### SIEMENS

### MANUFACTURERS DATA REPORT

## SUPPLY AND INSTALLATION OF VSD DRIVES FOR SP10 EAGLE FARM SEWAGE PUMP STATION DRY WELL NO.1 2MW PUMPS 11, 12 & 13

Prepared for:

Central SEQ Distributor-Retailer trading as QUEENSLAND URBAN UTILITIES

**Contract Number: C1112-032** 

Equipment TAG Numbers: 0110-SR11, 0110-SR12, 0110-SR13

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Certificate of Compliance for Electrical Equipment and Installation



• ELECTRICAL **INSTALLATION AND** MAINTENANCE

24 HOUR **BREAKDOWN SERVICE** 

 SWITCHBOARD DESIGN AND MANUFACTURE

■ DATA & COMMUNICATIONS

 HIGH VOLTAGE **INSTALLATIONS** 

 ELECTRICAL ENGINEERING. PLC & PROCESS SOFTWARE DESIGN

 OVERHEAD **RETICULATION & UNDERGROUND** RETICULATION

 ROADWAY LIGHTING & TRAFFIC SIGNALLING

 MUNICIPAL PUMPING INSTALLATIONS

 PUMPING EQUIPMENT MECHANICAL SERVICE & REPAIRS

 SHEETMETAL **FABRICATION** 

### **BRANCHES**

EAGLE FARM PH: (07) 3868 3535

**IPSWICH** PH: (07) 3281 1399

**TOOWOOMBA** PH: (07) 4634 3800

**GOLD COAST** PH: (07) 5591 6340

SUNSHINE COAST PH: (07) 5476 5133

**CHINCHILLA** PH: (07) 4662 7452

YATAI A PH: (07) 3386 1355





### J. & P. RICHARDSON INDUSTRIES PTY. LTD.

114 CAMPBELL AVENUE, WACOL, BRISBANE, QLD. 4076 POSTAL ADDRESS: P.O. BOX 124, SUMNER PARK, QLD. 4074

Phone: (07) 3271 2911 - All Hours Fax: (07) 3271 3623

**ELECTRICAL CONTRACTORS & ENGINEERS** INDUSTRIAL - COMMERCIAL - MINING

Web: www.jpr.com.au

ca1308/lb

Email: jpr@jpr.com.au

Job No:

C64800

6 May 2014

Siemens

Attention:

Mr. Pieter Taljaard

Dear Sir,

### **Eagle Farm Pump Station VSD Replacement**

Please be advised that the VSD replacement at Eagle Farm has been completed as per the contract requirements.

All applicable work was carried out to AS3000:2007 and has been tested in accordance with the prescribed procedure and that such work complies in every respect with the requirements of the electrical safety regulation 2002.

Thank you for your order, we trust that yourself and your team has been impressed by our commitment to Siemens and we look forward to assisting you in the future.

Should you require any further information or clarification please do not hesitate in contacting the undersigned.

Yours faithfully,

Chris Andersen

**Electrical Installation Assistant Manager** J & P Richardson Industries Pty Ltd

### 1) 0110-SR11 Variable Speed Drive System

A. MV Cable Test Sheets



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114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

### **HV CABLE TEST SHEET**

Project:	SEIMF	7NS						Job No:	T64800
Date of Tes		02-	2014				-12	3	
Cable Circ	uit:	From: Fe	EDER 1	ANEL A	24 SR)	To: /~/	PUT TERMI	WALS O	110-5R11
Type:	NGLE C					6 kV		/50sq m	
Reason for		ETERMIN			Cable Tem		HOT		
	tance in Ol					Yes(No)	-		200
Measured v				11				IT WAS.	
Type:			Leads:			ohms			
G: :		4 D	_	oop	T	1 4	4		
Circuit	Total	A-B Net	Total	B-C Net	Total	-A Net	-		
	10141	Net	Total	Net	1 Otal	INCL	+		
								4 3 61	0.3.51
Insulation	Resistance	in Megohm	IS				Volts	1 Min	2 Min
) /	1!al. NI.					A-Earth		200,000	
Meast	ired with No	):	06/48			B-Earth C-Earth	5000.		200,000
	Type	e: K7	DOIT SI	)		A - B	100		200,000
	Тур	/	OKT JU			B-C	5000		200,000
						C-A	5000	200,000	
High Volta	ige Test Sho	eet /	MA.	1 Start; 1	Finish – Le	akage Cur	rents in mA		
	Connections		Time		Negative			Positive	
-	+	Earth	Mins	kV	1 Start	1 Finish	ı kV	1 Start	1 Finish
ABC									
A	В	С							
В	С	A							
C	A	В				A 1 m			
Weather Co		Fine			-	Amb. Te	mp. °C: - tached at:		
Result of T		sea				Label At	tached at.		
Comments	S:							1.4	
-									
10									
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					=::-		/ <u></u>		
								24 11/17/2	
	78 287/								
Testing	01	G: .	- D	4 74	Engi	neer		D-4	E E
Officer: S	S. ann	INGHA	M Da	te: /4-02	'-/4. if Re	quired:		Date:	1 1



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114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

### **HV CABLE TEST SHEET**

Project:	SEIP	NANS						Job No:	T64800.
Date of Te	est: /	4-02-	2014.						
Cable Cir	cuit:	From: out	PUT TERM	INACS	Ollo-SR	To: Is	CATOR	0110-I	4 ES11.
Type: 5	NGLE !	CORE YL	PE		6.6	5 kV			m こし.
Reason fo	r Test: /	CORE XL	STALLAT	ON.	Cable Tem		ca	D.	
Loop Resi	stance in C	hms (is Loo	p Resistanc	e Applicabl	le?)	Yes			
Measured	with No:						AB	6	
Туре:	Ţ.		Leads:			ohms	RWI	13.	
G: :,		4 D		oop					
Circuit	Total	A-B Net	Total	B-C Net	Total	-A Net	-		
	10141	I INCL	Total	Net	Total	Net	-		- 1
			1				7		
Insulation	Resistance	e in Megohm	ıs				Volts	1 Min	2 Min
			1			A-Earth	5000		100,000
Meas	ured with N	lo: M	00 148			B-Earth	5000	100	100,000
	T	ie -	1-1-6.	)		C-Earth	5000		100,000
	ТУĮ	pe: K	10K113U			A - B B - C	5000	200,000	200,000
						C-A		20,000	200,000
High Volt	age Test Sl	neet A	1/4	1 Start: 1	Finish – Le		rents in mA	Source )	700,000
	Connections		Time	1 50011, 1	Negative			Positive	
_	+	Earth	Mins	kV	1 Start	1 Finish	ı kV	1 Start	1 Finish
ABC									
A	В	C							
В	С	A							
С	Α	В							
Weather C		Fine				Amb. Te		-	3 37
Result of 7	Test: Pas	ssed				Label At	tached at:		
Comment	s:			100					
					89.197				
									9
		11							
		A							
	77							700	n n
T42	/	-			17			-3-W	
Testing Officer:	5. Con	ININGHA	Zm Da	te: 14-02	Engine if Re	neer quired:		Date:	1 1 _



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### **HV CABLE TEST SHEET**

Project:	50	FIMPN	5					Job No:_	I64800
Date of Te	st: /	4-02	-2014	s				N72	
Cable Circ	cuit:	From: 750	KATOR	0110-	TAESIC	To:	10TOR S	SRIL-	
Type: S	166	DE VIE	F		6.6	kV		/Josq m	ım AC
Reason for	Test:	POTORMU	MITION		Cable Tem	perature:	Ho		
	stance in Ol					Yes/No)		- 104	
Measured v		` .		11				IT WAS	5
Type:			Leads:			ohms			*
G: :		4 D		oop	T -		_		
Circuit	Total	A-B Net	Total	-C Net	Total	C-A Net	-		
	10141	INCL	Total	INCL	Total	TACE			
T 1.1	<u> </u>						37.1	134	234
Insulation 	Resistance	ın Megohm	IS			A-Earth	Volts	1 Min	2 Min
Measi	ared with No	· N	1 1/0			B-Earth	5000	1100	1100
IVICASI			00 148			C-Earth	5000	1100	1400
	Tyne	e:	YORT	Sil.		A - B	5000	1100	7200
	1)[1		101			B - C	5		_
						C - A		_	-
High Volta	age Test Sho	eet	NIA.	1 Start; 1	Finish – Le	akage Cui	rents in mA		
C	Connections		Time		Negative			Positive	
-	+	Earth	Mins	kV	1 Start	1 Finisl	h kV	1 Start	1 Finish
ABC		Village Line							
A	В	C							<u> </u>
В	C	A							
C Weather Co	A	B Fine				Amb. Te	mn °C:		
Result of T			==:				ttached at:	-	
Comments		, cu		- 11		Daberry	itaonoa at.		
-						60 00 <b>0</b>	111		
CABL	E 7E3	TINC	CODE	DIO!	TOR U	INOP	095.		
							_		
				OT THE					
							11 /A-24/1 - 2	-	
		22.02							
Testing	11	NINGHA	ZAA Dat	te: //	Engi	neer		Date:	1 1
Officer:	J. WNI	NINGHA	77 Da	14-02	if Re	quired:			rates in the

