G00002

163163

FIG. 1

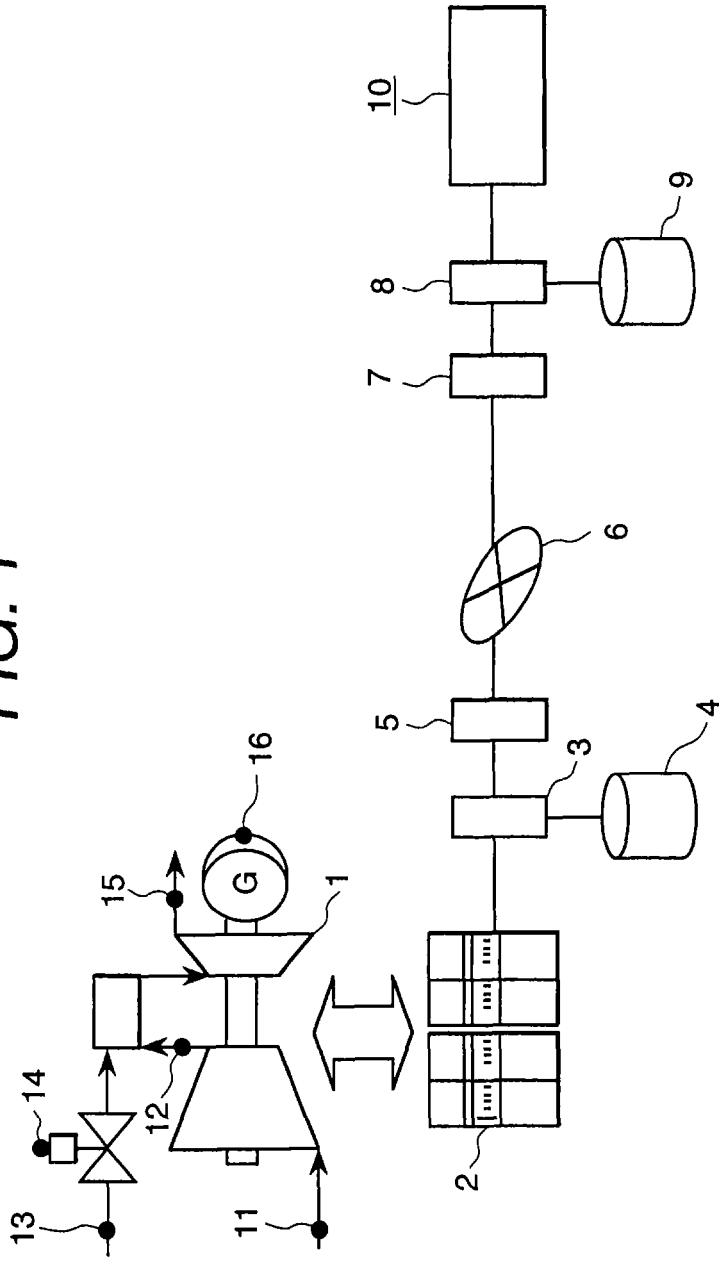


FIG. 2

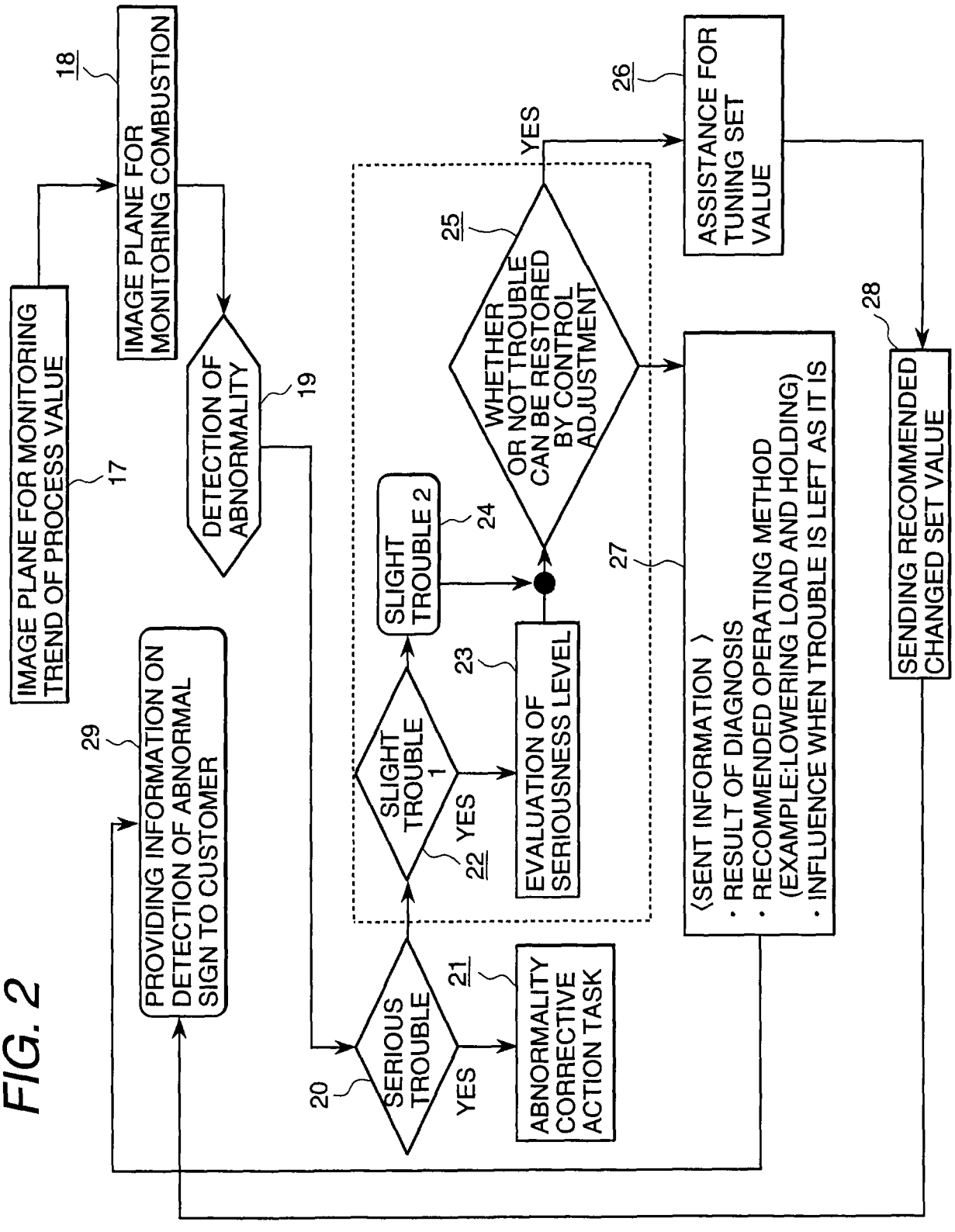

IMAGE PLANE FOR MONITORING TREND OF PROCESS VALUE
17
IMAGE PLANE FOR MONITORING COMBUSTION
18
DETECTION OF ABNORMALITY
19
PROVIDING INFORMATION ON DETECTION OF ABNORMAL SIGN TO CUSTOMER
29
SERIOUS TROUBLE
20
YES
ABNORMALITY CORRECTIVE ACTION TASK
21
SLIGHT TROUBLE 1
22
YES
EVALUATION OF SERIOUSNESS LEVEL
23
SLIGHT TROUBLE 2
24
WHETHER OR NOT TROUBLE CAN BE RESTORED BY CONTROL ADJUSTMENT
25
YES
ASSISTANCE FOR TUNING SET VALUE
26
〈SENT INFORMATION〉
・RESULT OF DIAGNOSIS
・RECOMMENDED OPERATING METHOD (EXAMPLE:LOWERING LOAD AND HOLDING)
・INFLUENCE WHEN TROUBLE IS LEFT AS IT IS
27
SENDING RECOMMENDED CHANGED SET VALUE
28

