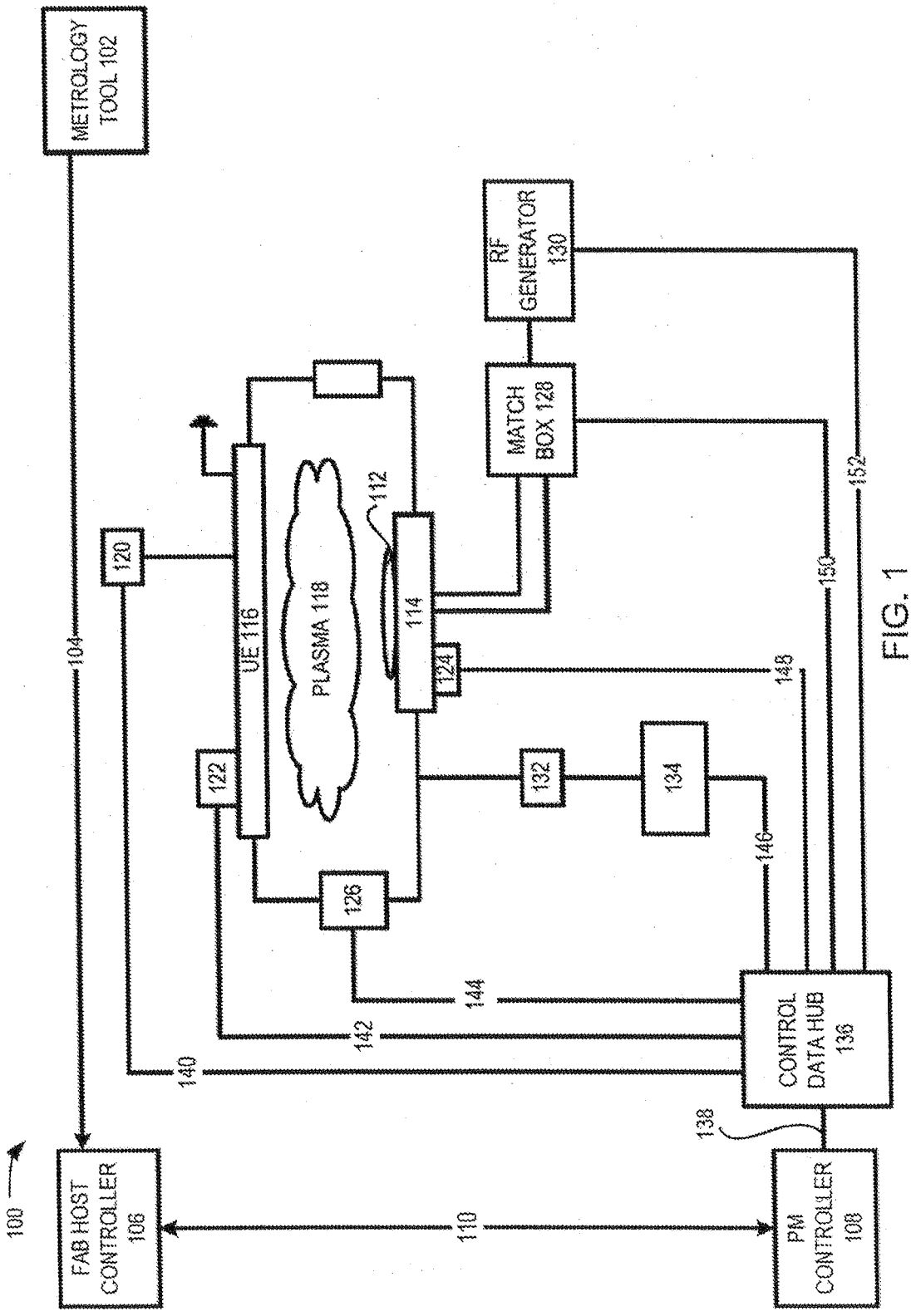


FIG. 1
(PRIOR ART)