### 1) 0110-SR11 Variable Speed Drive System

B. LV cable Test Sheets

J & P RICHARDSON INDUSTRIES PTY LTD A.B.N. 23 001 952 325

114 Campbell Avenue, WACOL QLD 4076 Ph. (07) 3271 2911 - Fax. (07) 3271 3623 E-mail: jpr@jpr.com.au

CABIENO		2129				SIZE	0	mm²
FROM		SR1)		4cte	ある	TYPE	7	PVC XLPE/PVC
TO			BOARD			LENGTH	~)	35m
CORE No.		_	INSULATION			FAULT	FAULT LOOP	EARTH CONTINUITY
	TO EARTH	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	а
RED	300 Mat	<b>ΜΑ</b> Μα	+aM 005	4 am 005	- 200 Ma+	α —	AMPS	,
WHITE	JOS MAT	Lao Mat	N/A Ma	290 Mpt	200 Mat	α	AMPS	_
BLUE	0	200	TOW OBZ	N/A MD	200 Mat	σ	AMPS	0
NEUTRAL	200 Mat	+ 200 Mp+	40M 005	200 Mp +	N/A MD	N/A D	N/A AMPS	
ve I/			Verification	ation				
Lugs/Pin Ends	Gla	Glands	Heat Shrink	hrink	Shrouds	spn	Cable	Cable lable
Start End Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
	>	>	>	>	A N	4	>	>
PRINT NAME	in Cerrot	Story						
	1							
SIGNATURE	7							
DATE 14.	ナーと							

CABLE No.	E No.		7229				SIZE	Z. S mm²	mm²
FROM	MC		SRI	_	2c	2cote	TYPE	PVC	PVC XLPE/PVC
5	0		MOTOR	HEATER	8		LENGTH	,	SSM
CORE No.	. No.			INSULATION			FAULT	FAULT LOOP	EARTH CONTINUITY
		TO EARTH	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	a
	RED	αM	M/A Ma	aM	αM	αM	С	AMPS	
	WHITE	Ma	αM	N/A Ma	ωM	MΩ	α	AMPS	
	BLUE	αM	MΩ	MΩ	N/A MD	MΩ	α	AMPS	
	NEUTRAL	MΩ	MΩ	MΩ	MΩ	N/A MΩ	α <b>Α/Ν</b>	N/A AMPS	
				Verific	Verification			c	
Lugs/Pi	Lugs/Pin Ends	Gla	Glands	Heat 5	Heat Shrink	Shro	Shrouds	Cable lable	lable
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
>	67	>	D M	<i>&gt;</i>	A N	せて	2	>	PN
FINIO	Cloud		Groth						
		Ku	)						
SIGNATURE			1						
DATE	7	711							

CABLE No.	No.		P231	4			SIZE	2 · S mm²	mm²
FROM	M		SRII		25	2002	TYPE	J. J.	XLPE/PVC
TO				BOARD			LENGTH	8	35m
CORE No.	No.		-	INSULATION			FAULT	FAULT LOOP	EARTH CONTINUITY
77 77 17 18 18 18		TO EARTH	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	а
2	RED	+ aM 001	N/A MD	Ma	ωW	+ aM O	a	AMPS	
5	WHITE	GM	MD	N/A MD	ΜΩ	Min	O	AMPS	^
m	BLUE	aM —	MD	ωM —	N/A Mn	OM -	σ	AMPS	0
Z	NEUTRAL	+ am 90-	100 Mpt	MD	Mα	N/A Mn	Ω <b>A/N</b>	N/A AMPS	
				Verific	Verification				
Lugs/Pin Ends	ר Ends	Glands	spu	Heat S	Heat Shrink	Shr	Shrouds	Cable	Cable lable
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
>	>	<i>&gt;</i>	>	/	AN	8P	とこ	>	>
PRINT NAME	Claro	deveto	2						
	3	da							
	1								
DATE	7	7 7							

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114 Campbell Avenue, WACOL QLD 4076 Ph. (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

CABL	CABLE No.		マゴン	Far			SIZE	2.5 mm²	
FR	FROM		SRI		3 CO E	40	TYPE	PVC	PVC_XLPEIPVC SCARES
Ĺ	TO		VED	FAS			LENGTH		
CORE No.	П No.			INSULATION			FAULT	FAULT LOOP	EARTH CONTINUITY
		TO EARTH	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	а
	RED	200 Mat	MA MD	200 Mat	200 Mat	DM PN	σ —	AMPS	
	WHITE	200 Mp +	28 Ma+	N/A Mn	200 Mat	AA MD	σ	SUMP	¢ C
	BLUE	200 Mn +	200 Mn+	HUM COS	N/A MD	AM MD	σ	AMPS	2
A∈†	NEUTRAL	A MD	aM € ∠	DM PV	NA MD	N/A MD	υ V/N	SAWA A/N	
V⊕ 17				Verification	ation				
Lugs/Pi	ugs/Pin Ends	Glands	spu	Heat Shrink	hrink	Shr	Shrouds	Cable	Cable lable
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
>		>		>		NA	NA	UN	47
PRINT NAME	Glen	Slenn Cervetto	ofe						
SIGNATURE		Es a							
DATE	グーサ	· ナ /							
		/							

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### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.	F	211-7	J	2011 10 10			SIZE		1.5mm²
FRO	OM		SRI		6	PR		TYPE		ND SCN
T	0		ENC	DDER				LENGTH		55m.
CORE	No.	WI	RE NUMB	ER	FROM	TERI 乙 巴		L	TO TE	RMINAL
				Correct			Cor	rect		Correct
1	WHITE	PP11	+15V	<b>V</b>	30	)	V		NA	
1	BLACK	PPII	-com	<b>V</b>	31		<b>/</b>	/	NA	
2	WHITE	PPII	-B/	<b>/</b>	28		<b>&gt;</b>		NA	
2	BLACK	PPII	-B	<b>\times</b>	29		>	/	NA	
. 3	WHITE	PPII	-A/	<b>/</b>	26		V		NA	
3	BLACK	PPII	-A	<b>/</b>	27		>		NA.	
4	WHITE									
4	BLACK									
5	WHITE									
5	BLACK									
6	WHITE									
6	BLACK									
7	WHITE									
7	BLACK									
8	WHITE		<u> </u>							
8	BLACK									
9	WHITE									
9	BLACK									
10	WHITE									
10	BLACK									
11	WHITE									
11	BLACK									
12	WHITE									
12	BLACK									
7/				Verifi	cation					27-310
Pin e	ends	Gla	nds	Heat \$	Shrink		Shro	ouds	Cal	ole Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start	End	Finish End	Start E	nd Finish End
/	NA	1	NA	<b>/</b>	NA	7	A	NA	<b>/</b>	NA