FIG. 3

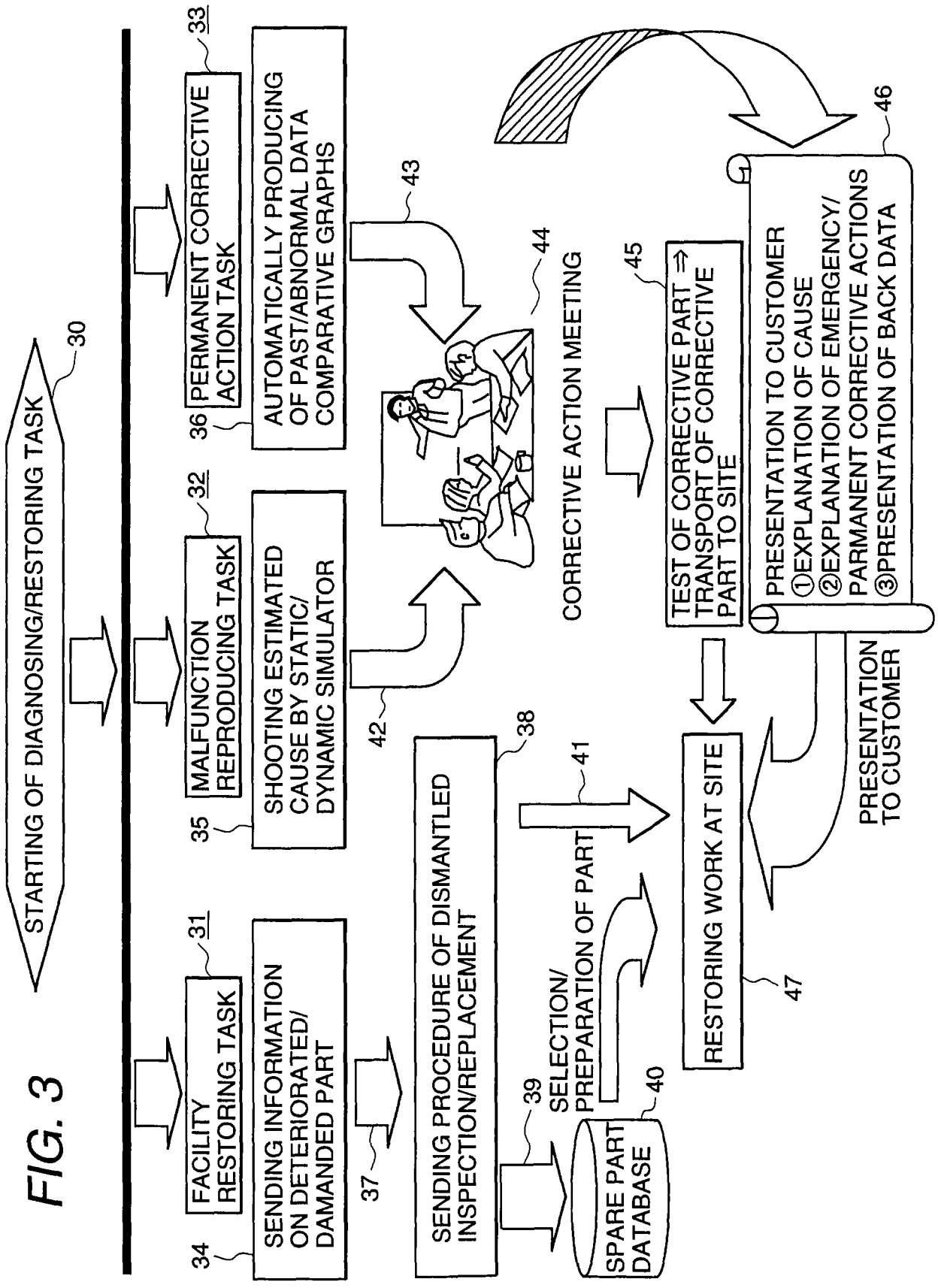

STARTING OF DIAGNOSING/RESTORING TASK
30
FACILITY RESTORING TASK
31
MALFUNCTION REPRODUCING TASK
32
PERMANENT CORRECTIVE ACTION TASK
33
SENDING INFORMATION ON DETERIORATED/ DAMANDED PART
34
SHOOTING ESTIMATED CAUSE BY STATIC/ DYNAMIC SIMULATOR
35
AUTOMATICALLY PRODUCING OF PAST/ABNORMAL DATA COMPARATIVE GRAPHS
36
37
42
43
44
CORRECTIVE ACTION MEETING
45
TEST OF CORRECTIVE PART ⇒ TRANSPORT OF CORRECTIVE PART TO SITE
PRESENTATION TO CUSTOMER
①EXPLANATION OF CAUSE
②EXPLANATION OF EMERGENCY/ PARMANENT CORRECTIVE ACTIONS
③PRESENTATION OF BACK DATA
46
PRESENTATION TO CUSTOMER
SENDING PROCEDURE OF DISMANTLED INSPECTION/REPLACEMENT
38
39
SELECTION/ PREPARATION OF PART
41
SPARE PART DATABASE
40
RESTORING WORK AT SITE
47

