

College

Hoog complexe beademing en weanen



Curves & Loops

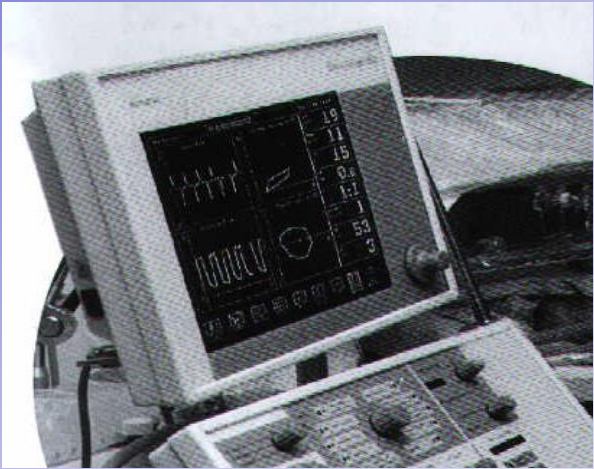
- Auto-PEEP

Hans Verberne

Teamoudste Intensive care

Docent respiratie/beademing

Curves & Loops



Curves / Loops

- **Beter inzicht in de interactie tussen Patiënt en Machine.**
- **Ademarbeid.**
- **Auto-peep, Resistance, Compliantie.**
- **Afstemming beademing.**
- **Educatief.**
- **Interventie.**

Curve / Loop

- **CURVE:** Grafische weergave van een parameter uitgezet tegen tijd.
- **LOOP:** Weergave van twee parameters uitgezet tegen elkaar.

Grafische weergave

Mechanische / Spontane ventilatie

CURVE

- * Volume
- * FLOW
- * Druk

LOOP

- * Druk - Volume
- * Volume - Flow

Real Time Curve

Y-as:

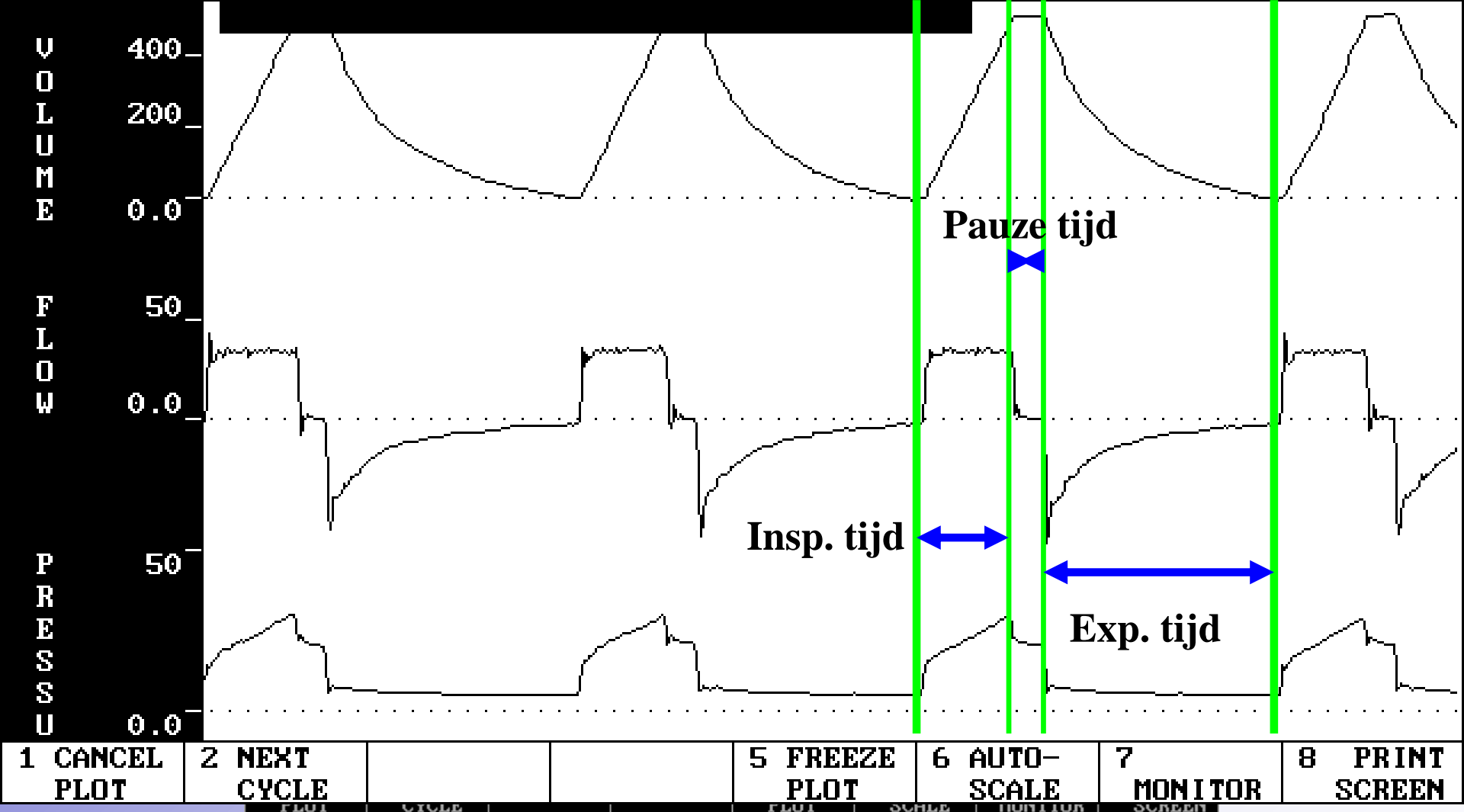
* **VOLUME**

* **FLOW**

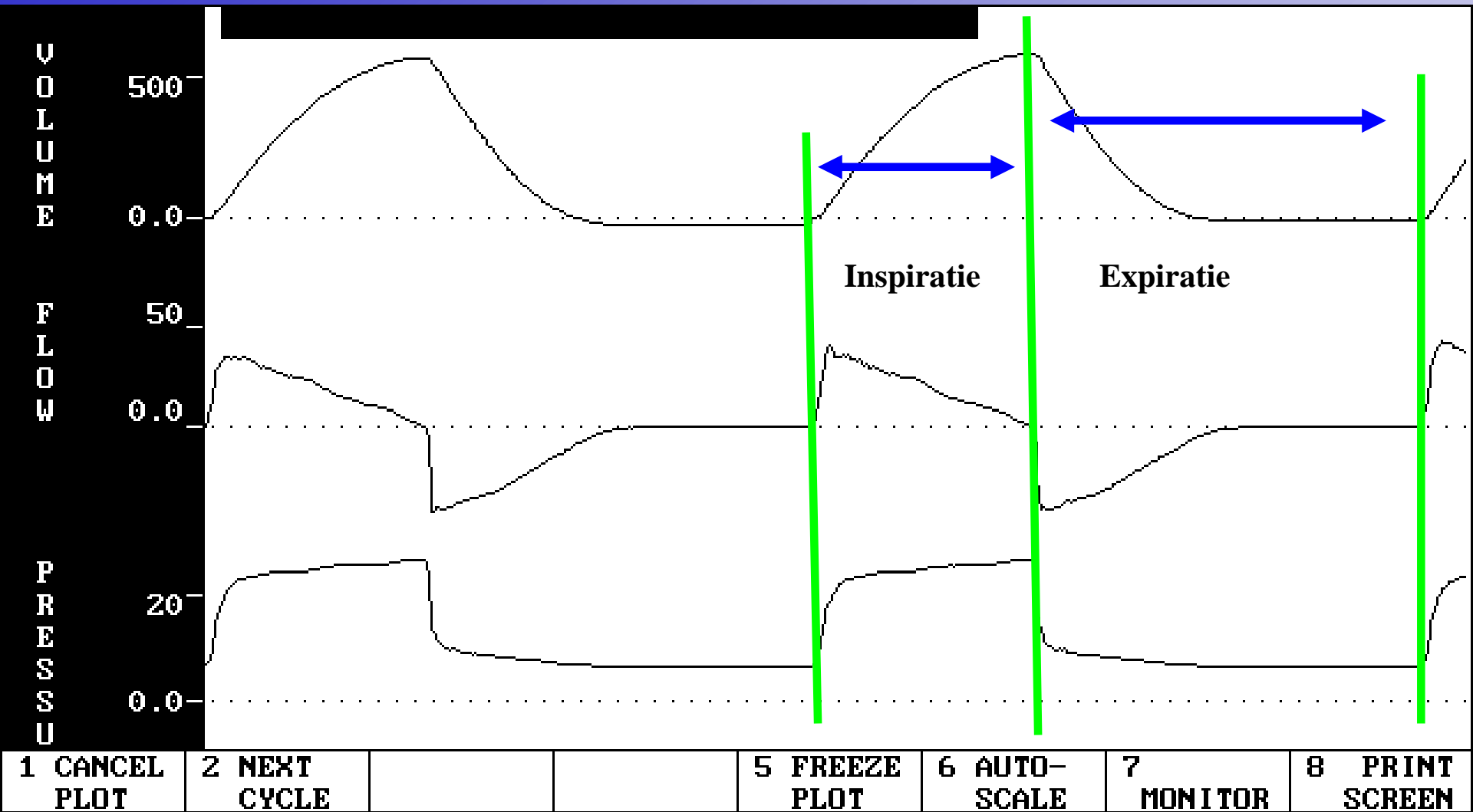
* **DRUK**

X-as:

