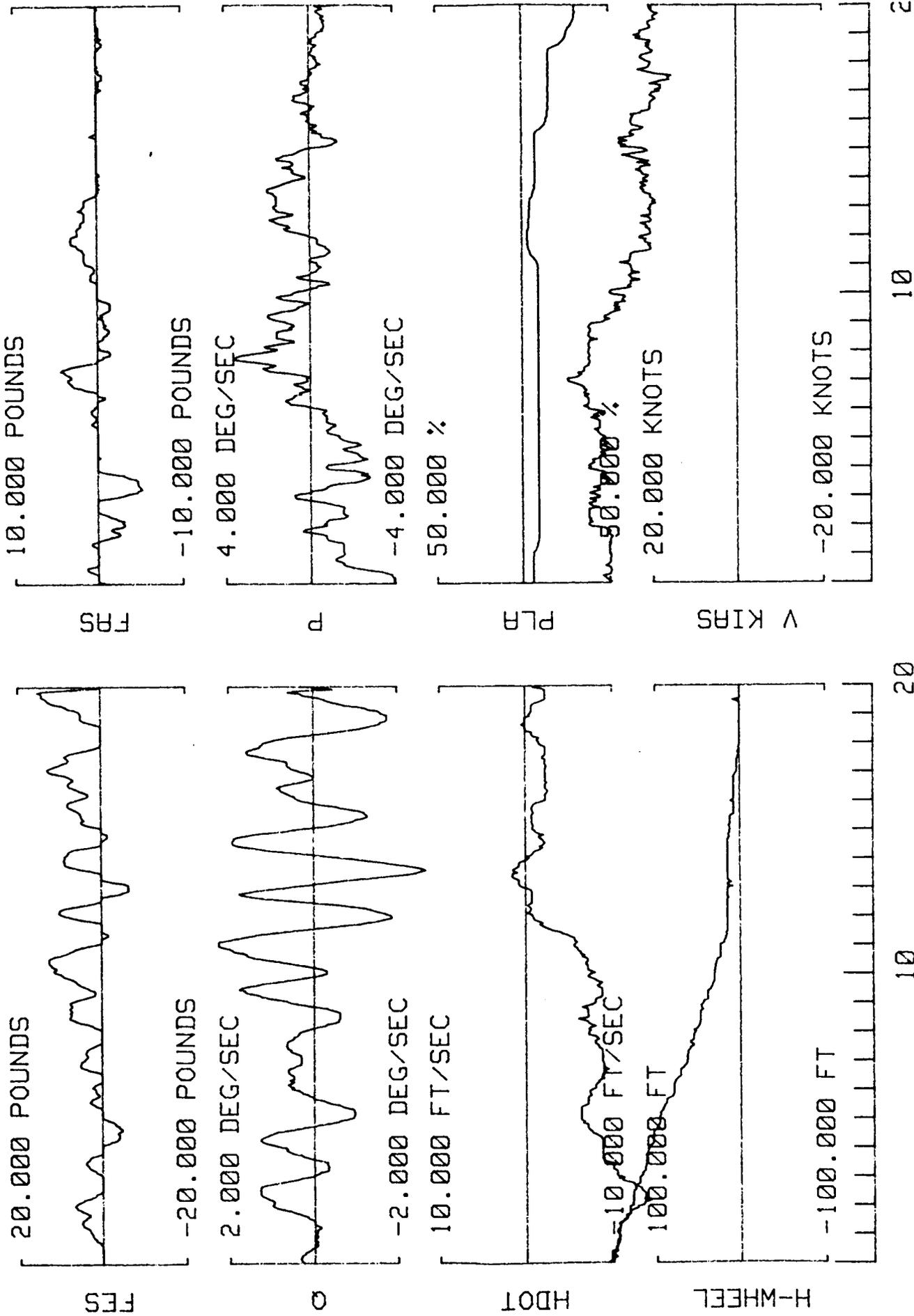
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2

FLT 916 APP 3 CONF 28

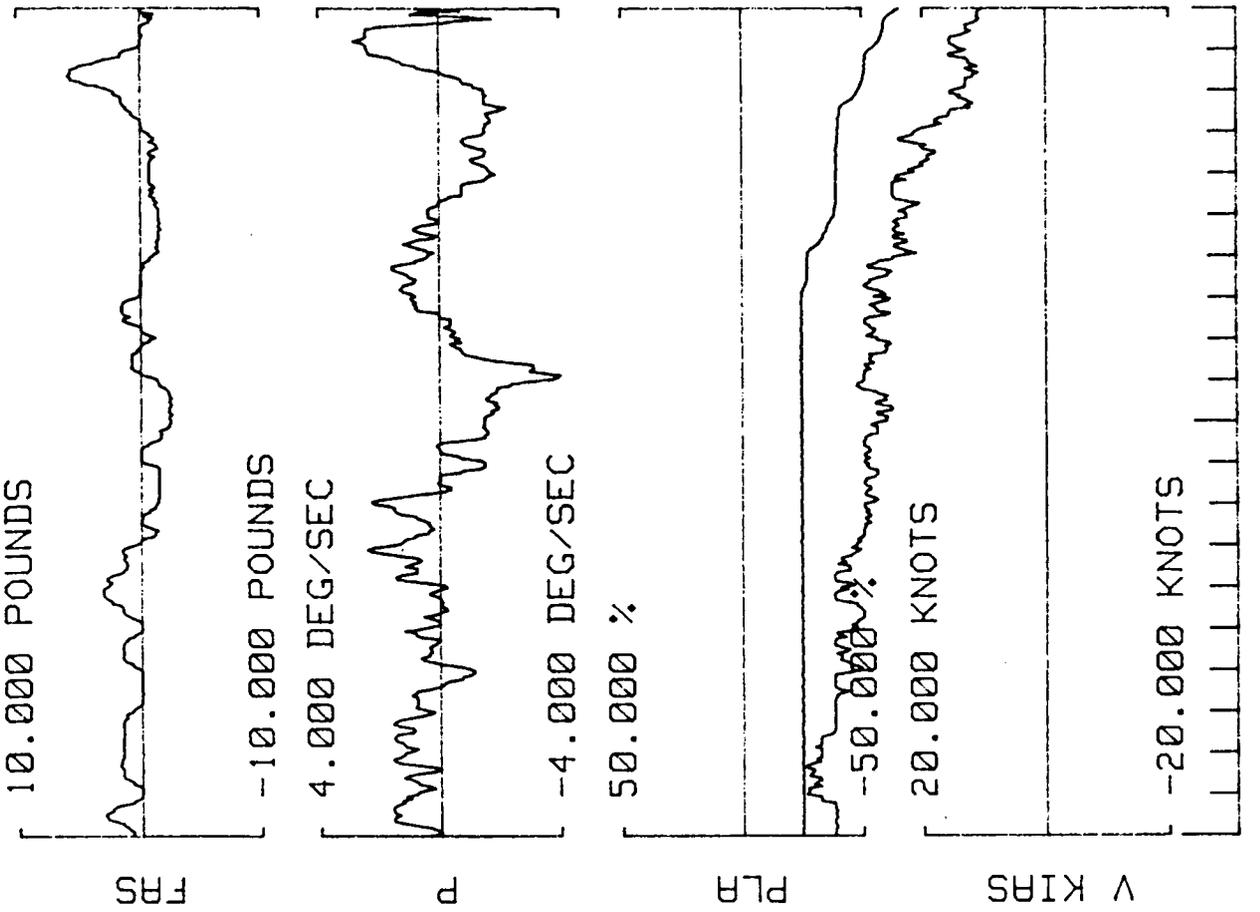
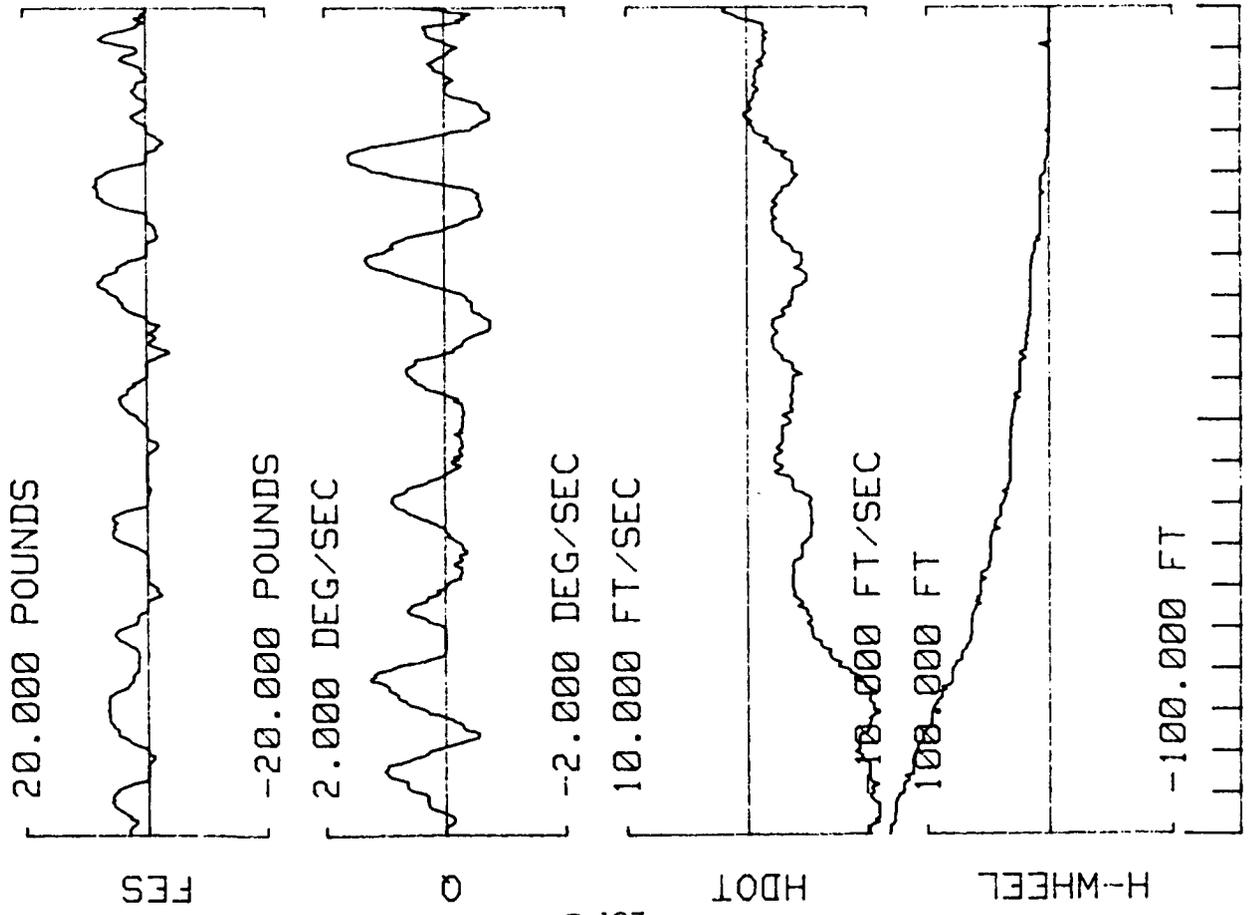


161-3



CONF 5 + 200ms

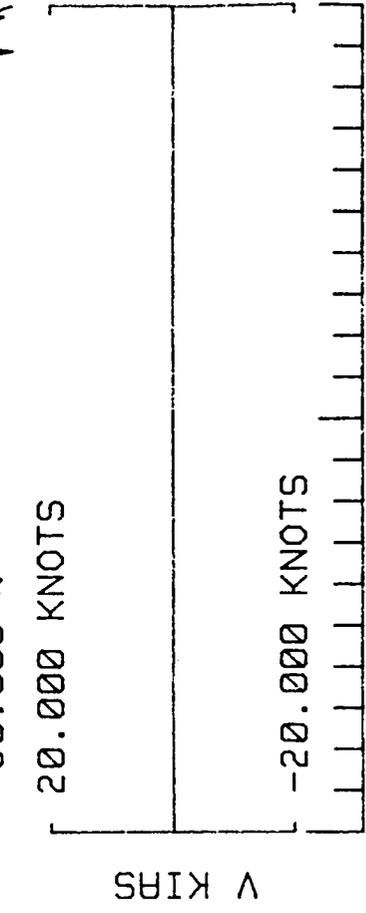
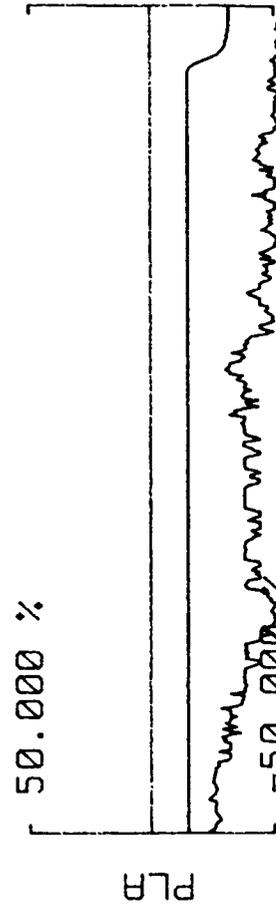
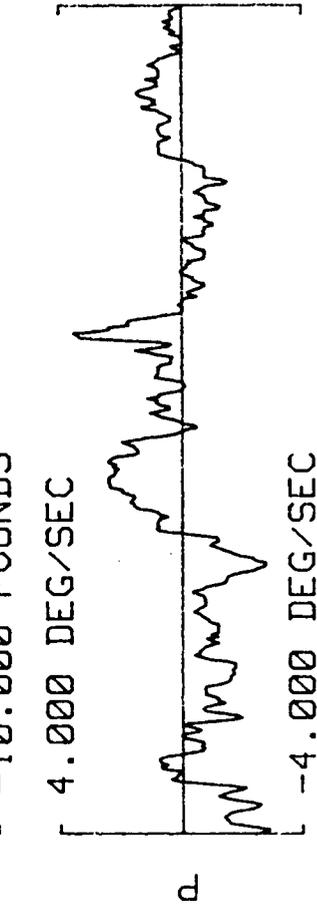
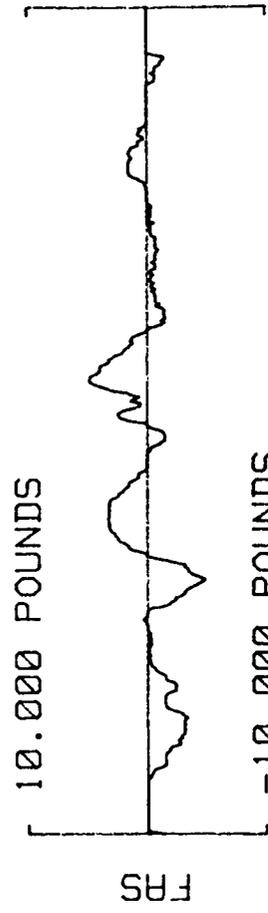
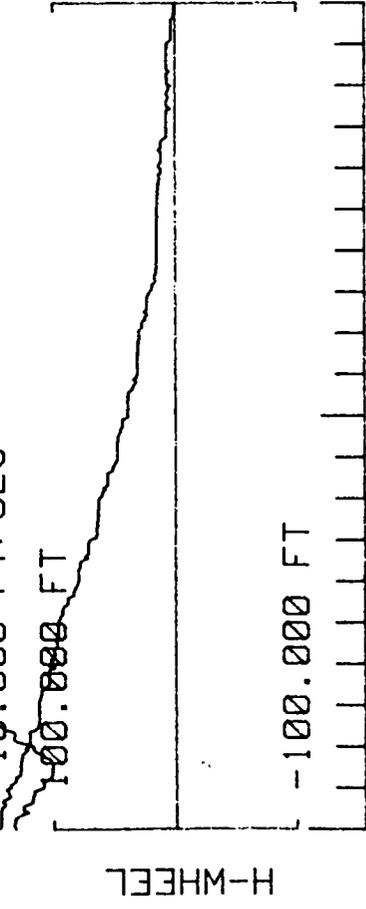
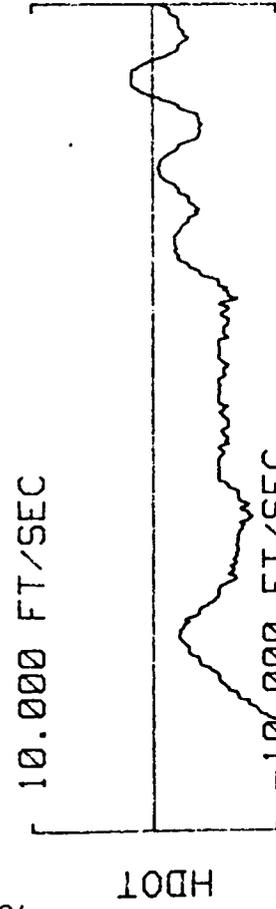
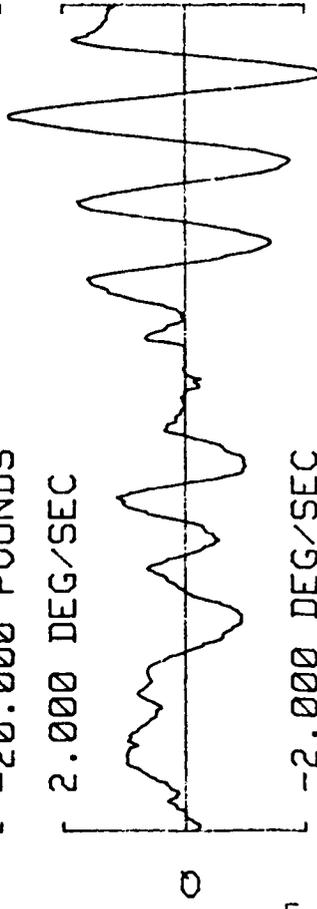
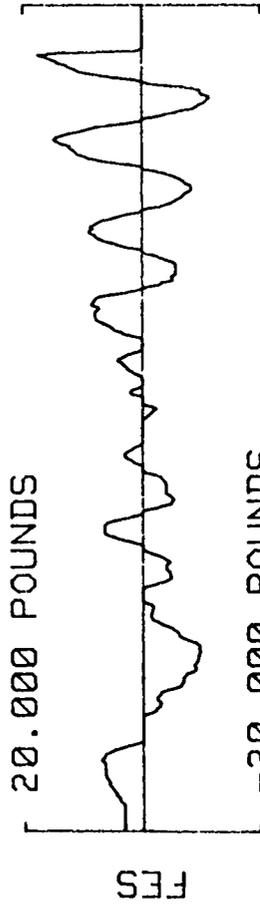
FLT 916 APP 5



FLT 916

APP 6

CONF 5 + 200ms



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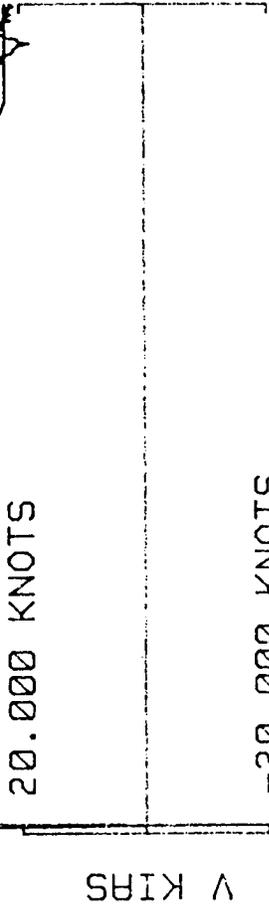
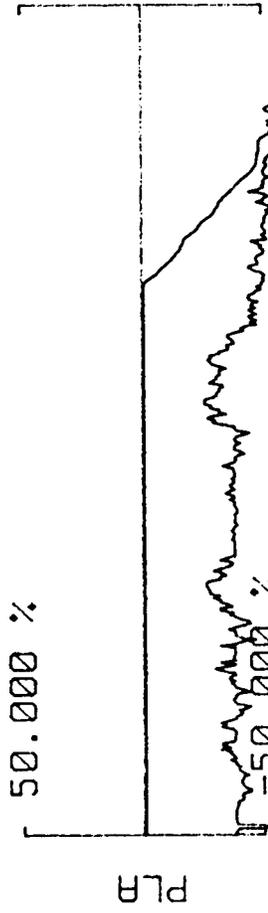
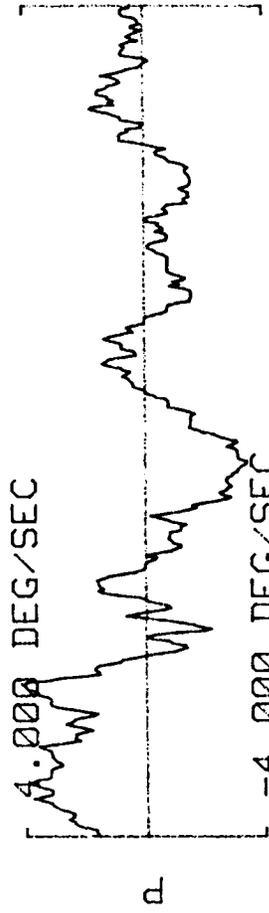
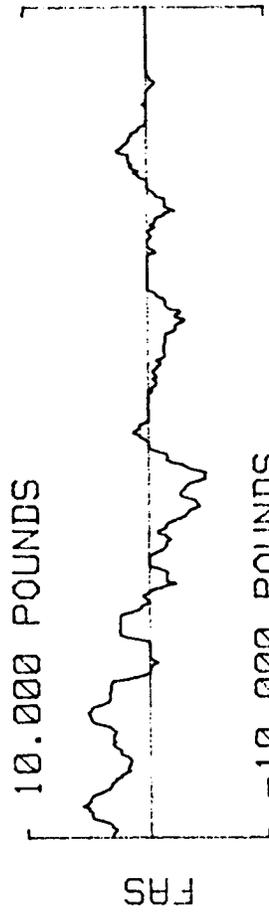
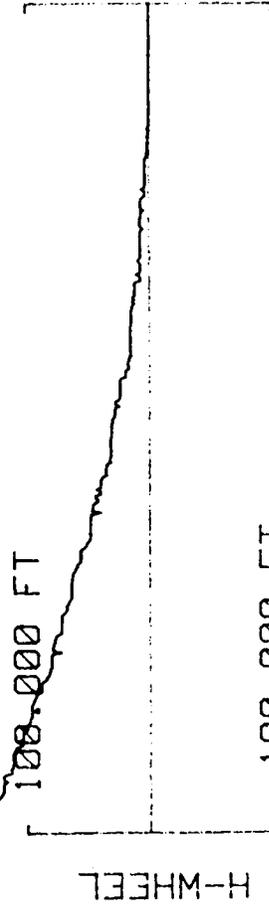
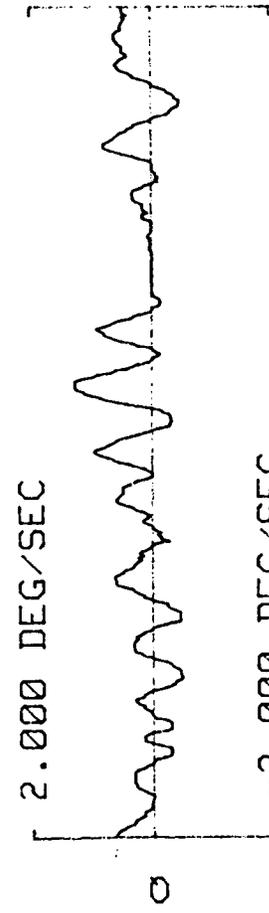
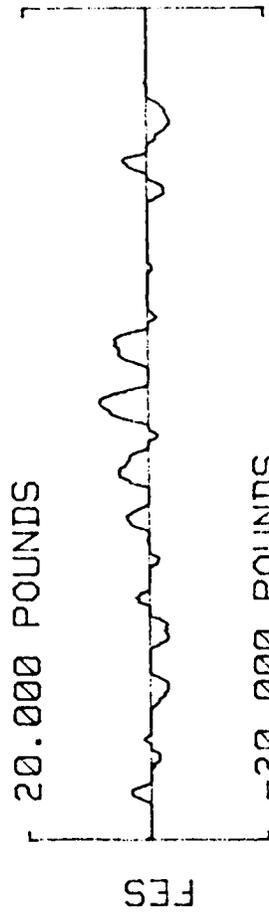
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FLT 916

APP 7

CONF 7

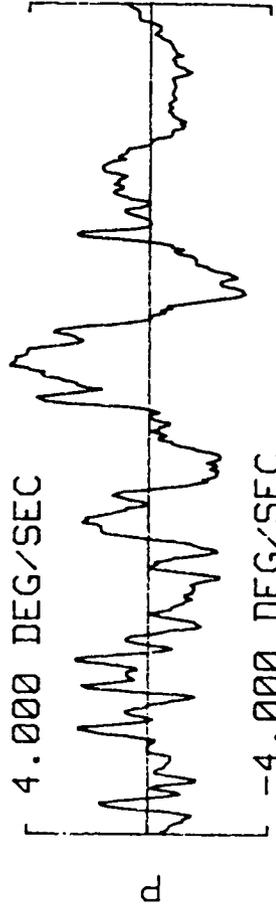
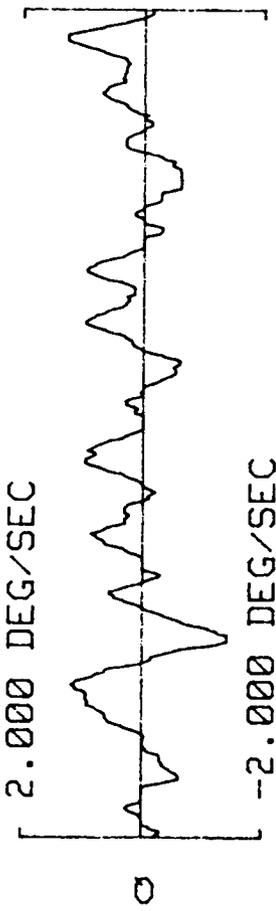
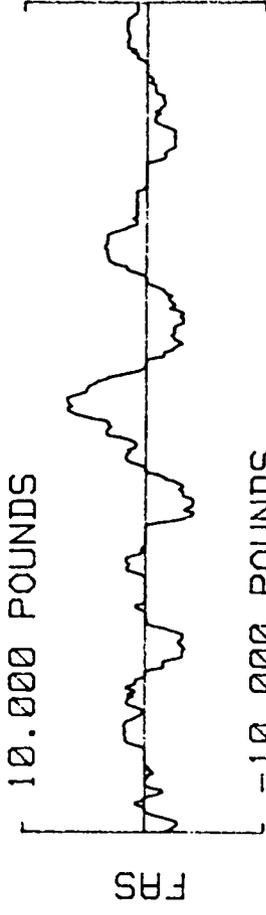
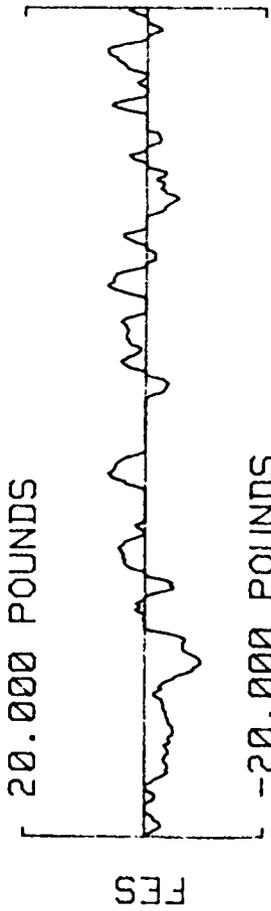


561-3

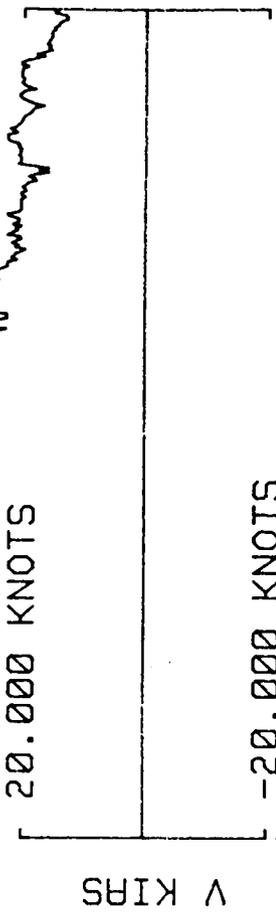
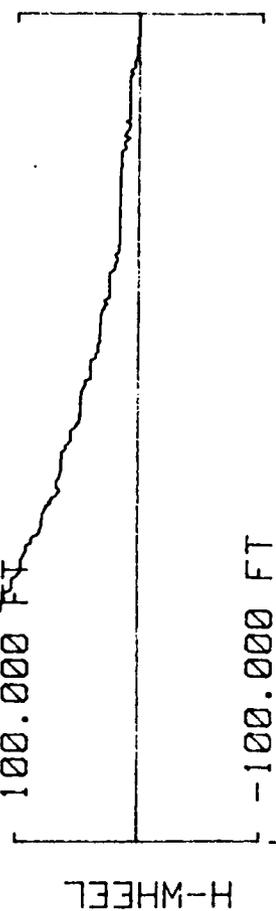
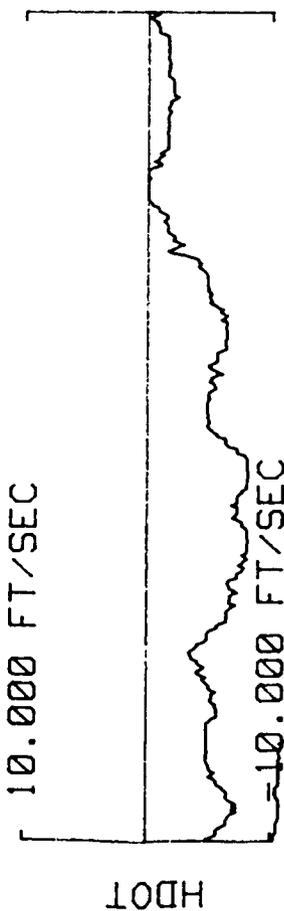
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FLT 916 APP 8 CONF 7



961-E



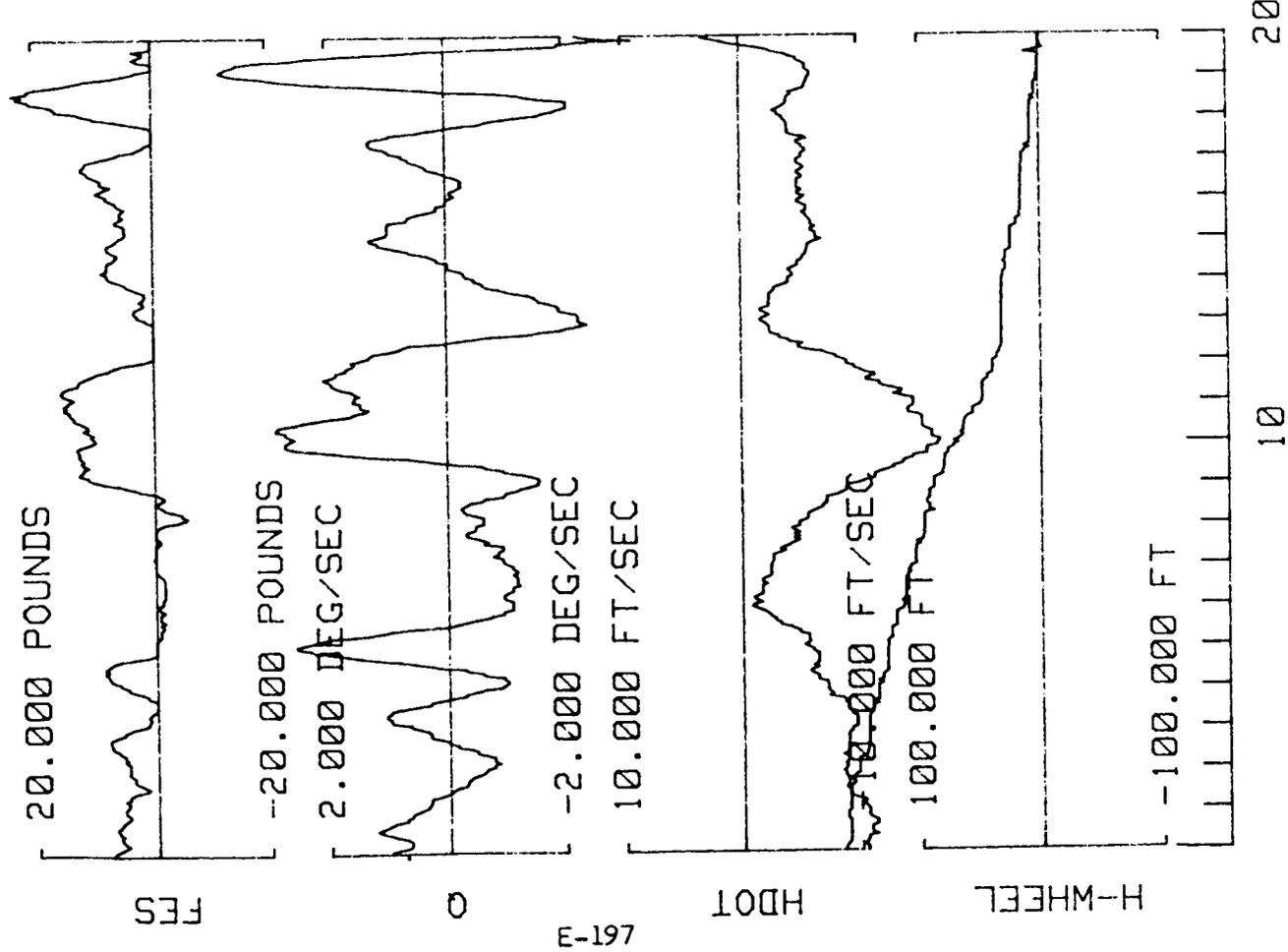
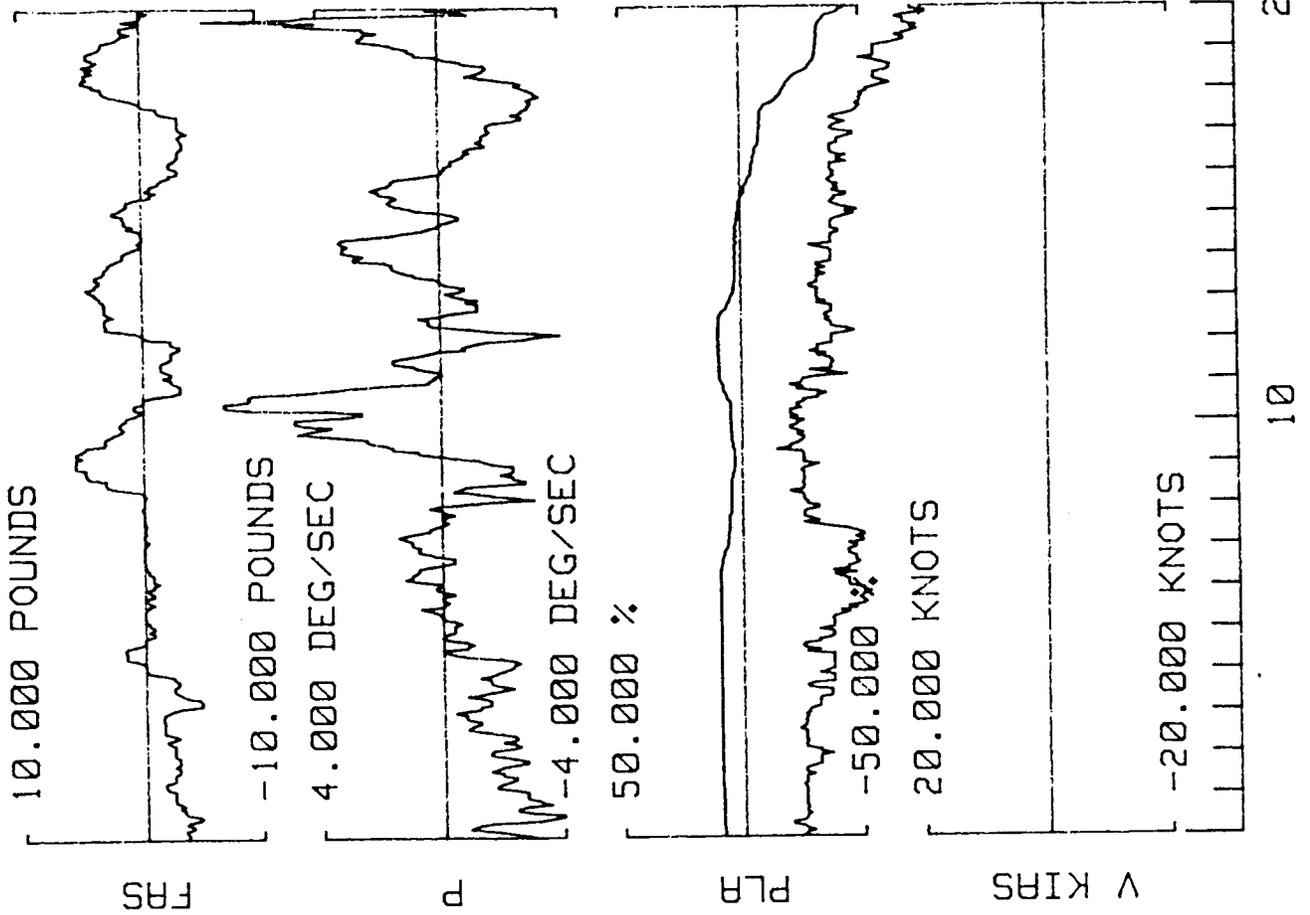
10 20

