

## เอกสารแนบที่ 6 บันทึกการตรวจสอบระบบ CEMs

## Inspection Report

Subject / Title: <b>BD000166U01 SSUT 1:1 Level A-inspection 50 kEOH 2022</b> <b>Inspection report</b>	<b>Samutprakarn, Thailand</b>	<b>20 Feb 2023</b>
	Location	Date
Project: <b>SSUT</b>	<b>Somdej Arunplod</b>	
Customer Name: <b>SSUT Company Ltd</b>	Author(s)	
Orderer's File Ref: <b>E1B101139185: A</b>		
Order No Internal: <b>EA031213U01A112511</b>		
Report No Internal: <b>RTSOFL87/23</b>	Released technically	Released for external use
Classification: <b>Confidential</b>		

Codeword	:	<b>SSUT 1:1</b>
Equipment No	:	<b>BD000166U01</b>
Product Type	:	<b>SGT-800B1</b>
Mobilization Date	:	<b>2023-02-18</b>
Demobilization Date	:	<b>2023-02-20</b>
Client Contact Name	:	<b>Mr. Vithul R.</b>

### Executive Summary:

The purpose of visit was to perform A-inspection between 18-Feb-2023 to 20-Feb-2023 to perform a Level A'50-inspection according to activity list E1B101139185: A  
Compressor washing of GT unit BD000166U01 was performed before inspection. Several minor remarks were noted. Details can be found in the report.

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## Inspection Report

# 1 Summary of results

### **HG 4150 Air intake**

- Contamination found on pre-filter element.
- Moderate contamination found on ventilation filter.

### **HG 4980 Speed reduction gear**

- Observed white mark are as same as A40 inspection wheel gear.
- Observed electro discharge on left and right wheel gear.

### **HG 2640 Turbine Rotor**

- Minor oxidation around leading edge and trailing edge cooling holes of blade stage 1.

### **HG 2650 Turbine stator stage 1**

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on stage 1 heat shield.
- Minor oxidation found on stage 1 rear hooks.

### **HG 2651 Turbine stator stage 2&3**

- Minor oxidation on heat shield stage 2

### **HG2665 Outlet casing**

- Observed bellow joint have damaged all around area.

### **HG 2660 Exhaust diffuser**

- Observed indication on struts support see table below.

### **HG 2132 Insulation**

- Observed several insulation materials major damaged around fuel burner and central casing drain.

## Inspection Report

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## Inspection Report

### 2 Personnel on site

Personnel on site :	Date for the visit
Kittikun Chancharoen, Commissioning lead	230218-230220
Kittinan Witchawut, Commissioning engineer.	230218-230220
Somdej Arunplod, Quality inspector	230218-230220
Thitsanu Hirunyanadath, Mechanical TFA	230218-230220
Sorapong Lapngoen, Quality inspector OJT	230218-230220

### 3 General data / Operating statistics

Site:	SSUT 1:1	
B-number:	BD000166U01	
Project manager:	Wuttichai Pakavarangkur	
Application engineer:	Erik Gregeborg	
Activity list:	E1B101139185: A	
Owner:	SSUT Company Ltd	
Owner representative:	Mr. Vithul R.	
Order number:	4290244	
Gas turbine: Siemens	Type: SGT-800B	S/N: DD080044
Main gear:	Type: TX112/4C	S/N: 12719
Generator:	Type: AMS1250 ALK	S/N: 8269006
Configuration:	Combine cycle	
Site:	Power plant	
Fuel	Natural gas	
Operating profile:	Base load	
Compressor washing system/wash interval	Offline 10,000 hours	
Site address or GPS coordinates	13.532603, 100.651876	

Fuel:              Gas: ☒              Liquid: ☐              Dual fuel: ☐

## Inspection Report

<b>Date for counter readings:</b> 20230218	Installation
Operating hours:	47786 h
Equivalent operating hours:	50603 h
Starts:	369
Fast starts:	N/A
Equivalent operating cycles:	560 h
Total production of MWh:	1578987
Total production of MVar+:	304495
Total production of MVar-:	10

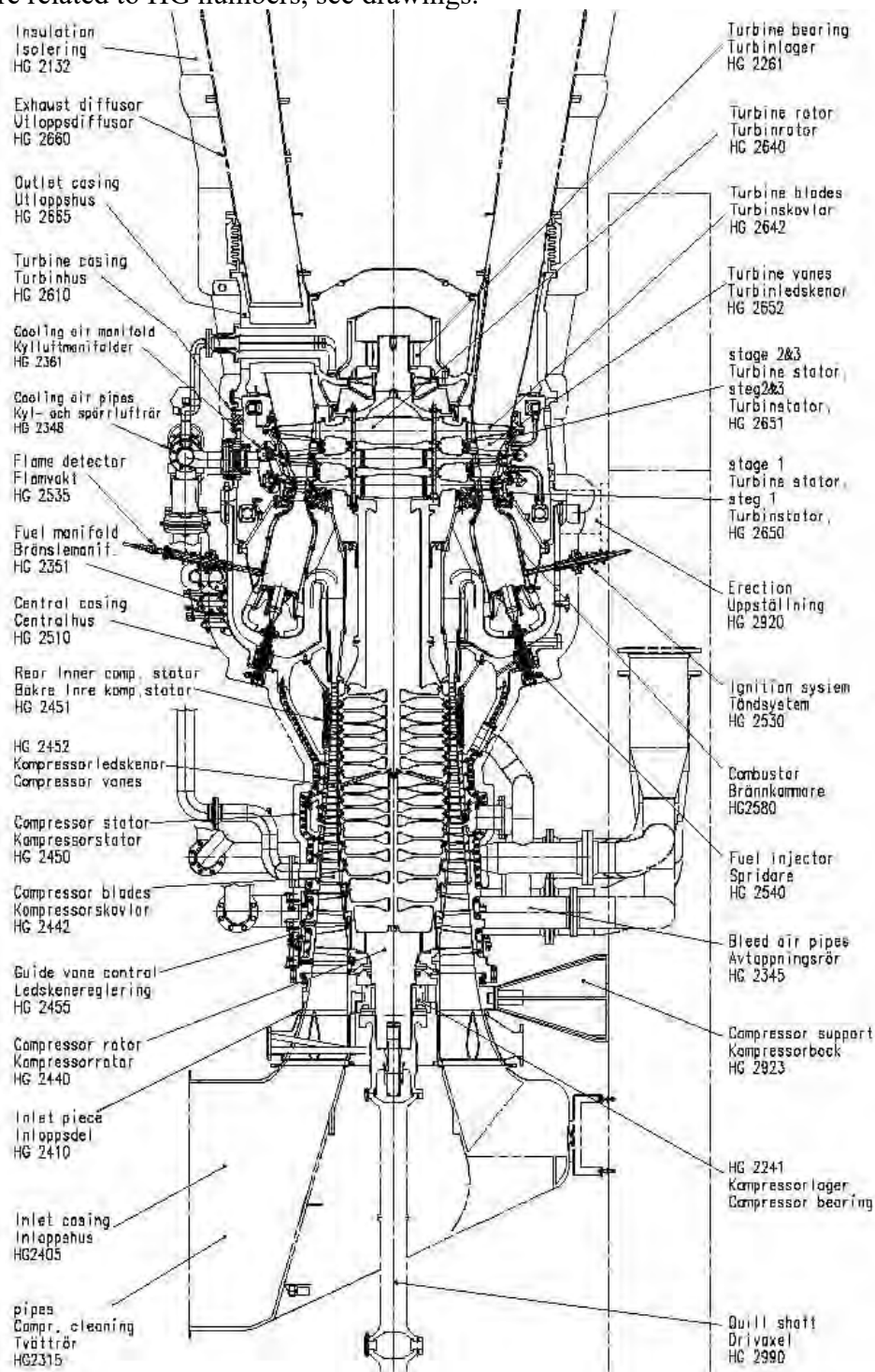
Latest inspections:

Date	Report no	Reason	Author	
2023-02-20		Level A-inspection	Somdej Arunplod	A50
2022-07-31	E1B101126828	FO to replace GV1	Krit Phunsub	
2022-06-07	E1B101067448	Borescope Insp of GV1	Somdej Arunplod	
2022-02-18	E1B101009820	Borescope Insp of GV1	Krit Phunsub	
2021-11-12	E1B100962567	Minor Inspection	Somdej Arunplod	A40

## Inspection Report

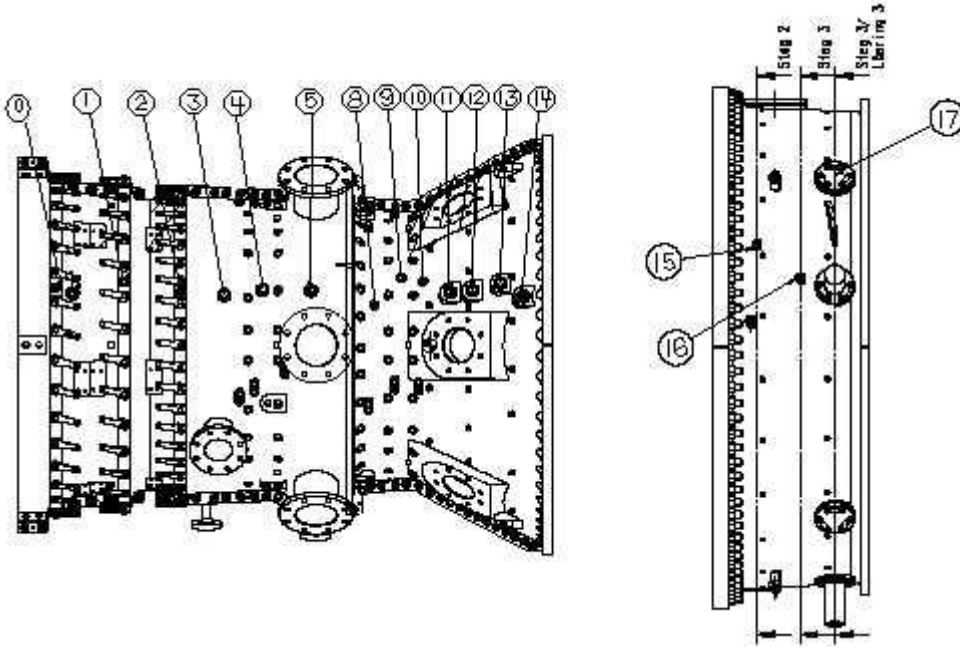
### 4 HG-list SGT-800

Activities are related to HG numbers, see drawings.



## Inspection Report

### 5 Borescope inspection SGT-800



- Plan B0 Compressor rotor stage 1, stator stage 0
- Plan B1 Compressor rotor stage 1 and 2, stator stage 1
- Plan B2 Compressor rotor stage 2 and 3, stator stage 2
- Plan B3 Compressor rotor stage 3 and 4, stator stage 3
- Plan B4 Compressor rotor stage 4 and 5, stator stage 4
- Plan B5 Compressor rotor stage 5 and 6, stator stage 5
- Plan B8 Compressor rotor stage 8 and 9, stator stage 8
- Plan B9 Compressor rotor stage 9 and 10, stator stage 9
- Plan B10 Compressor rotor stage 10 and 11, stator stage 10
- Plan B11 Compressor rotor stage 11 and 12, stator stage 11
- Plan B12 Compressor rotor stage 12 and 13, stator stage 12
- Plan B13 Compressor rotor stage 13 and 14, stator stage 13
- Plan B14 Compressor rotor stage 14 and 15, stator stage 14
- Plan B15 Turbine rotor stage 1 and 2, stator stage 2
- Plan B16 Turbine rotor stage 2 and 3, stator stage 3
- Plan B17 Turbine rotor stage 3, stator stage 3

## Inspection Report

# 6 Inspection activities

## 6.1 Planned inspection.

### 6.1.1 Activities according to maintenance plan

5				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	/Air intake system/MBL	Visual inspection in air intake housing, ducting, silencer, and plenum. Check for obstructions, cleanliness, leakages and for foreign objects. Check flanges, inspection hatches, sealings and gaskets.		Performed
2	/Air intake system/MBL	Visual inspection of filters for obstruction and contamination.		Performed
3	2132/Insulation/	Visual inspection.		Performed
4	2351/Fuel manifold/	Visual external inspection.		Performed
5	2405/Compressor air inlet casing/	Visual inspection.		Performed
6	2410/Inlet Piece/	Visual inspection.		Performed
7	2442/Compressor blades/	Borescope inspection of compressor blades stages 5, 11 and 14.	Compressor blades	Performed
8	2442/Compressor blades/	Borescope inspection of compressor blades stage 4.	Compressor blades	Performed
9	2452/Compressor vanes/	Borescope inspection of compressor vanes stages 5, 11 and 14.	Compressor vanes	Performed
10	2452/Compressor vanes/	Borescope inspection of compressor vanes stage 4.	Compressor vanes	Performed
11	2530/Ignition system/	Visual inspection.		Performed
12	2535/Flame detector/	Visual inspection.		Performed
13	2540/Burner/	Borescope inspection of 1 (RMI, #15) or 4 (MI, equal distr.) burners		Performed
14	2580/Combustor/MBM	Borescope inspection.		Performed
15	2610/Turbine casing/	Visual inspection.		Performed
16	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1.		Performed
17	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1 outer vane plate.		Performed
18	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1 inner vane plate.		Performed
19	2650/Turbine guide vanes/	Borescope inspection of guide vane 2.	Turbine stator 2 - GV2	Performed
20	2650/Turbine stator, stage 1/	Borescope inspection turbine heat shield 1.		Performed
21	2640/Turbine rotor (incl. Blades)/	Borescope inspection of turbine blades stage 1		Performed

### Inspection Report

5				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
22	2640/Turbine rotor (incl. Blades)/	Borescope inspection of turbine blades stage 2.		Performed
23	2665/Outlet casing/	Internal visual inspection of outlet casing.		Performed
24	2665/Exhaust casing/	Visual inspection of outlet bellow.		Performed
25	2920, 2925/Assembly material/Erection exhaust diffusor at site/	Visual inspection of the supports.	Support stands	Performed

7				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	4980, 4995/Main gear/Alignment instruction/	Visual inspection of tooth mesh through inspection cover. Main gear.	MBK10AZ005	Performed

### 6.1.2 Activities outside maintenance plan

9				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	/Gear system/MBK	Continue to monitor flex coupling flex plate bundle condition during next inspection.	Acc to Inspection Report E1B100962567	Performed
2	/Gear system/MBK	Continue to monitor for the progression of the white marks pattern on wheel gear.	Acc to Inspection Report E1B100962567	Performed
5	/Gas fuel system. General/MBP	PSW/SGT-800/18-004 Safety Warning of the gas fuel flexible hoses installed on all medium gas turbines		Performed
6	2650/Turbine guide vanes/	PAB/SGT-800/22-001 TGV1 oxidation: extended RMI/MI Inspection		Performed
8	/Air intake/	PSW/SGT-800/18-001 New hatch holder in Air Intake		Performed



## Inspection Report

# 7 Inspection result

## 7.1 HG 4150 Air intake system

### Performed work:

- Visual Inspection

### Result:

- Contamination found on pre-filter element.
- Moderate contamination found on ventilation filter.



Intake filter housing overall condition.

## Inspection Report



Algae cover inlet filter housing condition.



Internal wall condition on silencer ducting unit.



Silencer unit intake side overall condition.



Silencer unit intake side close up condition.



Intake inside overall condition.



Close up on silencer unit flat bars weld joint condition.



## Inspection Report



Inside intake filter housing overall condition.



Pre-filter element as found condition.



Fine filter as found condition.



Intake side of fine filter as found condition.



Installed fine filter CamGT 3V-600-E12 Std.



Drain port condition on walk way.

## Inspection Report



Intake door seal overall condition.



Intake door push open mechanism good condition.



E12 fine filter as found condition.



Another view fine filter condition.



Intake filter drain port.



Intake filter drain port.

## Inspection Report



Clean air exit to enclosure ventilation unit.



Ventilation filter floor condition.



Ventilation filter elements fouling condition.



Ventilation silencer exit to enclosure.

### **Recommendation:**

- Clean intake filter housing intake louvers and ventilation filter housing intake louvers when replace filters.
- Clean floor inside intake filter housing when replace filters.
- Clean ventilation filter housing floor.
- Open mechanism needs to apply prevent rust with lubricant.

**Air Intake system is in serviceable condition.**

## Inspection Report

### 7.2 HG 4981 Starting gear

#### Performed work:

- Visual inspection

#### Result:

- No remark.



Starter motor overall condition.



Flexible coupling overall condition.



Flex plate bundle condition on starter motor side.



Flex plate bundle condition on gearbox side.

#### Recommendation:

- Continue to monitor flex coupling flex plate bundle condition during next inspection.

**Starter motor system is in serviceable condition.**



## Inspection Report

### 7.3 HG 4980 Speed reduction gear

#### Performed work:

- Visual inspection and Borescope inspection.

#### Result:

- Observed white mark are as same as A40 inspection wheel gear.
- Observed electro discharge on left and right wheel gear.



ETD overall condition.



Gearbox casing overall condition generator side.



Gearbox casing overall condition startor motor side.



Wheel gear condition found white mark

## Inspection Report



Pinion cogs condition.



Jacking oil hose condition.



Original marks are same position on wheel gear.



White mark 3.0 cm at left side on left wheel.



White mark 5.0 cm at right side on right wheel.

## Inspection Report



Electro discharge 15 cm at right side on right wheel and follow up location at next inspection.



Electro discharge 15 cm at left side on left wheel and follow up location at next inspection.

### **Recommendation:**

- Continue to monitor for the progression of the white marks pattern on wheel gear.
- Continue to monitor for the progression of the elector discharge pattern on wheel gear.

**Speed reduction gear system is in serviceable condition.**

## Inspection Report

### 7.4 HG 2405 Compressor inlet casing

**Performed work:**

- Visual inspection

**Result:**

- No remark.



Inlet casing external condition left side.



Inlet casing external condition right side.



Compressor wash supply piping overall condition.



Compressor wash supply hose manifold condition.



Inlet casing drain good condition.



Minor dirt found left over on the floor of inlet casing.



## Inspection Report



Compressor washing nozzle overall condition.

### **Recommendation:**

- None

**The Compressor inlet casing is in serviceable condition.**

## Inspection Report

### 7.5 HG 2410 Compressor inlet piece

#### Performed work:

- Visual inspection

#### Result:

- Observed lube oil leakage under right junction box.



Inlet piece external condition left side.



Inlet piece external condition right side.



Jacking oil to bearing 1 overall condition.

## Inspection Report



Overall condition of struts around inlet piece.



As found condition of struts around inlet piece.



Clean the inlet piece by hand before startup.



As found condition of struts around inlet piece.



Clean the inlet piece by hand before startup.

## Inspection Report



As found condition of struts around inlet piece.



Clean the inlet piece by hand before startup.

### **Recommendation:**

- It is recommended to clean the inlet piece by hand before startup.

**The Compressor inlet piece is in serviceable condition.**

## Inspection Report

### 7.6 HG 2320 Drainpipes

**Performed work:**

- Visual inspection

**Result:**

- No remark



Drain valves overall condition.



CC casing drain port as found condition (No leakage)

**Recommendation:**

- Re-tighten during routine maintenance.

**The drainpipes are in serviceable condition.**

## Inspection Report

### 7.7 HG 2455 Guide vane control

**Performed work: -**

- Visual inspection

**Result:**

- No remark.



GV Actuator support bracket overall condition.



GV Actuator rod overall condition.



GV actuator mechanism overall condition left side.



GV actuator mechanism overall condition right side.

**Recommendation:**

- None

**The guide vane control system is in serviceable condition.**

## Inspection Report

### 7.8 HG 2440 Compressor rotor

#### Performed work:

- Borescope inspection of rotor stage 3, 5, 11 and 14

#### Result:

- No remark.



Compressor rotor stage 3 condition.



Compressor rotor stage 5 condition.



Compressor rotor stage 11 condition.



Compressor rotor stage 14 condition.

#### Recommendation:

- None

**The Compressor Rotor is in serviceable condition.**



## Inspection Report

### 7.9 HG 2442 Compressor blade

#### Performed work:

- Borescope inspection of rotor stage 3, 5, 11 and 14

#### Result:

- No remark.



Compressor blades stage 3 condition.



Compressor blades stage 5 condition.



Compressor blades stage 11 condition.



Compressor blades stage 14 condition.

#### Recommendation:

- None

**The Compressor blades are in serviceable condition.**



## Inspection Report

### 7.10 HG 2450 Compressor stator

#### Performed work:

- Borescope inspection of rotor stage 3, 5, 11 and 14

#### Result:

- No remark.



Abradable seal stage 3 condition.



Abradable seal stage 5 condition.



Abradable seal stage 11 condition.



Abradable seal stage 14 condition.

#### Recommendation:

- None

**The Compressor stators are in serviceable condition.**

## Inspection Report

### 7.11 HG 2452 Compressor vanes

#### Performed work:

- Borescope inspection of rotor stage 3, 5, 11 and 14

#### Result:

- No remark



Compressor Inlet guide vanes stage 0.



Compressor guide vanes stage 3



Compressor guide vanes stage 5



Compressor guide vanes stage 11



Compressor guide vanes stage 14.

#### Recommendation:

- None

## Inspection Report

The Compressor guide vanes are in serviceable condition.

### 7.12 HG 2580 Combustor

#### Performed work:

- Borescope inspection

#### Result:

- No remark.



Front panel with burners from burner#1.



Front panel with burners from burner#7.



Front panel with burners from burner#15.



Front panel with burners from burner#22.

## Inspection Report



Overall coating condition inside combustor

### **Recommendation:**

- None

**The Combustor is in serviceable condition.**

## **7.13 HG 2540 Fuel burner**

### **Performed work:**

- Visual inspection burner #1, #7, #15 and #22

### **Result:**

- No remark.



Dismantled burner#1 overall condition.



Burner#1 S/N BI2019 158477

## Inspection Report



Gas fuel wings and pilot fuel pipe overall condition.



Mixing chamber overall condition.



No yellow powder deposit in main gas fuel.



Outer bellow condition.



TBC coating condition.



Dismantled burner#7 overall condition.



## Inspection Report



Burner#7 S/N BI2019 15863



Gas fuel wings and pilot fuel pipe overall condition.



Mixing chamber overall condition.



No yellow powder deposit in main gas fuel.



Outer bellow condition.



TBC coating condition.

## Inspection Report



Dismantled burner#15 overall condition.



Burner#15 S/N BI2019 15865



Gas fuel wings and pilot fuel pipe overall condition.



Mixing chamber overall condition.



No yellow powder deposit in main gas fuel.



Outer bellow condition.

## Inspection Report



TBC coating condition.



Dismantled burner#22 overall condition.



Burner#22 S/N BI2019 15864



Gas fuel wings and pilot fuel pipe overall condition



Mixing chamber overall condition.



No yellow powder deposit in main gas fuel.



## Inspection Report



Outer bellow condition.



TBC coating condition.

### **Recommendation:**

- None.

**The fuel burners are in serviceable condition.**

## Inspection Report

### 7.14 HG 2535 Flame detector

#### Performed work:

- Visual inspection

#### Result:

- No remark.



Flame detector on the left-side overall condition.



Flame detector on the right-side overall condition.

#### Recommendation:

- None

**The flame detectors are in serviceable condition.**

## Inspection Report

### 7.15 HG 2530 Ignition system

**Performed work:**

- Visual inspection

**Result:**

- No remark.



Ignition plug external condition.

**Recommendation:**

- None.

**The ignition system is in serviceable condition.**

## Inspection Report

### 7.16 HG 2351 Fuel manifold

#### Performed work:

- Visual inspection

#### Result:

- No remark.



Manifold ring supply to burners overall condition.



Fuel manifolds pipe connecting overall condition

#### Recommendation:

- None

**The fuel manifold is in serviceable condition.**

## Inspection Report

### 7.17 HG 2510 Central casing

**Performed work:**

- Visual inspection

**Result:**

- No remark.



Overall condition of central casing.

**Recommendation:**

- None.

**The central casing is in serviceable condition.**

## Inspection Report

### 7.18 HG 2640 Turbine rotor

#### Performed work:

- Borescope inspection.

#### Result:

- Minor oxidation around leading edge and trailing edge cooling holes of blade stage 1.



TB blades 1 leading edge overall condition.



Blades 1 trailing edge cooling passage and platform.



Turbine blades 2 leading edge condition.



Turbine blades 2 trailing edge cooling passages.



Condition leading edge tip blades 3.



Condition leading edge platform blade 3.



## Inspection Report



Blades 3 trailing edge overall condition.



Blade 3 tip with honeycomb condition.

### **Recommendation:**

- None.

**The turbine rotor is in serviceable condition.**

## Inspection Report

### 7.19 HG 2650 Turbine stator stage no 1

#### Performed work:

- Borescope inspection

#### Result:

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on stage 1 heat shield.
- Minor oxidation found on stage 1 rear hooks.



GV1 segment found good condition.



Inner/Outer vane plate condition.



GV1 as found condition at burner position 15



Inner/Outer vane plate condition at burner position 15.

## Inspection Report



Heatsheld stage 1 overall condition.



Heatshield stage 1 overall condition and seal strip



Rear hooks and heatshields condition.



Another view rear hooks and heatshields condition.

### **Recommendation:**

- None

**The turbine stator stage 1 is in serviceable condition.**

## Inspection Report

### 7.20 HG 2651 Turbine stator stage no 2&3

#### Performed work:

- Borescope inspection.

#### Result:

- Minor oxidation on heat shield stage 2



GV2 seen segments condition.



Stage2 heatshields condition.



Stage2 rear hook condition.

## Inspection Report



Stage 3 leading edge overall condition.



Stage 3 heatshield honeycomb overall condition.

### **Recommendation:**

- None

**The turbine stator stage 2&3 are in serviceable condition.**

## Inspection Report

### 7.21 HG 2665 Outlet casing

#### Performed work:

- Visual inspection

#### Result:

- Found below joint have damaged some area.



Vibration sensor to bearing 2 overall conditions.



Outlets bellow overall condition.



Bellow condition right bottom view condition



#### Recommendation:

- Prepare vendor for repair bellow joint at next major inspection.

**The outlet casing is in serviceable condition.**



## Inspection Report

### 7.22 HG 2660 Exhaust diffuser

#### Performed work:

- Visual inspection.

#### Result:

- Cracks observed at multiple positions described in table below.



Exhaust diffuser wall overall condition.



All Bolts on inner cone are good condition.



Bleed pipe right hole condition



Bleed pipe left hole condition.

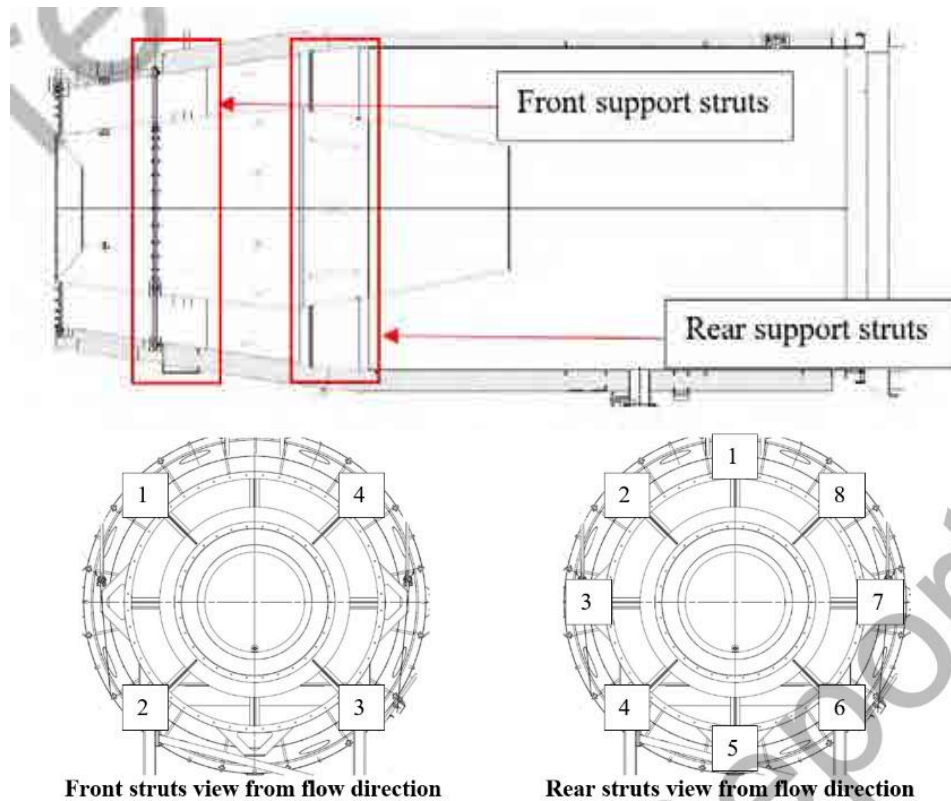


Example of crack at front support struts.



Example of crack at front support struts.

## Inspection Report



Position	Leading edge outer weld	Trailing edge outer weld	Leading edge inner weld	Trailing edge Inner weld
1	Crack			
2	Crack			
3				
4	Crack			

Table of front support struts with cracks in the weld.

Position	Leading edge outer weld	Trailing edge outer weld	Leading edge inner weld	Trailing edge Inner weld
1				
2				
3				
4				
5				
6				
7				
8				

Table of rear support struts with cracks in the weld.

### Recommendation:

- Repair crack at front struts support next major inspection, according to table above.

**The exhaust diffuser is in serviceable condition.**

## Inspection Report

### 7.23 HG 2132 Insulation

#### Performed work:

- Visual inspection

#### Result:

- Observed several insulation materials major damaged around fuel burner.



Insulation left side condition compressor area.



Insulation right side condition compressor area.



Condition of insulation on bleed pipe.



Condition of insulation on bleed pipe.

#### Recommendation:

- Next major inspection, please prepare vendor to repair some insulation pieces.

**The insulation is in serviceable condition.**

## Inspection Report

### 7.24 HG 2920 Skid erection, GT

#### Performed work:

- Visual inspection

#### Result:

- No remark.



Front inlet piece support overall condition.



Front inlet piece support overall condition.



Left side central casing support as found condition.



Left side central casing support foundation.



Right side central casing support overall condition.



Right side central casing support foundation.



## Inspection Report



Front central casing keys plates overall condition.



Rear central casing keys plates overall condition.

### **Recommendation:**

- None.

**The Skid erection are in serviceable condition.**



## Inspection Report

### 7.25 HG 2925 Erection, exhaust diffuser

#### Performed work:

- Visual inspection

#### Result:

- No remark.



Left side exhaust diffuser support condition.



Left side support foundation condition.



Right side exhaust diffuser support condition.



Right side support foundation condition.

## Inspection Report



Central exhaust diffuser support.

### **Recommendation:**

- None.

**The Erection, exhaust diffuser is in serviceable condition.**

## Inspection Report

### 7.26 Other observations

**PSW/SGT-800/18-004: Safety Warning of the gas fuel flexible hoses installed on all medium gas turbines.**

**Performed work:**

- Visual inspection

**Result:**

- No remark.



Gas flexible hoses condition

**Recommendation:**

- None.

**Flexible hoses is in serviceable condition.**

## Inspection Report

# 8 Recommendations

### **HG4150 Air intake**

- Clean intake filter housing intake louvers and ventilation filter housing intake louvers when replace filters.
- Clean floor inside intake filter housing when replace filters.
- Clean ventilation filter housing floor.
- Open mechanism needs to apply prevent rust with lubricant.

### **HG4981 Starter motor**

- Continue to monitor flex coupling flex plate bundle condition during next inspection.

### **HG4980 Speed reduction gear**

- Continue to monitor for the progression of the white marks pattern on wheel gear.
- Continue to monitor for the progression of the elector discharge pattern on wheel gear.

### **HG2410 Compressor inlet piece**

- It is recommended to clean the inlet piece by hand before startup.

### **HG2320 Drainpipe**

- Re-tighten during routine maintenance.

### **HG2665 Outlet casing**

- Prepare vendor for repair bellow joint at next major inspection.

### **HG2660 Exhaust diffuser**

- Repair crack at front struts support next major inspection, according to table above.

### **HG2132 Insulation**

- Next major inspection, please prepare vendor to repair some insulation pieces.



MGT-2022-0433

Subject / Title:  
**BD000166U01 SSUT 1:1, MI-50 KEOH, 2022,  
Commissioning report**

<b>Thailand</b>	<b>2023-02-20</b>
Location	Date

Project:  
Customer Name: **SSUT Company Ltd**  
Orderer's File Ref: **E1B101139185:A**  
Order No Internal: **EA031213U01A112511**  
Report No Internal:

<b>Chancharoen Kittikun</b>	
Author(s)	
<b>Nordin, Kristoffer</b>	<b>Hansson, Martin</b>
Released technically	Released for external use

Classification:	<b>Restricted</b>	No of Appendices: <b>7</b>	Total Pages of Report: <b>112</b>
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Codeword	:	<b>Bangpoo 1:1 (BP1)</b>
Machine No	:	<b>BD000166U01</b>
Product Type	:	<b>SGT-800</b>
Type of Activity	:	<b>Commissioning</b>
Mobilization Date	:	<b>2023-02-17</b>
Demobilization Date	:	<b>2023-02-21</b>
Client Contact Name	:	<b>Vithul Rattanaarome</b>

Executive Summary:

Level A inspection was performed according to the maintenance activity list.

Copies To:

Taptawat Paleerat  
Emelie Ljungblad

Gregeborg Erik  
Frobom Sofie



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ID: EIB101232740 Name: Commissioning report Rev: A Protection: Restricted IP: R00.S00  
Creator: Reviewer: Approver:  
ALIN ECGNN ECL: US-ContNo CoO:TH

## 1. Summary

Level A inspection was performed according to the maintenance activity list. A number of minor remarks were noted and rectified where possible, see details in report.

## 2. Personnel

Name	Type	Start Date	End Date	Qualification	Comment	Shift
Chancharoen Kittikun	Siemens Energy Personnel	2023-02-18	2023-02-20	Senior commissioning engineer		Day
Witchawut Kittinan	Siemens Energy Personnel	2023-02-18	2023-02-20	Commissioning engineer		Day
Arunplod Somdej	Siemens Energy Personnel	2023-02-18	2023-02-20	Quality inspector		Day

## 3. Operating Statistics

### Package

Date of Counter Readings : 2023-02-18  
 Operating Hours : 47786  
 Equivalent Operating Hours : 50603  
 Starts : 369  
 Equivalent Operating Cycles : 560  
 Total Production of MWh : 1578987  
 Total Production of MV Ar+ : 304495  
 Total Production of MV Ar- : 10  
 Serial Number of Gearbox : Flender S/N : 12719  
 Serial Number of Generator : ABB S/N : 8269005

### Comment :

## 4. Commissioning Activities

### 4.1. Activities According to Maintenance Plan

#### 4.1.1 Preparation

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ /	Off-line washing of the compress or prior to the inspection (customer obligation).	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.

#### 4.1.2 Before shutdown

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ /	Check the start sequence during start-up.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
2	/ /	Perform readings before shutdown, full load (T7L), 75%, 50% and 25% load. Operation on temperature limitation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

#### 4.1.3 Shutdown

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ /	Trip the unit with an emergency stop button to check the trip function (From approximately 0,5MW-load).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
2	/ /	Secure the unit for safe work.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remarks.

#### 4.1.4 Stationary commissioning

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Gas turbine system / MBA	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<p>Performed.</p> <p>Some insulation blankets were found damaged. It is recommended for the customer to repair or replace the damaged insulation blanket.</p> <p><b>Photo Attachments</b>  Damaged insulation blanket (2)  Damaged insulation blanket</p>
2	/ Gas turbine system / MBA	Pulsation measuring equipment. Cleaning and function check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA	<p>Performed without remarks.</p> <p>See Appendix H for protocol.</p>
3	/ Gas turbine system / MBA	Check function of VGV. Verify position at 20%, 50% and fully open.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA	<p>Performed without remarks.</p> <p>See Appendix F for protocol.</p>
4	/ Gas turbine system / MBA	Instrumentation. Check selected switches, transmitters, vibration- and speed probes, according to setting list	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<p>Performed.</p> <p>MBA10CP040 Pressure transmitter was found with a malfunctioning display. The pressure transmitter was rectified by customer.</p> <p>See Appendix C for speed and overspeed system protocol.</p> <p>See Appendix D for vibration system protocol.</p>

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
						See Appendix E for pressure transmitter protocol.  <b>Photo Attachments</b> MBA10CP040 pressure transmitter display malfunction
5	/ Gas turbine / MBA	Flame detector, function check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA10CQ005/010	Performed without remarks.
6	/ Cooling/Sealing/Purge air system / MBH	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
7	/ Cooling/Sealing/Purge air system / MBH	Check function of valves.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH	Performed without remarks.
8	/ Cooling/Sealing/Purge air system / MBH	Bleed valves. Check opening and closing time, fully opened and closed position.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH	Performed without remarks.  MBH10AA005  0-100 = 12 s  100-0 = 35 s  MBH10AA010  0-100 = 11 s  100-0 = 31 s
9	/ Cooling/Sealing/Purge air system / MBH	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH10 MBH20	Performed without remarks.  See Appendix E for protocol.
10	/ Starting/Gear electric generator system / MJB/MBK	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
11	/ Starting/Gear electric generator system / MJB/MBK	Visual inspection of frequency converter cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
12	/ Starting/Gear electric generator system / MJB/MBK	Check frequency converters fan function.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
13	/ Starting/Gear electric generator system / MBJ/MBK	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBJ MBK	Performed without remarks.  See Appendix D for protocol.
14	/ Air intake system / MBL	Visual inspection for general condition, obstructions, cleanliness, flanges, inspection hatches, sealings, gaskets and for foreign objects.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
15	/ Air intake system / MBL	Visual inspection of filters for obstruction and contamination.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  <b>Photo Attachments</b> Air inlet filters
16	/ Air intake system / MBL	Visual inspection (limited access).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBL	Performed without remarks.
17	/ Air intake system / MBL	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.  MBL30CP030 pressure transmitter measuring value read was found deviation compare to setting list. The pressure transmitter was calibrated by customer.  See Appendix E for protocol.  <b>Photo Attachments</b> MBL30CP030 pressure transmitter deviation
23	/ Gas fuel system / MBP	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
24	/ Gas fuel system / MBP	Central gas control valve. Function check and inspection for external leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.  See Appendix F for protocol.
25	/ Gas fuel system / MBP	Check the control valves positions at 0, 45 and 90	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		degrees and the zero-offset. Check of limit switches and ignition position. Inspection for external leakage.				See Appendix F for protocol.
26	/ Gas fuel system / MBP	Shut-off valves. Function check and inspection for external leakage. Check the pneumatic regulator settings. Check opening and closing time.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.  Opening time:  < 3 sec  Closing time:  < 3 sec
27	/ Gas fuel system / MBP	Isolation valve. Function check and inspection for external leakage. Check opening and closing time.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.  Opening time:  < 3 sec  Closing time:  < 3 sec
28	/ Gas fuel system / MBP	Flow meter. Visual inspection during operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.
29	/ Gas fuel system / MBP	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.  See Appendix E for protocol.
30	/ Gas fuel system / MBP	Option 249, 250, 251 Coalescer and particle Filters. Visual inspection for rust, deposit and liquids, clean and replace cartridges if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBP	Customer Obligation.
33	/ Lube Oil System / MBV	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
34	/ Lube Oil System / MBV	Visual inspection of frequency converter cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
35	/ Lube Oil System / MBV	Check frequency converter fan and pump function.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
36	/ Lube Oil System / MBV	Oil filter. Replace disposable cartridges if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	Customer Obligation.
37	/ Lube Oil System / MBV	Check for no water in the tank by external pump connected at interface MBV10/05.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.
38	/ Lube Oil System / MBV	Check oil tank level.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  Tank level is 658 mm at full load operation.
39	/ Lube Oil System / MBV	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBV	Performed without remarks.  See Appendix E for protocol.
42	/ Lube Oil System / MBV	Option 197, 198. Water cooled oil cooler. Visual inspection for External leakage.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	Customer Obligation.
48	/ Ventilation gas turbine system / SAG	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
49	/ Ventilation gas turbine system / SAG	Visual inspection of filter for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAG	Performed without remarks.
50	/ Ventilation gas turbine system / SAG	Visual inspection and function check of shut-off dampers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAG	Performed without remarks.
51	/ Ventilation gas turbine system / SAG	Verify switches and transmitters	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAG	Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		According to setting list.				<p>SAG10CP010 pressure transmitter measuring value read was found deviation compare to setting list. The pressure transmitter was calibrated by customer.</p> <p>See Appendix E for protocol.</p> <p><b>Photo Attachments</b> SAG10CP010 pressure transmitter deviation</p>
52	/ Ventilation gas turbine system / SAG	Visual inspection of the low point extractions below the turbine.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
53	/ HVAC for LER / SAC	Visual inspection of filters for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.
54	/ HVAC for LER / SAC	Ventilation fan. Check for abnormal noise and vibrations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.
55	/ Washing and cleaning system / SDB	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
56	/ Washing and cleaning system / SDB	Check correct delivery pressure and leakage of pump.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer Obligation.
57	/ Washing and cleaning system / SDB	Inspect pump inlet strainer and outlet filter.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer Obligation.
58	/ Washing and cleaning system / SDB	Check the nozzles for obstruction, clean if necessary with instrument air.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer Obligation.
59	/ Washing and cleaning system / SDB	Check hoses for leakage and general condition.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
60	/ Washing and cleaning system / SDB	Heaters - Check proper operation and setting.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer Obligation.
61	/ Washing and cleaning system / SDB	Inspect the tanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer Obligation.
62	/ Fire detection and extinguishing system CO2 / S GJ	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
63	/ Fire detection and extinguishing system CO2 / S GJ	Check all detectors for proper function.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.
64	/ Fire detection and extinguishing system CO2 / S GJ	Visual inspection of the weighing mechanism for the CO2 bottles. Check if the bottles have to be refilled or changed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.
65	/ Gas detection system / SFY	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
66	/ Instrument air system / QFA	Check pressure and for external leaks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
67	/ Instrument air system / QFA	Check oil level in compressor and refill if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.
68	/ Instrument air system / QFA	Visual inspection and replace cartridges if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
69	4093 / Enclosure /	Visual inspection for damage and leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
70	/ Control system / CJP/CRB	Visual inspection of cabinets.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
71	/ Control system / CJP/CRB	Take backups of all the programs from the controller.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CJP/CRB	Performed without remarks.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		ers where changes have been performed.				
72	/ Control system / CJP/CRB	Verify time synchronization on data collector/CMS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Valid for PCS7	Performed without remarks.
73	/ Protection system / CAA	Check function of ESD: Low lubrication-oil pressure. Pump change over and trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
74	/ Protection system / CAA	Check function of ESD: Fire protection. Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
75	/ Protection system / CAA	Check function of ESD: Emergency stop push button.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
76	/ Protection system / CAA	Check function of ESD: Ventilation system Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
77	/ Protection system / CAA	Check function of ESD: Gas Detection Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
78	/ Protection system / CAA	Check function of ESD: Overspeed trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
79	/ Protection system / CAA	Check function of ESD: Pulsation trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
80	/ Synchronizing cubicle / CBP	Check setting levels of equipment.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
81	/ Generator Protection / CHA	Visual inspection of the cabinet.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CHA	Performed without remarks.
82	/ Generator transformer / BAT	Visual inspection of transformer for oil leaks and cleanliness.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Customer Obligation.
83	/ Generator transformer / BAT	Check the oil level.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Customer Obligation.
84	/ Generator transformer / BAT	Check drying equipment.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Customer Obligation.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
86	/ Main LV switch boards / BFA	Visual inspection of the switchboards and switchgear.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
87	/ Auxiliary transformer / BFT	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BFT	Performed without remarks.
88	/ UMD/UPS system / BPA	Visual inspection of the cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BPA, UMD/UPS	Performed without remarks.
89	/ Battery system, 440V / BTA	Visual inspection of battery system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
90	/ Battery charger, 440V / BTL	Visual inspection of charger cubicle.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remarks.
91	/ Battery charger, 440V / BTL	Check the charger LL level.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remarks.  Undervoltage<<  420.2 ^ 438.6 v
92	/ Battery charger, 440V / BTL	Check normal charging current and voltage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remarks.  System A :  460.8V 0.04 A  System B :  459.7V 0.11 A
93	/ Battery charger, 440V / BTL	Check fast charging sequence if applicable.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BTL	Customer Obligation.

**Photo Attachments Stationary commissioning**



1 Damaged insulation blanket (2)



1 Damaged insulation blanket

ID: E1B101232740 Name: Commissioning report Rev: A Protection: Restricted IP: R00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH



4 MBA10CP040 pressure transmitter display malfunction



15 Air inlet filters





17 MBL30CP030 pressure transmitter deviation



51 SAG10CP010 pressure transmitter deviation

4.1.5 Rotating commissioning

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Before start /	Before starting visual inspection of inlet channel from intake to inlet casing. Check cleanliness for GG-room, generator room, air inlet room and plenum.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
2	/ Before start /	Before start check lubrication-oil pressures sub-pressure and tank level. Check for abnormal noise, vibrations and leaks from pumps	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		and mist fan. Check that all valves are in correct position.				
3	/ Before start /	Test of pump change over simulate cool init and verify feedback. Test of ESD function low lubrication-oil pressure.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
4	/ Before start /	Preparation of temporary measuring equipment. Measure the speed from barring speed to zero and from purge speed to zero.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  Barring to Zero:  09 m 03 s  Purge to Zero:  11 m 06 s
5	/ Before start /	Check and adjust ignition system if needed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
6	/ Before start /	Check that the drain valves for washing water are closed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer Obligation.
7	/ Before start /	Check that all the transmitter blocks were calibration have been performed are open/closed correct for operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
8	/ Checks during start /	Check start-sequence during run-up. Note T7 max and observe vibration levels during start-up, fuel valve, pressure and bearings temperature.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  T7 max = 412°C
9	/ Checks during start /	Check that there are no fuel-, lubr	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		ication-oil or hot air leakages.				
10	/ Checks during start /	Check function o f selected hard w ired trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
11	/ Checks during start /	Before synchron ization check reg ulator response for AVR and FC R.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
12	/ Checks during start /	Take readings, p ulsation measur ement, verify val ve opening/heat ing value when f low meter and h eating value for t he gas is availab le and do inspec tion rounds of th e unit at stabilize d condition at idl e, 5 MW, 10MW , 15MW, 20MW, 25MW, 30MW, 35MW, 40MW a nd base load (pe ak load if applica ble).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  See Appendix I for details.
13	/ Checks during start /	Take readings fo r performance va lidity if the unit has performanc e degradation gu arantee.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
14	/ Checks during start /	At base load, ch eck temperature s after bleed valv es to ensure that bleed valves are closed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
15	/ Checks during start /	Visual inspection of flow meter (M BP05/20CF005) during operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
16	/ Miscellaneous /	Note hours of turbine operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<p>Performed without remarks.</p> <p>Starts : 371</p> <p>Operating hours : 47788 h</p> <p>Equivalent hours : 50610 h</p> <p>Equivalent op cycles : 561</p>

#### 4.1.6 Generator maintenance ABB AMS 900-1250

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Electric generator or system / MKA	Look through all logged or recorded data available; load, temperature, vibrations etc. Fill in the report.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	<p>Performed without remarks.</p> <p><b>Photo Attachments</b> Generator nameplate</p>
2	/ Electric generator or system / MKA	External inspection regarding rust, leaks or other affection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.
3	/ Electric generator or system / MKA	Checking of tightness of all fixing elements.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.
4	/ Electric generator or system / MKA	Ensure ventilation ducts are clean and free from obstructions if connected to external air.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.
5	/ Electric generator or system / MKA	Replace air filter, if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.
6	/ Electric generator or system / MKA	Inspection of winding connections	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stator winding	<p>Performed without remarks.</p> <p><b>Photo Attachments</b> Generator stator (1) Generator stator (2)</p>

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
						Generator stator (3) Generator stator (4) Stator winding connection Stator winding connention
7	/ Electric generat or system / MKA	Inspection of win ding and bracing rope	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stator winding	Performed without remarks.
8	/ Electric generat or system / MKA	Inspection for dis coloration.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pressure fingers	Performed without remarks.
9	/ Electric generat or system / MKA	Visual inspection of sealing.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air cover	Performed without remarks.
10	/ Electric generat or system / MKA	Check if the RTD s give reasonabl e values on the v isual display unit (VDU).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	RTD:s	Performed without remarks.
11	/ Electric generat or system / MKA	Check all line- a nd neutral connec tions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remarks.  <b>Photo Attachments</b> Connections CT Line and Neutral connection
12	/ Electric generat or system / MKA	Check of genera l condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remarks.
13	/ Electric generat or system / MKA	Inspection of pre ssure relief hatc h.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remarks.
14	/ Electric generat or system / MKA	Visual inspection of insulators.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remarks.
15	/ Electric generat or system / MKA	Visual inspection of turn insulation , discoloration et c from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rotor coils	Performed without remarks.  <b>Photo Attachments</b> Rotor fan Rotor
16	/ Electric generat or system / MKA	Visual inspection of pole shoes re garding discolora tion from inspecti on hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pole shoes	Performed without remarks.  <b>Photo Attachments</b> Pole shoe Rotor support
17	/ Electric generat or system / MKA	Inspection for lea ks. External and from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remarks.  <b>Photo Attachments</b> Bearing housing (1)

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
						Bearing housing (2) Bearing housing
18	/ Electric generat or system / MKA	Inspect all bolted joints.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remarks.
19	/ Electric generat or system / MKA	Inspection of gui de support.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remarks.
20	/ Electric generat or system / MKA	Visual inspection for leaks, extern al and from insp ection hatches. I f leaks, check fo r wear and dam age	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shaft seals	Performed without remarks.
21	/ Electric generat or system / MKA	Visual external i nspection for lea ks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oil piping	Performed without remarks.
22	/ Electric generat or system / MKA	Verify function of all measuring in struments.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Measuring instrument	Performed without remarks.
23	/ Electric generat or system / MKA	If necessary rep lace filter for air i ntake to the air-l ock seals locate d on bearing ped estals.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air filter	Performed without remarks.  <b>Photo Attachments</b> Air filter
24	/ Electric generat or system / MKA	Visual inspectio n.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exciter rotor	Performed without remarks.  <b>Photo Attachments</b> Control pulse unit Rotating diode PMG
25	/ Electric generat or system / MKA	Visual inspection from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exciter Stator	Performed without remarks.
26	/ Electric generat or system / MKA	Visual inspection . Replace if short er than 15 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brush and brush holder	Performed without remarks.
27	/ Electric generat or system / MKA	Check of rotor gr ound fault protec tion. Not valid if r emoved.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brush and brush holder	Performed without remarks.
28	/ Electric generat or system / MKA	Visual inspection of slipring.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Slip ring	Performed without remarks.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
						<b>Photo Attachments</b> Slipring
29	/ Electric generat or system / MKA	Visual external in spection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remarks.  <b>Photo Attachments</b> Cooler
30	/ Electric generat or system / MKA	Check of cleanlin ess, corrosion an d/or erosion dam ages on air- or w ater side.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remarks.
31	/ Electric generat or system / MKA	Clean air and wa ter sides.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remarks.
32	/ Electric generat or system / MKA	Pressure check.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cooler	The activity was postponed to next inspection.
33	/ Electric generat or system / MKA	Function check o f casing water le akage detector.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remarks.

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Creator: Reviewer: Approver:  
ALN ECNN ECL: US-ContNo CoO:TH

Photo Attachments Generator maintenance ABB AMS 900-1250



1 Generator nameplate



6 Generator stator (1)

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Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH



6 Generator stator (2)



6 Generator stator (3)



6 Generator stator (4)



6 Stator winding connection



6 Stator winding connention



11 Connections





11 CT



11 Line and Neutral connection





15 Rotor fan



15 Rotor



16 Pole shoe



16 Rotor support

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Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH



17 Bearing housing (1)



17 Bearing housing (2)



17 Bearing housing



23 Air filter



24 Control pulse unit



24 Rotating diode





24 PMG



28 Slipring

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Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH



29 Cooler

ID: EIBI01232740 Name: Commissioning report Rev: A Protection: Restricted IP: R00, S00  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH

## 4.2. Activities Outside Maintenance Plan

### 4.2.1 Additional activities

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
3	/ Control system General / CJP C RB	SuP19/2020/SG T-800 Revised L FP/NFP Pulsatio ns levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  See Appendix J for details.
4	/ Control system General / CJP C RB	SuP01/2021/SG T-800 Removal of high temperat ure alarm on stat or ring 2 & 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  See Appendix J for details.
7	/ Control system General / CJP C RB	SuP25/2015/SG T-800 Reduction Vibration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Check if previously implemented	The activity has been implemented prior to start of inspection.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
8	/ Gear system Instrumentation / MBK	Closely monitor the vibration level (MBK10CY005-007) and contact Siemens Energy vibration support team for planning of field balancing if the vibration increases further than the current level	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report E1B101198112	Performed.  The vibration levels is 2.4 mm/s at full load. It is recommended for the customer to closely monitor and contact Siemens Energy for planning of field balancing if the vibration increase further than the warning level.
9	/ Gear system Instrumentation / MBK	Check pinion bearing turbine end temperature sensor MBK10CT005)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report E1B101198112	Performed.  The temperature probe is malfunctioning and will be replaced at next inspection plan according to customer information.
11	/ Gas generator system Instrumentation / MBT	Check stator ring temperature sensor (MBA10CT050)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report E1B101198112	Performed.  The temperature probe connector and cable was found damage. The sensor and cable were replaced with customer spare part.  <b>Photo Attachments</b> MBA10CT050 Cable damaged MBA10CT050 Connector

ID: E1B1011232740 Name: Commissioning report Rev: A Protection: Restricted IP: R00\_S00  
Creator: Reviewer: Approver:  
ALN ECONN ECL: US-ContNo CoO:TH

## Photo Attachments Additional activities



11 MBA10CT050 Cable damaged



11 MBA10CT050 Connecto

## 5. Replaced Parts

### 5.1. Unplanned Replacement Parts

HG/KKS	Assembly Drawing Number	Item No/Position	Parts No	Name of Parts	Qty	Qty Installed	Unit	Modification	Modification Revision	Field Service Remarks
MBA10 C T050			2426824-2	Thermocouple	1	1	EA			Connector and cable damaged

## 6. Inspection Result

Level A inspection was completed according to activity list and recommendation was provided to customer for further actions. Machine vibration level at gearbox are in acceptable. The unit BD000166U01 is in serviceable condition and handed over to customer for operation.

## 7. Recommendations

It is recommended for the customer to repair or replace damaged insulation blankets.

It is recommended for the customer to closely monitor the gearbox vibration and contact Siemens Energy for planning of field balancing if the vibration increases further than warning level.

## 8. Software Changes

Change	Item Designation	Reference	Remark
Revised LFP and NFP pulsation levels	MBA10CP901 MBA10CP085 MBA10CP090 MBA10CP095	SuP 19/2020/SGT-800	Performed without remarks.
Removal of high temperature alarm on stator ring 2 & 3	MBA10FT905	SuP01/2021/SGT-800	Performed without remarks.

## 9. Appendices

9.1 Appendix C Speed and Overspeed Function test Protocol

9.2 Appendix D Vibration Function test Protocol

9.3 Appendix E Pressure Transmitter Protocol

9.4 Appendix F Regulated Valves and VGV Protocol

9.5 Appendix H Pulsation Protocol

9.6 Appendix I Readings

9.7 Appendix J Activities outside maintenance plan.doc

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**9.1 Appendix C Speed and Overspeed Function test Protocol**

ID: E1B101232740 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECCNN ECL: US-ContNo CoO:TH

## Speed and Overspeed Function Test Protocol

**Rotor speed**

Scale factor                      Setting                      Unit  
    [ 2 ]                      rpm / Hz

Frequency (Hz)	MBA10CS005 Speed rotor	MBA10CS010 Speed rotor	Unit
750	1500	1500	rpm
1500	3000	3000	rpm
2250	4500	4500	rpm
3000	6000	6000	rpm
3300	6600	6600	rpm
3650	7300	7300	rpm

**Rotor overspeed**

Scale factor                      Setting                      Unit  
    [ 2 ]                      rpm / Hz  
   H Alarm level setting        [ 6930 ]                      rpm  
   H Trip level setting         [ 7260 ]                      rpm

Frequency (Hz)	MBA10CS015 Overspeed rotor	MBA10CS020 Overspeed rotor	MBA10CS030 Overspeed rotor	Unit
750	1500	1500	1500	rpm
1500	3000	3000	3000	rpm
2250	4500	4500	4500	rpm
3000	6000	6000	6000	rpm
3300	6600	6600	6600	rpm
3650	7300	7300	7300	rpm

H Alarm	6930	6930	6930	rpm
H Trip	7260	7260	7260	rpm

**COMPLETION**

Test Executer	Date	Signature	Company
	18 Feb 2023	Kittikun Ch	Siemens Energy
	-	-	-

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**9.2 Appendix D Vibration Function test Protocol**

ID: E1B101232740 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH



## Vibration Function Test Protocol

### Vibration monitoring system

#### Gas turbine Bearing#1 vibration

	<u>Setting</u>	<u>Unit</u>
Scale factor	[ 10.19 ]	mV / mm/s
H Alarm level setting	[ 7 ]	mm/s
H Trip level setting	[ 15 ]	mm/s

Input signal (mV)	MBA10CY005	MBA10CY025	MBA10CY030	Unit
51	5.0	5.0	5.0	mm/s
102	10.0	10.0	10.0	mm/s
153	15.0	15.0	15.0	mm/s
204	20.0	20.0	20.0	mm/s
255	25.0	25.0	25.0	mm/s

H Alarm	7.0	7.0	7.0	mm/s
H Trip	15.0	15.0	15.0	mm/s

#### Gas turbine Bearing#2 vibration

	<u>Setting</u>	<u>Unit</u>
Scale factor	[ 5.71 ]	mV / mm/s
H Alarm level setting	[ 7 ]	mm/s
H Trip level setting	[ 15 ]	mm/s

Input signal (mV)	MBA10CY010	MBA10CY015	MBA10CY020	Unit
29	5.0	5.0	5.0	mm/s
57	10.0	10.0	10.0	mm/s
86	14.9	14.9	14.9	mm/s
114	20.0	20.0	20.0	mm/s
142	25.0	25.0	25.0	mm/s

H Alarm	7.0	7.0	7.0	mm/s
H Trip	15.0	15.0	15.0	mm/s

## Vibration Function Test Protocol

### Generator Bearing Vibration – Drive End (DE)

	<u>Setting</u>	<u>Unit</u>
Scale factor	[ 3.94 ]	mV / mm/s
H Alarm level setting	[ 4.5 ]	mm/s
H Trip level setting	[ 8 ]	mm/s

Input signal (mV)	MKA10CY005	MKA10CY035	MKA10CY040	Unit
20	5.0	5.0	5.0	mm/s
40	10.0	10.0	10.0	mm/s
59	14.9	14.9	14.9	mm/s
79	20.0	20.0	20.0	mm/s
99	25.0	25.0	25.0	mm/s

H Alarm	4.5	4.5	4.5	mm/s
H Trip	8.0	8.0	8.0	mm/s

### Generator Bearing Vibration – Non Drive End (NDE)

	<u>Setting</u>	<u>Unit</u>
Scale factor	[ 3.94 ]	mV / mm/s
H Alarm level setting	[ 4.5 ]	mm/s
H Trip level setting	[ 8 ]	mm/s

Input signal (mV)	MKA10CY010	MKA10CY045	MKA10CY050	Unit
20	5.0	5.0	5.0	mm/s
40	10.0	10.0	10.0	mm/s
59	14.9	14.9	14.9	mm/s
79	20.0	20.0	20.0	mm/s
99	25.0	25.0	25.0	mm/s

H Alarm	4.5	4.5	4.5	mm/s
H Trip	8.0	8.0	8.0	mm/s

## Vibration Function Test Protocol

### Gearbox Bearing Vibration – High speed shaft

	<u>Setting</u>	<u>Unit</u>
Scale factor	[ 10.19 ]	mV / mm/s
H Alarm level setting	[ 4.5 ]	mm/s
H Trip level setting	[ 8 ]	mm/s

Input signal (mV)	MBK10CY005	MBK10CY006	MBK10CY007	Unit
51	5.0	5.0	5.0	mm/s
102	10.0	10.0	10.0	mm/s
153	15.0	15.0	15.0	mm/s
204	20.0	20.0	20.0	mm/s
255	24.9	24.9	24.9	mm/s

H Alarm	4.5	4.5	4.5	mm/s
H Trip	8.0	8.0	8.0	mm/s

### Gearbox Bearing Vibration – Low speed shaft

	<u>Setting</u>	<u>Unit</u>
Scale factor	[ 10.19 ]	mV / mm/s
H Alarm level setting	[ 4.5 ]	mm/s
H Trip level setting	[ N/A ]	mm/s

Input signal (mV)	MBK10CY030	Unit
51	5.0	mm/s
102	10.0	mm/s
153	15.0	mm/s
204	20.0	mm/s
255	24.9	mm/s

H Alarm	4.5	mm/s
H Trip	N/A	mm/s

## COMPLETION

	Date	Signature	Company
Test Executer	18 Feb 2023	Kittikun Ch.	Siemens Energy

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**9.3 Appendix E Pressure Transmitter Protocol**

ID: E1B101232740 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH

# Pressure Transmitter Test Protocol

## Pressure Transmitter

### ***MBA Gas turbine system***

MBA10CP005 Compressor Inlet Diff Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [30]     | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-]            | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |
| H Trip                    | [-]            | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	15	30	0	15	30	kPa
Input pressure	0	15	30	-	-	-	kPa
VDU	0	15	30	-	-	-	kPa

MBA10CP010 Compressor Inlet Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [80] – [120]   | kPa (a)     |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-]            | kPa (a)     | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |
| H Trip                    | [-]            | kPa (a)     | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	80	100	120	80	100	120	kPa (a)
Input pressure	80	100	120	-	-	-	kPa (a)
VDU	80	100	120	-	-	-	kPa (a)

## Pressure Transmitter Test Protocol

MBA10CP015 Pressure Compressor Outlet

Function check according to setting list

- Nominal setting

	<u>Range</u>	<u>Unit</u>	
	[0] – [2.5]	MPa	
- Protection level

	<u>Setting</u>	<u>Unit</u>	
H Alarm	[-]	MPa	<input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A
H Trip	[-]	MPa	<input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>1.25</b>	<b>2.5</b>	<b>0</b>	<b>1.25</b>	<b>2.5</b>	<b>MPa</b>
<b>Input pressure</b>	0	1.25	2.5	-	-	-	<b>MPa</b>
<b>VDU</b>	0	1.25	2.5	-	-	-	<b>MPa</b>

MBA10CP016 Pressure Compressor Outlet

Function check according to setting list

- Nominal setting

	<u>Range</u>	<u>Unit</u>	
	[0] – [2.5]	MPa	
- Protection level

	<u>Setting</u>	<u>Unit</u>	
H Alarm	[-]	MPa	<input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A
H Trip	[-]	MPa	<input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>1.25</b>	<b>2.5</b>	<b>0</b>	<b>1.25</b>	<b>2.5</b>	<b>MPa</b>
<b>Input pressure</b>	0	1.25	2.5	-	-	-	<b>MPa</b>
<b>VDU</b>	0	1.25	2.5	-	-	-	<b>MPa</b>



## Pressure Transmitter Test Protocol

MBA10CP017 Pressure Compressor Outlet

Function check according to setting list

- Nominal setting

	<u>Range</u>	<u>Unit</u>	
	[0] – [2.5]	MPa	
- Protection level

	<u>Setting</u>	<u>Unit</u>	
H Alarm	[-]	MPa	<input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A
H Trip	[-]	MPa	<input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>1.25</b>	<b>2.5</b>	<b>0</b>	<b>1.25</b>	<b>2.5</b>	<b>MPa</b>
<b>Input pressure</b>	0	1.25	2.5	-	-	-	<b>MPa</b>
<b>VDU</b>	0	1.25	2.5	-	-	-	<b>MPa</b>

MBA10CP030 Pressure Combustion Chamber

Function check according to setting list

- Nominal setting

	<u>Range</u>	<u>Unit</u>	
	[0] – [2.5]	MPa	
- Protection level

	<u>Setting</u>	<u>Unit</u>	
H Alarm	[-]	MPa	<input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A
H Trip	[-]	MPa	<input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>1.25</b>	<b>2.5</b>	<b>0</b>	<b>1.25</b>	<b>2.5</b>	<b>MPa</b>
<b>Input pressure</b>	0	1.25	2.5	-	-	-	<b>MPa</b>
<b>VDU</b>	0	1.25	2.5	-	-	-	<b>MPa</b>

# Pressure Transmitter Test Protocol

MBA10CP035 Disc 1 Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [2.5]    | MPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-]            | MPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |
| H Trip                    | [-]            | MPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	1.25	2.5	0	1.25	2.5	MPa
Input pressure	0	1.25	2.5	-	-	-	MPa
VDU	0	1.25	2.5	-	-	-	MPa

MBA10CP040 Turbine Exhaust Diff Pressure

Function check according to setting list

- | <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|-------------------------|----------------|-------------|--|
|                         | [0] – [12]     | kPa         |  |
| <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                 | [4]            | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                  | [5]            | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	6	12	0	6	12	kPa
Input pressure	0	6	12	-	-	-	kPa
VDU	0	6	12	-	-	-	kPa

# Pressure Transmitter Test Protocol

MBA10CP041 Turbine Exhaust Diff Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [12]     | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [4]            | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                    | [5]            | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	6	12	0	6	12	kPa
Input pressure	0	6	12	-	-	-	kPa
VDU	0	6	12	-	-	-	kPa

MBA10CP042 Turbine Exhaust Diff Pressure

### Function check according to setting list

- | <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|-------------------------|----------------|-------------|--|
|                         | [0] – [12]     | kPa         |  |
| <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                 | [4]            | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                  | [5]            | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	6	12	0	6	12	kPa
Input pressure	0	6	12	-	-	-	kPa
VDU	0	6	12	-	-	-	kPa

# Pressure Transmitter Test Protocol

MBA10CP045 Turbine Exhaust Pressure

Function check according to setting list,

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [80] – [120]   | kPa (a)     |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-]            | kPa (a)     | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |
| H Trip                    | [-]            | kPa (a)     | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	80	100	120	80	100	120	kPa (a)
Input pressure	80	100	120	-	-	-	kPa (a)
VDU	80	100	120	-	-	-	kPa (a)

MBA10CP065 Air Intake Diff Pressure

Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [-3] – [3 ]    | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [2.3]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                    | [2.5]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	-3	0	3	-3	0	3	kPa
Input pressure	-3	0	3	-	-	-	kPa
VDU	-3	0	3	-	-	-	kPa

## Pressure Transmitter Test Protocol

MBA10CP070 Air Intake Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
    [-3] – [3 ]                      kPa
- Protection level                      Setting                      Unit  
    H Alarm                      [2.3]                      kPa                      ☒ Checked    ☐ N/A  
    H Trip                      [2.5]                      kPa                      ☒ Checked    ☐ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	-3	0	3	-3	0	3	kPa
<b>Input pressure</b>	-3	0	3	-	-	-	kPa
<b>VDU</b>	-3	0	3	-	-	-	kPa

MBA10CP075 Air Intake Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
    [-3] – [3 ]                      kPa
- Protection level                      Setting                      Unit  
    H Alarm                      [2.3]                      kPa                      ☒ Checked    ☐ N/A  
    H Trip                      [2.5]                      kPa                      ☒ Checked    ☐ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	-3	0	3	-3	0	3	kPa
<b>Input pressure</b>	-3	0	3	-	-	-	kPa
<b>VDU</b>	-3	0	3	-	-	-	kPa

# Pressure Transmitter Test Protocol

## ***MBH Cooling/Sealing/Purge air system***

MBH10CP020 DP Stage 2 Cooling

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [1000]   | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-]            | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |
| H Trip                    | [-]            | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	500	1000	0	500	1000	kPa
Input pressure	0	500	1000	-	-	-	kPa
VDU	0	500	1000	-	-	-	kPa

MBH10CP025 DP External Stator Cooling

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [250]    | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-]            | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |
| H Trip                    | [-]            | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	125	250	0	125	250	kPa
Input pressure	0	125	250	-	-	-	kPa
VDU	0	125	250	-	-	-	kPa



## Pressure Transmitter Test Protocol

MBH10CP030 DP Stage 3 Cooling

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [400]      kPa
- Protection level      Setting      Unit  
H Alarm      [-]      kPa      ☐ Checked ☒ N/A  
H Trip      [-]      kPa      ☐ Checked ☒ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	200	400	0	200	400	kPa
Input pressure	0	200	400	-	-	-	kPa
VDU	0	200	400	-	-	-	kPa

## Pressure Transmitter Test Protocol

### MBL Air intake system

MBL10CP005 Diff Pressure Pre-filter

Function check according to setting list

- Nominal setting      Range      Unit  
    [0] – [2]      kPa
- Protection level      Setting      Unit  
    [0.45]      kPa      ☒ Checked    ☐ N/A  
    H Alarm      [-]      kPa      ☐ Checked    ☒ N/A  
    H Trip

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>kPa</b>
<b>Input pressure</b>	0	1	2	-	-	-	kPa
<b>VDU</b>	0	1	2	-	-	-	kPa

MBL10CP010 Diff Pressure High Efficiency Filter

Function check according to setting list

- Nominal setting      Range      Unit  
    [0] – [2]      kPa
- Protection level      Setting      Unit  
    [0.6]      kPa      ☒ Checked    ☐ N/A  
    H Alarm      [-]      kPa      ☐ Checked    ☒ N/A  
    H Trip

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>kPa</b>
<b>Input pressure</b>	0	1	2	-	-	-	kPa
<b>VDU</b>	0	1	2	-	-	-	kPa

# Pressure Transmitter Test Protocol

MBL30CP030      Diff Pressure Air intake Channel

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [2]      | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [1.35]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                    | [1.5]          | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	1	2	0	1	2	kPa
Input pressure	0	1	2	-	-	-	kPa
VDU	0	1	2	-	-	-	kPa

MBL30CP035      Diff Pressure Air intake Channel

Function check according to setting list

- | <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|-------------------------|----------------|-------------|--|
|                         | [0] – [2]      | kPa         |  |
| <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                 | [1.35]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                  | [1.5]          | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	1	2	0	1	2	kPa
Input pressure	0	1	2	-	-	-	kPa
VDU	0	1	2	-	-	-	kPa

## Pressure Transmitter Test Protocol

MBL30CP040 Diff Pressure Air intake Channel

Function check according to setting list

- Nominal setting      Range      Unit  
    [0] – [2]      kPa
- Protection level      Setting      Unit  
    [1.35]      kPa      ☒ Checked    ☐ N/A  
    [1.5]      kPa      ☐ Checked    ☒ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>kPa</b>
<b>Input pressure</b>	0	1	2	-	-	-	kPa
<b>VDU</b>	0	1	2	-	-	-	kPa

## Pressure Transmitter Test Protocol

**MBP Gas fuel system**

MBP10CP005 Gas Fuel Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [4]      MPa
- Protection level      Setting      Unit  
H Alarm      [-]      MPa      ☐ Checked ☒ N/A  
H Trip      [-]      MPa      ☐ Checked ☒ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	2	4	0	2	4	MPa
Input pressure	0	2	4	-	-	-	MPa
VDU	0	2	4	-	-	-	MPa

MBP10CP010 Gas Fuel Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [4]      MPa
- Protection level      Setting      Unit  
H Alarm      [-]      MPa      ☐ Checked ☒ N/A  
H Trip      [3.9]      MPa      ☒ Checked ☐ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	2	4	0	2	4	MPa
Input pressure	0	2	4	-	-	-	MPa
VDU	0	2	4	-	-	-	MPa

# Pressure Transmitter Test Protocol

MBP10CP011 Gas Fuel Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [4]      | MPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-]            | MPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |
| H Trip                    | [3.9]          | MPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	2	4	0	2	4	MPa
Input pressure	0	2	4	-	-	-	MPa
VDU	0	2	4	-	-	-	MPa

MBP10CP012 Gas Fuel Pressure

### Function check according to setting list

- | <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|-------------------------|----------------|-------------|--|
|                         | [0] – [4]      | MPa         |  |
| <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                 | [-]            | MPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |
| H Trip                  | [3.9]          | MPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	2	4	0	2	4	MPa
Input pressure	0	2	4	-	-	-	MPa
VDU	0	2	4	-	-	-	MPa



## Pressure Transmitter Test Protocol

MBP10CP025 Gas Fuel Pressure after Main Valve

Function check according to setting list

- Nominal setting      Range      Unit  
                                  [0] – [4]      MPa
- Protection level      Setting      Unit  
                                  [-]      MPa      ☐ Checked ☒ N/A  
                                  [-]      MPa      ☐ Checked ☒ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>MPa</b>
<b>Input pressure</b>	0	2	4	-	-	-	<b>MPa</b>
<b>VDU</b>	0	2	4	-	-	-	<b>MPa</b>

MBP20CP025 Gas Fuel Pressure after Pilot Valve

Function check according to setting list

- Nominal setting      Range      Unit  
                                  [0] – [4]      MPa
- Protection level      Setting      Unit  
                                  [-]      MPa      ☐ Checked ☒ N/A  
                                  [-]      MPa      ☐ Checked ☒ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>MPa</b>
<b>Input pressure</b>	0	2	4	-	-	-	<b>MPa</b>
<b>VDU</b>	0	2	4	-	-	-	<b>MPa</b>

## Pressure Transmitter Test Protocol

MBP30CP025 Central Gas Fuel Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
    [0] – [4]      MPa
- Protection level      Setting      Unit  
    [-]      MPa      ☐ Checked ☒ N/A  
    L Trip (Start Abort) [0.1]      MPa      ☒ Checked ☐ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>MPa</b>
<b>Input pressure</b>	0	2	4	-	-	-	<b>MPa</b>
<b>VDU</b>	0	2	4	-	-	-	<b>MPa</b>

MBP60CP005 Ignition Gas Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
    [0] – [4]      MPa
- Protection level      Setting      Unit  
    [-]      MPa      ☐ Checked ☒ N/A  
    H Trip      [-]      MPa      ☐ Checked ☒ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>MPa</b>
<b>Input pressure</b>	0	2	4	-	-	-	<b>MPa</b>
<b>VDU</b>	0	2	4	-	-	-	<b>MPa</b>

# Pressure Transmitter Test Protocol

### ***MBV Lube oil system***

MBV10CP015 Lube Oil Tank Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [-5]     | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-0.8]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                    | [-0.4]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	-2.5	-5	0	-2.5	-5	kPa
Input pressure	0	-2.5	-5	-	-	-	kPa
VDU	0	-2.5	-5	-	-	-	kPa

MBV10CP020 Lube Oil Tank Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [-5]     | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-0.8]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                    | [-0.4]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	-2.5	-5	0	-2.5	-5	kPa
Input pressure	0	-2.5	-5	-	-	-	kPa
VDU	0	-2.5	-5	-	-	-	kPa

# Pressure Transmitter Test Protocol

MBV10CP025 Lube Oil Tank Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [-5]     | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                   | [-0.8]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                    | [-0.4]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	-2.5	-5	0	-2.5	-5	kPa
Input pressure	0	-2.5	-5	-	-	-	kPa
VDU	0	-2.5	-5	-	-	-	kPa

MBV40CP010 Lube Oil Filter DP

Function check according to setting list

- | <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|-------------------------|----------------|-------------|--|
|                         | [0] – [150]    | kPa         |  |
| <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| H Alarm                 | [110]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Trip                  | [-]            | kPa         | <input type="checkbox"/> Checked <input checked="" type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	75	150	0	75	150	kPa
Input pressure	0	75	150	-	-	-	kPa
VDU	0	75	150	-	-	-	kPa

# Pressure Transmitter Test Protocol

MBV40CP015 Lube Oil Supply Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [300]    | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| L Alarm                   | [140]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| L Trip                    | [110]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	150	300	0	150	300	kPa
Input pressure	0	150	300	-	-	-	kPa
VDU	0	150	300	-	-	-	kPa

MBV40CP025 Lube Oil Supply Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [300]    | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| L Alarm                   | [140]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| L Trip                    | [110]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	150	300	0	150	300	kPa
Input pressure	0	150	300	-	-	-	kPa
VDU	0	150	300	-	-	-	kPa

## Pressure Transmitter Test Protocol

MBV40CP055 Lube Oil Supply Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
    [0] – [300]      kPa
- Protection level      Setting      Unit  
    [140]      kPa      ☒ Checked    ☐ N/A  
    [110]      kPa      ☒ Checked    ☐ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	<b>0</b>	<b>150</b>	<b>300</b>	<b>0</b>	<b>150</b>	<b>300</b>	<b>kPa</b>
<b>Input pressure</b>	0	150	300	-	-	-	kPa
<b>VDU</b>	0	150	300	-	-	-	kPa



# Pressure Transmitter Test Protocol

### ***SAG Ventilation system gas turbine room***

SAG10CP005 GT-Room/Ambient Diff Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [2]      | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| L Alarm                   | [0.05]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| H Alarm                   | [0.25]         | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	1	2	0	1	2	kPa
Input pressure	0	1	2	-	-	-	kPa
VDU	0	1	2	-	-	-	kPa

SAG10CP010 GT Room Vent Fan Diff Pressure

### Function check according to setting list

- |                           |                |             |  |
|---------------------------|----------------|-------------|--|
| • <u>Nominal setting</u>  | <u>Range</u>   | <u>Unit</u> |  |
|                           | [0] – [2]      | kPa         |  |
| • <u>Protection level</u> | <u>Setting</u> | <u>Unit</u> |  |
| L Alarm                   | [0.2]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |
| L Trip                    | [0.1]          | kPa         | <input checked="" type="checkbox"/> Checked <input type="checkbox"/> N/A |

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
Setting	0	1	2	0	1	2	kPa
Input pressure	0	1	2	-	-	-	kPa
VDU	0	1	2	-	-	-	kPa

## Pressure Transmitter Test Protocol

SAG10CP015 GT Room Vent Fan Diff Pressure

Function check according to setting list

- Nominal setting

	<u>Range</u>	<u>Unit</u>
	[0] – [2]	kPa
- Protection level

	<u>Setting</u>	<u>Unit</u>
L Alarm	[0.2]	kPa
L Trip	[0.1]	kPa

☒ Checked ☐ N/A  
☒ Checked ☐ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	0	1	2	0	1	2	kPa
<b>Input pressure</b>	0	1	2	-	-	-	kPa
<b>VDU</b>	0	1	2	-	-	-	kPa

SAG10CP020 GT Room Vent Fan Diff Pressure

Function check according to setting list

- Nominal setting

	<u>Range</u>	<u>Unit</u>
	[0] – [2]	kPa
- Protection level

	<u>Setting</u>	<u>Unit</u>
L Alarm	[0.2]	kPa
L Trip	[0.1]	kPa

☒ Checked ☐ N/A  
☒ Checked ☐ N/A

	As found			As left			Unit
	0%	50%	100%	0%	50%	100%	
<b>Setting</b>	0	1	2	0	1	2	kPa
<b>Input pressure</b>	0	1	2	-	-	-	kPa
<b>VDU</b>	0	1	2	-	-	-	kPa

---

Pressure Transmitter Test Protocol

---

**MBA Gas Turbine System**

MBA10CP050 Anti-Surge Protection  
MBA10CP055 Anti-Surge Protection  
MBA10CP060 Anti-Surge Protection

Function check according to setting list

	Setting value	Existing value	Adjusted value	Unit
MBA10CP050	0.5	0.5	-	kPa
MBA10CP055	0.5	0.5	-	kPa
MBA10CP060	0.5	0.5	-	kPa

---

**MBV Lube oil System**  
**Pressure switches**

MBV21CP005 Lube Oil Pressure After Pumps 1  
MBV22CP005 Lube Oil Pressure After Pumps 2  
MBV23CP005 Lube Oil Pressure After Pumps 3

Function check according to setting list

- Nominal setting                      Range                      Unit  
[50] L1                                      kPa

	Setting value	Existing value	Adjusted value	Unit
MBV21CP005	50	50	-	kPa
MBV22CP005	50	50	-	kPa
MBV23CP005	50	51	-	kPa

---

**COMPLETION**

---

Test Executer	Date	Signature	Company
	19 Feb 2023	Kittinan W.	Siemens Energy

**4**

**9.4 Appendix F Regulated Valves and VGV Protocol**

ID: E1B101232740 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH

## Regulated Valves and VGV Test Protocol

### Regulated Valves

#### Main Gas Control Valve

SP	VDU (%)	Valve (%)
0	0	0
25	25	25
50	50	50
75	75	75
100	100	100
Start position (XP31)	VDU (%)	Valve (%)
0 -> 1 Falling	5	5
1 -> 0 Raising	8	8

#### Pilot Gas Control Valve

SP	VDU (%)	Valve (%)
0	0	0
25	25	25
50	50	50
75	75	75
100	100	100
Start position (XP31)	VDU (%)	Valve (%)
0 -> 1 Falling	24	24
1 -> 0 Raising	28	28

## Regulated Valves and VGV Test Protocol

### Central Gas Control Valve

SP	VDU (%)	Valve (%)
0	-0.3	-0.3
25	24.6	24.6
50	49.6	49.6
75	74.7	74.7
100	99.6	99.6

IDE1B101232740 Name: Commissioning report Rev: A Protection: Restricted IPR: 00, S00  
 Creator: Reviewer: Approver:  
 ALN ECCNN ECL: US-ContNo CoO:TH



## Regulated Valves and VGV Test Protocol

### Bleed Valve 1

SP	Valve (%)	VDU (%)
0	0.0	0.0
25	24.5	24.5
50	49.5	49.5
75	74.7	74.7
100	100.1	100.1
Closed position (XP01)	VDU (%)	
0 -> 1 Falling	7	
1 -> 0 Raising	11	
Closed position (XP02)	VDU (%)	
0 -> 1 Falling	7	
1 -> 0 Raising	10	

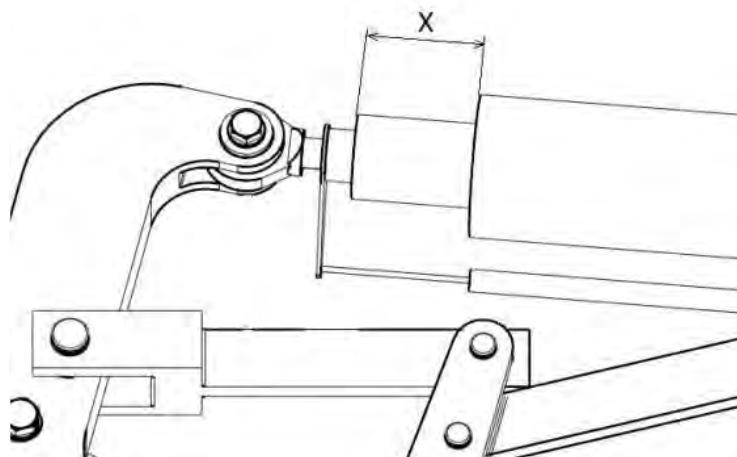
### Bleed Valve 2

SP	Valve (%)	VDU (%)
0	0.0	0.0
25	24.6	24.6
50	49.7	49.7
75	74.6	74.6
100	100.0	100.0
Closed position (XP01)	VDU (%)	
0 -> 1 Falling	6	
1 -> 0 Raising	9	
Closed position (XP02)	VDU (%)	
0 -> 1 Falling	7	
1 -> 0 Raising	10	

## Regulated Valves and VGV Test Protocol

### Variable Guide Vane

SP (%)	VDU (%)	Angle before adjustment (°)	Angle after adjustment (°)	Piston length before adjustment (mm)	Piston length after adjustment (mm)
20	20	-41	-	240	-
25	25	-38	-	224.5	-
50	50	-20	-	148	-
75	75	-2.5	-	71	-
78.8	78.8	0	-	61	-
80.6	80.6	1.5	-	55	-
Zero offset			Old (rev/min)		New (rev/min)
			-		-



### **COMPLETION**

Test Executer	Date	Signature	Company
	18 Feb 2023	Kittikun Ch.	Siemens Energy

## 5

### 9.5 Appendix H Pulsation Protocol

## Pulsation Test Protocol

**Pulsation (pC-simulator)****Low Frequency Pulsations**

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (LFP)	MBA10CP090 VDU (LFP)	MBA10CP095 VDU (LFP)
2	190	110	108	109	109
5	190	275	272	275	273
10	190	550	539	546	544

**Narrow Frequency Pulsations**

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (NFP)	MBA10CP090 VDU (NFP)	MBA10CP095 VDU (NFP)
2	220	110	105	109	108
5	220	275	271	275	274
10	220	550	538	548	543

**Medium Frequency Pulsations**

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (MFP)	MBA10CP090 VDU (MFP)	MBA10CP095 VDU (MFP)
2	620	120	115	118	116
5	620	300	296	302	297
10	620	600	588	598	593

---

Pulsation Test Protocol

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**High Frequency Pulsations**

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (HFP)	MBA10CP090 VDU (HFP)	MBA10CP095 VDU (HFP)
2	2000	135	129	132	131
5	2000	338	331	336	332
10	2000	675	658	667	662

**COMPLETION**

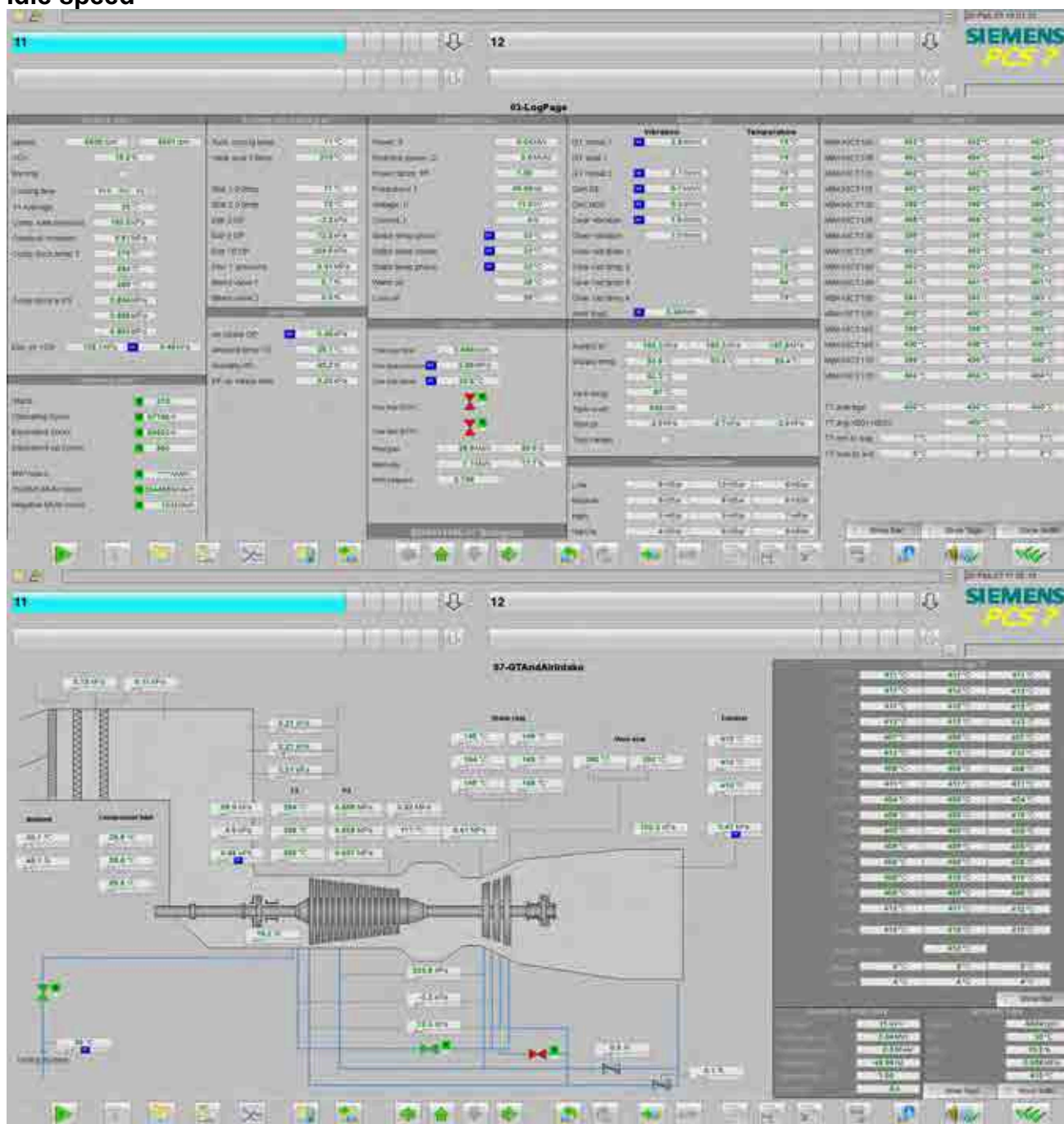
Test Executer	Date	Signature	Company
	19 Feb 2023	Kittikun Ch.	Siemens Energy

## 6

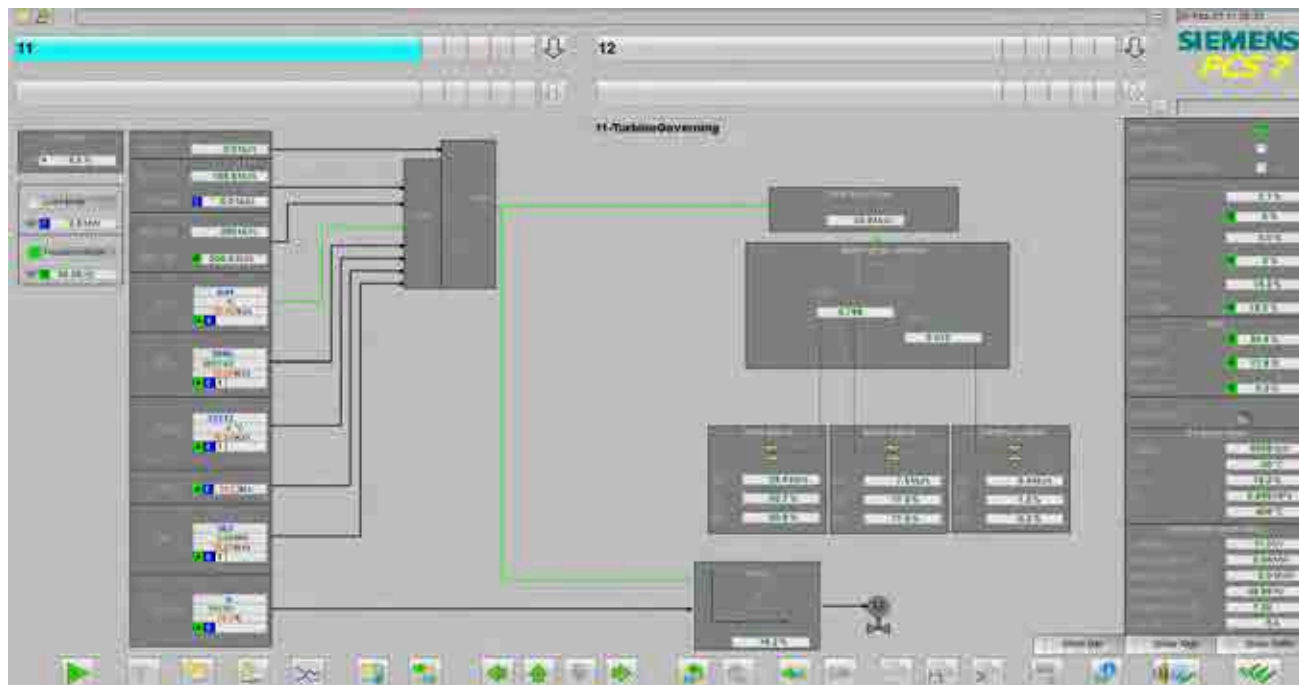
### 9.6 Appendix I Readings

## Readings

During start-up  
Idle speed



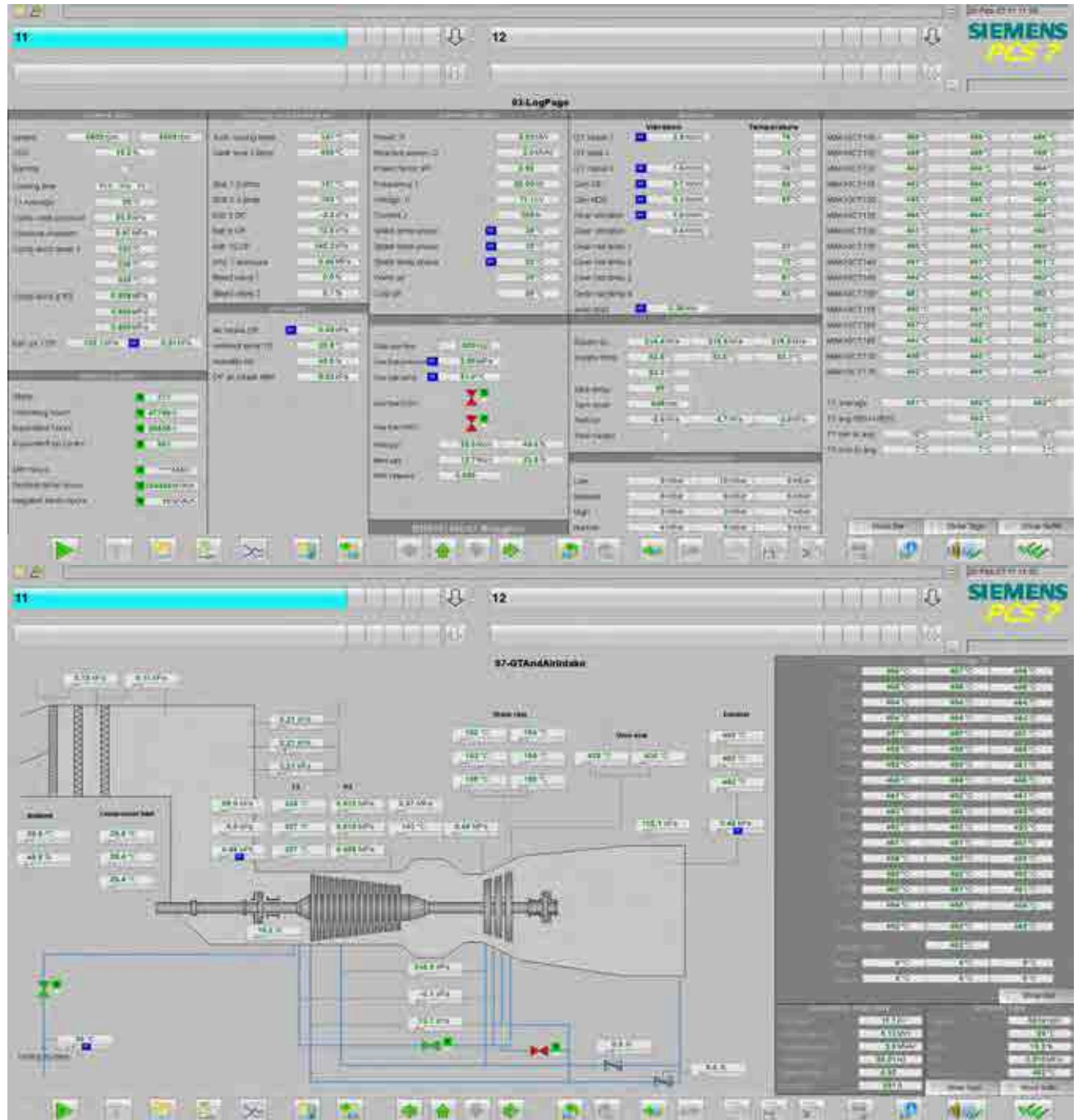


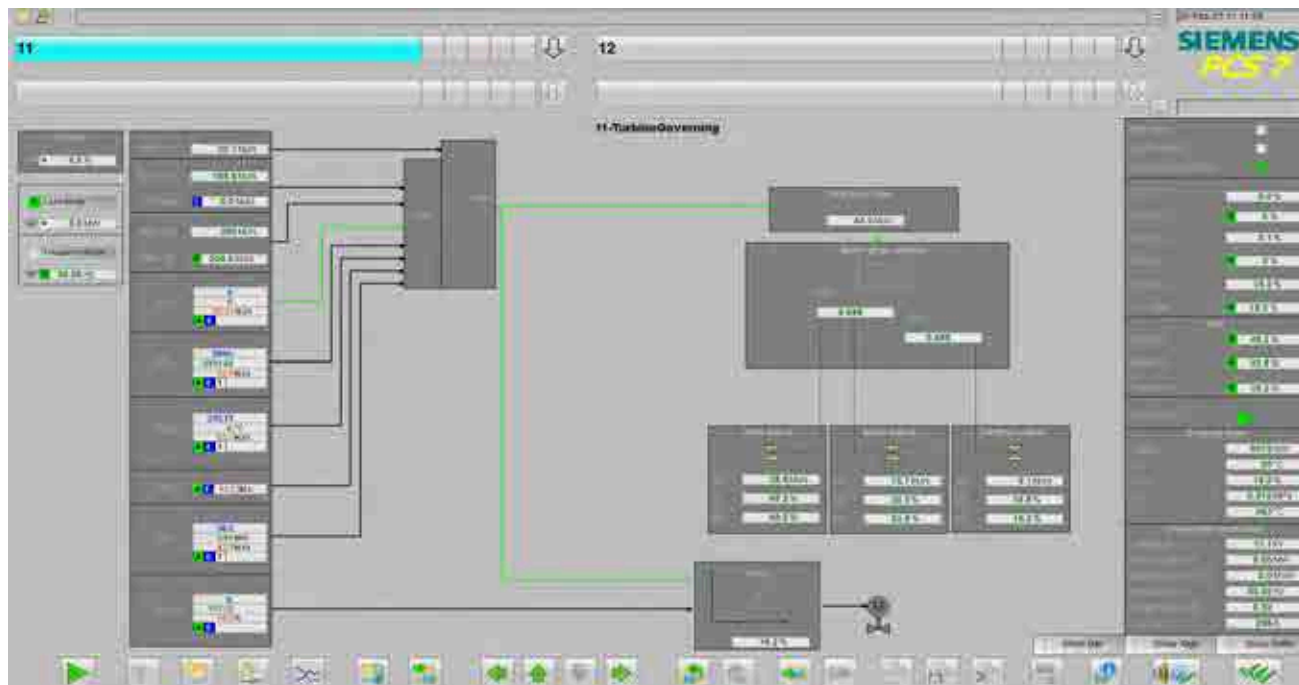


IDE1B101232740 Name: Commissioning report Rev: A Protection: Restricted IP: R00\_S00  
Creator: Reviewer: Approver:  
ALN ECCNN ECL: US-ContNo CoO:TH

## Readings

### 5MW

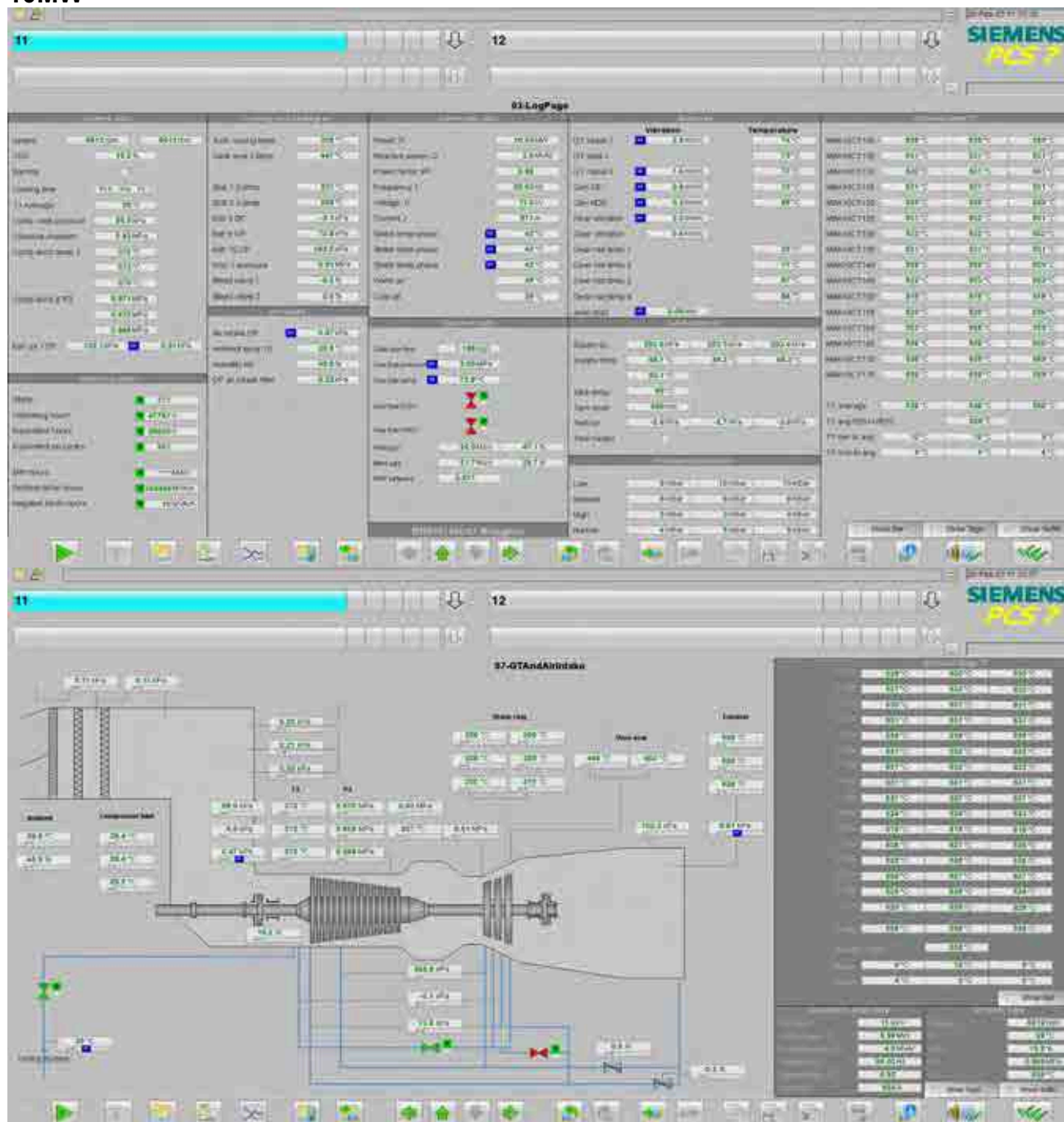


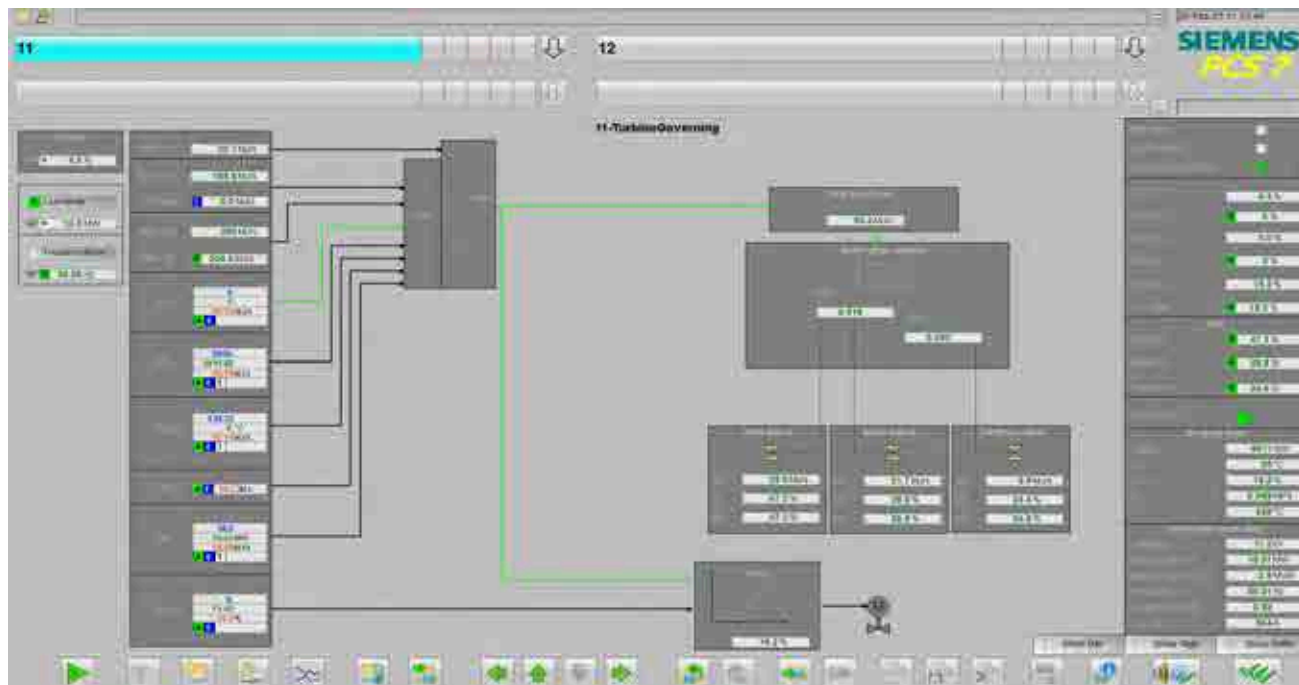


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 Creator: Reviewer: Approver:  
 ALN ECCNN ECL: US-ContNo CoO:TH

## Readings

**10MW**



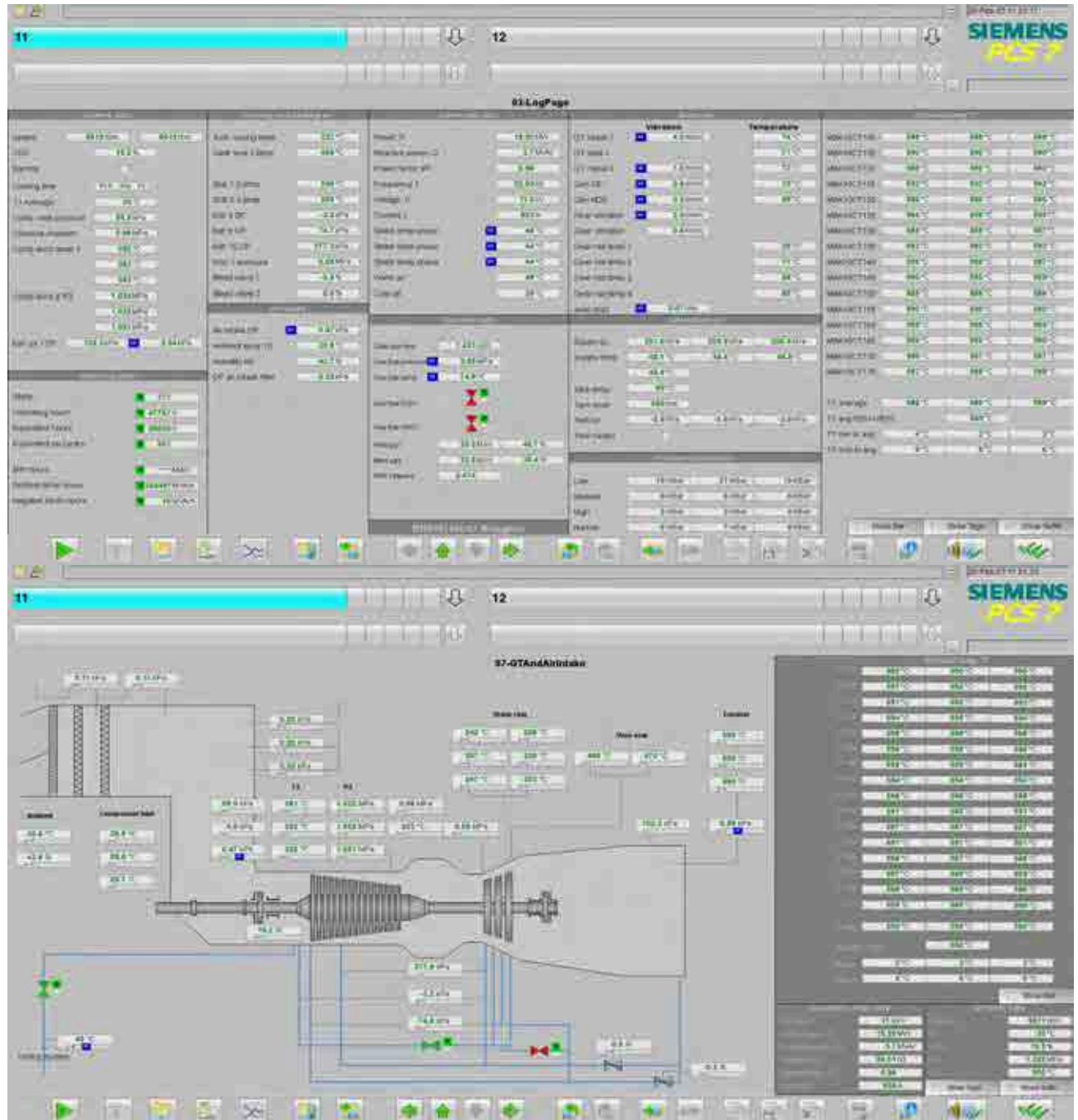


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 ALN ECCNN ECL: US-ContNo CoO:TH