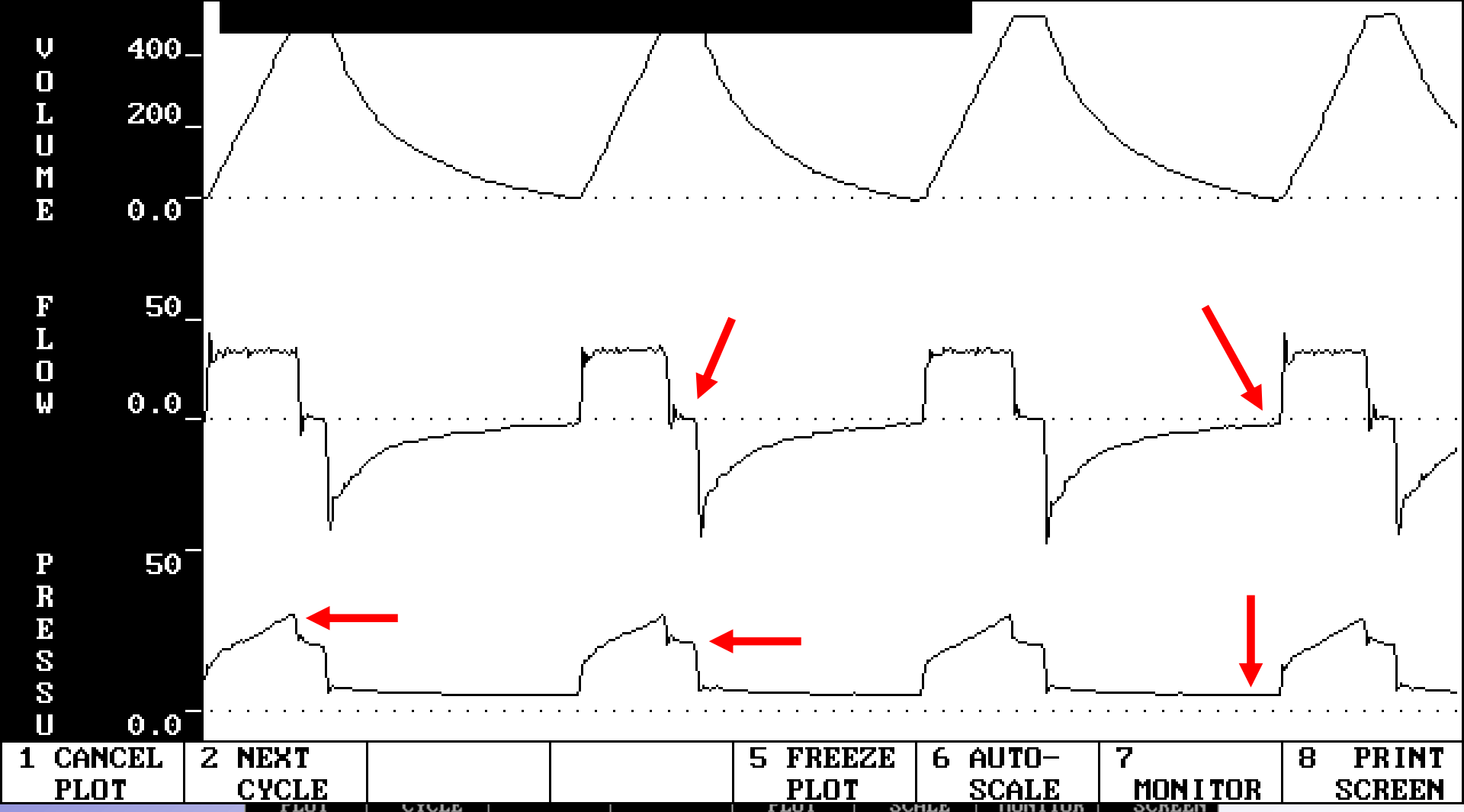
* **TIJD**



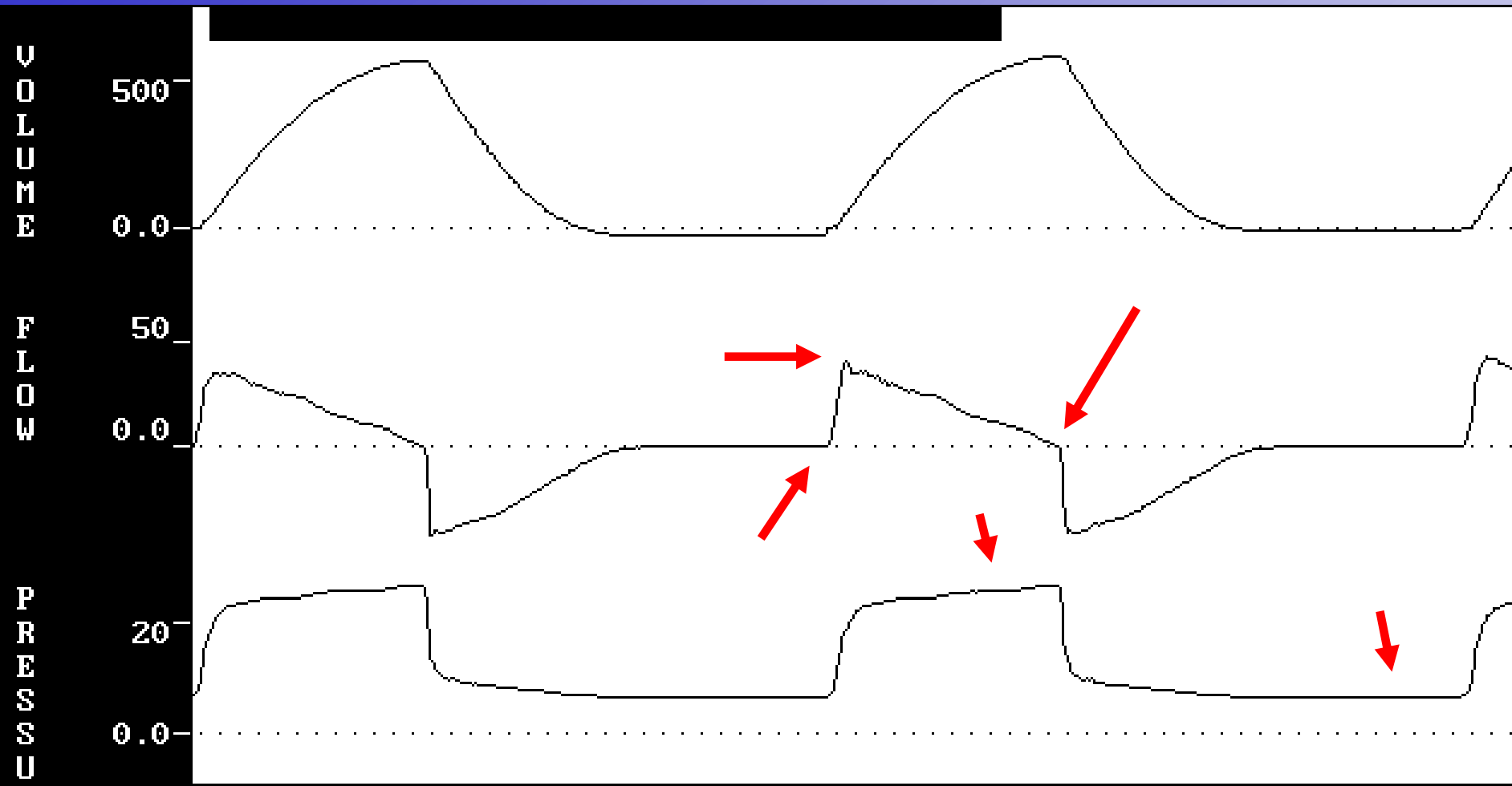
(S)CMV – VC - CPPV



PCV – BIPAP

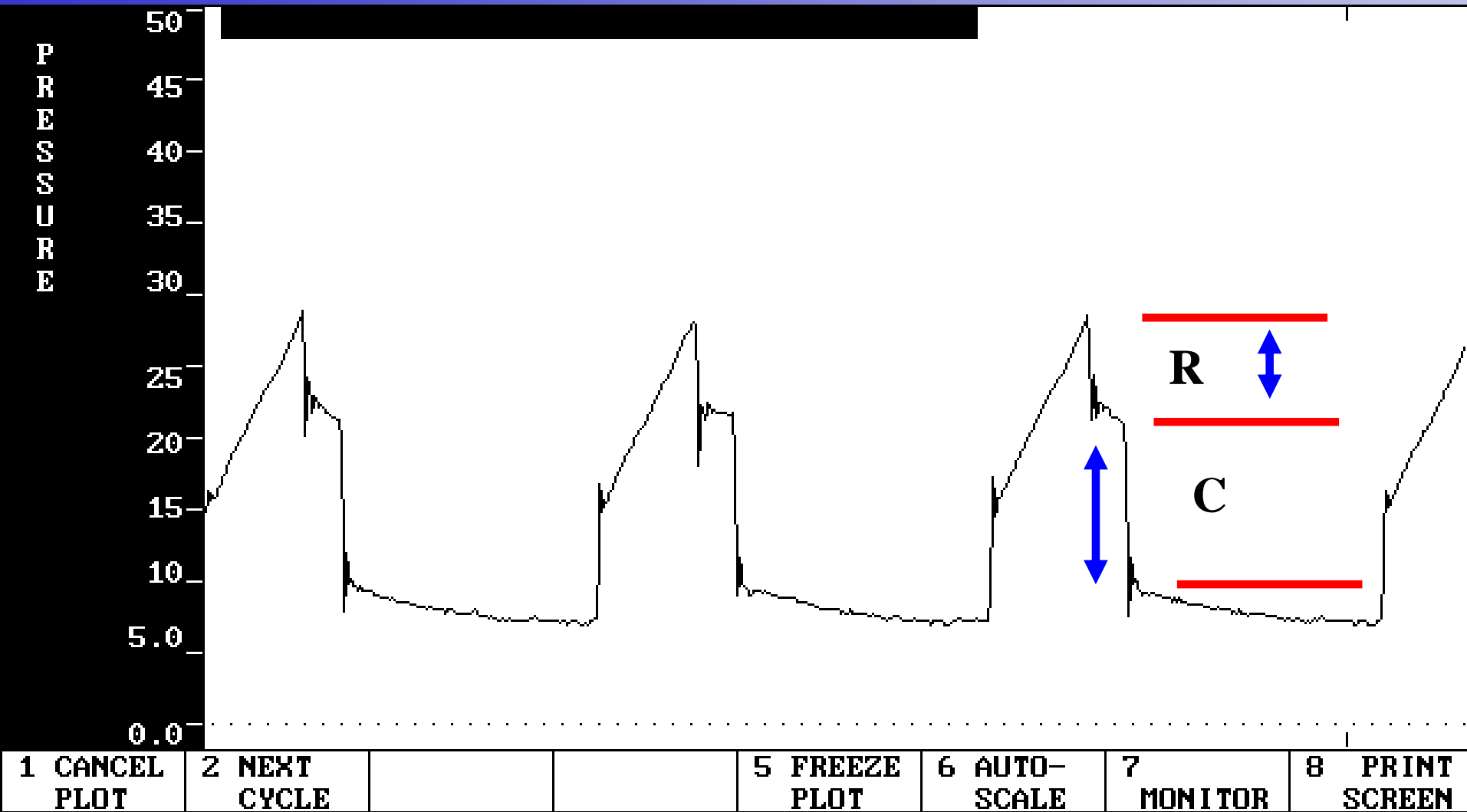


(S)CMV – VC – CPPV



1 CANCEL PLOT	2 NEXT CYCLE			5 FREEZE PLOT	6 AUTO-SCALE	7 MONITOR	8 PRINT SCREEN
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PCV – BIPAP



(S)CMV – VC – CPPV: Drukcurve

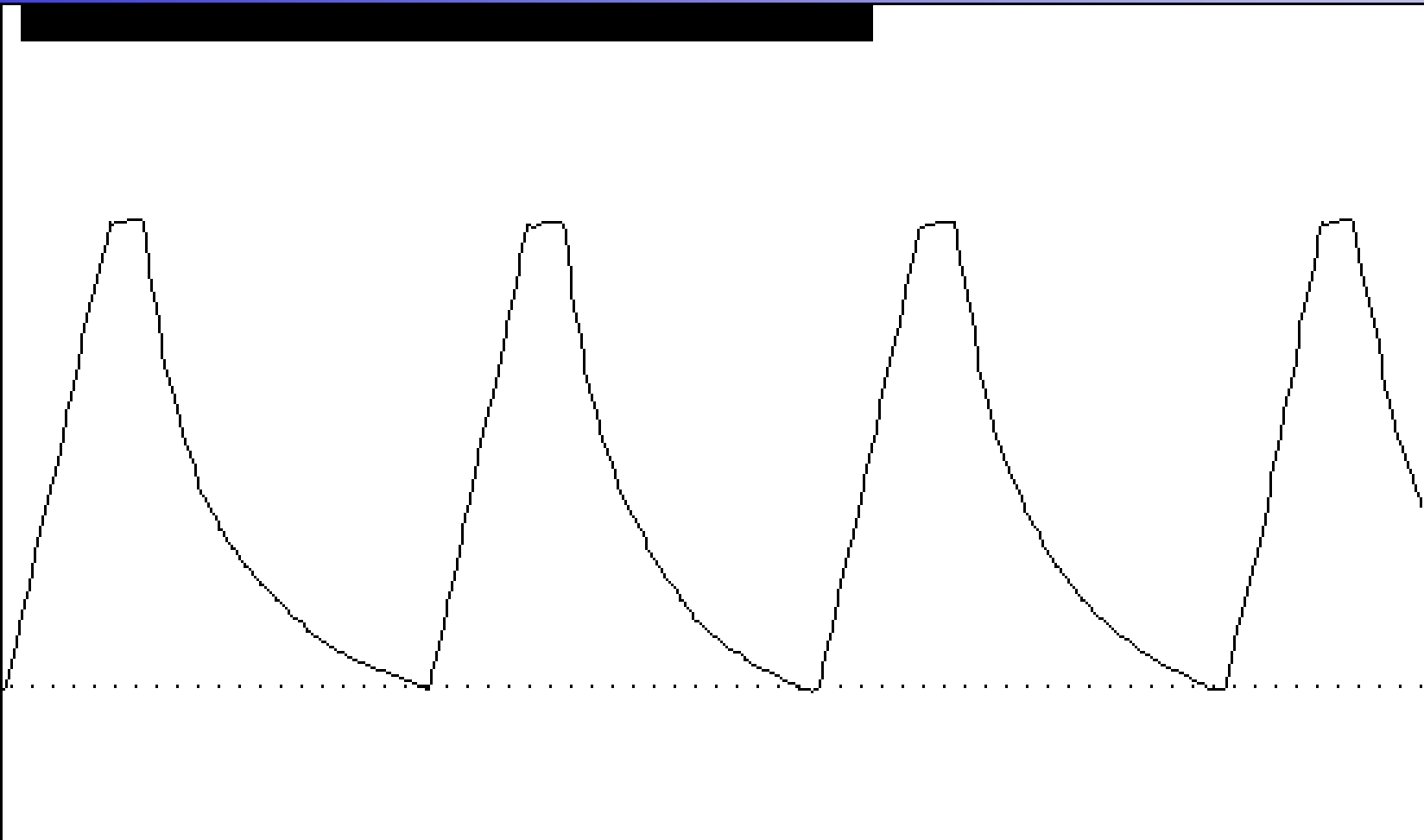


1 CANCEL PLOT	2 NEXT CYCLE		5 FREEZE PLOT	6 AUTO-SCALE	7 MONITOR	8 PRINT SCREEN
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(S)CMV - VC – CPPV: Drukcurve