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CONF 28

APP 1

FLT 917

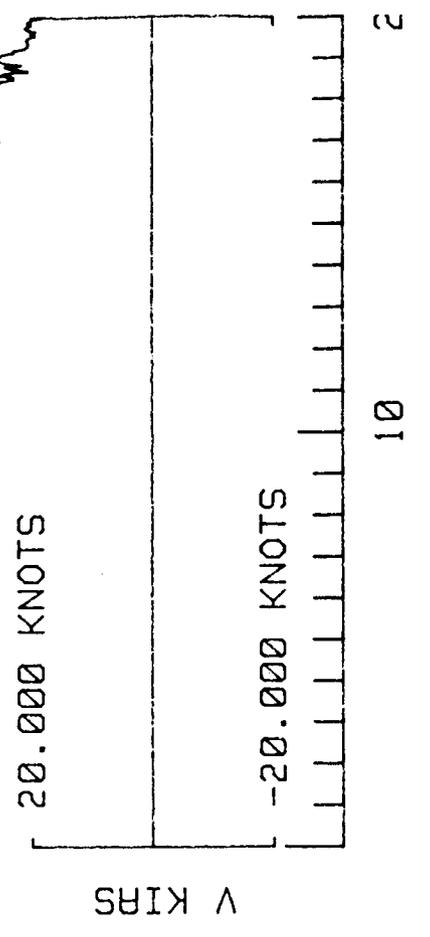
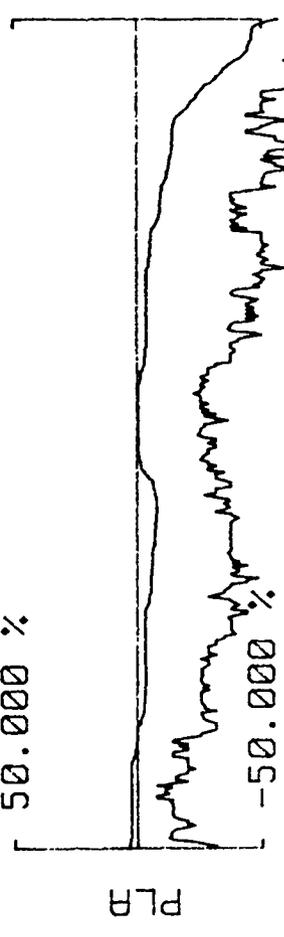
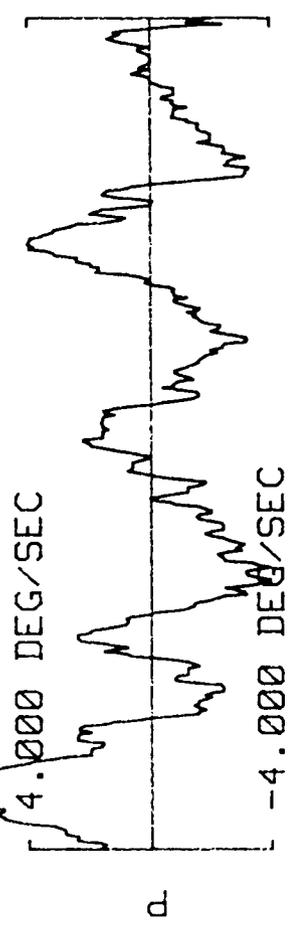
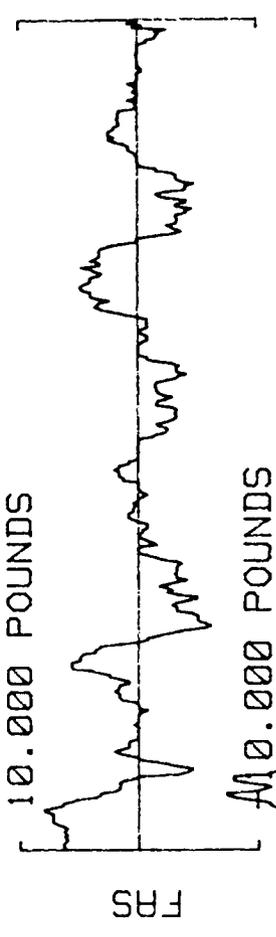
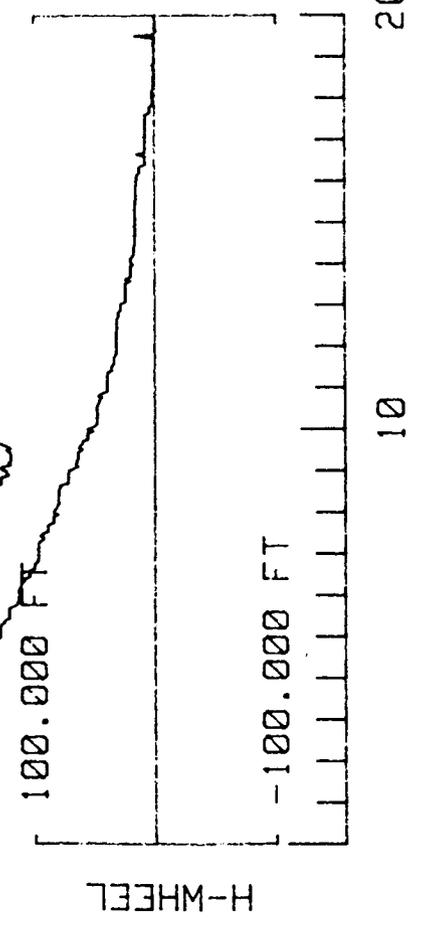
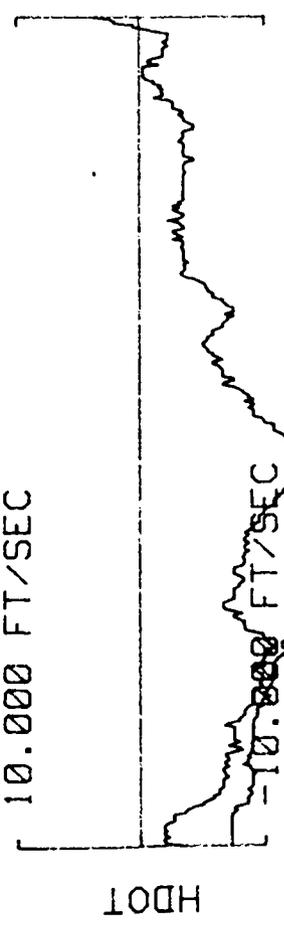
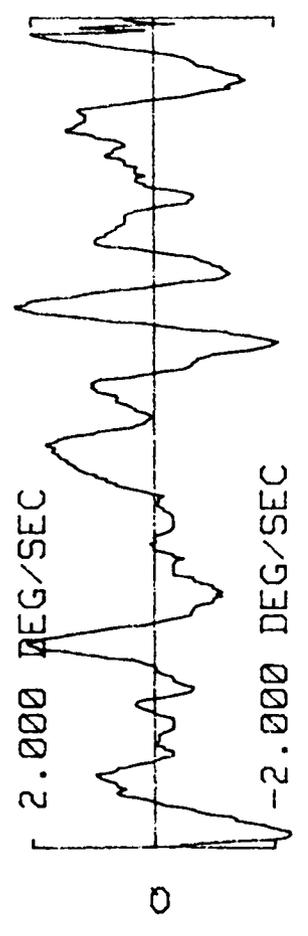
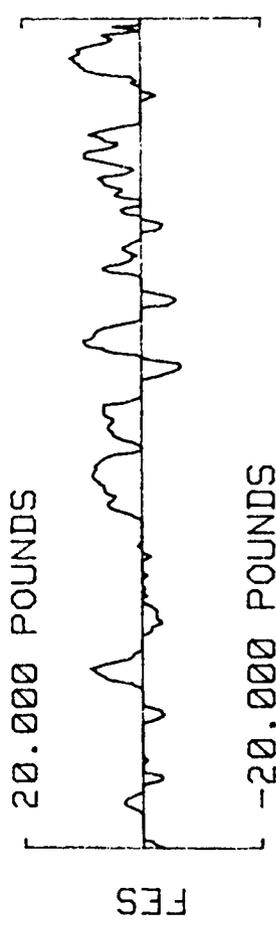


197-3

FLT 917

APP 2

CONF 28



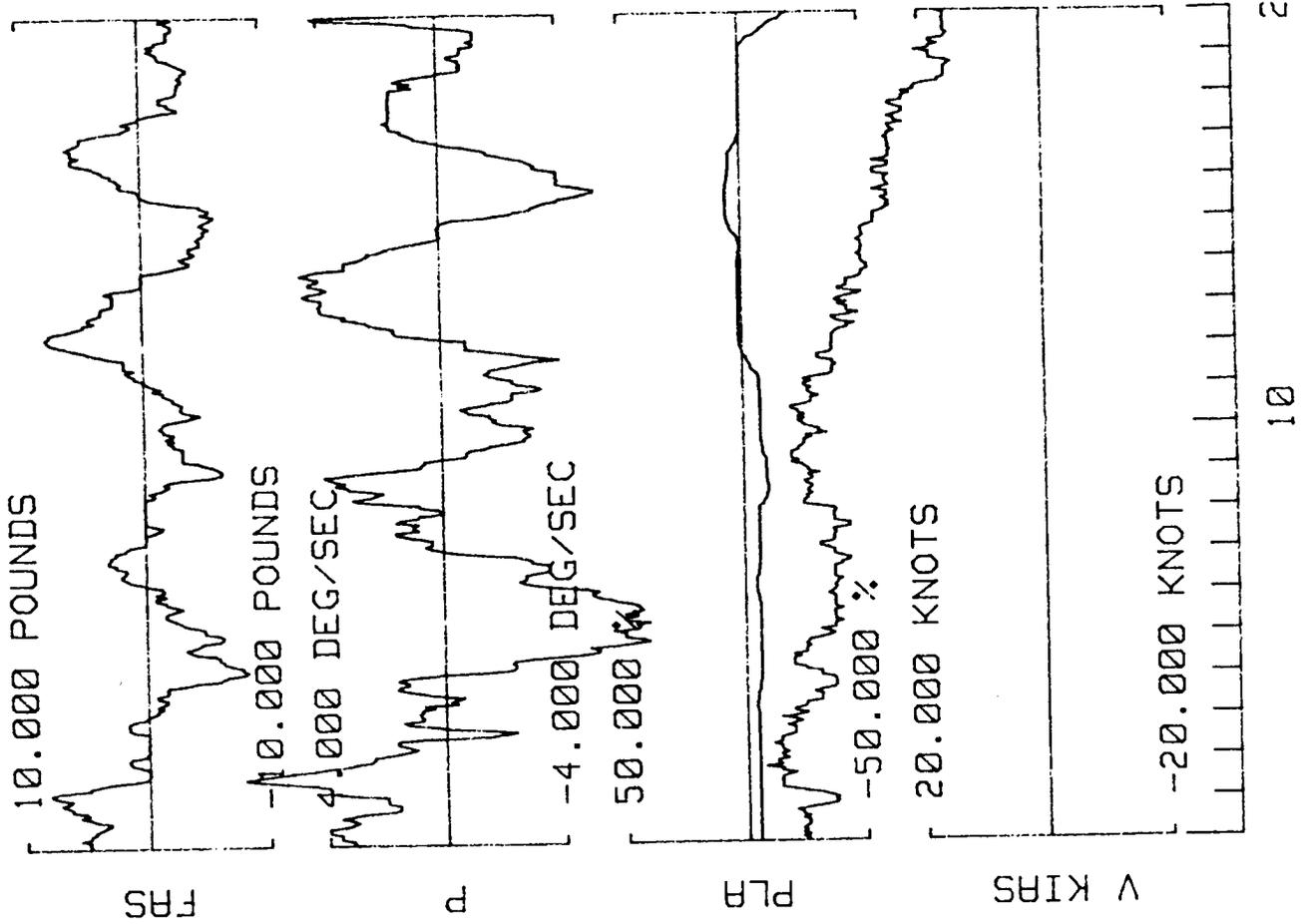
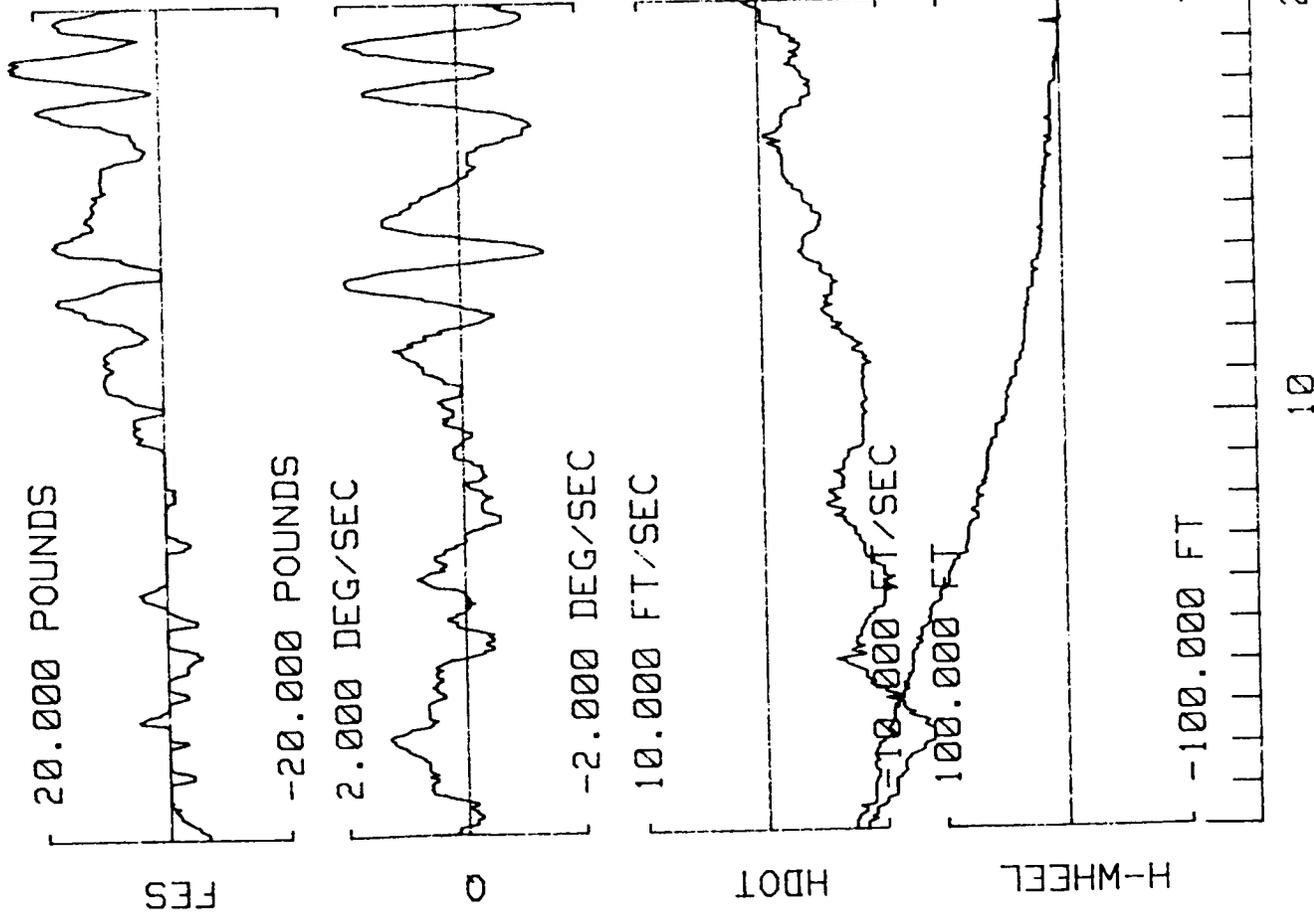
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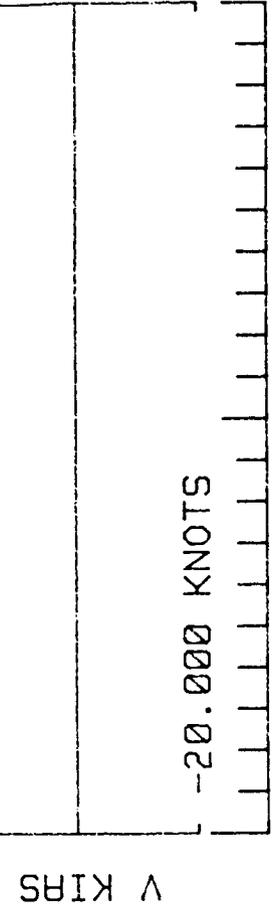
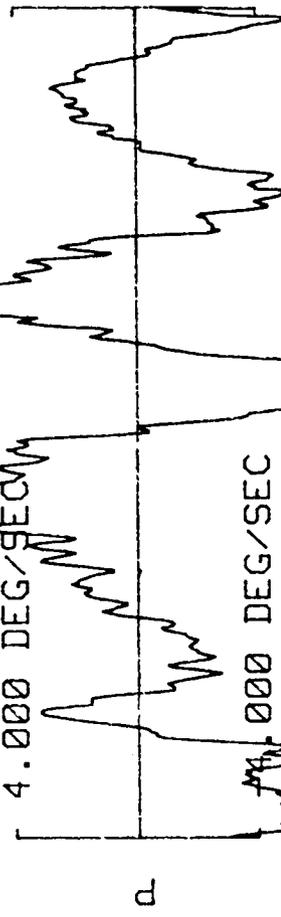
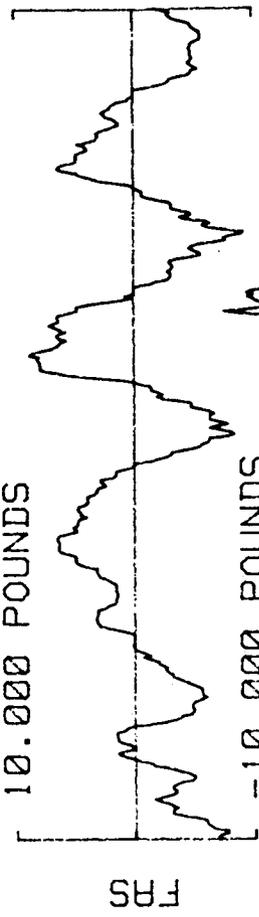
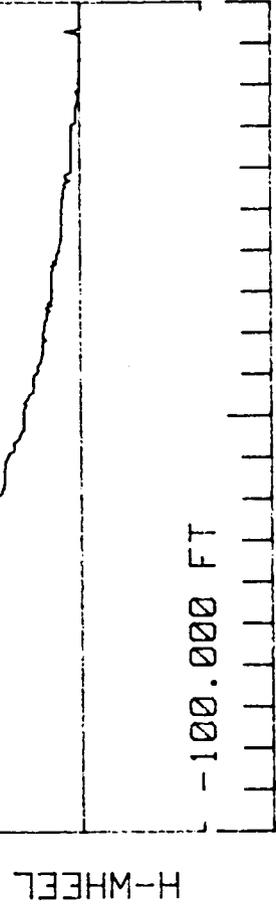
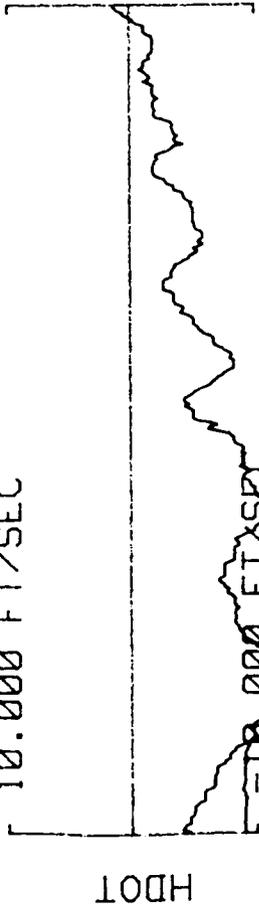
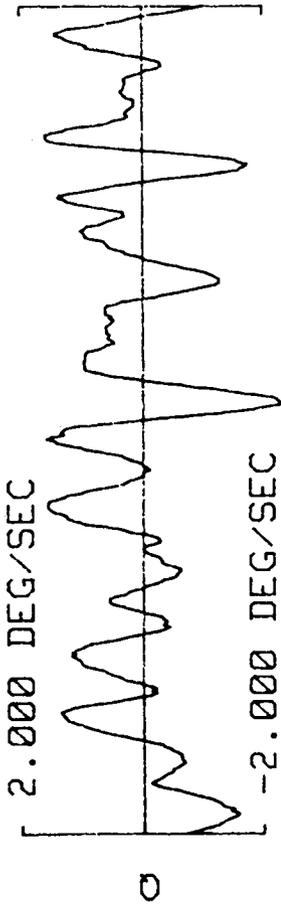
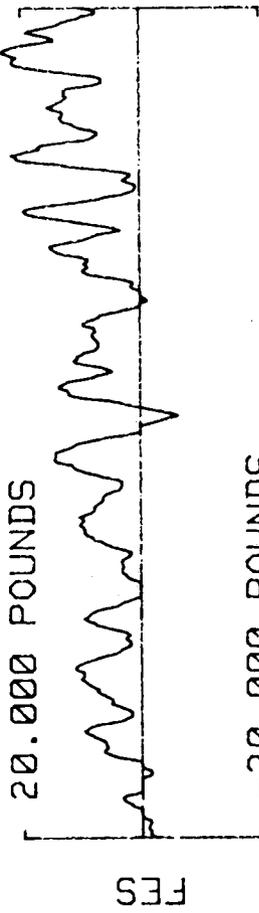
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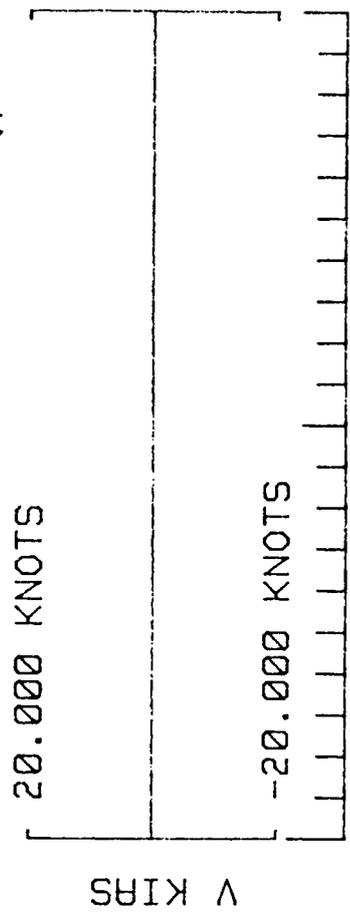
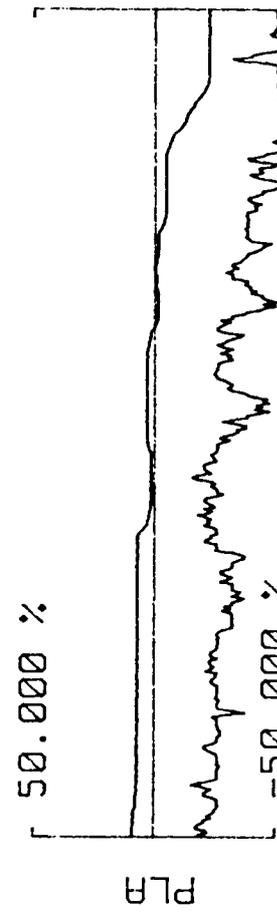
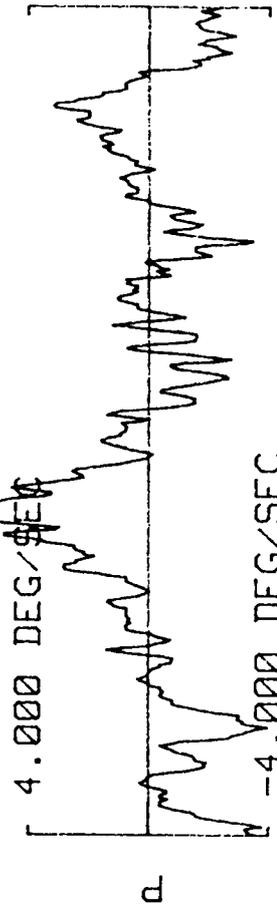
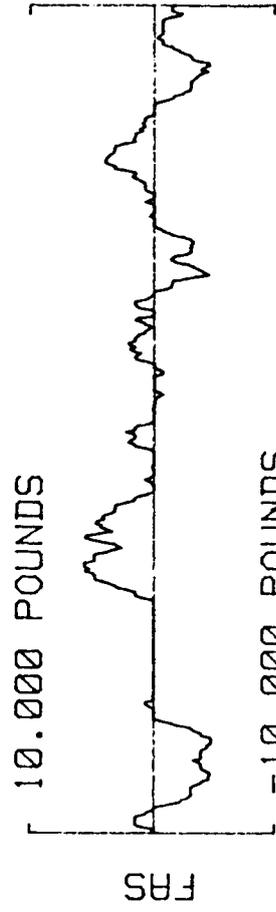
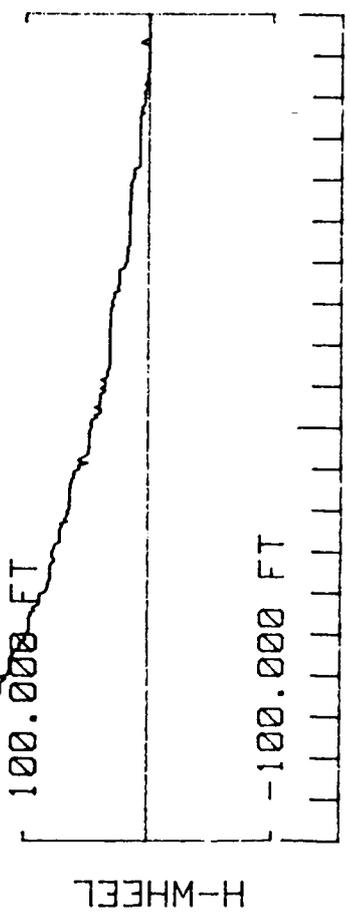
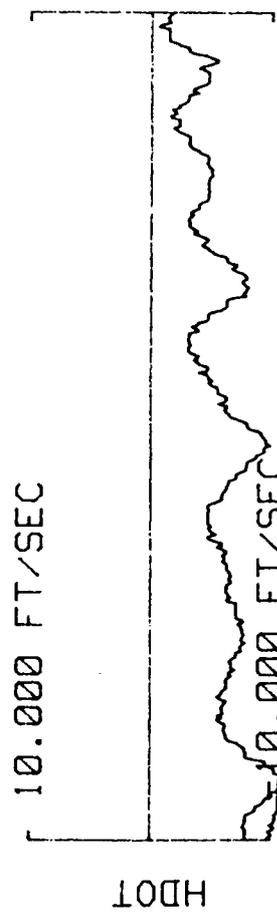
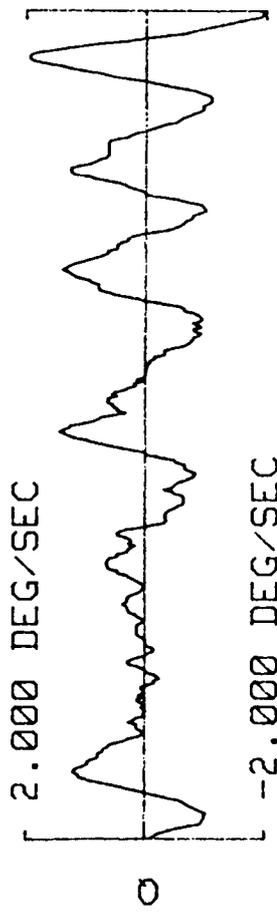
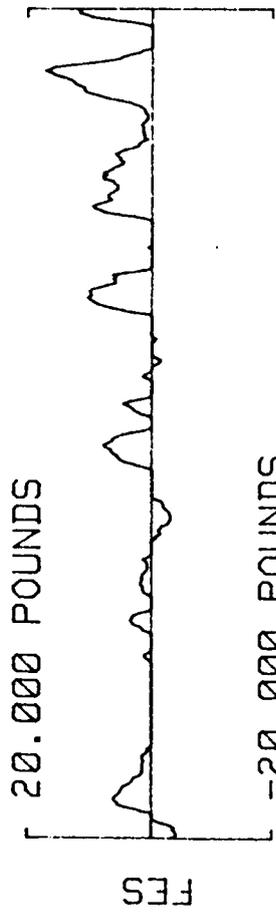
FLT 917 APP 3 CONF 1



FLT 917 APP 4 CONF 1



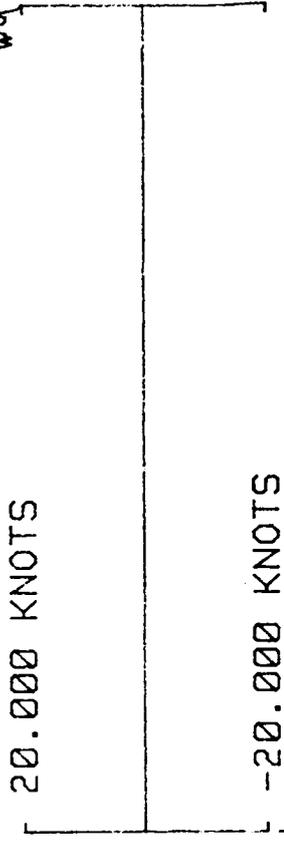
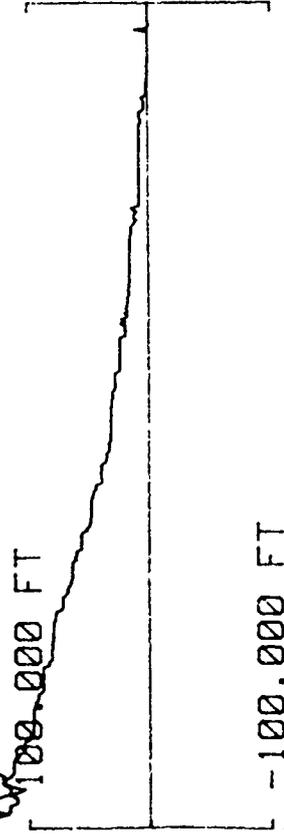
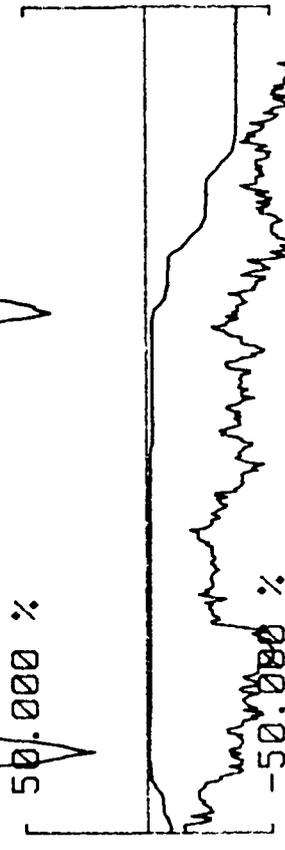
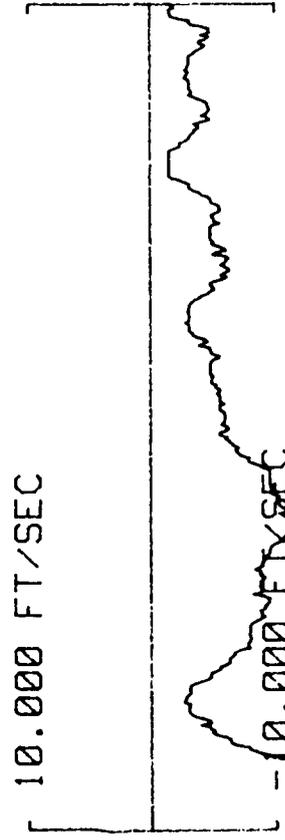
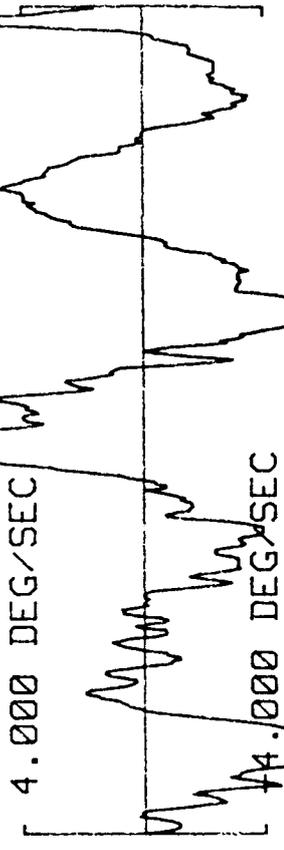
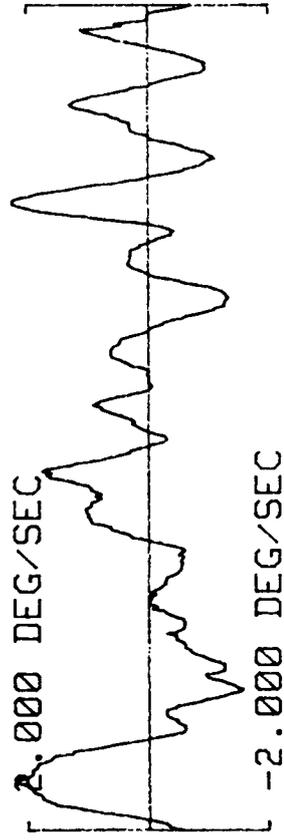
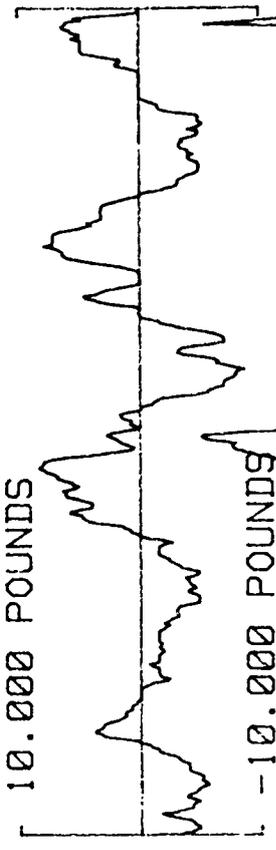
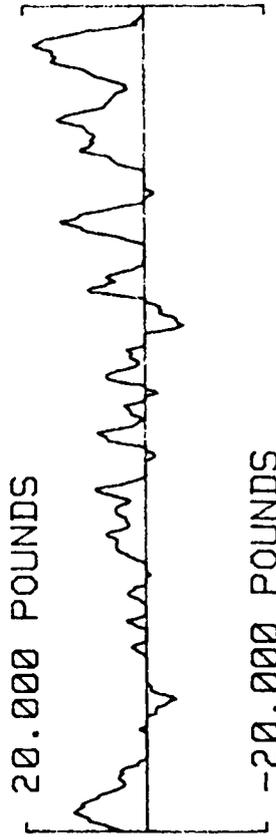
FLT 917 APP 5 CONF 13