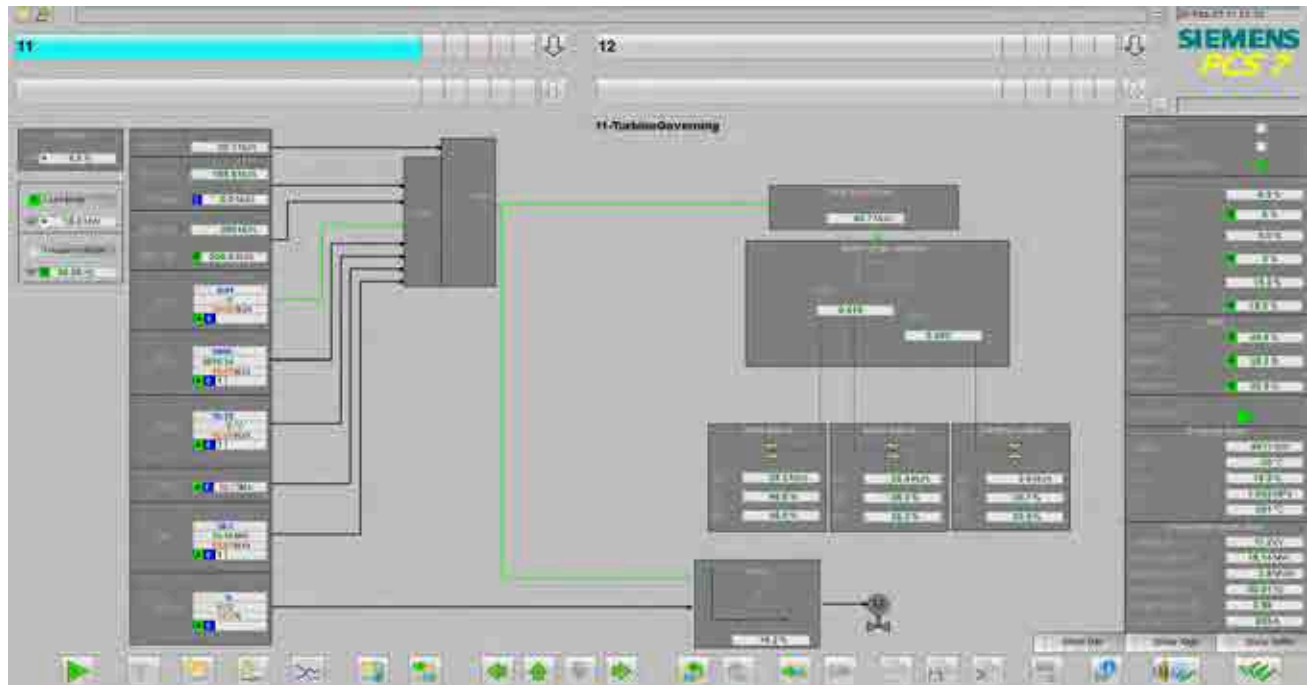


## Readings

### 15MW



## Readings

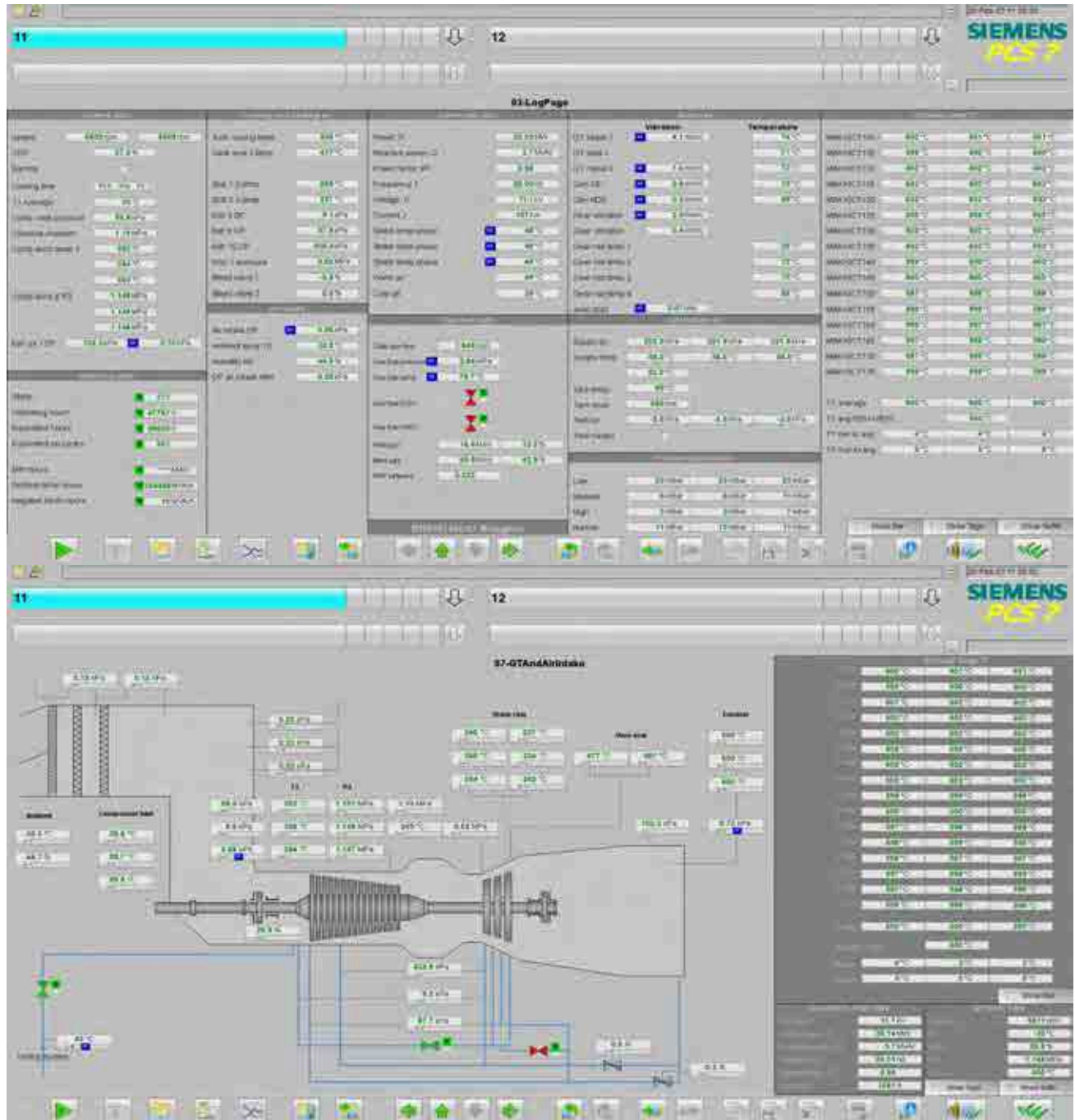


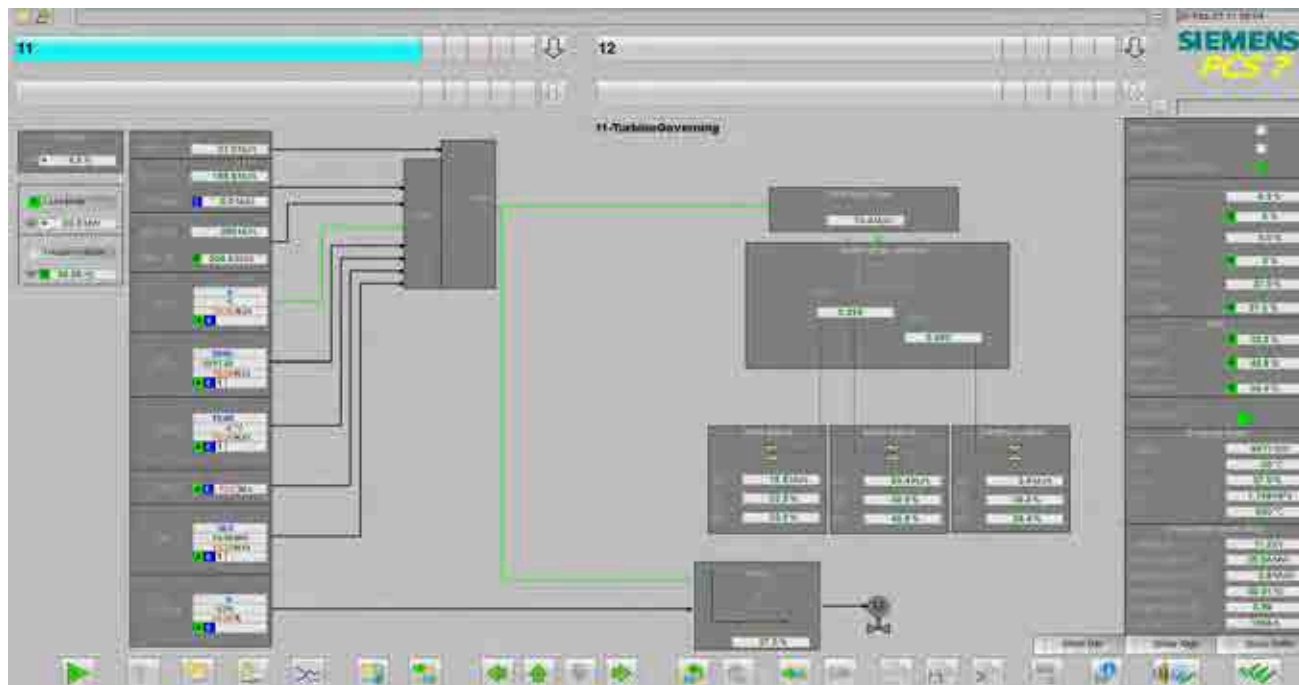
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 ALN ECCNN ECL: US-ContNo CoO:TH



## Readings

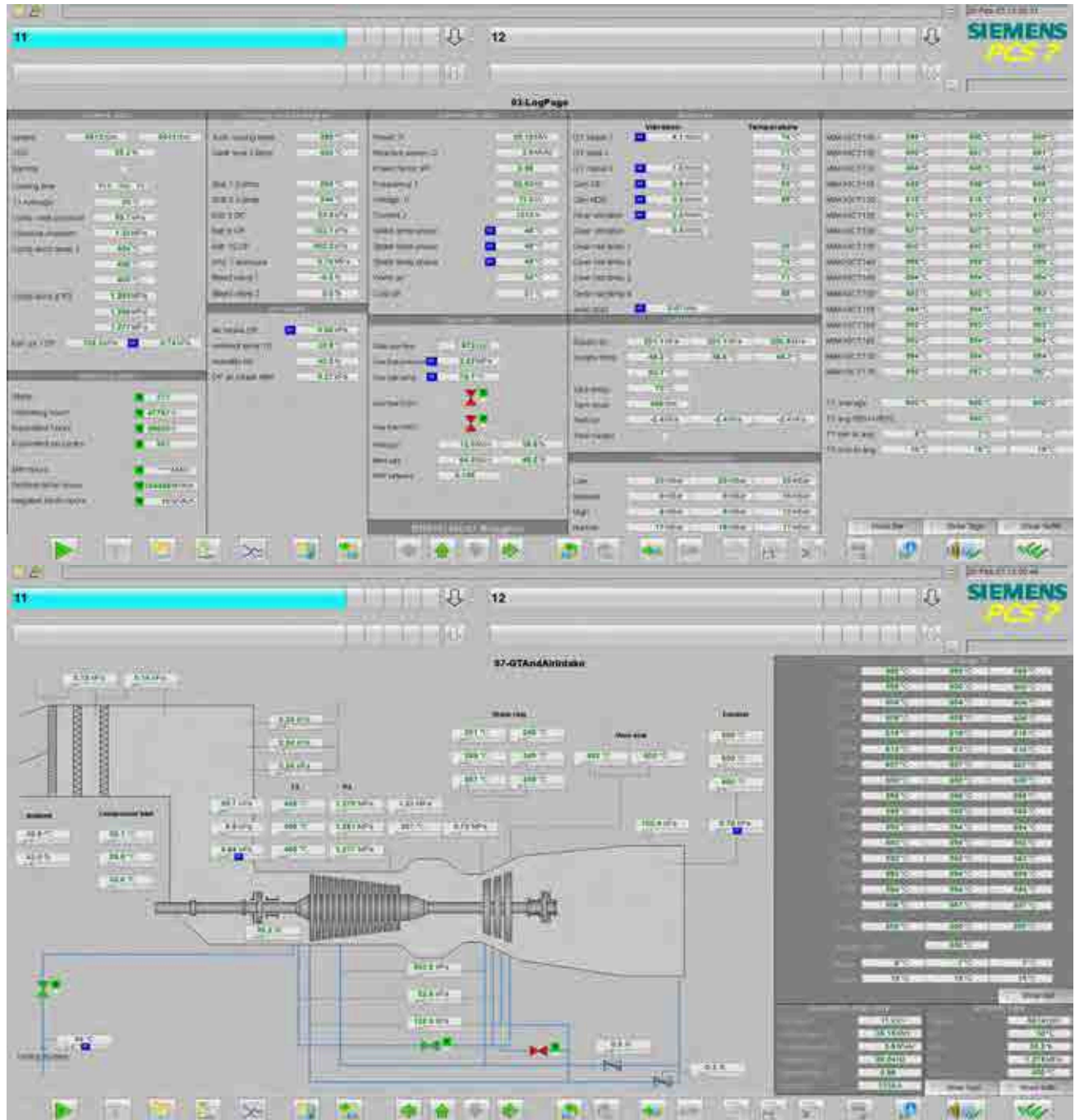
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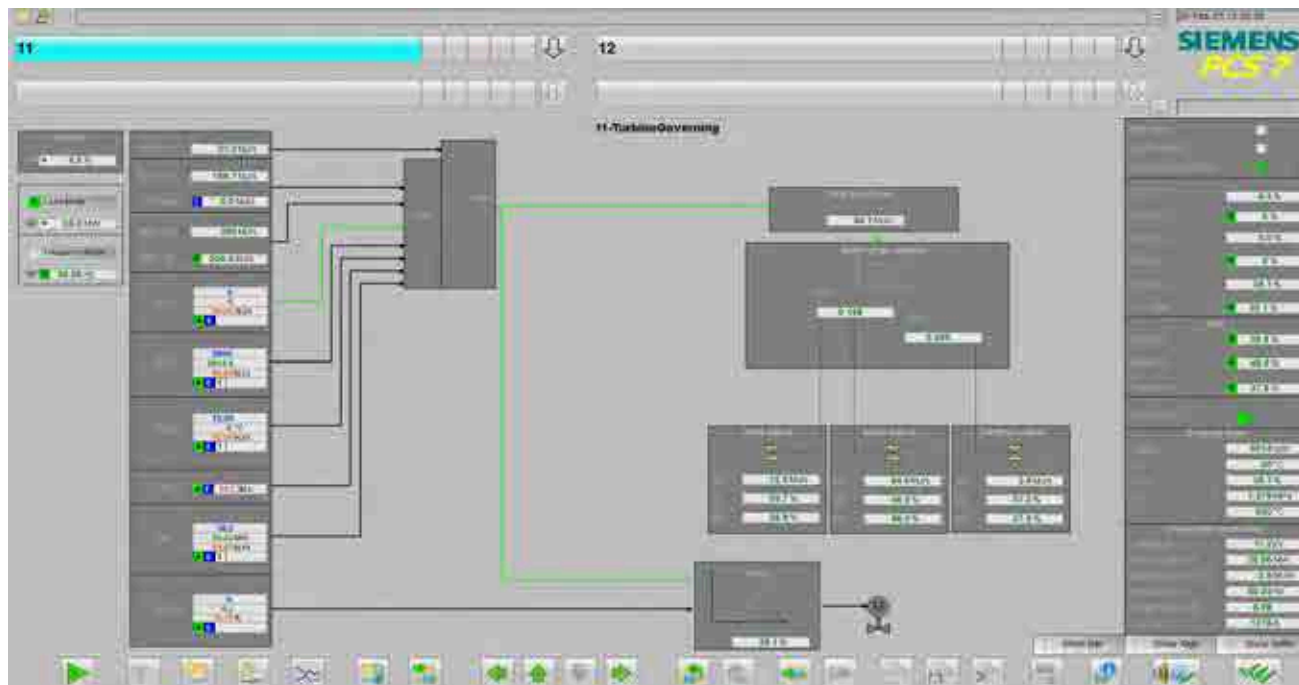




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## 25MW

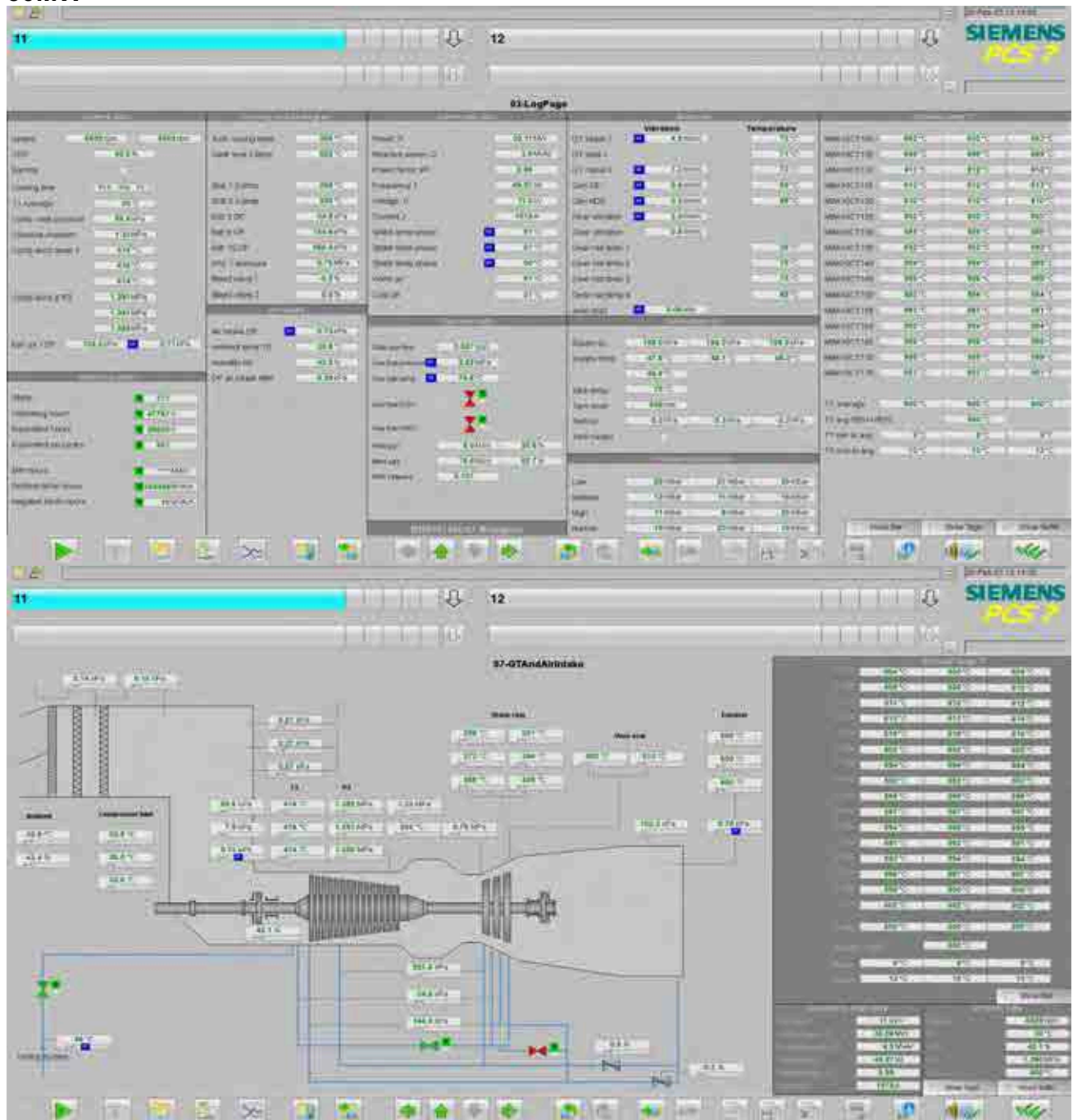




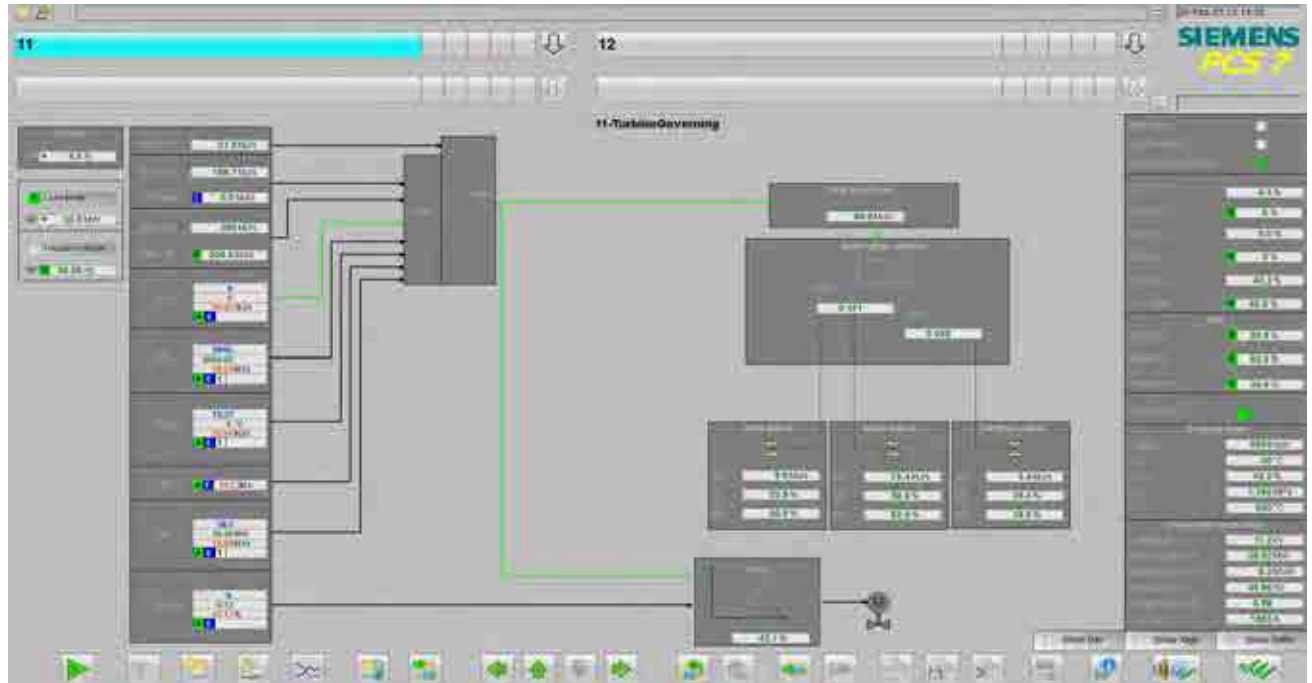
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### 30MW



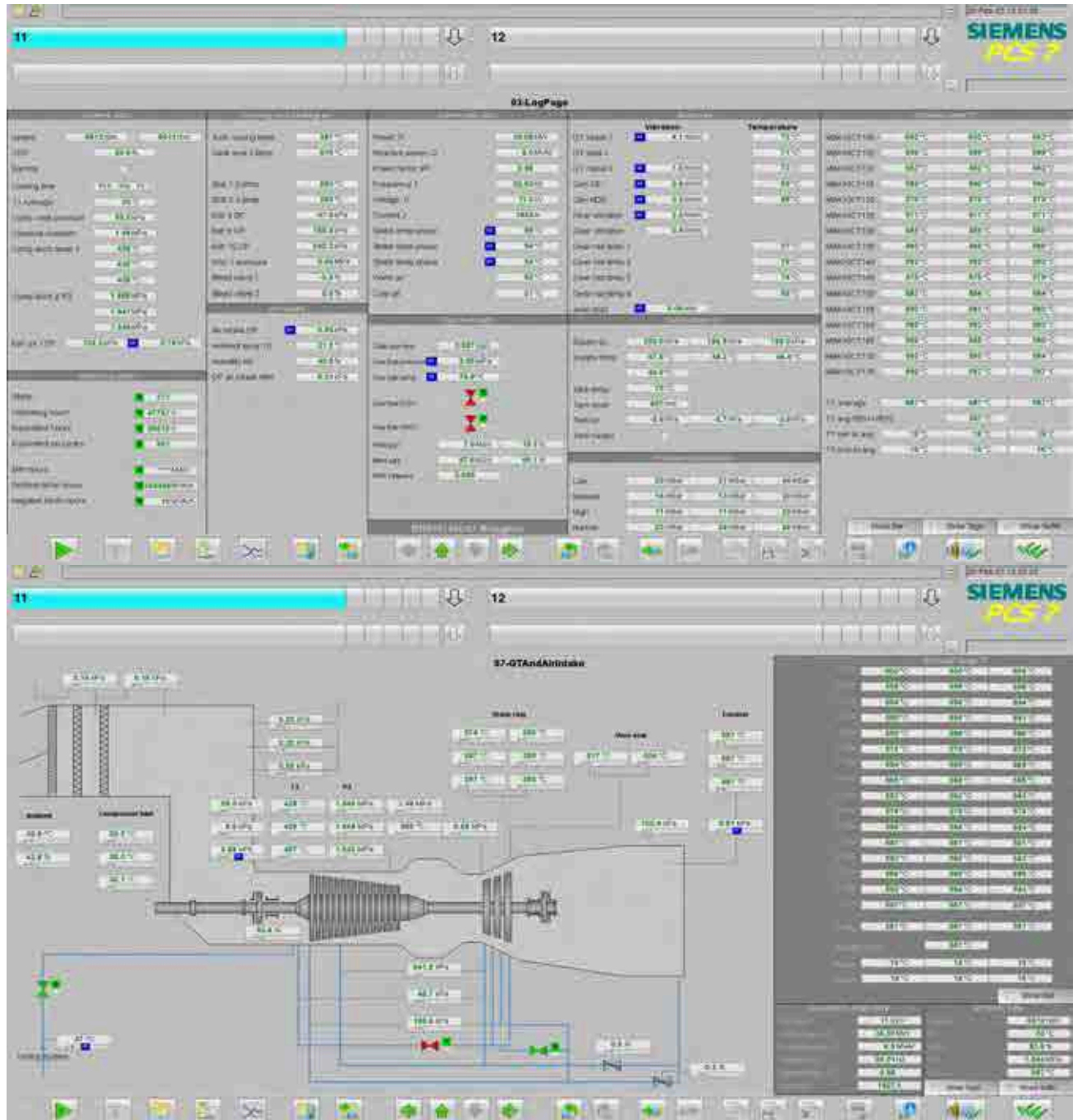
## Readings



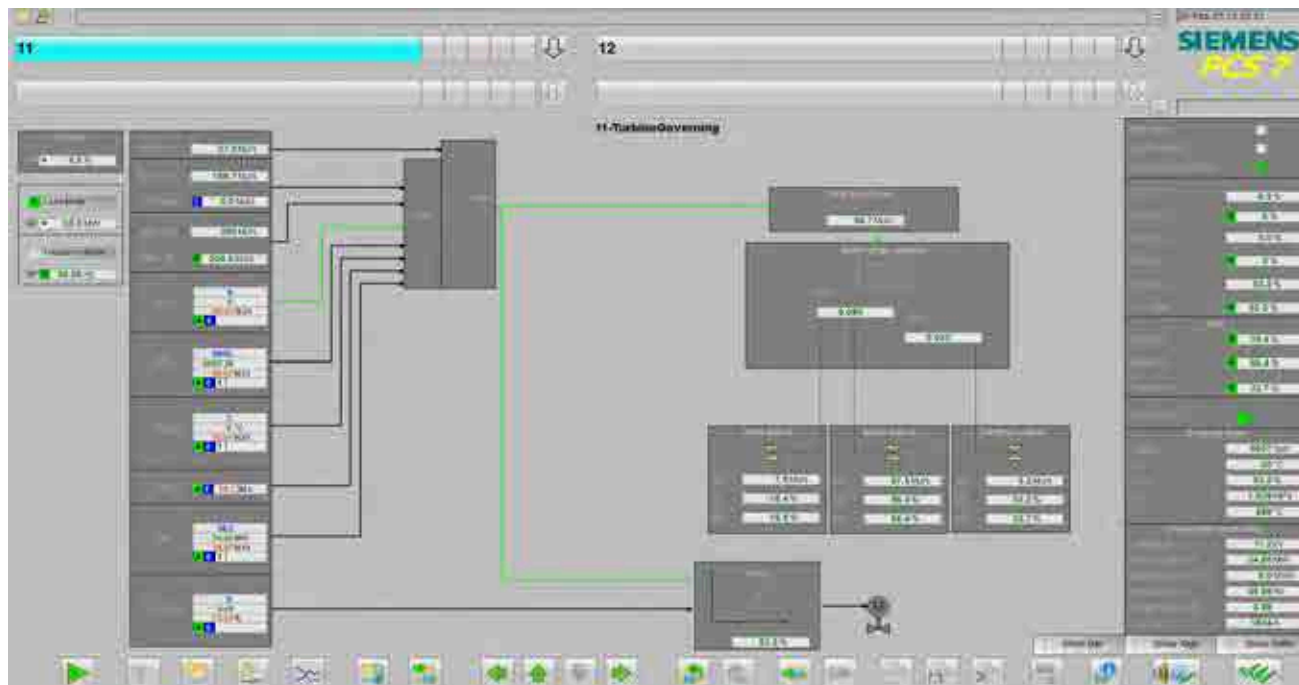
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 ID:E1B101232740 Name:Commissioning report Rev:A Protection:Restricted IP:R00,S00

# Readings

35MW

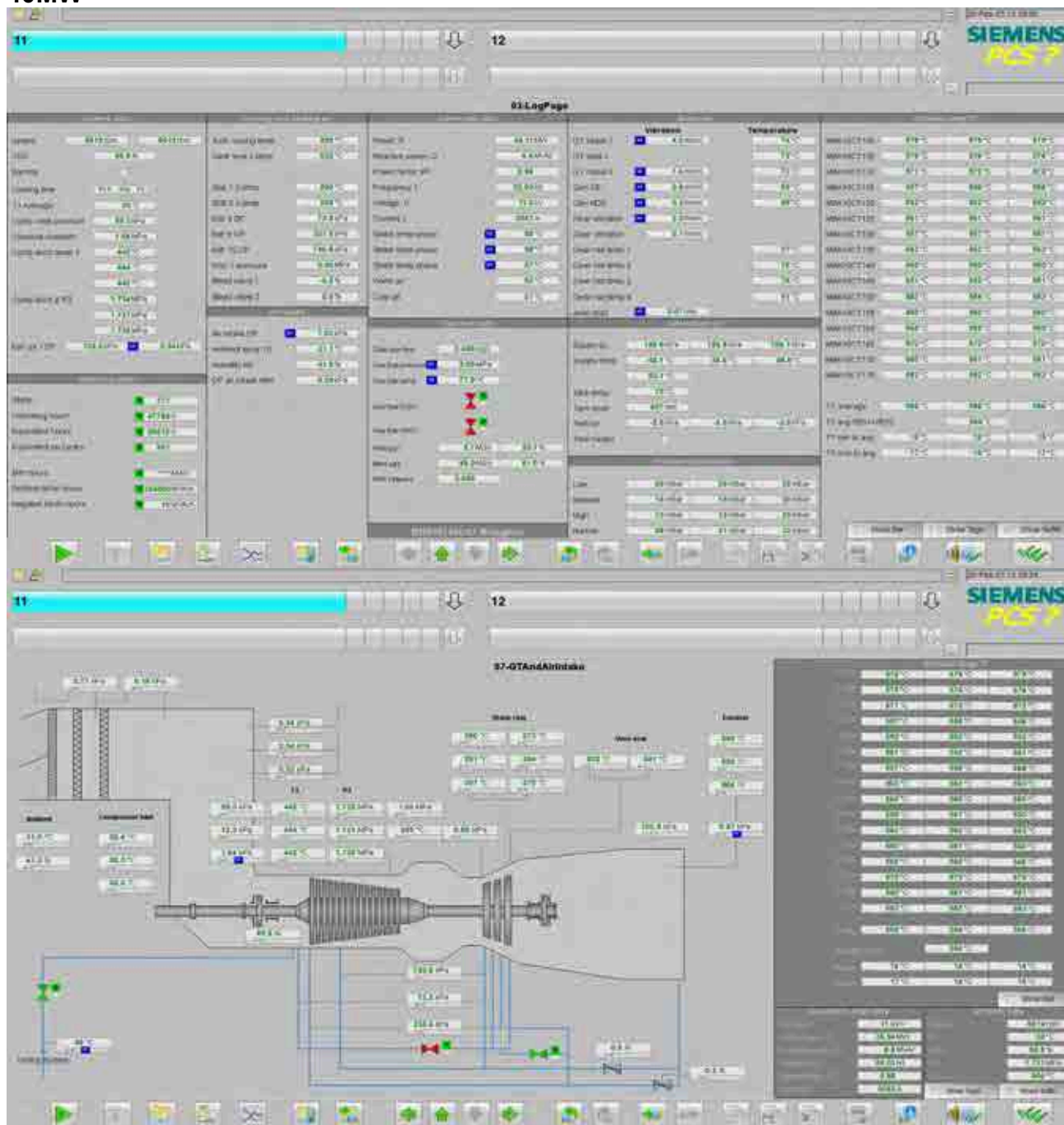


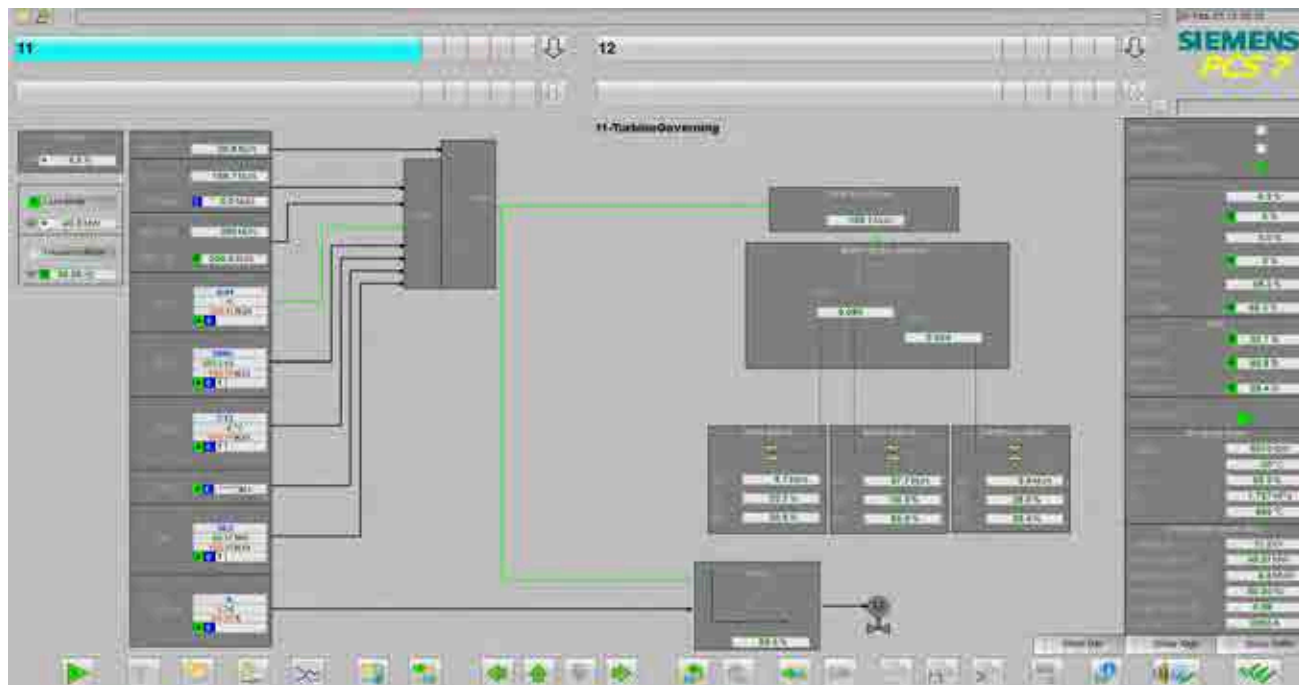




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## 40MW

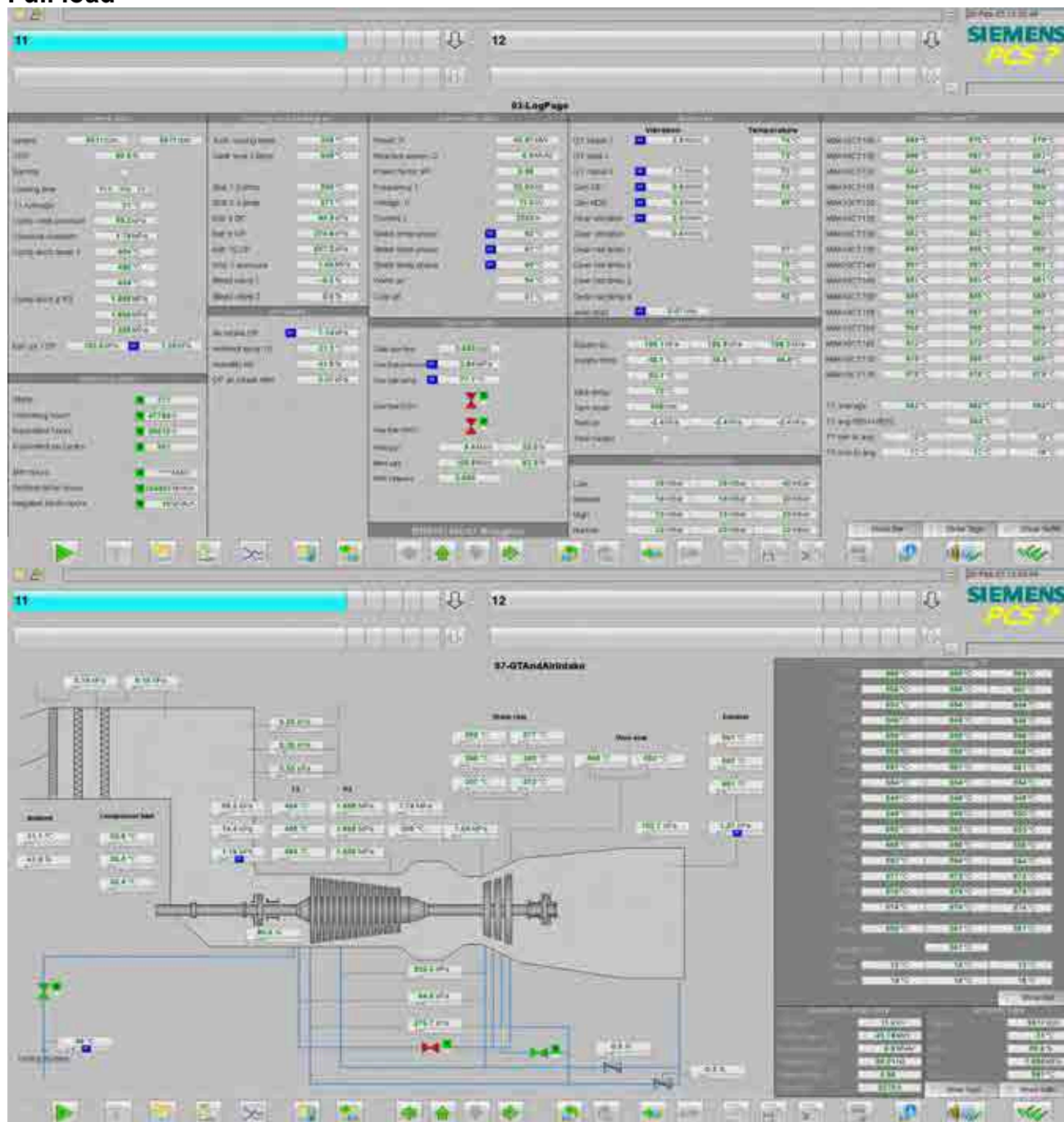


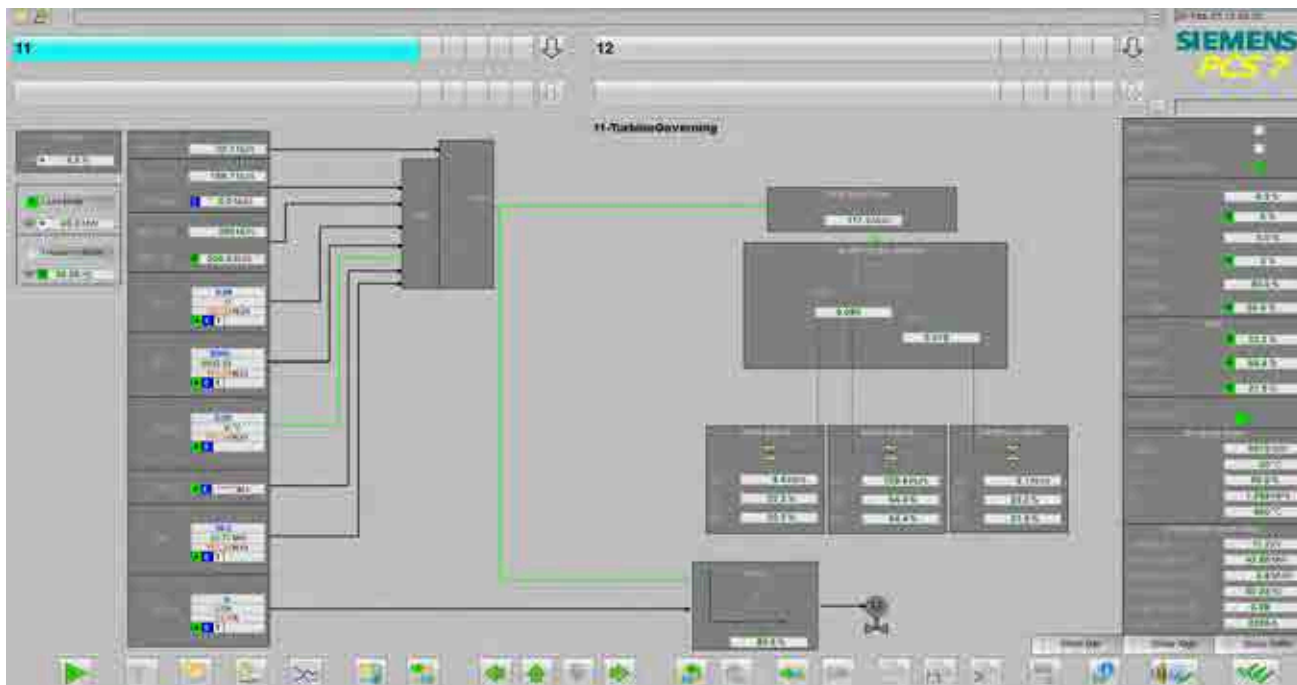


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Creator: Reviewer: Approver:  
ALN ECCNN ECL: US-ContNo CoO:TH

## Readings

### Full load





IDE:1B101232740 Name:Commissioning report Rev:A Protection:Restricted IP:R00,S00  
 Creator: Reviewer: Approver:  
 ALN ECCNN ECL: US-ContNo CoO:TH

## COMPLETION

Test Executer	Date	Signature	Company
	20 Feb 2023	Kittinan W.	Siemens Energy

**7**

**9.7 Appendix J Activities outside maintenance plan.doc**

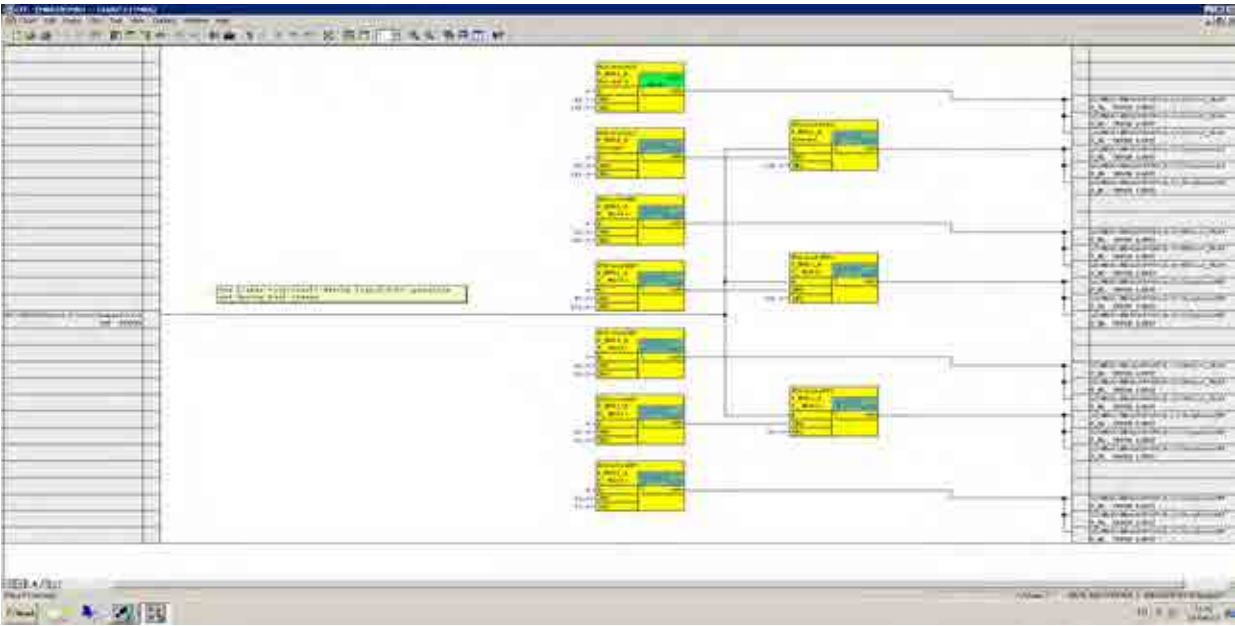


Activities outside maintenance plan

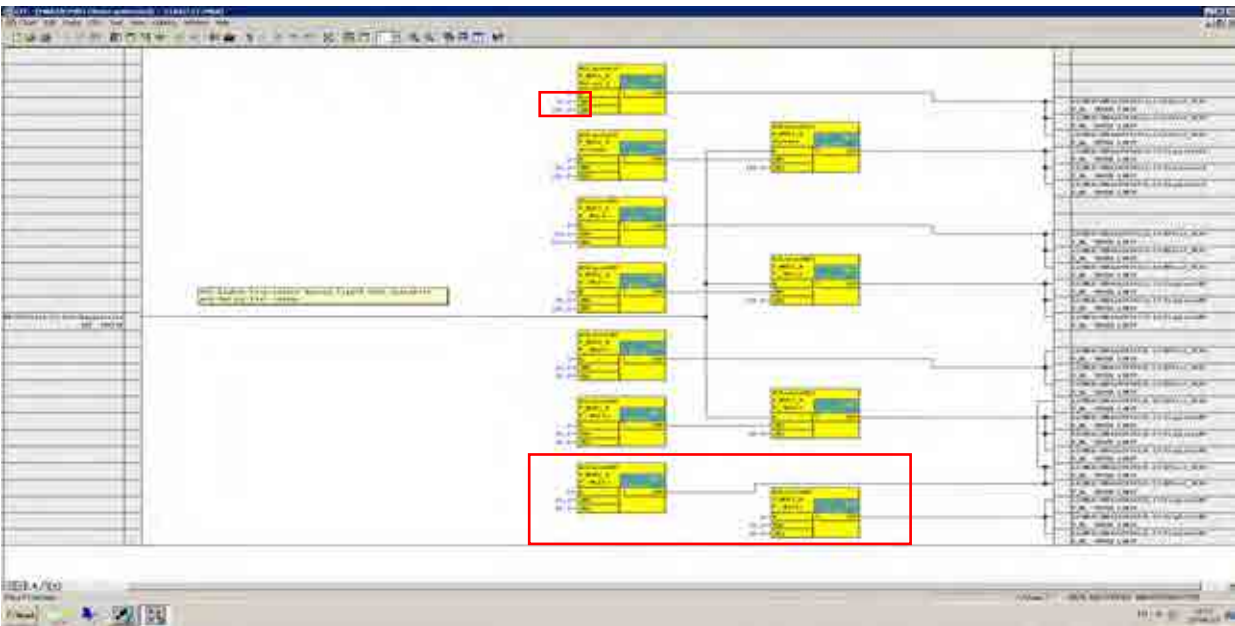
Project:	SSUT GT11
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4.2

**SuP19/2020/SGT-800 Revised LFP/NFP Pulsations level**  
Before



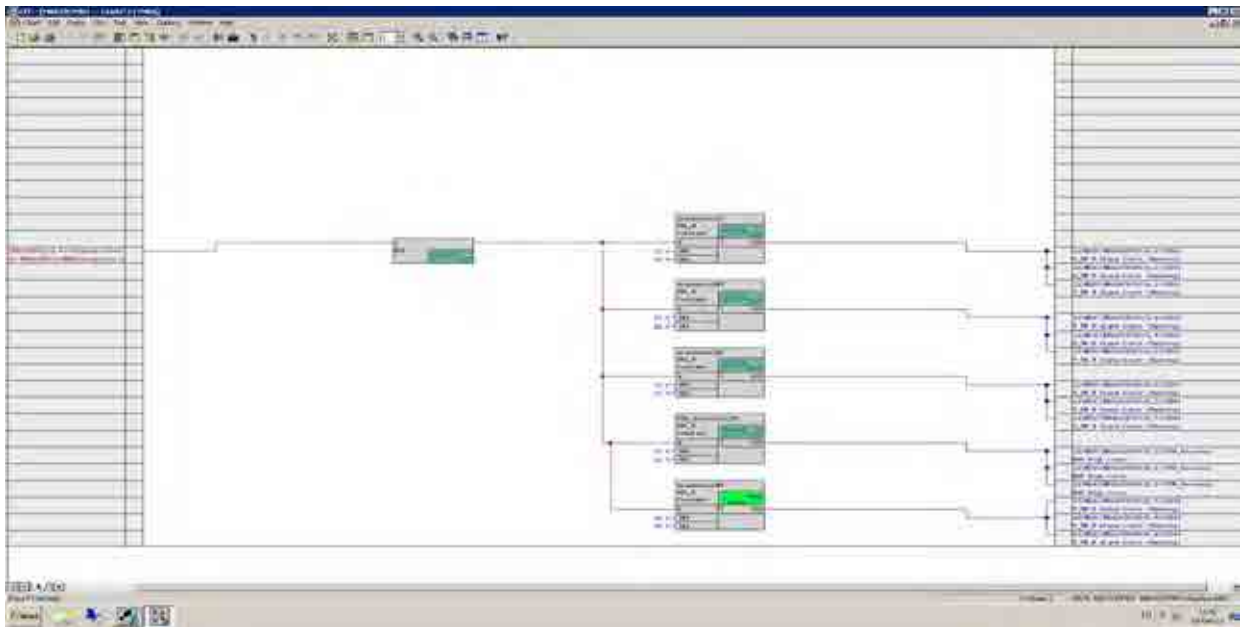
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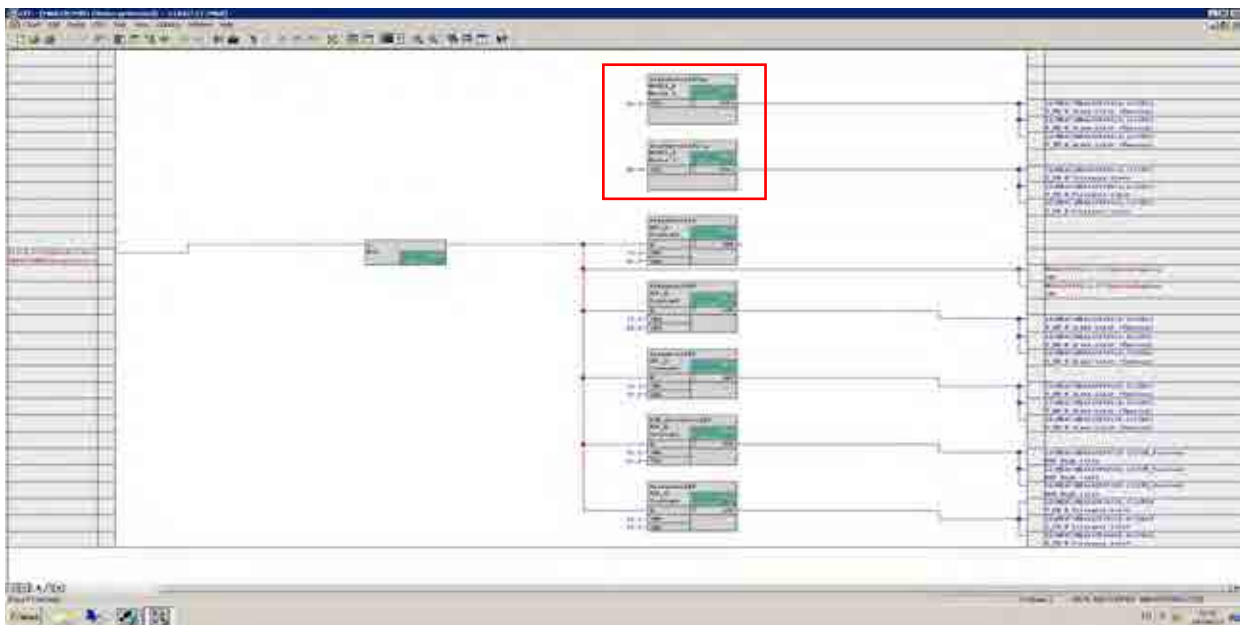


## Activities outside maintenance plan

Before

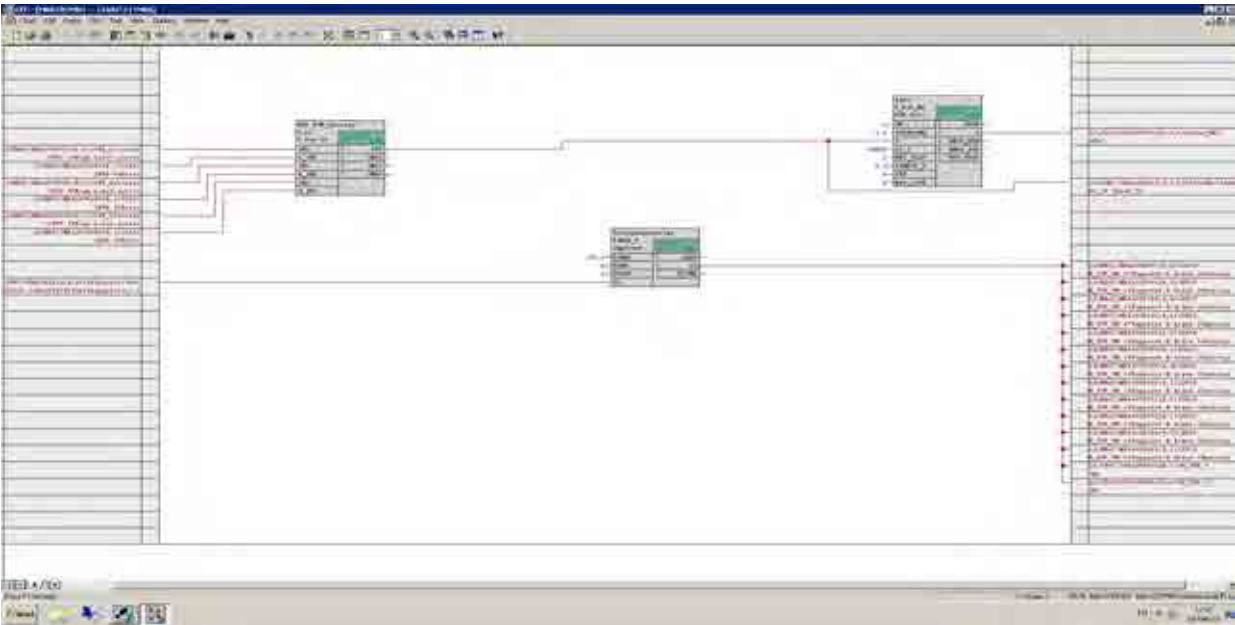


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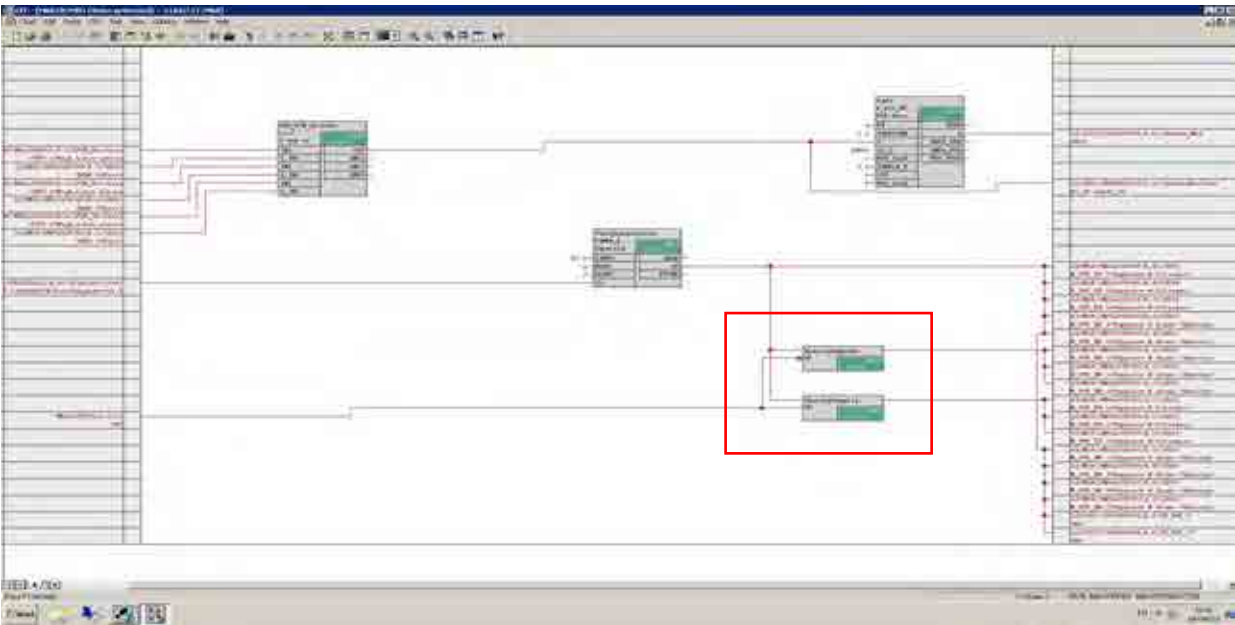


Activities outside maintenance plan

Before



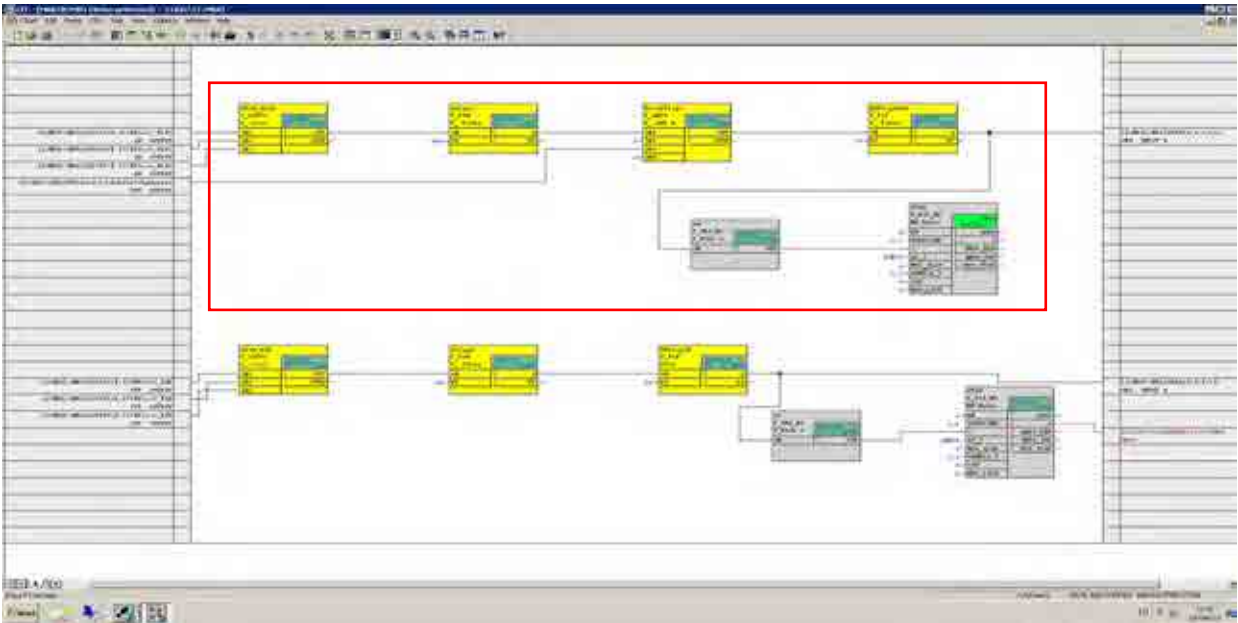
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ALN EOCNN ECL: US-ContNo CoO:TH

Activities outside maintenance plan

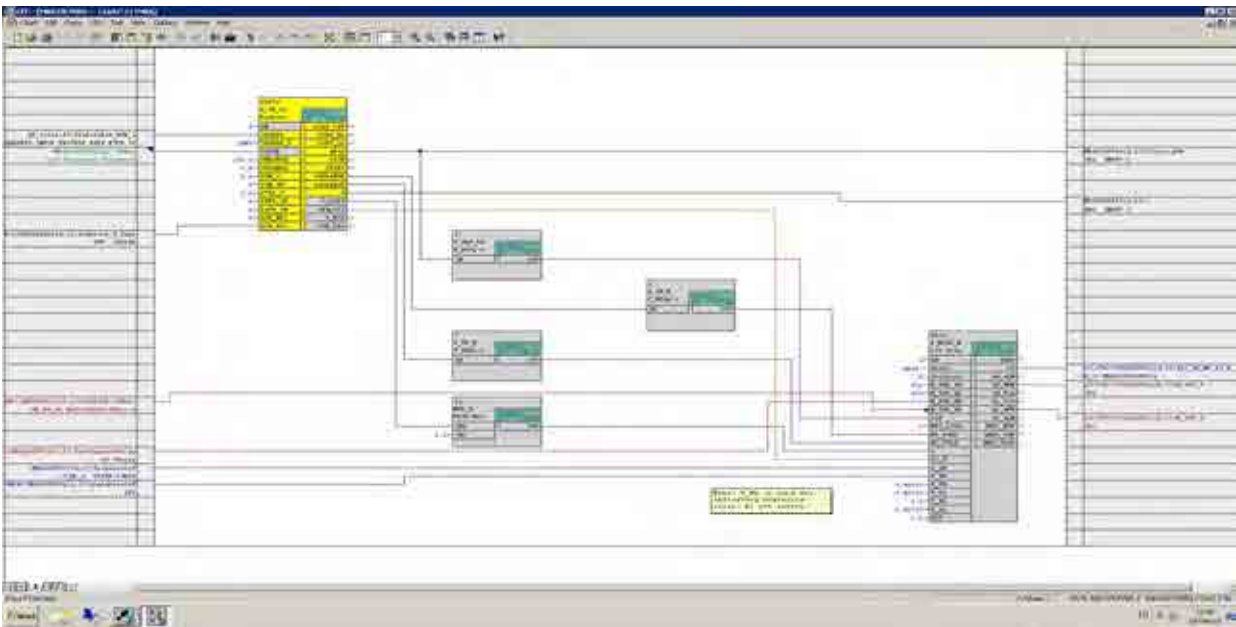
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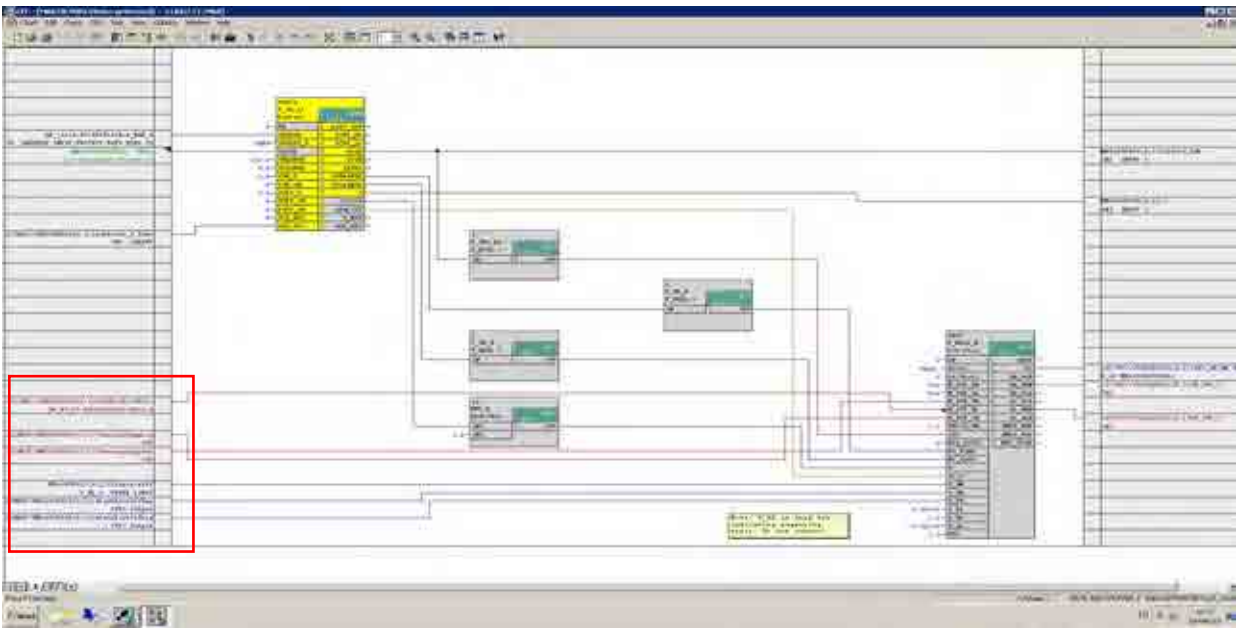
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Activities outside maintenance plan

Before



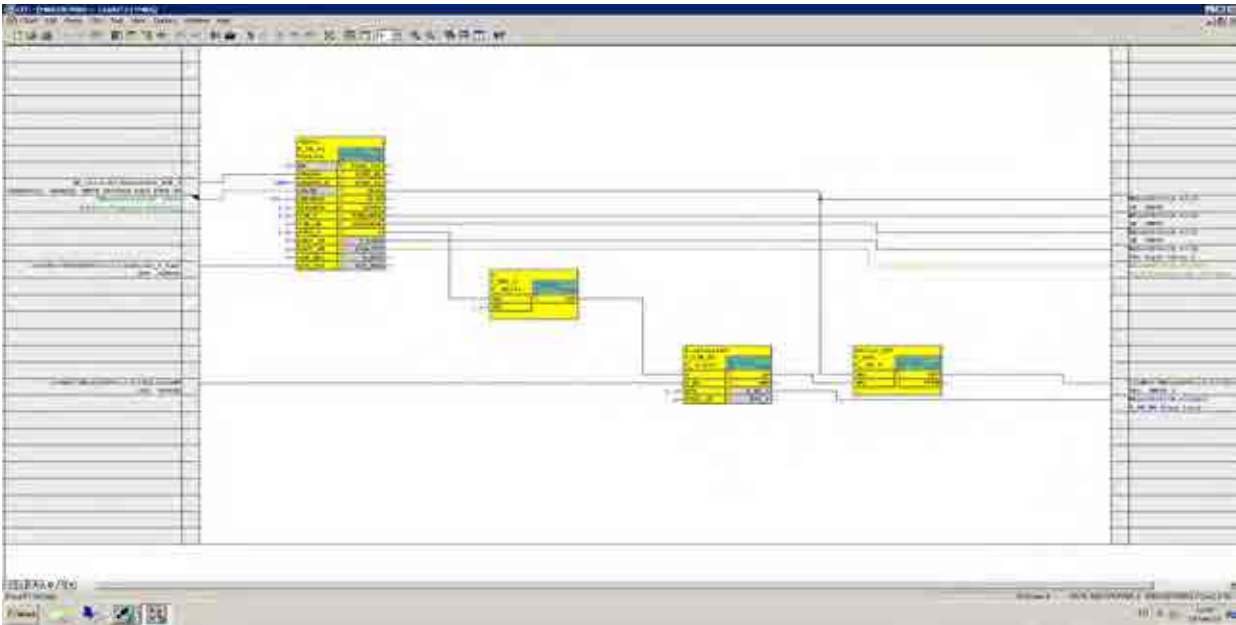
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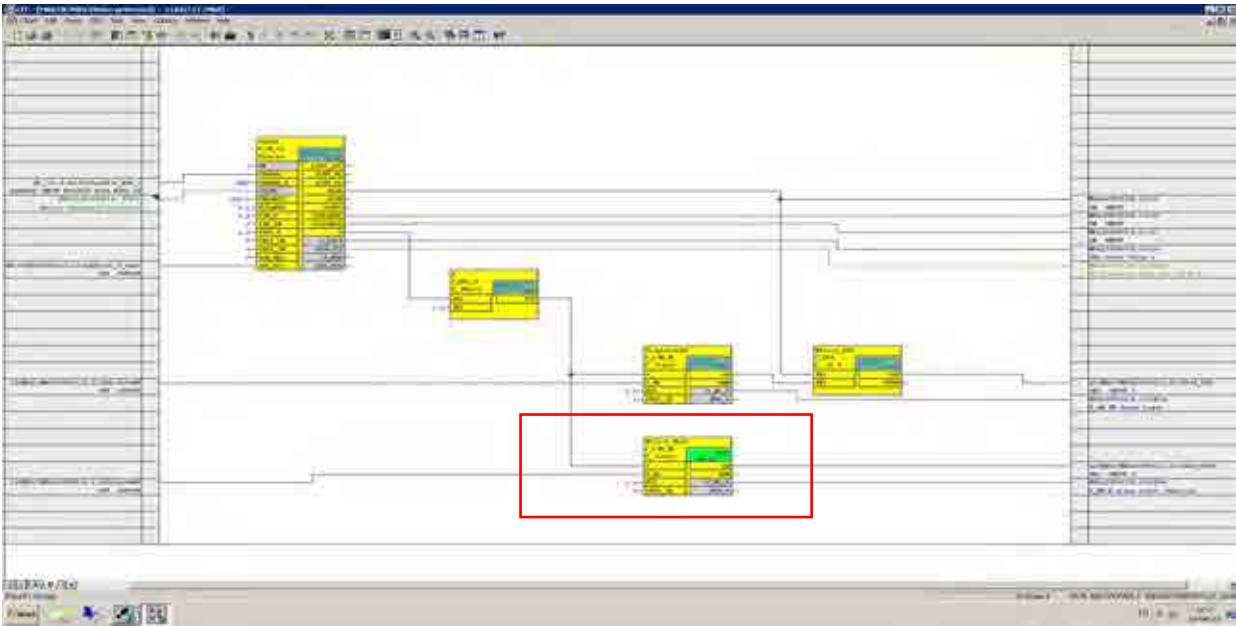
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Activities outside maintenance plan

Before



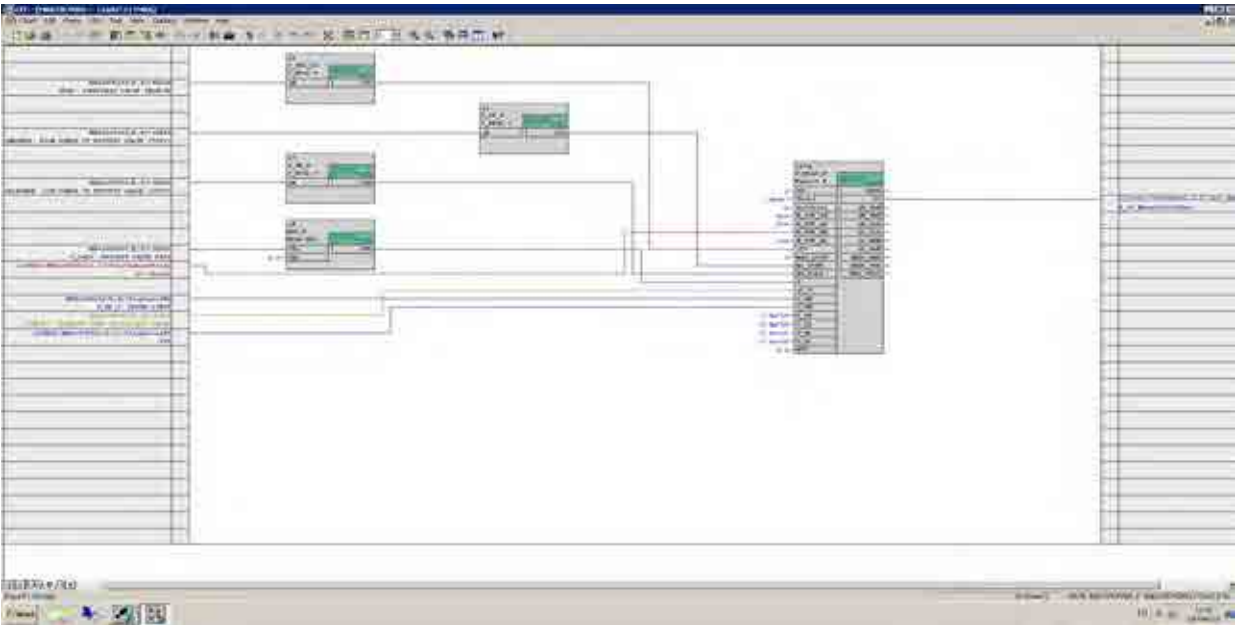
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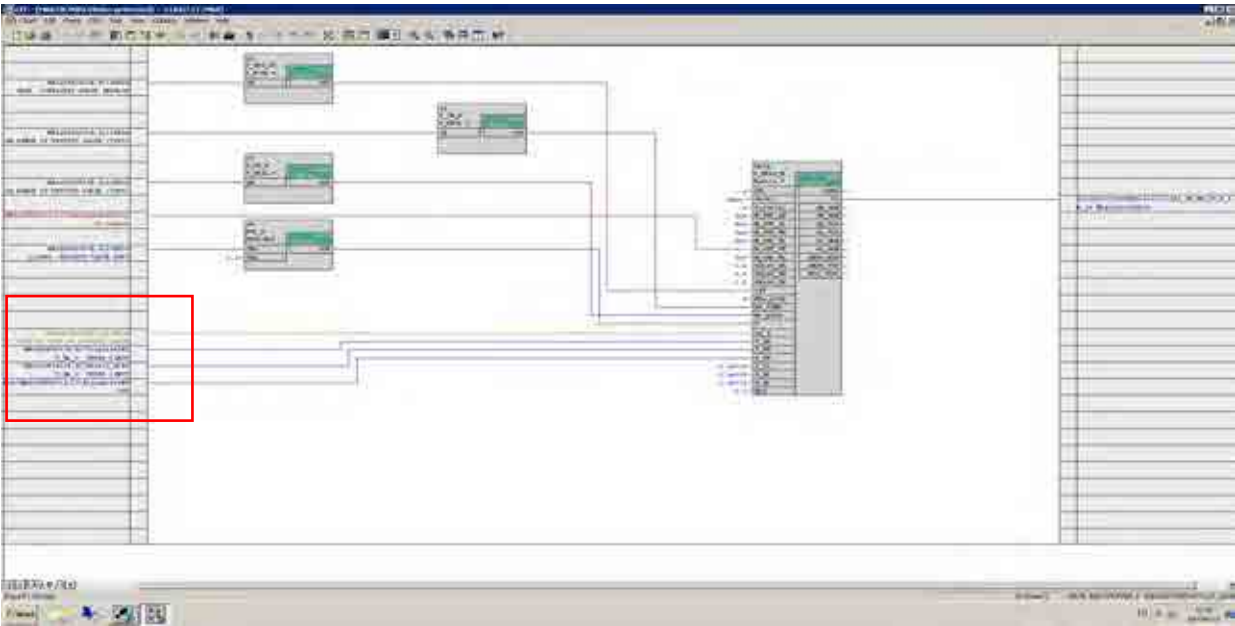
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Activities outside maintenance plan

Before



After

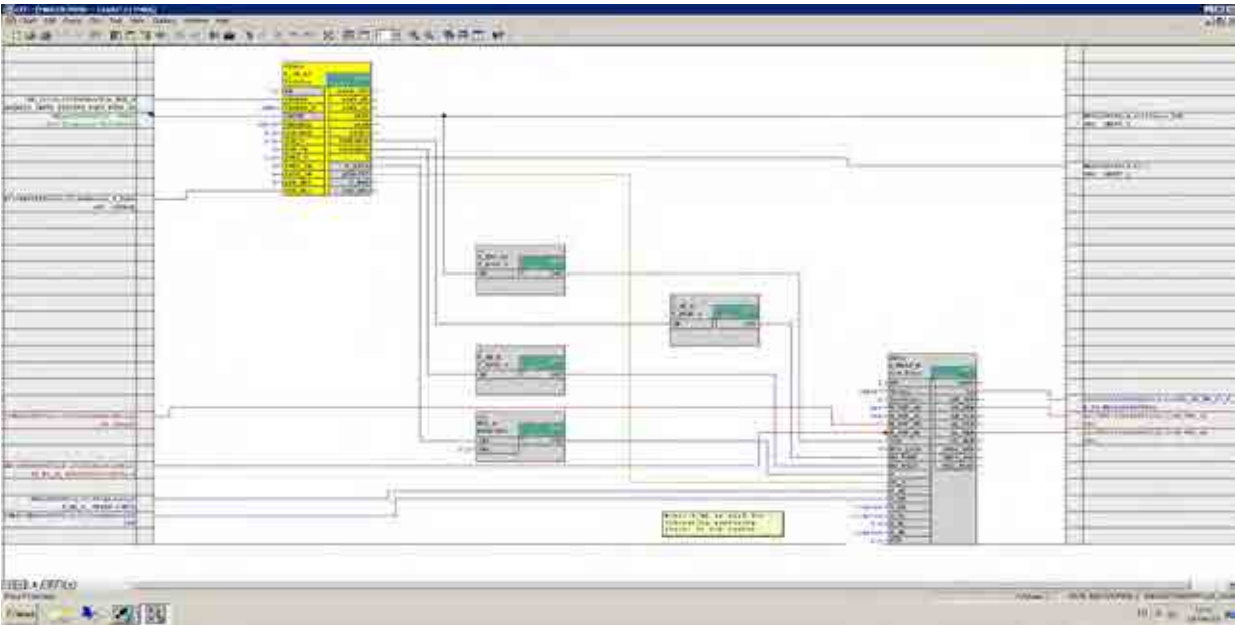


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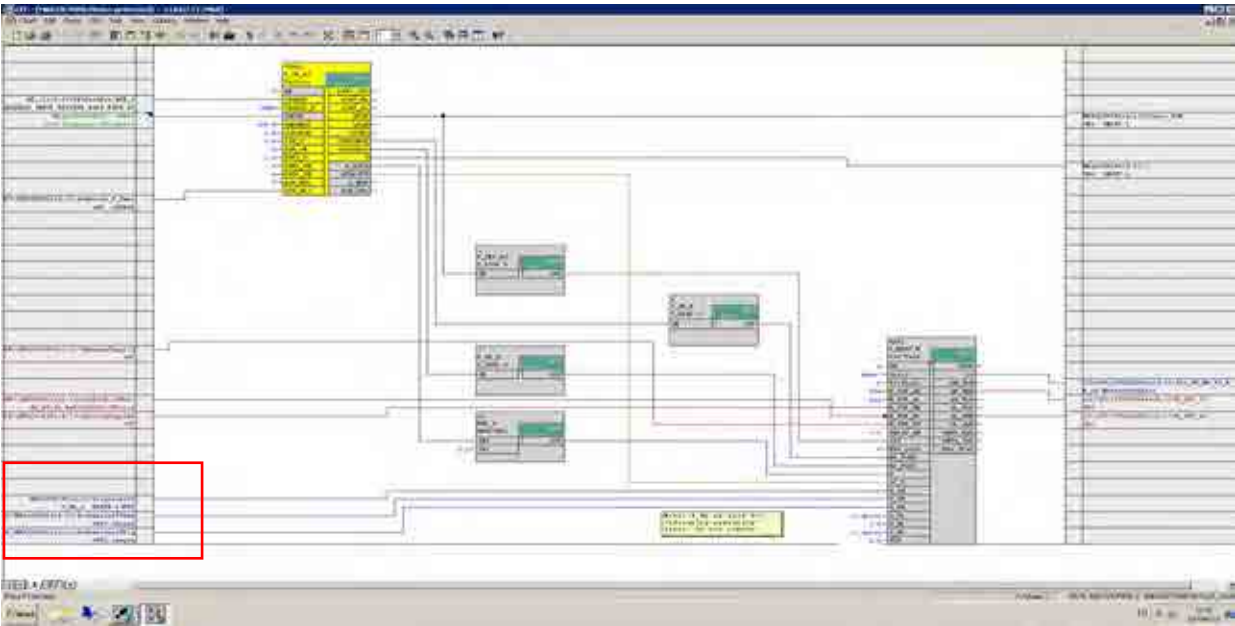


Activities outside maintenance plan

Before



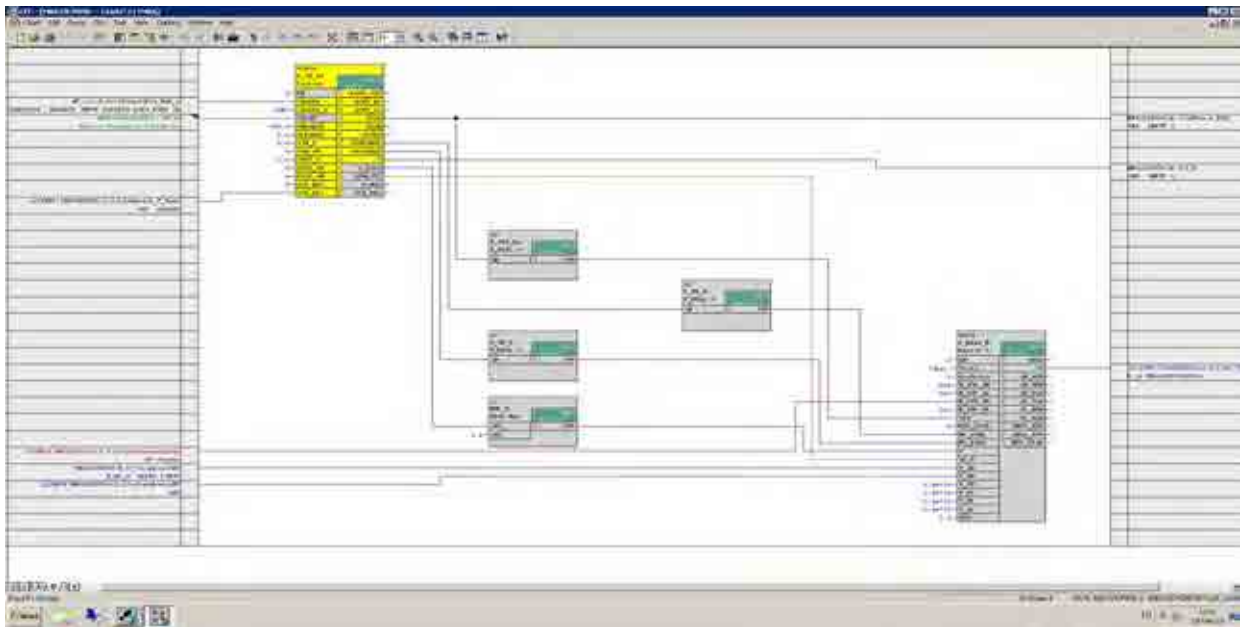
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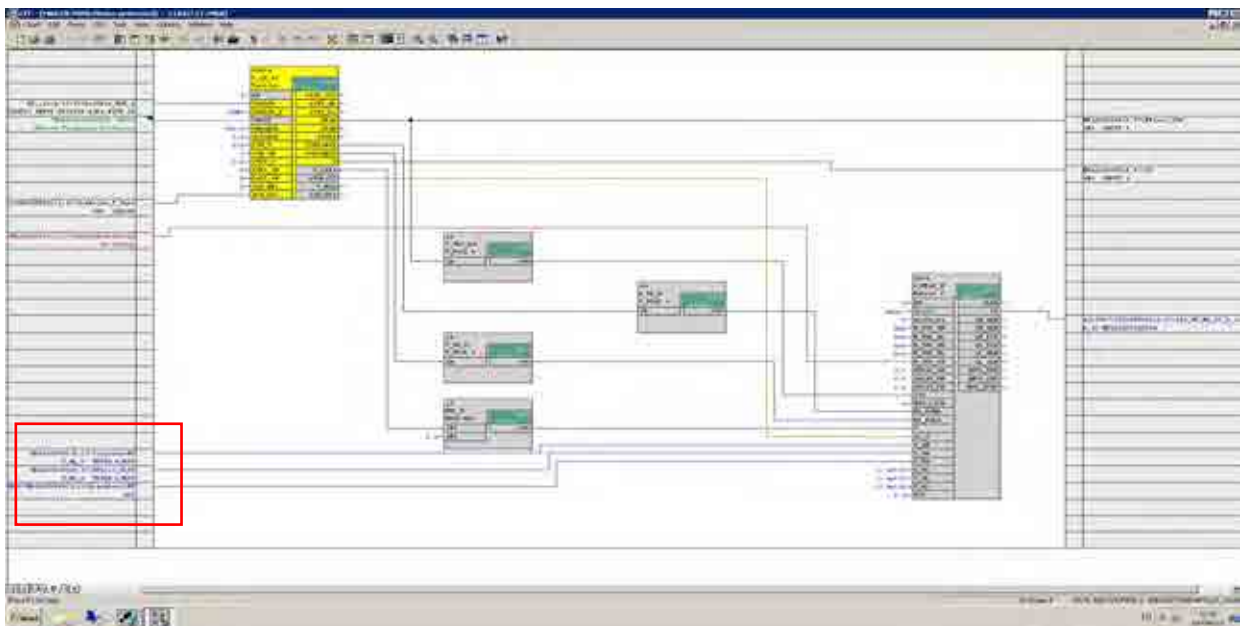
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## Activities outside maintenance plan

### Before

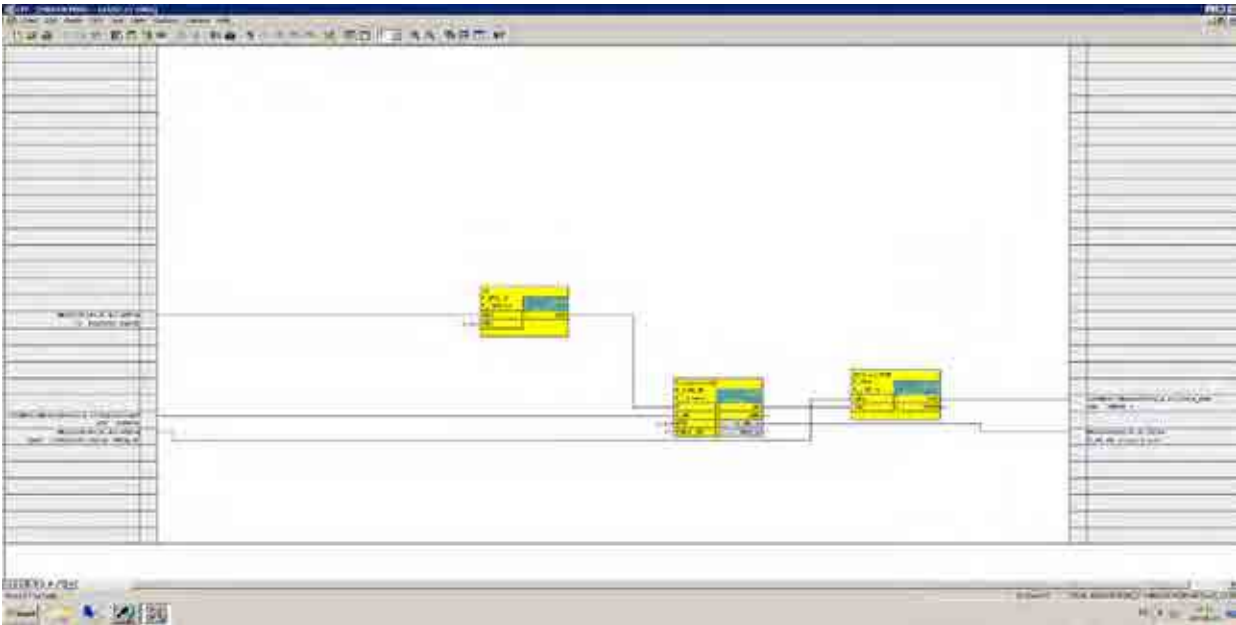


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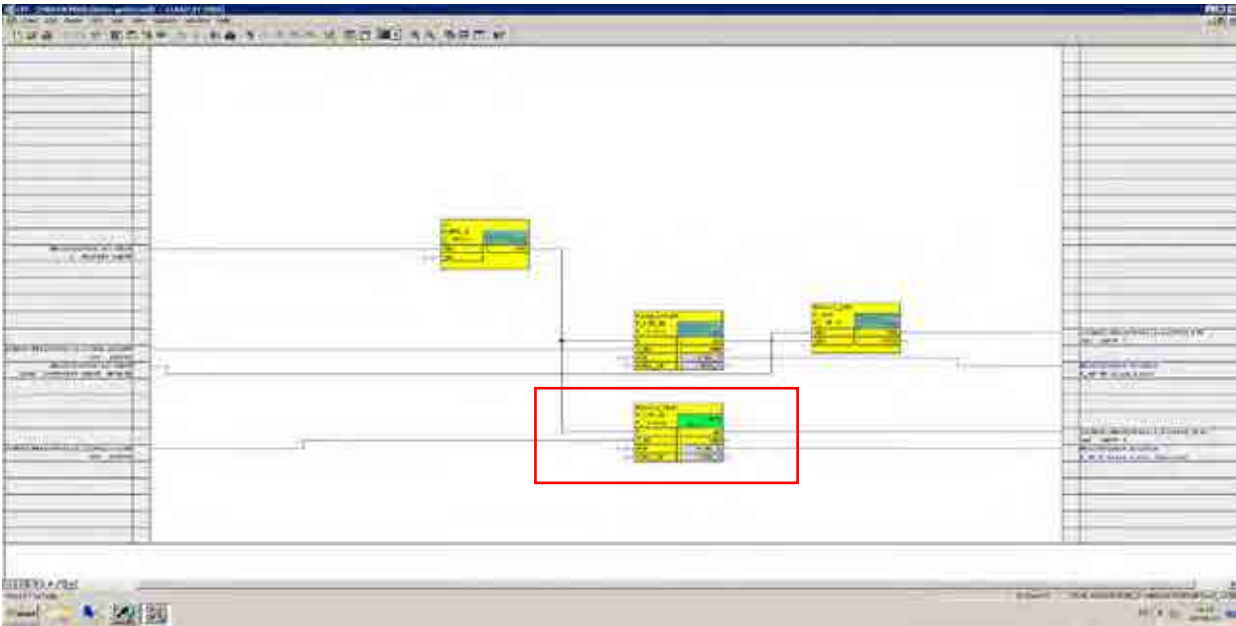


Activities outside maintenance plan

Before



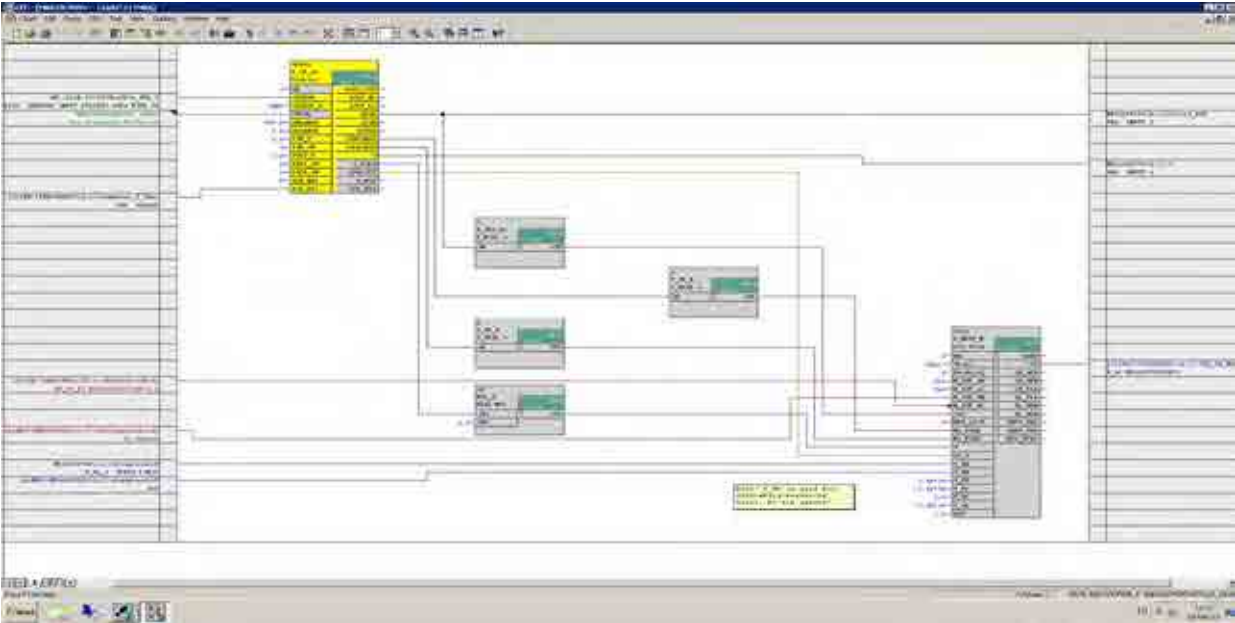
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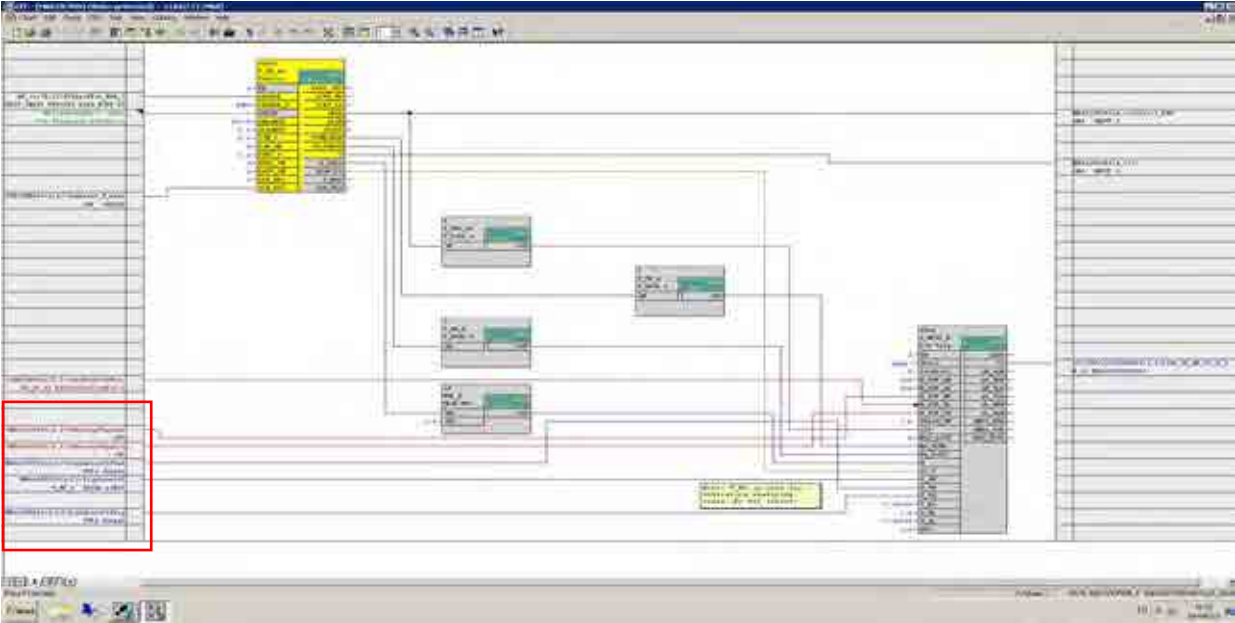
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ALN EOCNN ECL: US-ContNo Co: 0:TH

Activities outside maintenance plan

Before



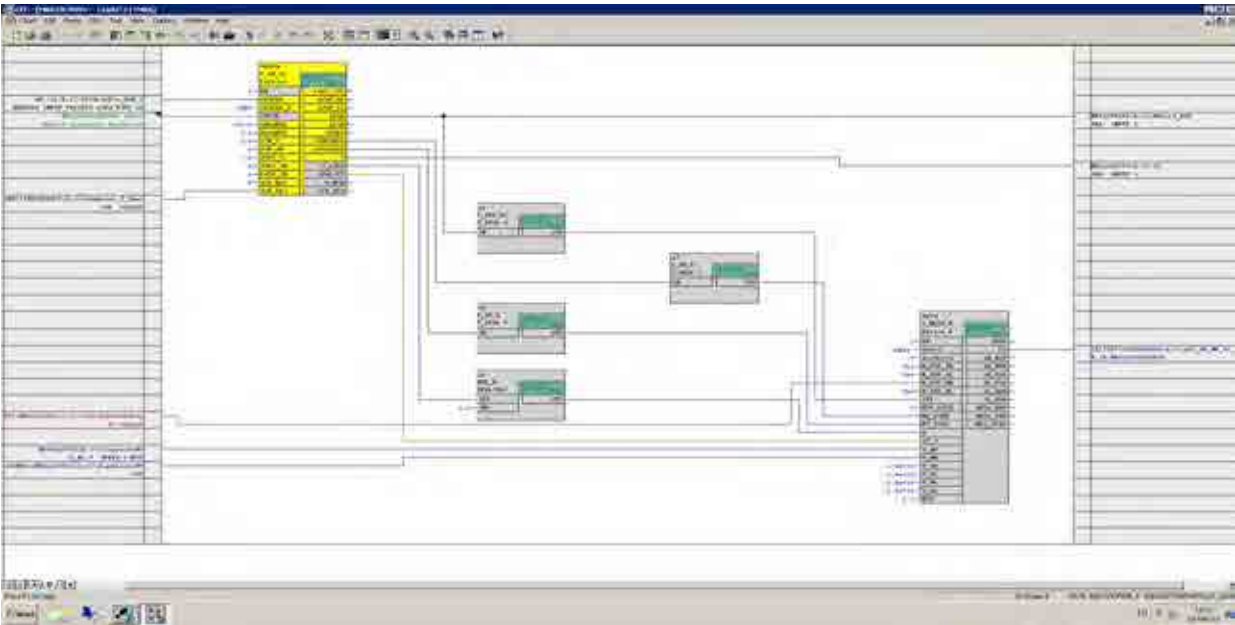
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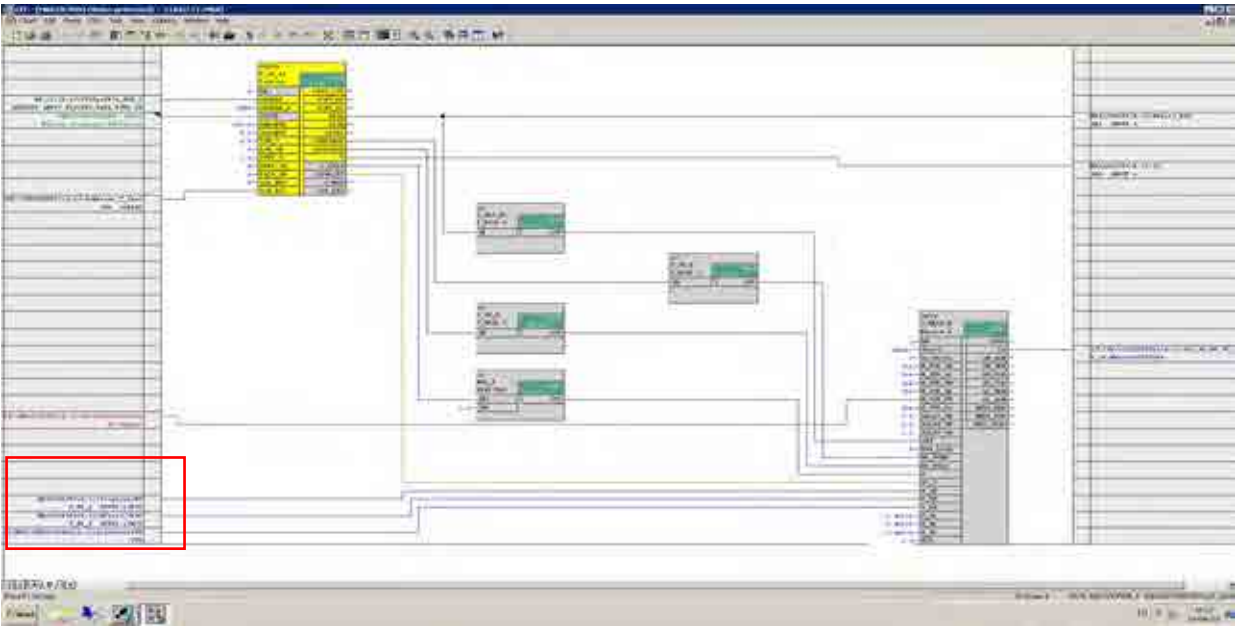
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ALN EOCNN ECL: US-ContNo Co:TH

Activities outside maintenance plan

Before

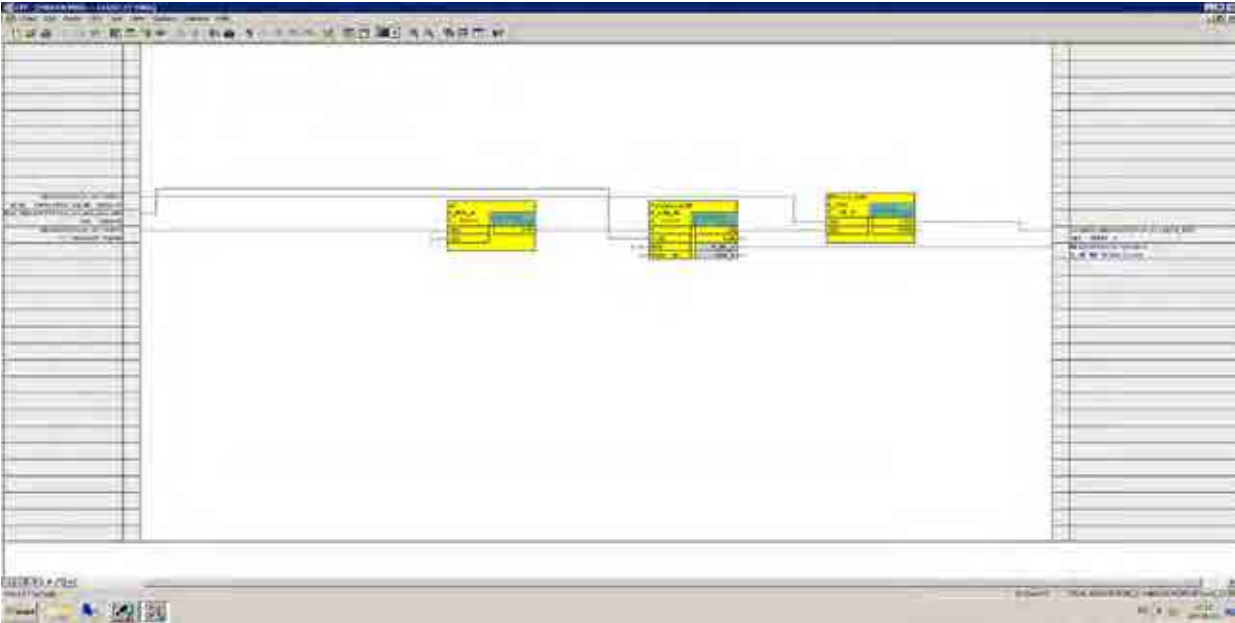


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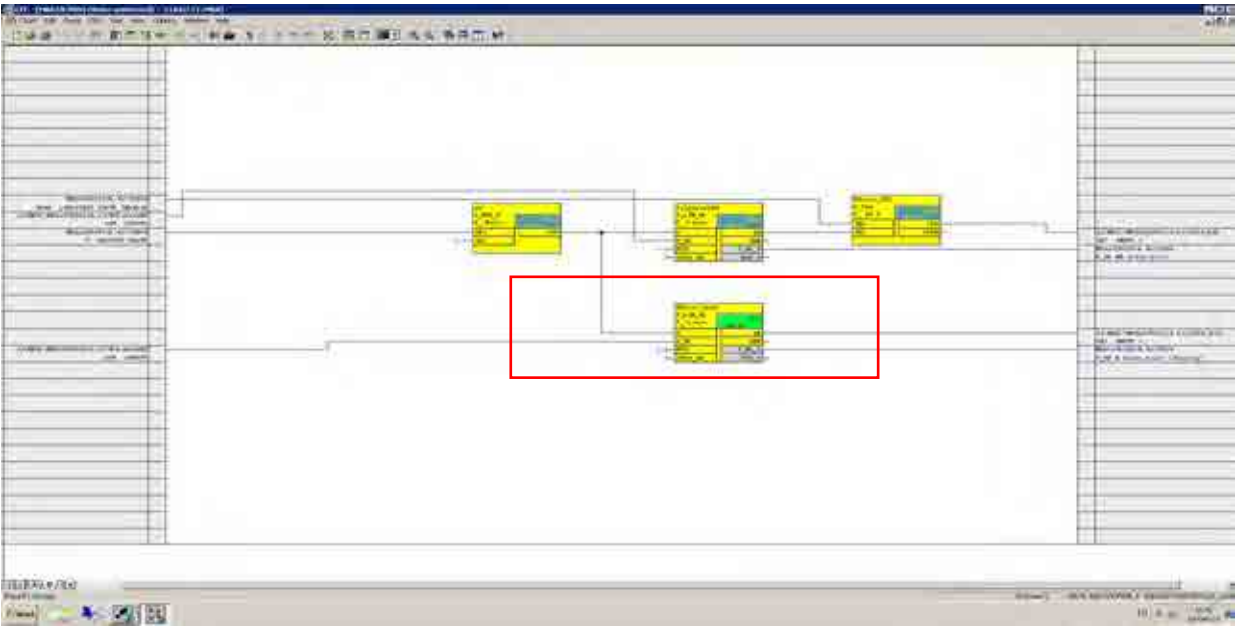


Activities outside maintenance plan

Before



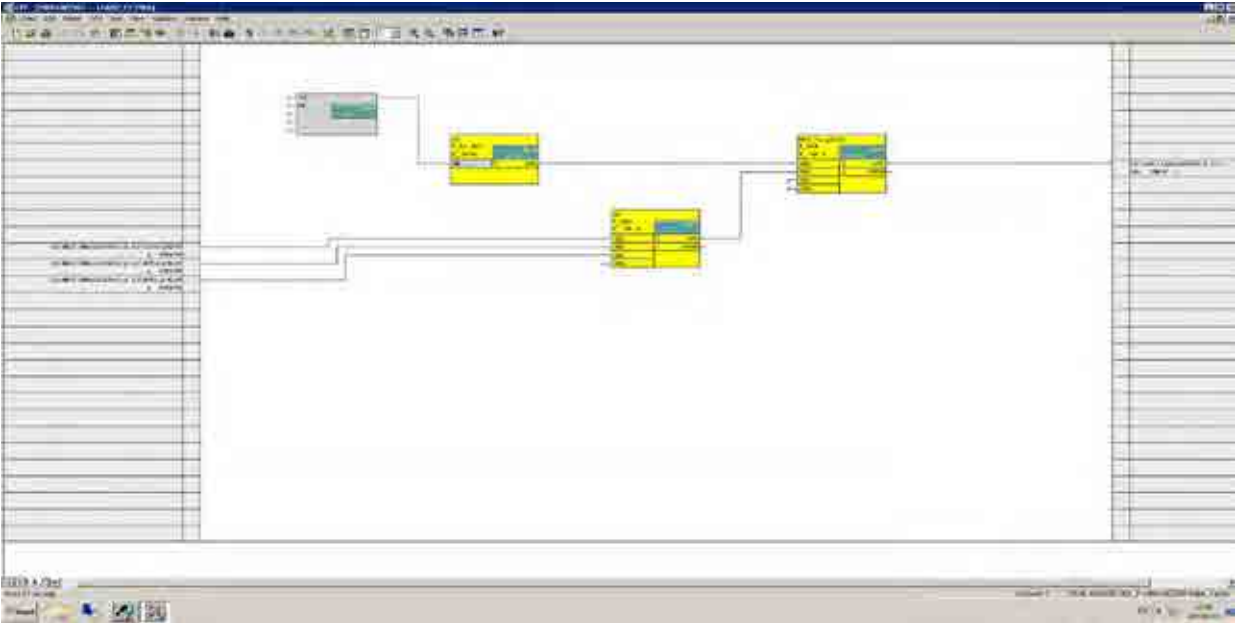
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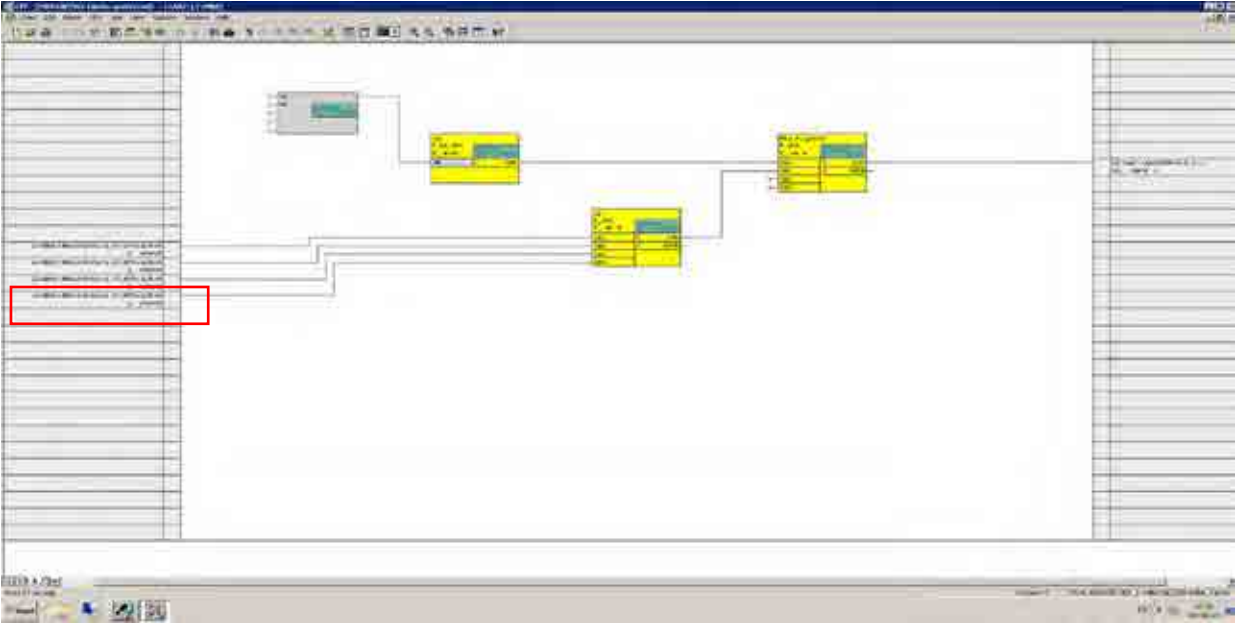


Activities outside maintenance plan

Before



After



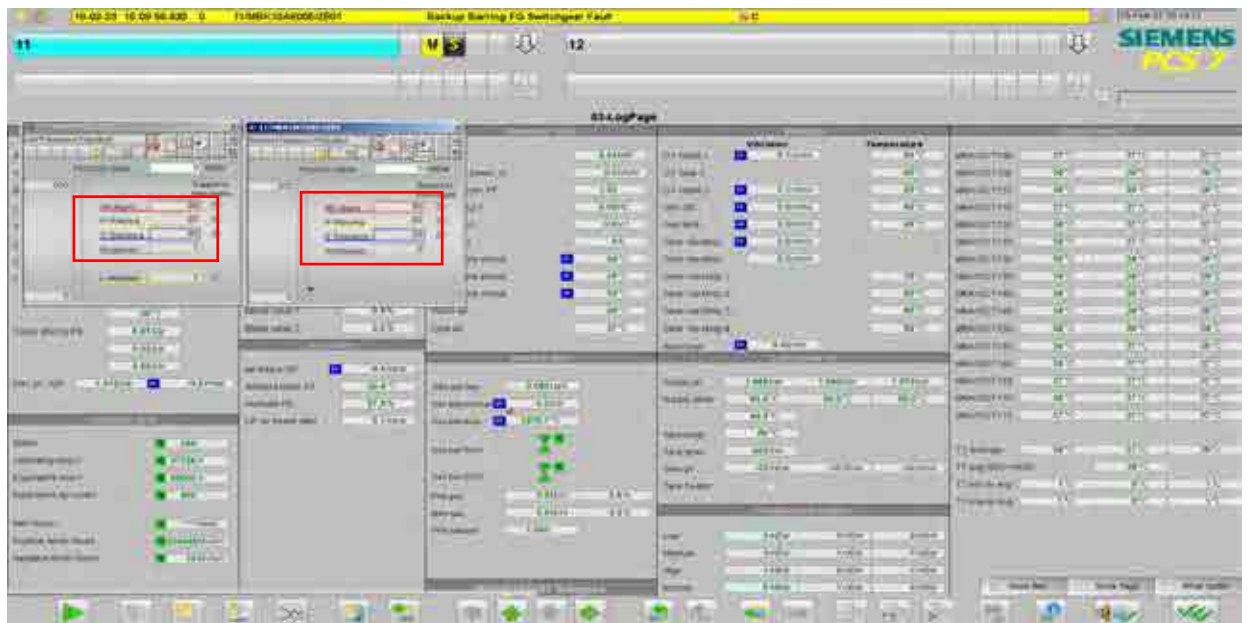
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Creator: Reviewer: Approver:  
ALN EOCNN ECL: US-ContNo Co0:TH

## Activities outside maintenance plan

### Before

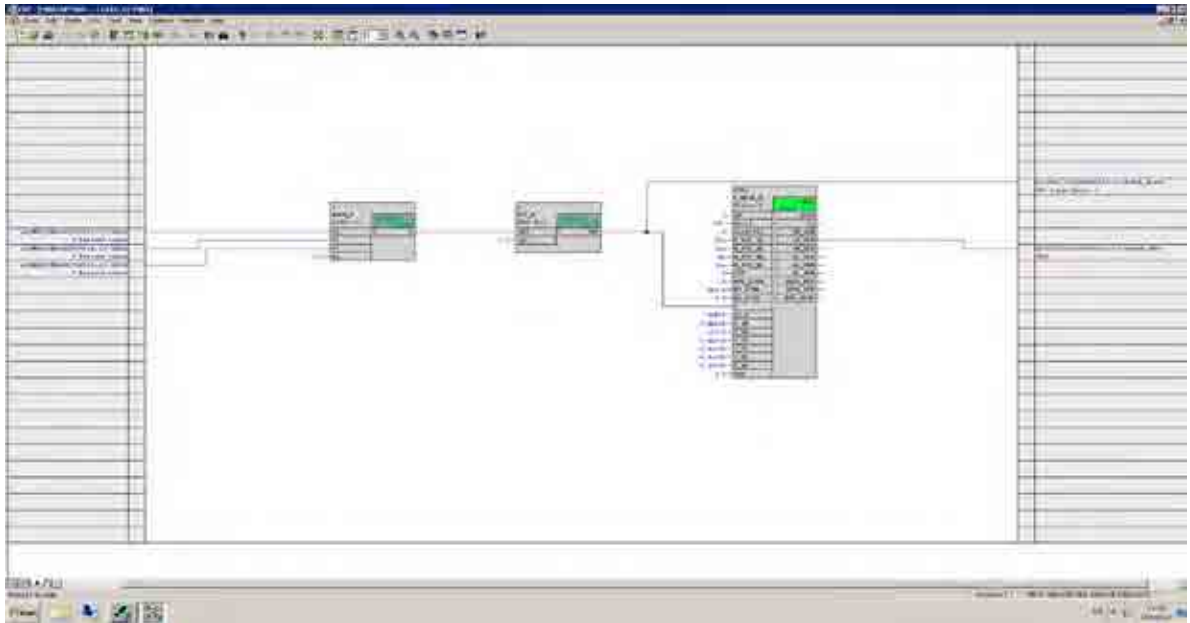


### After

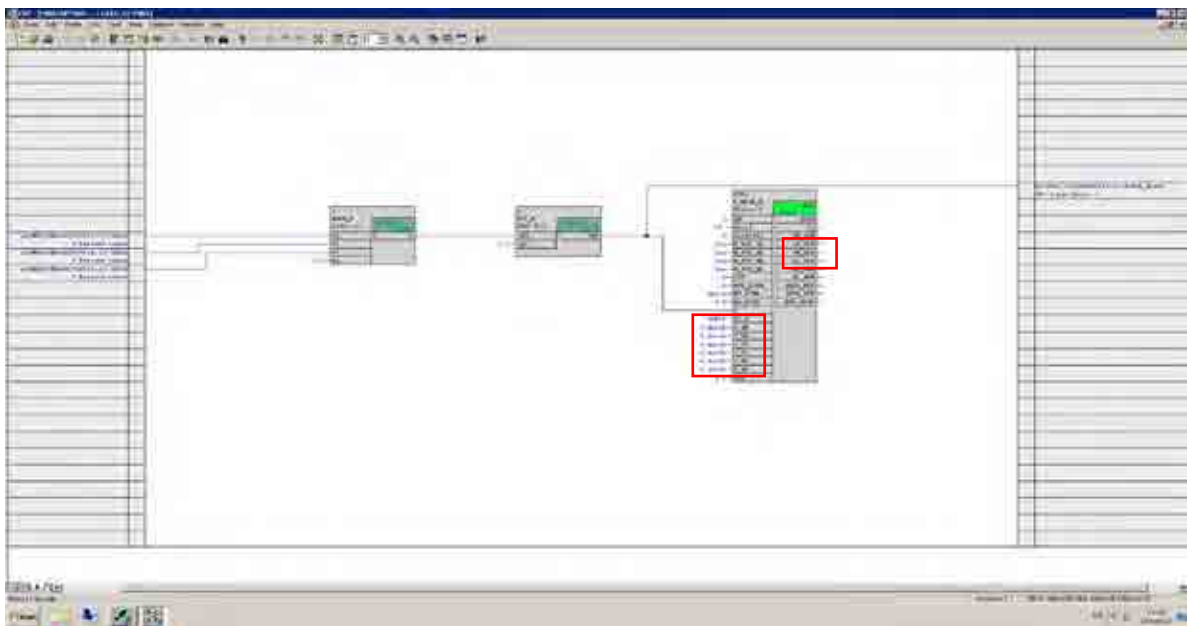


## Activities outside maintenance plan

### SuP01/2021/SGT-800 Removal of high temperature alarm on stator ring 2 & 3 Before



### After



## Inspection Report

Subject / Title: <b>BD000166U01 SSUT 1:1 Level A-inspection 50 kEOH 2022</b> <b>Inspection report</b>	<u><b>Samutprakarn, Thailand</b></u> Location	<u><b>20 Feb 2023</b></u> Date
Project: <b>SSUT</b>	<u><b>Somdej Arunplod</b></u> Author(s)	
Customer Name: <b>SSUT Company Ltd</b>		
Orderer's File Ref: <b>E1B101139185: A</b>		
Order No Internal: <b>EA031213U01A112511</b>		
Report No Internal: <b>RTSOFL87/23</b>	<u>Released technically</u>	<u>Released for external use</u>
Classification: <b>Confidential</b>		

Codeword	:	<b>SSUT 1:1</b>
Equipment No	:	<b>BD000166U01</b>
Product Type	:	<b>SGT-800B1</b>
Mobilization Date	:	<b>2023-02-18</b>
Demobilization Date	:	<b>2023-02-20</b>
Client Contact Name	:	<b>Mr. Vithul R.</b>

### Executive Summary:

The purpose of visit was to perform A-inspection between 18-Feb-2023 to 20-Feb-2023 to perform a Level A'50-inspection according to activity list E1B101139185: A  
Compressor washing of GT unit BD000166U01 was performed before inspection. Several minor remarks were noted. Details can be found in the report.