V
O
L
U
M
E

700
600
500
400
300
200
100
0.0
-100



1 CANCEL
PLOT

2 NEXT
CYCLE

5 FREEZE
PLOT

6 AUTO-
SCALE

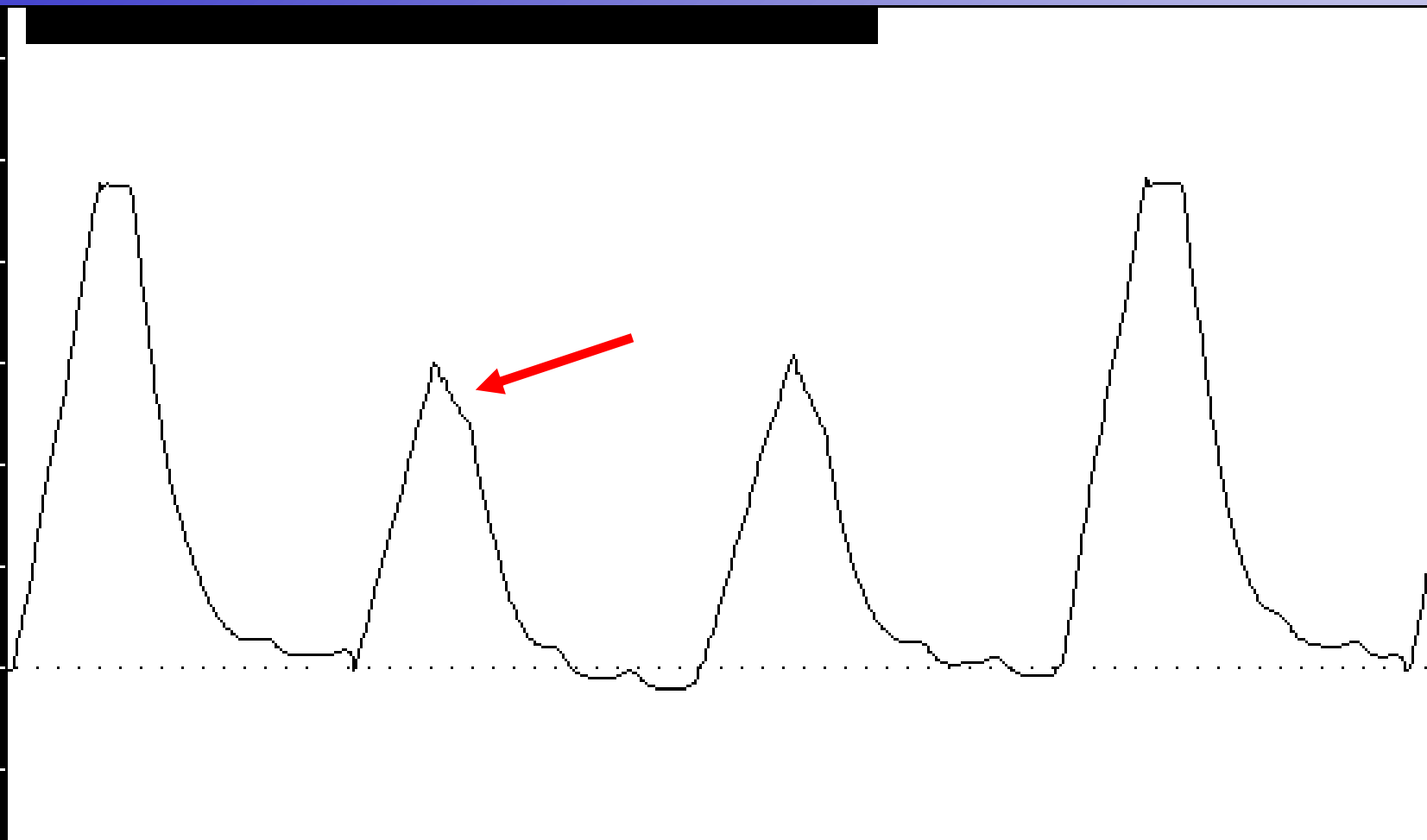
7 MONITOR

8 PRINT
SCREEN

(S)CMV – VC – CPPV: Volumecurve

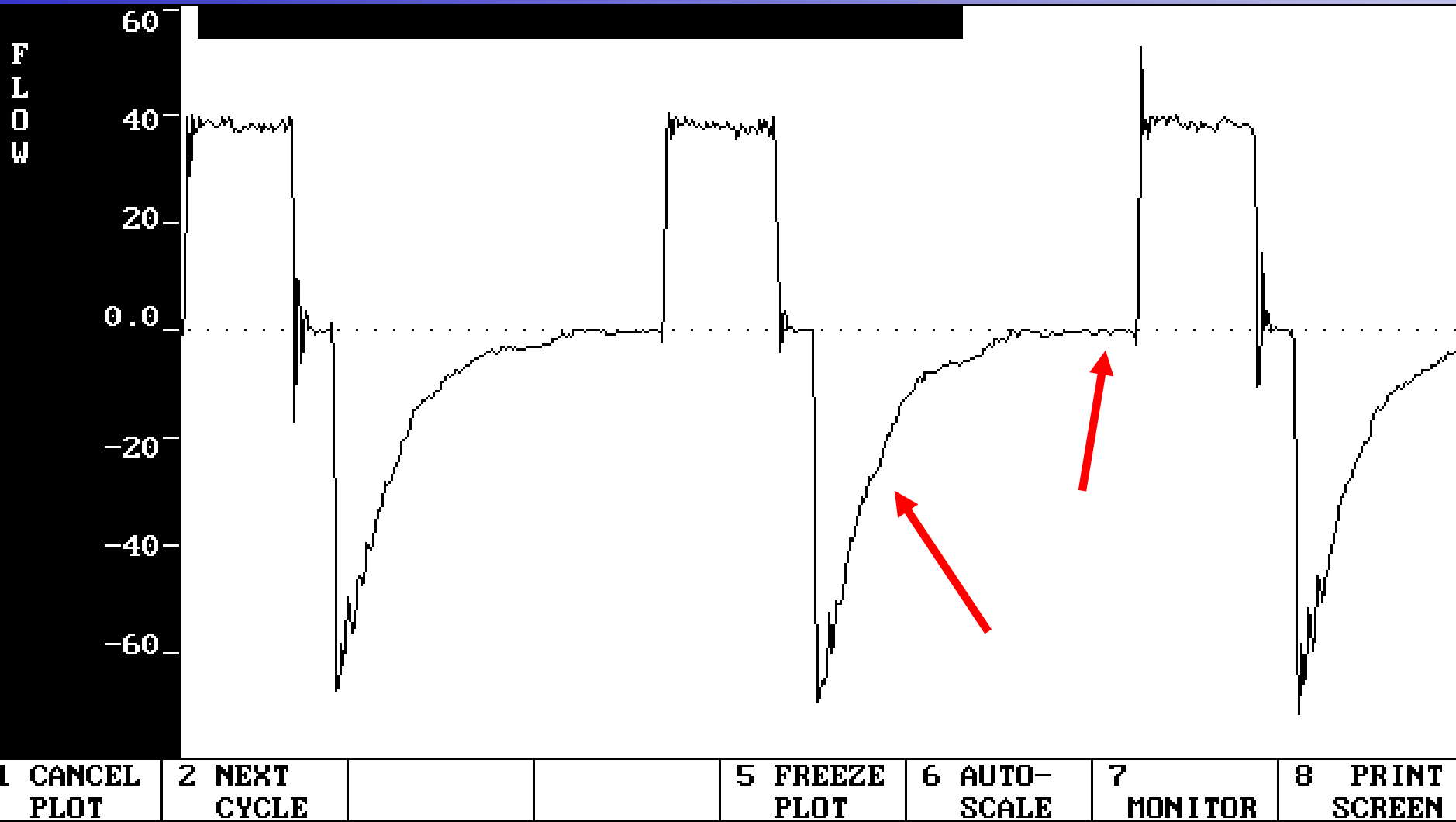
V
O
L
U
M
E

600
500
400
300
200
100
0.0
-100



1 CANCEL PLOT	2 NEXT CYCLE		5 FREEZE PLOT	6 AUTO-SCALE	7 MONITOR	8 PRINT SCREEN
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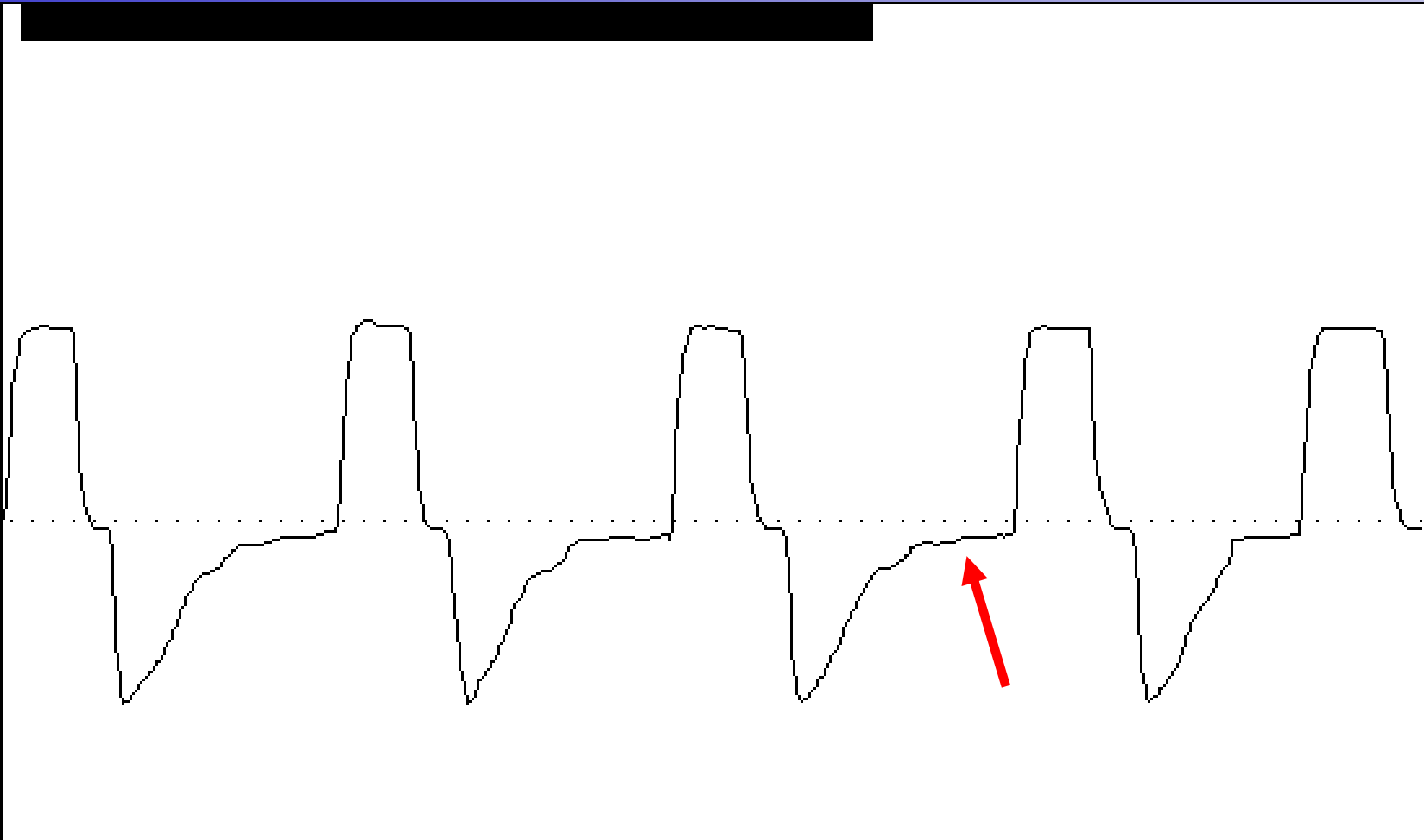
(S)CMV – VC – CPPV: Volumeverlies



