出國報告(出國類別：國外承攬）

關島 CABRAS 電廠#1 機汽機大修

服務機關：台灣電力公司電力修護處

姓名職稱：曾　琨　程　工程專員

派赴國家：美　　國　　關　　島

出國期間：106/07/14～106/09/16

報告日期：106 年 9 月 18 日

出國報告審核表

出國報告名稱：關島 CABRAS 電廠#1 機汽機大修報告		
出國人姓名 (2人以上，以1人為代表)	職稱	服務單位
曾琨程	機械工程專員	電力修護處
出國類別	考察 □進修 □研究 □實習 ■其他 汽機大修 （例如國際會議、國際比賽、業務接洽等）	
出國期間：106 年 07 月 16 日至 106 年 09 月 16 日	報告繳交日期： 106 年 09 月 18 日	

出國人員自我審核	計畫主辦機關審核	審核項目
■	□	1.依限繳交出國報告
■	□	2.格式完整（本文必須具備「目地」、「過程」、「心得及建議事項」）
■	□	3.無抄襲相關資料
■	□	4.內容充實完備.
□	□	5..建議具參考價值
□	□	6.送本機關參考或研辦
□	□	7.送上級機關參考
□	□	8.退回補正，原因：
□	□	（1）不符原核定出國計畫
□	□	（2）以外文撰寫或僅以所蒐集外文資料為內容
□	□	（3）內容空洞簡略或未涵蓋規定要項
□	□	（4）抄襲相關資料之全部或部分內容
□	□	（5）引用相關資料未註明資料來源
□	□	（6）電子檔案未依格式辦理
□	□	9.本報告除上傳至出國報告資訊網外，將採行之公開發表：
□	□	（1）辦理本機關出國報告座談會（說明會），與同仁進行知識分享。
□	□	（2）於本機關業務會報提出報告
□	□	（3）其他 _____
□	□	10.其他處理意見及方式：

報告人：曾琨程 106. 9. 18　單位主管：潘乃春 106. 9. 20　主管處主管：莊進華 106. 9. 19　主管：吳育中 106. 9. 20　副總經理：陳建益 106. 9. 21

說明：

各機關可依需要自行增列審核項目內容，出國報告審核完畢本表請自行保存。

審核作業應儘速完成，以不影響出國人員上傳出國報告至「公務出國報告資訊網」為原則。

行政院及所屬各機關出國報告提要

出國報告名稱：

關島 CABRAS 電廠#1 機汽機大修　　頁數 77 含附件：☑是□否

出國計畫主辦機關/聯絡人/電話

台灣電力公司電力修護處/曾琨程/02-27853199-258

出國人員姓名/服務機關/單位/職稱/電話

曾琨程/台灣電力公司/電力修護處/第一工作隊專員/02-27853199-258

出國類別：□1 考察□2 進修□3 研究□4 實習☑5 其他

出國期間：106/07/14～106/09/16　　出國地區：美國關島

報告日期：106/09/18

分類號/目

關鍵詞：

內容摘要：(二百至三百字)

關島 cabras 電廠#1 機汽機大修預定工期 35 天於 2017 年 7 月 17 日開始大修至 8 月 18 日。大修主要工作內容為全開蓋大修包含高低壓開蓋大修與汽機主閥拆解大修工作。

轉子吊出後，經由 NDT 檢查，確認並無任何葉片受損需更換，另汽機主閥全部拆卸檢修。MSV 響導閥 SEAT 與 RSV DISC 在經過 NDT 檢查後發現有裂痕(線性指示)，此次大修將 MSV 響導閥 SEAT 與 RSV DISC 更換成新品。此外因 CV#1 在拆解過程中無法將 STEM 從閥體中取下，所以將其切割取下後更換成新品(STEM 與 DISC)。

在動葉與靜葉檢查，並未發現葉片或葉根有裂縫需更換。僅有中壓第十一級上下半靜葉環與中壓第十級靜葉環下半葉片有些吹蝕現象，經過焊補磨修與 PT 檢查後，將其回裝。汽機汽封更換方面，本次檢查發現只有 HP7 之 Packing ring 有些微變形，將其更換為新品。因應電廠要求，低壓外缸安全膜片也做了更換。因電廠輔機系統與飼水泵在大修後啟動有些問題，第一次並聯時間為 8/28　19:42，發電量為 0.4MW。

本文電子檔已傳至出國報告資訊網 (http://open.nat.gov.tw/reportwork)

2017 關島 CABRAS # 1 STEAM TURBINE 大修報告

台灣電力股份有限公司

電力修護處

台灣電力公司
Taiwan power company

目錄

Ⅰ：前言

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大修工期:

預定工期: 07/17/2017 to 09/18/2017

完工日期: 07/17/2017 to 09/12/2017

汽機配重與超速跳脫試驗

08/27/2017. Start to Roll turbine, speed up to 900 rpm

08/28/2017 19:42. Turbine is synchronized

09/09/2017, add 336gm(6 pieces) balance piece on 240°~250°,

09/14/2017, decrease 56gm(1 pieces) balance piece on 250°

Then restart turbine to rate speed

09/11/2017 12:14 Output 24.8MW

震動數值如下： unit：mils

24.8MW	1X	1Y	2X	2Y	3X	3Y	4X	4Y	5X	5Y
12:14	0.6	0.6	3.1	2.6	1.9	1.2	1.4	0.5	0.6	0.5

軸承金屬溫度如下：

Bearing	1	2	3	4	5	Thrust Inactive (TE)	Thrust Active (GE)
T.F°	183.2	163.6	145.9	160.3	103.1	119.9	143.9
T.C°	84	73.1	63.3	71.3	39.5	48.8	62.2

09/11/2017 14:42 Output 41.4MW

震動數值如下： unit：mils

41.4MW	1X	1Y	2X	2Y	3X	3Y	4X	4Y	5X	5Y
14:42	0.6	0.6	2.9	1.9	2.1	1.3	1.2	0.6	0.7	0.4

軸承金屬溫度如下：

Bearing	1	2	3	4	5	Thrust Inactive (TE)	Thrust Active (GE)
T.F°	184.2	164.1	146.5	160.5	105.4	120.9	150.1
T.C°	84.5	73.4	63.6	71.4	40.8	29.4	65.6

09/15/2017 19:17 Output 16.1MW

震動數值如下： unit：mils

16.1MW	1X	1Y	2X	2Y	3X	3Y	4X	4Y	5X	5Y
19:17	0.5	0.4	2.7	2.2	2.1	1.2	1.1	0.6	0.8	0.6

Ⅱ：工作內容

依據合約檢修內容有下列幾項工作：

1：汽缸

1.1：拆除高低壓外缸與內缸，檢查動靜葉片軸逕向間隙、更換汽封與清除保溫

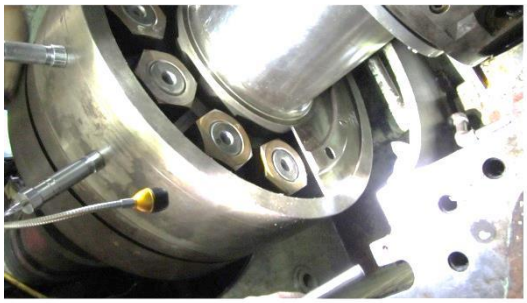
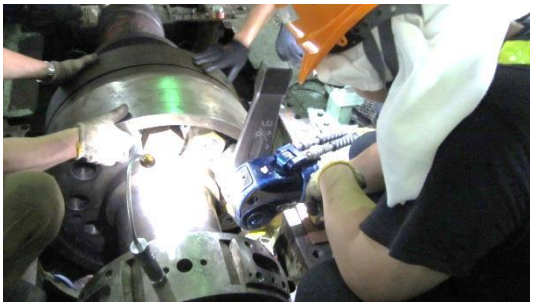
汽輪機外觀(TE Side)	汽輪機外觀(GEN Side)
	
外罩拆除	保溫拆除
	
拆除跨管	拆除跨管
	

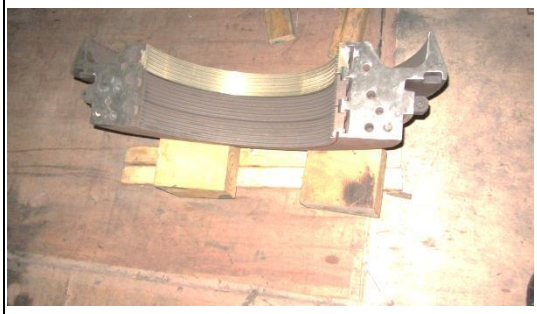
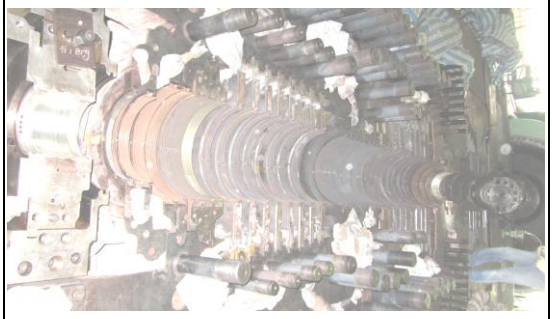
跨管拆除	跨管法蘭拆除
	
低壓人孔拆除	低壓內導流板拆除
	
低壓外缸拆除	低壓外缸吊掛
	

低壓內缸螺栓拆除	低壓內缸螺栓拆除
	
低壓內缸拆除吊掛	低壓轉子動葉片
	
#2 BRG 油槽外殼	#3 BRG 油槽拆除
	
高壓進汽管法蘭拆除	高壓進汽管法蘭拆除
	

高壓外缸拆除	高壓外缸頂升作業
	
高壓外缸頂升作業	高壓外缸頂升作業
	
高壓外缸頂升作業	高壓外缸頂升作業
	
高壓外缸吊掛作業	高壓內缸
	

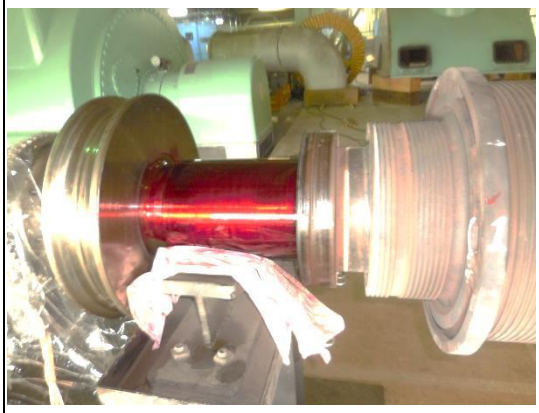
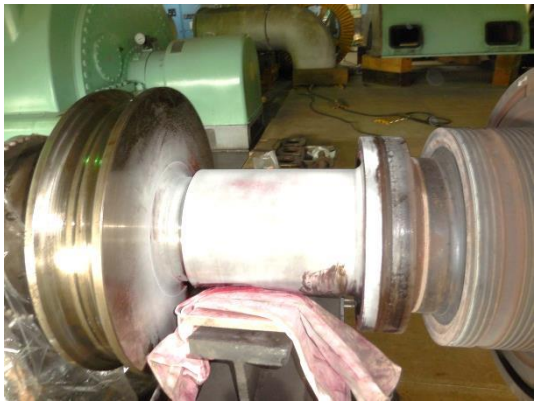
中壓上半靜葉環	中壓上半靜葉吊掛
	
高壓內缸拆解吊掛	高壓內缸拆解吊掛
	

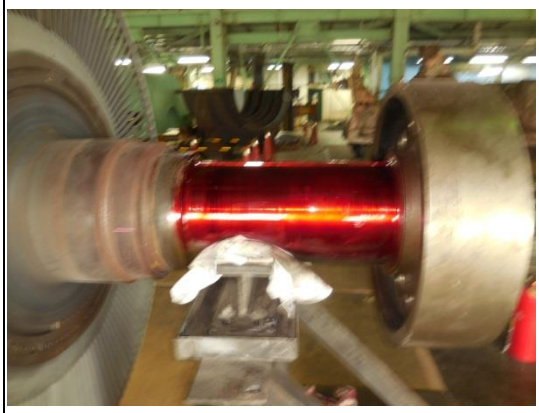
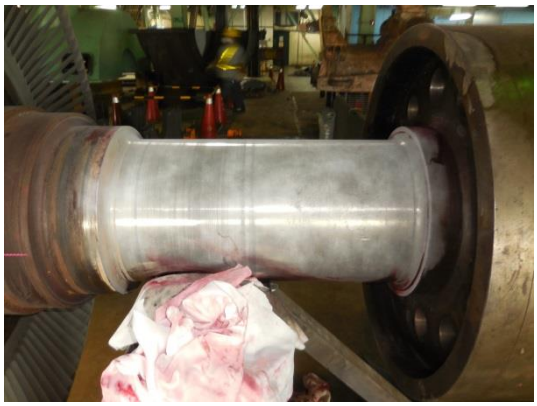
#3 BRG 上半油槽蓋拆解	聯軸器蓋拆解
	
聯軸器螺栓拆解	#2 BRG 上半拆解
	
#3 BRG 上半拆解	推力軸承拆解
	
轉子吊離前間隙核測	轉子吊掛作業
	

轉子置於架上	上半靜葉拆解吊出
	
HP7 汽封更換	HP7 汽封更換
	

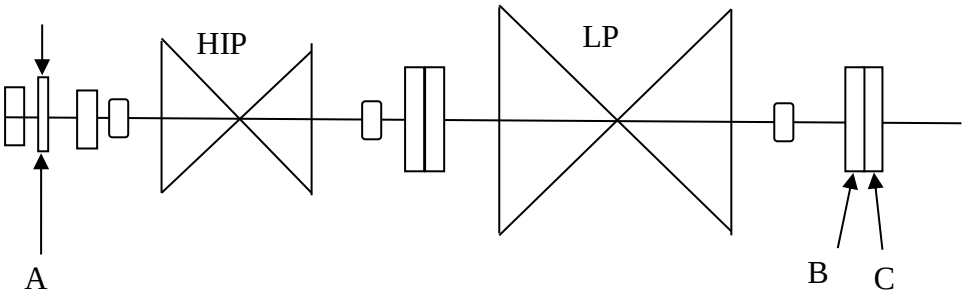
2.Rotor, Discs and blades.the following parts shall be inspected.