Copies To:  
Paleerat Taptawat  
Erik Gregeborg

Emilien Zara Souleman  
Emelie Ljungblad

## Inspection Report

### 7.19 HG 2650 Turbine stator stage no 1

#### Performed work:

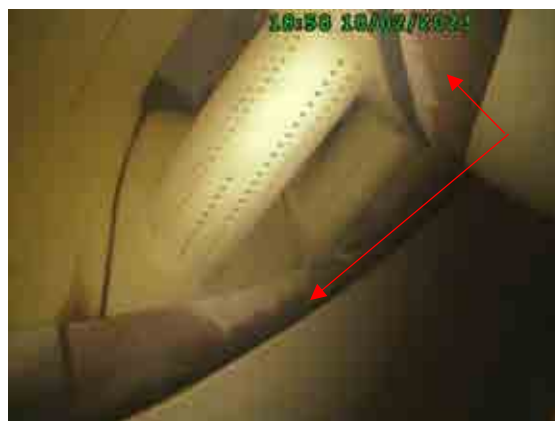
- Borescope inspection

#### Result:

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on stage 1 heat shield.
- Minor oxidation found on stage 1 rear hooks.



GV1 segment found good condition.



Inner/Outer vane plate condition.



GV1 as found condition at burner position 15



Inner/Outer vane plate condition at burner position 15.

## Inspection Report



Heatsheld stage 1 overall condition.



Heatshield stage 1 overall condition and seal strip



Rear hooks and heatshields condition.



Another view rear hooks and heatshields condition.

### **Recommendation:**

- None

**The turbine stator stage 1 is in serviceable condition.**



## Inspection Report

Subject / Title: <b>BD000166U02 SSUT 1:2, MI-50 KEOH, 2022, inspection report</b> Project: Customer Name: <b>SSUT Company Ltd</b> Orderer's File Ref: <b>E1B101145363: B</b> Order No Internal: <b>EA031213U02A112511</b> Report No Internal: <b>RTSOFL99/22</b>  Classification: <b>Confidential</b>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"><b>Samutprakarn, Thailand</b></td> <td style="width: 50%; text-align: right;"><b>25 Feb 2023</b></td> </tr> <tr> <td>Location</td> <td style="text-align: right;">Date</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td colspan="2"><b>Somdej Arunplod</b></td> </tr> <tr> <td colspan="2">Author(s)</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td>Released technically</td> <td style="text-align: right;">Released for external use</td> </tr> </table>	<b>Samutprakarn, Thailand</b>	<b>25 Feb 2023</b>	Location	Date	 		<b>Somdej Arunplod</b>		Author(s)		 		Released technically	Released for external use
<b>Samutprakarn, Thailand</b>	<b>25 Feb 2023</b>														
Location	Date														
<b>Somdej Arunplod</b>															
Author(s)															
Released technically	Released for external use														

Codeword	:	<b>SSUT 1:2</b>
Equipment No	:	<b>BD000166U02</b>
Product Type	:	<b>SGT-800B1</b>
Mobilization Date	:	<b>2023-02-25</b>
Demobilization Date	:	<b>2023-02-27</b>
Client Contact Name	:	<b>Mr. Vithul R.</b>

### Executive Summary:

The purpose of visit was to perform A-inspection between 25 27 Feb 2023 to perform a Level A'50-inspection according to activity list E1B101145363.  
 Compressor washing of GT unit BD000166U02 was performed before inspection. Several minor remarks were noted. Details can be found in the report.

Copies To:  
 Paleerat Taptawat  
 Erik Gregeborg

Emilien Zara Souleman  
 Emelie Ljungblad

## Inspection Report

# 1 Summary of results

### **HG 4150 Air intake**

- Contamination found on pre-filter element.
- Mild corrosion found on silencer unit.
- Moderate contamination found on ventilation filter.

### **HG 4980 Speed reduction gear**

- Observed white mark are as same as A40 inspection wheel gear.
- Observed electro discharge on left and right wheel gear.
- Observed oil leakage on left and right side of manifold.
- 

### **HG 2405 Compressor inlet casing**

- Minor amount of dirt found on inlet casing floor

### **HG 2410 Compressor inlet piece**

- Observed lube oil leakage inside inlet piece.

### **HG 2640 Turbine Rotor**

- Minor oxidation around leading edge and trailing edge cooling holes of blade stage 1.
- Observed TBC loss on TB blades 1 trailing edge.

### **HG 2650 Turbine stator stage 1**

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on stage 1 heat shield.
- Minor oxidation found on stage1 rear hooks.

### **HG 2651 Turbine stator stage 2&3**

- Minor oxidation on stage 2 heat shield

### **HG2665 Outlet casing**

- Observed bellow joint have damaged all around area.

### **HG 2660 Exhaust diffusor**

- Observed indication on struts support see table below.

### **HG 2132 Insulation**

- Observed several insulation materials damaged around compressor casing, bleed pipe and cooling and sealing air pipe.

## Inspection Report

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## Inspection Report

## 2 Personnel on site

Personnel on site :	Date for the visit
Kittinan Witchawut, Commissioning lead	230225-230227
Kittikun Chanchaoen, Commissioning engineer.	230225-230227
Tasuku Maki, Commissioning engineer OJT.	230225-230227
Somdej Arunplod, Quality inspector	230225-230227
Sorapong Lapngoen, Mechanical TFA	230225-230227
Siriporn Wongsas, Quality inspector OJT	230225-230227

## 3 General data / Operating statistics

Site:	SSUT 1:2	
B-number:	BD000166U02	
Project manager:	Wuttichai Pakavarangkur	
Application engineer:	Erik Gregeborg	
Activity list:	E1B101145363: B	
Owner:	SSUT Company Ltd	
Owner representative:	Mr. Vithul R.	
Order number:	4290245	
Gas turbine: Siemens	Type: SGT-800B1	S/N: DD080008
Main gear:	Type: TX112/4C	S/N: 12721
Generator:	Type: AMS1240 ALK	S/N: 8269006
Configuration:	Combine cycle	
Site:	Power plant	
Fuel	Natural gas	
Operating profile:	Base load	
Compressor washing system/wash interval	Offline 10,000 hours	
Site address or GPS coordinates	13.532603, 100.651876	
Fuel:	Gas: <input checked="" type="checkbox"/>	Liquid: <input type="checkbox"/> Dual fuel: <input type="checkbox"/>

## Inspection Report

<b>Date for counter readings:</b> 20230225	Installation
Operating hours:	46280 h
Equivalent operating hours:	49323 h
Starts:	478
Fast starts:	N/A
Equivalent operating cycles:	606 h
Total production of MWh:	1527952
Total production of MVar+:	289190
Total production of MVar-:	11

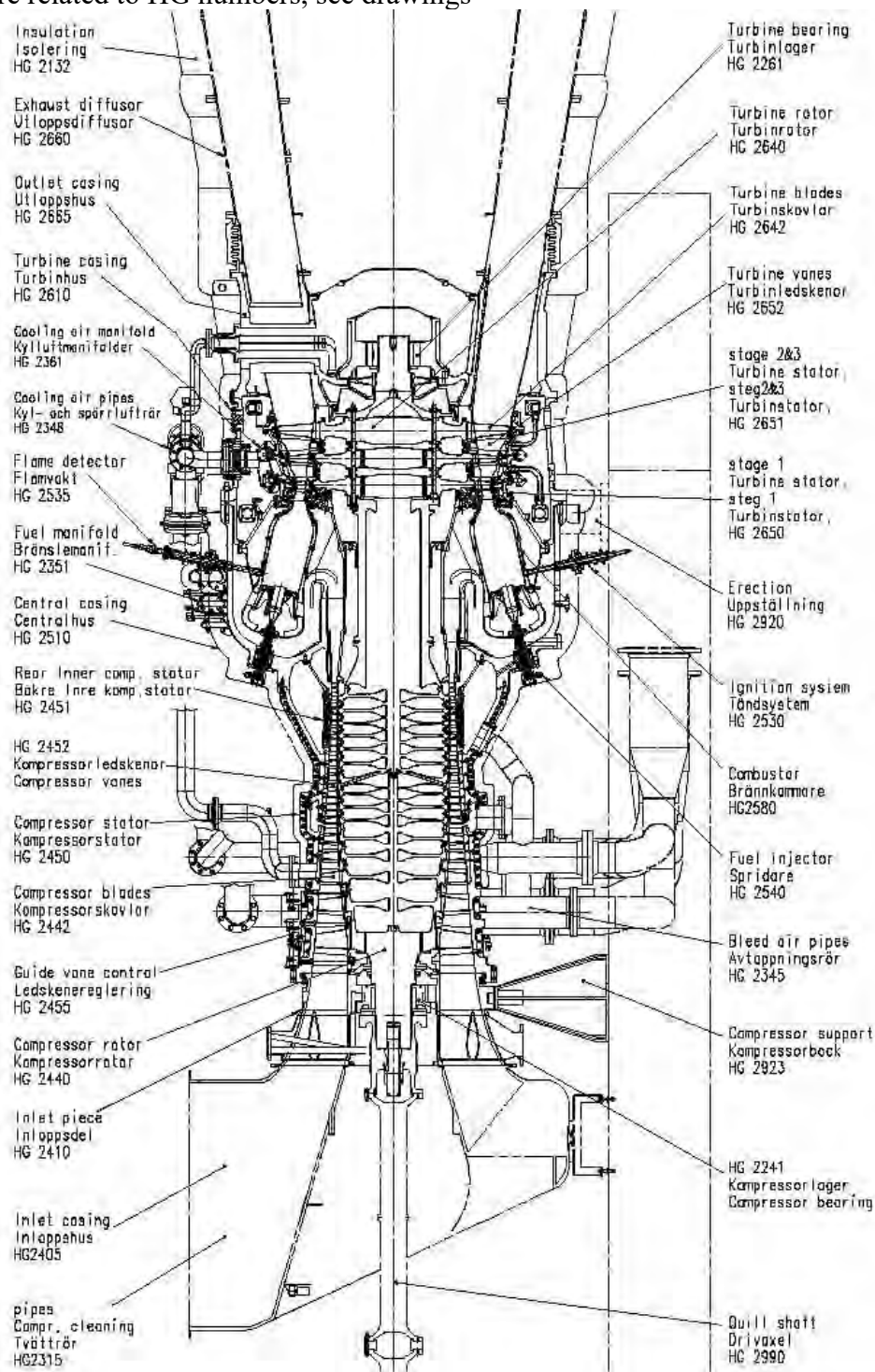
Latest inspections:

Date	Report no	Reason	Author	
2022-07-31	E1B101126828	FO to replace GV1	Krit Phunsub	
2022-06-07	E1B101067448	Borescope Insp of GV1	Somdej Arunplod	
2022-02-18	E1B101009820	Borescope Insp of GV1	Krit Phunsub	
2021-11-12	E1B100962567	Minor Inspection	Somdej Arunplod	A40

## Inspection Report

### 4 HG-list SGT-800

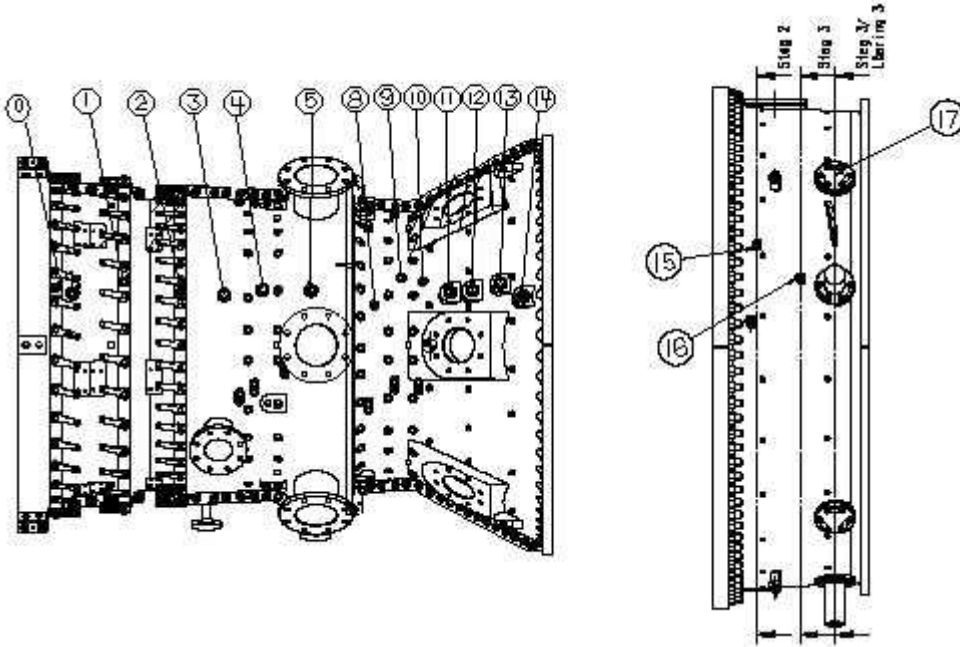
Activities are related to HG numbers, see drawings





## Inspection Report

### 5 Borescope inspection SGT-800



- Plan B0 Compressor rotor stage 1, stator stage 0
- Plan B1 Compressor rotor stage 1 and 2, stator stage 1
- Plan B2 Compressor rotor stage 2 and 3, stator stage 2
- Plan B3 Compressor rotor stage 3 and 4, stator stage 3
- Plan B4 Compressor rotor stage 4 and 5, stator stage 4
- Plan B5 Compressor rotor stage 5 and 6, stator stage 5
- Plan B8 Compressor rotor stage 8 and 9, stator stage 8
- Plan B9 Compressor rotor stage 9 and 10, stator stage 9
- Plan B10 Compressor rotor stage 10 and 11, stator stage 10
- Plan B11 Compressor rotor stage 11 and 12, stator stage 11
- Plan B12 Compressor rotor stage 12 and 13, stator stage 12
- Plan B13 Compressor rotor stage 13 and 14, stator stage 13
- Plan B14 Compressor rotor stage 14 and 15, stator stage 14
- Plan B15 Turbine rotor stage 1 and 2, stator stage 2
- Plan B16 Turbine rotor stage 2 and 3, stator stage 3
- Plan B17 Turbine rotor stage 3, stator stage 3

## Inspection Report

# 6 Inspection activities

## 6.1 Planned inspection

### 6.1.1 Activities according to maintenance plan

5				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	/Air intake system/MBL	Visual inspection in air intake housing, ducting, silencer, and plenum. Check for obstructions, cleanliness, leakages and for foreign objects. Check flanges, inspection hatches, sealings and gaskets.		Performed
2	/Air intake system/MBL	Visual inspection of filters for obstruction and contamination.		Performed
3	2132/Insulation/	Visual inspection.		Performed
4	2351/Fuel manifold/	Visual external inspection.		Performed
5	2405/Compressor air inlet casing/	Visual inspection.		Performed
6	2410/Inlet Piece/	Visual inspection.		Performed
7	2442/Compressor blades/	Borescope inspection of compressor blades stages 5, 11 and 14.	Compressor blades	Performed
8	2442/Compressor blades/	Borescope inspection of compressor blades stage 4.	Compressor blades	Performed
9	2452/Compressor vanes/	Borescope inspection of compressor vanes stages 5, 11 and 14.	Compressor vanes	Performed
10	2452/Compressor vanes/	Borescope inspection of compressor vanes stage 4.	Compressor vanes	Performed
11	2530/Ignition system/	Visual inspection.		Performed
12	2535/Flame detector/	Visual inspection.		Performed
13	2540/Burner/	Borescope inspection of 1 (RMI, #15) or 4 (MI, equal distr.) burners		Performed
14	2580/Combustor/MBM	Borescope inspection.		Performed
15	2610/Turbine casing/	Visual inspection.		Performed
16	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1.		Performed
17	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1 outer vane plate.		Performed
18	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1 inner vane plate.		Performed
19	2650/Turbine guide vanes/	Borescope inspection of guide vane 2.	Turbine stator 2 - GV2	Performed
20	2650/Turbine stator, stage 1/	Borescope inspection turbine heat shield 1.		Performed
21	2640/Turbine rotor (incl. Blades)/	Borescope inspection of turbine blades stage 1		Performed

### Inspection Report

5				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
22	2640/Turbine rotor (incl. Blades)/	Borescope inspection of turbine blades stage 2.		Performed
23	2665/Outlet casing/	Internal visual inspection of outlet casing.		Performed
24	2665/Exhaust casing/	Visual inspection of outlet bellow.		Performed
25	2920, 2925/Assembly material/Erection exhaust diffusor at site/	Visual inspection of the supports.	Support stands	Performed

7				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	4980, 4995/Main gear/Alignment instruction/	Visual inspection of tooth mesh through inspection cover. Main gear.	MBK10AZ005	Performed

### 6.1.2 Activities outside maintenance plan

9				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	/Gear system/MBK	Continue to monitor flex coupling flex plate bundle condition during next inspection.	Acc to Inspection Report E1B100962567	Performed
2	/Gear system/MBK	Continue to monitor for the progression of the white marks pattern on wheel gear.	Acc to Inspection Report E1B100962567	Performed
5	/Gas fuel system. General/MBP	PSW/SGT-800/18-004 Safety Warning of the gas fuel flexible hoses installed on all medium gas turbines		Performed

## Inspection Report

# 7 Inspection result

## 7.1 HG 4150 Air intake system

### Performed work:

- Visual Inspection

### Result:

- Contamination found on pre-filter element.
- Mild corrosion found on silencer unit.
- Moderate contamination found on ventilation filter.



Intake filter housing overall condition.



## Inspection Report



*Silencer unit intake side overall condition.*



*Silencer unit intake side close up condition.*



*Intake inside overall condition.*



*Close up on silencer unit flat bars weld joint condition.*



*Inside intake filter housing overall condition.*



*Pre-filter element as found condition.*

## Inspection Report



*Fine filter as found condition.*



*Intake side of fine filter as found condition.*



*Installed fine filter CamGT 3V-600-E12 Std.*



*Drain port condition on walk way.*



*Intake door seal overall condition.*



*Intake door push open mechanism good condition.*



## Inspection Report



*E12 fine filter overall condition.*



*Intake filter drain port.*



*Clean air exit to enclosure ventilation unit.*



*Ventilation filter floor condition.*



*Ventilation filter elements fouling condition.*



*Ventilation filter elements fouling condition.*

## Inspection Report

### **Recommendation:**

- Clean intake filter housing, louvers and ventilation filter housing during filter replacement.
- Clean floor inside intake filter housing when replace filters.
- Clean ventilation filter housing floor.
- Open mechanism needs to apply prevent rust with lubricant.
- Continue to monitor corrosion on silencer unit.

Air Intake system is in serviceable condition.

## Inspection Report

### 7.2 HG 4981 Starting gear

#### Performed work:

- Visual inspection.

#### Result:

- No remark.



*Starter motor overall condition.*



*Flexible coupling overall condition.*



*Flex plate bundle condition on starter motor side.*



*Flex plate bundle condition on gearbox side.*

#### Recommendation:

- Continue to monitor flex coupling flex plate bundle condition during next inspection.

Starter motor system is in serviceable condition.

## Inspection Report

### 7.3 HG 4980 Speed reduction gear

#### Performed work:

- Visual inspection and Borescope inspection.

#### Result:

- Observed white mark are as same as A40 inspection wheel gear.
- Observed electro static discharge on left and right wheel gear.
- Observed oil leakage on left and right side of manifold.



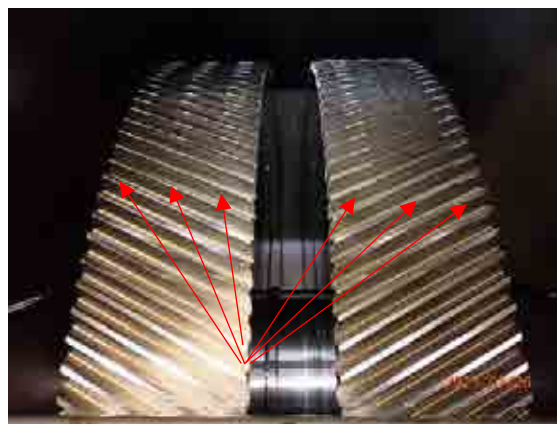
*ETD overall condition.*



*Gearbox casing overall condition generator side.*



*Foundation and key overall condition*



*Wheel gear condition found white mark*



## Inspection Report



*Pinion cogs condition.*



*Jacking oil hose condition.*



*Original marks are same position on left side and right side wheel gear.*



*White mark 50 mm at left side on left wheel.*



*White mark 40 mm at right side on right wheel.*

## Inspection Report



*Oil leakage on left side of manifold.*



*Oil leakage on right side of manifold.*



*Electro static discharge 15 cm at left and right side on right wheel and follow up location at next inspection*

### **Recommendation:**

- Continue to monitor for the progression of the white marks pattern on wheel gear.
- Continue to monitor for the progression of the electro static discharge pattern on wheel gear.

Speed reduction gear system is in serviceable condition.



## Inspection Report

### 7.4 HG 2405 Compressor inlet casing

**Performed work:**

- Visual inspection.

**Result:**

- Minor amount of dirt found on inlet casing floor.



*Minor dirt found left over on the floor of inlet casing.*



*Compressor washing nozzle overall condition.*



*Inlet casing drain and inlet casing support good condition.*

**Recommendation:**

- Clean inside inlet casing before starting up.

The Compressor inlet casing is in serviceable condition.

## Inspection Report

### 7.5 HG 2410 Compressor inlet piece

**Performed work:**

- Visual inspection.

**Result:**

- Observed lube oil leakage inside inlet piece.



*Inlet piece external condition left side.*



*Inlet piece external condition right side.*



*Overall condition of struts around inlet piece.*

## Inspection Report



*As found condition of struts around inlet piece.*



*Clean the inlet piece by hand before startup.*



*As found condition of struts around inlet piece.*



*Clean the inlet piece by hand before startup.*

### **Recommendation:**

- It is recommended to clean the inlet piece by hand before startup.

The Compressor inlet piece is in serviceable condition.

## Inspection Report

### 7.6 HG 2320 Drainpipes

**Performed work:**

- Visual inspection.

**Result:**

- No remark.



*Drain valves overall condition.*



*CC casing drain port as found condition (No leakage)*



*Compressors drain ports overall condition.*

**Recommendation:**

- Re-tighten during routine maintenance.

The drainpipes are in serviceable condition.

## Inspection Report

### 7.7 HG 2455 Guide vane control

**Performed work:**

- Visual inspection.

**Result:**

- No remark.



*GV Actuator support bracket overall condition.*



*GV Actuator rod overall condition.*



*GV actuator mechanism overall condition left side.*



*GV actuator mechanism overall condition right side.*

**Recommendation:**

- None

The guide vane control system is in serviceable condition.



## Inspection Report

### 7.8 HG 2440 Compressor rotor

#### Performed work:

- Borescope inspection of rotor stage 3, 5, 11 and 14.

#### Result:

- No remark.



*Compressor rotor stage 3 condition.*



*Compressor rotor stage 5 condition.*



*Compressor rotor stage 11 condition.*



*Compressor rotor stage 14 condition.*

#### Recommendation:

- None

The Compressor rotor is in serviceable condition.



## Inspection Report

### 7.9 HG 2442 Compressor blade

#### Performed work:

- Borescope inspection of rotor stage 3, 5, 11 and 14.

#### Result:

- No remark.



*Compressor blades stage 3 condition.*



*Compressor blades stage 5 condition.*



*Compressor blades stage 11 condition.*



*Compressor blades stage 14 condition.*

#### Recommendation:

- None

The Compressor blades are in serviceable condition.

## Inspection Report

### 7.10 HG 2450 Compressor stator

#### Performed work:

- Borescope inspection of rotor stage 3, 5, 11 and 14.

#### Result:

- No remark.



*Abradable seal stage 3 condition.*



*Abradable seal stage 5 condition.*



*Abradable seal stage 11 condition.*



*Abradable seal stage 14 condition.*

#### Recommendation:

- None

The Compressor stators are in serviceable condition.

## Inspection Report

### 7.11 HG 2452 Compressor vanes

#### Performed work:

- Borescope inspection of rotor stage 3, 5, 11 and 14.

#### Result:

- No remark.



*Compressor Inlet guide vanes stage 0.*



*Compressor guide vanes stage 3*



*Compressor guide vanes stage 5*

## Inspection Report



*Compressor guide vanes stage 11*



*Compressor guide vanes stage 14.*

### **Recommendation:**

- None.

The Compressor guide vanes are in serviceable condition.

## Inspection Report

### 7.12 HG 2580 Combustor

#### Performed work:

- Borescope inspection.

#### Result:

- No remark.



*Front panel with burners from burner#1.*



*Front panel with burners from burner#7.*



*Front panel with burners from burner#15.*



*Front panel with burners from burner#22.*

#### Recommendation:

- None

The Combustor is in serviceable condition.



## Inspection Report

### 7.13 HG 2540 Fuel burner

#### Performed work:

- Visual inspection burner #1, #7, #15 and #22

#### Result:

- No remark.

Example of Burner#1 S/N BI2019 15900



*Dismantled burner#1 overall condition.*



*TBC coating condition.*



*Gas fuel wings and pilot fuel pipe overall condition.*



*Mixing chamber overall condition.*



## Inspection Report



*No yellow powder deposit in main gas fuel.*



*Outer bellow condition.*

### Example of Burner#7 S/N BI2019-15916



*Dismantled burner#7 overall condition.*



*TBC coating condition.*



*Gas fuel wings and pilot fuel pipe overall condition.*



*Mixing chamber overall condition.*

## Inspection Report



*No yellow powder deposit in main gas fuel.*



*Outer bellow condition.*

Example of Burner#15 S/N BI2019-15914



*Dismantled burner#15 overall condition.*



*TBC coating condition.*



*Gas fuel wings and pilot fuel pipe overall condition.*



*Mixing chamber overall condition.*

## Inspection Report



*No yellow powder deposit in main gas fuel.*



*Outer bellow condition.*

### Example of Burner#22 S/N BI2019-15912



*Dismantled burner#22 overall condition.*



*TBC coating condition.*



*Gas fuel wings and pilot fuel pipe overall condition*



*Mixing chamber overall condition.*



## Inspection Report



*No yellow powder deposit in main gas fuel.*



*Outer bellow condition.*

### **Recommendation:**

- None.

The fuel burners are in serviceable condition.

## Inspection Report

### 7.14 HG 2535 Flame detector

**Performed work:**

- Visual inspection.

**Result:**

- No remark.



*Flame detector on the left-side overall condition.*



*Flame detector on the right-side overall condition.*

**Recommendation:**

- None.

The flame detectors are in serviceable condition.

## Inspection Report

### 7.15 HG 2530 Ignition system

**Performed work:**

- Visual inspection.

**Result:**

- No remark.



*Ignition plug external condition.*

**Recommendation:**

- None.

The ignition system is in serviceable condition.



## Inspection Report

### 7.16 HG 2351 Fuel manifold

#### Performed work:

- Visual inspection.

#### Result:

- No remark.



*Manifold ring supply to burners overall condition.*



*Fuel manifold's pipe connecting overall condition.*

#### Recommendation:

- None

The fuel manifold is in serviceable condition.

## Inspection Report

### 7.17 HG 2510 Central casing

**Performed work:**

- Visual inspection.

**Result:**

- No remark.



*Overall condition of central casing.*

**Recommendation:**

- None.

The central casing is in serviceable condition.

## Inspection Report

### 7.18 HG 2640 Turbine rotor

#### Performed work:

- Borescope inspection.

#### Result:

- Minor oxidation around leading edge and trailing edge cooling holes of blade stage 1.
- Observed TBC loss on turbine blades stage 1 trailing edge.



*TB blades 1 leading edge overall condition.*



*Blades 1 trailing edge cooling passage and platform.*



*Observed TBC loss on Turbine blades 1 trailing edge.*



*Turbine blades 1 trailing edge close up view.*

## Inspection Report



*Turbine blades 2 leading edge condition.*



*Turbine blades 2 trailing edge cooling passages.*



*Condition leading edge tip turbine blades 3.*



*Condition leading edge platform turbine blade 3.*



*Turbine blades 3 trailing edge overall condition.*



*Turbine blade 3 tip with honeycomb condition.*

### **Recommendation:**

- None.

The turbine rotor is in serviceable condition.

## Inspection Report

### 7.19 HG 2650 Turbine stator stage no 1

#### Performed work:

- Borescope inspection.

#### Result:

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on stage 1 heat shield.
- Minor oxidation found on stage 1 rear hooks.



*GV1 segment found good condition.*



*Inner/Outer vane plate condition.*



*GV1 as found condition at burner position 15*



*Inner/Outer vane plate condition at burner position 15.*

## Inspection Report



*Heatsheild stage 1 overall condition.*



*Heatshield stage 1 overall condition and seal strip*



*Rear hooks and heatshields condition.*



*Another view rear hooks and heatshields condition.*

### **Recommendation:**

- None

The turbine stator stage 1 is in serviceable condition.



## Inspection Report

### 7.20 HG 2651 Turbine stator stage no 2&3

#### Performed work:

- Borescope inspection.

#### Result:

- Minor oxidation on heat shield stage 2.



*GV2 seen segments condition.*



*Heatshields stage 2 as found condition.*



*Rear hook stage 2 as found condition.*

## Inspection Report



*GV3 leading edge overall condition.*



*Stage 3 heat shield honeycomb overall condition.*

### **Recommendation:**

- None

The turbine stator stage 2&3 are in serviceable condition.

## Inspection Report

### 7.21 HG 2665 Outlet casing

#### Performed work:

- Visual inspection.

#### Result:

- Observed bellow joint have damaged some area.



*Inner and outer wall conditions.*



*Outlets bellow overall condition.*



*Bellow condition left bottom view condition*



*Bellow condition left bottom view condition*

#### Recommendation:

- Prepare vendor for repair bellow joint at next major inspection.

The outlet casing is in serviceable condition.

## Inspection Report

### 7.22 HG 2660 Exhaust diffuser

#### Performed work:

- Visual inspection.

#### Result:

- Observed cracks at multiple positions described in table below.
- Observed 1 damaged bolt holding inner cone.



*Exhaust diffuser wall overall condition.*



*Found 1 damaged bolt holding.*



*Bleed pipe right hole condition*



*Bleed pipe left hole condition.*

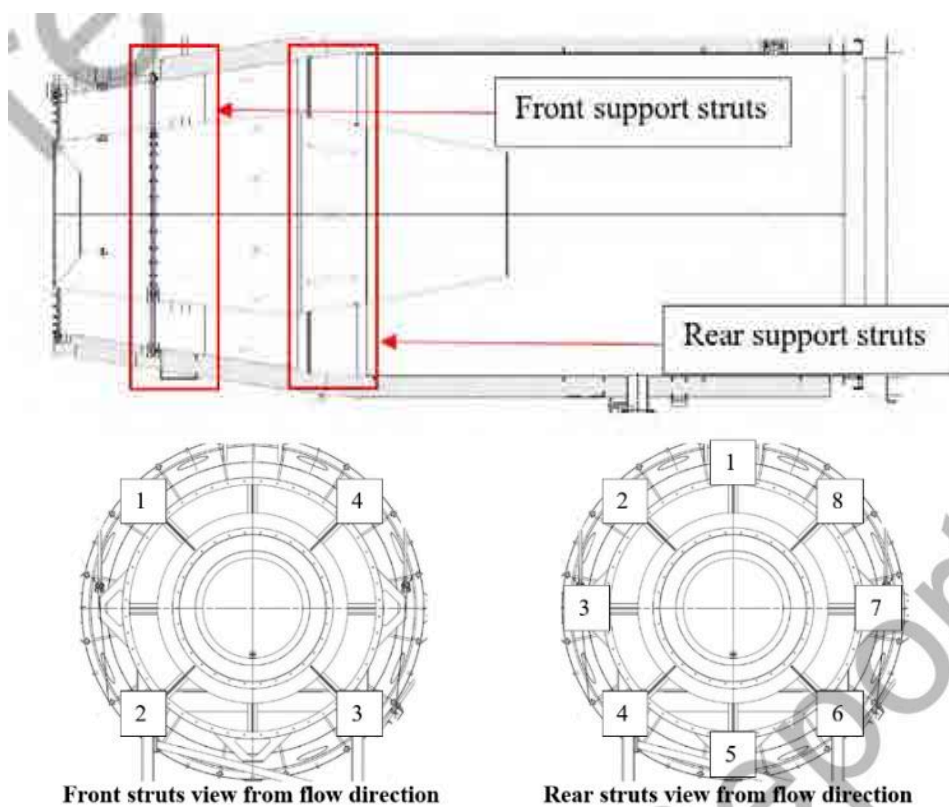
## Inspection Report



Example of crack at front support struts.



Example of crack at front support struts.



Position	Leading edge outer weld	Trailing edge outer weld	Leading edge inner weld	Trailing edge Inner weld
1	Crack	Crack		
2	Crack			Crack
3	Crack	Crack		Crack
4	Crack			Crack

Table of front support struts with cracks in the weld.

### Inspection Report

<i>Position</i>	<i>Leading edge outer weld</i>	<i>Trailing edge outer weld</i>	<i>Leading edge inner weld</i>	<i>Trailing edge Inner weld</i>
1			Crack	
2			Crack	
3			Crack	
4				Crack
5				Crack
6				
7				
8				Crack

*Table of rear support struts with cracks in the weld.*

#### **Recommendation:**

- Repair crack at front struts support next major inspection, according to table above.
- Replace damaged bolt inner cone.

The exhaust diffuser is in serviceable condition.



## Inspection Report

### 7.23 HG 2132 Insulation

#### Performed work:

- Visual inspection.

#### Result:

- Observed several insulation materials damaged around compressor casing, bleed pipe and cooling and sealing air pipe.



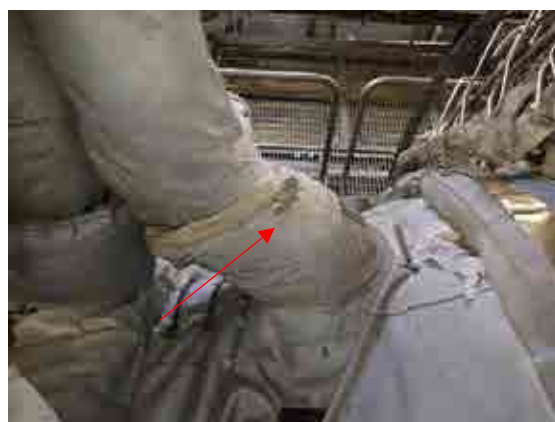
*Insulation left side condition compressor area.*



*Insulation right side condition compressor area.*



*Condition of insulation on bleed pipe.*



*Condition of insulation on bleed pipe.*

## Inspection Report



*Condition of insulation on cooling and sealing air pipe. Condition of insulation on cooling and sealing air pipe.*

### **Recommendation:**

- Next major inspection, please prepare vendor to repair some insulation pieces.
- Recheck and re-tightening bolts flange before starting up.

The insulation is in serviceable condition.

## **7.24 HG 2920 Skid erection, GT**

### **Performed work:**

- Visual inspection.

### **Result:**

- No remark.



*Front inlet piece support overall condition.*



*Front inlet piece support overall condition.*

## Inspection Report



*Left side central casing support as found condition.*



*Left side central casing support foundation.*



*Right side central casing support overall condition.*



*Right side central casing support foundation.*



*GT key slot shim overall condition.*



*Central GT skid condition.*

### **Recommendation:**

- None.

The Skid erection are in serviceable condition.



## Inspection Report

### 7.25 HG 2925 Erection, exhaust diffuser

#### Performed work:

- Visual inspection.

#### Result:

- Observed hot air leaked sign around exhaust diffuser.



*Hot air leaked sign bottom side*



*Hot air leaked sign right side*



*Left side exhaust diffuser support condition.*



*Left side support foundation condition.*

## Inspection Report



*Right side exhaust diffuser support condition.*



*Right side support foundation condition.*



*Central exhaust diffuser support.*

### **Recommendation:**

- Recheck and retightening bolts flange before starting up.

The Erection, exhaust diffuser is in serviceable condition.

## Inspection Report

### 7.26 Other observations

**PSW/SGT-800/18-004: Safety Warning of the gas fuel flexible hoses installed on all medium gas turbines.**



Gas flexible hoses condition

### Guide collar

#### Result:

- Observed some bolts loose on top and bottom side.



Top side guide collar as found condition



Bottom side guide collar as found condition.

#### Recommendation:

- Routine maintenance to retorque all guides collar bolts when machine shutdown.

The guide collars are in serviceable condition.



## Inspection Report

# 8 Recommendations

### **HG4150 Air intake**

- Clean intake filter housing intake louvers and ventilation filter housing intake louvers when replace filters.
- Clean floor inside intake filter housing when replace filters.
- Clean ventilation filter housing floor.
- Open mechanism needs to apply prevent rust with lubricant.
- Continue to monitor corrosion on silencer unit.

### **HG4981 Starter motor**

- Continue to monitor flex coupling flex plate bundle condition during next inspection.

### **HG4980 Speed reduction gear**

- Continue to monitor for the progression of the white marks pattern on wheel gear.
- Continue to monitor for the progression of the elector discharge pattern on wheel gear.

### **HG2405 Compressor inlet casing**

- It is recommended to clean inside the inlet casing before startup.

### **HG2410 Compressor inlet piece**

- It is recommended to clean the inlet piece by hand before startup.

### **HG2320 Drainpipe**

- Re-tighten during routine maintenance.

### **HG2665 Outlet casing**

- Prepare vendor for repair bellow joint at next major inspection.

### **HG2660 Exhaust diffuser**

- Repair crack at front struts support next major inspection, according to table above.
- Replace damaged bolt inner cone.

### **HG2132 Insulation**

- Next major inspection, please prepare vendor to repair some insulation pieces.
- Recheck and re-tightening bolts flange before starting up

### **Other observations**

- Routine maintenance to retorque all guides collar bolts when machine shutdown.



MGT-2022-0434

Subject / Title:  
**BD000166U02 SSUT1:2, MI-50 KEOH, 2022,  
Commissioning report**

<b>Thailand</b>	<b>2023-02-27</b>
Location	Date

Project:  
Customer Name: **SSUT Company Ltd**  
Orderer's File Ref: **E1B101145363**  
Order No Internal: **EA031213U02A112511**  
Report No Internal:

<b>Witchawut Kittinan</b>	
Author(s)	
<b>Nordin, Kristoffer</b>	<b>Hansson, Martin</b>
Released technically	Released for external use

Classification:	<b>Restricted</b>	No of Appendices: <b>6</b>	Total Pages of Report: <b>107</b>
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Codeword	:	<b>Bangpoo 1:2 (BP1)</b>
Machine No	:	<b>BD000166U02</b>
Product Type	:	<b>SGT-800</b>
Type of Activity	:	<b>Commissioning</b>
Mobilization Date	:	<b>2023-02-25</b>
Demobilization Date	:	<b>2023-02-27</b>
Client Contact Name	:	<b>Vithul Rattanarome</b>

Executive Summary:

Level A inspection was performed according to the maintenace activity list.

Copies To:

Taptawat Paleerat	Souleman Emilien Zara
Gregeborg Erik	

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ID: E1B101232743 Name: Commissioning report Rev: A Protection: Restricted IP: R00\_S00  
Creator: Reviewer: Approver:  
ALIN ECGNN ECL: US-ContNo CoO:TH

## 1. Summary

Level A inspection was performed according to the maintenance activity list. A number of minor remarks were noted and rectified where possible, see details in report.

## 2. Personnel

Name	Type	Start Date	End Date	Qualification	Comment	Shift
Witchawut Kittin an	Siemens Energy Personnel	2023-02-25	2023-02-27	Senior commissioning engineer		Day
Chancharoen Kittikun	Siemens Energy Personnel	2023-02-25	2023-02-27	Commissioning engineer		Day
Arunplod Somdej	Siemens Energy Personnel	2023-02-25	2023-02-27	Quality inspector		Day

## 3. Operating Statistics

### Package

Date of Counter Readings : 2023-02-25  
 Operating Hours : 46280  
 Equivalent Operating Hours : 49323  
 Starts : 478  
 Equivalent Operating Cycles : 606  
 Total Production of MWh : 1527952  
 Total Production of MV Ar+ : 289190  
 Total Production of MV Ar- : 11  
 Serial Number of Gearbox : Flender:12721  
 Serial Number of Generator : ABB:8269006

### Comment :

## 4. Commissioning Activities

### 4.1. Activities According to Maintenance Plan

#### 4.1.1 Preparation

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ /	Off-line washing of the compress or prior to the inspection (customer obligation).	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation

#### 4.1.2 Before shutdown

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ /	Check the start sequence during start-up.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
2	/ /	Perform readings before shutdown, full load (T7L), 75%, 50% and 25% load. Operation on temperature limitation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

#### 4.1.3 Shutdown

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ /	Trip the unit with an emergency stop button to check the trip function (From approximately 0,5MW-load).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
2	/ /	Secure the unit f or safe work.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation

#### 4.1.4 Stationary commissioning

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Gas turbine sys tem / MBA	Visual inspection for general cond ition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
2	/ Gas turbine sys tem / MBA	Pulsation measu ring equipment. Cleaning and fun ction check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA	Performed without remarks.  See appendix D for protocol.
3	/ Gas turbine sys tem / MBA	Check function of VGV. Verify p osition at 20%, 5 0% and fully ope n.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA	Performed without remarks.  See appendix C for protocol.
4	/ Gas turbine sys tem / MBA	Instrumentation. Check selected s witches, transmi tters, vibration- a nd speed probes , according to se tting list	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed  Found MBA10CP042 pressure transmitter measuring value read was deviated compare to setting list. The pressure transmitter was calibrated by customer.  Found MBA10CP055 anti surge protection was damaged and could not be hold pressure. The new one was replaced by customer.  See appendix A for speed and vibration protocol.  See appendix B for transmitter protocol.  <b>Photo Attachments</b>



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
						MBA10CP042 MBA10CP055
5	/ Gas turbine / M BA	Flame detector, f unction check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA10CQ005/010	Performed without remarks.
6	/ Cooling/Sealin g/Purge air syste m / MBH	Visual inspection for general cond ition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
7	/ Cooling/Sealin g/Purge air syste m / MBH	Check function o f valves.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH	Performed without remarks.
8	/ Cooling/Sealin g/Purge air syste m / MBH	Bleed valves. Ch eck opening and closing time, fully opened and clos ed position.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH	Performed without remarks.  See appendix C for protocol.
9	/ Cooling/Sealin g/Purge air syste m / MBH	Verify switches a nd transmitters a ccording to settin g list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH10 MBH20	Performed without remarks.  See appendix B for protocol.
10	/ Starting/Gear e lectric generator system / MBJ/M BK	Visual inspection for general cond ition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
11	/ Starting/Gear e lectric generator system / MBJ/M BK	Visual inspection of frequency co nverter cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
12	/ Starting/Gear e lectric generator system / MBJ/M BK	Check frequency converters fan f unction.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
13	/ Starting/Gear e lectric generator system / MBJ/M BK	Verify switches a nd transmitters a ccording to settin g list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBJ MBK	Performed without remarks.
14	/ Air intake syste m / MBL	Visual inspection for general cond ition, obstruction s, cleanliness, fla nges, inspection hatches, sealing s, gaskets and fo r foreign objects.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
15	/ Air intake system / MBL	Visual inspection of filters for obstruction and contamination.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
16	/ Air intake system / MBL	Visual inspection (limited access).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBL	Performed without remarks.
17	/ Air intake system / MBL	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  See appendix B for protocol.
23	/ Gas fuel system / MBP	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
24	/ Gas fuel system / MBP	Central gas control valve. Function check and inspection for external leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.  See appendix C for protocol.
25	/ Gas fuel system / MBP	Check the control valves positions at 0, 45 and 90 degrees and the zero-offset. Check of limit switches and ignition position. Inspection for external leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  See appendix C for protocol.
26	/ Gas fuel system / MBP	Shut-off valves. Function check and inspection for external leakage. Check the pneumatic regulator settings. Check opening and closing time.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed.  MBP10AA020 shut off valve 2 was found air leakage at pulse jet valve. Tightening to fix leakage by customer.  Opening time and closing time : < 2 Sec  <b>Photo Attachments</b> MBP10AA020
27	/ Gas fuel system / MBP	Isolation valve. Function check and inspection for external leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.  Opening time and closing time : < 2 Sec

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		Check opening and closing time.				
28	/ Gas fuel system / MBP	Flow meter. Visual inspection during operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.
29	/ Gas fuel system / MBP	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remarks.  See appendix B for protocol.
30	/ Gas fuel system / MBP	Option 249, 250, 251 Coalescer and particle Filters. Visual inspection for rust, deposit and liquids, clean and replace cartridges if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBP	Customer obligation
33	/ Lube Oil System / MBV	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
34	/ Lube Oil System / MBV	Visual inspection of frequency converter cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
35	/ Lube Oil System / MBV	Check frequency converter fan and pump function.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
36	/ Lube Oil System / MBV	Oil filter. Replace disposable cartridges if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	Customer obligation
37	/ Lube Oil System / MBV	Check for no water in the tank by external pump connected at interface MBV10/05.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation
38	/ Lube Oil System / MBV	Check oil tank level.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  Lube oil tank 654 mm at based load.
39	/ Lube Oil System / MBV	Verify switches and transmitters a	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBV	Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		According to setting list.				See appendix B for protocol.
42	/ Lube Oil System / MBV	Option 197, 198. Water cooled oil cooler. Visual inspection for External leakage.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	Customer obligation
48	/ Ventilation gas turbine system / SAG	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
49	/ Ventilation gas turbine system / SAG	Visual inspection of filter for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAG	Customer obligation
50	/ Ventilation gas turbine system / SAG	Visual inspection and function check of shut-off dampers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAG	Performed without remarks.
51	/ Ventilation gas turbine system / SAG	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAG	Performed without remarks.  See appendix B for protocol.
52	/ Ventilation gas turbine system / SAG	Visual inspection of the low point extractions below the turbine.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
53	/ HVAC for LER / SAC	Visual inspection of filters for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation
54	/ HVAC for LER / SAC	Ventilation fan. Check for abnormal noise and vibrations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation
55	/ Washing and cleaning system / SDB	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
56	/ Washing and cleaning system / SDB	Check correct delivery pressure and leakage of pump.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer obligation

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
57	/ Washing and cleaning system / SDB	Inspect pump inlet strainer and outlet filter.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer obligation
58	/ Washing and cleaning system / SDB	Check the nozzles for obstruction, clean if necessary with instrument air.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer obligation
59	/ Washing and cleaning system / SDB	Check hoses for leakage and general condition.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation
60	/ Washing and cleaning system / SDB	Heaters - Check proper operation and setting.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer obligation
61	/ Washing and cleaning system / SDB	Inspect the tanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Customer obligation
62	/ Fire detection and extinguishing system CO2 / SGJ	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
63	/ Fire detection and extinguishing system CO2 / SGJ	Check all detectors for proper function.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation
64	/ Fire detection and extinguishing system CO2 / SGJ	Visual inspection of the weighing mechanism for the CO2 bottles. Check if the bottles have to be refilled or changed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation
65	/ Gas detection system / SFY	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
66	/ Instrument air system / QFA	Check pressure and for external leaks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
67	/ Instrument air system / QFA	Check oil level in compressor and refill if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
68	/ Instrument air system / QFA	Visual inspection and replace cartridges if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
69	4093 / Enclosure /	Visual inspection for damage and leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
70	/ Control system / CJP/CRB	Visual inspection of cabinets.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
71	/ Control system / CJP/CRB	Take backups of all the programs from the controllers where changes have been performed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CJP/CRB	Performed without remarks
72	/ Control system / CJP/CRB	Verify time synchronization on data collector/CMS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Valid for PCS7	Performed without remarks.
73	/ Protection system / CAA	Check function of ESD: Low lubrication-oil pressure. Pump change over and trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
74	/ Protection system / CAA	Check function of ESD: Fire protection. Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
75	/ Protection system / CAA	Check function of ESD: Emergency stop push button.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
76	/ Protection system / CAA	Check function of ESD: Ventilation system Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
77	/ Protection system / CAA	Check function of ESD: Gas Detection Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
78	/ Protection system / CAA	Check function of ESD: Overspeed trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.
79	/ Protection system / CAA	Check function of ESD: Pulsation trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remarks.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
80	/ Synchronizing cubicle / CBP	Check setting levels of equipment.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
81	/ Generator Protection / CHA	Visual inspection of the cabinet.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CHA	Performed without remarks.
82	/ Generator transformer / BAT	Visual inspection of transformer for oil leaks and cleanliness.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Customer obligation
83	/ Generator transformer / BAT	Check the oil level.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Customer obligation
84	/ Generator transformer / BAT	Check drying equipment.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Customer obligation
86	/ Main LV switchboards / BFA	Visual inspection of the switchboards and switchgear.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
87	/ Auxiliary transformer / BFT	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BFT	Performed without remarks.
88	/ UMD/UPS system / BPA	Visual inspection of the cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BPA, UMD/UPS	Performed without remarks.
89	/ Battery system, 440V / BTA	Visual inspection of battery system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
90	/ Battery charger, 440V / BTL	Visual inspection of charger cubicle.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remarks.
91	/ Battery charger, 440V / BTL	Check the charger LL level.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remarks.  Undervoltage<<  420.2 ^ 438.6 v
92	/ Battery charger, 440V / BTL	Check normal charging current and voltage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remarks.  System A : 459.0 V, 0.05 A  System B : 459.6 V, 0.04 A
93	/ Battery charger, 440V / BTL	Check fast charging sequence if applicable.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BTL	Customer obligation

**Photo Attachments Stationary commissioning**



4 MBA10CP042



4 MBA10CP055



26 MBP10AA020

4.1.5 Rotating commissioning

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Before start /	Before starting visual inspection of inlet channel from intake to inlet casing. Check cleanliness for GG-room, generator room, air inlet room and plenum.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
2	/ Before start /	Before start check lubrication-oil pressures sub-pressure and tank level. Check for abnormal noise, vibrations and leaks from pumps	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		and mist fan. Check that all valves are in correct position.				
3	/ Before start /	Test of pump change over simulate cool init and verify feedback. Test of ESD function low lubrication-oil pressure.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
4	/ Before start /	Preparation of temporary measuring equipment. Measure the speed from barring speed to zero and from purge speed to zero.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  Barring to zero : 9 min 24 sec  Purge to zero : 11 min 47 sec
5	/ Before start /	Check and adjust ignition system if needed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
6	/ Before start /	Check that the drain valves for washing water are closed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation
7	/ Before start /	Check that all the transmitter blocks were calibration have been performed are open/closed correct for operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
8	/ Checks during start /	Check start-sequence during run-up. Note T7 max and observe vibration levels during start-up, fuel valve, pressure and bearings temperature.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  T7 max : 409 C
9	/ Checks during start /	Check that there are no fuel-, lubr	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		ication-oil or hot air leakages.				
10	/ Checks during start /	Check function of selected hard wired trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
11	/ Checks during start /	Before synchronization check regulator response for AVR and FC R.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
12	/ Checks during start /	Take readings, pulsation measurement, verify valve opening/heat ing value when flow meter and heating value for the gas is available and do inspection rounds of the unit at stabilized condition at idle, 5 MW, 10MW, 15MW, 20MW, 25MW, 30MW, 35MW, 40MW and base load (peak load if applicable).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  See appendix E for protocol.
13	/ Checks during start /	Take readings for performance validation if the unit has performance degradation guarantee.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
14	/ Checks during start /	At base load, check temperatures after bleed valves to ensure that bleed valves are closed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.
15	/ Checks during start /	Visual inspection of flow meter (MBP05/20CF005) during operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  Flow meter 2.682 kg/s at based load.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
16	/ Miscellaneous /	Note hours of turbine operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.

#### 4.1.6 Generator maintenance ABB AMS 900-1250

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Electric generator or system / MKA	Look through all logged or recorded data available; load, temperature, vibrations etc. Fill in the report.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.  <b>Photo Attachments</b> Generator nameplate
2	/ Electric generator or system / MKA	External inspection regarding rust, leaks or other affection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.  <b>Photo Attachments</b> External generator
3	/ Electric generator or system / MKA	Checking of tightness of all fixing elements.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.
4	/ Electric generator or system / MKA	Ensure ventilation ducts are clean and free from obstructions if connected to external air.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.
5	/ Electric generator or system / MKA	Replace air filter, if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remarks.
6	/ Electric generator or system / MKA	Inspection of winding connections	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stator winding	Performed without remarks.  <b>Photo Attachments</b> Stator winding 1 Stator winding 2 Stator winding 3 Stator winding 4 Stator winding connection 1 Stator winding connection 2
7	/ Electric generator or system / MKA	Inspection of winding and bracing rope	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stator winding	Performed without remarks.  <b>Photo Attachments</b> Bracing rope



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
8	/ Electric generat or system / MKA	Inspection for dis coloration.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pressure fingers	Performed without remarks.
9	/ Electric generat or system / MKA	Visual inspection of sealing.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air cover	Performed without remarks.  <b>Photo Attachments</b> Air cover
10	/ Electric generat or system / MKA	Check if the RTD s give reasonabl e values on the v isual display unit (VDU).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	RTD:s	Performed without remarks.
11	/ Electric generat or system / MKA	Check all line- a nd neutral connec tions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remarks.  <b>Photo Attachments</b> Line and neutral connection
12	/ Electric generat or system / MKA	Check of genera l condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remarks.  <b>Photo Attachments</b> Current transformer Outgoing line Surge arrester Voltage transformer
13	/ Electric generat or system / MKA	Inspection of pre ssure relief hatc h.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remarks.
14	/ Electric generat or system / MKA	Visual inspection of insulators.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remarks.  <b>Photo Attachments</b> Insulator
15	/ Electric generat or system / MKA	Visual inspection of turn insulation , discoloration et c from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rotor coils	Performed without remarks.  <b>Photo Attachments</b> Rotor coil Rotor fan
16	/ Electric generat or system / MKA	Visual inspection of pole shoes re garding discolora tion from inspecti on hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pole shoes	Performed without remarks.  <b>Photo Attachments</b> Pole shoe Rotor support
17	/ Electric generat or system / MKA	Inspection for lea ks. External and	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remarks.  <b>Photo Attachments</b>

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		from inspection hatches.				Bearing housing 1 Bearing housing 2
18	/ Electric generator system / MKA	Inspect all bolted joints.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remarks.
19	/ Electric generator system / MKA	Inspection of guide support.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remarks.
20	/ Electric generator system / MKA	Visual inspection for leaks, external and from inspection hatches. If leaks, check for wear and damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shaft seals	Performed without remarks.
21	/ Electric generator system / MKA	Visual external inspection for leaks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oil piping	Performed without remarks.
22	/ Electric generator system / MKA	Verify function of all measuring instruments.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Measuring instrument	Performed without remarks.
23	/ Electric generator system / MKA	If necessary replace filter for air intake to the air-lock seals located on bearing pedestals.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air filter	Performed. All 4 air filters were removed and cleaned by customer.  <b>Photo Attachments</b> Air filter
24	/ Electric generator system / MKA	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exciter rotor	Performed without remarks.  <b>Photo Attachments</b> Control pulse unit Rotating diode
25	/ Electric generator system / MKA	Visual inspection from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exciter Stator	Performed without remarks.  <b>Photo Attachments</b> Exciter stator
26	/ Electric generator system / MKA	Visual inspection. Replace if shorter than 15 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brush and brush holder	Performed. All 4 rotor earth brushes are longer than 15 mm.  <b>Photo Attachments</b> Brush holder Earth Brush 1 Earth brush 2
27	/ Electric generator system / MKA	Check of rotor ground fault protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brush and brush holder	Performed without remarks.

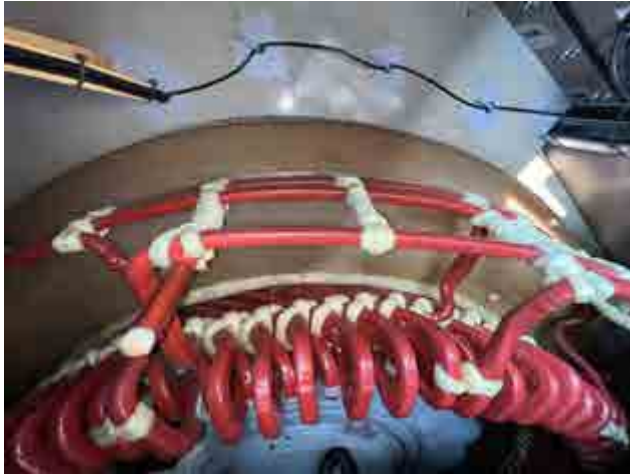
Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		tion. Not valid if r emoved.				
28	/ Electric generat or system / MKA	Visual inspection of slipring.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Slip ring	Performed without remarks.  <b>Photo Attachments</b> Slip ring
29	/ Electric generat or system / MKA	Visual external in spection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remarks.  <b>Photo Attachments</b> Cooler
30	/ Electric generat or system / MKA	Check of cleanlin ess, corrosion an d/or erosion dam ages on air- or w ater side.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remarks.
31	/ Electric generat or system / MKA	Clean air and wa ter sides.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remarks.
32	/ Electric generat or system / MKA	Pressure check.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cooler	Customer obligation.
33	/ Electric generat or system / MKA	Function check o f casing water le akage detector.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remarks.

**Photo Attachments Generator maintenance ABB AMS 900-1250**


1 Generator nameplate



2 External generator



6 Stator winding 1



6 Stator winding 2



6 Stator winding 3



6 Stator winding 4



6 Stator winding connection 1

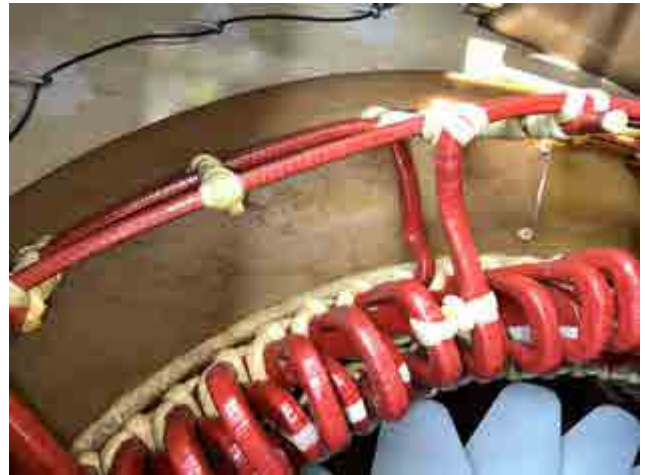


6 Stator winding connection 2





7 Bracing rope



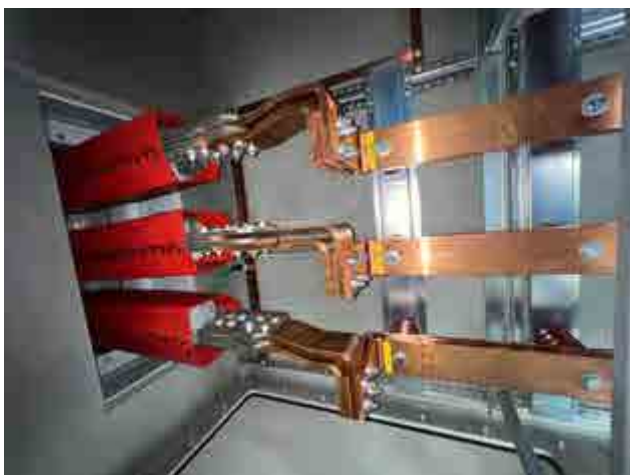
9 Air cover



11 Line and neutral connection



12 Current transformer



12 Outgoing line



12 Surge arrester



12 Voltage transformer



14 Insulator



15 Rotor coil



15 Rotor fan



16 Pole shoe



16 Rotor support





17 Bearing housing 1



17 Bearing housing 2



23 Air filter



24 Control pulse unit



24 Rotating diode



25 Exciter stator



26 Brush holder



26 Earth Brush 1



26 Earth brush 2



28 Slip ring



29 Cooler

## 4.2. Activities Outside Maintenance Plan

### 4.2.1 Additional activities

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
3	/ Control system General / CJP C RB	SuP19/2020/SG T-800 Revised L FP/NFP Pulsatio ns levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  See appendix F for details.
4	/ Control system General / CJP C RB	SuP01/2021/SG T-800 Removal of high temperat ure alarm on stat or ring 2 & 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remarks.  See appendix F for details.
7	/ Control system General / CJP C RB	SuP25/2015/SG T-800 Reduction Vibration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Check if previously implemented	The activity has been implemented prior to start of inspection.
8	/ Gear system In strumentation / MBK	Troubleshoot the pinion bearing t urbine end temp erature sensor M BK10CT005	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report E1B101201941	Performed.  The same problem with BD000166U01, the temperature probe will be replaced next major inspection according to customer information.
9	/ Fire detection a nd extinguishing system CO2 / S GJ	Troubleshoot the alarms coming f rom fire system	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report E1B101201941	From customer information, this machine shutdown almost everyday and operators usually enter inside gas turbine enclosure to check instrument that why this alarm coming up frequently.
10	/ Gas turbine / M BA	Check the P3 tra nsmitter MBA10 CP017	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report E1B101201941	Performed.  MBA10CP015, 016 and 017 have been checked by pressure test which found in good condition.  Pipe connected to the compressor outlet have been clean and flush with air.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
11	2535 / Flame detector /	Check and verify flame detectors MBA10CQ005 and MBA10FQ900	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report E1B101201941	This problem has been solved by customer since December 2022.

## 5. Replaced Parts

### 5.1. Unplanned Replacement Parts

HG/KKS	Assembly Drawing Number	Item No/Position	Parts No	Name of Parts	Qty	Qty Installed	Unit	Modification	Modification Revision	Field Service Remarks
MBA10CP055			3820 314-3	Diff. Pressure surge protection	1	1	EA			Body damaged

## 6. Inspection Result

Level A inspection was completed according to activity list and recommendation was provided to customer for further actions. The unit BD000166U02 is in serviceable condition and handed over to customer for operation.

## 7. Recommendations

It is recommended for the customer to closely monitor alarm P3 deviation. If the alarm still persists, transmitters should be replaced.

## 8. Software Changes

Change	Item Designation	Reference	Remark
Revised LFP and NFP pulsation levels	MBA10CP901 MBA10CP085 MBA10CP090 MBA10CP095	SuP 19/2020/SGT-800	Performed without remarks.
Removal of high temperature alarm on stator ring 2 & 3	MBA10FT905	SuP01/2021/SGT-800	Performed without remarks.

## 9. Appendices

- 9.1 Appendix A Speed and Vibration Protocol(2av3)
- 9.2 Appendix B Pressure Transmitter Protocol(2av3u)
- 9.3 Appendix C Regulated Valves and VGV Protocol
- 9.4 Appendix D Pulsation Protocol
- 9.5 Appendix E Readings
- 9.6 Appendix F Additional Activities



# 1

## 9.1 Appendix A Speed and Vibration Protocol(2av3)

ID: E1B101232743 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH



## Speed and Vibration Test Protocol

### Speed and Vibration

Scale factor: 2 rpm / Hz

Frequency (Hz)	MBA10CS005 Speed rotor VDU (rpm)	MBA10CS010 Speed rotor VDU (rpm)
750	1500	1500
1500	3000	3000
2250	4500	4500
3000	6000	6000
3300	6600	6600
3650	7300	7300

Scale factor: 2 rpm / Hz

Frequency (Hz)	MBA10CS015 Overspeed rotor VDU (rpm)	MBA10CS020 Overspeed rotor VDU (rpm)	MBA10CS030 Overspeed rotor VDU (rpm)
750	1500	1500	1500
1500	3000	3000	3000
2250	4500	4500	4500
3000	6000	6000	6000
3300	6600	6600	6600
3650	7300	7300	7300
H Warning	6930		
HH Alarm	7260		

## Speed and Vibration Test Protocol

Scale factor: 10.19 mV / mm/s

mV	MBA10CY005 Bearing 1 VDU (mm/s)	MBA10CY025 Bearing 1 VDU (mm/s)	MBA10CY030 Bearing 1 VDU (mm/s)
51	5	5	5
102	10	10	10
153	15	15	15
204	20	20	20
255	25	25	25

Scale factor: 5.71 mV / mm/s

mV	MBA10CY010 Bearing 2 VDU (mm/s)	MBA10CY015 Bearing 2 VDU (mm/s)	MBA10CY020 Bearing 2 VDU (mm/s)
29	5	5	5
57	10	10	10
86	15	15	15
114	20	20	20
142	24.9	24.9	24.9

Scale factor: 3.94 mV / mm/s

mV	MKA10CY005 Generator bearing DE VDU (mm/s)	MKA10CY035 Generator bearing DE VDU (mm/s)	MKA10CY040 Generator bearing DE VDU (mm/s)
20	5	5	5
40	10	10	10
59	14.9	14.9	14.9
79	20	20	20
99	25.1	25.1	25.1

## Speed and Vibration Test Protocol

Scale factor: 3.94 mV / mm/s

<b>mV</b>	<b>MKA10CY010</b> <b>Generator bearing NDE</b> <b>VDU (mm/s)</b>	<b>MKA10CY045</b> <b>Generator bearing NDE</b> <b>VDU (mm/s)</b>	<b>MKA10CY050</b> <b>Generator bearing NDE</b> <b>VDU (mm/s)</b>
<b>20</b>	5	5	5
<b>40</b>	10	10	10
<b>59</b>	14.9	14.9	14.9
<b>79</b>	20	20	20
<b>99</b>	25.1	25.1	25.1

Scale factor: 10.19 mV / mm/s

<b>mV</b>	<b>MBK10CY005</b> <b>Gearbox casing turbine side</b> <b>VDU (mm/s)</b>	<b>MBK10CY006</b> <b>Gearbox casing turbine side</b> <b>VDU (mm/s)</b>	<b>MBK10CY007</b> <b>Gearbox casing turbine side</b> <b>VDU (mm/s)</b>
<b>51</b>	5	5	5
<b>102</b>	10	10	10
<b>153</b>	15	15	15
<b>204</b>	20	20	20
<b>255</b>	25	25	25

Scale factor: 10.19 mV / mm/s

<b>mV</b>	<b>MBK10CY030</b> <b>Gearbox casing wheel side</b> <b>VDU (mm/s)</b>
<b>51</b>	5
<b>102</b>	10
<b>153</b>	15
<b>204</b>	20
<b>255</b>	25

## Speed and Vibration Test Protocol

### COMPLETION

Test Executer	Date	Signature	Company
	25/2/2023	Kittinan W.	Siemens Energy Limited
	25/2/2023	Tasuku Maki	Siemens Energy Limited

IDEIB101232743 Name: Commissioning report Rev: A Protection: Restricted IP: R00.S00  
 Creator: Reviewer: Approver:  
 AL: N ECCNN ECL: US-ContNo CoO: TH

**2**

**9.2 Appendix B Pressure Transmitter Protocol(2av3u)**

## Pressure Transmitter Test Protocol

### Pressure Transmitter

#### **MBA Gas turbine system**

MBA10CP005 Compressor Inlet Diff Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [30]   | kPa         |

	0%		50%		100%	Unit
Setting	0		15		30	kPa
Input pressure	0		15		30	kPa
VDU	0		15		30	kPa

MBA10CP010 Compressor Inlet Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [80] – [120] | kPa (a)     |

	0%		50%		100%	Unit
Setting	80		100		120	kPa(a)
Input pressure	80		100		120	kPa(a)
VDU	80.1		100.1		120.1	kPa(a)

MBA10CP015 Pressure Compressor Outlet

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2.5]  | MPa         |

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa



## Commissioning

BD000166U02

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Pressure Transmitter Test Protocol

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MBA10CP016      Pressure Compressor Outlet

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

---

MBA10CP017      Pressure Compressor Outlet

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

---

MBA10CP030      Pressure Combustion Chamber

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

## Commissioning

BD000166U02

## Pressure Transmitter Test Protocol

MBA10CP035 Disc 1 Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [2.5]      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

MBA10CP040 Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [12]      kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0		6		12	kPa
VDU	0.05		5.95		11.95	kPa

MBA10CP041 Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [12]      kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0		6		12	kPa
VDU	0.02		6		12	kPa

## Pressure Transmitter Test Protocol

MBA10CP042 Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [12]	kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0		6		12	kPa
VDU	0.03		6.03		12.03	kPa

MBA10CP045 Turbine Exhaust Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[80] – [120]	kPa (a)

	0%		50%		100%	Unit
Setting	80		100		120	kPa(a)
Input pressure	80		100		120	kPa(a)
VDU	80		100		120	kPa(a)

MBA10CP065 Air Intake Diff Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[-3] – [3]	kPa

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3		0		3	kPa
VDU	-3		0		3	kPa

## Pressure Transmitter Test Protocol

MBA10CP070 Air Intake Diff Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[-3] – [3]	kPa

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3		0		3	kPa
VDU	-3		0		3	kPa

MBA10CP075 Air Intake Diff Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[-3] – [3]	kPa

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3		0		3	kPa
VDU	-3		-0.01		2.99	kPa

---

Pressure Transmitter Test Protocol

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**MBH Cooling/Sealing/Purge air system**

MBH10CP020 DP Stage 2 Cooling

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [1000] | kPa         |

	0%		50%		100%	Unit
Setting	0		500		1000	kPa
Input pressure	0		500		1000	kPa
VDU	0		501		1000	kPa

MBH10CP025 DP External Stator Cooling

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [250]  | kPa         |

	0%		50%		100%	Unit
Setting	0		125		250	kPa
Input pressure	0		125		250	kPa
VDU	0		125		251	kPa

## Pressure Transmitter Test Protocol

MBH10CP030 DP Stage 3 Cooling

Function check according to setting list

- Nominal setting

<u>Range</u>	<u>Unit</u>
[0] – [400]	kPa

	0%		50%		100%	Unit
Setting	0		200		400	kPa
Input pressure	0		200		400	kPa
VDU	0		199		399	kPa



## Pressure Transmitter Test Protocol

**MBL Air intake system**

MBL10CP005 Diff Pressure Pre-filter

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                      kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0.01		1.01		2.01	kPa

MBL10CP010 Diff Pressure High Efficiency Filter

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                      kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0.01		1.01		2.01	kPa

MBL30CP030 Diff Pressure Air intake Channel

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                      kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0.02		1.02		2.02	kPa

## Commissioning

BD000166U02

## Pressure Transmitter Test Protocol

MBL30CP035 Diff Pressure Air intake Channel

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [2]      kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0.02		1.02		2.02	kPa

MBL30CP040 Diff Pressure Air intake Channel

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [2]      kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0.02		1.02		2.02	kPa

## Pressure Transmitter Test Protocol

**MBP Gas fuel system**

MBP10CP005 Gas Fuel Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [4]                      MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP10CP010 Gas Fuel Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [4]                      MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP10CP011 Gas Fuel Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [4]                      MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

## Pressure Transmitter Test Protocol

MBP10CP012 Gas Fuel Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [4]	MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP10CP025 Gas Fuel Pressure after Main Valve

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [4]	MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP20CP025 Gas Fuel Pressure after Pilot Valve

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [4]	MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

## Pressure Transmitter Test Protocol

MBP30CP025 Central Gas Fuel Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [4]    | MPa         |

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP60CP005 Ignition Gas Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [4]    | MPa         |

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

## Pressure Transmitter Test Protocol

**MBV Lube oil system**

MBV10CP015 Lube Oil Tank Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [-5]                      kPa

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0		-2.5		-5	kPa
VDU	0		-2.5		-5	kPa

MBV10CP020 Lube Oil Tank Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [-5]                      kPa

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0		-2.5		-5	kPa
VDU	0		-2.5		-5	kPa

MBV10CP025 Lube Oil Tank Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [-5]                      kPa

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0		-2.5		-5	kPa
VDU	0		-2.5		-5	kPa



## Pressure Transmitter Test Protocol

MBV40CP010 Lube Oil Filter DP

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [150]  | kPa         |

	0%		50%		100%	Unit
Setting	0		75		150	kPa
Input pressure	0		75		150	kPa
VDU	0		75		150	kPa

MBV40CP015 Lube Oil Supply Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [300]  | kPa         |

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0		150		300	kPa
VDU	0		150		300	kPa

MBV40CP025 Lube Oil Supply Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [300]  | kPa         |

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0		150		300	kPa
VDU	0		150		300	kPa

## Pressure Transmitter Test Protocol

MBV40CP055 Lube Oil Supply Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [300]  | kPa         |

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0		150		300	kPa
VDU	0		150		300	kPa

## Pressure Transmitter Test Protocol

**SAG Ventilation system gas turbine room**

SAG10CP005 GT-Room/Ambient Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                      kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

SAG10CP010 GT Room Vent Fan Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                      kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

SAG10CP015 GT Room Vent Fan Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                      kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

## Pressure Transmitter Test Protocol

SAG10CP020 GT Room Vent Fan Diff Pressure

Function check according to setting list

- Nominal setting

<u>Range</u>	<u>Unit</u>
[0] – [2]	kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

## Pressure Transmitter Test Protocol

### MBA Gas Turbine System

MBA10CP050	Anti-Surge Protection
MBA10CP055	Anti-Surge Protection
MBA10CP060	Anti-Surge Protection

Function check according to setting list

	Setting value	Old value	New Value	Unit
MBA10CP050	5	4.9	-	mbar
MBA10CP055	5	5	-	mbar
MBA10CP060	5	5.1	-	mbar

### MBV Lube oil System Pressure switches

MBV21CP005	Lube Oil Pressure After Pumps 1
MBV22CP005	Lube Oil Pressure After Pumps 2
MBV23CP005	Lube Oil Pressure After Pumps 3

Function check according to setting list

- | <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|------------------------|--------------|-------------|
|                        | [50] L1      | kPa         |

	Setting value	Old value	New value	Unit
MBV21CP005	50	52	-	kPa
MBV22CP005	50	51	-	kPa
MBV23CP005	50	49	-	kPa

## COMPLETION

Test Executer	Date	Signature	Company
	25/2/2023	Kittikun Ch.	Siemens Energy Limited
			Siemens Energy Limited

**3**

**9.3 Appendix C Regulated Valves and VGV Protocol**

ID: E1B101232743 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH



## Valves and VGV Test Protocol

### Regulated Valves

#### Main Gas Valve

SP	VDU (%)	Valve (%)
0	0	0
25	25	25
50	50	50
75	75	75
100	100	100
Start position (XP31)	VDU (%)	Valve (%)
0 -> 1 Falling	4	4
1 -> 0 Raising	6	6
Zero offset	Old (rev/min)	New (rev/min)
	N/A	N/A

#### Pilot Gas Valve

SP	VDU (%)	Valve (%)
0	0	0
25	25	25
50	50	50
75	75	75
100	100	100
Start position (XP31)	VDU (%)	Valve (%)
0 -> 1 Falling	25	25
1 -> 0 Raising	28	28
Zero offset	Old (rev/min)	New (rev/min)
	N/A	N/A

## Valves and VGV Test Protocol

### Central Gas Valve

SP	VDU (%)	Valve (%)
0	0.8	0.8
25	24.7	24.7
50	49.6	49.6
75	74.6	74.6
100	99.7	99.7

IDEIB101232743 Name: Commissioning report Rev: A Protection: Restricted IPR00.S00  
 Creator: Reviewer: Approver:  
 ALIN ECCNN ECL: US-ContNo CoO:TH

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Valves and VGV Test Protocol

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### Bleed Valve 1

SP	Valve (%)	VDU (%)
0	0.3	0.3
25	24.6	24.6
50	49.8	49.8
75	74.7	74.7
100	101	101
Closed position (XP01)	VDU (%)	
0 -> 1 Falling	8	
1 -> 0 Raising	9	
Closed position (XP02)	VDU (%)	
0 -> 1 Falling	8	
1 -> 0 Raising	9	

Close Time = 35 S  
Open Time = 11 S

### Bleed Valve 2

SP	Valve (%)	VDU (%)
0	0.4	0.4
25	24.6	24.6
50	49.7	49.7
75	74.6	74.6
100	99.9	99.9
Closed position (XP01)	VDU (%)	
0 -> 1 Falling	8	
1 -> 0 Raising	10	
Closed position (XP02)	VDU (%)	
0 -> 1 Falling	8	
1 -> 0 Raising	10	

Close Time = 37 S  
Open Time = 11 S

## Valves and VGV Test Protocol

### VGV

SP (%)	VDU (%)	Angle before adjustment (°)	Angle after adjustment (°)	Piston length before adjustment (mm)	Piston length after adjustment (mm)
20	20	-41.5	-	234	-
25	25	-38	-	219	-
50	50	-20	-	142	-
57.41	57.41	-15	-	120	-
75	75	-3	-	65	-
78.8	78.8	0	-	54	-
80.6	80.6	1.5	-	48	-
Zero offset			Old (rev/min)		New (rev/min)
			-		-

### COMPLETION

Test Executer	Date	Signature	Company
	25/2/2023	Kittinan W.	Siemens Energy Limited
	25/2/2023	Kittikun C.	Siemens Energy Limited

## 4

### 9.4 Appendix D Pulsation Protocol

## Pulsation Test Protocol

### Pulsation (pC-simulator)

#### Low Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (LFP)	MBA10CP090 VDU (LFP)	MBA10CP095 VDU (LFP)
2	190	110	108	108	110
5	190	275	272	274	276
10	190	550	538	541	546

#### Narrow Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (NFP)	MBA10CP090 VDU (NFP)	MBA10CP095 VDU (NFP)
2	220	110	108	108	108
5	220	275	273	274	272
10	220	550	540	543	544

#### Medium Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (MFP)	MBA10CP090 VDU (MFP)	MBA10CP095 VDU (MFP)
2	620	120	114	118	117
5	620	300	295	297	295
10	620	600	586	592	591



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Pulsation Test Protocol

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## High Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (HFP)	MBA10CP090 VDU (HFP)	MBA10CP095 VDU (HFP)
2	2000	135	128	131	132
5	2000	338	329	335	333
10	2000	675	657	660	665

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COMPLETION

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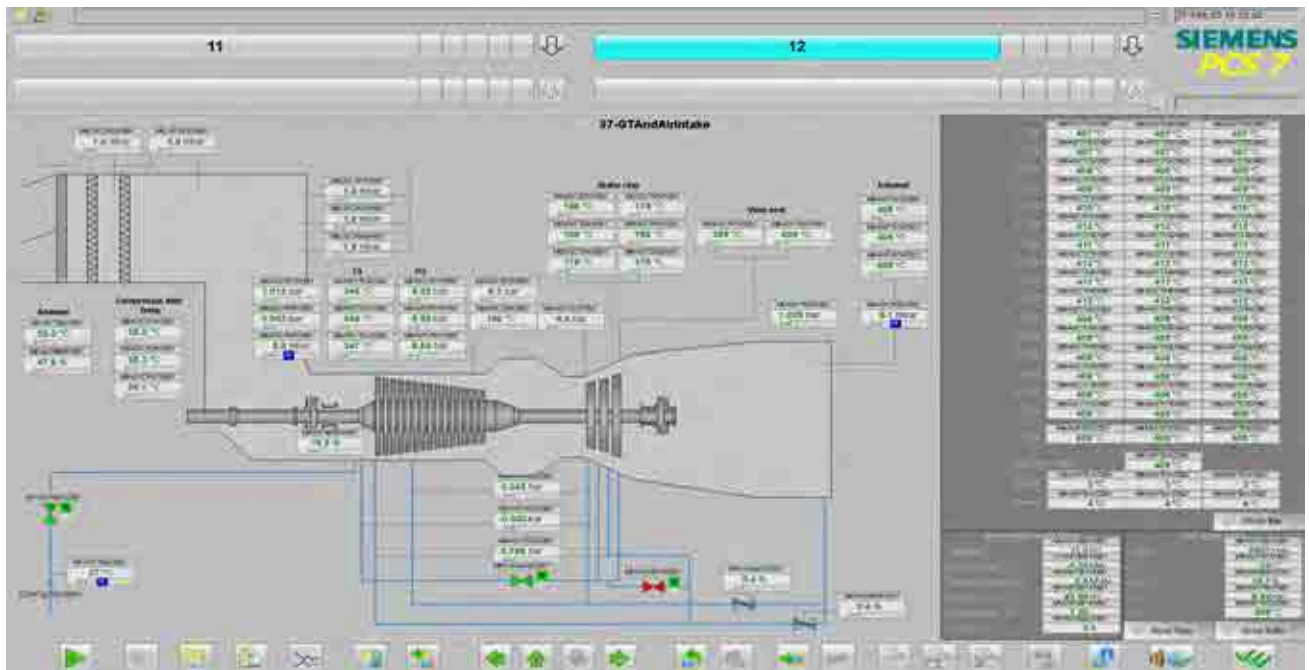
Test Executer	Date	Signature	Company
	25/2/2023	Kittinan W.	Siemens Energy Limited
	25/2/2023	Tasuku Maki	Siemens Energy Limited

## 5

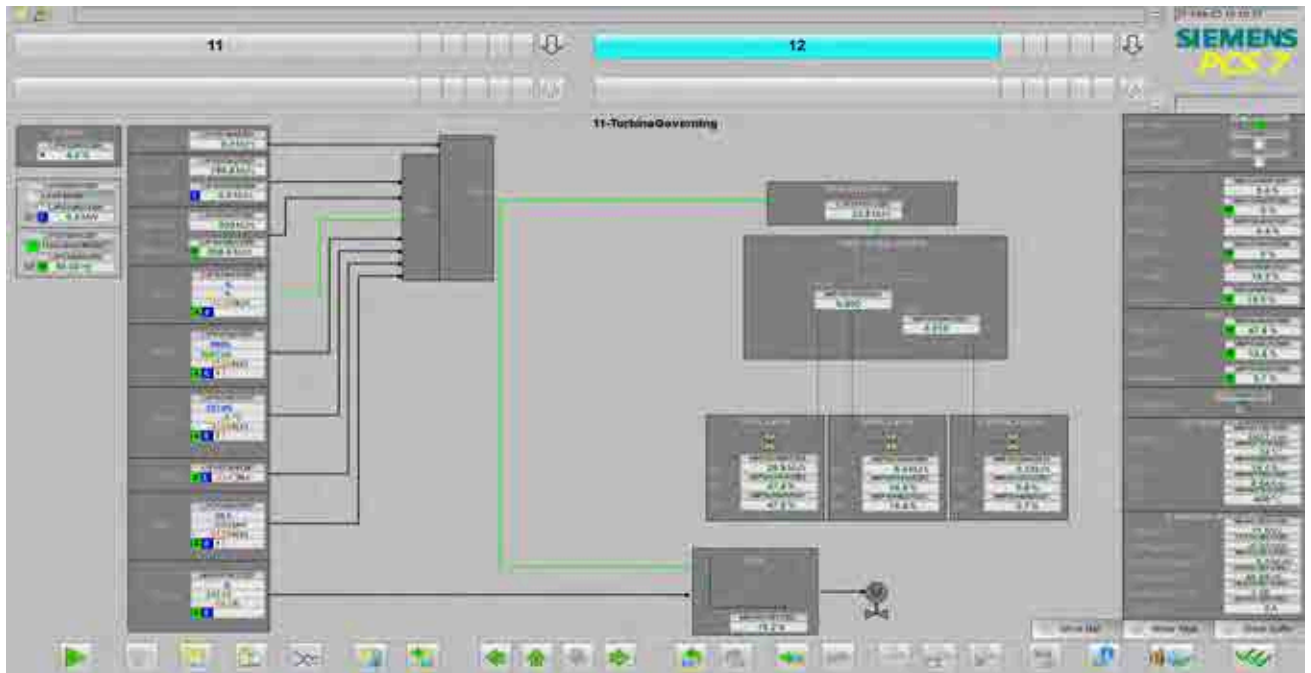
### 9.5 Appendix E Readings

## Readings

Idle speed 6600 RPM



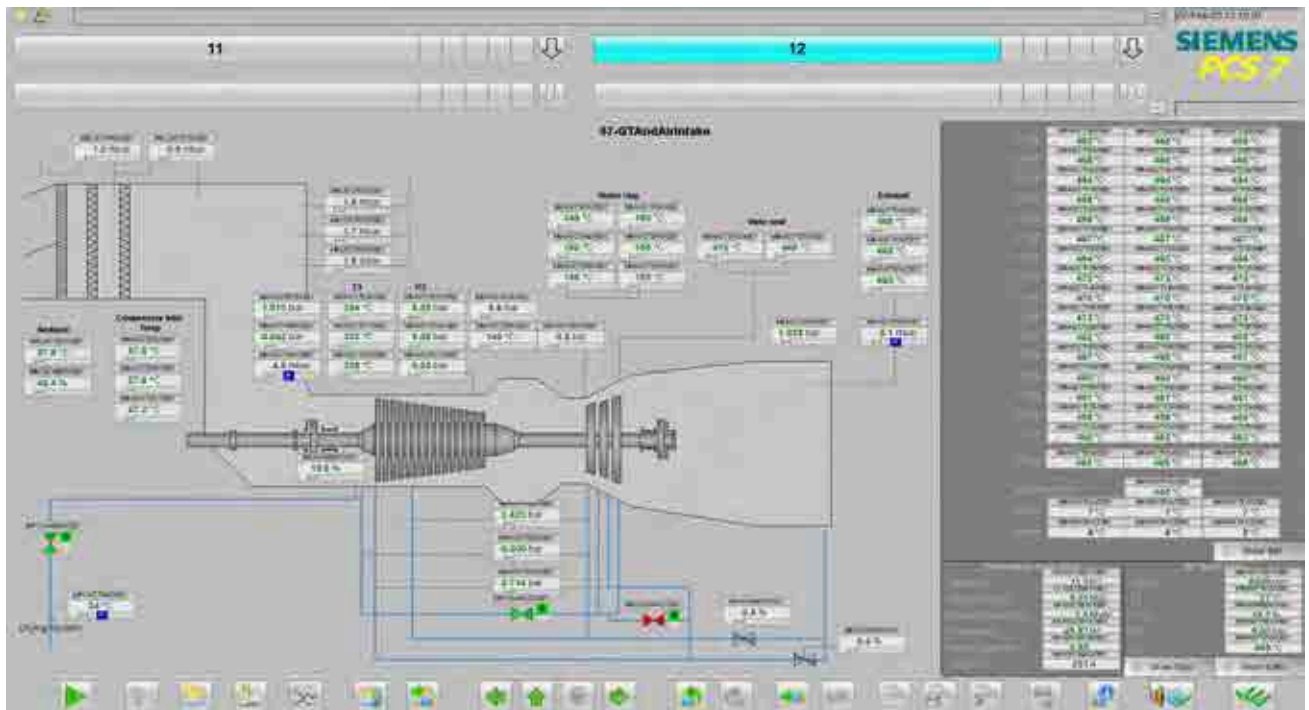
## Readings



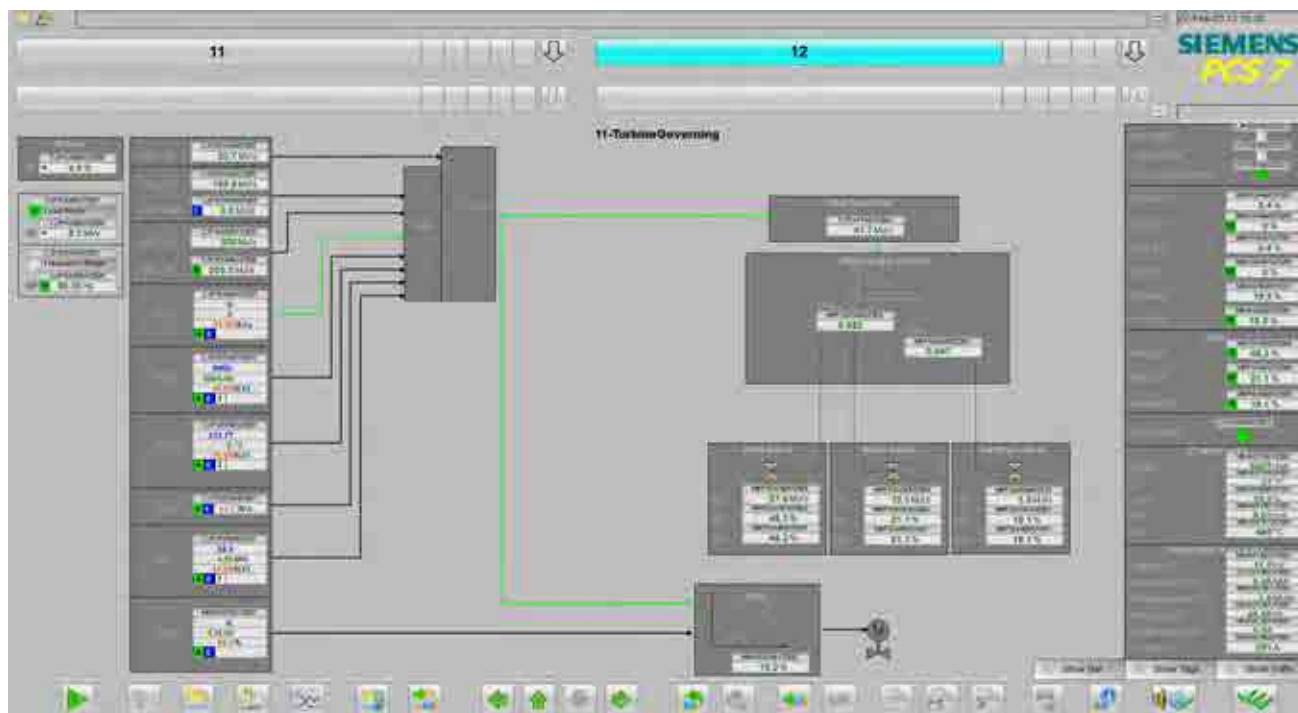
IDE1B101232743 Name: Commissioning report Rev: A Protection: Restricted IP: R00.500  
Creator: Reviewer: Approver:  
ALN ECCNN ECL: US-ContNo CoO:TH

## Readings

5 MW



## Readings

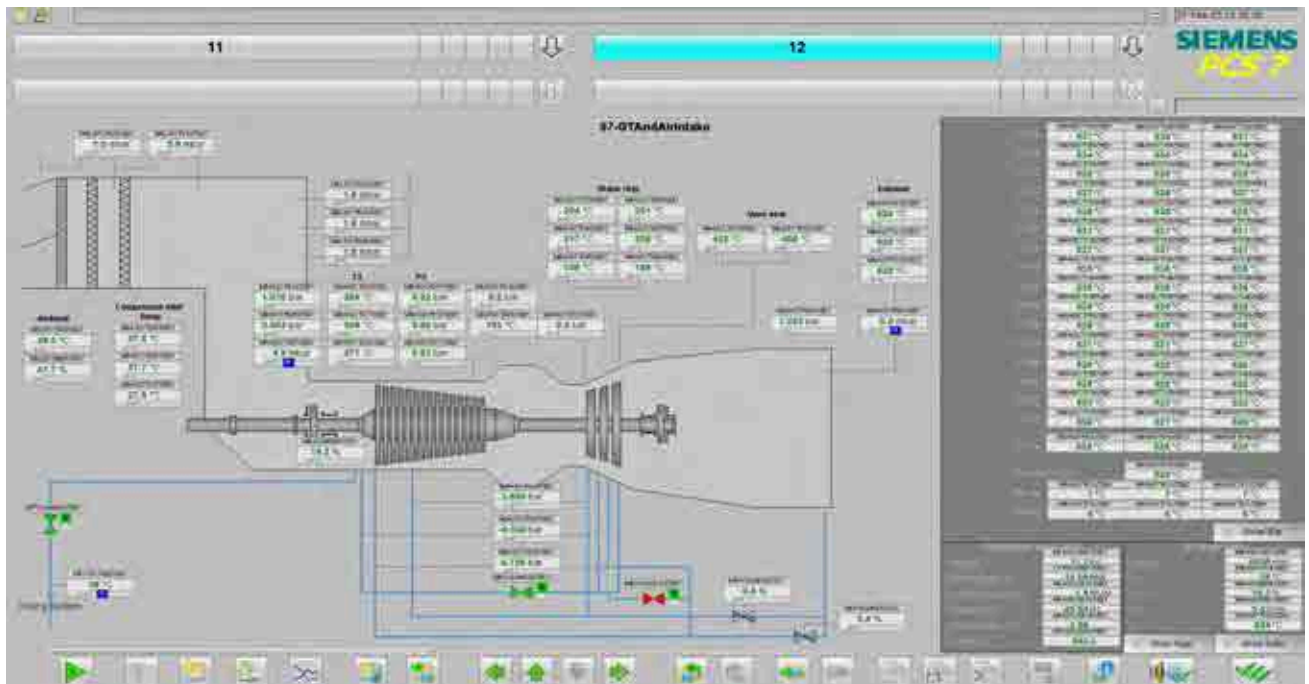


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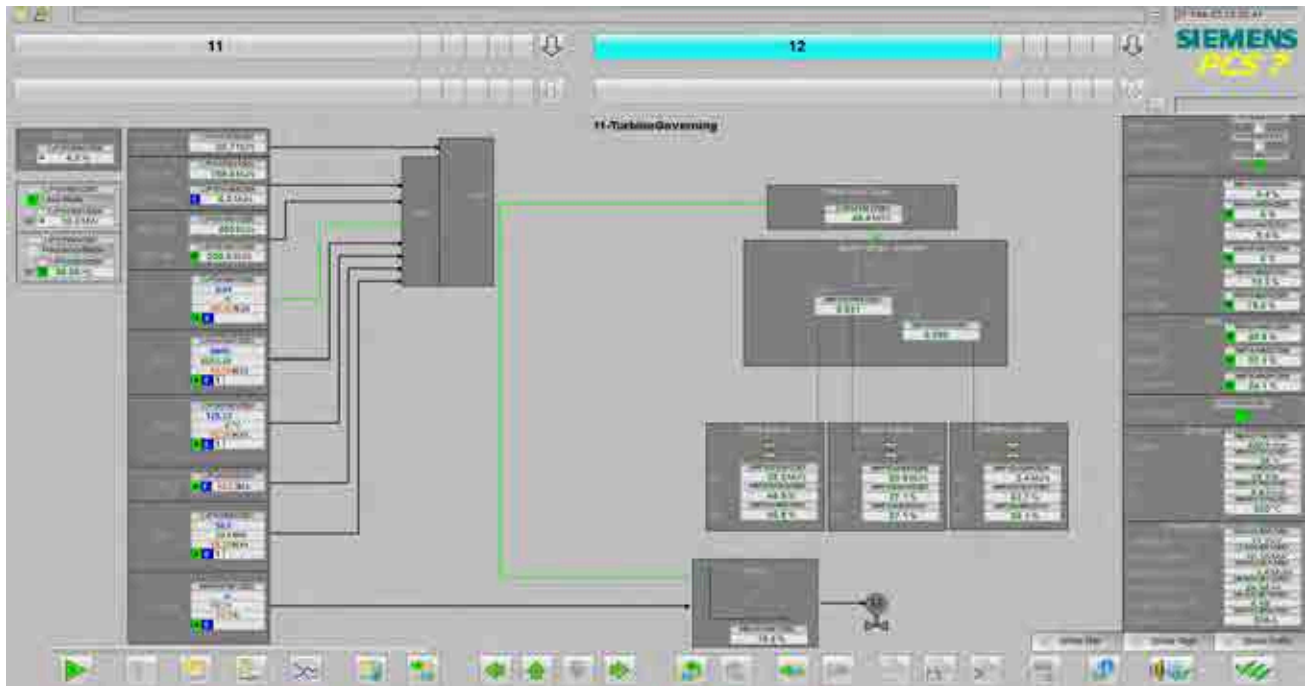


## Readings

10 MW



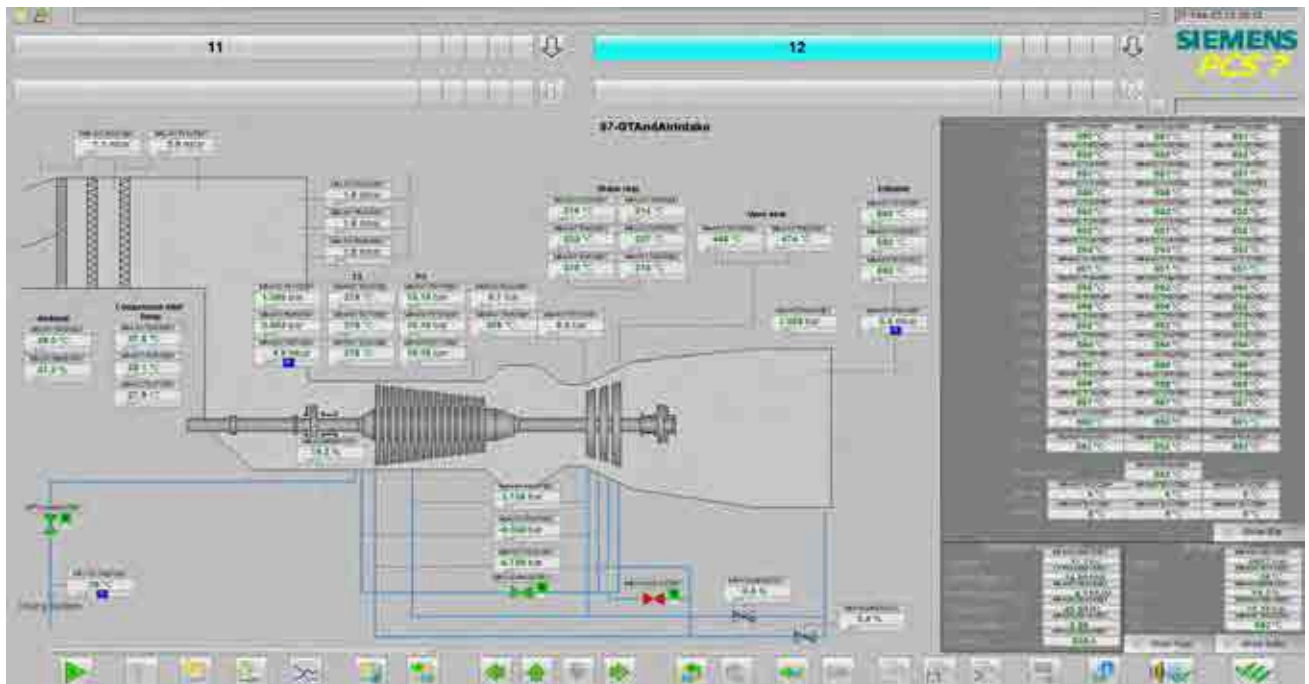
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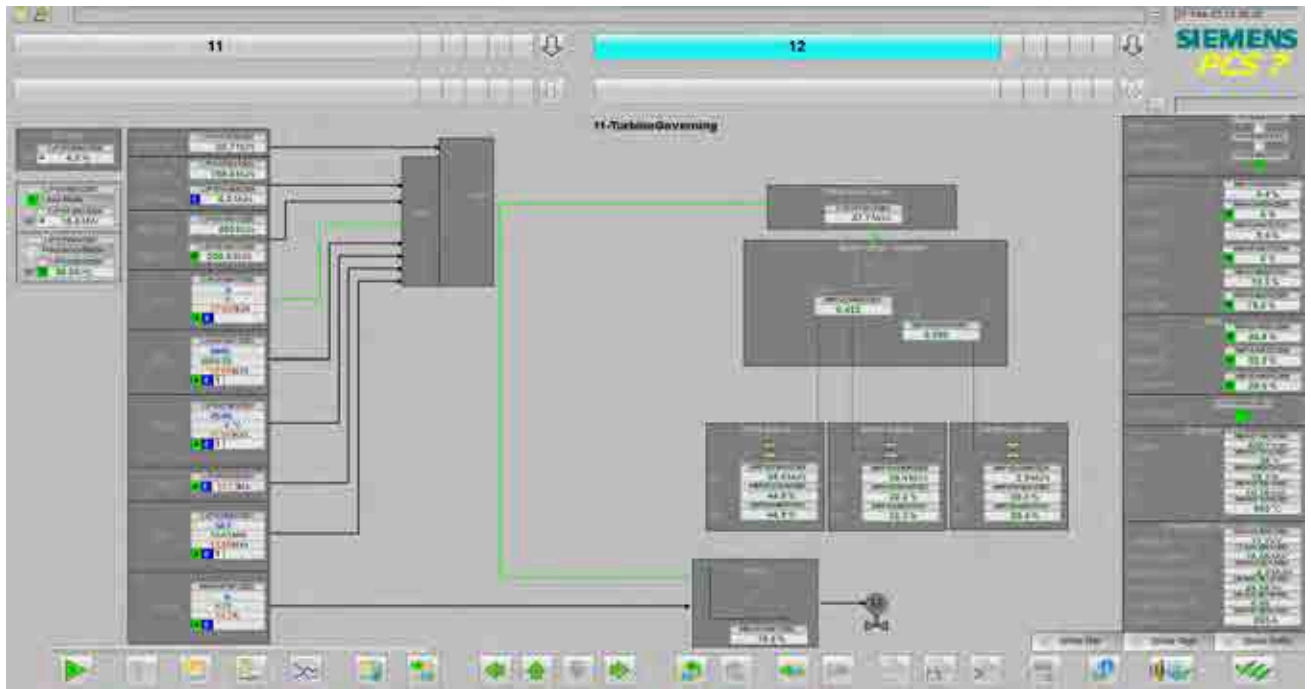
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 Creator: Reviewer: Approver:  
 ALN ECCNN ECL: US-ContNo CoO:TH

## Readings

15 MW



## Readings

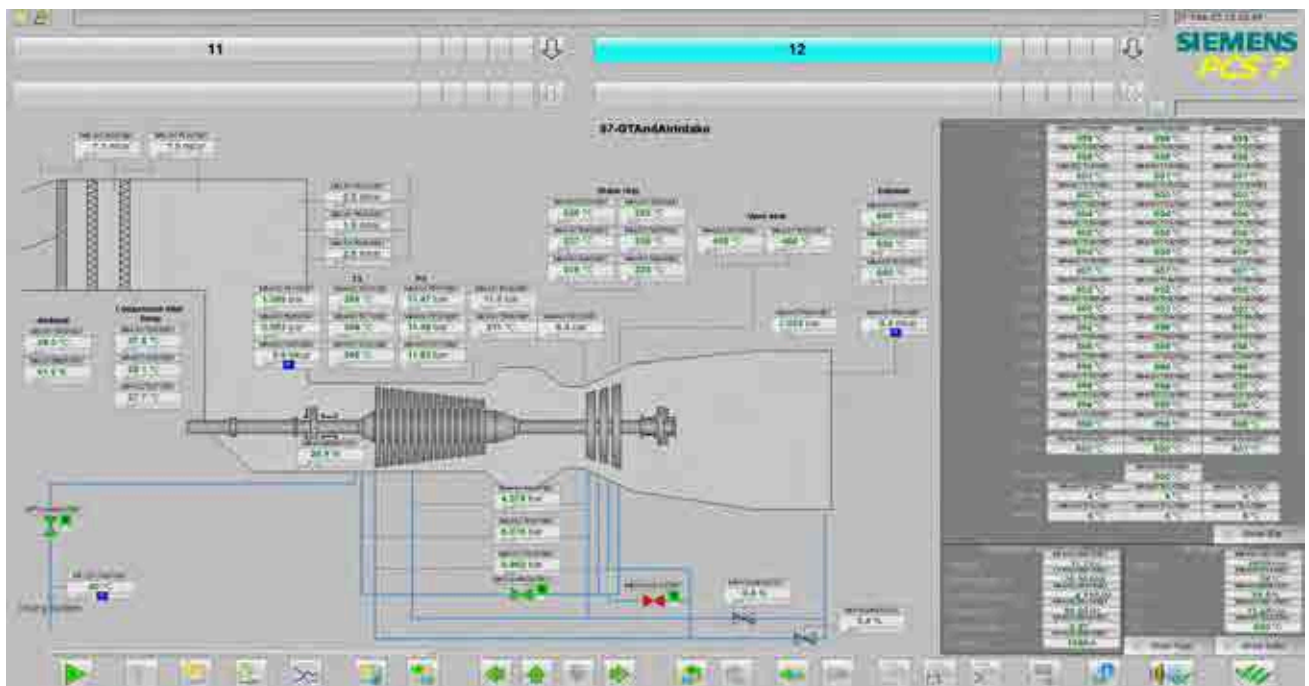


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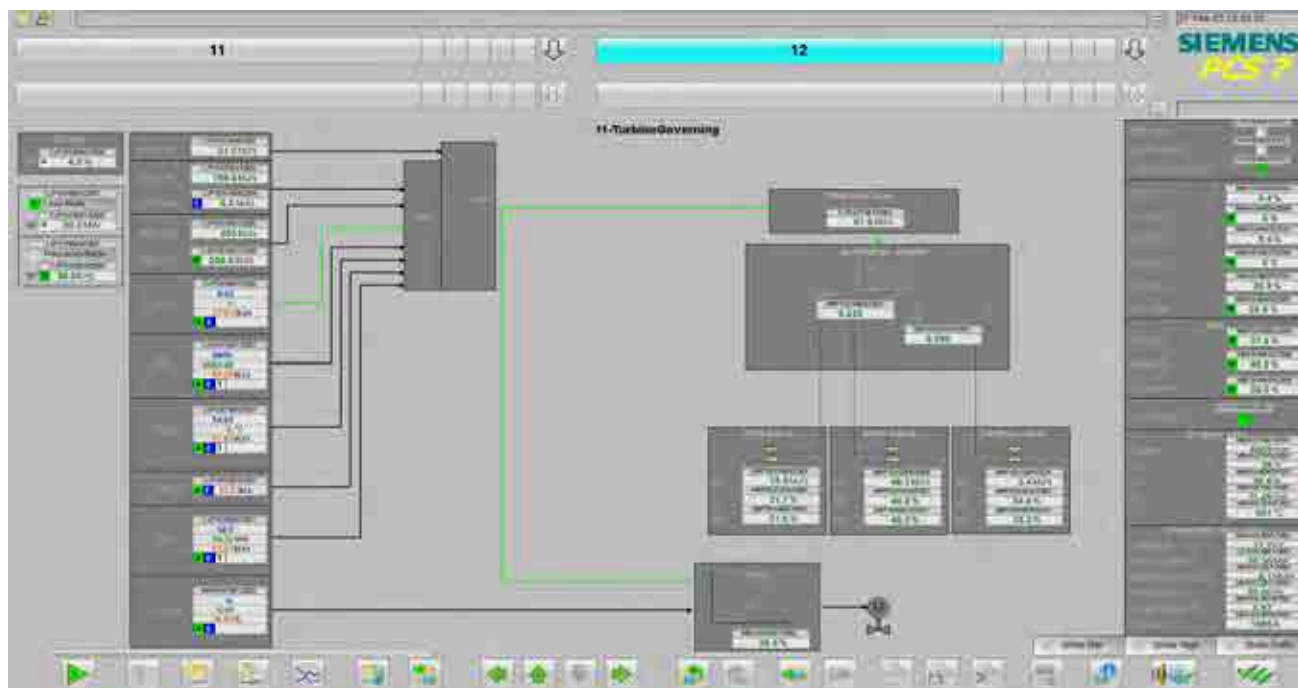