(S)CMV – VC – CPPV:Flowcurve

F
L
O
W

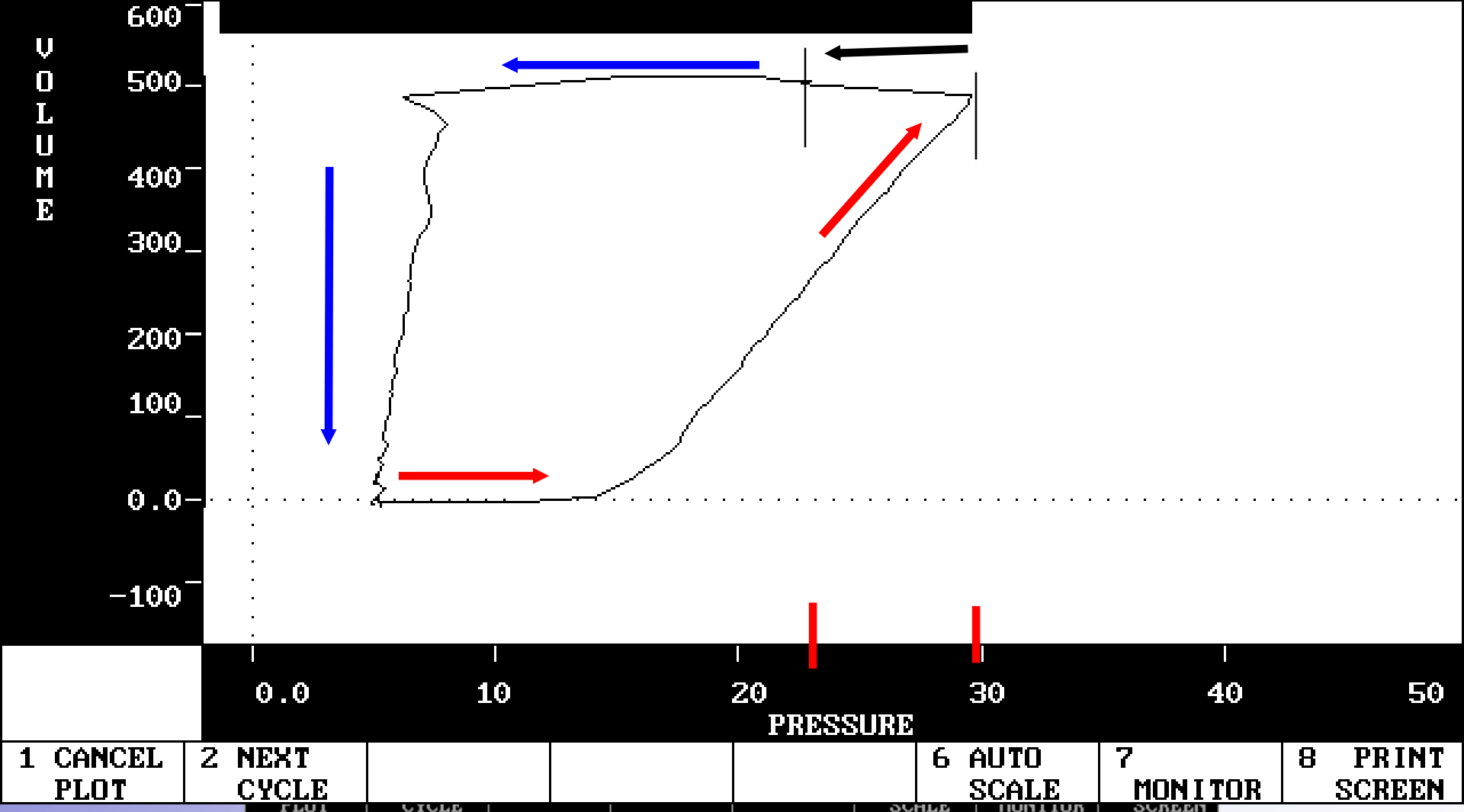
60
40
20
0.0
-20
-40



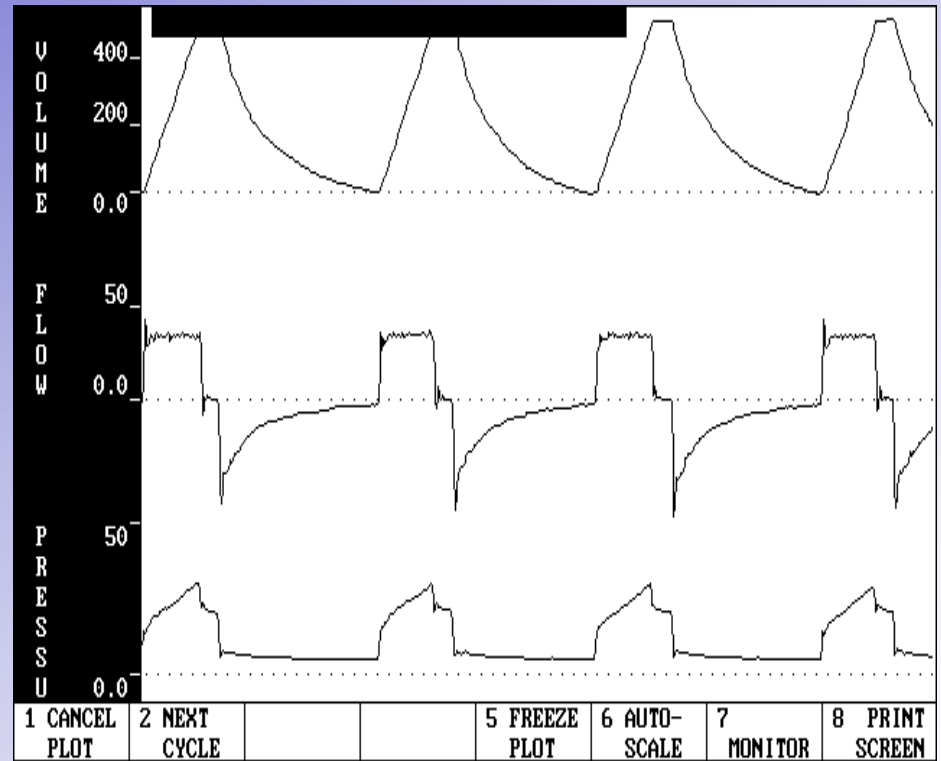
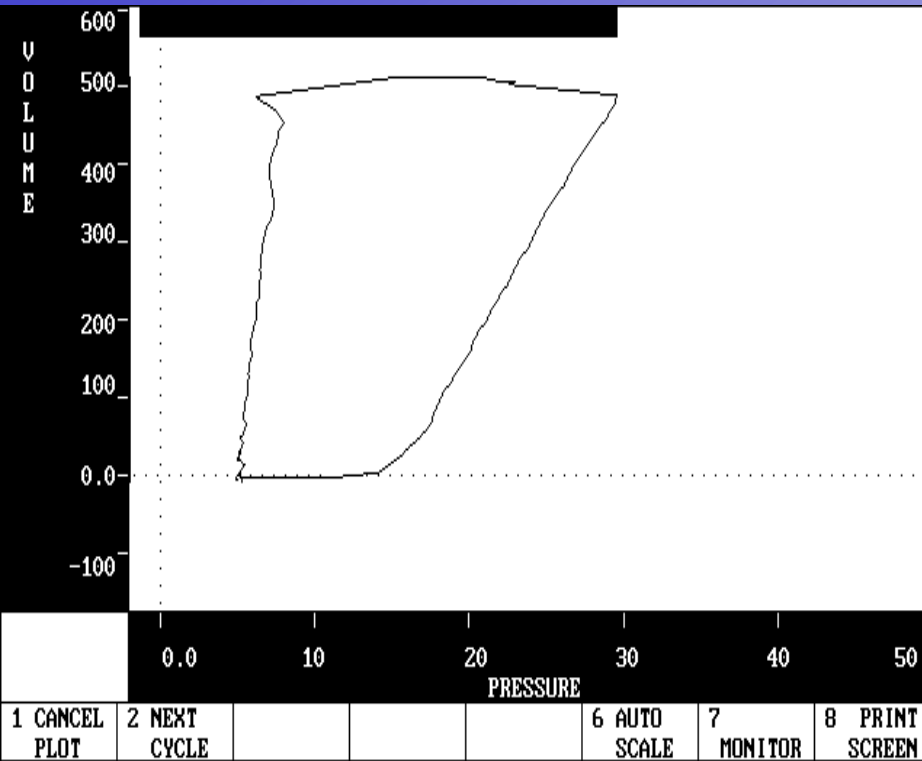
1 CANCEL PLOT	2 NEXT CYCLE		5 FREEZE PLOT	6 AUTO-SCALE	7 MONITOR	8 PRINT SCREEN
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(S)CMV – VC – CPPV: Flowcurve

BEADEMINGS LOOP



(S)CMV: P/V loop

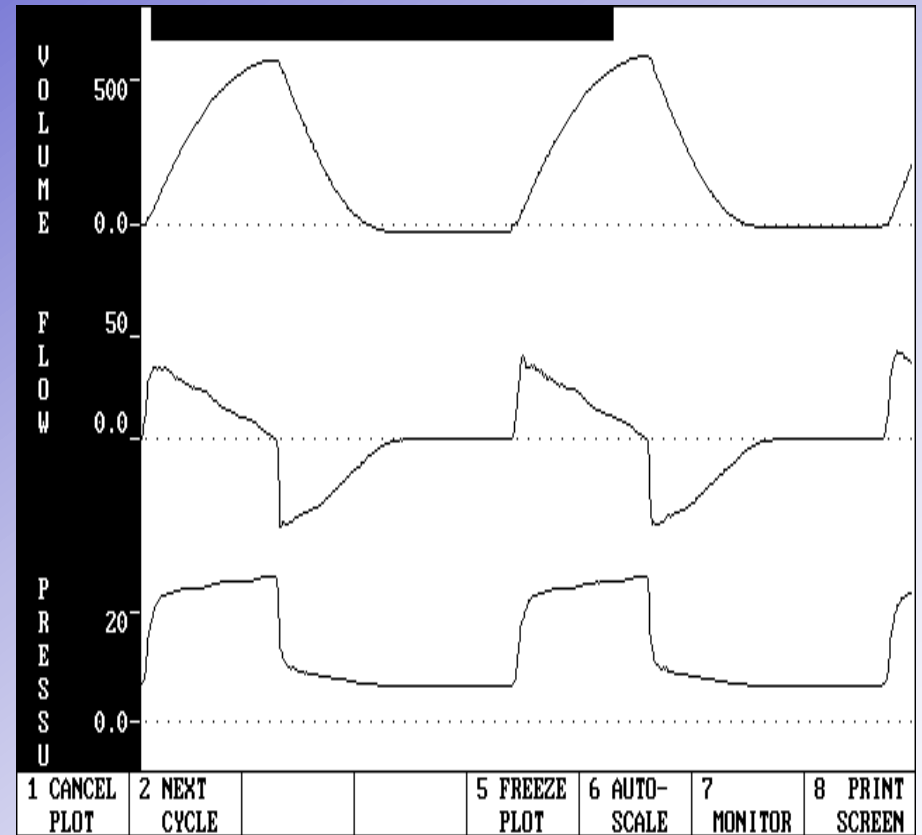
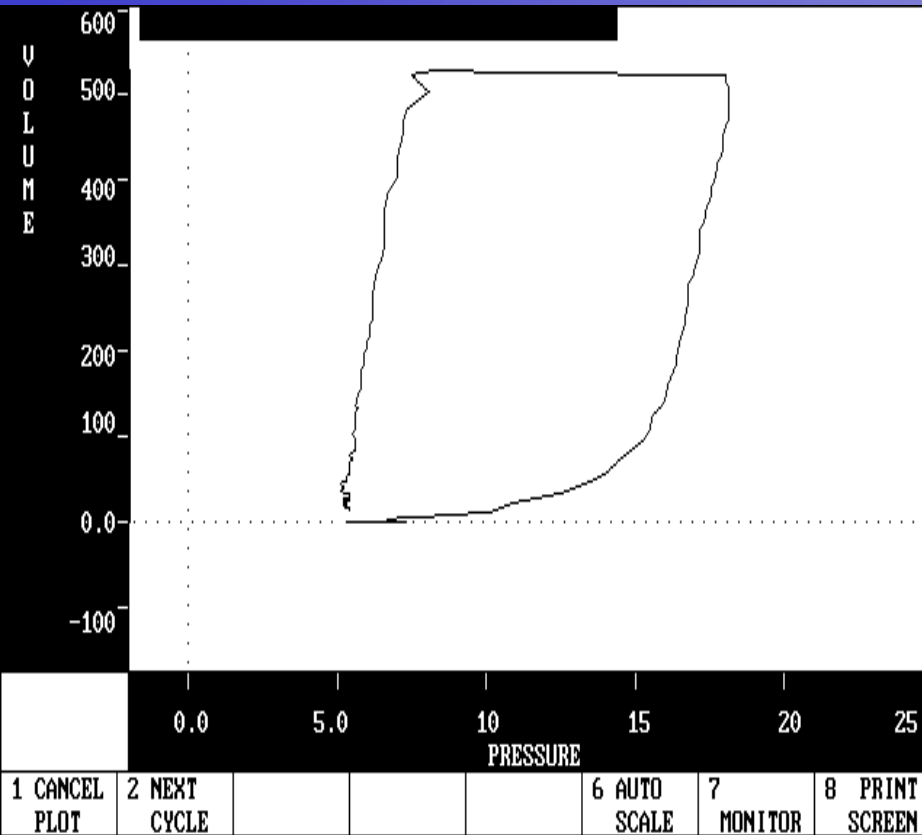


P/V Loop:

