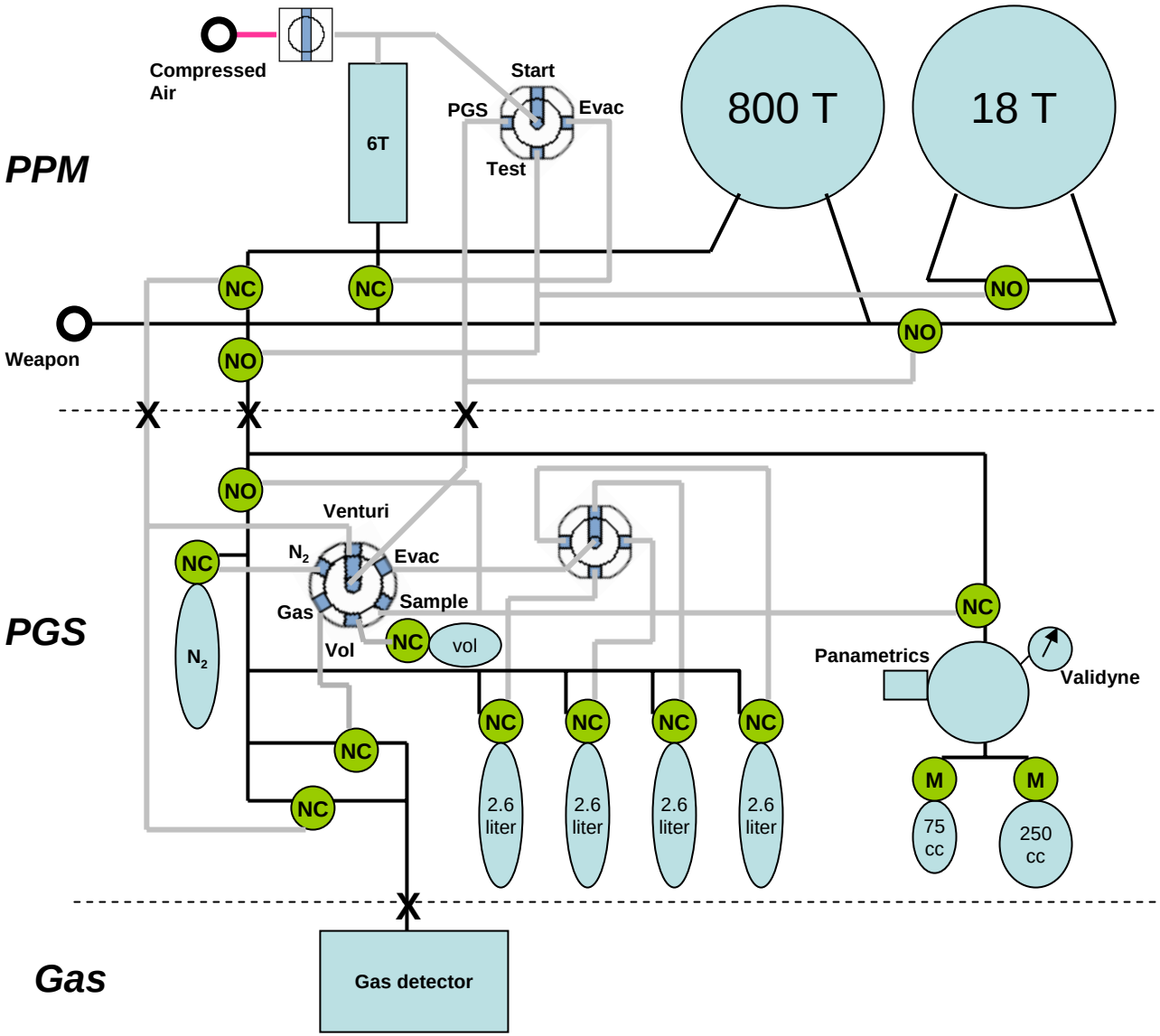


INITIAL STATE: SYSTEM IDLE.

Description: All pneumatic valves in their normal positions. Compressed air connected to unit. Connection made to weapon. All systems inactive.

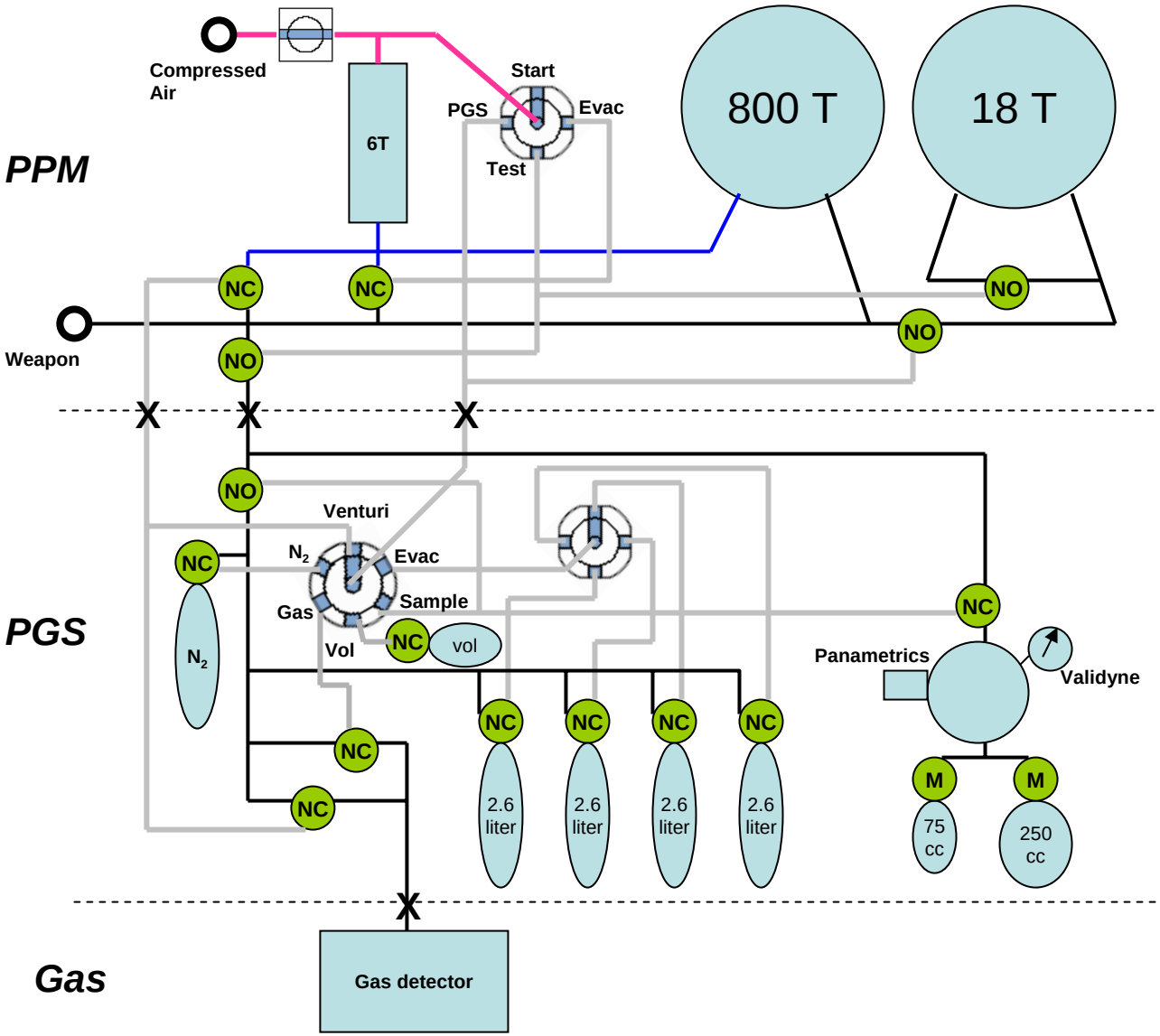
800 Torr Gauge Reading:
Zero.