2.1 Saddle or stand for the rotor and nondestructive testing

低壓段動葉片 MT check	高中壓段動葉片 MT check
	
#1 軸頸 PT	#1 軸頸 PT
	
#2 軸頸 PT	#2 軸頸 PT
	

#3 軸頸 PT	#3 軸頸 PT
	
動葉片葉根檢查	Shrouds inspect
	
配重塊相對位置確認	動葉片葉根 MT 檢查
	
動葉片與護環間隙核測	打鉚處硬度檢查
	

2.2 Run out check within the 0.002”



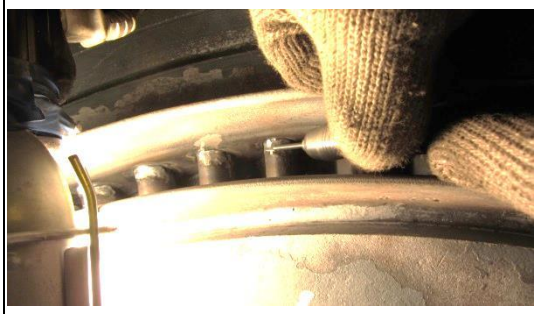
UNIT：1/100mm

	A	B	C
1	NA	19	22
2	NA	20	23
3	NA	23	22
4	NA	22	22
5	NA	22	22
6	NA	22	23
7	NA	22	22
8	NA	20	21

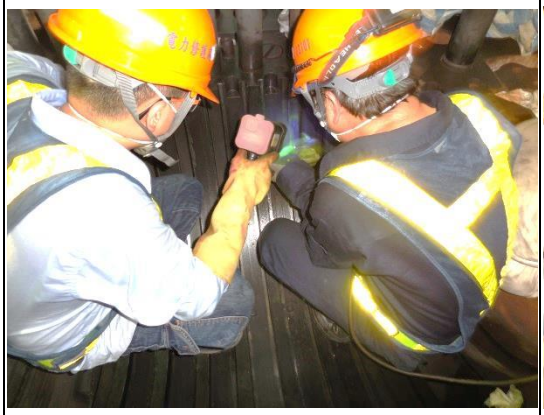
3：Nozzle block and buckets

3.1 IP 11(toper and lower half) and IP10 (lower half) nozzle van found some erosion and need to repair.,the other nozzle van are good.

IP11 nozzle 吹蝕	IP11 nozzle 吹蝕
	

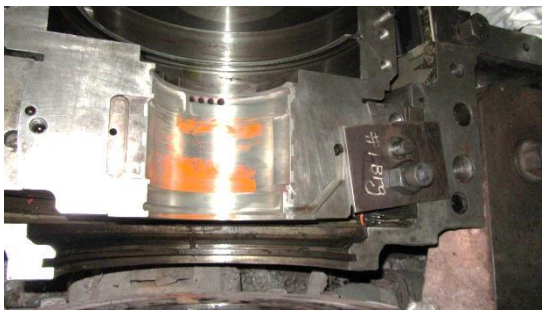
靜葉片 nozzle 焊補磨修	靜葉片 nozzle 焊補磨修
	
	

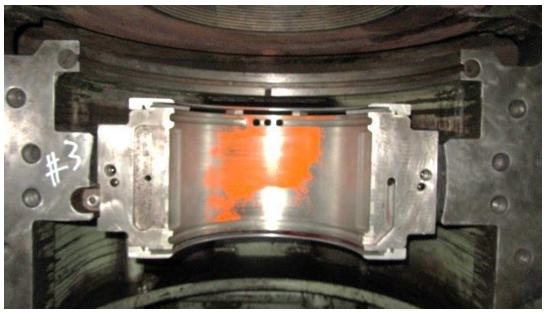
3.2 Perform MT&PT&UT

靜葉片導軌 MT check	靜葉片導軌 MT check
	
螺栓 UT check	靜葉片 MT check
	

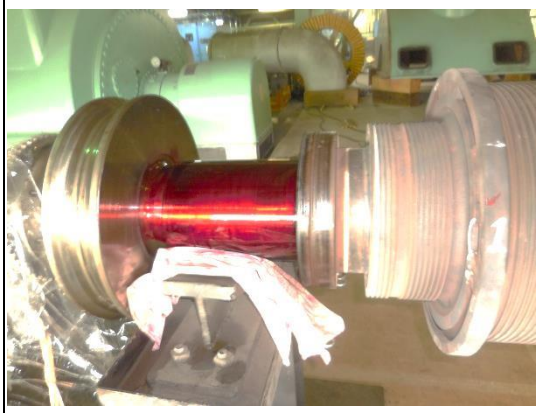
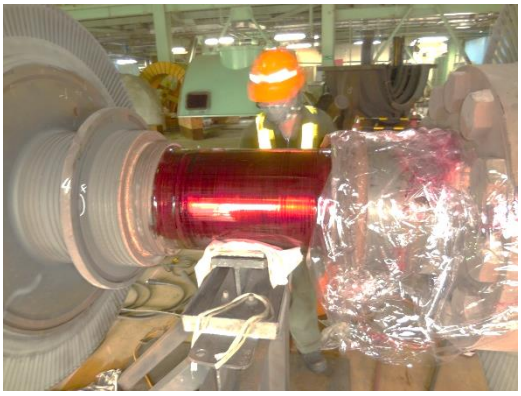
4：Bearings and journals

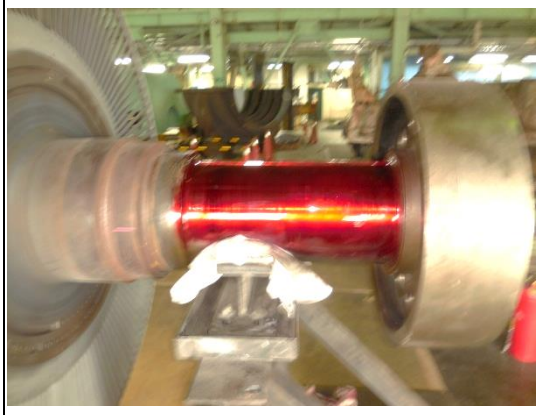
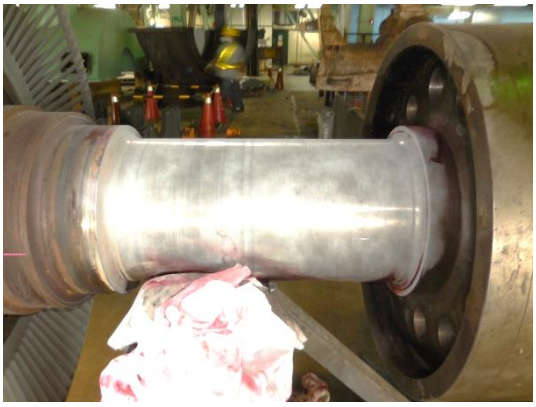
4.1：Clean and check contact surface or scrape if necessary.

#1 BRG 與軸頸接觸面試驗	#2BRG 與軸頸接觸面試驗
	

#3BRG 與軸頸接觸面試驗	
	

4.2：Perform PT&UT.

#1 軸頸 PT	#1 軸頸 PT
	
#2 軸頸 PT	#2 軸頸 PT
	

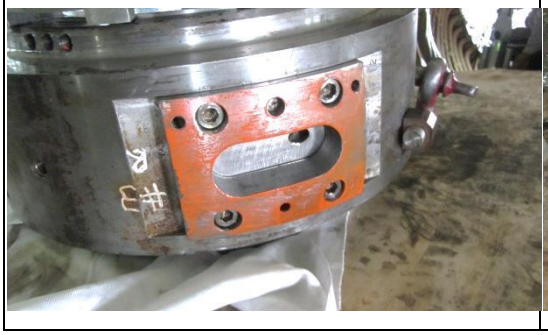
#3 軸頸 PT	#3 軸頸 PT
	

4.3：Perform center line check and adjustment.

軸心確認與調整	軸心確認與調整
	

4.4：Repaire Babbitt if needed or replace it with new parts.

#2BRG pad blue check	#2BRG pad blue check
	

#3BRG pad blue check	#3BRG pad blue check
	

4.5：Check inactive thrust bearing

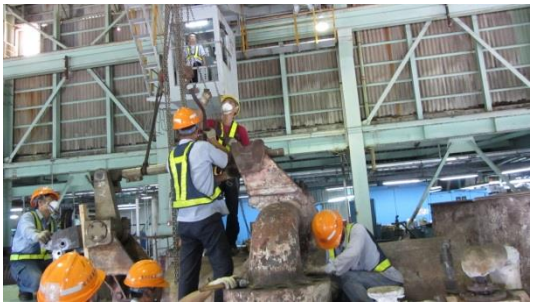
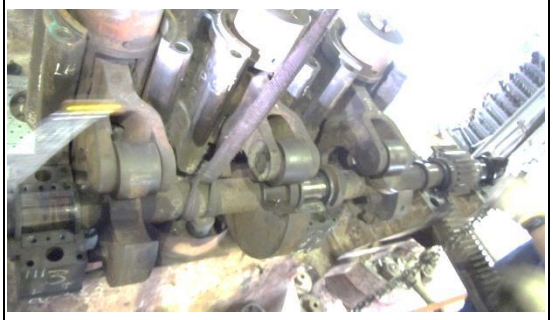
PT test for pad of thrust bearing	PT test for pad of thrust bearing
	

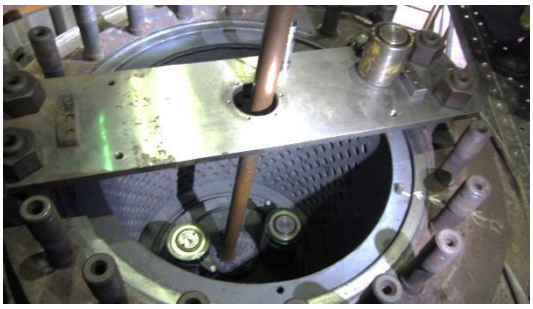
5：Main steam control valves(GV×6、MSV×1、RSV×1、IV×1、Steam seal regulator valve、Blow down valve, and 5 extraction steam non-return valves.)

5.1：Disassemble the valve

CV 彈簧拆除	CV 連趕拆除
	
CV 主閥吊掛	CV 主閥拆解
	

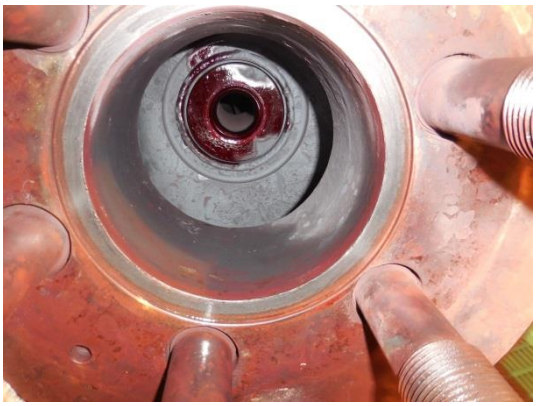
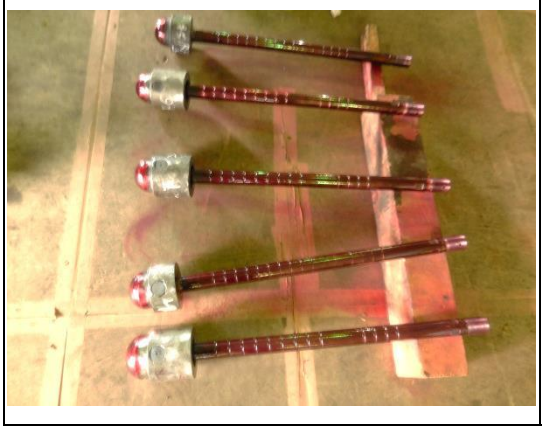
CV 細部拆解	閥桿切除作業
	
新閥桿 PT check	使用液態氮將 DISC 與閥桿組裝
	
將 PIN 組裝	閥桿新品
	

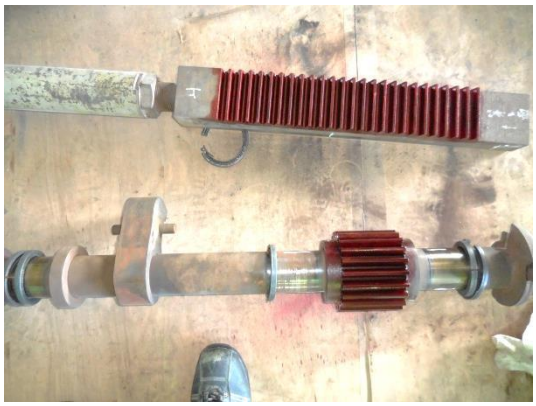
CV 分解後磨修	CV 分解後磨修
	
CV 驅動閥吊掛	CV 驅動感拆除
	
CV 驅動桿	IV 拆除吊掛
	

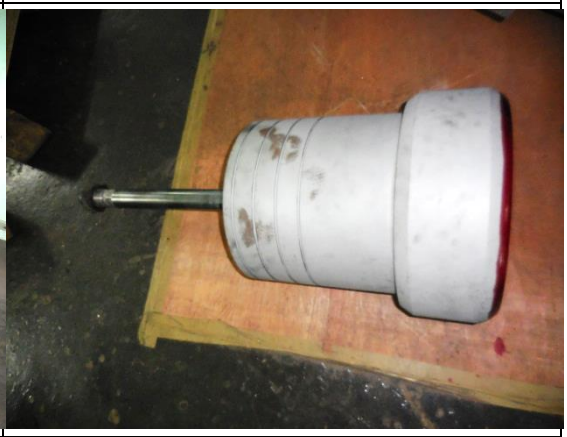
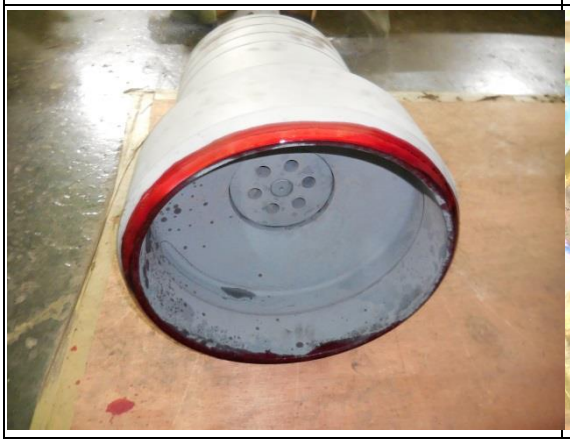
RSV SEAT	RSV 閥桿中心校準
	