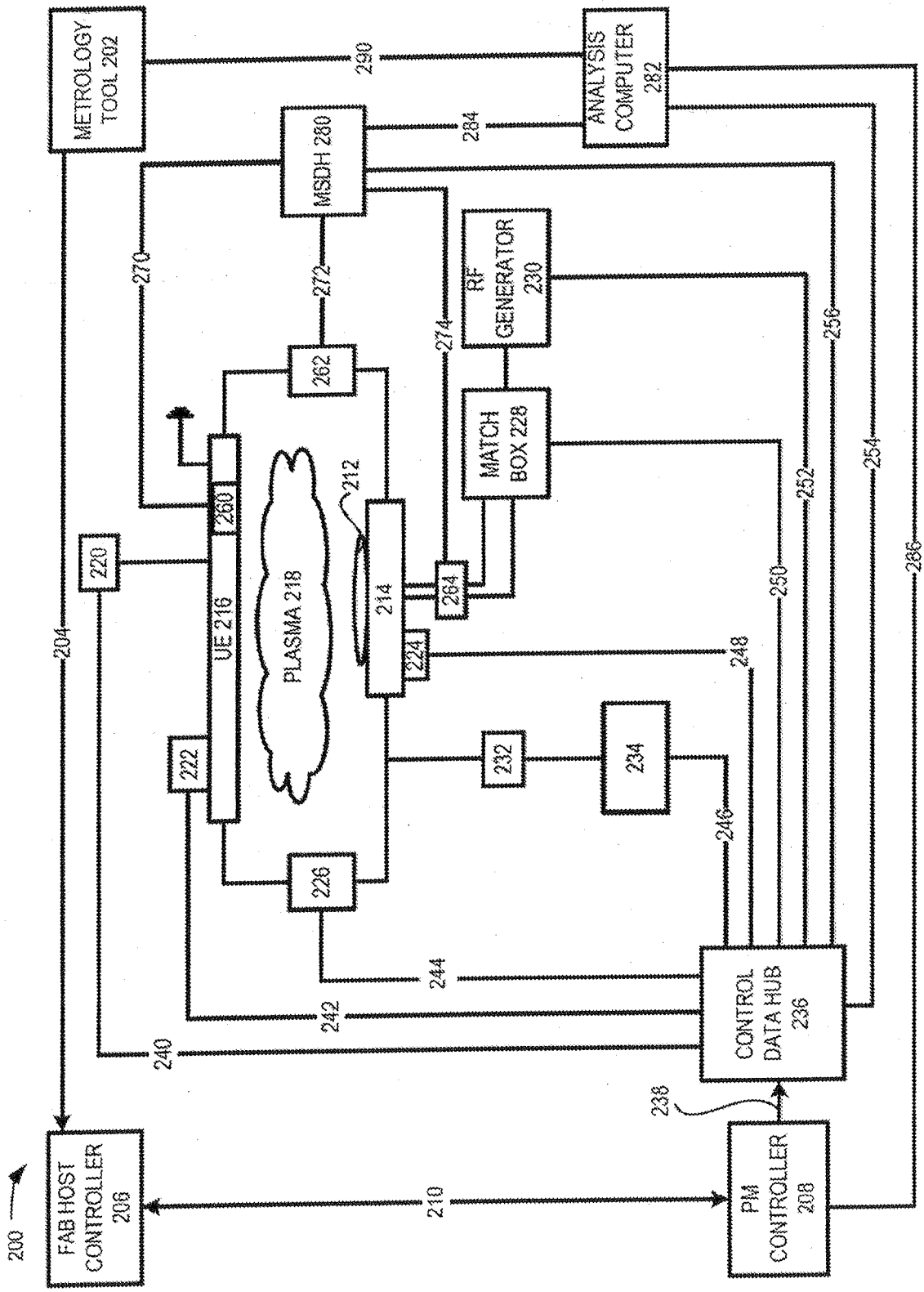

METROLOGY TOOL 202
290
ANALYSIS COMPUTER 282
MSDH 280
284
270
272
274
RF GENERATOR 230
256
262
MATCH BOX 228
254
252
212
260
220
UE 216
PLASMA 218
214
264
250
286
204
224
248
222
232
234
246
226
244
242
CONTROL DATA HUB 236
240
238
FAB HOST CONTROLLER 206
210
PM CONTROLLER 208
200