## Readings

20 MW



## Readings

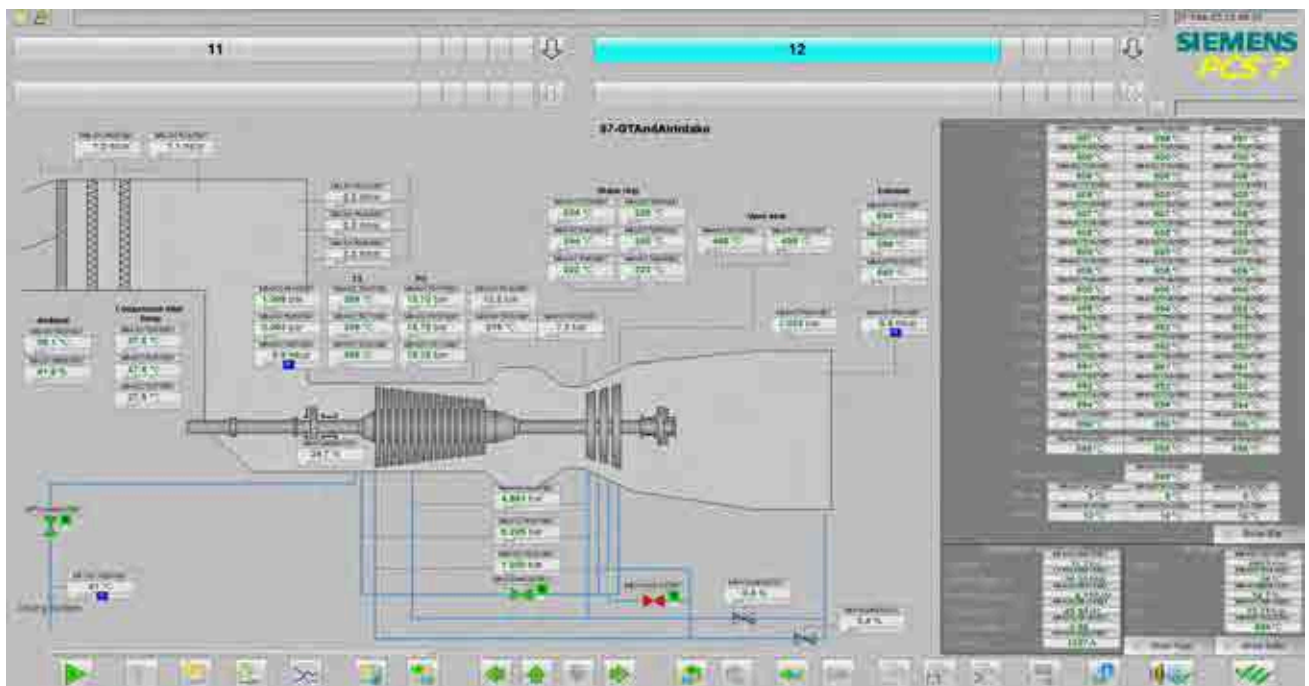


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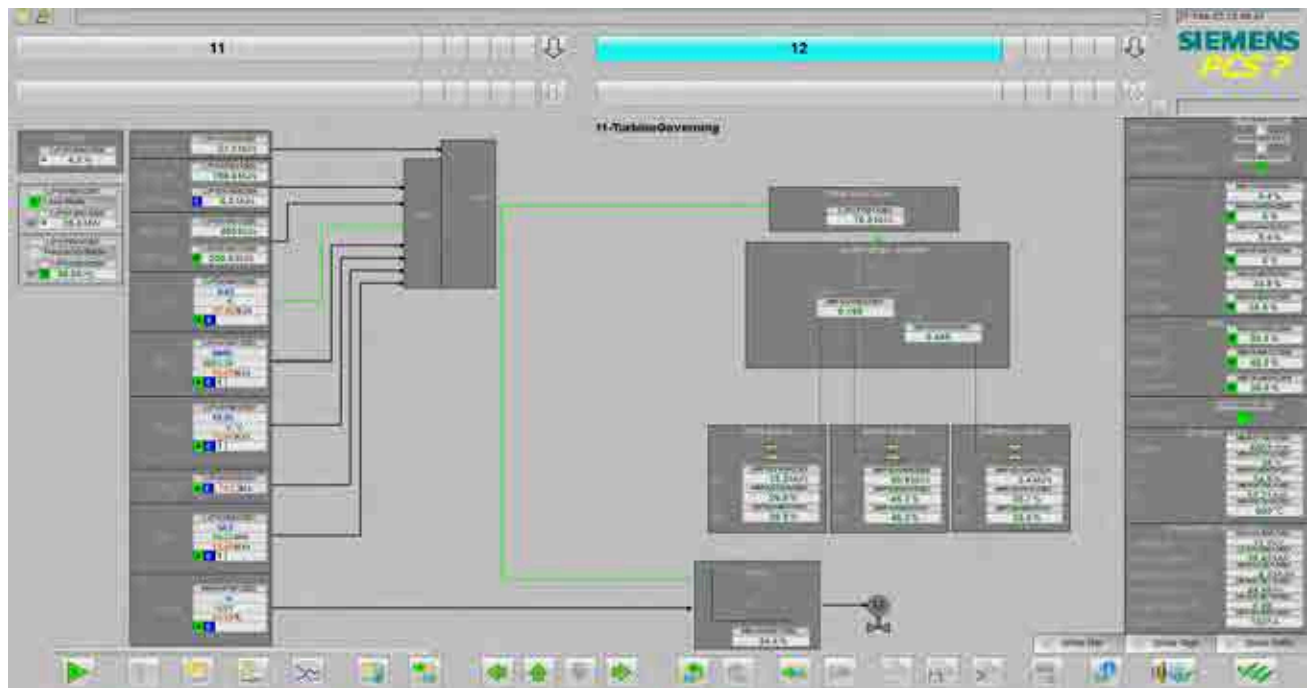


## Readings

25 MW



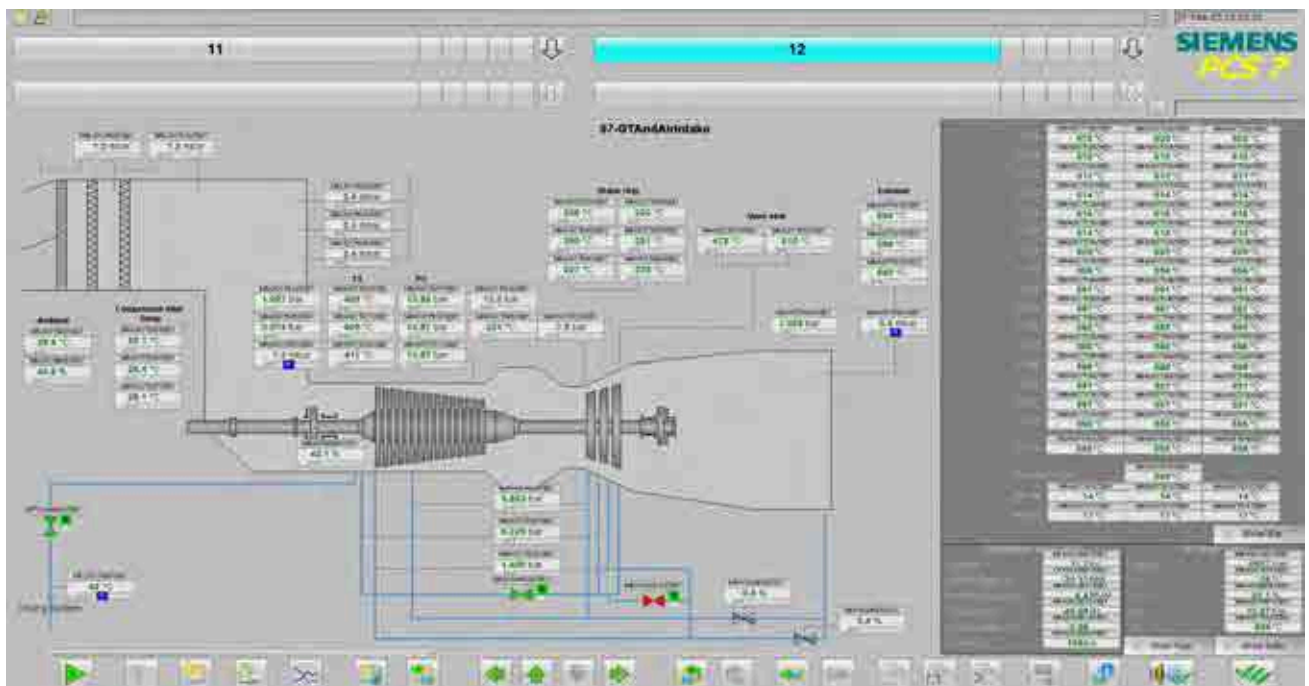
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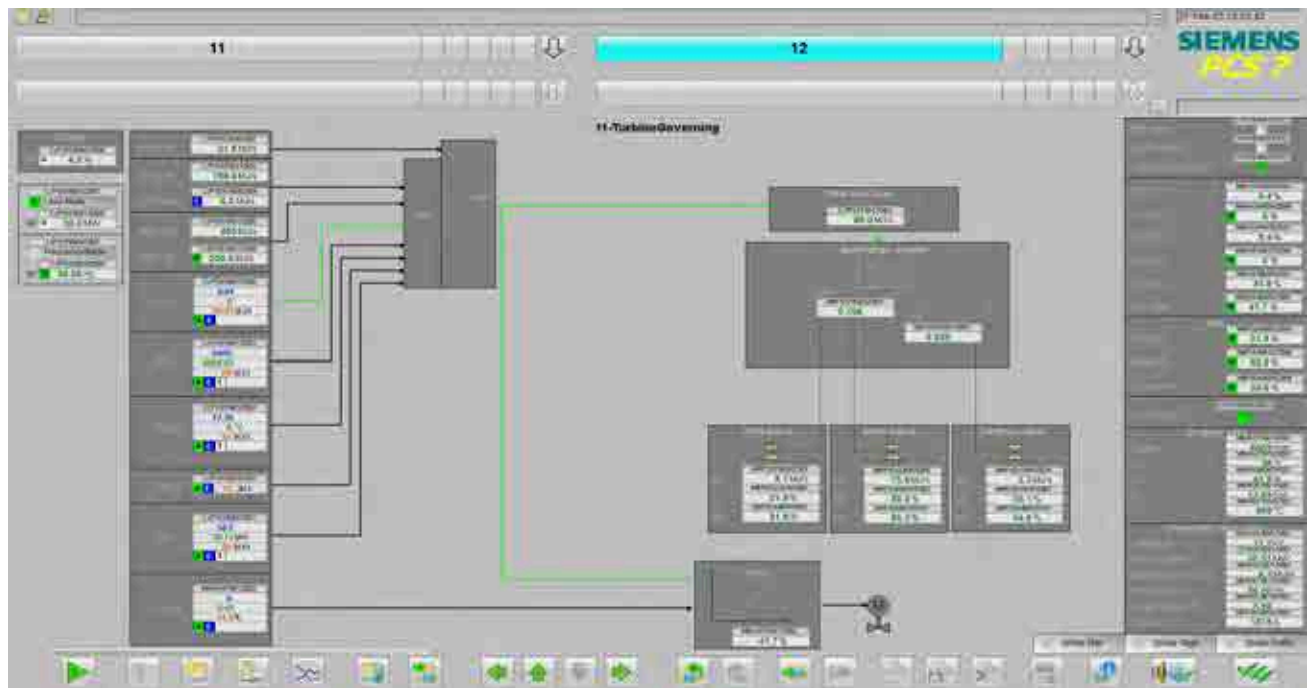
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## Readings

30 MW



## Readings

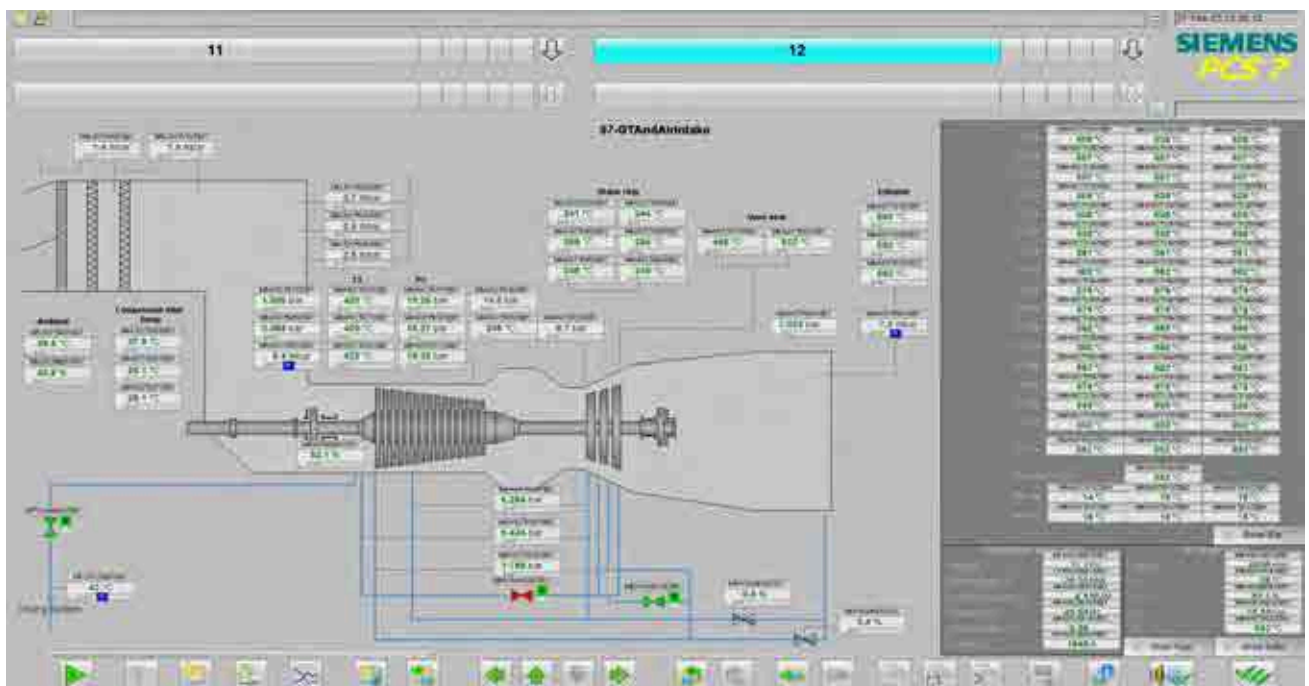


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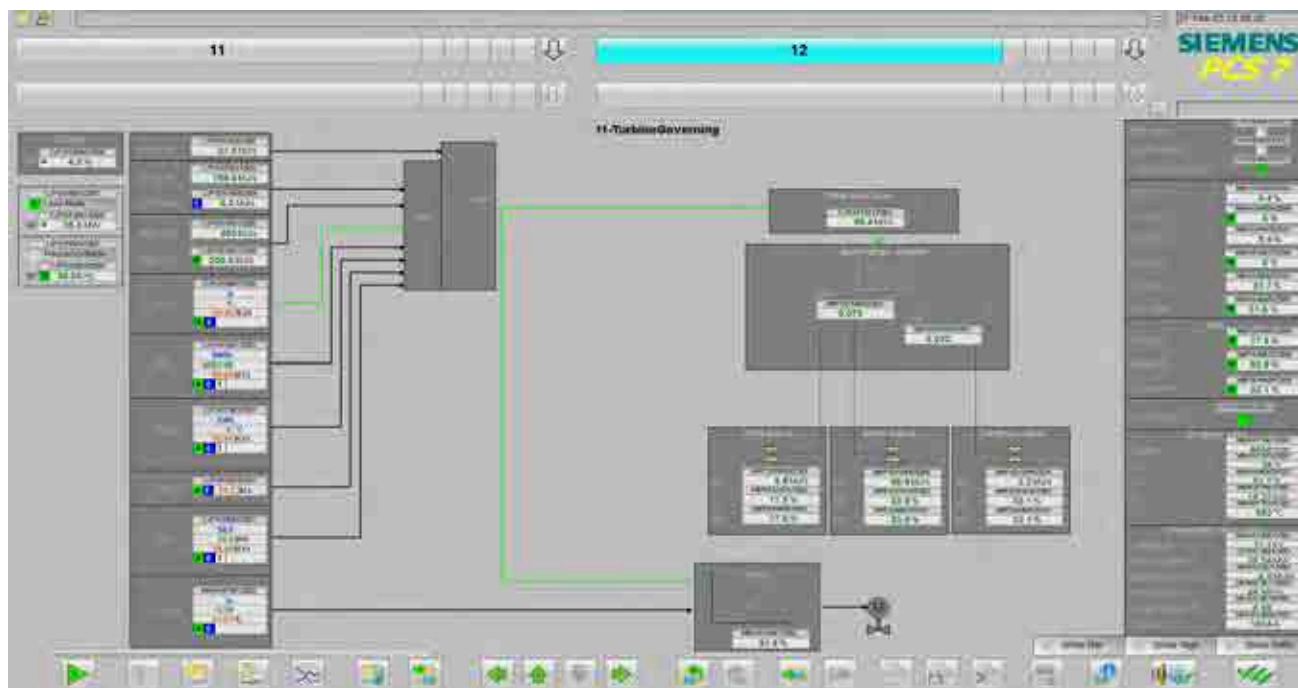


## Readings

35 MW



## Readings

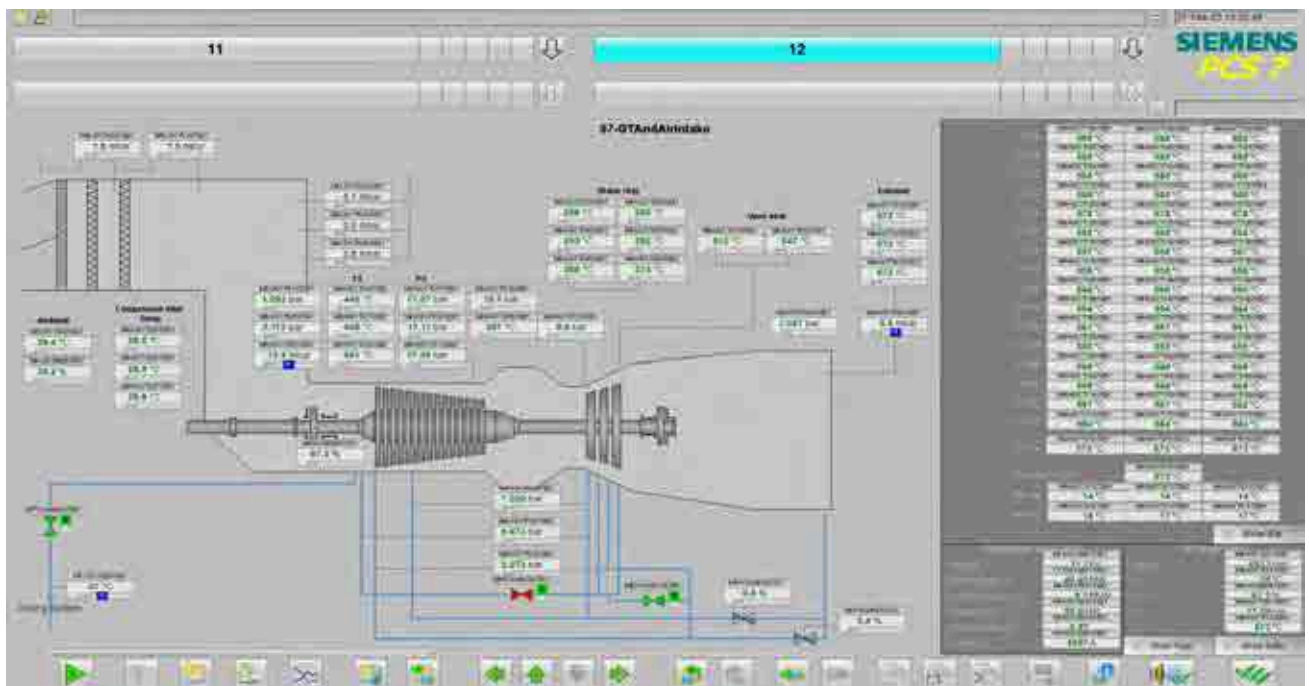


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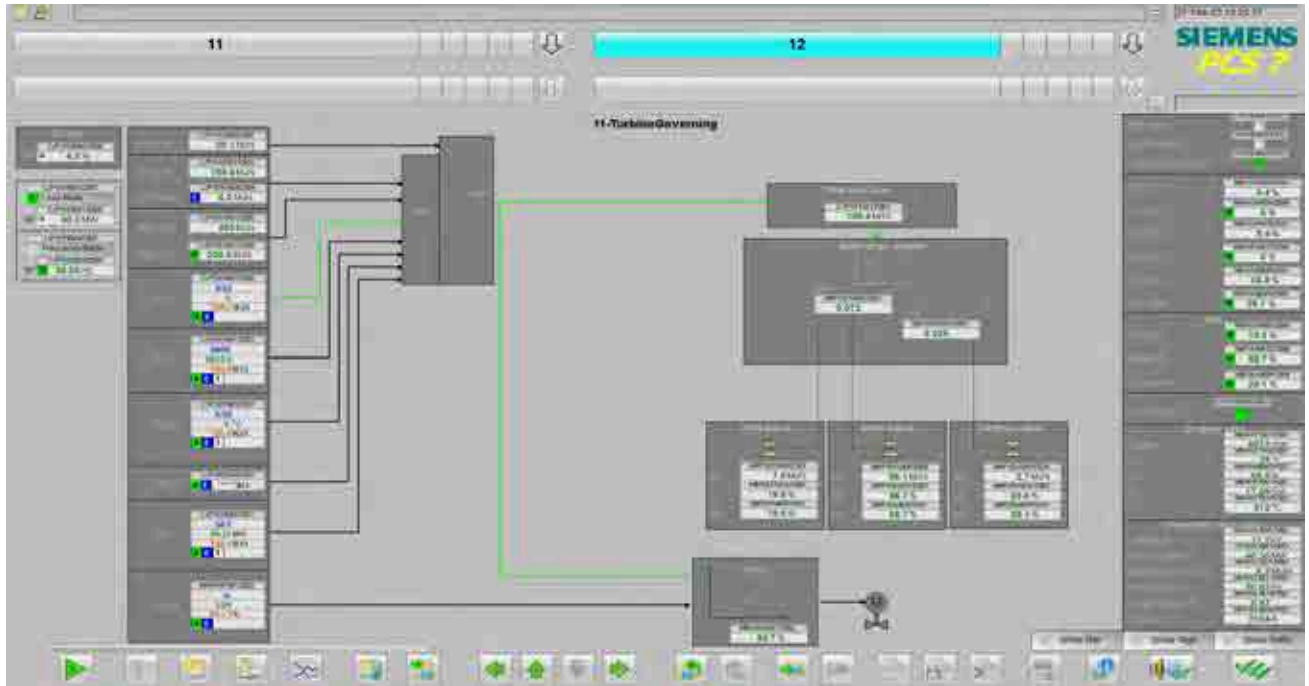


## Readings

40 MW



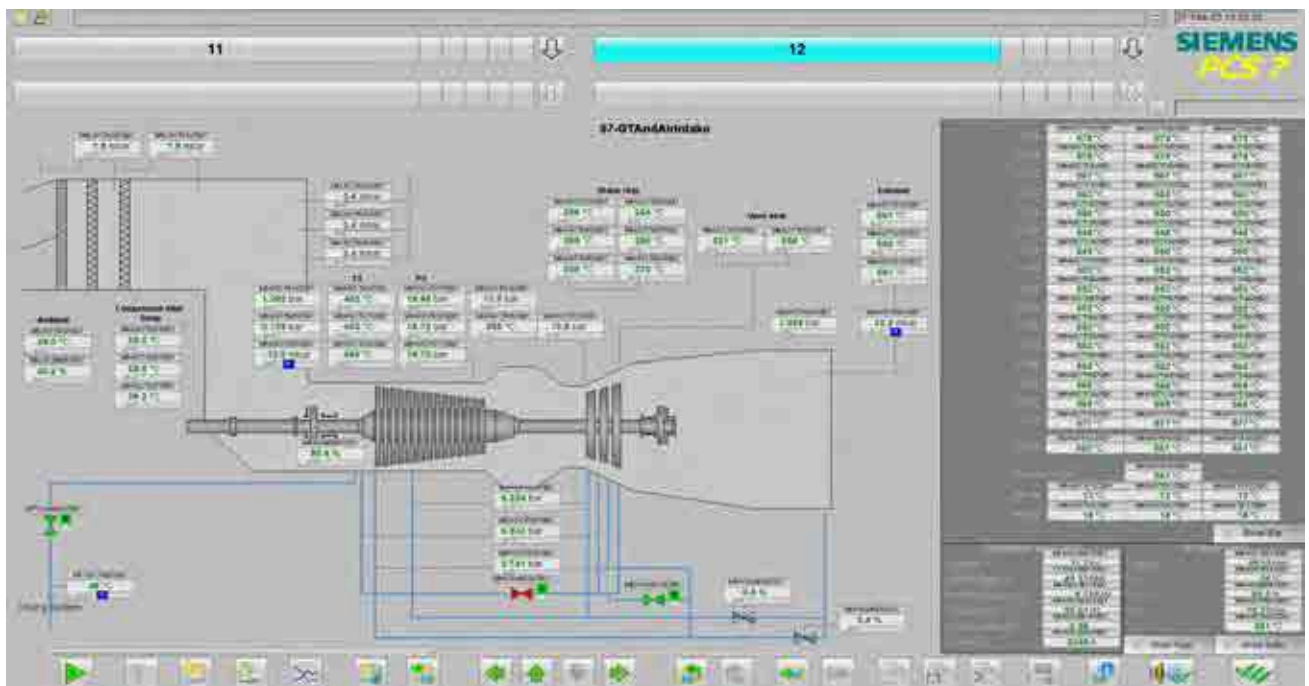
## Readings



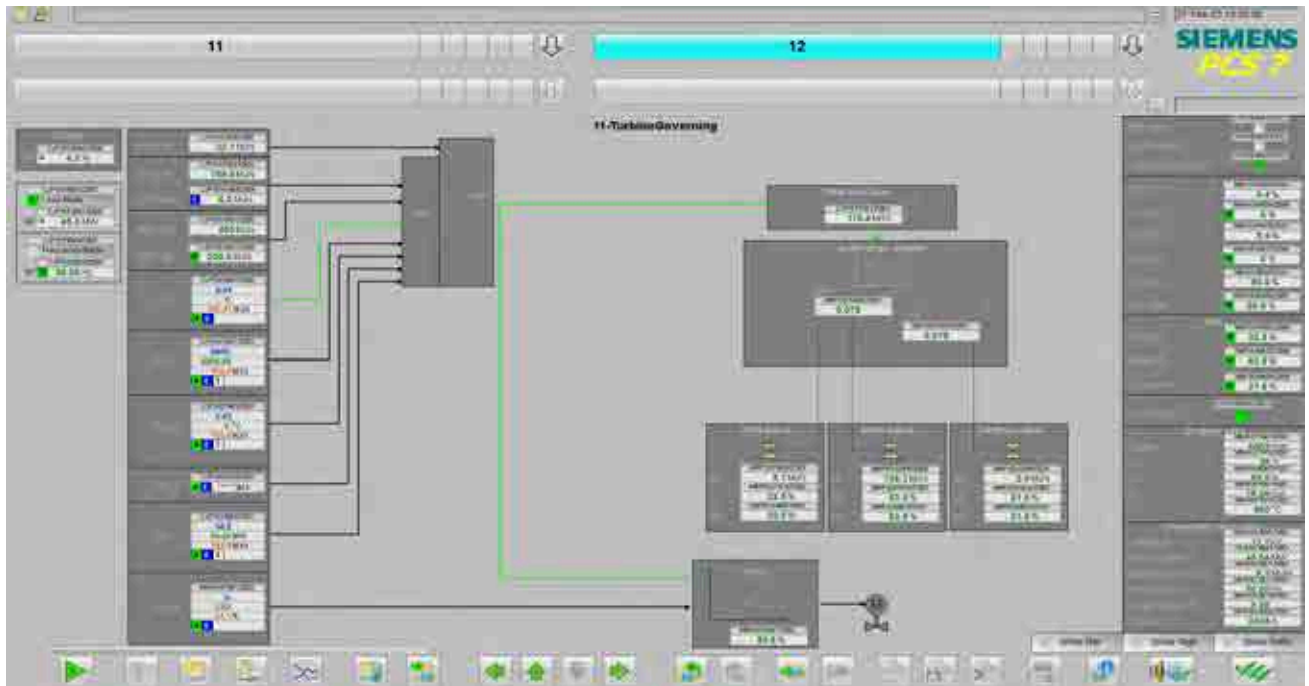
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## Readings

45 MW



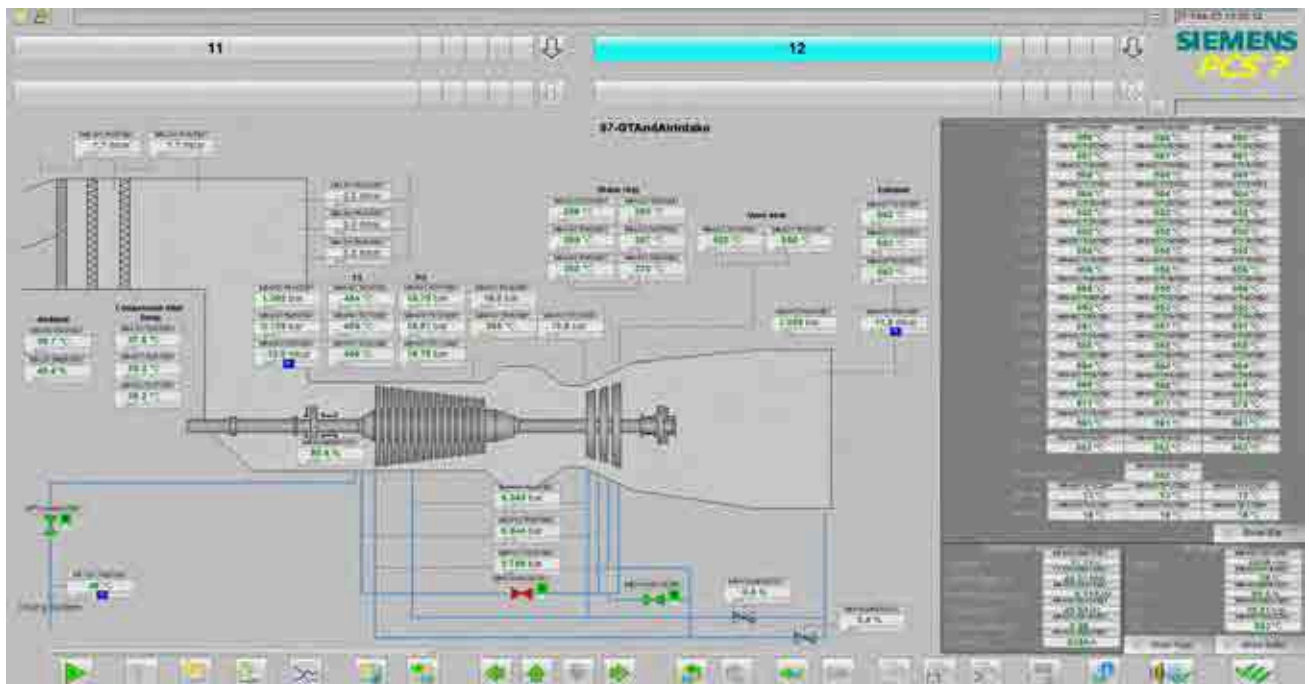
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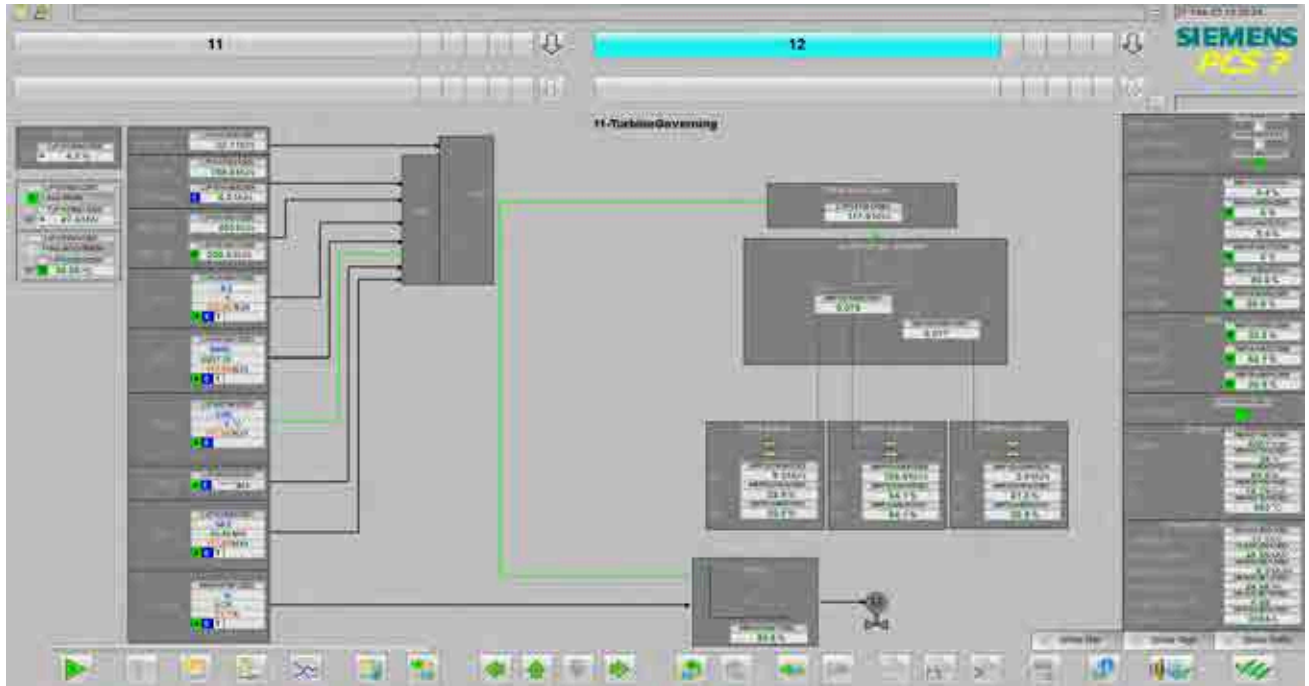


## Readings

Based load at 46 MW



## Readings



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ALN ECCNN ECL: US-ContNo CoO:TH



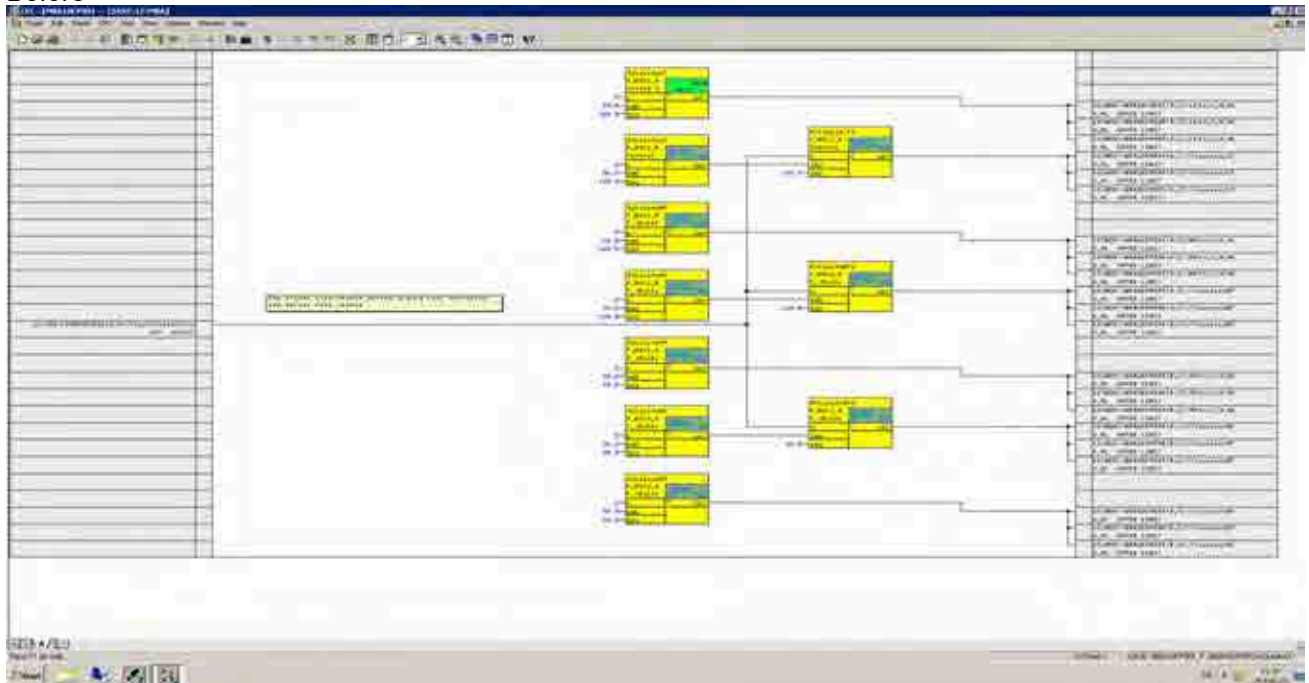
**6**

**9.6 Appendix F Additional Activities**

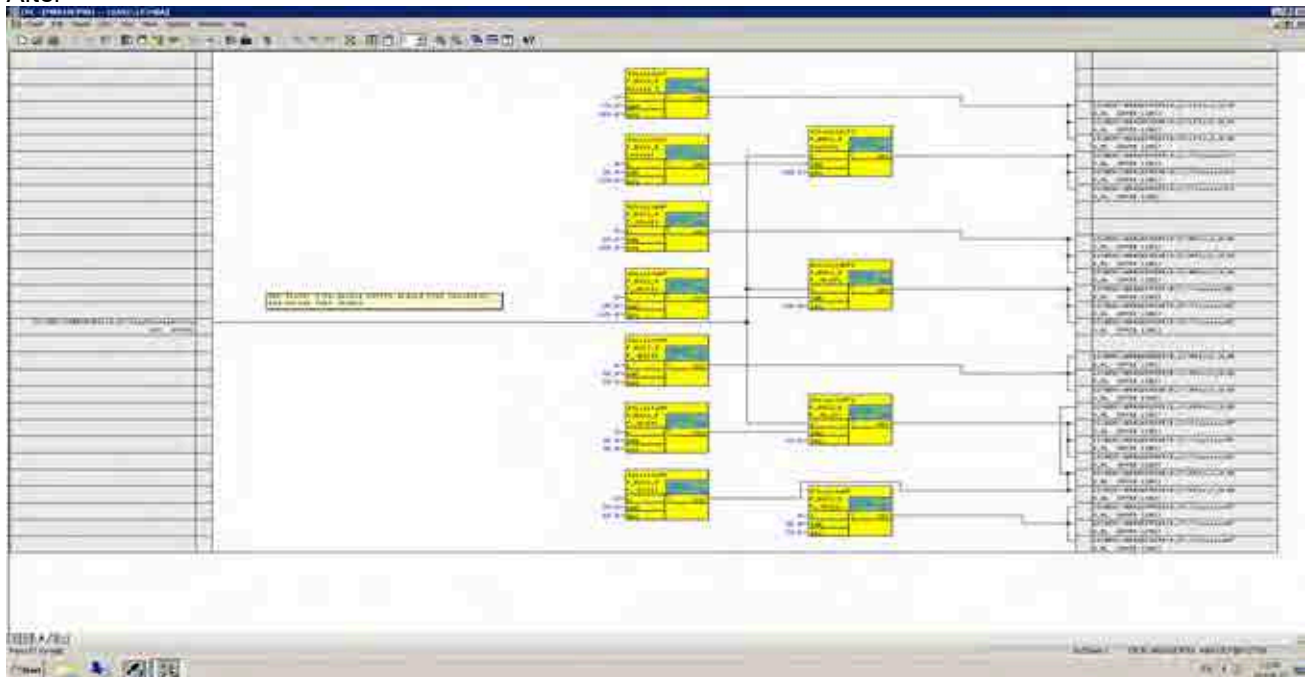
## Additional Activities

## 1 SuP19/2020/SGT-800 Revised LFP/NFP Pulsations levels

Before



After



Unrestricted SE-612 83 FINSPONG, Sweden

Siemens Industrial Turbomachinery AB

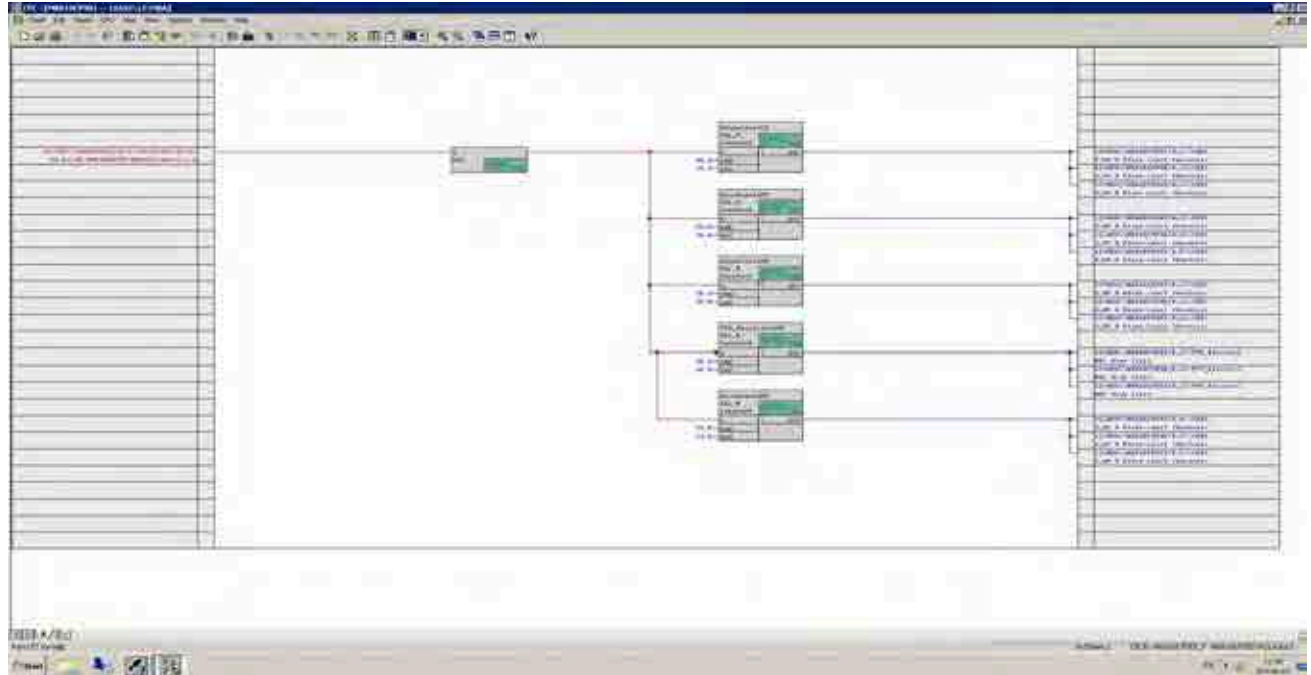
Revision:

Page 1/23

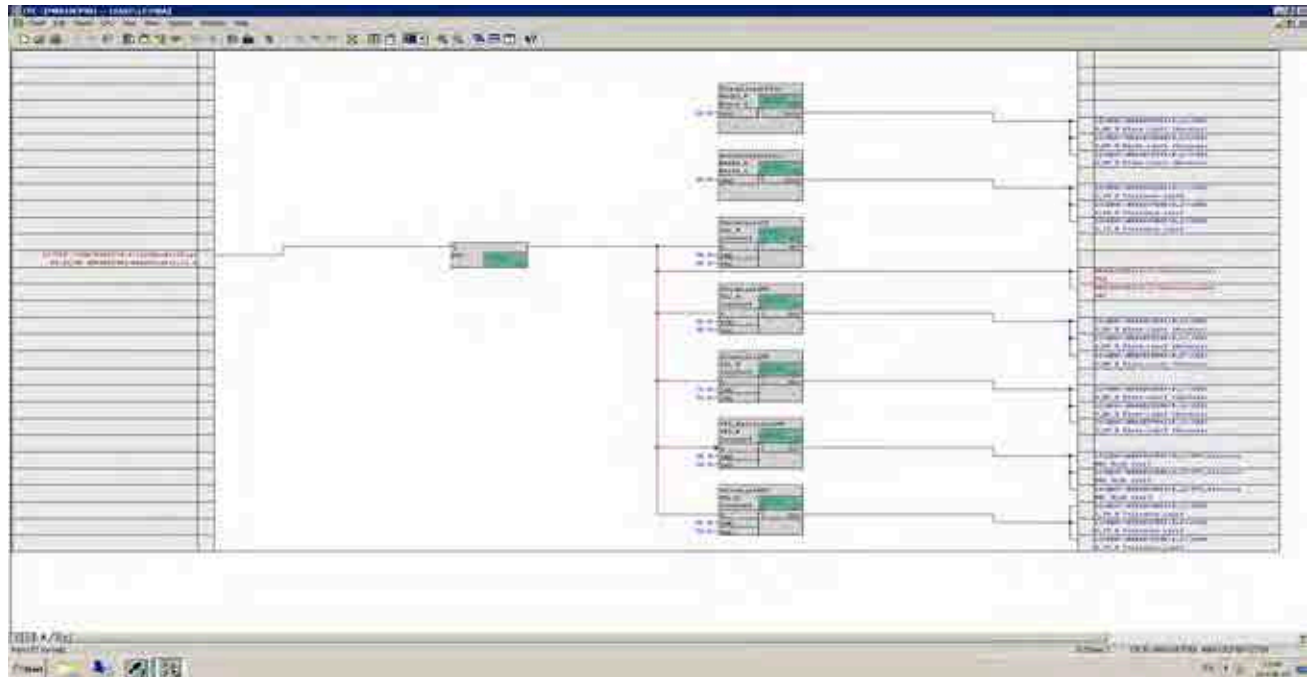
Responsible Dep.: Service, Gas Turbines

## Additional Activities

Before

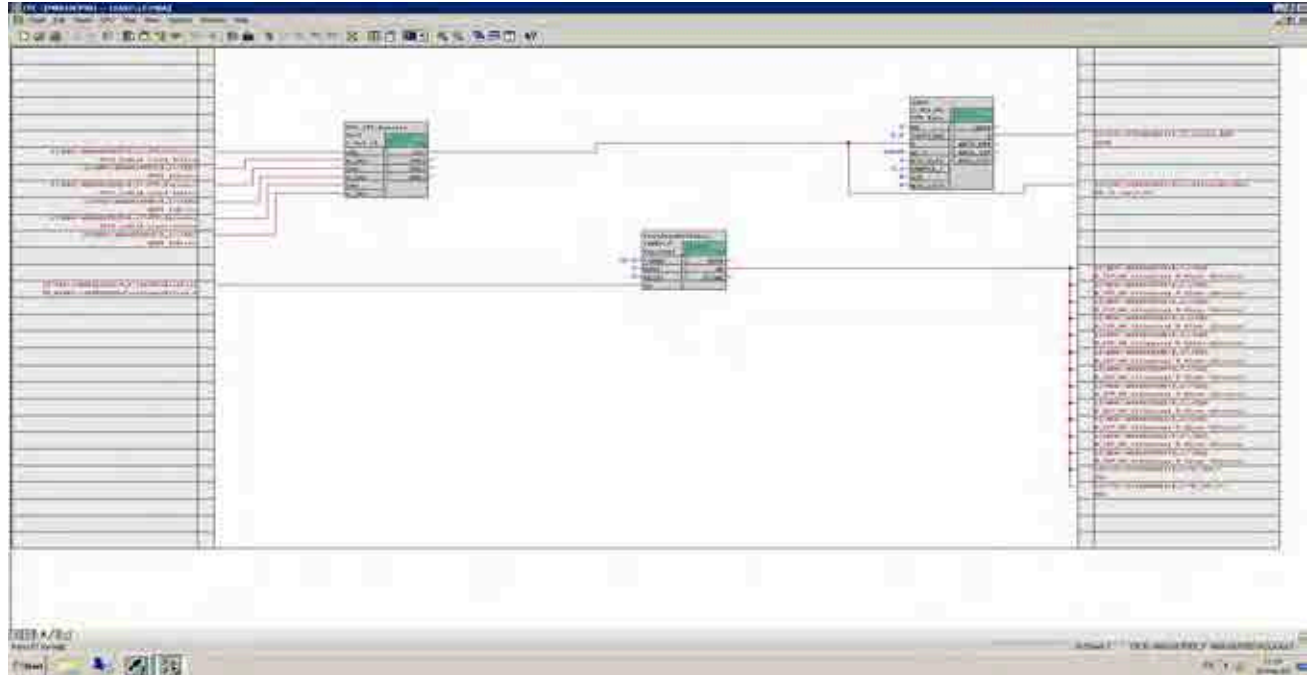


After

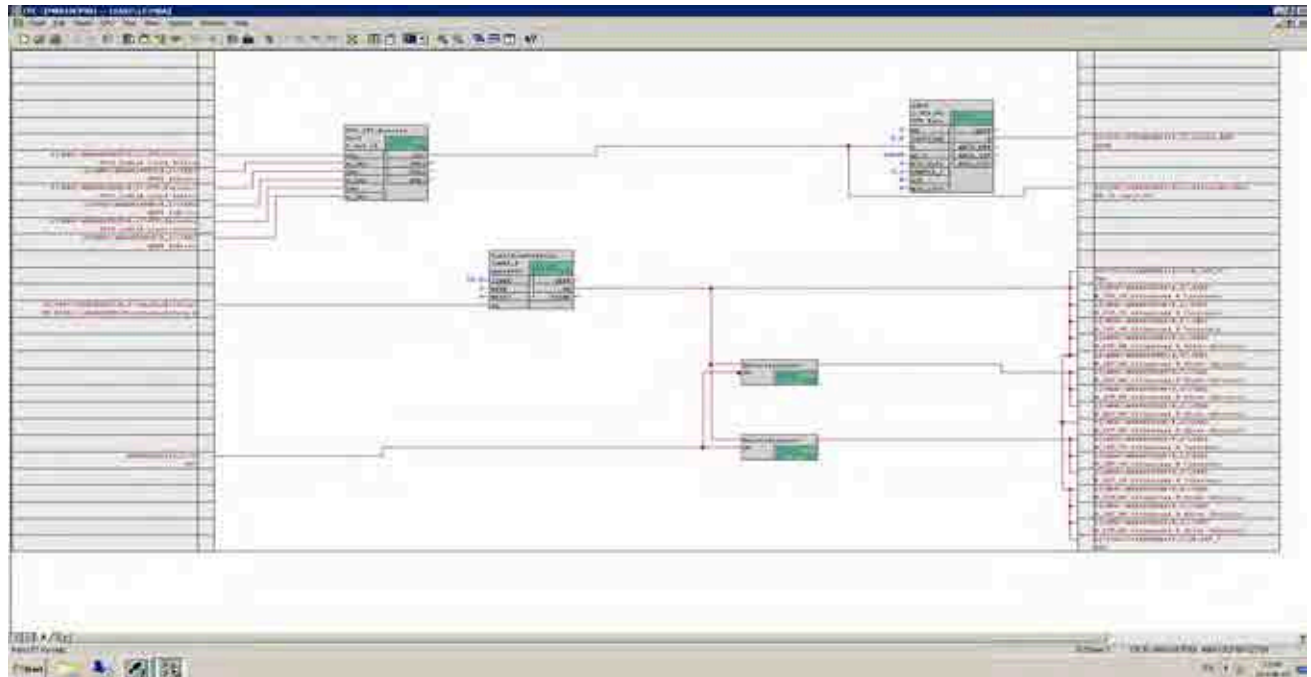


## Additional Activities

Before

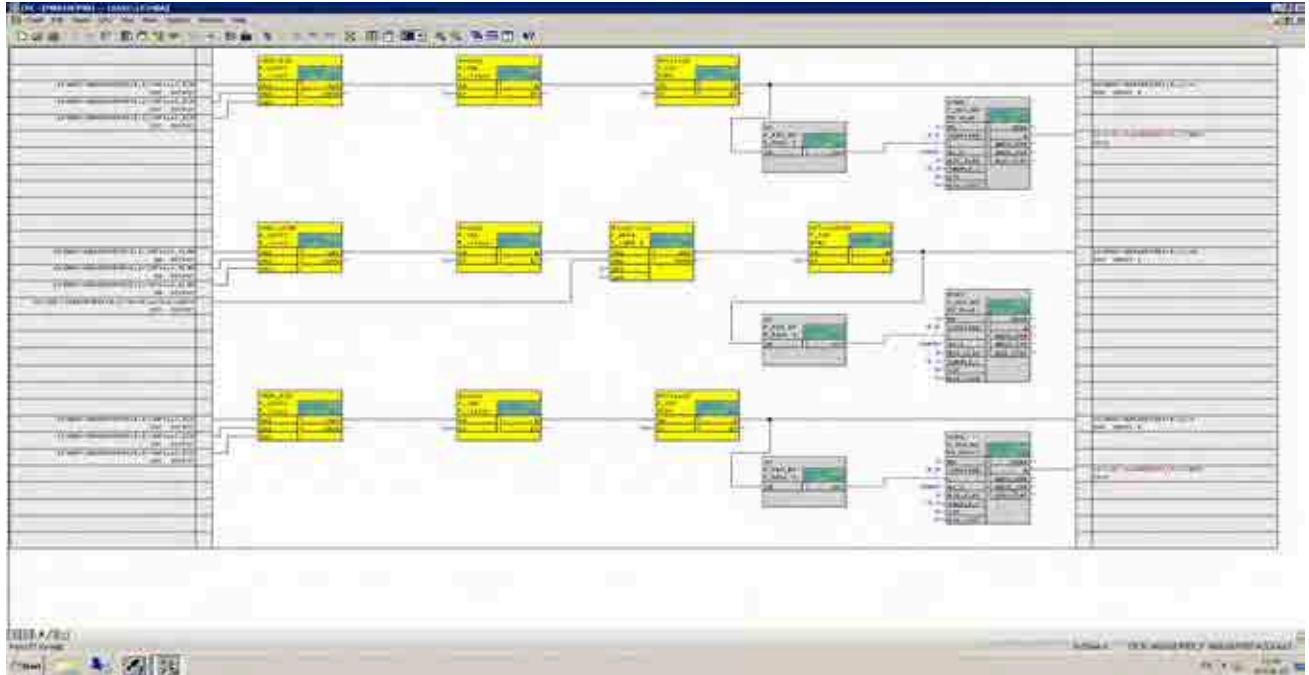


After

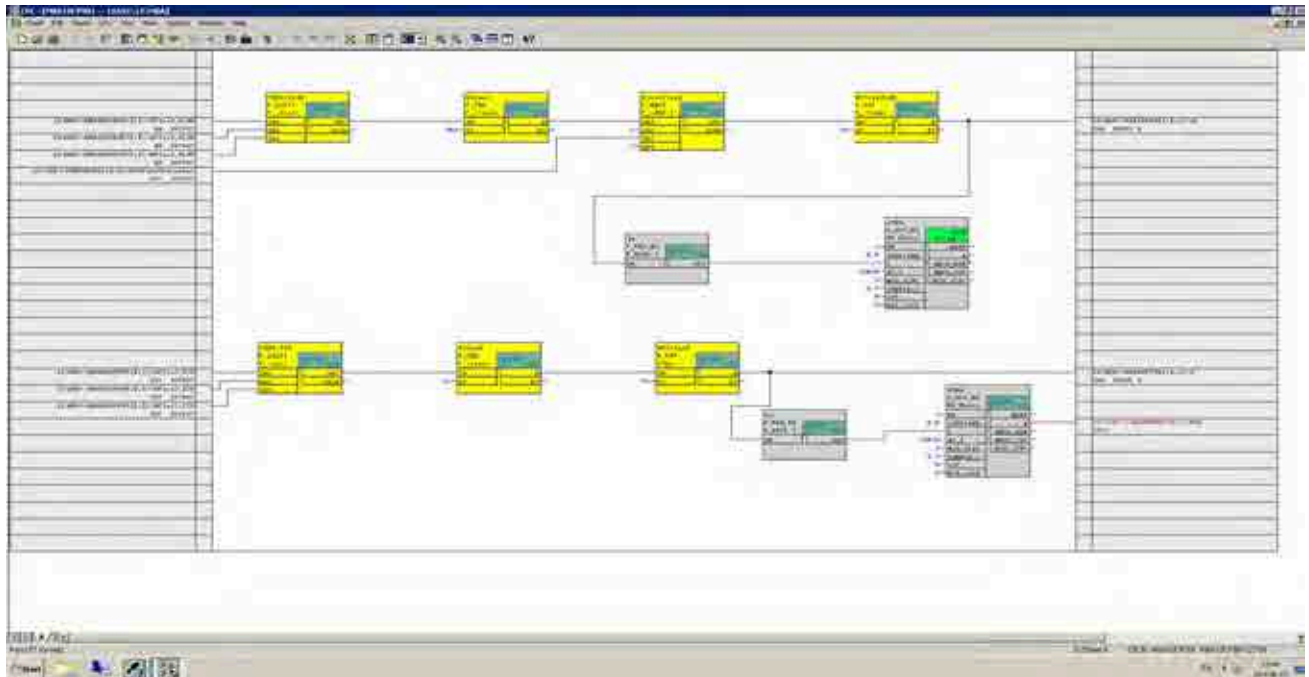


## Additional Activities

Before



After



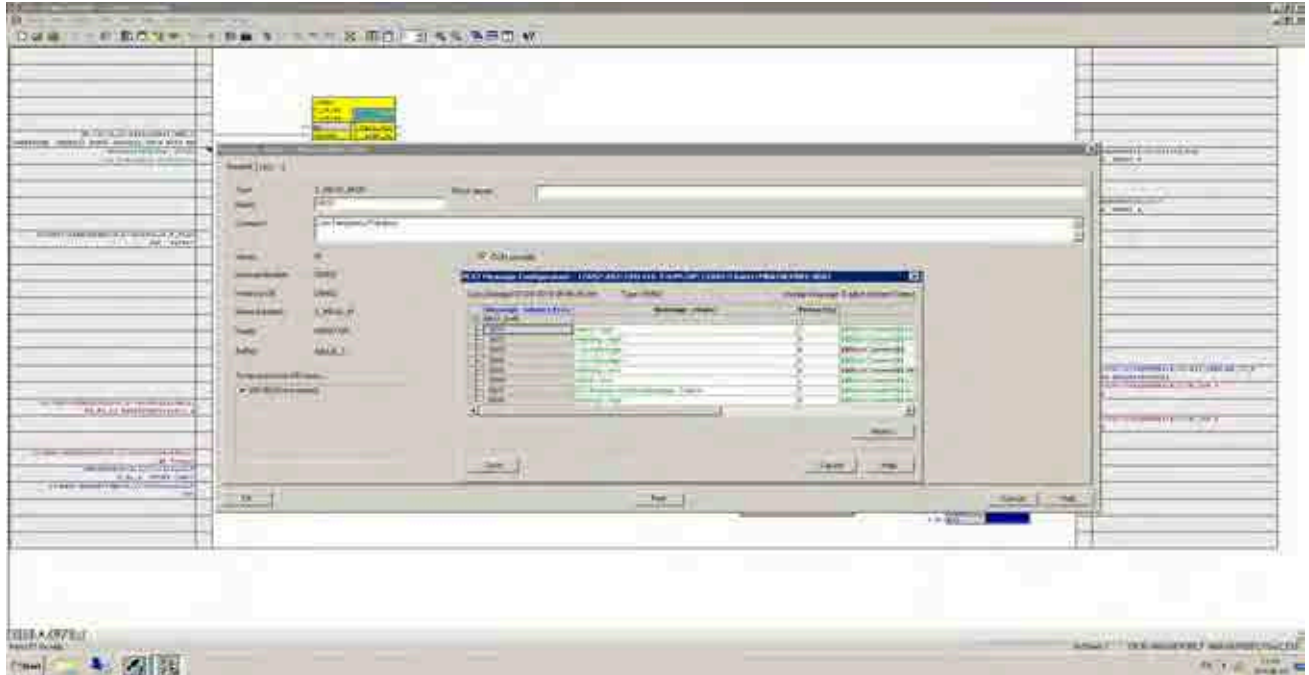






## Additional Activities

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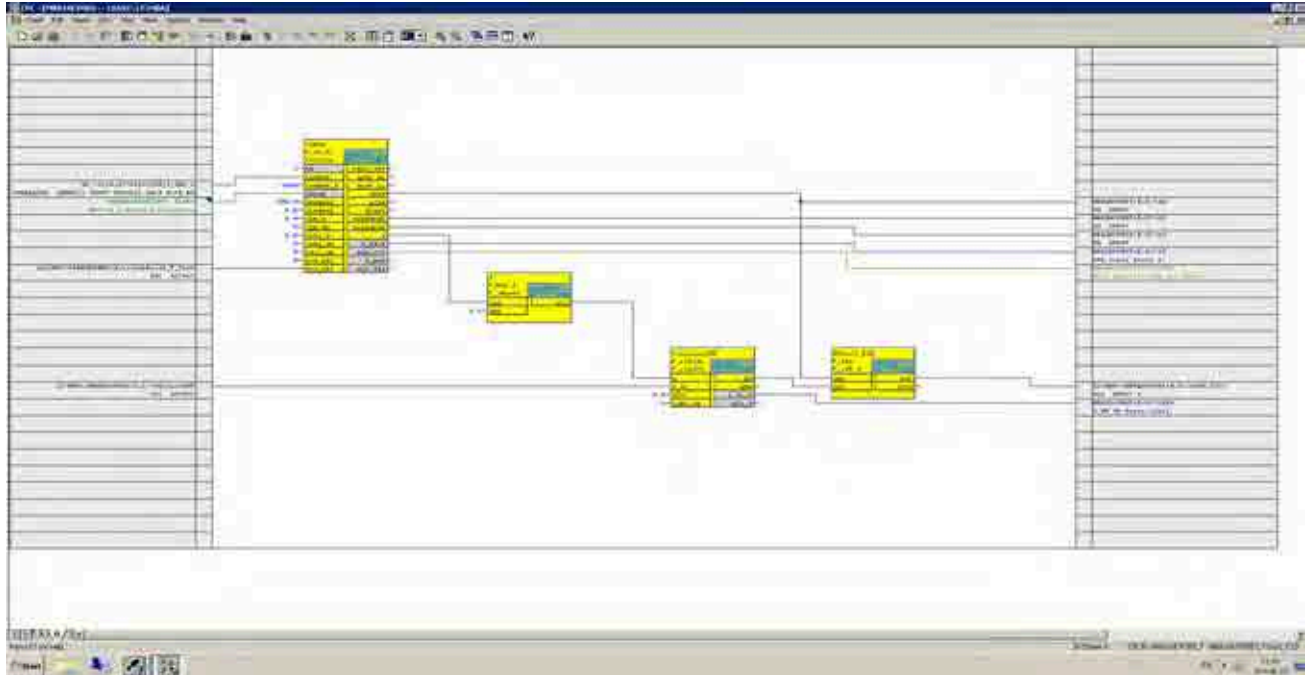


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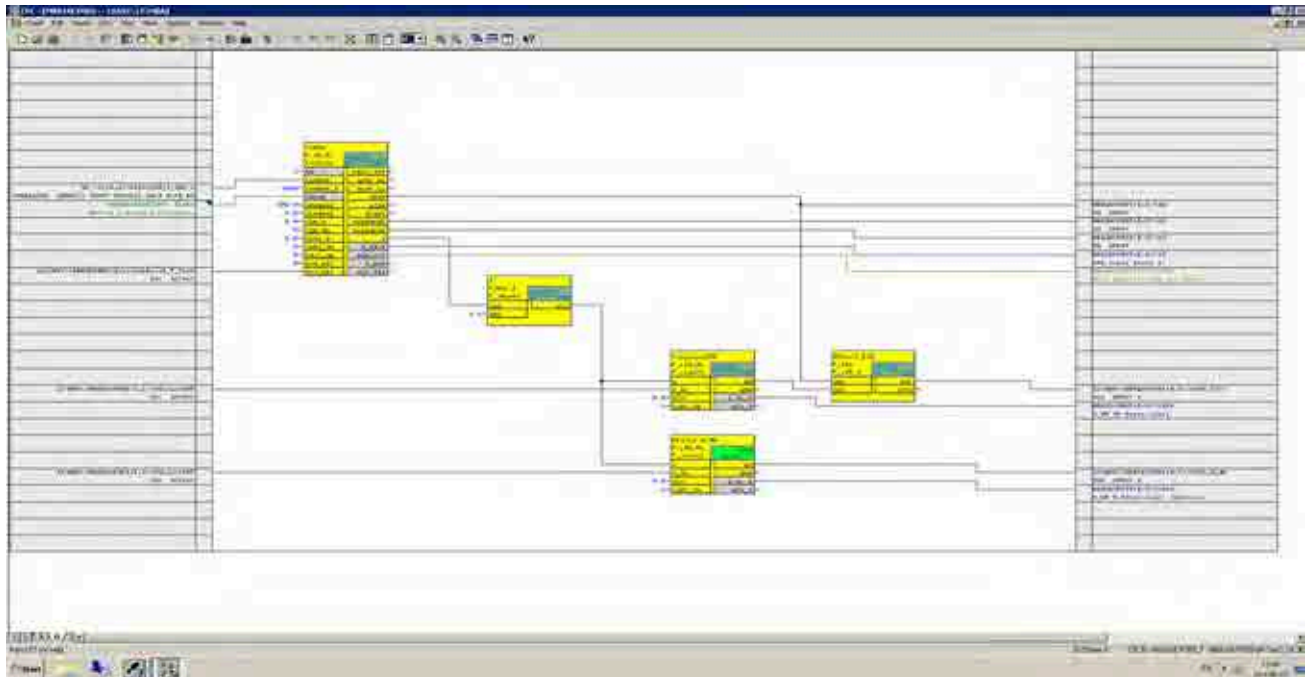


## Additional Activities

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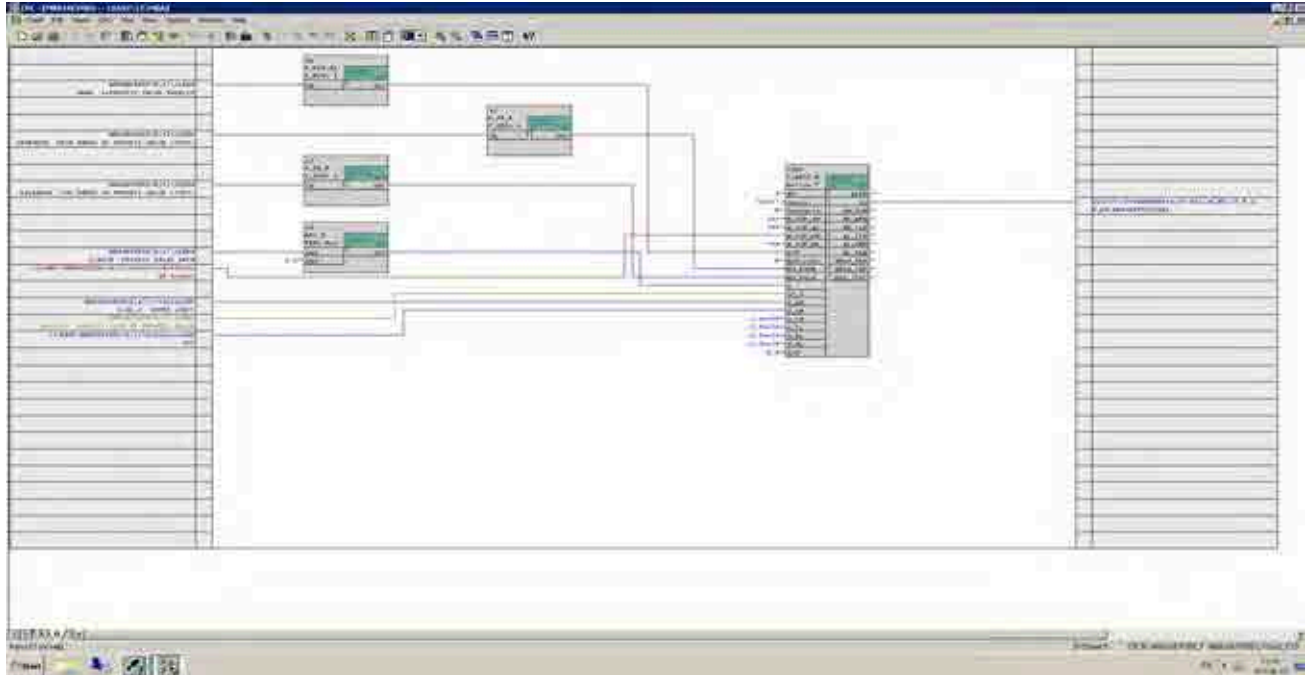


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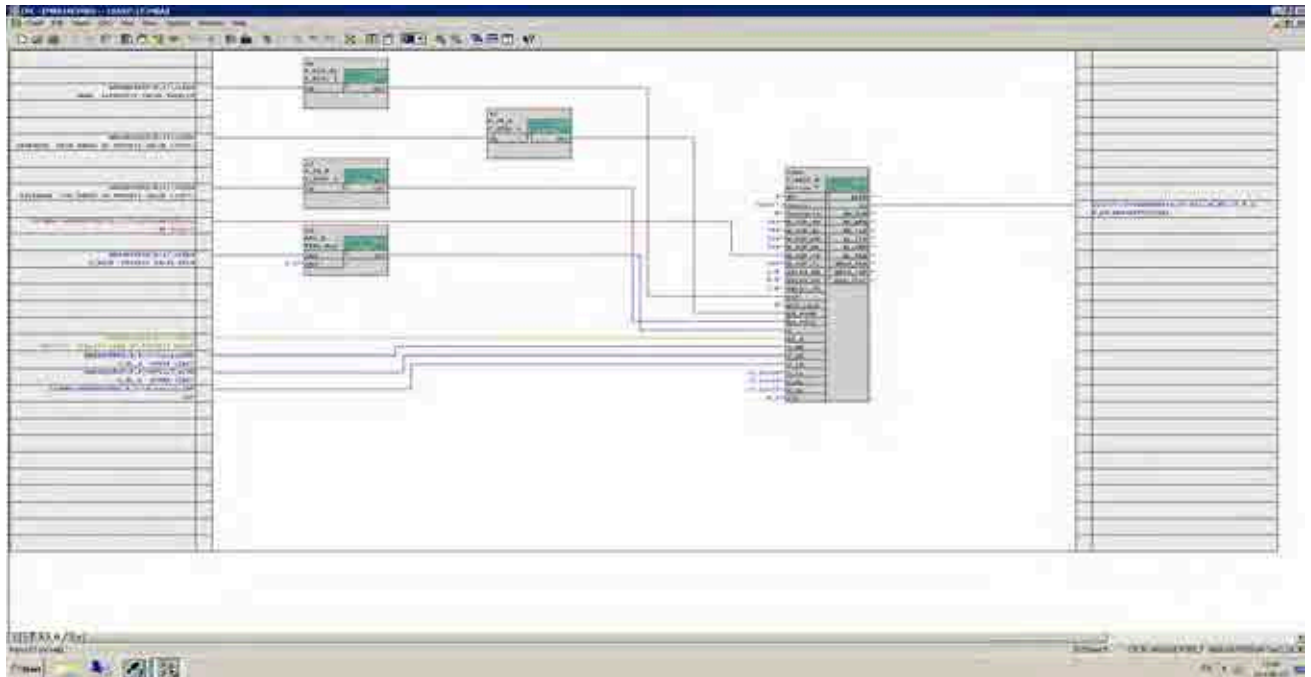


## Additional Activities

Before



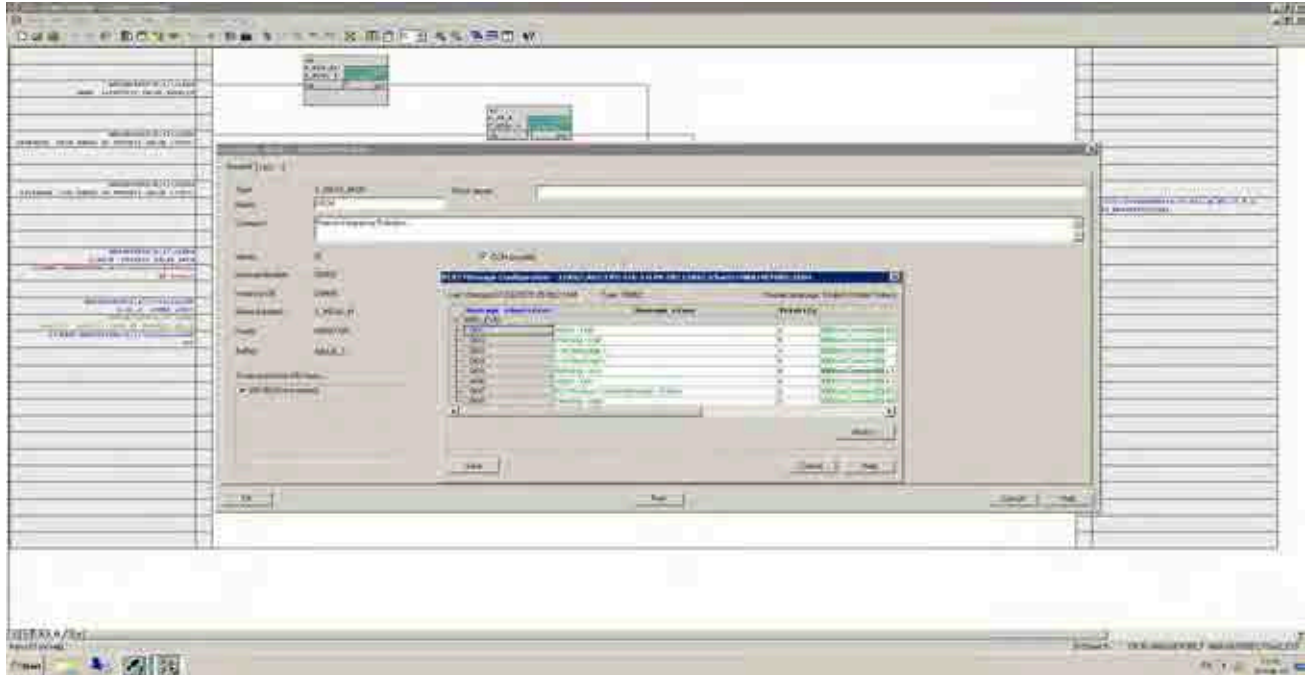
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ID: EIB101232743 Name: Commissioning report Rev: A Protection: Restricted IP: R00\_S00  
 Creator: AI\_N\_ECCN/N\_ECI · IIS-Cont/No CoO-TH  
 Reviewer: Approver:

## Additional Activities

Before

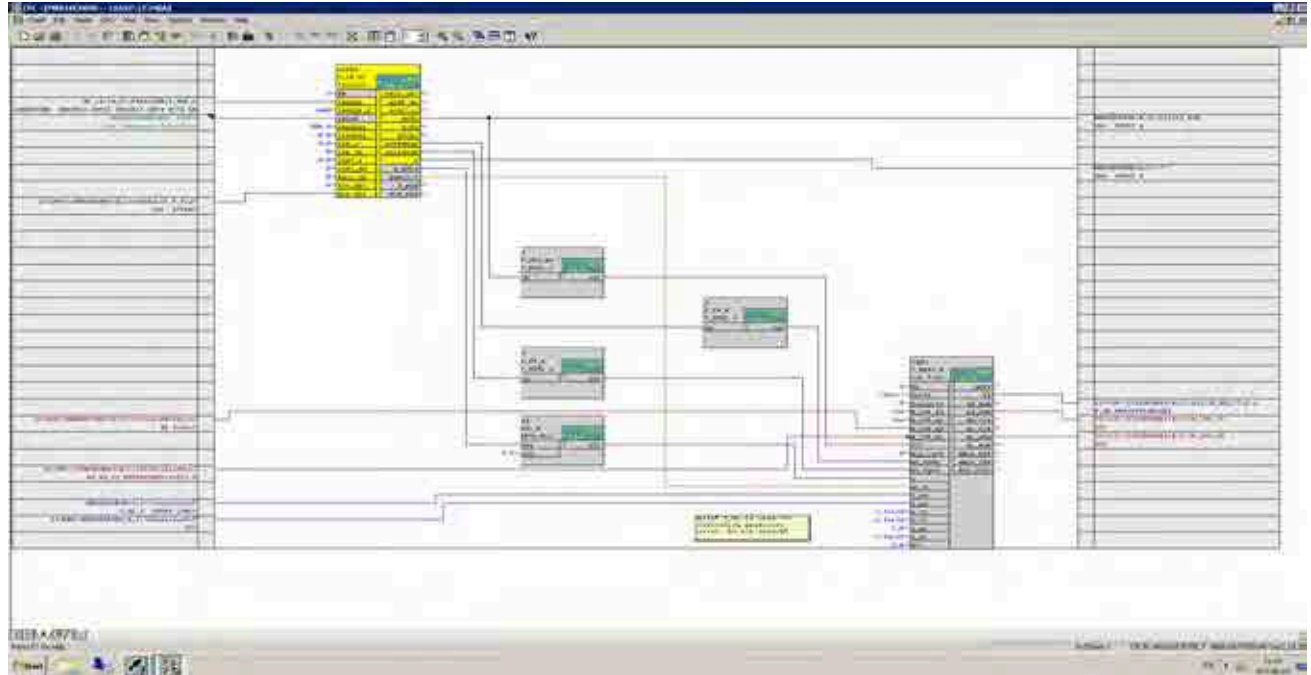


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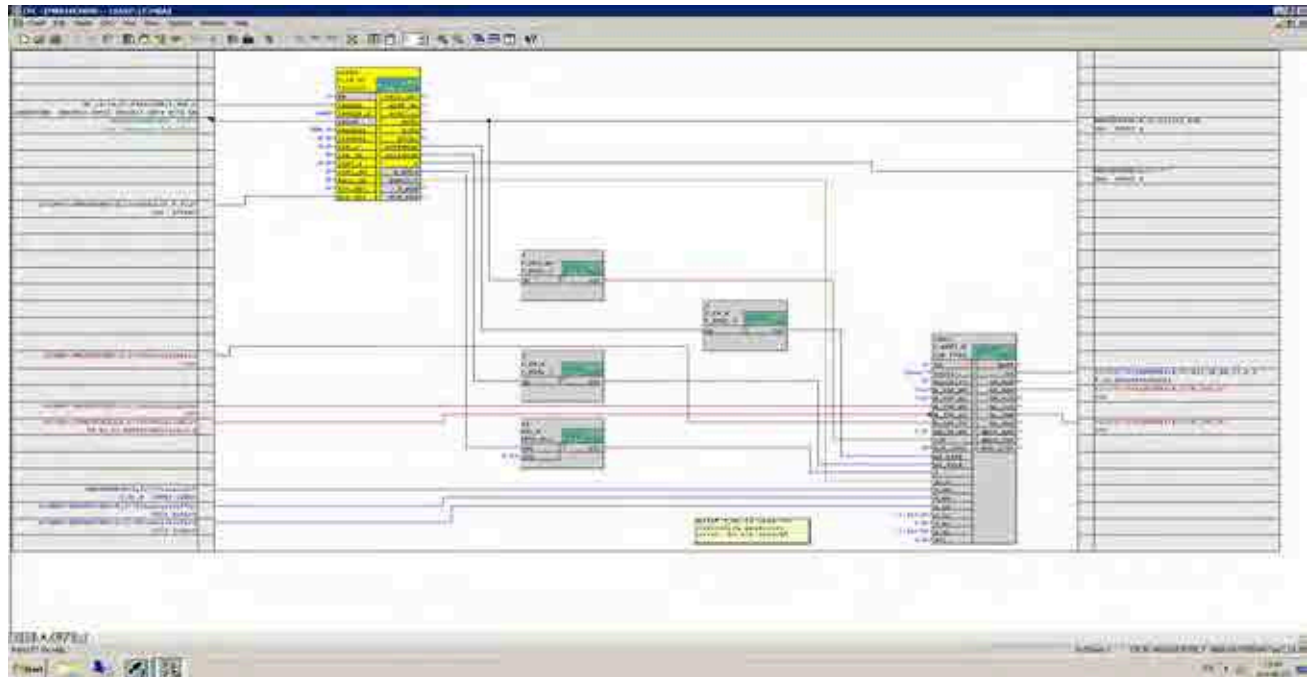


## Additional Activities

Before



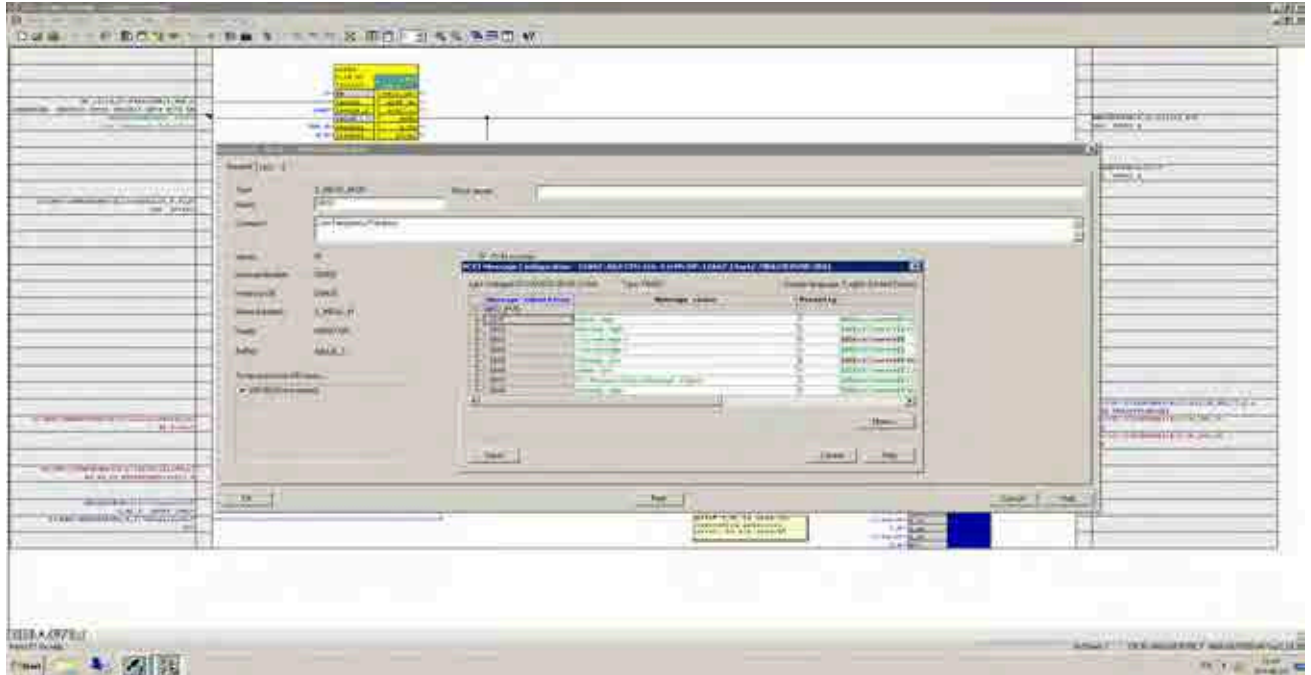
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## Additional Activities

Before



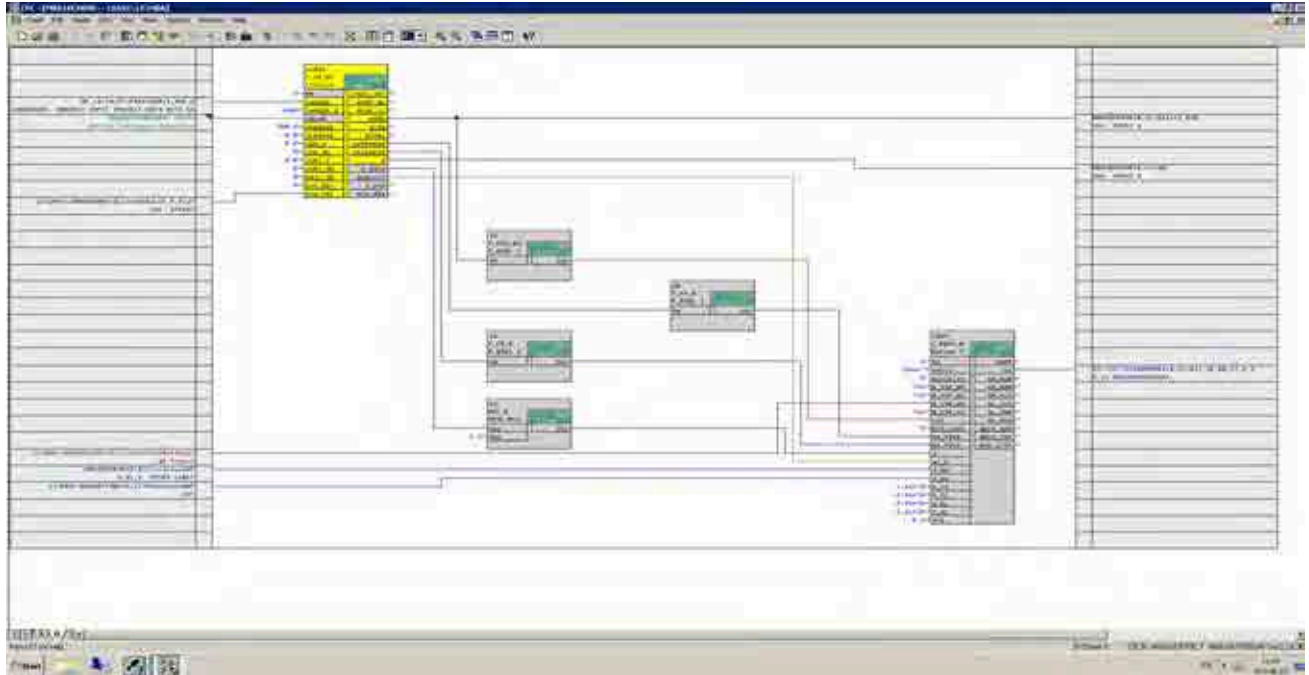
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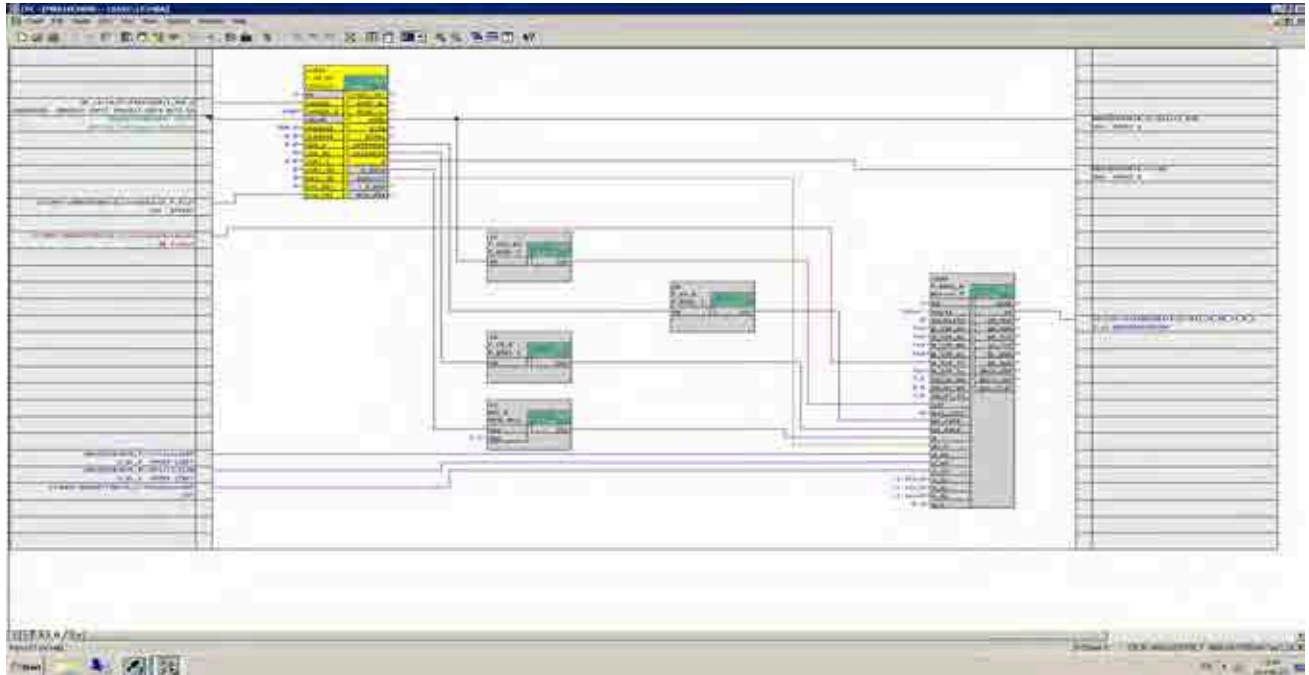


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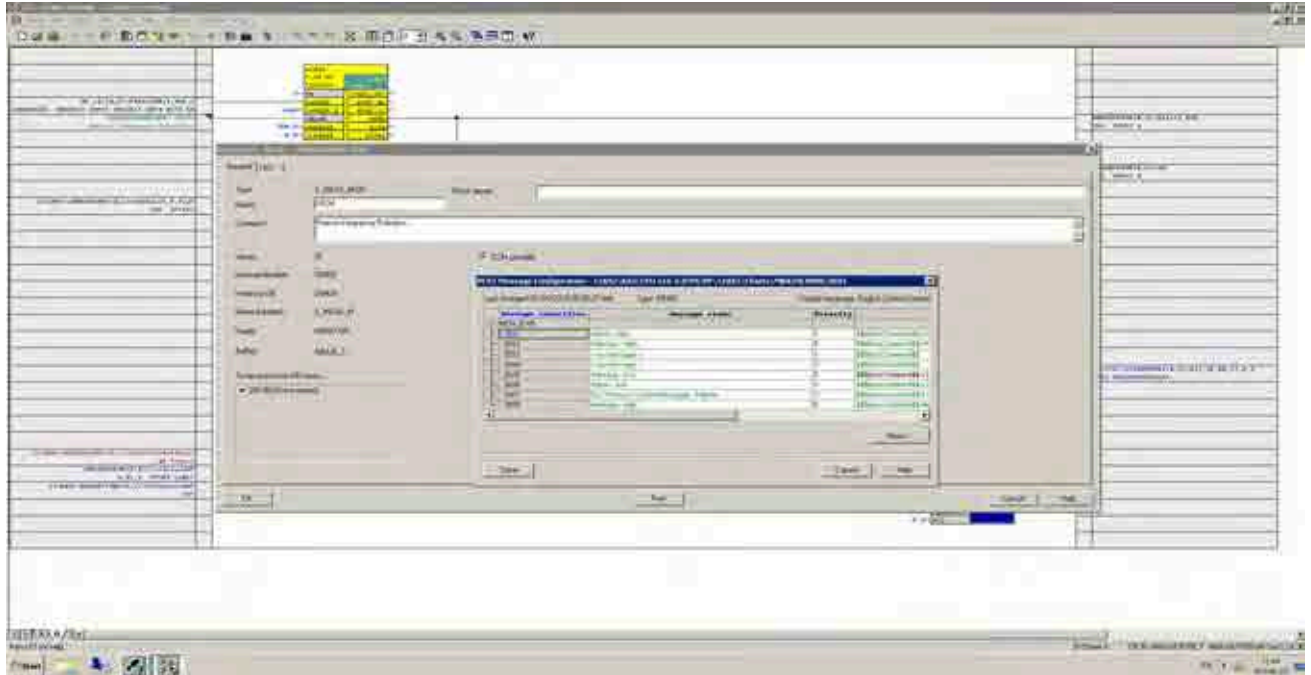


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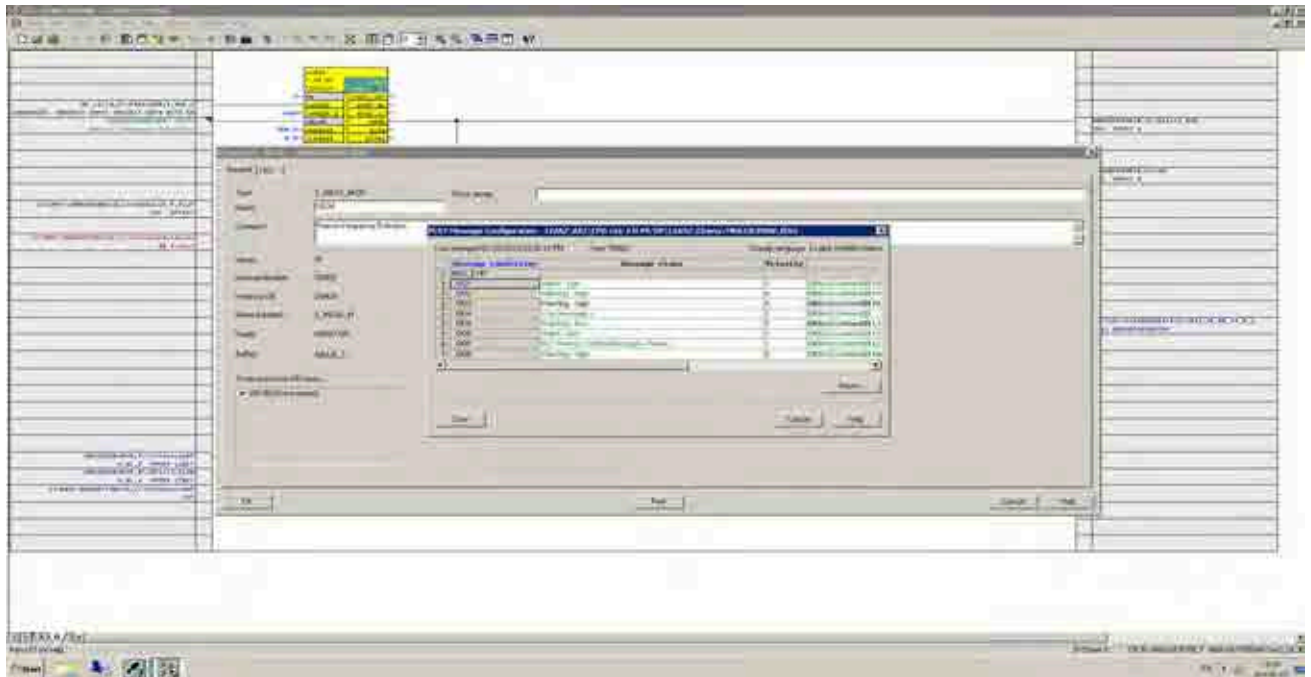


## Additional Activities

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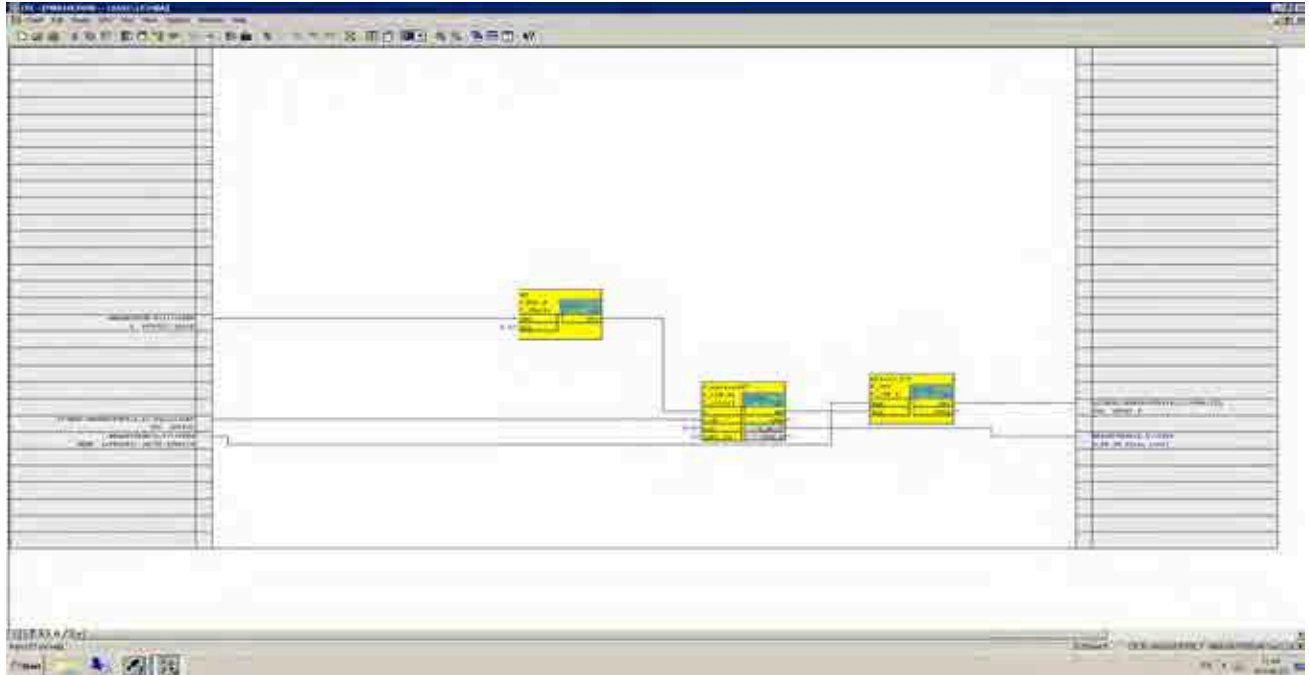


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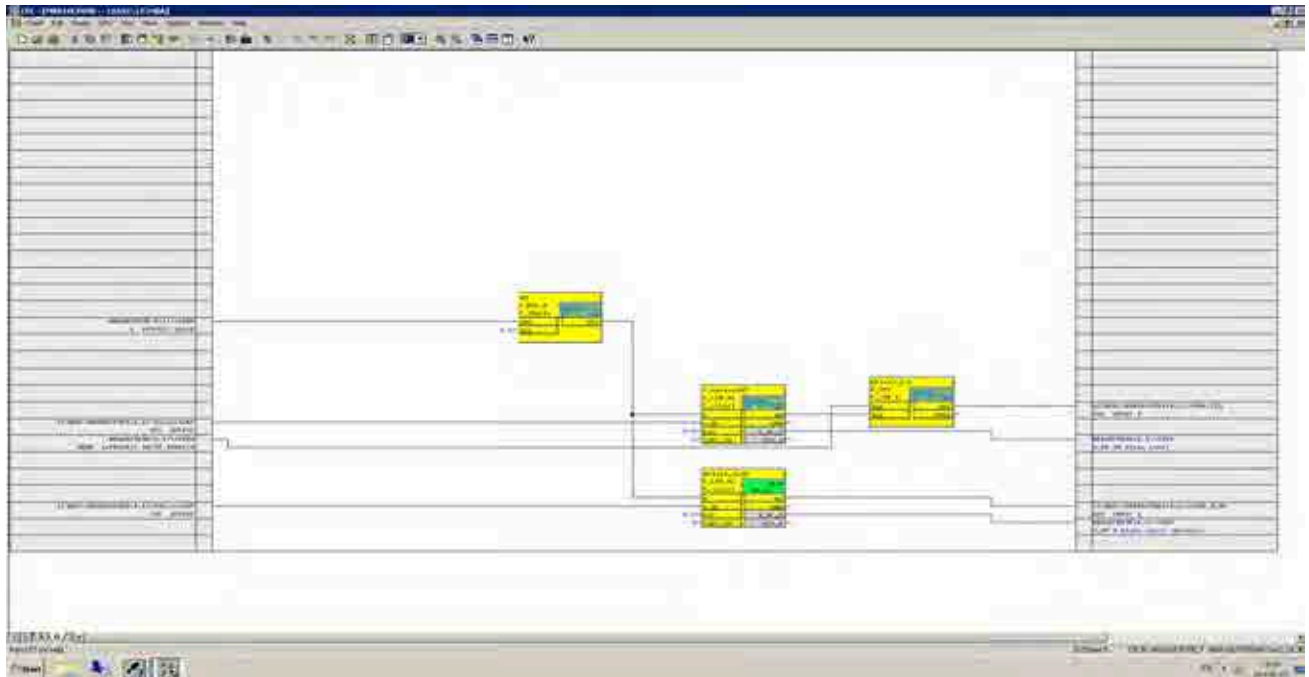


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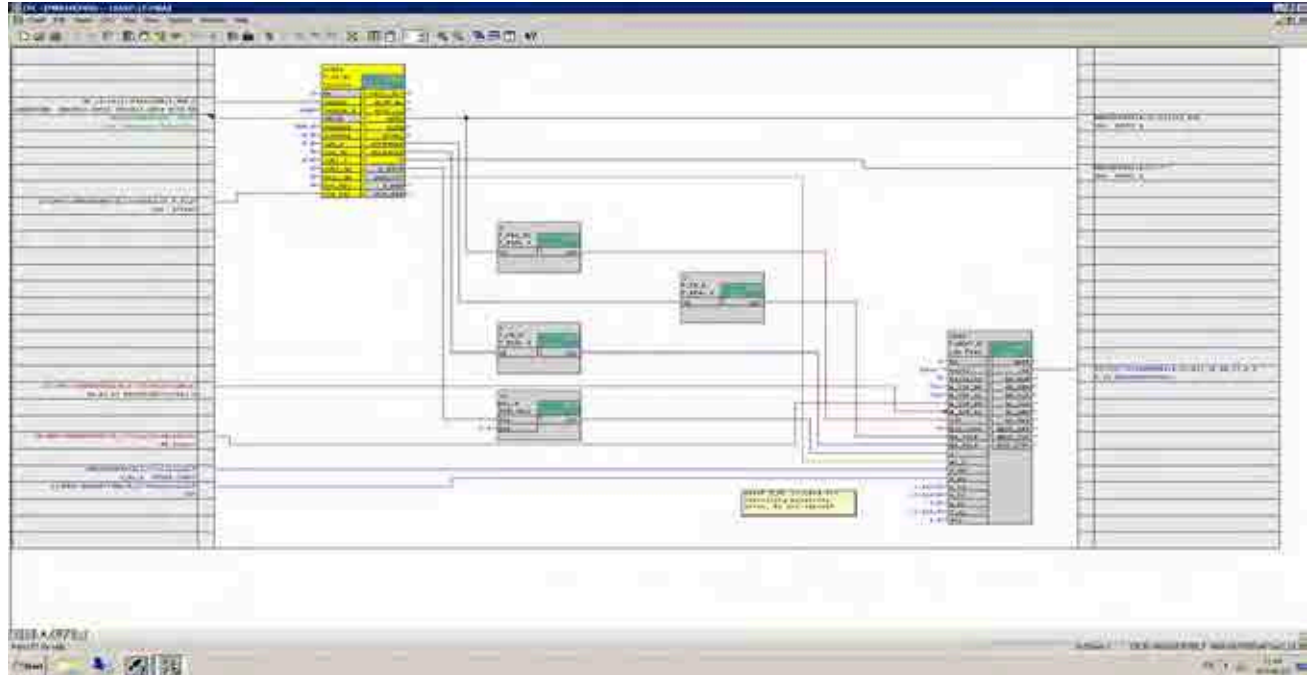


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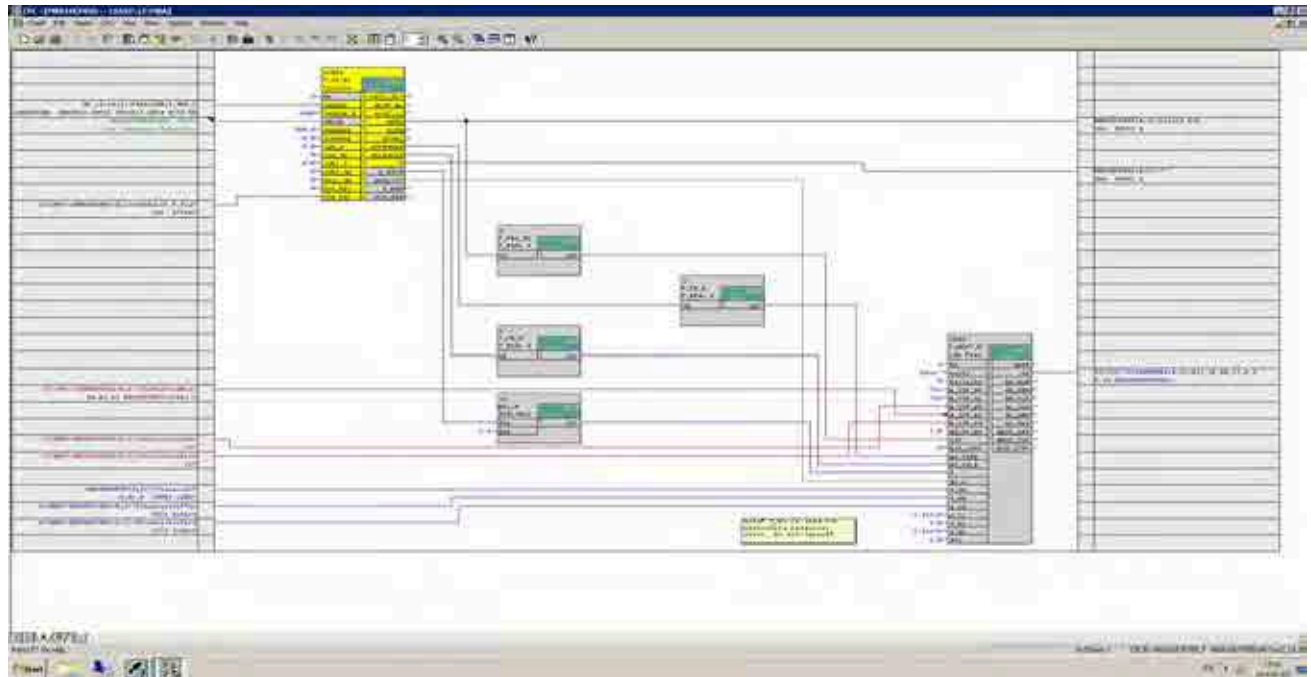


## Additional Activities

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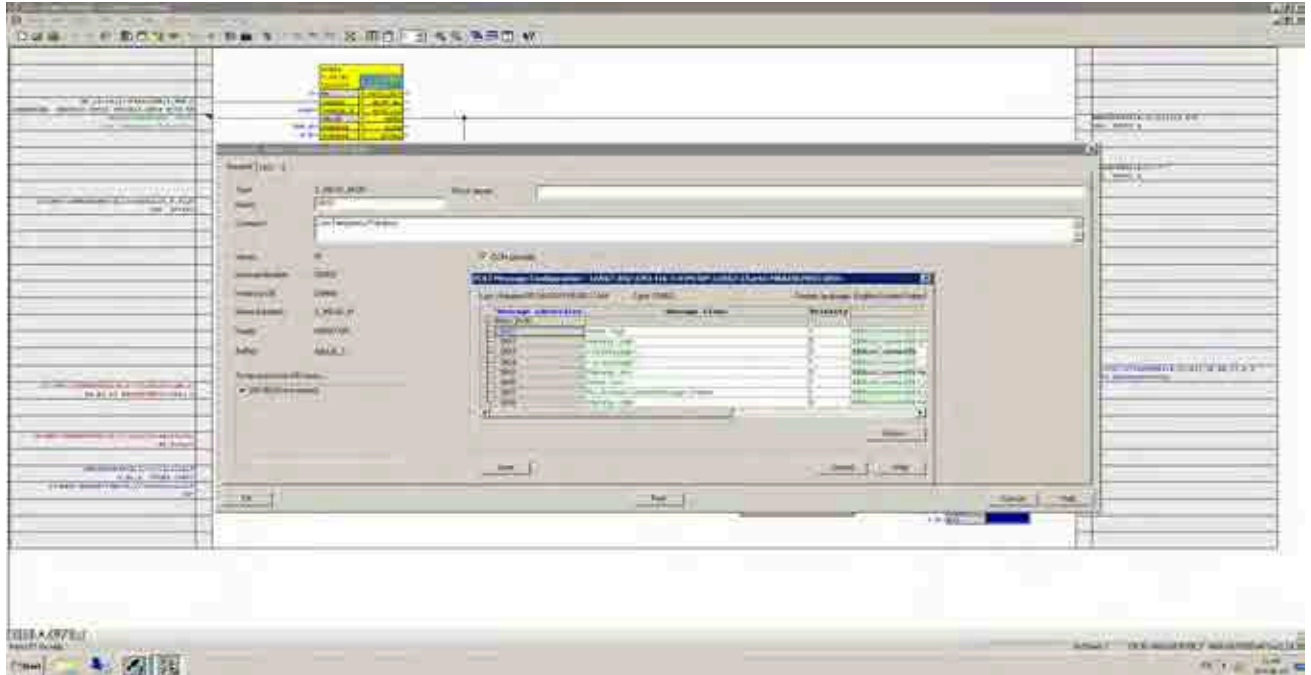


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## Additional Activities

Before



After

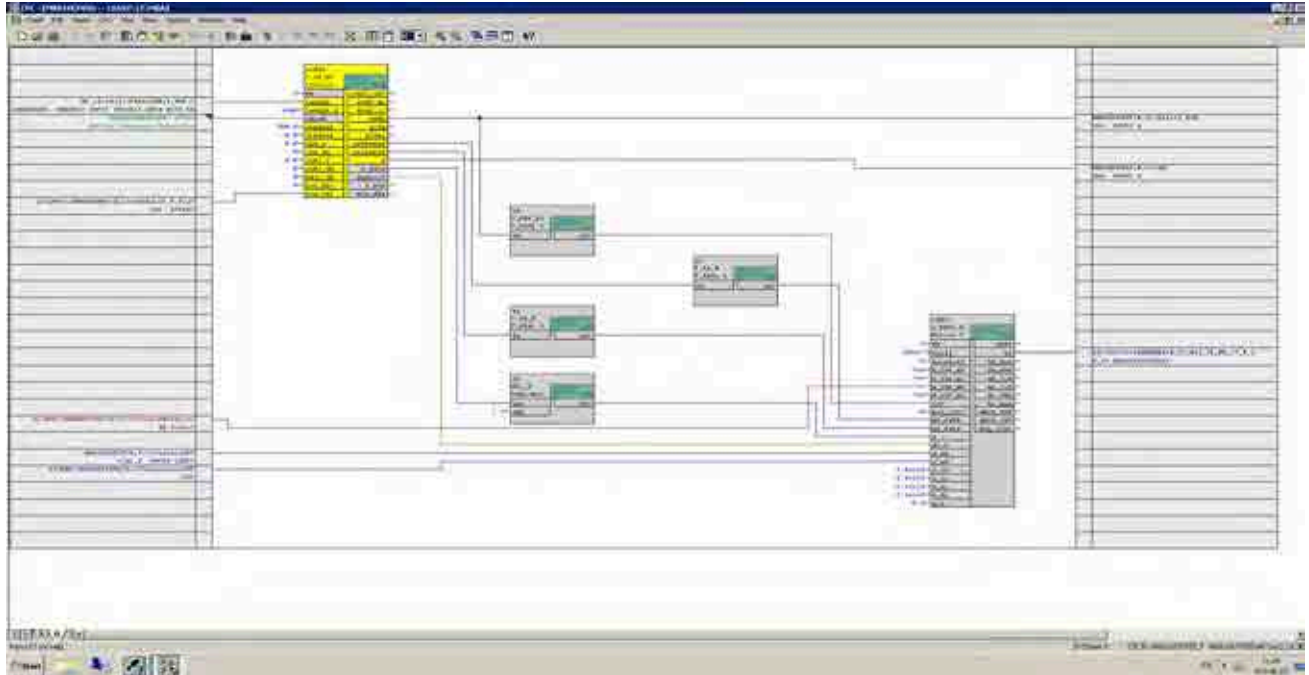


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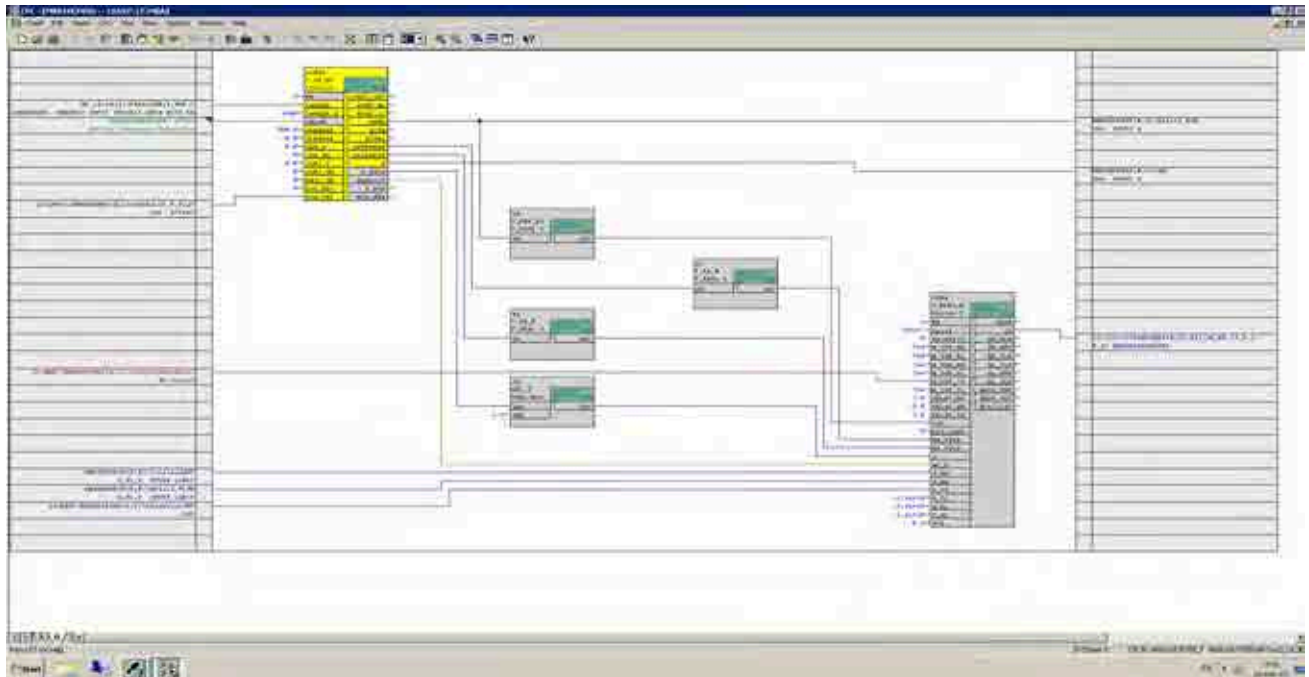