RSV 拆除	RSV disc & stem
	
RSV GASKET	RSV&IV 閥座
	

RSV Disc 拆解	RSV 拆解
	
oCombine Reheat Valve (CRV) 濾網拆解	MSV 閥蓋
	
MSV 拆解	MSV 組裝
	

5.2：Inspect the valve body for crack by PT and Check valve disc and seat contact；erosion and check for foreign materials

CV 閥座 PT check	CV 閥座 PT check
	
CV 閥座 PT check	CV 閥座 PT check
	
CV disc 與閥桿 PT check	CV disc 與閥桿 PT check
	

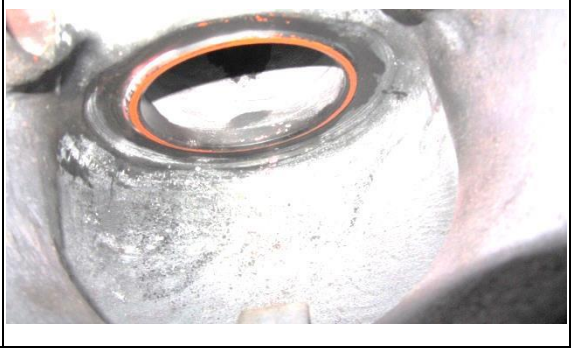
CV 連桿 PT check	CV 連桿 PT check
	
MSV pilot valve seat PT	MSV pilot valve seat Disc PT
	
MSV pilot valve seat Disc PT	MSV pilot valve Disc PT
	

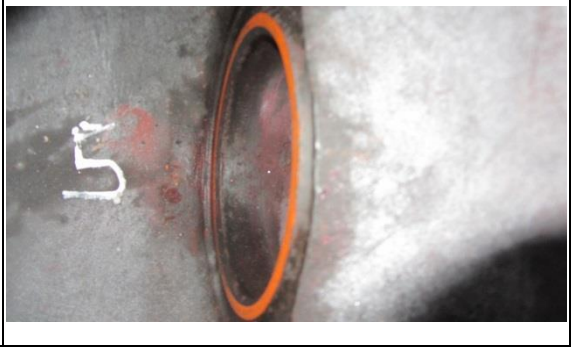
MSV pilot valve 閥座 PT	MSV pilot valve 閥座 PT
	
RSV 閥座 PT CHECK	RSV 閥座 PT CHECK
	
IV PT CHECK	IV PT CHECK
	
IV DISC PT CHECK	IV&RSV 閥座 PT CHECK
	

Check Valve Disc PT check	Check Valve Disc PT check
	
Check Valve 閥座 PT check	Check Valve 閥座 PT check
	
Check Valve 閥座 PT check	Check Valve 閥座 PT check
	

5.3：Reassemble upon completion of said work.

#1 CV 閥座 Blue Check	#1 CV Disc Blue Check
	
#3 CV 閥座 Blue Check	#3 CV Disc Blue Check
	
#5 CV 閥座 Blue Check	#5CV Disc Blue Check
	
#6 CV 閥座 Blue Check	#6CV Disc Blue Check
	

MSV 閥座 PT CHECK	Disc PT CHEKC
	
RSV 閥座 PT CHECK	RSV Disc PT CHEKC
	
IV 閥座 PT CHECK	IV Disc PT CHEKC
	
#1 Check Valve Disc Blue Check	#1 Check Valve 閥座 Blue Check
	

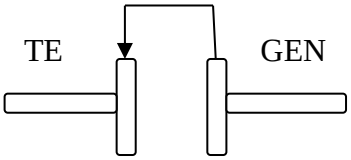
#2 Check Valve Disc Blue Check	#2 Check Valve 閥座 Blue Check
	
#3 Check Valve Disc Blue Check	#3 Check Valve 閥座 Blue Check
	
#4 Check Valve Disc Blue Check	#4 Check Valve 閥座 Blue Check
	
#5 Check Valve Disc Blue Check	#5 Check Valve 閥座 Blue Check
	

5.4：Check rotor alignment、bearing center line and perform adjustment as Required

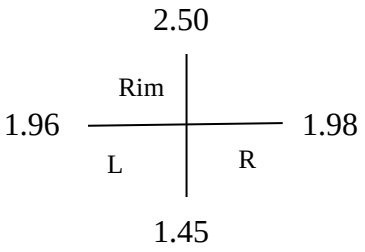
Rotor 對心作業	Rotor 對心作業
	

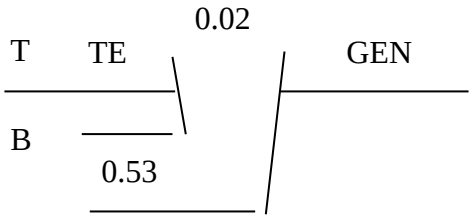
1：TB-GEN alignment

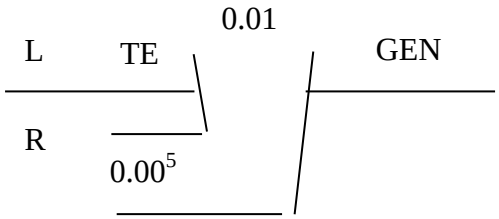
Unit:mm



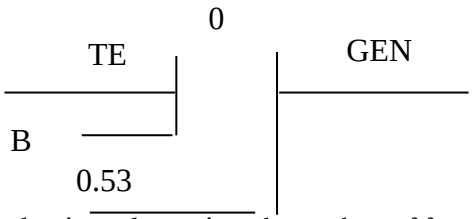
Face	T	B	L	R
0°	19.77	19.75	19.70	19.73
90°	19.72	19.76	19.74	19.70
180°	19.33	19.32	19.31	19.32
270°	19.80	19.78	19.78	19.80
Ave	19.65	19.65	19.63	19.64

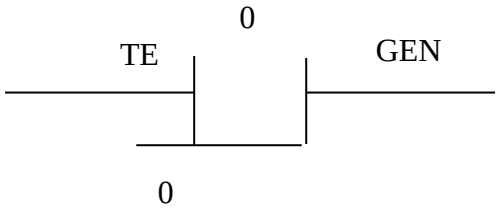






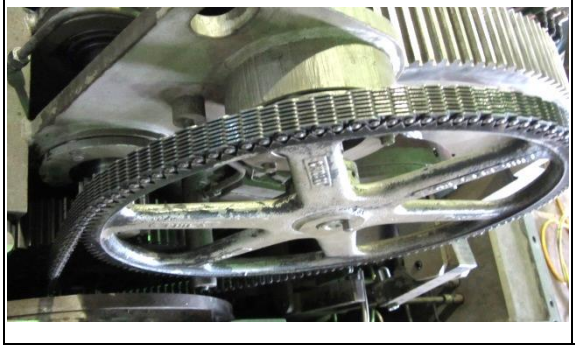
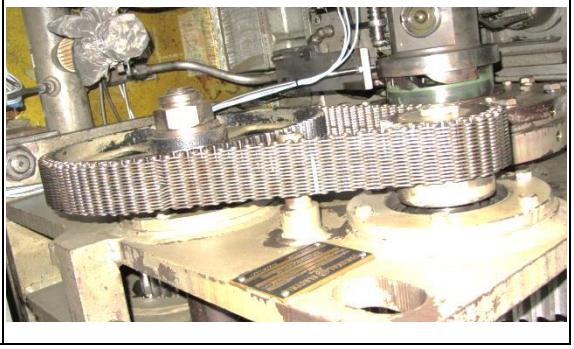
Designed Value





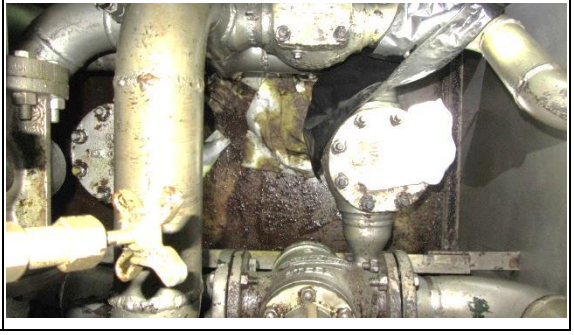
The design data is that the offset is zero and the generator is 0.53mm low to the turbine. A mounted on the generator reading to the turbine, and with parallel gage to measure all face.

5.5：Clean, check and inspect turning gear.

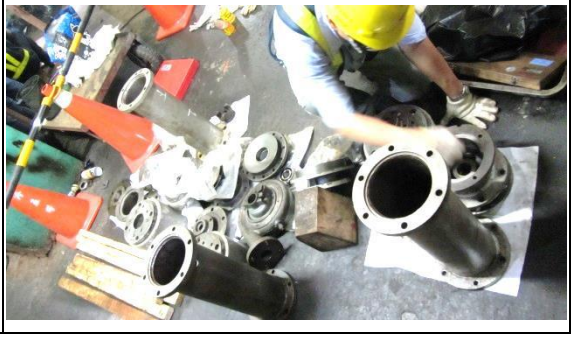
慢車齒輪 PT check	慢車齒輪 Gear PT check
	
慢車傳動系統	慢車傳動系統
	

6. Lube Oil System

6.1：Drain and clean the oil reservoir and inspect the inside condition

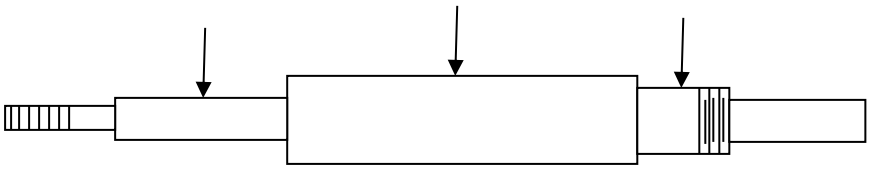
潤滑油槽清理	潤滑油槽清理
	
	

6.2：Disassemble and inspect AC & DC pump

拆除 AC & DC pump	拆除 AC & DC pump
	
拆除 AC & DC pump	拆除 AC & DC pump
	
分解 AC & DC pump	分解 AC & DC pump
	
	

AC、DC&EOP pump

		A	clearance	B	clearance	C	clearance
Wear ring(top)	Inside DIA	79.61	0.46	79.57	0.48	79.44	0.33
	Outside DIA	79.15		79.08		79.11	
Wear ring(lower)	Inside DIA	73.38	0.55	73.34	0.51	73.36	0.54
	Outside DIA	72.83		72.83		72.82	
Bushing (lower)	Inside DIA	44.58	0.15	44.61	0.17	44.60	0.16
	Outside DIA	44.43		44.44		44.44	



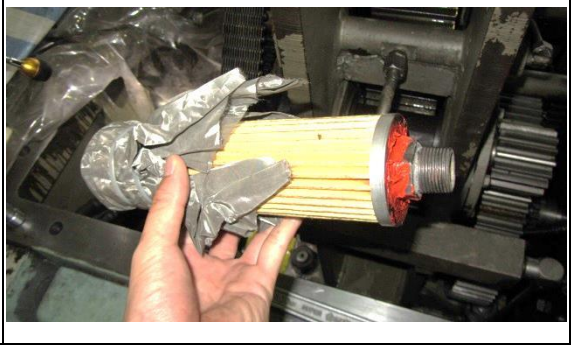
c b a

	STEM RUN OUT CHECK				
		0°	90°	180°	270°(0°)
A	a	0	-1	0	2
	b	0	0	0	0
	c	0	-4	0	0
B	a	0	8	13	4
	b	0	0	0	0
	c	0	1	3	1
C	a	0	6	3	-3
	b	0	0	0	0
	c	0	2	2	0

6.3：Clean the oil cooler by brushing tubes (LUBE & EH system)

分解潤滑油 cooler cover	分解潤滑油 the LUBE cooler cover
	
使用毛刷清理冷卻管(潤滑油系統)	使用毛刷清理冷卻管(潤滑油系統)
	
使用毛刷清理冷卻管 (EH System)	使用毛刷清理冷卻管 (EH System)
	

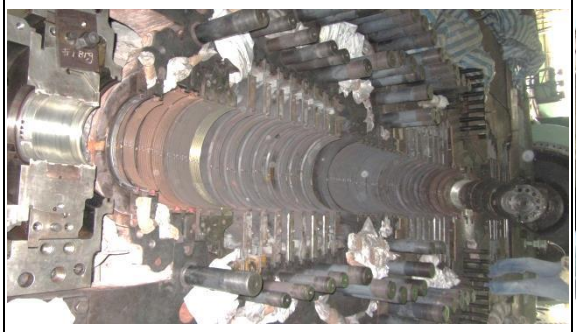
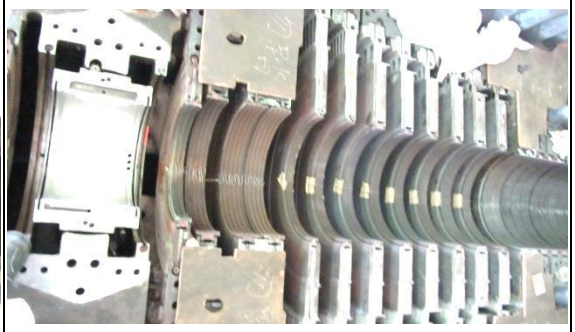
6.4：Flushing the piping of lube oil system

油洗濾網裝設	油洗濾網裝設
	

7：Perform coupling alignment.

