

ACONIS-2000[®] PMS

User's Manual

TERMS AND ABBREVIATIONS

This is a list of special terms and abbreviations used in this document.

Abbreviations

PMS	<i>ACONIS-2000® Power Management System</i>
GCE	Generator Control Equipment
GDP	Generator Display Panel
BT	Bus Tie
GE	Generator Engine

ABOUT THIS MANUAL

This manual describes the functions, the operation and the connections of the **ACONIS-2000® Power Management System**.

The description is based on the requirements of shipyard.

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CONTENTS

1.	ACONIS-2000® PMS General Description	5
1.1	ST/BY Start & Alarm (Manual & Auto)	7
1.2	GDP (Generator Display Panel)	9
1.3	GCE (Generator Control Equipment)	10
1.4	ACONIS-2000® PMS General Specification.....	12
1.5	ACONIS-2000® PMS I/O Signals	13
2.	ACONIS-2000® PMS Functions.....	14
2.1	Function in Manual Mode	14
2.2	Function of in Automatic Mode.....	14
2.2.1	Auto mode Start by pressing the push button on GDP	14
2.2.2	Auto mode Stop by pressing the push button on GDP	14
2.2.3	Load dependant automatic start.....	15
2.2.4	Synchronizing	15
2.2.5	Load Sharing / Frequency control	15
2.2.6	Heavy consumer automatic start.....	15
2.2.7	Black-out recovery and bus abnormal.....	16
2.3	Function of ACONIS-2000® PMS	17
2.3.1	Reverse power trip	17
2.3.2	Over current trip.....	17
2.3.3	Low / High voltage / frequency alarming	17
2.3.4	Preferential trip 1 & 2.....	17
2.4	Function of the Alarm output	18
3.	ACONIS-2000® PMS Operation with GDP	19
3.1	GDP Two Display section.....	19
3.1.1	Power.....	19
3.1.2	Frequency.....	19
3.1.3	Voltage.....	19
3.1.4	Ampere	19
3.2	GDP Sequence Status LED indicators section	19
3.3	GDP Panel Status LED indicators.....	20
3.4	GDP Alarm & Status LED indicators section.....	20
3.5	GDP Mode KEY Operation.....	21
3.6	GDP Normal Mode KEY Operation	22
3.7	GDP Parameter Setup Mode KEY Operation	23
3.8	GDP Custom Mode KEY Operation	24
3.9	GDP Test Mode KEY Operation.....	25

1. General Description

This manual describes *PMS* applications with 3 diesel generator sets. (Max 5sets)
PMS for each generator is installed inside main switchboard.

The *PMS* is advanced system for full automation of the power plant: including generator control, power management, generator protection and engine safety system.

- The followings are assumed:

Each diesel generator is equipped with a local control panel with local / remote switch.
In local mode, the diesel generator is controlled at local.
In remote mode, the diesel generator is controlled by the switchboard.

- The switchboard is equipped with a manual / auto switch.

“Manual” or “Auto” control mode is only selected by each select switch installed on the GDP in each generator panel.

In manual mode, *PMS* is not controlled by push buttons.

In auto mode, the diesel generator is controlled by the *PMS* program and the push buttons on the GDP can be used as well.

Each generator set is equipped with its own independent and autonomous *PMS*, which is built-up in a module way. This ensures the highest degree of reliability and availability.

The *PMS* is built-up with two modules for each generator set:

- GDP (Generator Display Panel)

: installed flush panel at each generator section of switchboard.

- GCE (Generator Control Equipment)

: installed inside of each generator panel.

1.1 Summarized table of operation and mode

The various operation and protection modes can be summarized as follows:

Description	PMS Auto mode	Manual mode	Local mode
Auto start, Synchronize and ACB close via push buttons on GDP	O	X	X
Manual start, Synchronize and ACB close via MSB	X	O	X
Local panel start	X	X	O
Synchronize and ACB close 1st Stand-By start	O	X	X
Stand-by start and ACB close at Black-Out	O	X	X
ACB open and stop via push buttons on GDP	O	X	X
Manual ACB open and stop via MSB	X	O	X
Local panel stop	O	O	O
Load dependant auto start / stop	O	X	X
ACB trip, reverse power, short circuit, very low / High Frequency and very Low / High Voltage	O	O	X
Monitoring and alarming of Low / High Frequency and Low / High Voltage and overload	O	O	X
Load sharing	O	X	X
Frequency control	O	X	X
Preference Tripping 1 and 2	O	X	X
Heavy consumer start and accept	O	X	X

1.2 Stand-by Start & Alarm (Manual & Auto)

Item		Manual			Auto		
		Alarm	Trip	Stand-by Alarm	Alarm	Trip	Stand-by Alarm
BUS Abnormal (High / Low Voltage, Frequency)		O	X	X	O	O	O
PT Trip	Low Frequency	O	O	X	O	O	O
	Over Current						
	Over Load						
	ACB Abnormal Trip						
ACB Non Close		X	X	X	O	X	O
Start Fail		X	X	X	O	X	O
Over Current Trip		O	O(ACB)	X	O	O(ACB)	O
Short Circuit		O	O(ACB)	X	O	O(ACB)	X
Reverse Power Trip		O	O	X	O	O	O
Engine Shut Down		O	O	X	O	O	O
Heavy Load		X	X	X	X	X	X
Heavy Consumer Block		X	X	X	X	X	X

“BUS abnormal” recovery process is controlled in “AUTO” mode, even the running generator is set as “MANUAL” mode.

- Automatic start logic is designed for operating with an above condition.

- Among upside conditions it is designed for operating the ACB close first for the idle running GE when idle running GE and 1st standby selected GE exist at the same time.
- This is because idle running GE can close ACB faster.
- The close condition of idle running GE is as following.
 - Control Mode = Auto control
 - Local / Remote = Remote
 - GE status = No GE alarm

1.3 Generator Display Panel (GDP)

The GDP unit (which is flush panel mounted in each generator section) has the layout according the drawing below.

Note that in the drawing you can find the function of the two 4 digit digital display, function of the push buttons and function of the LED status indicators. The GDP is identical for all generators and no specific hardware setting is required.

Note that the **PMS** configuration (parameter setting) is done via this panel by switching the mode switch to push and enter the password.

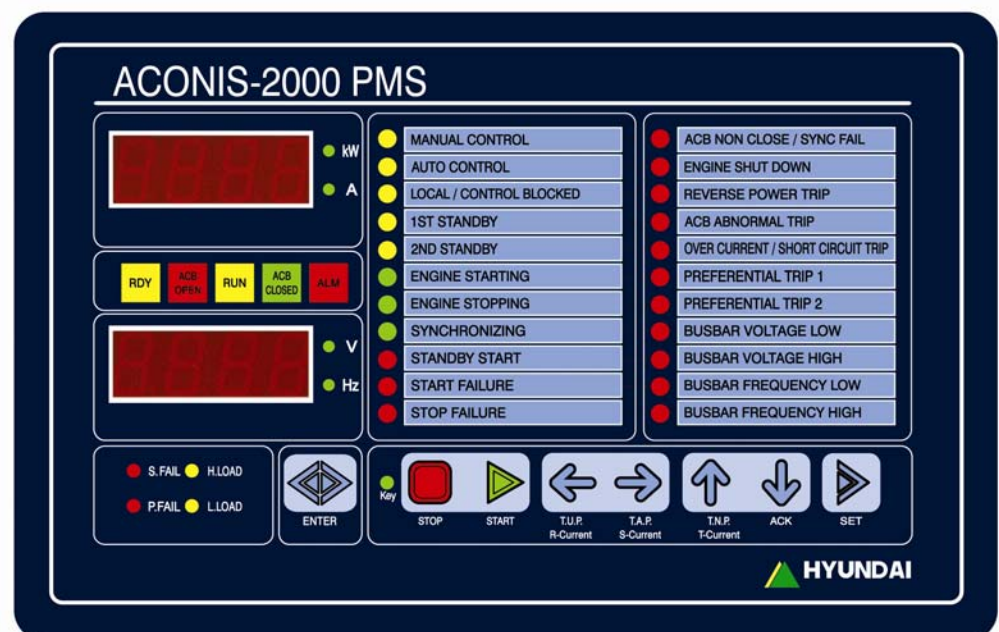


Figure1. Generator Display Panel

Operator Panel includes 8 push buttons and two 4 digit numeric display that indicates Power, Current, (upper side 4 digit) Voltage and Frequency (lower side 4 digit).

In addition, 22 LED indicator status and alarm condition conditions and 4LED (S. Fail / P. Fail / H.LOAD / L.LOAD) indicate Operator Panel status. Including connection serial cable (L=2m) to GCE.

1.4 Generator Control Equipment (GCE)

The GCE (are mounted in each generator panel with 6 x M5 screws):

The following hardware setting is needed:

The bottom side of the GCE contains the rotary encoder switch which needed to be set as follows:

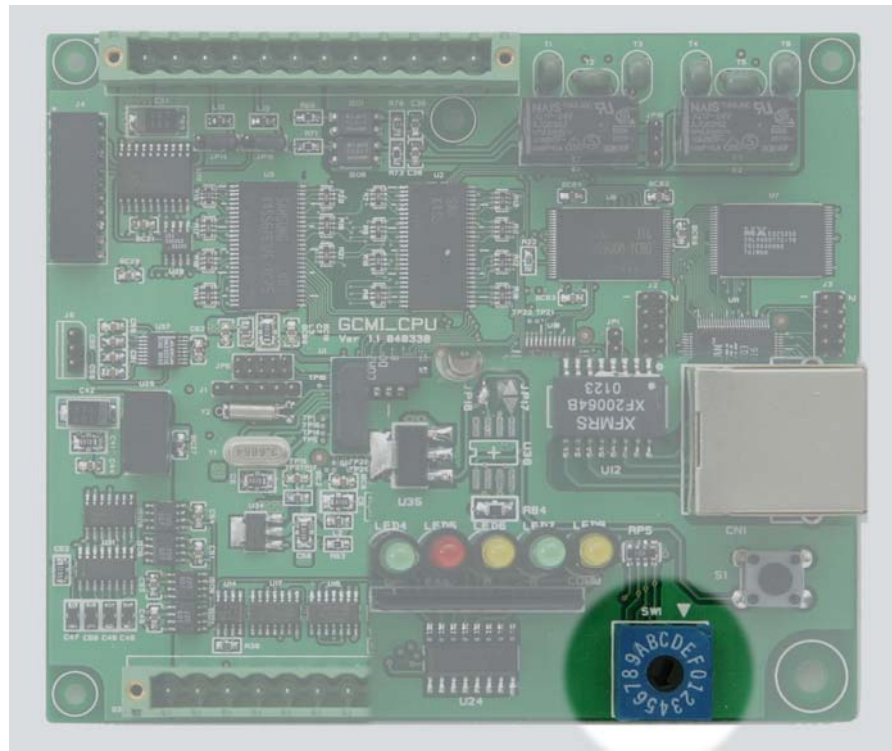


Figure2. Generator Control ID

- No. 0: Generator #1
- No. 1: Generator #2
- No. 2: Generator #3
- No. 3: Generator #4

The GCE of each generator is connected to the GCE of the other generators via a redundant Field-bus connection.

The Field-bus is based upon the ARC-net bus standard.

I/O signals from Bus Bar, generator, engine and breaker are directly connected to GCE.

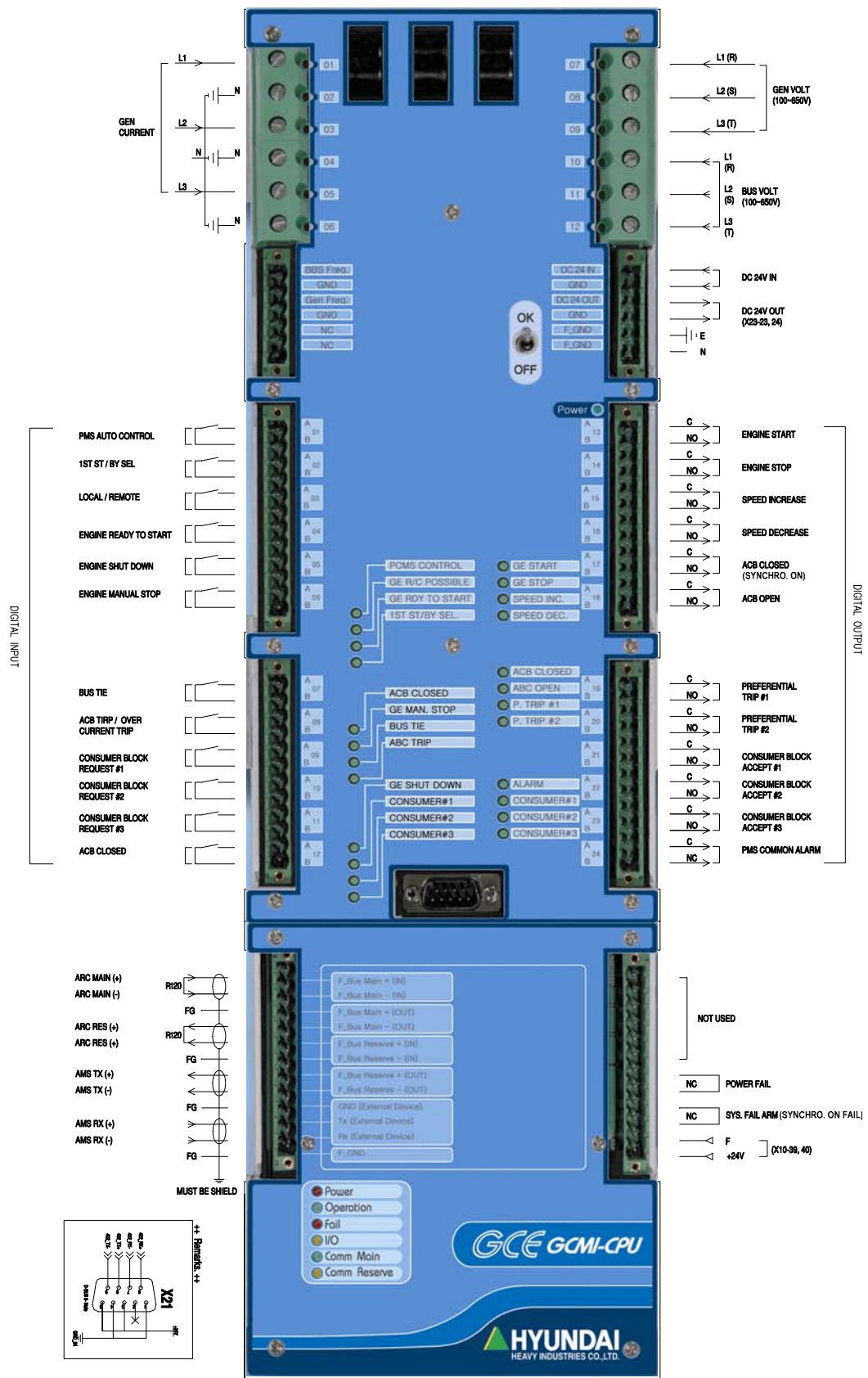


Figure3. GCE and GCEI-CPU

1.5 General Specification

Parameter	Description
Control power supply	24VDC
Burden	kW (ex. 800kW)
Control Processor	Intel X-scale PXA-255
Clock speed	200 MHz
Program memory read only	512Kb
Program memory SDRAM	32MB
Program memory read / write	32MB
Non-volatile read/write memory	4Kb
Watchdog and power fail logic	Yes
Operating temperature	0 – 70 Deg. C
Environmental	According classification rules
Weight:	7Kg (GDP: , GCE:)
Protection degree	GDP : IP52 / GCE : IP
Digital inputs	
Field bus interface	Main and back-up field bus based upon Arc-Net bus interfaces to other PMS systems field bus cable: twisted and shielded
Digital outputs	Relay normally de-energized 24VDC to 230VAC isolated relay output contact for each channel. Note that when a normally closed output terminal is required a jumper has to be set to other position.
Digital output for alarm and power / system fail	Relay normally energized isolated relay output contact for each channel. Contact closes upon alarm and upon power failure.