18 Torr Gauge Reading:
Zero.

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)

PPM Operation



STEP 1: Open Compressed Air Valve.

Description: Venturi pump actuated. Reference side of 800 Torr gauge evacuated.

800 Torr Gauge Reading:

$P_{atm} - P_{base}$

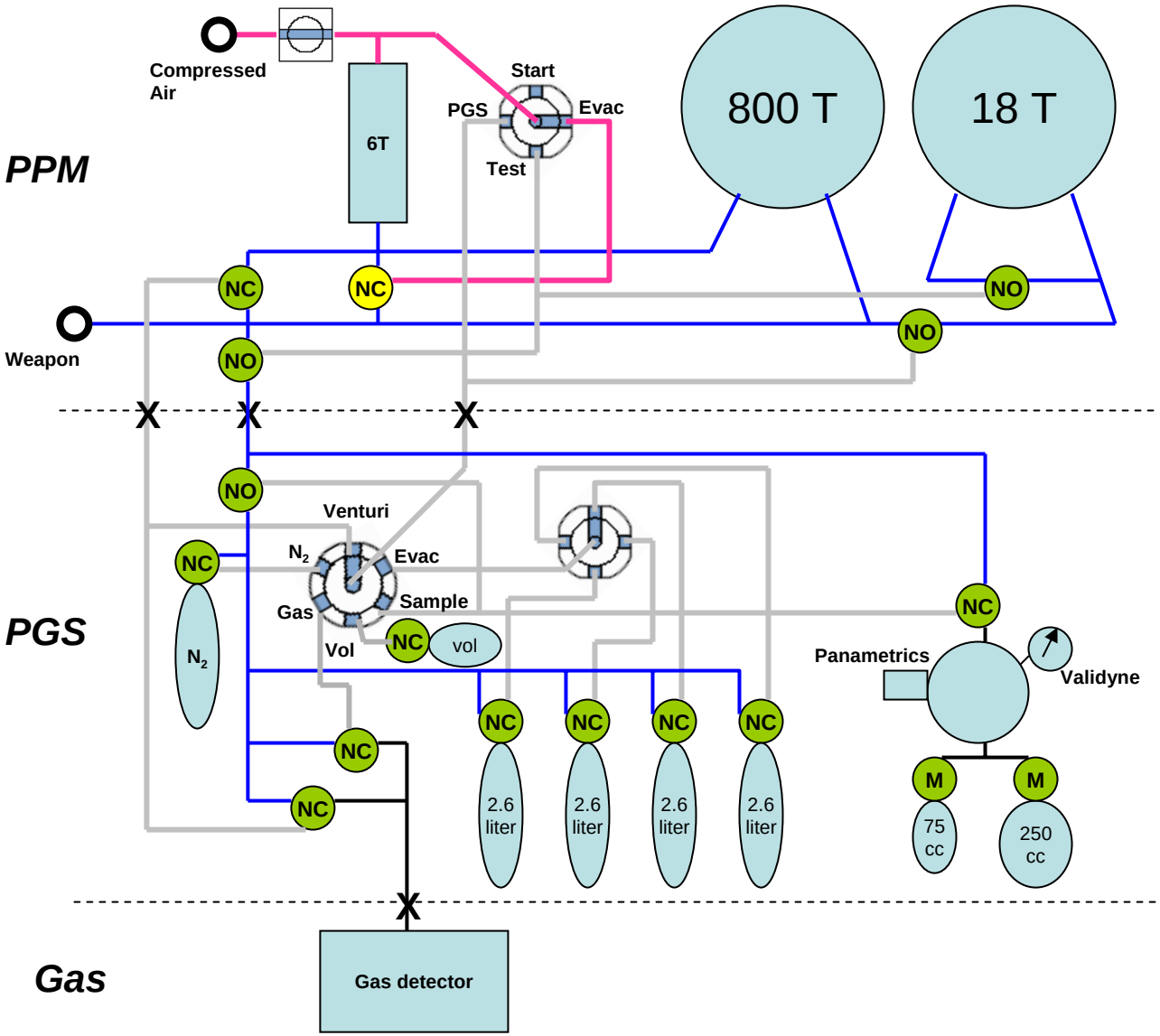
18 Torr Gauge Reading:

Zero.

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)

PPM Operation



STEP 2: Move PPM control valve to "Evac" position.

Description: Entire PPM system evacuated up to weapon. PGS system also evacuated up to closed valves.

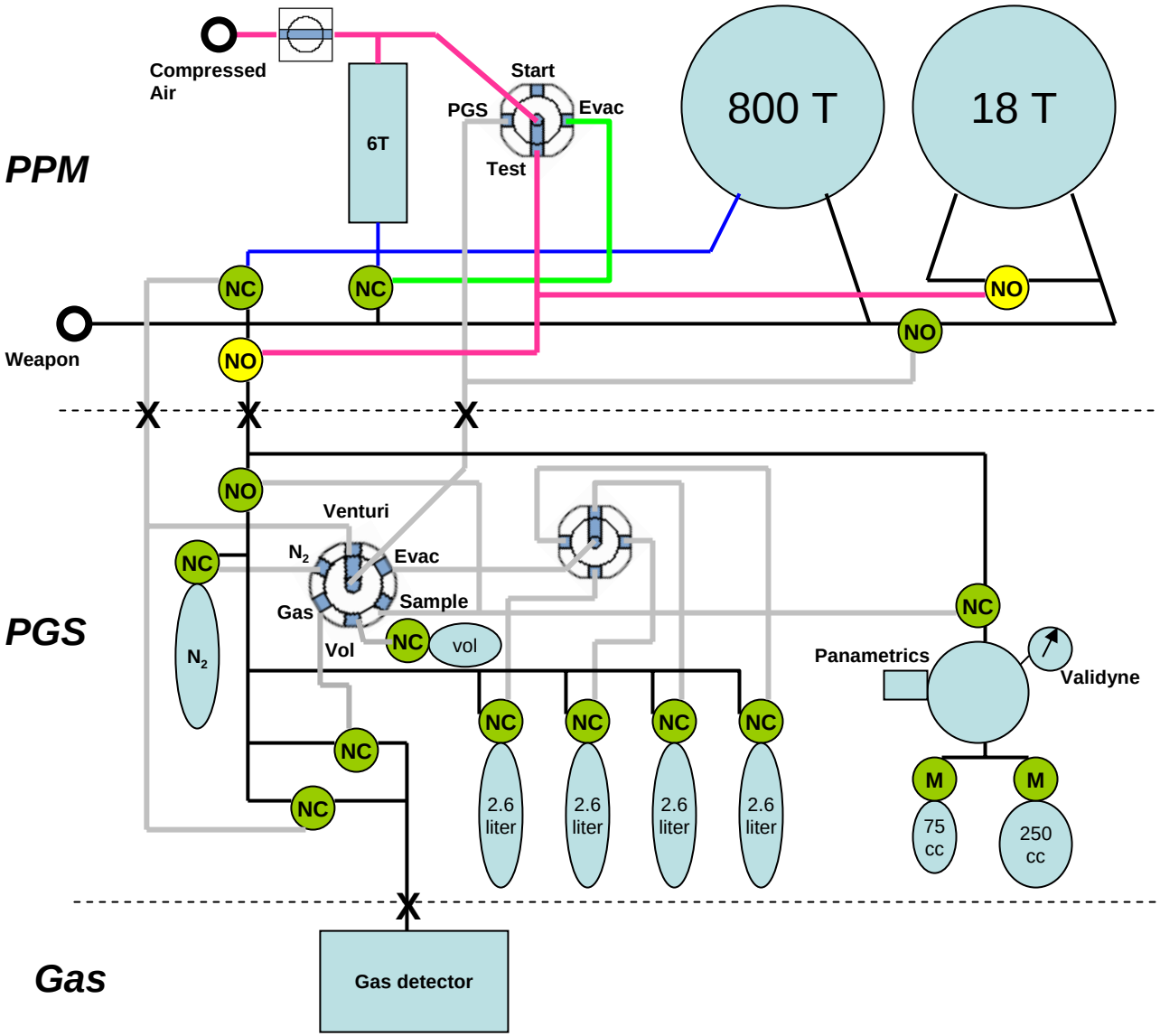
800 Torr Gauge Reading:
Zero.