PRINT NAME

Glenn Cervoth

**SIGNATURE** 

DATE

14, En4

### **CONTROL CABLE INSPECTION & TEST SHEET**

CABLE No.         C   70         SIZE           FROM         SR     .         2	PVC/PVC H 55m TO TERMINAL
TO PIMP FLOOR ESTOP LENGTH  CORE No. WIRE NUMBER FROM TERMINAL    Correct   Correct	
Correct   Correct     1	TO TERMINAL
1	
3 4 5 6 7 8 9 10 11 12 13	Correct
3 4 5 6 7 8 9 10 11 12 13	N <sub>4</sub>
4 5 6 7 7 8 8 9 9 10 11 12 12 13	NA.
5 6 7 7 8 9 9 10 11 12 12 13	
6 7 8 9 10 11 12 13 13	
7 8 9 10 11 12 13	
8 9 10 11 12 13	
9 10 11 12 13	· ·
10 11 12 13	
11 12 13 13 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
12 13	
13	
14	
15	
16	
17	
18	
19	
20	
Verification	
Pin ends Glands Heat Shrink Shrouds	Cable Label
Start End Finish End Start End Finish End Start End Finish End Finish End	Start End Finish End
V NA V NA NA NA	V NA
PRINT NAME Glenn Cervetto	
SIGNATURE	
DATE 14, 2 (1) 14	

### **CONTROL CABLE INSPECTION & TEST SHEET**

CABLE	No.		C30	7				SIZE		1.5mm²
FRO	М		SRII		10	-		TYPE	F	NC/PV
то	)	HV Su	VITCHROC	m SE	3			LENGTH		
CORE	No.	WI	RE NUMBI	ER	FROM	TER	MINA	L	TO TER	RMINAL
				Correct			Con	rect		Correct
1		13	81<		TBG-	2	<b>√</b>		NO	
2		13	9K		TBG-	-3	<b>✓</b>		NA	
3		10	IK		TB6.	-9	<b>✓</b>			
4			ZK	<u> </u>	TB6-	-4	<b>V</b>			
5			2K-1		TB6	-S	<b></b>			
6										
7										
8				·						
9										
10										
11										
12										
13										
14										_
15										
16		-								
17										
18										
19	-									
20										
				Verifi	cation					
Pin e	nds	Gla	nds	Heat \$	Shrink	ļ	Shro	ouds	Cab	le Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start	End	Finish End	Start En	d Finish Er
✓	NA	1	NA	<b>(</b>	NA		IA	NA		NK
			Calas-	C.	ervetk	)				
RINT NAM	ME		<u>O ienn</u>	(200	211010					

**SIGNATURE** 

DATE

### **CONTROL CABLE INSPECTION & TEST SHEET**

CABL	E No.	7.5	c 310	)			SI	ZE		1.5mm²
FR	OM		SRI		6	<u></u>	TY	PΕ	M	ULTICORE
T	0		MKI	.1			LEN	IGTH		55m
CORE	≣ No.	WI	RE NUMB	ER	FROM	TERMIN	IAL		TO TER	MINAL
				Correct		1	Correct			Correct
1		BK	11-2	<b>\</b>	TB2-	4	$\checkmark$		11-19	
2		BI	K11-Z K11-7	<b>✓</b>	TBZ-	3	<u> </u>	BK	(11-19)	2 /
3		,								
4										
5			<11-3	V	TB6-	- 1	<u>√</u>	BK	11-194	+ /
6		B	K11-5	<b>√</b>	TB6	-2	<u> </u>	BK	11-19	9 /
7										
8										
9							_			
10										
11										
12										
13									. <u>-</u>	
14					<u></u>					
15										
16										
17										
18										
19								<u> </u>		
20										
				Verifi	cation					
Pin e	ends	Gla	nds	Heat	Shrink	Sh	rouds	<b>S</b>	Cab	le Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finis	h End	Start End	Finish End
/	70	<b>/</b>	NA	/	NA	NA	~	A	$\checkmark$	NA

**PRINT NAME SIGNATURE** 

**DATE** 

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PRICHARDSON INDOSTRIES F11 A.B.N. 23 001 952 325 114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.		PHY	+			SIZ	Έ		1.5mm²
FR	ОМ		SRII		11	OR	TYF	PΕ	SC	REENE
T	)	24VD	C DIS	ST B			LENG	3TH		NA.
CORE	No.	WII	RE NUMBI	ER	FROM	TERMIN	NAL	Т	O TERM	INAL
		Diese-		Correct			Correct			Correct
1	WHITE	SRII	+VE	<b>\</b>	31	7	1		VA	
1	BLACK		-VE	✓	32	i i	$\sqrt{}$		VA.	
2	WHITE							-		
2	BLACK									
3	WHITE									
3	BLACK									
4	WHITE									
4	BLACK									
5	WHITE									
5	BLACK									
6	WHITE				-					
6	BLACK									
7	WHITE									
7	BLACK									•
8	WHITE									
8	BLACK			,						
9	WHITE			-						
9	BLACK									
10	WHITE									
10	BLACK									
11	WHITE			-			ĺ			
11	BLACK					-				
12	WHITE									
12	BLACK			-						
				Verifi	cation					
Pin e	ends	Gla	nds	Heat \$	Shrink	Sh	rouds		Cable	Label
tart End	Finish End	Start End	Finish End	Start End	Finish End	Start End	l Finish	End	Start End	Finish End
5	NA	1	NA	$\checkmark$	NA	NP	N	A	<b>V</b>	NA

PRINT NAME

Glenn Cervette

**SIGNATURE** 

DATE

Active 17/06/2014 Page 18 of 283

### J & P RICHARDSON INDUSTRIES PTY LTD

A.B.N. 23 001 952 325 114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABLE	E No.		LAN	11-2			SI	ZE		1.5mm²	
FRC	M		SRI	11-2	İF	PR	TY	PE	5	CREENE	
TC	)						LENGTH			TERMINAL	
CORE	No.	WI	RE NUMB	ER	FROM	TERMI			TO TERM		
			1	Correct			Correct			Correct	
1	WHITE	^	(A	KA	Bud	XZ	<b>√</b>		NA		
1	BLACK	١	79	NA	BLOG	SX	<b>/</b>		NA		
2	WHITE										
2	BLACK		_								
3	WHITE										
3	BLACK										
4	WHITE										
4	BLACK										
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7	WHITE								_		
7	BLACK		-								
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8	BLACK						-				
9	WHITE										
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10	WHITE	-									
10	BLACK										
11	WHITE										
11	BLACK										
12	WHITE										
12	BLACK										
				Verific	cation						
Pin e	nds	Gla	nds	Heat S	Shrink	SI	rouds	•	Cable	e Label	
art End	Finish End	Start End	Finish End	Start End	Finish End	Start En	f Finisi	h End	Start End	Finish End	
<b>√</b>	NA	<b>√</b>	NA	<b>V</b>	NA	NA	. 1	AA	<b>V</b>	NA	

**PRINT NAME** 

**SIGNATURE** 

**DATE** 

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### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.	L	AN II	-3			SIZ	E		1.5mm²	
FR	OM		AN II SRI	1	16	PR	TYPE		SCREENE		
T	0						LENG	TH		NA.	
CORE	E No.	WI	RE NUMB	ER	FROM	TERMIN	AL	T	O TERM	INAL	
-				Correct			orrect	_		Correct	
1	WHITE	r	49		Buoc	K3	<b>√</b>		NA		
1	BLACK		10		BLOC	:K3	<b>/</b>		NA		
2	WHITE										
2	BLACK										
3	WHITE										
3	BLACK										
4	WHITE										
4	BLACK										
5	WHITE	-									
5	BLACK										
6	WHITE							-			
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9	WHITE										
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10	WHITE										
10	BLACK										
11	WHITE										
11	BLACK			-							
12	WHITE										
12	BLACK										
				Verifi	cation						
Pin e	ends	Gla	nds	Heat :	Shrink	Shi	rouds		Cable	Label	
tart End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish	End	Start End	Finish En	
<b>\</b>	NA	$\sqrt{}$	NA		NA	NA	7	A	/	NA	