1.6 Input / Output Signals

Parameter	I/O Type	Description
Main Bus Voltage	AC Input / 3 phase R,S,T	440VAC
Generator Voltage	AC Input / 3 phase R,S,T	440VAC
Generator Current	AC Input / 3 phase R,S,T	5A Maximum; via Current transformers
Engine Start	Digital output	Normally Open contact. Output activated when engine start required
Engine Stop	Digital output	Normally Open contact. Output activated when engine stop required
Engine Ready to start	Digital input	Normally Open contact When activated, Engine is ready to start.
Engine Shut Down	Digital input	Normally Open contact When closed, the engine has shut down.
Engine remote control	Digital input	Normally Open contact. When closed, Engine is in remote (MSB) operation.
ACB Overload / Short Circuit	Digital input	Normally Open contact When closed the ACB has tripped due to overload or short circuit
1st Standby	Digital input	Normally Open contact Digital input from Standby Selection switch; when closed the generator is selected 1st Standby.
Speed increase	Digital Output	Normally Open contact. Output activated when increase of engine speed required
Speed decrease	Digital Output	Normally Open contact. Output activated when decrease of engine speed required
ACB Open	Digital Output	Normally Open contact. Output activated when open circuit breaker required
ACB Close	Digital Output	Normally Open contact. Output activated when close circuit breaker required
ACB Status	Digital input	Normally Open contact. When closed the ACB is closed when open than the ACB is open.
Preferential Trip Output 1 / 2	Digital Output	Normally Open contact. Output activated when Non Preferential consumer 1 / 2 should be switched off.
Man Bus Tie closed	Digital Input	Normally Open contact. When closed the BT is closed and when open the Bus Tie is open.
PMS Common Alarm	Digital Output	Normally Closed contact. Output activated when open PMS alarm required.

Remarks

Digital input / output can be changed according to project.

2. PMS Functions

Each generator is equipped with its own and autonomous PMS generator control and power management system.

PMS system executes automatic control functions and can be operated from the GDP.

The following section assumes that the diesel generators are set to remote (MSB) mode.

PMS can be operated in automatic mode and manual mode. The automatic or manual mode can be selected from the MSB.

When PMS in manual mode, the "Manual" indicating LED on GDP will be illuminated.

When PMS in Auto mode, the "Auto" indicating LED on GDP will be illuminated.

2.1 Function in Manual Mode

Only generator status or alarm is indicated.

Start, Stop push button on GDP cannot be used.

2.2 Function of in Automatic Mode

2.2.1 Auto mode Start by pressing the push button on GDP

When pressing the "Start" push button, the following functions are executed:

Synchronization and close ACB to main Bus Bar.

During the start sequence the "START" push button will be illuminated "ENGINE STARTING" LED on the GDP. And "RUN" LED is flashing

When the diesel engine is running, "ENGINE STARTING" LED is off and "RUN" LED is on (steady).

The status of the ACB is displayed on the GDP by lighting the LED "ACB CLOSED" or "ACB OPEN"

When synchronization is fail, this is indicated on the GDP by lighting the LED "ACB NON CLOSE / SYNC. FAIL"

2.2.2 Auto mode Stop by pressing the push button on GDP

When pressing the "STOP" push button in Automatic mode, the following functions are executed:

Check if the other running generators can take over the load; when this is not possible (over 80%), the stop sequence will be aborted. The operator will notify this because the "ENGINE STOPPING" LED will not be illuminated.

- Order unload of the generator (ENGINE STOPPING LED is flashing)
- Open circuit breaker (ENGINE STOPPING LED is flashing)
- Idle running (ENGINE STOPPING LED is flashing)
- Engine Stop (ENGINE STOPPING LED is on (steady))

2.2.3 Load dependant automatic start

When a preset value of load in percentage is reached and available for a preset time, a start request is generated to the 1st standby generator. The 1st Standby generator can be selected via a selection switch in the switchboard. When a generator is selected 1st Standby or 2nd Standby this is indicated by lighting a LED on the GDP.

The preset values and times are listed in the parameter-list and changeable by means of adapting the parameters via the set-up on the GDP.

2.2.4 Synchronizing

PMS checks that the voltage and frequency deviation between generator and net is acceptable, and finally gives the breaker a close signal when phase is equal on generator and net. If synchronizing exceeds 60 second, a synchronizing fail alarm will be given. The diesel engine will stop and, if there is an automatic start situation, another diesel will be started.

2.2.5 Load Sharing / Frequency control

Based on input data (net frequency, generator load), PMS controls the speed on the auxiliary engines, which is proportionally generator frequency. By giving increase and decrease pulses to the governor motor, PMS keeps a steady net frequency and will also, when more than one generator are connected to the net, perform load between the generators.

Parameters can be set for fine-tuning this function.

2.2.6 Heavy consumer automatic start

When a heavy consumer request is detected by the system, the system checks if the available power is sufficient for the consumer to start up. If the available power is insufficient, a start request is issued to the 1st standby generator. As soon as this generator is on line and load shared (within a pre-set percentage), the consumer start is granted.

2.2.7 Black-out recovery and bus abnormal

Black out is a situation defined as no voltage and no frequency is measured on the BUS BAR section and all generator circuit breakers are open.

All outgoing breakers on the blackout BUS BAR section will be opened by the A PMS system.

When Blackout is detected, the PMS will start to 1st standby generator and a close breaker signal. When BUS abnormal than 1st Standby generator starts, and after running, if bus status is still abnormal, working ACB trips and than 1st Standby ACB closed. After standby generator is running, if bus abnormal is recovery, after standby generator is idle running for 30sec, standby generator is stopping.

Within the above 30sec, bus abnormal is occurred again, working ACB trips and than standby ACB closes.

2.3 Function of PMS

2.3.1 Reverse power trip

A reverse power trip takes place in case the measured reverse power has exceeded the pre-configured limit for a certain time. The preset values and times are listed in the parameter-list and changeable by means of adapting the parameters via the set-up on the GDP.

The reverse power trip will be indicated on the GDP by lighting the LED "REVERSE POWER TRIP"

2.3.2 Over current trip

An over current / short circuit trip takes place in case the measured current has exceeded the pre-configured limit for a certain time. The preset values and times are listed in the parameter-list and changeable by means of adapting the parameters via the set-up on the GDP.

The over current trip will be indicated on the GDP by lighting the LED "OVER CURRENT /SHORT CIR.TRIP"

2.3.3 Low / High voltage / frequency alarming

An alarm takes place in case the measured values have exceeded the pre-configured limit for a certain time. The preset values and times are listed in the parameter-list and changeable by means of adapting the parameters via the set-up on the GDP.

The alarms will be indicated on the GDP by blinking the LED, "BUSBAR VOLTAGE LOW" / "BUSBAR VOLTAGE HIGH" / "BUSBAR FREQUENCY HIGH" or "BUSBAR FREQUENCY LOW"

2.3.4 Preferential trip 1 & 2

Each PMS has two non-essential groups which can be tripped in case of:

Group 1: generator load at certain load for certain time (e.g. 100% for 5 seconds).

Group 2: generator load at certain load for certain time (e.g. 100% for 10 seconds).

The preferential tripping will be indicated on the GDP by lighting the LED "Preferential Trip 1 and 2"

The load and time can be set via parameters.

Restoration of the tripped consumers is not controlled by the PMS system.

2.4 Function of the Alarm output

The PMS S is equipped with an Alarm Output relay (normally energized). This output will be de-energized in case of any alarm and/or trip condition.

This output is typically connected to an Alarm and Monitoring System to indicate a failure of the power plant.

When this alarm occurs on the AMS, the watchman should go to the PMS and look on the GDP to see the cause of the alarm.

The Alarm output will be de-energized fewer than one of the following conditions:

- STANDBY START
- START FAILURE
- STOP FAILURE
- ACB NON CLOSE / SYNC FAIL
- ENGINE SHUT DOWN
- REVERSE POWER
- ACB ANORMAL TRIP
- OVER CURRENT / SHORT CIR.TRIP
- PREFERENTIAL TRIP 1
- PREFERENTIAL TRIP 2
- BUSBAR VOLTAGE LOW
- BUSBAR VOLTAGE HIGH
- BUSBAR FREQUENCY LOW
- BUSBAR FREQUENCY HIGH
- S. FAIL (System Fail Power Fail or Communication Fail or I/O Fail)
- P. FAIL (Generator Display Panel Fail)

When the above alarm occurred, each LED is flashing.

When pressing the “ACK” push button on GDP, if each alarm status is continuous detected, each LED is on (steady). If each alarm is cleared, each LED is off.

3. PMS Operation with GDP

GDP can be divided in the following parts:

- Two Display (Gauge function)
- Sequence status LED indicators
- Alarm/status LED indicators
- Configuration (set-up) mode

3.1 GDP Two Display section

3.1.1 Power

- Off: Indication on the display is not the Power.
- On: Indication on the display is the Power [kW]

3.1.2 Frequency

- Off: Indication on the display is not the Frequency.
- On: Indication on the display is the Frequency [Hz]

3.1.3 Voltage

- Off: Indication on the display is not the Voltage.
- On: Indication on the display is the Voltage [V]

3.1.4 Ampere

- Off: Indication on the display is not the Ampere
- On: Indication on the display is the Ampere [A]

When you press the 'ENTER' button, the LED's will turn on the "kW-V", "kW-Hz", "A-V", "A-Hz" indication on the GDP display.

3.2 GDP Sequence Status LED indicators section

On the display unit you will find 5 indicate:

- READY
- ACB OPEN
- RUN
- ACB CLOSED
- ALARM

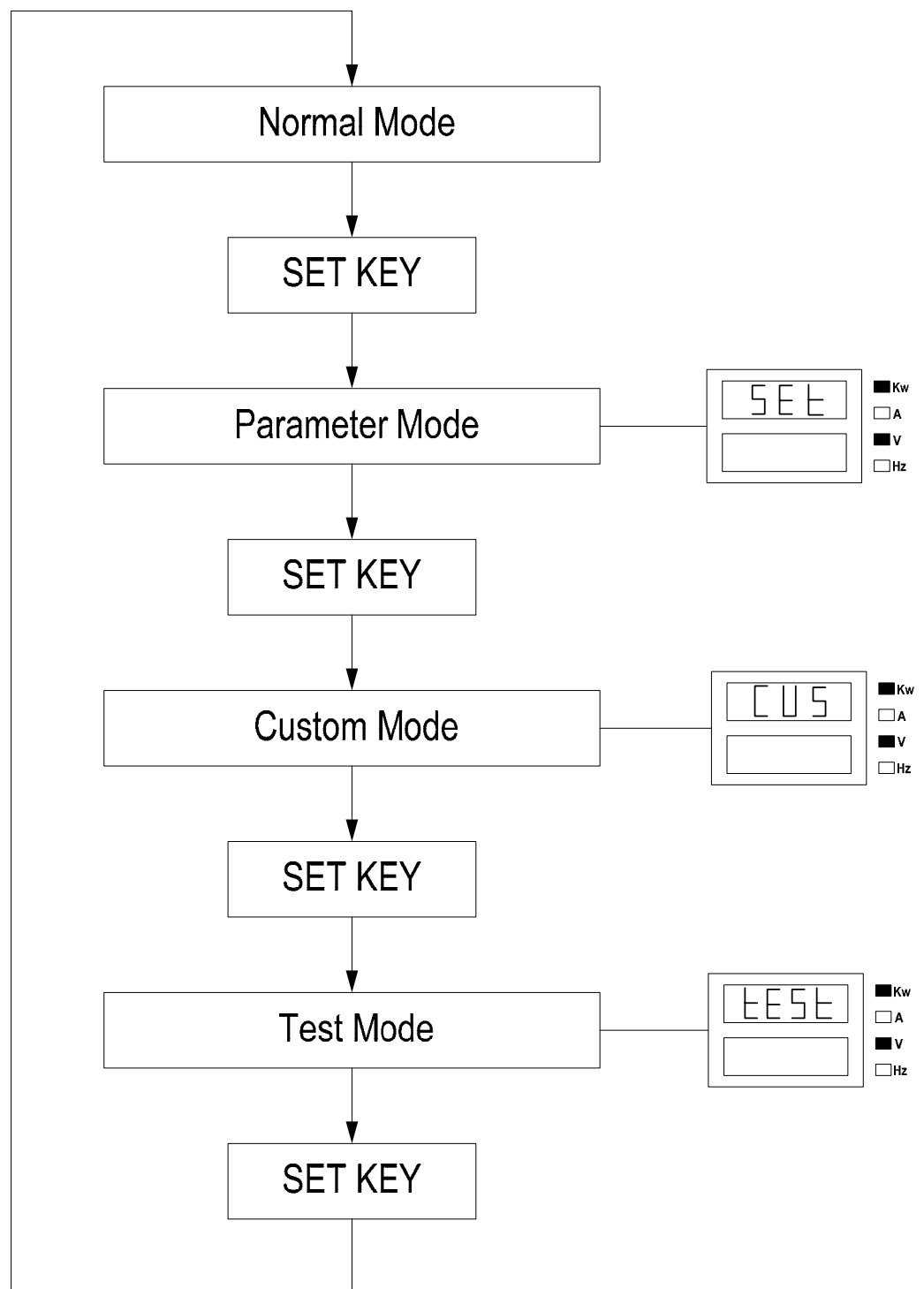
3.3 GDP Panel Status LED indicators

- S. FAIL (System Fail: Power Fail or Communication Fail or I/O Fail)
- P. FAIL (Generator Display Panel Fail)
- HEAVY LOAD
- LIGHT LOAD