18 Torr Gauge Reading:
Zero.

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)

PPM Operation



STEP 3: Move PPM control valve to "Test" position. (That's it for the PPM!)

Description: Weapon connection leak test. Weapon isolated from vacuum; look for pressure rise on 18 Torr pressure gauge.

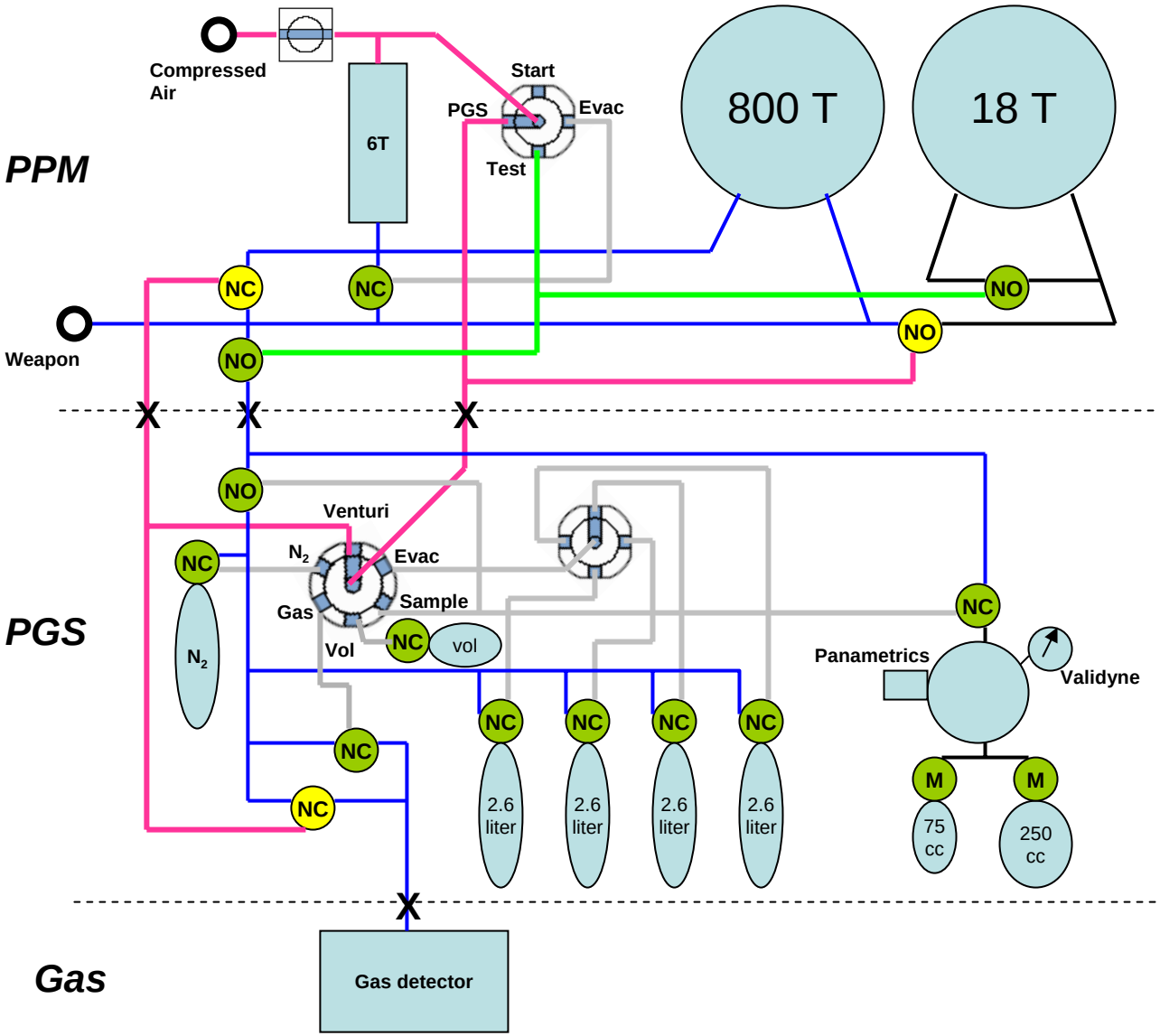
800 Torr Gauge Reading:
Zero. (Pressure rise will be observed if a gross leak exists in weapon connection.)

18 Torr Gauge Reading:
Start at zero; rising pressure indicates leak or O-ring permeation from weapon connection.

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)

PGS Operation



STEP 4: Move PPM control valve to "PGS" position.

Description: 18 Torr gauge isolated during PGS operation. Test manifold and Gas detector volume evacuated.

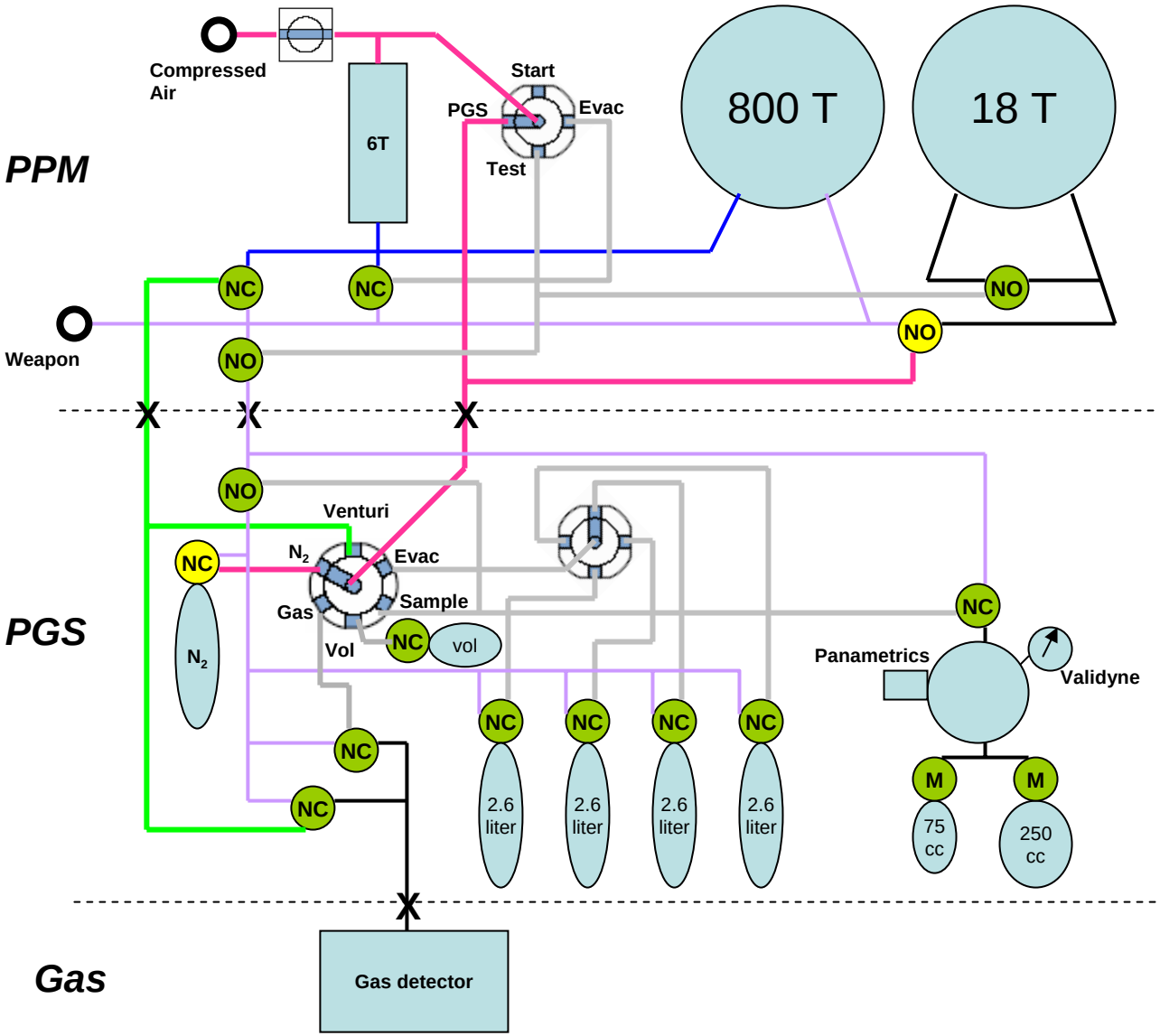
800 Torr Gauge Reading:
Zero.