## Additional Activities

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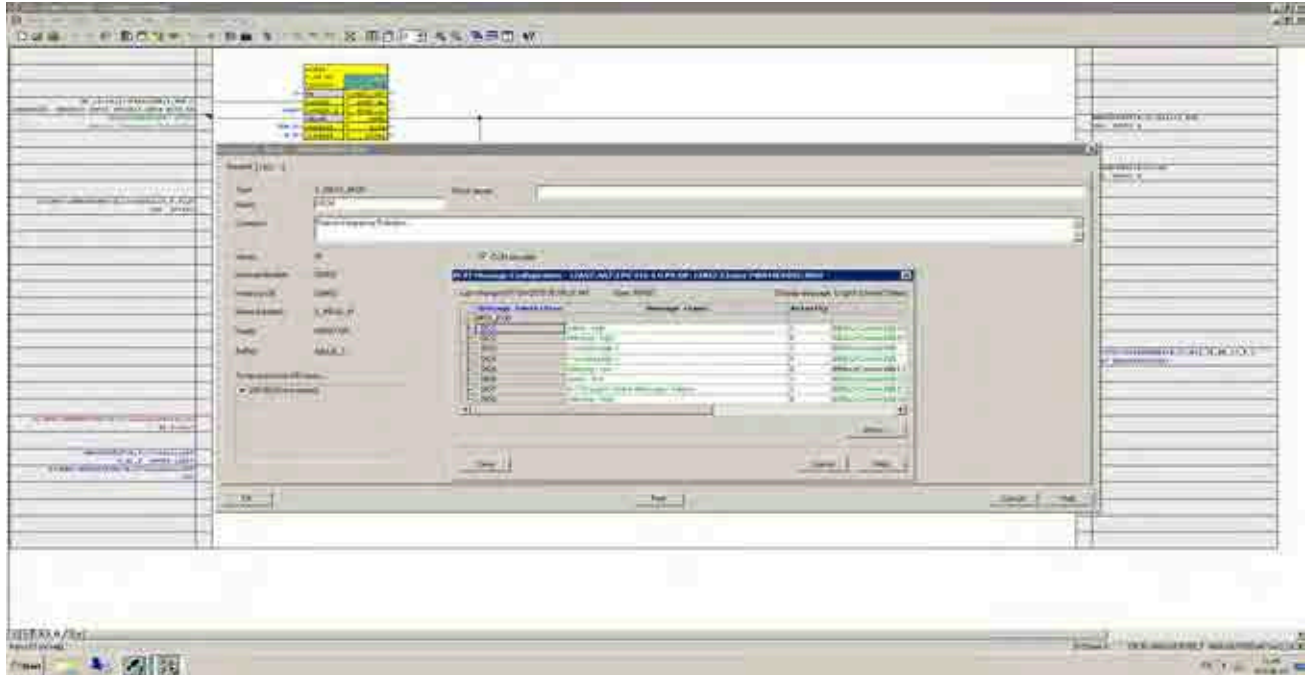
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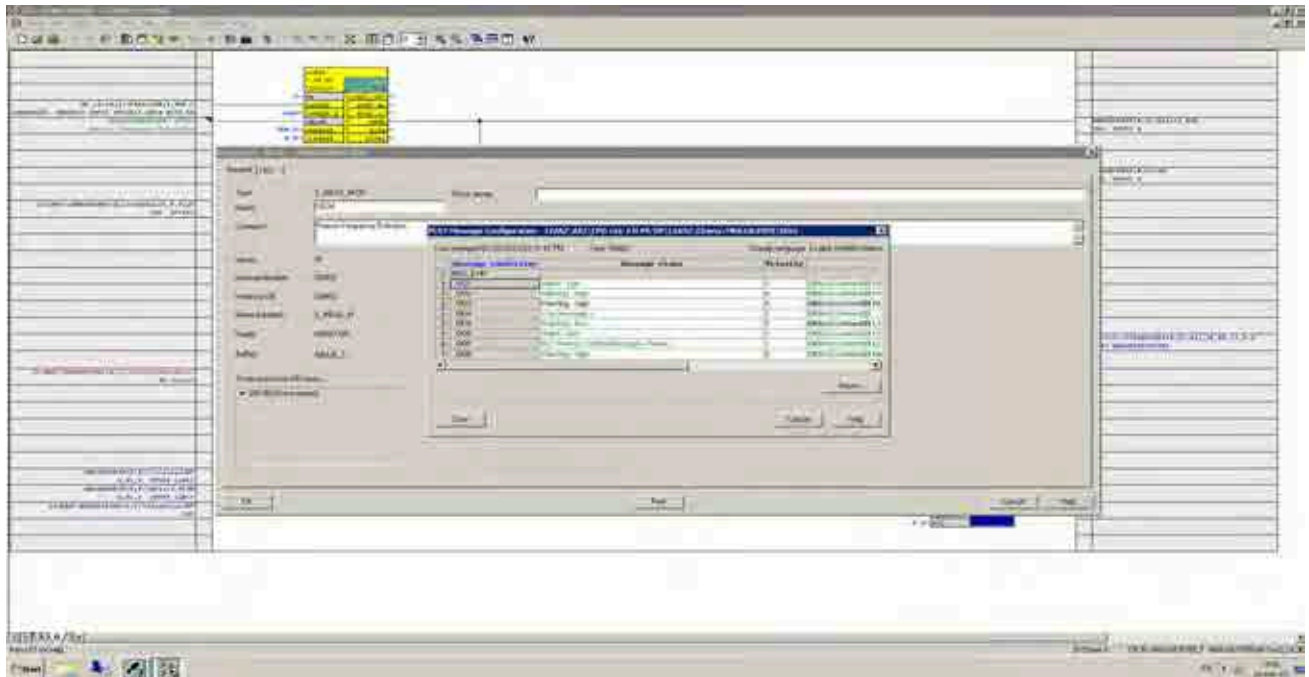


## Additional Activities

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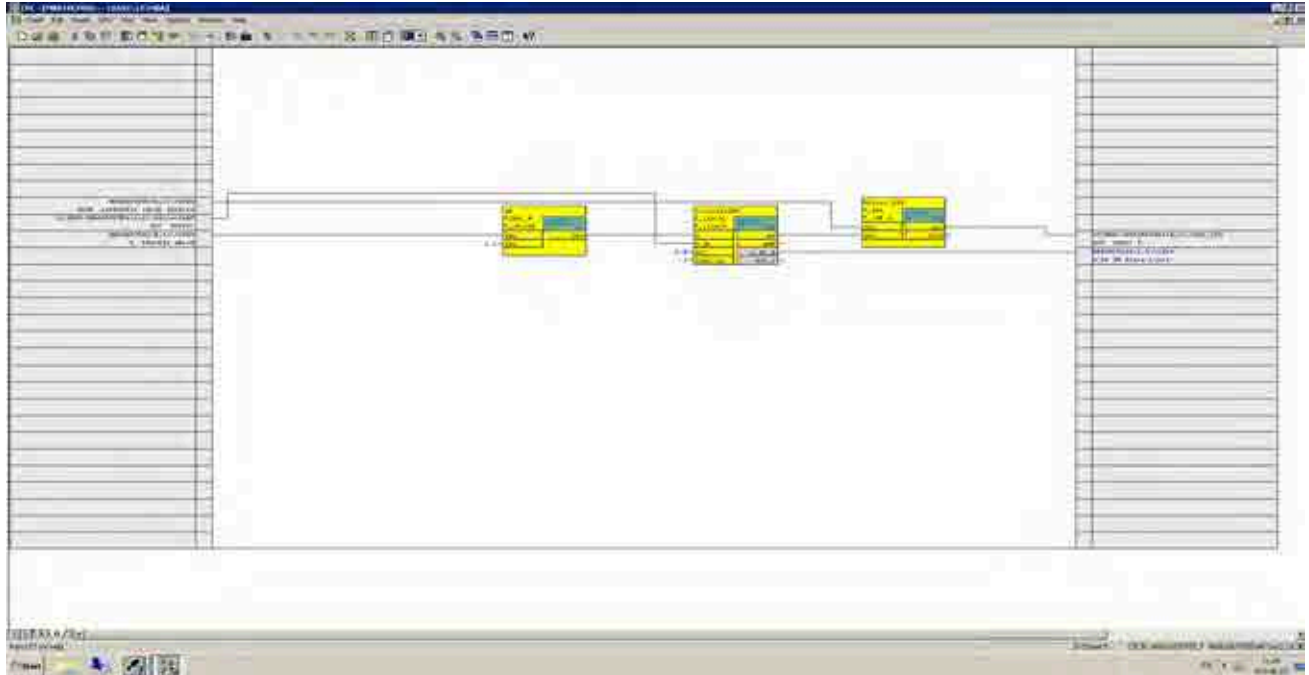


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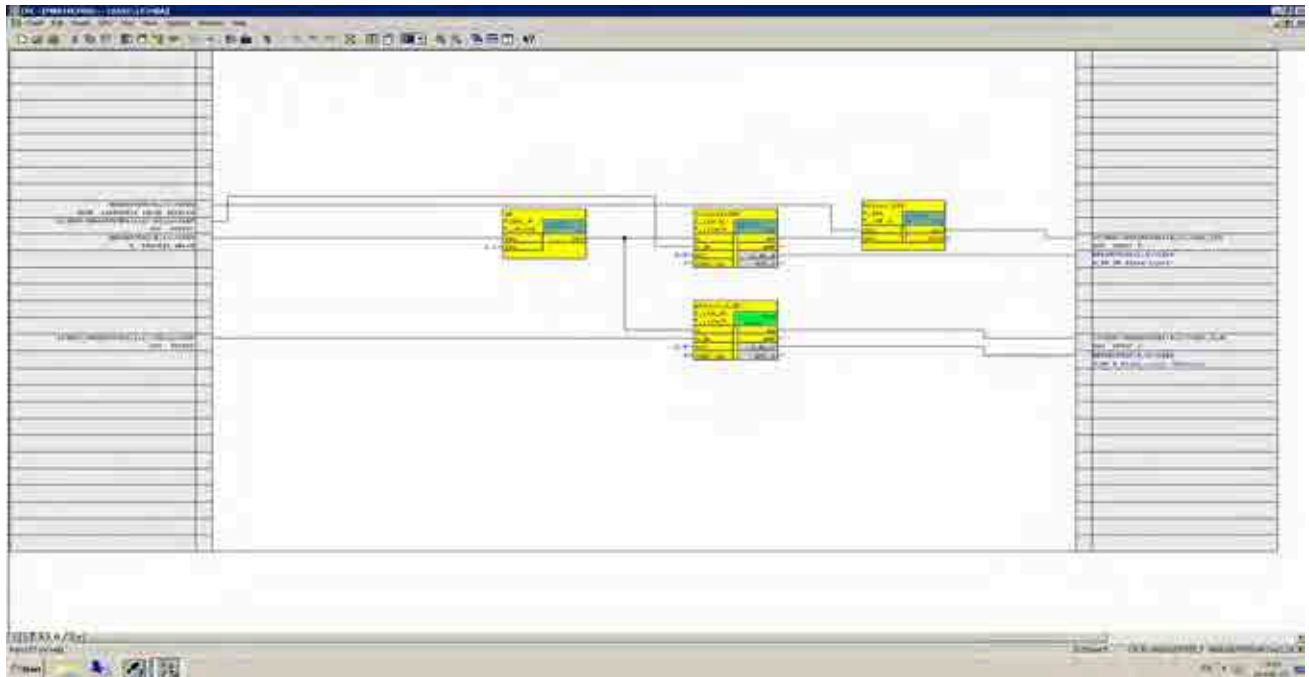


## Additional Activities

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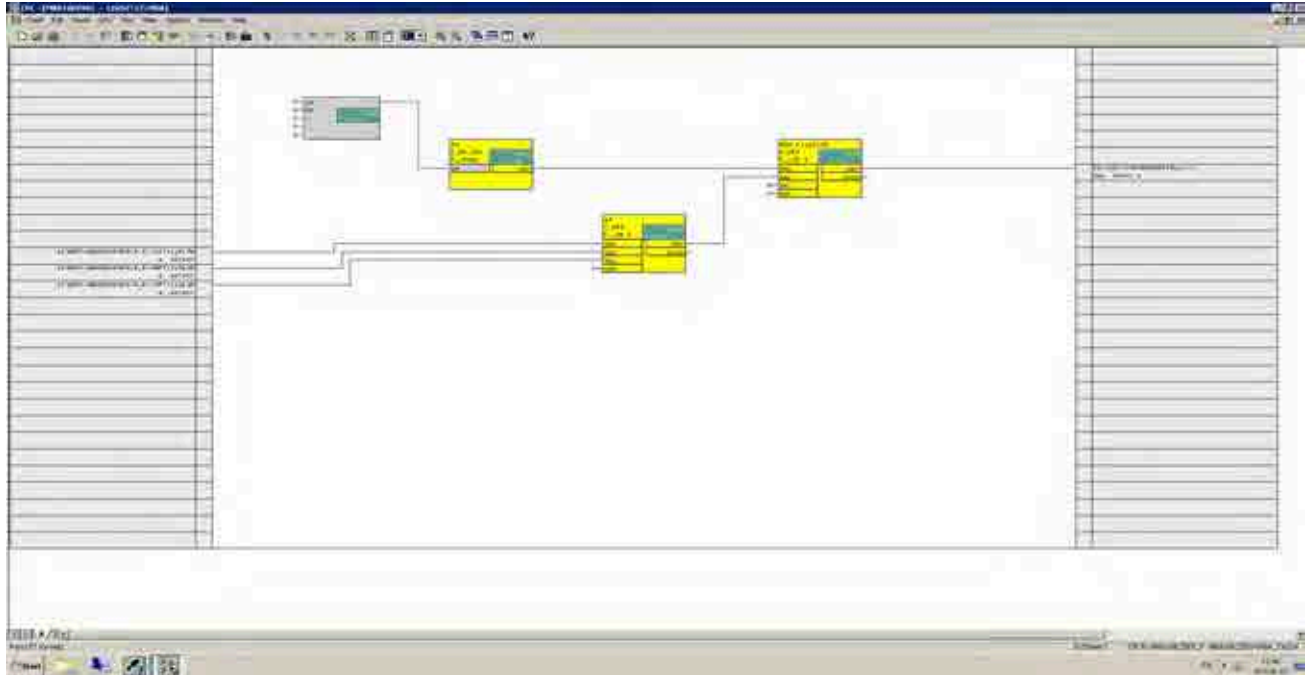


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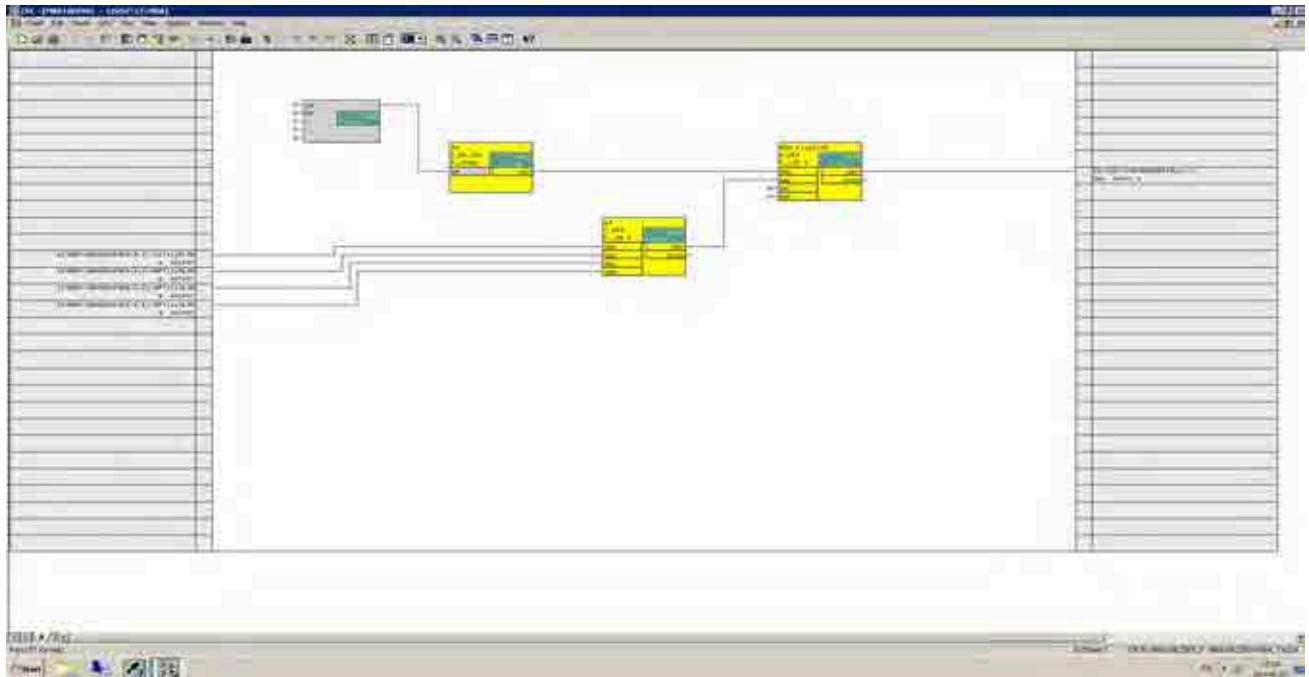


## Additional Activities

Before



After



## Additional Activities

Before



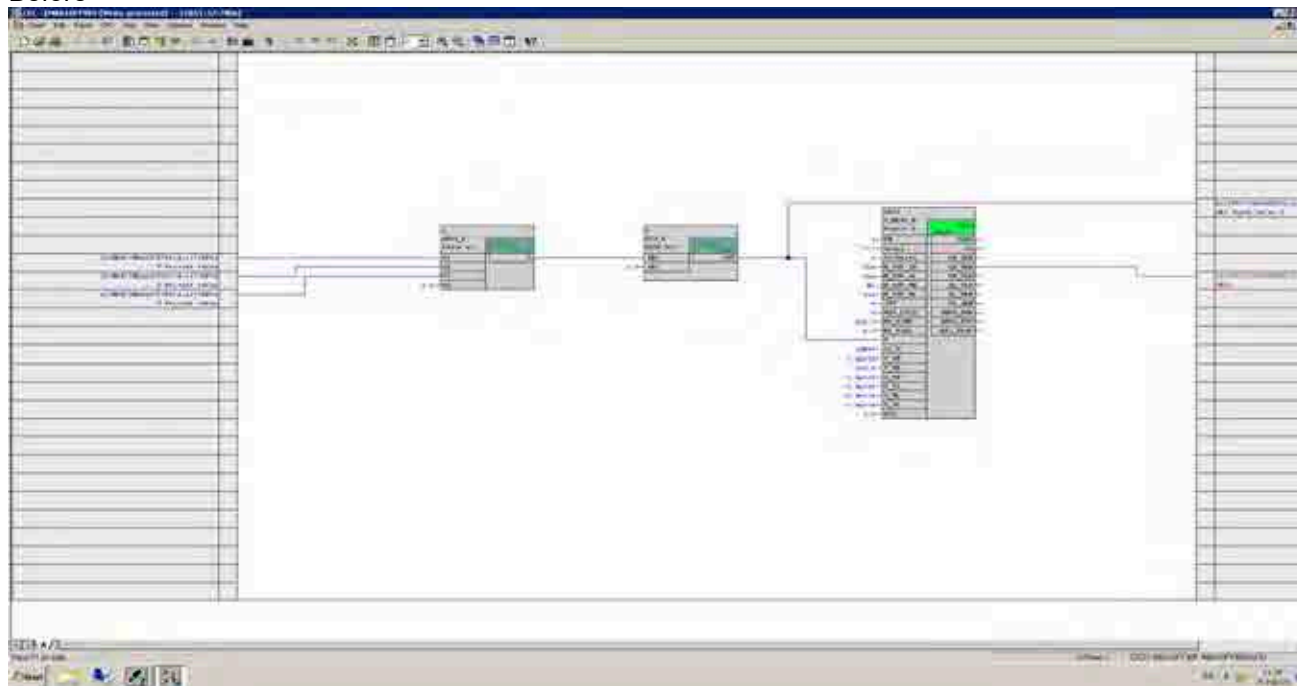
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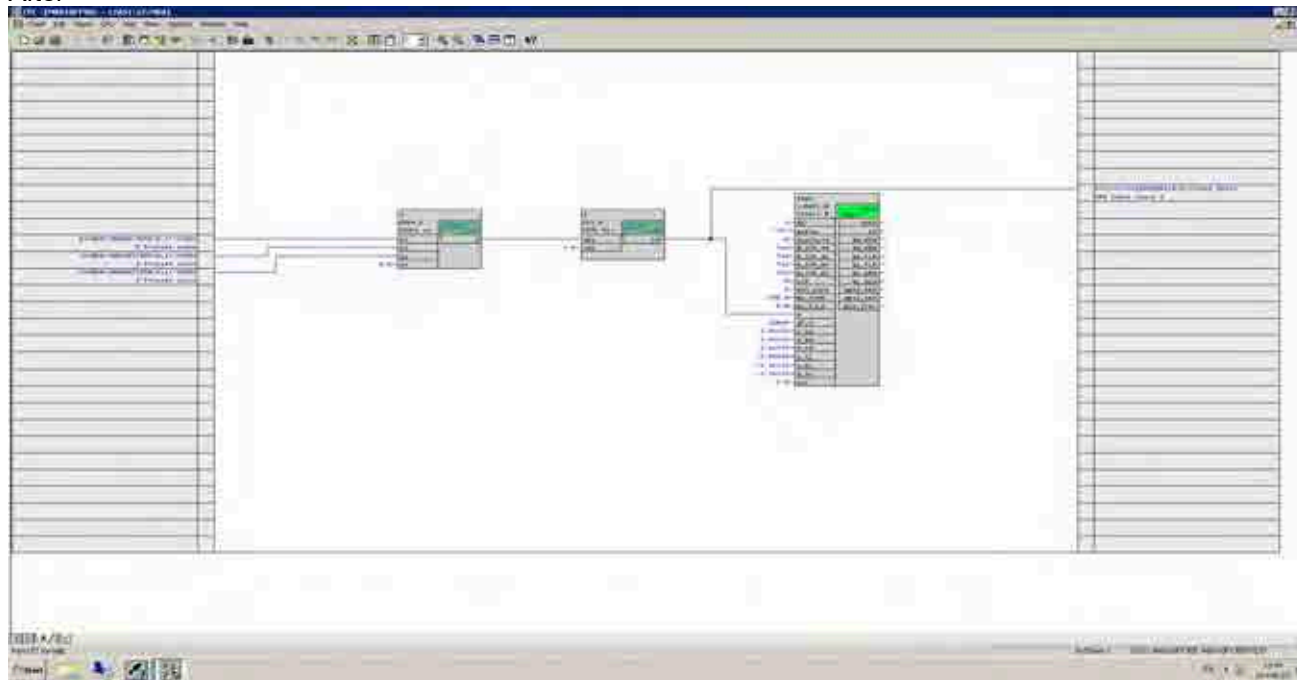
## Additional Activities

### 2 SuP01/2021/SGT-800 Removal of high temperature alarm on stator ring 2 & 3

Before



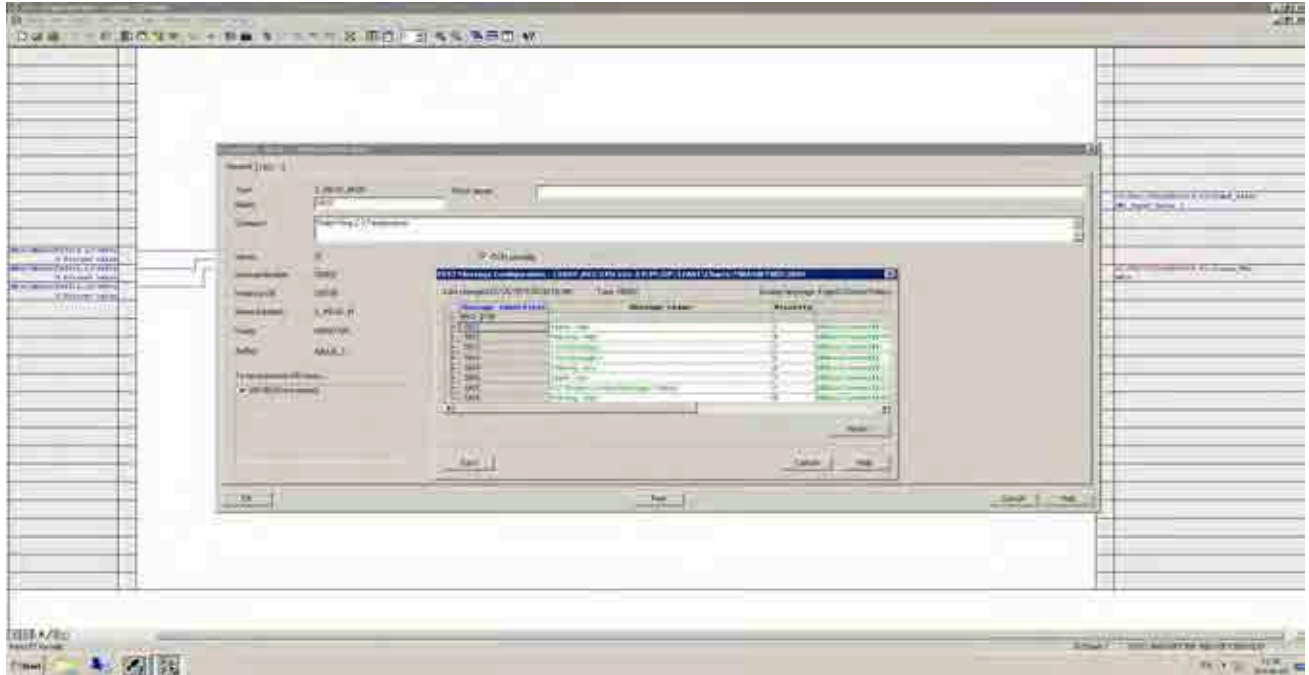
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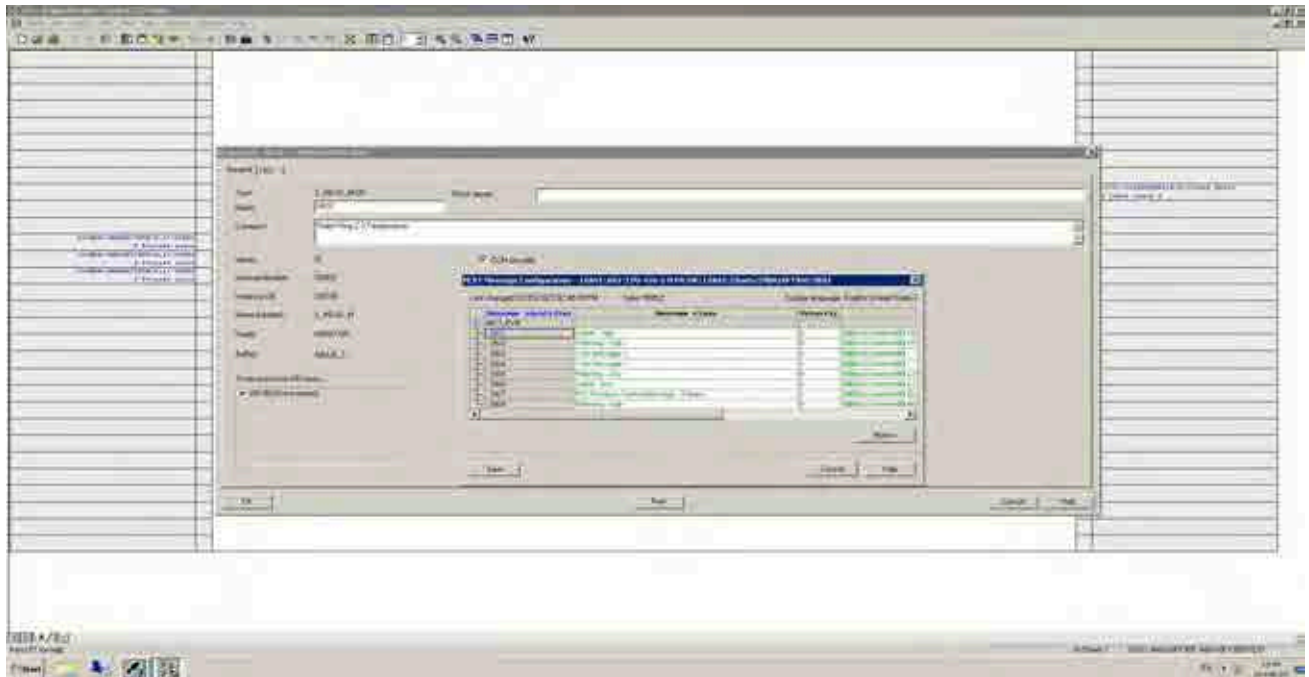


## Additional Activities

Before



After





## Inspection Report

Subject / Title: <b>BD000166U02 SSUT 1:2, MI-50 KEOH, 2022, inspection report</b> Project: Customer Name: <b>SSUT Company Ltd</b> Orderer's File Ref: <b>E1B101145363: B</b> Order No Internal: <b>EA031213U02A112511</b> Report No Internal: <b>RTSOFL99/22</b>  Classification: <b>Confidential</b>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"><b>Samutprakarn, Thailand</b></td> <td style="width: 50%; text-align: right;"><b>25 Feb 2023</b></td> </tr> <tr> <td>Location</td> <td style="text-align: right;">Date</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td colspan="2"><b>Somdej Arunplod</b></td> </tr> <tr> <td colspan="2">Author(s)</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td>Released technically</td> <td style="text-align: right;">Released for external use</td> </tr> </table>	<b>Samutprakarn, Thailand</b>	<b>25 Feb 2023</b>	Location	Date	 		<b>Somdej Arunplod</b>		Author(s)		 		Released technically	Released for external use
<b>Samutprakarn, Thailand</b>	<b>25 Feb 2023</b>														
Location	Date														
<b>Somdej Arunplod</b>															
Author(s)															
Released technically	Released for external use														

Codeword	:	<b>SSUT 1:2</b>
Equipment No	:	<b>BD000166U02</b>
Product Type	:	<b>SGT-800B1</b>
Mobilization Date	:	<b>2023-02-25</b>
Demobilization Date	:	<b>2023-02-27</b>
Client Contact Name	:	<b>Mr. Vithul R.</b>

### Executive Summary:

The purpose of visit was to perform A-inspection between 25 27 Feb 2023 to perform a Level A'50-inspection according to activity list E1B101145363.  
 Compressor washing of GT unit BD000166U02 was performed before inspection. Several minor remarks were noted. Details can be found in the report.

Copies To:  
 Paleerat Taptawat  
 Erik Gregeborg

Emilien Zara Souleman  
 Emelie Ljungblad

## Inspection Report

### 7.19 HG 2650 Turbine stator stage no 1

#### Performed work:

- Borescope inspection.

#### Result:

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on stage 1 heat shield.
- Minor oxidation found on stage 1 rear hooks.



*GV1 segment found good condition.*



*Inner/Outer vane plate condition.*



*GV1 as found condition at burner position 15*



*Inner/Outer vane plate condition at burner position 15.*

## Inspection Report



*Heatsheild stage 1 overall condition.*



*Heatshield stage 1 overall condition and seal strip*



*Rear hooks and heatshields condition.*



*Another view rear hooks and heatshields condition.*

### **Recommendation:**

- None

The turbine stator stage 1 is in serviceable condition.

## Inspection Report

Subject / Title:	<b>BD000166U03 SSUT 2:1, MI-50 kEOH, 2022, Inspection report</b>	<b>Samutprakarn, Thailand</b>	<b>1 Jan 2023</b>
Project:	<b>SSUT 2:1, MI-50</b>	Location	Date
Customer Name:	<b>SSUT Company Ltd</b>	<b>Krit Phunsub</b>	
Orderer's File Ref:	<b>E1B101145802:A</b>	Author(s)	
Order No Internal:	<b>EA033854U01A112511</b>		
Report No Internal:	<b>RTSOFL635/22</b>	Released technically	Released for external use
Classification:	<b>Confidential</b>		

Codeword	: <b>SSUT 2:1</b>
Equipment No	: <b>BD000166U03</b>
Product Type	: <b>SGT-800B1</b>
Mobilization Date	: <b>2022-12-31</b>
Demobilization Date	: <b>2023-01-02</b>
Client Contact Name	: <b>Mr. Suchat Junlee</b>

### Executive Summary:

Purpose of this visit was to perform a level MI50-inspection of unit BD000166U03 SSUT GT21. Compressor wash was performed prior to borescope inspection of compressor section. The inspection was performed according to the maintenance Activity List **E1B101145802**

Findings are report in this inspection report any finding which could be rectified during the inspection schedule will be rectify/repair or replace with parts from customer stock and/or planned inspection parts.

Once all the recommendations have been implemented unit can return to service.

Copies To:  
Paleerat Taptawat  
Erik Gregeborg

Emilien Zara Souleman  
Emelie Ljungblad

## Inspection Report

# 1 Summary of results

### **HG 4150 Air intake**

- Dust collected on weather louvers both intake filter and ventilation filter.
- Slight contamination on prefilter element.
- Moderate contamination notices on fine filter element.
- Noticed some condensed water droplets on the floor behind fine filter area.
- Noticed surface corrosion on some of the silencer unit.
- Ventilation filter housing floor found water collected on the inner support frame.
- Ventilation filter element found moderate contamination.

### **HG 4980 Speed reduction gear**

- Thin varnish found all over pinion and wheel cogs.
- Found white mark on non-active side on both sides of the wheel.
- Found white mark on active side on both generator and turbine sides of the wheel in a pattern of 4 teeth in a row skip 4 teeth and repeated all around the wheel.

### **HG 2405 Compressor Inlet casing**

- Found paint coating crack on internal wall of inlet casing.
- Found surface corrosion on silencer exit area on some of the silencer unit and on the flexible joint cover plate.

### **HG 2410 Compressor inlet piece**

- Traces of dirty water notice on inner wall near inlet casing flange connection.

### **HG 2580 Combustor**

- White spot notices on front panel around burners in several places.

### **HG 2540 Burner**

- Minor Fretting found on hood sealing ring and pilot nozzle piston ring on burners #1, #7, #15 and #22.

### **HG 2640 Turbine Rotor**

- Minor TBC loss on leading edge and blade tip of turbine blades stage 1.

### **HG 2650 Turbine Guide Vane Stator 1**

- Minor TBC loss and Oxidation found on some of the outer vane plates.
- Oxidation notice on GV1 heat shields and rear hooks.

## Inspection Report

### **HG 2651 Turbine Guide Vane Stator 2 and 3**

- Mild oxidation condition notice on heatshield 2.

### **HG 2665 Outlet casing**

- Soft skin of the outlet bellows flexible part found damages from contacts with bolts head on the top area.

### **HG 2660 Exhaust diffuser**

- Cracks found on welded joint on front and rear support struts.

### **HG 2132 Insulation**

- Insulation around compressor casing, burners and guide collar area found deteriorates from operation.



## Inspection Report

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## Inspection Report

## 2 Personnel on site

Personnel on site:	Date for the visit
Nikorn Jodejone, Technical Field Supervisor	221230-220101
Nataphat Pattamadilok, Commissioning lead	221230-220101
Thanom Rattanapunjak, Commissioning engineer	221230-220101
Krit Phunsub, Quality Inspector	221230-220101

## 3 General data / Operating statistics

Site:	SSUT 2:1	
B-number:	BD000166U03	
Project manager:	Paleerat Taptawat	
Application engineer:	Erik Gregeborg	
Activity list:	E1B101145802:A	
Owner:	SSUT Company Ltd	
Owner representative:	Mr. Suchat Junlee	
Order number:	4290246	
Gas turbine: Siemens	Type: SGT-800	S/N: DD080050
Main gear:	Type: TX 112/4C	S/N: 12720
Generator:	Type: AMS1240ALK	S/N: 8269007
Configuration:	Combi cycle	
Site:	Powerplant	
Fuel	Natural gas	
Operating profile:	Base load	
Compressor washing system/wash interval	Offline & 10,000 hours	
Site address or GPS coordinates	13.532752,100.651721	

Fuel:              Gas: ☒              Liquid: ☐              Dual fuel: ☐

## Inspection Report

<b>Date for counter readings:</b> 20221230	Installation
Operating hours:	47262
Equivalent operating hours:	49960
Starts:	396
Equivalent operating cycles:	536
Total production of MWh:	1517414
Total production of MVar+:	252681
Total production of MVar-:	1

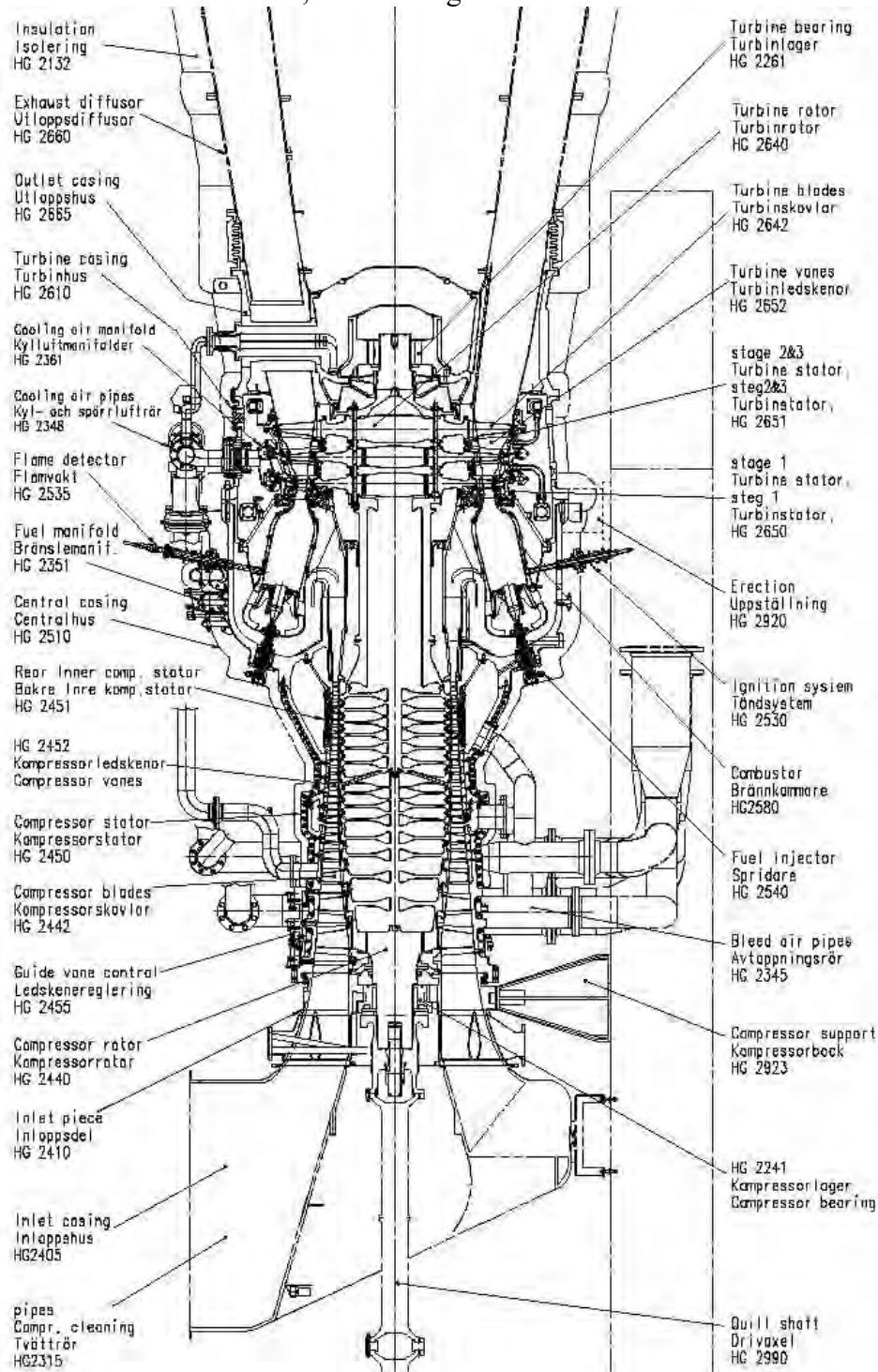
Latest inspections:

Date	Report no	Reason	Author	
2021-10-19	E1B100955481	Minor Inspection	Natthapon Wechagornngoson	A40
2021-10-18	E1B100951144	Forced Outage	Krit Phunsub	
2020-06-29	E1B100730066	Level B-inspection	Natthapon Wechagornngoson	B30
2019-04-14	E1B100497654	Level A-inspection	Krit Phunsub	A20

## Inspection Report

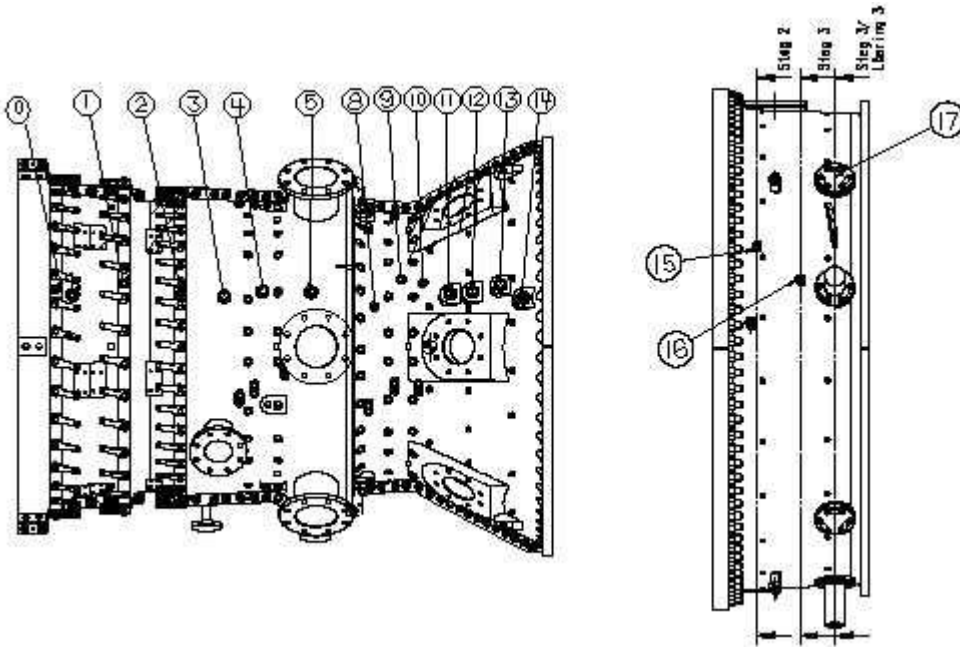
### 4 HG-list SGT-800

Activities are related to HG numbers, see drawings



## Inspection Report

### 5 Borescope inspection SGT-800



- Plan B0 Compressor rotor stage 1, stator stage 0
- Plan B1 Compressor rotor stage 1 and 2, stator stage 1
- Plan B2 Compressor rotor stage 2 and 3, stator stage 2
- Plan B3 Compressor rotor stage 3 and 4, stator stage 3
- Plan B4 Compressor rotor stage 4 and 5, stator stage 4
- Plan B5 Compressor rotor stage 5 and 6, stator stage 5
- Plan B8 Compressor rotor stage 8 and 9, stator stage 8
- Plan B9 Compressor rotor stage 9 and 10, stator stage 9
- Plan B10 Compressor rotor stage 10 and 11, stator stage 10
- Plan B11 Compressor rotor stage 11 and 12, stator stage 11
- Plan B12 Compressor rotor stage 12 and 13, stator stage 12
- Plan B13 Compressor rotor stage 13 and 14, stator stage 13
- Plan B14 Compressor rotor stage 14 and 15, stator stage 14
- Plan B15 Turbine rotor stage 1 and 2, stator stage 2
- Plan B16 Turbine rotor stage 2 and 3, stator stage 3
- Plan B17 Turbine rotor stage 3, stator stage 3

## Inspection Report

# 6 Inspection activities

## 6.1 Planned inspection

### 6.1.1 Activities according to maintenance plan

5				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	/Air intake system/MBL	Visual inspection in air intake housing, ductings, silencer and plenum. Check for obstructions, cleanliness, leakages and for foreign objects. Check flanges, inspection hatches, sealings and gaskets.		Performed
2	/Air intake system/MBL	Visual inspection of filters for obstruction and contamination.		Performed
3	2132/Insulation/	Visual inspection.		Performed
4	2351/Fuel manifold/	Visual external inspection.		Performed
5	2405/Compressor air inlet casing/	Visual inspection.		Performed
6	2410/Inlet Piece/	Visual inspection.		Performed
7	2442/Compressor blades/	Borescope inspection of compressor blades stages 5, 11 and 14.	Compressor blades	Performed
8	2442/Compressor blades/	Borescope inspection of compressor blades stage 4.	Compressor blades	Performed
9	2452/Compressor vanes/	Borescope inspection of compressor vanes stages 5, 11 and 14.	Compressor vanes	Performed
10	2452/Compressor vanes/	Borescope inspection of compressor vanes stage 4.	Compressor vanes	Performed
11	2530/Ignition system/	Visual inspection.		Performed
12	2535/Flame detector/	Visual inspection.		Performed
13	2540/Burner/	Borescope inspection of 1 (RMI, #15) or 4 (MI, equal distr.) burners		Performed
14	2580/Combustor/MBM	Borescope inspection.		Performed
15	2610/Turbine casing/	Visual inspection.		Performed
16	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1.		Performed
17	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1 outer vane plate.		Performed
18	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1 inner vane plate.		Performed
19	2650/Turbine guide vanes/	Borescope inspection of guide vane 2.	Turbine stator 2 - GV2	Performed



### Inspection Report

5				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
20	2650/Turbine stator, stage 1/	Borescope inspection turbine heat shield 1.		Performed
21	2640/Turbine rotor (incl. Blades)/	Borescope inspection of turbine blades stage 1		Performed
22	2640/Turbine rotor (incl. Blades)/	Borescope inspection of turbine blades stage 2.		Performed
23	2665/Outlet casing/	Internal visual inspection of outlet casing.		Performed
24	2665/Exhaust casing/	Visual inspection of outlet bellow.		Performed
25	2920, 2925/Assembly material/Erection exhaust diffuser at site/	Visual inspection of the supports.	Support stands	Performed

7				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	4980, 4995/Main gear/Alignment instruction/	Visual inspection of tooth mesh through inspection cover. Main gear.	MBK10AZ005	Performed

### 6.1.2 Activities outside maintenance plan

9				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	/Gas fuel system. General/MBP	PSW/SGT-800/18-004 Safety Warning of the gas fuel flexible hoses installed on all medium gas turbines		Performed
5	2650/Turbine guide vanes/	PAB/SGT-800/22-001 TGV1 oxidation: extended RMI/MI Inspection		Performed
9	/Lube Oil System/MBV	Visually inspect for the lube oil leakage. Check and confirm that there is no fault from the measurement loop. Fill the lube oil supply tank to a level within Siemens Energy recommendation.	As Recommended in ROC report	Performed. By commissioning team

## Inspection Report

# 7 Inspection result

## 7.1 HG 4150 Air intake system

### Performed work:

- Visual inspection.

### Result:

- Dust collected on weather louvers both intake filter and ventilation filter.
- Slight contamination on prefilter element.
- Moderate contamination notices on fine filter element.
- Noticed some condensed water droplets on the floor behind fine filter area.
- Noticed surface corrosion on some of the silencer unit.
- Ventilation filter housing floor found water collected on the inner support frame.
- Ventilation filter element found moderate contamination.



Air intake filter housing overall condition.



Flexible joint connection between elbow duct condition.



Filter housing overall condition.



Instruments panel overall condition.

## Inspection Report



External wall of second floor housing.



Front intake louvers overall condition.



Intake filter housing door rubber seal condition.



Condition inside filter housing.



Example of pre-filter contamination condition.



Installed pre-filter element were CamFlo GT Hybrid X7.

## Inspection Report



Intake side condition of pre-filter element.



Intake louvers exit side overall condition.



Intake housing floor drain port condition.



Example of fine filter element contamination.



Installed fine filters are CamGT 3V-600-E12 Std.



Clean air side of fine filter condition.



## Inspection Report



Some droplet found on the floor behind fine filter.



Clean air intake duct side after fine filter elements.



Floor corner area on the clean air side condition.



Second floor of air intake overall condition.



Silencer duct external overall condition.



Rubber seal gasket overall condition.

## Inspection Report



Intake side to silencer overall condition.



Clean air side exit from elbow duct overall condition.



Inside clean air intake duct wall overall condition.



Example of surface corrosion found on silencer unit.



Ventilation filter housing duct overall condition.



Flexible joint and shutter door lever overall condition.



## Inspection Report



Ventilation filter housing intake louvers condition.



Ventilation housing door rubber seal overall condition.



Condition inside ventilation filter housing.



Ventilation housing floor overall condition.



Intake to enclosure overall condition.



Example of contamination condition on filter element.

## Inspection Report



Water collected found at inner support frame inside. Ventilation silencer enclosure exit overall condition.

### **Recommendation:**

- Replace pre-filter and fine filter elements as per operation schedule plan, keep monitoring filter DP for progressing trend.
- While replace filter recommend clean the intake louvers on Intake housing and ventilation housing.
- Clean inside ventilation filter housing floor.
- When replace filter elements ensure a proper sealing between filter elements and the housing.
- Remove surface corrosion found on silencer unit during next major inspection.

Air Intake system is in serviceable condition.

## **7.2 HG 4980 Speed reduction gear**

### **Performed work:**

- Visual inspection.

### **Result:**

- Thin varnish found all over pinion and wheel cogs.
- Found white mark on non-active side on both sides of the wheel.
- Found white mark on active side on both generator and turbine sides of the wheel in a pattern of 4 teeth in a row skip 4 teeth and repeated all around the wheel.

## Inspection Report



Backup barring motor overall condition.



Gearbox casing overall condition seen from generator side.



Lube oil supply pipe overall condition.



Gearbox foundation support and keys condition.



Gearbox casing seen from starter motor side.



Gear trains overall condition.



## Inspection Report



Wheel as found condition.



Pinion as found condition.



Wheel active side white mark (generator side).



Wheel active side white mark (Turbine side).



Wheel non-active side white mark (generator side).

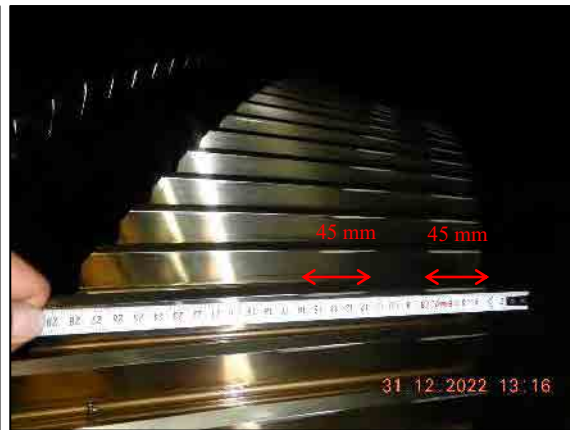


Wheel non-active side white mark (Turbine side).

## Inspection Report



Pinion cogs active side condition (Starter motor side). Pinion cogs active side condition (Turbine side).



Recorded white mark on wheel cogs generator side. Recorded white mark on wheel cogs turbine side.

### **Recommendation:**

- Continue to monitor white mark area and varnish condition on cogs during next major inspection, performed oil sampling analysis every six months to keep track of lubrication oil condition.
- Check lube oil pressure and lube oil spray nozzles angle orientation during next major inspection.

Speed reduction gear system is in serviceable condition.

## Inspection Report

### 7.3 HG 6324 Starter motor

#### Performed work:

- Visual inspection

#### Result:

- Minor shims packed separation noticed on flexible coupling.



Starter motor overall condition.



Flexible coupling overall condition.



Shim pack separation condition on stator motor side.



Shim pack separation condition on gearbox side.

#### Recommendation:

- None.

Starter motor system can continue serviceable follow recommendations above.



## Inspection Report

### 7.4 HG 2405 Compressor inlet casing

**Performed work:**

- Visual inspection.

**Result:**

- Found paint coating crack on internal wall of inlet casing.
- Found surface corrosion on silencer exit area on some of the silencer unit and on the flexible joint cover plate.



Inlet casing overall condition seen from left side.



Inlet casing overall condition seen from lube oil filters.



Inlet casing drain port overall condition.



Inlet casing foundation support overall condition.

## Inspection Report



Intake silencer ducting external condition.



Inlet casing overall condition seen from right side.



Sight glasses inspection hatch overall condition.



Sight glasses rubber seal condition.



Internal wall of inlet casing condition.



Location and orientation of crack at this area.

## Inspection Report



Example of compressor wash spray nozzle condition. Inlet casing drain port overall condition.



Flexible joint connecting area overall condition.

Example of corrosion found at this area.

## Inspection Report



Silencer exit overall condition.



Example of surface corrosion found on some of the silencer.

### **Recommendation:**

- Repair crack on surface paint during next major inspection.
- Remove surface corrosion area found on silencer exit and flexible joint cover plate during next major inspection.
- Clean inside of inlet casing and keep monitor for dirt deposits on the next inspection.

Compressor inlet casing is in serviceable condition.

## **7.5 HG 2410 Compressor inlet piece**

### **Performed work:**

- Visual inspection.

### **Result:**

- Traces of dirty water notice on inner wall near inlet casing flange connection.



Inlet piece left side overall condition.



Inlet piece right side overall condition.



## Inspection Report



Inlet piece static support condition.



Right side dirty water trace condition.



Left side dirty water trace condition.



Inner/outer wall and top struts overall condition.

### **Recommendation:**

- Clean inlet piece.

Compressor inlet piece is in serviceable condition.

## Inspection Report

### 7.6 HG 2320 Drainpipes

**Performed work:**

- Visual inspection

**Result:**

- None.



Drain valves overall condition.



Compressor casing drain pipes overall condition.



Central casing drain overall condition.



Turbine casing drain port overall condition.

**Recommendation/Action:**

- None.

Drainpipes is serviceable condition.



## Inspection Report

### 7.7 HG 2455 Guide vane control

**Performed work:**

- Visual inspection.

**Result:**

- No remark.



Guide vane actuator support overall condition.



GV arms and lever mechanism on left side.



GV arms and lever mechanism on right side.



GV arms and lever mechanism at bottom.

**Recommendation:**

- None.

Guide Vane control system is in serviceable condition.

## Inspection Report

### 7.8 HG 2440 Compressor rotor

**Performed work:**

- Borescope inspection.

**Result:**

- No remark.



Compressor rotor stage 3 condition.



Compressor rotor stage 4 condition



Compressor rotor stage 5 condition.



Compressor rotor stage 6 condition

## Inspection Report



Compressor rotor stage 8 condition.



Compressor rotor stage 9 condition



Compressor rotor stage 11 condition.



Compressor rotor stage 12 condition



Compressor rotor stage 14 condition.



Compressor rotor stage 15 condition

### **Recommendation:**

- None.

Compressor Rotor is in serviceable condition.

## Inspection Report

### 7.9 HG 2442 Compressor blades

**Performed work:**

- Borescope inspection.

**Result:**

- No remark.



Compressor blades stage 3 condition.



Compressor blades stage 4 condition.



Compressor blades stage 5 condition.



Compressor blades stage 6 condition.



## Inspection Report



Compressor blades stage 8 condition.



Compressor blades stage 9 condition.



Compressor blades stage 11 condition.



Compressor blades stage 12 condition.



Compressor blades stage 14 condition.



Compressor blades stage 15 condition.

### **Recommendation:**

- Perform compressor wash every 10,000 hours or as soon as schedule available after 10,000 hours of operation period.

Compressor blades is in serviceable condition.

## Inspection Report

### 7.10 HG 2450 Compressor stator

**Performed work:**

- Borescope inspection.

**Result:**

- No remark.



Abradable seal stage 3 condition.



Abradable seal stage 4 condition.



Abradable seal stage 5 condition.



Abradable seal stage 6 condition.



## Inspection Report



Abradable seal stage 8 condition.



Abradable seal stage 9 condition.

### **Recommendation:**

- None.

Compressor stator is in serviceable condition.

## **7.11 HG 2451 Rear compressor stator**

### **Performed work:**

- Borescope inspection.

### **Result:**

- No remark.



Abradable seal stage 11 condition.



Abradable seal stage 12 condition.

## Inspection Report



Abradable seal stage 14 condition.



Abradable seal stage 15 condition.

### **Recommendation:**

- None.

Rear compressor stator is in serviceable condition.

## **7.12 HG 2452 Compressor vanes**

### **Performed work:**

- Borescope inspection.

### **Result:**

- No remark.



Compressor Inlet guide vanes stage 0.



Compressor Variable guide vanes stage 2.

## Inspection Report



Compressor guide vanes stage 3.



Compressor guide vanes stage 4.



Compressor guide vanes stage 5.



Compressor guide vanes stage 6.



Compressor guide vanes stage 7.



Compressor guide vanes stage 8.

## Inspection Report



Compressor guide vanes stage 9.



Compressor guide vanes stage 10.



Compressor guide vanes stage 11.



Compressor guide vanes stage 12.



Compressor guide vanes stage 13.



Compressor guide vanes stage 14.

## Inspection Report



Compressor guide vane stage 15.

### **Recommendation:**

- None.

Compressor Vanes are in serviceable condition.

## **7.13 HG 2580 Combustor**

### **Performed work:**

- Borescope inspection.

### **Result:**

- White spot notices on front panel around burners in several places.



Inner/outer wall TBC overall condition.



Inner/outer wall TBC condition, different location.



## Inspection Report



Front panel and burners tip condition.



Front panel and burners tip condition, different location.



Example of close-up burner condition on front panel. Inner/outer wall TBC condition between GV1 entrance.



Area between inner heat shield wall of combustor and central casing exit flow area condition.





## Inspection Report



Area at the bottom of central casing drain port no debris found in this area.

### **Recommendation:**

- None.

Combustor is in serviceable condition.

## **7.14 HG 2540 Fuel burner**

### **Performed work:**

- Visual inspection.

### **Result:**

- Minor Fretting found on hood sealing ring and pilot nozzle piston ring on burners #1, #7, #15 and #22.

Burner #1 S/N: BI2019-15976



Overall condition of burner#1.



Outer bellow overall condition.

## Inspection Report



Condition of TBC coating at pilot flame nozzle.



Condition inside mixing tube.

Burner# 7 S/N: BI2019-15978



Burner#7 overall condition.



Outer bellow overall condition.



Condition of TBC coating at pilot flame nozzle.



Condition inside mixing tube.

## Inspection Report

Burner#15 S/N: BI2019-15972



Burner# 15 overall condition.



Outer bellow overall condition.



Condition of TBC coating at pilot flame nozzle.



Condition inside mixing tube.

Burner#24 S/N: BI2019-15968



Overall condition of Burner#22.



Outer bellow overall condition.



## Inspection Report



Condition of TBC coating at pilot flame nozzle.



Condition inside mixing tube.

### **Recommendation:**

- None.

Fuel Burner is in serviceable condition.

## **7.15 HG 2535 Flame detector**

### **Performed work:**

- Visual inspection.

### **Result:**

- No remark.



Flame detector on the left side overall condition.



Flame detector on the right-side overall condition.

### **Recommendation:**

- None

Flame detector is in serviceable condition.

## Inspection Report

### 7.16 HG 2530 Ignition system

**Performed work:**

- Visual inspection and borescope inspection.

**Result:**

- No remark.



Ignition plug external condition.

**Recommendation:**

- None.

Ignition system is in serviceable condition.

## Inspection Report

### 7.17 HG 2351 Fuel manifold

**Performed work:**

- Visual inspection.

**Result:**

- None.



Gas fuel supply manifold connection area.



Ignition control valves overall condition.



Example of gas fuel supply flexible hose overall condition.



**Recommendation:**

- Check for fuel pipes support bracket coming loose and touching pipes from operation during shutdown.

Fuel Manifold is in serviceable condition.



## Inspection Report

### 7.18 HG 2510 Central casing

**Performed work:**

- Visual inspection

**Result:**

- No remark.



Overall condition of central casing left side.



Overall condition of central casing top side.

**Recommendation:**

- None.

Central casing is in serviceable condition.

## Inspection Report

### 7.19 HG 2640 Turbine rotor

#### Performed work:

- Borescope inspection.

#### Result:

- Minor TBC loss on leading edge and blade tip of turbine blades stage 1.



Leading edge condition of turbine blades stage 1.



Example of turbine blade stage 1 tip condition.



Trailing edge cooling passages of turbine blades 1.



Example of blade 1 trailing edge base platform condition.

## Inspection Report



Leading edge condition of turbine blades stage 2.



Leading edge tip condition of turbine blades stage 2.



Trailing edge cooling of turbine blades stage 2.



Trailing edge base platform of turbine blades 2.



Trailing edge suction side overall condition.



Turbine blades 2 tip area overall condition.

## Inspection Report



Example of leading edge root of turbine blades 3.



Leading edge tip of turbine blades stage 3.



Blades 3 tip z-notch condition.



Turbine blades stage 3 trailing edge overall condition.

### **Recommendation:**

- None.

Turbine rotos is in serviceable condition.

## Inspection Report

### 7.20 HG 2650 Turbine stator stage no 1

#### Performed work:

- Borescope inspection.

#### Result:

- Minor TBC loss and Oxidation found on some of the outer vane plates.
- Oxidation condition notice on GV1 heat shields and rear hooks.

Seen from burner#1



Are around Guide vanes 1 entrance condition.



Guide vanes 1 leading edge cooling holes and inner/outer vane plates overall condition.



## Inspection Report



Heatshield 1 overall condition.



Rear hooks overall condition.

Seen from burner#7



Are around Guide vanes 1 entrance condition.



Guide vanes 1 leading edge cooling holes and inner/outer vane plates overall condition.





## Inspection Report



Example of Heatshield 1 condition.



Rear hooks overall condition.

Seen from burner#15



Are around Guide vanes 1 entrance condition.



Guide vanes 1 leading edge cooling holes and inner/outer vane plates overall condition.



## Inspection Report



Example of Heatshield 1 condition.



Rear hooks overall condition.

Seen from burner#22



Are around Guide vanes 1 entrance condition.



Guide vanes 1 leading edge cooling holes and inner/outer vane plates overall condition.



## Inspection Report



Example of Heatshield 1 condition.



Rear hooks overall condition.

Seen from borescope port B15



Heatshields overall condition.



Heatshields overall condition.



Rear hooks overall condition.



Rear hook overall condition.

### **Recommendation:**

- None.

Turbine stator stage no.1 is in serviceable condition.

## Inspection Report

### 7.21 HG 2651 Turbine stator stage no 2&3

#### Performed work:

- Borescope inspection.

#### Result:

- Mild oxidation condition notice on heatshield 2.



Guide vane 2 leading edge overall condition.



Example of Guide vane 2 leading edge inner platform side.



Guide vane 2 leading edge overall condition.



Guide vane 2 leading edge overall condition different views.

## Inspection Report



Guide vane 2 seen from borescope port B15.



Guide vane 2 side cooling holes overall condition.



Guide vane 2 rear hooks and heatshields condition.



Guide vane 2 rear hooks overall condition.



Guide vane 3 seen from borescope port B16.



Guide vane 3 heat shield overall condition.

### **Recommendation:**

- None.

Turbine stator stage no 2&3 is in serviceable condition.



## Inspection Report

### 7.22 HG 2665 Outlet casing

#### Performed work:

- Visual inspection.

#### Result:

- Soft skin of the outlet bellows flexible part found damages from contacts with bolts head on the top area.



Flexible part soft skin damaged notice.



Lube oil supply to bearing 2 flange overall condition.



Area between blades 3 and front struts condition.



Inner/outer heatshields and struts at bottom area.



## Inspection Report



Inner/outer heatshield and struts right condition.



Inner/outer heatshield and struts right bottom condition.

### **Recommendation:**

- Damaged on outlet casing soft part can be repaired or replaced during next major inspection.

Outlet casing is in serviceable condition.

## **7.23 HG 2660 Exhaust diffuser**

### **Performed work:**

- Visual inspection.

### **Result:**

- Cracks found on welded joint on front and rear support struts.



Exhaust diffuser seen from HRSG.



Central cone and their support struts overall condition.

## Inspection Report



Right bleed pipe flow exit.



Right bleed valve overall condition.



Left bleed pipe flow exit.



Left bleed valve overall condition.



Example of front support struts overall condition.



Example crack found at this area.

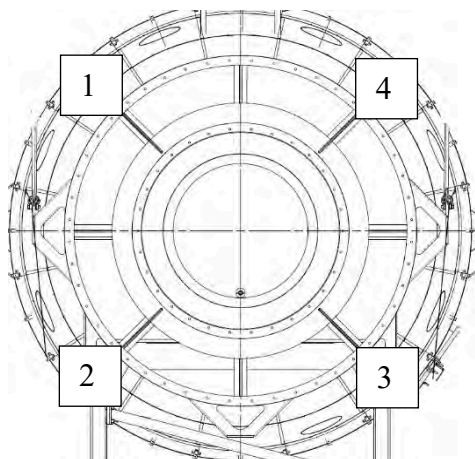
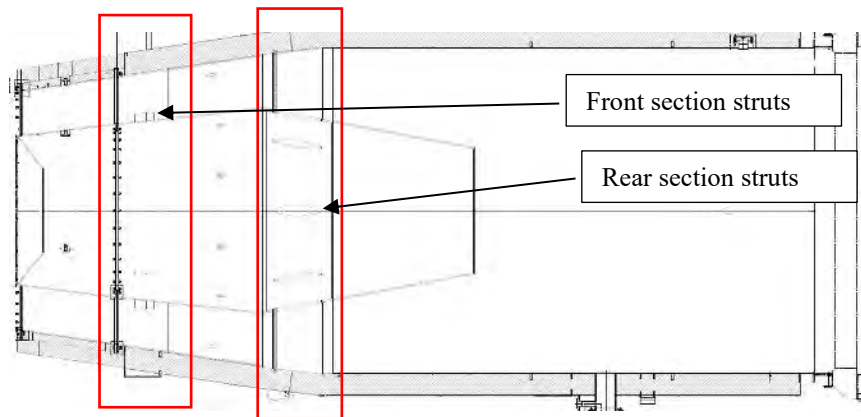
## Inspection Report



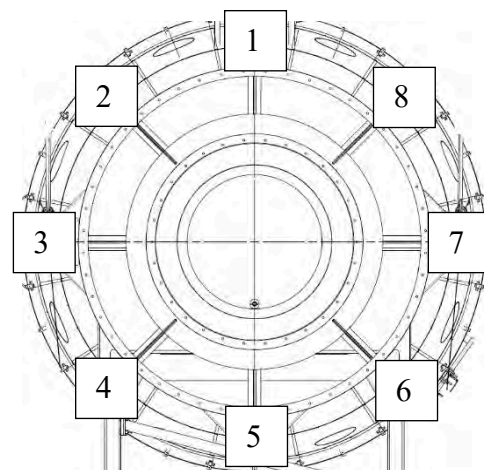
Example of rear support struts overall condition.



Example crack found at this area.



Front struts view from flow direction



Rear struts view from flow direction

## Inspection Report

<i>Position</i>	<i>Leading edge outer weld</i>	<i>Trailing edge outer weld</i>	<i>Leading edge inner weld</i>	<i>Trailing edge Inner weld</i>
<i>1</i>	<i>Crack</i>	<i>Crack</i>		<i>Crack</i>
<i>2</i>	<i>Crack</i>	<i>Crack</i>		<i>Crack</i>
<i>3</i>	<i>Crack</i>			
<i>4</i>	<i>Crack</i>			

*Table of front support struts with cracks in the weld.*

<i>Position</i>	<i>Leading edge outer weld</i>	<i>Trailing edge outer weld</i>	<i>Leading edge inner weld</i>	<i>Trailing edge Inner weld</i>
<i>1</i>			<i>Crack</i>	<i>Crack</i>
<i>2</i>			<i>Crack</i>	<i>Crack</i>
<i>3</i>			<i>Crack</i>	<i>Crack</i>
<i>4</i>			<i>Crack</i>	<i>Crack</i>
<i>5</i>			<i>Crack</i>	<i>Crack</i>
<i>6</i>			<i>Crack</i>	<i>Crack</i>
<i>7</i>			<i>Crack</i>	<i>Crack</i>
<i>8</i>			<i>Crack</i>	<i>Crack</i>

*Table of rear support struts with cracks in the weld.*

### **Recommendation:**

- Repair minor crack on exhaust diffuser front and rear support struts during next major inspection. Perform PT to check extend of cracks prior to repair.

Exhaust diffuser is in serviceable condition after broken bolts has been replaced.

## Inspection Report

### 7.24 HG 2132 Insulation

#### Performed work:

- Visual inspection

#### Result:

- Insulation around compressor casing, burners and guide collar area found deteriorates from operation.



Example of insulations condition around compressor. Example of insulations condition around bleed pipes.

#### Recommendation:

- Repair or replace deteriorating insulation around burner and compressor area during next major inspection.

Insulation is in serviceable condition.



## Inspection Report

### 7.25 HG 2920 Skid erection, GT

**Performed work:**

- Visual inspection.

**Result:**

- No remark.



Front support overall condition.



Front support overall condition.



Left central casing support pendulum.



Left foundation support of central casing.



## Inspection Report



Right central casing support pendulum.



Right foundation support of central casing.



Front view of central key support condition.



Rear view of central key support condition.

### **Recommendation:**

- None.

Skid erection, GT is in serviceable condition.

## Inspection Report

### 7.26 HG 2925 Erection, exhaust diffuser

**Performed work:**

- Visual inspection.

**Result:**

- No remark.



Left side exhaust diffuser support condition.



Left side support foundation condition.



Right side exhaust diffuser support condition.



Right side support foundation condition.

## Inspection Report



Central exhaust diffuser support.

### **Recommendation:**

- None.

Erection, Exhaust diffuser is in serviceable condition.

## Inspection Report

### 7.27 Other observations



Found crack on the ventilation duct near rear exit door. Repair crack during next major inspection.



Bracket locking jacking oil pipes to bearing 2 found broken.

## Inspection Report



Bracket locking jacking oil pipes to bearing 2 found broken.

## Inspection Report

# 8 Recommendations

### **HG 4150 Air intake**

- Replace pre-filter and fine filter elements as per operation schedule plan or keep monitoring filter DP for progressing trend.
- While replace filter recommend clean the intake louvers on Intake housing and ventilation housing.
- Clean inside ventilation filter housing floor.
- When replace filter elements ensure a proper sealing between filter elements and the housing.
- Remove surface corrosion found on silencer unit during next major inspection.

### **HG 4980 Speed reduction gear**

- Continue to monitor white mark area and varnish condition on cogs during next major inspection, performed oil sampling analysis every six months to keep track of lubrication oil condition.
- Check lube oil pressure and lube oil spray nozzles angle orientation during next major inspection.

### **HG 2405 Compressor Inlet casing**

- Repair crack on surface paint during next major inspection.
- Remove surface corrosion area found on silencer exit and flexible joint cover plate during next major inspection.
- Clean inside of inlet casing and keep monitor for dirt deposits on the next inspection.

### **HG 2410 Compressor inlet piece**

- Clean inlet piece.

### **HG 2442 Compressor blades**

- Perform compressor wash every 10,000 hours or as soon as schedule available after 10,000 hours of operation period.

### **HG 2351 Fuel manifold**

- Check for fuel pipes support bracket coming loose and touching pipes from operation during shutdown.

### **HG 2665 Outlet casing**

- Damaged on outlet casing soft part can be repair or replace soft part during next major inspection.



## Inspection Report

### **HG 2660 Exhaust diffuser**

- Repair minor crack on exhaust diffuser front and rear support struts during next major inspection. Perform PT to check extend of cracks prior to repair.

### **HG 2132 Insulation**

- Repair or replace deteriorating insulation around burner and compressor area during next major inspection.

### **Other observation**

- Found crack on the ventilation duct near rear exit door. Repair crack during next major inspection.
- Bracket locking jacking oil pipes to bearing 2 found broken.



MGT-2022-0435

Subject / Title:  
**BD000166U03 SSUT 2:1, MI-50 KEOH, 2022,  
Commissioning report**

<b>Thailand</b>	<b>2023-01-01</b>
Location	Date

Project:  
Customer Name: **SSUT Company Ltd**  
Orderer's File Ref: **E1B101145802**  
Order No Internal: **EA256377U04A112411**  
Report No Internal:

<b>Pattamadilok Nataphat</b>	
Author(s)	
<b>Johansson, Mats</b>	<b>Hansson, Martin</b>
Released technically	Released for external use

Classification:	<b>Restricted</b>	No of Appendices: <b>6</b>	Total Pages of Report: <b>96</b>
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Codeword	:	<b>Bangpoo 2:1 (BP2)</b>
Machine No	:	<b>BD000166U03</b>
Product Type	:	<b>SGT-800</b>
Type of Activity	:	
Mobilization Date	:	<b>2022-12-30</b>
Demobilization Date	:	<b>2023-01-01</b>
Client Contact Name	:	

Executive Summary:

Copies To:

Taptawat Paleerat  
Emelie Ljungblad

Gregeborg Erik

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ID: EIB101214042 Name: Commissioning report Rev: A Protection: Restricted IP: R00\_S00  
Creator: Reviewer: Approver:  
ALIN ECGNN ECL: US-ContNo CoO:TH

## 1. Summary

A inspection was performed according to the maintenance activity list E1B101145802 number of minor remarks were noted and rectified where possible, see details in report.

## 2. Personnel

Name	Type	Start Date	End Date	Qualification	Comment	Shift
Pattamadilok Nataphat	Siemens Energy Personnel	2022-12-30	2023-01-01	Commissioning Lead		
Rattanapunjak Thanom	Siemens Energy Personnel	2022-12-30	2023-01-01	Commissioning engineer		

## 3. Operating Statistics

### Package

Date of Counter Readings :	2022-12-31
Operating Hours :	47262
Equivalent Operating Hours :	49960
Starts :	396
Equivalent Operating Cycles :	536
Total Production of MWh :	1517414
Total Production of MV Ar+ :	252681
Total Production of MV Ar- :	1
Serial Number of Gearbox :	12720
Serial Number of Generator :	8269007

### Comment :

## 4. Commissioning Activities

### 4.1. Activities According to Maintenance Plan

#### 4.1.1 Preparation

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	//	Off-line washing of the compressor prior to the inspection	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Customer obligation.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		(customer obligation).				
2	//	Perform EHS-Round.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Customer obligation.
3	//	Check of spare parts and consumables.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
4	//	Check of required tools and instruments.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
5	//	Confirmation of required customer personnel.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
6	//	Site meeting with customer. Definition of work scope, permits, safety regulations etc.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.

#### 4.1.2 Before shutdown

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	//	Check the start sequence during start-up.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
2	//	Perform readings before shutdown, full load (T7L), 75%, 50% and 25% load. Operation on temperature limitation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		SE was not present at site for the time of the shutdown no irregularities reported from the event.
3	//	Shaft voltage measurement to assess the bearing insulation	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		(Siemens generators)				

#### 4.1.3 Shutdown

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	//	Trip the unit with an emergency stop button to check the trip function (From approximately 0,5MW-load).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
2	//	Secure the unit for safe work.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.

#### 4.1.4 Gas turbine maintenance

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Air intake system / MBL	Visual inspection in air intake housing, ductings, silencer and plenum. Check for obstructions, cleanliness, leakages and for foreign objects. Check flanges, inspection hatches, sealings and gaskets.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
2	/ Air intake system / MBL	Visual inspection of filters for	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		obstruction and contamination.				
3	2132 / Insulation /	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
4	2351 / Fuel manifold /	Visual external inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
5	2405 / Compressor air inlet casing /	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
6	2410 / Inlet Piece /	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
7	2442 / Compressor blades /	Borescope inspection of compressor blades stages 5, 11 and 14.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Compressor blades	Please see in inspection report.
8	2442 / Compressor blades /	Borescope inspection of compressor blades stage 4.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Compressor blades	Please see in inspection report.
9	2452 / Compressor vanes /	Borescope inspection of compressor vanes stages 5, 11 and 14.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Compressor vanes	Please see in inspection report.
10	2452 / Compressor vanes /	Borescope inspection of compressor vanes stage 4.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Compressor vanes	Please see in inspection report.
11	2530 / Ignition system /	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
12	2535 / Flame detector /	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
13	2540 / Burner /	Borescope inspection of 1 (RMI, #15) or 4 (MI, equal distr.) burners	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
14	2580 / Combustor / MBM	Borescope inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
15	2610 / Turbine casing /	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
16	2650 / Turbine stator, stage 1 /	Borescope inspection of guide vane 1.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
17	2650 / Turbine stator, stage 1 /	Borescope inspection of guide vane 1 outer vane plate.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
18	2650 / Turbine stator, stage 1 /	Borescope inspection of guide vane 1 inner vane plate.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
19	2650 / Turbine guide vanes /	Borescope inspection of guide vane 2.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Turbine stator 2 - GV2	Please see in inspection report.
20	2650 / Turbine stator, stage 1 /	Borescope inspection turbine heat shield 1.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
21	2640 / Turbine rotor (incl Blades) /	Borescope inspection of turbine blades stage 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
22	2640 / Turbine rotor (incl Blades) /	Borescope inspection of turbine blades stage 2.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
23	2665 / Outlet casing /	Internal visual inspection of outlet casing.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
24	2665 / Exhaust casing /	Visual inspection of outlet bellow.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Please see in inspection report.
25	2920, 2925 / Assembly material/Erection exhaust diffuser at site /	Visual inspection of the supports.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Support stands	Please see in inspection report.

#### 4.1.5 Stationary commissioning

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Gas turbine system / MBA	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
2	/ Gas turbine system / MBA	Pulsation measuring equipment. Cleaning and function check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA	Performed without remark.
3	/ Gas turbine system / MBA	Check function of VGV. Verify position at 20%, 50% and fully open.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA	Performed without remark.
4	/ Gas turbine system / MBA	Instrumentation. Check selected switches, transmitters, vibration- and speed probes, according to setting list	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
5	/ Gas turbine / MBA	Flame detector, function check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA10CQ005/010	Performed without remark.
6	/ Cooling/ Sealing/Purge air system / MBH	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
7	/ Cooling/ Sealing/Purge air system / MBH	Check function of valves.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH	Performed without remark.
8	/ Cooling/ Sealing/Purge air system / MBH	Bleed valves. Check opening and closing time, fully opened and closed position.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH	Performed without remark.
9	/ Cooling/ Sealing/Purge air system / MBH	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH10 MBH20	Performed without remark.
10	/ Starting/ Gear electric generator	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
	system / MBJ/ MBK					
11	/ Starting/ Gear electric generator system / MBJ/ MBK	Visual inspection of frequency converter cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
12	/ Starting/ Gear electric generator system / MBJ/ MBK	Check frequency converters fan function.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
13	/ Starting/ Gear electric generator system / MBJ/ MBK	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBJ MBK	Performed without remark.
14	/ Air intake system / MBL	Visual inspection for general condition, obstructions, cleanliness, flanges, inspection hatches, sealings, gaskets and for foreign objects.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
15	/ Air intake system / MBL	Visual inspection of filters for obstruction and contamination.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
16	/ Air intake system / MBL	Visual inspection (limited access).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBL	Performed without remark.
17	/ Air intake system / MBL	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
18	/ Air intake system / MBL	Option 732-0, pulse cleaned filters. Visual inspection of filters for obstruction and contamination.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
19	/ Air intake system / MBL	Option 574, Anti-icing: If performance decreased, clean if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
20	/ Air intake system / MBL	Option 574, Anti-icing: Check glycol density.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
21	/ Air intake system / MBL	Option 574, Anti-icing: Visual inspection for leakage, damage and corrosion.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A
22	/ Air intake system / MBL	Option 574, Anti-icing: Blow in doors - Check proper function and movement.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A
23	/ Gas fuel system / MBP	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
24	/ Gas fuel system / MBP	Central gas control valve. Function check and inspection for external leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remark.
25	/ Gas fuel system / MBP	Check the control valves positions at 0, 45 and 90 degrees and the zero-offset. Check of limit switches and ignition position. Inspection for external leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
26	/ Gas fuel system / MBP	Shut-off valves. Function check and inspection for external leakage. Check the pneumatic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		regulator settings. Check opening and closing time.				
27	/ Gas fuel system / MBP	Isolation valve. Function check and inspection for external leakage. Check opening and closing time.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remark.
28	/ Gas fuel system / MBP	Flow meter. Visual inspection during operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remark.
29	/ Gas fuel system / MBP	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed without remark.
30	/ Gas fuel system / MBP	Option 249, 250, 251 Coalescer and particle Filters. Visual inspection for rust, deposit and liquids, clean and replace cartridges if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBP	N/A
31	/ Gas fuel system / MBP	Option 252 Heater. Check for proper operation and setting.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	N/A
32	/ Gas fuel system / MBP	Option 254 Knock out pot. Safety relief valve. Visual inspection for external leakage.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBP	N/A
33	/ Lube Oil System / MBV	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
34	/ Lube Oil System / MBV	Visual inspection of frequency	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		converter cubicles.				
35	/ Lube Oil System / MBV	Check frequency converter fan and pump function.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
36	/ Lube Oil System / MBV	Oil filter. Replace disposable cartridges if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	N/A
37	/ Lube Oil System / MBV	Check for no water in the tank by external pump connected at interface MBV10/05.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.
38	/ Lube Oil System / MBV	Check oil tank level.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed with remark.Lubeoil level in normal condition but the level sensor seem to be malfunction the display broke and the level swing sometime
39	/ Lube Oil System / MBV	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBV	Performed without remark.
40	/ Lube Oil System / MBV	Option 194, 196. Air cooled oil cooler. Visual inspection of fan blades for cracks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	Performed without remark.
41	/ Lube Oil System / MBV	Option 194, 196. Air cooled oil cooler. Check for leaks. Clean if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	Performed without remark.
42	/ Lube Oil System / MBV	Option 197, 198. Water cooled oil cooler. Visual inspection for External leakage.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	N/A

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
43	/ Ventilation generator system / SAE	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
44	/ Ventilation generator system / SAE	Visual inspection of filters for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAE	Performed without remark.
45	/ Ventilation generator system / SAE	Louvers. General visual inspection for obstructions.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAE	Performed without remark.
46	/ Ventilation generator system / SAE	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAE	Performed without remark.
47	/ Ventilation generator system / SAE	Option 246 Shut-off dampers inlet and outlet. Visual inspection of damper and function check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAE	Performed without remark.
48	/ Ventilation gas turbine system / SAG	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
49	/ Ventilation gas turbine system / SAG	Visual inspection of filter for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAG	Performed without remark.
50	/ Ventilation gas turbine system / SAG	Visual inspection and function check of shut-off dampers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAG	Performed without remark.
51	/ Ventilation gas turbine system / SAG	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAG	Performed without remark.
52	/ Ventilation gas turbine system / SAG	Visual inspection of the low point extractions below the turbine.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
53	/ HVAC for LER / SAC	Visual inspection of filters for	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		obstruction and contamination.				
54	/ HVAC for LER / SAC	Ventilation fan. Check for abnormal noise and vibrations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.
55	/ Washing and cleaning system / SDB	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
56	/ Washing and cleaning system / SDB	Check correct delivery pressure and leakage of pump.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Performed without remark.
57	/ Washing and cleaning system / SDB	Inspect pump inlet strainer and outlet filter.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Performed without remark.
58	/ Washing and cleaning system / SDB	Check the nozzles for obstruction, clean if necessary with instrument air.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Performed without remark.
59	/ Washing and cleaning system / SDB	Check hoses for leakage and general condition.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.
60	/ Washing and cleaning system / SDB	Heaters - Check proper operation and setting.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Performed without remark.
61	/ Washing and cleaning system / SDB	Inspect the tanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Performed without remark.
62	/ Fire detection and extinguishing system CO2 / SGJ	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
63	/ Fire detection and extinguishing system CO2 / SGJ	Check all detectors for proper function.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.
64	/ Fire detection and	Visual inspection of the weighing	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
	extinguishing system CO2 / SGJ	mechanism for the CO2 bottles. Check if the bottles have to be refilled or changed.				
65	/ Gas detection system / SFY	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
66	/ Instrument air system / QFA	Check pressure and for external leaks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
67	/ Instrument air system / QFA	Check oil level in compressor and refill if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.
68	/ Instrument air system / QFA	Visual inspection and replace cartridges if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
69	4093 / Enclosure /	Visual inspection for damage and leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
70	/ Control system / CJP/ CRB	Visual inspection of cabinets.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
71	/ Control system / CJP/ CRB	Take backups of all the programs from the controllers where changes have been performed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CJP/CRB	Performed without remark.
72	/ Control system / CJP/ CRB	Verify time synchronization on data collector/ CMS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Valid for PCS7	Performed without remark.
73	/ Protection system / CAA	Check function of ESD: Low lubrication-oil pressure. Pump change over and trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
74	/ Protection system / CAA	Check function of ESD: Fire protection. Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remark.
75	/ Protection system / CAA	Check function of ESD: Emergency stop push button.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remark.
76	/ Protection system / CAA	Check function of ESD: Ventilation system Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remark.
77	/ Protection system / CAA	Check function of ESD: Gas Detection Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remark.
78	/ Protection system / CAA	Check function of ESD: Overspeed trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remark.
79	/ Protection system / CAA	Check function of ESD: Pulsation trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed without remark.
80	/ Synchronizing cubicle / CBP	Check setting levels of equipment.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
81	/ Generator Protection / CHA	Visual inspection of the cabinet.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CHA	Performed without remark.
82	/ Generator transformer / BAT	Visual inspection of transformer for oil leaks and cleanliness.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Performed without remark.
83	/ Generator transformer / BAT	Check the oil level.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Performed without remark.
84	/ Generator transformer / BAT	Check drying equipment.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	Performed without remark.
85	/ MV switchboards / BBA	Visual inspection of switchboards and switchgears.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
86	/ Main LV switchboards / BFA	Visual inspection of the switchboards and switchgear.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
87	/ Auxiliary transformer / BFT	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BFT	Performed without remark.
88	/ UMD/UPS system / BPA	Visual inspection of the cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BPA, UMD/UPS	Performed without remark.
89	/ Battery system, 440V / BTA	Visual inspection of battery system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
90	/ Battery charger, 440V / BTL	Visual inspection of charger cubicle.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remark.
91	/ Battery charger, 440V / BTL	Check the charger LL level.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remark.
92	/ Battery charger, 440V / BTL	Check normal charging current and voltage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed without remark.
93	/ Battery charger, 440V / BTL	Check fast charging sequence if applicable.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BTL	N/A

#### 4.1.6 Rotating commissioning

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Before start /	Before starting visual inspection of inlet channel from intake to inlet casing. Check cleanness for GG-room, generator room, air inlet room and plenum.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
2	/ Before start /	Before start check lubrication-oil pressures sub-pressure and tank level. Check	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		for abnormal noise, vibrations and leaks from pumps and mist fan. Check that all valves are in correct position.				
3	/ Before start /	Test of pump change over simulate cool init and verify feedback. Test of ESD function low lubrication-oil pressure.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
4	/ Before start /	Preparation of temporary measuring equipment. Measure the speed from barring speed to zero and from purge speed to zero.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark. Tbarring=8.27 m/ Tpurge=10.56 m
5	/ Before start /	Check and adjust ignition system if needed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
6	/ Before start /	Check that the drain valves for washing water are closed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed without remark.
7	/ Before start /	Check that all the transmitter blocks were calibration have been performed are open/closed correct for operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
8	/ Checks during start /	Check start-sequence during run-up. Note T7 max and observe vibration	<input checked="" type="checkbox"/>	<input type="checkbox"/>		T7=403C

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		levels during start-up, fuel valve, pressure and bearings temperature.				
9	/ Checks during start /	Check that there are no fuel-, lubrication-oil or hot air leakages.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
10	/ Checks during start /	Check function of selected hard wired trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
11	/ Checks during start /	Before synchronization check regulator response for AVR and FCR.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
12	/ Checks during start /	Take readings, pulsation measurement, verify valve opening/heating value when flow meter and heating value for the gas is available and do inspection rounds of the unit at stabilized condition at idle, 5 MW, 10MW, 15MW, 20MW, 25MW, 30MW, 35MW, 40MW and base load (peak load if applicable).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
13	/ Checks during start /	Take readings for performance validation if the unit has performance degradation guarantee.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
14	/ Checks during start /	At base load, check temperatures after bleed valves to ensure that bleed valves are closed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
15	/ Checks during start /	Visual inspection of flow meter (MBP05/20CF005) during operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.
16	/ Miscellaneous /	Note hours of turbine operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark.

#### 4.1.7 Main gear maintenance - G1

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	4980, 4995 / Main gear/ Alignment instruction /	Visual inspection of tooth mesh through inspection cover. Main gear.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBK10AZ005	Performed without remark.

#### 4.1.8 Generator maintenance ABB AMS 900-1250

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Electric generator system / MKA	Look through all logged or recorded data available; load, temperature, vibrations etc. Fill in the report.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
2	/ Electric generator system / MKA	External inspection regarding rust, leaks or other affection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remark.
3	/ Electric generator system / MKA	Checking of tightness of all fixing elements.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remark.
4	/ Electric generator system / MKA	Ensure ventilation ducts are clean and free from obstructions if connected to external air.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remark.
5	/ Electric generator system / MKA	Replace air filter, if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed without remark.
6	/ Electric generator system / MKA	Inspection of winding connections	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stator winding	Performed without remark.
7	/ Electric generator system / MKA	Inspection of winding and bracing rope	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stator winding	Performed without remark.
8	/ Electric generator system / MKA	Inspection for discoloration.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pressure fingers	Performed without remark.
9	/ Electric generator system / MKA	Visual inspection of sealing.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air cover	Performed without remark.
10	/ Electric generator system / MKA	Check if the RTDs give reasonable values on the visual display unit (VDU).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	RTD:s	Performed without remark.
11	/ Electric generator system / MKA	Check all line- and neutral connections.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remark.
12	/ Electric generator system / MKA	Check of general condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
13	/ Electric generator system / MKA	Inspection of pressure relief hatch.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remark.
14	/ Electric generator system / MKA	Visual inspection of insulators.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed without remark.
15	/ Electric generator system / MKA	Visual inspection of turn insulation, discoloration etc from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rotor coils	Performed without remark.
16	/ Electric generator system / MKA	Visual inspection of pole shoes regarding discoloration from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pole shoes	Performed without remark.
17	/ Electric generator system / MKA	Inspection for leaks. External and from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remark.
18	/ Electric generator system / MKA	Inspect all bolted joints.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remark.
19	/ Electric generator system / MKA	Inspection of guide support.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed without remark.
20	/ Electric generator system / MKA	Visual inspection for leaks, external and from inspection hatches. If leaks, check for wear and damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shaft seals	Performed without remark.
21	/ Electric generator system / MKA	Visual external inspection for leaks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oil piping	Performed without remark.
22	/ Electric generator system / MKA	Verify function of all measuring instruments.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Measuring instrument	Performed without remark.
23	/ Electric generator system / MKA	If necessary replace filter for air intake	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air filter	Performed without remark.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		to the air-lock seals located on bearing pedestals.				
24	/ Electric generator system / MKA	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exciter rotor	Performed without remark.
25	/ Electric generator system / MKA	Visual inspection from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exciter Stator	Performed without remark.
26	/ Electric generator system / MKA	Visual inspection. Replace if shorter than 15 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brush and brush holder	Performed without remark.
27	/ Electric generator system / MKA	Check of rotor ground fault protection. Not valid if removed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brush and brush holder	Performed without remark.
28	/ Electric generator system / MKA	Visual inspection of slipring.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Slip ring	Performed without remark.
29	/ Electric generator system / MKA	Visual external inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remark.
30	/ Electric generator system / MKA	Check of cleanliness, corrosion and/ or erosion damages on air- or water side.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remark.
31	/ Electric generator system / MKA	Clean air and water sides.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remark.
32	/ Electric generator system / MKA	Pressure check.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cooler	Performed without remark.
33	/ Electric generator system / MKA	Function check of casing water leakage detector.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed without remark.



## 4.2. Activities Outside Maintenance Plan

### 4.2.1 Additional activities

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
2	/ Control system General / CJP CRB	SuP19/2020/ SGT-800 Revised LFP/ NFP Pulsations levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark
3	/ Control system General / CJP CRB	SuP01/2021/ SGT-800 Removal of high temperature alarm on stator ring 2 & 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed without remark
4	/ Control system General / CJP CRB	SuP25/2015/ SGT-800 Reduction Vibration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Check if previously implemented	It was performed before this inspection
6	/ Control system General / CJP CRB	Consider shut down and restart the unit when the low frequency pulsation frequently peak above H1 warning level.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	As Recommended in ROC report	Performed without remark
7	/ Gas fuel system General / MBP	Contact Siemens Energy Helpdesk for assistance of central/pilot gas flow tuning and guidance in the implementation of MO-3647/ SUP19/2020/ SGT-800 Revised LFP/ NFP Pulsation Levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As Recommended in ROC Report	Not found this issue
8	/ Gas turbine / MBA	Check cable connections and measuring loop of the Stator Ring 1-2 and Stator Ring 2-3 Temperature	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As Recommended in ROC report	Performed without remark

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		reading. Contact Siemens Energy Helpdesk for further support if the fault is identified not being in the measuring loop.				
10	/ Air filter /	Consider replacing the ventilation air inlet filters at available opportunity. It is also recommended to check the transmitter for any leakage or water ingress in the instrument lines. Ensure that the transmitter is calibrated and showing the correct reading.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	As Recommended in the ROC report	N/A
11	/ Gas detection system / SFY	Calibrate all gas detectors every 6-12 months or during the planned inspection.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	As Recommended in ROC report	Performed without remark

## 5. Appendices

- 5.1 Appendix C Speed and Vibration Protocol(2av3)
- 5.2 Appendix D Pressure Transmitter Protocol(2av3u)
- 5.3 Appendix E Regulated Valves and VGV Protocol
- 5.4 Appendix F Activities outside maintenance plan.doc
- 5.5 Appendix H Pulsation Protocol
- 5.6 Appendix I Readings

**1**

**5.1 Appendix C Speed and Vibration Protocol(2av3)**

ID: E1B1C1214042 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH

## Speed and Vibration Test Protocol

### Speed and Vibration

Scale factor: 2 rpm / Hz

Frequency (Hz)	MBA10CS005 Speed rotor VDU (rpm)	MBA10CS010 Speed rotor VDU (rpm)
750	1500	1500
1500	3000	3000
2250	4500	4500
3000	6000	6000
3300	6600	6600
3650	7300	7300

Scale factor: 2 rpm / Hz

Frequency (Hz)	MBA10CS015 Overspeed rotor VDU (rpm)	MBA10CS020 Overspeed rotor VDU (rpm)	MBA10CS030 Overspeed rotor VDU (rpm)
750	1500	1500	1500
1500	3000	3000	3000
2250	4500	4500	4500
3000	6000	6000	6000
3300	6600	6600	6600
3650	7300	7300	7300
Overspeed step 1	6930		
Overspeed Trip	7260		

## Speed and Vibration Test Protocol

Scale factor: 10.19 mV / mm/s

mV	MBA10CY005 Bearing 1 VDU (mm/s)	MBA10CY025 Bearing 1 VDU (mm/s)	MBA10CY030 Bearing 1 VDU (mm/s)
51	5.0	5.0	5.0
102	10.0	10.0	10.0
153	15.0	15.0	15.0
204	20.0	20.0	20.0
255	25.0	25.0	25.0

Scale factor: 5.71 mV / mm/s

mV	MBA10CY010 Bearing 2 VDU (mm/s)	MBA10CY015 Bearing 2 VDU (mm/s)	MBA10CY020 Bearing 2 VDU (mm/s)
29	5.0	5.0	5.0
57	10.0	10.0	10.0
86	15.0	15.0	15.0
114	20.0	20.0	20.0
142	25.0	25.0	25.0

Scale factor: 3.94 mV / mm/s

mV	MKA10CY005 Generator bearing DE VDU (mm/s)	MKA10CY035 Generator bearing DE VDU (mm/s)	MKA10CY040 Generator bearing DE VDU (mm/s)
20	5.0	5.0	5.0
40	10.0	10.0	10.0
59	15.0	15.0	15.0
79	20.0	20.0	20.0
99	25.0	25.0	25.0

## Speed and Vibration Test Protocol

Scale factor: 3.94 mV / mm/s

mV	MKA10CY010 Generator bearing NDE VDU (mm/s)	MKA10CY045 Generator bearing NDE VDU (mm/s)	MKA10CY050 Generator bearing NDE VDU (mm/s)
20	5.0	5.0	5.0
40	10.0	10.0	10.0
59	15.0	15.0	15.0
79	20.0	20.0	20.0
99	25.0	25.0	25.0

Scale factor: 10.19 mV / mm/s

mV	MBK10CY005 Gearbox casing turbine side VDU (mm/s)	MBK10CY006 Gearbox casing turbine side VDU (mm/s)	MBK10CY007 Gearbox casing turbine side VDU (mm/s)
51	5.0	5.0	5.0
102	10.0	10.0	10.0
153	15.0	15.0	15.0
204	20.0	20.0	20.0
255	25.0	25.0	25.0

Scale factor: 10.19 mV / mm/s

mV	MBK10CY030 Gearbox casing wheel side VDU (mm/s)
51	5.0
102	10.0
153	15.0
204	20.0
255	25.0



## Speed and Vibration Test Protocol

### COMPLETION

Test Executer	Date	Signature	Company
	30 Dec 22	Nataphat Pattamadilok	SIEMENS Energy Thailand

IDE:1B101214042 Name:Commissioning report Rev:A Protection:Restricted IP:R00,S00  
 Creator: Reviewer: Approver:  
 AL:N ECCNN ECL: US:ContNo CoO:TH

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**5.2 Appendix D Pressure Transmitter Protocol(2av3u)**

ID: E1B101214042 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH

## Pressure Transmitter Test Protocol

### Pressure Transmitter

#### **MBA Gas turbine system**

MBA10CP005 Compressor Inlet Diff Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [30]   | kPa         |

	0%		50%		100%	Unit
Setting	0		15		30	kPa
Input pressure	0.0		15.0		30.0	kPa
VDU	0.0		15.0		30.0	kPa

MBA10CP010 Compressor Inlet Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [80] – [120] | kPa (a)     |

	0%		50%		100%	Unit
Setting	80		100		120	kPa(a)
Input pressure	80		100		120	kPa(a)
VDU	80.0		100.0		120.0	kPa(a)

MBA10CP015 Pressure Compressor Outlet

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2.5]  | MPa         |

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0.0		1.25		2.50	MPa
VDU	0.0		1.25		2.50	MPa

## Commissioning

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## Pressure Transmitter Test Protocol

MBA10CP016 Pressure Compressor Outlet

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0.0		1.25		2.50	MPa
VDU	0.0		1.25		2.50	MPa

MBA10CP017 Pressure Compressor Outlet

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0.0		1.25		2.50	MPa
VDU	0.0		1.25		2.50	MPa

MBA10CP030 Pressure Combustion Chamber

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0.0		1.25		2.50	MPa
VDU	0.0		1.25		2.50	MPa

## Pressure Transmitter Test Protocol

MBA10CP035 Disc 1 Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0.0		1.25		2.50	MPa
VDU	0.0		1.25		2.50	MPa

MBA10CP040 Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [12]                      kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0.0		6.0		12.0	kPa
VDU	0.0		6.0		12.0	kPa

MBA10CP041 Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [12]                      kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0.0		6.0		12.0	kPa
VDU	0.0		6.0		12.0	kPa

## Pressure Transmitter Test Protocol

MBA10CP042 Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting
Range
Unit  
[0] – [12]
kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0.0		6.0		12.0	kPa
VDU	0.0		6.0		12.0	kPa

MBA10CP045 Turbine Exhaust Pressure

Function check according to setting list

- Nominal setting
Range
Unit  
[80] – [120]
kPa (a)

	0%		50%		100%	Unit
Setting	80		100		120	kPa(a)
Input pressure	80		100		120	kPa(a)
VDU	80.0		100.0		120.0	kPa(a)

MBA10CP065 Air Intake Diff Pressure

Function check according to setting list

- Nominal setting
Range
Unit  
[-3] – [3]
kPa

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3.0		0.0		3.0	kPa
VDU	-3.0		0.0		3.0	kPa



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## Pressure Transmitter Test Protocol

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MBA10CP070      Air Intake Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [-3] – [3]                      kPa

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3.0		0.0		3.0	kPa
VDU	-3.0		0.0		3.0	kPa

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MBA10CP075      Air Intake Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [-3] – [3]                      kPa

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3.0		0.0		3.0	kPa
VDU	-3.0		0.0		3.0	kPa

---

## Pressure Transmitter Test Protocol

### MBH Cooling/Sealing/Purge air system

MBH10CP020 DP Stage 2 Cooling

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [1000] | kPa         |

	0%		50%		100%	Unit
Setting	0		500		1000	kPa
Input pressure	0.0		500.0		1000.0	kPa
VDU	0.0		500.0		1995.4	kPa

MBH10CP025 DP External Stator Cooling

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [250]  | kPa         |

	0%		50%		100%	Unit
Setting	0		125		250	kPa
Input pressure	0.0		125.0		250.0	kPa
VDU	0.0		121.8		248.5	kPa

MBH10CP030 DP Stage 3 Cooling

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [400]  | kPa         |

	0%		50%		100%	Unit
--	----	--	-----	--	------	------

## Pressure Transmitter Test Protocol

Setting	0		200		400	kPa
Input pressure	0.0		200.0		400.0	kPa
VDU	0.0		196.5		396.5	kPa

**MBL Air intake system**

MBL10CP005 Diff Pressure Pre-filter

Function check according to setting list

- | <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|------------------------|--------------|-------------|
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa

MBL10CP010 Diff Pressure High Efficiency Filter

Function check according to setting list

- | <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|------------------------|--------------|-------------|
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa

MBL30CP030 Diff Pressure Air intake Channel

Function check according to setting list

- | <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|------------------------|--------------|-------------|
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
--	----	--	-----	--	------	------

# Pressure Transmitter Test Protocol

Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa

MBL30CP035 Diff Pressure Air intake Channel

Function check according to setting list

- | <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|------------------------|--------------|-------------|
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa

MBL30CP040      Diff Pressure Air intake Channel

Function check according to setting list

- | <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|------------------------|--------------|-------------|
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa

## Pressure Transmitter Test Protocol

**MBP Gas fuel system**

MBP10CP005 Gas Fuel Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [4]    | MPa         |

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0.0		2.0		4.0	MPa
VDU	0.0		2.0		4.0	MPa

MBP10CP010 Gas Fuel Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [4]    | MPa         |

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0.0		2.0		4.0	MPa
VDU	0.0		2.0		4.0	MPa

MBP10CP011 Gas Fuel Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|------------------------|--------------|-------------|

## Commissioning

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## Pressure Transmitter Test Protocol

[0] – [4] MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0.0		2.0		4.0	MPa
VDU	0.0		2.0		4.0	MPa

MBP10CP012 Gas Fuel Pressure

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [4]      MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0.0		2.0		4.0	MPa
VDU	0.0		2.0		4.0	MPa

MBP10CP025 Gas Fuel Pressure after Main Valve

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [4]      MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0.0		2.0		4.0	MPa
VDU	0.0		2.0		4.0	MPa

MBP20CP025 Gas Fuel Pressure after Pilot Valve

Function check according to setting list

- Nominal setting      Range      Unit  
[0] – [4]      MPa



## Commissioning

BD000166U03

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Pressure Transmitter Test Protocol

---

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0.0		2.0		4.0	MPa
VDU	0.0		2.0		4.0	MPa

MBP30CP025 Central Gas Fuel Pressure

Function check according to setting list

- Nominal setting
Range
Unit  
[0] – [4]
MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0.0		2.0		4.0	MPa
VDU	0.0		2.0		4.0	MPa

MBP60CP005 Ignition Gas Pressure

Function check according to setting list

- Nominal setting
Range
Unit  
[0] – [4]
MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0.0		2.0		4.0	MPa
VDU	0.0		2.0		4.0	MPa

## Pressure Transmitter Test Protocol

**MBV Lube oil system**

MBV10CP015 Lube Oil Tank Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [-5]   | kPa         |

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0.0		-2.5		-5.0	kPa
VDU	0.0		-2.5		-5.0	kPa

MBV10CP020 Lube Oil Tank Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [-5]   | kPa         |

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0.0		-2.5		-5.0	kPa
VDU	0.0		-2.5		-5.0	kPa

MBV10CP025 Lube Oil Tank Pressure

Function check according to setting list

## Commissioning

BD000166U03

## Pressure Transmitter Test Protocol

- Nominal setting                      Range                      Unit  
[0] – [-5]                      kPa

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0.0		-2.50		-5.0	kPa
VDU	0.0		-2.50		-5.0	kPa

MBV40CP010              Lube Oil Filter DP

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [150]                      kPa

	0%		50%		100%	Unit
Setting	0		75		150	kPa
Input pressure	0.0		75.0		150.0	kPa
VDU	0.0		75.0		150.0	kPa

MBV40CP015              Lube Oil Supply Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [300]                      kPa

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0.0		150.0		300.0	kPa
VDU	0.0		150.0		300.0	kPa

MBV40CP025              Lube Oil Supply Pressure

Function check according to setting list

## Pressure Transmitter Test Protocol

- Nominal setting

Range	Unit
[0] – [300]	kPa

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0.0		150.0		300.0	kPa
VDU	0.0		150.0		300.0	kPa

MBV40CP055      Lube Oil Supply Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [300]	kPa

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0.0		150.0		300.0	kPa
VDU	0.0		150.0		300.0	kPa

## Pressure Transmitter Test Protocol

### SAG Ventilation system gas turbine room

SAG10CP005 GT-Room/Ambient Diff Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa

SAG10CP010 GT Room Vent Fan Diff Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa

## Pressure Transmitter Test Protocol

SAG10CP015 GT Room Vent Fan Diff Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [2]	kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa

SAG10CP020 GT Room Vent Fan Diff Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [2]	kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0.0		1.0		2.0	kPa
VDU	0.0		1.0		2.0	kPa



## Pressure Transmitter Test Protocol

**MBA Gas Turbine System**

MBA10CP050	Anti-Surgé Protection
MBA10CP055	Anti-Surge Protection
MBA10CP060	Anti-Surge Protection

Function check according to setting list

	Setting value	Old value	New Value	Unit
MBA10CP050	5	5	-	mbar
MBA10CP055	5	5	-	mbar
MBA10CP060	5	5	-	mbar

**MBV Lube oil System**  
**Pressure switches**

MBV21CP005	Lube Oil Pressure After Pumps 1
MBV22CP005	Lube Oil Pressure After Pumps 2
MBV23CP005	Lube Oil Pressure After Pumps 3

Function check according to setting list

- Nominal setting                      Range                      Unit  
[50] L1                                      kPa

	Setting value	Old value	New value	Unit
MBV21CP005	50	49	-	kPa
MBV22CP005	50	52	-	kPa
MBV23CP005	50	52	-	kPa

## Pressure Transmitter Test Protocol

### COMPLETION

Test Executer	Date	Signature	Company
	31/12/2022	Thanom R	Siemens-Energy
	31/12/2022	Nataphat P	Siemens-Energy

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 AL: N ECC: N ECL: US: Cont: No CoO: TH

**3**

**5.3 Appendix E Regulated Valves and VGV Protocol**

## Regulated Valves and VGV Test Protocol

**Regulated Valves****Main Gas Valve**

SP	VDU (%)	Valve (%)
0	0.0	0
25	25.0	25
50	50.0	50
75	75.0	75
100	100.0	100
Start position (XP31)	VDU (%)	Valve (%)
0 -> 1 Falling	4.0	4
1 -> 0 Raising	6.0	6
Zero offset	Old (rev/min)	New (rev/min)
	N/A	N/A

**Pilot Gas Valve**

SP	VDU (%)	Valve (%)
0	0.1	0.0
25	25.0	25
50	50.0	50
75	75.0	75
100	100.0	100
Start position (XP31)	VDU (%)	Valve (%)
0 -> 1 Falling	26.0	26
1 -> 0 Raising	29.0	29
Zero offset	Old (rev/min)	New (rev/min)
	N/A	N/A

## Regulated Valves and VGV Test Protocol

### Central Gas Valve

SP	VDU (%)	Valve (%)
0	0.1	0
25	25.3	25
50	50.2	50
75	75.2	75
100	99.5	100

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## Regulated Valves and VGV Test Protocol

## Bleed Valve 1

SP	Valve (%)	VDU (%)
0	0	0.0
25	25	24.7
50	50	49.8
75	75	74.9
100	100	100.1
Closed position (XP01)		VDU (%)
0 -> 1 Falling	7.1	
1 -> 0 Raising	8.9	
Closed position (XP02)		VDU (%)
0 -> 1 Falling	6.2	
1 -> 0 Raising	8.0	

	Time
Closing	29.01 s
Opening	10.32 s

## Bleed Valve 2

SP	Valve (%)	VDU (%)
0	0	1.1
25	25	24.5
50	50	49.6
75	75	74.7
100	100	99.9
Closed position (XP01)		VDU (%)
0 -> 1 Falling	5.4	
1 -> 0 Raising	6.6	
Closed position (XP02)		VDU (%)
0 -> 1 Falling	8.4	
1 -> 0 Raising	9.4	

	Time
Closing	33.7 s
Opening	9.9 s



## Regulated Valves and VGV Test Protocol

**VGV**

SP (%)	VDU (%)	Angle before adjust-ment (°)	Angle after adjust-ment (°)	Piston length before adjustment (mm)	Piston length after adjustment (mm)
20	20	-40	-	240	-
50	50	-20	-	151	-
57.41	57.41	-15	-	130	-
75	75	-3	-	78	-
78.8	78.8	0	-	67	-
80.6	80.6	1	-	63	-
82.0	82.0	2	-	57	-
Zero offset			Old (rev/min)		New (rev/min)
			-		-

**COMPLETION**

Test Executer	Date	Signature	Company
	31 Dec 22	Nataphat Pattamadilok	SIEMENS Energy Thailand
	31 Dec 22	Thanom R.	SIEMENS Energy Thailand