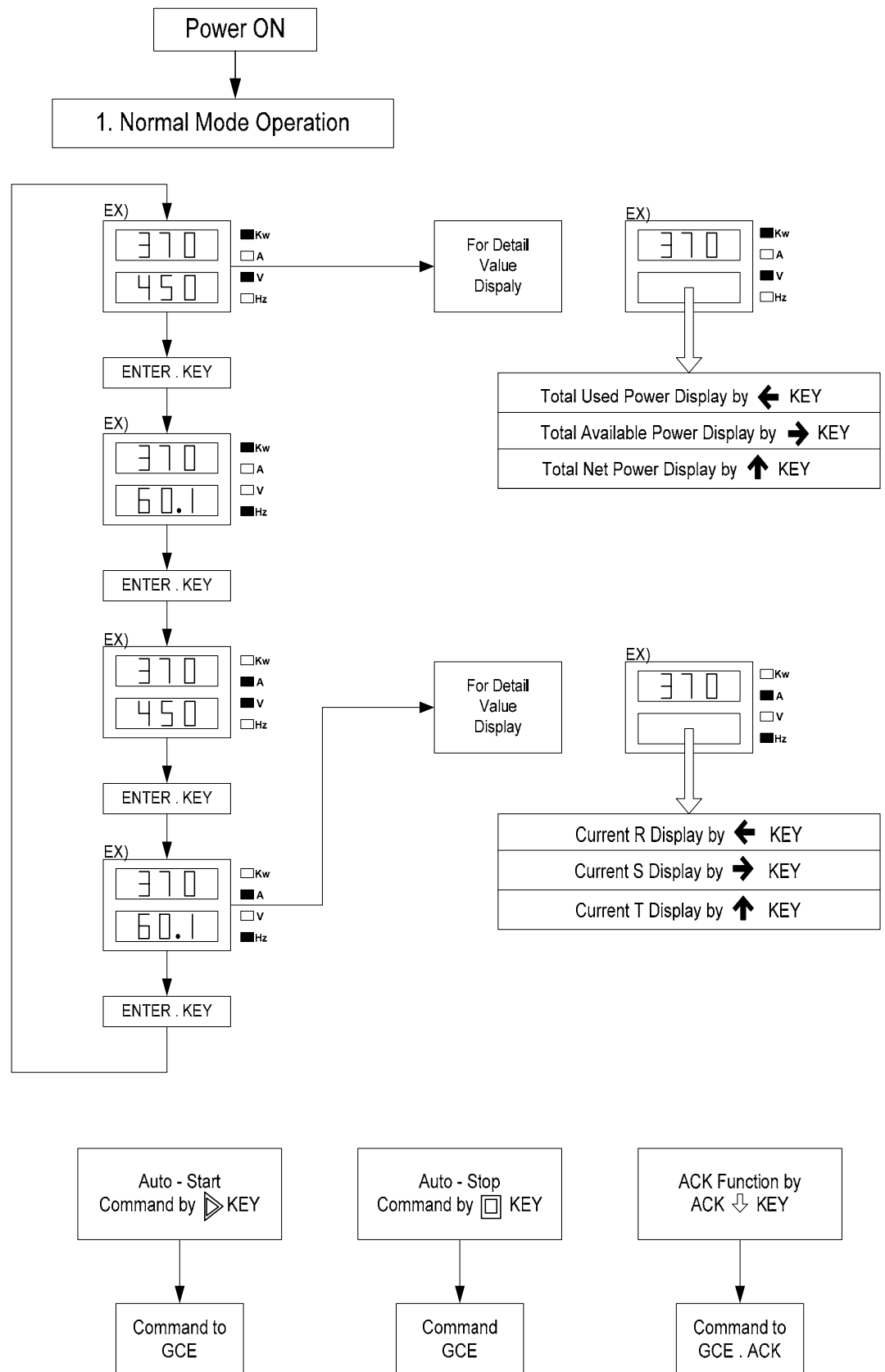
3.4 GDP Alarm & Status LED indicators section

- MANUAL CONTROL
- AUTO CONTROL
- LOCAL / CONTROL BLOCKED
- 1ST STANDBY
- 2ST STANDBY
- ENGINE STARTING
- ENGINE STOPPING
- SYNCHRONIZING
- STANDBY START
- START FAILURE
- STOP FAILURE
- ACB NON CLOSE / SYNC FAIL
- ENGINE SHUT DOWN
- REVERSE POWER
- ACB ABNORMAL TRIP
- OVER CURRENT / SHORT CIRCUIT
- PREFERENTIAL TRIP 1
- PREFERENTIAL TRIP 2
- BUSBAR VOLTAGE LOW
- BUSBAR VOLTAGE HIGH
- BUSBAR FREQUENCY LOW
- BUSBAR FREQUENCY HIGH
- S. FAIL (System Fail: Power Fail or Communication Fail or I/O Fail)
- P. FAIL (Generator Display Panel Fail)

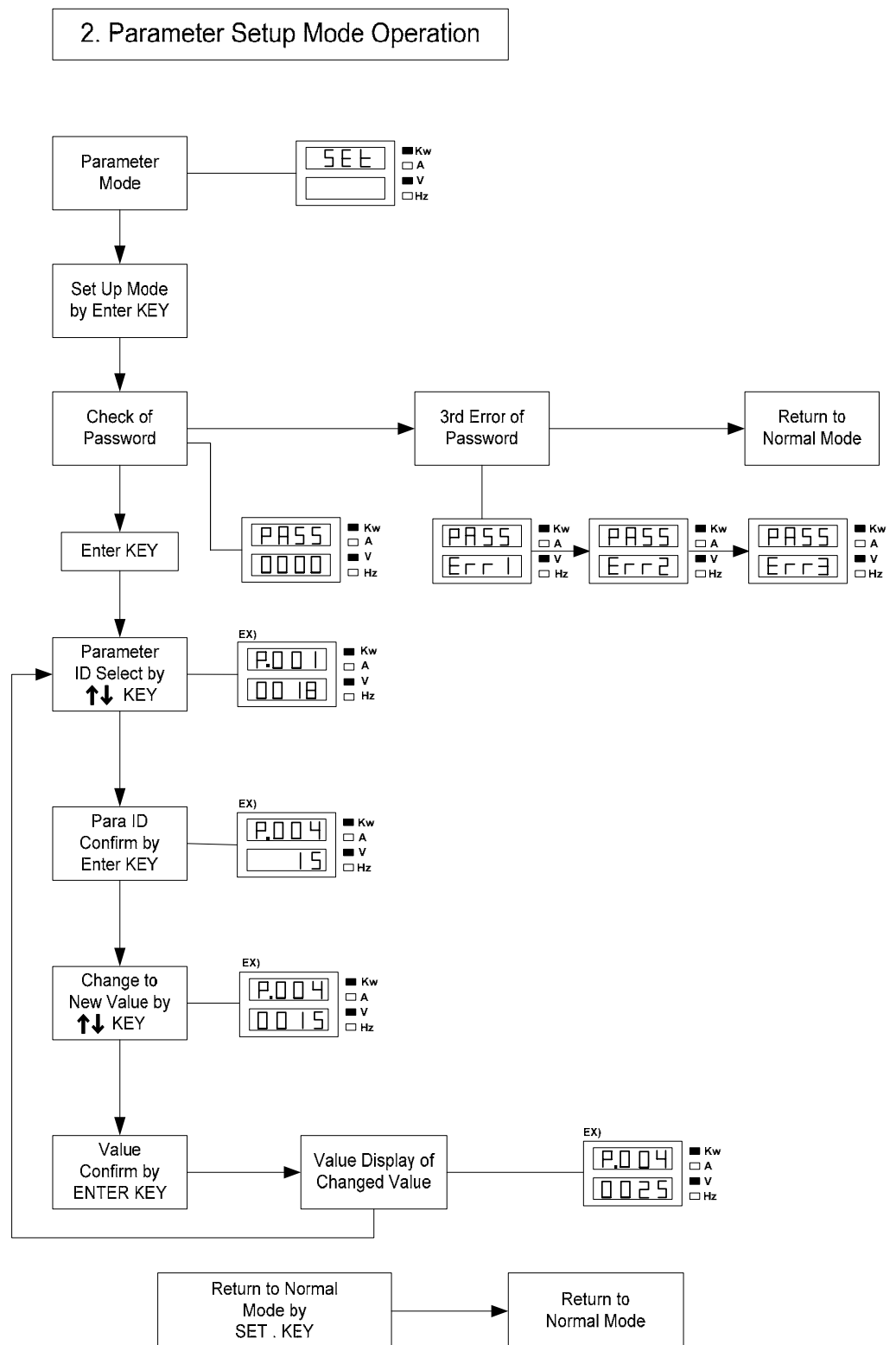
3.5 GDP Mode KEY Operation



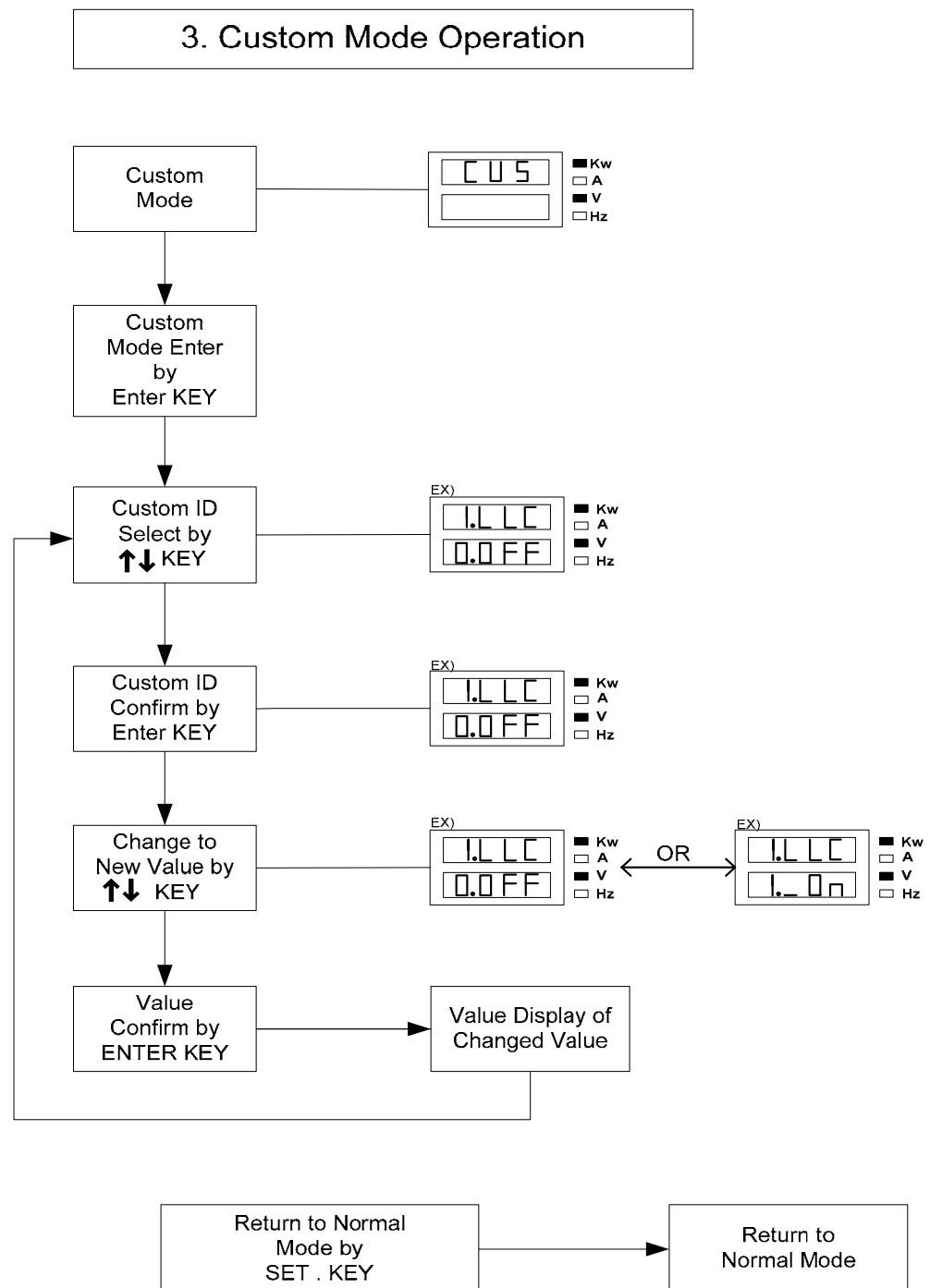
3.6 GDP Normal Mode KEY Operation



3.7 GDP Parameter Setup Mode KEY Operation

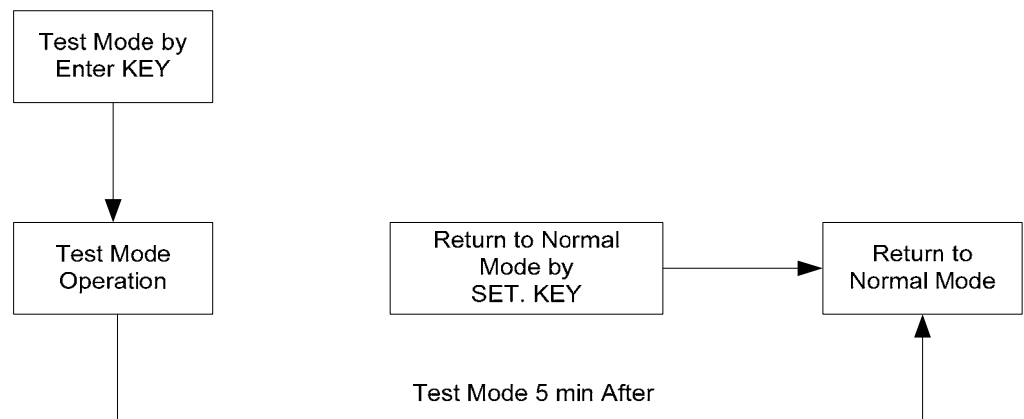


3.8 GDP Custom Mode KEY Operation



3.9 GDP Test Mode KEY Operation

4. Test Mode Operation



ACONIS-2000[®] PMS

Parameter List

1. ACONIS2000 PMS Parameters

Category	P. No	Description	Unit	DG1	DG2	DG3	Remarks
Bus Bar setting	P001	Bus Bar Nominal Voltage	V	450	450	450	
	P002	Bus Bar Nominal Frequency	Hz	60	60	60	
Generator setting	P003	G/E Nominal Power	kW	750	750	750	
	P004	G/E Nominal Current	A	1323	1323	1323	
Start Control setting	P005	Start Command Pulse Width	sec	15	15	15	
	P006	Control Try (Attempts)	Num	1	1	1	Fixed 1 Item
Stop Control setting	P007	Max Unloading Time	sec	60	60	60	
	P008	CB Open at Load	%	10	10	10	
	P009	Idle Running Time	sec	180	180	180	60~600 sec
	P010	Stop Command Pulse Width	sec	10	10	10	
Synchronize Control setting	P011	Synchronize Time	sec	60	60	60	
	P012	Delta Frequency	Hz	0.2	0.2	0.2	
	P013	Delta Voltage	V	22.5	22.5	22.5	5%
	P014	CB Make Time	msec	100	100	100	
	P015	Min Pulse Time	msec	600	600	600	
Auto Governor Control setting	P016	Frequency Dead Band	Hz	0.2	0.2	0.2	
	P017	Frequency Prop Band	Hz	2	2	2	
	P018	Active Load Dead Band	kW	25	25	25	
	P019	Active Load Prop Band	%	50	50	50	
	P020	Cycle Time	sec	3	3	3	
	P021	Min Pulse Time	sec	0.5	0.5	0.5	
	P022	Max Pulse Time	sec	1.5	1.5	1.5	
Heavy Load demand Auto Starting	P023	Load High Limit step 1	%	90	90	90	
	P024	Load High Delay step 1	sec	15	15	15	
	P025	Current High Limit step 1	%	190	190	190	
	P026	Current High Limit step 1	sec	-1	-1	-1	Not used