對心作業	對心作業
	

8 : Perform the necessary reinstallation and restoration

下半靜葉回裝	下半靜葉回裝
	
轉子回裝	低壓內缸回裝
	
高壓內缸回裝	高壓上半靜葉環回裝
	

高壓外缸回裝	高壓外缸回裝
	
高壓螺栓回裝熱鎖	低壓外缸回裝
	
跨管回裝	HP inlet pipe assembly
	

9：汽機配重與超速跳脫試驗

08/27/2017. Start to Roll turbine, speed up to 900 rpm

08/28/2017 19:42. Turbine is synchronized

09/09/2017, add 336gm(6 pieces) balance piece on 240°~250°,

09/14/2017, decrease 56gm(1 pieces) balance piece on 250°

Then restart turbine to rate speed

09/11/2017 12:14 Output 24.8MW

震動數值如下： unit：mils

24.8MW	1X	1Y	2X	2Y	3X	3Y	4X	4Y	5X	5Y
12:14	0.6	0.6	3.1	2.6	1.9	1.2	1.4	0.5	0.6	0.5

軸承金屬溫度如下：

Bearing	1	2	3	4	5	Thrust Inactive (TE)	Thrust Active (GE)
T.F°	183.2	163.6	145.9	160.3	103.1	119.9	143.9
T.C°	84	73.1	63.3	71.3	39.5	48.8	62.2

09/11/2017 14:42 Output 41.4MW

震動數值如下： unit：mils

41.4MW	1X	1Y	2X	2Y	3X	3Y	4X	4Y	5X	5Y
14:42	0.6	0.6	2.9	1.9	2.1	1.3	1.2	0.6	0.7	0.4

軸承金屬溫度如下：

Bearing	1	2	3	4	5	Thrust Inactive (TE)	Thrust Active (GE)
T.F°	184.2	164.1	146.5	160.5	105.4	120.9	150.1
T.C°	84.5	73.4	63.6	71.4	40.8	29.4	65.6

09/15/2017 19:17 Output 16.1MW

震動數值如下： unit：mils

16.1MW	1X	1Y	2X	2Y	3X	3Y	4X	4Y	5X	5Y
19:17	0.5	0.4	2.7	2.2	2.1	1.2	1.1	0.6	0.8	0.6

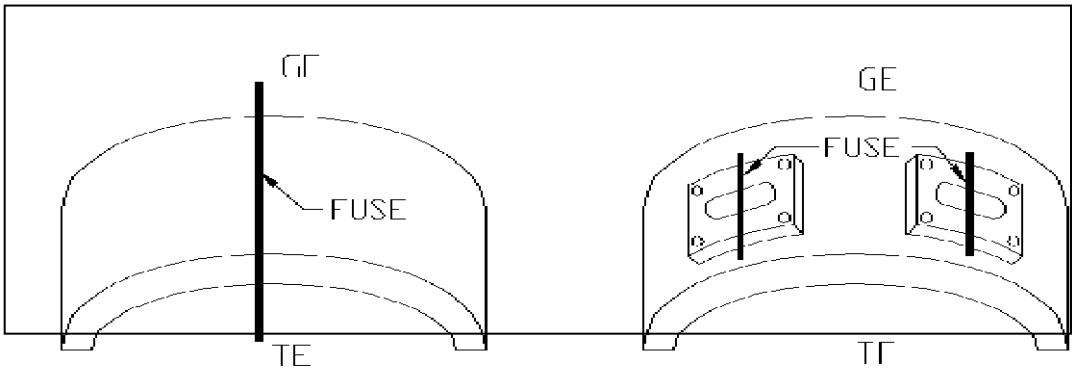
Ⅲ：Inspection Form

Brg Pinch Check

Cabras Plant： Unit 1 As Found Date：21/July/2017

No.1brg mode

Unit：mm



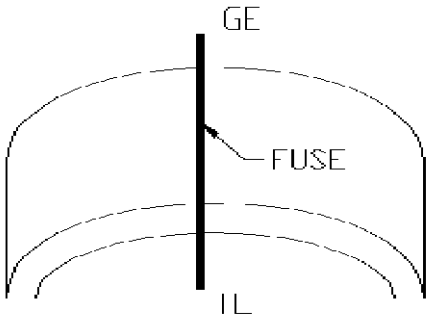
NO.1軸承型式 NO.2、3號軸承型式

Brg NO	SIM Width	Mea Point		FUSE Thick	PINCH	DESIGN	Note
1		TOP	TE	0.39	0.08	0.05-	
			GE	0.40	0.08	0.125	
2	×0.7 =	LEFT	TE	0.40	0.08	0.05-	
			GE	0.40	0.08	0.125	
		RIGHT	TE	0.44	0.9	0.05-	
			GE	0.44	0.9	0.125	
3	×0.7 =	LEFT	TE	0.44	0.8	0.05-	
			GE	0.44	0.9	0.125	
		RIGHT	TE	0.51	0.8	0.05-	
			GE	0.51	0.8	0.125	

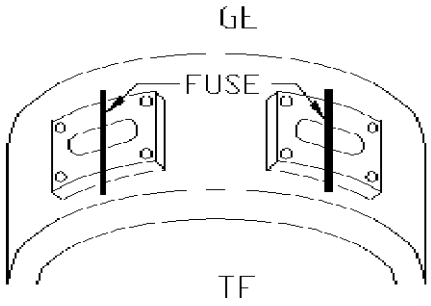
inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

Brg Pinch Check

Cabras Plant： Unit 1 .　.As Left　　Date：02/Aug/2017.



No. .1brg mode



No. .2&3brg mode

unit：mm

Brg NO	SIM Width	Mea Point		FUSE Thick	PINCH	DESIGN	Note
1		TOP	TE	0.80	0.08	0.00-	
			GE	0.80	0.08	0.05	
2	×0.7 =	LEFT	TE	0.80	0.08	0.00-	
			GE	0.80	0.08	0.15	
		RIGHT	TE	0.80	0.9	0.00-	
			GE	0.80	0.9	0.15	
3	×0.7 =	LEFT	TE	0.80	0.8	0.00-	
			GE	0.80	0.9	0.15	
		RIGHT	TE	0.80	0.8	0.00-	
			GE	0.80	0.8	0.05	

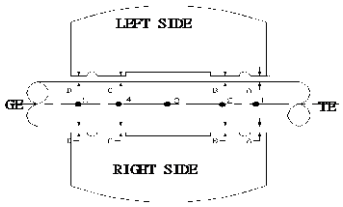
inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

#1、2、3Brg Clearance&Parallel Check

Cabras Plant： Unit 1 . .As Found & Left Date：21/July/2017

02/Aug/2017.



Brg parallel check（as found） unit：mm

	A		B		C		D	
	left	right	left	right	left	right	left	right
NO.1	0.13	0.10	0.12	0.10	0.12	0.10	0.12	0.15
NO.2	0.30	0.42	0.28	0.38	0.30	0.28	0.31	0.30
NO.3	0.11	0.20	0.27	0.25	0.32	0.20	0.14	0.11

Brg parallel check（as left） unit：mm

	A		B		C		D	
	left	right	left	right	left	right	left	right
NO.1	0.13	0.10	0.12	0.10	0.12	0.10	0.12	0.15
NO.2	0.30	0.42	0.28	0.38	0.30	0.28	0.31	0.30
NO.3	0.11	0.20	0.27	0.25	0.32	0.20	0.14	0.11

brg top clearance unit：mm

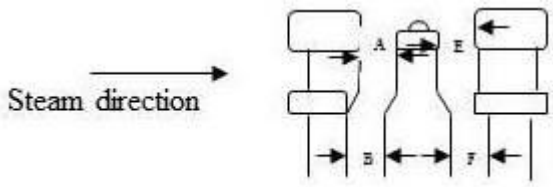
	#1		#2		#3	
	TE	GE	TE	GE	TE	GE
As found	0.35	0.35	0.52	0.53	0.54	0.58
As left	0.35	035	0.52	0.53	0.54	0.58

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

HP Rotor Axial Clearance

Cabras Plant： Unit 2 ..As Found Date：22/July/2017.



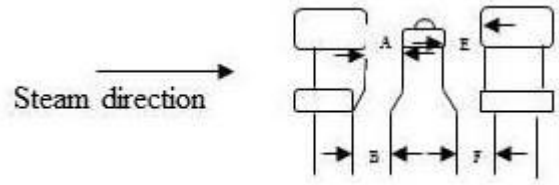
		design HP-LH				HP-RH			
		A	B	E	F	A	B	E	F
1	design		2.99	NA		2.99	2.99	NA	
	actual	4.0	NA	NA	10.8	3.7	NA	NA	11.7
2	design	2.59	2.59	NA	5.51	2.59	2.59	NA	5.51
	actual	4.0	NA	NA	10.3	3.9	NA	NA	10.6
3	design	2.62	2.49	NA	6.60	2.62	2.49	NA	6.60
	actual	3.1	9.3	NA	10.3	3.3	9.8	NA	9.8
4	design	2.57	2.44	NA	5.00	2.57	2.44	NA	5.00
	actual	2.9	9.0	NA	11.0	3.3	9.3	NA	10.7
5	design	2.44	2.31	NA	4.95	2.44	2.31	NA	4.95
	actual	3.0	9.5	NA	10.3	3.2	9.5	NA	9.7
6	design	2.39	2.13	NA	4.88	2.39	2.13	NA	4.88
	actual	3.3	7.7	NA	16.0	3.2	7.6	NA	16.1
7	design	2.11	1.85	NA	4.72	2.11	1.85	NA	4.72
	actual	3.4	7.4	NA	13.6	3.4	7.7	NA	13.4
8	design	1.95	1.70	NA	4.57	1.95	1.70	NA	4.57
	actual	4.0	9.7	NA	9.4	4.2	9.8	NA	9.4
9	design	1.75	1.50	NA	4.45	1.75	1.50	NA	4.45
	actual	3.8	9.7	NA	11.3	3.9	9.4	NA	11.2

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

HP Rotor Axial Clearance

Cabras Plant： Unit 2 ..As Left Date：02/Aug/2017.



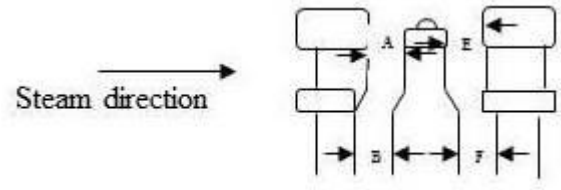
		HP-LH				HP-RH			
		A	B	E	F	A	B	E	F
1	design	2.9	2.9	NA	NA	2.9	2.9	NA	NA
	actual	4.0	3.8			3.6	3.8		
2	design	2.9	2.9	NA	8.2	2.9	2.9	NA	8.2
	actual	4.0	3.5		10.2	4.0	3.3		9.8
3	design	2.9	2.9	NA	8.2	2.9	2.9	NA	8.2
	actual	3.3	3.3		10.7	3.5	3.6		10.1
4	design	4.3	4.3	NA	8.5	4.3	4.3	NA	8.5
	actual	3.5	3.6		10.1	3.8	3.6		9.6
5	design	4.2	4.2	NA	8.5	4.2	4.2	NA	8.5
	actual	3.5	3.5		11.8	3.7	3.5		9.3
6	design	4.2	4.2	NA	8.5	4.2	4.2	NA	8.5
	actual	3.6	3.6		12.6	3.6	3.7		11.4
7	design	4.2	4.2	NA	8.5	4.2	4.2	NA	8.5
	actual	3.5	3.4		9.2	3.4	3.5		9.5
8	design	4.2	4.4	NA	8.5	4.2	4.4	NA	8.5
	actual	3.9	4.0		8.4	3.5	3.8		7.6
9	design	4.4	4.4	NA	8.5	4.4	4.4	NA	8.5
	actual	3.8	4.5		11.0	5.3	5.3		11.0

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

IP Rotor Axial Clearance

Cabras Plant： Unit 2 . .As Found Date：..22/July/2017



unit：mm

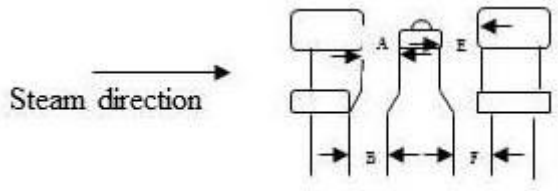
		IP-LH				IP-RH			
		A	**B**	**E**	**F**	**A**	**B**	**E**	**F**
1	design	**NA**	**8.58**	**6.25**	**NA**	**design**	**8.58**	**6.25**	**NA**
	actual	**NA**	**13.5**	**NA**	**NA**	**NA**	**13.8**	**NA**	**NA**
2	design	**3.61**	**9.14**	**3.73**	**8.51**	**3.61**	**9.14**	**3.73**	**8.51**
	actual	**5.1**	**11.3**	**NA**	**17.0**	**5.2**	**11.2**	**NA**	**15.4**
3	design	**4.09**	**3.83**	**3.96**	**8.81**	**4.09**	**3.83**	**3.96**	**8.81**
	actual	**7.1**	**12.9**	**NA**	**26.50**	**5.3**	**13.1**	**NA**	**26.4**
4	design	**4.04**	**9.73**	**4.16**	**9.12**	**4.04**	**9.73**	**4.16**	**9.12**
	actual	**7.3**	**13.7**	**NA**	**16.7**	**5.4**	**13.8**	**NA**	**16.6**
5	design	**4.27**	**10.21**	**4.52**	**9.35**	**4.27**	**10.21**	**4.52**	**9.35**
	actual	**6.6**	**13.9**	**NA**	**29.5**	**6.5**	**14.0**	**NA**	**29.3**
6	design	**4.42**	**10.84**	**4.67**	**9.60**	**4.42**	**10.84**	**4.67**	**9.60**
	actual	**6.3**	**13.9**	**NA**	**23.5**	**6.0**	**13.6**	**NA**	**23.6**
7	design	**4.52**	**11.05**	**4.93**	**9.80**	**4.52**	**11.05**	**4.93**	**9.80**
	actual	**6.4**	**15.2**	**NA**	**24.0**	**6.2**	**15.4**	**NA**	**24.0**
8	design	**4.65**	**11.46**	**5.16**	**10.01**	**4.65**	**11.46**	**5.16**	**10.01**
	actual	**6.3**	**12.5**	**NA**	**26.4**	**6.0**	**12.5**	**NA**	**26.1**
9	design	**4.63**	**11.15**	**5.14**	**10.13**	**4.63**	**11.15**	**5.14**	**10.13**
	actual	**6.2**	**14.2**	**NA**	**11.9**	**6.1**	**14.1**	**NA**	**11.8**