18 Torr Gauge Reading:
(Not being used.)

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)

PGS Operation



STEP 5: Move PGS control valve to "N2" position.

Description: Dry N2 fills evacuated system lines (shown in purple), replacing residual air and speeding up the removal of adsorbed water.

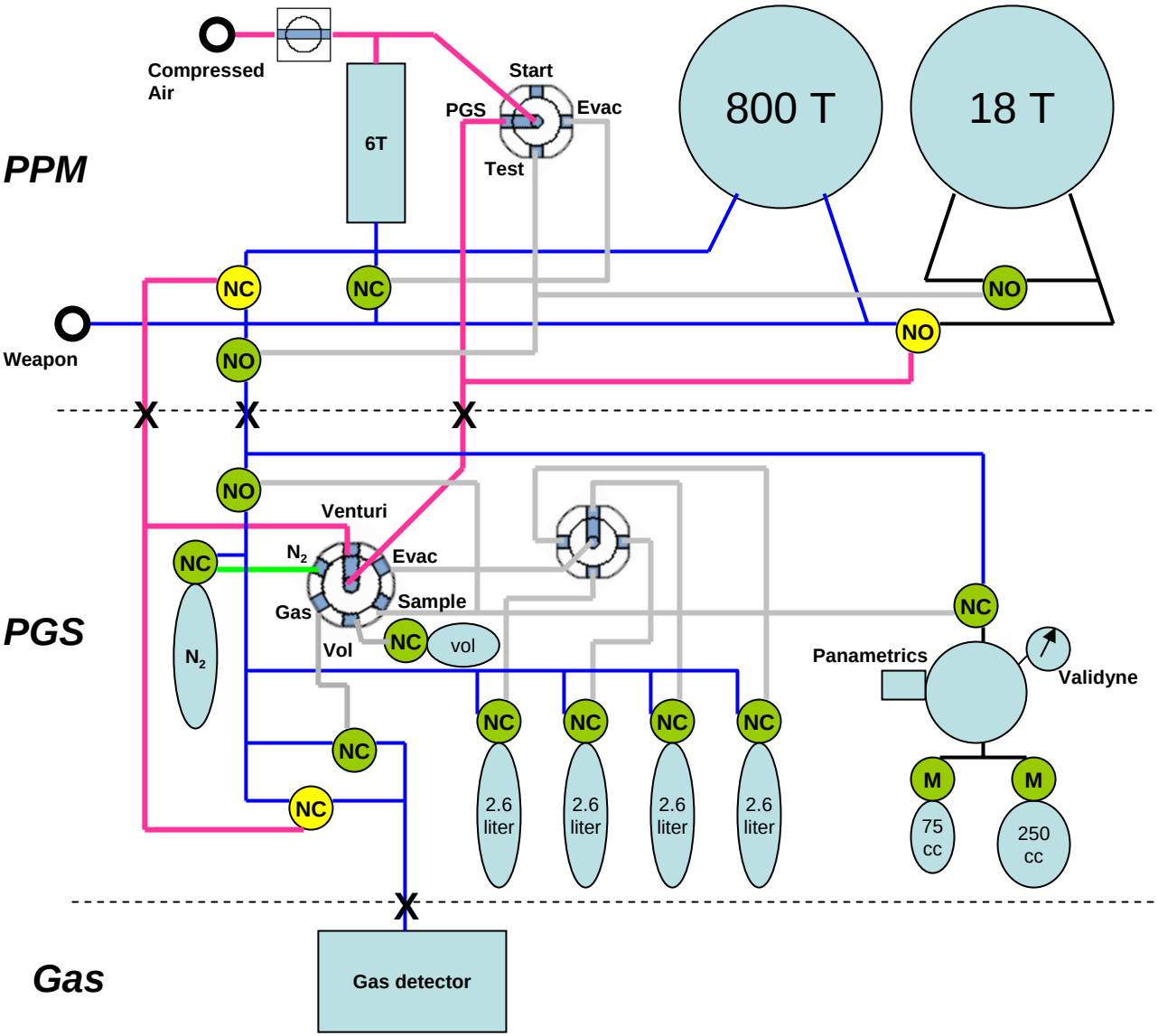
800 Torr Gauge Reading:
Nitrogen equilibration pressure (~ 1 atm or less)

18 Torr Gauge Reading:
(Not being used.)

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)
- system line (N_2 backfill)

PGS Operation



STEP 6: Move PGS control valve back to "Venturi" position. (Switch back and forth between "N2" and "Venturi" x more times.)

Description: Evacuates manifold up to all closed valves. Switching back and forth between Venturi and N2 effectively "cleans" the manifold in preparation for opening the weapon valve.

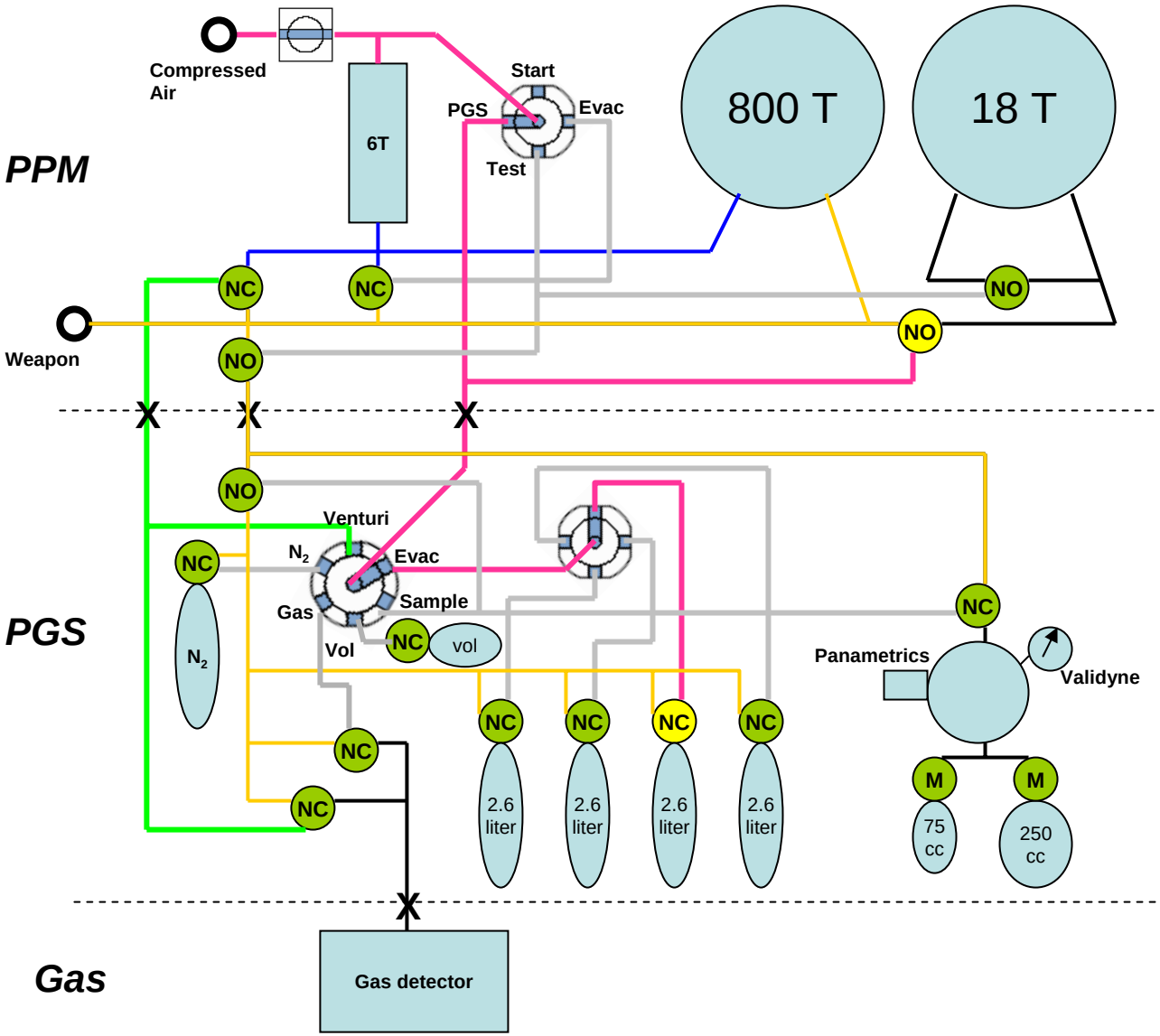
800 Torr Gauge Reading:
Zero.