FIG. 2

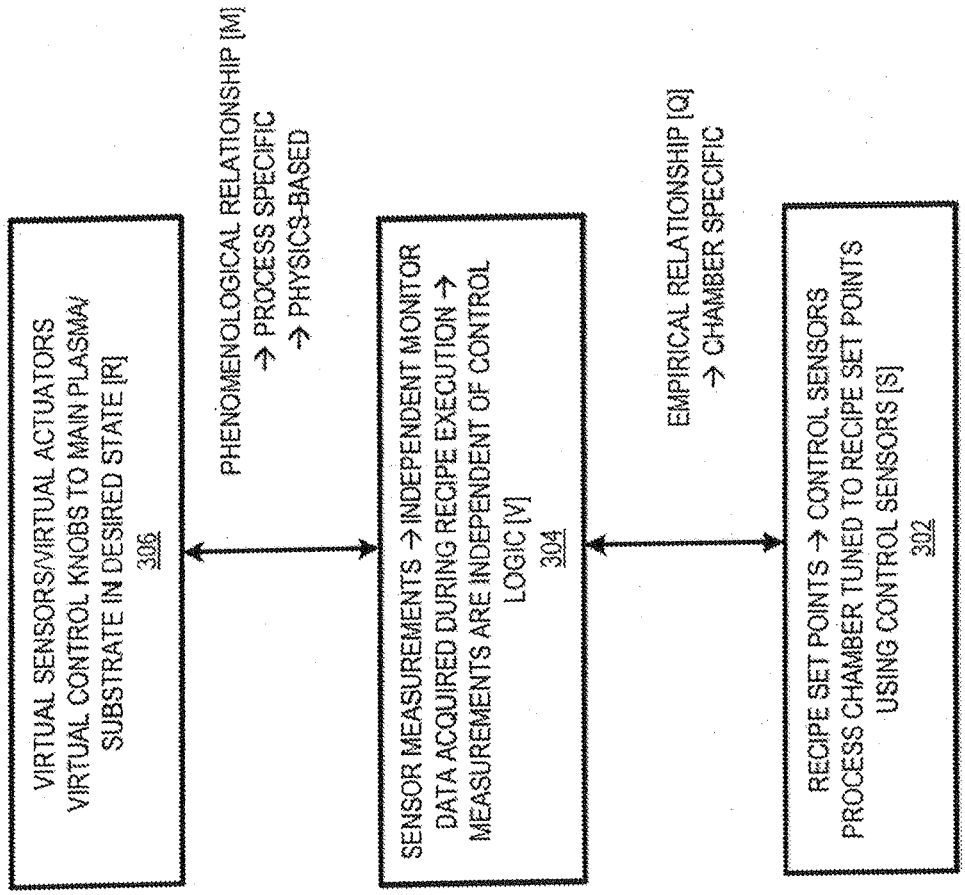

VIRTUAL SENSORS/VIRTUAL ACTUATORS
VIRTUAL CONTROL KNOBS TO MAIN PLASMA/
SUBSTRATE IN DESIRED STATE [R]
306
PHENOMENOLOGICAL RELATIONSHIP [M]
→ PROCESS SPECIFIC
→ PHYSICS-BASED
SENSOR MEASUREMENTS → INDEPENDENT MONITOR
DATA ACQUIRED DURING RECIPE EXECUTION →
MEASUREMENTS ARE INDEPENDENT OF CONTROL
LOGIC [V]
304
EMPIRICAL RELATIONSHIP [Q]
→ CHAMBER SPECIFIC
RECIPE SET POINTS → CONTROL SENSORS
PROCESS CHAMBER TUNED TO RECIPE SET POINTS
USING CONTROL SENSORS [S]
302