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

IP Rotor Axial Clearance

Cabras Plant：Unit 2 . .As Left Date：02/Aug/2017.



unit：mm

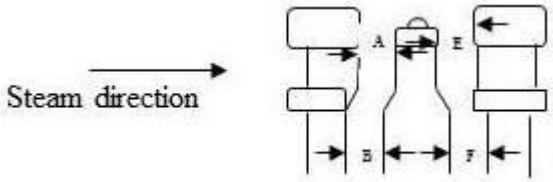
		IP-LH				IP-RH			
		A	**B**	**E**	**F**	**A**	**B**	**E**	**F**
1	design		**8.58**	**6.25**	**8.51**	**design**	**8.58**	**6.25**	
	actual	**7.9**	**12.4**	**12.1**	**16.5**	**7.2**	**11.9**	**9.2**	**15.5**
2	design	**3.61**	**9.14**	**3.73**	**8.51**	**3.61**	**9.14**	**3.73**	**8.51**
	actual	**4.9**	**11.5**	**14.1**	**25.5**	**4.7**	**11.5**	**13.9**	**26.5**
3	design	**4.09**	**3.83**	**3.96**	**8.81**	**4.09**	**3.83**	**3.96**	**8.81**
	actual	**4.8**	**12.5**	**13.5**	**16.7**	**4.7**	**12.5**	**13.3**	**26.5**
4	design	**4.04**	**9.73**	**4.16**	**9.12**	**4.04**	**9.73**	**4.16**	**9.12**
	actual	**5.2**	**13.6**	**12.4**	**29.6**	**5.2**	**13.5**	**12.2**	**29.6**
5	design	**4.27**	**10.21**	**4.52**	**9.35**	**4.27**	**10.21**	**4.52**	**9.35**
	actual	**5.5**	**13.7**	**12.3**	**23.4**	**5.8**	**13.8**	**12.8**	**23.9**
6	design	**4.42**	**10.84**	**4.67**	**9.60**	**4.42**	**10.84**	**4.67**	**9.60**
	actual	**5.8**	**13.7**	**13.5**	**24.0**	**5.8**	**13.5**	**12.6**	**23.7**
7	design	**4.52**	**11.05**	**4.93**	**9.80**	**4.52**	**11.05**	**4.93**	**9.80**
	actual	**6.2**	**15.2**	**13.6**	**26.0**	**6.3**	**15.2**	**13.7**	**26.0**
8	design	**4.65**	**11.46**	**5.16**	**10.01**	**4.65**	**11.46**	**5.16**	**10.01**
	actual	**6.5**	**12.5**	**13.6**	**12.1**	**6.5**	**12.4**	**13.4**	**12.7**
9	design	**4.63**	**11.15**	**NA**	**NA**	**4.63**	**11.15**	**NA**	**NA**
	actual	**6.6**	**13.9**	**NA**	**NA**	**6.5**	**13.8**	**NA**	**NA**

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			
	repair			
	new part replacement			
	trace			
	as it stands			

LP Rotor Axial&Radial Clearance

Cabras Plant： Unit 2 . .As found Date：.21/July/2017



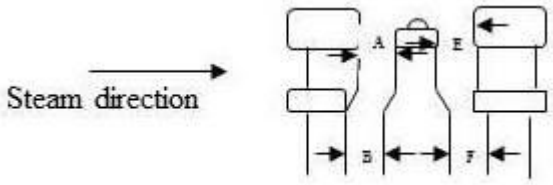
Unit：mm

		LP-LH				LP-RH			
		A	B	E	F	A	B	E	F
TE4	design	12.5	18.5	NA	NA	12.5	18.5	NA	NA
	actual	1.2	19	NA	13	11.3	18.8	NA	12.5
TE3	design	13.3	18.5	NA	15.4	13.3	18.5	NA	15.4
	actual	9.8	18.3	NA	12.5	10	18.5	NA	12.5
TE2	design	13.3	18.5	NA	14.9	13.3	18.5	NA	14.9
	actual	10.5	21	NA	11.5	10.5	21.2	NA	11.5
TE1	design	11.32	16	NA	14.2	11.2	16.3	NA	14.2
	actual	11	NA	NA	NA	11.3	NA	NA	NA
GE1	design	9.9	9.9	NA	16.1	9.9	9.9	NA	16.1
	actual	9	NA	NA	NA	9	NA	NA	NA
GE2	design	11.8	13.5	NA	17.2	11.8	13.5	NA	17.2
	actual	9.5	19.2	NA	13.3	9.6	19.2	NA	13.3
GE3	design	11.6	12.3	NA	17.5	11.6	12.3	NA	17.5
	actual	7.7	16.6	NA	16.8	7.7	16.5	NA	16.8
GE4	design	11.6	16.8	NA	NA	11.6	16.8	NA	NA
	actual	8.6	18	NA	13.2	8.6	18.8	NA	13.2

inspection result		qualified		
		unqualified		
		only for reference		
Option				

LP Rotor Axial&Radial Clearance

Cabras Plant： Unit 2 . .As Left Date：02/Aug/2017.



Unit：mm

		LP-LH				LP-RH			
		A	B	E	F	A	B	E	F
TE4	design	12.5	18.5	NA	NA	12.5	18.5	NA	NA
	actual	11.6	17.3	NA	NA	11.9	17.9	NA	NA
TE3	design	13.3	18.5	NA	15.4	13.3	18.5	NA	15.4
	actual	10.0	14.8	NA	14.2	10.9	15.2	NA	12.6
TE2	design	13.3	18.5	NA	14.9	13.3	18.5	NA	14.9
	actual	11.1	14.2	NA	12.6	11.3	14.3	NA	12.6
TE1	design	11.32	16	NA	14.2	11.2	16.3	NA	14.2
	actual	11.3	13.2	NA	11.1	11.8	12.8	NA	11.2
GE1	design	9.9	9.9	NA	16.1	9.9	9.9	NA	16.1
	actual	8.3	9.5	NA	13.5	8.6	10.3	NA	11.5
GE2	design	11.8	13.5	NA	17.2	11.8	13.5	NA	17.2
	actual	8.8	14.2	NA	16.7	9.1	12.8	NA	16.2
GE3	design	11.6	12.3	NA	17.5	11.6	12.3	NA	17.5
	actual	7.6	12.4	NA	15.3	8.3	12.5	NA	14.4
GE4	design	11.6	16.8	NA	NA	11.6	16.8	NA	NA
	actual	8.5	15.7	NA	NA	8.8	14.4	NA	NA

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

HP Packing ring clearance

Name	No.	AS FOUND				AS LEFT			
		L	B	R	T	L	B	R	T
HP Outer Gland	1	1.0	1.05	0.1	NA	1.0	0.77	0.1	1.5
	2	0.6	1.0	0.2	NA	0.8	0.88	0.2	1.6
HP Inner Gland	3	0.2	1.04	0.1	NA	0.1	1.04	0.3	1.5
	4	0.1	1.15	0.1	NA	0.1	1.02	0.3	1.5
HP TE Dummy	5	0.8	1.11	0.1	NA	0.1	1.02	0.6	2.22
	6	0.8	1.18	2.3	NA	0.1	0.98	0.8	1.86
	7	0.7	1.14	0.7	NA	0.1	0.96	0.1	2.11
HP	8	0.5	2.27	0.8	NA	0.7		0.7	2.33
	9	0.5	2.02	0.2	NA	0.2	1.52	0.7	1.04
	10	1.0	2.12	0.5	NA	0.5	1.73	0.6	1.78
	11	0.1	2.20	0.5	NA	0.5	1.52	0.7	1.56
	12	0.3	2.03	0.7	NA	0.6	1.35	0.6	1.33
	13	0.5	1.98	0.5	NA	0.8	1.09	0.9	1.60
	14	0.1	1.85	0.9	NA	0.5	1.51	0.8	1.68
	15	0.2	1.32	0.7	NA	0.18	1.32	0.9	1.63
HP Center Gland	16	0.7	1.23	1.0	NA	0.5	1.17	0.8	2.15
	17	0.2	1.23	1.0	NA	0.7	**1.17**	0.7	2.23
	18	0.2	1.23	0.8	NA	0.8	**1.17**	0.7	2.46
	19	0.1	1.18	1.0	NA	0.8	**1.17**	0.7	2.43
	20	0.3	1.15	0.8	NA	0.8	**1.17**	0.8	2.30

inspection result		**qualified**		
		unqualified		
		only for reference		

Treatment				
	redo	**verify**	**customer**	**captain**
	repair			
	new part replacement			
	trace			
	as it stands			

HP Seal Strip clearance

	AS FOUND				AS LEFT			
NO	L	B	R	T	L	B	R	T
1	1.5	2.27	1.2	NA	0.8	1.75	1.8	1.31
2	0.8	2.02	1.2	**NA**	0.8	2.10	1.0	1.92
3	1.0	2.12	0.7	**NA**	0.8	2.11	1.0	2.03
4	0.2	2.20	0.5	**NA**	1.0	2.27	1.0	1.72
5	0.8	2.03	0.7	**NA**	0.7	2.22	0.8	1.70
6	0.8	1.98	0.8	**NA**	1.0	2.19	0.8	1.73
7	1.0	1.85	0.9	**NA**	0.8	2.30	1.0	1.47
8	0.8	1.32	0.8	**NA**	0.7	2.26	1.2	1.08
9	0.8	1.32	0.8	**NA**	1.5	1.83	0.8	1.85

inspection result		**qualified**		
		unqualified		
		only for reference		

Treatment				
	redo	**verify**	**customer**	**captain**
	repair			
	new part replacement			
	trace			
	as it stands			

IP Packing ring clearance

Name	No.	AS FOUND				AS LEFT			
		L	B	R	T	L	B	R	T
IP TE Dummy	21	0.7	1.19	1.2	**NA**	0.6	**1.17**	1.0	2.33
	22	0.8	1.18	1.0	**NA**	0.7	**1.17**	1.0	2.41
	23	1.0	1.16	1.0	**NA**	0.9	**1.17**	1.0	2.37
IP	24	0.1	1.15	2.0	**NA**	0.9	NA	1.0	2.38
	25	0.5	1.15	2.0	**NA**	1.0	1.39	1.1	2.15
	26	0.5	1.43	1.3	**NA**	0.2	1.94	1.3	2.45
	27	0.1	2.31	1.5	**NA**	0.2	1.54	1.2	2.45
	28	0.1	2.25	1.1	**NA**	0.6	1.35	1.5	2.45
	29	0.1	2.0	1.3	**NA**	0.2	1.97	1.2	1.8
	30	0.1	2.25	0.7	**NA**	0.3	1.83	0.1	1.55
	31	0.5	2.2	1.5	**NA**	0.4	2.39	0.6	1.95
	32	0.5	2.2	1.5	**NA**	0.5	2.21	0.8	2.35
	33	0.1	1.8	1.5	**NA**	0.2	2.21	1.0	1.4
IP Inner Gland	34	0.2	0.8	1.0	**NA**	0.4	0.57	0.8	2.0
	35	0.3	1.03	0.9	**NA**	0.4	0.73	1.0	2.1
IP Outer Gland	36	0.2	1.04	0.8	**NA**	0.3	1.04	0.9	1.8
	37	0.3	1.6	1.1	**NA**	0.6	0.89	0.9	1.7

inspection result		**qualified**		
		unqualified		
		only for reference		

Treatment				
	redo	**verify**	**customer**	**captain**
	repair			
	new part replacement			
	trace			
	as it stands			

IP SEAL STRIP CLEARANCE

	AS FOUND				AS LEFT			
NO	L	B	R	T	L	B	R	T
1	2.0	1.1	1.8	NA	3.0	1.88	3.3	2.0
2	1.2	1.0	1.7	**NA**	0.9	1.85	3.0	2.2
3	0.5	1.6	2.1	**NA**	1.6	1.65	2.5	1.83
4	1.2	1.2	1.7	**NA**	1.0	2.11	2.8	2.15
5	1.3	1.6	2.0	**NA**	1.2	1.67	2.8	2.0
6	1.0	1.5	0.7	**NA**	1.1	1.68	1.9	2.0
7	1.3	1.4	1.4	**NA**	1.0	2.37	1.2	1.65
8	1.0	1.5	1.0-	**NA**	1.0	2.38	1.8	1.6
9	1.0	1.3	1.0	**NA**	1.0	2.02	1.8	1.7

inspection result		**qualified**		
		unqualified		
		only for reference		
Treatment				
	redo	**verify**	**customer**	**captain**
	repair			
	new part replacement			
	trace			
	as it stands			