18 Torr Gauge Reading:
(Not being used.)

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)

PGS Operation



STEP 7: Move PGS control valve to "Evac" position.

Description: First evacuated 2.6 liter volume immediately opens to manifold (shown in yellow).

800 Torr Gauge Reading:
Zero.

18 Torr Gauge Reading:
(Not being used.)

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)
- system line (w/ evac. volumes)

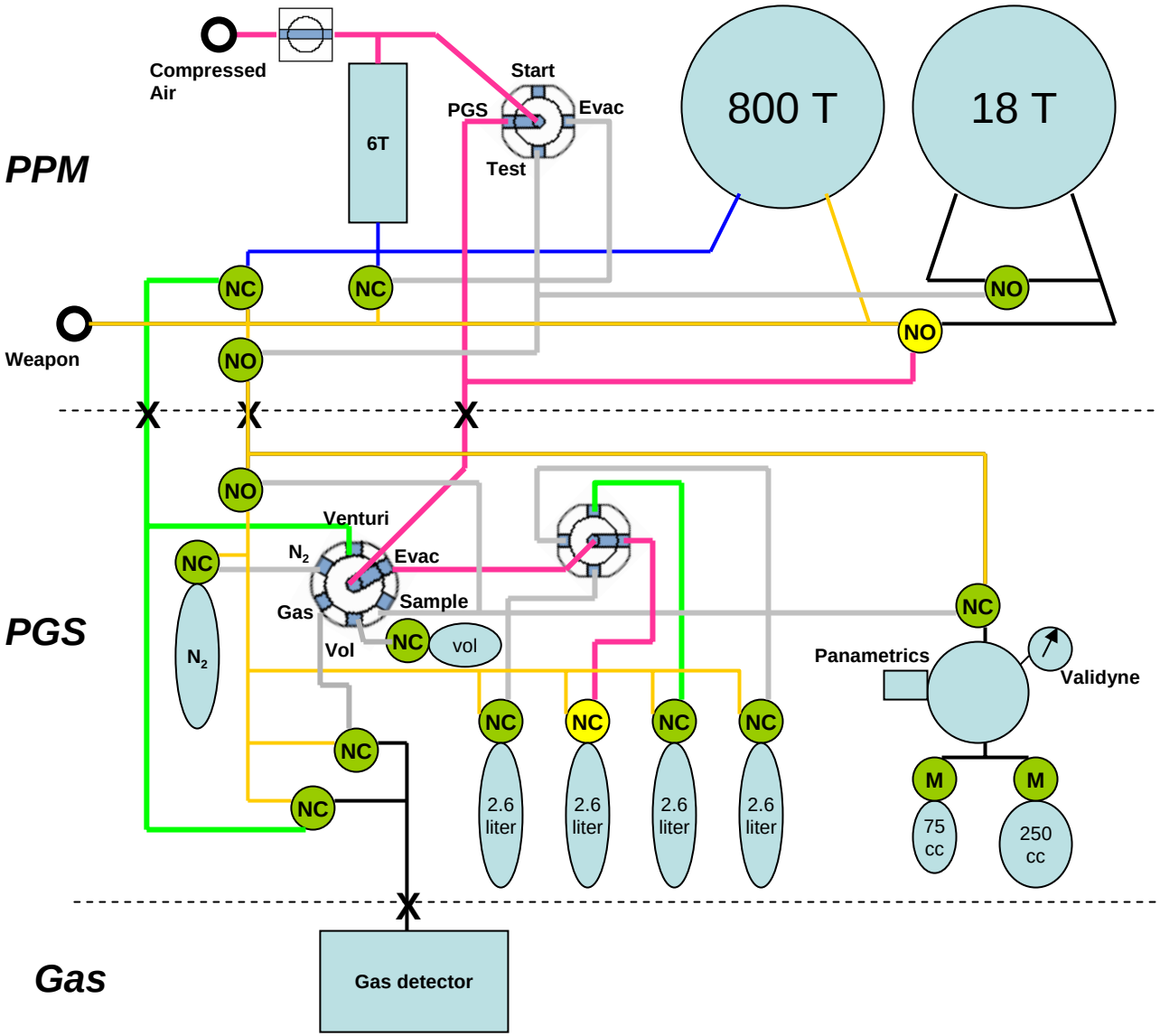
PGS Operation

STEP 8: Move Evac control valve to position 2.

Description: First evacuated 2.6 liter isolated; second evacuated 2.6 liter volume opens to manifold, further reducing pressure.

800 Torr Gauge Reading:
Zero.

18 Torr Gauge Reading:
(Not being used.)



KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)
- system line (w/ evac. volumes)