FIG. 4

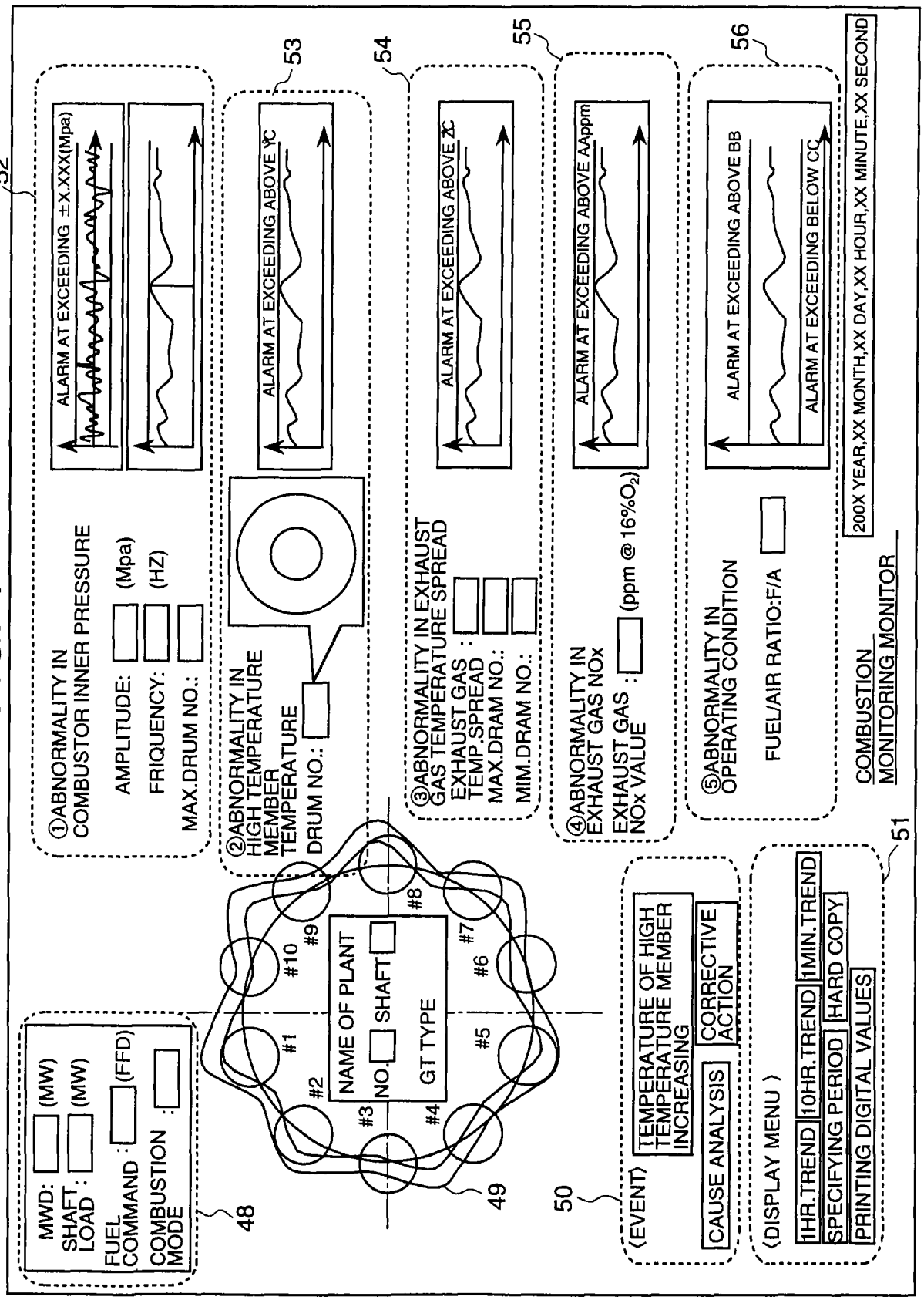

52
①ABNORMALITY IN COMBUSTOR INNER PRESSURE
AMPLITUDE: (Mpa)
FRIQUENCY: (HZ)
MAX.DRUM NO.:
ALARM AT EXCEEDING ±X.XXX(Mpa)
53
②ABNORMALITY IN HIGH TEMPERATURE MEMBER TEMPERATURE
DRUM NO.:
ALARM AT EXCEEDING ABOVE ℃
54
③ABNORMALITY IN EXHAUST GAS TEMPERATURE SPREAD
EXHAUST GAS TEMP.SPREAD :
MAX.DRAM NO.:
MIM.DRAM NO.:
ALARM AT EXCEEDING ABOVE ℃
55
④ABNORMALITY IN EXHAUST GAS NOx
EXHAUST GAS NOx VALUE : (ppm @16%O2)
ALARM AT EXCEEDING ABOVE AAppm
56
⑤ABNORMALITY IN OPERATING CONDITION
FUEL/AIR RATIO:F/A
ALARM AT EXCEEDING ABOVE BB
ALARM AT EXCEEDING BELOW CC
200X YEAR,XX MONTH,XX DAY,XX HOUR,XX MINUTE,XX SECOND
COMBUSTION MONITORING MONITOR
51
48
MWD: (MW)
SHAFT LOAD : (MW)
FUEL COMMAND : (FFD)
COMBUSTION MODE :
49
#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
NAME OF PLANT
NO. SHAFT
GT TYPE
50
〈EVENT〉
TEMPERATURE OF HIGH TEMPERATURE MEMBER INCREASING
CAUSE ANALYSIS
CORRECTIVE ACTION
〈DISPLAY MENU 〉
1HR.TREND
10HR.TREND
1MIN.TREND
SPECIFYING PERIOD
HARD COPY
PRINTING DIGITAL VALUES