LP Packing ring clearance

Name	No.	AS FOUND				AS LEFT			
		L	B	R	T	L	B	R	T
LP TE Gland	38	0.05	1.03	0.8	NA	0.2	0.83	0.7	0.8
	39	0.25	1.15	0.35	**NA**	0.6	1.18	0.7	0.7
	40	0.30	0.98	0.35	**NA**	0.7	0.92	0.8	0.7
LP	41	0.4	1.4	1.0	**NA**	1.0	2.12	0.2	2.10
	42	0.4	1.53	0.8	**NA**	0.4	2.09	0.8	2.65
	43	0.7	1.7	0.8	**NA**	0.2	2.09	0.8	3.2
	44	0.15	1.45	1.0	**NA**	0.3	2.26	1.0	2.5
	45	0.8	1.7	0.7	**NA**	1.0	2.10	0.4	1.98
	46	0.2	1.53	1.4	**NA**	1.0	1.91	0.3	2.0
	47	0.5	1.35	0.5	**NA**	0.6	2.18	0.4	1.8
LP GE Gland	48	0.3	1.0	0.3	**NA**	0.4	0.82	0.2	0.8
	49	0.1	0.9	0.8	**NA**	0.3	1.05	0.3	0.6
	50	1.0	0.4	0.45	**NA**	0.2	1.03	0.2	0.7

inspection result		**qualified**			
		unqualified			
		only for reference			
Treatment					
	redo		**verify**	**customer**	**captain**
	repair				
	new part replacement				
	trace				
	as it stands				

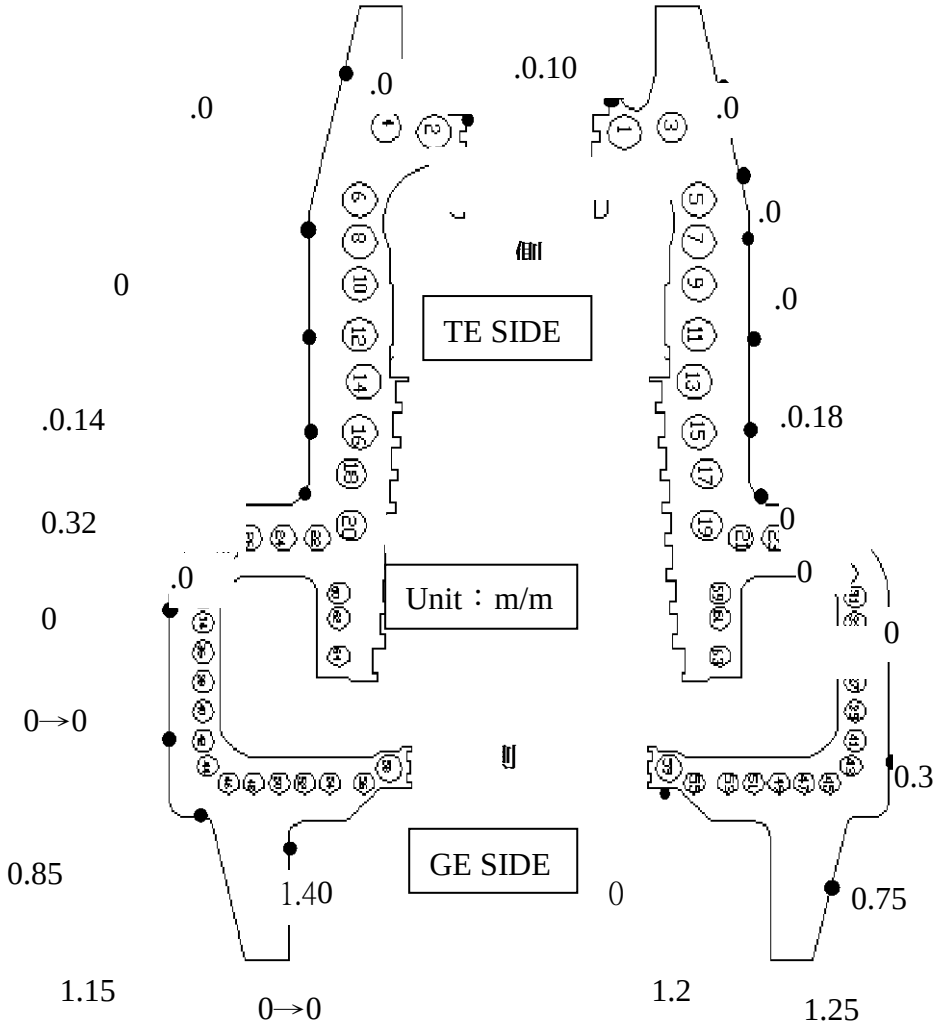
LP SEAL STRIP CLEARANCE

	AS FOUND				AS LEFT			
NO	L	B	R	T	L	B	R	T
22	1.6	1.46	2.0	NA	3.0	1.42	2.4	3.0
21	1.1	1.5	1.6	NA	1.5	1.43	1.5	1.5
20	1.1	1.82	1.4	NA	0.7	1.69	1.9	1.4
19	2.0	2.16	2.4	NA	1.0	2.28	2.5	3.1
19	1.9	3.07	2.5	NA	1.8	2.45	2.4	1.5
20	1.2	2.08	1.5	NA	1.5	2.01	1.1	1.0
21	1.7	1.99	2.5	NA	2.1	1.89	1.4	2.0
22	1.5	1.47	2.2	NA	2.0	1.45	2.3	3.0

inspection result		**qualified**		
		unqualified		
		only for reference		
Treatment				
	redo	**verify**	**customer**	**captain**
	repair			
	new part replacement			
	trace			
	as it stands			

HP Outer Casing Joint Face Clearance

Cabras Plant： Unit 1 . .As Found Date：19/July/2017



TOOL NO：

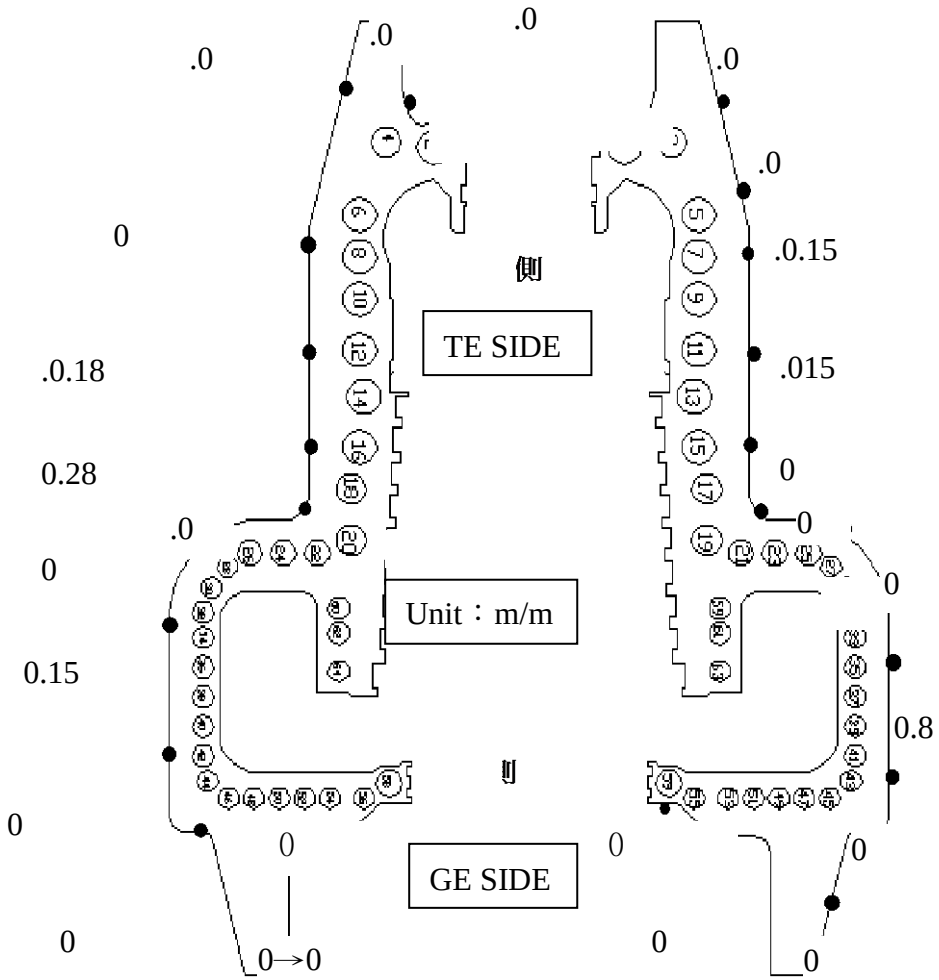
unit：mm

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

HP Outer Casing Joint Face Clearance

Cabras Plant： Unit 1 . .As left Date：8/ August/2017



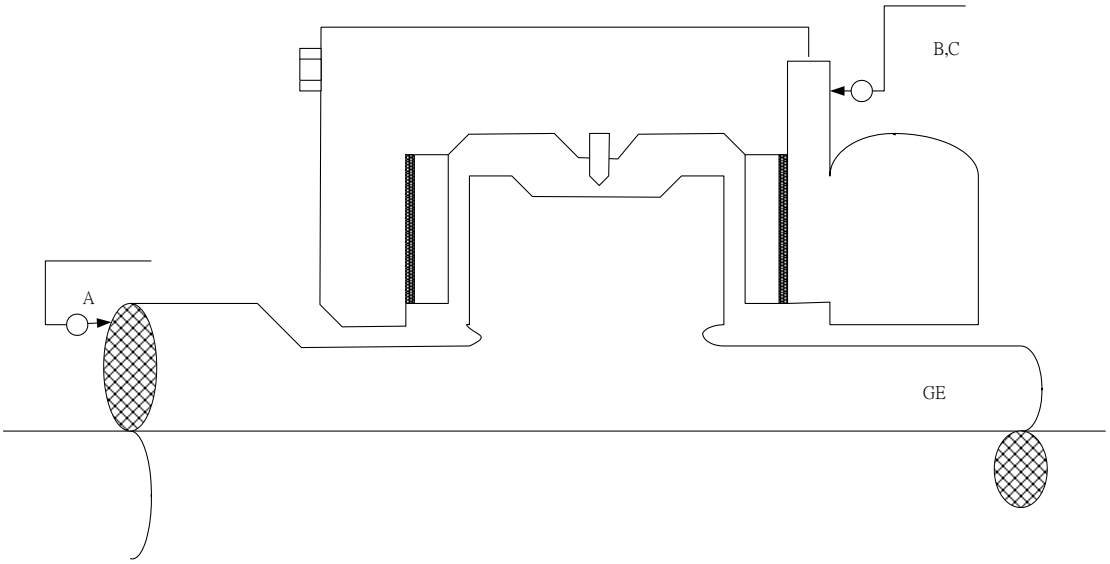
TOOL NO：

unit：mm

inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

Thrust Brg Clearance Check

Cabras Plant： Unit 1 .　. .AsLeft　　Date：02/Aug/2017



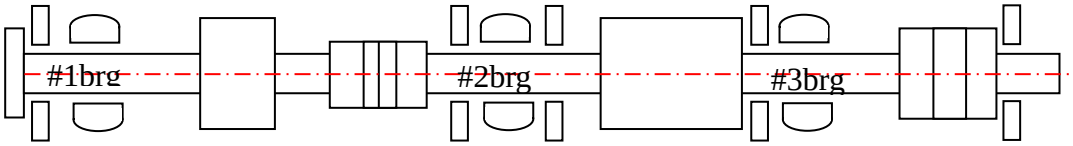
Thrust Brg Clearance Check　　Unit：mm

		L	Casing L	Casing R	Gage	CLE	design
as found	rotor to TE	310.33		0	0		0.38
	rotor to GE	310.74		0.03	0.42	0.39	
as left	rotor to TE	9.79	0.02	0.01	0		∫
	rotor to GE	10.22	-0.04	-0.02-	0.41	0.39	0.50

inspection result		qualified	measureer	
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

OIL RING BORE Measurement

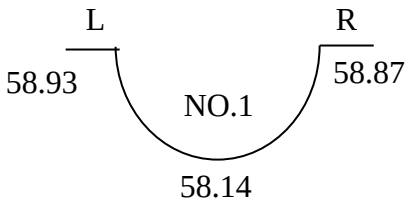
Cabras Plant： Unit 1 . .As Found Date：21/July/2017

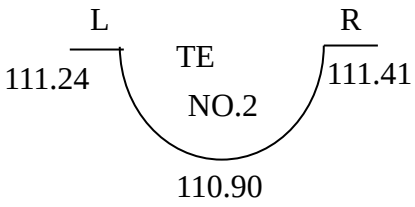


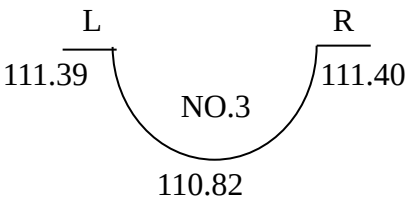
NO.1 NO.2 NO.3

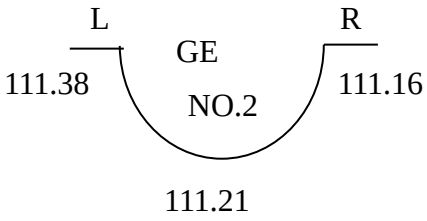
CLEARANCE BETWEEN OIL RING BORE AND SHAFT

unit:mm







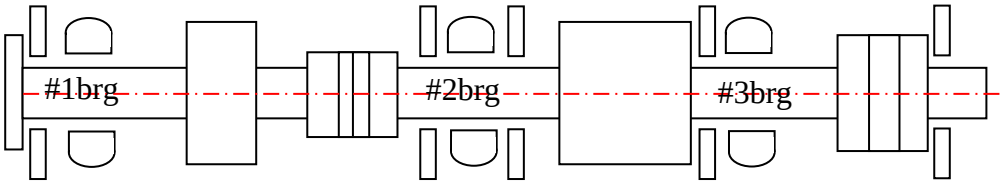


inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

OIL RING BORE Measurement

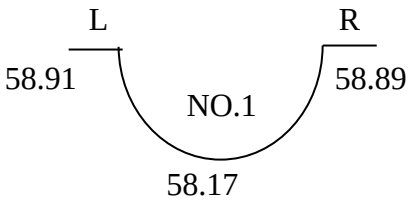
Cabras Plant： Unit 1 . .As Left Date：02/Aug/2017