Category	P. No	Description	Unit	DG1	DG2	DG3	Remarks
Heavy Load demand Auto Starting	P027	Load High Limit step 2	%	95	95	95	
	P028	Load High Delay step 2	sec	10	10	10	
	P029	Current High Limit step 2	%	195	195	195	
	P030	Current High Limit step 2	sec	-1	-1	-1	Not used
	P031	Load High Limit step 3	%	100	100	100	
	P032	Load High Delay step 3	sec	3	3	3	
	P033	Current High Limit step 3	%	200	200	200	
	P034	Current High Limit step 3	sec	-1	-1	-1	Not used
Light Load demand Auto Stopping	P035	Max allowed Load after Low Load Stop	%	70	70	70	
	P036	Low Load stop delay	sec	180	180	180	60 ~ 600sec
Load Demand Preferential Trip Group	P037	Load High Limit group 1	%	100	100	100	
	P038	Load High Delay group 1	sec	5	5	5	
	P039	Current High Limit group 1	%	100	100	100	
	P040	Current High Limit group 1	sec	10	10	10	
	P041	Frequency Low Limit group 1	Hz	58.5	58.5	58.5	
	P042	Frequency Low Limit group 1	sec	5	5	5	
	P043	Load High Limit group 2	%	100	100	100	
	P044	Load High Delay group 2	sec	10	10	10	
	P045	Current High Limit group 2	%	100	100	100	
	P046	Current High Limit group 2	sec	15	15	15	
	P047	Frequency Low Limit group 2	Hz	58.5	58.5	58.5	
	P048	Frequency Low Limit group 2	sec	5	5	5	
Bus Abnormal	P049	Low Voltage Limit	V	427.5	427.5	427.5	95%
	P050	Low Voltage Delay	sec	5	5	5	
	P051	High Voltage Limit	V	472.5	472.5	472.5	105%
	P052	High Voltage Delay	sec	5	5	5	

Category	P. No	Description	Unit	DG1	DG2	DG3	Remarks
Bus Abnormal	P053	Low Frequency Limit	Hz	57	57	57	95%
	P054	Low Frequency Delay	sec	5	5	5	
	P055	High Frequency Limit	Hz	63	63	63	105%
	P056	High Frequency Delay	sec	5	5	5	
DG Protection Setting (ACB Trip)	P057	Low Low Voltage Limit	V	315	315	315	70%
	P058	Low Low Voltage Delay	sec	1	1	1	
	P059	High High Voltage Limit	V	585	585	585	130%
	P060	High High Voltage Delay	sec	5	5	5	
	P061	Low Low Frequency Limit	Hz	54	54	54	90%
	P062	Low Low Frequency Delay	sec	10	10	10	
	P063	High High Frequency Limit	Hz	66	66	66	110%
	P064	High High Frequency Delay	sec	3	3	3	
	P065	Current High Limit	%	150	150	150	
	P066	Current High Delay	sec	30	30	30	
	P067	Reverse Power Limit	%	-10	-10	-10	
	P068	Reverse Power Delay	sec	5	5	5	
Aux #1. DO Control setting	P069	Aux. #1 DO Function Code	-	1	1	1	see AXO Table
	P070	Aux. #1 DO Function Parameter #1	-	330	99	90	
	P071	Aux. #1 DO Function Parameter #2	-	1	1	1	
	P072	Aux. #1 DO Function Parameter #3	-	0	0	0	
Aux #2. DO Control setting	P073	Aux. #2 DO Function Code	-	1	1	1	see AXO Table
	P074	Aux. #2 DO Function Parameter #1	-	99	99	150	
	P075	Aux. #2 DO Function Parameter #2	-	1	1	1	
	P076	Aux. #2 DO Function Parameter #3	-	0	0	0	
Aux #3. DO Control setting	P077	Aux. #3 DO Function Code	-	1	1	1	see AXO Table
	P078	Aux. #3 DO Function Parameter #1	-	90	50	50	
	P079	Aux. #3 DO Function Parameter #2	-	1	1	1	
	P080	Aux. #3 DO Function Parameter #3	-	0	0	0	

Category	P. No	Description	Unit	DG1	DG2	DG3	Remarks
Aux #1. DI	P081	Aux. #1 DI Function Code	-	0	0	0	See AXI Table
Aux #2. DI	P082	Aux. #2 DI Function Code	-	0	0	0	
Aux #3. DI	P083	Aux. #3 DI Function Code	-	0	0	0	

1 System / Hardware Configuration

Category	P. No	Description	Unit	DG1	DG2	DG3	Remarks
Hardware setting	P084	GE Running Voltage Build up Dead Band	V	30	30	30	
	P085	GE Stable Running Delay Time	sec	3	3	3	
	P086	GE Stop by user Load Shift	%	85	85	85	
	P090	CT Ratio (ex 400 = 2000/5A)	-	400	400	400	
Internal Control setting	P091	GE Running Voltage > Nominal Voltage	%	70	70	70	
	P092	GE Stopped Voltage < Nominal Voltage	%	10	10	10	
Heavy Consumer Block Setup	P093	Consumer Block accept Load Sharing	%	10	10	10	
	P094	Consumer Block accept Signal off Delay	sec	5	5	5	
Synchronize Setup	P095	Synchronize ACB Close Degree Offset	Deg	0	0	0	Fixed items
	P096	Synchronize ACB Close Dead Band	Deg	8	8	8	
System Configuration	P100	Number of GCE	Num	3	3	3	
	P101	Index of Bus Tie Position	Num	1	1	1	
	0=None / 1=DG1, BT, DG2, DG3 / 2=DG1, DG2, BT, DG3						
Meter Calibration Factor	P102	Gen. Voltage Meta Calibration Factor	Num	1000	1000	1000	(x 1000) Time Value
	P103	Gen. Current Meta Calibration Factor	Num	1000	1000	1000	
	P104	Gen. Power Meta Calibration Factor	Num	1000	1000	1000	
	P105	Bus. Voltage Meta Calibration Factor	Num	1000	1000	1000	
Extern System Communication Setup	P108	XIC Configure Value	Num	0	0	0	
	P109	XIC Reserved	Num	10	10	10	x 100ms

2 User Custom Parameter

Category	P. No	Description	Unit	DG1	DG2	DG3	Remarks
Custom Function Parameters	P111	Light Load Cancel (0=No, 1=Yes)	0/1	0	0	0	
	P112	GDP Buzzer Sounding (0=Off, 1=On)	0/1	1	1	1	

3 Reserved Parameters

Category	P. No	Description	Unit	DG1	DG2	DG3	Remarks
System Reserved Parameters	P120	Program Build Number in EEP	Num	715	715	715	
	P121	Program Version Number in EEP	Num	2300	2300	2300	
	P122	GCE Node ID Number in EEP	Num	0	1	2	
	P123	Reserved for Operator Info (Password)	Num	8005	8005	8005	Hull No

4 AXO Table

Description	Function Code	Parameter Value		Remark
Aux. DO Function Disable	Code = 00	Parameter #1	Not Use	
		Parameter #2	Not Use	
		Parameter #3	Not Use	
Heavy Consumer Block	Code = 01	Parameter #1	Request Minimum Power	
		Parameter #2	Request Minimum Number of Parallel Running DG	
		Parameter #3	Not Use	
PMS Status Output	Code = 02	Parameter #1	Status Code Number	
		Parameter #2	Invert Flag (0 = Non Invert, 1 = Invert)	
		Parameter #3	Delay Time (sec)	
<u>Where, Status Code (Parameter #1) as bellows.</u>				
00 : PMS Ready				
01 : CB Open				
02 : GE Run				
03 : CB Closed				
04 : Alarm				
05 : Manual				
06 : Automatic				
07 : Local (Control blocked)				
08 : 1 st Stand by				
09 : 2 nd Stand by				
10 : GE Starting				
11 : GE Stopping				
12 : Synchronizing				
13 : Stand by GE Start				
14 : Start Failure				
15 : Stop Failure				
16 : CB Non Closed / Synchro Fail				
17 : GE Shut Down				
18 : Reverse Power Trip				
19 : ACB Abnormal Trip				
20 : Over Current Trip				
21 : Preferential Trip 1				
22 : Preferential Trip 2				
23 : Bus Bar Voltage Low				
24 : Bus Bar Voltage High				
25 : Bus Bar Frequency Low				
26 : Bus Bar Frequency High				
27 : Heavy Load Condition				
28 : Light Load Condition				
29 : Light Load Cancel				
ACB Trip INFO	Code = 03	Parameter #1	Unused	
		Parameter #2	Invert Flag (0 = Non Invert, 1 = Invert)	
		Parameter #3	Delay Time (sec)	
ACB ABNORMAL / ENGINE SHUT DOWN / OCR / SHORT CIRCUIT / REVERSE POWER TRIP				

Description	Function Code	Parameter Value		Remark
Total Available Power [%] Condition	Code = 21	Parameter #1	Total Available Power [%] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	
Total Available Power [kw] Condition	Code = 22	Parameter #1	Total Available Power [kw] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	
Total Used Power [%] Condition	Code = 23	Parameter #1	Total Used Power [%] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	
Total Used Power [kw] Condition	Code = 24	Parameter #1	Total Used Power [kw] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	
Single DG Available Power [%] Condition	Code = 25	Parameter #1	Single DG Available Power [%] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	
Single DG Available Power [kw] Condition	Code = 26	Parameter #1	Single DG Available Power [kw] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Off Delay	
Single DG Used Power [%] Condition	Code = 27	Parameter #1	Single DG Used Power [%] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	
Single DG Used Power [kw] Condition	Code = 28	Parameter #1	Single DG Used Power [kw] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	

Description	Function Code	Parameter Value		Remark
Multiple 1&2 DG Used Power [%] Condition	Code = 29	Parameter #1	Multiple 1&2 DG Used Power [%] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	
Multiple 1&2 DG Used Power [kw] Condition	Code = 30	Parameter #1	Multiple 1&2 DG Used Power [kw] Limit	
		Parameter #2	0 = "<", 1 = ">"	
		Parameter #3	Delay Time (sec)	

5 AXI Table

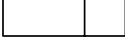
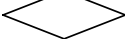
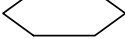
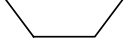
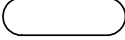
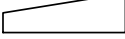
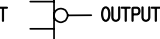
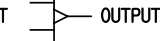
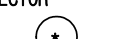
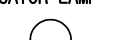
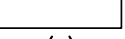
Function Code	Description	Parameter Value	Remark
Code = 00	Aux DI Function Disable		
Code = 01	Power Request Input of Heavy Consumer Block		
Code = 02	Light Load Auto-Stop Blocking		
Code = 03	Power Request Input and Auto Light Load Cancel		Option