**PRINT NAME** 

Glenn

**SIGNATURE** 

**DATE** 

### J & P RICHARDSON INDUSTRIES PTY LTD

114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.	L	T003	3-25				SIZE		1.5mm²	
FR	OM		SRI	1	16	PR.		TYPE		SCREENE	
T	0							LENGTH		MA.	
CORE	E No.	WI	RE NUMB	ER	FROM	TER	MINA	TO T		ERMINAL	
				Correct			Cor	rect		Correct	
1	WHITE	11	-3-1	<b>√</b>	35	7	<b>~</b>		NA	,	
1	BLACK	V	-3-1 1W+1	<b></b>	35 35	P	>		NA		
2	WHITE										
2	BLACK										
3	WHITE										
3	BLACK										
4	WHITE			-							
4	BLACK										
5	WHITE										
5	BLACK										
6	WHITE										
6	BLACK										
7	WHITE										
7	BLACK										
8	WHITE										
8	BLACK										
9	WHITE										
9	BLACK										
10	WHITE		·								
10	BLACK								·		
11	WHITE										
11	BLACK										
12	WHITE										
12	BLACK										
				Verifi	cation						
Pin e	ends	Gla	nds	Heat	Shrink	,	Shro	ouds	Cal	ble Label	
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start	End	Finish End	Start E	nd Finish End	
/	AA	✓	NA	$\checkmark$	NA	~	10	NA	<b>√</b>	NA	

**PRINT NAME** 

Glenn Cervetto

**SIGNATURE** 

**DATE** 

14/2/14

### **INSTRUMENTATION CABLE INSPECTION TEST SHEET**

CABL	E No.	1	_TOO:	3-35				SIZE		1.5mm²	
FR	OM		SRI		10	R		TYPE	S	CREENE)	
Т	0				111			LENGTH		NA.	
COR	≣ No.	WI	RE NUMB	ER	FROM	TERM	IINA	L.	TO TEF	TERMINAL	
				Correct			Corr	ect		Correct	
1	WHITE	W	w -	<b>✓</b>	350	7	<b>V</b>		NA		
1	BLACK	12	W- -3-1	<u></u>	36		<b>\</b>	·	NA.		
2	WHITE										
2	BLACK										
3	WHITE										
3	BLACK										
4	WHITE										
4	BLACK										
5	WHITE										
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10	WHITE										
10	BLACK										
11	WHITE										
11	BLACK										
12	WHITE								-		
12	BLACK								_		
			1	Verifi	cation						
Pin e	ends	Gla	nds	Heat	Shrink	S	hro	ouds	Cab	le Label	
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start E	End	Finish End	Start End	d Finish End	
1	NA	1	NA	<b>_</b>	NA	7	IA	NA	<b>√</b>	NA	

PRINT NAME

**SIGNATURE** 

**DATE** 

### 1) 0110-SR11 Variable Speed Drive System

C. Electrical Installation Report.



PO Box 1067 | Tewantin 4565 | PH:0438 394 269 EMAIL: auditor@jantec.com.au | WEB: www.jantec.com.au

### **ELECTRICAL INSTALLATION REPORT**

REPORT No.: JPR-QUU-022-SD

Page 1 of 1

Issued in accordance with the *Electrical Safety Regulation 2002* (Qld)

Section 221 for electrical work in a Hazardous Area
or on a High Voltage installation.

Occupier:	Location of Installation:
Qld Urban Utilities	Violet Street/Kingsford Smith Drive, Eagle Farm 4009

### **Electrical Installation Audited (Audit Scope):**

Replacement of existing VVVF 0110-SR11

- Isolator & earthing panel 0110-0 ES11
- Motor Feeder from Panel A24 SR11 to VVVF 0110-SR11
- Feeder from VVVF to Isolator
- Feeder from Isolator to motor

Electrical Contractor Responsible for the installation:	Electrical Contractors Lic:
J&P Richardson Industries	756

### **Audit Limitations**

### **Inherent Limitations:**

Because of the inherent limitations of any internal control structure, it is possible non-compliance with standards may occur and not be detected. An audit is not designed to detect all weaknesses in compliance as an audit is not performed continuously throughout the period of installation.

### **Scope Limitations:**

Test results of VVVF have not been verified

Α	4:4	Resi	.14.
ΑU	ЮПП	Resi	ш

The auditor issuing this notification reasonably believes that the installation work described in the Audit Scope above is **not in compliance** with the relevant standards.

X

I advise that the audit of the electrical installation work described in the Audit Scope above, was successfully executed and compliance with the relevant parts of AS2067 and AS/NZS3000 is demonstrated (subject to the audit limitations) at the time of the audit.

From the evidence provided, conclusion can be drawn that the onsite test results recorded by the installer, satisfy the minimum test requirements of AS2067, AS/NZS3000 and other relevant standards.

It is reasonable to believe that the electrical installation described in the Audit Scope above is electrically safe to connect.

Audit Date:	Auditor:	Auditors Signature:	Auditors No:	Phone No:
14/02/14	S.Downey	Dong	02/0114	0438 394 269

### **Comments/Observations:**

- 1. Phasing out across any tie switches and phase rotation (where applicable) must be verified before operation.
- 2. The High Voltage system must be operated under a safe system of work by persons competent in high voltage switching and authorised to do so.
- 3. To ensure continued safe and satisfactory operation of an electrical system with a minimum risk of breakdown and the consequent interruption of supply, it is recommended the system be subject to periodic examination and inspection as per AS2467 and the manufacturer's instructions.

1)	0110-SR11	Variable S	peed Drive	System
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D. Commissioning Report and Parameter List

### SIEMENS

### STARTUP & COMMISSIONING MANUAL

FOR SIEMENS
PERFECT HARMONY, AIR-COOLED,
MEDIUM VOLTAGE,
VARIABLE FREQUENCY DRIVES

A5E32168985 VSD 0110-SR11 Queensland Urban Utilities – Eagle Farm

### **Important Note:**

These Startup & Commissioning instructions are solely intended as working instructions or information for Field Service specialist personnel of the SII DT LD, Customer Services Division.

Even where product specific information is included, these instructions are not to be regarded as operating Instructions for a particular product.

Revision	Description of Change	Initials	Date

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### Reference Material (for Siemens Personnel)

### For Gen IV Drives:

SIEMENS Gen IV Product User Manual A5E01454341C SIEMENS Gen IV Commissioning and Maintenance Manual A5E01454341D

### For Gen III/e Drives:

SIEMENS Perfect Harmony Gen III/e User's Manual A1A19000405A
SIEMENS Perfect Harmony Gen III/Gen III/e Startup and Advanced Topics Manual A1A19000404A
SIEMENS Perfect Harmony Gen III/e Installation Manual A1A19000403A
SIEMENS NXG Manual A1A19001588
Tech Notes (Applications)

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### **Abbreviations**

The following abbreviations are used throughout this procedure.

Table 1: Abbreviations

Abbreviation	Description
Α	Ampere(s); Amp(s)
AC	Alternating Current
ACH	Anti-Condensation Heater
ACU	Air Conditioning Unit
СВ	Circuit Breaker
CDS	Circuit Disconnect Switch
CPS	Control Power Supply
СТ	Current Transformer
DC	Direct Current
DCR	Digital Card Rack
DWG	Drawing
ES	Emergency Shutdown
ESD	Electrostatic Discharge
F	Fuse
FSR	Field Service Representative
ICP	Installation and Commissioning Procedure
GA	General Arrangement
HESPS	Hall Effect Sensor Power Supply
HMI	Human-Machine Interface
LV	Low Voltage
MV	Medium Voltage
N/A	Not Applicable
OEM	Original Equipment Manufacturer
P/N	Part Number
PDC	Power Distribution Center
PPE	Personal Protective Equipment
PSD	Process Shutdown
S/N	Serial Number
SOP	System Operating Program
ТВ	Terminal Block
UPS	Uninterruptible Power Supply
V	Volt(s)
VAC	Volt(s) / -Alternating Current
VDC	Volt(s) / -Direct Current
VFD	Variable Frequency Drive
WPS	Wago Power Supply

### 1.0 INTRODUCTION

This document is for all Air-Cooled Perfect Harmony Drives with NXG Controls.

### 1.1 Purpose of Manual

The purpose of this document is to effectively guide competent and trained Siemens personnel through Startup and Commissioning for the Air-Cooled Perfect Harmony Variable Frequency Drive (VFD). The individual checks must be performed within each of the separate sections of this procedure. Following any introductory text and precautions, each section contains a series of checkboxes that indicate the completion of the individual steps.