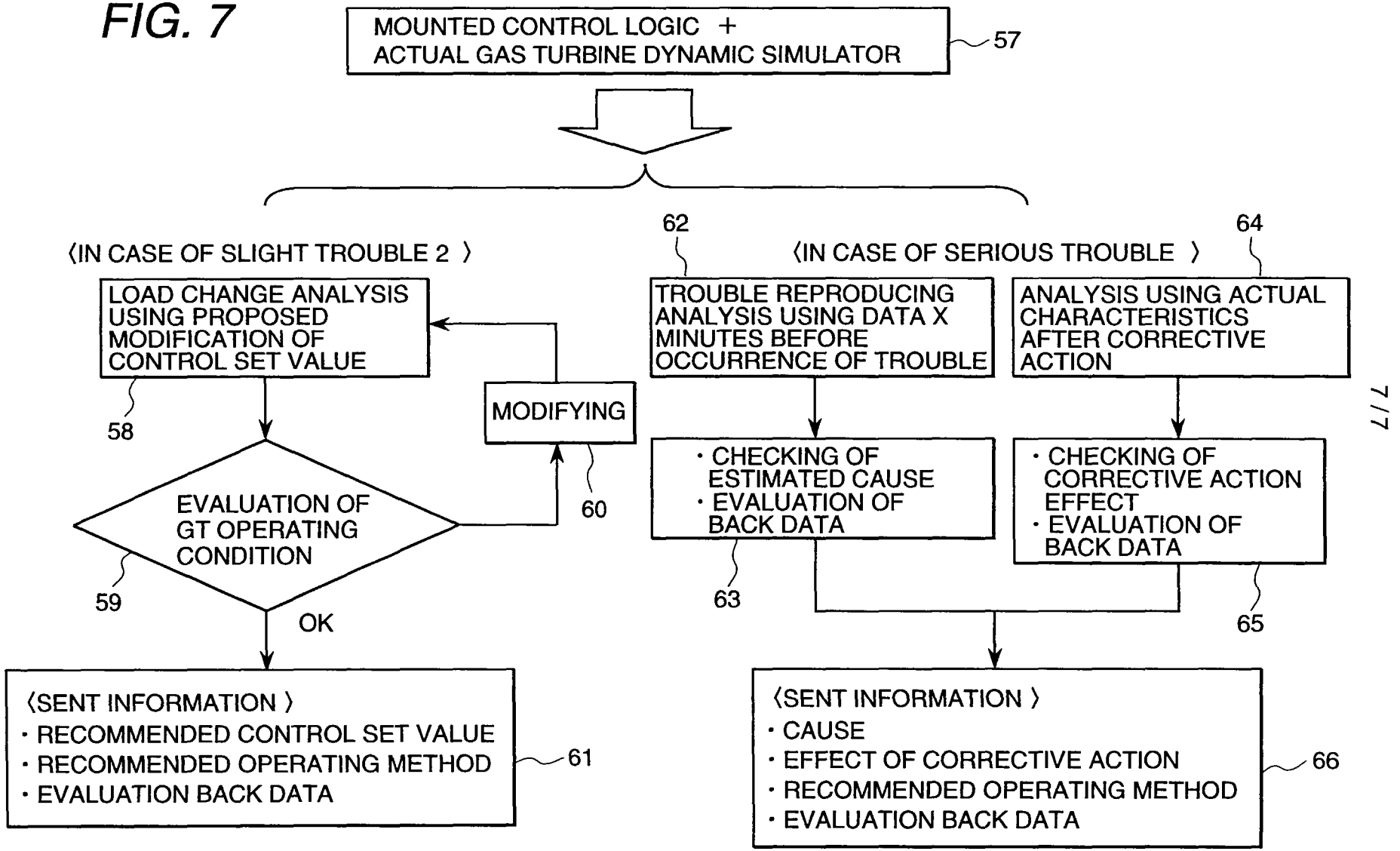
FIG. 5

SENSOR INFORMATION					
ITEM	UNIT	DAMAGE IN HIGH TEMP.GAS PASSAGE	FUEL NOZZLE	CLOGGING IN FUEL NOZZLE	ABNORMAL COMBUSTION
SHAFT POWER	MW	TREND MONITORING	—	—	TREND MONITORING
EXHAUST TEMP.INFORM.	℃	TREND MONITORING	TREND MONITORING	TREND MONITORING	TREND MONITORING
COMBUSTOR INNEP PRESS.	hPa	—	—	—	TREND MONITORING
COMPRESSOR DELIVERY PRESS.	MPa	TREND MONITORING	—	—	—
NOZZLE SOURCE PRESS.	MPa	—	TREND MONITORING	TREND MONITORING	—
HIGH TEMP.MEMBER METAL TEMP.	℃	TREND MONITORING	—	—	TREND MONITORING
AIR FLOW RATE	kg/s	TREND MONITORING	—	—	TREND MONITORING
FUEL FLOW RATE	kg/s	—	TREND MONITORING	TREND MONITORING	—
FUEL/AIR RATIO	—	TREND MONITORING	TREND MONITORING	TREND MONITORING	TREND MONITORING
URGENCY	TROUBLE LEVEL	SLIGHT TROUBLE 1	SLIGHT TROUBLE 1	SLIGHT TROUBLE 1	SLIGHT TROUBLE 1
MONITORING TIMING	MONITORING PERIOD	1MIN.OR 1HR.	1MIN.OR 1HR.	1MIN.OR 1HR.	1MIN.OR 1HR.
CORRECTIVE ACTION		DECREASING LOAD	DECREASING FUEL	DECREASING FUEL	DECREASING FUEL/ARE RATIO

FIG. 6

SENSOR INFORMATION AND OTHERS			CONDITION		
ITEM	SYMBOL	UNIT	1	2	3