ACONIS-2000[®] PMS

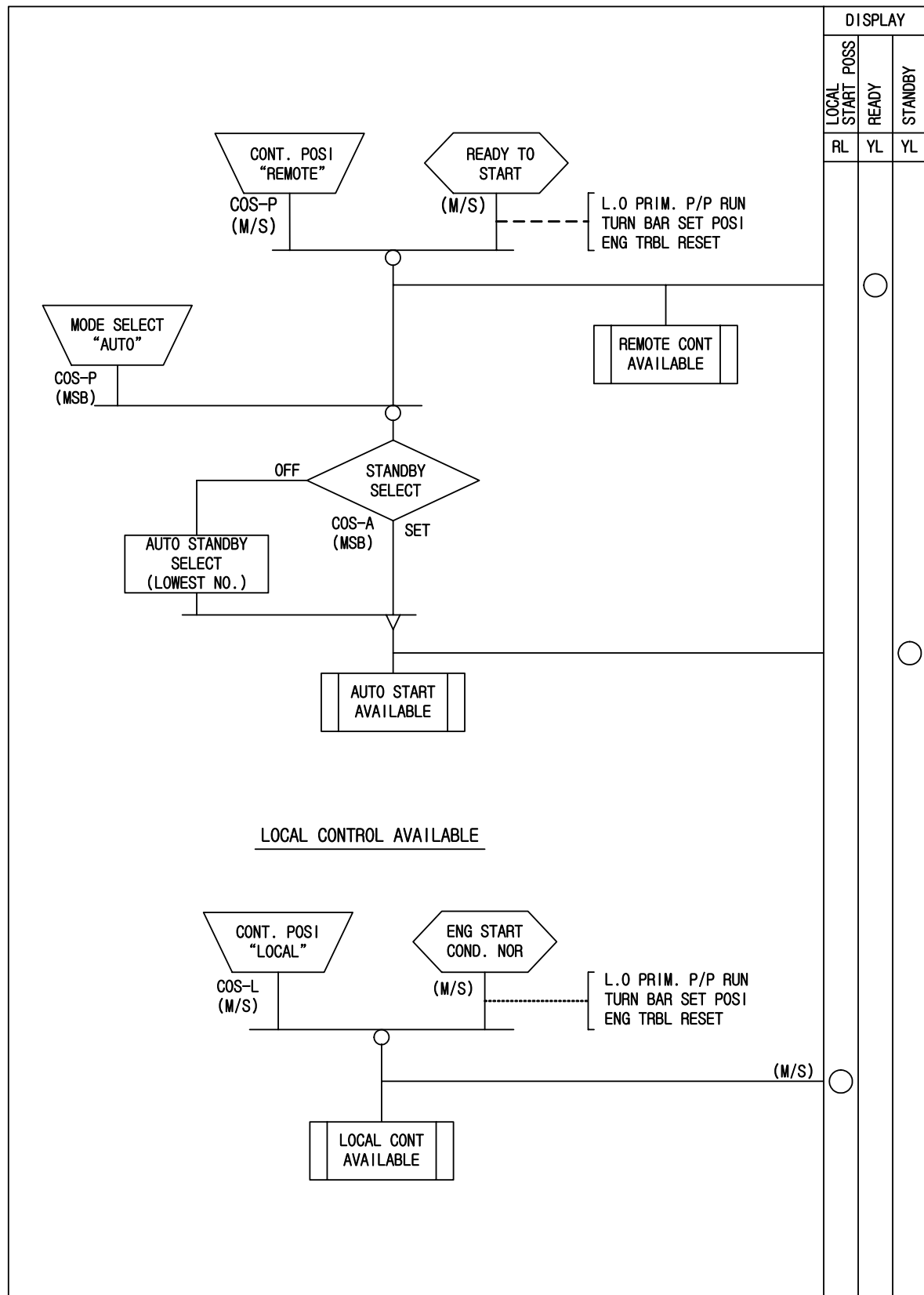
Flow Chart

1 Flow Chart

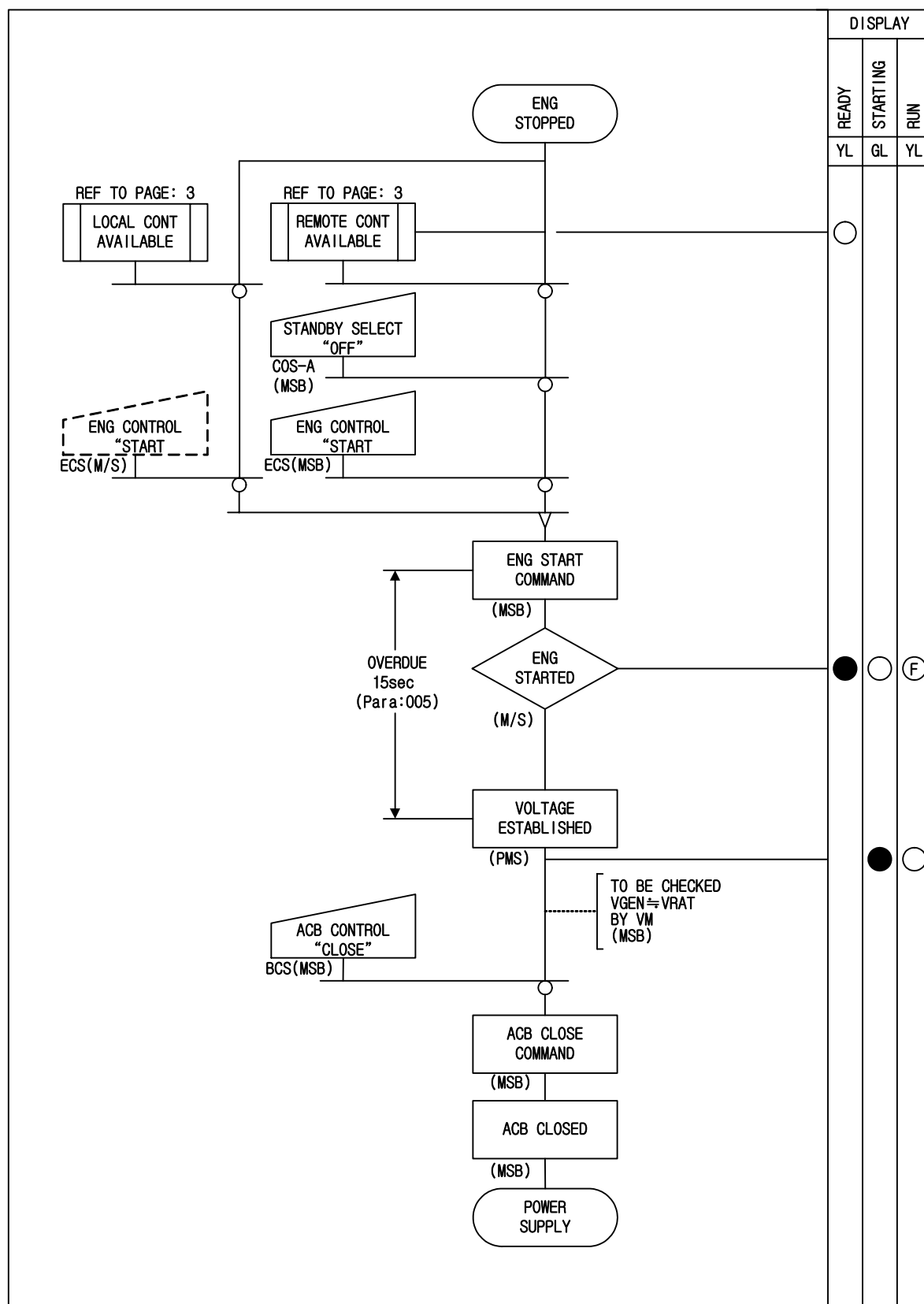
1.1 Flow Chart Symbol

FLOWCHART SYMBOLS		* NOTE : THESE SYMBOLS ARE SHOWN IN ACCORDANCE WITH JIS-C-6270
SYMBOL	DESCRIPTION	
PROCESS 	USED TO INDICATE ANY FORM OF INTERNAL PROCESSING MANIPULATION OTHER THAN DECISIONS. AN IDENTIFYING LEGEND APPEARS IN THE BOX.	
PREDEFINED PROCESS 	USED TO INDICATE THE PREDEFINED COMMAND GROUP SUCH LIKE SUB-ROUTINE IN ANOTHER PROGRAM OR ORDERED PROCESS STEPS CONSIST OF SOME OPERATIONS.	
CAUSE 	USE TO INDICATE INITIATING CONDITIONS. AN IDENTIFYING LEGEND AND A SET VALUE OF VALUES APPEAR IN THE LEFTHAND AND RIGHTHAND COLUMNS OF THE BOX. RESEECTIVELY.	
DECISION 	USED TO INDICATE DECISION-TYPE OPERATIONS THAT DETERMINE WHICH OF A NUMBER OF ALTERNATE PATHS IS TO BE FOLLOWED. AN IDENTIFYING LEGEND APPEARS IN THE BOX.	
PREPARATION 	USED TO INDICATE ANY PRESET CONDITION REQUIRED. AN IDENTIFYING LEGEND APPEARS IN THE BOX.	
MANUAL OPERATION 	USED TO INDICATE POINTS IN A FLOWCHART WHERE HUMAN INTERVENTION IS REQUIRED. AN IDENTIFYING LEGEND APPEARS IN THE BOX.	
TERMINAL 	USED TO INDICATE THE STARTING, STOPPING, AND ENDING POINTS OF THE PROCESS STEPS. AN IDENTIFYING LEGEND APPEARS IN THE BOX.	
MANUAL INPUT 	USED TO INPUT A SIGNAL PRODUCED BY MANUAL OPERATION. AN IDENTIFYING LEGEND APPEARS IN THE BOX.	
ANNOTATION 	USED FOR ADDITION OF DESCRIPTIVE COMMENTS OF EXPLANATORY NOTES.	
"AND" OPERATION 	USED TO INDICATE "AND" OPERATIONS; THE OUTPUT IS PRESENT IF ALL INPUTS ARE PRESENT, OTHERWISE THERE IS NO OUTPUT.	
"OR" OPERATION 	USED TO INDICATE "OR" OPERATIONS; THE OUTPUT IS PRESENT IF ONE OR MORE INPUTS ARE PRESENT.	
FLOW LINE 	USED TO CONNECT EACH BOX AND SYMBOL IN A FLOWCHART.	
CONNECTOR 	USED TO INDICATE CONNECTION OF FLOWCHART TO OR FORM ELSE-WHERE WITH SAME NUMBER. * : NUMBER 1, 2, - - - - - N.	
ALARM 	USED TO INDICATE LIGHTING OR FLASHING OF ALARM LAMP WHICH MAY OR MAY NOT BE ASSOCIATED WITH SOUNDING OF THE AUDIBLE ALARM. AN IDENTIFYING LEGEND APPEARS IN THE FLOW CHART.	
INDICATOR LAMP 	⊕: INDICATES THE LAMP IS ALIGHT(STEADY). ●: INDICATES THE LAMP IS DARK. ⊖: INDICATES THE LAMP IS FLICKERING. * : LAMP COLOR. WL:WHITE, RL:RED, GL:GREEN, YL:YELLOW	
	* : EXPLANATORY NOTE AFFIXED TO EACH SYMBOL INDICATES DEVICE AND LOCATION (IN PARENTHESIS) OF THE CONTROL ETC.	

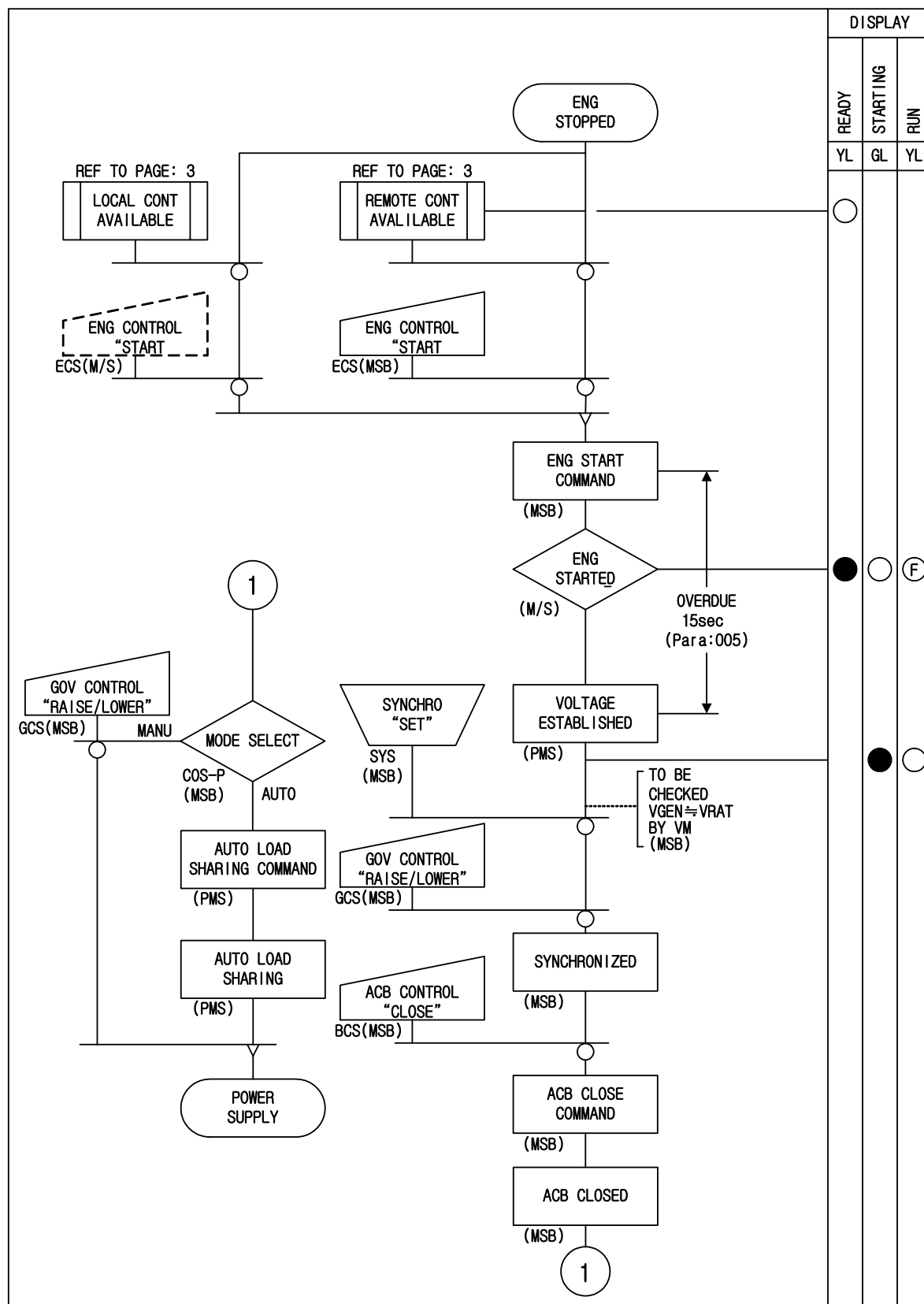
1.2 Remote control available and auto start available



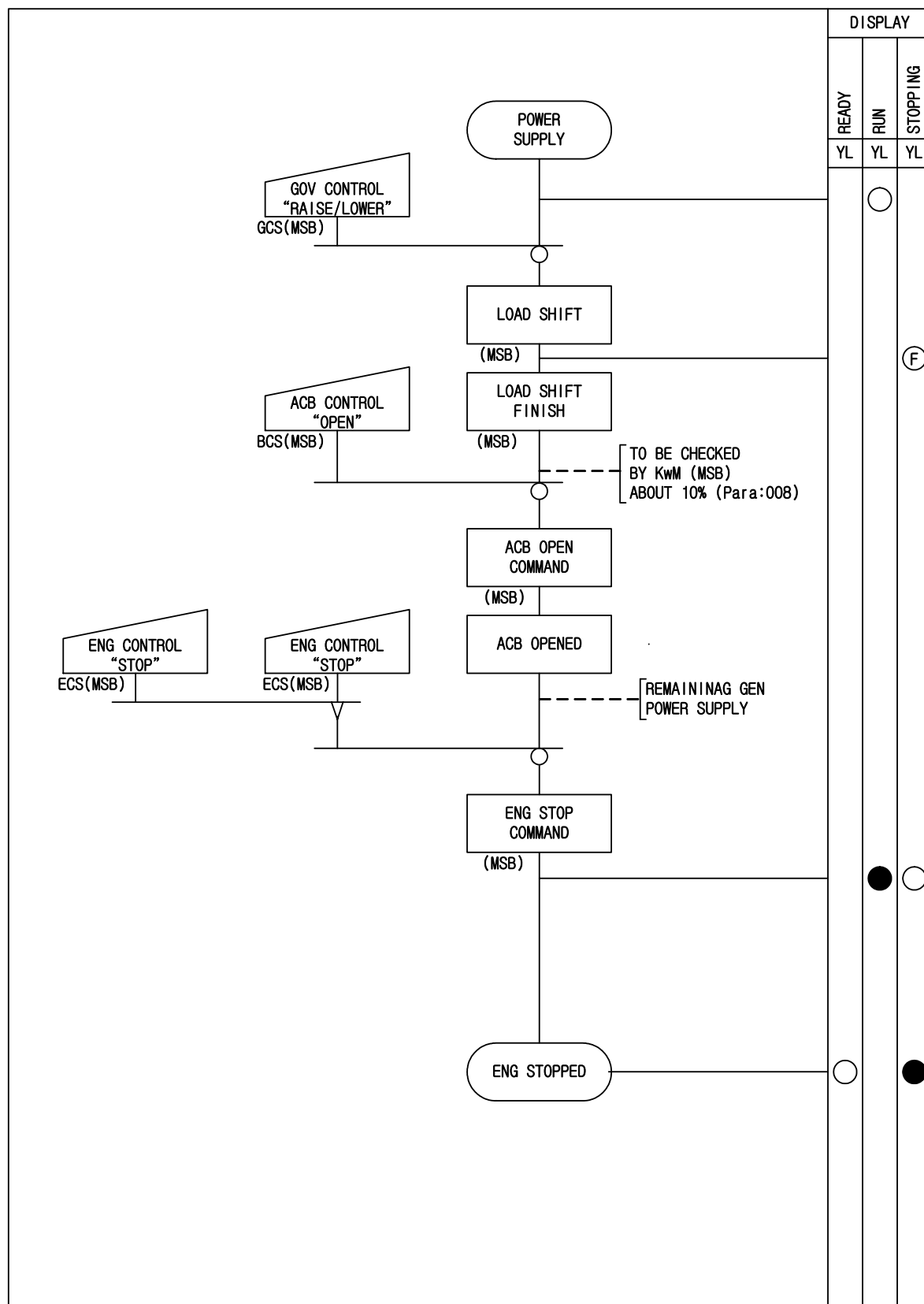
1.3 Manual start and ACB closure onto the Dead BUS