FLT 917

APP 6

CONF 13



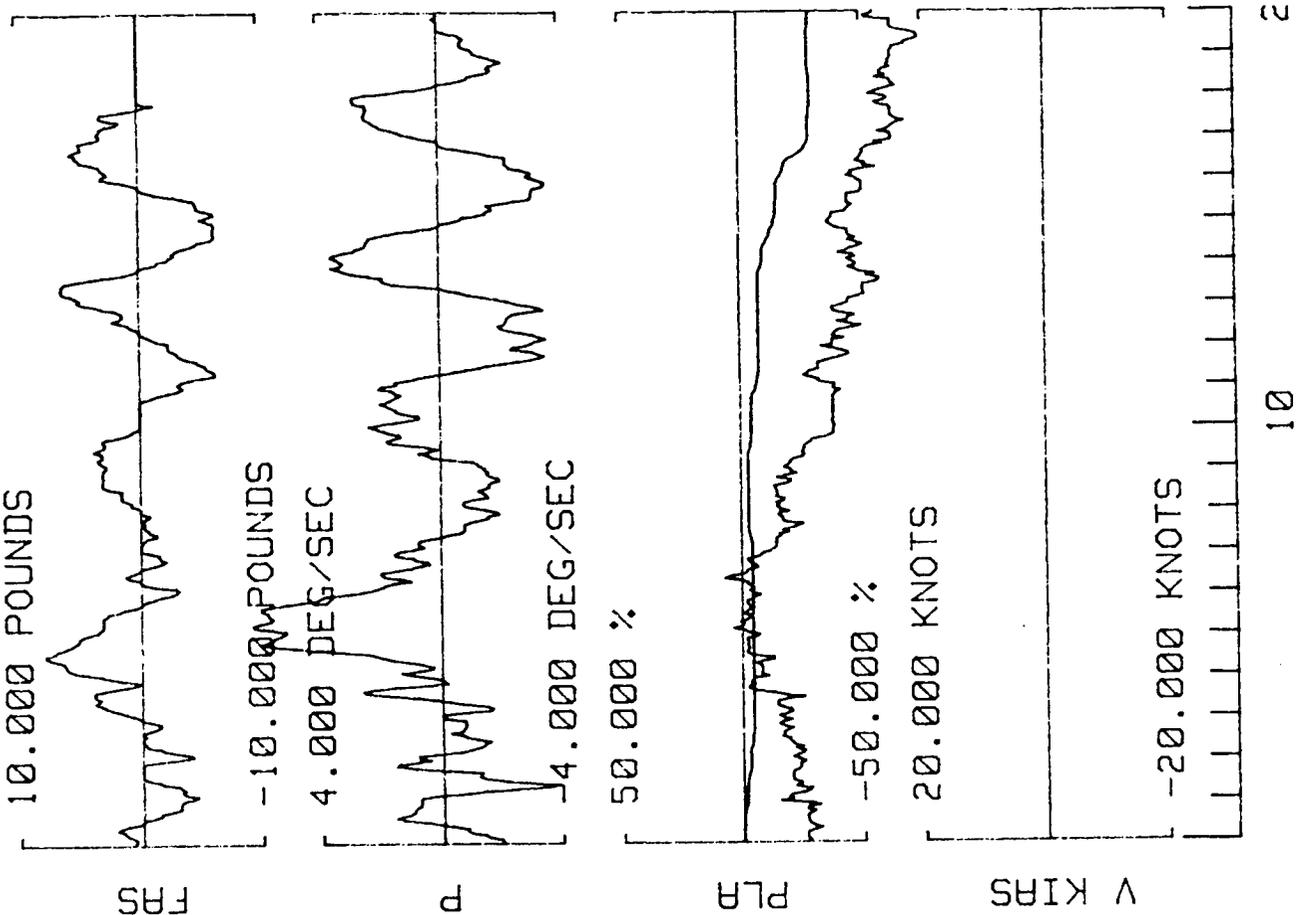
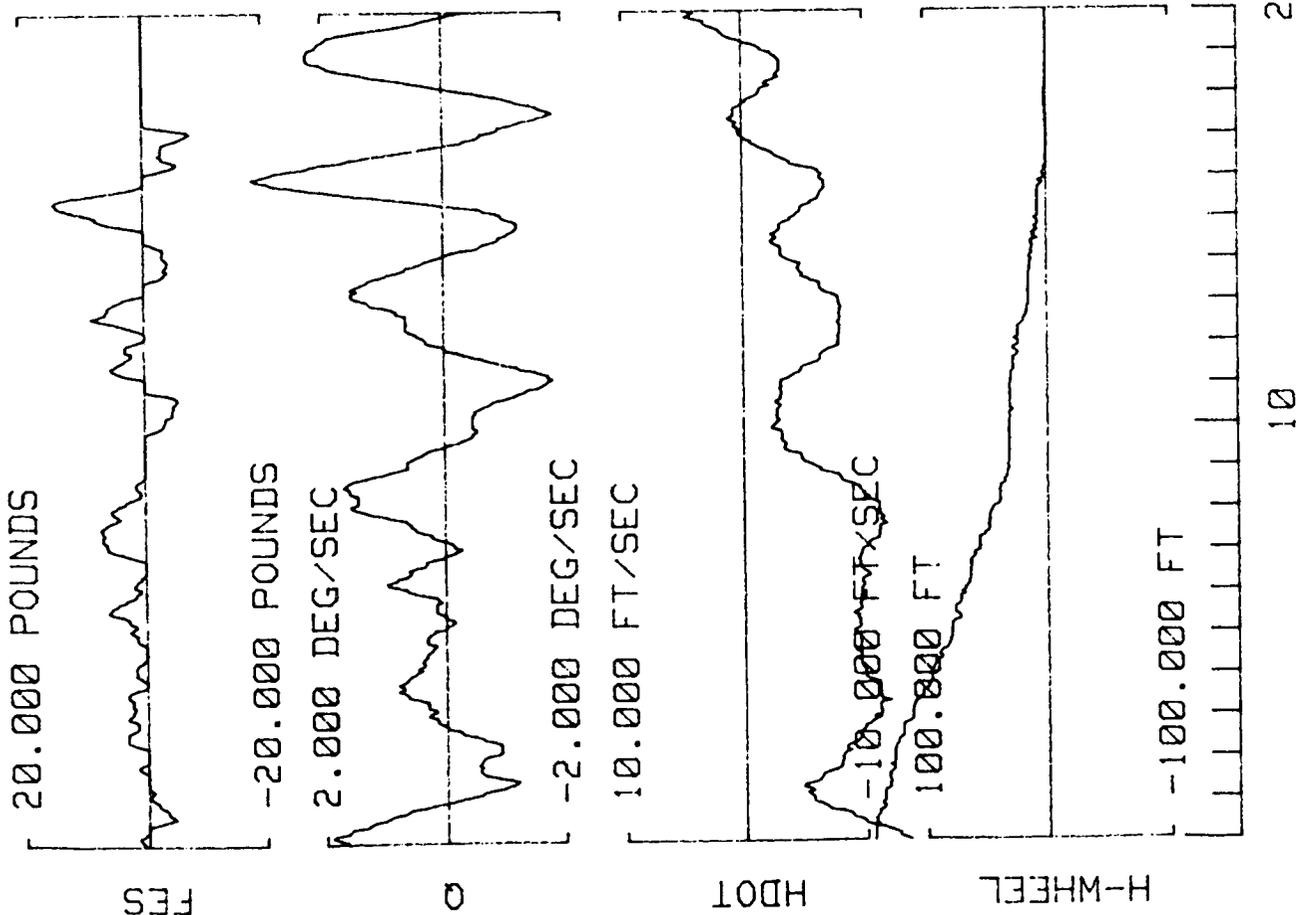
202-3

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FLT 917 APP 7

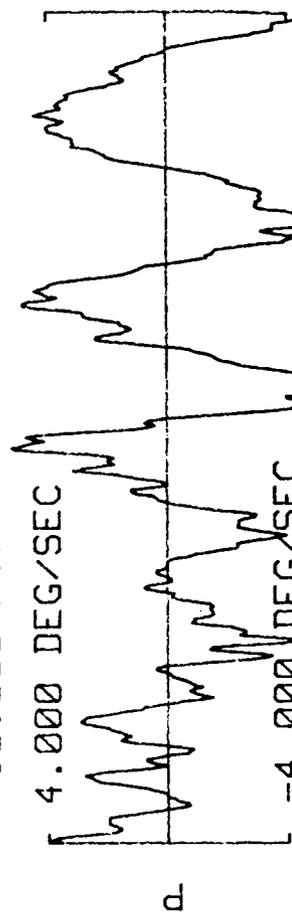
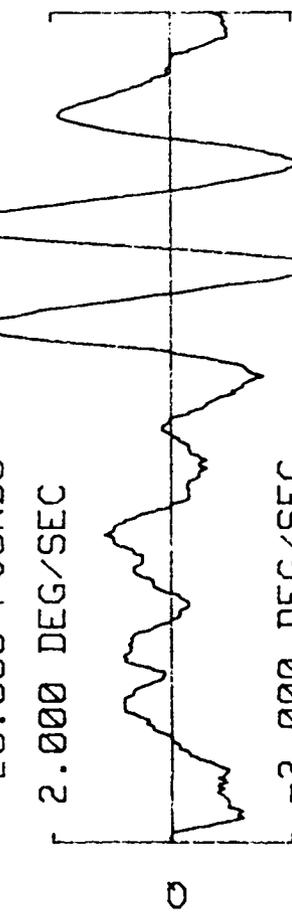
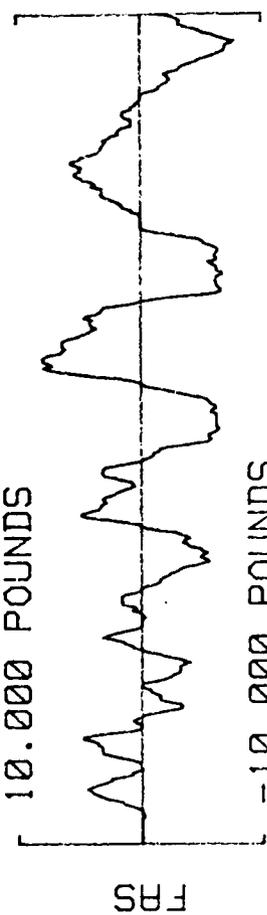
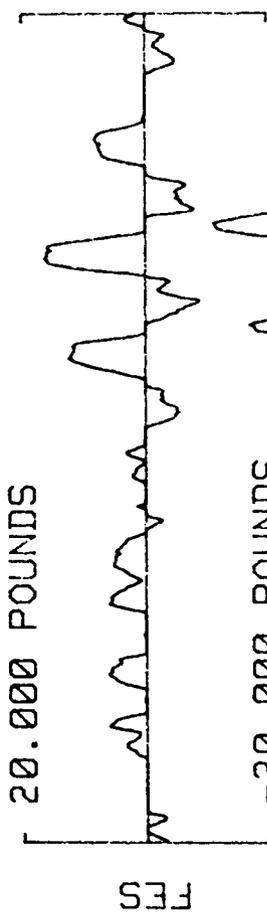
CONF 11



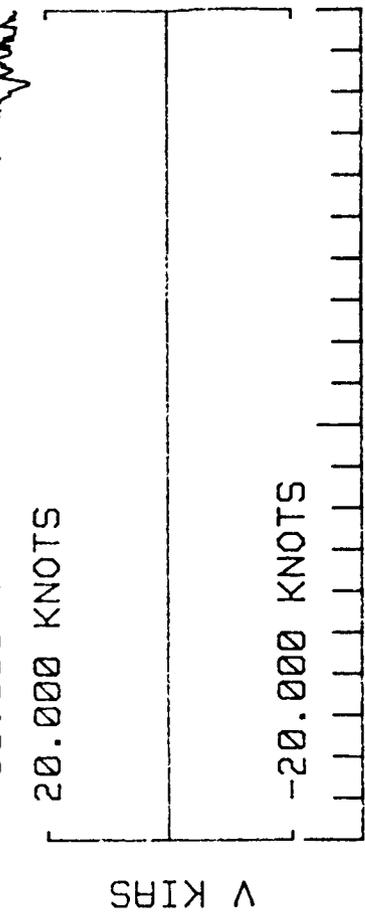
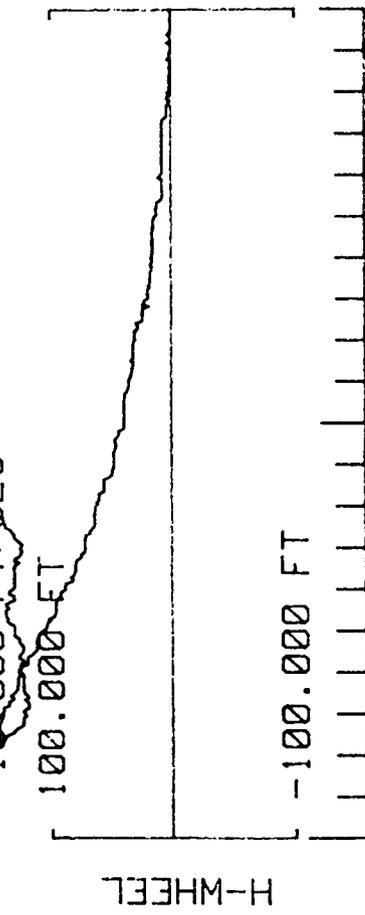
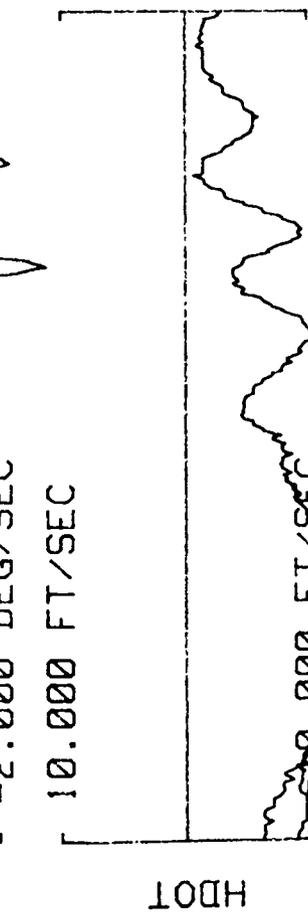
CONF 11

APP 8

FLT 917



402-3

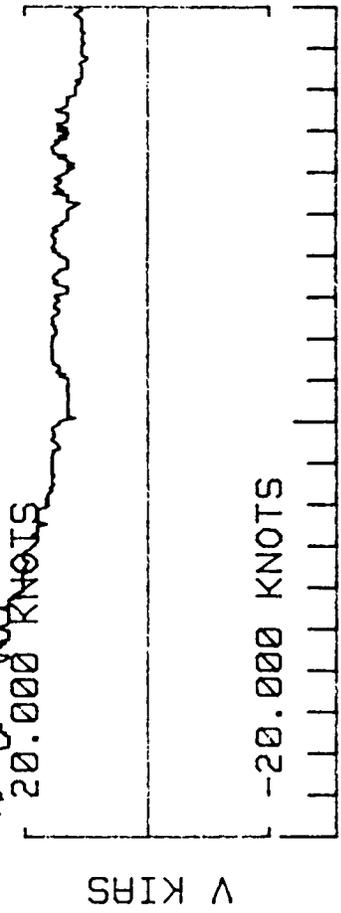
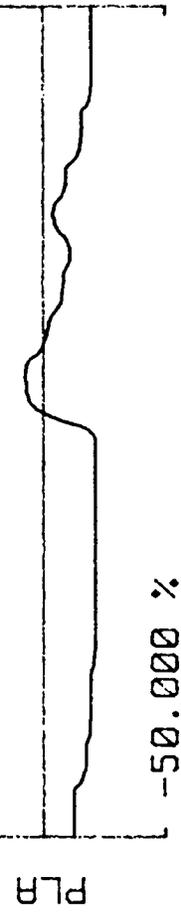
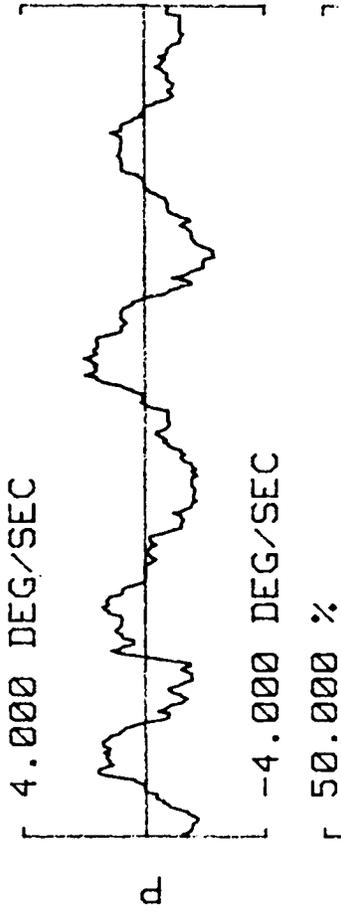
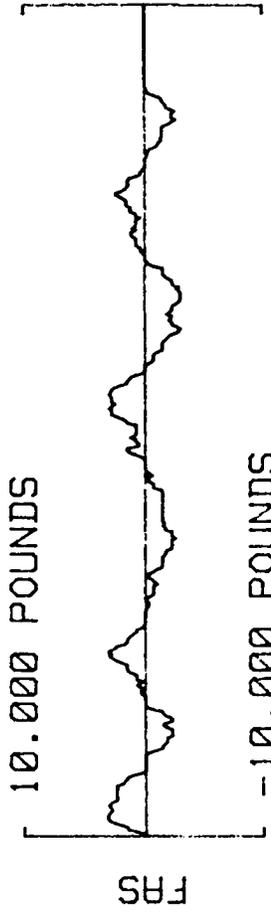
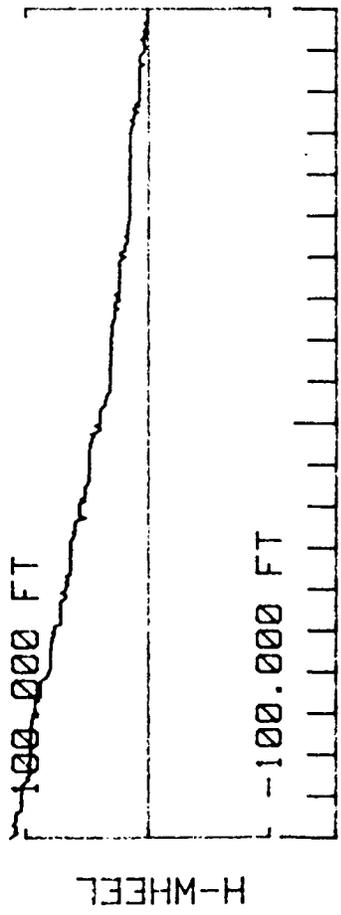
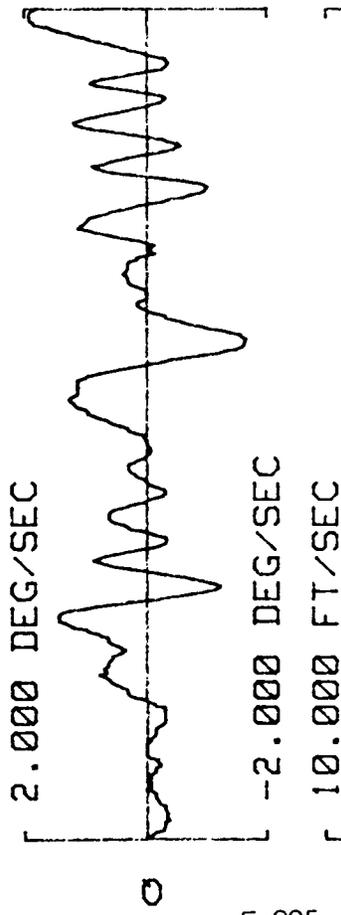
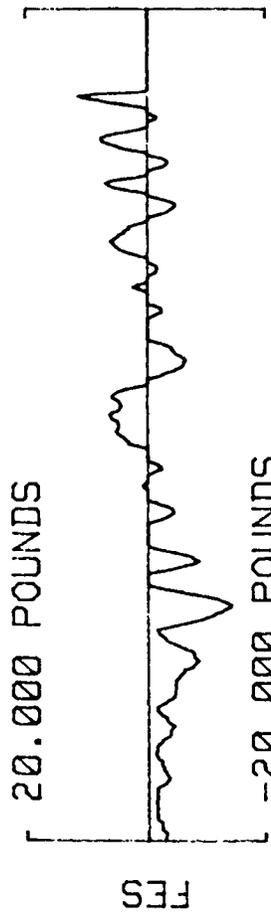


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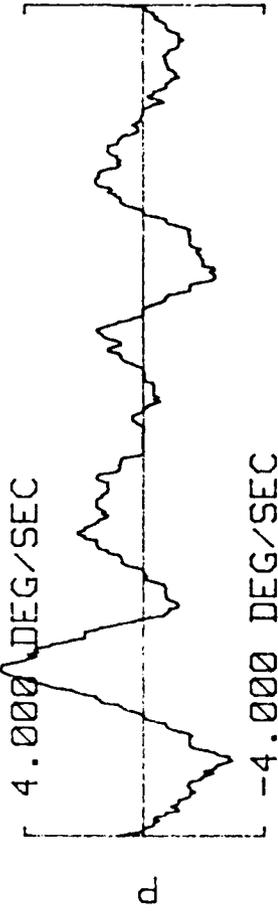
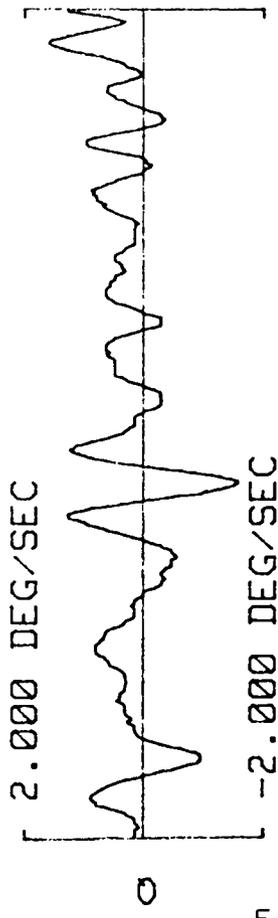
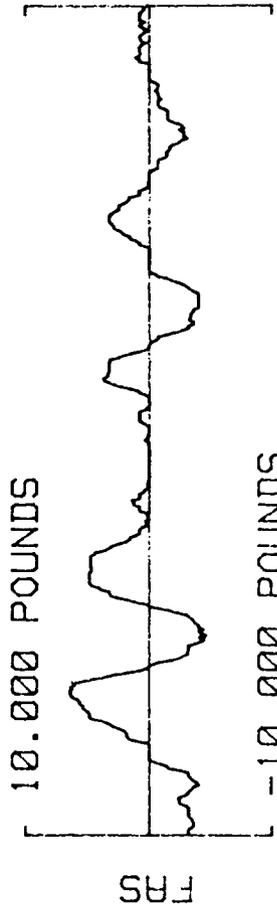
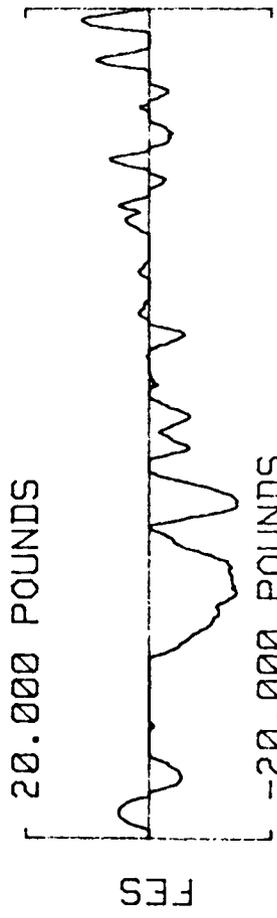
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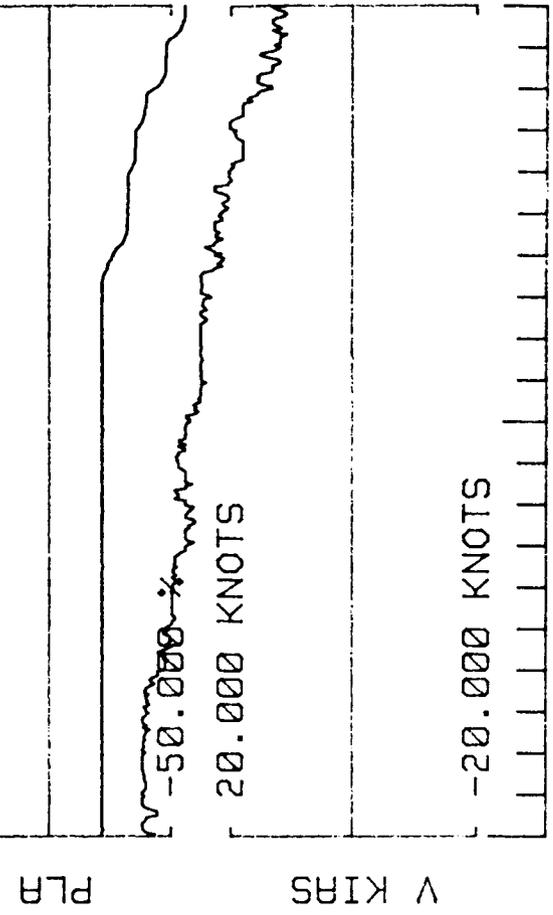
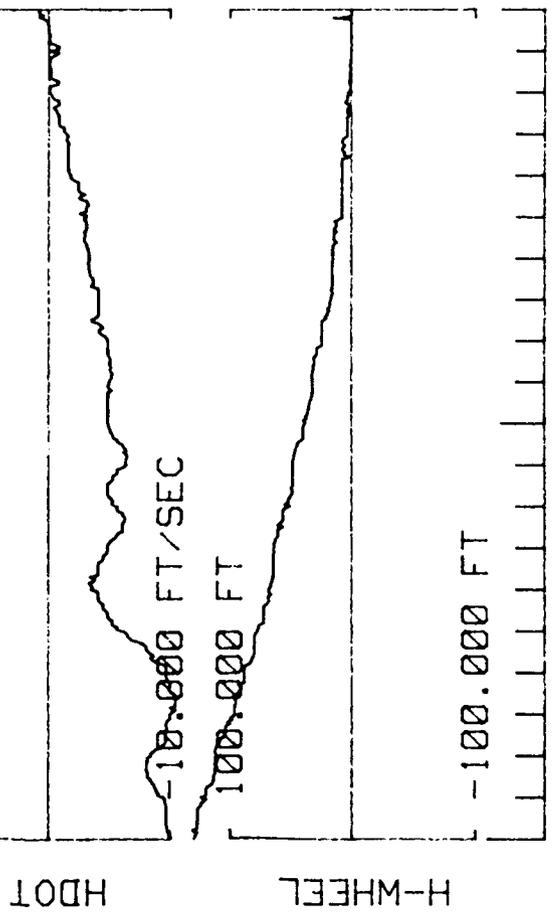
FLT 918 APP 1 CONF 9



FLT 918 APP 2 CONF 9

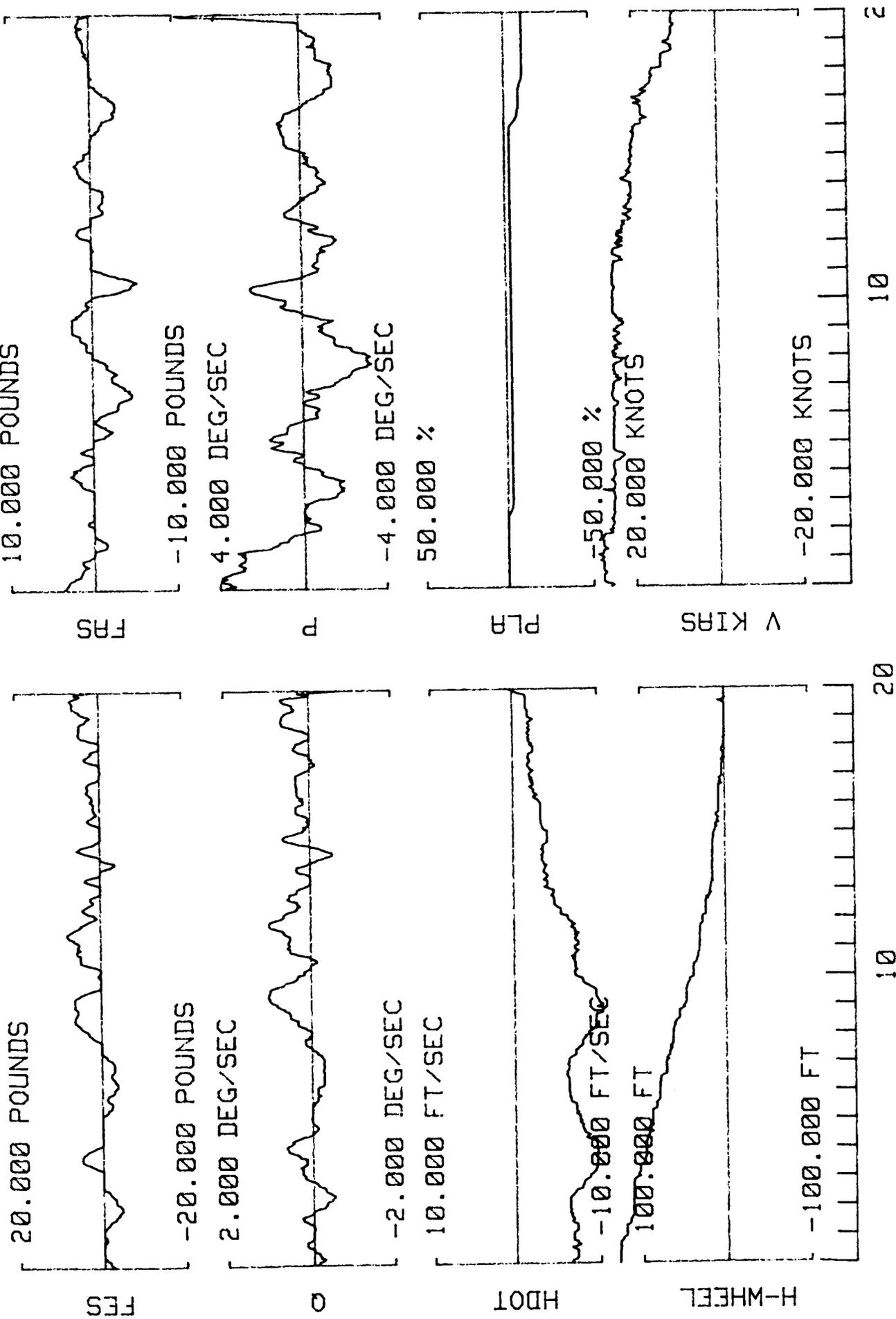


902-3



0 10 20 10 20

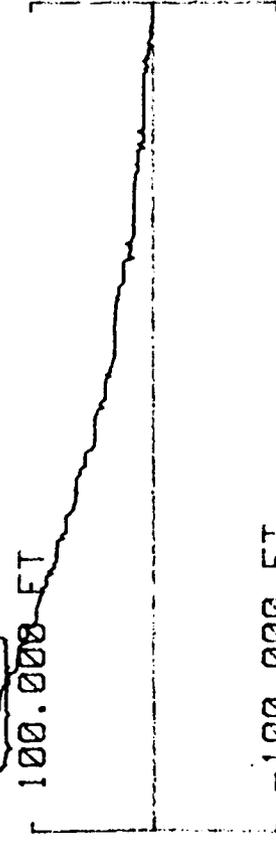
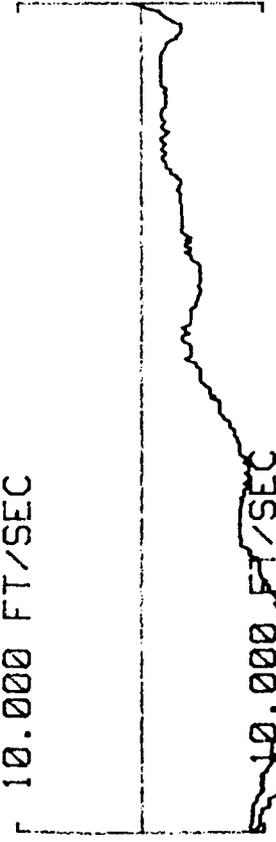
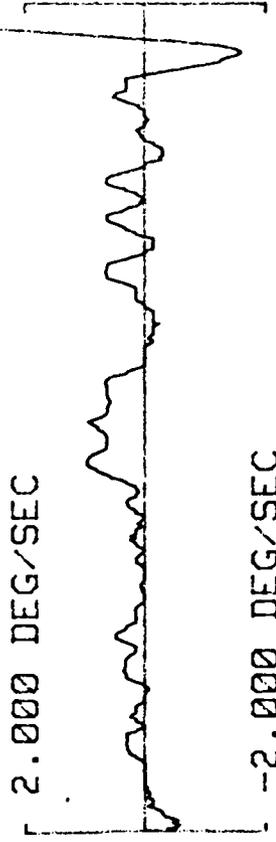
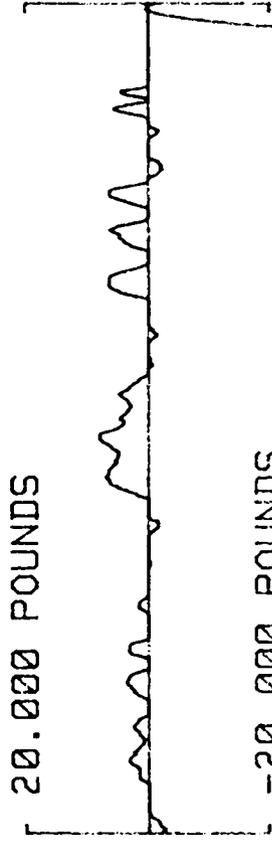
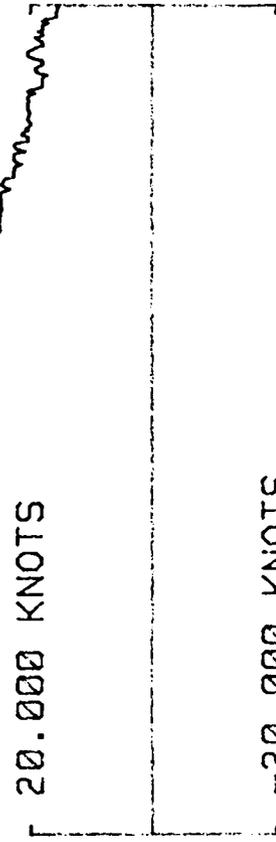
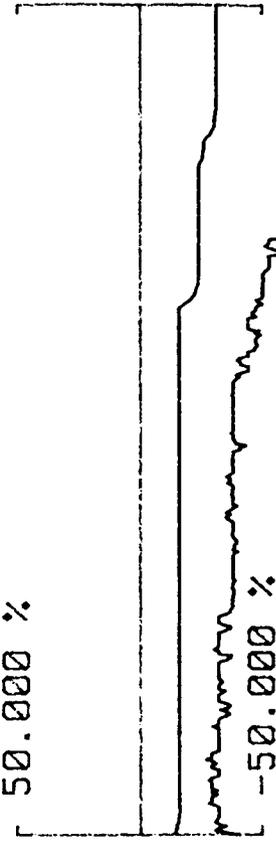
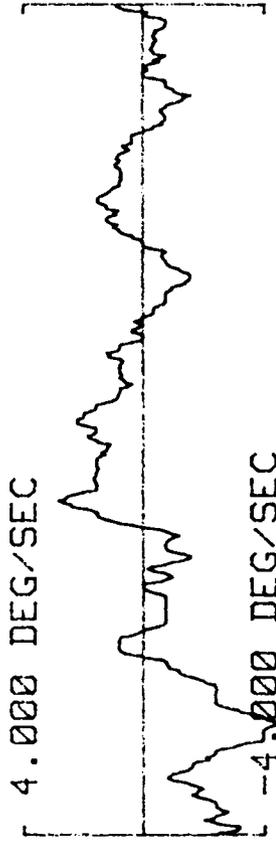
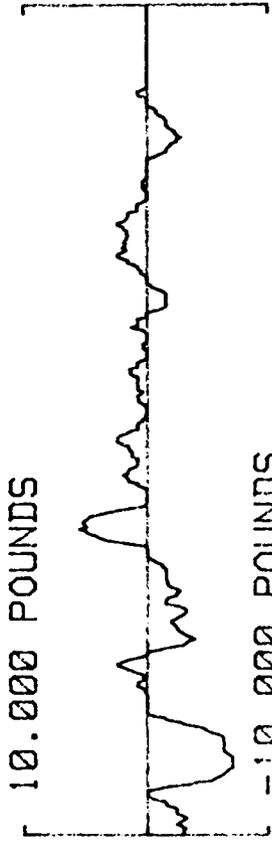
JFLT 918 APP 3 CONF 10