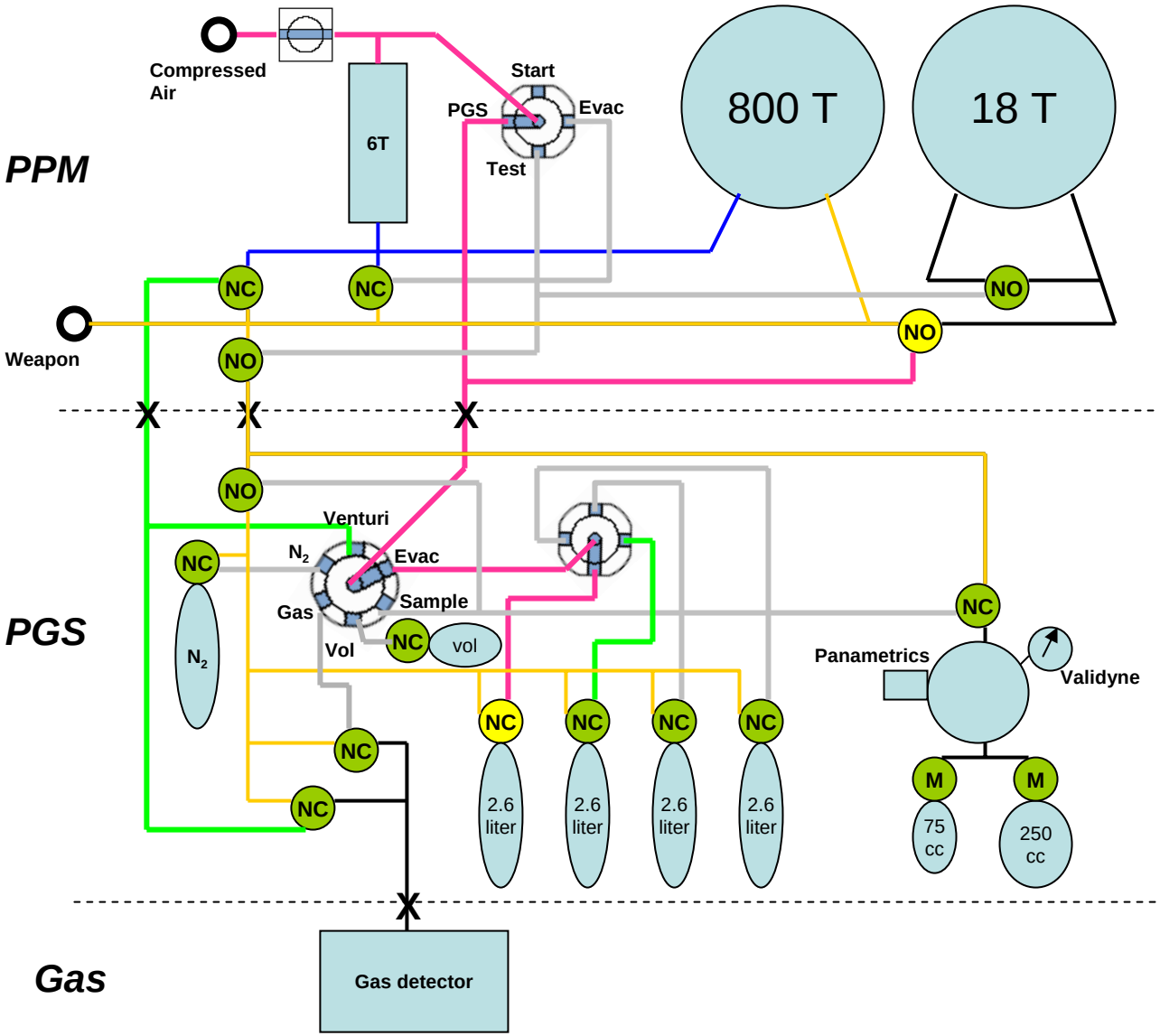
PGS Operation

STEP 9: Move Evac control valve to position 3.

Description: Second evacuated 2.6 liter isolated; third evacuated 2.6 liter volume opens to manifold, further reducing pressure.

800 Torr Gauge Reading:
Zero.

18 Torr Gauge Reading:
(Not being used.)



KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)
- system line (w/ evac. volumes)

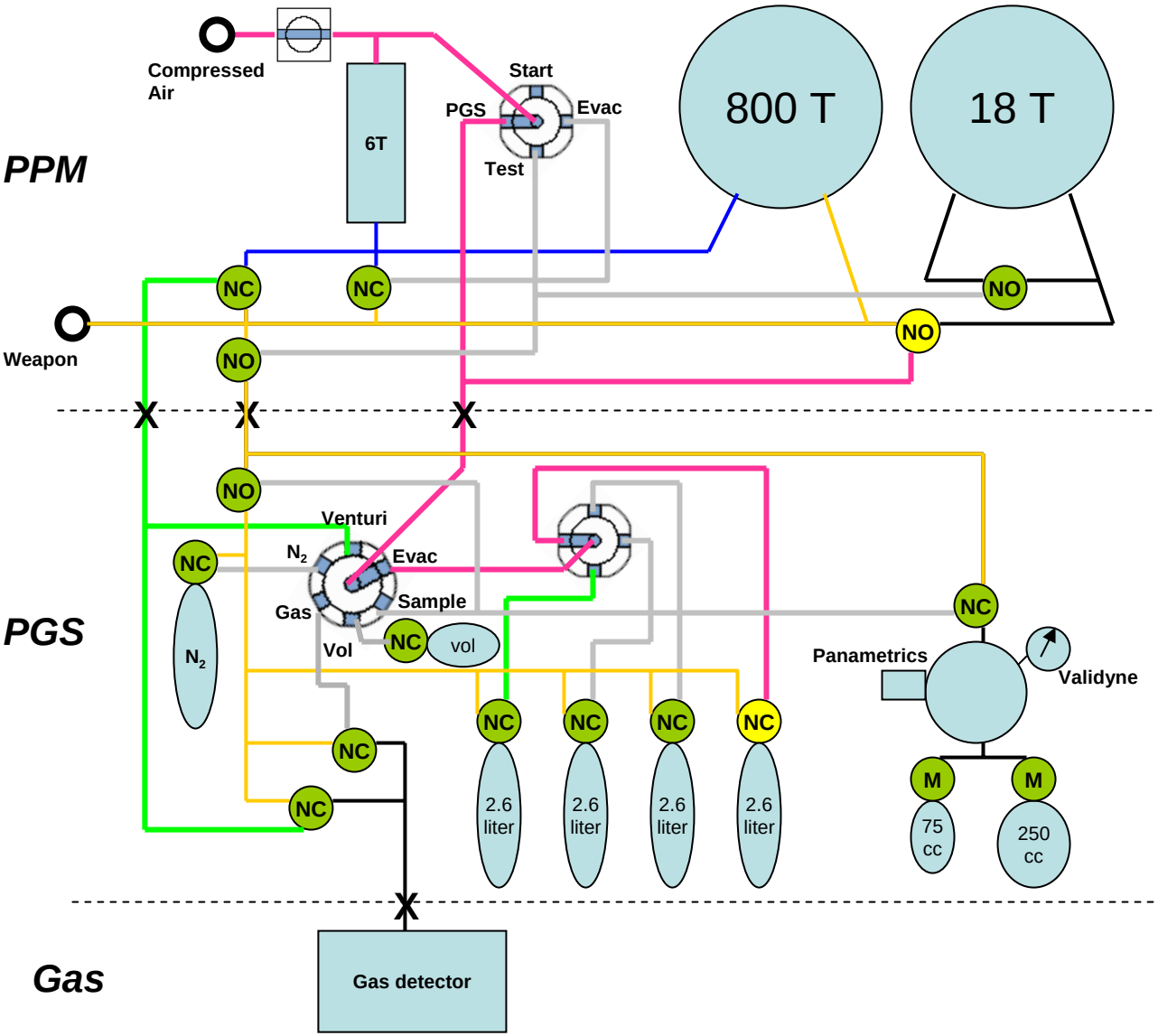
PGS Operation

STEP 10: Move Evac control valve to position 4.

Description: Third evacuated 2.6 liter isolated; fourth evacuated 2.6 liter volume opens to manifold, further reducing pressure.