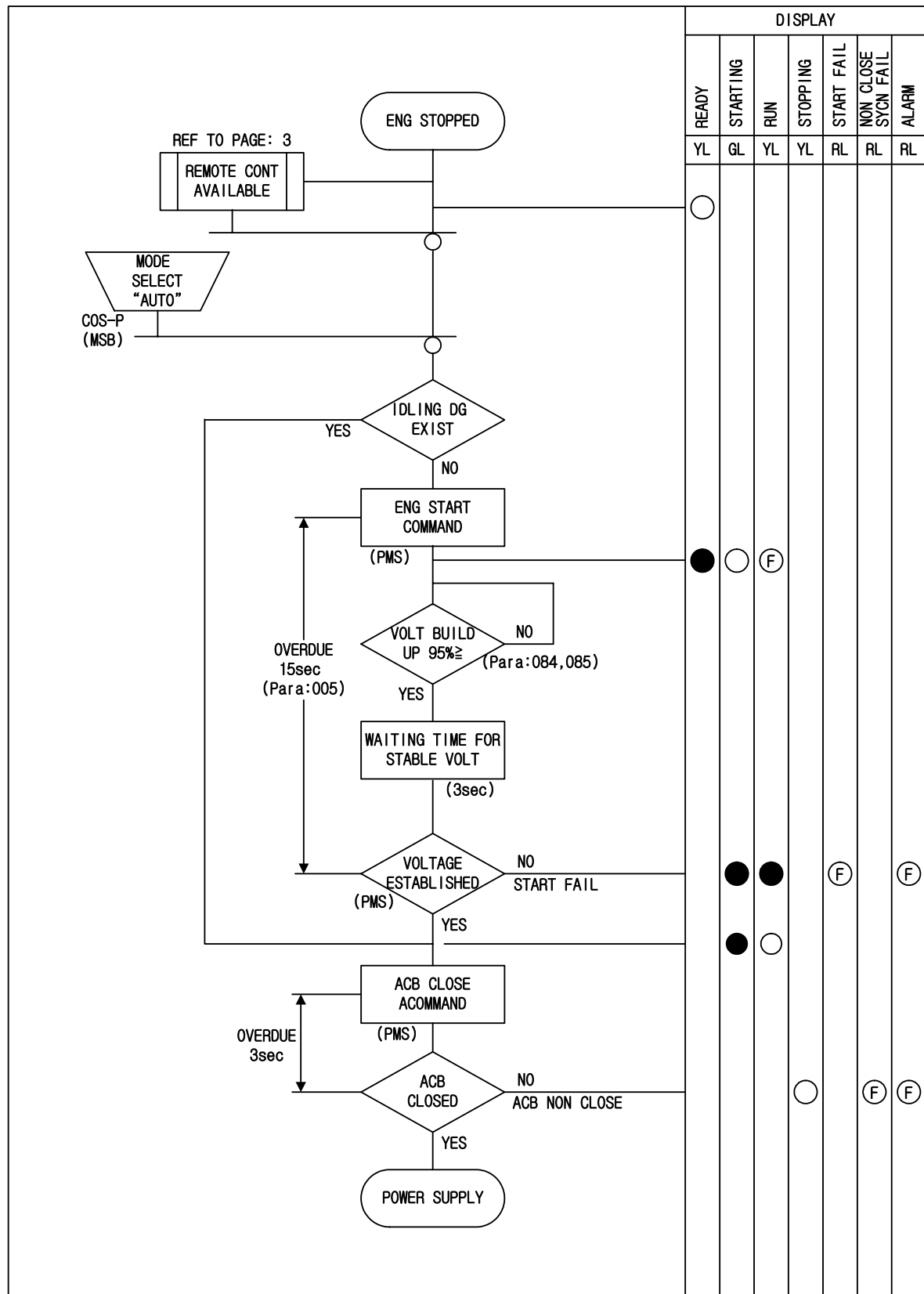
1.4 Manual start and parallel running



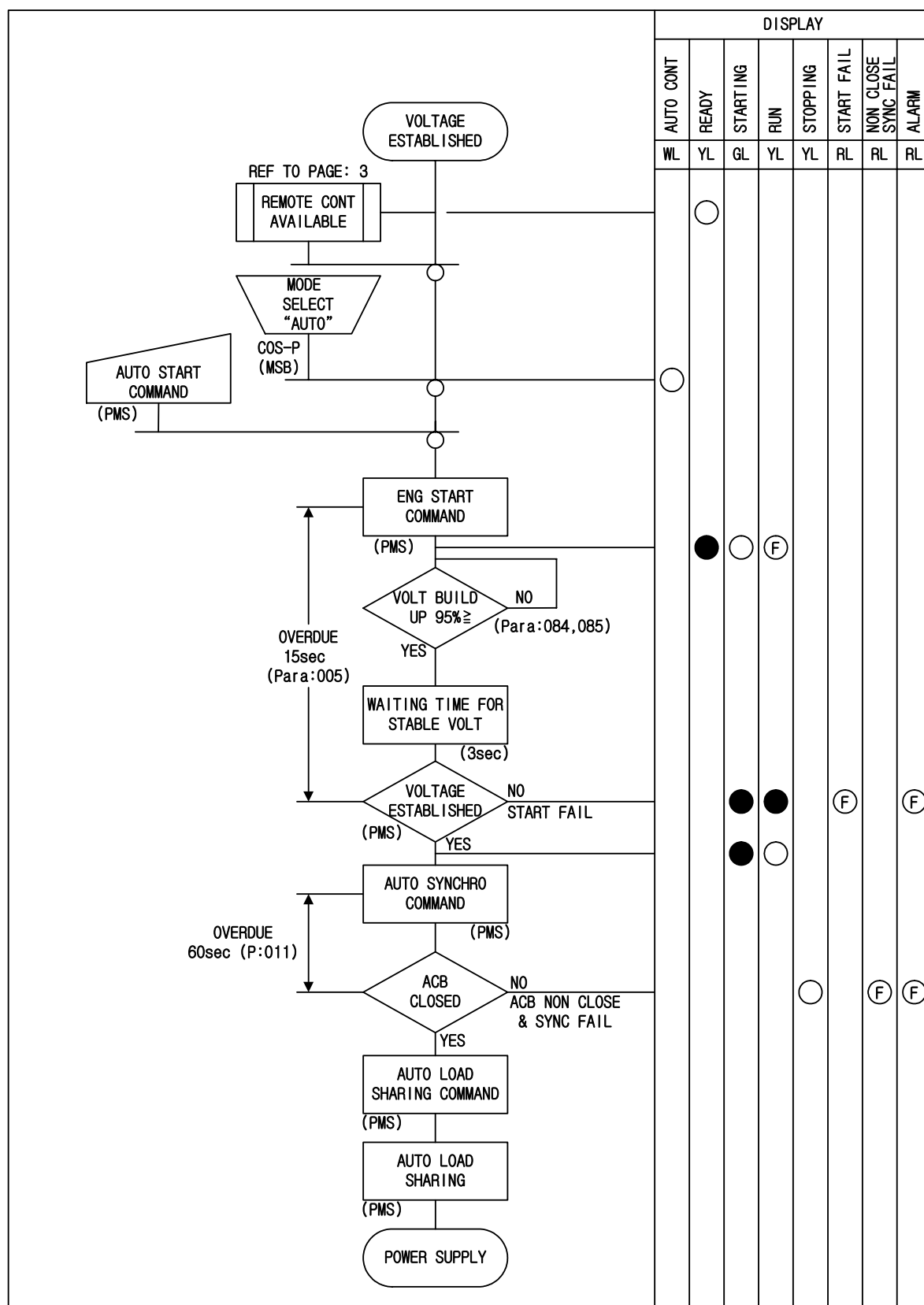
1.5 Manual Load shift and ACB disconnection



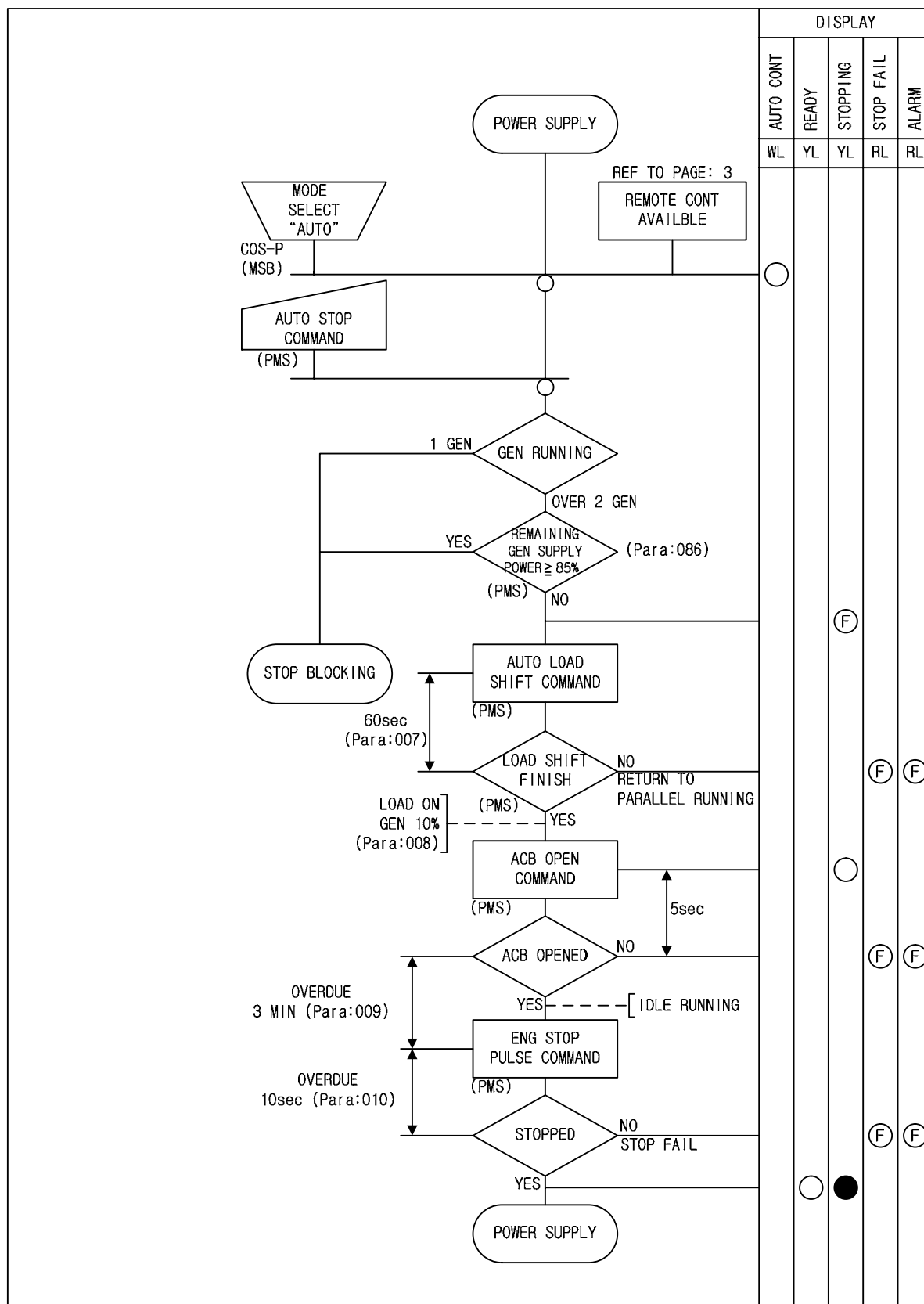
1.6 Automatic start and ACB closure onto the Dead BUS (Black Out)



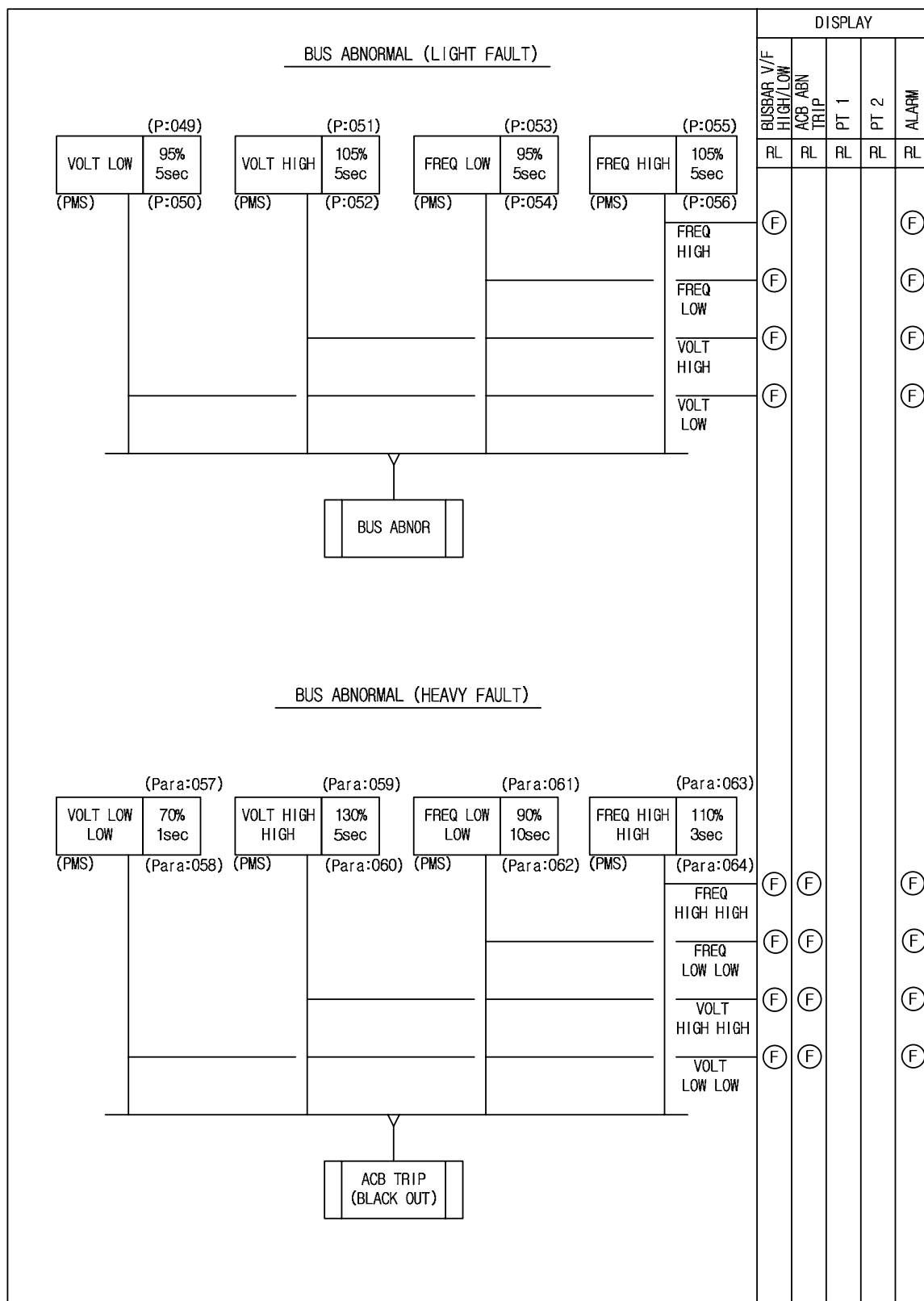
1.7 Automatic start and parallel running