V.C. / (S) CMV / CPPV

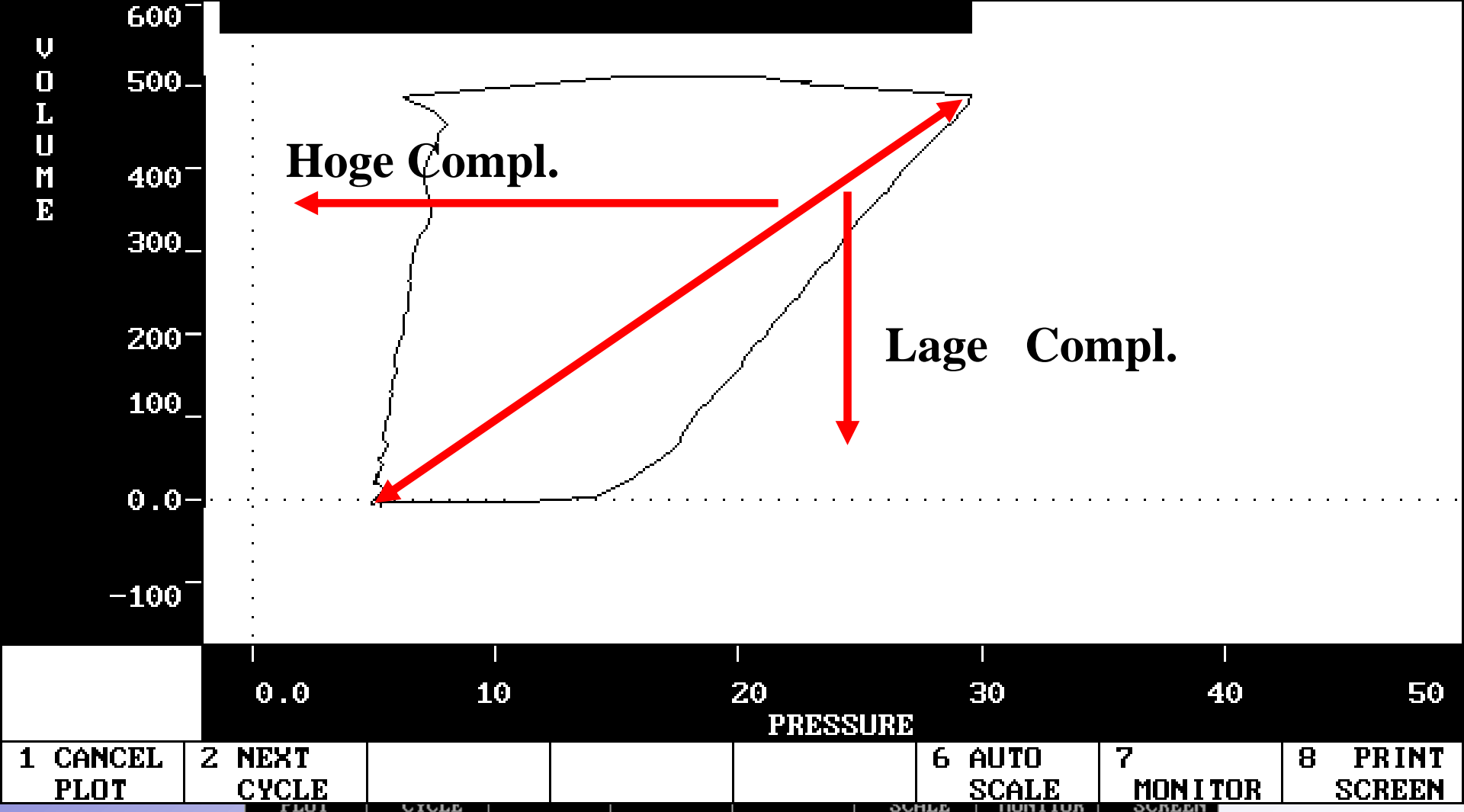
Real time curven

Volume / Flow / Druk



**P/V Loop:
PCV / BIPAP**

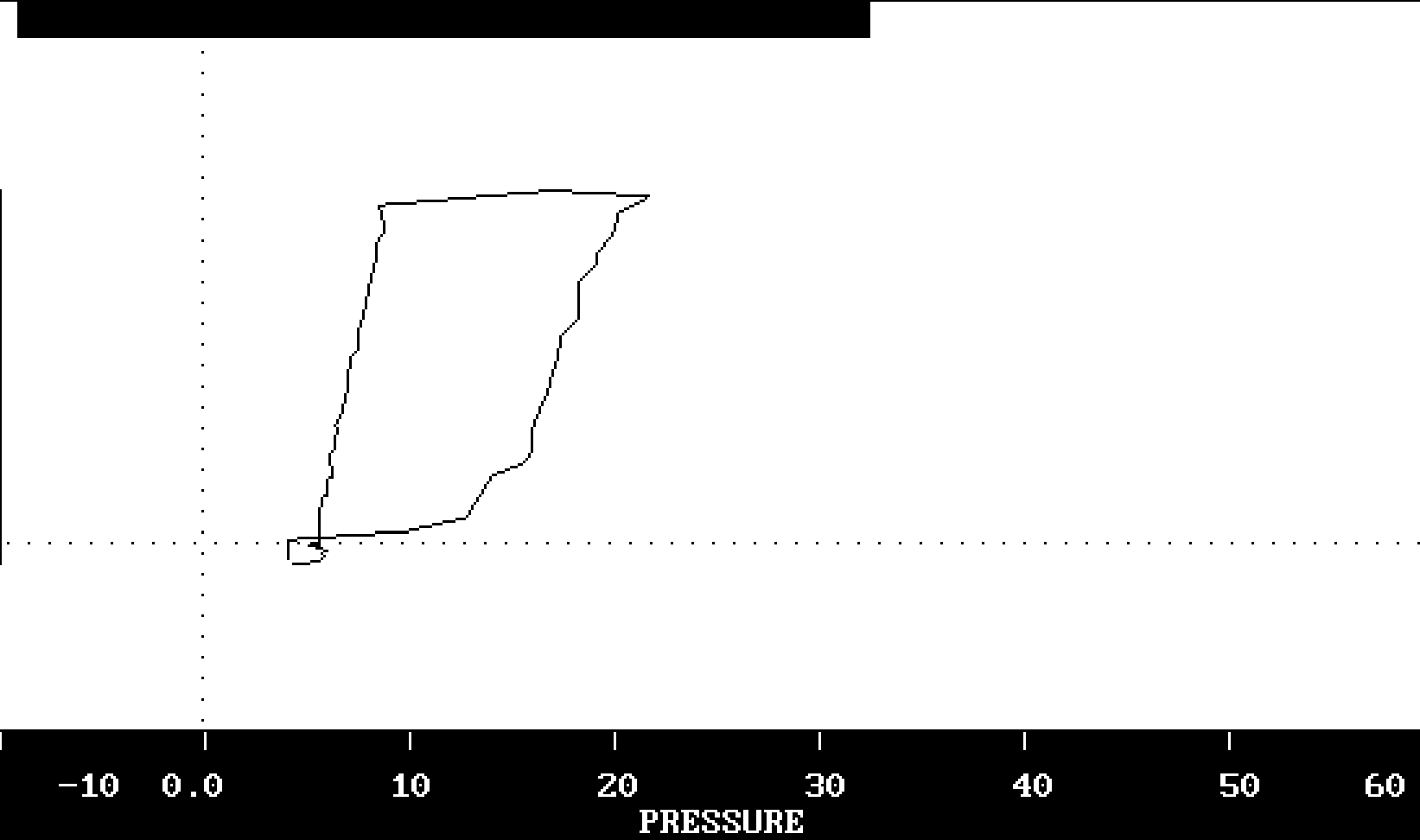
**Real time curven
Volume / Flow / Druk**



(S)CMV: P/V loop

VOLUME

500
400
300
200
100
0.0
-100



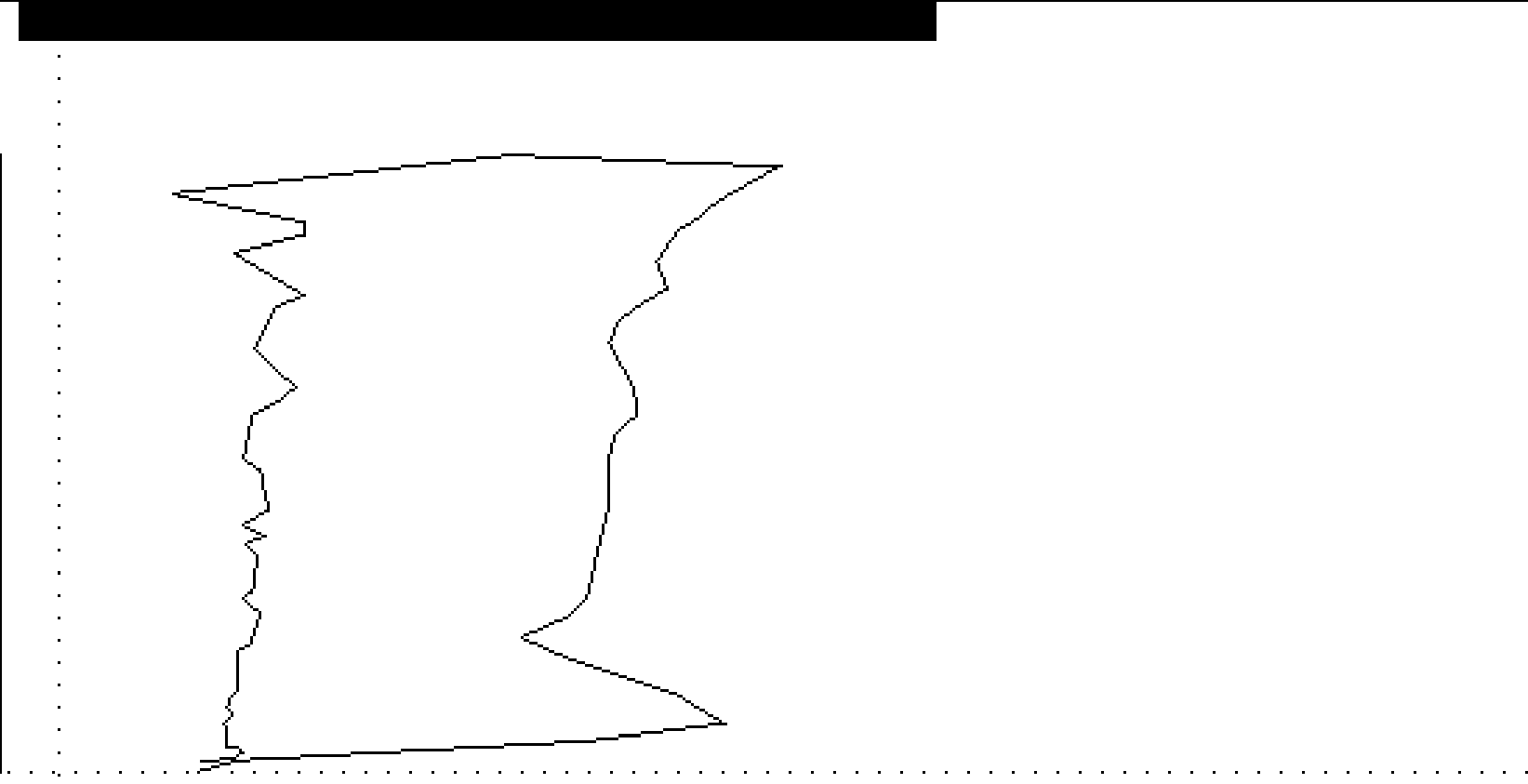
-10 0.0 10 20 30 40 50 60
PRESSURE

1 CANCEL PLOT	2 NEXT CYCLE				6 AUTO SCALE	7 MONITOR	8 PRINT SCREEN
PLU1	CYCLE				SCHLE	TURTUR	SCREEN

Triggeren (WOB)

VOLUME

400
350
300
250
200
150
100
50
0.0



0.0 10 20 30 40 50

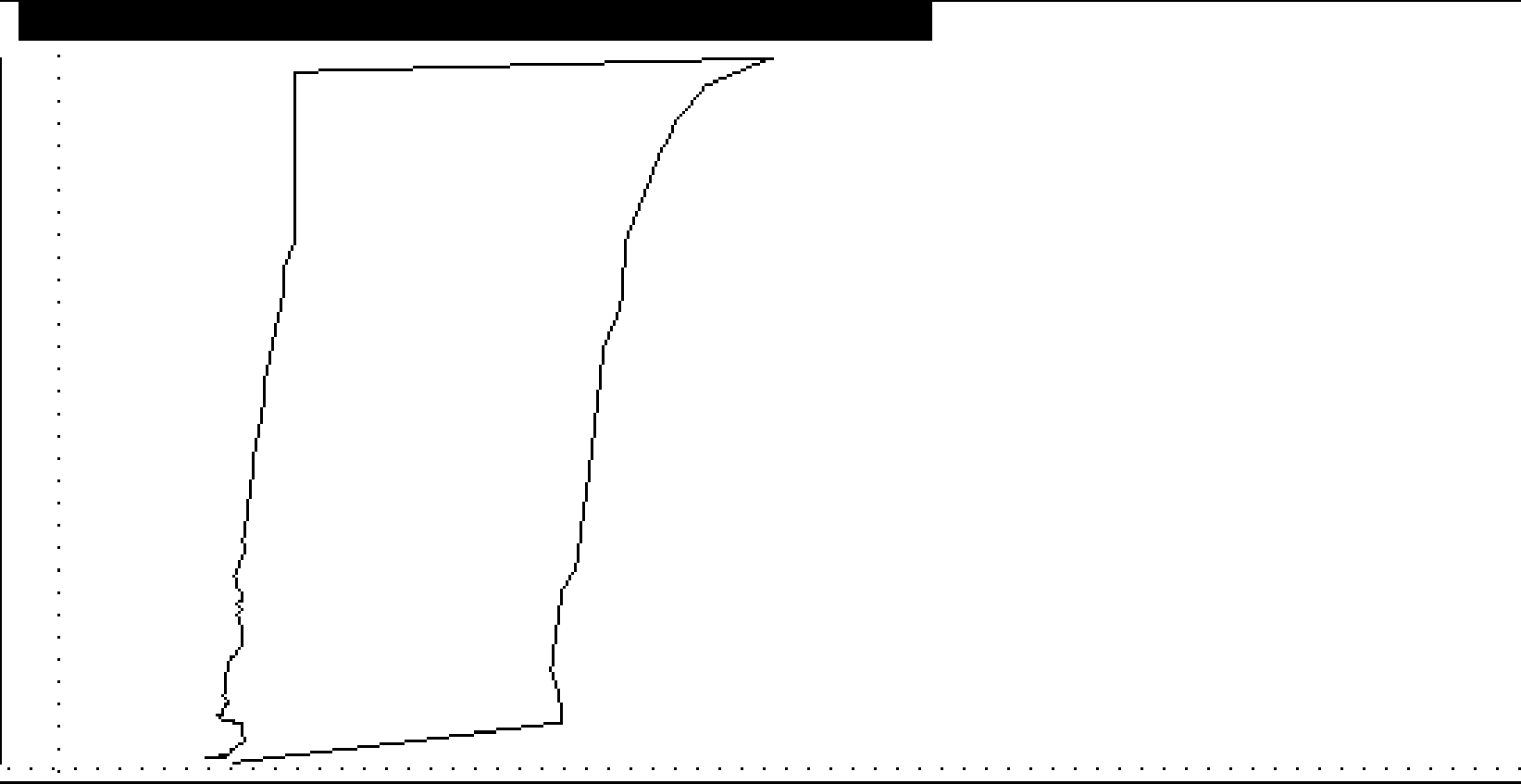
PRESSURE

1 CANCEL PLOT	2 NEXT CYCLE				6 AUTO SCALE	7 MONITOR	8 PRINT SCREEN
PLU1	CYCLE				SCHLE	TUTOR	SCREEN

P/V loop : voor BT

VOLUME

400
350
300
250
200
150
100
50
0.0



0.0 10 20 30 40 50

PRESSURE

1 CANCEL PLOT	2 NEXT CYCLE				6 AUTO SCALE	7 MONITOR	8 PRINT SCREEN
PLU1	CYCLE				SCHLE	TUTOR	SCREEN

P/V loop : na BT

Volledige Beademing

• **Volume**

begrensd

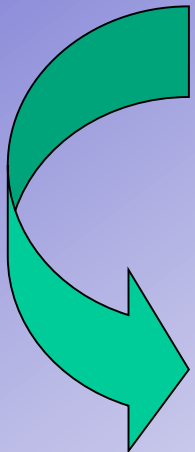
druk ?????