CONF 10

APP 4

FLT 918



802-E

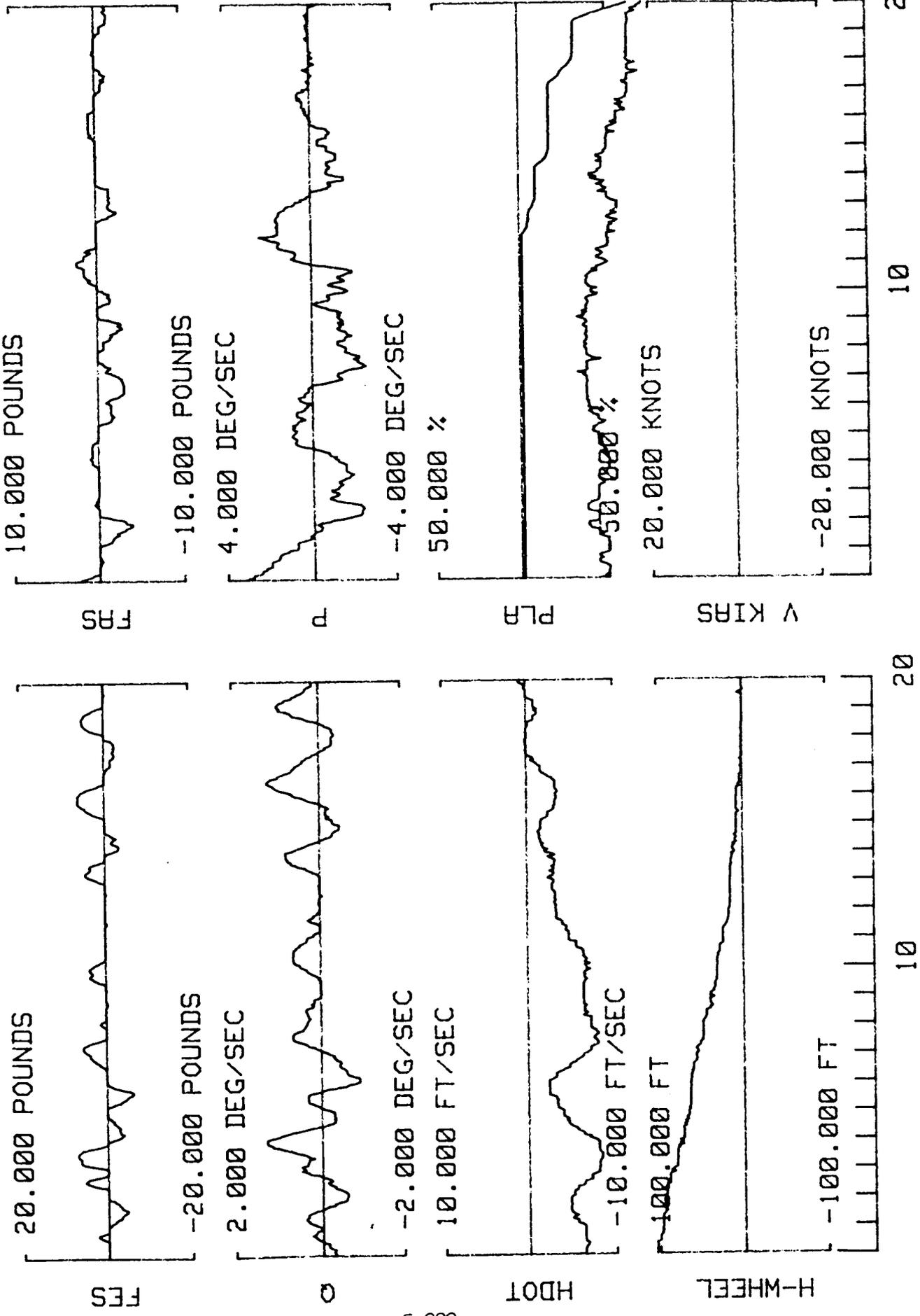
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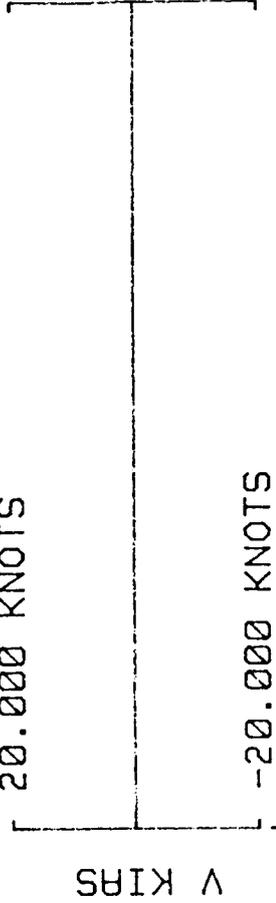
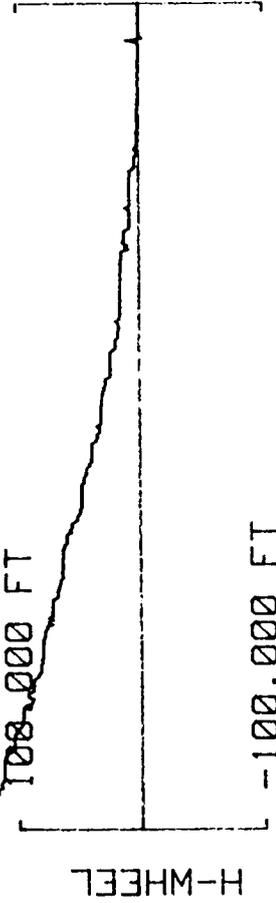
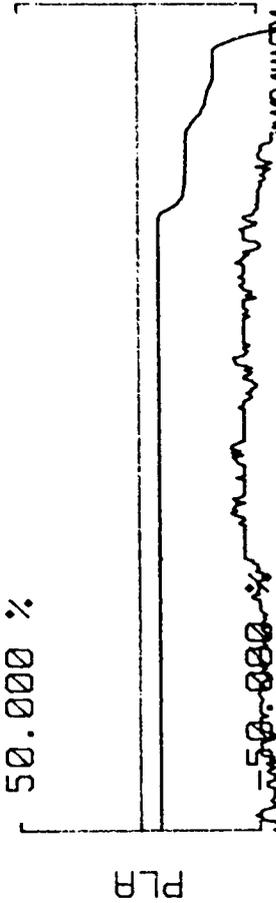
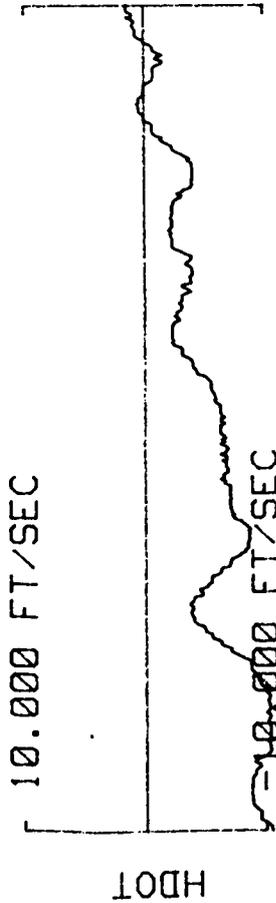
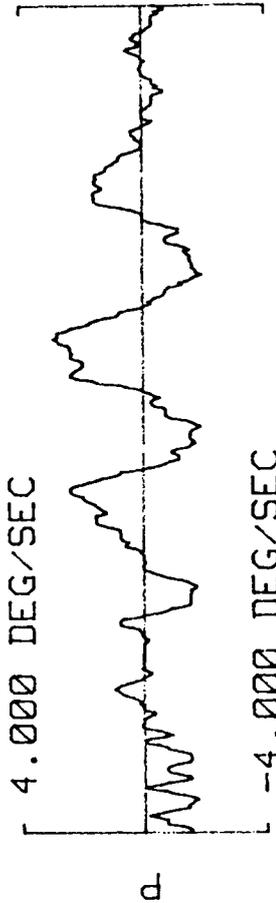
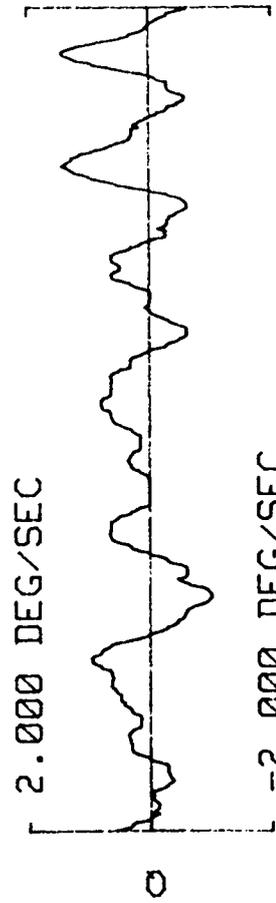
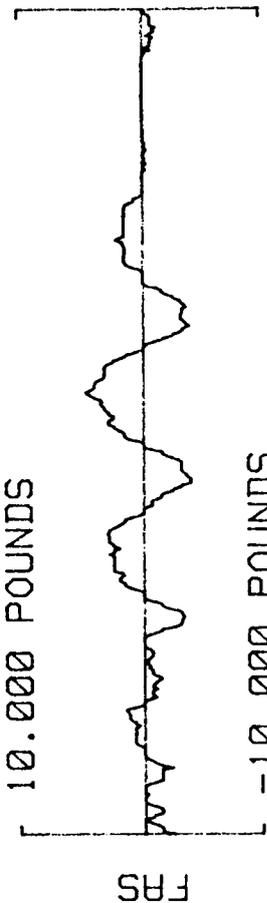
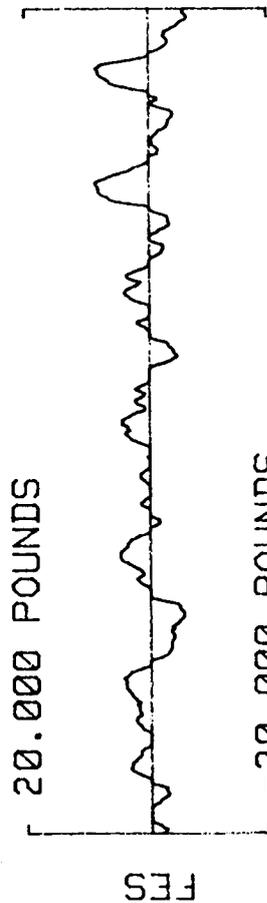
FLT 918 APP 5 CONF 14



FLT 918

APP 6

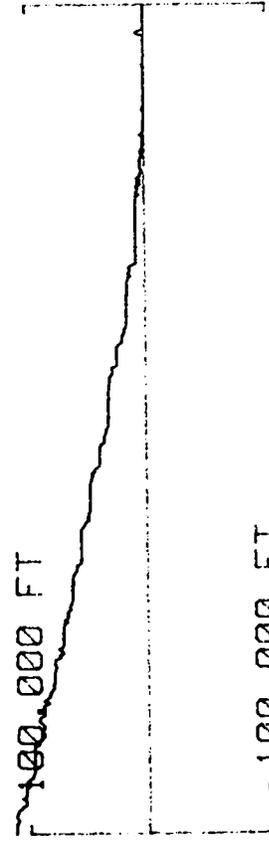
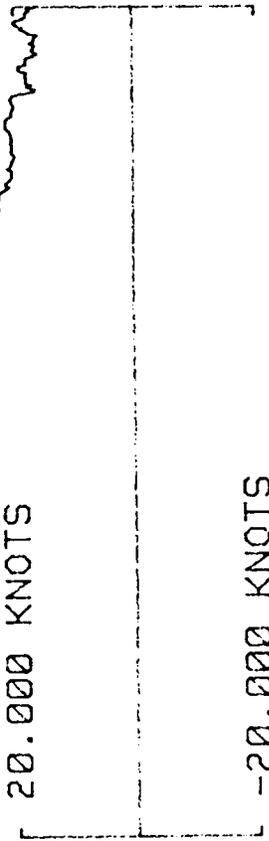
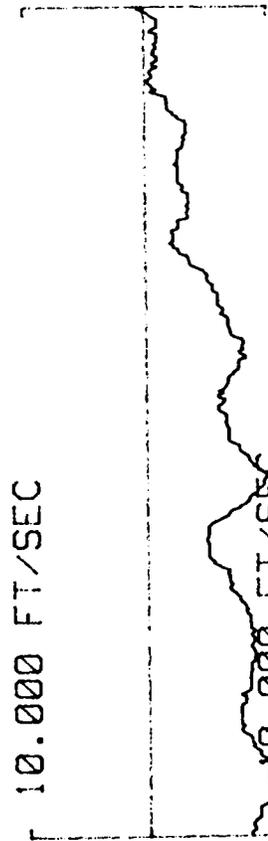
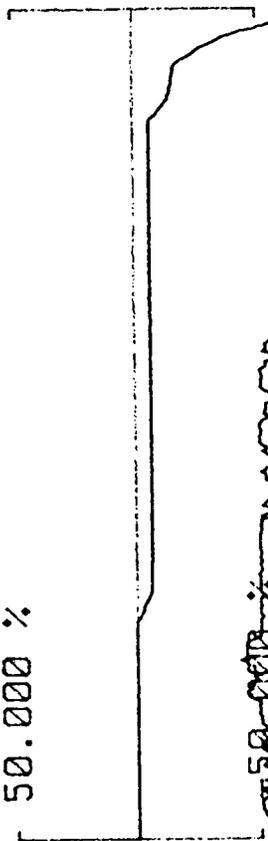
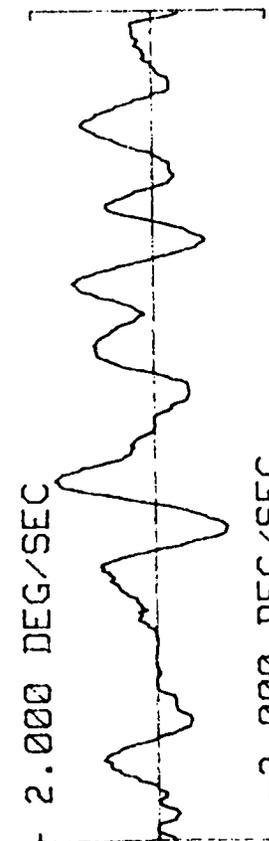
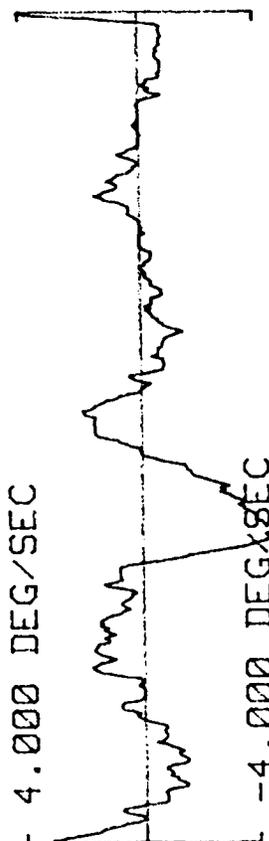
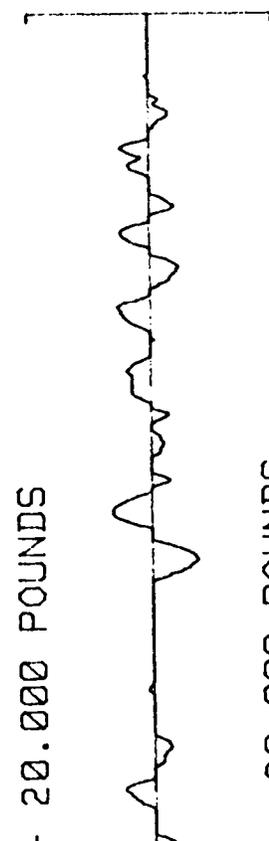
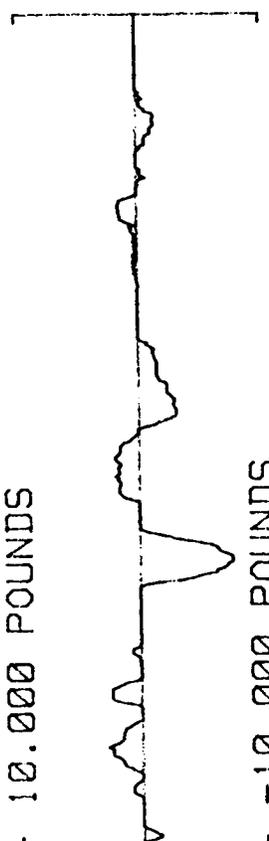
CONF 14



CONF 11

APP 7

FLT 918



-10.000 POUNDS

-20.000 POUNDS

-4.000 DEG/SEC

-2.000 DEG/SEC

50.000 %

10.000 FT/SEC

20.000 KNOTS

100.000 FT

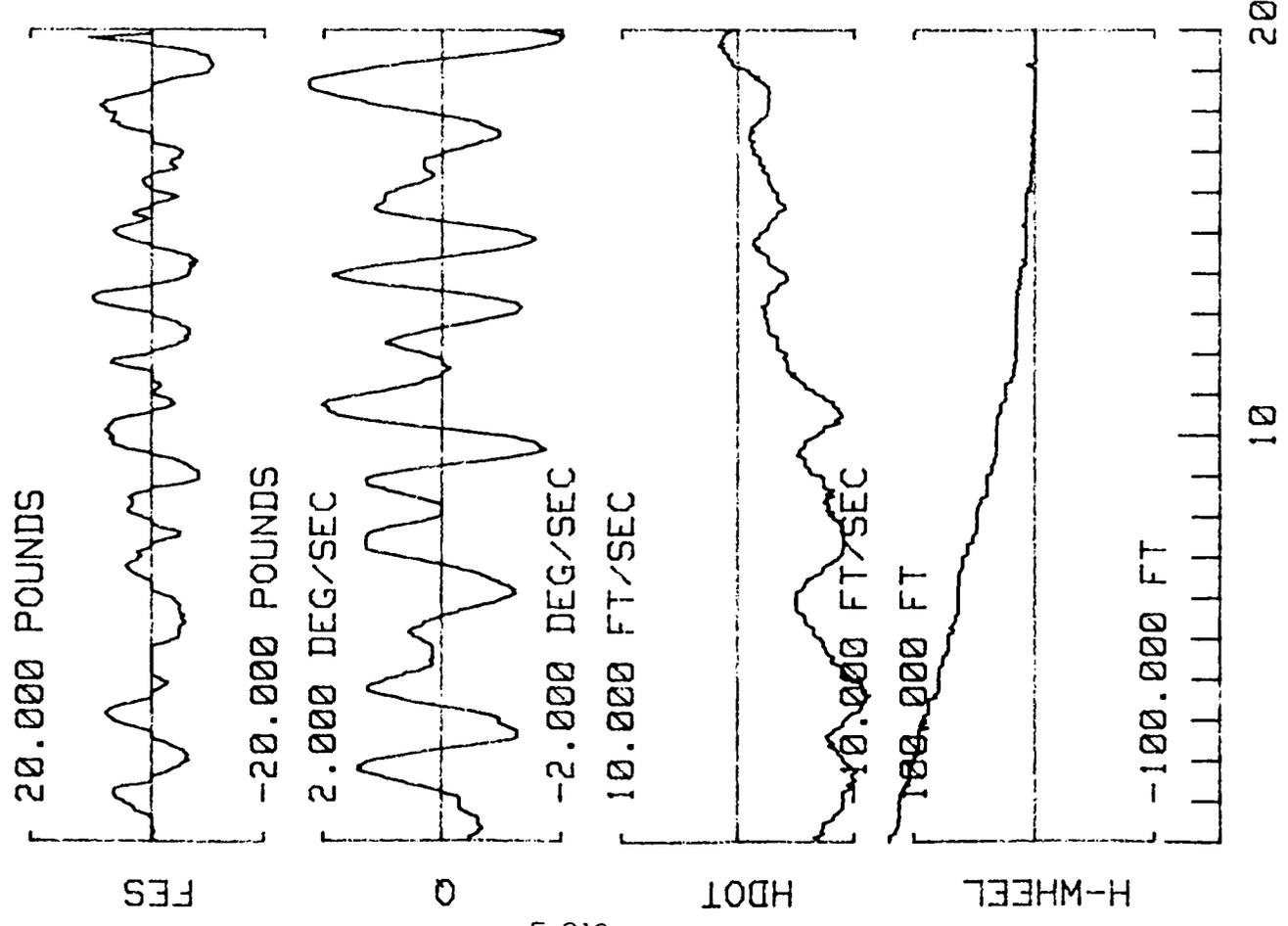
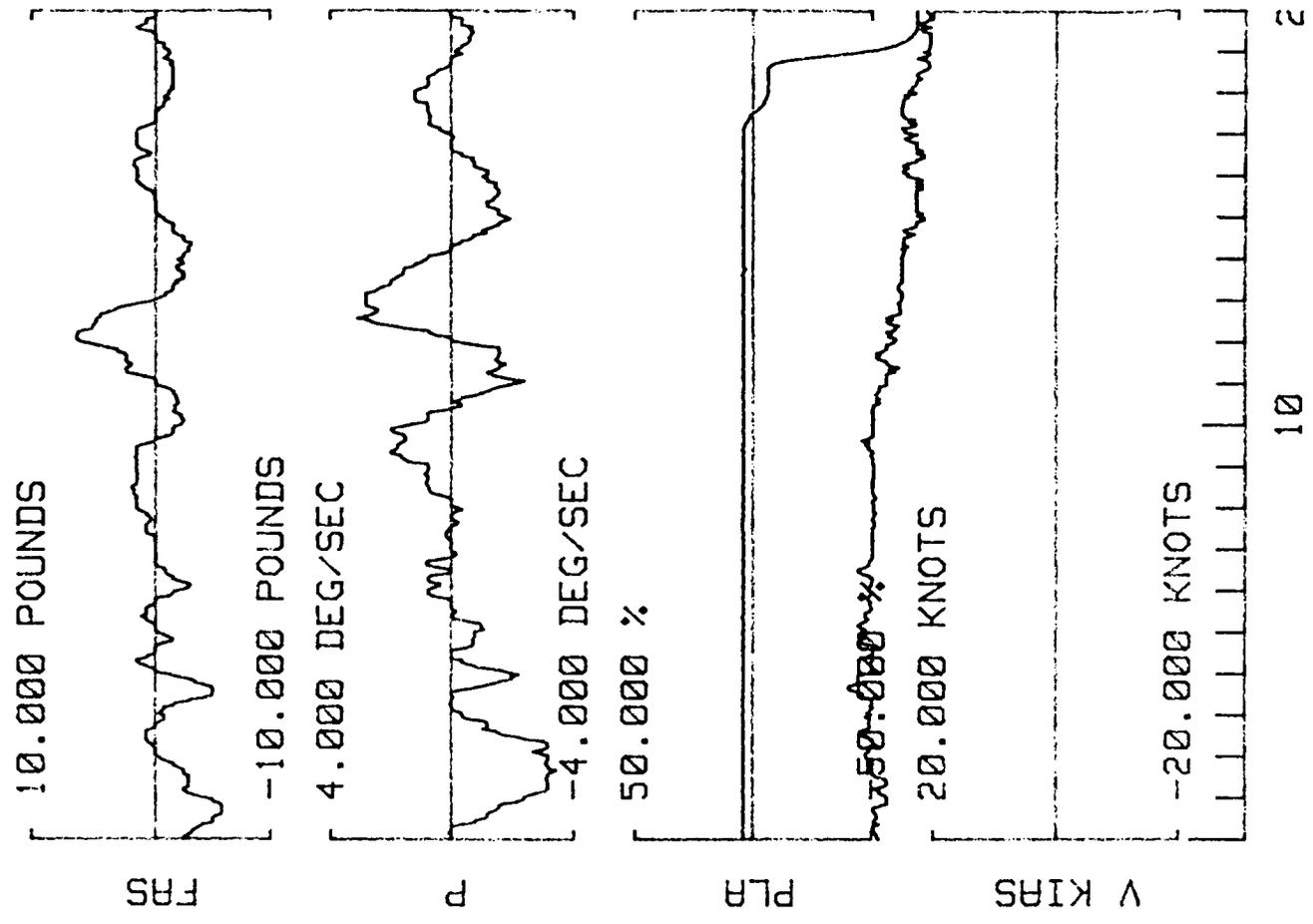
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20

10

2

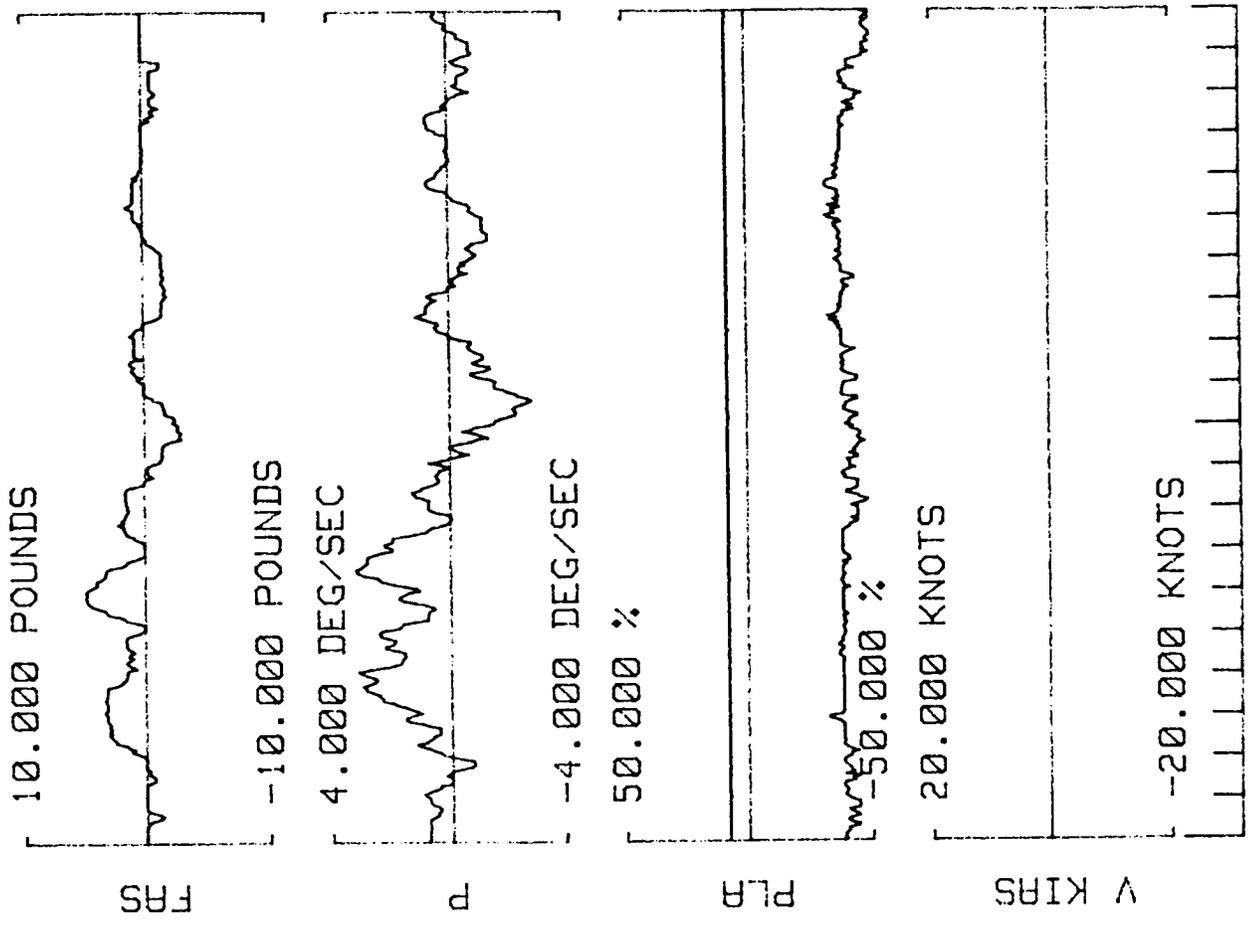
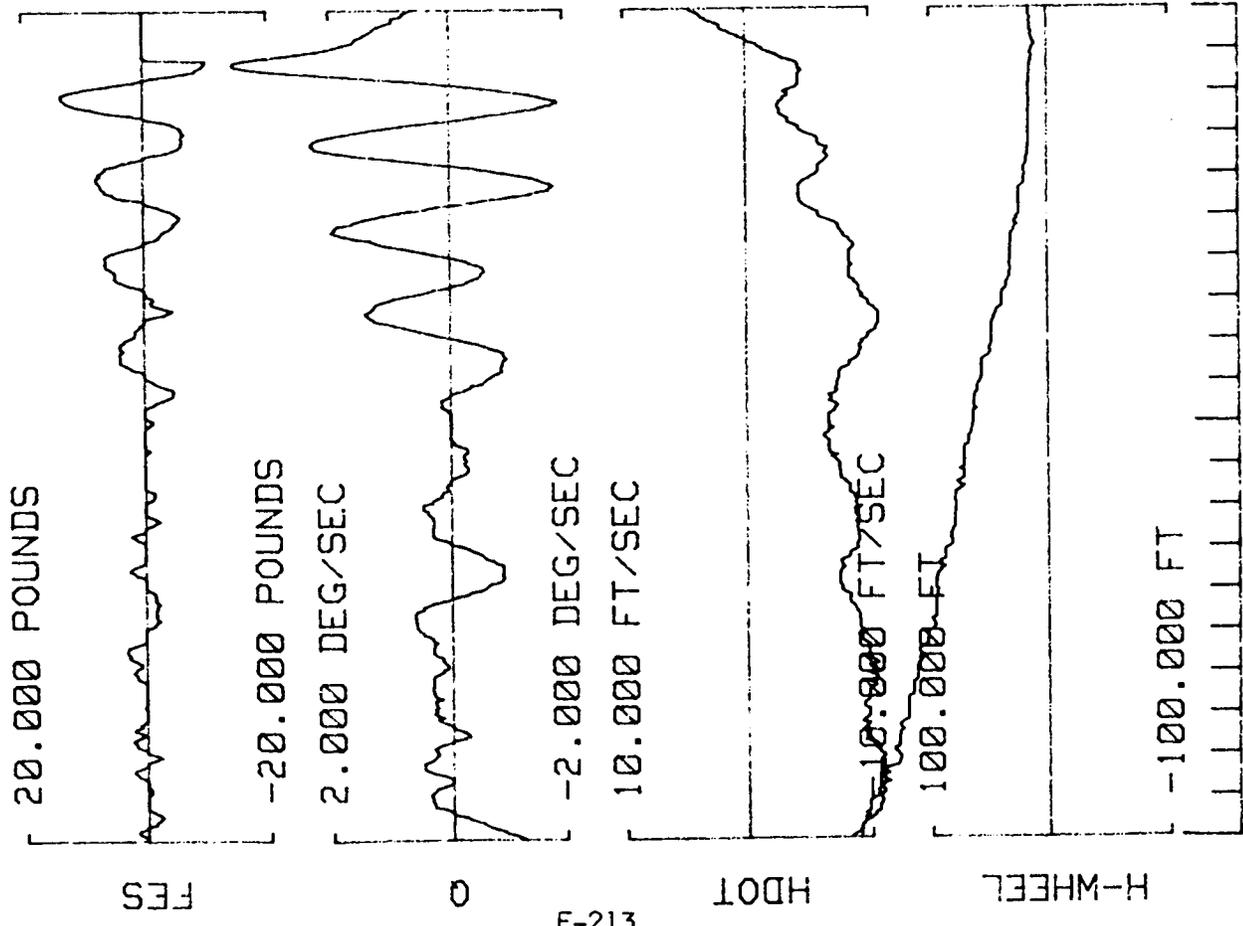
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FLT 918