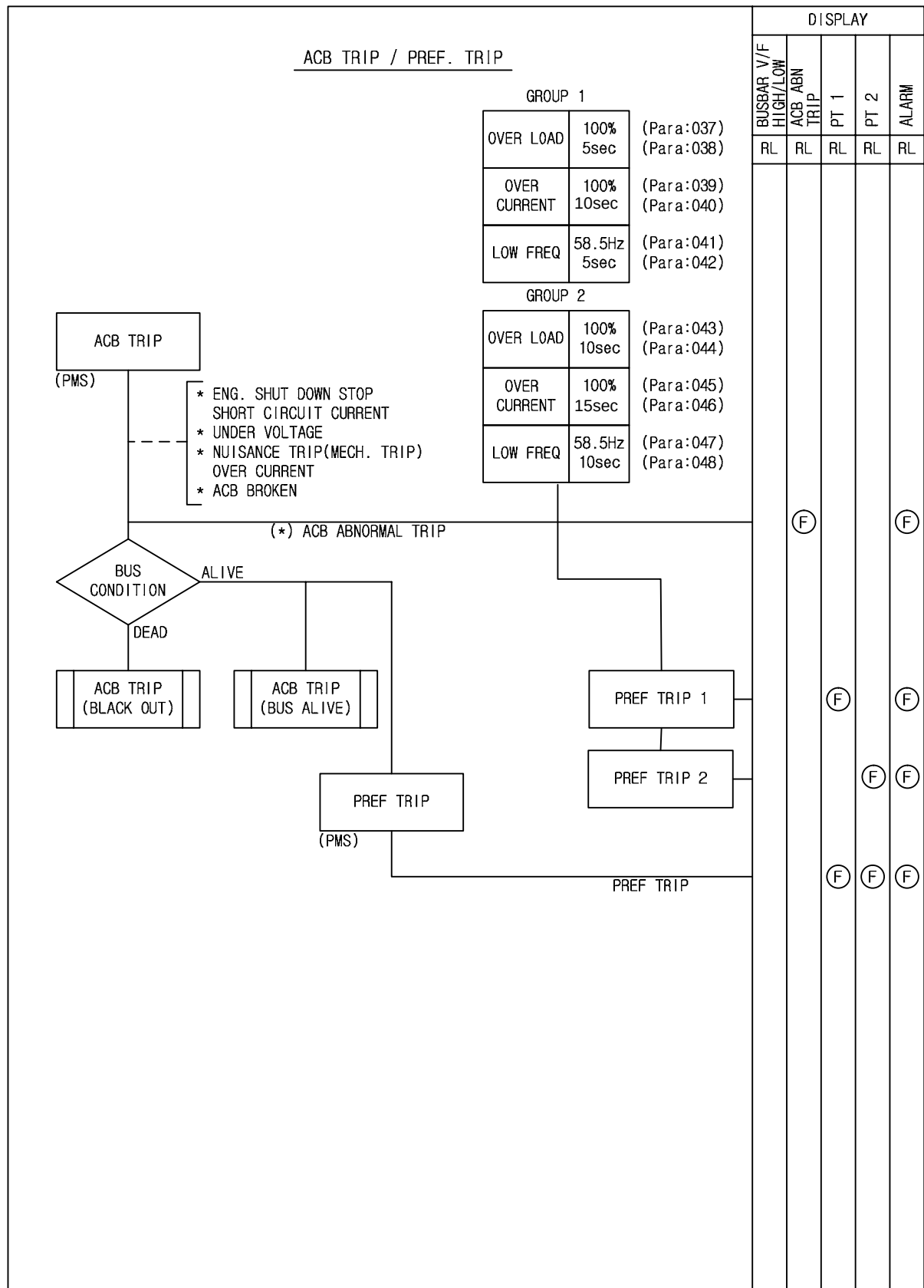
1.8 Automatic Load shift / ACB disconnection and Engine stop



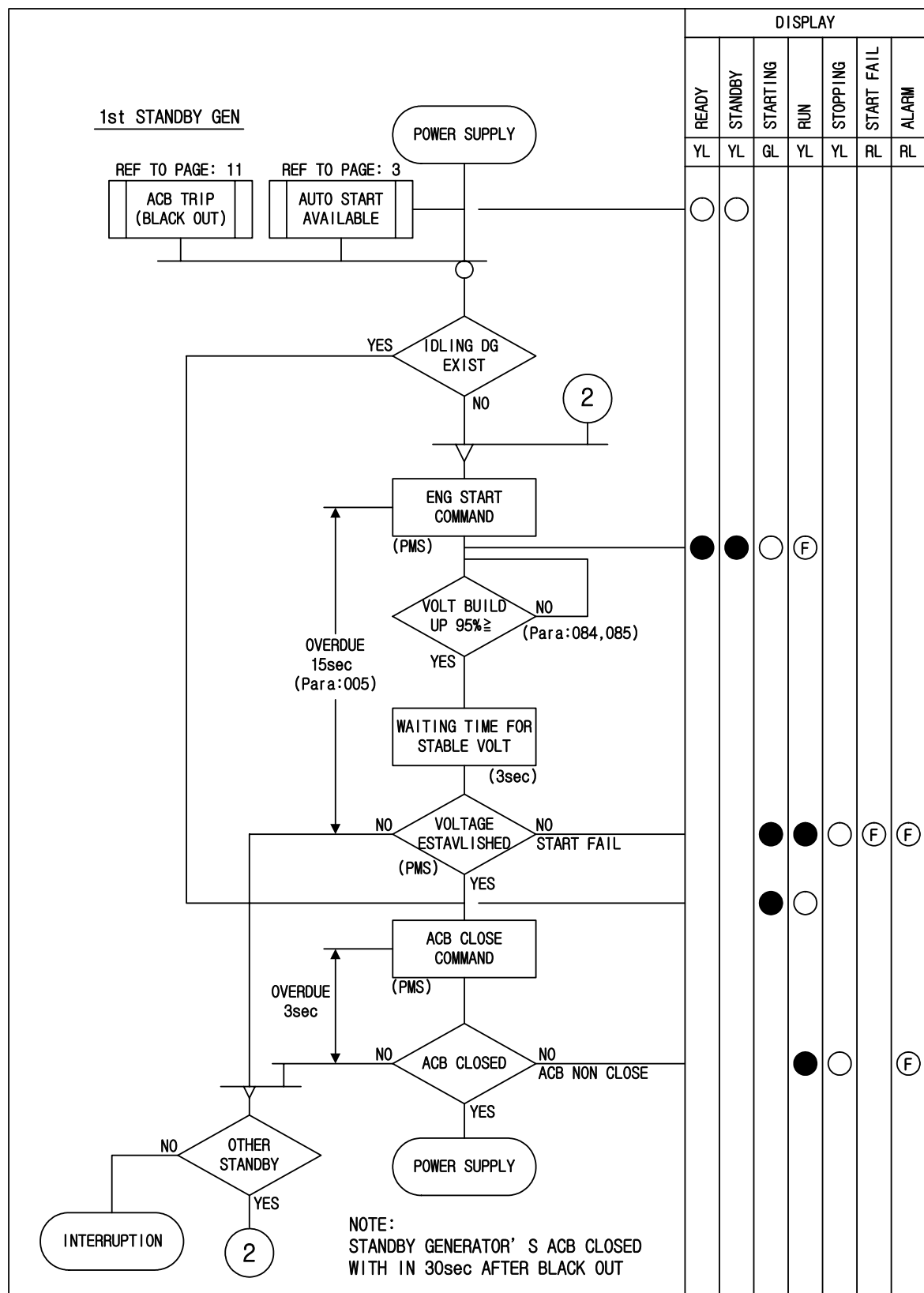
1.9 BUS Abnormal



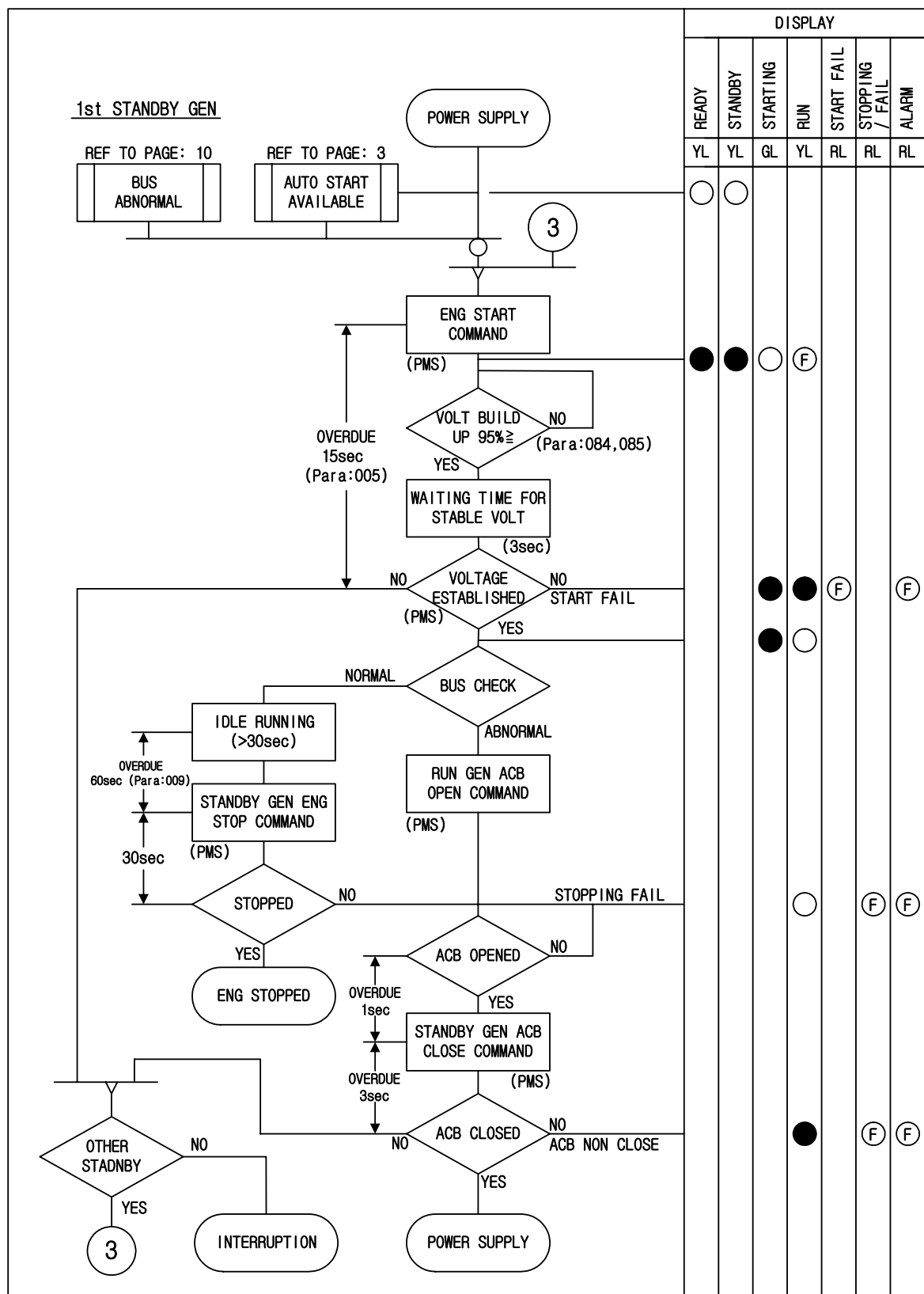
1.10 ACB Trip and Preferential Trip



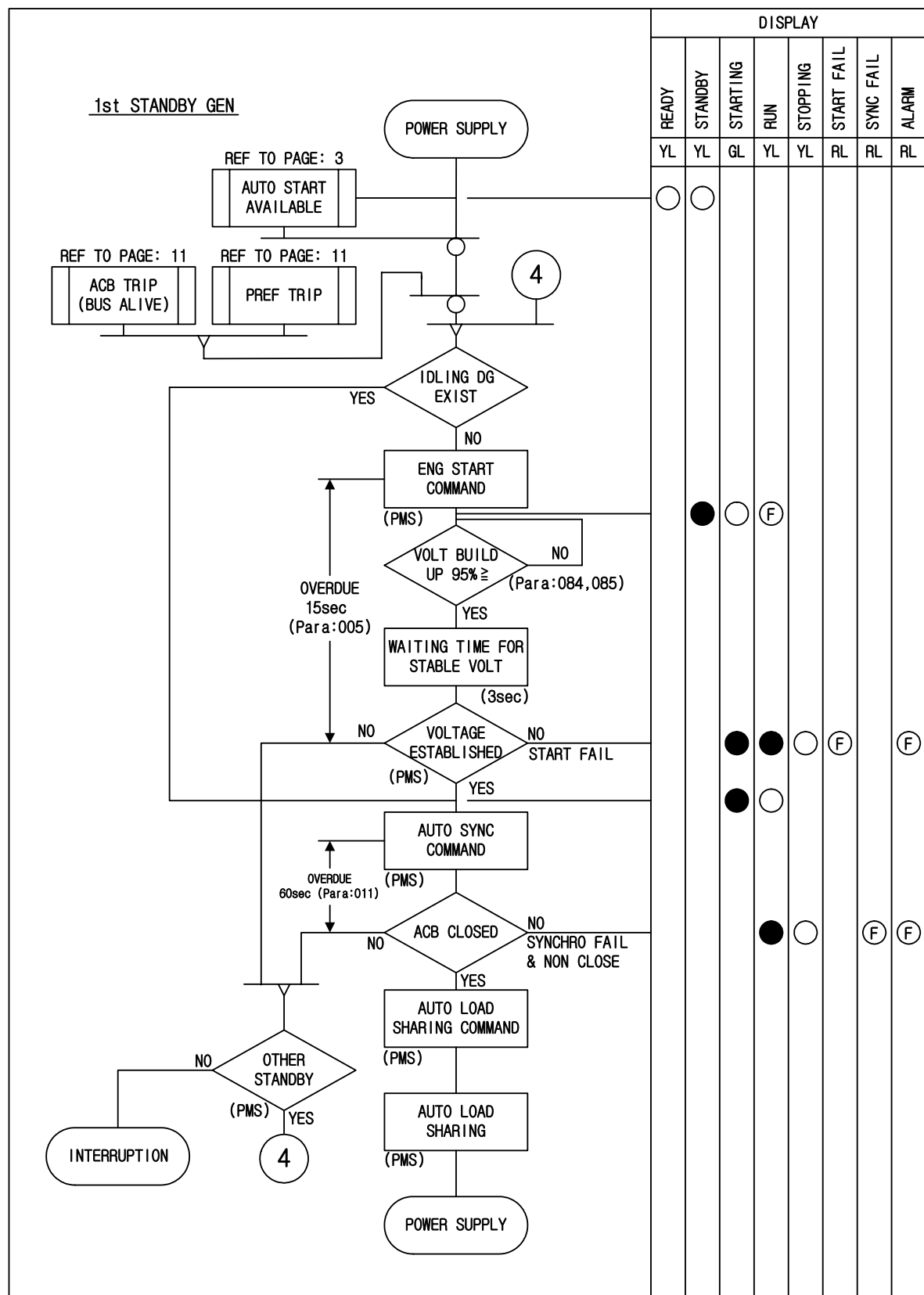
1.11 Auto and Dead BUS due to Black Out (ACB Trip, Reverse Power, Over Current)