In addition to the checkboxes, tables may be included in some sections. Such tables are used to record information like the following: a) parameter settings; b) test point data values; c) any errors or deviations. Major sub-sections also contain initials/date fields that must be completed by the individual performing and completing that section of the Startup and Commissioning procedure.

### 1.2 Startup Task Agenda

### 1.2.1 Punch List for Open Items During Startup & Commissioning

- List any issues as open items. (Attachment #1, CCF-004)
- Assign responsibility, due date, and date of completion.
- Review with Customer and return copy to Project Manager (PM) at end of Commissioning.

### 1.2.2 Drive Cabinet Inspections

- Installation Inspections Perform a visual inspection to detect signs of deterioration and discoloration. Inspection detects issues in the equipment where components may need replacement and/or corrective action.
- Equipment Cleanliness Check Check each of the enclosures of the equipment for cleanliness of power and control circuitry. This should include removal of installation dirt and debris.
- Connection Checks Perform a variety of connection and torque mark checks on the Drive system
  including inspection for loose wires, loose hardware, stripped or cut wires, poor/melted insulation,
  and proper torquing on the component mountings.

### 1.2.3 Power-up Checks

- Power-up the equipment and perform a functional and operational evaluation running at various operation levels.
- Inspection verifies the equipment is in operating condition.

### 1.2.4 Customer / Performance Review

- Meet with the customer to review the current site conditions.
- Record any issues with the installation of the Siemens equipment.
- Record training classes taken by on-site personnel and recommend any to be taken.

### 1.2.5 Spare Parts Checkout

- Perform a visual inspection of Spare Power Cells, Spare Control PCBs, and other components.
- Spare Control PCBs or Power Cells should be installed in the Drive to verify setup and operation.
- Record recommended spare parts.
- Recommend a backup flash disk of the operating system.

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### 1.3 Symbols and Conventions

### 1.3.1 Symbol Definitions

The following words and symbols found throughout this manual mark special messages to alert the operator of specific information concerning of the PERSONNEL, the EQUIPMENT or the PROCESS.



Text set off in this manner provides warning notice that failure to follow these directions in this WARNING can result in bodily harm or loss of life and/or extensive damage to equipment.



Text set off in this manner provides warning notice that failure to follow these directions in this CAUTION can result in damage to equipment.



Text set off in this manner present clarifying information or specific instructions pertinent to the immediate instruction.

### 1.3.2 Warnings and Caution Notes

WARNING	Personnel performing this procedure MUST read the entire document before beginning the procedure.
NOTE	Personnel executing this procedure shall acquire the necessary permits prior to commencing any work activity.
WARNING	Before performing this procedure, the Customer Personnel and Siemens Field Service Representative MUST conduct a job safety briefing for all participants. The briefing shall cover hazards, special precautions, energy source controls and personal protective equipment requirements.
WARNING	Always work with one hand, wear safety shoes rated electrical hazard/composite and safety glasses. Always work with another person present who is acting as a safety monitor.
WARNING	Only qualified Siemens Field Service Representatives should install, operate, troubleshoot, and maintain this Drive. A qualified individual is "one familiar with the commissioning and operation of the equipment and the hazards involved.

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Q-Pulse Id

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WARNING	Always use extreme caution when handling or measuring components that are inside the enclosure. Be careful to prevent meter leads from shorting together or from touching other terminals.
WARNING	Use only instrumentation (e.g., meters, oscilloscopes, etc.) intended for high voltage measurements (that is, isolation is provided inside the instrument, not provided by isolating the chassis ground of the instrument).
WARNING	Never touch anything within the Perfect Harmony cabinets until verifying that it is neither thermally hot nor electrically alive.
WARNING	Never remove safety shields (marked with a HIGH VOLTAGE sign) or attempt to measure points beneath the shields.
WARNING	Never connect any grounded instrumentation (i.e., non-isolated meters or oscilloscopes) to the Perfect Harmony system.
WARNING	Never connect or disconnect wiring or printed circuit boards while the Drive is energized.
WARNING	Hazardous voltages may still exist within the Perfect Harmony cabinets even when the disconnect switch is open (off) and the supply power is shut off.
CAUTION	Be sure to make appropriate connections/disconnection to equipment in order to perform this test correctly and safely. Failure to do so may result in DAMAGE to equipment.
WARNING	Only personnel performing the test shall be in the area while the test is being performed. Test area shall be barricaded and unauthorized personnel shall not be allowed inside.
	1

### 2.0 SITE AND SAFETY INSTRUCTIONS

### 2.1 Test Equipment and Tool Check

2.1.1	All test instruments, supporting tools, and accessories shall be rated for intended use.				Initial
2.1.2	Perform a visual inspection of all test instruments, equipment and all associated test leads, cables, power cords, probes, and connectors for external defects and damage.				Initial
2.1.3	Ensure that all test instruments, equipment, and their accessories are calibrated and valid throughout the ENTIRE test period.				Initial
2.1.4	Verify customer can supply the following accessories for possible use during Standard Commissioning activities:				
	□ Rags     □ Air Filters     □ Compressed Air	Guards Step Stool Ladder Hoses	□ Caution Tape     □ Alcohol based Cleaning Fluid     □ Shop Vacuum     □ Water & Hose	☐Cell Lifter ☐Grease Gun ☐Soft Brush	Initial

Table 2: Test Equipment and Tool List

Equipment/Tool	Manufacturer & Model Number	Serial Number	Calibration/ Inspection Date	
PPE Arc Flash Jacket	Stanco Temp Test Salisbury			
	Fluke 1587, Megger			
	Fluke 43B, PQM			
	Fluke 787, Process Mtr			
Meter	Fluke 87 V, DVM			
	Simpson 260-8P			
	AEMC JM810A, 2000A			
	Fluke i400s			
	Craftsman 250 ft-lbs			
Torque Wrenches	Craftsman 250 in-lbs			
	Craftsman 50 in-lbs			
ESD Pad & Wrist Strap				

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### 2.2 Site and Safety Activities

### 2.2.1 Meet with Site Supervisor

- Review of safety requirements.
- Site Specific Safety Training, as required.
- Plan for the day's progress.
- Discuss any open issues.
- Complete Daily Safety Log Form.

### 2.2.2 Review the Equipment Location and Drive Information

- Be certain your work area is clear of debris.
- Confirm that barriers, guards or Caution Tape are in place to prevent. unauthorized personnel form entering into the work area.
- Collect the site and Drive information.

### 2.2.3 Follow Lockout/Tagout Procedures

- Coordinate with customer on local Lockout/Tagout Procedures.
- If the customer has no requirements, follow Siemens' LD A Lockout/Tagout Procedures.
- Insure Personal Protection Equipment (PPE) and Safety Tools are available.

### 5 Safety Rules of LOTO

- 1. Switch off power sources
- 2. Lock the circuit against re-closure
- 3. Establish that system is de-energized
- 4. Earth and short circuit phases
- 5. Cover or enclose "live" parts

### 2.2.4 At the end of each day

- Clean your area.
- Pack your tools and equipment.
- Meet with the site supervisor.
- Review what was done that day.
- Equipment status at end of day.
- Determine what time you will be returning in the morning.
- Ask if there are any questions or other issues that need to be addressed.
- Complete entries in service report.

### 2.2.5 At the end of the Startup and Commissioning service

- Review daily service reports.
- Obtain Customer signature on service report.
- Ensure any warranty or repair parts have RMAs and are shipped for return.
- Ensure any FSKits used during Startup are packaged for return. Obtain an RMA number and handle shipping back to Siemens.
- Review checklist:
  - Spare parts review
  - Customer review
  - Record follow-up items
  - Contact in-house support personnel
- Complete the Startup and Commissioning Acceptance and Sign Off Sheet.