FIG. 3

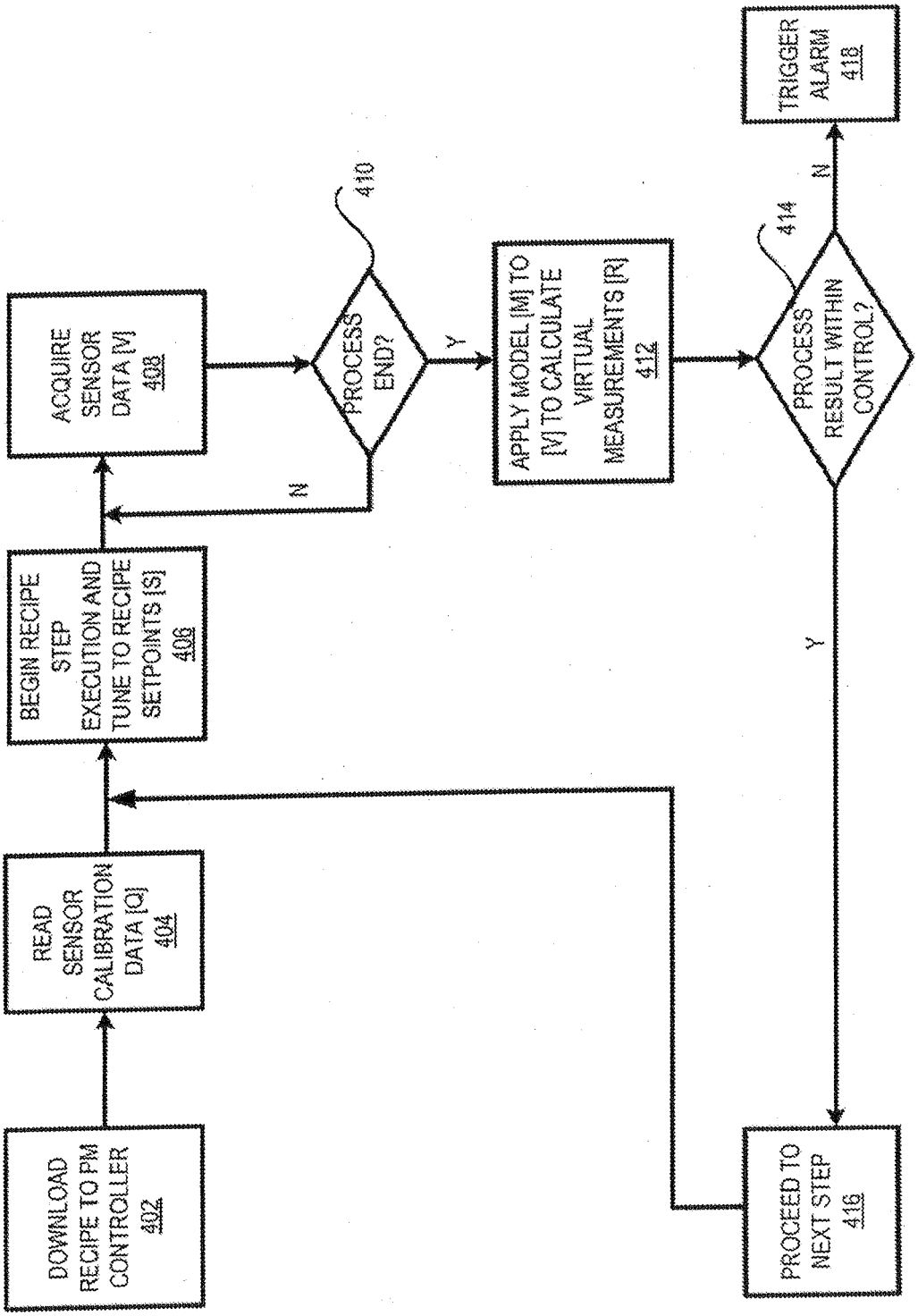

DOWNLOAD RECIPE TO PM CONTROLLER 402
READ SENSOR CALIBRATION DATA [Q] 404
BEGIN RECIPE STEP EXECUTION AND TUNE TO RECIPE SETPOINTS [S] 406
ACQUIRE SENSOR DATA [V] 408
410
PROCESS END?
Y
N
APPLY MODEL [M] TO [V] TO CALCULATE VIRTUAL MEASUREMENTS [R] 412
414
PROCESS RESULT WITHIN CONTROL?
N
Y
TRIGGER ALARM 418
PROCEED TO NEXT STEP 416