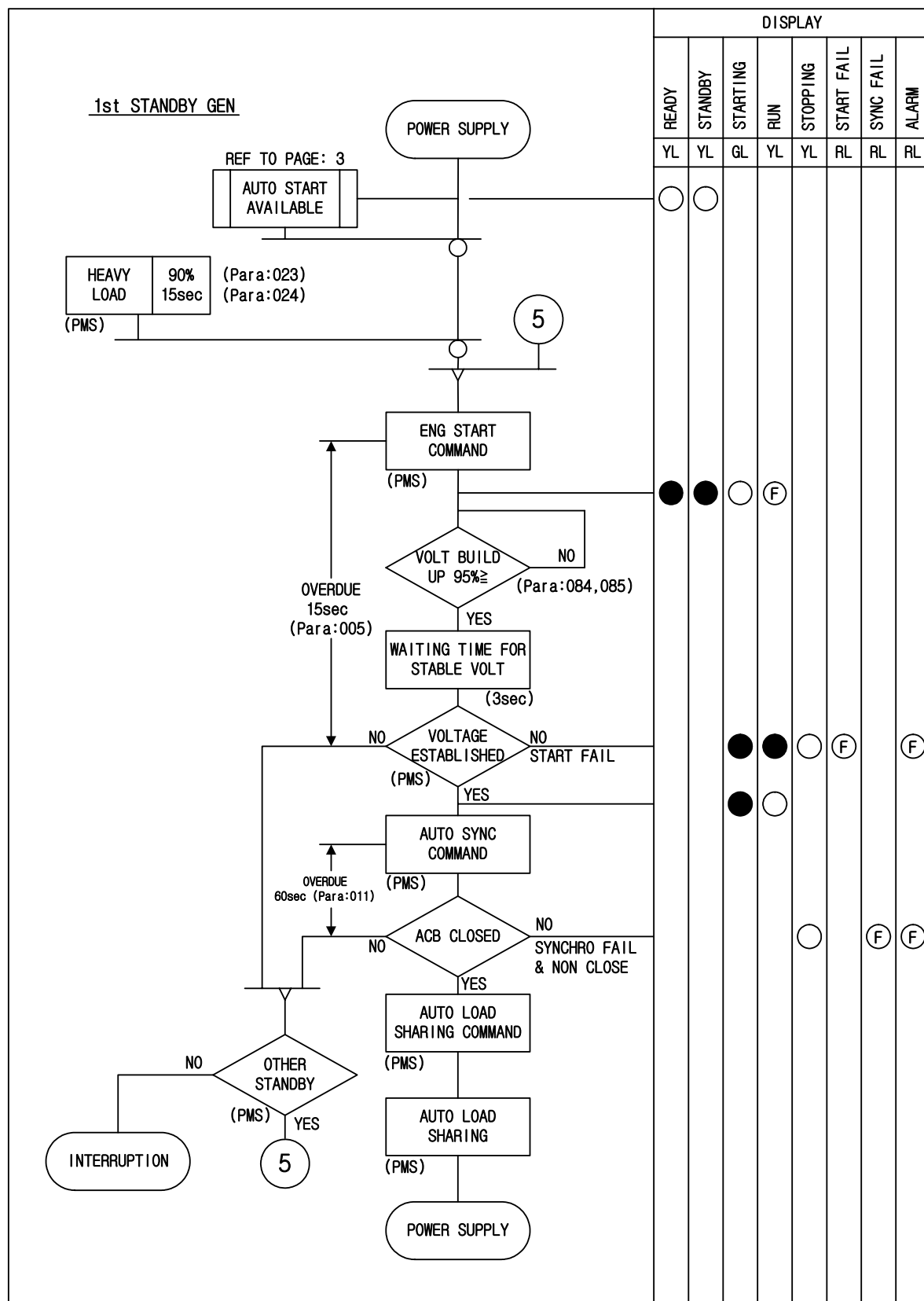
1.12 Auto start and ACB closure onto the Dead BUS via Black Out (due to BUS Abnormal)



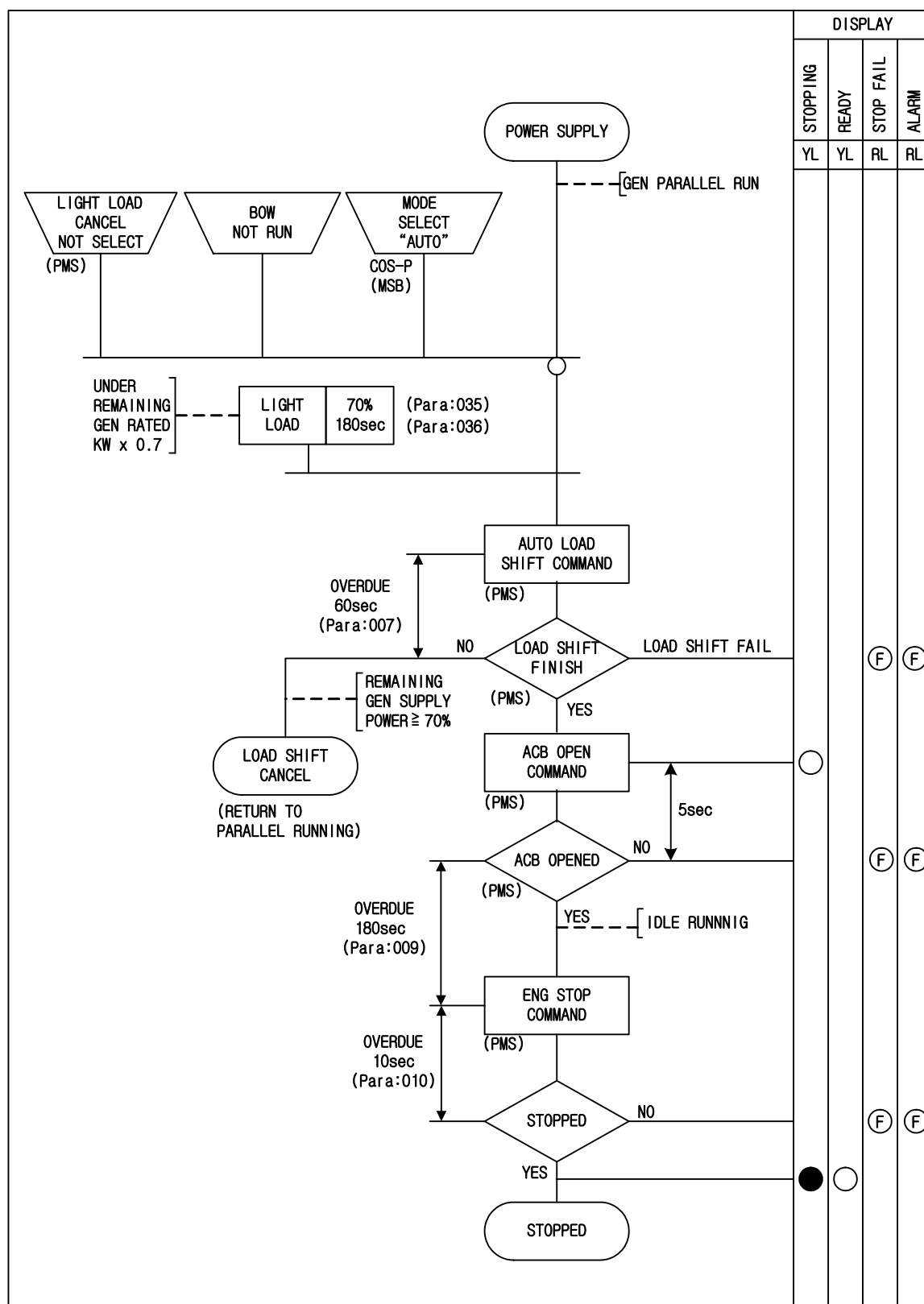
1.13 Auto start and synchronization due to ACB trip (BUS Alive) or Preferential Trip



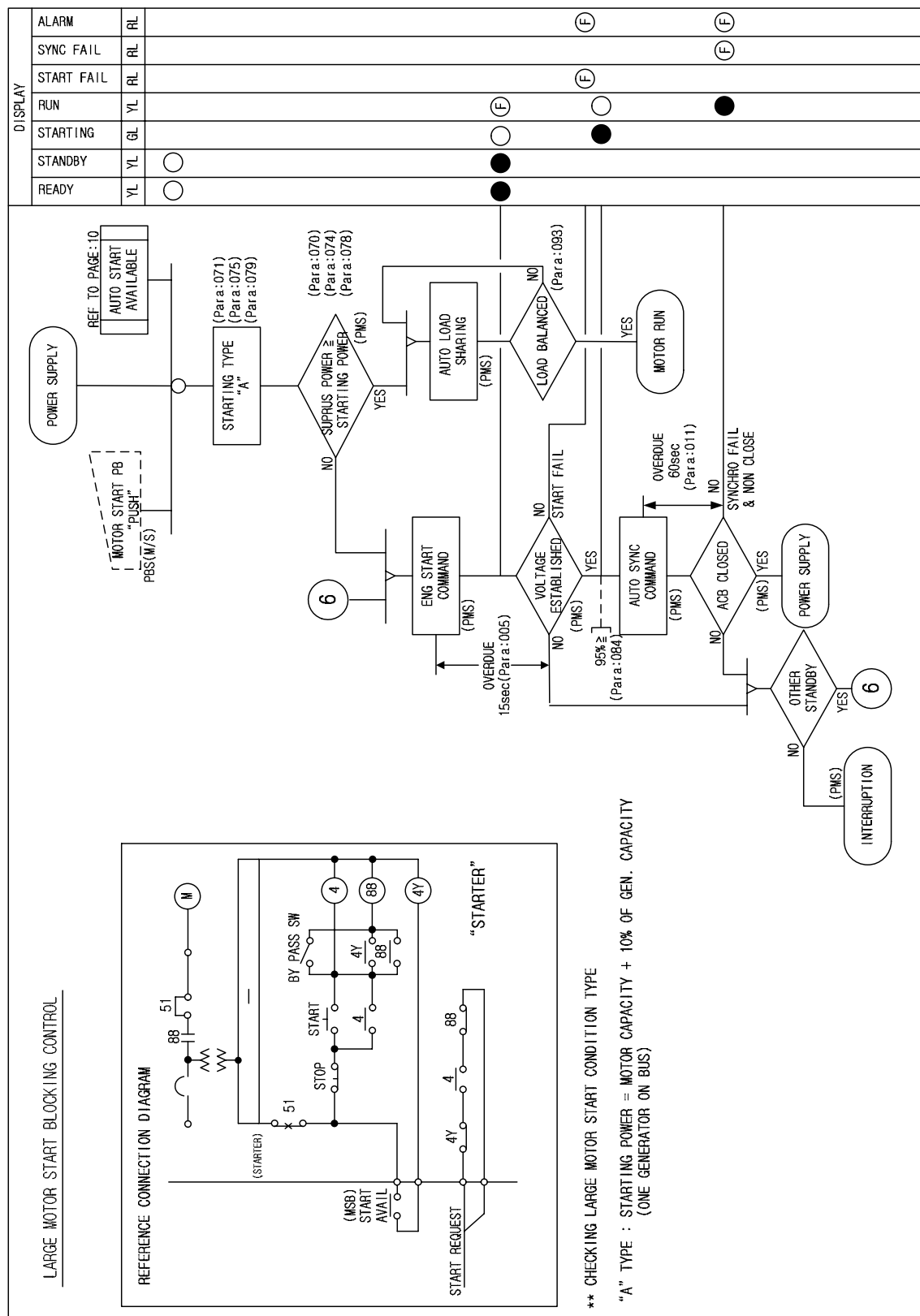
1.14 Auto starting due to Load Increase



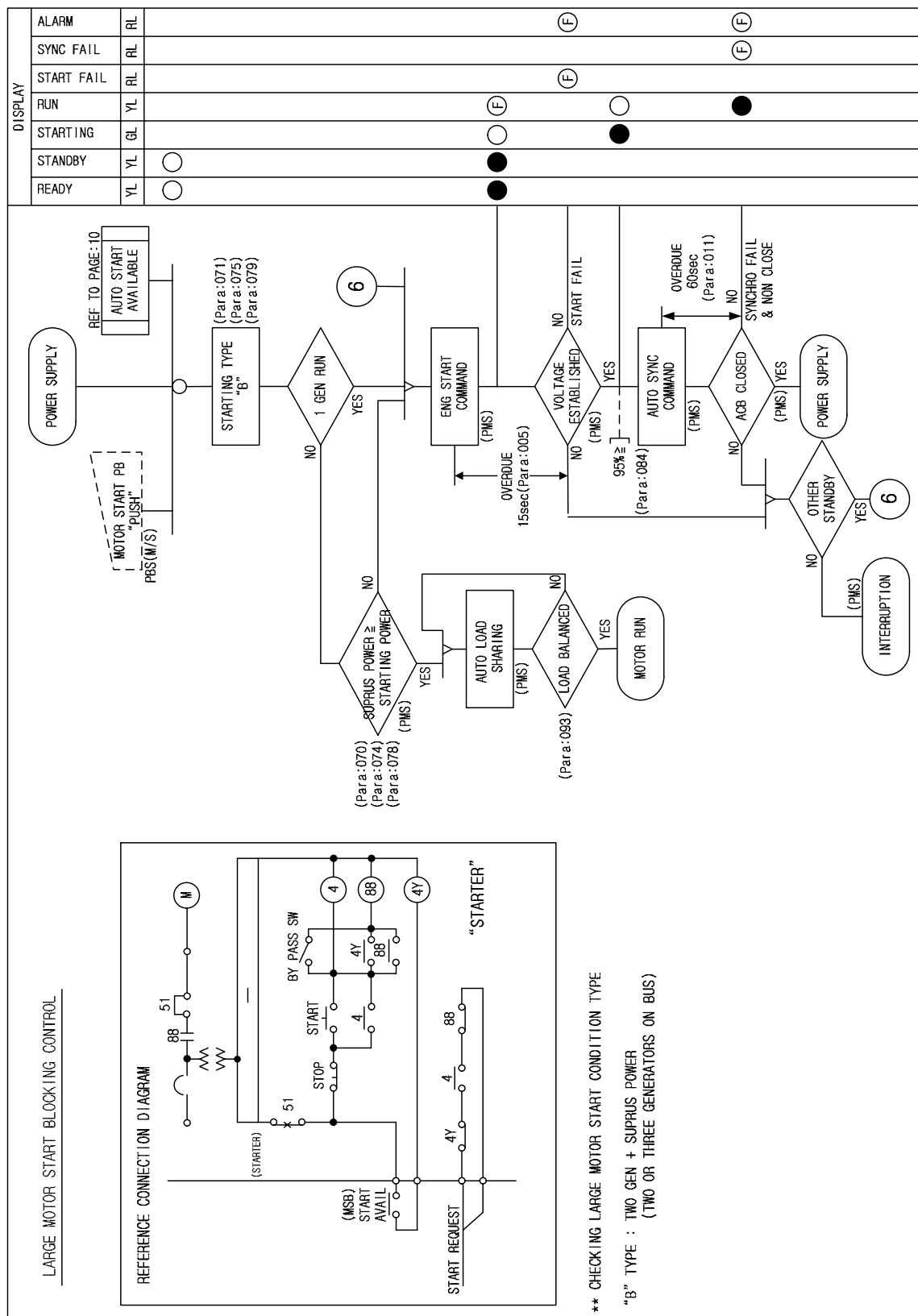
1.15 Auto stopping due to Load Decrease



1.16 Large motor starting blocking control (Type “A”)



1.17 Large motor starting blocking control (Type “B”)



1.18 ACONIS-2000® PMS Fail