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### 3.0 SITE AND DRIVE INFORMATION

### 3.1 Customer Information

Customer Name:	Queensland Urban Utilities			
Street Address:	Eagle Farm		City, State Zip code:	Eagle Farm
Primary Contact:	Wayne Henricksen		Primary Phone No:	0401 688 731
Primary Fax No:			Primary Email Addr:	
Secondary Contact:	Eddie Granic		Secondary Phone No:	0414 576 390
Secondary Fax No:			Secondary Email Addr:	
Date Completed Pre-Startup Checklist: 17/02/2014		Client's Drive ID:	0110-SR11	

Date: <u>17/02/2014</u>

### 3.2 Dispatch Information

Notification No:	52-204606	Original SO No:	3002133943
Field Service Rep:	Mohamed Ayad	Drive Type:	Gen3
Technical Support:	SCCC: Ph. 1300 369 515	Drive P/N:	M6SR3
Project Engineer:	Pieter Taljaard (Siemens Aust.)	Drive S/N:	Z831501002460
Location of Drive:	Eagle Farm	Drive Date Code:	13-23

### 3.3 Location Environment

Elevation:	Ft, Above Mean Sea Level	Air Conditioning:	☐ Yes
Enclosure:	☐ PDC ☐ Building	Air Conditioning:	BTU, or Ton
Room Temperature:	°C, Indoors	Heating:	☐ Yes
Ambient Temperature:	30+ °C, Outdoors	Humidity:	☐ High        Low
Outside Air Blown In:	☐ Yes	Dusty Environment:	☐ Yes
Drive Blowers Ducted Outdoors:	⊠ Yes □ No	Conductive Dusts:	☐ Yes
Other Influences:		Corrosive Gases:	⊠ Yes □ No
List all.			Type(s): Sewage

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#### 3.4 Drive Information

Power		Load Type/Descripti	on	Voltage		Ampacity	,	Frequency	
Input Power:		2750 KVA		6600V		214A		50Hz	
Output Power:	Output Power: 2051 KW			0-6600 V		260 A		0-75Hz	
Control #1 Power: Control and Blower			415V 3ph		20A		50Hz		
Control #2 Power: Motor Heater external power (customer)			110Vac 1Ph		Power=KW	•	50Hz		
Control #3 Powe	er:								
Control #4 Powe	er:								
Xfmr Blower Motors: Voltage:		HP/KW:	HP/KW: HP, or		/ FLA:	Amp	RPM:		
Xfmr Blower Motor OL Settings:									
Cell Blower Motors: Voltage:		HP/KW:	: HP, or	KW	/ FLA:	Amp	RPM:		
Cell Blower Mot	or OL S	Settings:							
Transformer:	Mfg	: TBA		ŀ			KVA: 2750		
	Mod	lel No: HZ50	Part No	lo: A5E03071254		Serial No:			
	Inpu	ıt Voltage: 6600 V	Sec Vol	Sec Voltage: 630 V			Tap Setting: ☐ -5% ☐ 0% 🖂 +5%		
	Reason if Tap Setting is not +5%:								
Input CT'S:		Ratio: 250:5	No. pe	No. per Phase: 1					
Attenuator Resistors: Input: 4.8 MΩ		Output	Output: 4.8 MΩ						

# 3.5 Drive Options

Cell Bypass	☐ Yes	UPS:	☐ Yes	⊠ No
Drive Bypass:	☐ Yes	Communication Protocol:	□No	
				Type: Modbus RS485
Sync Motor:	☐ Yes ☐ No	Sync Transfer	☐ Yes	⊠ No
Sync Motor Exciter:	Voltage:	Manufacturer:		
	Configuration:	Serial No.:		
	Model:			

**Table 3: Cell Information** 

Power Cel	ls: VSD P/N: 6SF	R3502-6HF42-7BH-Z	5	Size: Amp <u>260</u>	Total No of Cells: 18	
Cell			С	ell Control Board		
Location	CELLS P/N	S/N		P/N	S/N	Rev.
A1	LDZ14501002.260	130162		A1A10000432.30M	U13020XXXBR	BR
A2	LDZ14501002.260	130160		A1A10000432.30M	U13020410BR	BR
А3	LDZ14501002.260	130165		A1A10000432.30M	U13020395BR	BR
A4	LDZ14501002.260	130169		A1A10000432.30M	U13020407BR	BR
A5	LDZ14501002.260	130166		A1A10000432.30M	U13020440BR	BR
A6	LDZ14501002.260	130171		A1A10000432.30M	U13020427BR	BR
B1	LDZ14501002.260	130163		A1A10000432.30M	U13020XXXBR	BR
B2	LDZ14501002.260	130161		A1A10000432.30M	U13020433BR	BR
В3	LDZ14501002.260	130164		A1A10000432.30M	U13020468BR	BR
B4	LDZ14501002.260	130173		A1A10000432.30M	U13020392BR	BR
B5	LDZ14501002.260	130172		A1A10000432.30M	U13020439BR	BR
В6	LDZ14501002.260	130176		A1A10000432.30M	U13020455BR	BR
C1	LDZ14501002.260	130175		A1A10000432.30M	U13020XXXBR	BR
C2	LDZ14501002.260	130174		A1A10000432.30M	U13020403BR	BR
C3	LDZ14501002.260	130177		A1A10000432.30M	U13020479BR	BR
C4	LDZ14501002.260	130168		A1A10000432.30M	U13020391BR	BR
C5	LDZ14501002.260	130167		A1A10000432.30M	U13020481BR	BR
C6	LDZ14501002.260	130170		A1A10000432.30M	U13020452BR	BR

#### 3.6 Motor Information

Manufacturer:	ТВА	Model Number:	
HP/KW Rating:	HP, 2000 KW	Serial Number:	
Rated Voltage:	6600 V	Туре:	☐ Induction ☐ Synchronous
Full Load Data:	Amp: 217 A, Eff: , PF: 0.86	6, RPM: 593	
Locked KVA Code:		Speed Encoder:	⊠ Yes ⊠ No
Service Factor:		Encoder Model:	, 1024 PPR, Incremental
Motor Cooling:	Air, Other:	RTD's:	⊠ Stator ⊠ Bearings
Stator Connection:	⊠ Wye □ Delta	RTD Type:	PT100
Line Start Capability:	☐ Yes	RTD Alarm/Trip:	Stator: N/A °C, Bearing: N/A °C
Exciter Manufacturer:		Exciter Voltage:	V, □ AC □ DC
Exciter Model No:		Exciter Config:	

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## 4.0 CUSTOMER PRE-STARTUP CHECKLIST REVIEW

# 4.1 Customer Responsibilities 4.1.1 Customer is responsible for completing the pre-startup items on the Customer Pre-Startup Checklist (See Attachment #2). Complete ☐ Incomplete ☐ 4.2 Review and record checklist items status 4.2.1 Review each item in the checklist with the Customer and

Complete ☐ Incomplete ☐

#### 5.0 DRIVE PRE-POWER INSPECTIONS AND CHECKS

record status of completion in the Attachment #2.

Description	Initial
Visually check the equipment for any shipping or installation damage.	MA
Ensure that the entire system is earth grounded at one of the system grounding points. (Customer specified where ground to be connected in VFD. Either to input or output cabinet.)	MA
Confirm Siemens drawings are the same at the Customer's drawings. Note: <i>Drawings need to be updated for new encoder connection.</i>	MA
Verify the source voltage to the Drive matches the Drive specification. The Drive's intended input voltage is specified on the foil label located inside the control panel door. (Note: This foil label may be located in the customer connection cabinet.)	MA
Ensure the control power (typically 120 VAC or 125 VDC) and auxiliary power (typically 415 or 690 VAC) sources are connected per the VFD schematics and that they match the Drive's control voltage ratings as stated on the foil label.	MA
Verify the presence of markings/labels on all terminal strips, mounted components, cell and other sub-assemblies. Notify the factory of any discrepancies.  List discrepancies: NA	MA
Verify the presence and proper installation of all protective covers.  List discrepancies: 415V for PLC I/O Transformer protection barrier to be fitted->Done!	MA
Verify the installation of the fan hood. Verify that the fan rotates freely while mounted.	MA
Check Blower Assembly installation and check hardware connections.	MA
Confirm all air gaps are blocked between cabinets.	MA
Confirm Shipping Splits are internally bolted together. n/a	MA