800 Torr Gauge Reading:
Zero.

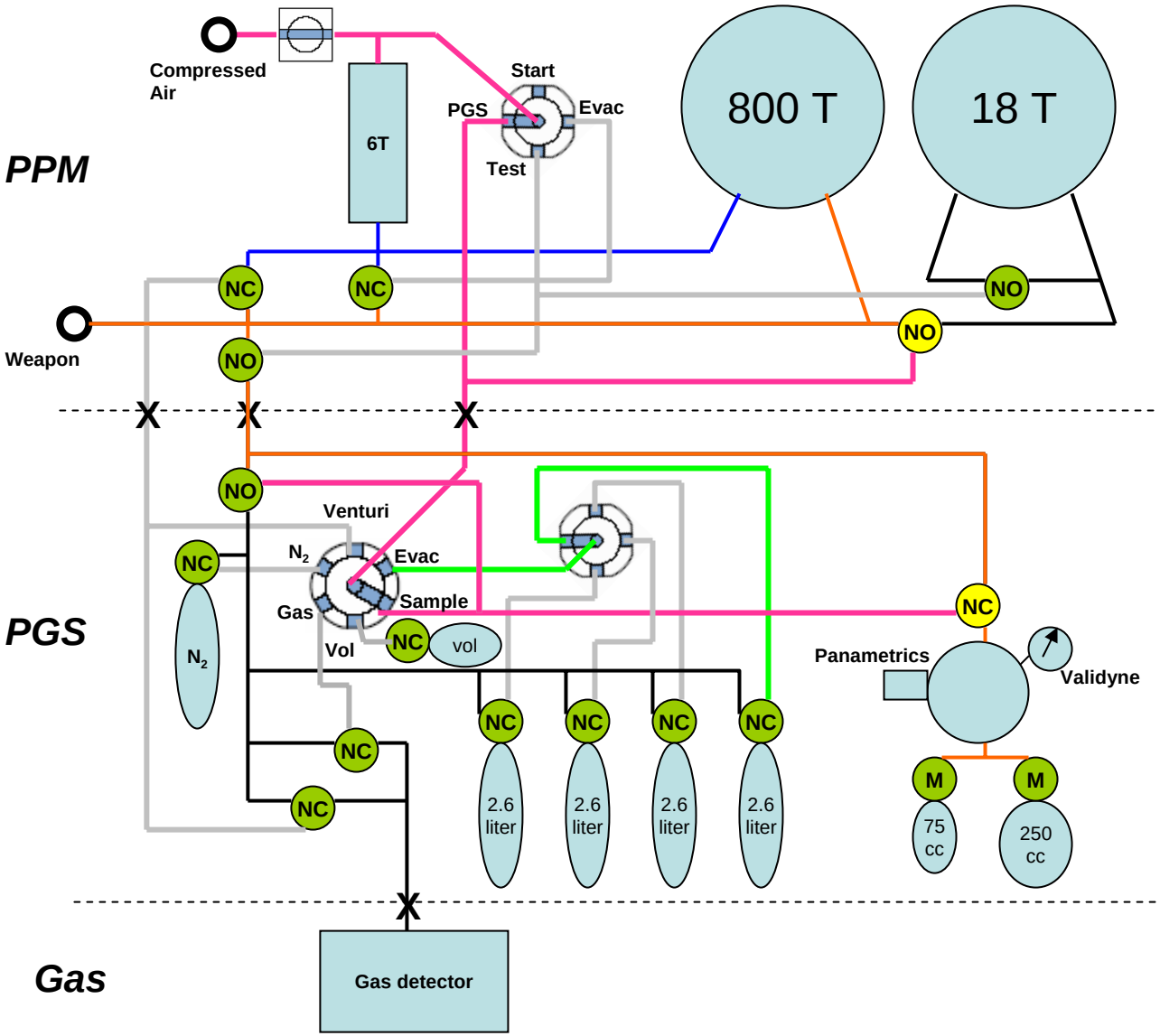
18 Torr Gauge Reading:
(Not being used.)



KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)
- system line (w/ evac. volumes)

PGS Operation



STEP 11: Move PGS control valve to "Sample" position.

Description: Valve to moisture sensor, Validyne pressure gauge, and evacuated sample bottles opens. At this point, the weapon valve is opened, releasing the internal atmosphere into the evacuated manifold and the gas sampler (shown in orange).

800 Torr Gauge Reading:

$< P_{weapon} - P_{base}$

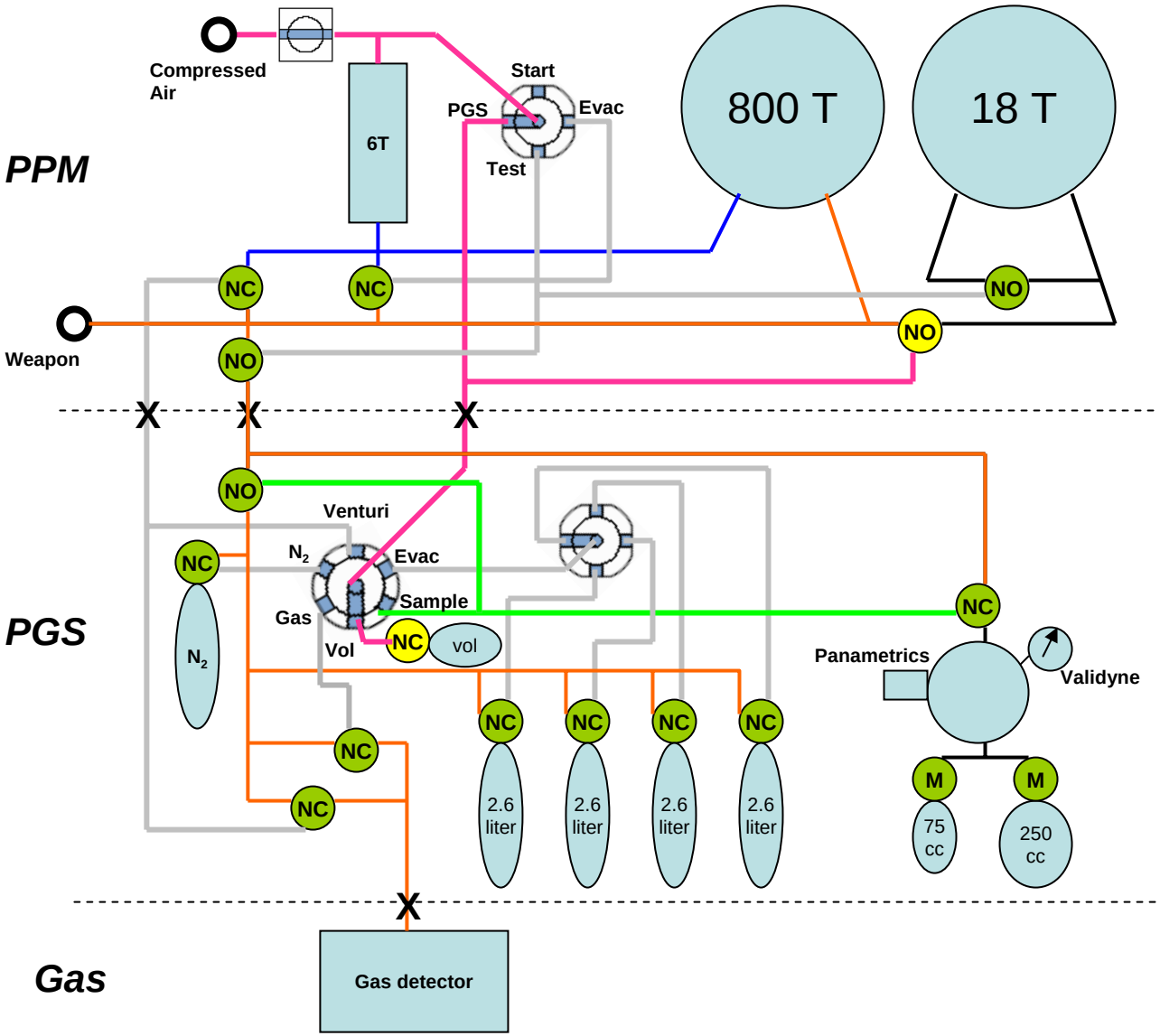
18 Torr Gauge Reading:

(Not being used.)

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)
- system line (w/ weapon gas)

PGS Operation



STEP 12: Move PGS control valve to "Vol" position.

Description: Gas sampler isolated. Valve to calibrated volume opened, allowing weapon gas to expand and equilibrate.

800 Torr Gauge Reading:

> 0.