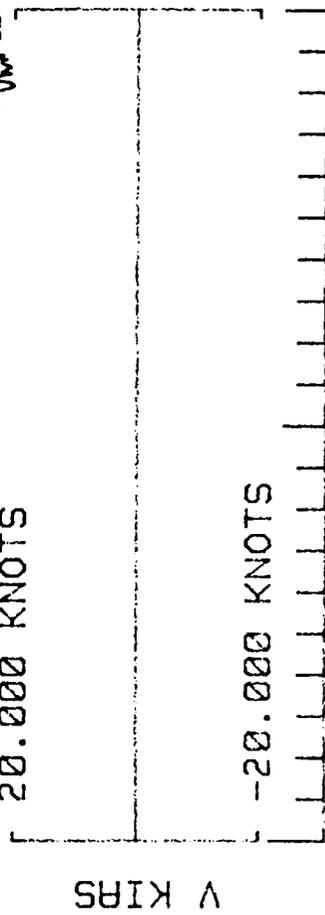
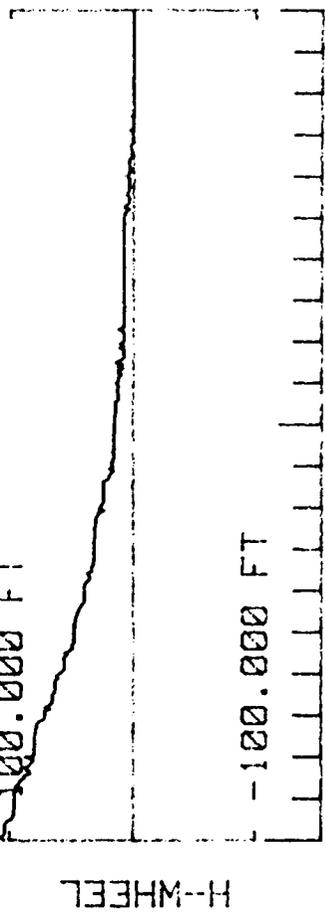
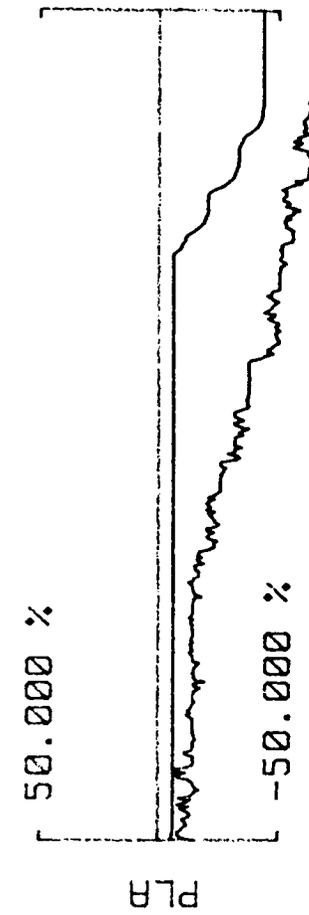
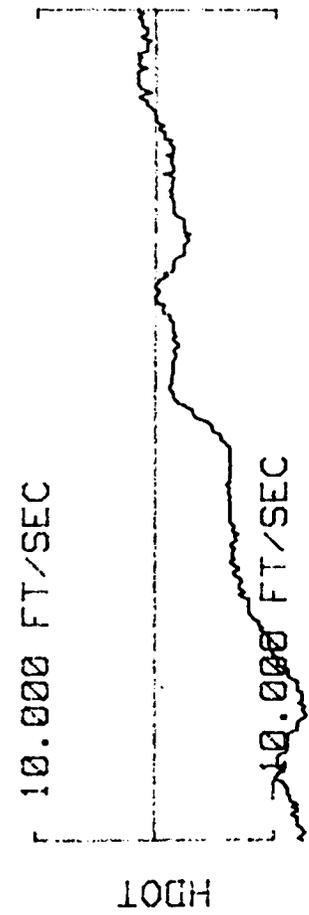
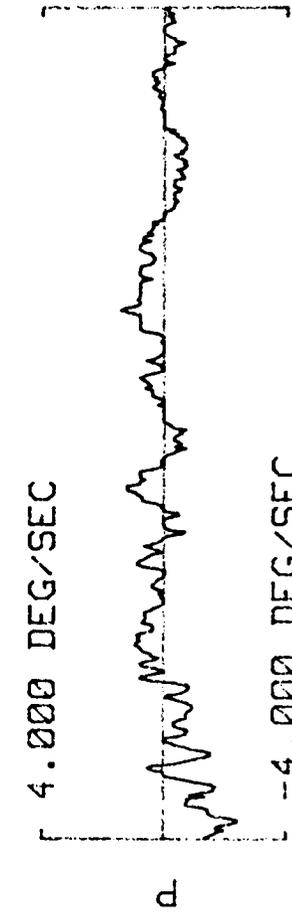
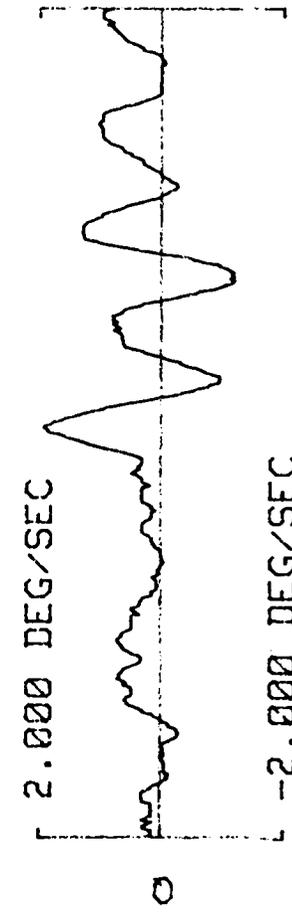
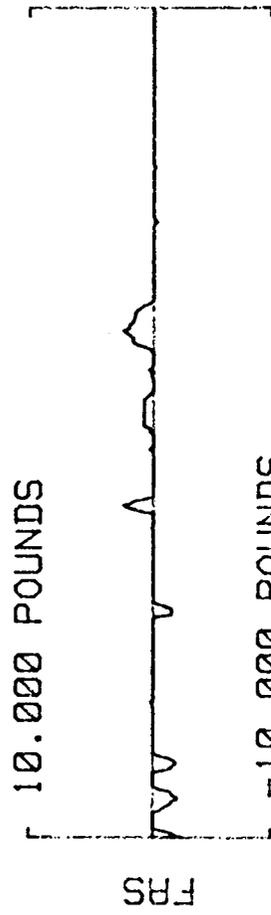
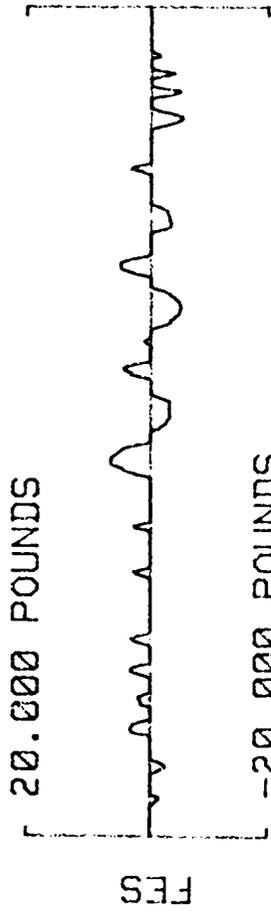
APP 9

CONF 12

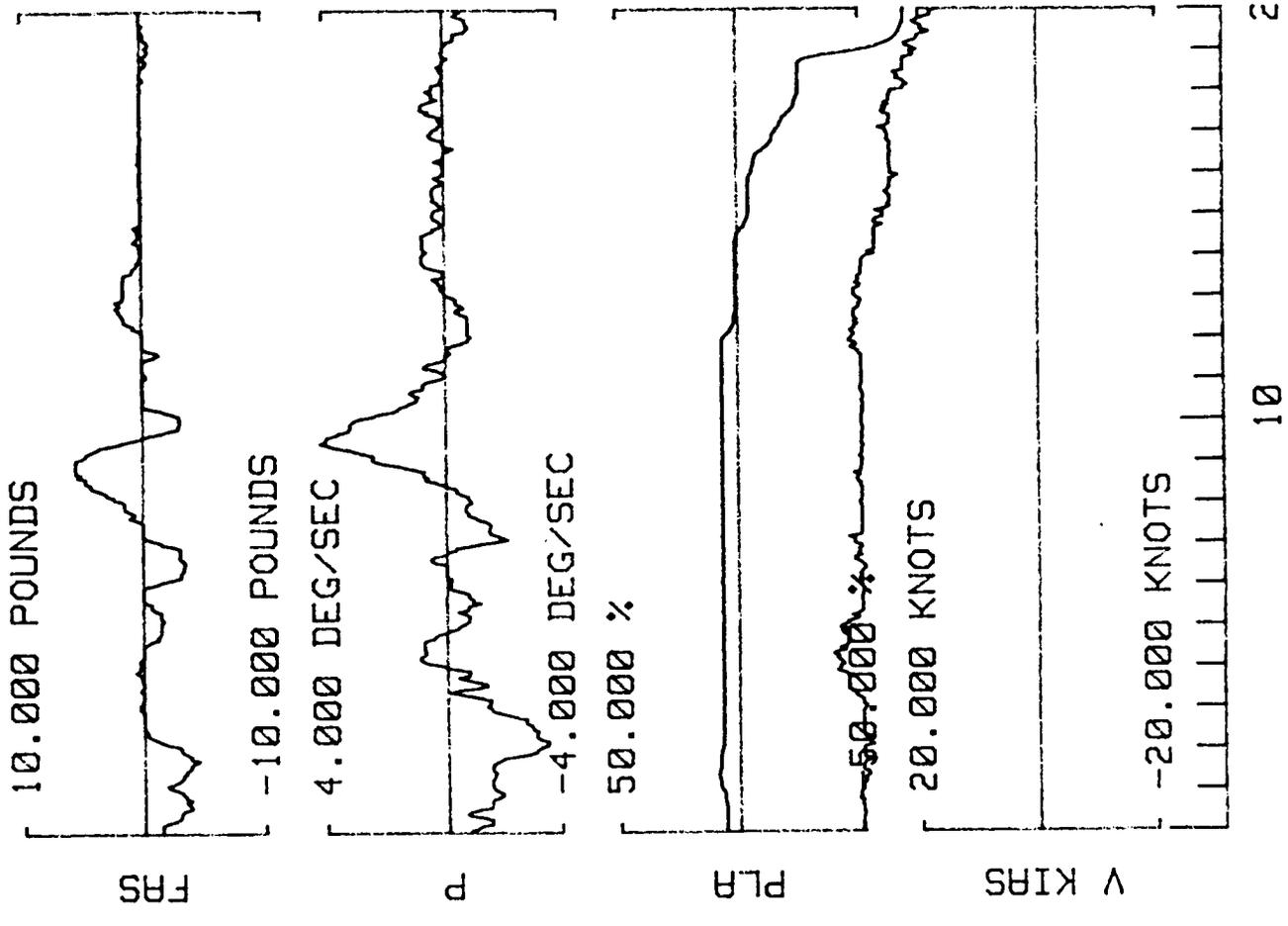
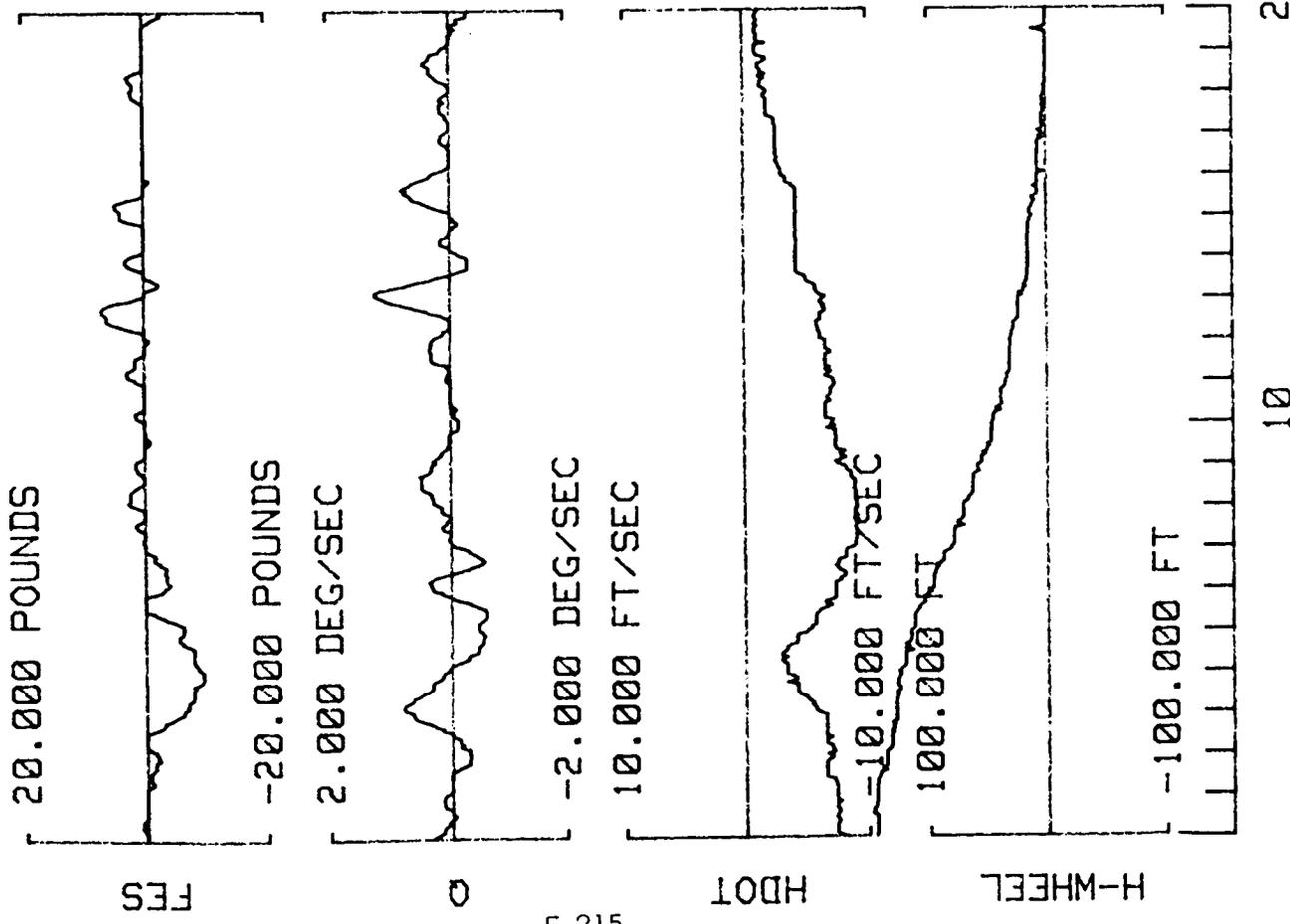


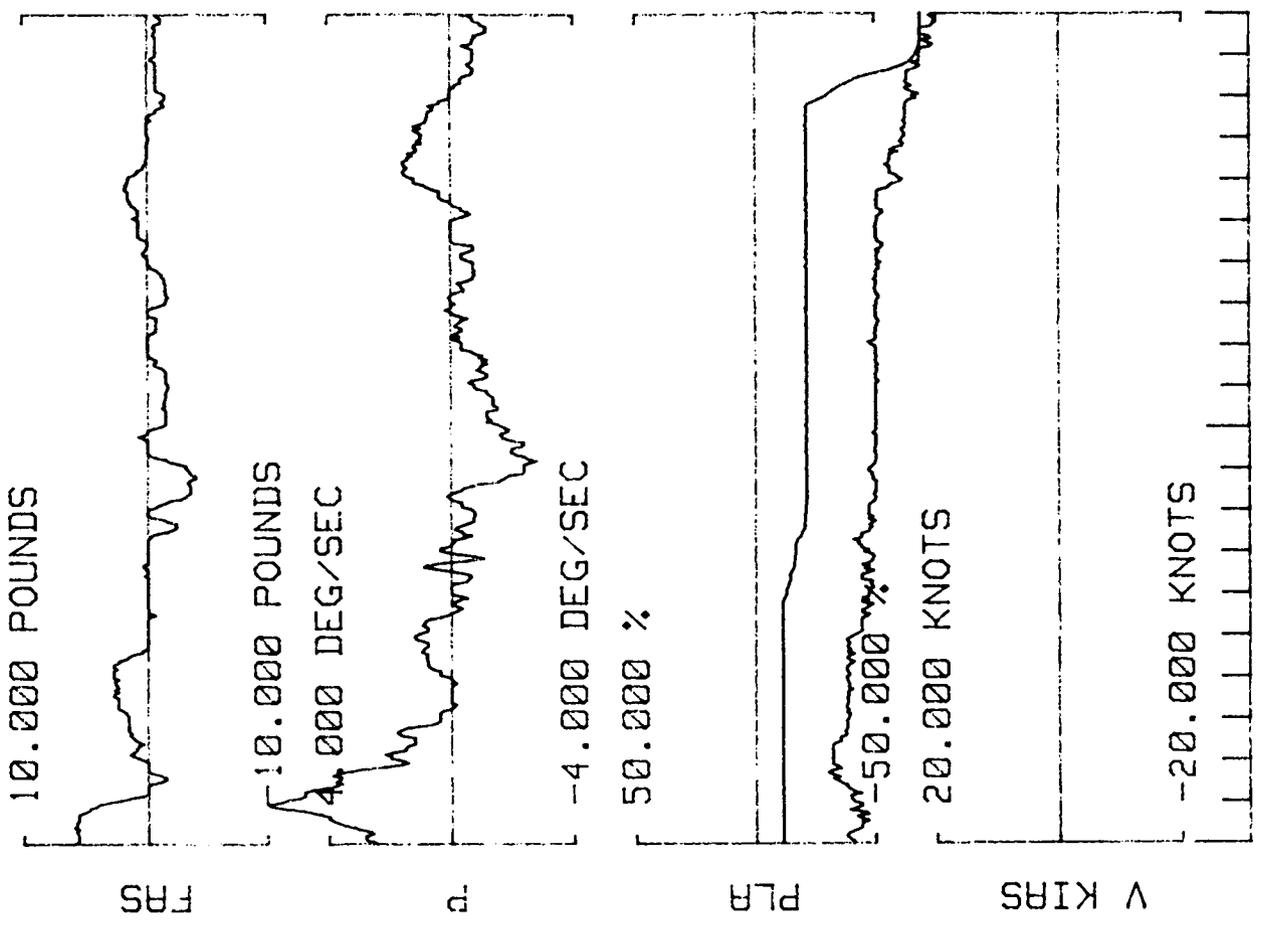
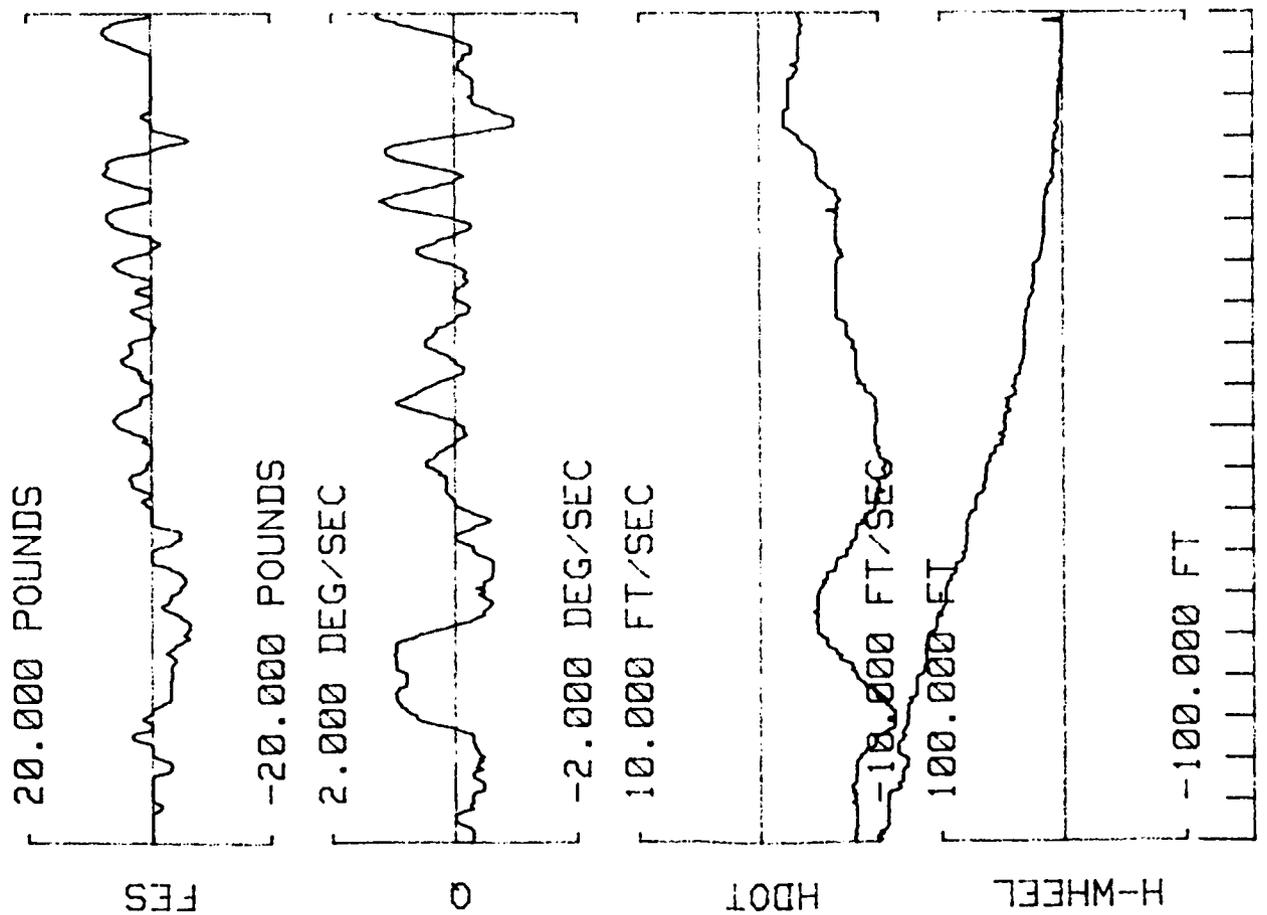
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FLT 918 APP 10 CONF 12



FLT 918 APP 11 CONF 5





Appendix F  
NEAL-SMITH PARAMETER PLANE PLOTS

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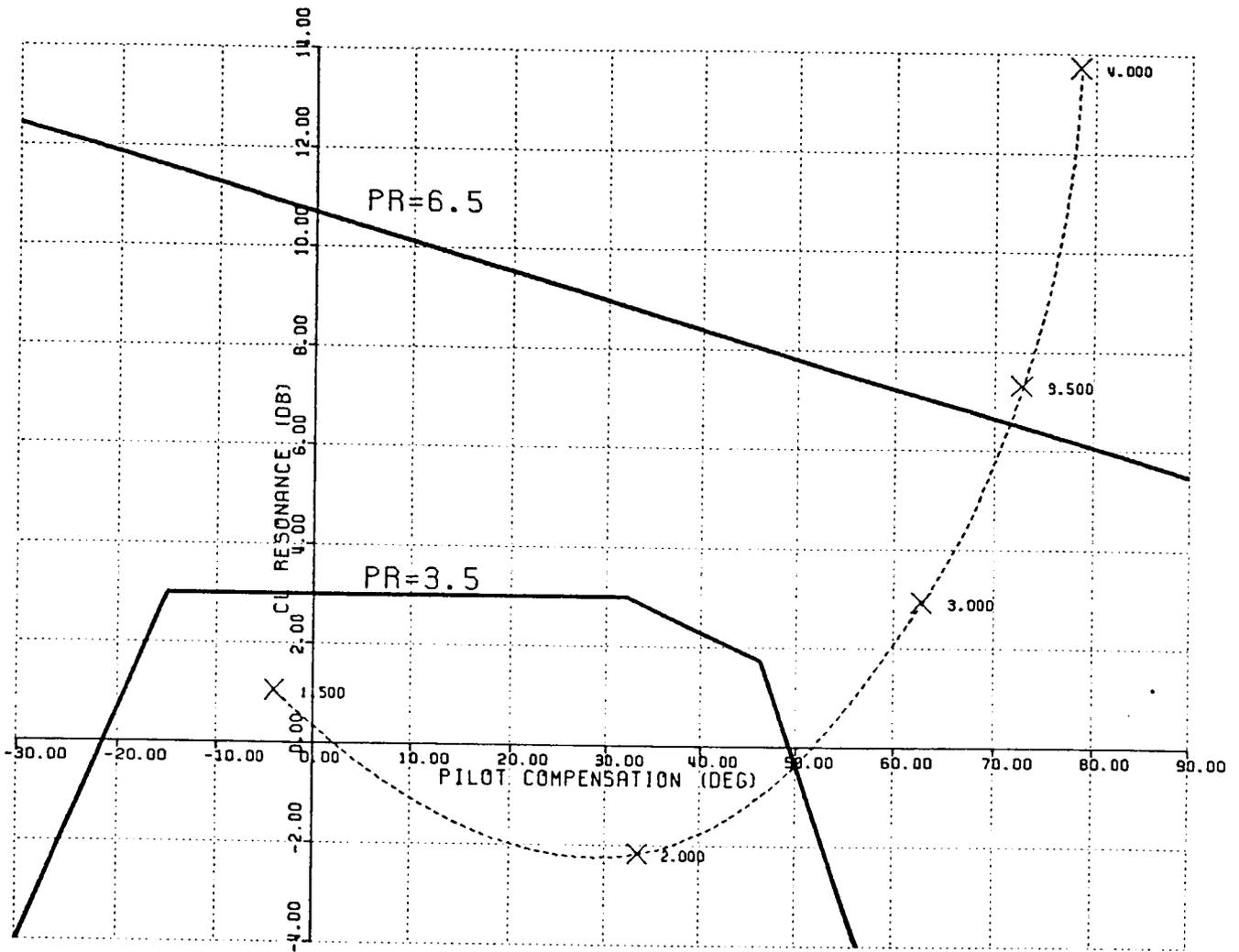