• **Druk**

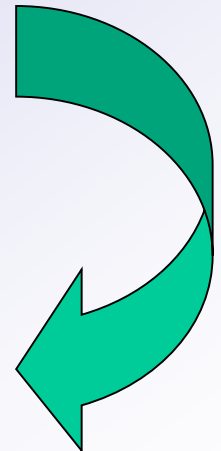
begrensd

• **volume ?????**



Volume_{begrensd.}(AMV)

Druk regulatie



- **Secundair sturingsmechanisme**

= druk-alarmgrens

- **Alarmgrens = omslagpunt van in - naar expiratie**

Beademingsdrukken:

- **P_{max.} / Peak**
- **P_{plateau}**
- **PEEP(e)**
- **PEEP(i) – AUTO-PEEP**

AUTO-PEEP

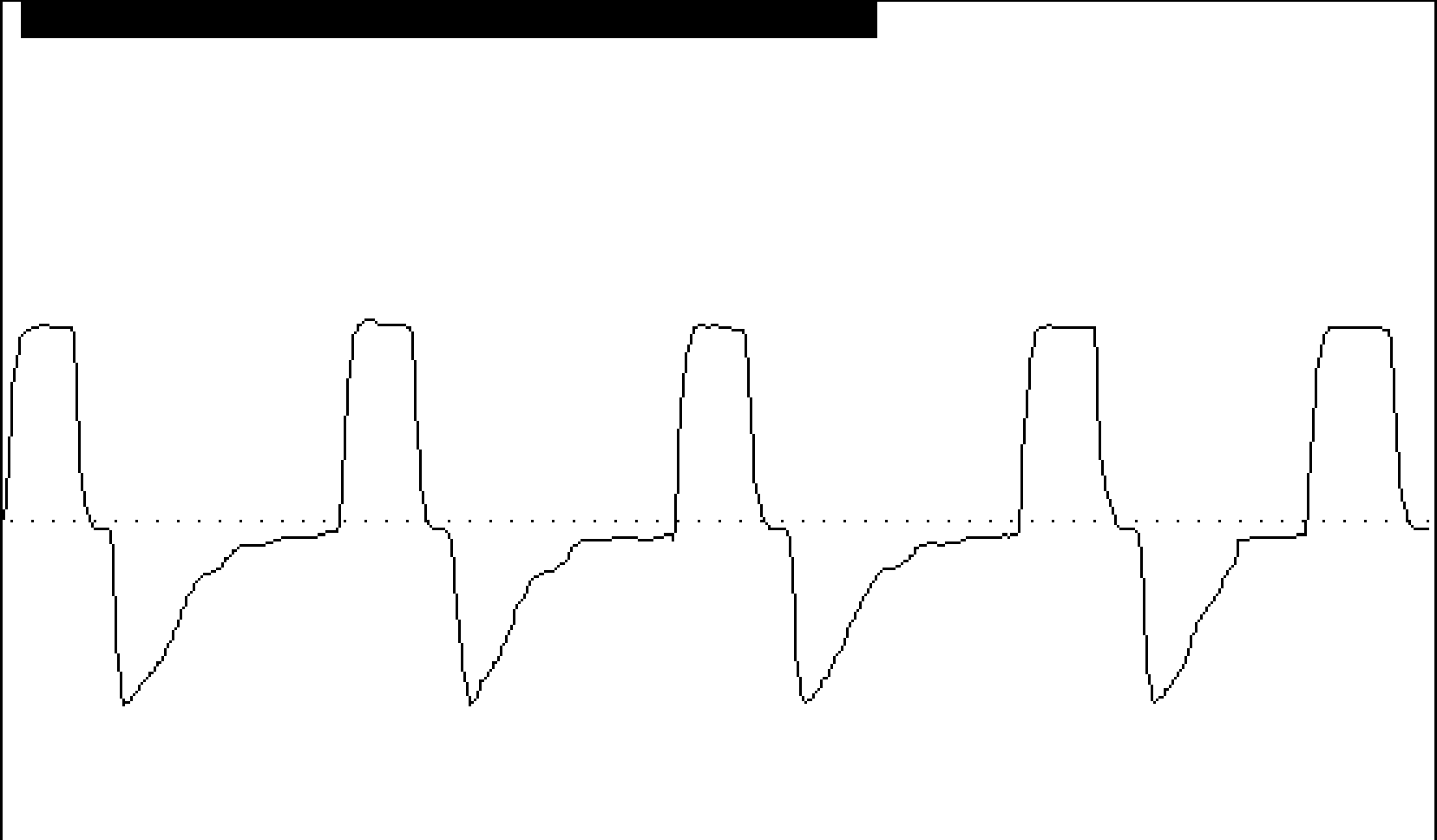
HOREN - ZIEN - MIETEN!