**4**

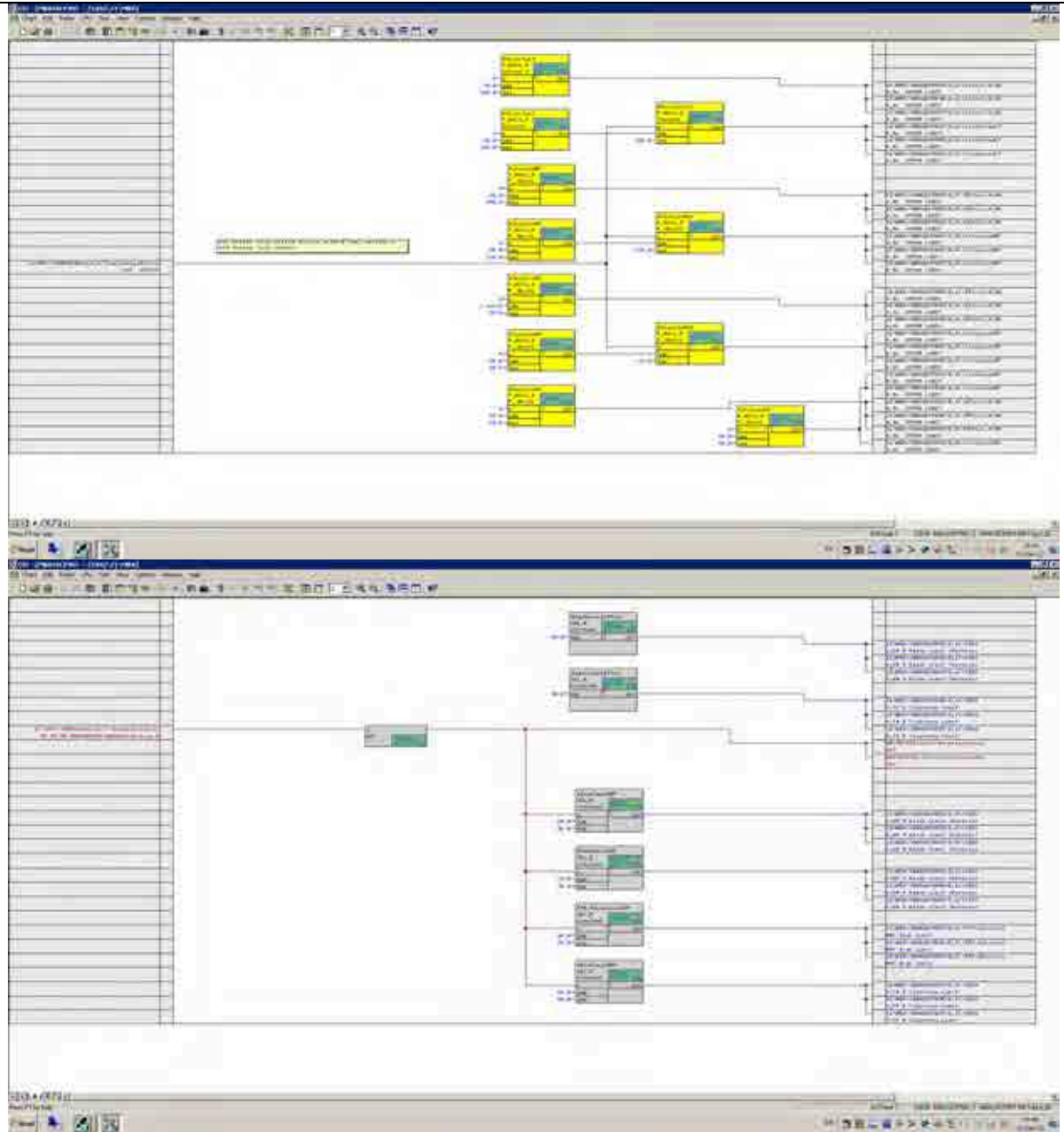
**5.4 Appendix F Activities outside maintenance plan.doc**

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ALN ECGNN ECL: US-ContNo CoO:TH

## Activities outside maintenance plan

<b>Project:</b>	SSUT GT21
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<b>9.2</b>	SuP19/2020/SGT-800 Revised LFP/NFP Pulsations levels
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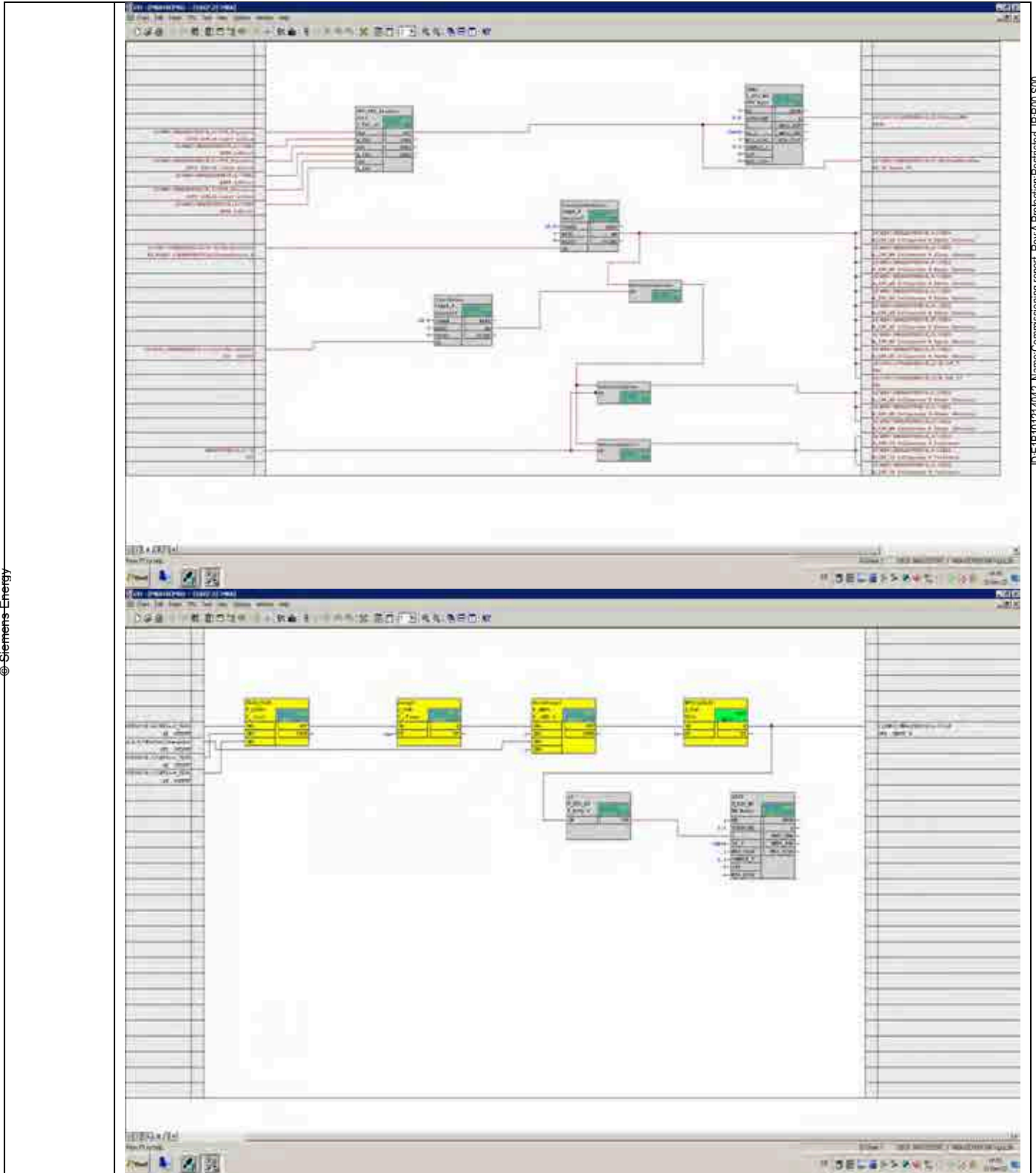


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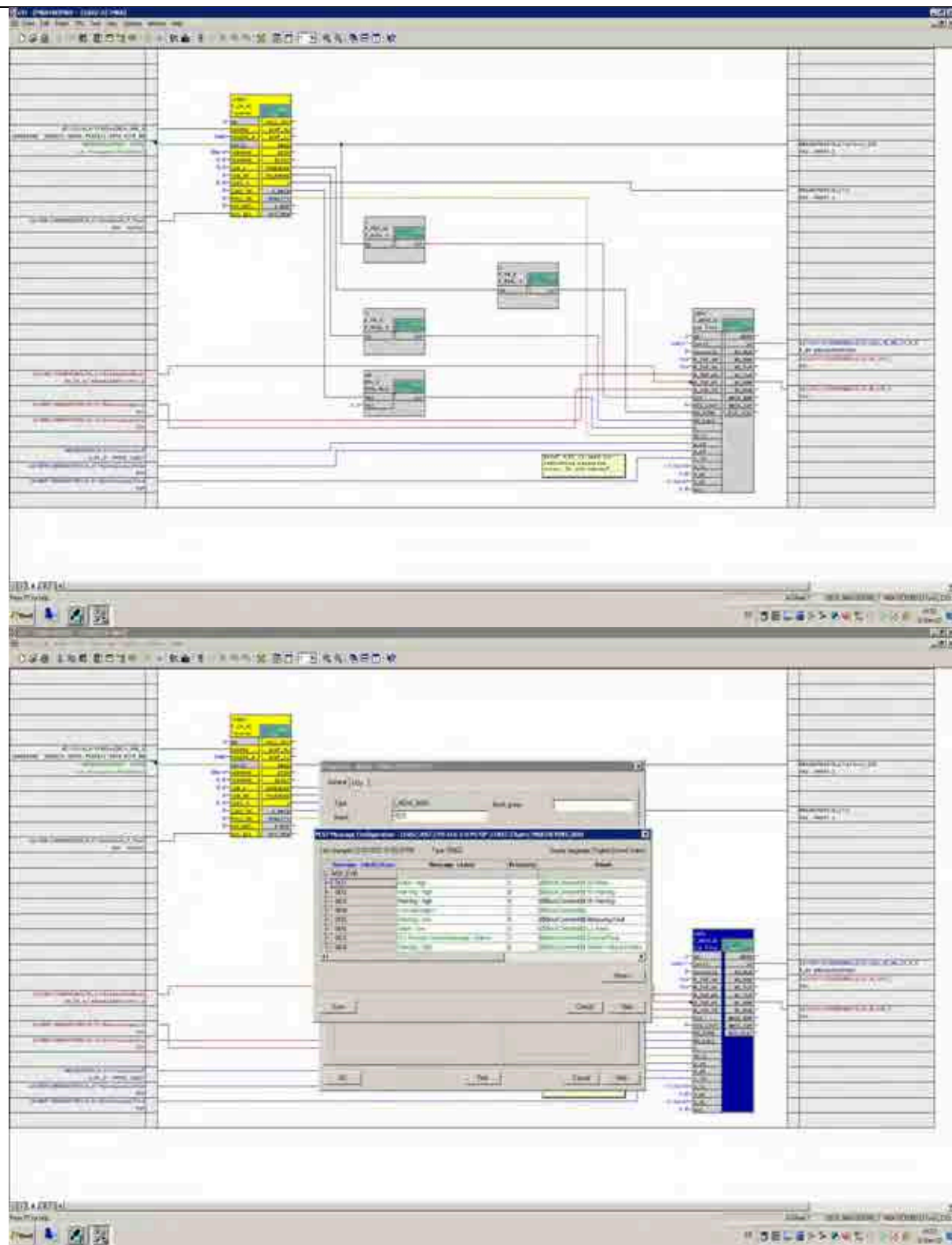
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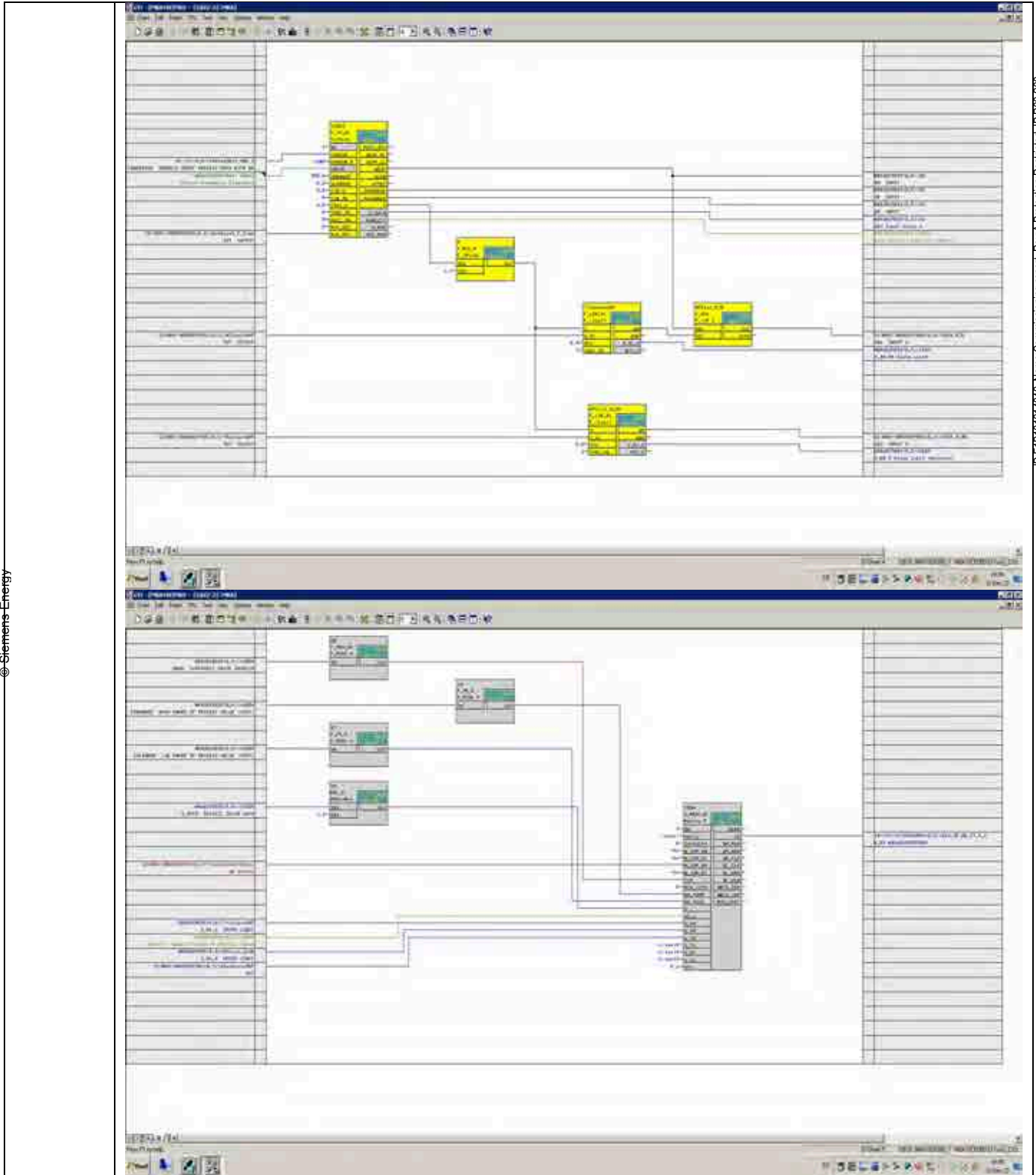


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## Activities outside maintenance plan

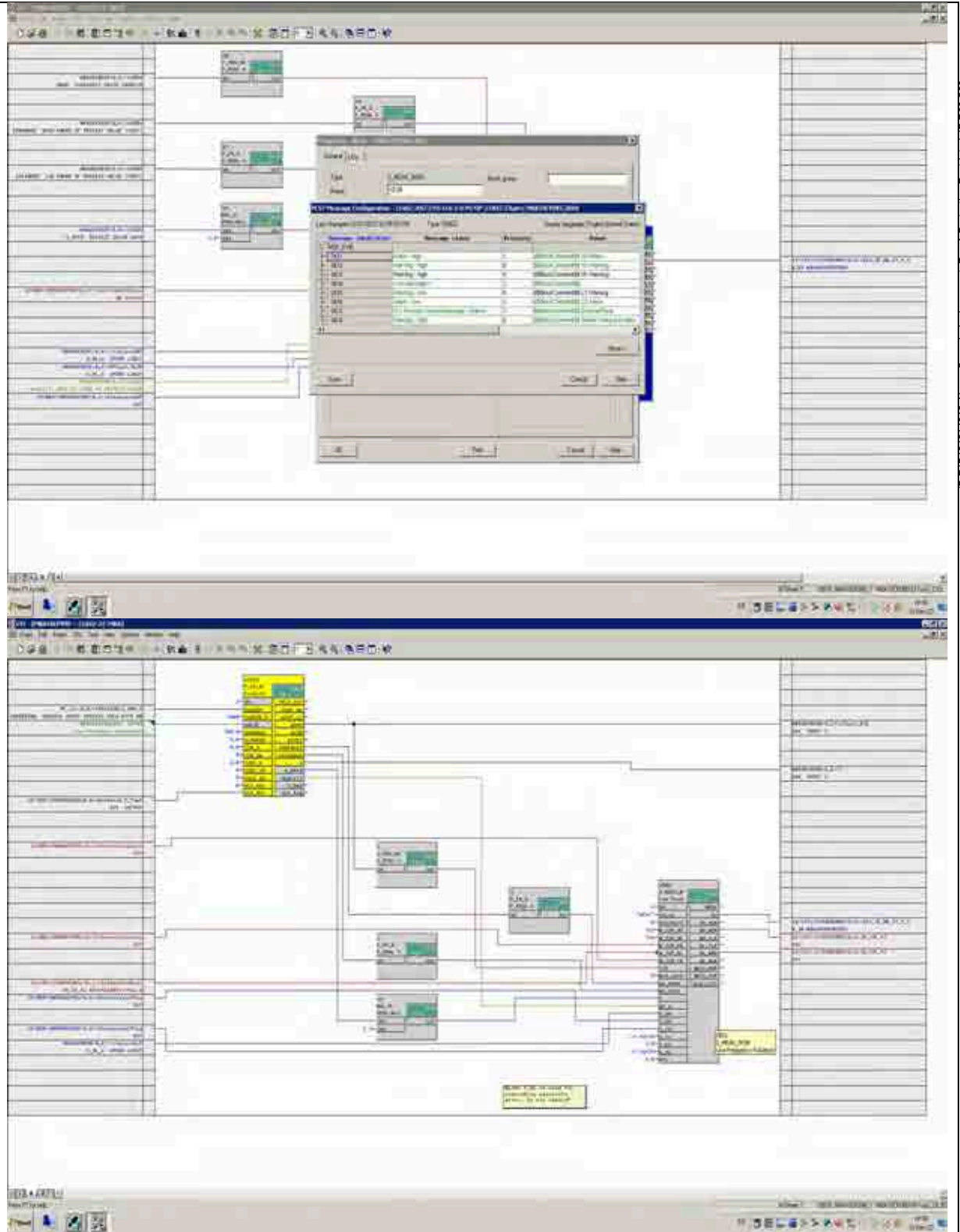


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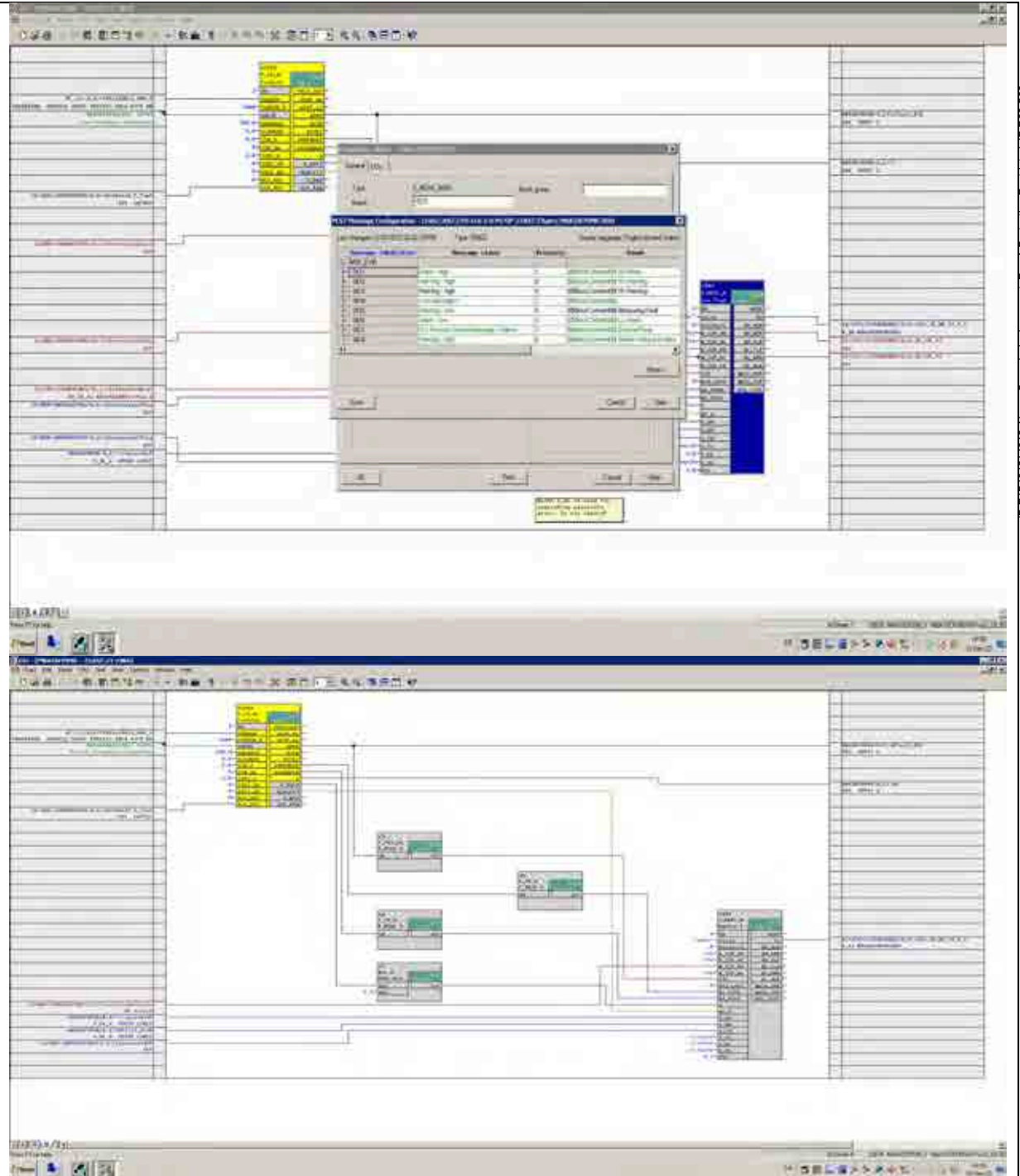
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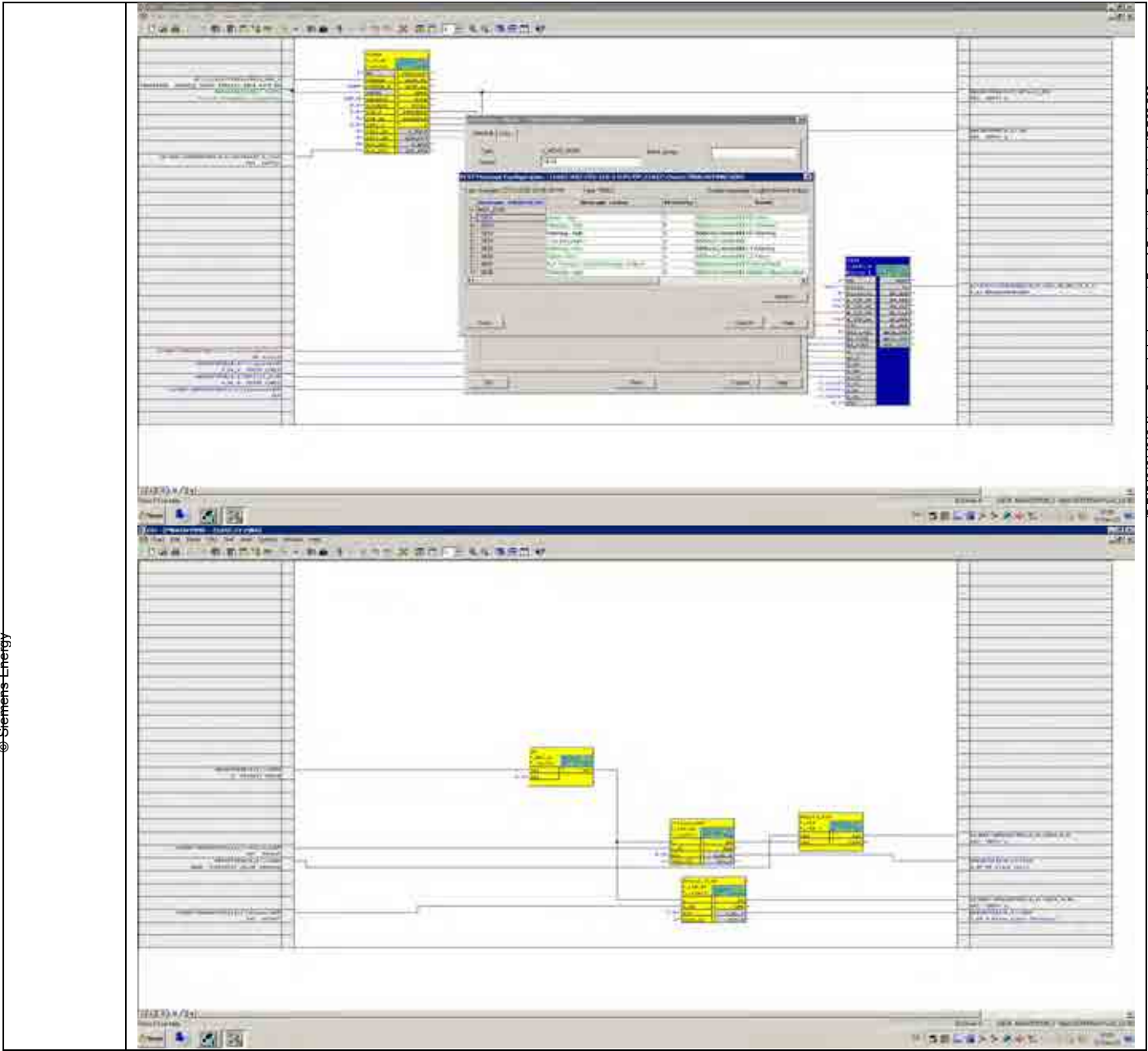


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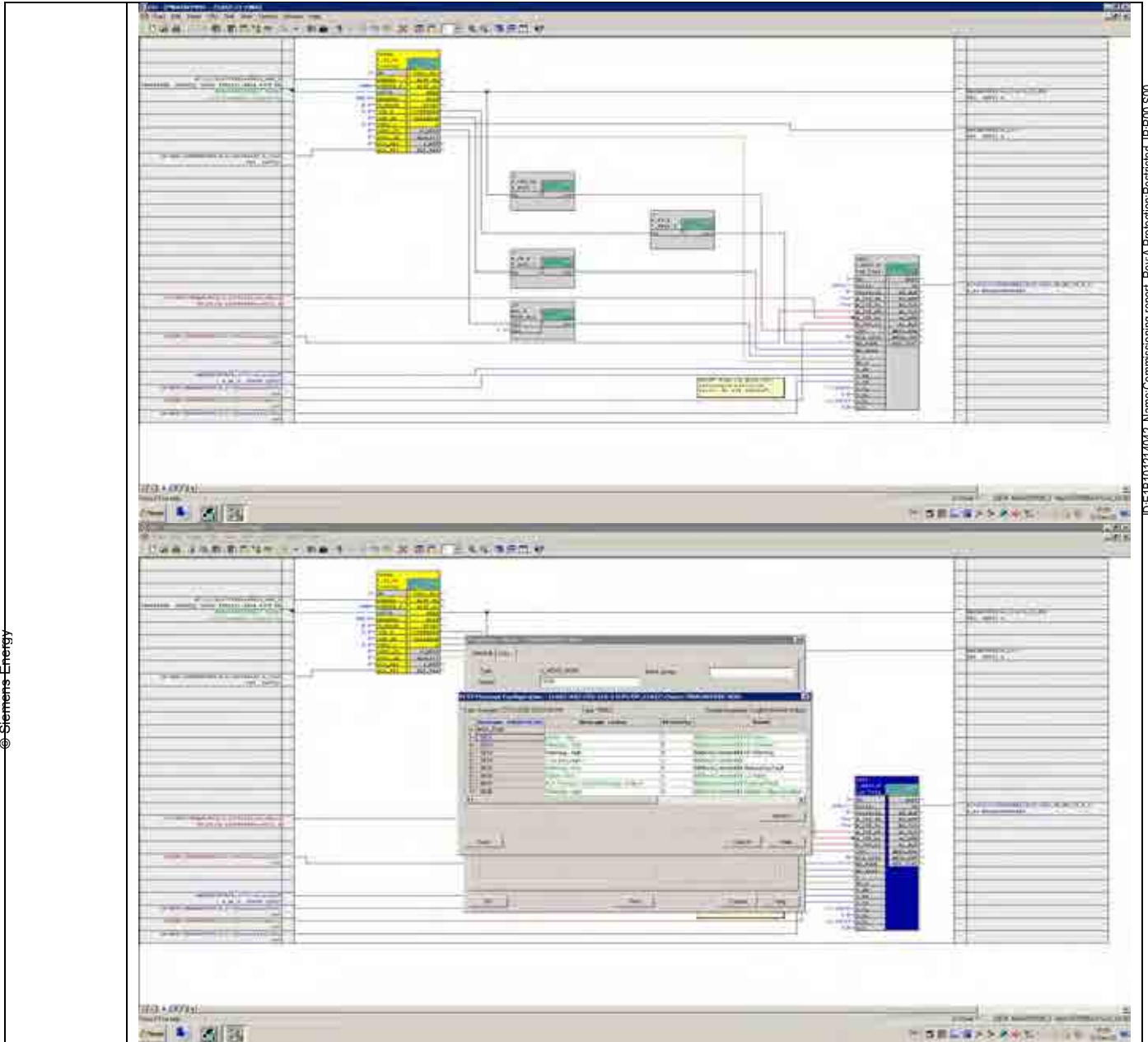
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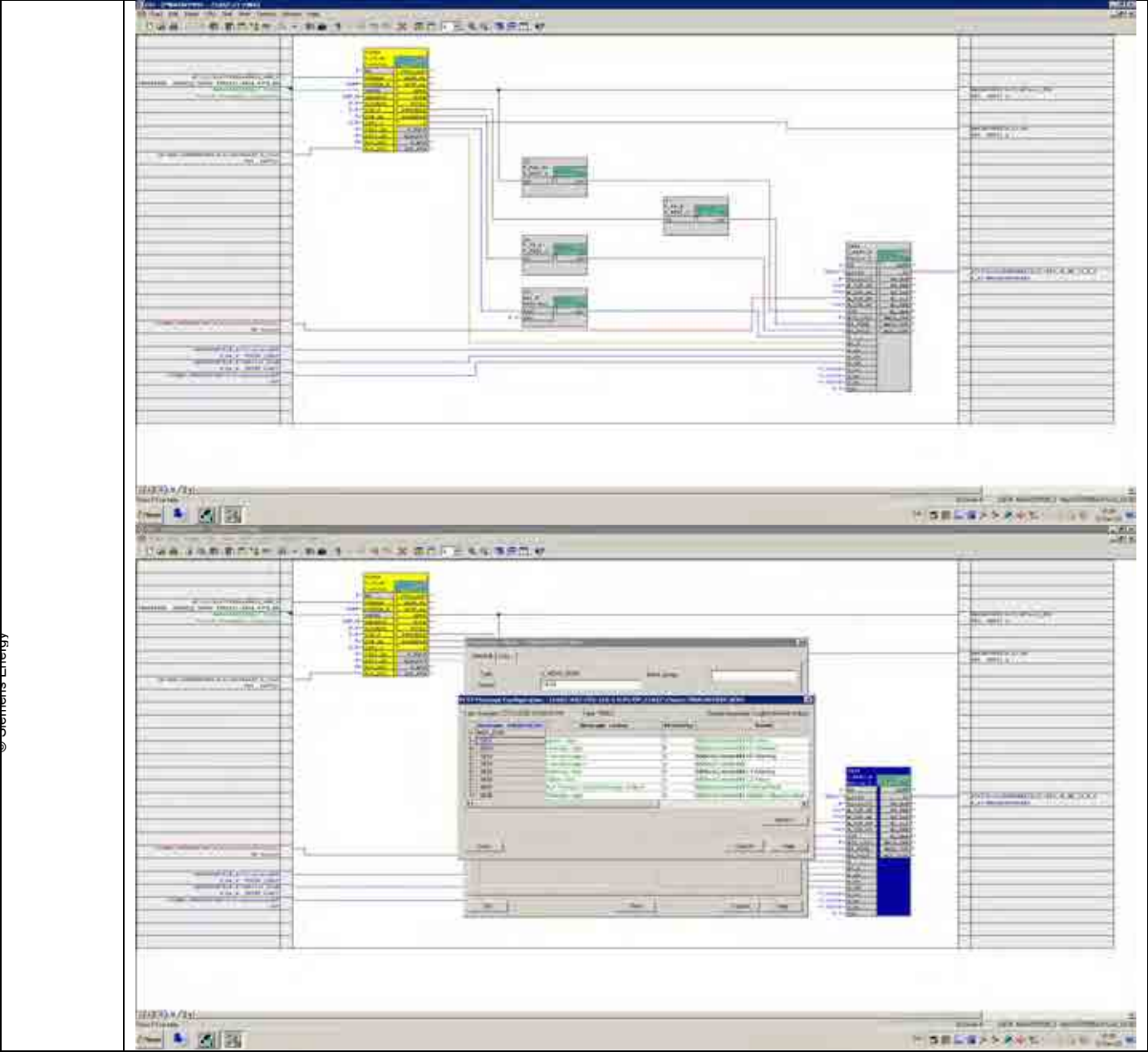
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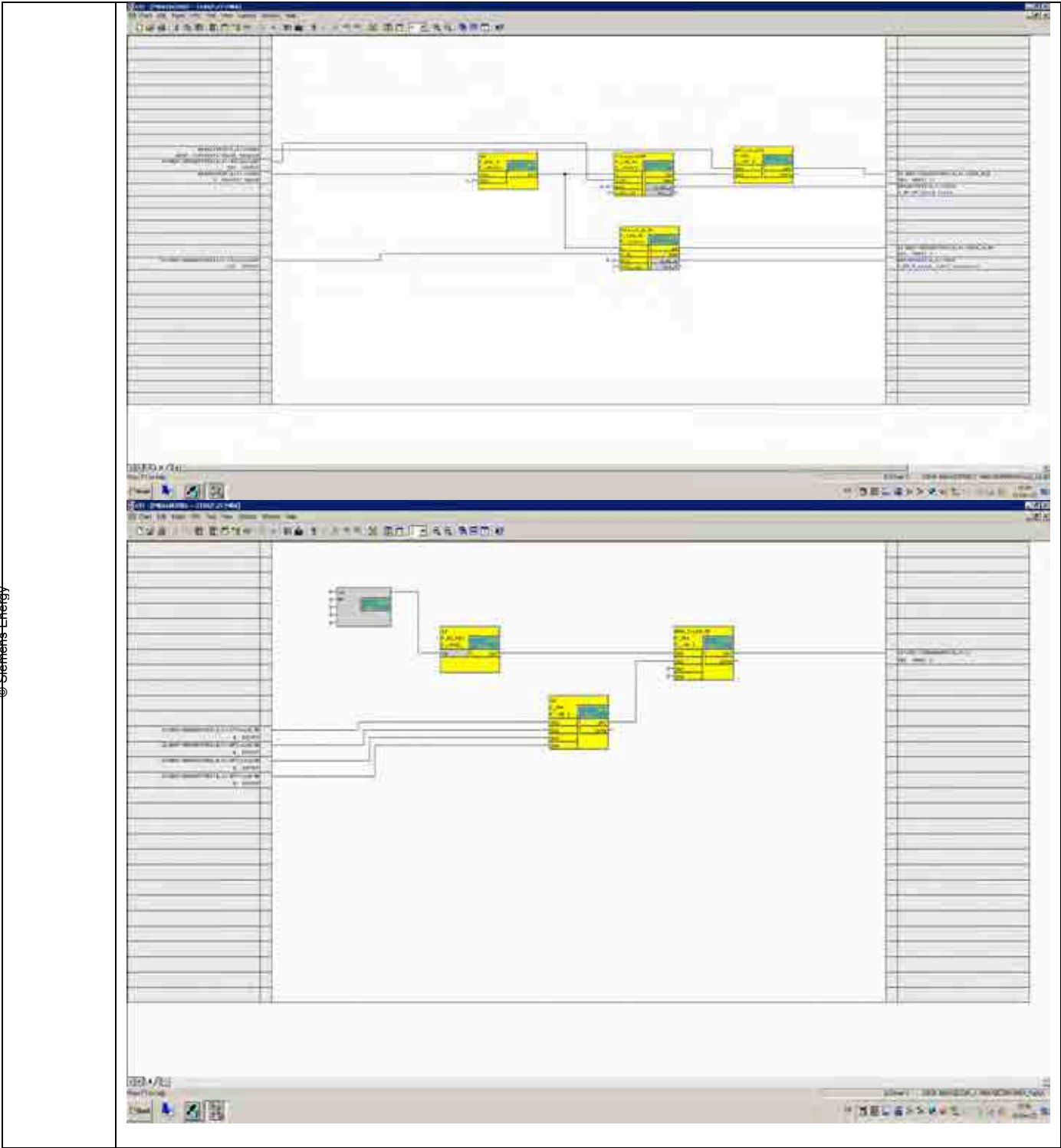
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## Activities outside maintenance plan

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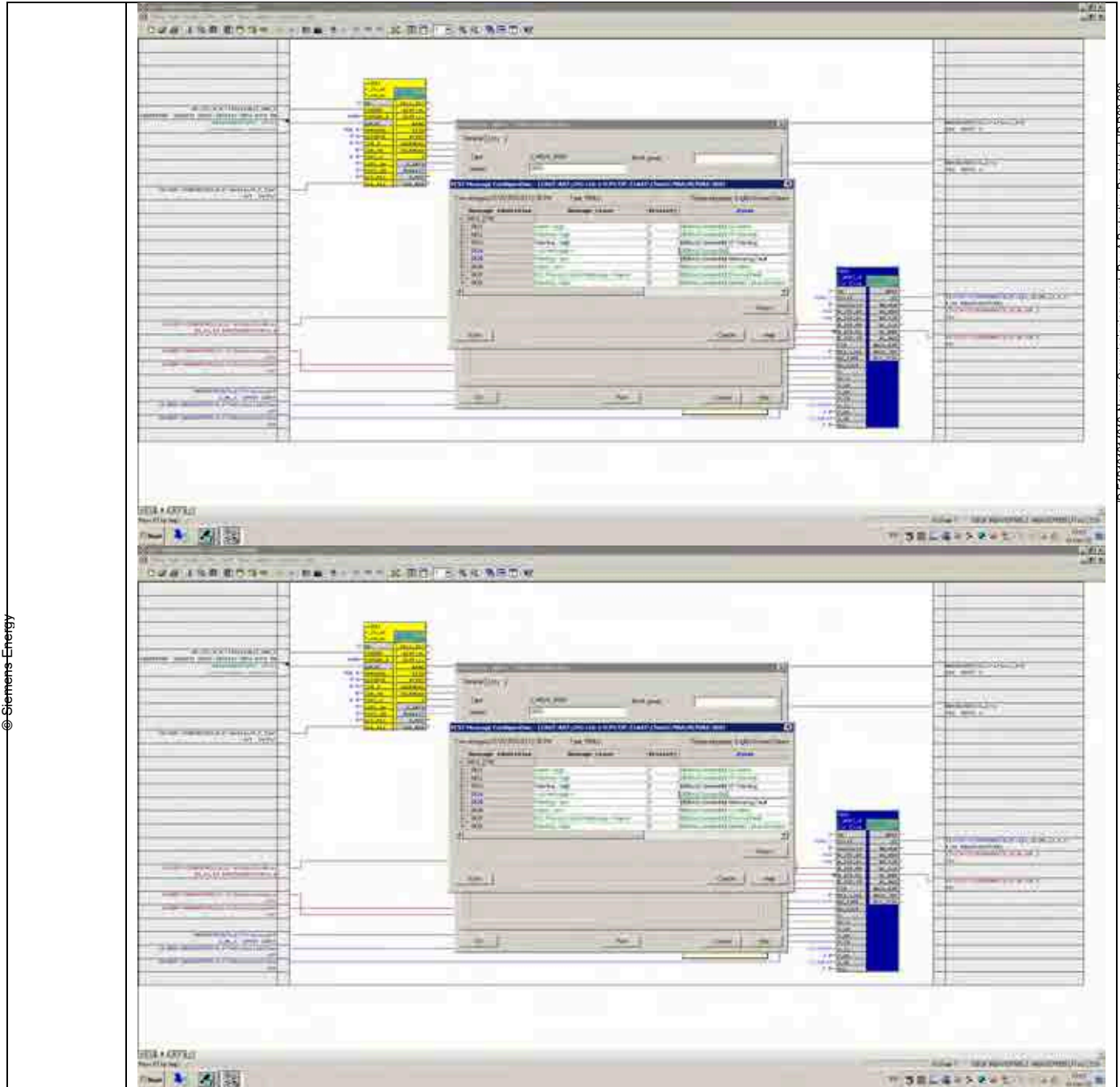
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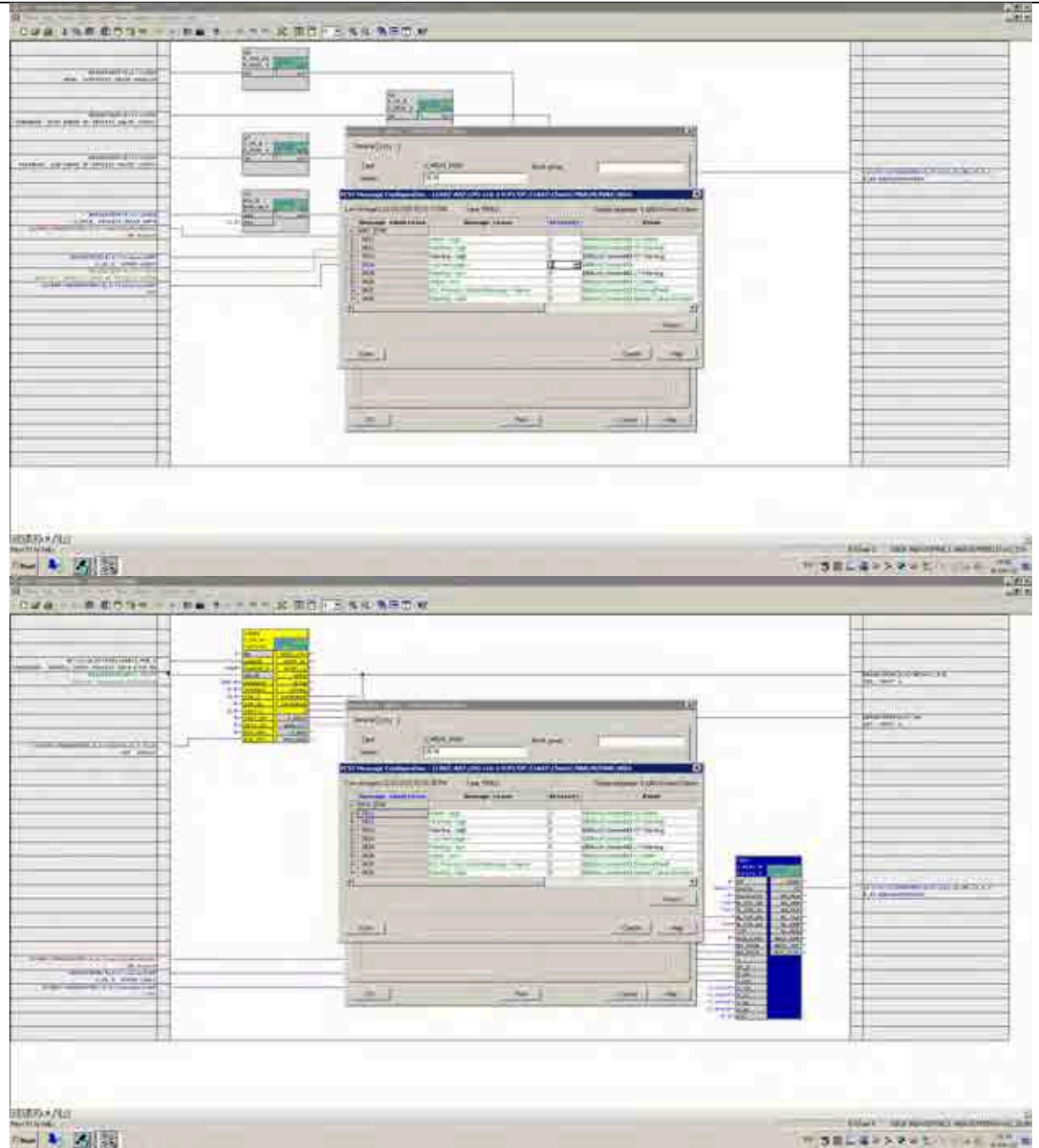
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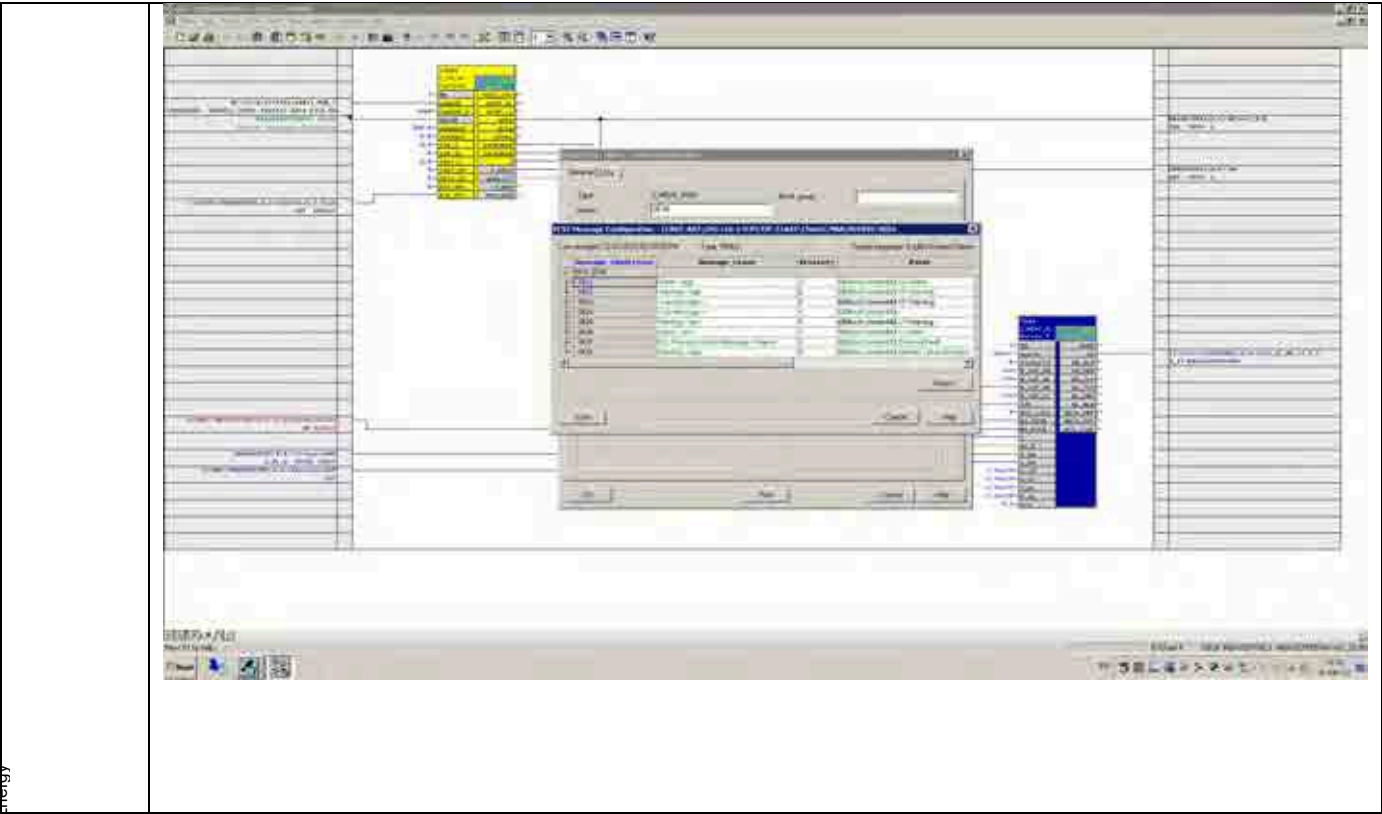
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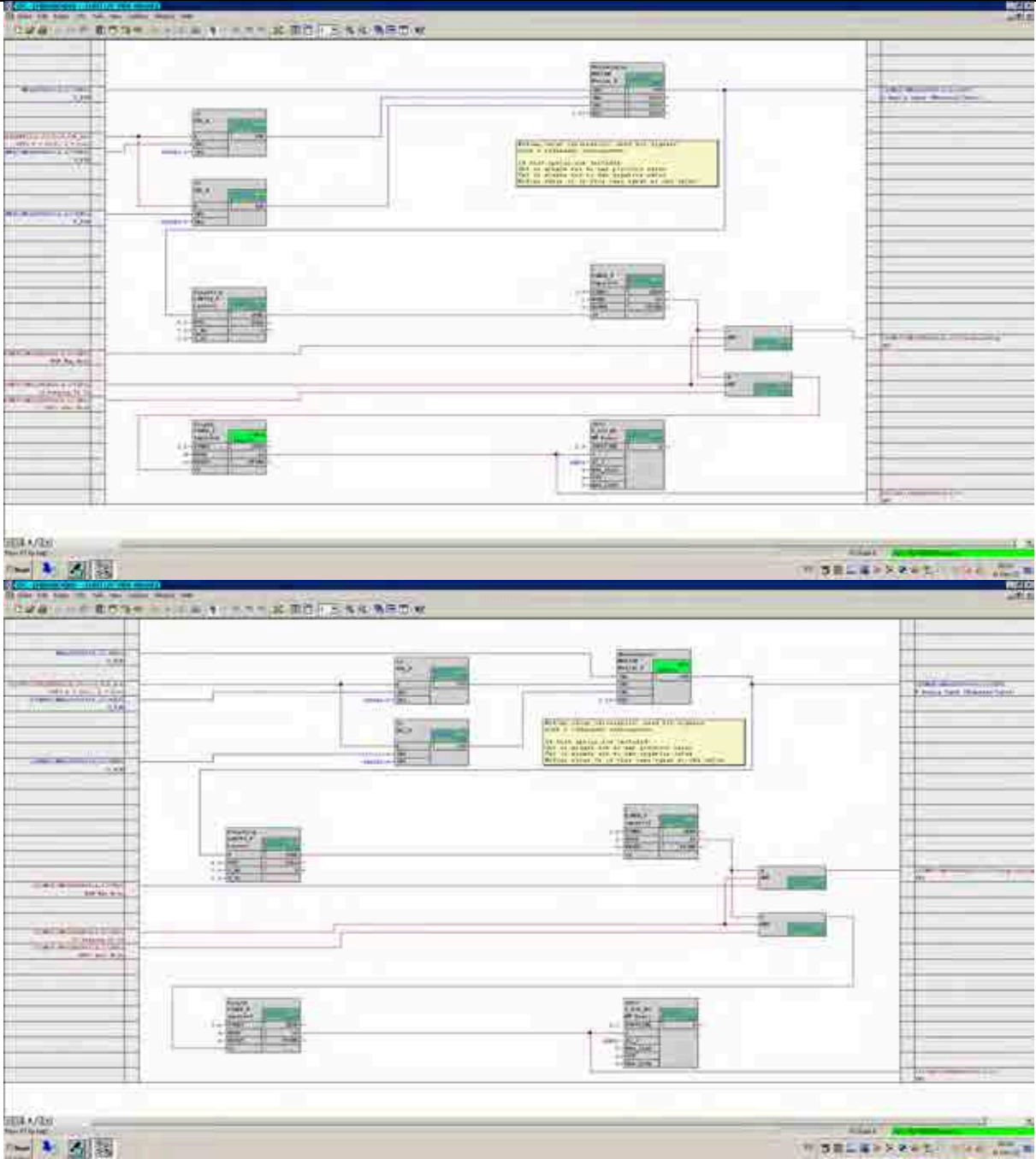
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9.4 SuP25/2015/SGT-800 Reduction Vibration

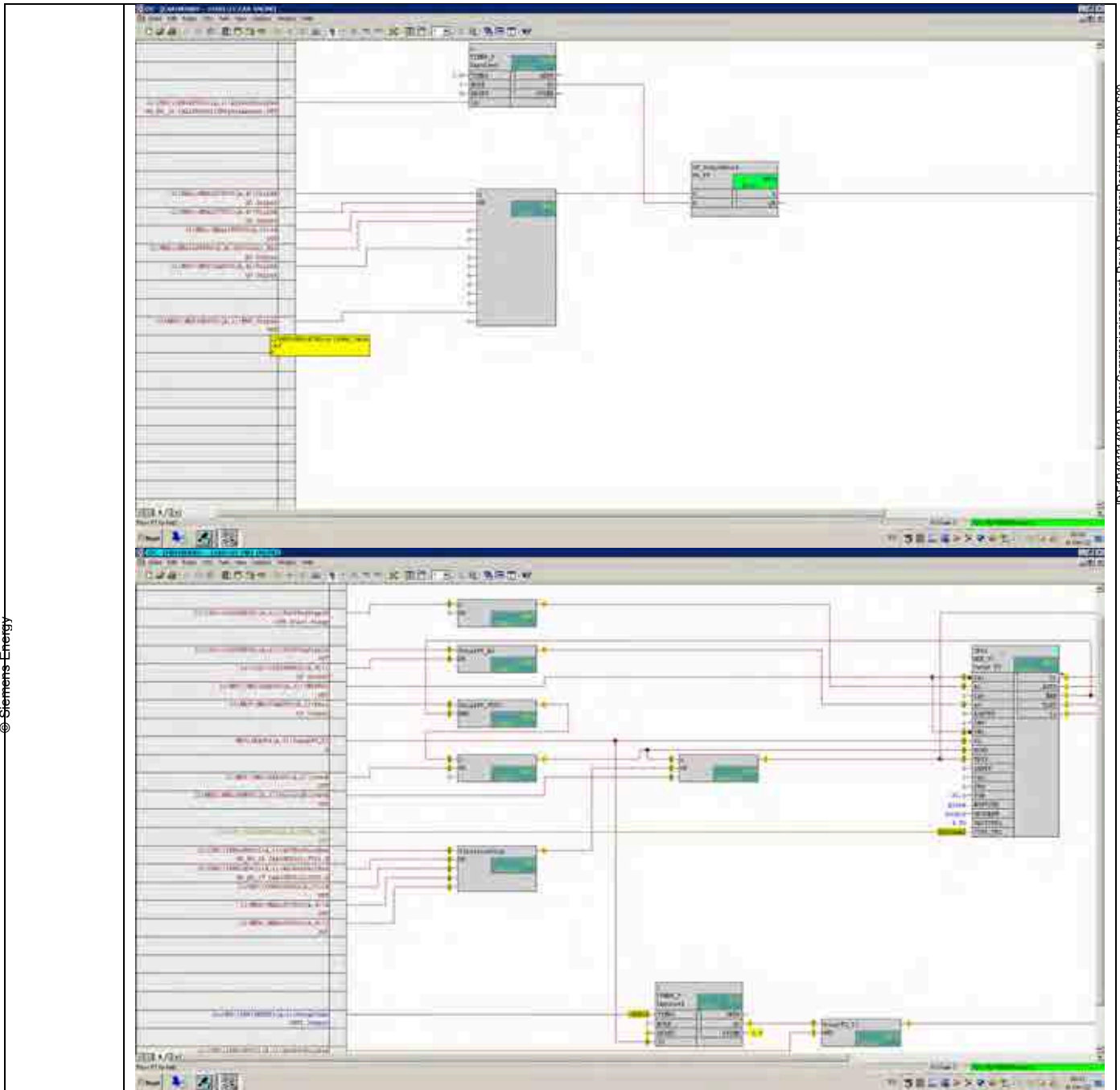


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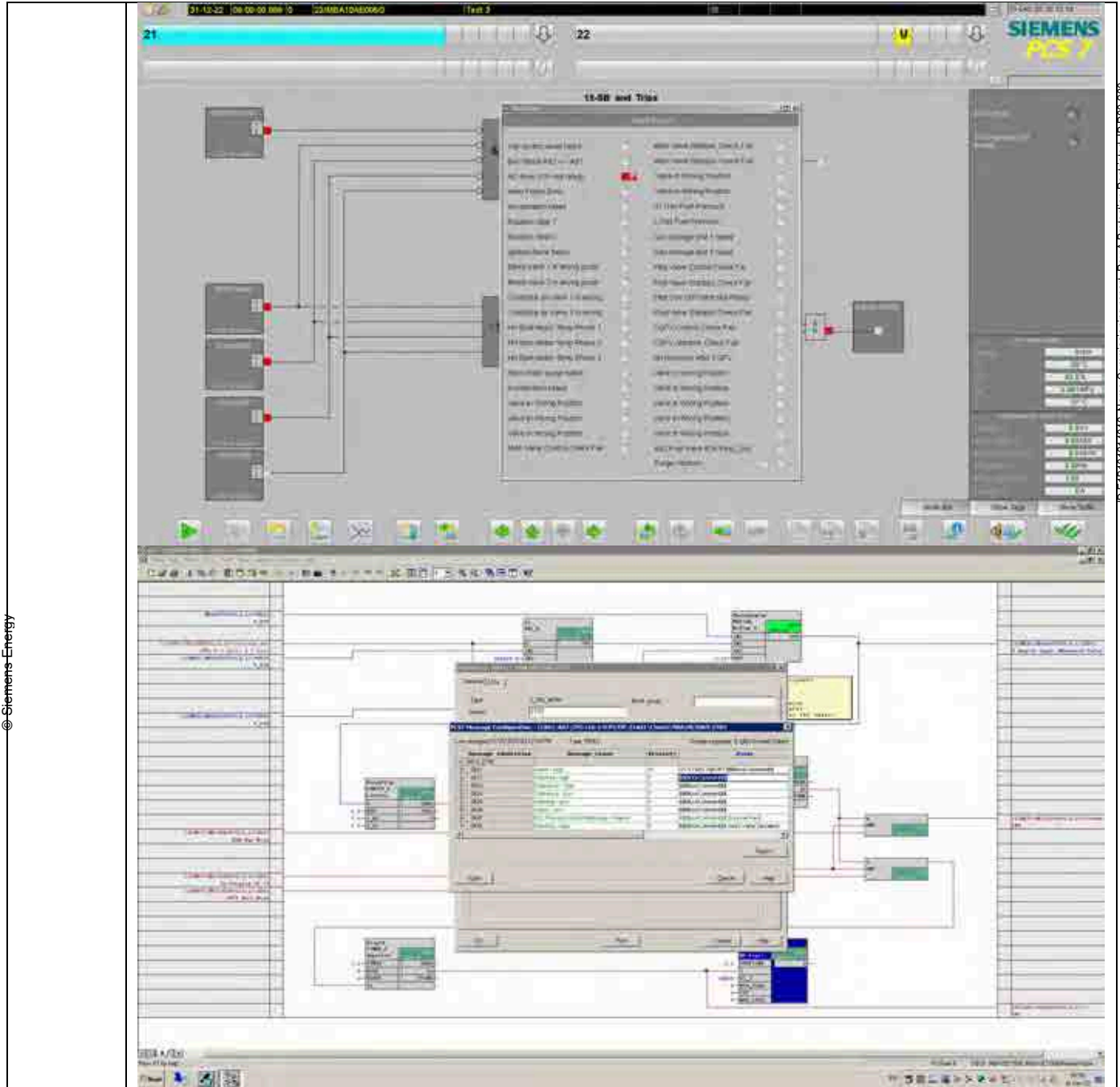
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Restricted

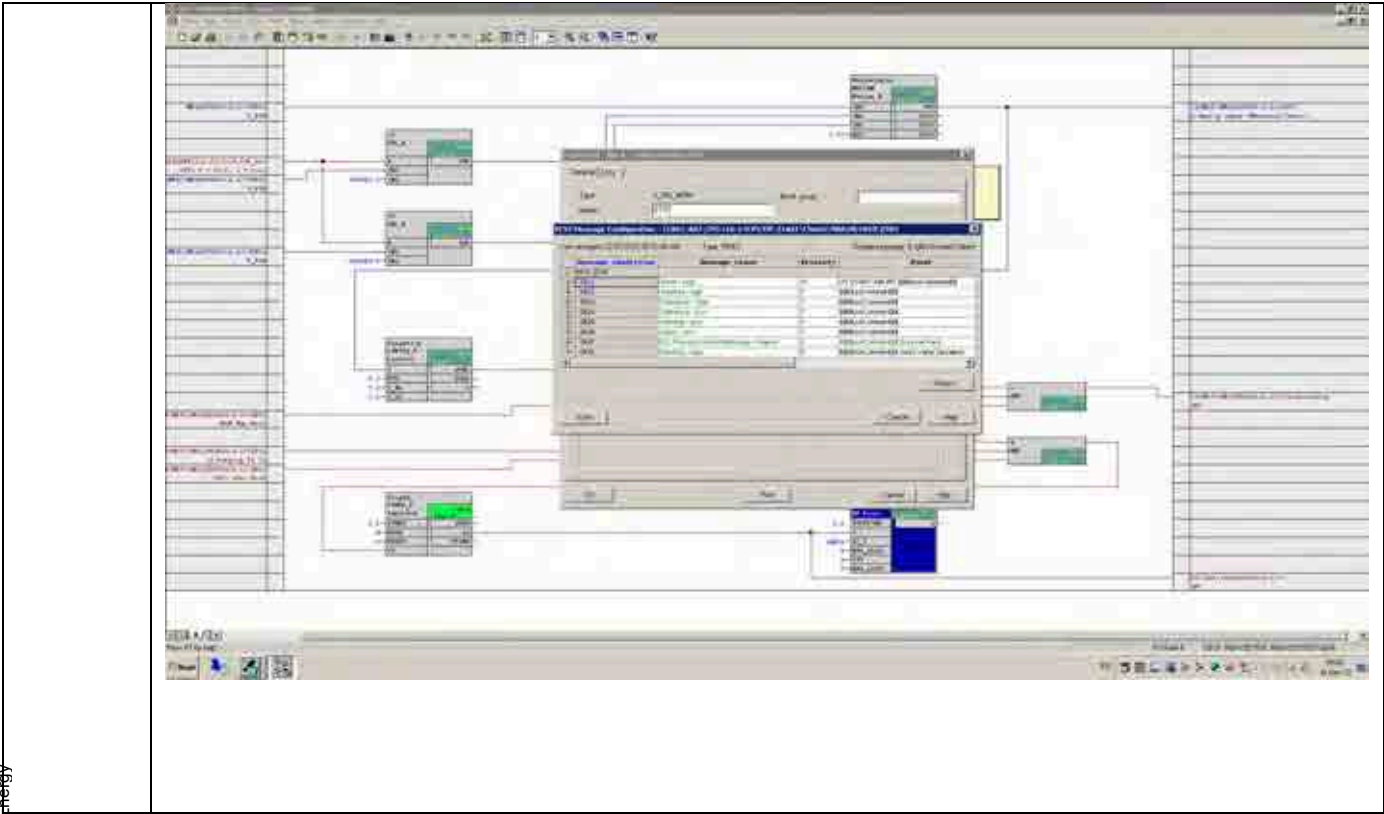
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Test Executer	Date	Signature	Company
	30/12/2022	Nataphat P.	Siemens Energy Ltd.

## 5

### 5.5 Appendix H Pulsation Protocol

## Pulsation Test Protocol

### Pulsation (pC-simulator)

#### Low Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (LFP)	MBA10CP090 VDU (LFP)	MBA10CP095 VDU (LFP)
2	190	110	108	108	109
5	190	275	274	274	273
10	190	550	544	542	544

#### Narrow Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (NFP)	MBA10CP090 VDU (NFP)	MBA10CP095 VDU (NFP)
2	220	110	108	106	107
5	220	275	273	272	275
10	220	550	544	541	544

#### Medium Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (MFP)	MBA10CP090 VDU (MFP)	MBA10CP095 VDU (MFP)
2	620	120	117	115	117
5	620	300	300	296	298
10	620	600	595	589	594

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Pulsation Test Protocol

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**High Frequency Pulsations**

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (HFP)	MBA10CP090 VDU (HFP)	MBA10CP095 VDU (HFP)
2	2000	135	133	131	131
5	2000	338	336	332	335
10	2000	675	666	662	664

---

**COMPLETION**

---

Test Executer	Date	Signature	Company
	31/12/2022	Thanom R	SIEMENS ENERGY
	31/12/2022	Nataphat P	SIEMENS ENERGY

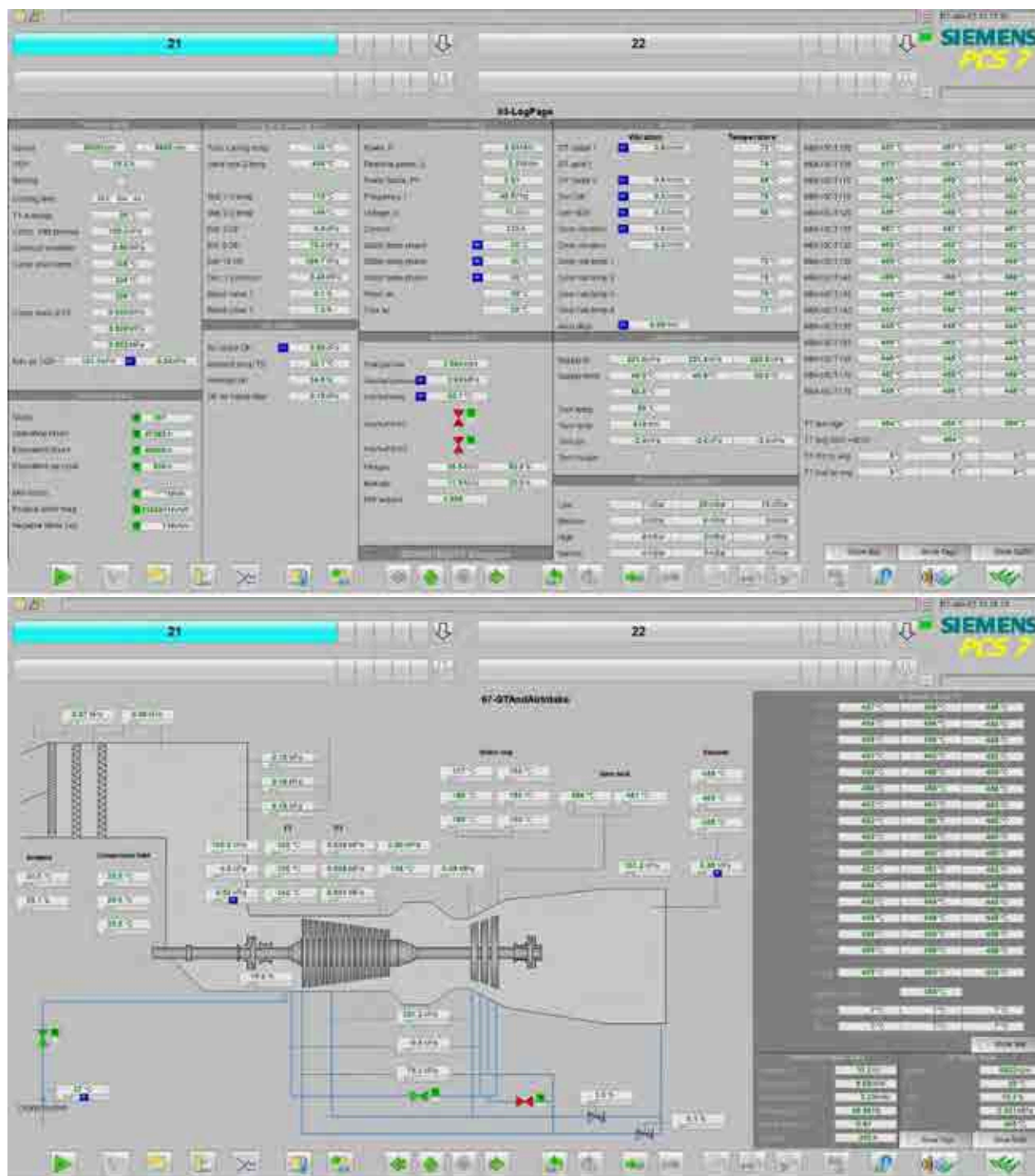


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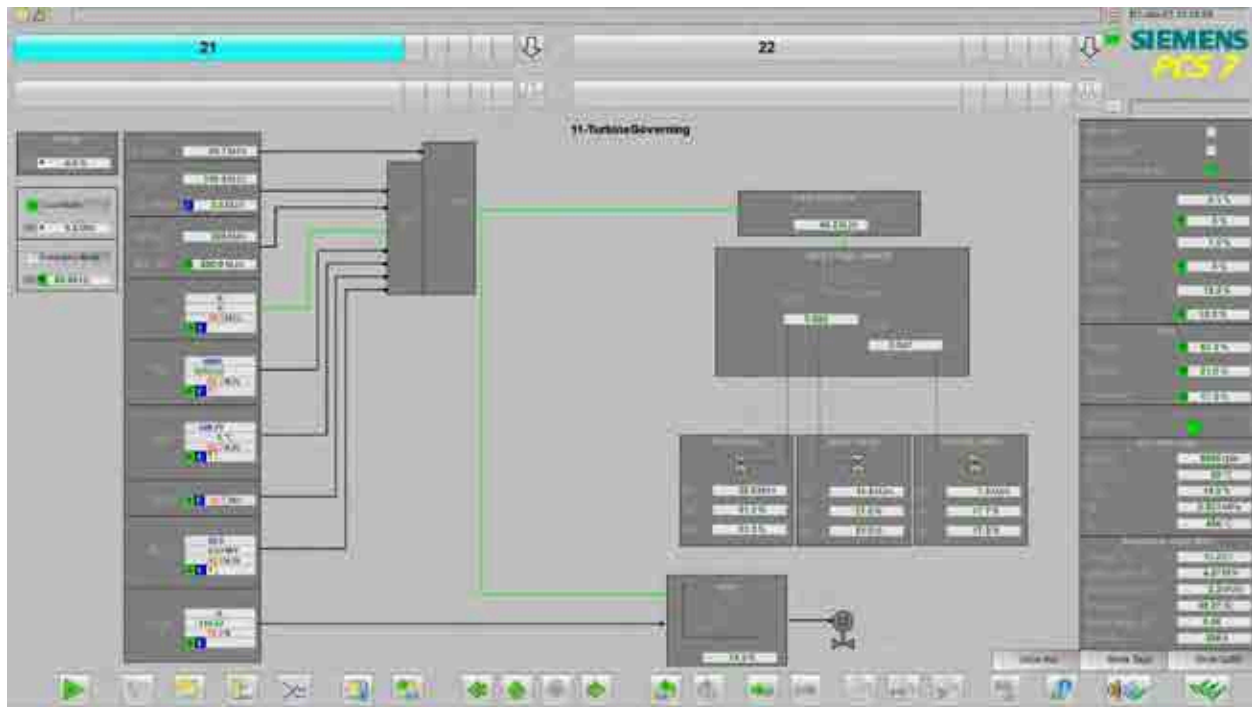
### 5.6 Appendix I Readings

## Readings

5MW

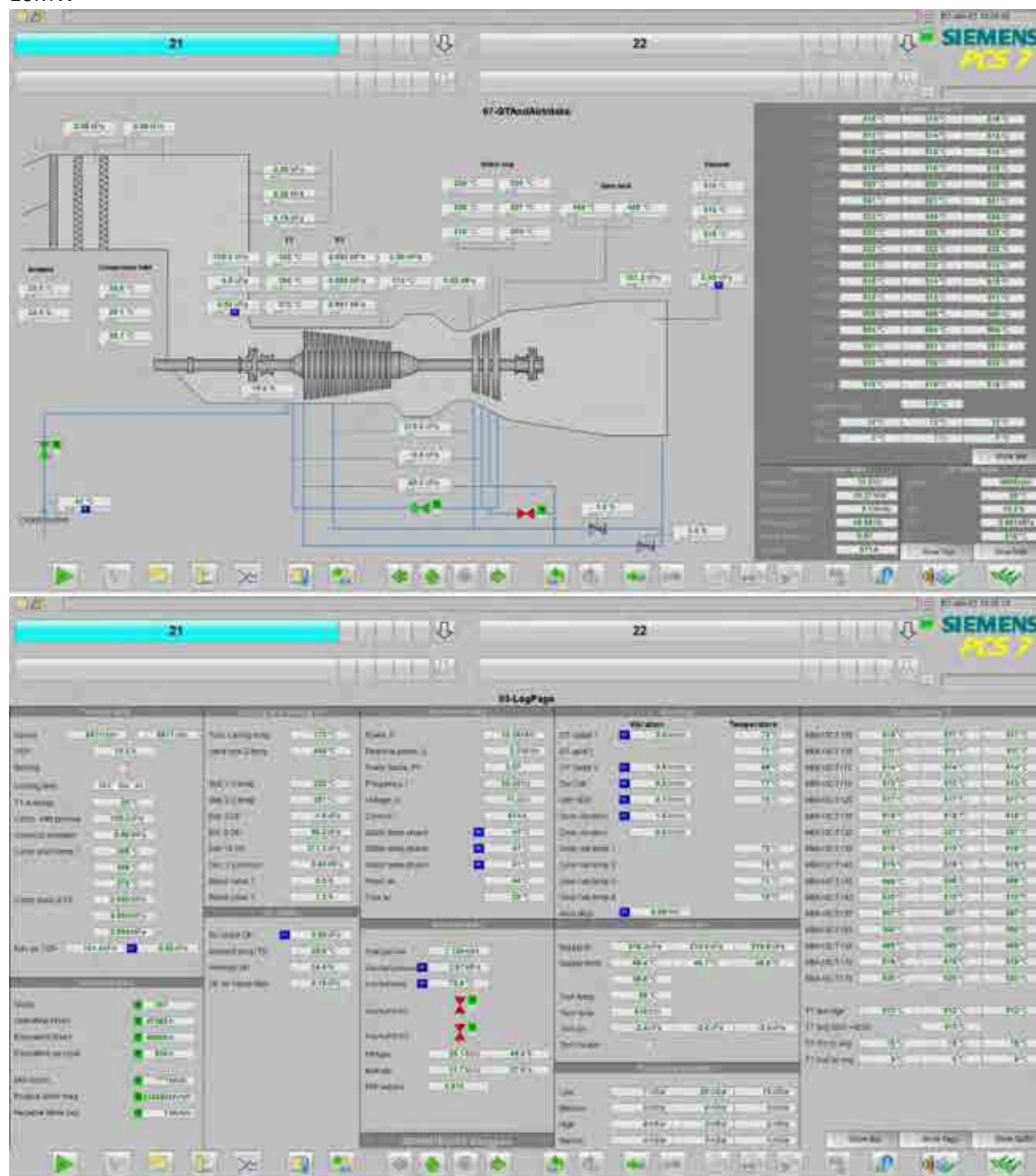


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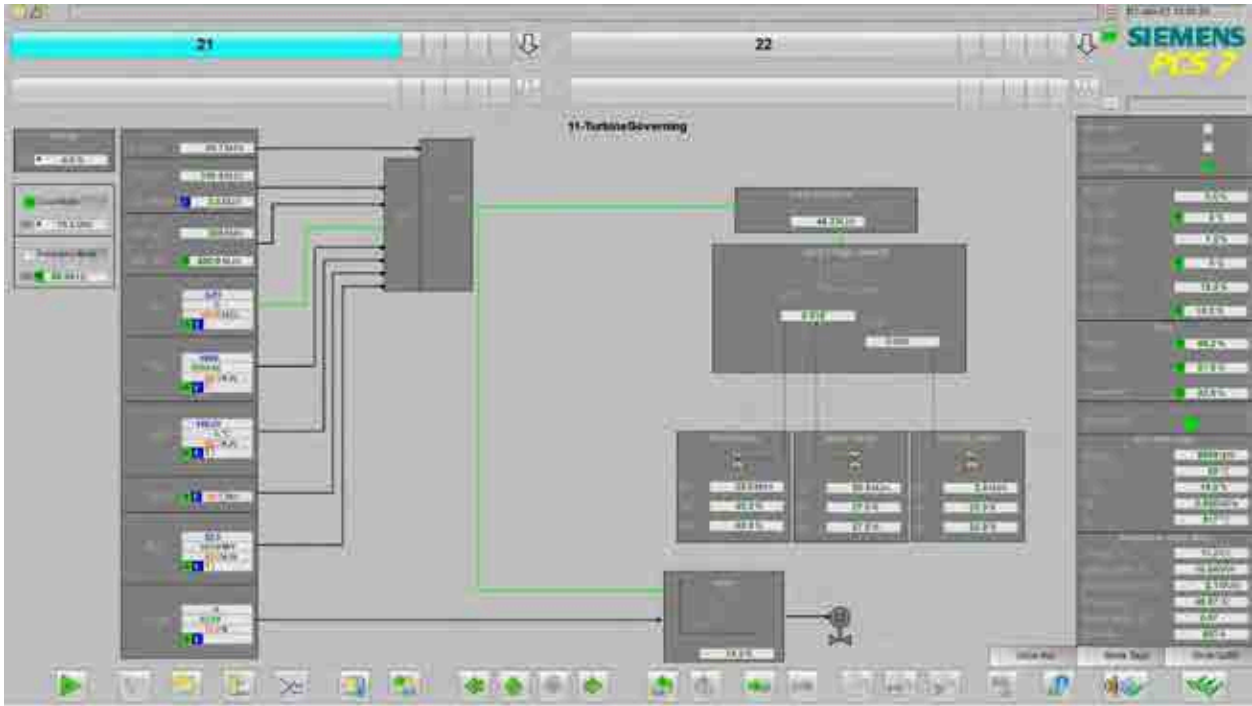


## Readings

10MW



Readings

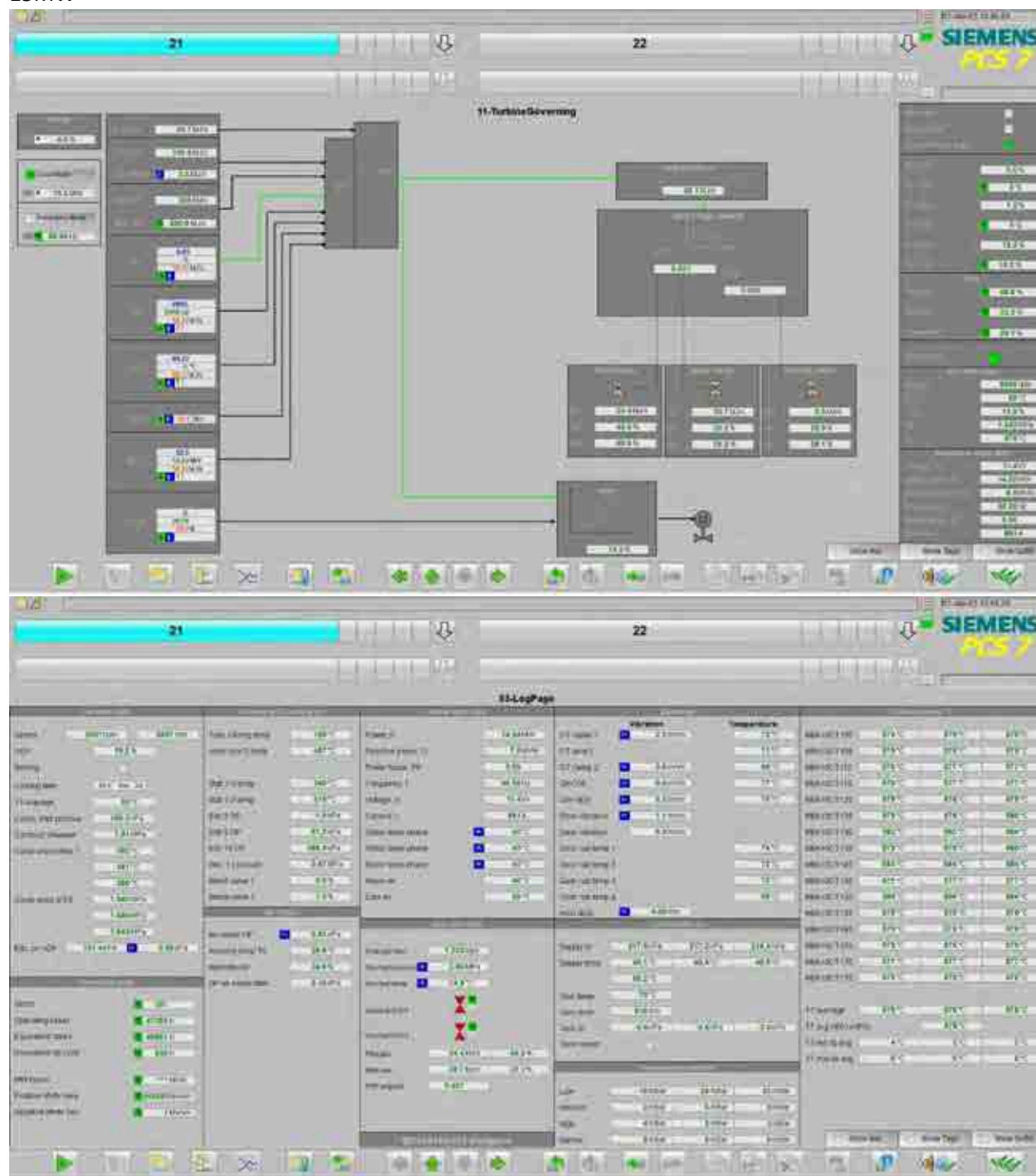


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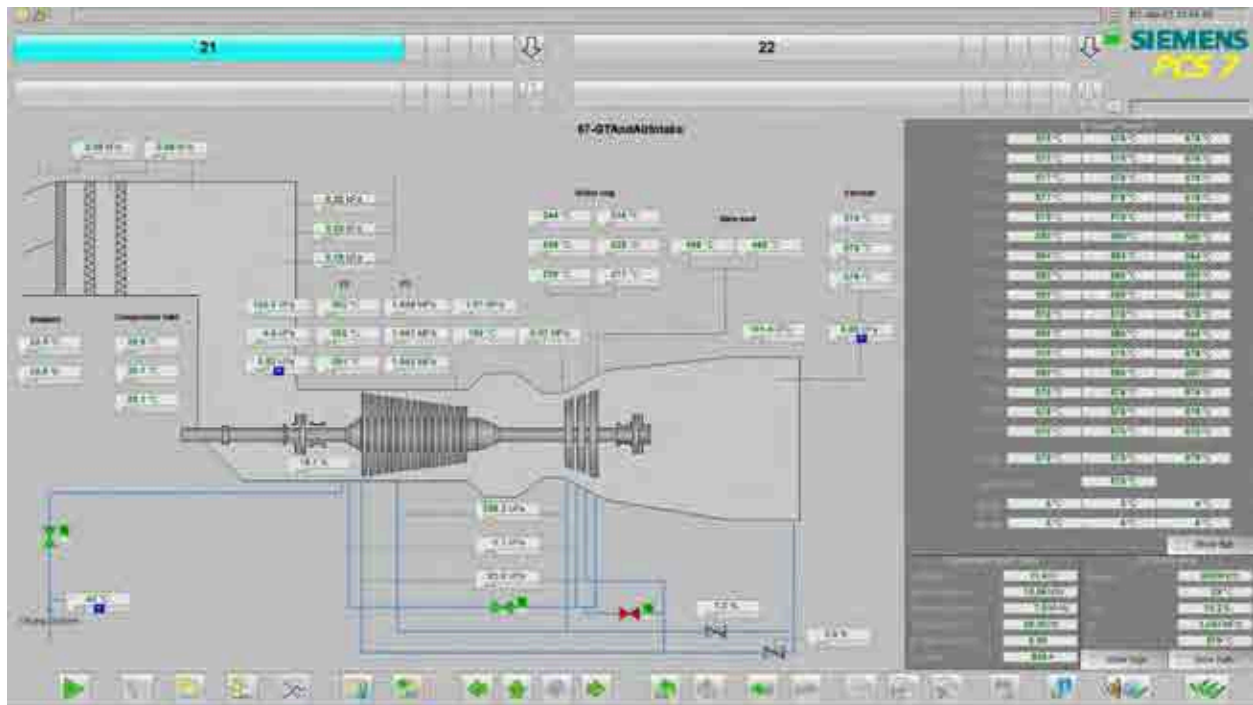
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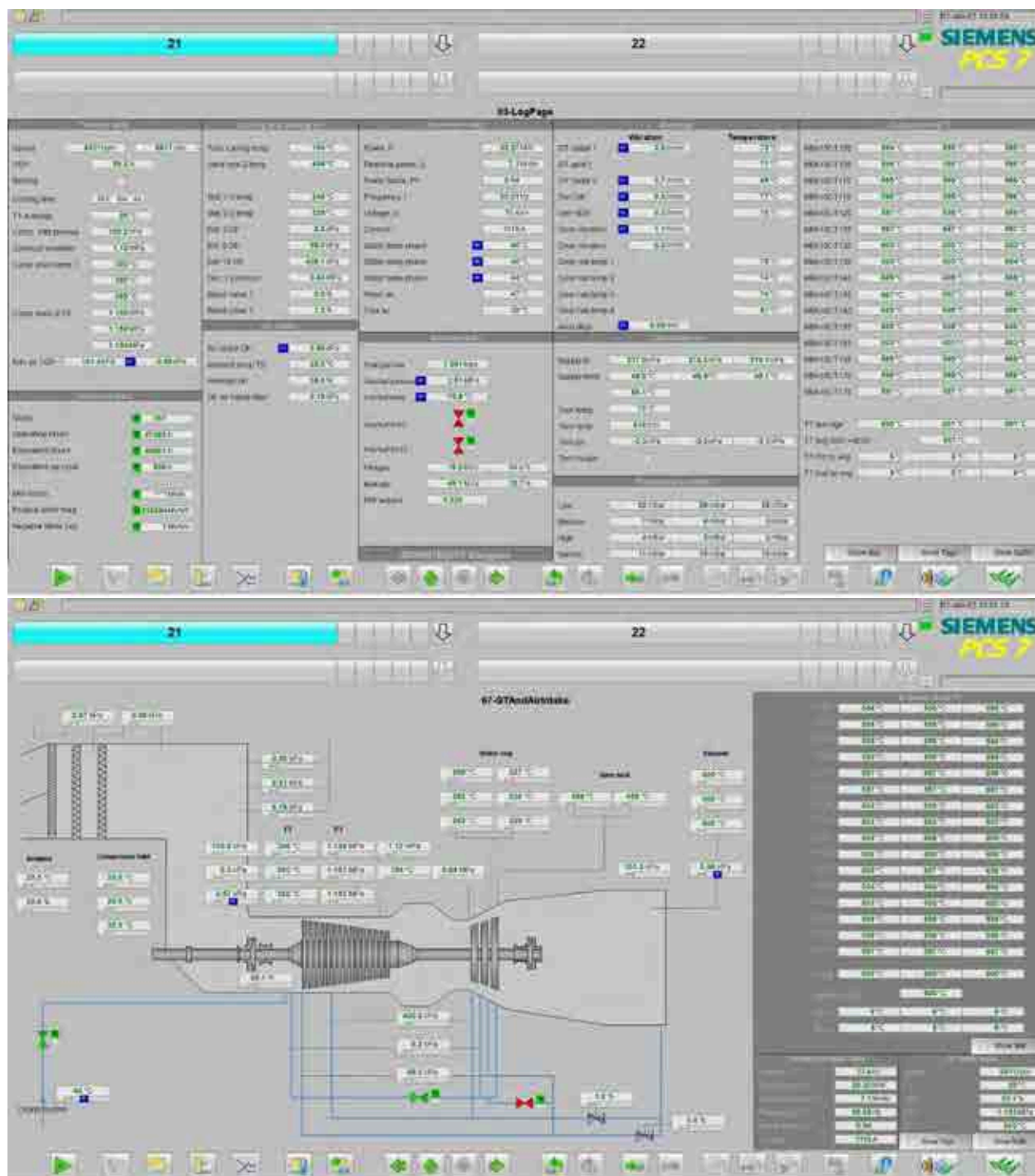


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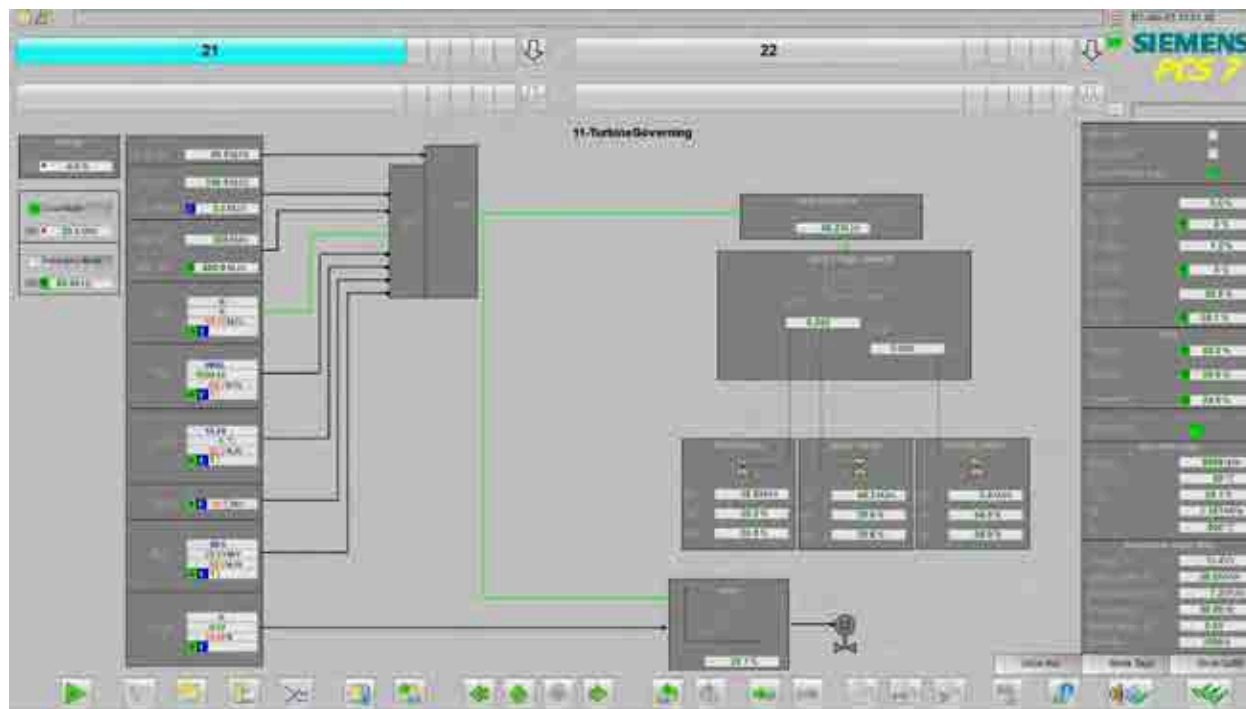


## Readings

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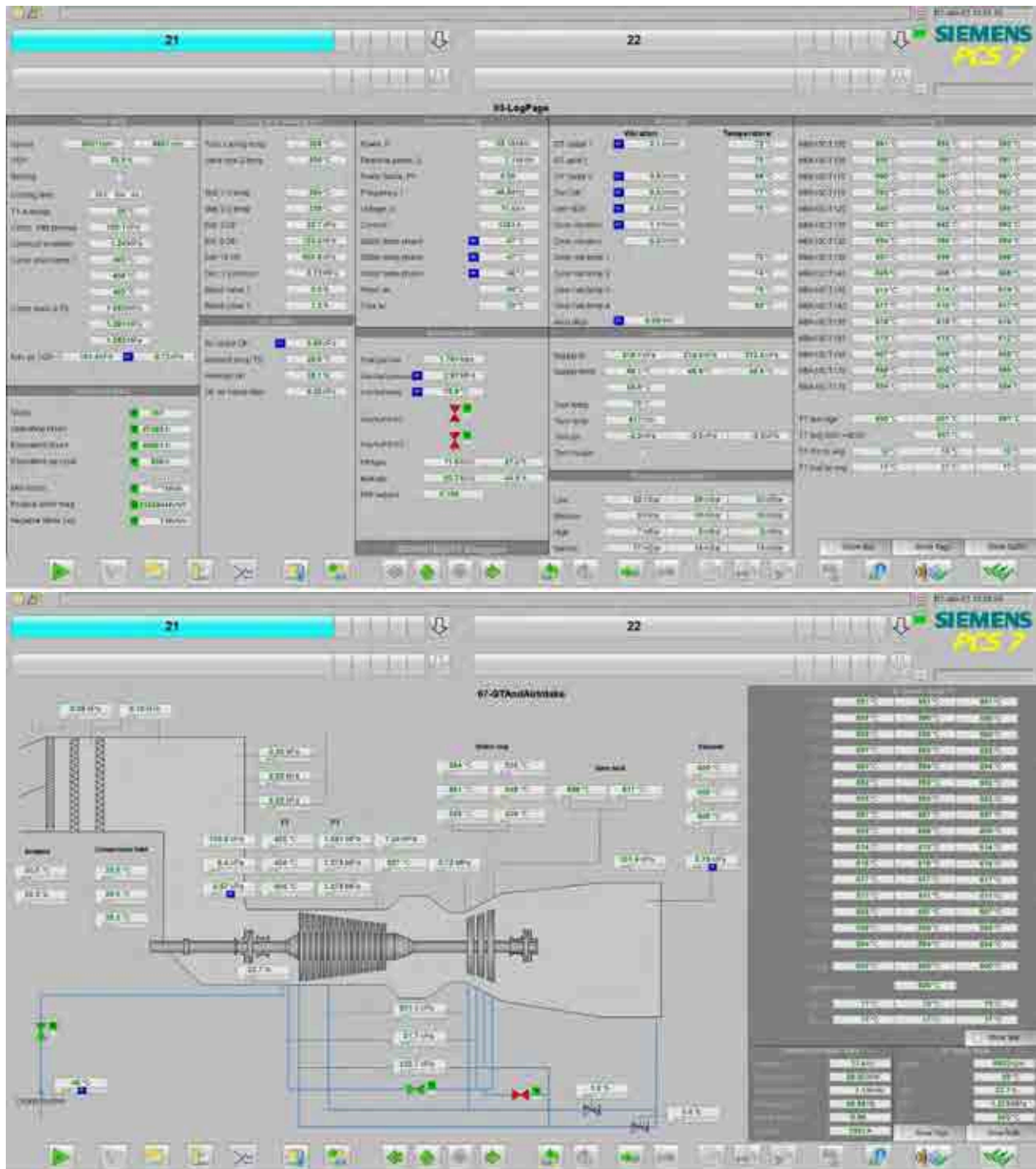


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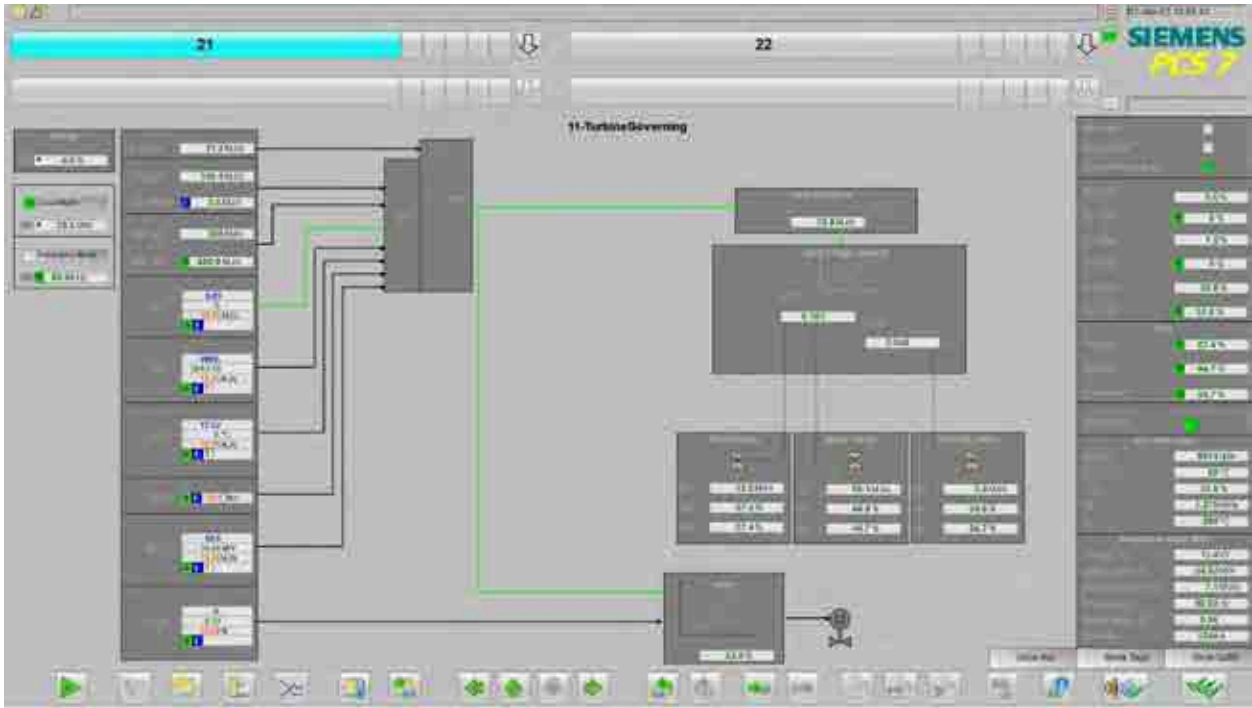


## Readings

25MW



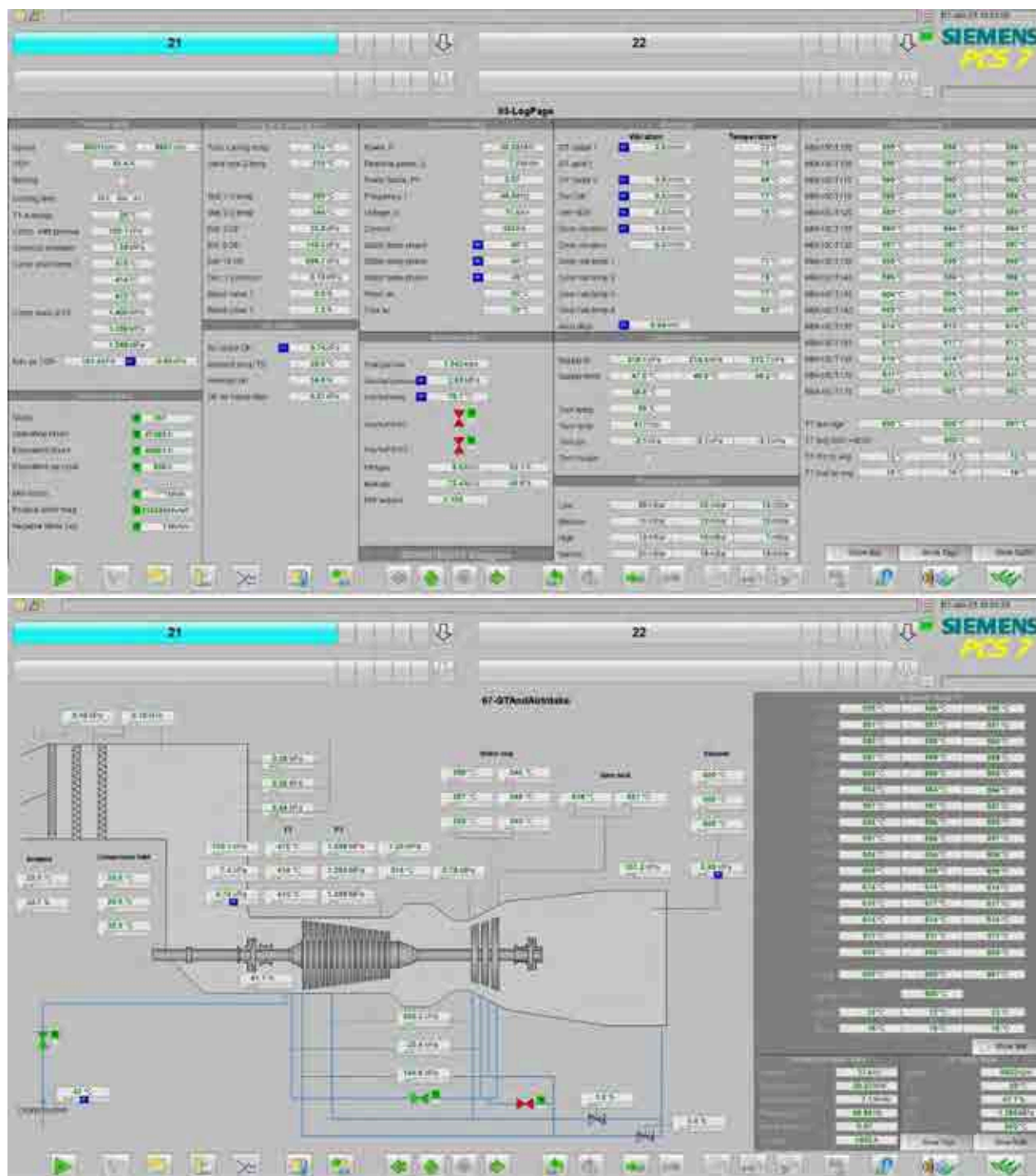
Readings



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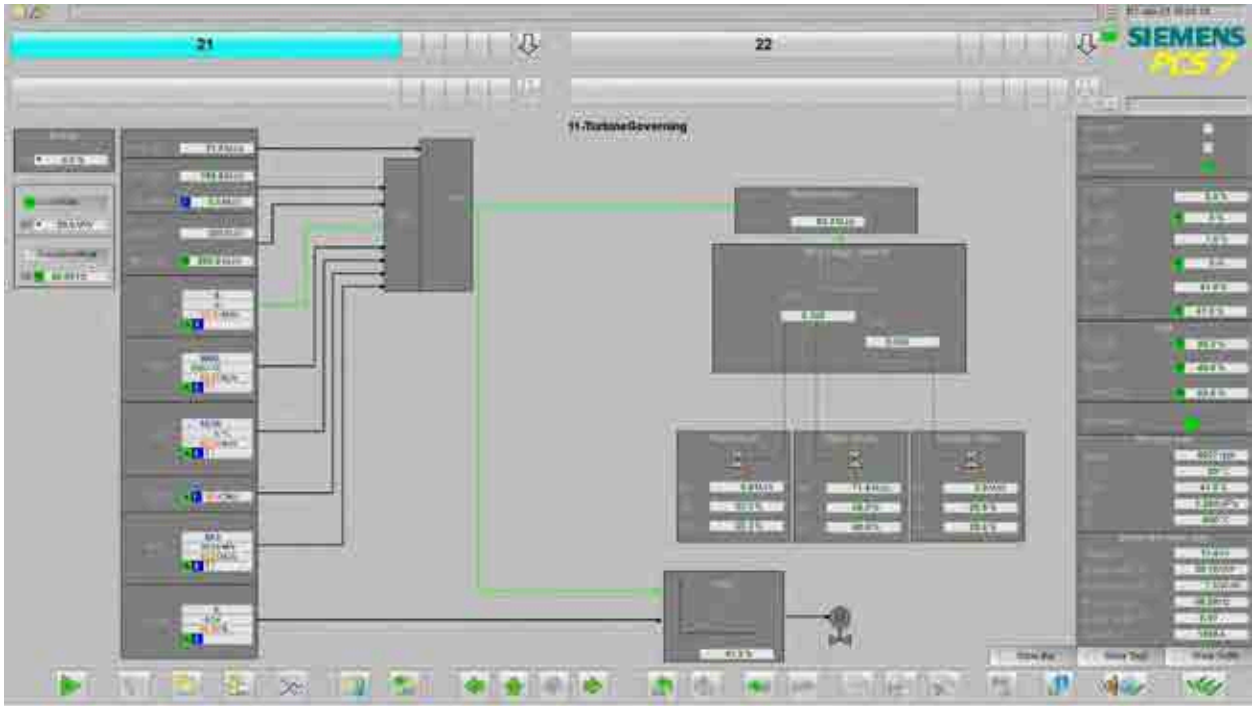


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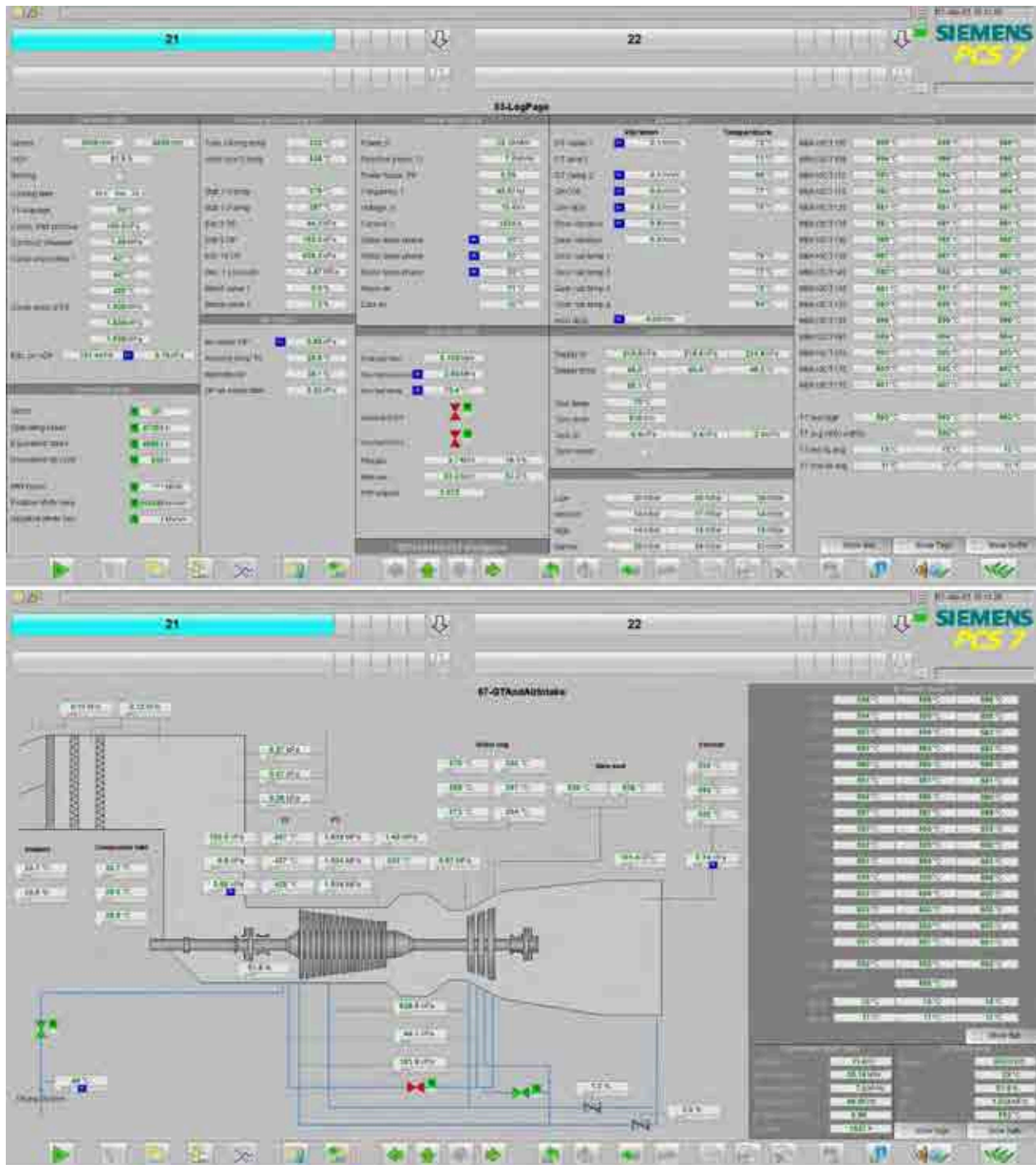


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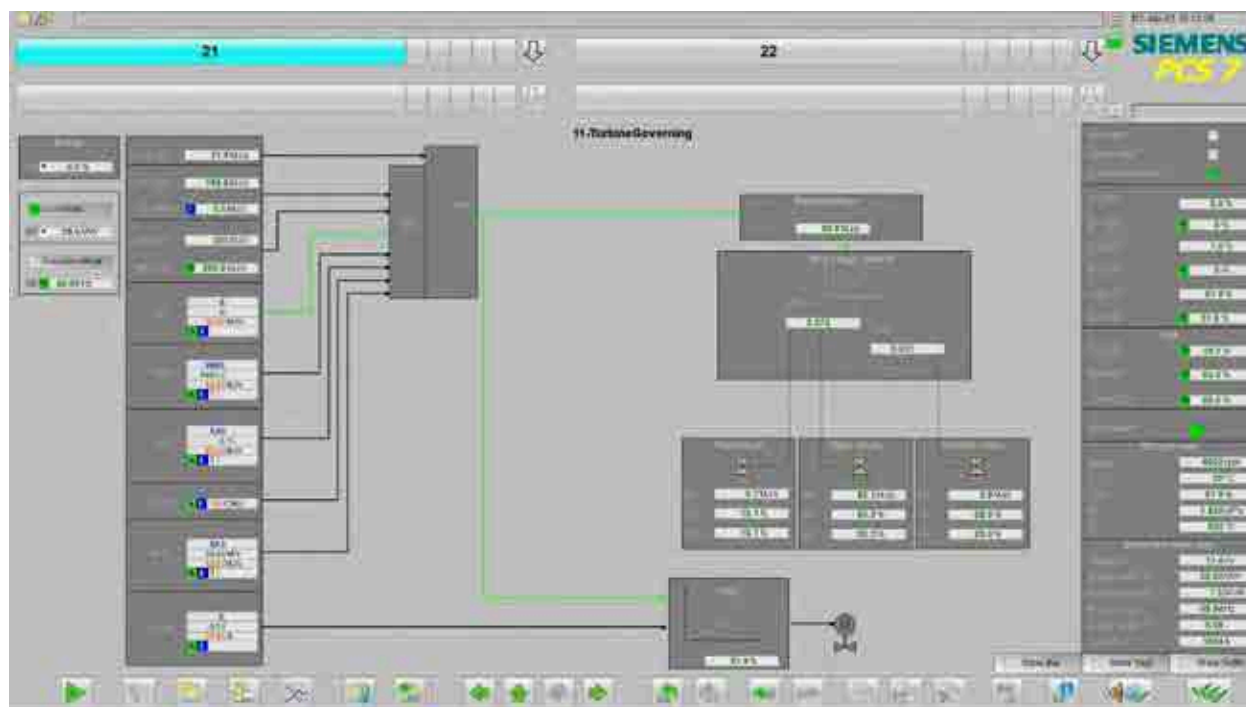


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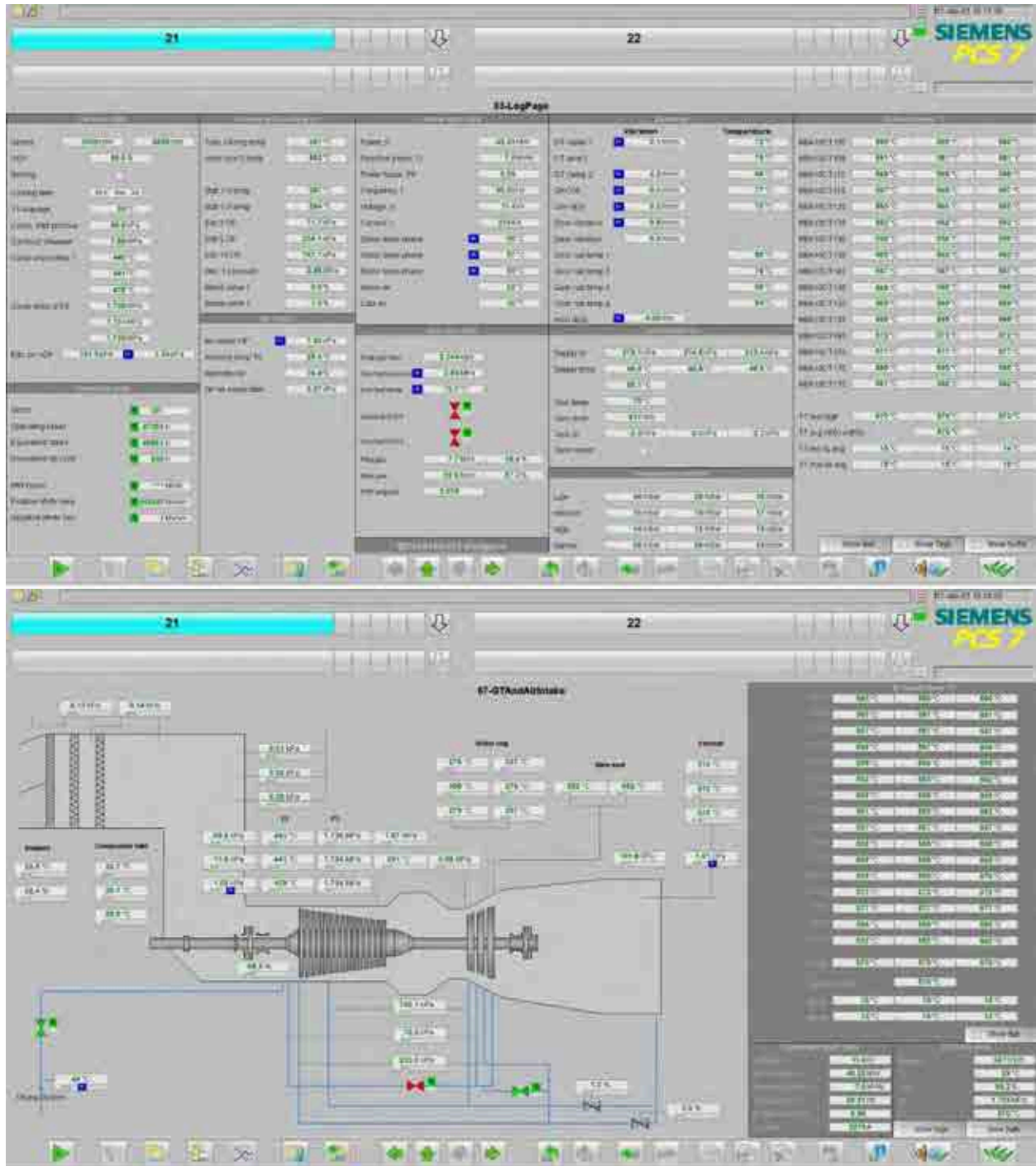


## Readings

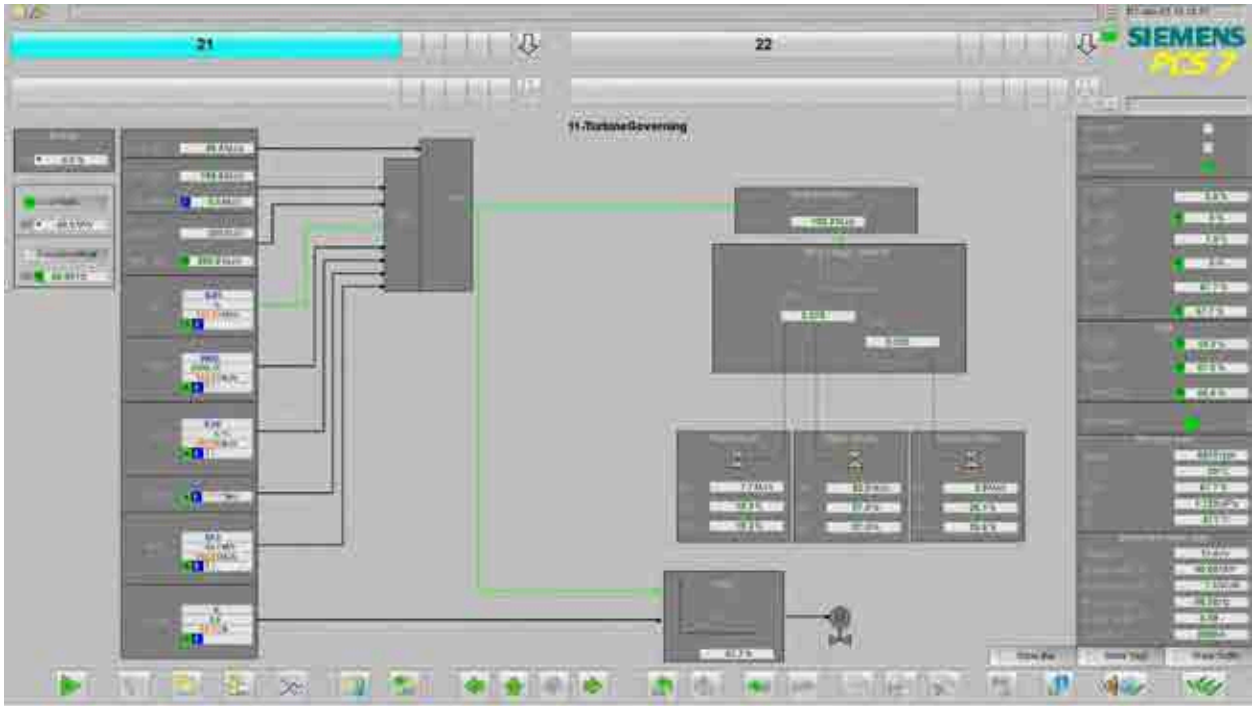


## Readings

40 MW



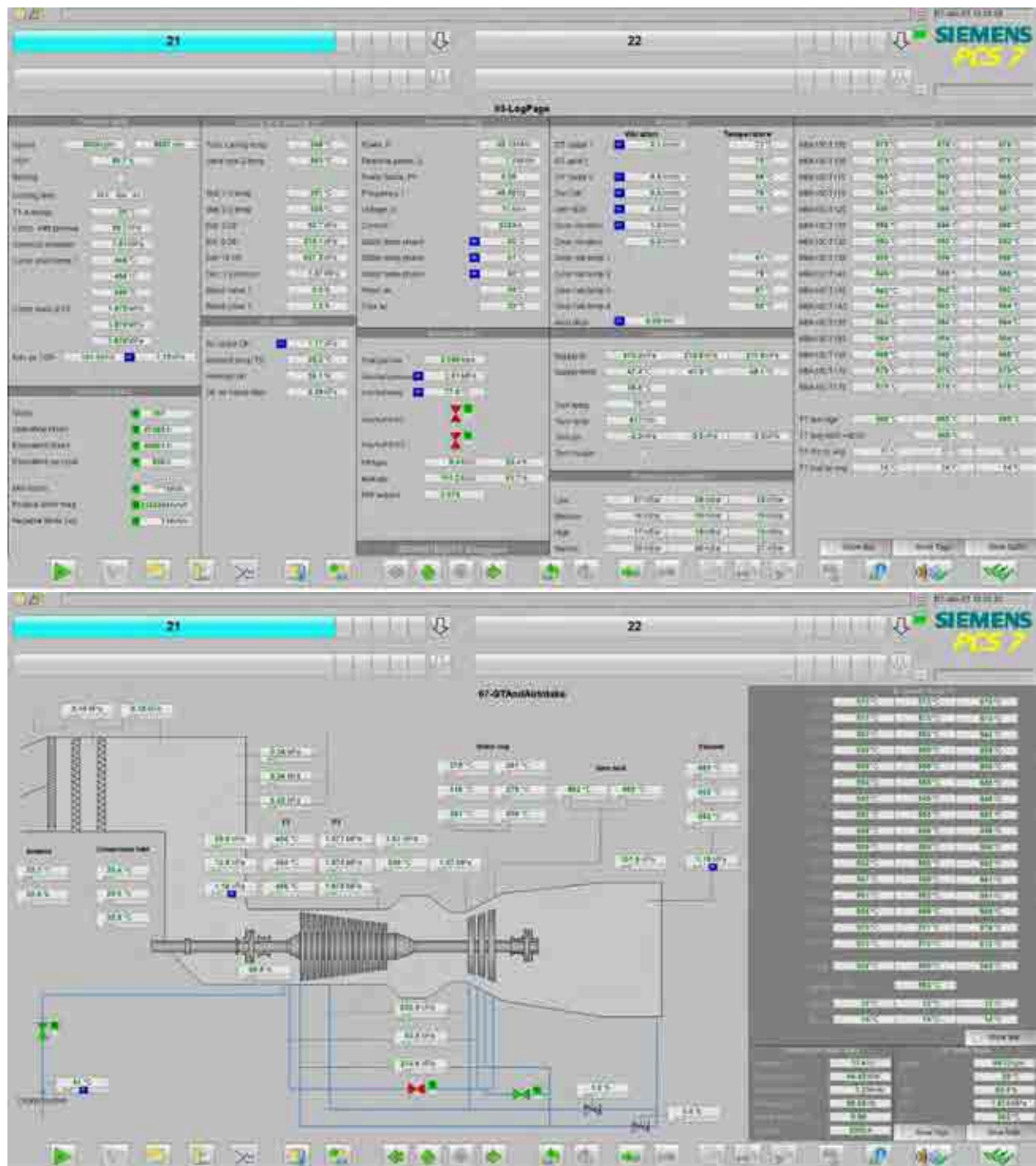
Readings



ID: E1B101214042 Name: Commissioning report Rev: A Protection: Restricted IP: R00.S00  
Creator: Reviewer: Approver:  
ALN ECONN ECL: US-ContNo CoO:TH

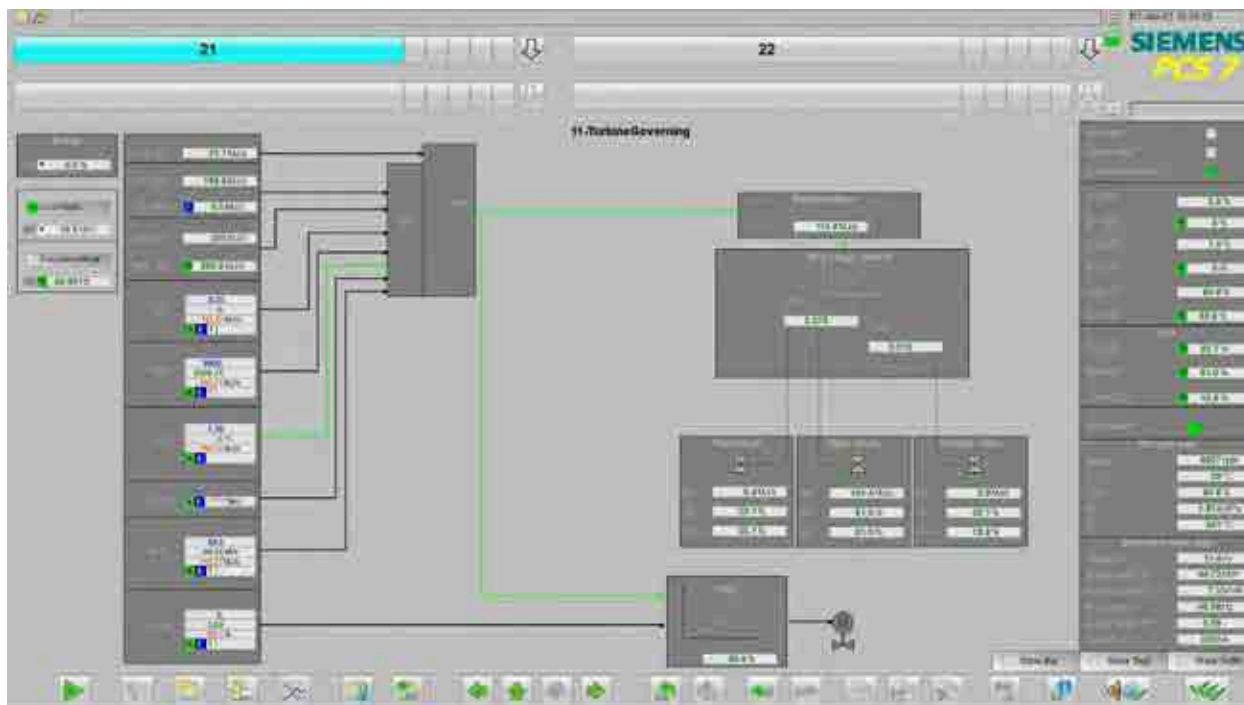


## Readings





## Readings



Test Executer	Date	Signature	Company
	1 Jan 22	Nataphat Pattamadilok	SIEMENS Energy Thailand
	1 Jan 22	Thanom R.	SIEMENS Energy Thailand

## Inspection Report

Subject / Title: <b>BD000166U03 SSUT 2:1, MI-50 kEOH, 2022, Inspection report</b>		<b>Samutprakarn, Thailand</b>	<b>1 Jan 2023</b>
Project: <b>SSUT 2:1, MI-50</b>		Location	Date
Customer Name: <b>SSUT Company Ltd</b>		<b>Krit Phunsub</b>	
Orderer's File Ref: <b>E1B101145802:A</b>		Author(s)	
Order No Internal: <b>EA033854U01A112511</b>			
Report No Internal: <b>RTSOFL635/22</b>		Released technically	Released for external use
Classification: <b>Confidential</b>			

Codeword	: <b>SSUT 2:1</b>
Equipment No	: <b>BD000166U03</b>
Product Type	: <b>SGT-800B1</b>
Mobilization Date	: <b>2022-12-31</b>
Demobilization Date	: <b>2023-01-02</b>
Client Contact Name	: <b>Mr. Suchat Junlee</b>

### Executive Summary:

Purpose of this visit was to perform a level MI50-inspection of unit BD000166U03 SSUT GT21. Compressor wash was performed prior to borescope inspection of compressor section. The inspection was performed according to the maintenance Activity List **E1B101145802**

Findings are report in this inspection report any finding which could be rectified during the inspection schedule will be rectify/repair or replace with parts from customer stock and/or planned inspection parts.