DAVIATION IN FUEL/AIR RATIO(PLANNED VALUE –MEASURED VALUE)	F/A	–	LARGE DEVIATION ↘ ↗	LARGE DEVIATION ↘ ↗	LARGE DEVIATION ↘ ↗
OPERATION FOR SLIGHT TROUBLE 1	–	–	OFF	OFF	OFF
ABNORMARITY IN ACTUATOR	–	–	OFF	OFF	OFF
UNDER LOAD CHANGING	–	–	OFF	OFF	OFF
AIR FLOW RATE	Wa	kg/s	UNDER CHANGING ↘ ↗	–	–
FUEL FLOW RATE	Gf	kg/h	–	UNDER CHANGING ↘ ↗	–
FUEL COMMAND	FSR	%	–	–	UNDER CHANGING ↘ ↗

FIG. 7


MOUNTED CONTROL LOGIC +
ACTUAL GAS TURBINE DYNAMIC SIMULATOR
57
〈IN CASE OF SLIGHT TROUBLE 2 〉
LOAD CHANGE ANALYSIS USING PROPOSED MODIFICATION OF CONTROL SET VALUE
58
MODIFYING
60
EVALUATION OF GT OPERATING CONDITION
59
OK
〈SENT INFORMATION 〉
・RECOMMENDED CONTROL SET VALUE
・RECOMMENDED OPERATING METHOD
・EVALUATION BACK DATA
61
62
〈IN CASE OF SERIOUS TROUBLE 〉
64
TROUBLE REPRODUCING ANALYSIS USING DATA X MINUTES BEFORE OCCURRENCE OF TROUBLE
ANALYSIS USING ACTUAL CHARACTERISTICS AFTER CORRECTIVE ACTION
・CHECKING OF ESTIMATED CAUSE
・EVALUATION OF BACK DATA
63
・CHECKING OF CORRECTIVE ACTION EFFECT
・EVALUATION OF BACK DATA
65
〈SENT INFORMATION 〉
・CAUSE
・EFFECT OF CORRECTIVE ACTION
・RECOMMENDED OPERATING METHOD
・EVALUATION BACK DATA
66