Figure F-1 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 1

TIFS CONFIGURATION 2

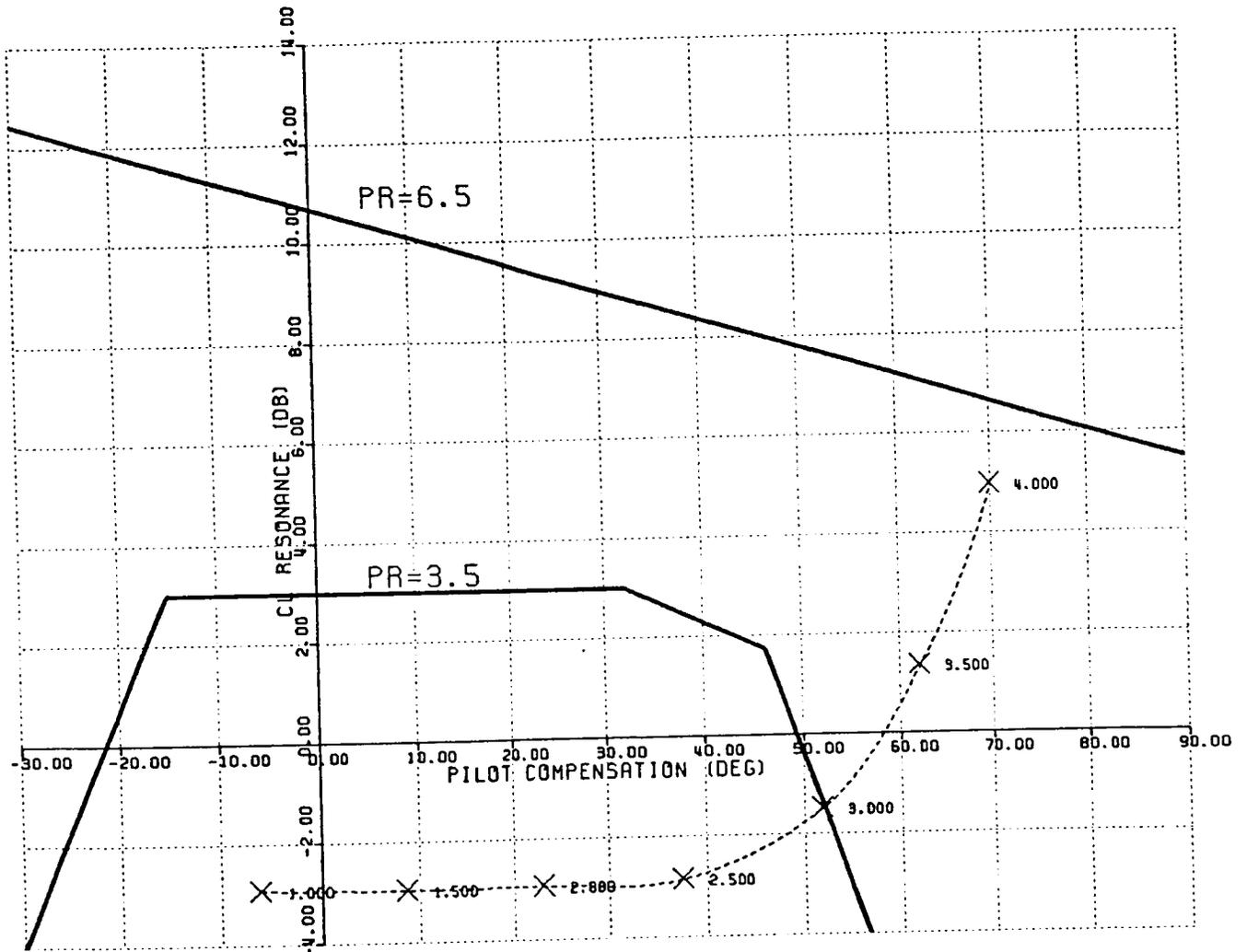


Figure F-2 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 2

TIFS CONFIGURATION 3

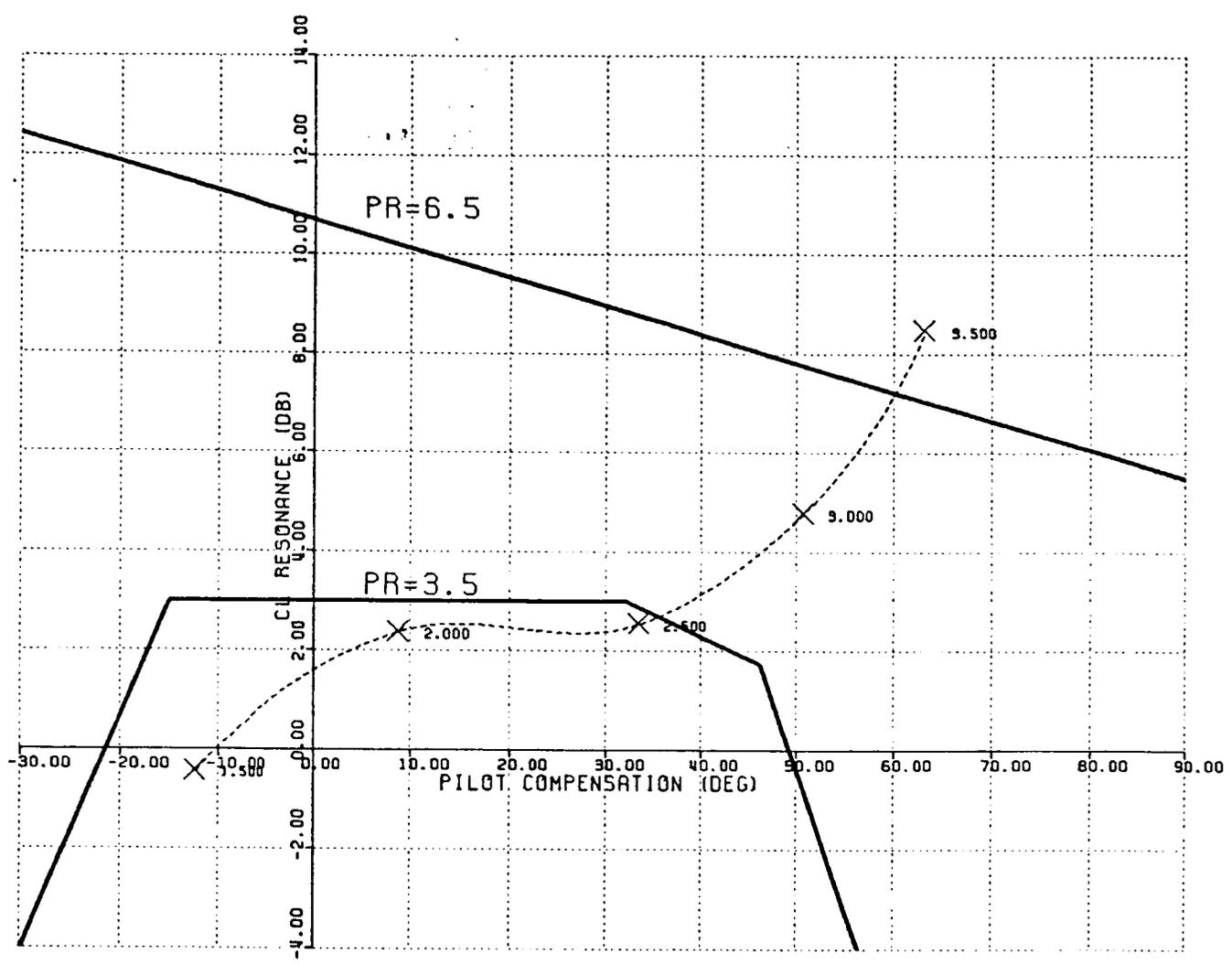


Figure F-3 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 3

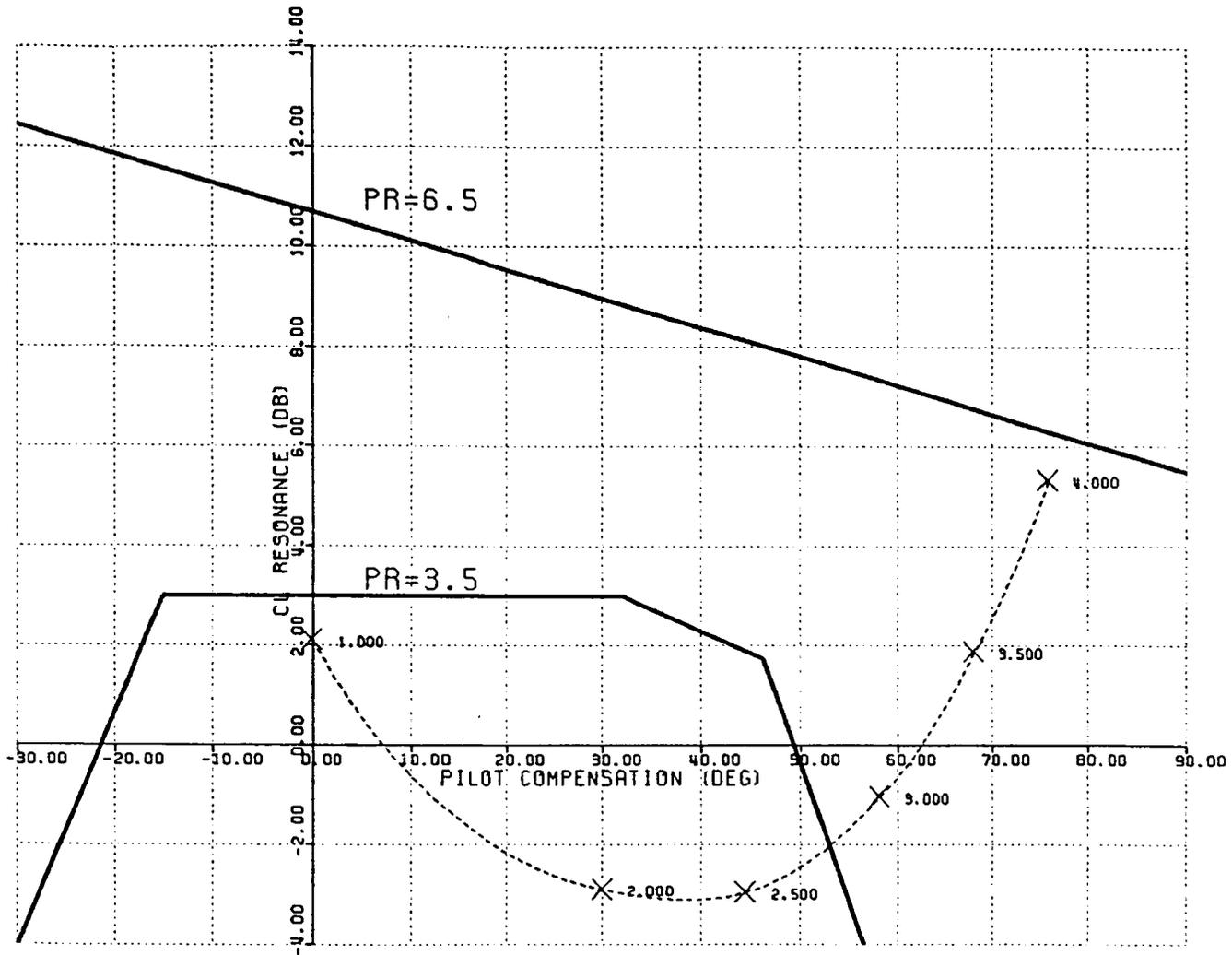


Figure F-4 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 4

TIFS CONFIGURATION 5

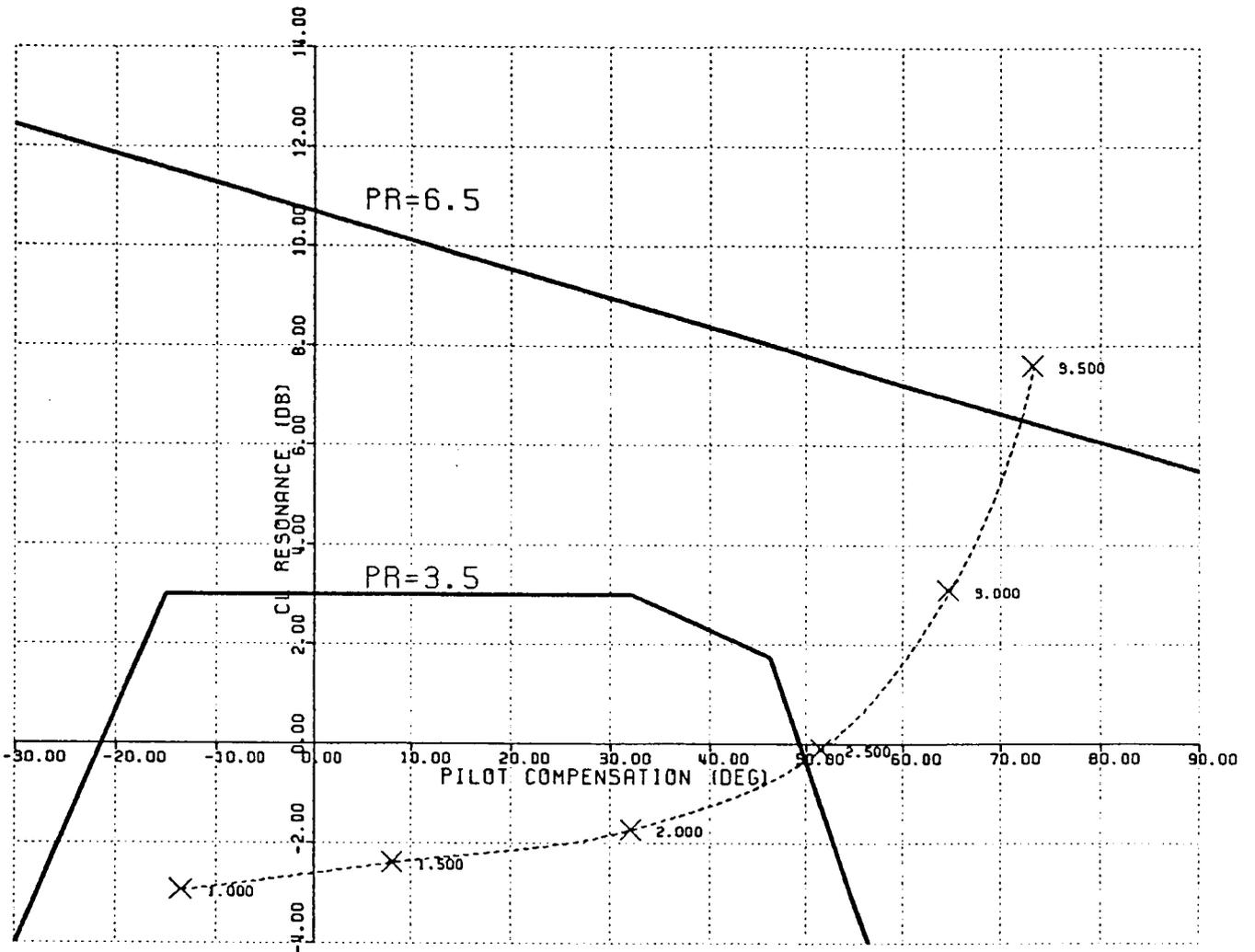


Figure F-5 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 5

TIFS CONFIGURATION 6

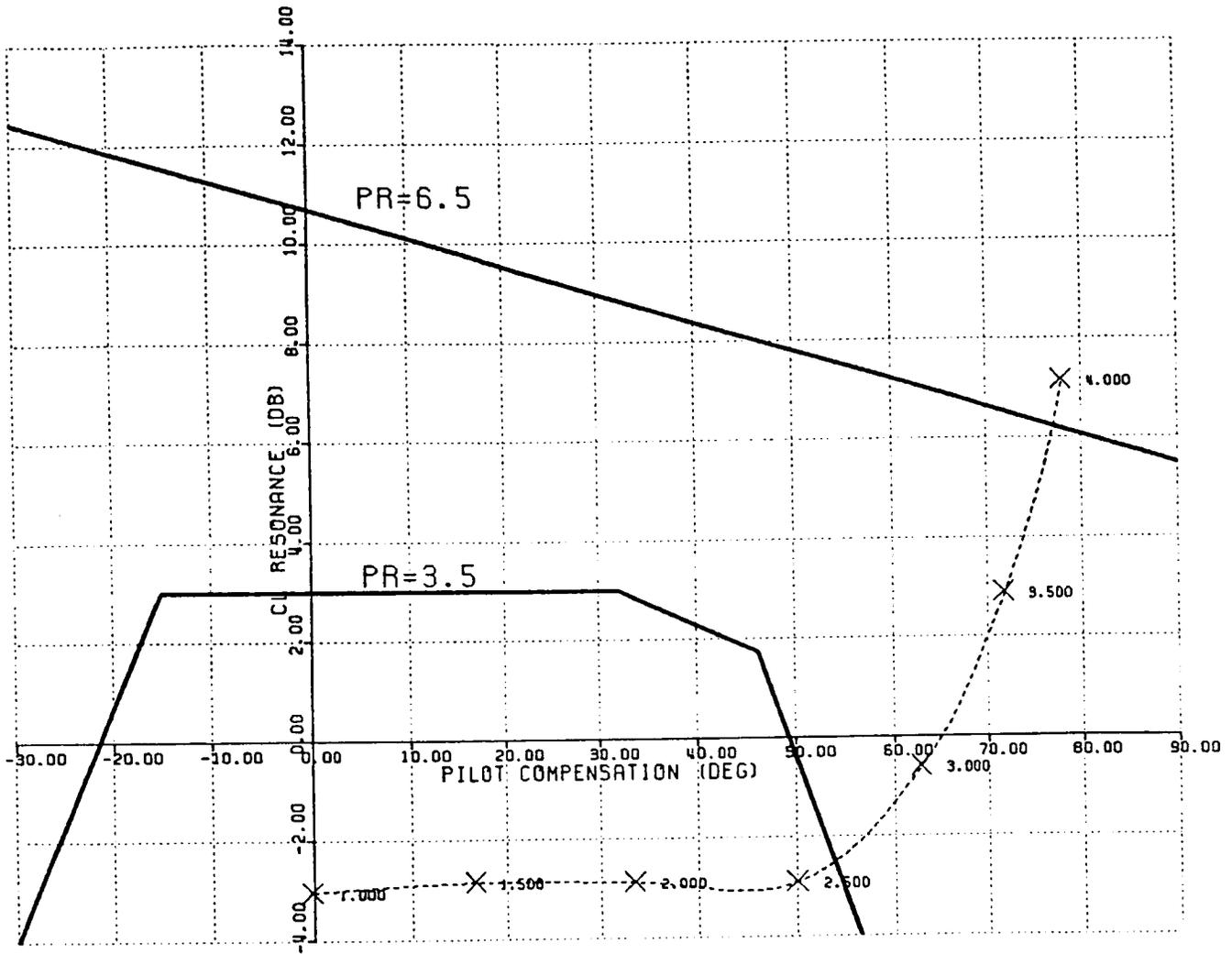


Figure F-6 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 6

TIFS CONFIGURATION 7

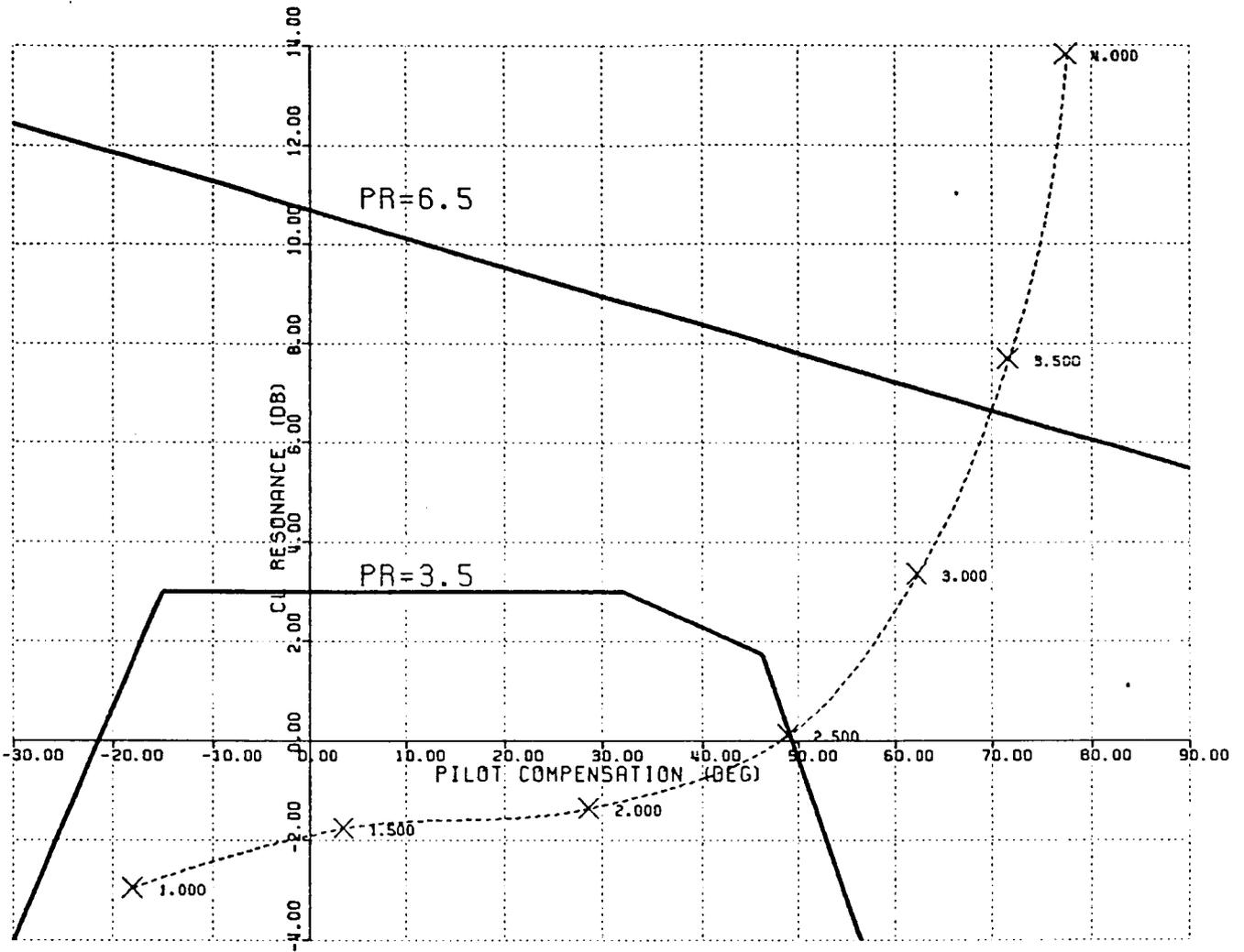


Figure F-7 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 7

TIFS CONFIGURATION 8

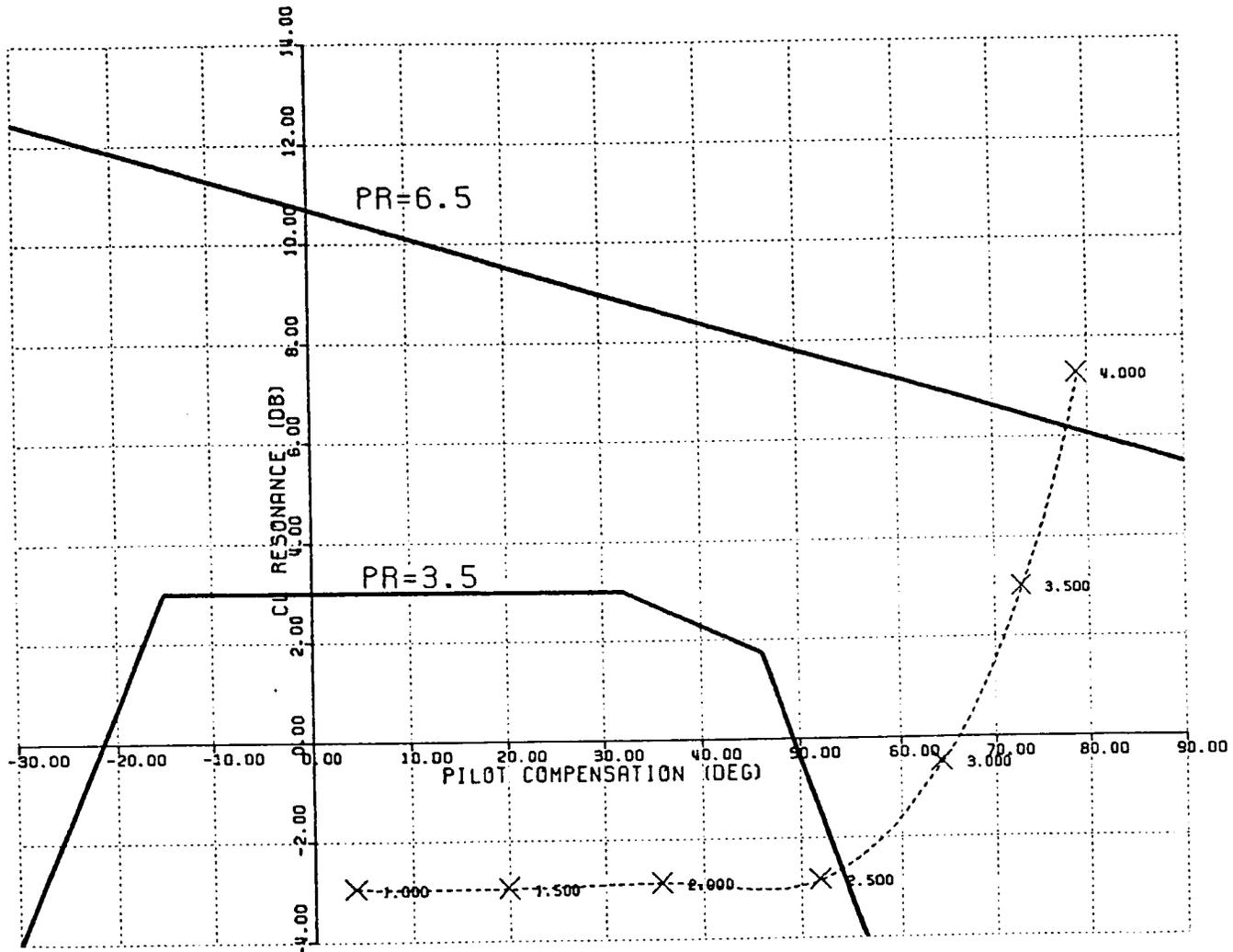


Figure F-8 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 8

TIFS CONFIGURATION 9

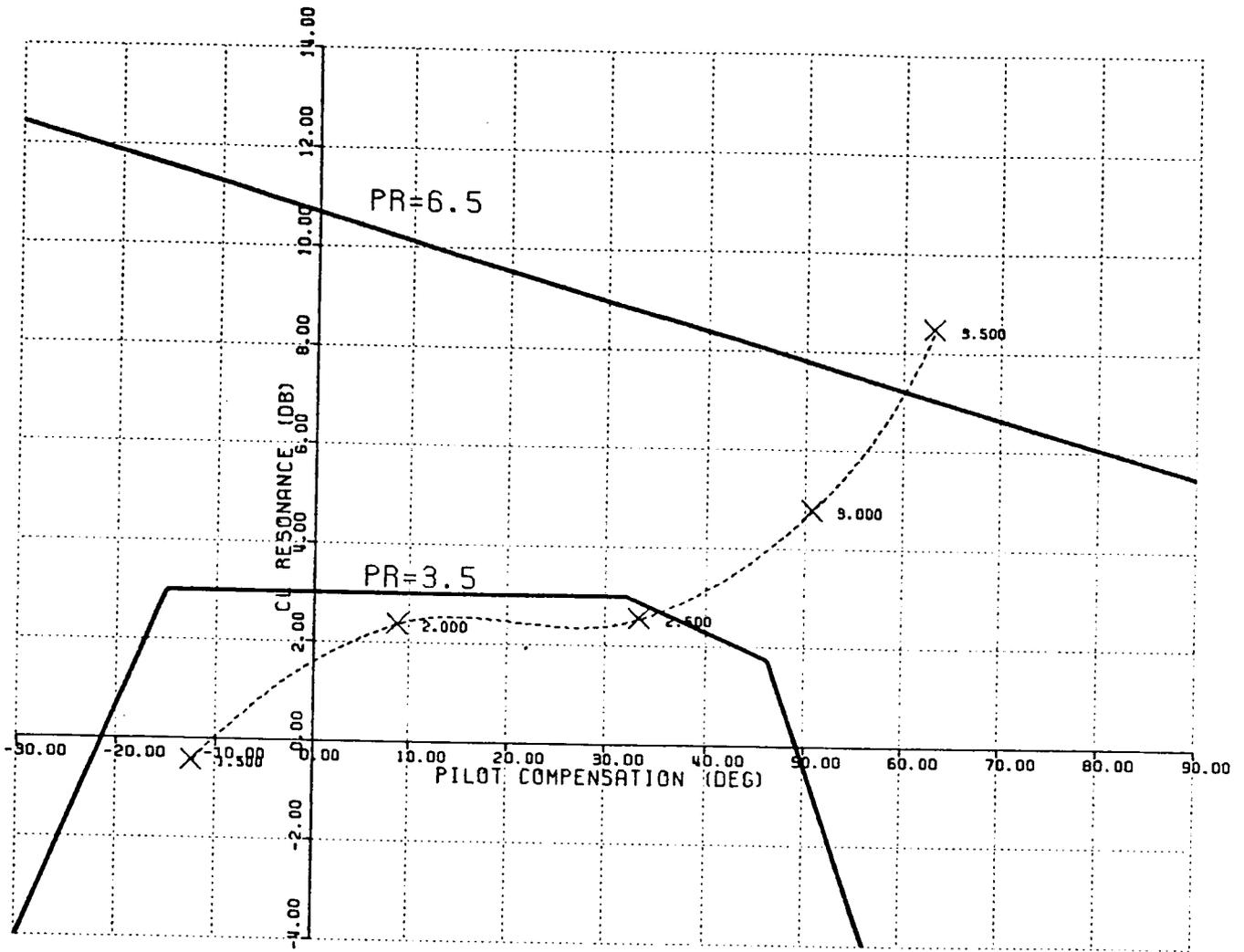


Figure F-9 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 9

TIFS CONFIGURATION 10

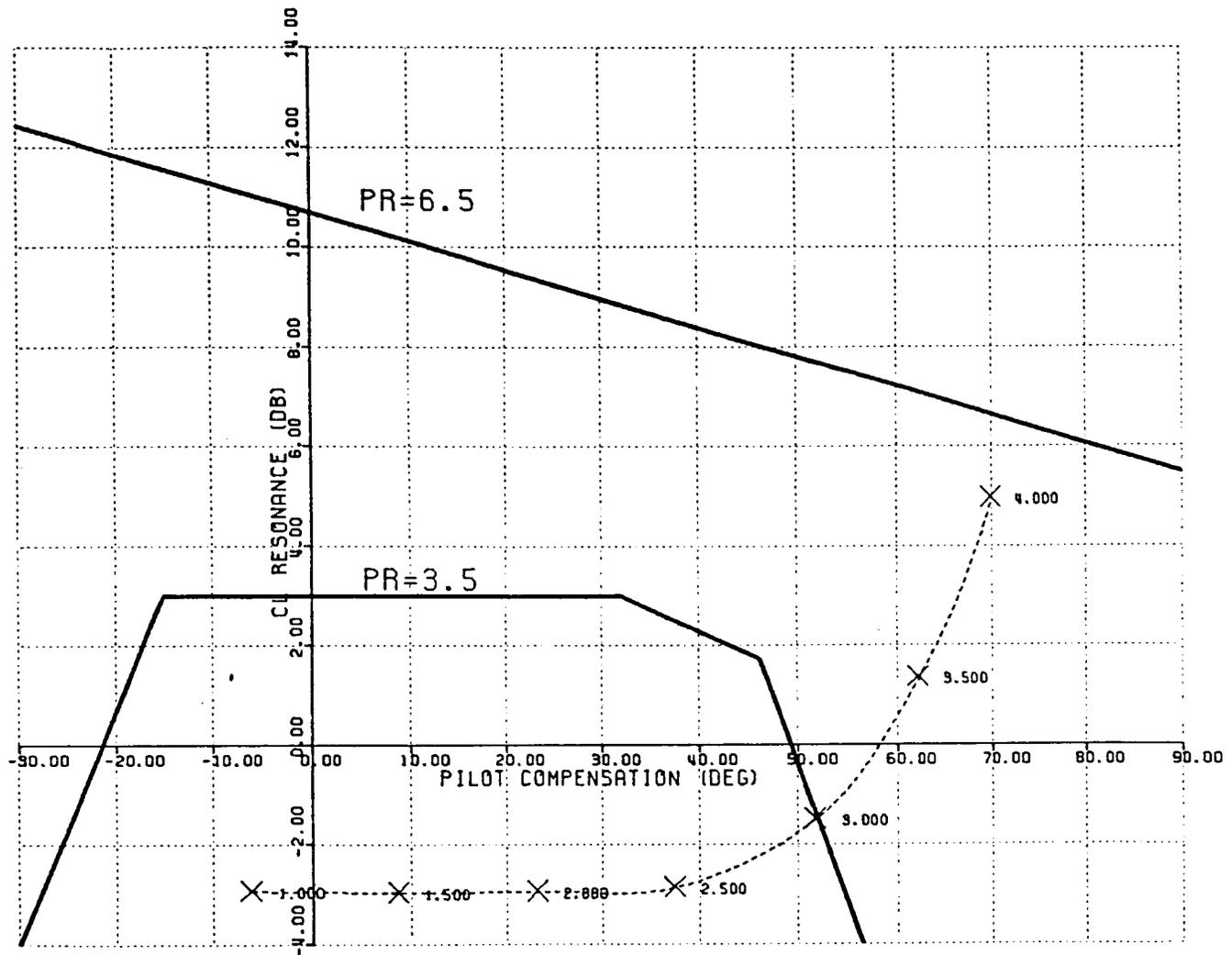


Figure F-10 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 10

TIFS CONFIGURATION 11

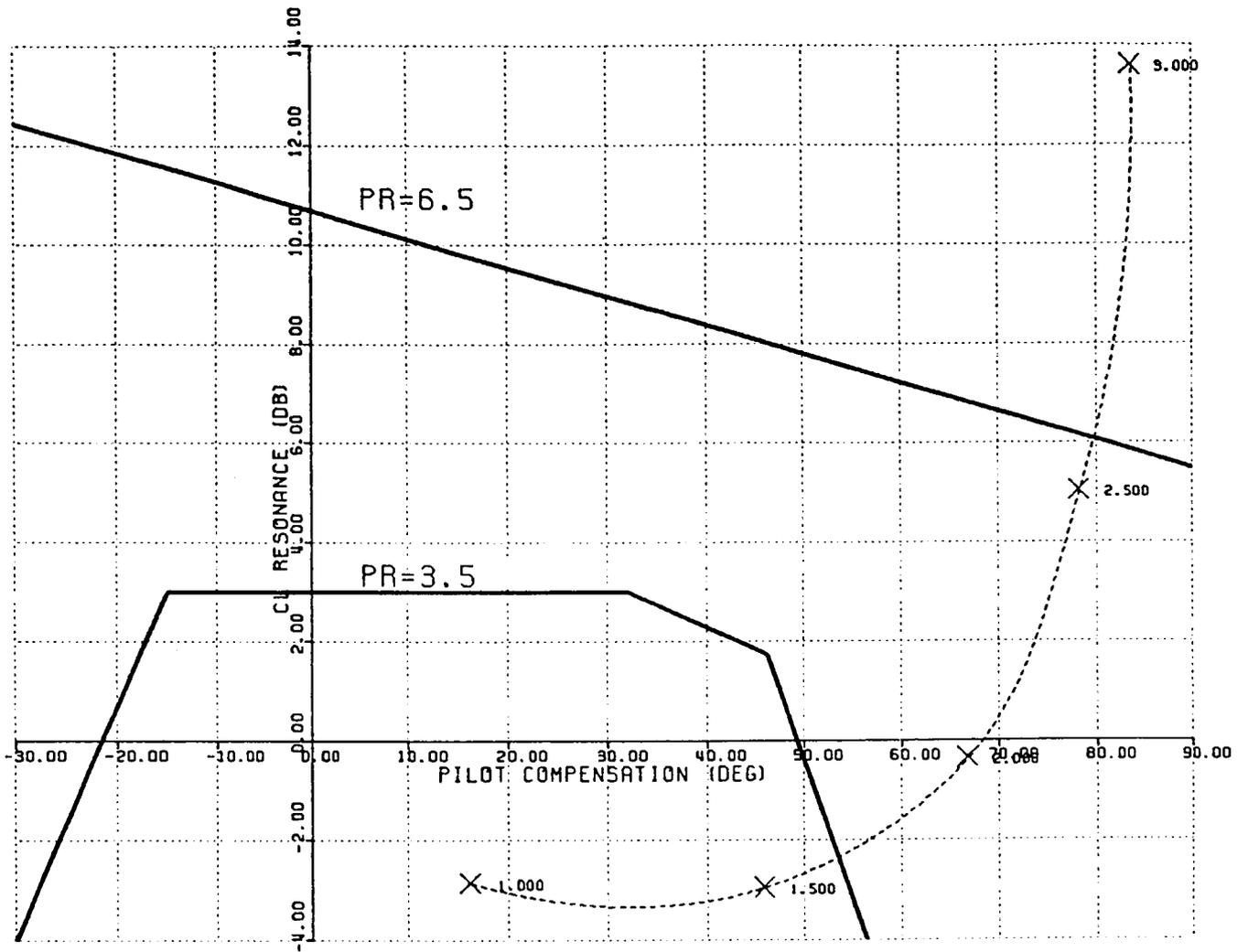


Figure F-11 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 11

TIFS CONFIGURATION 12

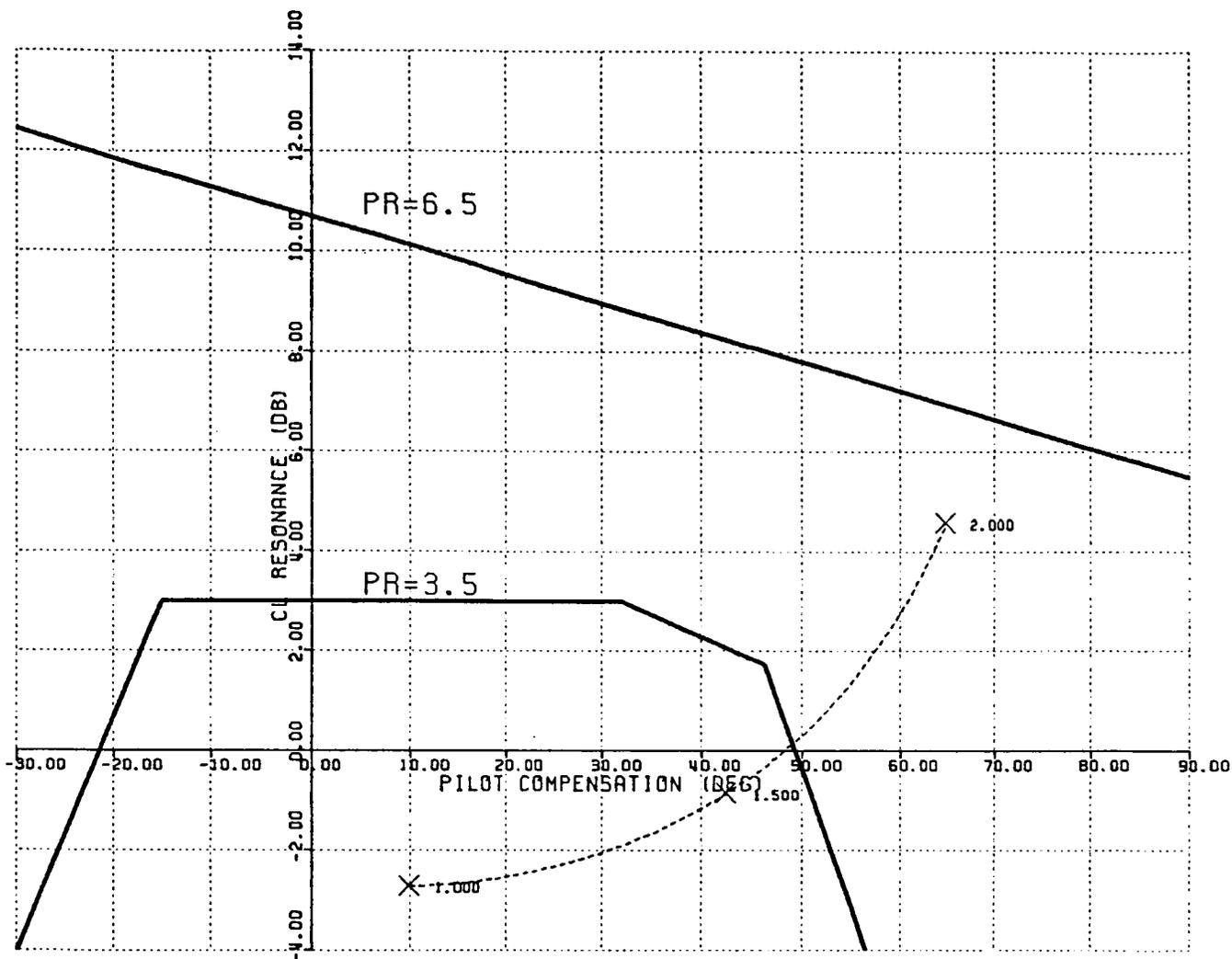


Figure F-12 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 12

TIFS CONFIGURATION 13

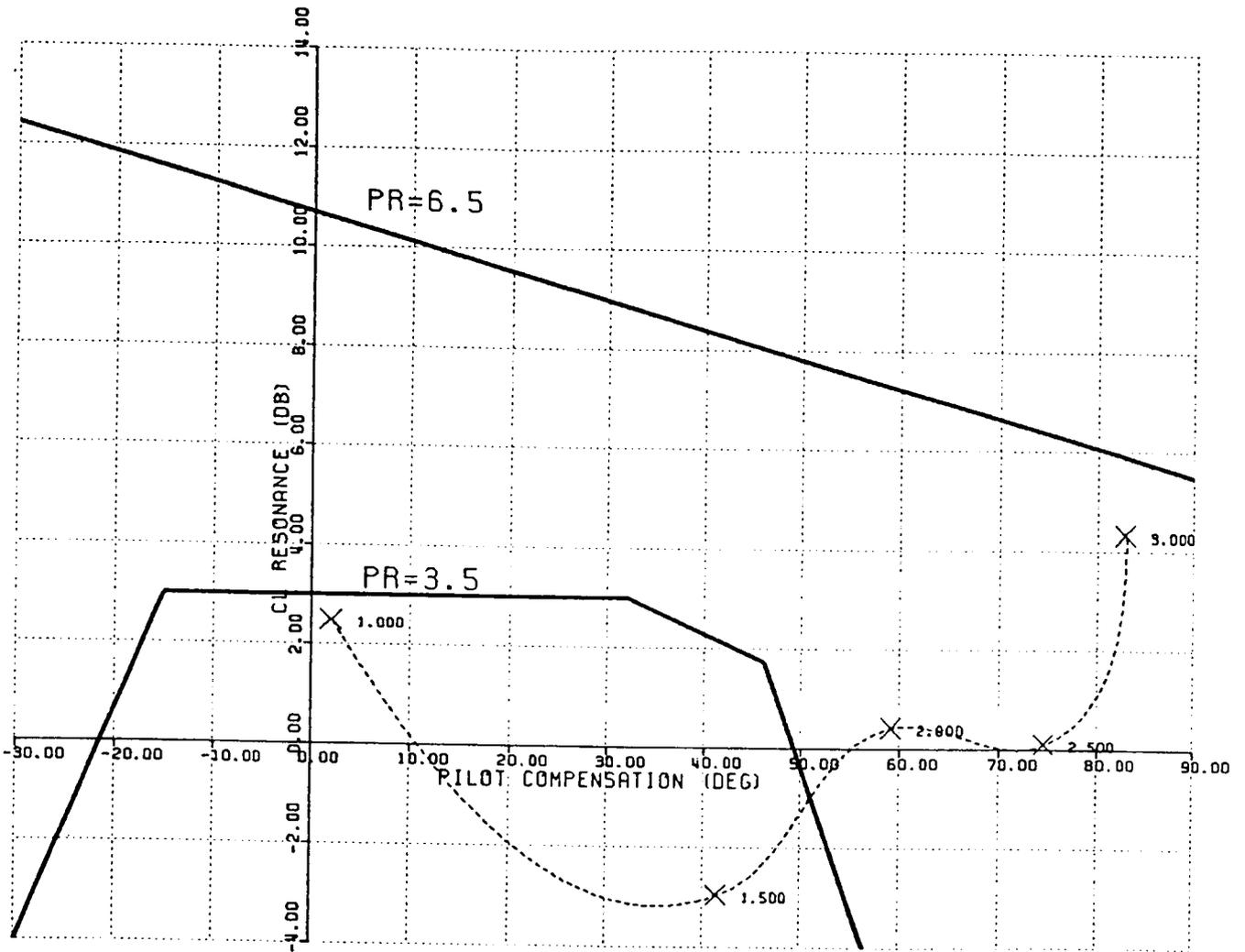


Figure F-13 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 13

TIFS CONFIGURATION 14

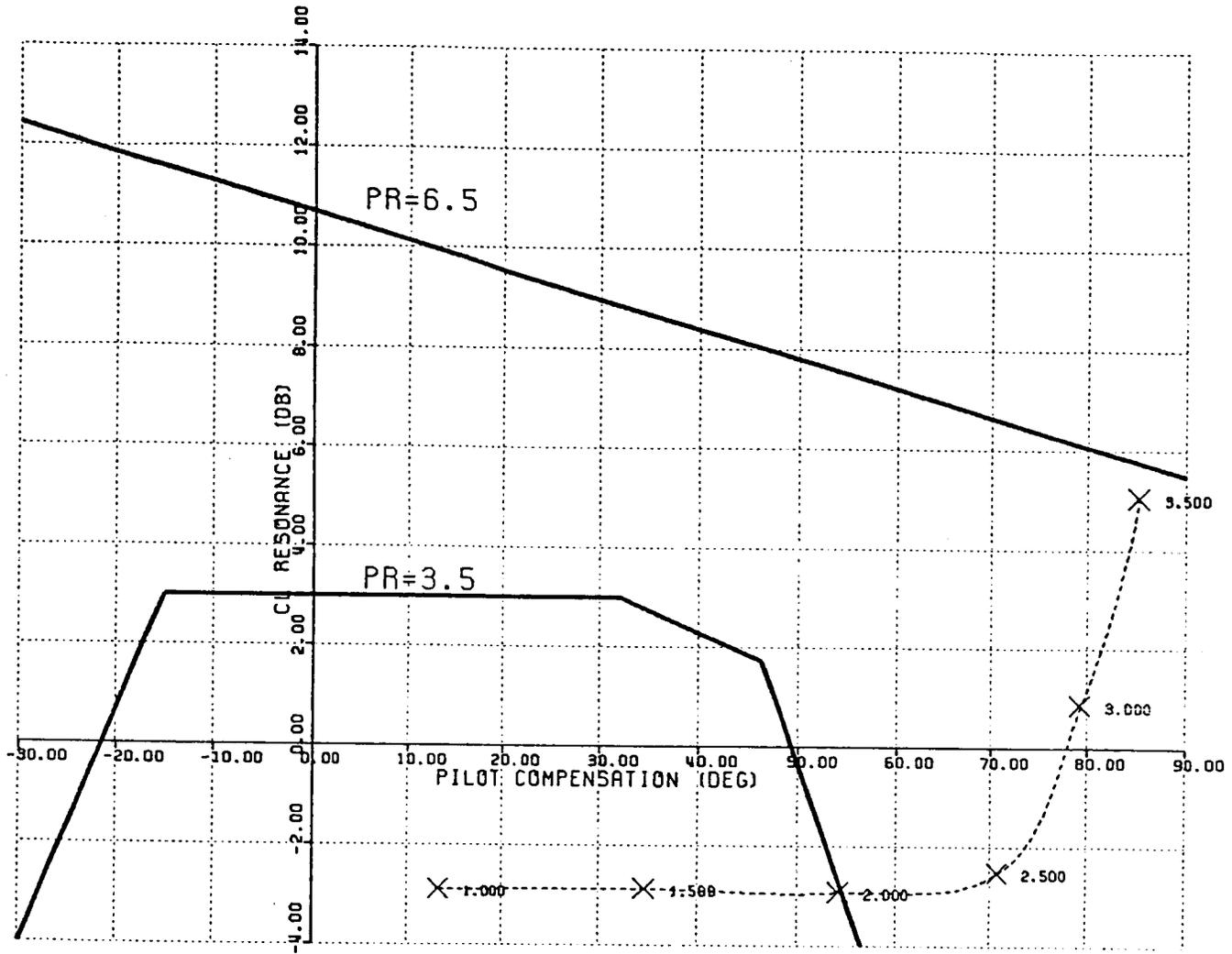


Figure F-14 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 14

TIFS CONFIGURATION 16

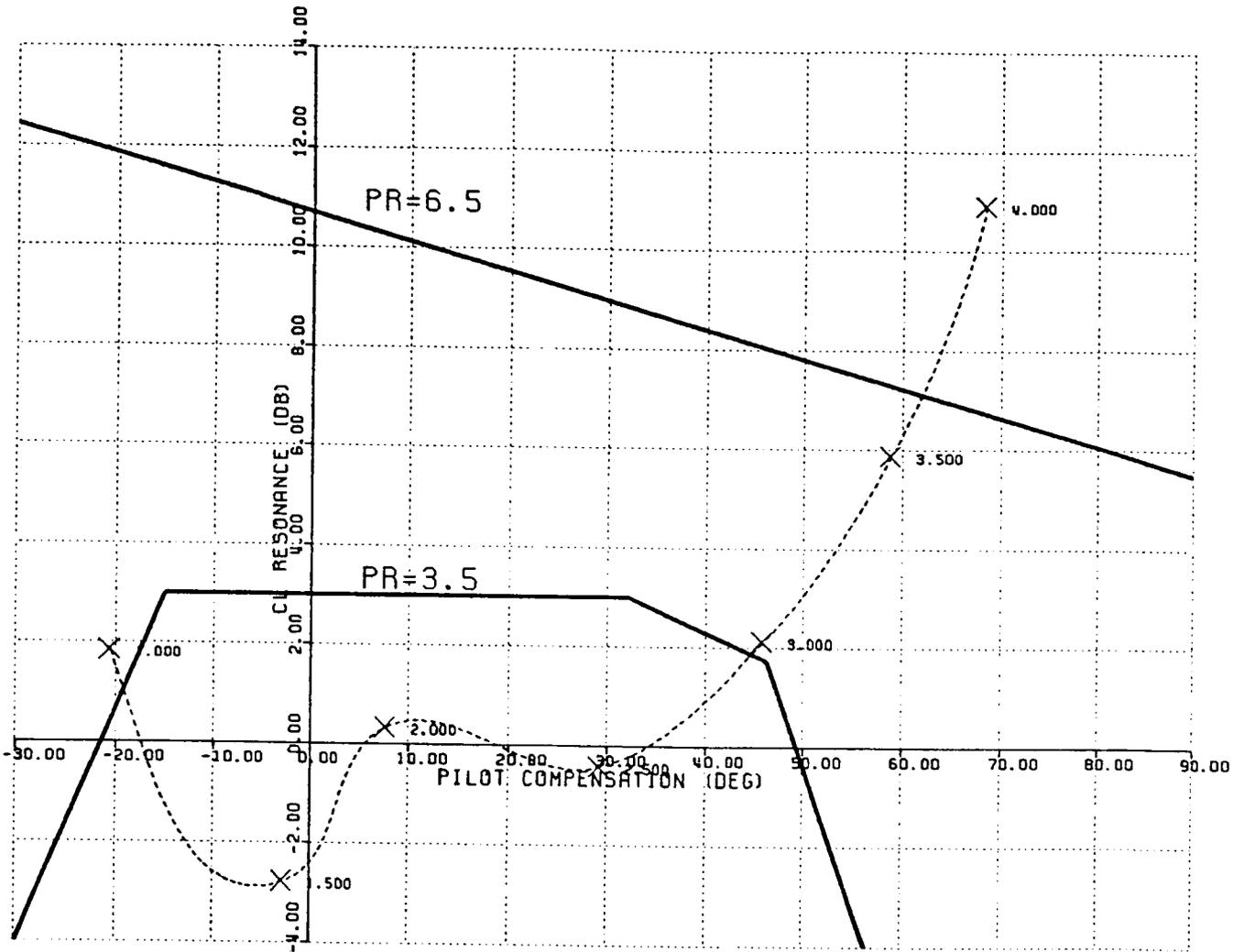


Figure F-15 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 16

TIFS CONFIGURATION 17

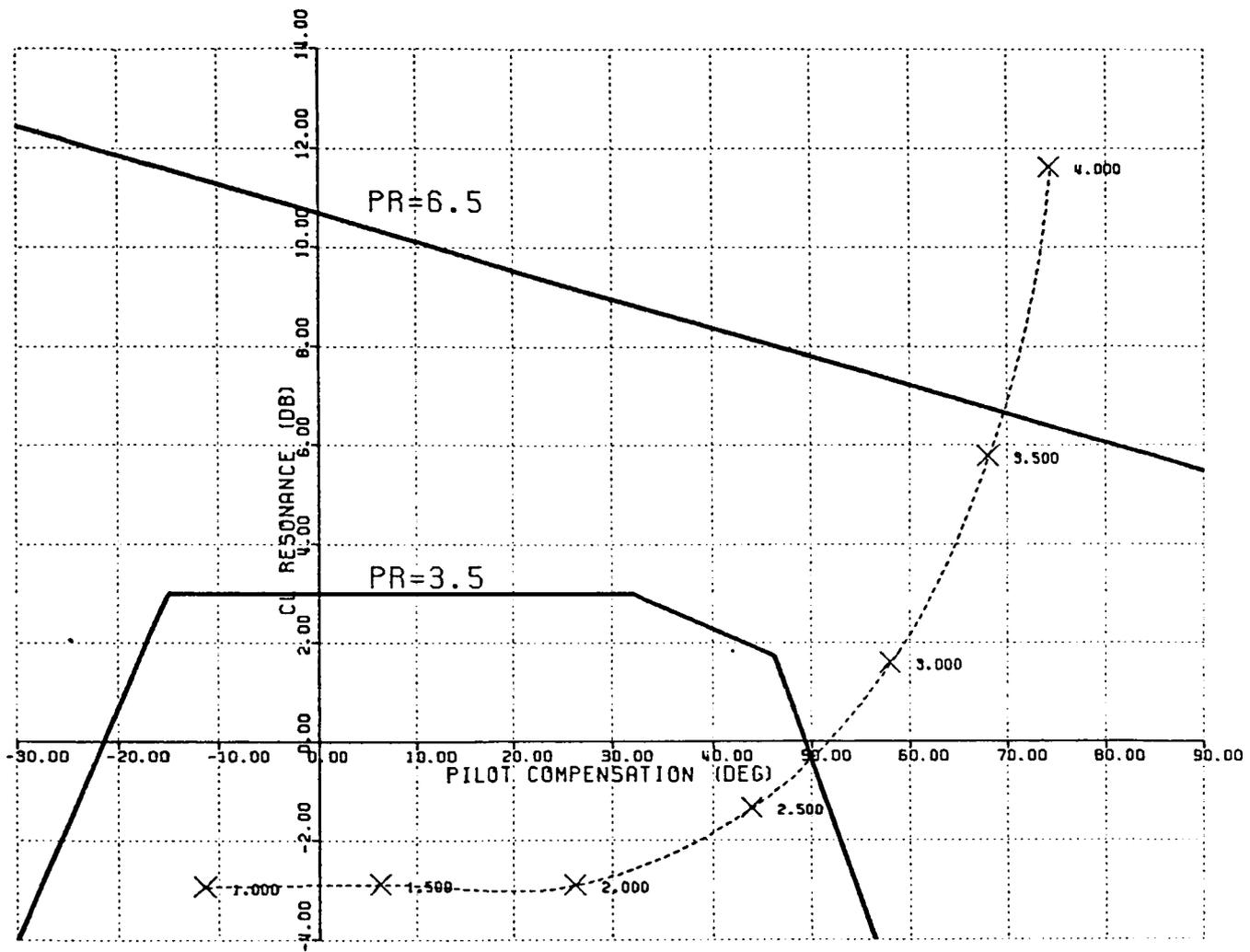


Figure F-16 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 17

TIFS CONFIGURATION 18