Description	Initial
Confirm Shipping Splits are externally bolted together (near floor). N/A	MA
Confirm cabinet to cabinet sealing.	MA
Confirm conduit entrance to cabinets is sealed.	MA
Confirm cabinet to floor is sealed.	MA
Confirm gland plates are installed properly.	MA
Verify that the ground bonding jumpers are present and connected (between shipping splits, cabinets to doors, cabinets to panels, motor).	N/A
Confirm MV and LV cables are installed in separate conduits (observe for proper spacing).	MA
Confirm LV (415V & 120V) and Analog Signal cables are installed in separate conduits.	MA
Check all cabling for insulation nicks, splitting and/or cracking.	MA
Verify that no conductors are exposed due to chafing or other shipping abuse.	MA
Input MV Power Cables: Verify insulation voltage rating is adequate.	MA
Input MV Power cables: Verify bend radii meet NEC requirements.	MA
Input MV Power cables: Check distance from cabinet/other cables.	MA
Input MV Power cables: Verify stress cones installed/mounted properly and shields are grounded at MV Switchgear end only – not at drive end. Ensure shield ground wires are adequately separated from bus work and GTO wires.	MA
Output MV Power Cables: Verify insulation voltage rating is adequate.	MA
Output MV Power cables: Verify bend radii meet NEC requirements.	MA
Output MV Power cables: Check distance from cabinet/other cables.	MA
Output MV Power cables: Verify stress cones installed/mounted properly and shields are grounded at VSD end only – not at Motor. Ensure shield ground wires are adequately separated from bus work and GTO wires.	MA
Verify that the transformer neutral is ungrounded.	MA
Check the tap jumper to be sure it is not touching the cabinet.	MA
Ensure that control and main power are installed and connected properly. Source to input. Output to motor.	MA
Check and inspect Motor Terminations in motor termination box. (done by JPR)	MA
Shipping split Bus Bar terminations complete, torqued and covers in place.	N/A
Ensure that VFD electrical connections are tight and that all torque marks are present.  * Re-examine for bolts bottoming out.	MA
Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.	N/A
Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connnections that deal with shipping splits are addressed).	N/A
Control wires (visually inspected and landed per customer connection drawings).	MA
Check Input Attenuator Resistors are the correct value for the rated voltage.	MA
Check Output Attenuator Resistors are the correct value for the rated voltage.	MA

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Description	Initial
Verify all Transorbs are grounded (located at/near input & output attenuator resistors).	MA
Check Fuses and Relays (inserted snugly into holders).	MA
Verify Wago wiring secure.	N/A
Verify Break Out Board wiring secure.	MA
Verify Signal Conditioning Board wiring secure.	MA
Verify DCR is properly grounded to ground point.	MA
Verify Plug/Ribbon cables are secured.	MA
Verify Keypad is grounded.	MA
Verify for Communication protocol only: termination resistor.	MA
Check Fiber optics (point to point) and verify that bend radii are acceptable. A3 fiber bent at Modulator Board End, light goes through.	MA
External air path in/out (distance from blower 30mm (minimum) - pass/fail. Pass	MA
Inlet/outlet located opposite side of room. ok	MA
All covers and doors installed and secured with the correct fasteners and ground straps.	MA
All Safety Interlock hardware (Fortress Locks) are installed and properly aligned.	MA
All Doors open/close properly.	MA
Drive door filters.	MA
Verify all components match the drawings: component location, labels, wire tags and Drive labels. (The drawing must reflect the Drive and vice-versa – internal connections only).	MA
Adjust Blower Motor Thermal OL's to correct settings.	MA

# 6.0 CONTROL POWER CHECKS

Description	Initial		
Ensure that all control power sources are available for Drive operation.	MA		
Verify free rotation of cell and transformer blowers. (A double-check before closing the cabinets.)	MA		
Verify Network Cabling is the correct type and landed on the correct terminals.			
Verify Speed Controls are terminated correctly (4-20 mA speed control or network control).	MA		
Verify Start/Stop commands terminated correctly (digital input or network control).	MA		

Energize the Control Power Circuits feeding the drive.

#### DON'T energize MV Power.

	Rated input current (2020)	214 A
Confirm the following parameters and document	Rated output current (2040)	260 A
values:	Neutral connection (2630)	T2
	CT turns (3035)	250 :5
Measure all control power voltage sources being	415 V <sub>AC</sub> (373V <sub>AC</sub> to 466V <sub>AC</sub> )	425 V <sub>AC</sub>
fed to the Drive. Verify that these voltages match	240 V <sub>AC</sub> (220V <sub>AC</sub> to 260V <sub>AC</sub> )	NA V <sub>AC</sub>
the drawings.	120 $V_{AC}$ (110 $V_{AC}$ to 130 $V_{AC}$ )	127 V <sub>AC</sub>
If supplied, verify the UPS voltage.	120 V <sub>AC</sub> (110V <sub>AC</sub> to 130V <sub>AC</sub> )	NA V <sub>AC</sub>

Energize the control power circuits at the drive – close breakers and fuse holders.

Description	Initial
Verify phasing for the blower motor power circuit (verified by checking that suction holds a sheet of paper firmly on drive cabinet filters).	MA

Record Drive address.	TCP/IP Address:	Address: 172.17.20.16	
Verify <b>DCS</b> or <b>PLC</b> addresses across communication link, if applicable.	TCP/IP Address:	NA	
PLC via Network2			
Modbus TCP			
	+5 V <sub>DC</sub> (+5.1	10 to +5.13 V <sub>DC</sub> )	5.15 V <sub>DC</sub>
	-5 V <sub>DC</sub> (-4.8	5.10 V <sub>DC</sub>	
	+12 V <sub>DC</sub> (+11.	12.07 V <sub>DC</sub>	
Power supply voltage checks.  Please see FAT docs.	-12 V <sub>DC</sub> (-11.6	-12.05 V <sub>DC</sub>	
7,10000 000 7717 0000.	+15 V <sub>DC</sub> (+14.	15.01 V <sub>DC</sub>	
	-15 V <sub>DC</sub> (-14.5	-15.00 V <sub>DC</sub>	
	24 V <sub>DC</sub> (21	<b>24.04</b> V <sub>DC</sub>	
	+5	5.14 V <sub>DC</sub>	
DCB valtage checks:	-5	-5.15 V <sub>DC</sub>	
DCR voltage checks:	+1	12.06 V <sub>DC</sub>	
	-12	-12.07 V <sub>DC</sub>	

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#### DON'T ENERGIZE MV POWER - FURTHER CHECKS REQUIRED IN SECTION 10.

#### Table 4: SOP, Parameters and Fault Logs

Upload/Review:	Initials Upload:		Initials		
SOP File: A5E32168985B	MA		Historical Log:	MA	
Parameter File (Level 7 Security):	MA		Fault Log:	MA	
Check Clock Time: to AEST only	RD		Event Log (NXG only):	MA	
			Cell Fault Log (Legacy only):	NA	
Were any existing issues found after	Normal commissioning code modification.				
reviewing SOP, Parameters and Logs?	Digital I/O	wi	ring modified as per Asbuilt drawings.		
	Added to SOP, DI-0B for Keypad local control, wiring and keysw yet to be fitted.  Added interlock for Ventilation running DI.				

Verify the following are functional under control power:		
MV Input Protection Interlock:	⊠ Yes □ No	
	⊠ Yes □ No	

# 7.0 SOFTWARE AND FIRMWARE VERSION RECORDING

Record the SOP Software (DRCTRY File) and	Software Ver:	Version 4.39
NXG Firmware (8090) version.	(8090) Firmware Ver:	Ver 5.2.3
Record HMI software version, if applicable. NA	Software Version:	NA
	Firmware Version:	NA
	Windows Version:	NA

#### 8.0 BYPASS CONTACTOR TEST

## 8.1 Reference Bypass Contactor Procedure located in Bypass Contactor Kit.

Table 5: By-Pass Contactor Testing. Dynamic test pulling FO off for each cell, and then reset from parameter ID:XXXX.