AUTO-PEEP COMPLICATIES

- **BARO-TRAUMA**
- **HYPO-TENSIE**
- **TOENAME ADEMARBED**

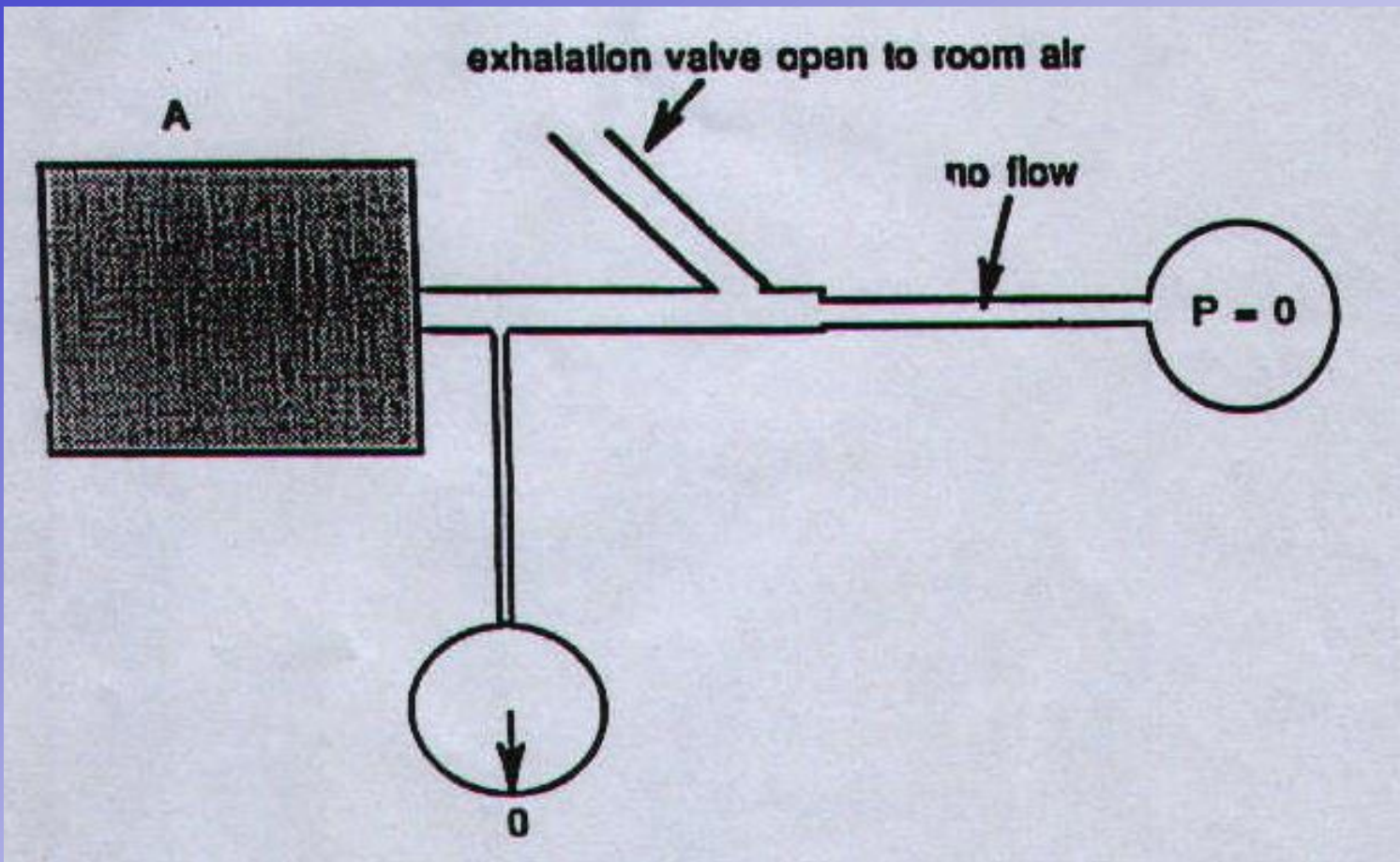
F
L
O
W

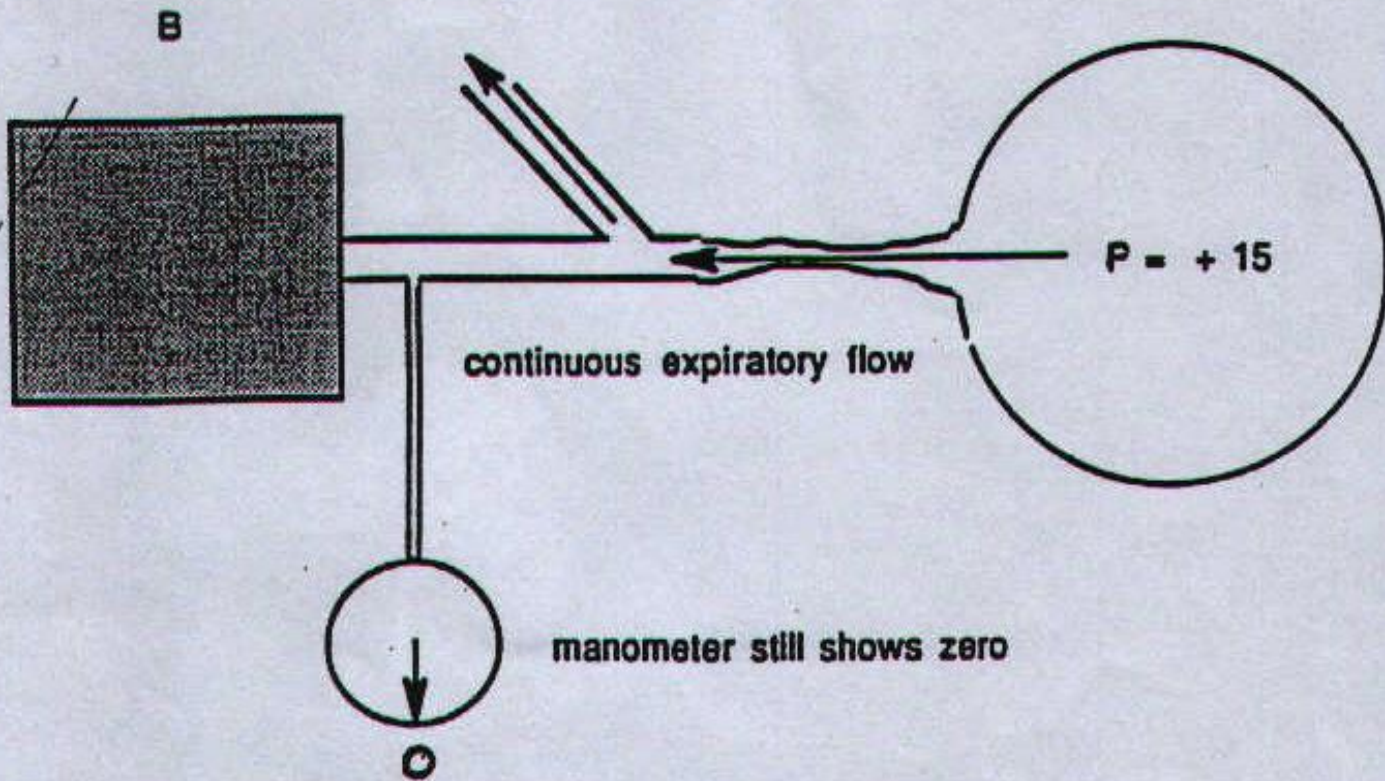
60
40
20
0.0
-20
-40

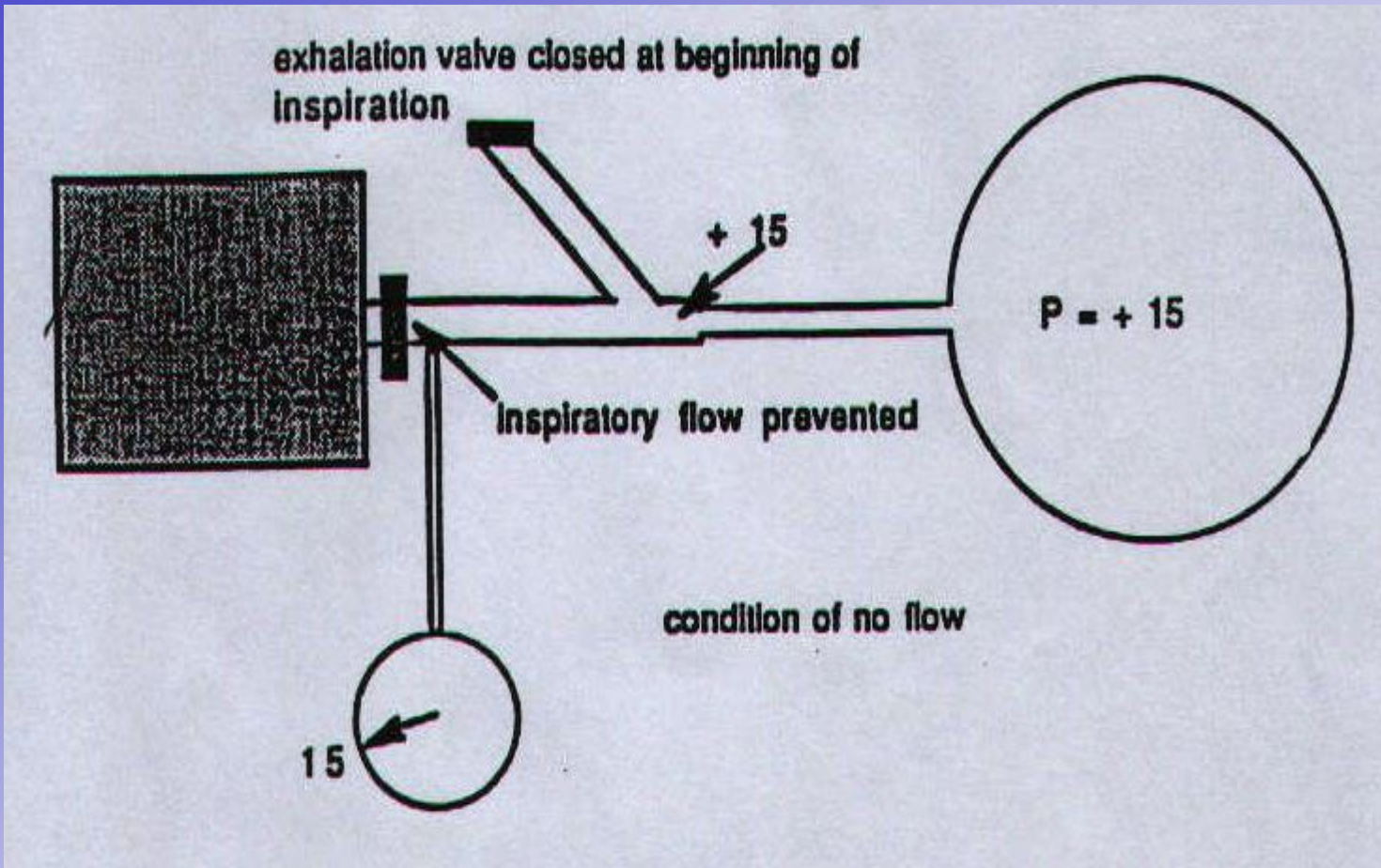


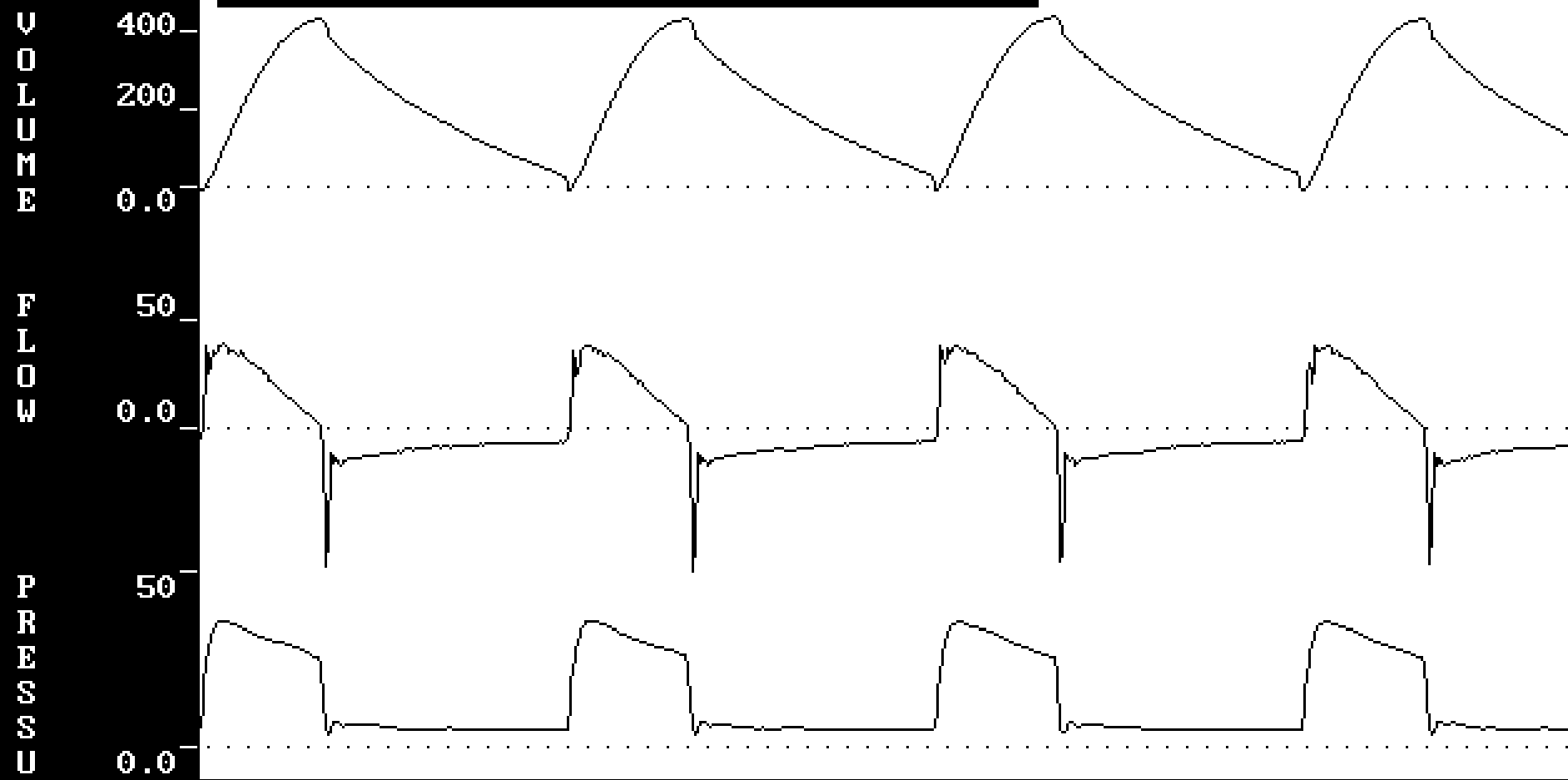
1 CANCEL PLOT	2 NEXT CYCLE			5 FREEZE PLOT	6 AUTO-SCALE	7 MONITOR	8 PRINT SCREEN
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AUTO-PEEP: Flow expiratoir !!



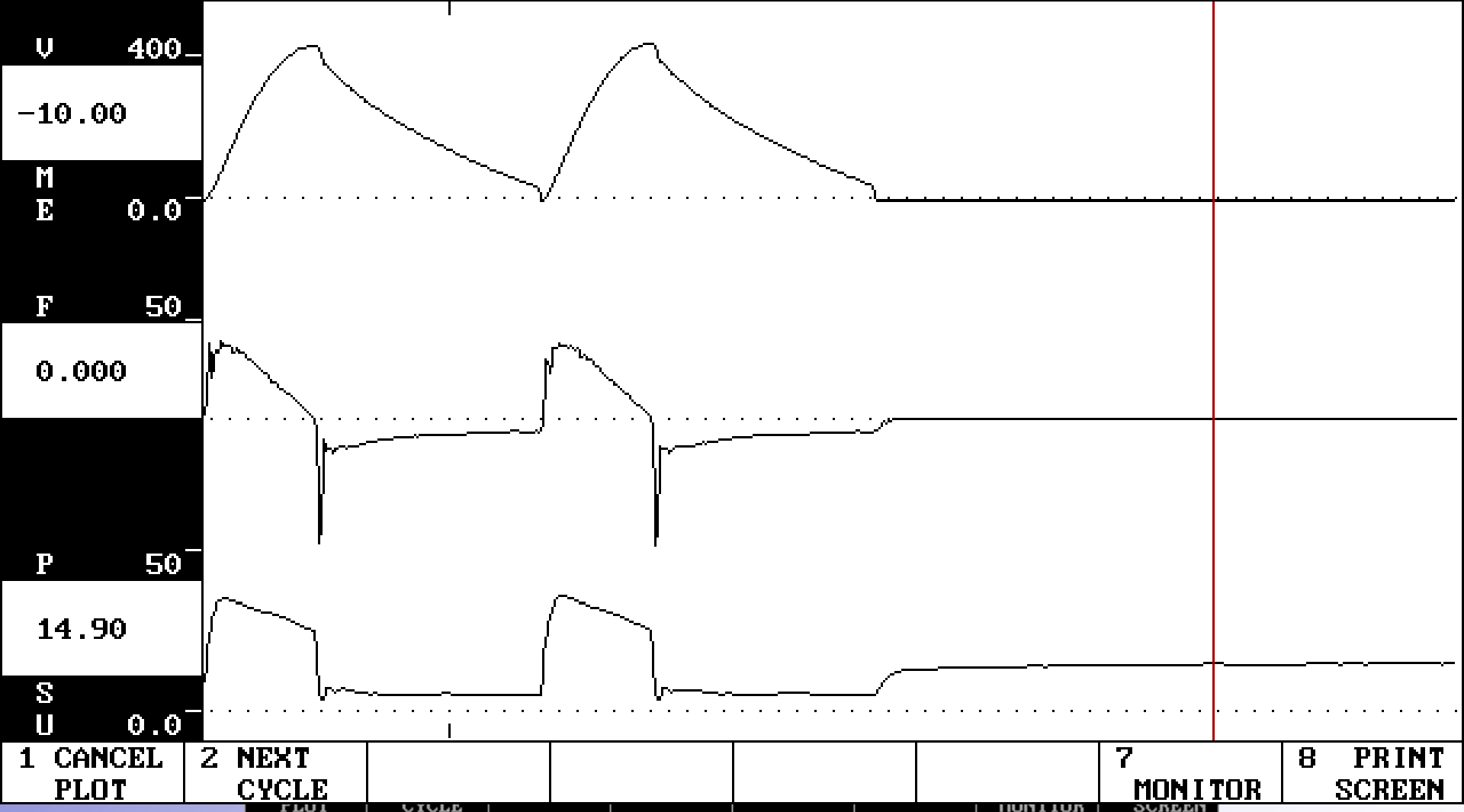






1 CANCEL PLOT	2 NEXT CYCLE			5 FREEZE PLOT	6 AUTO-SCALE	7 MONITOR	8 PRINT SCREEN
PLU1	CYCLE			PLU1	SCHLE	TURTUR	SCREEN

AUTO-PEEP: Flow expiratoir !!



AUTO-PEEP meting

**Beademing bij ernstige
longpathologie**

**Lung protective
strategie**

PCV / BIPAP

Pressure Control

Ventilation /

Biphasic Positive

Airway Pressure

PCV / BIPAP

Tidal Volume wordt bepaald door:

- **Ingestelde druk**
- **Tijd: - frequentie**
- **- I:E ratio**
- **Weerstand $\text{\textcircled{R}}$**
- **Compliantie $\text{\textcircled{C}}$**