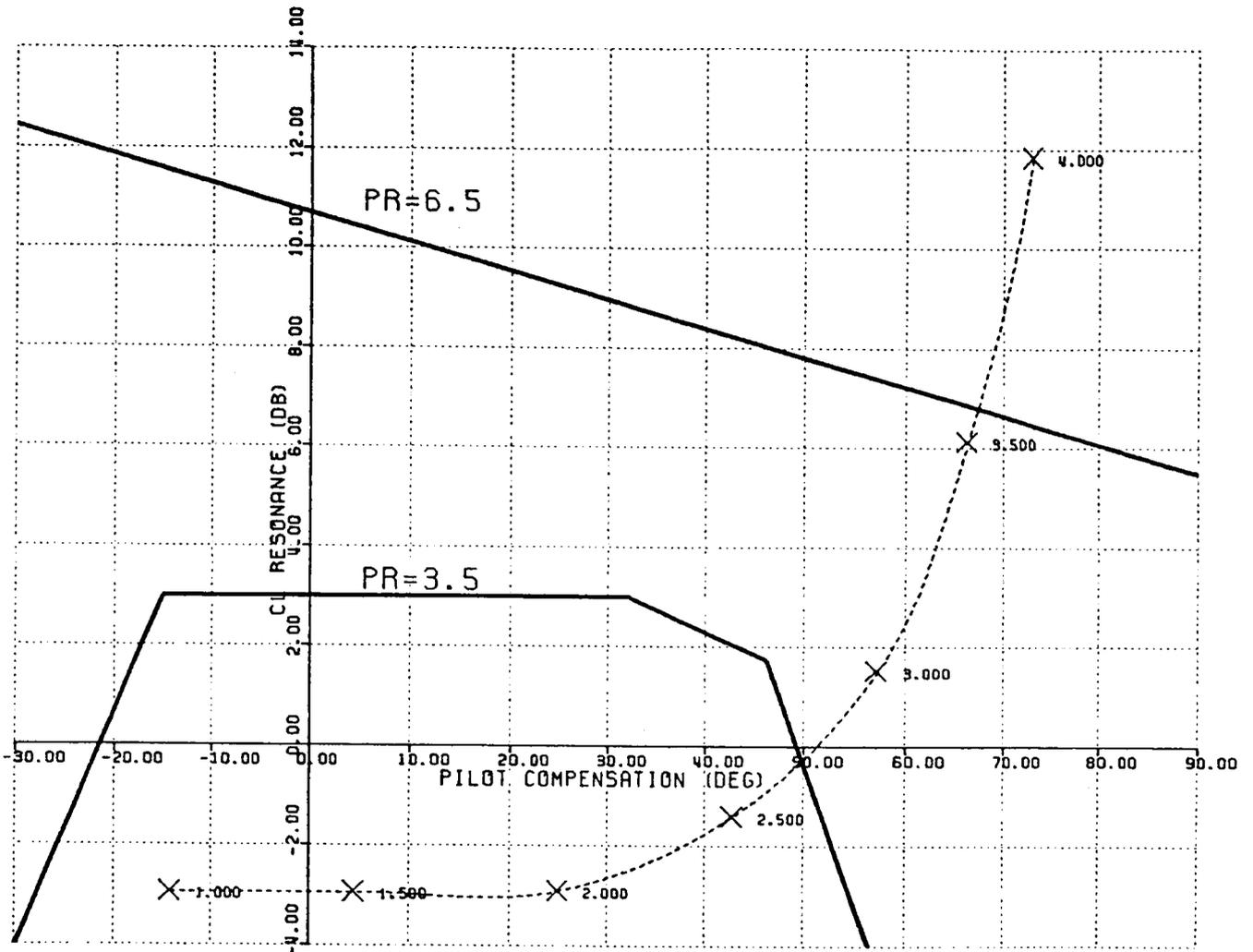


Figure F-17 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 18

TIFS CONFIGURATION 19

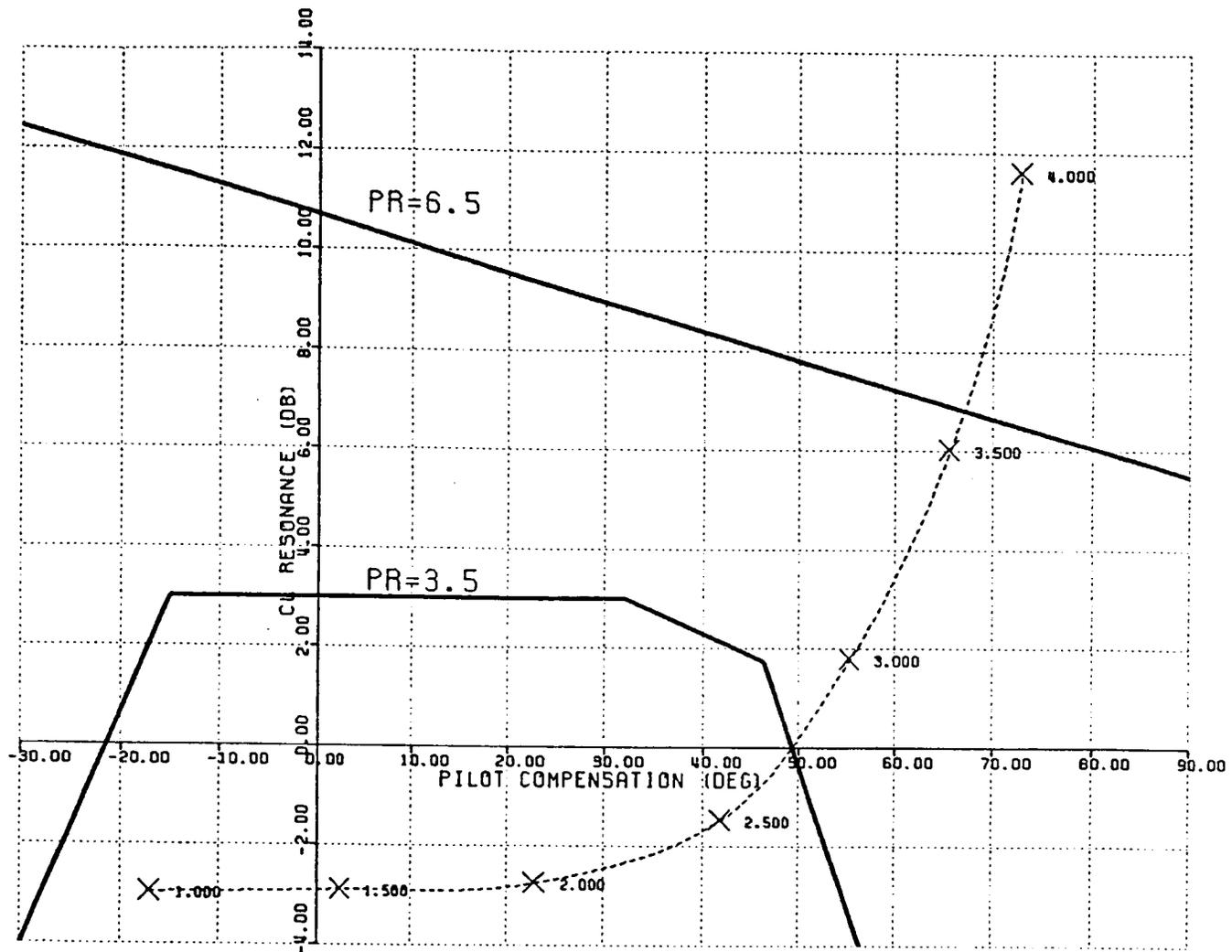


Figure F-18 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 19

TIFS CONFIGURATION 20

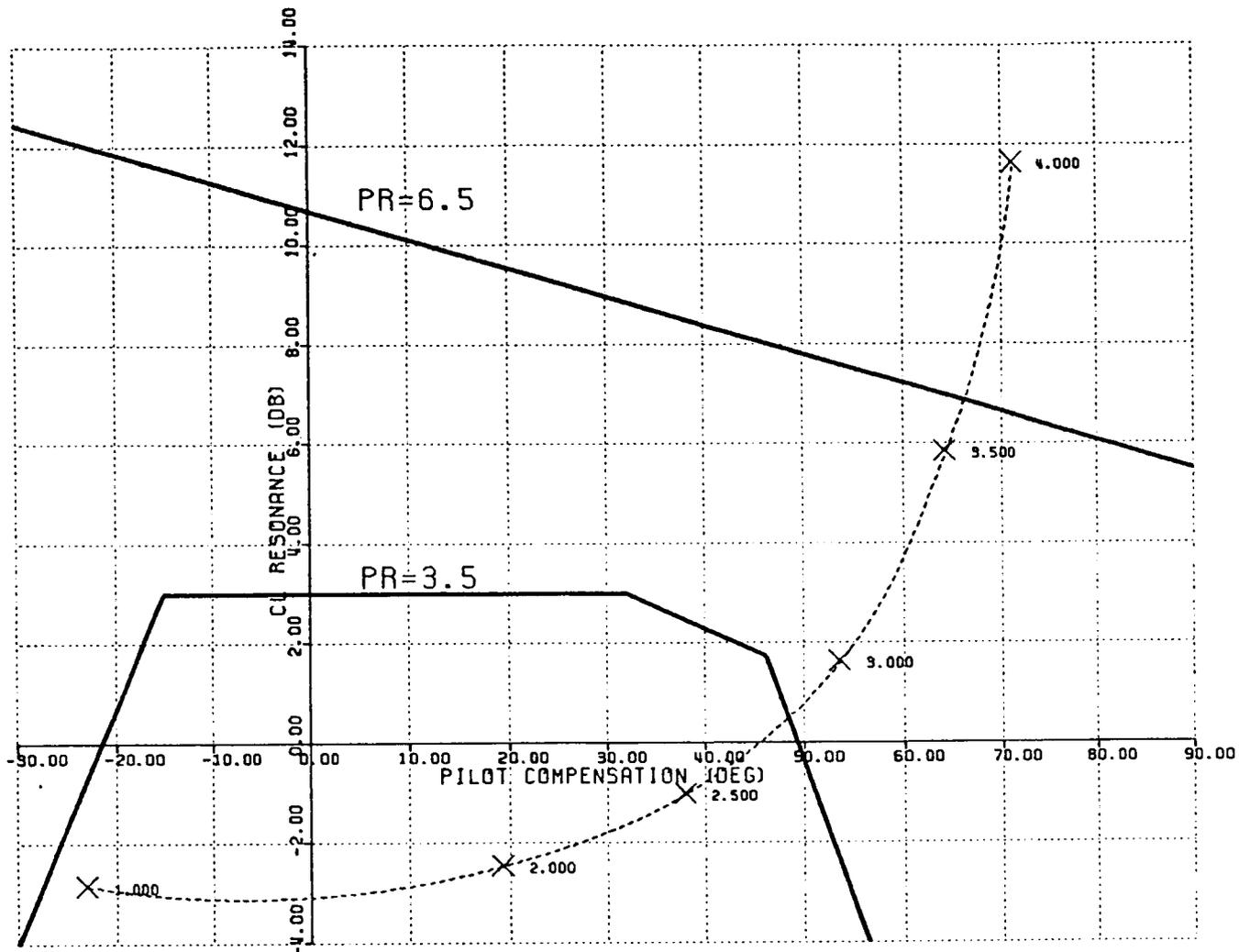


Figure F-19 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 20

TIFS CONFIGURATION B

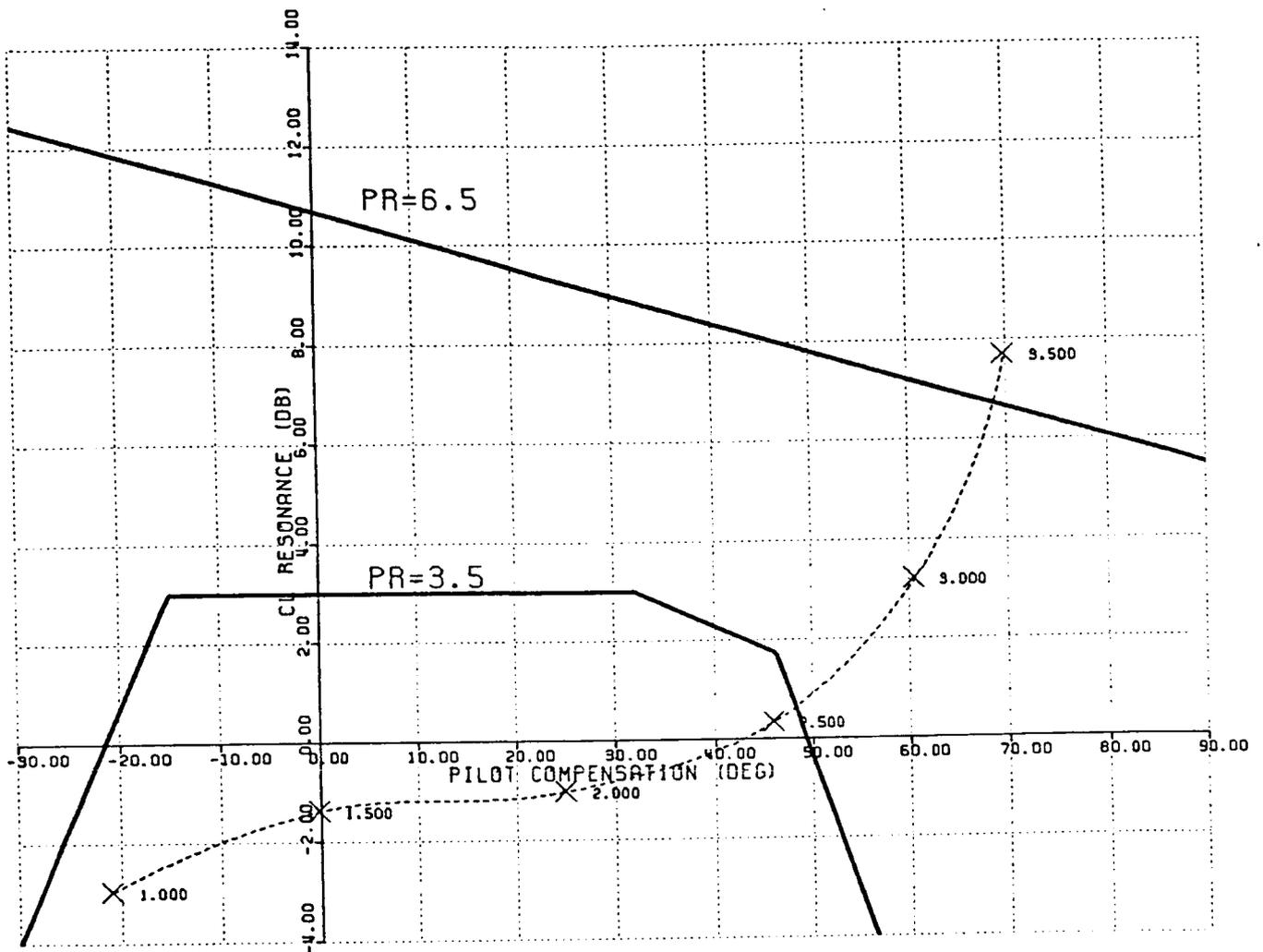


Figure F-20 NEAL-SMITH PARAMETER PLANE, CONFIGURATION B

TIFS CONFIGURATION 21

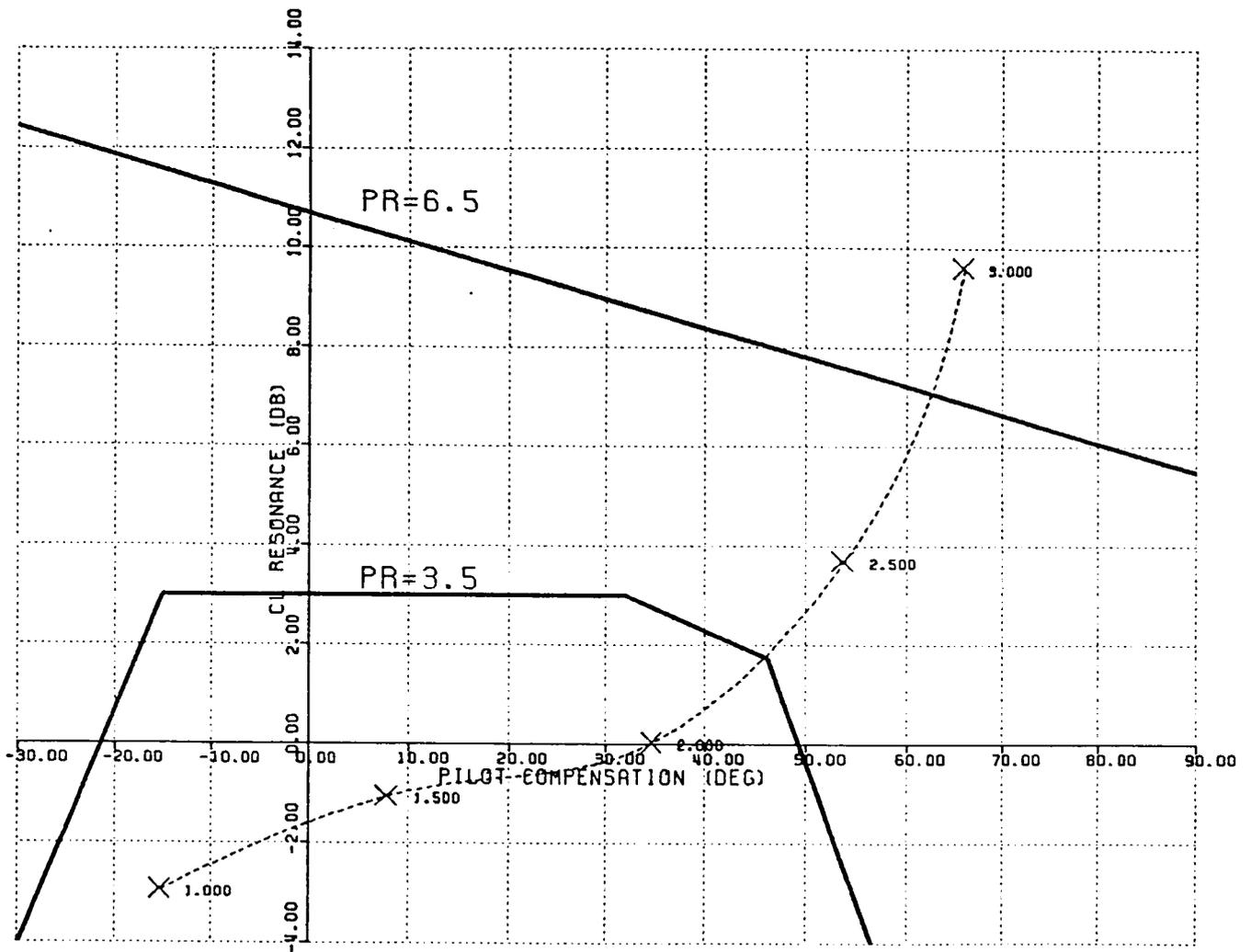


Figure F-21 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 21

TIFS CONFIGURATION 22

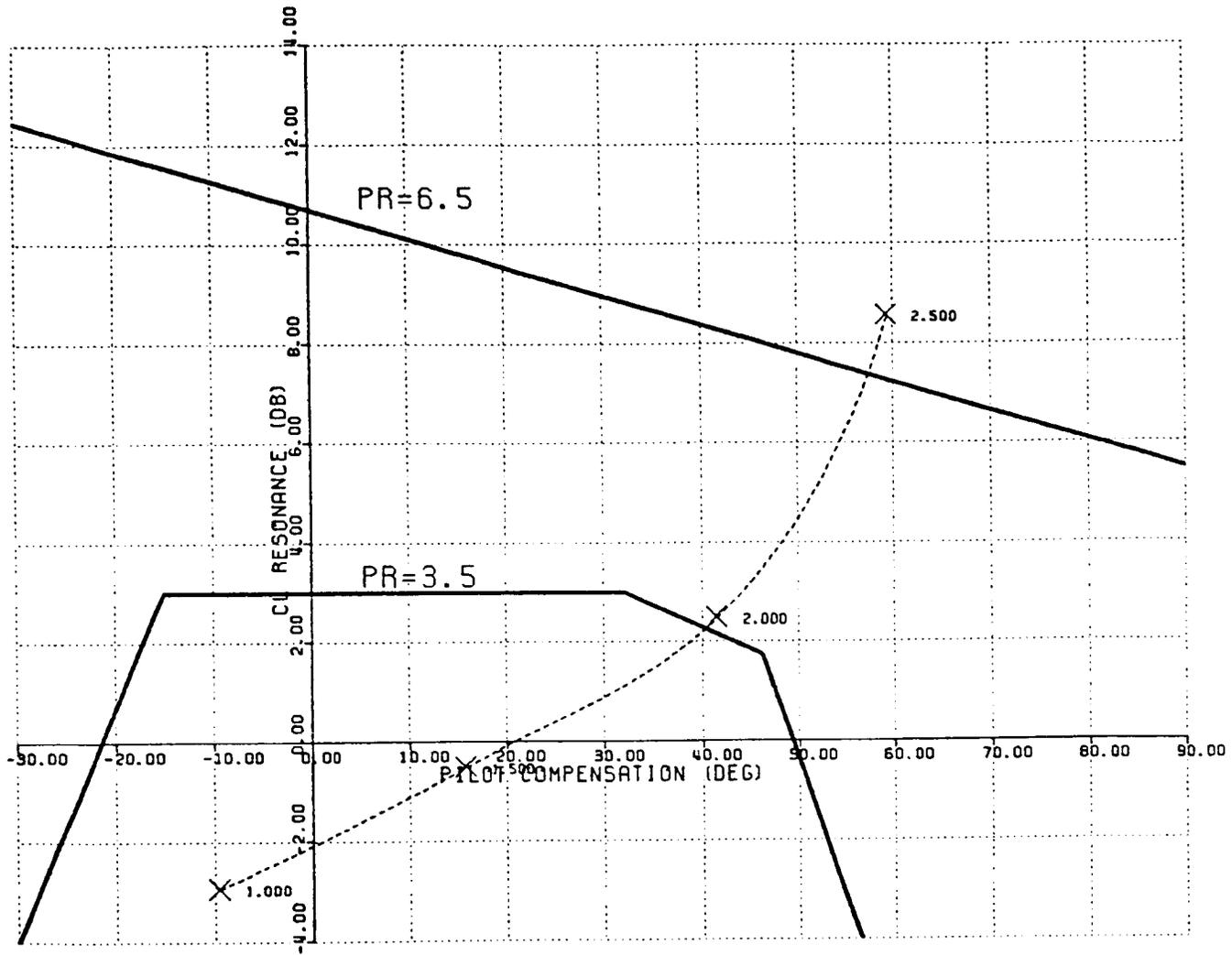


Figure F-22 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 22

TIFS CONFIGURATION 23

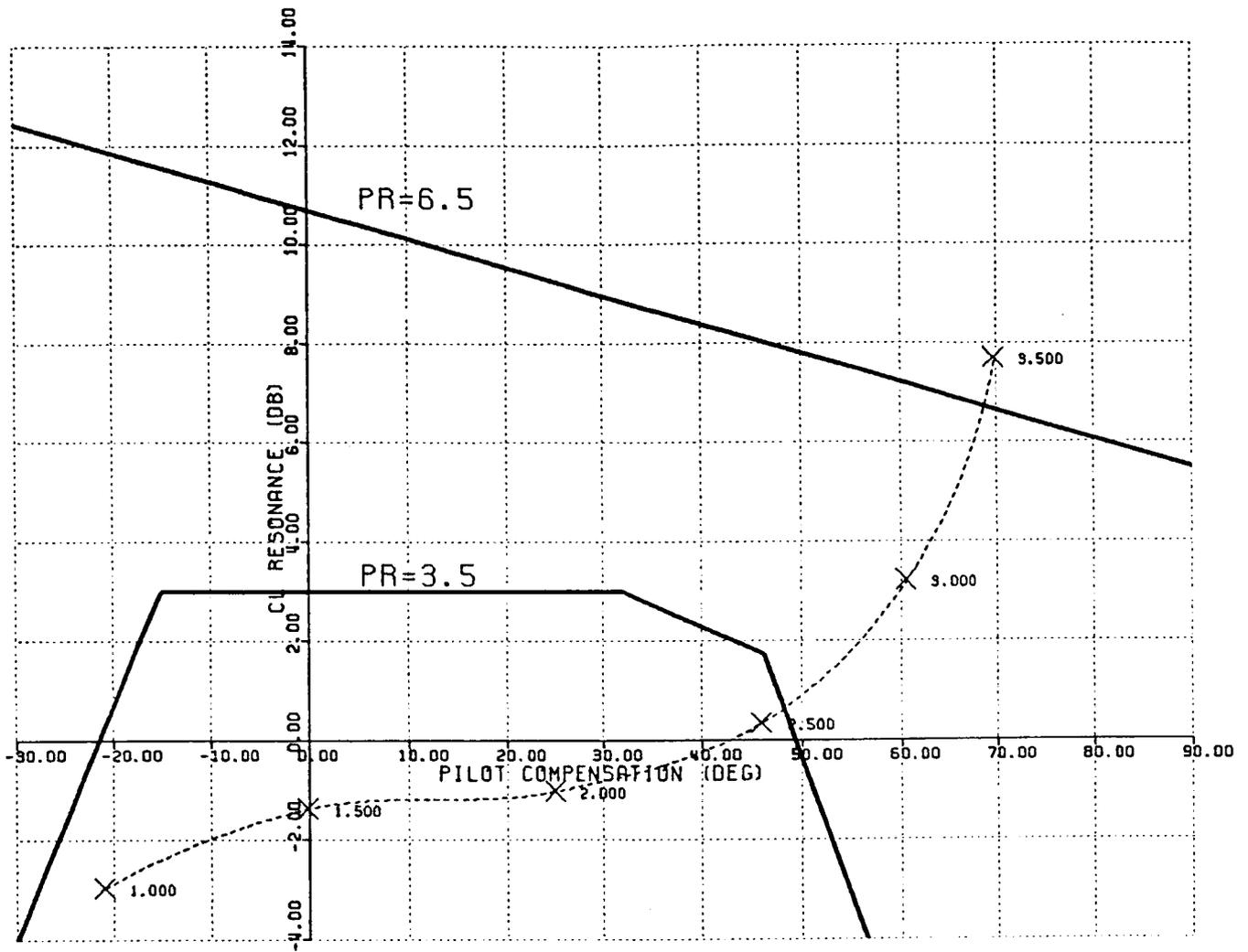


Figure F-23 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 23

TIFS CONFIGURATION 24

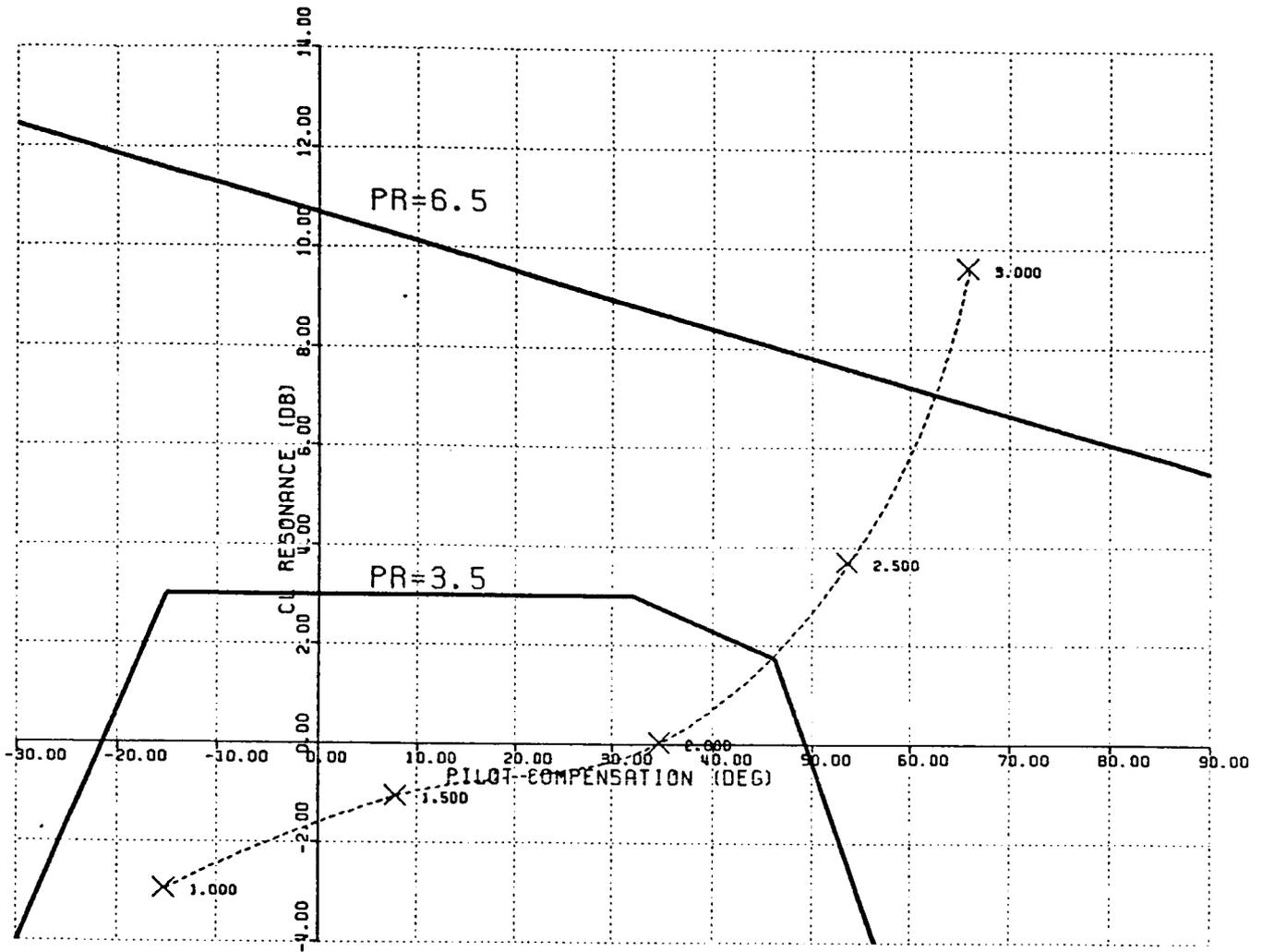


Figure F-24 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 24

TIFS CONFIGURATION 25

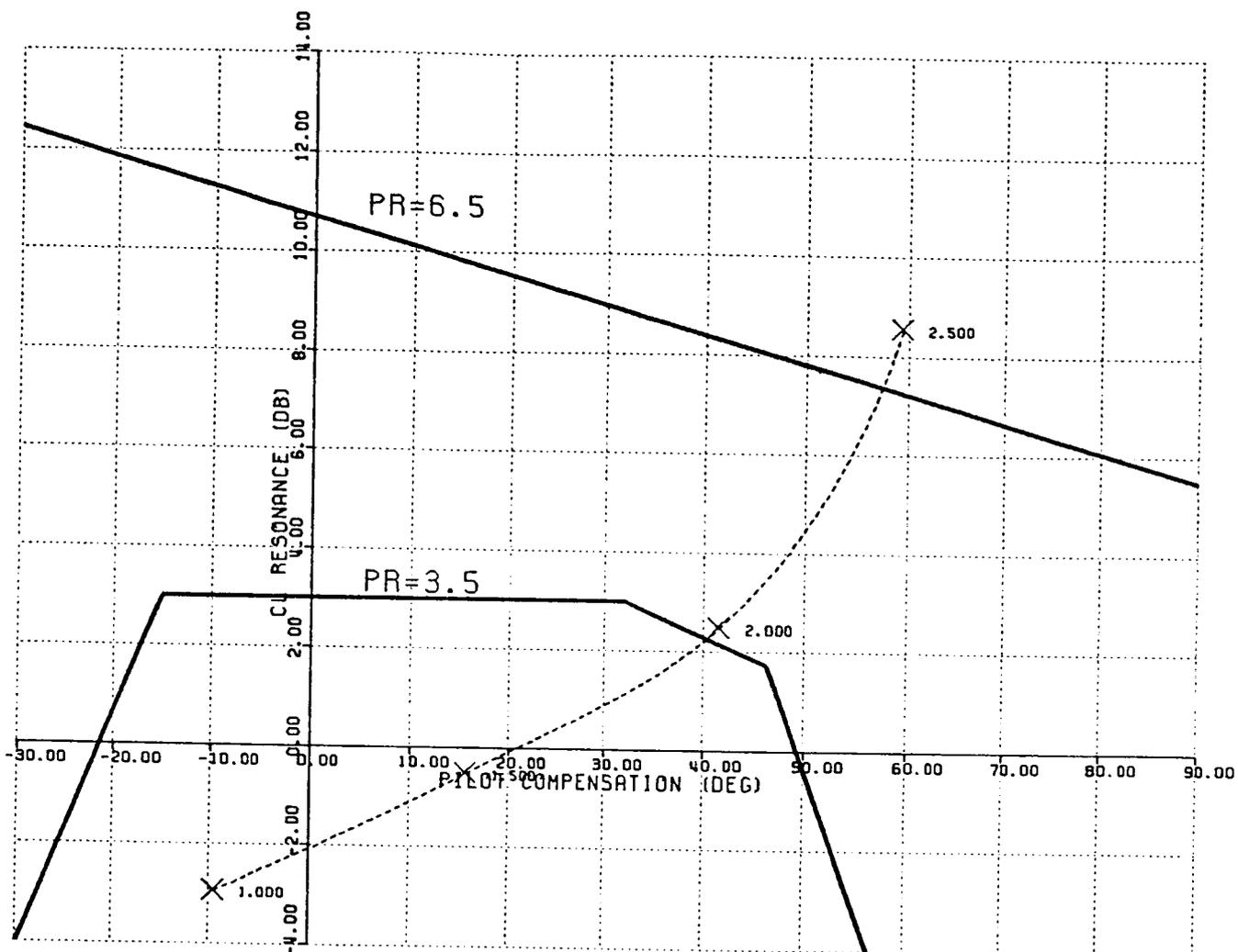


Figure F-25 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 25

TIFS CONFIGURATION 26

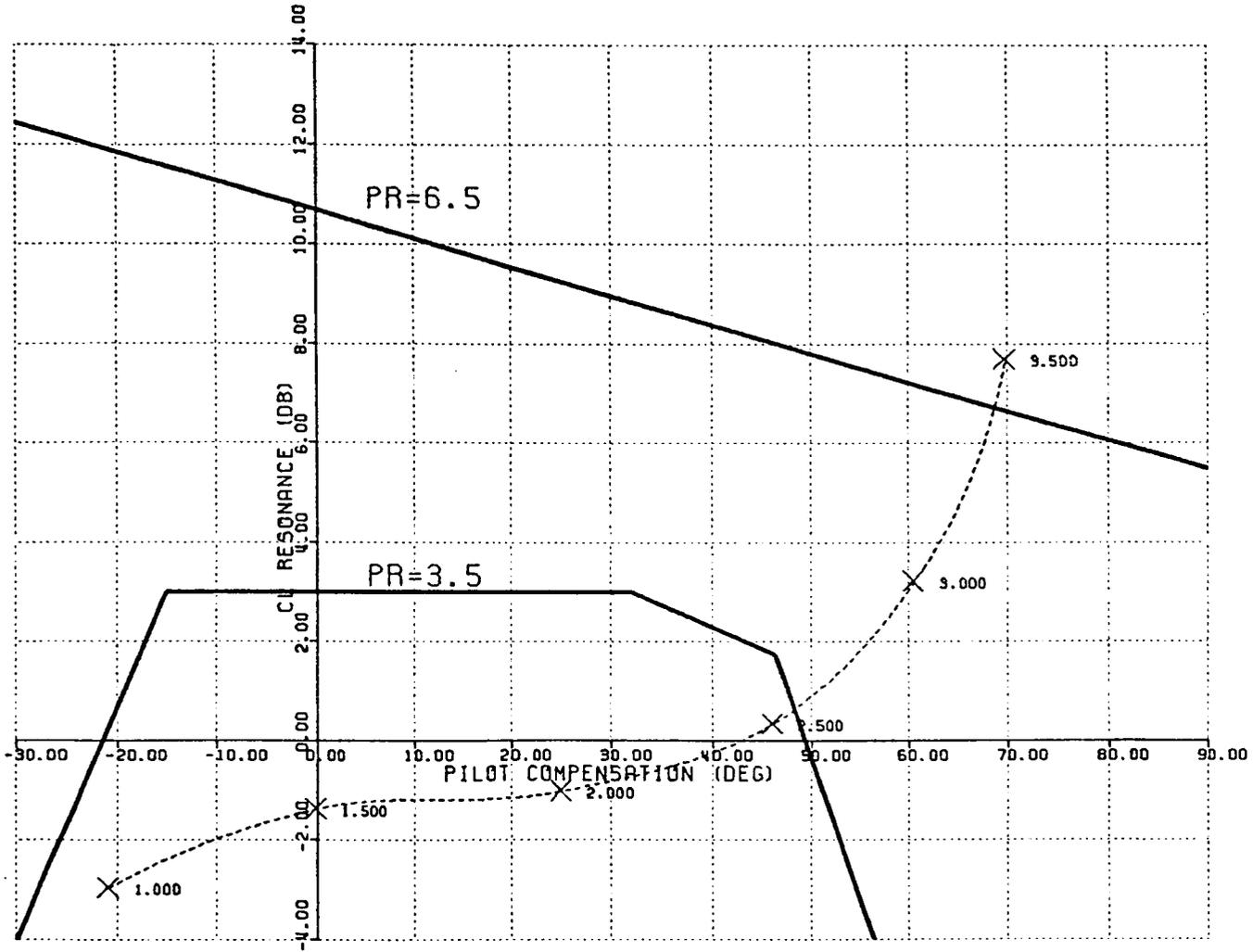


Figure F-26 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 26

TIFS CONFIGURATION 27

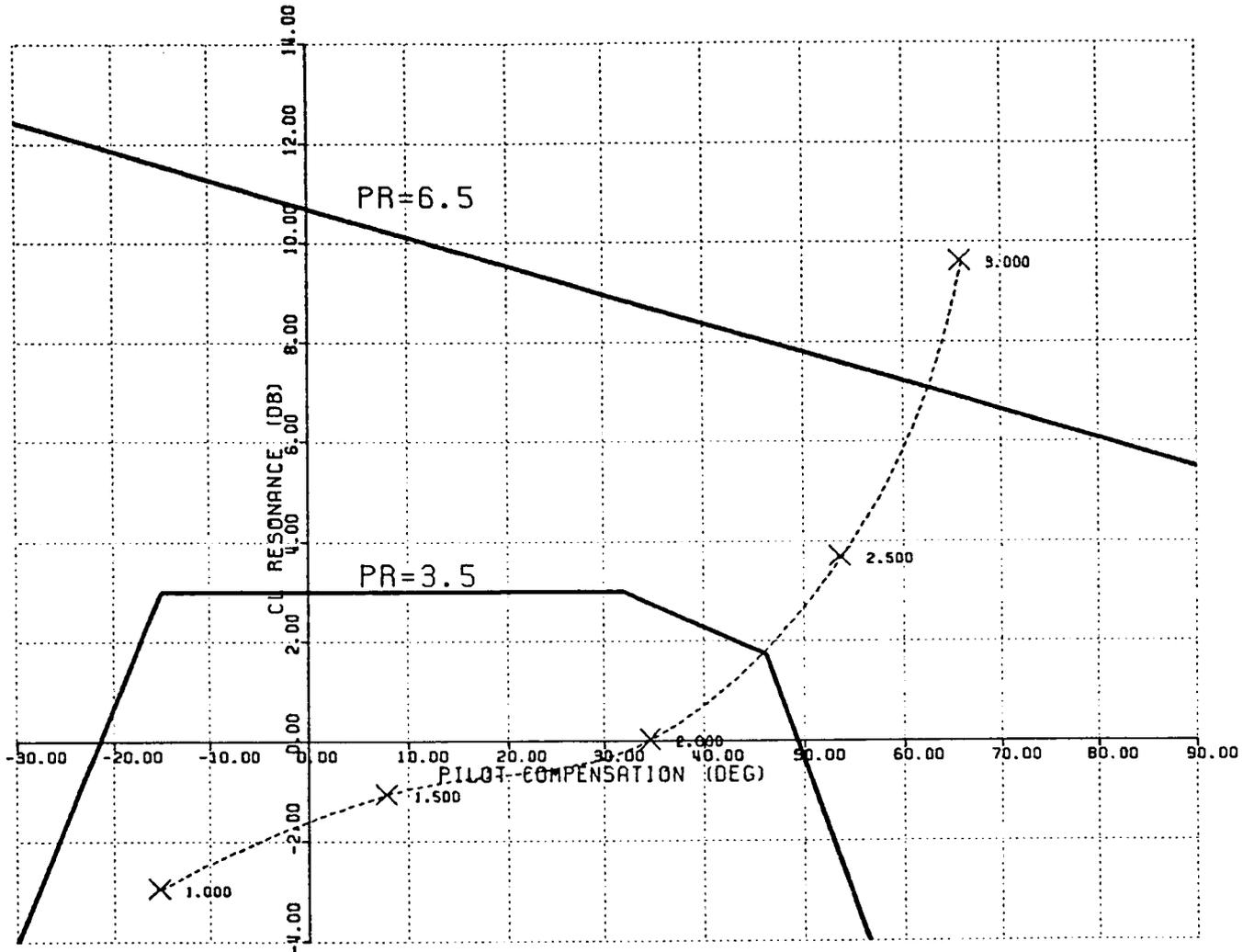


Figure F-27 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 27

TIFS CONFIGURATION 28

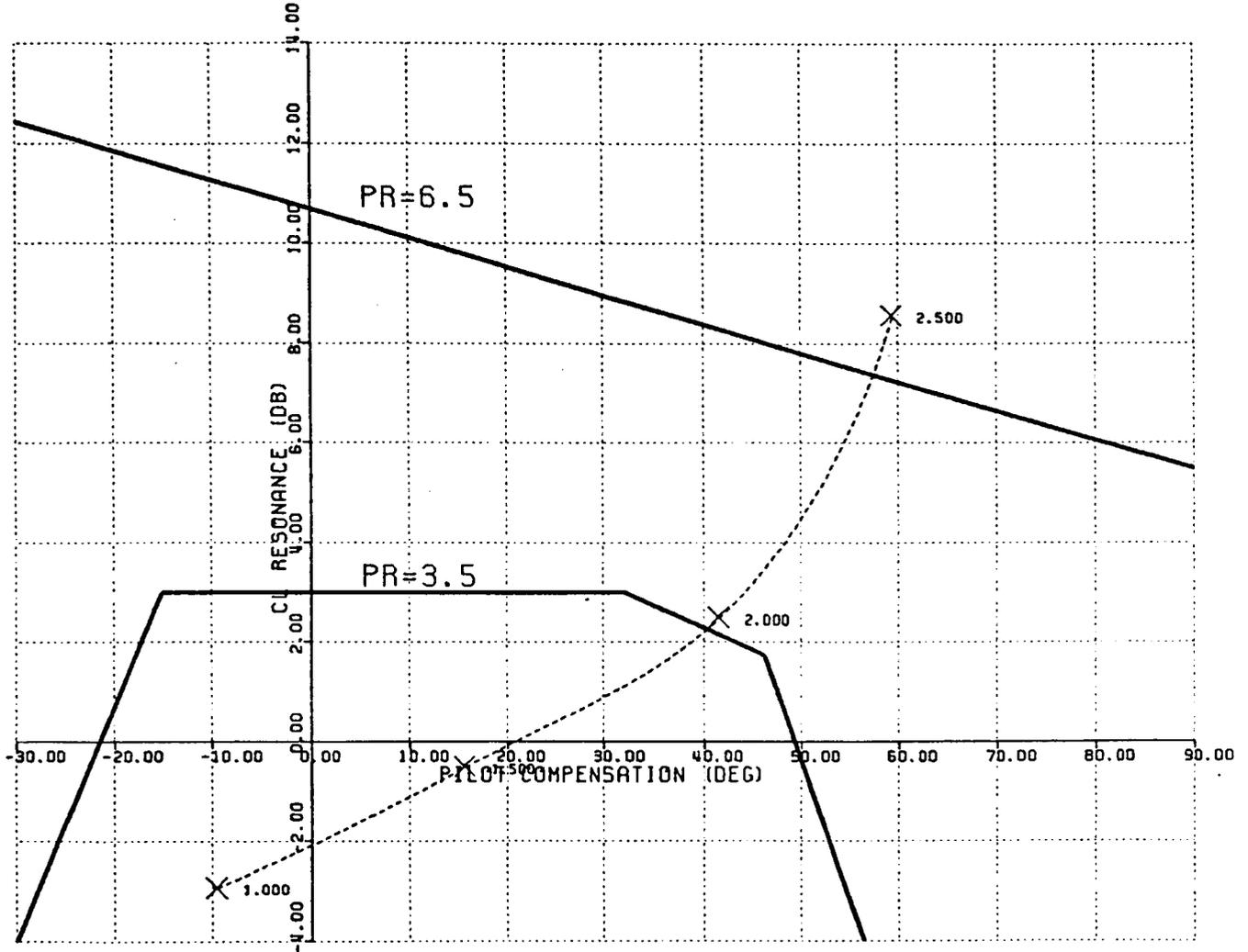


Figure F-28 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 28

TIFS CONFIGURATION 4-2-2

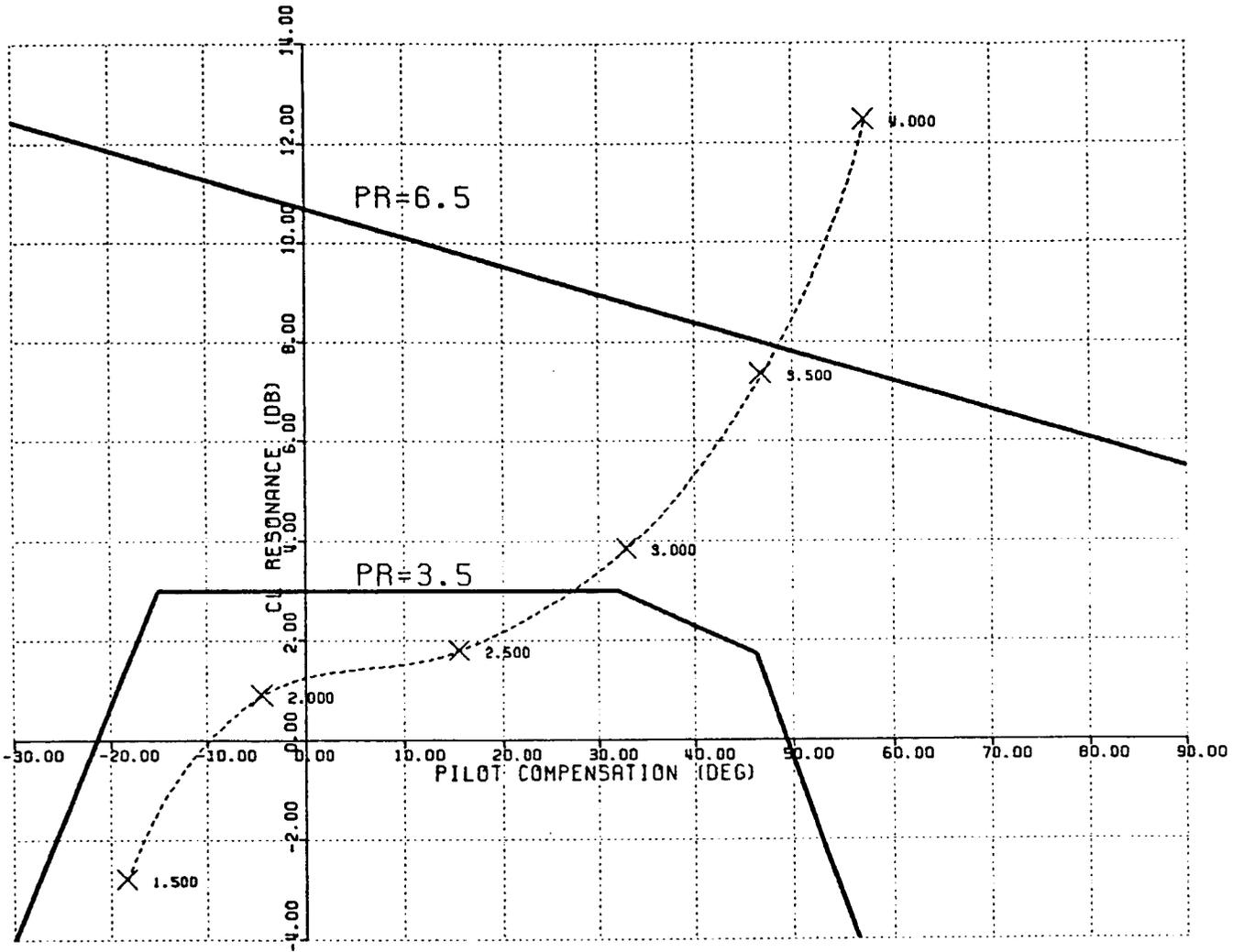


Figure F-29 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 17 + L/L

TIFS CONFIGURATION 22A

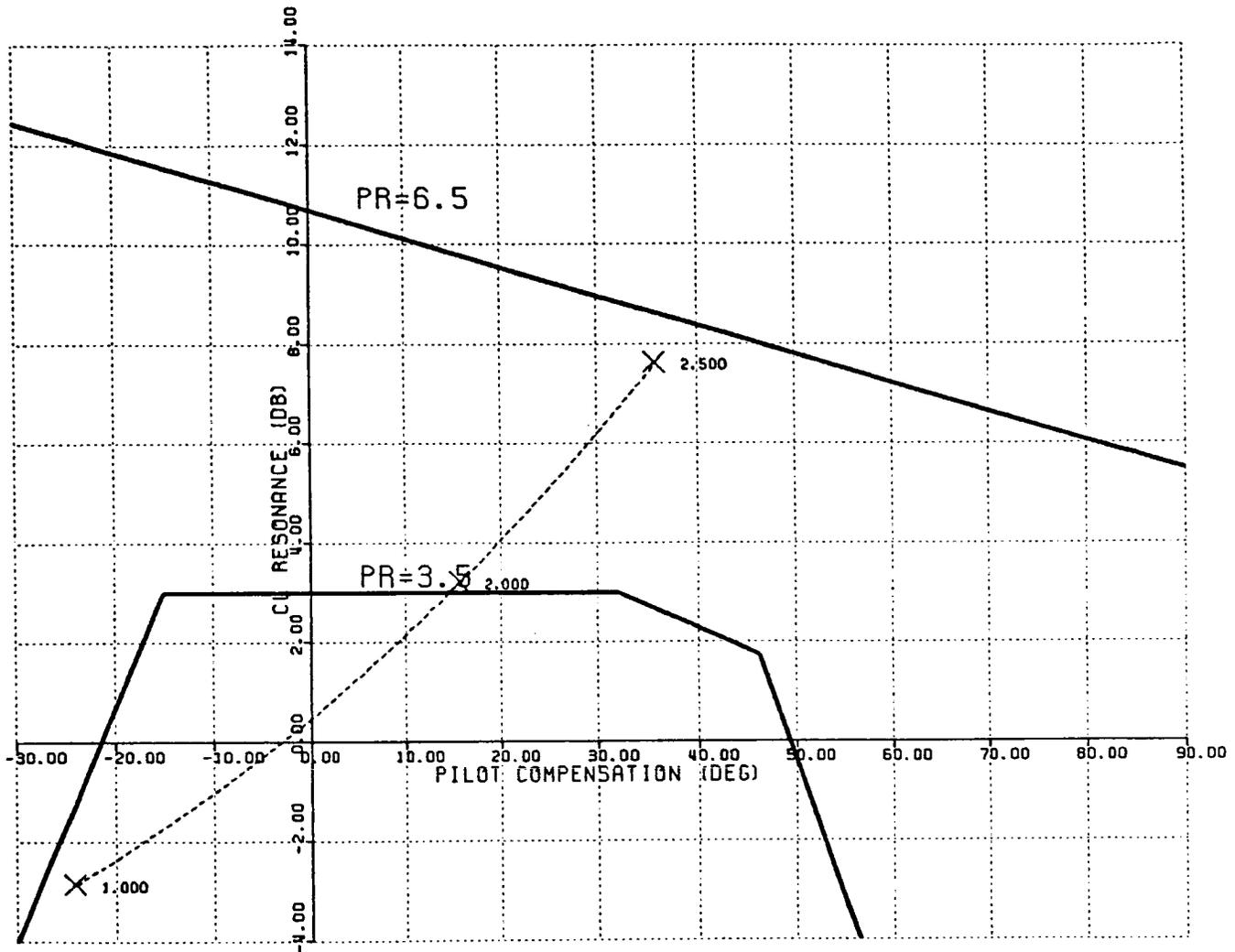


Figure F-30 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 22A

TIFS CONFIGURATION 25A

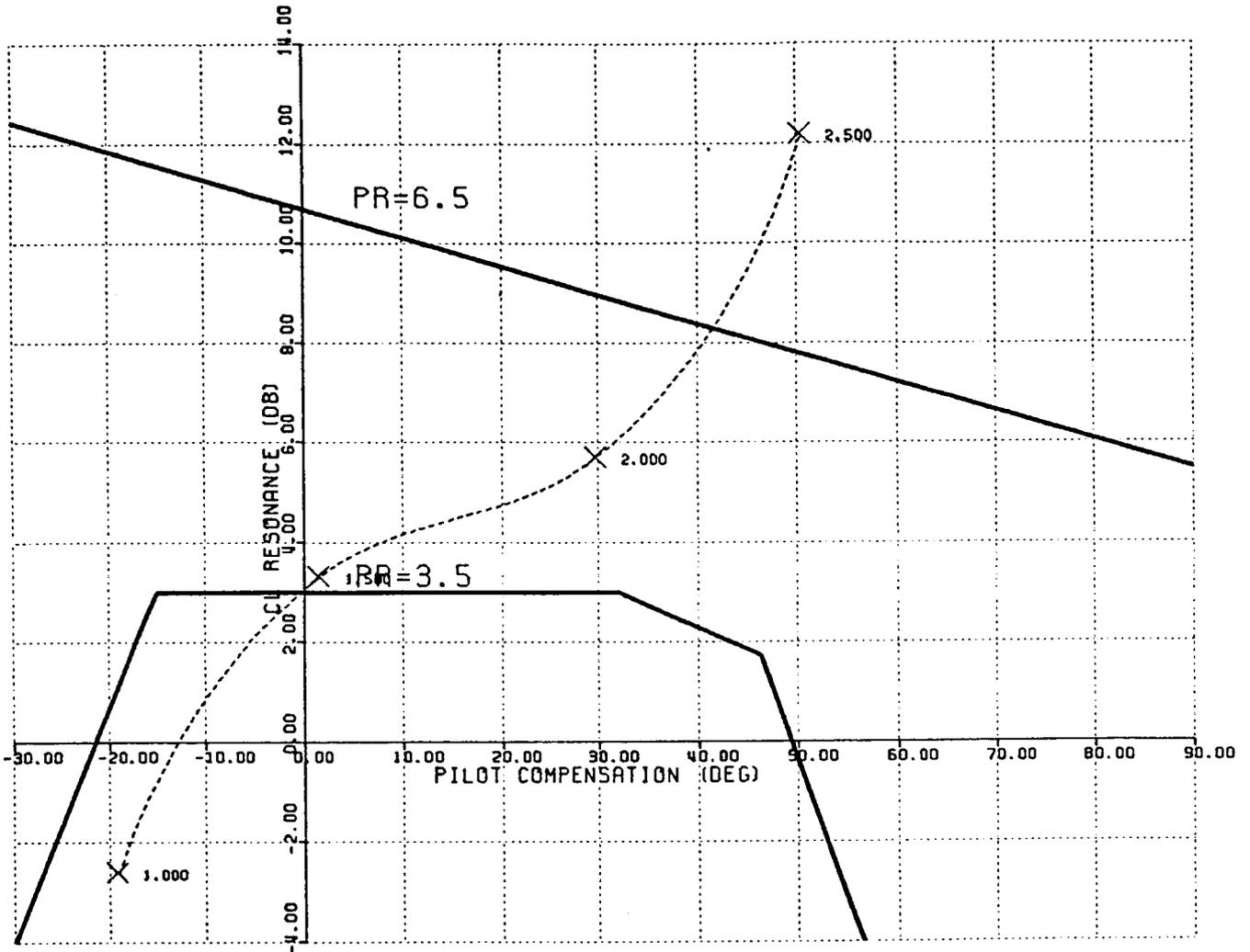


Figure F-31 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 25A

TIFS CONFIGURATION 28A

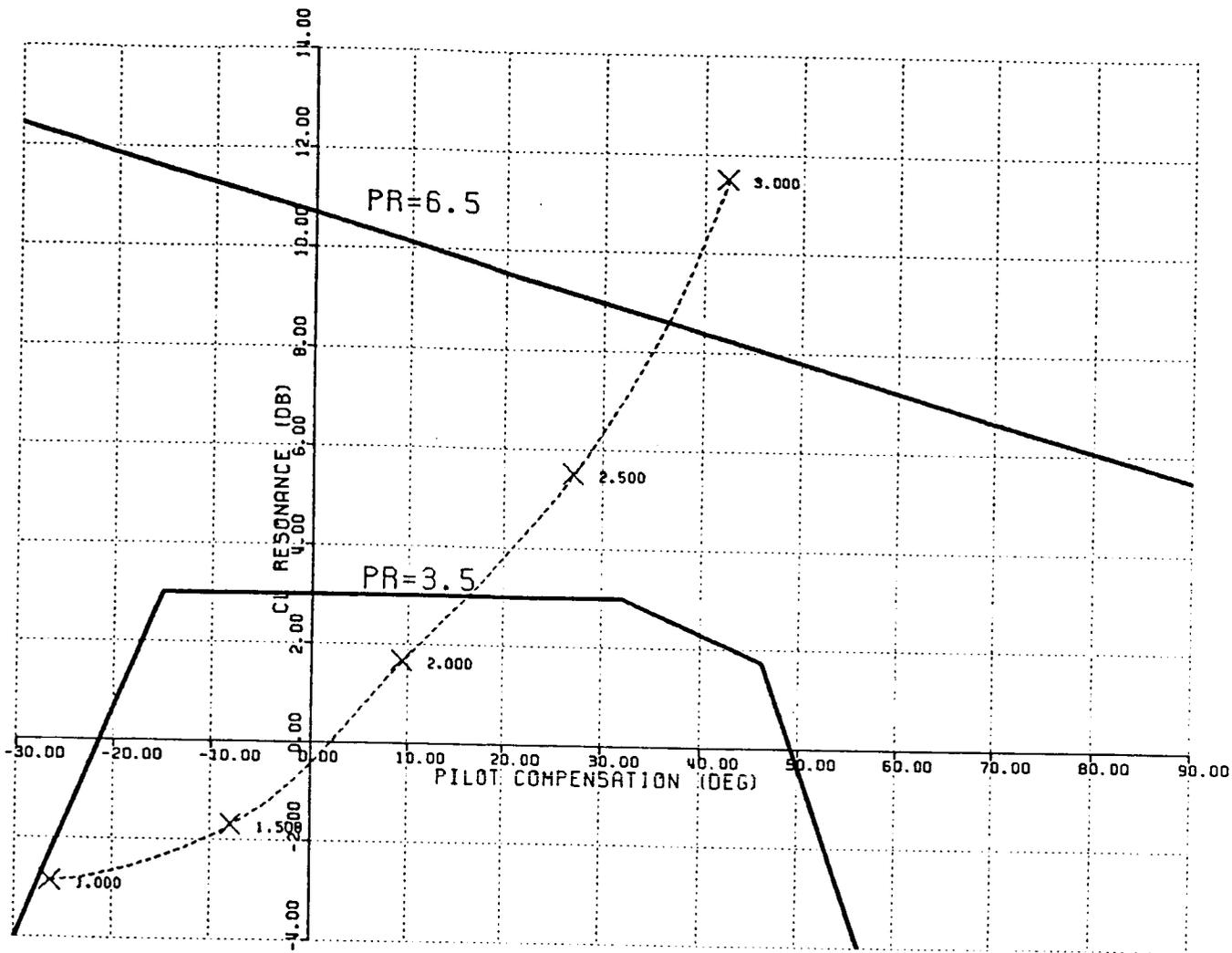