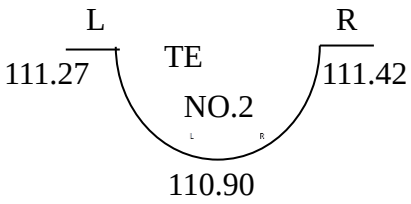


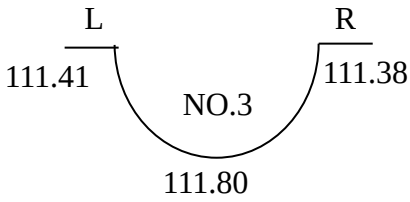
NO.1 NO.2 NO.3

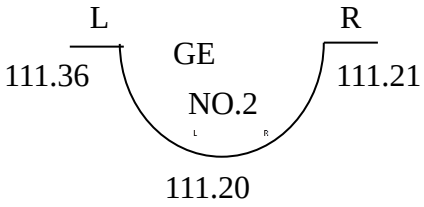
CLEARANCE BETWEEN OIL RING BORE AND SHAFT

unit:mm





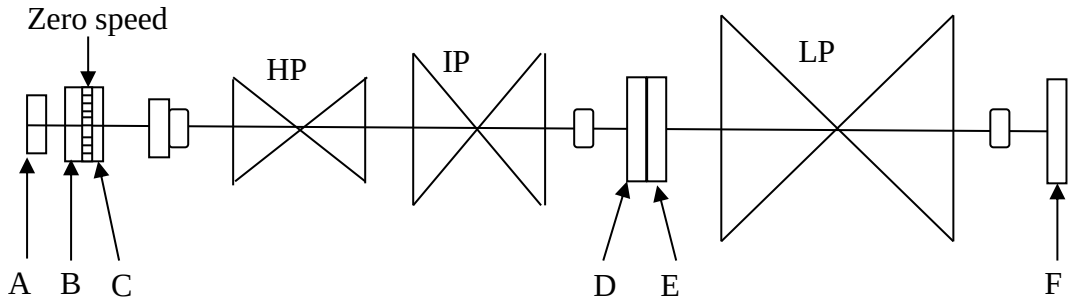




inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

RUNOUT CHECK

Cabras Plant：Unit 1 . .As Left Date：07/August/2010



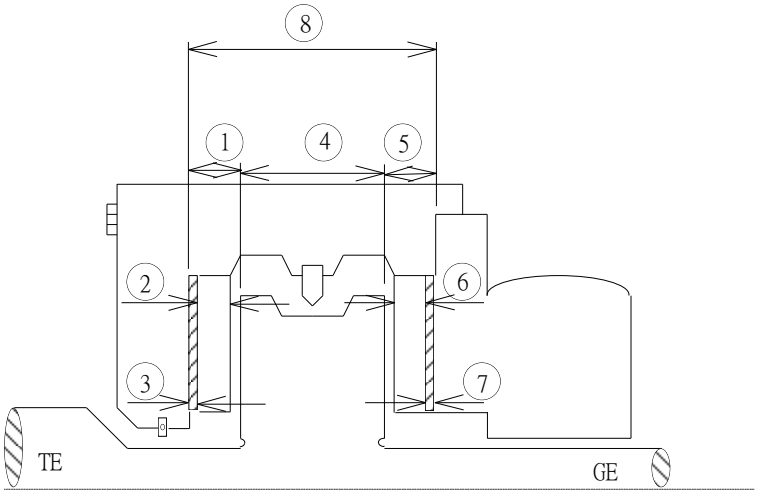
UNIT：1/100mm

	A	B	C	D	E	F
1	NA	NA	NA	19	22	NA
2	NA	NA	NA	20	23	NA
3	NA	NA	NA	23	22	NA
4	NA	NA	NA	22	22	NA
5	NA	NA	NA	22	22	NA
6	NA	NA	NA	22	23	NA
7	NA	NA	NA	22	22	NA
8	NA	NA	NA	20	21	NA

inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

Thrust Brg Parts Dimension Measurement

Cabras Plant： Unit 1.　.As Left　Date：2/ Aug/2017



1.GAP	23.06
2.PLATE（TE）	18.90
3.SHIM（TE）	5.0
4.RUNNER	101.63
5.GAP	27.53
6.PLATE（GE）	19.00
7.SHIM（GE）	7.11
8.CASING	152.13

CLEARANCE CALACULATE：

⑧-（②+③+④+⑥+⑦）

＝0.49

CLEARANCE

DESIGN：0.015"~0.020"

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

HP INNER CASING BOLT STRETCH RH

Cabras Plant： Unit 1 .. As Left Date：04/Aug/2017

NO	BOLT SIZE	FREE LENTH	STRETCH	BEFORE STRETCH	AFTER STRETCH	FINAL STRETCH
1	2 1/2"	13"	0.41	13.92	13.49	0.43
2	2 3/4"	13 3/4"	0.36	2.81	2.43	0.38
3	3"	15"	0.43	6.85	6.40	0.45
4	3"	15"	0.43	6.97	6.51	0.46
5	4"	16"	0.46	6.83	6.35	0.48
6	4"	19"	0.56	8.69	8.12	0.57
7	4"	19"	0.56	8.16	7.56	0.60
8	4"	19"	0.56	8.52	7.93	0.59
9	4"	19"	0.56	8.98	8.41	0.58
10	4"	19"	0.56	5.94	5.37	0.57
11	3 1/2"	18"	0.54	4.94	4.37	0.57
12	3 1/2"	18"	0.54	8.74	8.20	0.54

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

HP INNER CASING BOLT STRETCH LH

Cabras Plant： Unit 1. .. As Left Date：04/Aug/2017

NO	BOLT SIZE	FREE LENTH	STRETCH	BEFORE STRETCH	AFTER STRETCH	FINAL STRETCH
1	$2^1/_2$"	13"	0.41	11.16	10.74	0.42
2	$2^3/_4$"	$13^3/_4$"	0.36	3.88	3.50	0.38
3	3"	15"	0.43	7.42	6.97	0.45
4	3"	15"	0.43	6.60	6.16	0.44
5	4"	16"	0.46	9.11	8.64	0.47
6	4"	19"	0.56	7.88	7.31	0.57
7	4"	19"	0.56	5.91	5.33	0.58
8	4"	19"	0.56	6.96	6.40	0.56
9	4"	19"	0.56	7.83	7.24	0.59
10	4"	19"	0.56	6.80	6.23	0.57
11	$3^1/_2$"	18"	0.54	3.69	3.13	0.56
12	$3^1/_2$"	18"	0.54	3.75	3.18	0.57

inspection result		qualified			
		unqualified			
		only for reference			
Option					
	redo		verify	customer	captain
	repair				
	new part replacement				
	trace				
	as it stands				

HP OUTER CASING BOLT STRETCH LH

Cabras Plant： Unit 1. .. As Left Date：07/Aug/2017

NO	Bolt size	bolt lenth	stretch	Free lenth	After strecht	angle	final
1	$3^1/_2$"	17"	48	12.95	12.47	NA	0.48
2	$3^1/_2$"	17"	48	12.63	12.13	NA	0.50
3	$3^1/_2$"	17"	48	12.86	12.35	NA	0.51
4	$3^1/_2$"	18"	53	11.93	11.38	NA	0.55
5	$3^3/_4$"	18"	53	11.74	11.18	NA	0.56
6	4"	$18^1/_2$"	48	12.67	11.16	NA	0.49
7	$4^1/_2$"	$18^1/_2$"	48	12.35	11.85	NA	0.50
8	$4^1/_2$"	$20^1/_2$"	56	22.03	21.43	NA	0.60
9	$4^1/_2$"	$20^1/_2$"	56	22.88	22.31	NA	0.57
10	$4^1/_2$"	$20^1/_2$"	56	21.43	20.83	NA	0.60
11	$4^1/_2$"	$20^1/_2$"	56	24.22	23.63	NA	0.59
12	$4^1/_2$"	$20^1/_2$"	56	19.92	19.34	NA	0.58
13	$4^1/_2$"	$20^1/_2$"	56	21.32	20.76	NA	0.56
14	$4^1/_2$"	$20^1/_2$"	56	24.41	23.83	NA	0.58
15	$4^1/_2$"	$20^1/_2$"	56	21.64	21.08	NA	0.56
16	$4^1/_2$"	$20^1/_2$"	56	23.73	23.13	NA	0.60
17	$4^1/_2$"	$20^1/_2$"	56	21.61	21.02	NA	0.59
18	$4^1/_2$"	$18^1/_2$"	48	24.81	24.31	NA	0.50
19	$4^1/_2$"	$18^1/_2$"	48	24.70	24.20	NA	0.50
20	$4^1/_2$"	23"	48	23.60	23.11	NA	0.49
21	$3^1/_2$"	17"	48	23.81	23.31	NA	0.50

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

HP OUTER CASING BOLT STRETCH RH

Cabras Plant： Unit ：m/m As Left Date：07/August/2017

NO	Bolt size	bolt lenth	stretch	Free lenth	After strecht	angle	final
1	$3^1/_2$"	17"	48	13.04	12.54	NA	0.50
2	$3^1/_2$"	17"	48	13.25	12.76	NA	0.49
3	$3^1/_2$"	17"	48	13.17	12.67	NA	0.50
4	$3^1/_2$"	18"	53	11.86	11.31	NA	0.55
5	$3^3/_4$"	18"	53	11.92	11.38	NA	0.54
6	4"	$18^1/_2$"	48	11.45	10.97	NA	0.48
7	$4^1/_2$"	$18^1/_2$"	48	11.63	11.13	NA	0.50
8	$4^1/_2$"	$20^1/_2$"	56	24.20	23.62	NA	058
9	$4^1/_2$"	$20^1/_2$"	56	23.43	23.84	NA	0.59
10	$4^1/_2$"	$20^1/_2$"	56	22.99	22.39	NA	0.60
11	$4^1/_2$"	$20^1/_2$"	56	22.69	22.12	NA	0.57
12	$4^1/_2$"	$20^1/_2$"	56	22.53	21.94	NA	0.59
13	$4^1/_2$"	$20^1/_2$"	56	22.42	21.82	NA	0.60
14	$4^1/_2$"	$20^1/_2$"	56	21.70	21.12	NA	0.58
15	$4^1/_2$"	$20^1/_2$"	56	4.54	3.94	NA	0.60
16	$4^1/_2$"	$20^1/_2$"	56	22.57	22.16	NA	0.59
17	$4^1/_2$"	$20^1/_2$"	56	22.52	21.92	NA	0.60
18	$4^1/_2$"	$18^1/_2$"	48	23.70	23.20	NA	0.50
19	$4^1/_2$"	$18^1/_2$"	48	22.84	22.32	NA	0.52
20	$4^1/_2$"	23"	48	24.05	23.56	NA	0.49
21	$3^1/_2$"	17"	48	23.68	23.20	NA	0.48

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

HP STEAM INLET PIPE BOLT STRETCH

Cabras Plant： Unit 1. .. As Left　　Date：07/Aug/2017_

NO	BOLT SIZE	FREE LENTH	STRETCH	ANGLE	AFTER STRETCH	FINAL STRETCH
1	$2^1/_2$"	19"	27	78°		7000NM
2	$2^1/_2$"	19"	27	78°		7000NM
3	$2^1/_2$"	19"	27	78°		7000NM
4	$2^1/_2$"	19"	27	78°		7000NM
5	$2^1/_2$"	19"	27	78°		7000NM
6	$2^1/_2$"	19"	27	78°		7000NM
7	$2^1/_2$"	19"	27	78°		7000NM
8	$2^1/_2$"	19"	27	78°		7000NM
9	$2^1/_2$"	19"	27	78°		7000NM
10	$2^1/_2$"	19"	27	78°		7000NM
11	$2^1/_2$"	19"	27	78°		7000NM
12	$2^1/_2$"	19"	27	78°		7000NM

inspection result		qualified			
		unqualified			
		only for reference			
Option					
	redo		verify	customer	captain
	repair				
	new part replacement				
	trace				
	as it stands				

LP- GEN Coupling Bolt Streching Measurement

Cabras Plant：Unit 1．..As Left　　Date：9/ Aug/2017

一、TENSION VALUE　　UNIT：㎜

BOLT NO	FREE LENTH	FINAL LENTH	STRETCH	DESIGN
1	2.25	2.66	0.41	
2	2.29	2.69	0.40	
3	2.31	2.74	0.43	
4	2.16	2.56	0.40	
5	2.30	2.70	0.40	
6	2.15	2.56	0.41	0.40
7	2.31	2.73	0.42	∫
8	2.24	2.64	0.40	0.43
9	2.16	2.59	0.43	
10	2.17	2.57	0.40	
11	2.17	2.60	0.43	
12	2.21	2.61	0.40	

二、LP-GEN COUPLING Run-Out Check

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**TIR**	**DESIGN**
LP Coupling ”A”	0.19	0.20	0.23	0.22	0.22	0.22	0.22	0.20	0.03	**0.05mm**
GEN Coupling “B”	0.22	0.23	0.22	0.22	0.22	0.23	0.22	0.21	0.01	**0.05mm**
A-B	0	0	0.02	0.03	0.03	0.03	0.03	0.02	0.03	**0.04mm**