Once all the recommendations have been implemented unit can return to service.

Copies To:  
Paleerat Taptawat  
Erik Gregeborg

Emilien Zara Souleman  
Emelie Ljungblad

## Inspection Report

### 7.20 HG 2650 Turbine stator stage no 1

#### Performed work:

- Borescope inspection.

#### Result:

- Minor TBC loss and Oxidation found on some of the outer vane plates.
- Oxidation condition notice on GV1 heat shields and rear hooks.

Seen from burner#1



Are around Guide vanes 1 entrance condition.



Guide vanes 1 leading edge cooling holes and inner/outer vane plates overall condition.

## Inspection Report



Heatshield 1 overall condition.



Rear hooks overall condition.

Seen from burner#7



Are around Guide vanes 1 entrance condition.



Guide vanes 1 leading edge cooling holes and inner/outer vane plates overall condition.



## Inspection Report



Example of Heatshield 1 condition.



Rear hooks overall condition.

Seen from burner#15



Are around Guide vanes 1 entrance condition.



Guide vanes 1 leading edge cooling holes and inner/outer vane plates overall condition.



## Inspection Report



Example of Heatshield 1 condition.



Rear hooks overall condition.

Seen from burner#22



Are around Guide vanes 1 entrance condition.



Guide vanes 1 leading edge cooling holes and inner/outer vane plates overall condition.





## Inspection Report



Example of Heatshield 1 condition.



Rear hooks overall condition.

Seen from borescope port B15



Heatshields overall condition.



Heatshields overall condition.



Rear hooks overall condition.



Rear hook overall condition.

### **Recommendation:**

- None.

Turbine stator stage no.1 is in serviceable condition.

## Inspection Report

Subject / Title:  
**BD000166U04 SSUT 2:2,  
 MI-50 kEOH Inspection report 2022.**

**Samutprakarn, Thailand**  
 Location

**30 Dec 2022**  
 Date

Project:

Customer Name: **SSUT Company Ltd**

Orderer's File Ref: **E1B101145805: A**

Order No Internal: **EA033854U02A112511**

Report No Internal: **RTSOFL634/22**

**Somdej Arunplod**  
 Author(s)

Released technically      Released for external use

Classification: **Confidential**

Codeword	: <b>SSUT 2:2</b>
Equipment No	: <b>BD000166U04</b>
Product Type	: <b>SGT-800B1</b>
Mobilization Date	: <b>2022-12-30</b>
Demobilization Date	: <b>2023-01-01</b>
Client Contact Name	: <b>Mr. Suchart J.</b>

### Executive Summary:

The purpose of visit was to perform A-inspection between 30-Dec-2022 to 1-Jan-2023. Level A'50-inspection according to activity list E1B101145805. Compressor washing of GT unit BD000166U04 was performed before inspection. Several minor remarks were noted. Details can be found in the report.

Copies To:  
 Paleerat Taptawat  
 Erik Gregeborg

Emilien Zara Souleman  
 Emelie Ljungblad

## Inspection Report

# 1 Summary of results

### **HG 4150 Air intake**

- Contamination found on pre-filter element.
- Moderate contamination found on ventilation filter.

### **HG 4980 Speed reduction gear**

- Observed white marks are bigger than A40 inspection both wheel and pinion gear.
- Observed white mark on active face wheel gear cogs both generator and turbine side in a pattern of 3 cogs in the roll and skip 4 cogs and repeat.
- Observed lube oil manifold end cap were leakage.

### **HG2410 Compressor inlet piece.**

- Observed lube oil leakage under right junction box.

### **HG 2450 Compressor stator**

- Observed abradable coating outer surface spallation at stage 8.

### **HG 2640 Turbine Rotor**

- Minor oxidation around leading edge and trailing edge cooling holes of blade stage 1.
- Fretting mark have observed at leading edge tip turbine blade stage 3.

### **HG 2650 Turbine stator stage 1**

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on guide vane 1 heat shield.
- Minor oxidation found on guide vane 1 rear hooks.

### **HG 2651 Turbine stator stage 2&3**

- Minor oxidation on heat shield guide vane stage 2

### **HG2665 Outlet casing**

- Observed that the below joint has some damaged areas.

### **HG 2660 Exhaust diffuser**

- Observed indication on struts support see table below.

### **HG 2132 Insulation**

- Observed several insulation materials major damaged around fuel burner and central casing drain.

## Inspection Report

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## Inspection Report

### Personnel on site

Personnel on site :	Date for the visit
Natthapon Wechagorngoson, Commissioning lead	221230-230101
Arthit Phuttipongkit, Commissioning engineer.	221230-230101
Somdej Arunplod, Quality inspector	221230-230101
Yuttapol Shawbangruk, Mechanical TFA	221230-230101

## 2 General data / Operating statistics

Site:	SSUT 2:2	
B-number:	BD000166U04	
Project manager:	Paleerat Taptawat	
Application engineer:	Erik Gregeborg	
Activity list:	E1B101145805:A	
Owner:	SSUT Company Ltd	
Owner representative:	Mr. Suchart J.	
Order number:	4290247	
Gas turbine: Siemens	Type: SGT-800B	S/N: DD080051
Main gear:	Type: TX112/4C	S/N: 12722
Generator:	Type: AMS1240 ALK	S/N: 8269008
Configuration:	Combine cycle	
Site:	Power plant	
Fuel	Natural gas	
Operating profile:	Base load	
Compressor washing system/wash interval	Offline 10,000 hours	
Site address or GPS coordinates	13.532603, 100.651876	

Fuel:                      Gas: ☒                      Liquid: ☐                      Dual fuel: ☐

### Inspection Report

<b>Date for counter readings:</b> 20221230	Installation
Operating hours:	46307 h
Equivalent operating hours:	48968 h
Starts:	452
Fast starts:	N/A
Equivalent operating cycles:	529 h
Total production of MWh:	1463956
Total production of MVar+:	243697
Total production of MVar-:	7

Latest inspections:

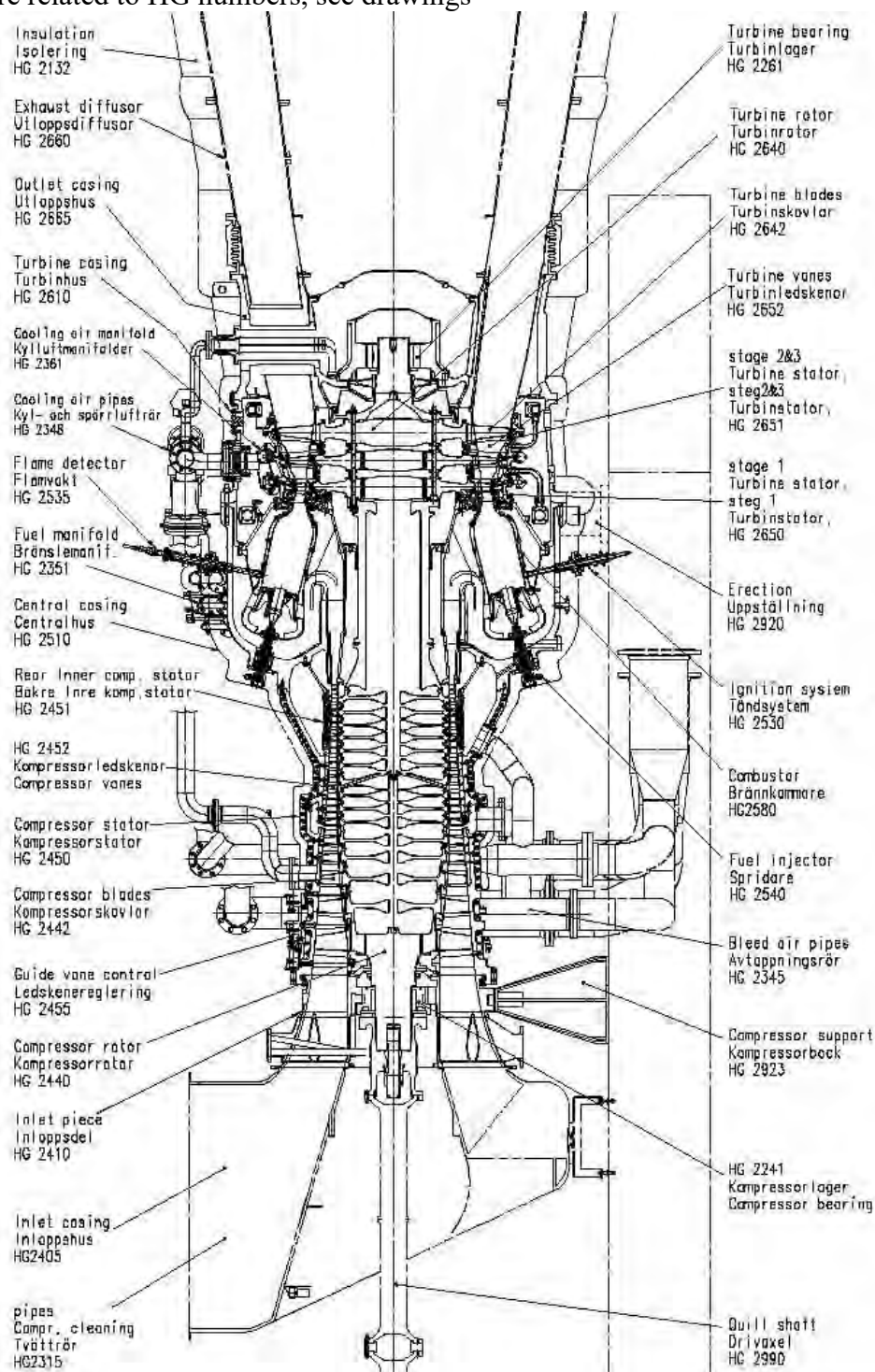
Date	Report no	Reason	Author	
2022-12-30		Level A-inspection	Somdej Arunplod	A50
2021-11-07	E1B100960684	Forced Outage	Krit Phunsub	
2021-10-27	E1B100955416	Minor Inspection	Chakapong Singharatanon	<b>A40</b>
2020-08-08	E1B100747055	Level B-inspection	Natthapon Wechagornngoson	B30
2019-04-17	E1B100501228	Level A-inspection	Krit Phunsub	A20



## Inspection Report

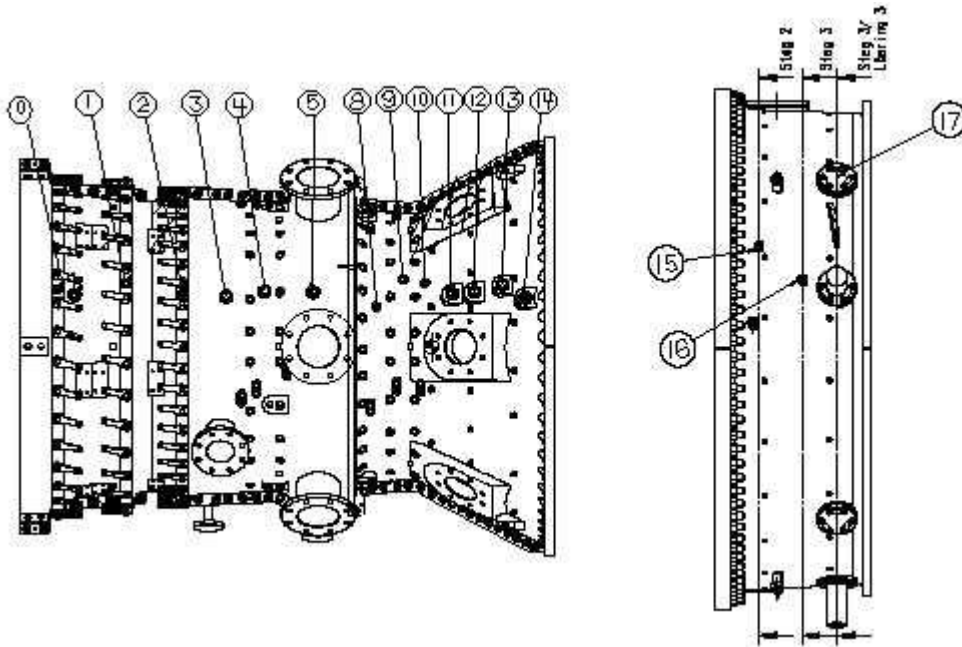
### 3 HG-list SGT-800

Activities are related to HG numbers, see drawings



## Inspection Report

### 4 Borescope inspection SGT-800



- Plan B0 Compressor rotor stage 1, stator stage 0
- Plan B1 Compressor rotor stage 1 and 2, stator stage 1
- Plan B2 Compressor rotor stage 2 and 3, stator stage 2
- Plan B3 Compressor rotor stage 3 and 4, stator stage 3
- Plan B4 Compressor rotor stage 4 and 5, stator stage 4
- Plan B5 Compressor rotor stage 5 and 6, stator stage 5
- Plan B8 Compressor rotor stage 8 and 9, stator stage 8
- Plan B9 Compressor rotor stage 9 and 10, stator stage 9
- Plan B10 Compressor rotor stage 10 and 11, stator stage 10
- Plan B11 Compressor rotor stage 11 and 12, stator stage 11
- Plan B12 Compressor rotor stage 12 and 13, stator stage 12
- Plan B13 Compressor rotor stage 13 and 14, stator stage 13
- Plan B14 Compressor rotor stage 14 and 15, stator stage 14
- Plan B15 Turbine rotor stage 1 and 2, stator stage 2
- Plan B16 Turbine rotor stage 2 and 3, stator stage 3
- Plan B17 Turbine rotor stage 3, stator stage 3

## Inspection Report

# 5 Inspection activities

## 5.1 Planned inspection

### 5.1.1 Activities according to maintenance plan

5 #	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	/Air intake system/MBL	Visual inspection in air intake housing, ducting, silencer, and plenum. Check for obstructions, cleanliness, leakages and for foreign objects. Check flanges, inspection hatches, sealings and gaskets.		Performed
2	/Air intake system/MBL	Visual inspection of filters for obstruction and contamination.		Performed
3	2132/Insulation/	Visual inspection.		Performed
4	2351/Fuel manifold/	Visual external inspection.		Performed
5	2405/Compressor air inlet casing/	Visual inspection.		Performed
6	2410/Inlet Piece/	Visual inspection.		Performed
7	2442/Compressor blades/	Borescope inspection of compressor blades stages 5, 11 and 14.	Compressor blades	Performed
8	2442/Compressor blades/	Borescope inspection of compressor blades stage 4.	Compressor blades	Performed
9	2452/Compressor vanes/	Borescope inspection of compressor vanes stages 5, 11 and 14.	Compressor vanes	Performed
10	2452/Compressor vanes/	Borescope inspection of compressor vanes stage 4.	Compressor vanes	Performed
11	2530/Ignition system/	Visual inspection.		Performed
12	2535/Flame detector/	Visual inspection.		Performed
13	2540/Burner/	Borescope inspection of 1 (RMI, #15) or 4 (MI, equal distr.) burners		Performed
14	2580/Combustor/MBM	Borescope inspection.		Performed
15	2610/Turbine casing/	Visual inspection.		Performed
16	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1.		Performed
17	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1 outer vane plate.		Performed
18	2650/Turbine stator, stage 1/	Borescope inspection of guide vane 1 inner vane plate.		Performed
19	2650/Turbine guide vanes/	Borescope inspection of guide vane 2.	Turbine stator 2 - GV2	Performed
20	2650/Turbine stator, stage 1/	Borescope inspection turbine heat shield 1.		Performed
21	2640/Turbine rotor (incl. Blades)/	Borescope inspection of turbine blades stage 1		Performed

### Inspection Report

5				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
22	2640/Turbine rotor (incl. Blades)/	Borescope inspection of turbine blades stage 2.		Performed
23	2665/Outlet casing/	Internal visual inspection of outlet casing.		Performed
24	2665/Exhaust casing/	Visual inspection of outlet bellow.		Performed
25	2920, 2925/Assembly material/Erection exhaust diffusor at site/	Visual inspection of the supports.	Support stands	Performed

7				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
1	4980, 4995/Main gear/Alignment instruction/	Visual inspection of tooth mesh through inspection cover. Main gear.	MBK10AZ005	Performed

#### 5.1.2 Activities outside maintenance plan

9				
#	HG/System/KKS	Activity	Scope Remark	Field Service Remark
2	/Gear system/MBK	Continue to monitor for the progression of the white marks pattern on wheel gear.	Acc to Inspection Report E1B100962567	Performed
5	/Gas fuel system. General/MBP	PSW/SGT-800/18-004 Safety Warning of the gas fuel flexible hoses installed on all medium gas turbines		Performed
6	2650/Turbine guide vanes/	PAB/SGT-800/22-001 TGV1 oxidation: extended RMI/MI Inspection		Performed



## Inspection Report

# 6 Inspection result

## 6.1 HG 4150 Air intake system

**Performed work:** Visual Inspection.

**Result:**

- Contamination found on pre-filter element.
- Moderate contamination found on ventilation filter.



Intake filter housing overall condition.

## Inspection Report



Algae cover inlet filter housing condition.



Internal wall condition on silencer ducting unit.



Silencer unit intake side overall condition.



Silencer unit intake side close up condition.



Intake inside overall condition.



Close up on silencer unit flat bars weld joint condition.



## Inspection Report



Inside intake filter housing overall condition.



Pre-filter element as found condition.



Fine filter as found condition.



Intake side of fine filter as found condition.



Installed fine filter CamGT 3V-600-E12 Std.



Drain port condition on walk way.

## Inspection Report



Intake door seal overall condition.



Intake door push open mechanism good condition.



E12 fine filter as found condition.



Another view fine filter condition.



Intake filter drain port.



Intake filter drain port.

## Inspection Report



Clean air exit to enclosure silencer unit.



Ventilation filter floor condition.



Ventilation filter elements fouling condition.



Ventilation silencer exit to enclosure.

### **Recommendation:**

- Clean intake filter housing intake louvers and ventilation filter housing intake louvers when replace filters.
- Clean floor inside intake filter housing when replace filters.
- Clean ventilation filter housing floor.
- Open mechanism needs to apply preventive rust with lubricant.

**Air Intake system is in serviceable condition.**

## Inspection Report

### 6.2 HG 4981 Starting gear

**Performed work:** Visual inspection.

**Result:** No remarks.



Starter motor overall condition.



Flexible coupling overall condition.



Flex plate bundle condition on starter motor side.



Flex plate bundle condition on gearbox side.

### **Recommendation:**

- Continue to monitor flex coupling flex plate bundle condition during next inspection.

**Starter motor system is in serviceable condition.**



## Inspection Report

### 6.3 HG 4980 Speed reduction gear

**Performed work:** Visual inspection and Borescope inspection.

**Result:**

- Observed white marks are bigger than A40 inspection both wheel and pinion gear.
- Observed white mark on active face wheel gear cogs both generator and turbine side in a pattern of 3 cogs in the roll and skip 4 cogs and repeat.
- Observed lube oil manifold end cap were leakage.



ETD overall condition.



Gearbox casing overall condition generator side.



Gearbox casing overall condition startor motor side.



Wheel gear condition found white marks on Generator side

## Inspection Report



Pinion cogs condition.



Jacking oil hose condition.



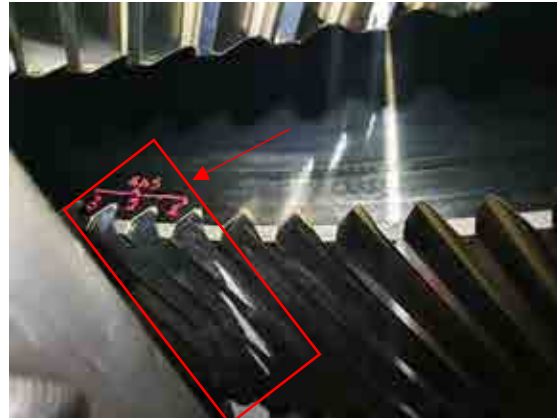
Original mark is same position on wheel gear.



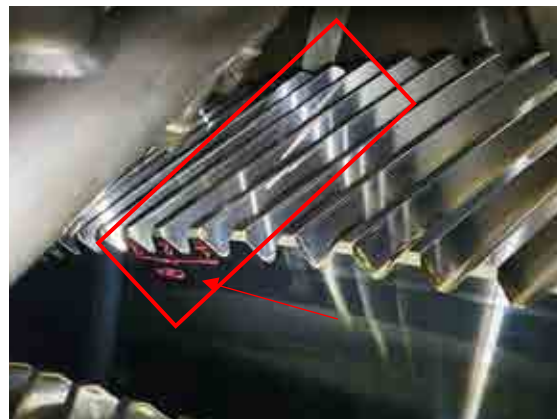
White mark 4.0 cm at left side on left wheel.



## Inspection Report



Electro discharge 14.5 cm at right side on right wheel and follow up location at next inspection.



Electro discharge 16 cm at left side on left wheel and follow up location at next inspection.



White mark on pinion gear generator side.



White mark on pinion gear gas turbine side.

## Inspection Report



Lube oil spraying when run lube oil system.



Lube oil leakage at end cap right side of manifold

### **Recommendation:**

- Continue to monitor for the progression of the white marks pattern on wheel gear.
- Continue to monitor for the progression of the elector discharge pattern on wheel gear.
- Continue to monitor for the progression of the white marks pattern on pinion gear.

**Speed reduction gear system is in serviceable condition.**

## Inspection Report

### 6.4 HG 2405 Compressor inlet casing

**Performed work:** Visual inspection.

**Result:**

- No remarks.



Inlet casing external condition left side.



Inlet casing external condition right side.



Compressor wash supply piping overall condition.



Compressor wash supply hose manifold condition.



Inlet casing drain good condition.



Minor dirt found left over on the floor of inlet casing.

## Inspection Report



Compressor washing nozzle overall condition.

### **Recommendation:**

- None

**The Compressor inlet casing is in serviceable condition.**



## Inspection Report

### 6.5 HG 2410 Compressor inlet piece

**Performed work:** Visual inspection.

**Result:**

- Observed lube oil leakage under right junction box.



Inlet piece external condition left side.



Inlet piece external condition right side.

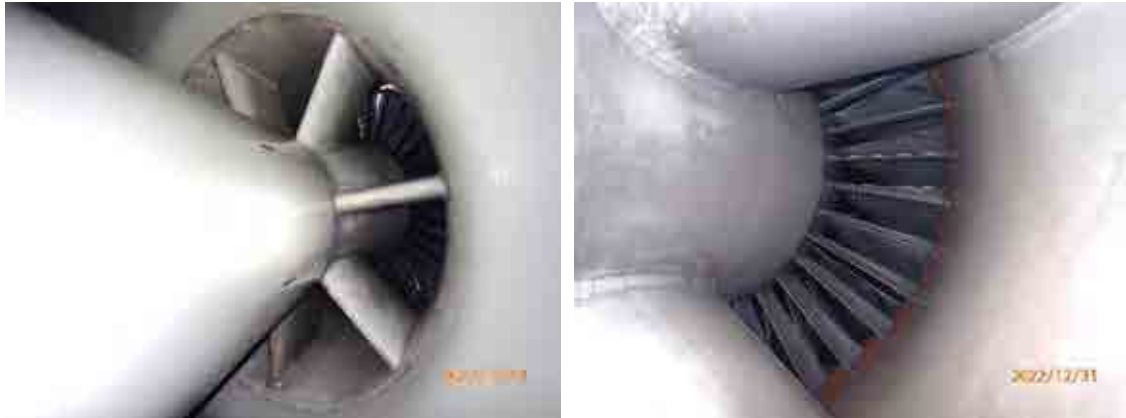


Jacking oil to bearing 1 overall condition.



Found lube oil on foundation under right junction box.

## Inspection Report



Overall condition of struts around inlet piece.

### **Recommendation:**

- It is recommended to clean the inlet piece by hand before startup.
- Follow up lube oil leakage under right side junction box.

**The Compressor inlet piece is in serviceable condition.**



## Inspection Report

### 6.6 HG 2320 Drainpipes

**Performed work:** Visual inspection.

**Result:**

- No remarks.



Drain valves overall condition.



CC casing drain port as found condition (No leakage)

**Recommendation:**

- Re-tighten during routine maintenance.

**The drainpipes are in serviceable condition.**

## Inspection Report

### 6.7 HG 2455 Guide vane control

**Performed work:** Visual inspection.

**Result:**

- No remarks.



GV Actuator support bracket overall condition.



GV Actuator rod overall condition.



GV actuator mechanism overall condition left side.



GV actuator mechanism overall condition right side.

**Recommendation:**

- None.

**The guide vane control system is in serviceable condition.**

## Inspection Report

### 6.8 HG 2440 Compressor rotor

**Performed work:** Borescope inspection of rotor stage 3, 8, 11 and 14.

**Result:**

- No remarks.



Compressor rotor stage 3 condition.



Compressor rotor stage 8 condition.



Compressor rotor stage 11 condition.



Compressor rotor stage 14 condition.

**Recommendation:**

- None.

**The Compressor Rotor is in serviceable condition.**

## Inspection Report

### 6.9 HG 2442 Compressor blade

**Performed work:** Borescope inspection of rotor stage 3, 8, 11 and 14.

**Result:**

- No remarks.



Compressor blades stage 3 condition.



Compressor blades stage 8 condition.



Compressor blades stage 11 condition.



Compressor blades stage 14 condition.

**Recommendation:**

- None.

**The Compressor blades are in serviceable condition.**

## Inspection Report

### 6.10 HG 2450 Compressor stator

**Performed work:** Borescope inspection of rotor stage 3, 8, 11 and 14.

**Result:**

- Observed abradable coating outer surface spallation at stage 8.



Abradable seal stage 3 condition.



Abradable seal stage 8 condition.



Abradable seal stage 11 condition.



Abradable seal stage 14 condition.

**Recommendation:**

- Follow up abradable seal stage 8 next major inspection.

**The Compressor stators are in serviceable condition.**



## Inspection Report

### 6.11 HG 2452 Compressor vanes

**Performed work:** Borescope inspection of rotor stage 3, 8, 11 and 14.

**Result:**

- No remarks.



Compressor Inlet guide vanes stage 0.



Compressor guide vanes stage 3.



Compressor guide vanes stage 8.



Compressor guide vanes stage 11.



Compressor guide vanes stage 14.

**Recommendation:**

- None.

**The Compressor guide vanes are in serviceable condition.**



## Inspection Report

### 6.12 HG 2580 Combustor

**Performed work:** Borescope inspection.

**Result:**

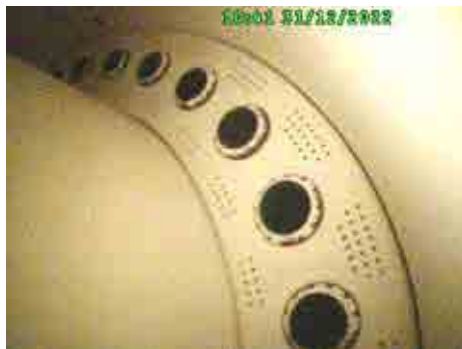
- No remarks.



Front panel with burners from burner#1.



Front panel with burners from burner#7.



Front panel with burners from burner#15.



Front panel with burners from burner#22.



Overall coating condition inside combustor.

**Recommendation:**

- None.

**The Combustor is in serviceable condition.**

## Inspection Report

### 6.13 HG 2540 Fuel burner

**Performed work:** Visual inspection burner #1, #7, #15 and #22.

**Result:**

- No remarks.



Dismantled burner#1 overall condition.



Burner#1 S/N 10077.



Gas fuel wings and pilot fuel pipe overall condition.



Mixing chamber overall condition.



No yellow powder deposit in main gas fuel.



Outer bellow condition.

## Inspection Report



TBC coating condition.



Dismantled burner#7 overall condition.



Burner#7 S/N 10072.



Gas fuel wings and pilot fuel pipe overall condition.



Mixing chamber overall condition.



No yellow powder deposit in main gas fuel.



## Inspection Report



Outer bellow condition.



TBC coating condition.



Dismantled burner#15 overall condition.



Burner#15 S/N 10082.



Gas fuel wings and pilot fuel pipe overall condition.



Mixing chamber overall condition.

## Inspection Report



No yellow powder deposit in main gas fuel.



Outer bellow condition.



TBC coating condition.



Dismantled burner#22 overall condition.



Burner#22 S/N 10080.



Gas fuel wings and pilot fuel pipe overall condition.

## Inspection Report



Mixing chamber overall condition.



Outer bellow condition.



TBC coating condition.

### **Recommendation:**

- None.

**The fuel burners are in serviceable condition.**



## Inspection Report

### 6.14 HG 2535 Flame detector

**Performed work:** Visual inspection.

**Result:**

- No remarks.



Flame detector on the left-side overall condition.



Flame detector on the right-side overall condition.

**Recommendation:**

- None.

**The flame detectors are in serviceable condition.**

## Inspection Report

### 6.15 HG 2530 Ignition system

**Performed work:** Visual inspection.

**Result:**

- No remarks.



Ignition plug external condition.

**Recommendation:**

- None.

**The ignition system is in serviceable condition.**

## Inspection Report

### 6.16 HG 2351 Fuel manifold

**Performed work:** Visual inspection.

**Result:**

- No remarks.



Manifold ring supply to burners overall condition.



Fuel manifold's pipe connecting overall condition.

**Recommendation:**

- None.

**The fuel manifold is in serviceable condition.**

## Inspection Report

### 6.17 HG 2510 Central casing

**Performed work:** Visual inspection.

**Result:**

- No remarks.



Overall condition of central casing.

**Recommendation:**

- None.

**The central casing is in serviceable condition.**

## Inspection Report

### 6.18 HG 2640 Turbine rotor

**Performed work:** Borescope inspection.

**Result:**

- Minor oxidation around leading edge and trailing edge cooling holes of blade stage 1.
- Fretting mark have observed at leading edge tip turbine blade stage 3.



TB blades 1 leading edge overall condition.



Blades 1 trailing edge cooling passage and platform.



Turbine blades 2 leading edge condition.



Turbine blades 2 trailing edge cooling passages.

## Inspection Report



Condition leading edge tip blades 3.



Condition leading edge platform blade 3.



Blades 3 trailing edge overall condition.



Blade 3 tip with honeycomb condition.

### **Recommendation:**

- None.

**The turbine rotor is in serviceable condition.**



## Inspection Report

### 6.19 HG 2650 Turbine stator stage no 1

**Performed work:** Borescope inspection.

**Result:**

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on guide vane 1 heat shield.
- Minor oxidation found on guide vane 1 rear hooks.



GV1 segment found good condition.



Inner/Outer vane plate condition.



GV1 as found condition at burner position 15



Inner/Outer vane plate condition at burner position 15.

## Inspection Report



Heatsheld stage 1 overall condition.



Heatshield stage 1 overall condition and seal strip.



Rear hooks and heatshields condition.



Another view rear hooks and heatshields condition.

### **Recommendation:**

- None

**The turbine stator stage 1 is in serviceable condition.**

## Inspection Report

### 6.20 HG 2651 Turbine stator stage no 2&3

**Performed work:** Borescope inspection.

**Result:**

- Minor oxidation on heat shield guide vane stage 2.



GV2 segments condition.



GV2 heatshields condition.



GV2 rear hook condition.

## Inspection Report



GV3 leading edge overall condition.



GV3 heatshield honeycomb overall condition.

### **Recommendation:**

- None.

**The turbine stator stage 2&3 are in serviceable condition.**

## Inspection Report

### 6.21 HG 2665 Outlet casing

**Performed work:** Visual inspection.

**Result:**

- Observed that the below joint has some damaged areas.



Vibration sensor to bearing 2 overall conditions.



Outlets bellow overall condition.



Bellow condition right bottom view condition.



**Recommendation:**

- Prepare vendor for repair bellow joint at next major inspection.

**The outlet casing is in serviceable condition.**

## Inspection Report

### 6.22 HG 2660 Exhaust diffuser

**Performed work:** Visual inspection.

**Result:**

- Cracks observed at multiple positions described in table below.



Exhaust diffuser wall overall condition.



All Bolts on inner cone are in good condition



Bleed pipe right hole condition



Bleed pipe left hole condition



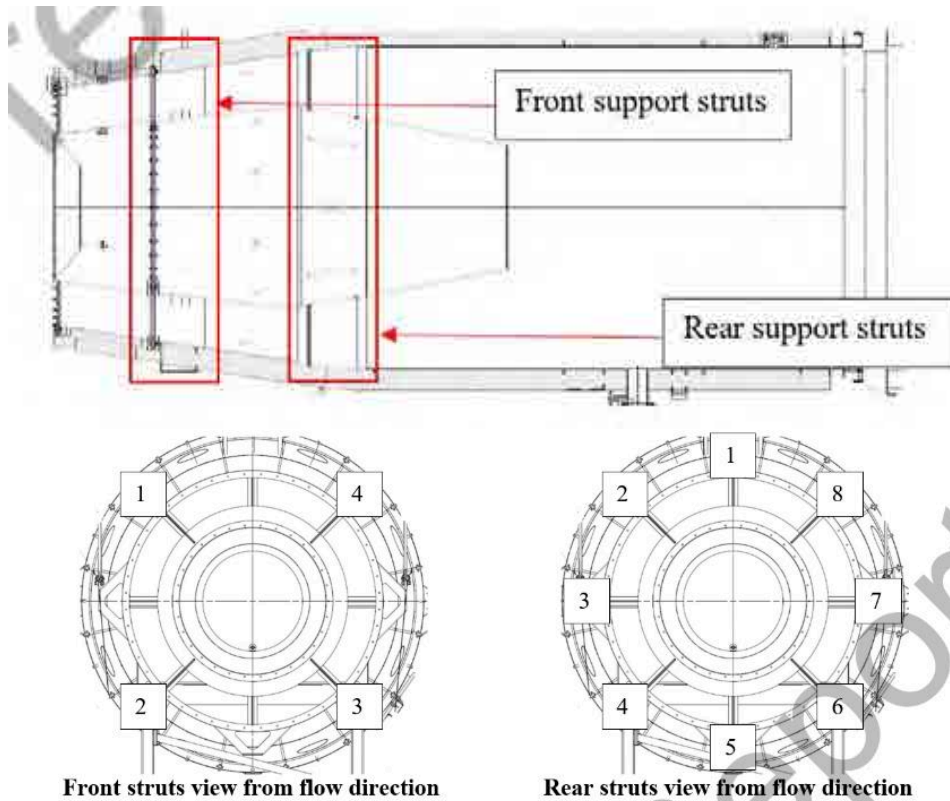
Example of crack at rear support struts.



Example of crack at front support struts.



## Inspection Report



Position	Leading edge outer weld	Trailing edge outer weld	Leading edge inner weld	Trailing edge Inner weld
1	Crack	Crack		Crack
2	Crack	Crack		Crack
3	Crack	Crack		
4	Crack	Crack		

Table of front support struts with cracks in the weld.

Position	Leading edge outer weld	Trailing edge outer weld	Leading edge inner weld	Trailing edge Inner weld
1			Crack	
2			Crack	
3			Crack	
4			Crack	
5			Crack	
6			Crack	
7			Crack	
8			Crack	

Table of rear support struts with cracks in the weld.

### Recommendation:

- Repair crack at front struts support next major inspection, according to table above.

## Inspection Report

**The exhaust diffuser is in serviceable condition.**

### 6.23 HG 2132 Insulation

**Performed work:** Visual inspection.

**Result:**

- Observed several insulation materials major damaged around fuel burner.



Insulation left side condition compressor area.



Insulation right side condition compressor area.



Condition of insulation on bleed pipe.



Condition of insulation at central casing drainpipes.

**Recommendation:**

- Next major inspection, please prepare vendor to repair some insulation pieces.

**The insulation is in serviceable condition.**

## Inspection Report

### 6.24 HG 2920 Skid erection, GT

**Performed work:** Visual inspection.

**Result:**

- No remarks.



Front inlet piece support overall condition.



Front inlet piece support overall condition.



Left side central casing support as found condition.



Left side central casing support foundation.



Right side central casing support overall condition.



Right side central casing support foundation.

## Inspection Report



Front central casing keys plates overall condition.



Rear central casing keys plates overall condition.

### **Recommendation:**

- None.

**The Skid erection are in serviceable condition.**



## Inspection Report

### 6.25 HG 2925 Erection, exhaust diffuser

**Performed work:** Visual inspection.

**Result:**

- No remarks.



Left side exhaust diffuser support condition.



Left side support foundation condition.



Right side exhaust diffuser support condition.



Right side support foundation condition.



Central exhaust diffuser support.

## Inspection Report

### **Recommendation:**

- None.

**The Erection, exhaust diffuser is in serviceable condition.**

### **6.26 Other observations**

**PSW/SGT-800/18-004: Safety Warning of the gas fuel flexible hoses installed on all medium gas turbines.**



Gas flexible hoses condition



## Inspection Report

# 7 Recommendations

### Air intake

- Clean intake filter housing intake louvers and ventilation filter housing intake louvers when replace filters.
- Clean floor inside intake filter housing when replace filters.
- Clean ventilation filter housing floor.
- Open mechanism needs to apply preventive rust with lubricant.

### Starter motor

- Continue to monitor flex coupling flex plate bundle condition during next inspection.

### Speed reduction gear

- Continue to monitor for the progression of the white marks pattern on wheel gear.
- Continue to monitor for the progression of the elector discharge pattern on wheel gear.
- Continue to monitor for the progression of the white marks pattern on pinion gear.

### Compressor inlet piece

- It is recommended to clean the inlet piece by hand before startup.
- Follow up lube oil leakage under right side junction box.

### Drainpipe

- Re-tighten during routine maintenance.

### Compressor stator

- Follow up abradable seal stage 8 next major inspection.

### Outlet casing

- Prepare vendor for repair bellow joint at next major inspection.

### Exhaust diffuser

- Repair crack at front struts support next major inspection, according to table above.

### Insulation

- Next major inspection, please prepare vendor to repair some insulation pieces.



MGT-2022-0436

Subject / Title:

**BD000166U04 SSUT 2:2, MI-50 KEOH, 2022,  
Commissioning report**

**Thailand**

Location

**2023-01-01**

Date

Project:

Customer Name: **SSUT Company Ltd**

Orderer's File Ref: **E1B101145805**

Order No Internal: **EA256377U03A112411**

Report No Internal:

**Wechagorngoson Natthapon**

Author(s)

**Johansson, Mats**

Released technically

**Hansson, Martin**

Released for external use

Classification:

**Restricted**

No of Appendices: **9**

Total Pages of Report: **87**

Codeword : **Bangpoo 2:2 (BP2)**  
Machine No : **BD000166U04**  
Product Type : **SGT-800**  
Type of Activity : **Inspection**  
Mobilization Date : **2022-12-30**  
Demobilization Date : **2023-01-01**  
Client Contact Name : **Mr.Wattana Chunark**

Executive Summary:

SSUT GT22 BD000166U04 A'50-inspection was performed according to Activity List E1B101145805: B. Findings were minimal and rectified during the inspection schedule with parts from customer stock.

Copies To:

Taptawat Paleerat  
Emelie Ljungblad

Gregeborg Erik

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ID: EIB101213257 Name: Commissioning report Rev: A Protection: Restricted IP: R00.S00  
Creator: Reviewer: Approver:  
ALIN ECGNN ECL: US-ContNo CoO:TH

## 1. Summary

1. Found VGV motor rubber coupling with actuator stiffness and damage. New rubber coupling has been replaced by customer spare part during inspection.
2. All gas detector sensors have been replaced and calibrated during inspection by customers.
3. Instrument air filter has been removed prior inspection by client.
4. All temperature sensors RTD on pinion bearing#22 MBK10CT010 had been opened. Temporary RTD has been connected to the terminal and measure temperature inside the cabinet.

## 2. Personnel

Name	Type	Start Date	End Date	Qualification	Comment	Shift
Natthapon Wechagorngoson	Siemens Energy Personnel	2022-12-30	2023-01-01	Commissioning Lead		Day
Arthit Phuttipongisit	Siemens Energy Personnel	2022-12-30	2023-01-01	Commissioning Engineer		Day
Somdej Arunplod	Siemens Energy Personnel	2022-12-30	2023-01-01	Quality Inspector		Day
Yuttapol Shawbangruk	Siemens Energy Personnel	2022-12-30	2023-01-01	Mech. TFA		Day

## 3. Operating Statistics

### Package

Date of Counter Readings : 2022-12-30  
 Operating Hours : 46307  
 Equivalent Operating Hours : 48968  
 Starts : 452  
 Fast Starts : N/A  
 Equivalent Operating Cycles : 529  
 Total Production of MWh : 1463956  
 Total Production of MV Ar+ : 243697  
 Total Production of MV Ar- : 7  
 Serial Number of Gearbox : 12722  
 Serial Number of Generator : 8269008

### Comment :

## 4. Commissioning Activities

### 4.1. Activities According to Maintenance Plan

#### 4.1.1 Preparation

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	//	Off-line washing of the compressor prior to the inspection (customer obligation).	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed prior inspection.

#### 4.1.2 Before shutdown

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	//	Check the start sequence during start-up.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
2	//	Perform readings before shutdown, full load (T7L), 75%, 50% and 25% load. Operation on temperature limitation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
3	//	Shaft voltage measurement to assess the bearing insulation (Siemens generators)	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A

#### 4.1.3 Shutdown

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	//	Trip the unit with an emergency stop button to check the trip function (From approximately 0,5MW-load).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
2	//	Secure the unit for safe work.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed.

#### 4.1.4 Stationary commissioning

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Gas turbine system / MBA	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
2	/ Gas turbine system / MBA	Pulsation measuring equipment. Cleaning and function check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA	Performed. See in Appendix D
3	/ Gas turbine system / MBA	Check function of VGV. Verify position at 20%, 50% and fully open.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA	<p>Performed.</p> <p>Found VGV motor rubber coupling with actuator stiffness and damage. New rubber coupling has been replaced by customer spare part during inspection.</p> <p>See in Appendix C</p> <p><b>Photo Attachments</b> VGV motor coupling was gone.</p>
4	/ Gas turbine system / MBA	Instrumentation. Check selected switches, transmitters, vibration- and	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed. See in Appendix A and B



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		speed probes, according to setting list				
5	/ Gas turbine / MBA	Flame detector, function check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBA10CQ005/010	Performed.  <b>Photo Attachments</b> Flame detector function check Flame detector function check
6	/ Cooling/ Sealing/Purge air system / MBH	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
7	/ Cooling/ Sealing/Purge air system / MBH	Check function of valves.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH	Performed.
8	/ Cooling/ Sealing/Purge air system / MBH	Bleed valves. Check opening and closing time, fully opened and closed position.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH	Performed. See in Appendix C
9	/ Cooling/ Sealing/Purge air system / MBH	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBH10 MBH20	Performed. See in Appendix B
10	/ Starting/ Gear electric generator system / MBJ/ MBK	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
11	/ Starting/ Gear electric generator system / MBJ/ MBK	Visual inspection of frequency converter cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
12	/ Starting/ Gear electric generator system / MBJ/ MBK	Check frequency converters fan function.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
13	/ Starting/ Gear electric generator system / MBJ/ MBK	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBJ MBK	Performed. See in Appendix B
14	/ Air intake system / MBL	Visual inspection for general	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		condition, obstructions, cleanliness, flanges, inspection hatches, sealings, gaskets and for foreign objects.				
15	/ Air intake system / MBL	Visual inspection of filters for obstruction and contamination.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
16	/ Air intake system / MBL	Visual inspection (limited access).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBL	Performed.
17	/ Air intake system / MBL	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed. See in Appendix B
18	/ Air intake system / MBL	Option 732-0, pulse cleaned filters. Visual inspection of filters for obstruction and contamination.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A
19	/ Air intake system / MBL	Option 574, Anti-icing: If performance decreased, clean if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
20	/ Air intake system / MBL	Option 574, Anti-icing: Check glycol density.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
21	/ Air intake system / MBL	Option 574, Anti-icing: Visual inspection for leakage, damage and corrosion.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A
22	/ Air intake system / MBL	Option 574, Anti-icing: Blow in doors - Check proper function and movement.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
23	/ Gas fuel system / MBP	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
24	/ Gas fuel system / MBP	Central gas control valve. Function check and inspection for external leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed.
25	/ Gas fuel system / MBP	Check the control valves positions at 0, 45 and 90 degrees and the zero-offset. Check of limit switches and ignition position. Inspection for external leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed. See in Appendix C
26	/ Gas fuel system / MBP	Shut-off valves. Function check and inspection for external leakage. Check the pneumatic regulator settings. Check opening and closing time.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed.  Opening and closing time < 1 sec.
27	/ Gas fuel system / MBP	Isolation valve. Function check and inspection for external leakage. Check opening and closing time.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed.  Opening and closing time < 1 sec.
28	/ Gas fuel system / MBP	Flow meter. Visual inspection during operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed.
29	/ Gas fuel system / MBP	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	Performed. See in Appendix B

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
30	/ Gas fuel system / MBP	Option 249, 250, 251 Coalescer and particle Filters. Visual inspection for rust, deposit and liquids, clean and replace cartridges if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBP	N/A
31	/ Gas fuel system / MBP	Option 252 Heater. Check for proper operation and setting.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBP	N/A
32	/ Gas fuel system / MBP	Option 254 Knock out pot. Safety relief valve. Visual inspection for external leakage.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBP	N/A
33	/ Lube Oil System / MBV	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
34	/ Lube Oil System / MBV	Visual inspection of frequency converter cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
35	/ Lube Oil System / MBV	Check frequency converter fan and pump function.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
36	/ Lube Oil System / MBV	Oil filter. Replace disposable cartridges if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	Performed.
37	/ Lube Oil System / MBV	Check for no water in the tank by external pump connected at interface MBV10/05.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
38	/ Lube Oil System / MBV	Check oil tank level.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
39	/ Lube Oil System / MBV	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MBV	Performed. See in Appendix B
40	/ Lube Oil System / MBV	Option 194, 196. Air cooled oil cooler. Visual inspection of fan blades for cracks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	N/A
41	/ Lube Oil System / MBV	Option 194, 196. Air cooled oil cooler. Check for leaks. Clean if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	N/A
42	/ Lube Oil System / MBV	Option 197, 198. Water cooled oil cooler. Visual inspection for External leakage.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MBV	Performed.
43	/ Ventilation generator system / SAE	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
44	/ Ventilation generator system / SAE	Visual inspection of filters for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAE	Performed.
45	/ Ventilation generator system / SAE	Louvers. General visual inspection for obstructions.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAE	Performed.
46	/ Ventilation generator system / SAE	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAE	Performed. See in Appendix B
47	/ Ventilation generator system / SAE	Option 246 Shut- off dampers inlet and outlet. Visual inspection of damper and function check.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAE	Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
48	/ Ventilation gas turbine system / SAG	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
49	/ Ventilation gas turbine system / SAG	Visual inspection of filter for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SAG	Performed.
50	/ Ventilation gas turbine system / SAG	Visual inspection and function check of shut-off dampers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAG	Performed.
51	/ Ventilation gas turbine system / SAG	Verify switches and transmitters according to setting list.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SAG	Performed.
52	/ Ventilation gas turbine system / SAG	Visual inspection of the low point extractions below the turbine.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
53	/ HVAC for LER / SAC	Visual inspection of filters for obstruction and contamination.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
54	/ HVAC for LER / SAC	Ventilation fan. Check for abnormal noise and vibrations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
55	/ Washing and cleaning system / SDB	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
56	/ Washing and cleaning system / SDB	Check correct delivery pressure and leakage of pump.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	N/A
57	/ Washing and cleaning system / SDB	Inspect pump inlet strainer and outlet filter.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	N/A
58	/ Washing and cleaning system / SDB	Check the nozzles for obstruction, clean if necessary with instrument air.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	N/A



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
59	/ Washing and cleaning system / SDB	Check hoses for leakage and general condition.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
60	/ Washing and cleaning system / SDB	Heaters - Check proper operation and setting.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	N/A
61	/ Washing and cleaning system / SDB	Inspect the tanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDB	Performed.
62	/ Fire detection and extinguishing system CO2 / SGJ	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
63	/ Fire detection and extinguishing system CO2 / SGJ	Check all detectors for proper function.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A
64	/ Fire detection and extinguishing system CO2 / SGJ	Visual inspection of the weighing mechanism for the CO2 bottles. Check if the bottles have to be refilled or changed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed.
65	/ Gas detection system / SFY	Visual inspection for general condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.  All detector sensors have been replaced and calibrated during inspection by customers
66	/ Instrument air system / QFA	Check pressure and for external leaks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.  Instrument air filter has been removed prior inspection by client.  <b>Photo Attachments</b> Instrument air filter has been removed.
67	/ Instrument air system / QFA	Check oil level in compressor	<input type="checkbox"/>	<input checked="" type="checkbox"/>		N/A

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		and refill if necessary.				
68	/ Instrument air system / QFA	Visual inspection and replace cartridges if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A.  Instrument air filter has been removed prior inspection by client.
69	4093 / Enclosure /	Visual inspection for damage and leakage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		N/A.  Instrument air filter has been removed prior inspection by client.
70	/ Control system / CJP/ CRB	Visual inspection of cabinets.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
71	/ Control system / CJP/ CRB	Take backups of all the programs from the controllers where changes have been performed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CJP/CRB	Performed.
72	/ Control system / CJP/ CRB	Verify time synchronization on data collector/ CMS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Valid for PCS7	Performed.
73	/ Protection system / CAA	Check function of ESD: Low lubrication-oil pressure. Pump change over and trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed.
74	/ Protection system / CAA	Check function of ESD: Fire protection. Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed.
75	/ Protection system / CAA	Check function of ESD: Emergency stop push button.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed.
76	/ Protection system / CAA	Check function of ESD: Ventilation system Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
77	/ Protection system / CAA	Check function of ESD: Gas Detection Trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed.
78	/ Protection system / CAA	Check function of ESD: Overspeed trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed.
79	/ Protection system / CAA	Check function of ESD: Pulsation trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CAA	Performed.
80	/ Synchronizing cubicle / CBP	Check setting levels of equipment.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
81	/ Generator Protection / CHA	Visual inspection of the cabinet.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CHA	Performed.
82	/ Generator transformer / BAT	Visual inspection of transformer for oil leaks and cleanliness.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	N/A
83	/ Generator transformer / BAT	Check the oil level.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	N/A
84	/ Generator transformer / BAT	Check drying equipment.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BAT	N/A
85	/ MV switchboards / BBA	Visual inspection of switchboards and switchgears.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
86	/ Main LV switchboards / BFA	Visual inspection of the switchboards and switchgear.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
87	/ Auxiliary transformer / BFT	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BFT	Performed.
88	/ UMD/UPS system / BPA	Visual inspection of the cubicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BPA, UMD/UPS	Performed.
89	/ Battery system, 440V / BTA	Visual inspection of battery system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
90	/ Battery charger, 440V / BTL	Visual inspection of charger cubicle.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
91	/ Battery charger, 440V / BTL	Check the charger LL level.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed.
92	/ Battery charger, 440V / BTL	Check normal charging current and voltage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BTL	Performed.
93	/ Battery charger, 440V / BTL	Check fast charging sequence if applicable.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BTL	N/A

### Photo Attachments Stationary commissioning



3 VGV motor coupling was gone.



5 Flame detector function check



5 Flame detector function check



66 Instrument air filter has been removed.

#### 4.1.5 Rotating commissioning

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Before start /	Before starting visual inspection of inlet channel from intake to inlet casing. Check cleanness for GG-room, generator room, air inlet room and plenum.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
2	/ Before start /	Before start check lubrication-oil pressures sub-pressure and tank level. Check for abnormal noise, vibrations and leaks from pumps and mist fan. Check that all valves are in correct position.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
3	/ Before start /	Test of pump change over simulate cool init and verify feedback. Test of ESD function low lubrication-oil pressure.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
4	/ Before start /	Preparation of temporary measuring equipment. Measure the speed from barring speed to zero and from purge speed to zero.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
5	/ Before start /	Check and adjust ignition	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		system if needed.				
6	/ Before start /	Check that the drain valves for washing water are closed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Performed.
7	/ Before start /	Check that all the transmitter blocks were calibration have been performed are open/closed correct for operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
8	/ Checks during start /	Check start-sequence during run-up. Note T7 max and observe vibration levels during start-up, fuel valve, pressure and bearings temperature.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed. T7 max = 403 deg.C
9	/ Checks during start /	Check that there are no fuel-, lubrication-oil or hot air leakages.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
10	/ Checks during start /	Check function of selected hard wired trip.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
11	/ Checks during start /	Before synchronization check regulator response for AVR and FCR.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
12	/ Checks during start /	Take readings, pulsation measurement, verify valve opening/heating value when flow meter and heating value for the gas is available and	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.



Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		do inspection rounds of the unit at stabilized condition at idle, 5 MW, 10MW, 15MW, 20MW, 25MW, 30MW, 35MW, 40MW and base load (peak load if applicable).				
13	/ Checks during start /	Take readings for performance validation if the unit has performance degradation guarantee.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
14	/ Checks during start /	At base load, check temperatures after bleed valves to ensure that bleed valves are closed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
15	/ Checks during start /	Visual inspection of flow meter (MBP05/20CF005) during operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.
16	/ Miscellaneous /	Note hours of turbine operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.

#### 4.1.6 Generator maintenance ABB AMS 900-1250

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Electric generator system / MKA	Look through all logged or recorded data available; load, temperature,	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
		vibrations etc. Fill in the report.				
2	/ Electric generator system / MKA	External inspection regarding rust, leaks or other affection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed.
3	/ Electric generator system / MKA	Checking of tightness of all fixing elements.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed.
4	/ Electric generator system / MKA	Ensure ventilation ducts are clean and free from obstructions if connected to external air.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed.
5	/ Electric generator system / MKA	Replace air filter, if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General	Performed.
6	/ Electric generator system / MKA	Inspection of winding connections	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stator winding	Performed.
7	/ Electric generator system / MKA	Inspection of winding and bracing rope	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Stator winding	Performed.
8	/ Electric generator system / MKA	Inspection for discoloration.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pressure fingers	Performed.
9	/ Electric generator system / MKA	Visual inspection of sealing.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air cover	Performed.
10	/ Electric generator system / MKA	Check if the RTDs give reasonable values on the visual display unit (VDU).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	RTD:s	Performed.
11	/ Electric generator system / MKA	Check all line- and neutral connections.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
12	/ Electric generator system / MKA	Check of general condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed.
13	/ Electric generator system / MKA	Inspection of pressure relief hatch.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed.
14	/ Electric generator system / MKA	Visual inspection of insulators.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Terminal box	Performed.
15	/ Electric generator system / MKA	Visual inspection of turn insulation, discoloration etc from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rotor coils	Performed.
16	/ Electric generator system / MKA	Visual inspection of pole shoes regarding discoloration from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pole shoes	Performed.
17	/ Electric generator system / MKA	Inspection for leaks. External and from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed.
18	/ Electric generator system / MKA	Inspect all bolted joints.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed.
19	/ Electric generator system / MKA	Inspection of guide support.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bearing housing and support	Performed.
20	/ Electric generator system / MKA	Visual inspection for leaks, external and from inspection hatches. If leaks, check for wear and damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shaft seals	Performed.
21	/ Electric generator system / MKA	Visual external inspection for leaks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oil piping	Performed.
22	/ Electric generator system / MKA	Verify function of all measuring instruments.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Measuring instrument	Performed.

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
23	/ Electric generator system / MKA	If necessary replace filter for air intake to the air-lock seals located on bearing pedestals.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Air filter	Performed.
24	/ Electric generator system / MKA	Visual inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exciter rotor	Performed.
25	/ Electric generator system / MKA	Visual inspection from inspection hatches.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exciter Stator	Performed.
26	/ Electric generator system / MKA	Visual inspection. Replace if shorter than 15 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brush and brush holder	Performed. All brushes in good condition.
27	/ Electric generator system / MKA	Check of rotor ground fault protection. Not valid if removed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Brush and brush holder	Performed.
28	/ Electric generator system / MKA	Visual inspection of slipring.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Slip ring	Performed.
29	/ Electric generator system / MKA	Visual external inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed.
30	/ Electric generator system / MKA	Check of cleanliness, corrosion and/ or erosion damages on air- or water side.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed.
31	/ Electric generator system / MKA	Clean air and water sides.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed.
32	/ Electric generator system / MKA	Pressure check.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cooler	N/A
33	/ Electric generator system / MKA	Function check of casing water leakage detector.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cooler	Performed.

## 4.2. Activities Outside Maintenance Plan

### 4.2.1 Additional activities

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
1	/ Flexible coupling /	Continue to monitor flex coupling flex plate bundle condition during next inspection.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Acc to Inspection Report E1B100962567	Performed.  See in Inspection Report
3	/ Control system General / CJP CRB	SuP19/2020/SGT-800 Revised LFP/ NFP Pulsations levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.  See in Appendix G.
4	/ Control system General / CJP CRB	SuP01/2021/SGT-800 Removal of high temperature alarm on stator ring 2 & 3	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Performed.  See in Appendix G.
7	/ Control system General / CJP CRB	SuP25/2015/SGT-800 Reduction Vibration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Check if previously implemented	Already performed.  Corrected alarm message. See in Appendix G.
8	/ Gear system Instrumentation / MBK	Check measurement loop of the Pinion Bearing (Free End) Temperature MBK10CT010 for disturbance or noise that can cause altered reading. Try swapping with the spare element. If the problem persists, it is recommended to replace the temperature sensor at next possible opportunity.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report	All temperature sensors RTD on pinion bearing 22 had been opened. Temporary RTD has been connected to the terminal and measure temperature inside the cabinet.  <b>Photo Attachments</b> Temporary RTD has been connected.

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Creator: Reviewer: Approver:  
ALIN ECGNN ECL: US-ContNo CoO:TH

Item No[A.Id]	HG/System/ KKS	Activity	Suppl.	Cust.	Scope Remark	Field Service Remark
9	/ Gear system Instrumentation / MBK	Visual inspect the Gear Box Casing vibration sensor MBK10CY030 regarding cables, ground points, connection points and installation of the sensor itself. If the problem persists, it is recommended to replace the vibration sensor at next possible opportunity.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As recommended in ROC report	Performed.  Sensor has been removed for cleaning the connector. Connection still tightened and shield is correct according to the drawing.  <b>Photo Attachments</b> VB sensor was cleaned and still tightened. Shield is correct according to dwg.

**Photo Attachments Additional activities**



8 Temporary RTD has been connected.



9 VB sensor was cleaned and still tightened.





9 Shield is correct according to dwg.

## 5. Inspection Result

The inspection was completed according to activity list. No major abnormal can be observed. Machine can continued running with some remark as shown in the report.

## 6. Recommendations

1. Replace MBK10CT010 RTD sensors for gearbox bearing during next major inspection.

## 7. Software Changes

Change	Item Designation	Reference	Remark
Alarm and trip levels for low and narrow frequency pulsations.	AS2 MBA10CP901 MBA10CP085 MBA10CP090 MBA10CP095 MBA10EZ901	M800-03647	See details in Appendix G.
Removal of high temperature alarm on stator ring 2 & 3	AS1: MBA10FT905	SuP01/2021/SGT-800	See in Appendix H.
Reduction of vibration level during purge.	AS2: MBA10CY005 MBA10CY010	SuP25/2015/SGT-800 Reduction of vibration level during purge	See in Appendix I.

## 8. Appendices

8.1 Appendix A Speed and Vibration Protocol

8.2 Appendix B Pressure Transmitter Protocol

- 8.3 Appendix C Regulated Valves and VGV Protocol
- 8.4 Appendix D Pulsation Protocol
- 8.5 Appendix E Coast Down Test
- 8.6 Appendix F Readings
- 8.7 Appendix G M800-03647 Change Pulsation level settings
- 8.8 Appendix H SuP01-2021 Remove high temp alarm stator ring 2 - 3
- 8.9 Appendix I SuP25-2015-SGT800 Reduction of vibration level during purge

**1**

**8.1 Appendix A Speed and Vibration Protocol**

ID: E1B101213257 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH

## Speed and Vibration Test Protocol

### Speed and Vibration

Scale factor: 2 rpm / Hz

Frequency (Hz)	MBA10CS005 Speed rotor VDU (rpm)	MBA10CS010 Speed rotor VDU (rpm)
750	1500	1500
1500	3000	3000
2250	4500	4500
3000	6000	6000
3300	6600	6600
3650	7300	7300

Scale factor: 2 rpm / Hz

Frequency (Hz)	MBA10CS015 Overspeed rotor VDU (rpm)	MBA10CS020 Overspeed rotor VDU (rpm)	MBA10CS030 Overspeed rotor VDU (rpm)
750	1500	1500	1499
1500	3000	3000	3000
2250	4500	4500	4499
3000	6000	6000	5999
3300	6600	6600	6599
3650	7300	7300	7299
Overspeed step 1	6932 /hmi		
Overspeed Trip	7260		

## Speed and Vibration Test Protocol

Scale factor: 10.19 mV / mm/s

mV	MBA10CY005 Bearing 1 VDU (mm/s)	MBA10CY025 Bearing 1 VDU (mm/s)	MBA10CY030 Bearing 1 VDU (mm/s)
51	6.1	6.1	6.1
102	10.6	10.6	10.6
153	15.3	15.3	15.3
204	20.3	20.3	20.3
255	25.2	25.2	25.2

Scale factor: 5.71 mV / mm/s

mV	MBA10CY010 Bearing 2 VDU (mm/s)	MBA10CY015 Bearing 2 VDU (mm/s)	MBA10CY020 Bearing 2 VDU (mm/s)
29	4.9	4.9	4.9
57	9.9	9.9	9.9
86	15.0	15.0	15.0
114	19.9	19.9	19.9
142	24.8	24.8	24.8

Scale factor: 3.94 mV / mm/s

mV	MKA10CY005 Generator bearing DE VDU (mm/s)	MKA10CY035 Generator bearing DE VDU (mm/s)	MKA10CY040 Generator bearing DE VDU (mm/s)
20	4.8	4.8	4.8
40	10.0	10.0	10.0
59	14.8	14.8	14.8
79	20.0	20.0	20.0
99	24.9	24.9	24.9

## Speed and Vibration Test Protocol

Scale factor: 3.94 mV / mm/s

mV	MKA10CY010 Generator bearing NDE VDU (mm/s)	MKA10CY045 Generator bearing NDE VDU (mm/s)	MKA10CY050 Generator bearing NDE VDU (mm/s)
20	4.8	4.8	4.8
40	10.0	10.0	10.0
59	14.8	14.9	14.8
79	20.0	19.9	19.9
99	24.9	24.9	24.9

Scale factor: 10.19 mV / mm/s

mV	MBK10CY005 Gearbox casing turbine side VDU (mm/s)	MBK10CY006 Gearbox casing turbine side VDU (mm/s)	MBK10CY007 Gearbox casing turbine side VDU (mm/s)
51	6.0	6.0	6.0
102	10.5	10.5	10.5
153	15.3	15.3	15.3
204	20.0	20.0	20.0
255	25.2	25.2	25.2

Scale factor: 10.19 mV / mm/s

mV	MBK10CY030 Gearbox casing wheel side VDU (mm/s)
51	6.1
102	10.4
153	15.4
204	20.2
255	25.3



## Speed and Vibration Test Protocol

### COMPLETION

Test Executer	Date	Signature	Company
	1/1/2023	Natthapon Wechagorngoson	Siemens Energy
	1/1/2023	Arthit Phuttipongisit	Siemens Energy

IDE:1B101213257 Name:Commissioning report Rev:A Protection:Restricted IP:R00,S00  
 Creator: Reviewer: Approver:  
 AL:N ECCNN ECL: US:ContNo CoO:TH

**2**

**8.2 Appendix B Pressure Transmitter Protocol**

## Pressure Transmitter Test Protocol

### Pressure Transmitter

#### **MBA Gas turbine system**

MBA10CP005 Compressor Inlet Diff Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [30]	kPa

	0%		50%		100%	Unit
Setting	0		15.0		30.0	kPa
Input pressure	0		15.0		30.0	kPa
VDU	0		15.0		30.0	kPa

MBA10CP010 Compressor Inlet Pressure

Function check according to setting list

- Nominal setting

Range	Unit
[80] – [120]	kPa (a)

	0%		50%		100%	Unit
Setting	80.0		100.0		120.0	kPa(a)
Input pressure	80.0		100.0		120.0	kPa(a)
VDU	80.0		100.0		120.0	kPa(a)

MBA10CP015 Pressure Compressor Outlet

Function check according to setting list

- Nominal setting

Range	Unit
[0] – [2.5]	MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

## Commissioning

BD000166U04

## Pressure Transmitter Test Protocol

MBA10CP016 Pressure Compressor Outlet

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

MBA10CP017 Pressure Compressor Outlet

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

MBA10CP30 Pressure Compressor Chamber

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

## Commissioning

BD000166U04

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Pressure Transmitter Test Protocol

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MBA10CP035      Pressure Disc1

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [2.5]                      MPa

	0%		50%		100%	Unit
Setting	0		1.25		2.5	MPa
Input pressure	0		1.25		2.5	MPa
VDU	0		1.25		2.5	MPa

MBA10CP040      Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [12]                      kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0		6		12	kPa
VDU	0		6		12	kPa

MBA10CP041      Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
   [0] – [12]                      kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0		6		12	kPa
VDU	0		6		12	kPa

## Commissioning

BD000166U04

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Pressure Transmitter Test Protocol

---

MBA10CP042 Turbine Exhaust Diff Pressure

Function check according to setting list

- Nominal setting

Range  
[0] – [12]

Unit  
kPa

	0%		50%		100%	Unit
Setting	0		6		12	kPa
Input pressure	0		6		12	kPa
VDU	0		6		12	kPa

MBA10CP045 Turbine Exhaust Pressure

Function check according to setting list

- Nominal setting

Range  
[80] – [120]

Unit  
kPa (a)

	0%		50%		100%	Unit
Setting	80		100		120	kPa(a)
Input pressure	80		100		120	kPa(a)
VDU	80		100		120	kPa(a)

MBA10CP065 Air Intake Diff Pressure

Function check according to setting list

- Nominal setting

Range  
[-3] – [3]

Unit  
kPa

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3		0		3	kPa
VDU	-3		0		3	kPa



## Pressure Transmitter Test Protocol

MBA10CP070 Air Intake Diff Pressure

Function check according to setting list.

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [-3] – [3]   | kPa         |

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3		0		3	kPa
VDU	-3		0		3	kPa

MBA10CP075 Air Intake Diff Pressure

Function check according to setting list.

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [-3] – [3]   | kPa         |

	0%		50%		100%	Unit
Setting	-3		0		3	kPa
Input pressure	-3		0		3	kPa
VDU	-3		0		3	kPa

**MBA Gas Turbine System**

MBA10CP050 Anti-Surge Protection  
MBA10CP055 Anti-Surge Protection  
MBA10CP060 Anti-Surge Protection

Function check according to setting list

	Setting value	Old value	Unit
MBA10CP050	5	5	mbar
MBA10CP055	5	5	mbar
MBA10CP060	5	5	mbar

## Pressure Transmitter Test Protocol

### MBH Cooling & Sealing Air system

MBH10CP020 Pressure Turbine Stage 2 Cooling

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [1]    | MPa         |

	0%		50%		100%	Unit
Setting	0		0.5		1.0	MPa
Input pressure	0		0.5		1.0	MPa
VDU	0		0.5		1.0	MPa

MBH10CP025 Pressure External Stator Cooling

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [250]  | KPa         |

	0%		50%		100%	Unit
Setting	0		125		250	KPa
Input pressure	0		125		250	KPa
VDU	0		125		250	KPa

MBH10CP030 Pressure Turbine Stage 3 Cooling

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [400]  | KPa         |

	0%		50%		100%	Unit
Setting	0		200		400	MPa
Input pressure	0		200		400	KPa
VDU	0		200		400	KPa

## Pressure Transmitter Test Protocol

### MBV Lube oil System

MBV10CP015 Lube Oil Tank Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [-5]   | kPa         |

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0		-2.5		-5	kPa
VDU	0		-2.5		-5	kPa

MBV10CP020 Lube Oil Tank Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [-5]   | kPa         |

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0		-2.5		-5	kPa
VDU	0		-2.5		-5	kPa

MBV10CP025 Lube Oil Tank Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [-5]   | kPa         |

	0%		50%		100%	Unit
Setting	0		-2.5		-5	kPa
Input pressure	0		-2.5		-5	kPa
VDU	0		-2.5		-5	kPa

## Commissioning

BD000166U04

## Pressure Transmitter Test Protocol

MBV40CP010 Lube Oil Filter DP

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [150]                      kPa

	0%		50%		100%	Unit
Setting	0		75		150	kPa
Input pressure	0		75		150	kPa
VDU	0		75		150	kPa

MBV40CP015 Lube Oil Supply Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [300]                      kPa

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0		150		300	kPa
VDU	0		150		300	kPa

MBV40CP025 Lube Oil Supply Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [300]                      kPa

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0		150		300	kPa
VDU	0		150		300	kPa

## Commissioning

BD000166U04

## Pressure Transmitter Test Protocol

MBV40CP055 Lube Oil Supply Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [300]                      kPa

	0%		50%		100%	Unit
Setting	0		150		300	kPa
Input pressure	0		150		300	kPa
VDU	0		150		300	kPa

**Pressure switches**

MBV21CP005 Lube Oil Pressure After Pumps 1  
MBV22CP005 Lube Oil Pressure After Pumps 2  
MBV23CP005 Lube Oil Pressure After Pumps 3

Function check according to setting list

- Nominal setting                      Range                      Unit  
[50] L1                      kPa

	Setting value	Old value	New value	Unit
MBV21CP005	50	50	-	kPa
MBV22CP005	50	50	-	kPa
MBV23CP005	50	50	-	kPa

## Pressure Transmitter Test Protocol

**MBL Air intake system**

MBL10CP005 Diff Pressure Pre-filter

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

MBL10CP010 Diff Pressure High Efficiency Filter

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

MBL10CP030 Air intake Diff Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa



## Commissioning

BD000166U04

## Pressure Transmitter Test Protocol

MBL10CP035 Air intake Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                                  kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

MBL10CP040 Air intake Diff Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                                  kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

**MBP Gas fuel system**

MBP10CP005 Gas Fuel Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [4]                                  MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

## Commissioning

BD000166U04

## Pressure Transmitter Test Protocol

MBP10CP010 Gas Fuel Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [4]                      MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP10CP011 Gas Fuel Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [4]                      MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP10CP012 Gas Fuel Pressure

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [4]                      MPa

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

## Pressure Transmitter Test Protocol

MBP10CP025 Gas Fuel Pressure after Main Valve

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [4]    | MPa         |

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP20CP025 Gas Fuel Pressure after Pilot Valve

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [4]    | MPa         |

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

MBP30CP025 Central Gas Fuel Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [4]    | MPa         |

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

## Pressure Transmitter Test Protocol

MBP60CP005 Ignition Gas Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [4]    | MPa         |

	0%		50%		100%	Unit
Setting	0		2		4	MPa
Input pressure	0		2		4	MPa
VDU	0		2		4	MPa

### SAG Ventilation system gas turbine room

SAG10CP005 GT-Room/Ambient Diff Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

SAG10CP010 GT Room Vent Fan Diff Pressure

Function check according to setting list

- |                        |              |             |
|------------------------|--------------|-------------|
| <u>Nominal setting</u> | <u>Range</u> | <u>Unit</u> |
|                        | [0] – [2]    | kPa         |

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

## Commissioning

BD000166U04

## Pressure Transmitter Test Protocol

SAG10CP015 Diff Pressure Over Fan

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                                  kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

SAG10CP020 Diff Pressure Over Fan

Function check according to setting list

- Nominal setting                      Range                      Unit  
[0] – [2]                                  kPa

	0%		50%		100%	Unit
Setting	0		1		2	kPa
Input pressure	0		1		2	kPa
VDU	0		1		2	kPa

## COMPLETION

Test Executer	Date	Signature	Company
	1/1/2023	Natthapon Wechagorngoson	Siemens Energy
	1/1/2023	Arthit Phuttipongkit	Siemens Energy

**3**

**8.3 Appendix C Regulated Valves and VGV Protocol**

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Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH



## Valves and VGV Test Protocol

### Regulated Valves

#### Main Gas Valve

SP	VDU (%)	Valve (%)
0	0	0
25	25	25
50	50	50
75	75	75
100	100	100
Start position (XP31)	VDU (%)	Valve (%)
0 -> 1 Falling	3	6
1 -> 0 Raising	5	7
Zero offset	Old (rev/min)	New (rev/min)
	N/A	N/A

#### Pilot Gas Valve

SP	VDU (%)	Valve (%)
0	0	0
25	25	25
50	50	50
75	75	75
100	100	100
Start position (XP31)	VDU (%)	Valve (%)
0 -> 1 Falling		24
1 -> 0 Raising		27
Zero offset	Old (rev/min)	New (rev/min)

## Valves and VGV Test Protocol

### Central Gas Valve

SP	VDU (%)	Valve (%)
0	0	0
25	25	25.3
50	50	50.3
75	75	75.2
100	100	99.8

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 Creator: Reviewer: Approver:  
 ALN ECCNN ECL: US-ContNo CoO:TH

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Valves and VGV Test Protocol

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### Bleed Valve 1

SP	Valve (%)	VDU (%)
0	-0.2	0
25	24.5	25
50	49.6	50
75	74.6	75
100	99.7	100
Closed position (XP01)	VDU (%)	
0 -> 1 Falling	8.4	
1 -> 0 Raising	9.6	
Closed position (XP02)	VDU (%)	
0 -> 1 Falling	8.0	
1 -> 0 Raising	8.2	

**O-C = 31 s C-O = 16.5 s**

### Bleed Valve 2

SP	Valve (%)	VDU (%)
0	0.0	0
25	24.5	25
50	49.6	50
75	74.6	75
100	100.0	100
Closed position (XP01)	VDU (%)	
0 -> 1 Falling	7.5	
1 -> 0 Raising	7.9	
Closed position (XP02)	VDU (%)	
0 -> 1 Falling	7.5	
1 -> 0 Raising	7.9	

**O-C = 32 s C-O = 15.2 s**

## Valves and VGV Test Protocol

**VGV**

SP (%)	VDU (%)	Angle before adjustment (°)	Angle after adjustment (°)	Piston length before adjustment (mm)	Piston length after adjustment (mm)
20	20	-41.5	N/A	244	N/A
25	25	-38	N/A	228	N/A
50	50	-20.5	N/A	151	N/A
75	75	-2.5	N/A	74	N/A
79.3	79.3	+0.5	N/A	62	N/A
80.6	80.6	+1.5	N/A	58	N/A
Zero offset			Old (rev/min)		New (rev/min)
			N/A		N/A

**COMPLETION**

Test Executer	Date	Signature	Company
	1/1/2023	Natthapon Wechagorngoson	Siemens Energy
	1/1/2023	Arthit Phuttipongkit	Siemens Energy

**4**

**8.4 Appendix D Pulsation Protocol**

## Pulsation Test Protocol

### Pulsation (pC-simulator)

#### Low Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (LFP)	MBA10CP090 VDU (LFP)	MBA10CP095 VDU (LFP)
2	190	110	110	109	110
5	190	275	273	275	274
10	190	550	542	544	543

#### Narrow Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (NFP)	MBA10CP090 VDU (NFP)	MBA10CP095 VDU (NFP)
2	220	110	107	107	106
5	220	275	273	274	274
10	220	550	540	545	541

#### Medium Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (MFP)	MBA10CP090 VDU (MFP)	MBA10CP095 VDU (MFP)
2	620	120	115	115	116
5	620	300	297	298	297
10	620	600	590	594	593



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Pulsation Test Protocol

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## High Frequency Pulsations

Charge signal Input (pC)	Charge signal Input (Hz)	Preferred pressure (mbar)	MBA10CP085 VDU (HFP)	MBA10CP090 VDU (HFP)	MBA10CP095 VDU (HFP)
2	2000	135	130	133	129
5	2000	338	334	337	330
10	2000	675	663	671	659

---

COMPLETION

---

Test Executer	Date	Signature	Company
	1/1/2023	Natthapon Wechagorngoson	Siemens Energy
	1/1/2023	Arthit Phuttipongisit	Siemens Energy

**5**

**8.5 Appendix E Coast Down Test**

## Coast Down Test Record

## GUIDELINES

**General**

This record is valid for SGT-800.

**Test Procedure**

Time is measured from when the Gas Turbine is stopped and the rotor speed starts to decrease, until the rotor is stopped.

## TEST RECORD

## Site Test

	From	To		Time [minutes]	Time [seconds]
NGT Barring Speed	600	0	rpm	10	05
NGT Purge Speed	1500	0	rpm	12	21

## COMPLETION

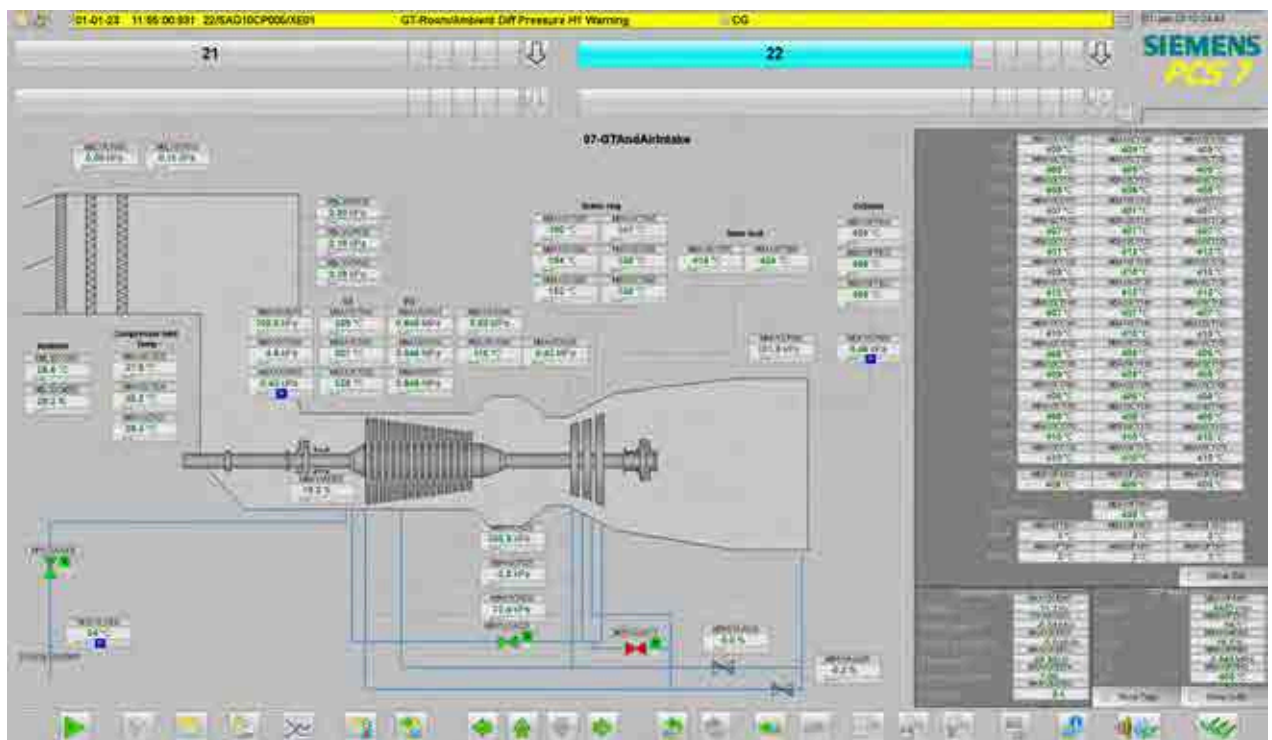
Test Executer	Date	Signature	Company
	1/1/2023	Natthapon Wechagorngoson	Siemens Energy
	1/1/2023	Arthit Phuttipongisit	Siemens Energy

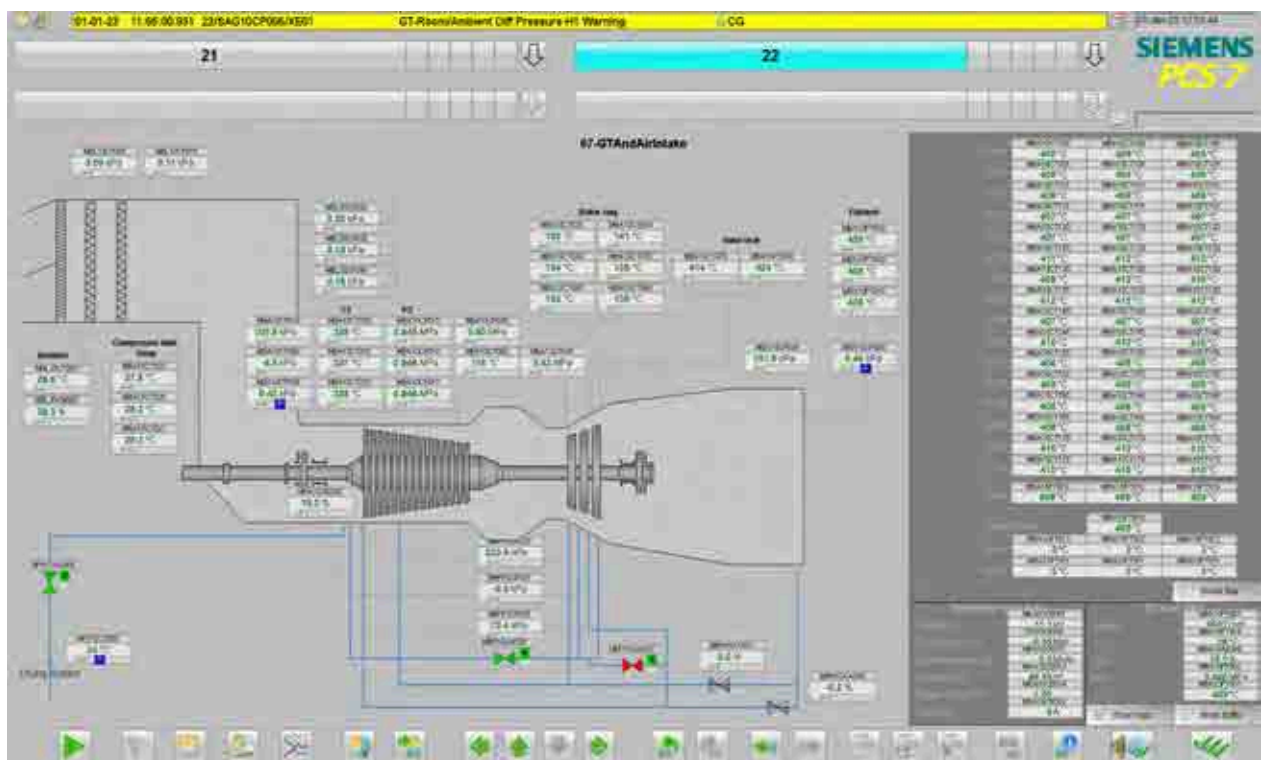
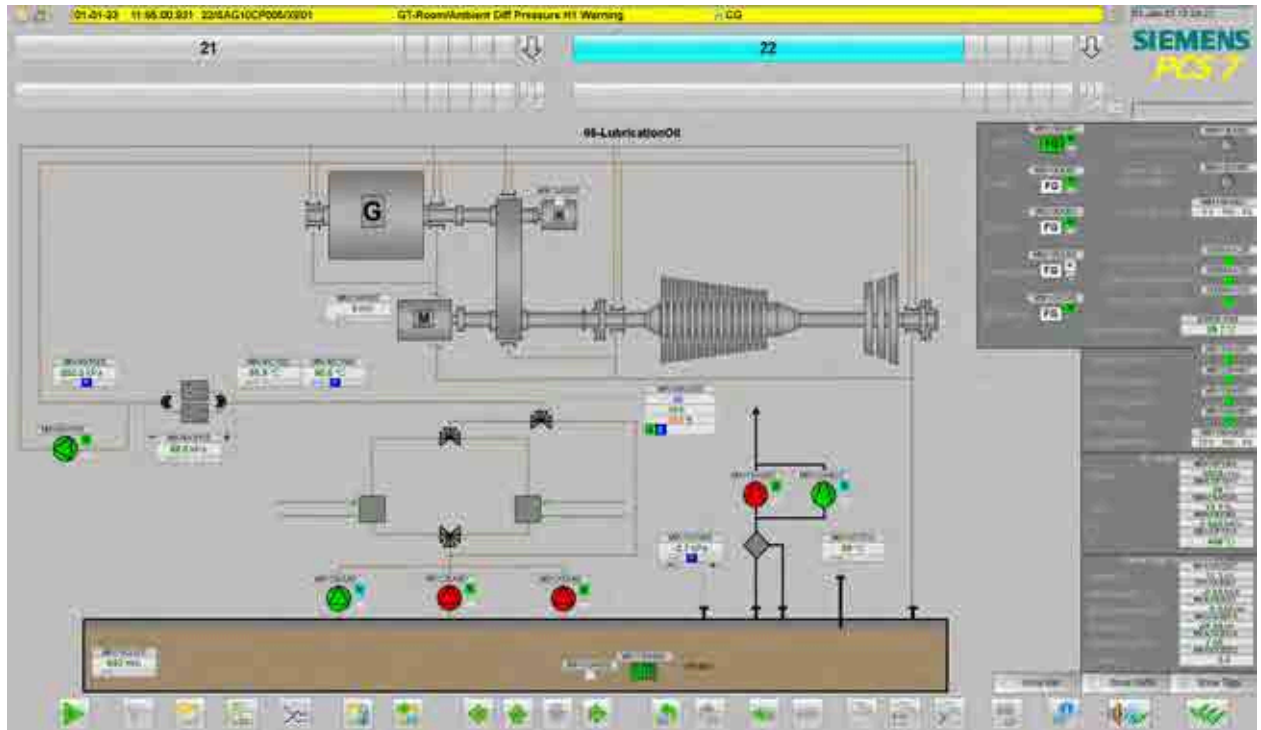
**6**

**8.6 Appendix F Readings**

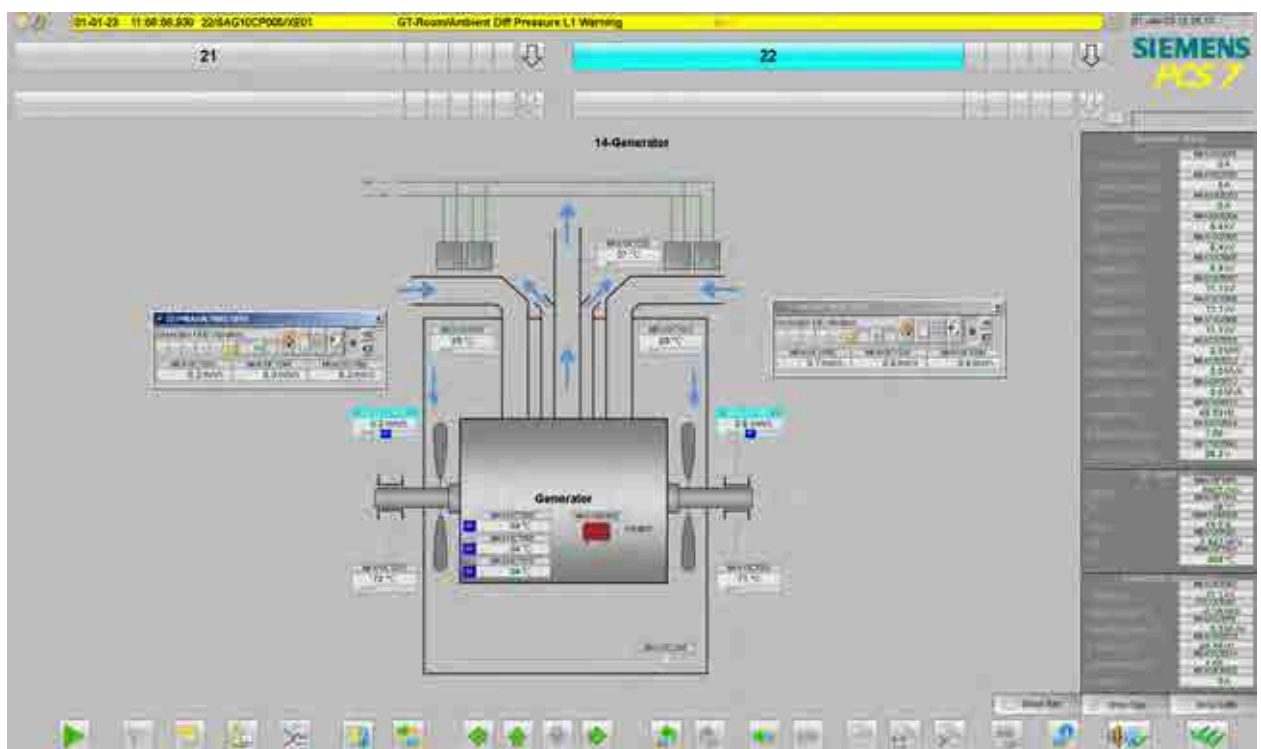
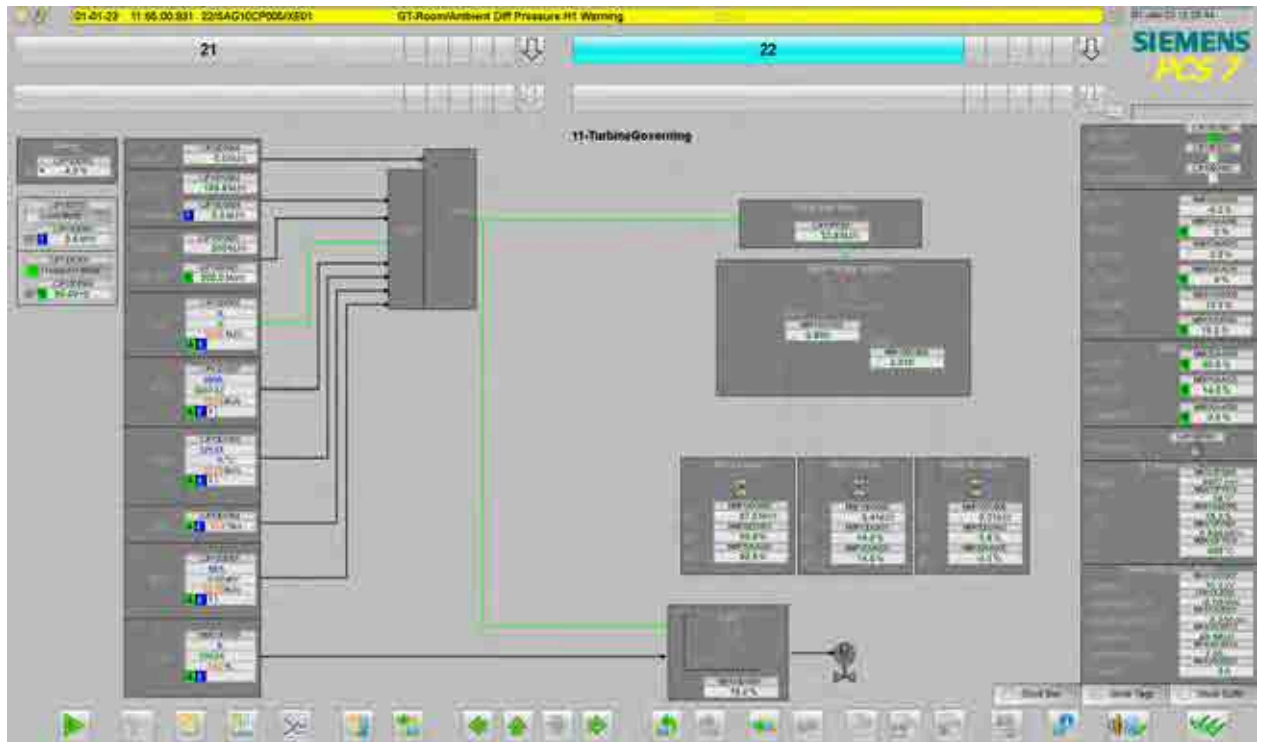
ID: E1B101213257 Name: Commissioning report Rev: A Protection: Restricted IPR: 00.500  
Creator: Reviewer: Approver:  
ALN ECGNN ECL: US-ContNo CoO:TH

## Idle speed

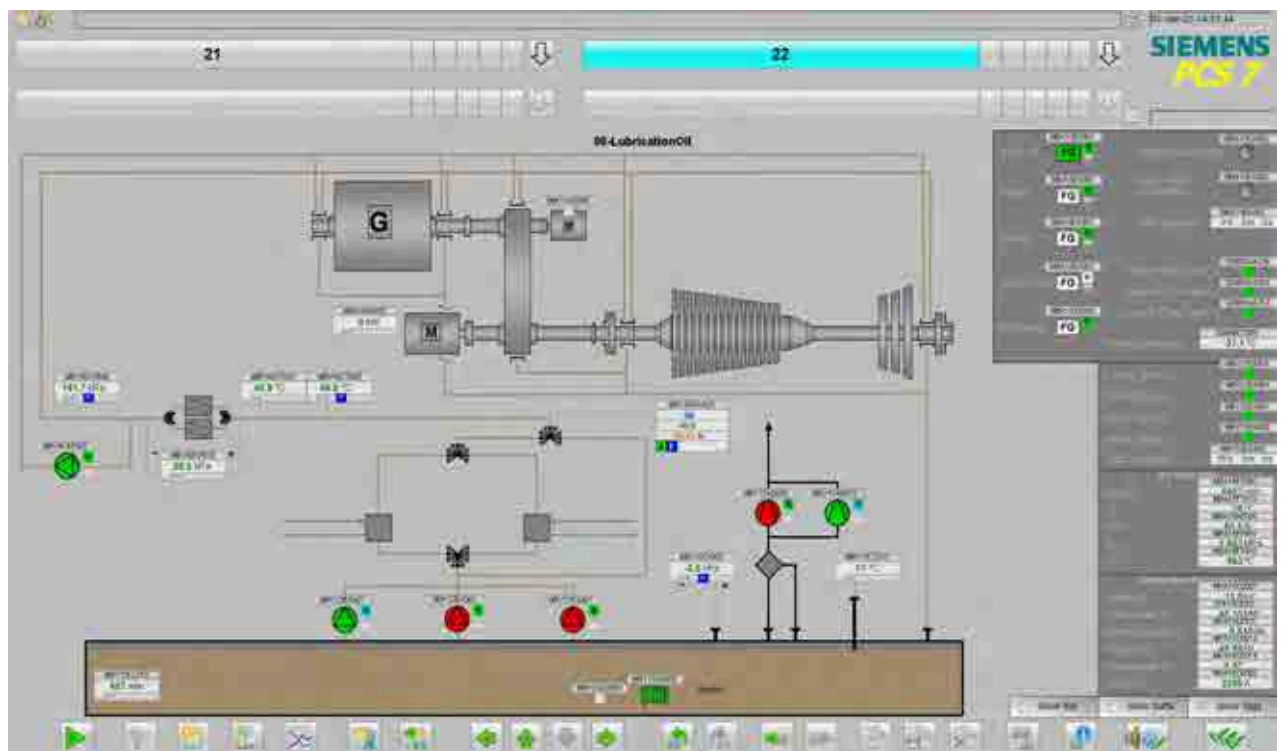


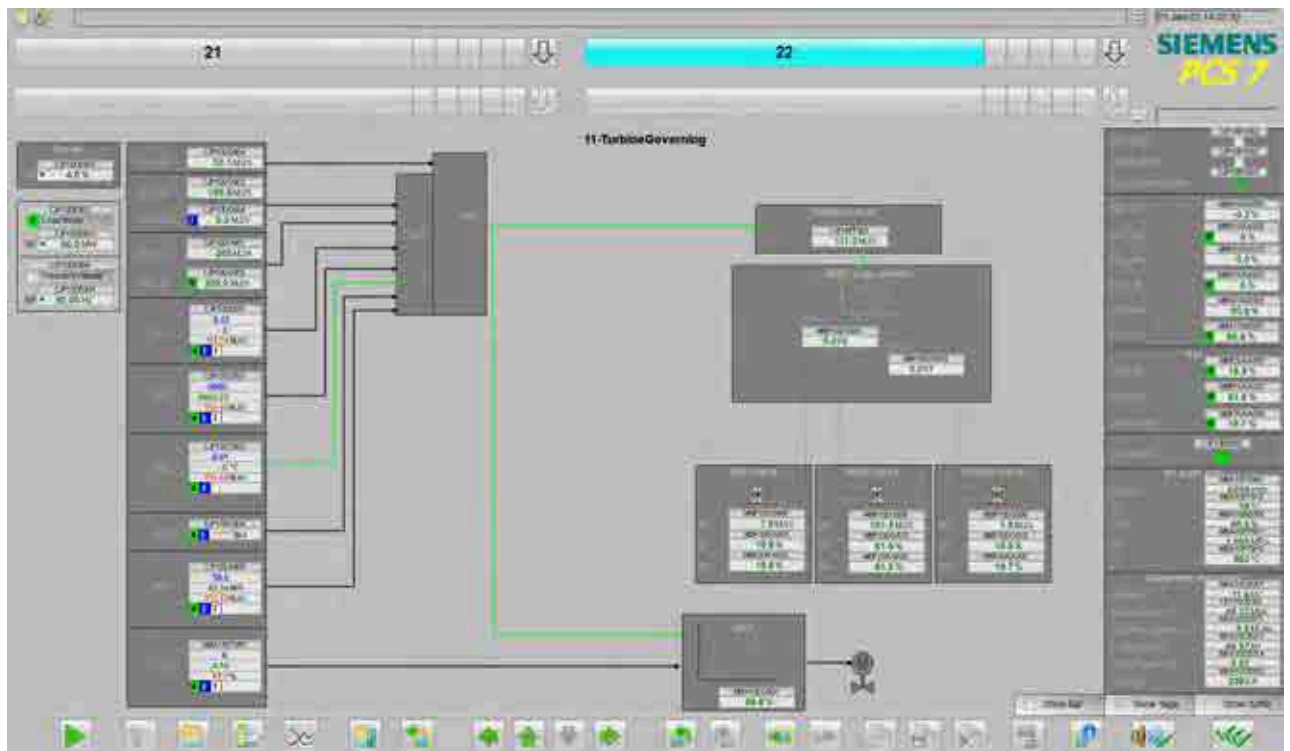
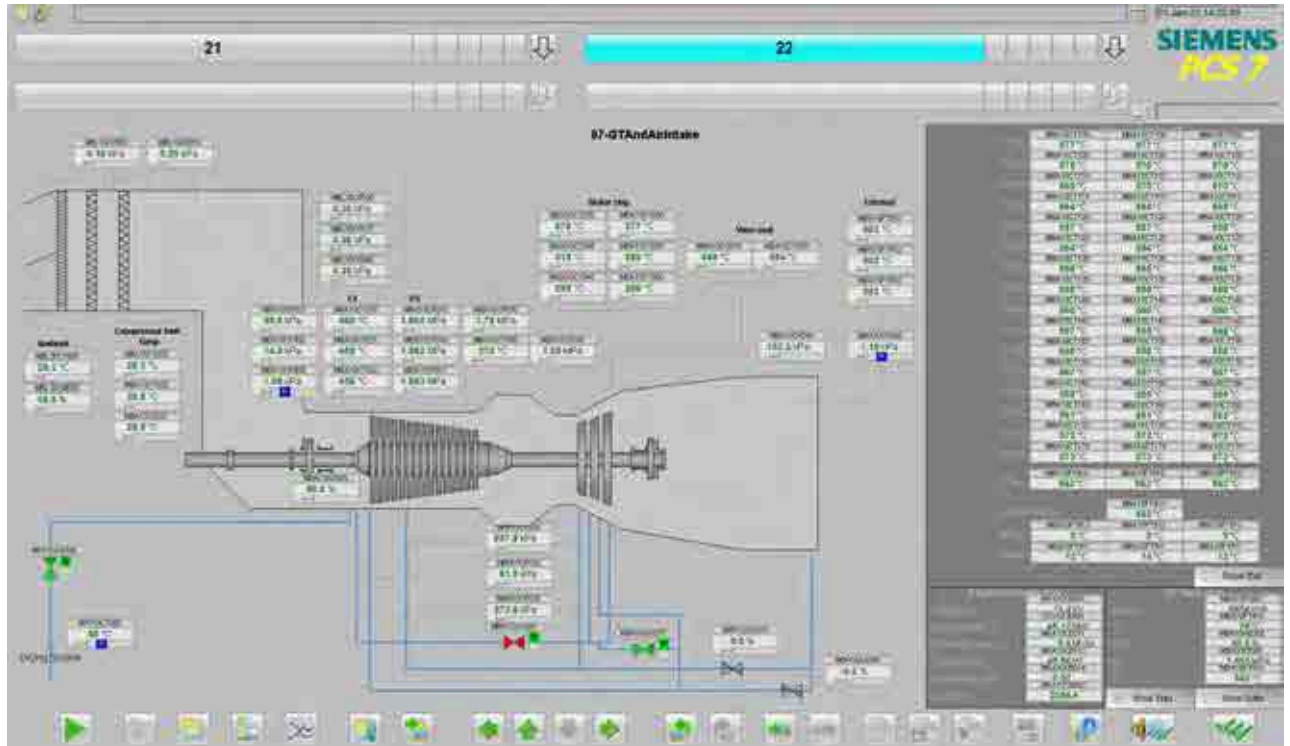


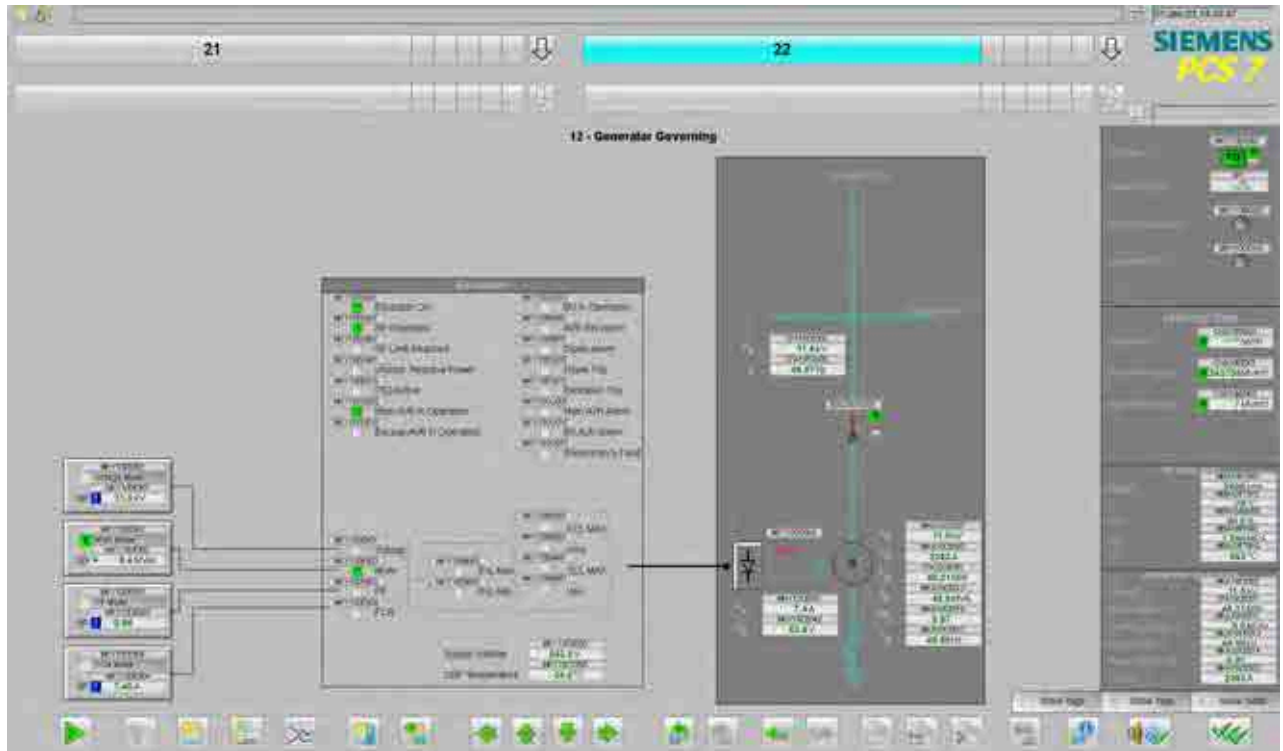




### Full Load @44.9 MW







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ALN ECCNN ECL: US-ContNo CoO:TH

## COMPLETION

Test Executer	Date	Signature	Company
	1/1/2023	Natthapon Wechagorngoson	Siemens Energy
	1/1/2023	Arthit Phuttiungsit	Siemens Energy

## 7

### 8.7 Appendix G M800-03647 Change Pulsation level settings



<b>Project:</b>	SSUT GT22
<b>Record number:</b>	BD000166U04
<b>Finished date:</b>	2023-01-01
<b>Description:</b>	M800-03647 Change Pulsation level settings

### Activity Outside Maintenance Planned:

Item  
01.01

M800-03647 Change Pulsation level settings for low and narrow frequency pulsations.