FIG. 4

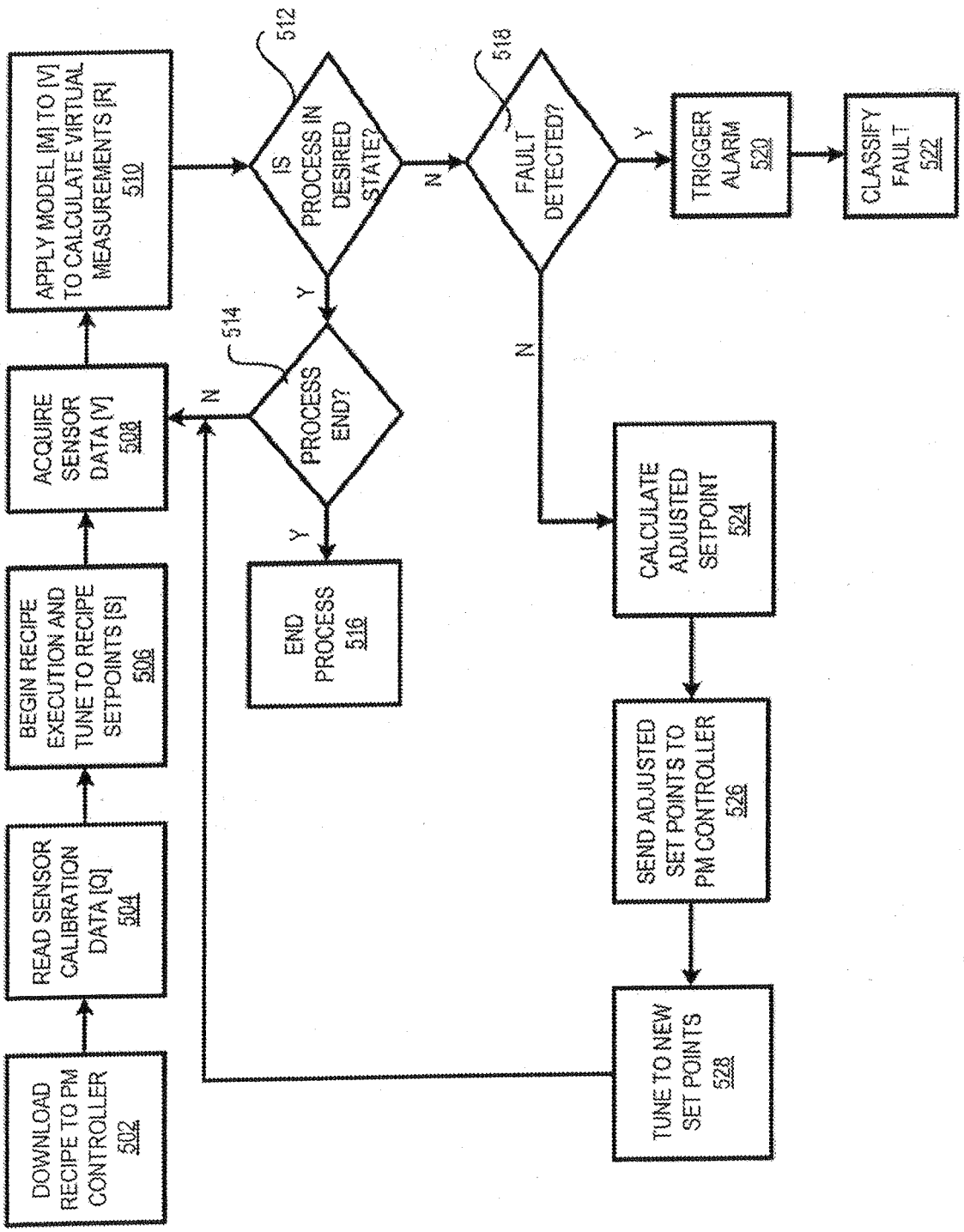

DOWNLOAD RECIPE TO PM CONTROLLER 502
READ SENSOR CALIBRATION DATA [Q] 504
BEGIN RECIPE EXECUTION AND TUNE TO RECIPE SETPOINTS [S] 506
ACQUIRE SENSOR DATA [V] 508
APPLY MODEL [M] TO [V] TO CALCULATE VIRTUAL MEASUREMENTS [R] 510
IS PROCESS IN DESIRED STATE? 512
PROCESS END? 514
FAULT DETECTED? 518
TRIGGER ALARM 520
CLASSIFY FAULT 522
END PROCESS 516
CALCULATE ADJUSTED SETPOINT 524
SEND ADJUSTED SET POINTS TO PM CONTROLLER 526
TUNE TO NEW SET POINTS 528
Y
N

FIG. 5