VOLUME

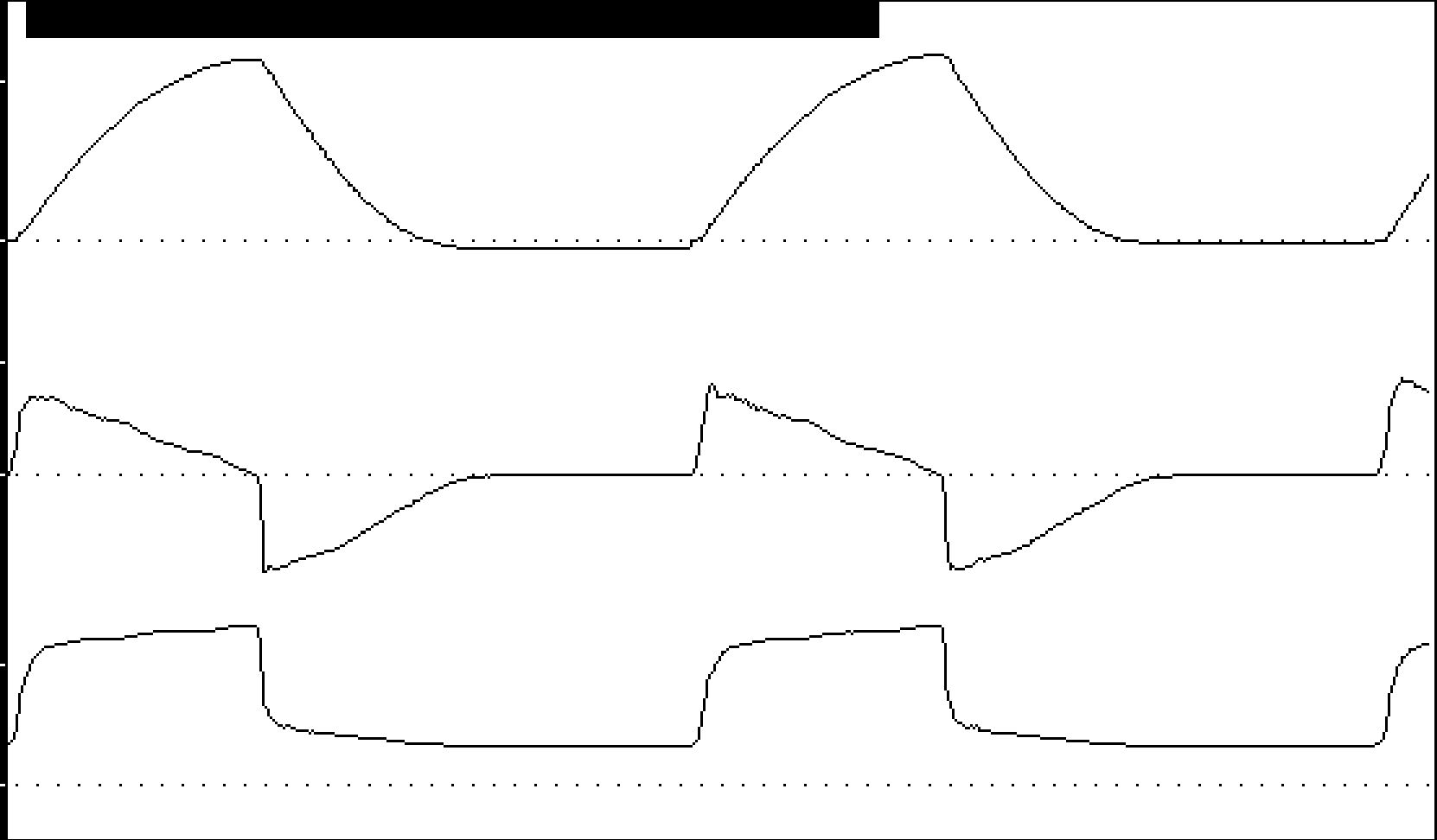
500
0.0

FLOW

50
0.0

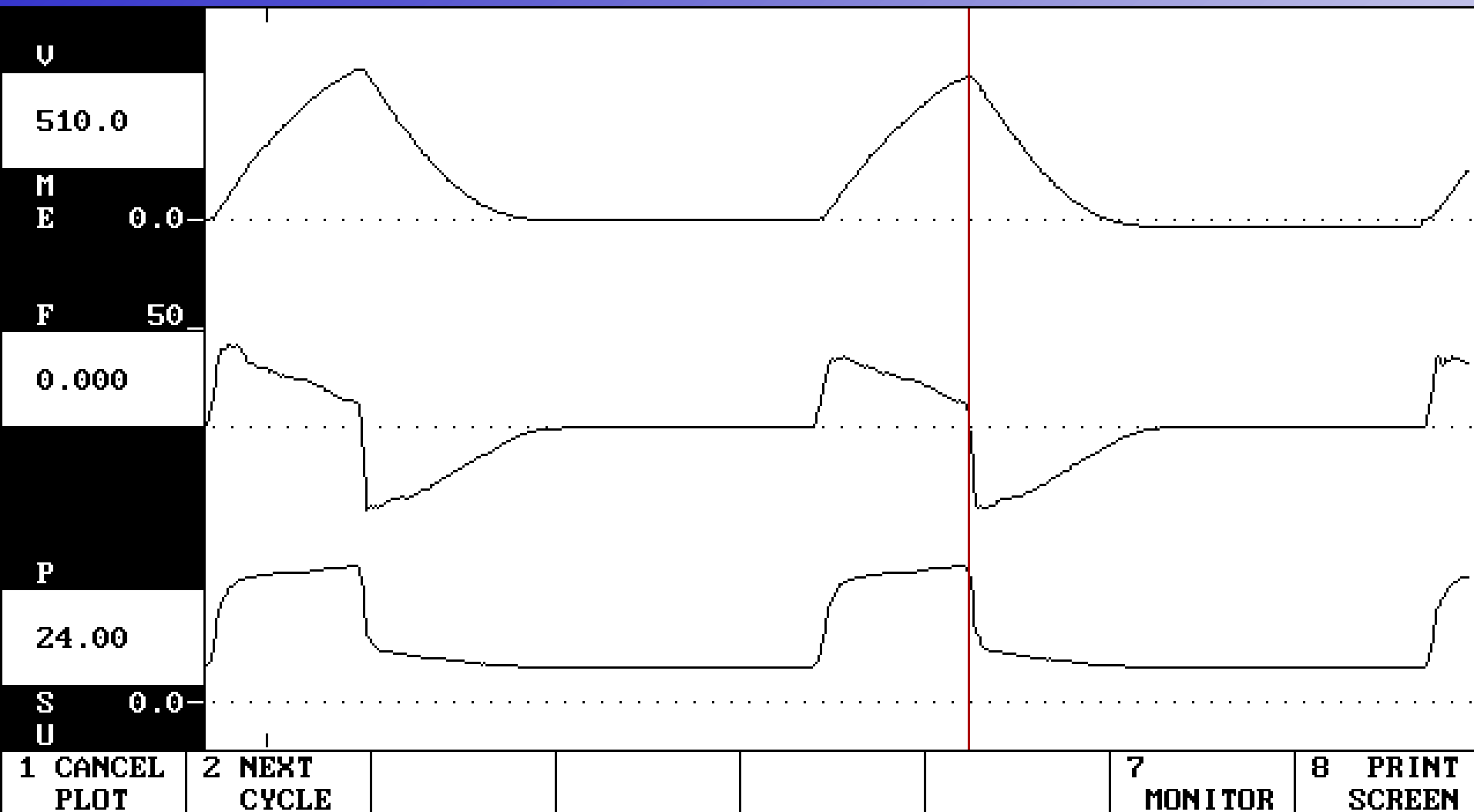
PRESSURE

20
0.0

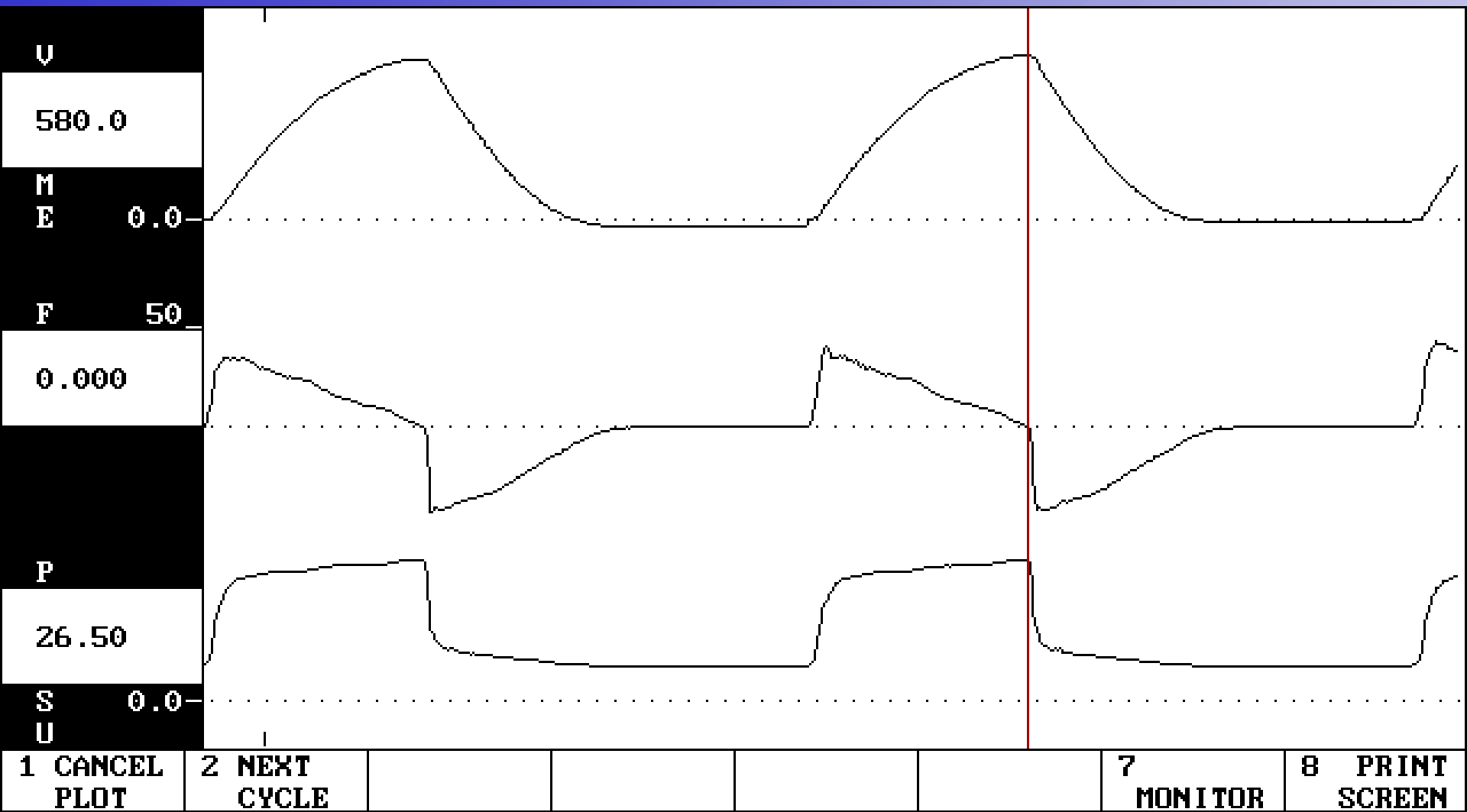


1 CANCEL PLOT	2 NEXT CYCLE			5 FREEZE PLOT	6 AUTO-SCALE	7 MONITOR	8 PRINT SCREEN
	PLU1	CYCLE		PLU1	SCHLE	TUTOR	SCREEN

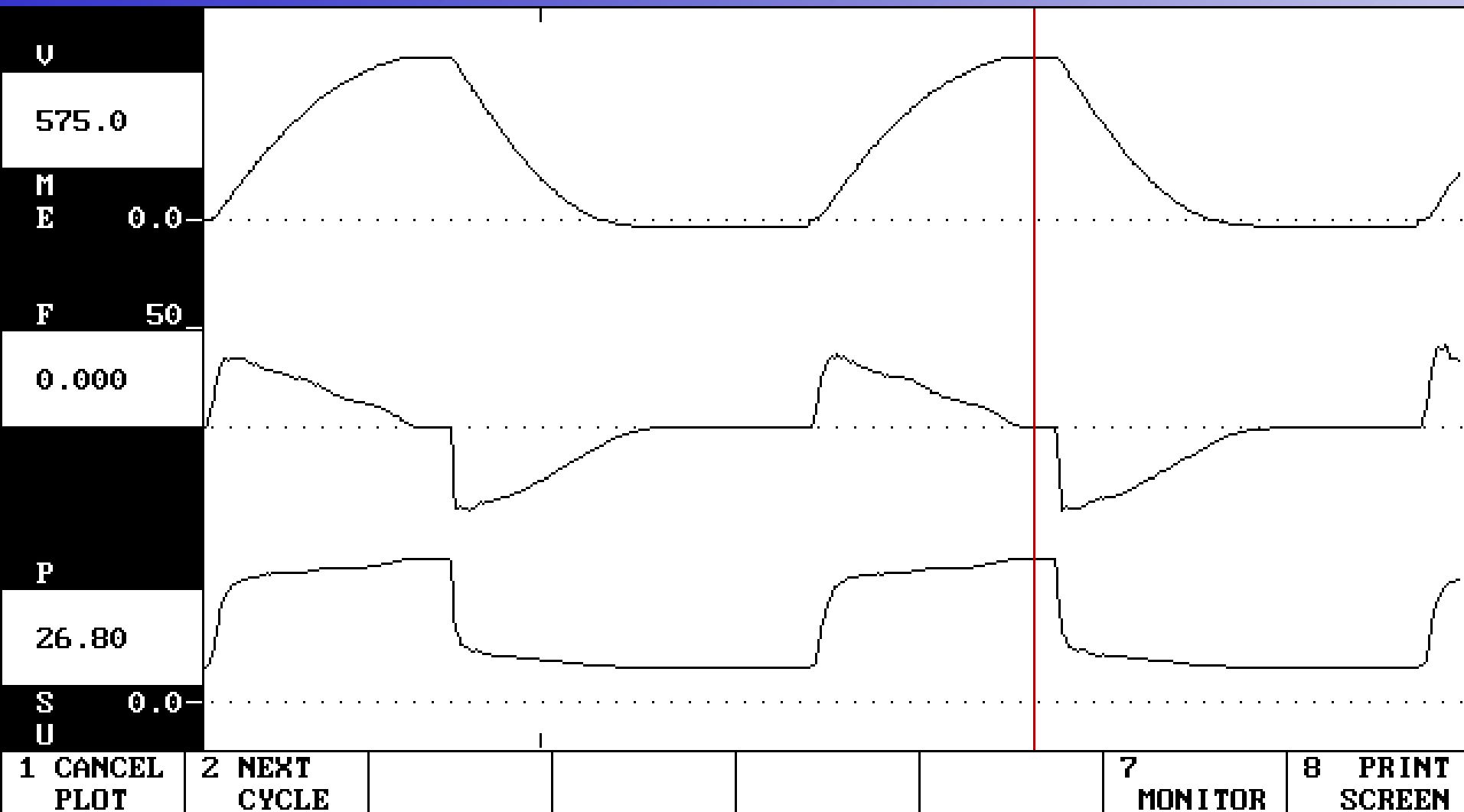
PCV / BIPAP



PCV : insp. tijd 25 % ITV : 510 ml



PCV : Insp.tijd 36% ITV: 580 ml



PCV : insp. tijd 40 %????

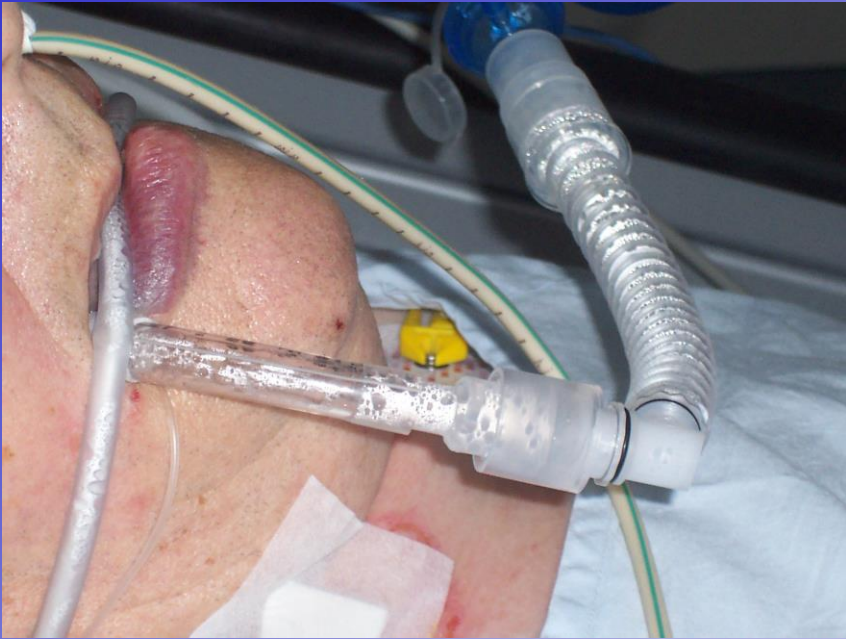
Let op, voorkom!!!!

- **Barotrauma - Pmax 30 / 35 cm H₂O**
- **Volutrauma - 6 ml / kg / lich.gew.**
- **Hyperinsufflatie**
- **Biotrauma**
- **Shearstress ----- PEEP**
- **FiO₂ ?**

Weaning

Weaning

- **Vertrekpunt**
- **Weaningsvorm**
- **Planning**



Weanen



Criteria niet respiratoir ?????

- Hemodynamiek
- Bio-chemie
- X-thorax - ECG
- Bewustzijn (hoestreactie tijdens tracheaal uitzuigen)
- Temperatuur - Medicatie
- Rust

Criteria Respirator ?????

- Spontane ademhaling
- Ratio PaO_2/FIO_2 . (>200)
- Peep < 6 cm H₂O

Weaningsvormen

- **ASB -Assisted
Spontaneous
Breathing**
- **Pressure Support**

Observeer

- **Ademhalingsfrequentie**
- **Tidal Volume**
- **Gebruik hulpademhalingsspieren**
- **Paradoxaal ademhaling**
- **Bloeddruk**
- **Saturatie - Astrup**
- **Cyanose**

Weaning:

- **Niet verwennen**
- **Zo vroeg mogelijk mee beginnen**
- **Continuïteit**
- **Afspraken / Plan / Criteria**
- **Rapportage / Overdracht**
- **Rust / Dag- nachtritme**

ARDS

Status Asthmaticus

Buikligging

Open lung concept

Beademing Obesitas



Beademing

Obesitas



Patient