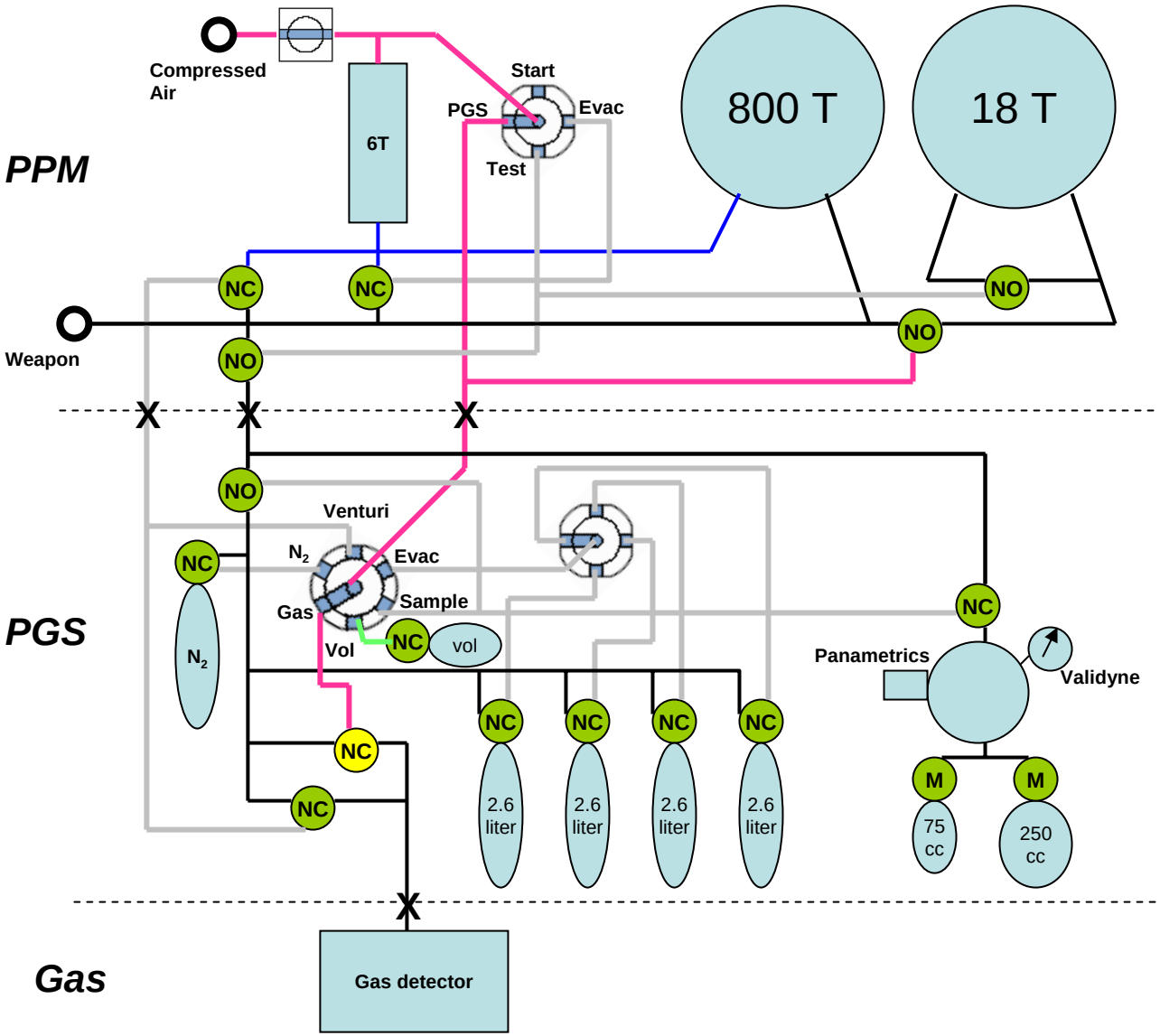
18 Torr Gauge Reading:

(Not being used.)

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)
- system line (w/ weapon gas)

PGS Operation



STEP 13 (Gas): Move PGS control valve to "Gas" position.

Description: Gas sample captured in Gas detector.

800 Torr Gauge Reading:

> 0.

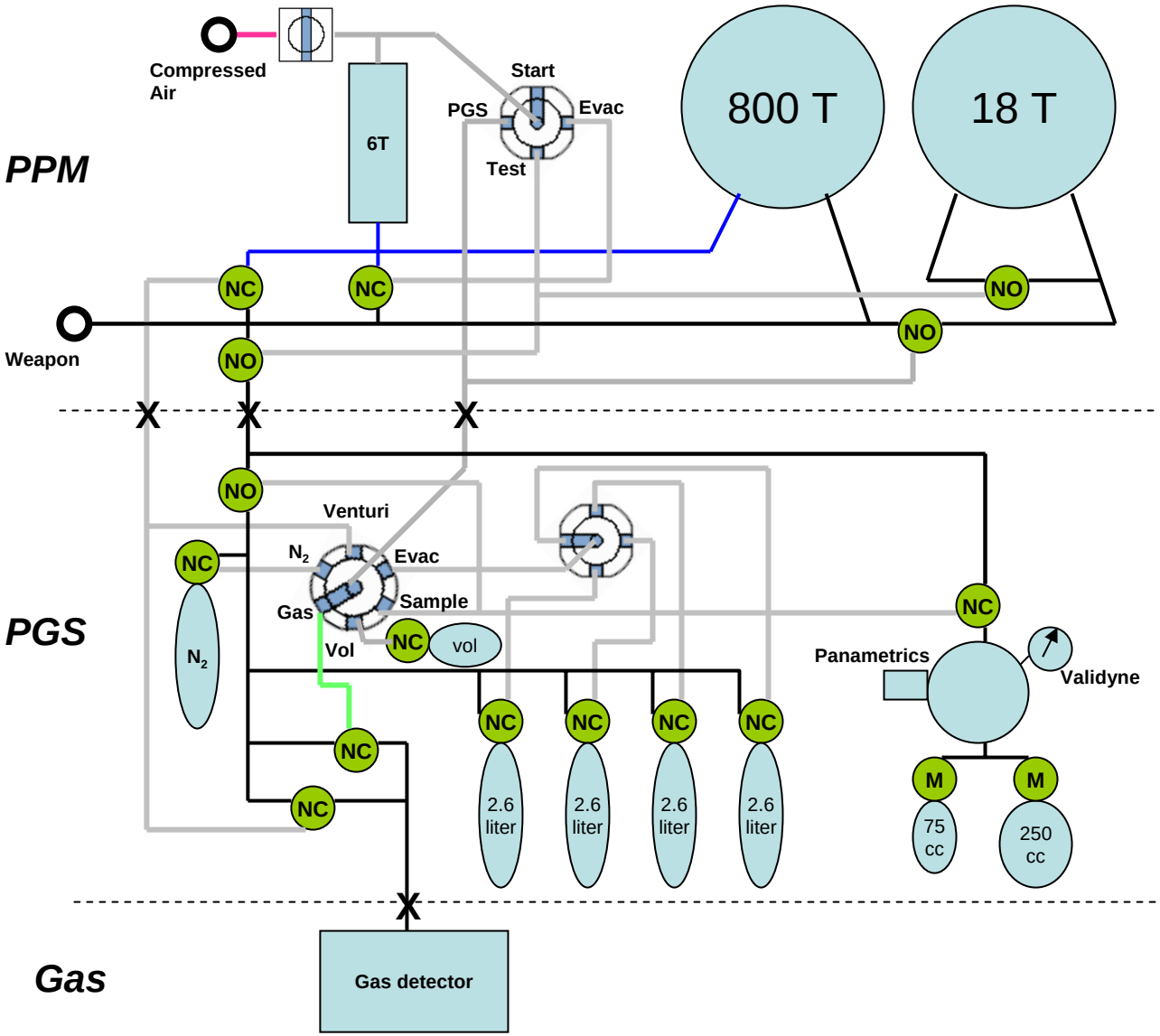
18 Torr Gauge Reading:

(Not being used.)

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)

PGS Operation



STEP 13 (Start, CA off): Move PPM control valve to "Start" position; shut off compress air.

Description: All valves in PGS module assume their normal position. (Weapon valve closed.)

System is now ready for disconnection after closing air supply and turning valve to Start.

800 Torr Gauge Reading:

(Not being used.)

18 Torr Gauge Reading:

(Not being used.)

KEY

- system line (inactive)
- compressed air line (inactive)
- system line (under Venturi)
- compressed air line (active)
- compressed air line (inactive, previously vented)