Figure F-32 NEAL-SMITH PARAMETER PLANE, CONFIGURATION 28A

1. Report No. NASA CR-178188		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Flared Landing Approach Flying Qualities Volume II - Appendices				5. Report Date December 1986	
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16. Abstract  An in-flight research study was conducted utilizing the USAF/Total In-Flight Simulator (TIFS) to investigate longitudinal flying qualities for the flared landing approach phase of flight. The purpose of the experiment was to generate a consistent set of data for: (1) determining what kind of commanded response (e.g., angle of attack or pitch rate) the pilot prefers/requires in order to flare and land an airplane with precision, and (2) refining a time history criterion that took into account all the necessary variables and their characteristics that would accurately predict flying qualities. Seven evaluation pilots participated in this experiment representing NASA Langley, NASA Dryden, Calspan, Boeing, Lockheed, and DFVLR (Braunschweig, Germany). The results of the first part of the study provides guidelines to the flight control system designer, using MIL-F-8785-(C) as a guide, that yield the dynamic behavior pilots prefer in flared landings. The results of the second part of the study provides the flying qualities engineer with a newly derived flying qualities predictive tool which appears to be highly accurate. This time-domain predictive flying qualities criterion was applied to the flight data of the present study as well as six previous flying qualities studies, and the results indicate that the criterion predicted the flying qualities level 81 percent of the time and the Cooper-Harper pilot rating, within $\pm 1$ , 60 percent of the time.					
17. Key Words (Suggested by Author(s)) Stability and Control Flying Qualities Landing Flare Pitch-Rate Control Systems Handling Qualities Criteria			18. Distribution Statement  Unclassified - Unlimited Subject Category 08		
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