LFP H1 - Alarm was changed from 50 to 60 mbar with 3s delay time

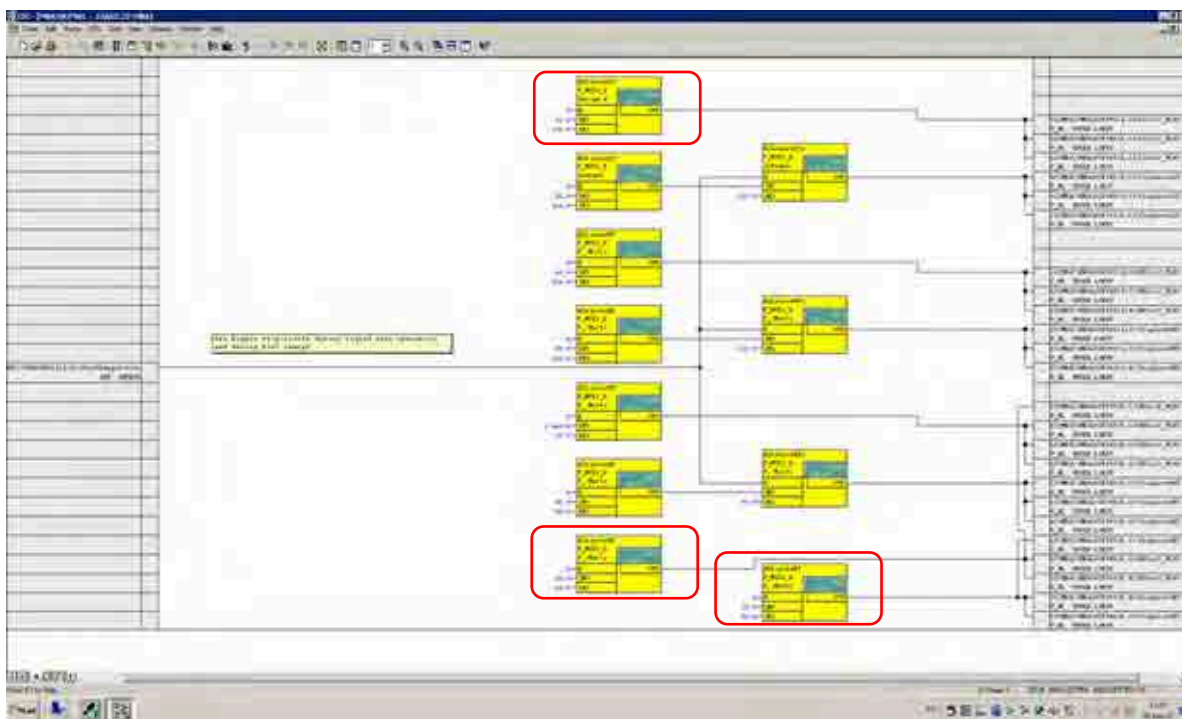
LFP H2 - UNLOAD90 was changed from 60 to 70 mbar

NFP H1 - Alarm was changed from 45 to 50 mbar with 3s delay time

NFP H2 - UNLOAD90 (from ESD) was changed from 50 to 60 mbar with no delay time.

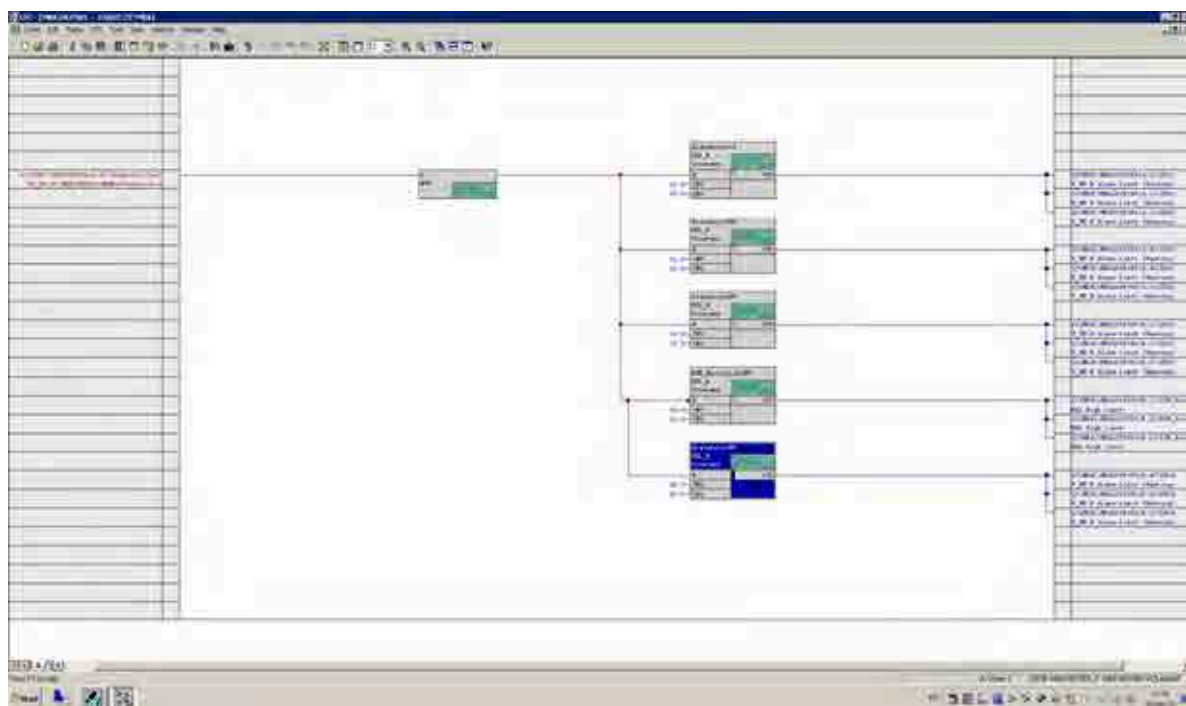
NFP H3 - GT ESD at 80 mbar delay time 3 sec.

#### Setting were changed.

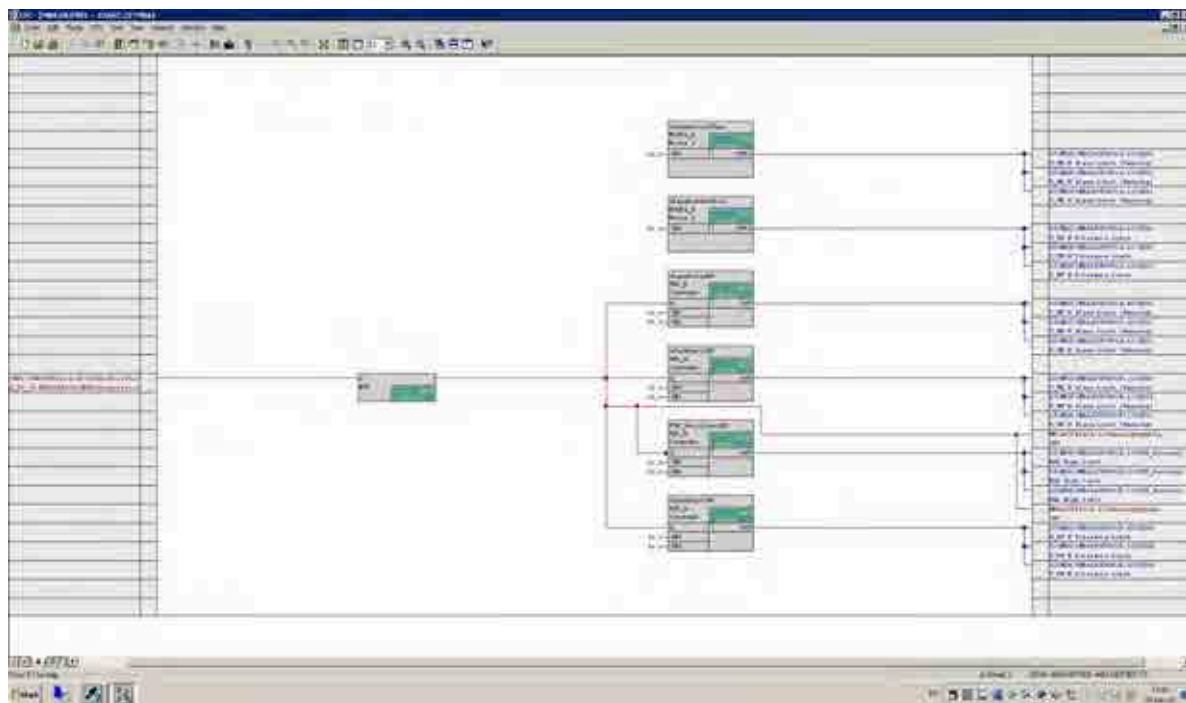




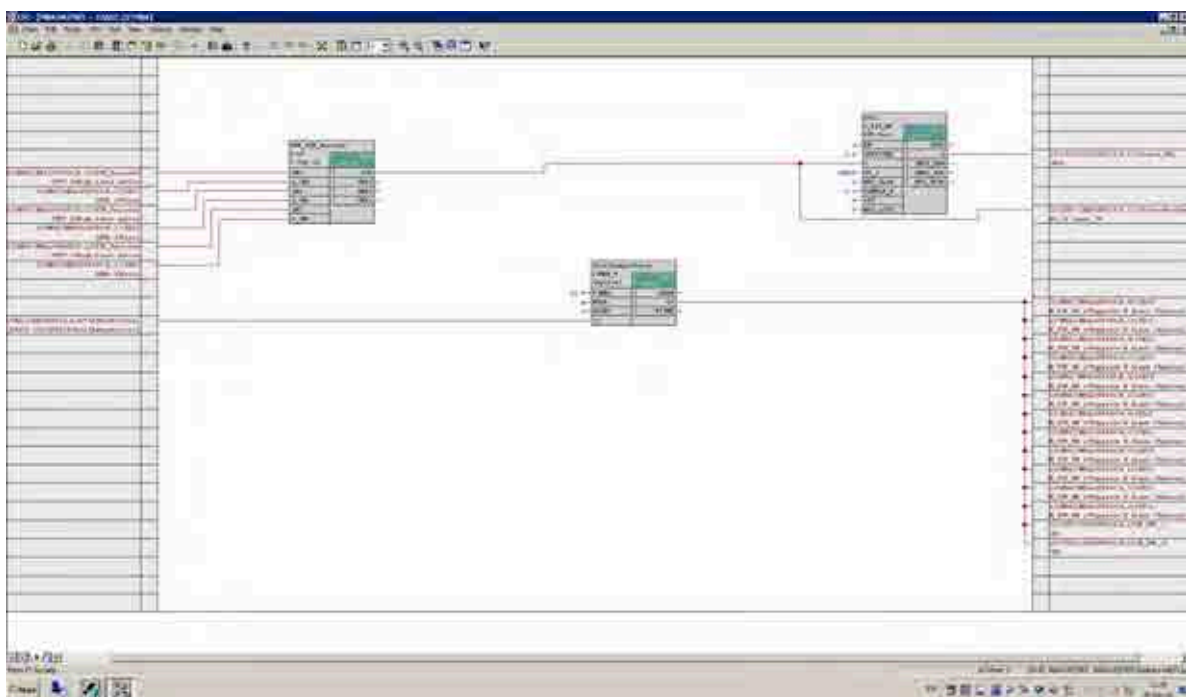
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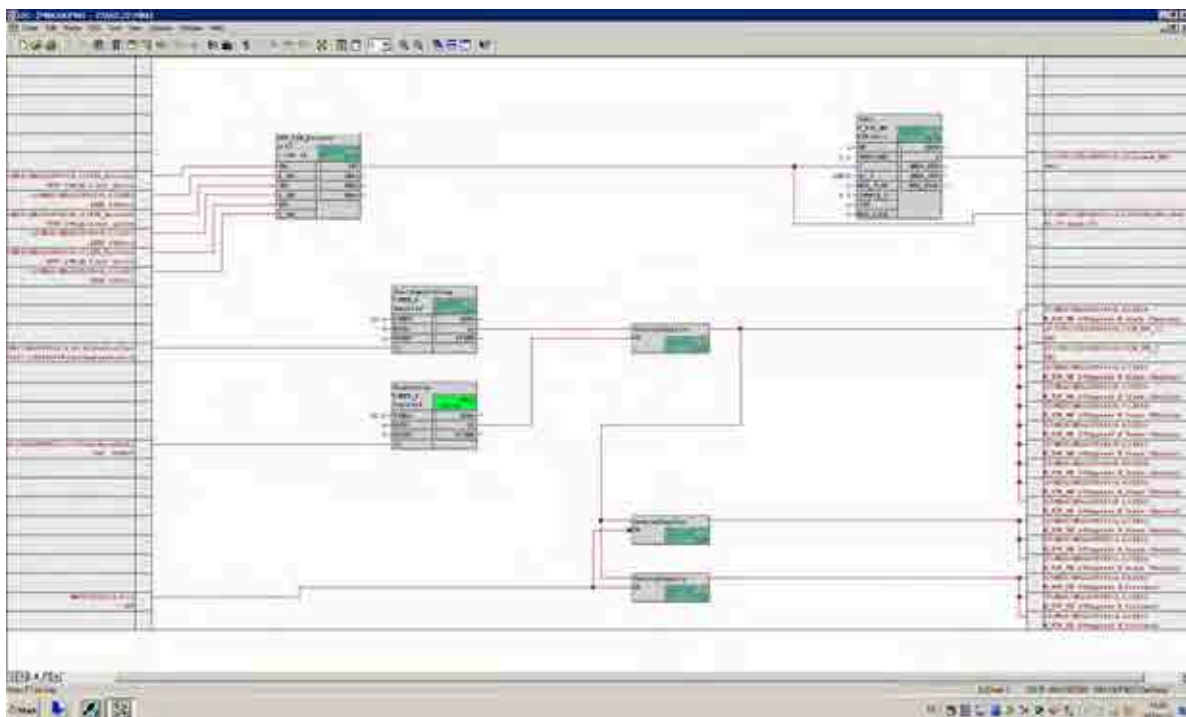
### After Changed



### Before changed



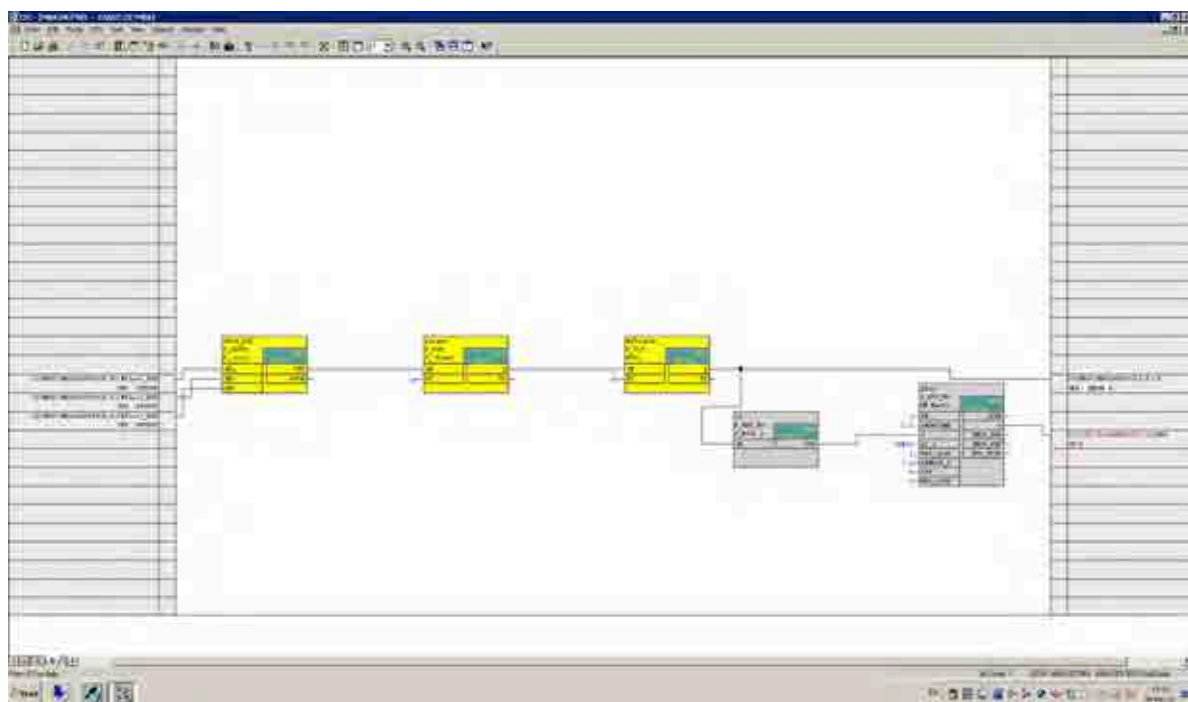
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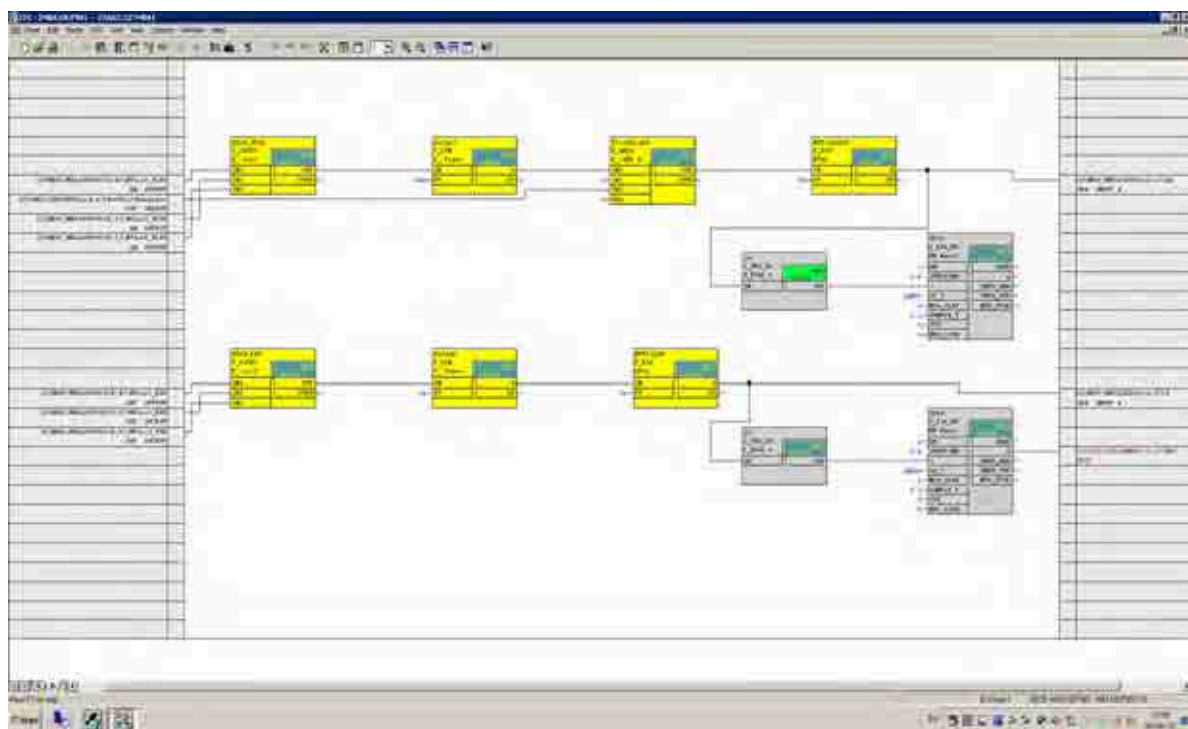
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Creator: Reviewer: Approver:  
ALN ECCNN ECL: US-ContNo CoO:TH

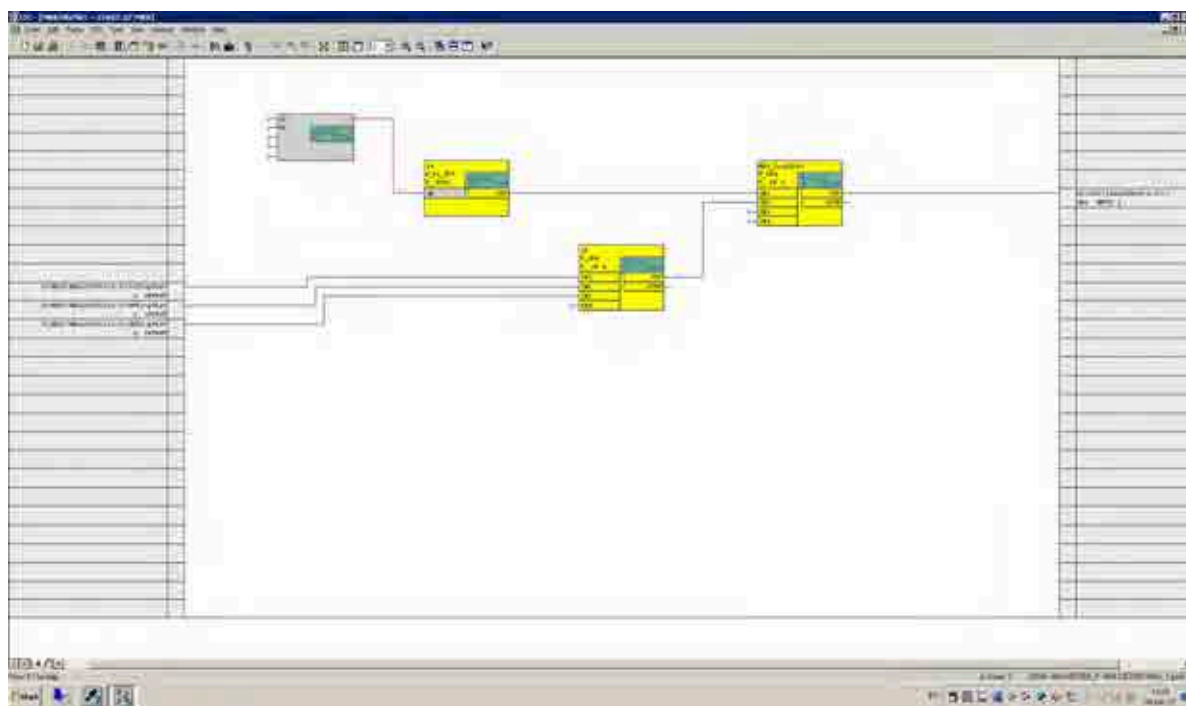
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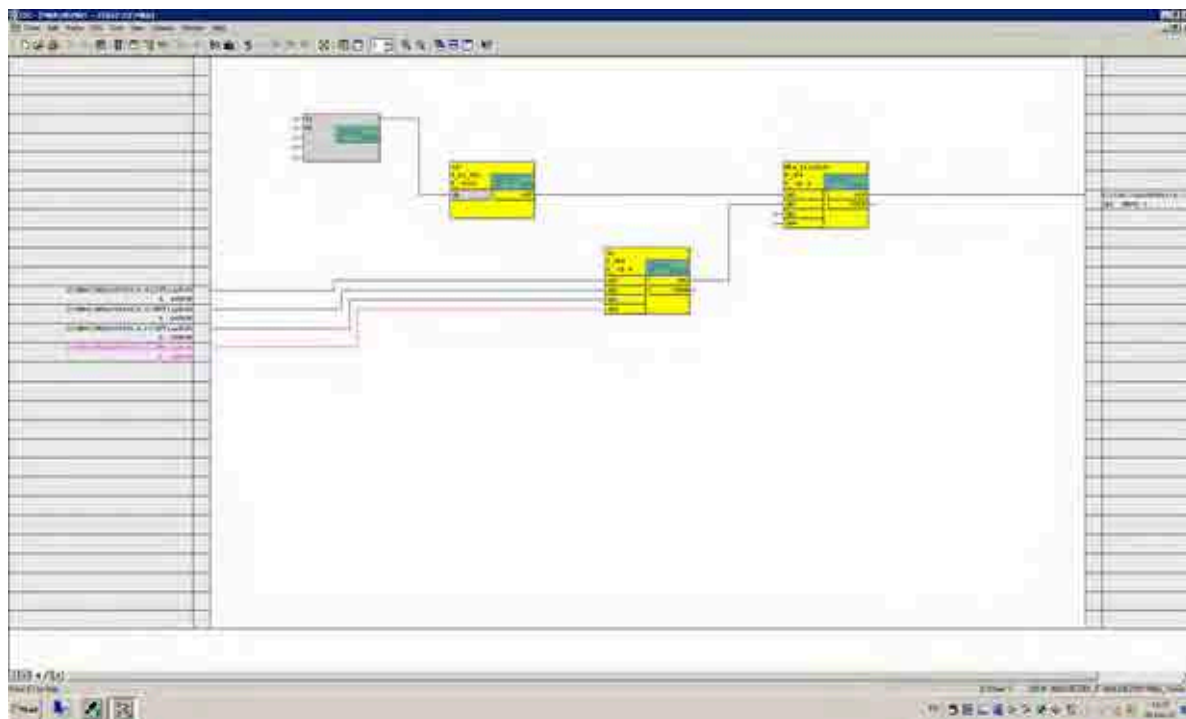
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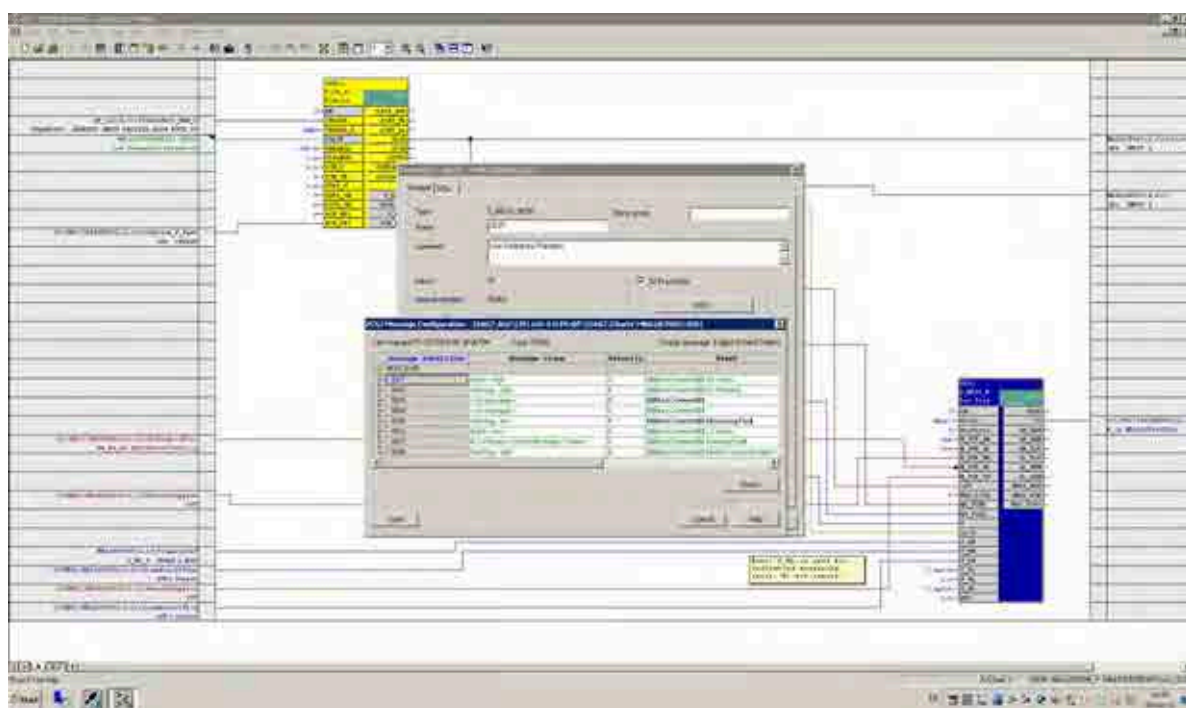
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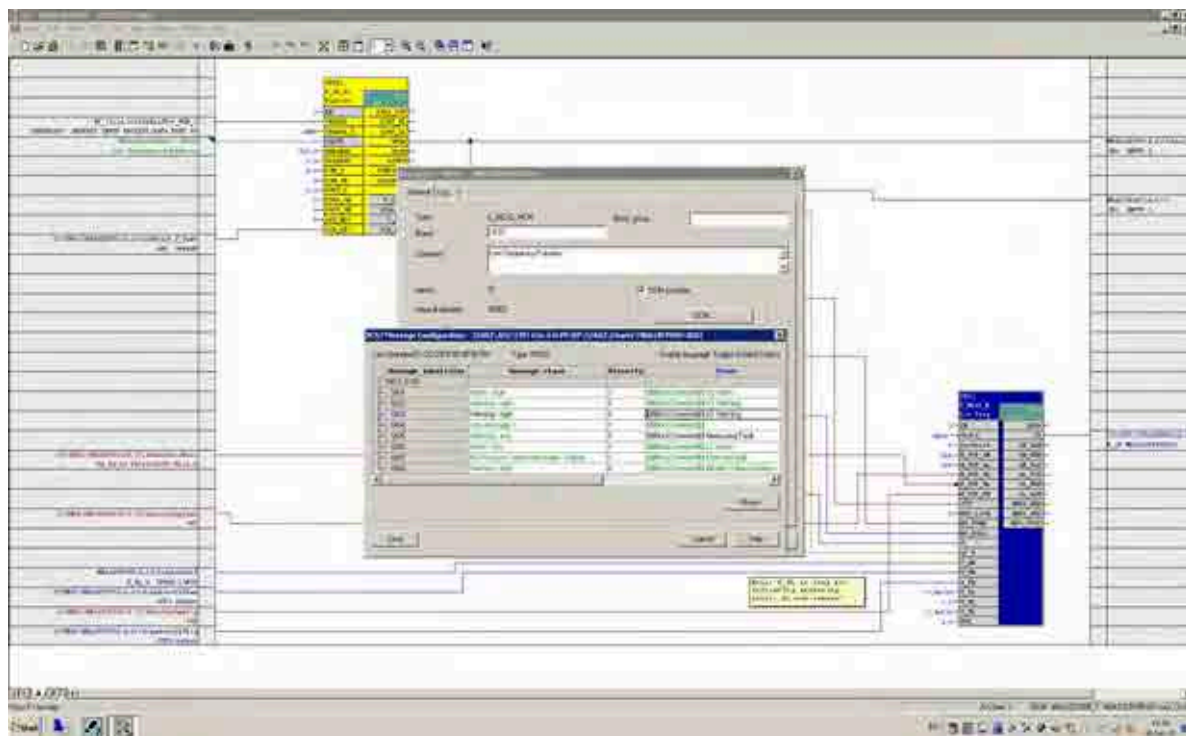
### After Changed



### Before changed

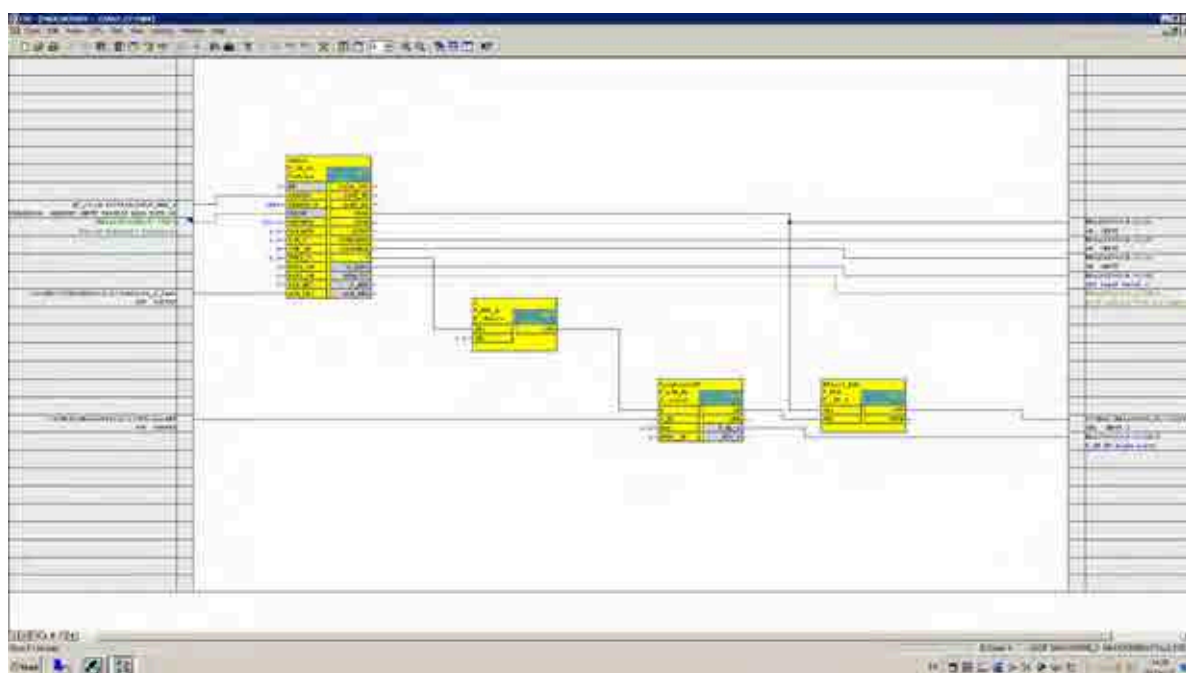


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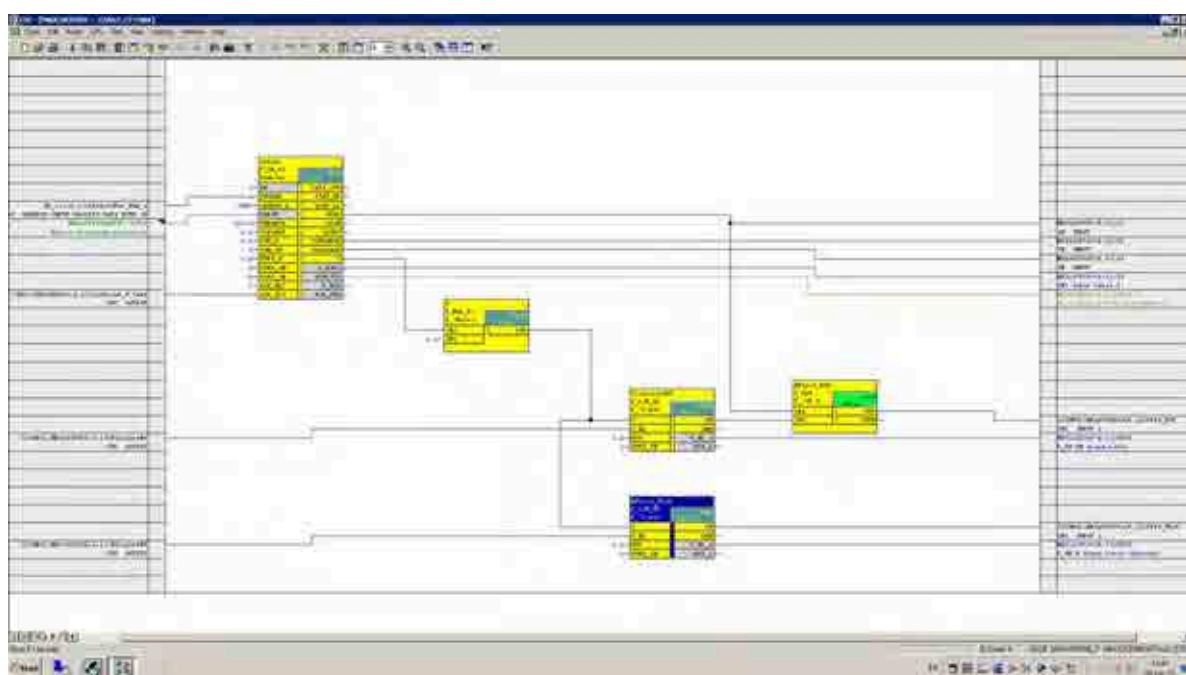




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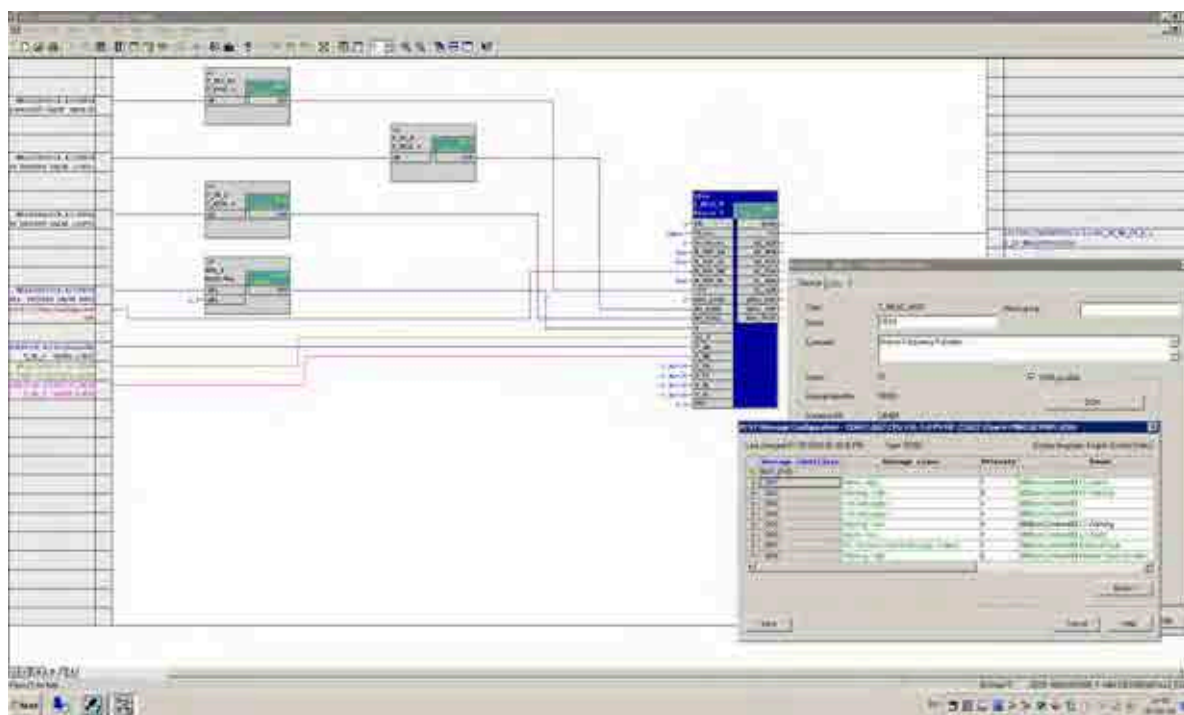


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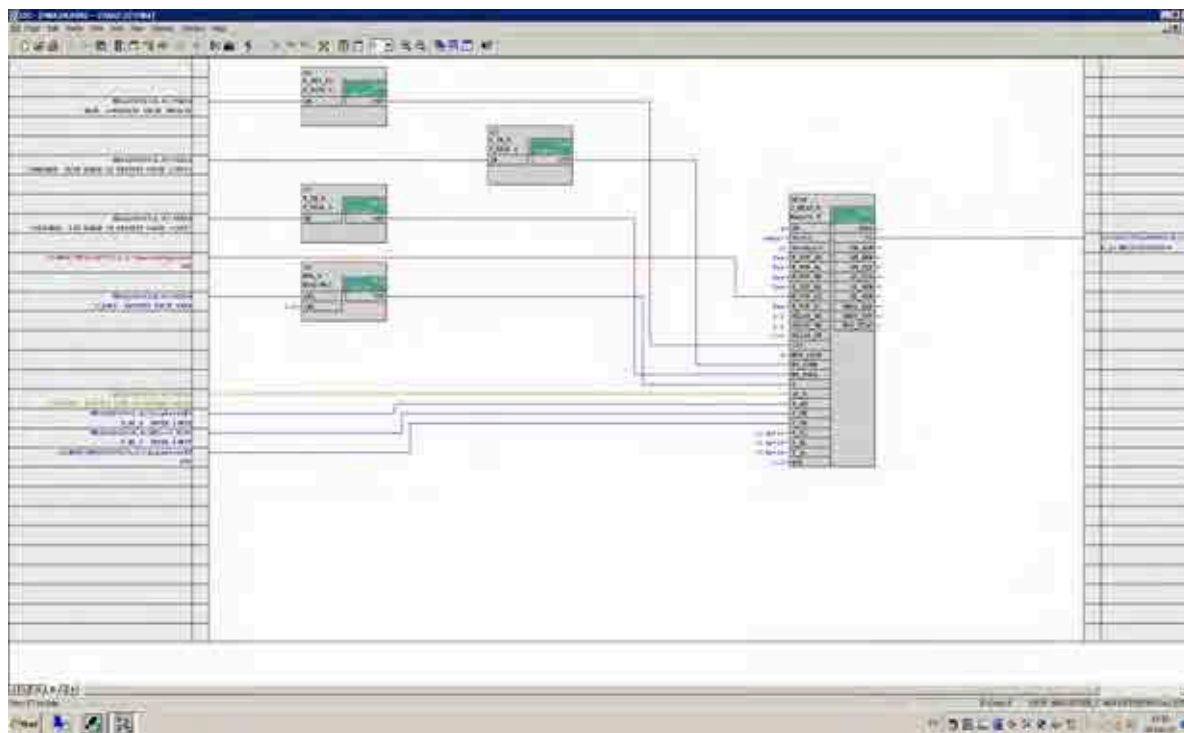




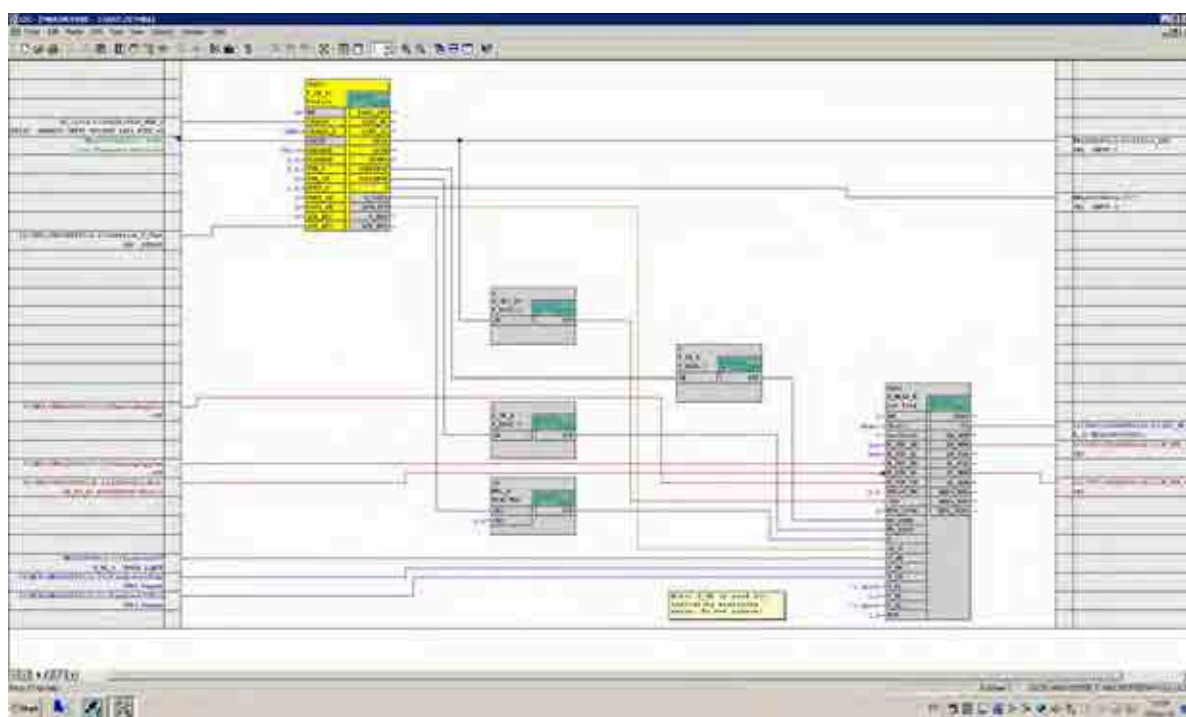
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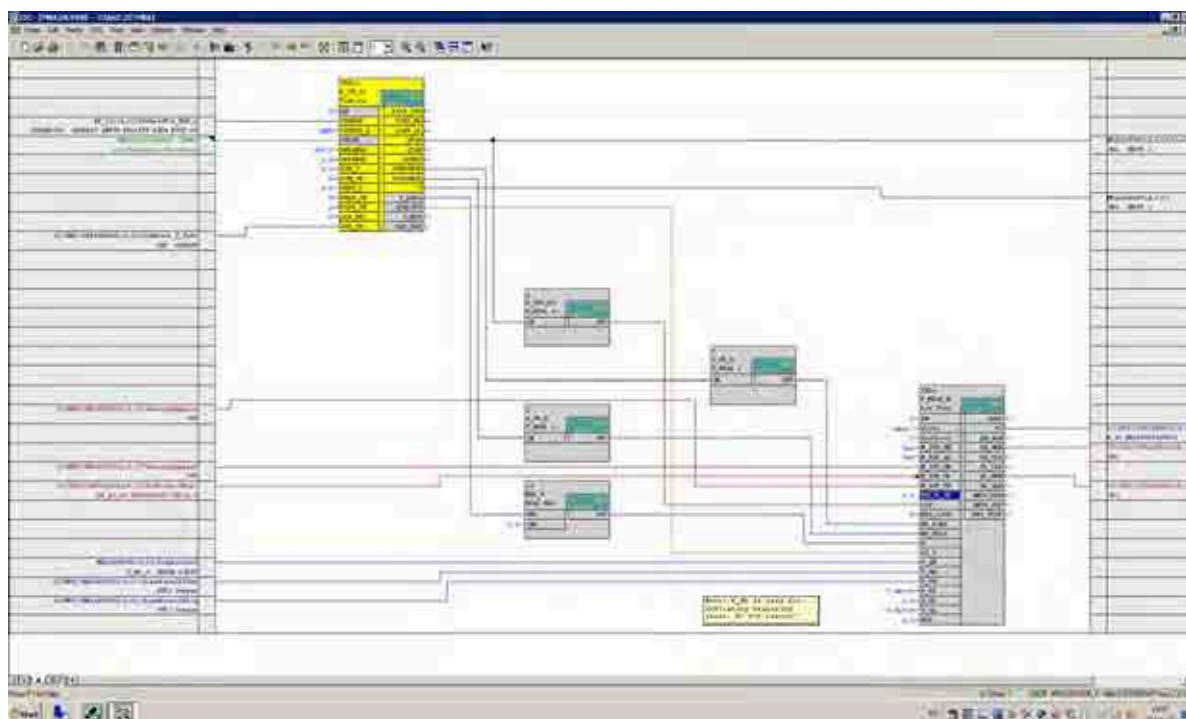
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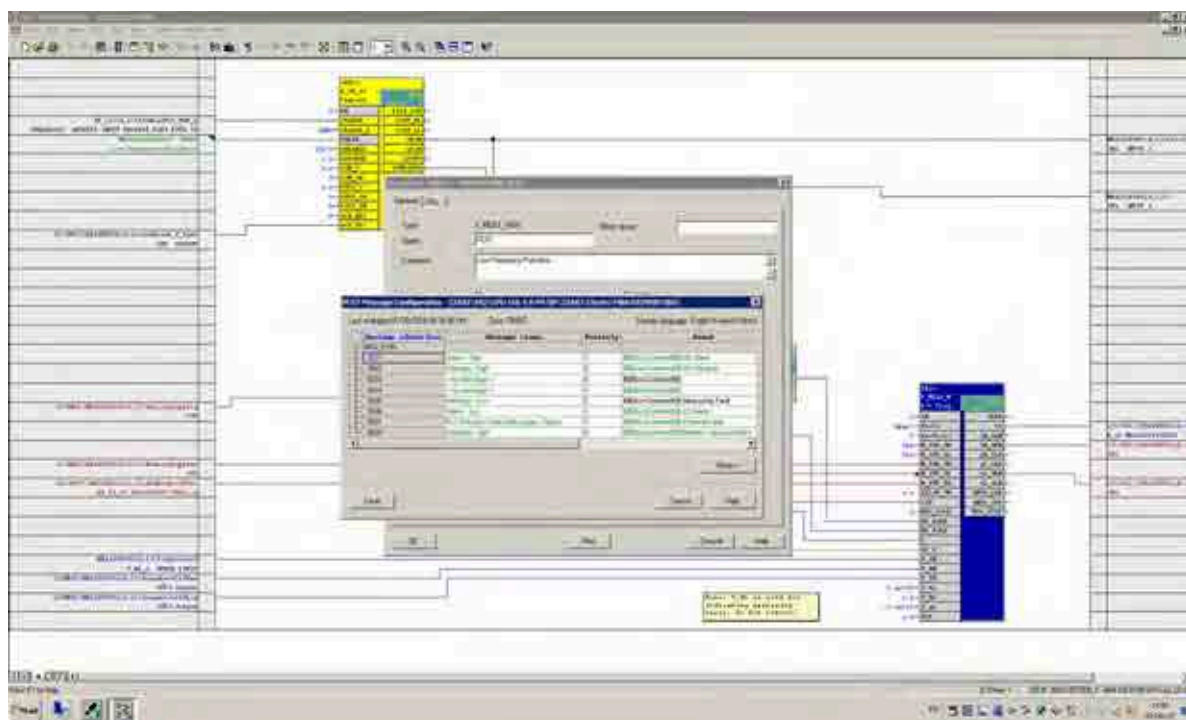
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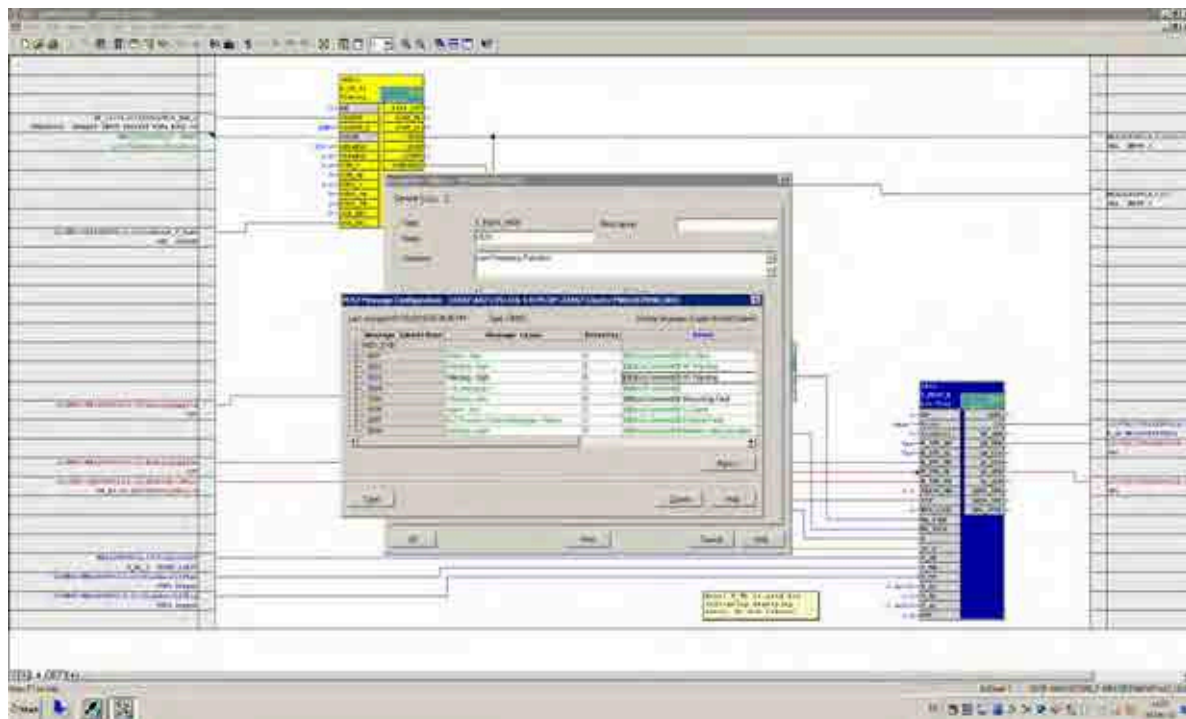
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### Before changed



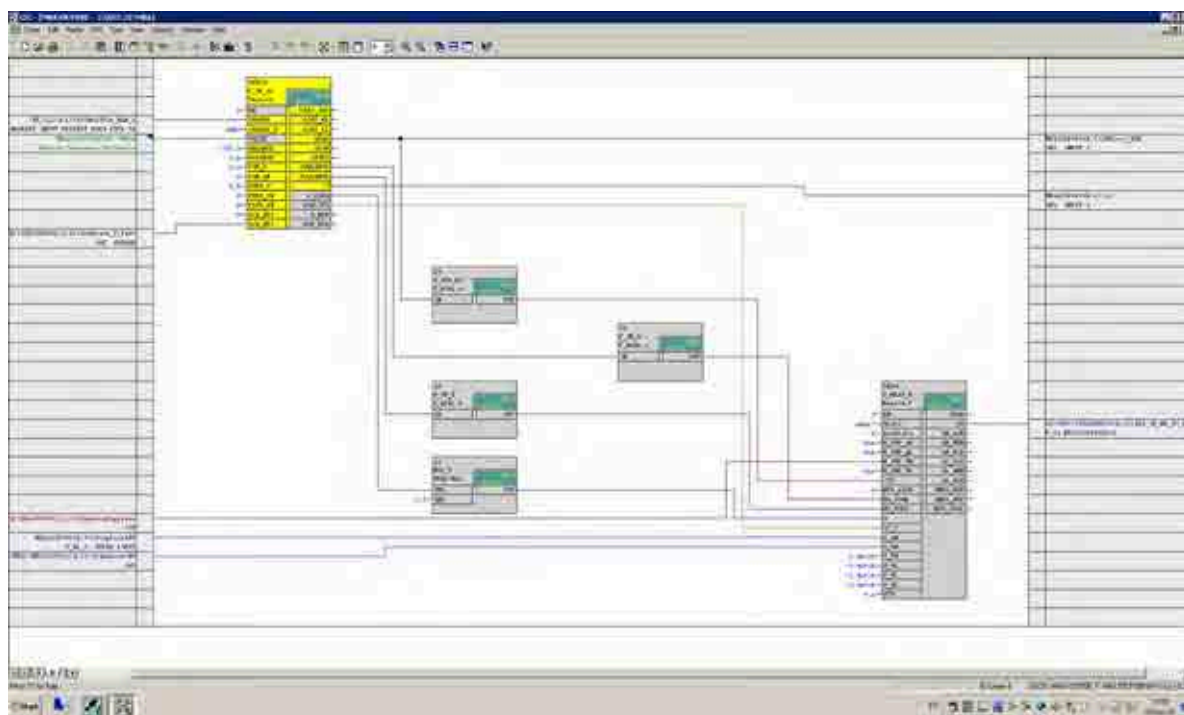
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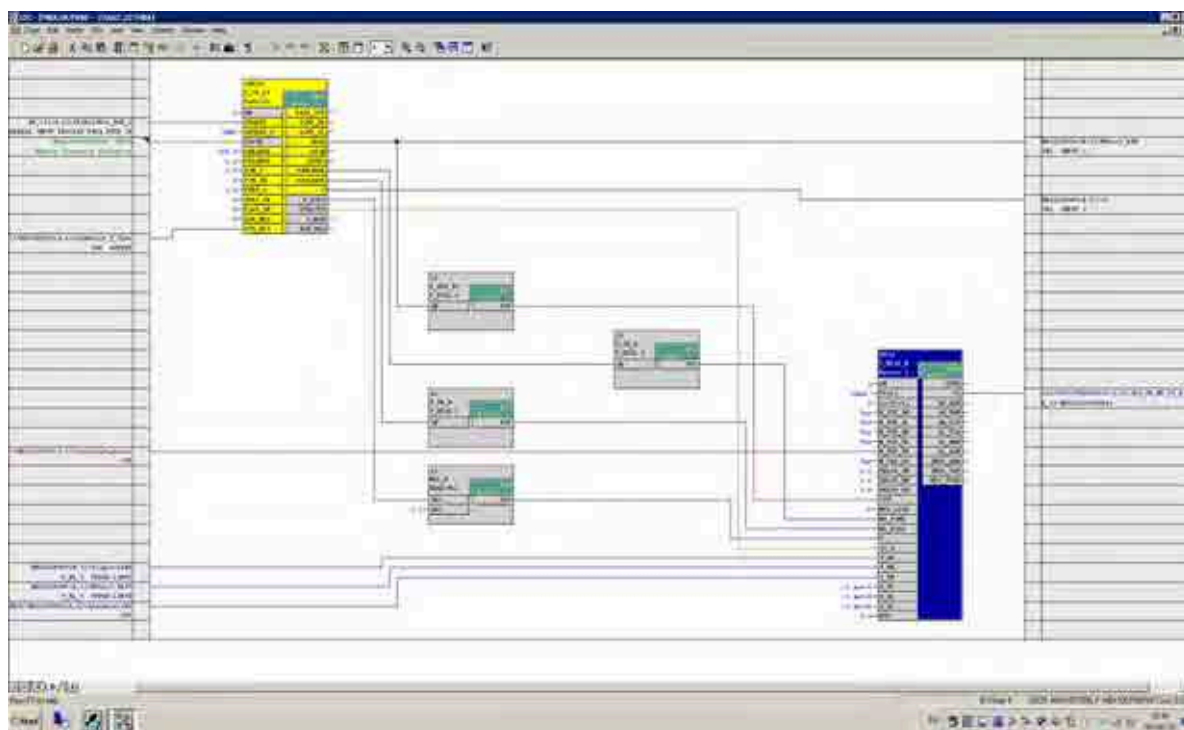
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ALN ECCNN ECL: US-ContNo CoO:TH

### Before changed

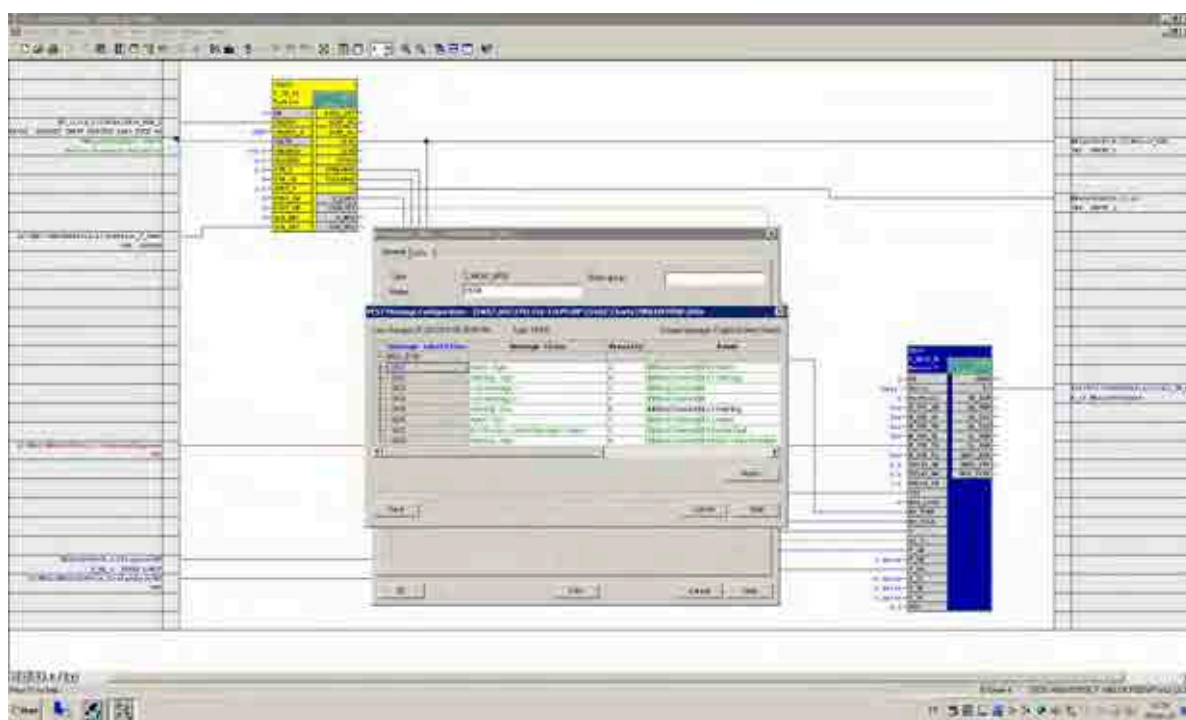


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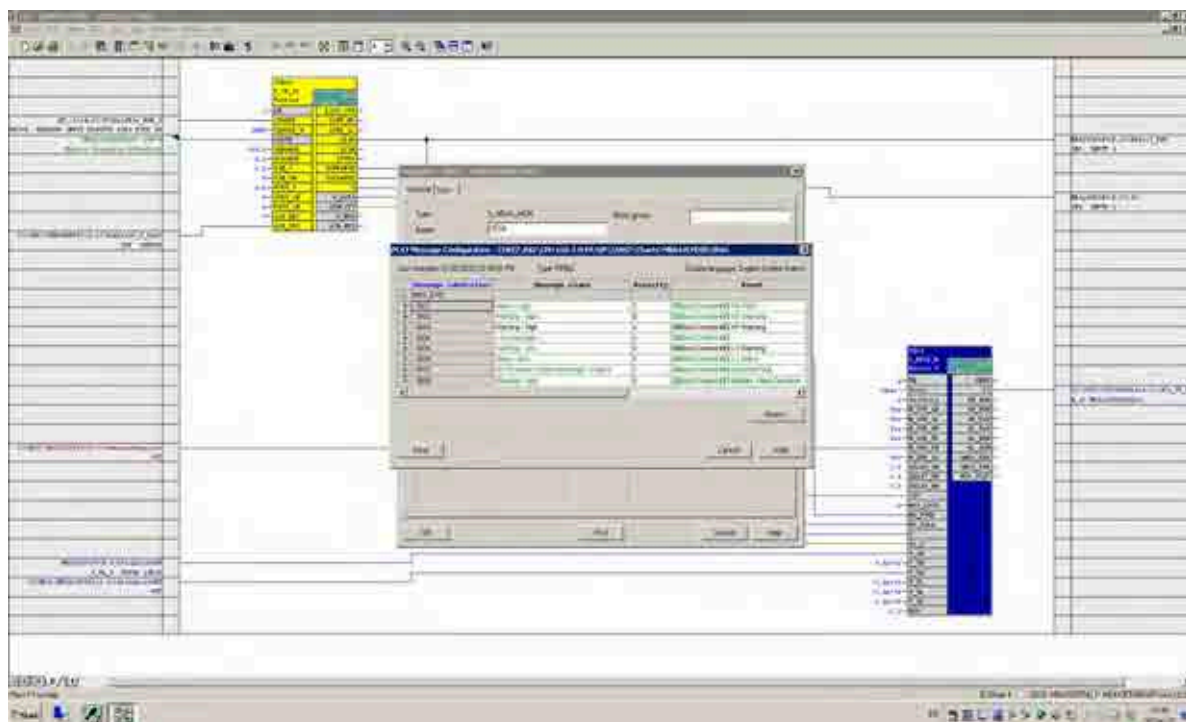




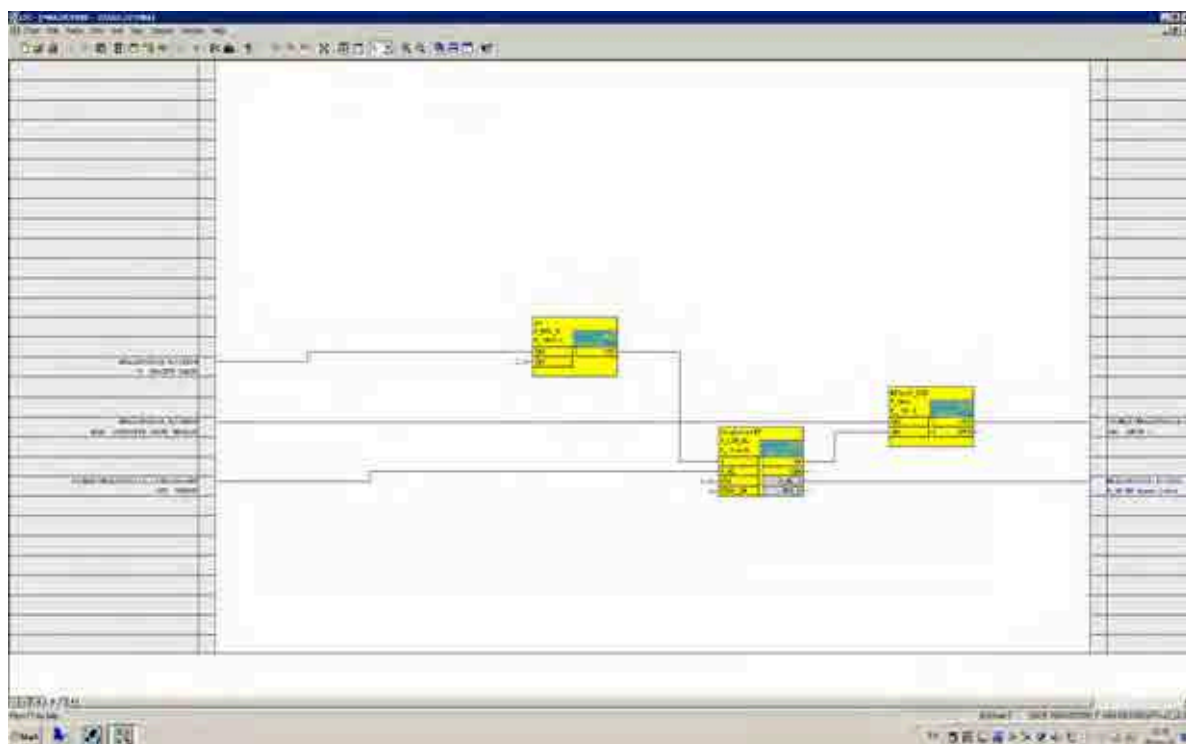
### Before changed



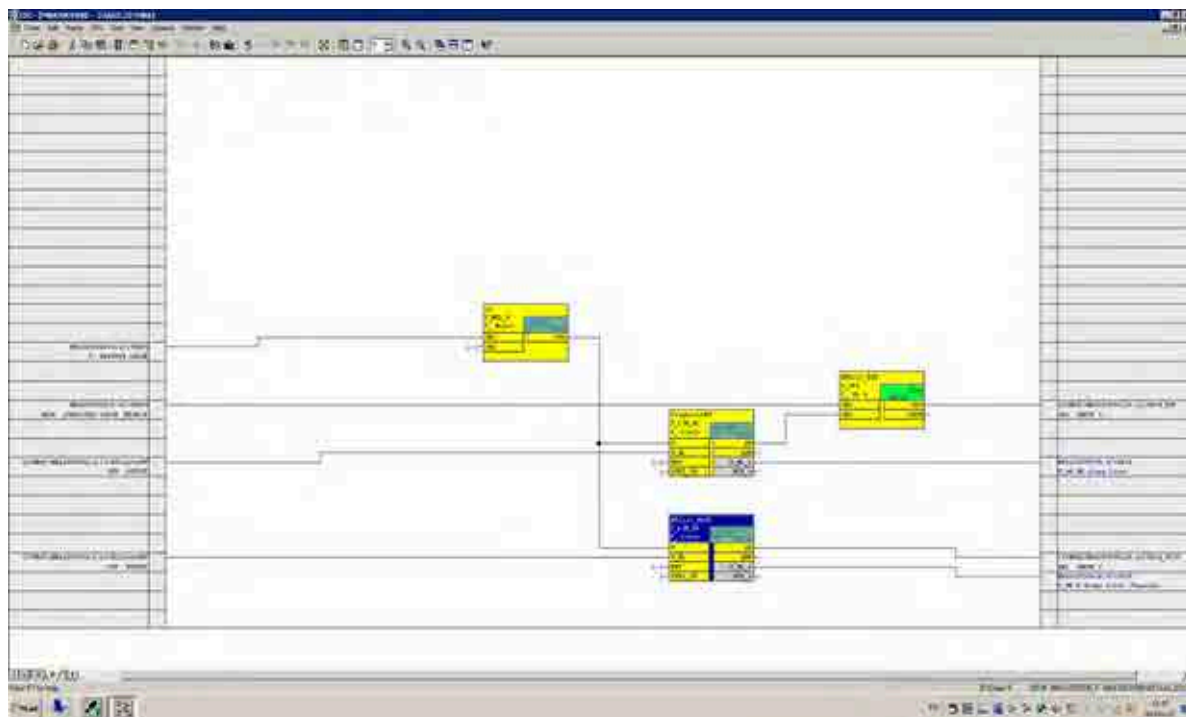
### After Changed



### Before changed

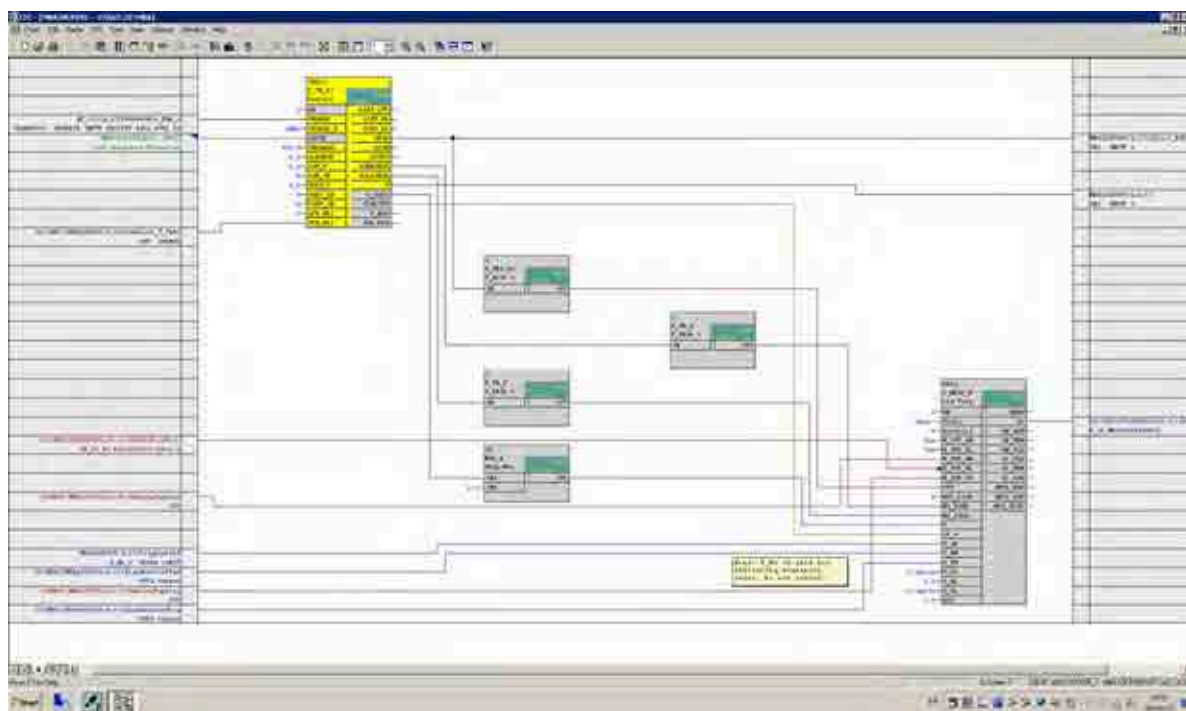


### After Changed

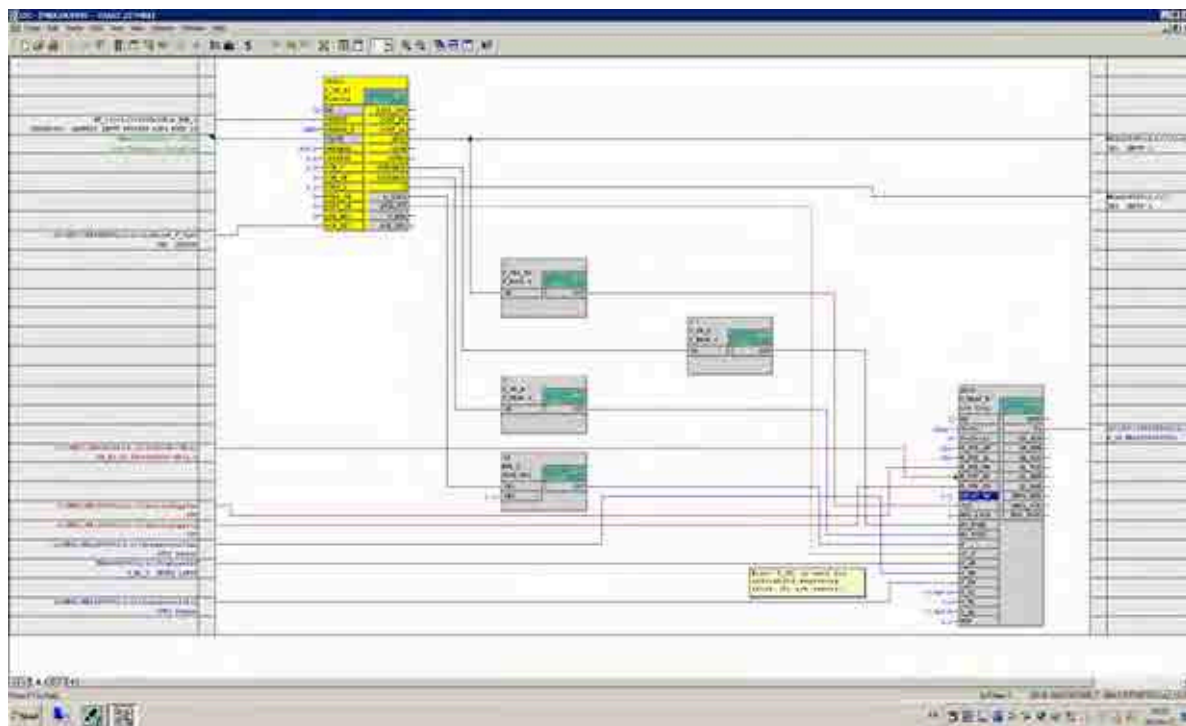




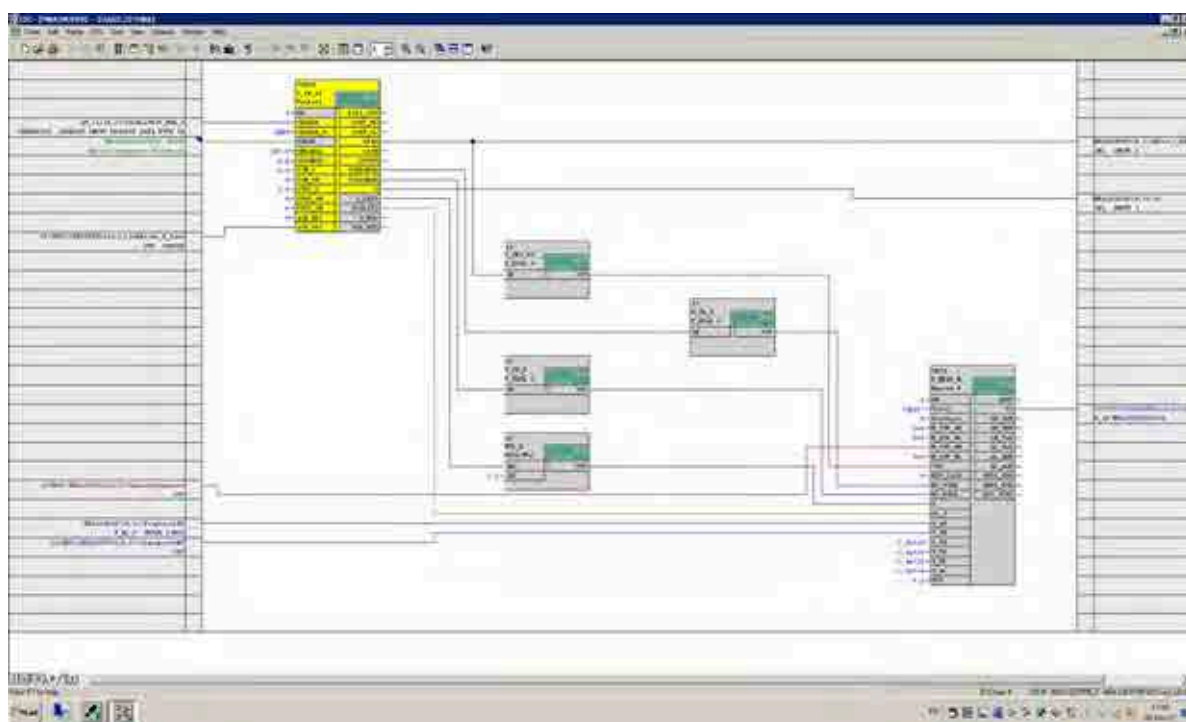
### Before changed



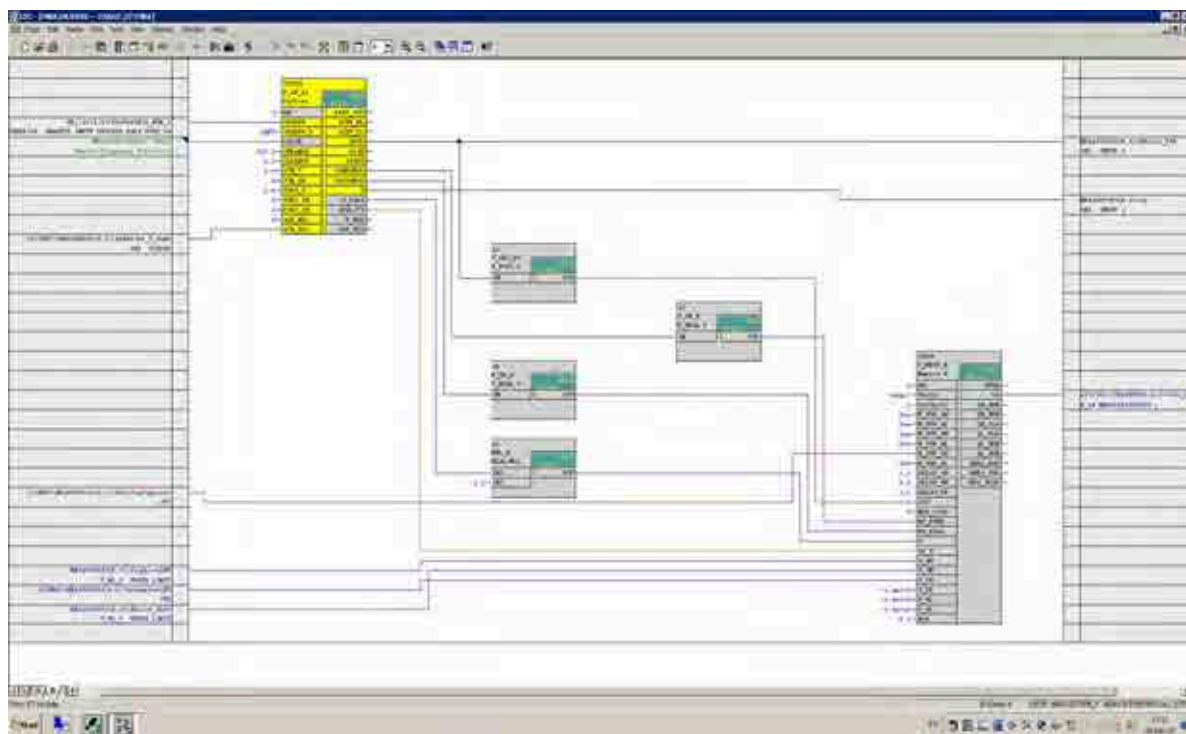
### After Changed



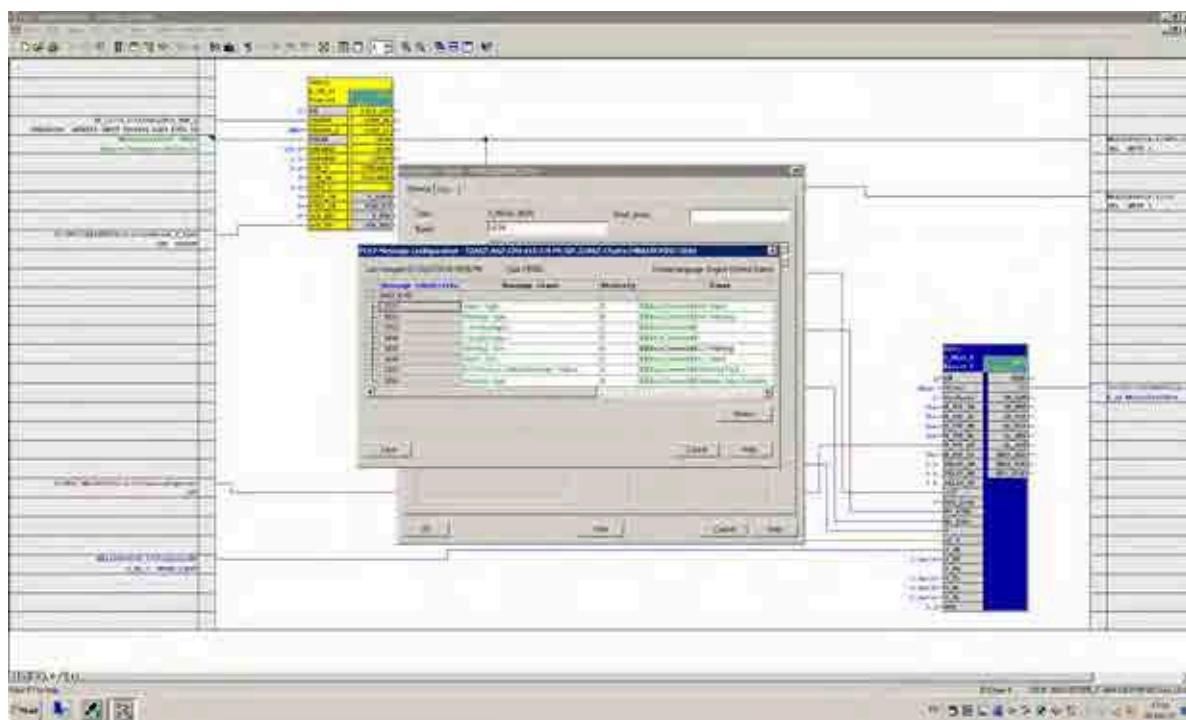
### Before changed



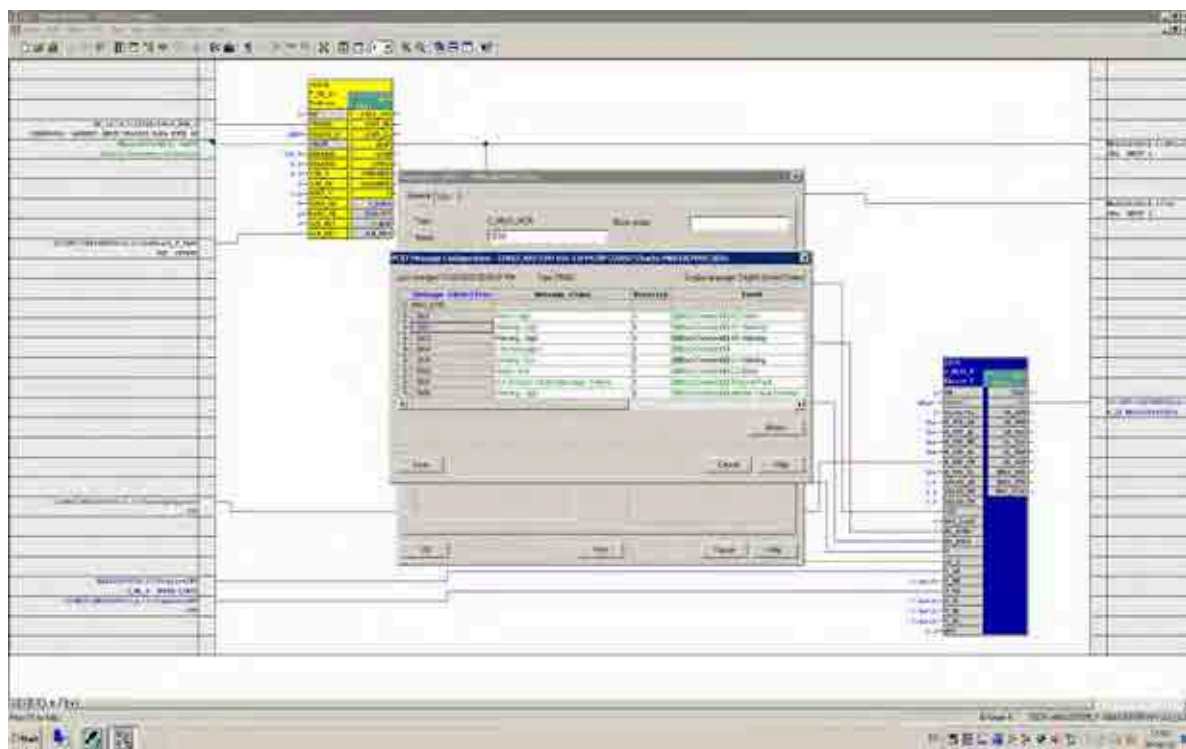
### After Changed



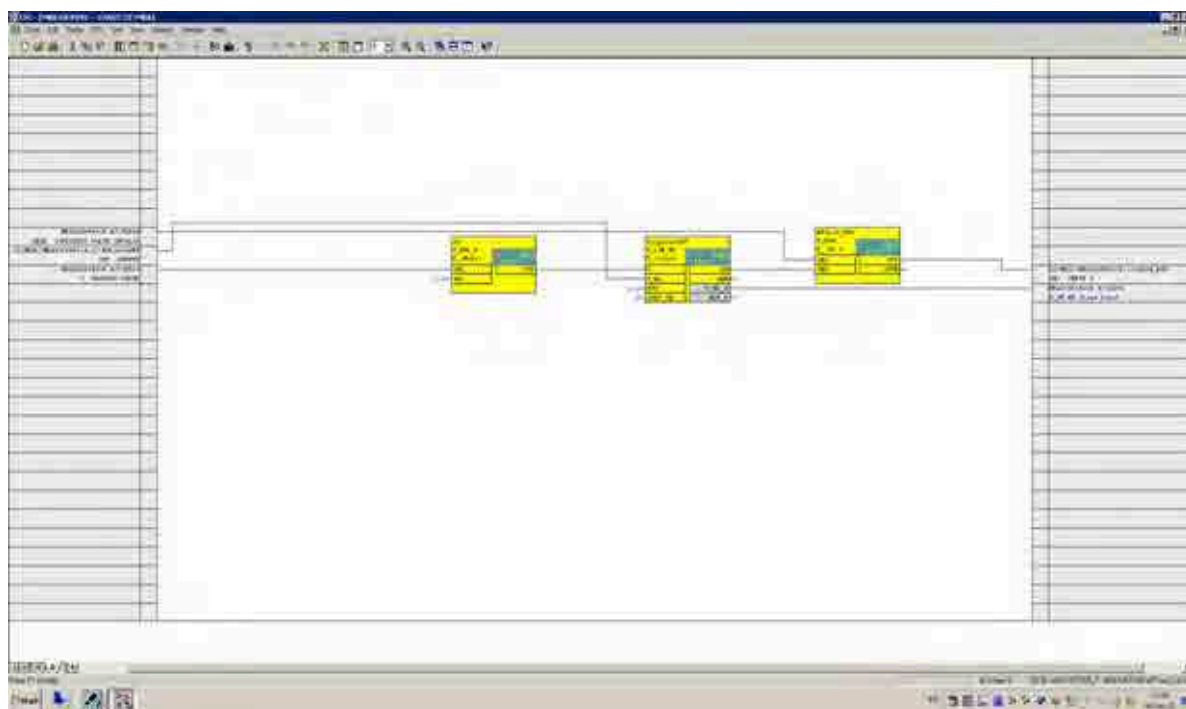
### Before changed



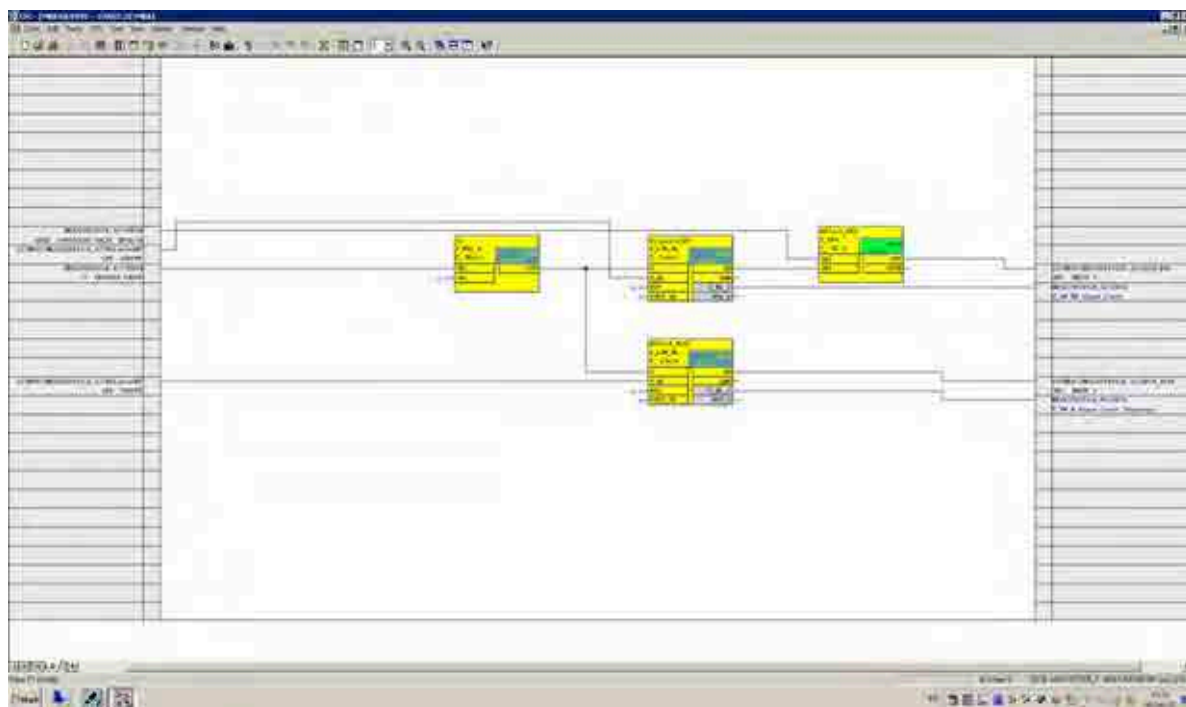
### After Changed



### Before changed



### After Changed



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IDE1B101213257 Name: Commissioning report Rev: A Protection: Restricted IP: R00, S00  
Creator: Reviewer: Approver:  
ALN ECCNN ECL: US-ContNo CoO:TH

**8****8.8 Appendix H SuP01-2021 Remove high temp alarm stator ring 2 - 3**

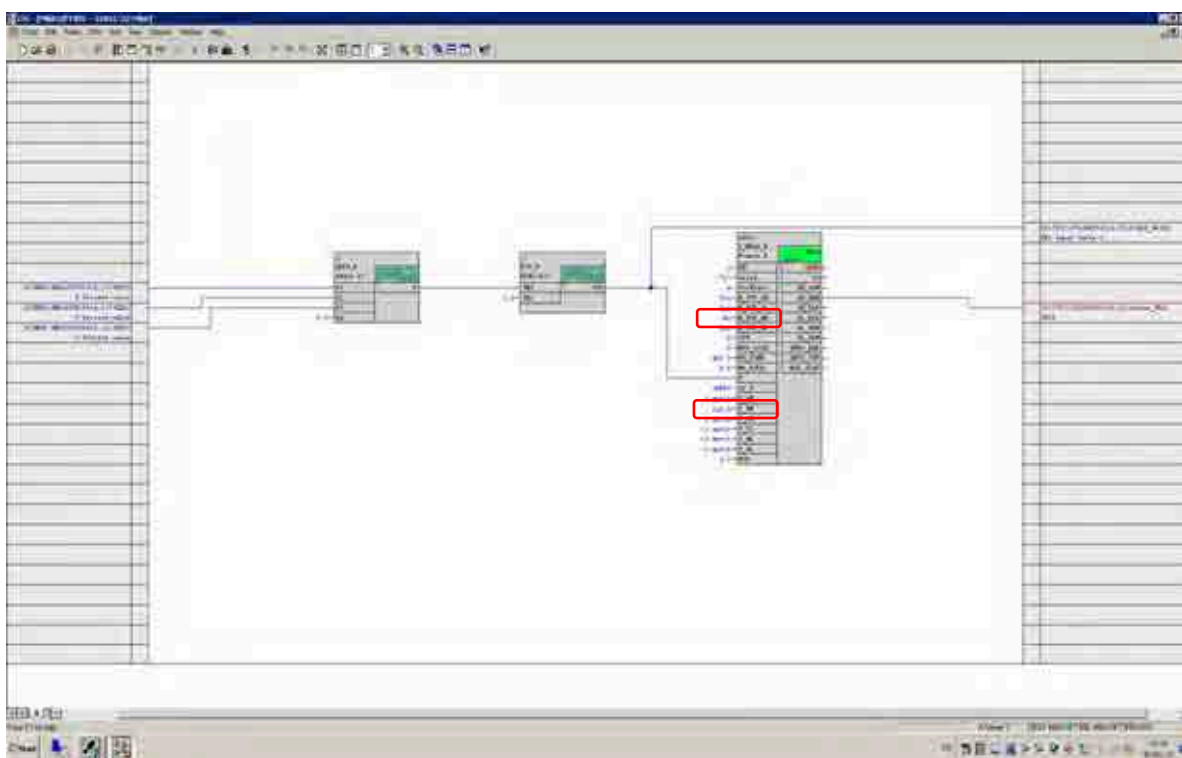
<b>Project:</b>	SSUT GT22
<b>Record number:</b>	BD000166U04
<b>Finished date:</b>	2023-01-01
<b>Description:</b>	SuP01/2021/SGT-800 Removal of high temperature alarm on stator ring 2 & 3

## Activity to be performed:

Item  
01.01

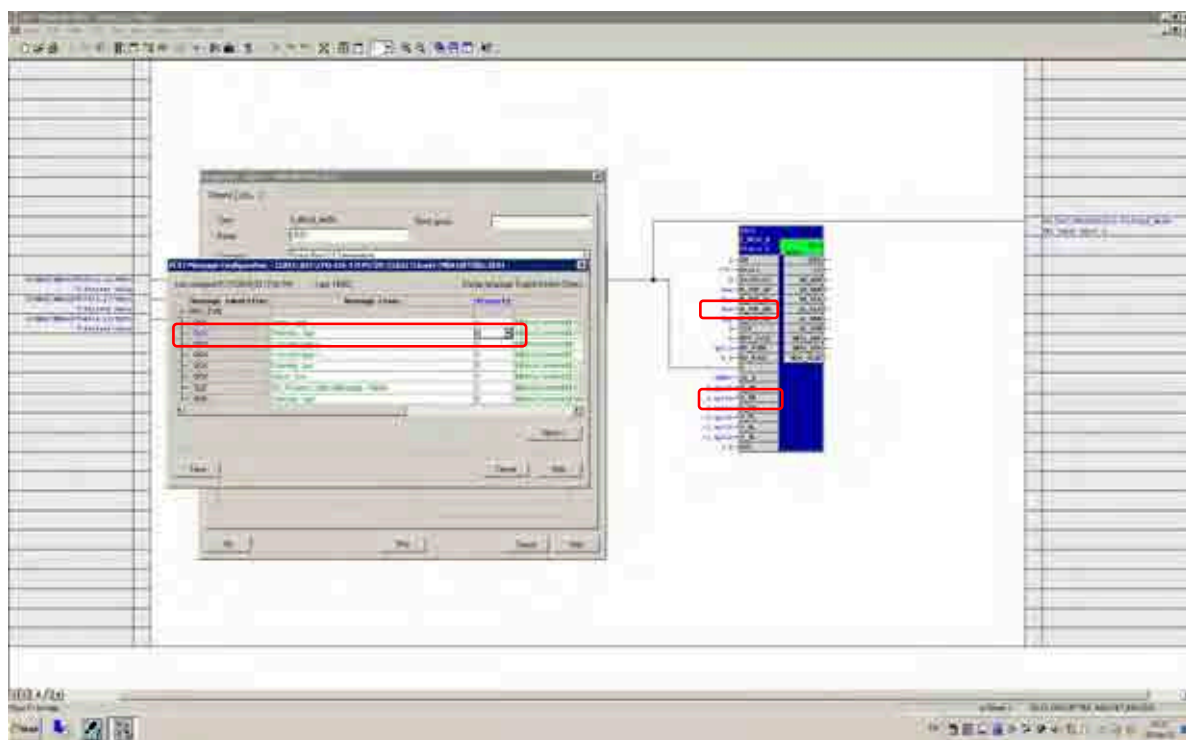
Removal of high temperature alarm on stator ring 2 & 3

Before changed





### After Changed



**9****8.9 Appendix I SuP25-2015-SGT800  
Reduction of vibration level during purge**

<b>Project:</b>	SSUT GT22
<b>Record number:</b>	BD000166U04
<b>Finished date:</b>	2023-01-01
<b>Description:</b>	SuP25/2015/SGT-800 Reduction of vibration level during purge

## Activity to be performed:

Item  
01.01

Logic has already performed prior inspection.  
Some message box found deviation and were corrected as following.

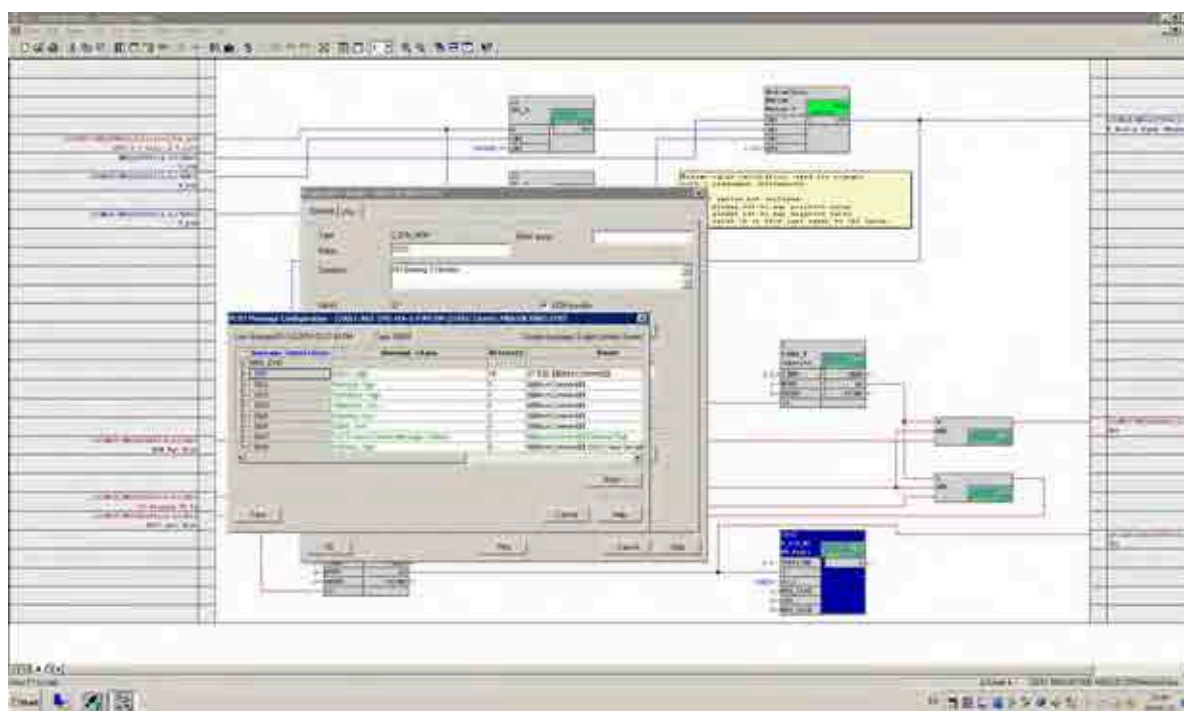
### MBA10CY005

- Change comment wording "HH Bearing 3 Vibration" to "HH Bearing 1 Vibration".
- Change event wording priority 14 "GT ESD" to priority11 "GT START ABORT".

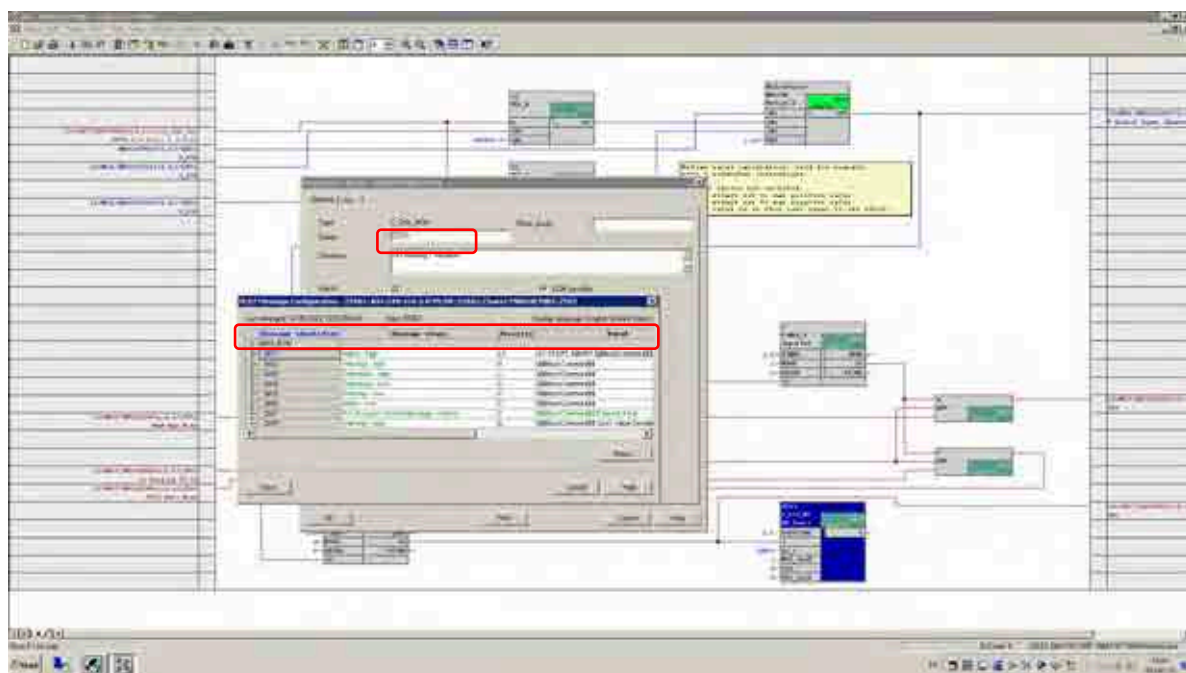
### MBA10CY010

- Change comment wording "HH Bearing 3 Vibration" to "HH Bearing 2 Vibration".
- Change event wording priority 14 "GT ESD" to priority11 "GT START ABORT".

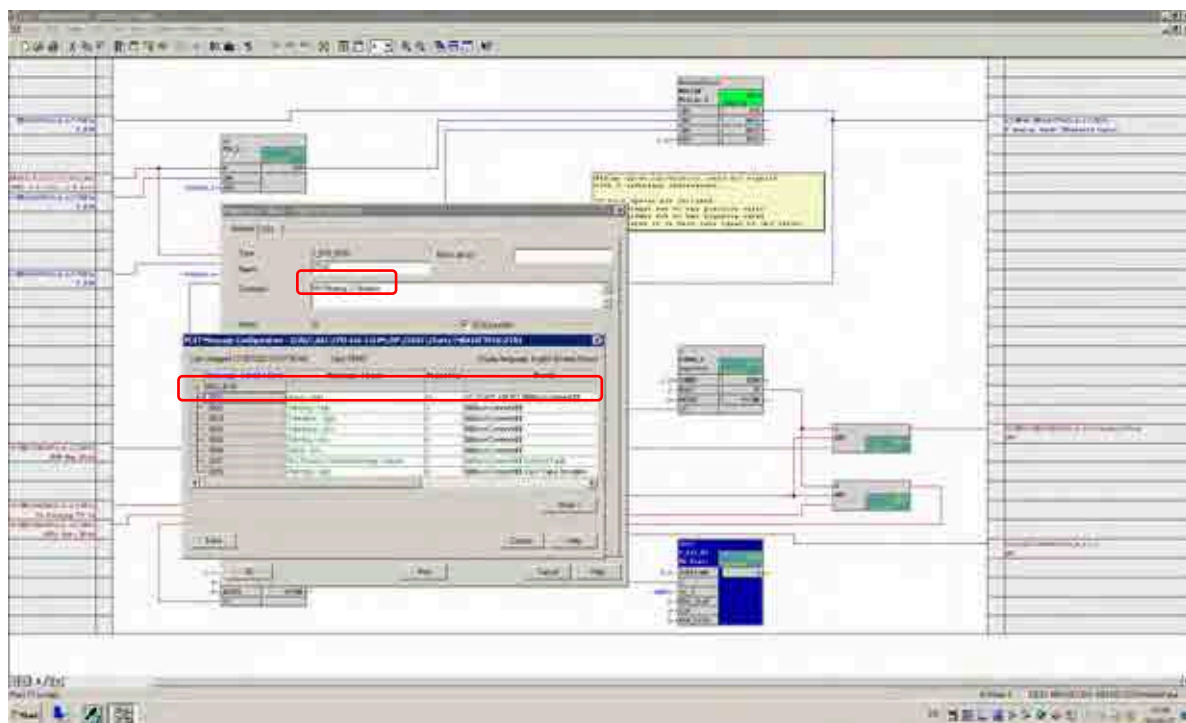
### Before changed



### After Changed MBA10CY005



### After Changed MBA10CY010



## Inspection Report

Subject / Title:  
**BD000166U04 SSUT 2:2,  
 MI-50 kEOH Inspection report 2022.**

**Samutprakarn, Thailand**  
 Location

**30 Dec 2022**  
 Date

Project:

Customer Name: **SSUT Company Ltd**

Orderer's File Ref: **E1B101145805: A**

Order No Internal: **EA033854U02A112511**

Report No Internal: **RTSOFL634/22**

**Somdej Arunplod**  
 Author(s)

Released technically      Released for external use

Classification: **Confidential**

Codeword	: <b>SSUT 2:2</b>
Equipment No	: <b>BD000166U04</b>
Product Type	: <b>SGT-800B1</b>
Mobilization Date	: <b>2022-12-30</b>
Demobilization Date	: <b>2023-01-01</b>
Client Contact Name	: <b>Mr. Suchart J.</b>

### Executive Summary:

The purpose of visit was to perform A-inspection between 30-Dec-2022 to 1-Jan-2023. Level A'50-inspection according to activity list E1B101145805. Compressor washing of GT unit BD000166U04 was performed before inspection. Several minor remarks were noted. Details can be found in the report.

Copies To:  
 Paleerat Taptawat  
 Erik Gregeborg

Emilien Zara Souleman  
 Emelie Ljungblad

## Inspection Report

### 6.19 HG 2650 Turbine stator stage no 1

**Performed work:** Borescope inspection.

**Result:**

- TBC oxidation found on outer vane plates and minor TBC oxidation on inner vane plates.
- Minor oxidation found on guide vane 1 heat shield.
- Minor oxidation found on guide vane 1 rear hooks.



GV1 segment found good condition.



Inner/Outer vane plate condition.



GV1 as found condition at burner position 15



Inner/Outer vane plate condition at burner position 15.



## Inspection Report



Heatsheld stage 1 overall condition.



Heatshield stage 1 overall condition and seal strip.



Rear hooks and heatshields condition.



Another view rear hooks and heatshields condition.

### **Recommendation:**

- None

**The turbine stator stage 1 is in serviceable condition.**