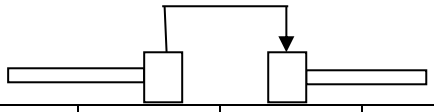
inspection result		qualified		
		unqualified		
		only for reference		

Option				
	Redo	verify	customer	captain
	Repair			
	new part replacement			
	Trace			
	as it stands			

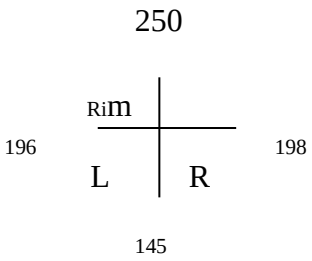
LP-GE Alignment

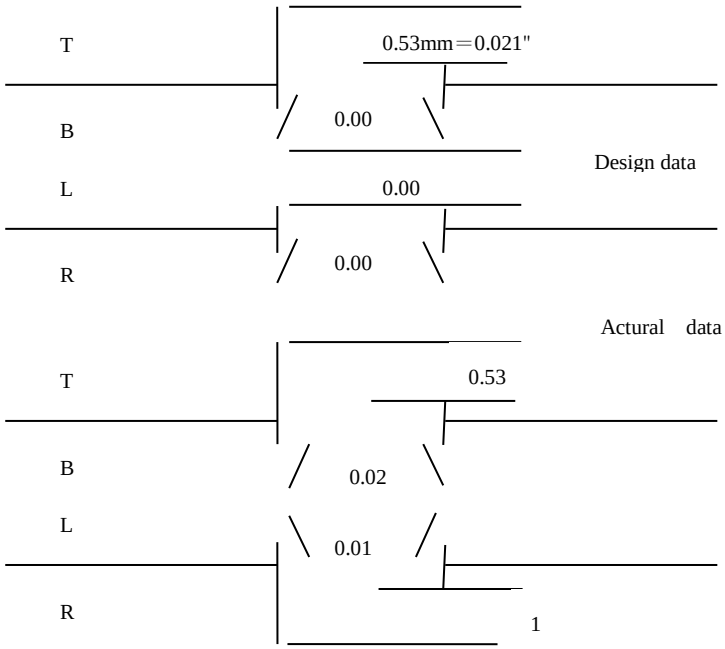
Cabras Plant： Unit 1 .As Left Date：4/ August/2017

LP GEN



	T	L	B	R
0	19.77	19.75	19.70	19.73
90	19.72	19.76	19.74	19.70
180	19.33	19.32	19.31	19.32
270	19.80	19.78	19.78	19.80
Ave	19.65	19.65	19.63	19.64



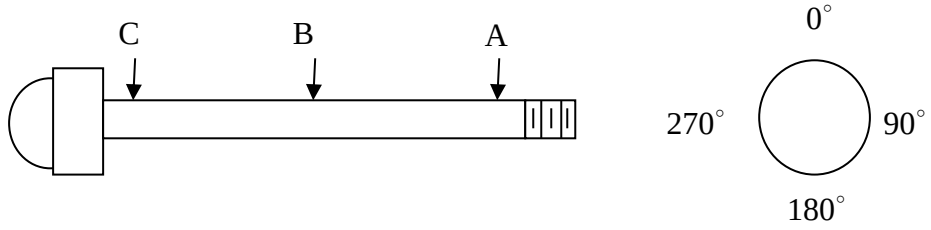


inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

CV Stem Run Out Check

Cabras Plant： Unit 1. .As left Date：31/July/2017



VALV	A				B				C			
NO.	0°	90°	180°	270°	0°	90°	180°	270°	0°	90°	180°	270°
1	0	3	5	2	0	-7	-12	-5	0	8	3	-5
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	2	3	1	0	-11	-11	0	0	0	0	0
4	0	-1	0	1	0	-8	-8	0	0	1	3	2
5	0	-2	-2	1	0	-11	-9	2	0	-2	1	3
6	0	-2	-1	-2	0	-14	-18	-4	0	-10	-12	-2

unit：0.01㎜

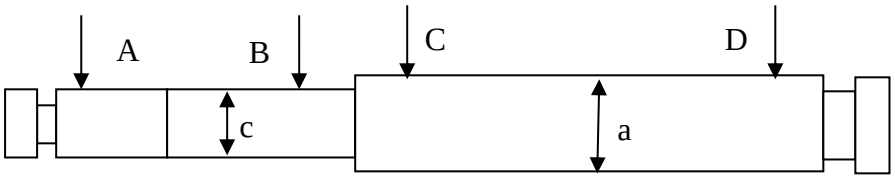
V/V NO	BUSHING ID	STEM OD	Clearance	DESIGN
1	38.14	37.85	0.29	0.20~0.254
2	38.15	37.88	0.27	0.20~0.254
3	38.17	37.94	0.23	0.20~0.254
4	38.04	37.83	0.21	0.20~0.254
5	38.10	37.88	0.22	0.20~0.254
6	38.08	37.80	0.28	0.20~0.254

unit：0.01㎜

inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

IV Stem RUNOUT CHECK

Cabras Plant： Unit 1． .As Left Date：01/Aug/2017



unit：1/100r

	A	B	C	D
1	NA	NA	NA	NA
2	NA	NA	NA	NA
3	NA	NA	NA	NA
4	NA	NA	NA	NA

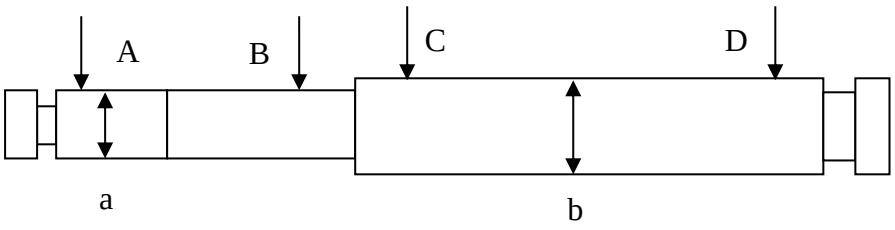
二、Stem & Bushing Clearance Check unit:mm

	a	c
Stem	59.90	59.91
Bushing	60.20	60.38
Clearance	0.30	0.47

inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

MSV Stem RUNOUT CHECK

Cabras Plant： Unit 1 . As Found Date：25/July/2017



unit：0.01㎜

	A	B	C	D
1	0	0	0	0
2	3	-6	-1	31
3	3	-10	-2	42
4	0	-4	-1	11

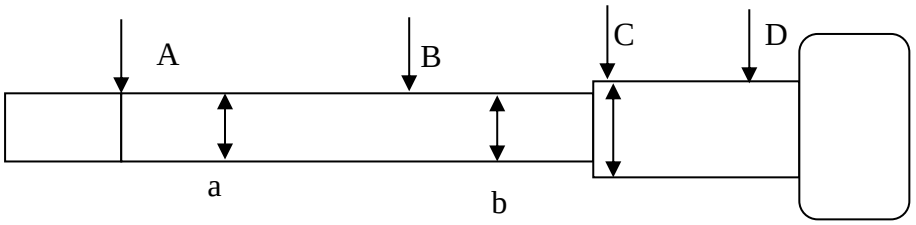
二、Stem & Bushing Clearance Check unit:0.01mm

	a	B
Stem	59.8	75.95
Bushing	60.02	76.18
Clearance	0.22	0.23

inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

RSV Stem RUNOUT CHECK

Cabras Plant： Unit 1 . As Found Date：25/July/2017



unit：0.01㎜

	A	B	C	D
1	0	0	0	0
2	-8	2	0	0
3	-18	4	0	-2
4	-10	2	0	-2

二、Stem & Bushing Clearance Check unit:0.01㎜

	a	b
Stem	63.23	75.80
Bushing	63.60	76.10
Clearance	0.37	0.30

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

MSV BOLT STRETCH

Cabras Plant： Unit 1. .. As Left Date：08/August /2017

NO	BOLT SIZE	FREE LENTH	STRETCH	FIRST STRETCH	AFTER STRETCH	FINAL STRETCH
1	$2^3/_4$"	$12^3/_4$"	13	20.28	19.95	0.33
2	$2^3/_4$"	$12^3/_4$"	13	20.39	20.36	0.33
3	$2^3/_4$"	$12^3/_4$"	13	19.75	19.40	0.35
4	$2^3/_4$"	$12^3/_4$"	13	19.55	19.22	0.33
5	$2^3/_4$"	$12^3/_4$"	13	20.40	20.08	0.32
6	$2^3/_4$"	$12^3/_4$"	13	20.20	19.88	0.32
7	$2^3/_4$"	$12^3/_4$"	13	20.13	19.80	0.30
8	$2^3/_4$"	$12^3/_4$"	13	20.54	20.20	0.34
9	$2^3/_4$"	$12^3/_4$"	13	20.92	20.58	0.34
10	$2^3/_4$"	$12^3/_4$"	13	21.00	20.65	0.35
11	$2^3/_4$"	$12^3/_4$"	13	20.83	20.51	0.32
12	$2^3/_4$"	$12^3/_4$"	13	21.40	20.08	0.32
13	$2^3/_4$"	$12^3/_4$"	13	20.40	20.07	0.33
14	$2^3/_4$"	$12^3/_4$"	13	20.26	19.93	0.33
15	$2^3/_4$"	$12^3/_4$"	13	19.43	19.10	0.33
16	$2^3/_4$"	$12^3/_4$"	13	19.18	18.86	0.32
17	$2^3/_4$"	$12^3/_4$"	13	19.96	19.64	0.32
18	$2^3/_4$"	$12^3/_4$"	13	19.50	19.18	0.32

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

RSV BOLT STRETCH

Cabras Plant： Unit 1. .. As Left Date：07/August /2017

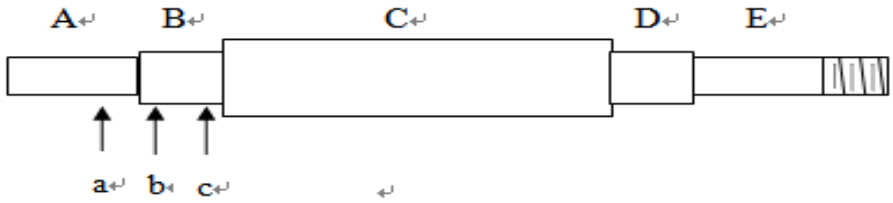
NO	BOLT SIZE	FREE LENTH	STRETCH	ANGLE	AFTER STRETCH	FINAL STRETCH
1	2"	3300	NA			3300ft/lb
2	2"	3300	NA			3300ft/lb
3	2"	3300	NA			3300ft/lb
4	2"	3300	NA			3300ft/lb
5	2"	3300	NA			3300ft/lb
6	2"	3300	NA			3300ft/lb
7	2"	3300	NA			3300ft/lb
8	2"	3300	NA			3300ft/lb
9	2"	3300	NA			3300ft/lb
10	2"	3300	NA			3300ft/lb
11	2"	3300	NA			3300ft/lb
12	2"	3300	NA			3300ft/lb
13	2"	3300	NA			3300ft/lb
14	2"	3300	NA			3300ft/lb
15	2"	3300	NA			3300ft/lb
16	2"	3300	NA			3300ft/lb
17	2"	3300	NA			3300ft/lb
18	2"	3300	NA			3300ft/lb
19	2"	3300	NA			3300ft/lb
20	2"	3300	NA			3300ft/lb

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

ACP-1(1A) STEM RUN OUT CHECK

Cabras Plant： Unit1　As Found&Left　Date：08/August /2017



Unit：1/100㎜

	A	B	C	D	E
1	0	0	0	0	-1
2	-2.5	0	1	0	-1
3	-3	0	1	0	3
4	0	0	0	0	3

二、Stem & Bushing Clearance　　Unit:mm

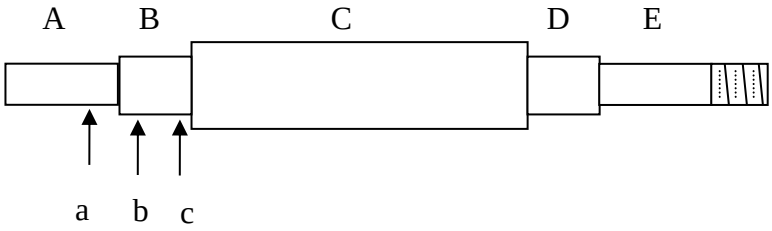
	a	b	C
Outside Dia	44.43	79.15	72.83
Inside Dia	44.58	79.61	73.38
Clearance	0.15	0.46	0.55

inspection result		qualified		
		unqualified		
		only for reference		

Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

ACP-2(2A) STEM RUN OUT CHECK

Cabras Plant： Unit 1　　As Found&Left　　Date：08/August /2017



Unit：1/100㎜

	A	B	C	D	E
1	0	0	-1	0	0
2	2	0	-1	0	-2
3	1	0	-2	0	-1
4	-1	-1	-2	0	2

二、Stem & Bushing Clearance　　Unit:mm

	a	b	C
Outside Dia	44.44	79.08	72.83
Inside Dia	44.61	79.57	73.34
Clearance	0.17	0.49	0.51

inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

DCP-(EP) STEM RUN OUT CHECK

Cabras Plant： Unit 1 As Found&Left　Date：08/August/2017

Unit：1/100㎜

	A	B	C	D	E
1	0	0	-1	0	0
2	0	1	2	0	-4
3	-1.5	0	2	0	-4
4	-2	-1	1	0	-1

二、Stem & Bushing Clearance　　Unit:mm

	a	B	C
Outside Dia	44.44	79.11	72.82
Inside Dia	44.60	79.44	73.36
Clearance	0.16	0.33	0.54

inspection result		qualified		
		unqualified		
		only for reference		
Option				
	redo	verify	customer	captain
	repair			
	new part replacement			
	trace			
	as it stands			

Ⅳ：建議事項

無