#### NOT FITTED.

Contactor Name	Voltage	Initial
BPKA1	Pick-up Voltage:	
DFRAT	Drop-out Voltage:	
BPKA2	Pick-up Voltage:	
DF NA2	Drop-out Voltage:	
BPKA3	Pick-up Voltage:	
211010	Drop-out Voltage:	
BPKA4	Pick-up Voltage:	
5.1011	Drop-out Voltage:	
BPKA5	Pick-up Voltage:	
	Drop-out Voltage:	
BPKA6	Pick-up Voltage:	
21.13.0	Drop-out Voltage:	
BPKB1	Pick-up Voltage:	
	Drop-out Voltage:	
BPKB2	Pick-up Voltage:	
	Drop-out Voltage:	
BPKB3	Pick-up Voltage:	
	Drop-out Voltage:	
BPKB4	Pick-up Voltage:	
	Drop-out Voltage: Pickup Voltage:	
BPKB5	Drop-out Voltage:	
	Pick-up Voltage:	
BPKB6	Drop-out Voltage:	
	Pick-up Voltage:	
BPKC1	Drop-out Voltage:	
DDIVCO	Pick-up Voltage:	
BPKC2	Drop-out Voltage:	
BPKC3	Pick-up Voltage:	
BI NOO	Drop-out Voltage:	
BPKC4	Pick-up Voltage:	
	Drop-out Voltage:	
BPKC5	Pick-up Voltage:	
	Drop-out Voltage:	
BPKC 6	Pick-up Voltage:	
On firm Outland at I/O	Drop-out Voltage:	
Confirm Customer I/O and communications Confirm Customer hard wiring into the VFD	This is the time to fine tune what is being received and if changes need to be done.	

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Description	
Install the covers and button up the Drives.	
Prepare the Drive for full input power. (Remove test equipment, motor free, etc.)	

#### 9.0 OPEN LOOP TESTS

#### N/A

The following steps verify operation of the Drive (without a motor) in Open Loop Test Mode (No motor current feedback).

Warning! Do not connect a grounded PC or laptop to a communications board with an isolator or while the Drive is running. To do so could damage the computer and/or the digital control rack.

Description	Initial
Review and follow safety procedures per Daily Safety Log.	
Make sure all safety grounds have been removed from input.	
Re-energize the AC or DC control power.	
Connect the PC/Laptop to the Ethernet Port (for access to the CPU Board). Connect Tool-Suite and the Debug Tool.	
Set the control loop type (2050) to Open Loop Test Mode (OLTM).	
Verify that the input current (3030) and input voltage (3040) scalers	
(stability →input processing) are set to the default values of 1.0.	
DISABLE spinning load using Drive $\rightarrow$ spinning load (2420) $\rightarrow$ spinning load mode (2430).	
Make sure the fast by-pass (2600) is DISABLED. Access this parameter through Drive $\rightarrow$ cells $\rightarrow$ fast by-pass.	
Configure the keypad to display input voltage (VDIN), input frequency (FRIN), and motor voltage (VLTS). – function of keypad	
Set the motor rated voltage (1040) parameter	
Energize MV Power to the system.	
(Everyone should leave the room the first time MV is applied to the Drive.)	

Description	Figures and Records	Initial
Verify that the keypad or drive tool displays the correct value of drive input voltage and frequency. At rated primary voltage, the AC input voltage feedback on Test Points VIA VIB, and VIC should be 5.4Vpp or 1.9Vrms.		
See the figure in the Comments Section.	Talk Stop	
These test points are on the system interface card. Perform the following corrective step if the input (or line) voltage is too high or too low.	VIB VIC VIA	
If the input voltage to the Drive is too high, then this needs to be corrected. Harmony Drives are shipped with the transformer tap set to +5%, which reduces the voltage by that percentage on the secondary side of the transformer.	Confirm Values using an oscilloscope and digital multimeter.	
If the voltage is low (5% less than rated), then change the tap on the transformer to the neutral ("O") or if the voltage is lower than 5% less than rated then change the tap on the transformer to -5% tap.		
If the input frequency is displayed as a negative number, then one pair of input phases has to be switched to change the phase rotation.		
Enter a speed demand of 25% and give the RUN command. The AC output voltage feedback signals on Test-Points VMA, VMB, and VMC should be 1.35Vpp ±0.27V (measure the average peak-to-peak voltage) or 0.48 Vrms ±0.20V.  See the figure in the Comments Section for signals on TestP-points VMA and VMB at 25% speed (15Hz).	Confirm Values using an oscilloscope and digital multimeter	
Increase the speed demand to 50% (30 Hz). The output voltage feedback signals should increase in proportion for both frequency and amplitude.		
Note that in Open Loop Test Mode, the flux regulator is not enabled and hence the output voltage will read higher or lower than calculated value corresponding to 50% of rated voltage. Adjust the flux demand parameter (3150) so that the motor voltage (on the keypad or tool) is approximately equal to 50% of rated voltage.		
Further increase the speed demand to 100% (60 Hz). The AC output voltage on Test-Points VMA, VMB, and VMC should be $5.4\text{Vpp} \pm 0.27\text{V}$ or $1.9\text{ Vrms} \pm 0.20\text{V}$ . The motor voltage on the keypad should read the rated value output voltage $\pm 5\%$ .		

# 10.0 DRIVE TEST IN OPEN LOOP TEST MODE WITH MOTOR CONNECTED

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The following steps verify operation of the Drive (with a motor connected at its output) in Open Loop Test Mode (No Current Feedback). This test is required only when the operation of the output Hall Effect Transducers requires to be verified. During this test the motor should be unloaded. If this test is not required then proceed to the next test.

Description [This procedure not followed, OLVC method used]				Initial
Disconnect control voltage and medium voltage	ge sources & follow LC	TO procedure	es.	
Connect the motor feeder cables or enable m	otor contactor.			
Re-energize the AC or DC control power.				
Set the motor rated voltage (1040) and freque  → motor parameters) to be equal to the moto		s (access it thr	ough motor	
Make sure that spinning load mode (2430) a	and fast by-pass (260	0) are DISABL	ED.	
Slow down Drive acceleration and deceleration. Set to 60 Sec or greater.	Accel time 1	(2270)	Sec	
"Drive/Speed Ramp Setup"	Decel time 1	(2280)	Sec	
DON"T operate the drive beyond 10% speed "Stability/Output P	without reducing the large rocessing/Flux Control		(3150) to 0.5.	
Energize the medium voltage feed to the VFD. Push the fault reset button on the keypad to reset faults and push the button a second time to acknowledge any alarms.				
If the mode on the keypad display reads RLBK, then change the control loop type (2050) to open loop vector control and exit out of the menu entry. This should force the RLBK on the keypad to change back to mode. Then change the control loop type (2050) back to open loop test mode.				
Configure the keypad to display motor magnetizing current, motor torque current and motor voltage.				
Spin the motor at 1% and observe proper rotation.				
Motor rotation correct or corrected:  Yes  No				
Operate the Drive with a speed demand of 10 motor current for phase A on test-points VMA			eedback and	
Since the motor is unloaded the current waveform should lead the voltage waveform by almost 90°. The hall effect current transducers introduce a negative sign since they are configured to measure the incoming current. Check test-points VMB, IMB and VMC, IMC for similar waveforms. See Figure 10.1				

IMA

VMA

VMA

Ch2 1.00 V MAO.oms A Ch1 7 600mV

Figure 10.1 Open Loop Test Mode operation at 10% speed with an unloaded motor.

(AC motor voltage and motor current at test-points VMA and IMA are shown.)

# 11.0 DRIVE TEST IN OPEN LOOP VECTOR CONTROL MODE FOR UNLOADED MOTOR APPLICATION

11.1 At this point the VFD is ready for actual (induction) motor operation. The following steps verify operation of the Drive and the load induction motor in open loop vector control mode.

Description	Initial
Re-energize the AC or DC control power, if de-energized.	
Change the Drive control loop type (2050) to open loop vector control.	

Description			Value
Setup the speed ramp parameters according to the following recommendations:	Accel time 1	(2270)	45 Sec
The acceleration and deceleration rate for a fan should be set to around 60 seconds and for a pump around 30 seconds. "Drive/Speed Ramp Setup"	Decel time 1	(2280)	45 Sec
Verify that fast (cell) by-pass is DISABLED at this time if you have that option	Fast by-pass	(2600)	NA Sec

**11.2** Verify that the following parameters are set correctly – default values are shown.

\*Note: Auto-Tuning modifies the italicized menu items.

\*\*Note: Param\_List= Please see Completed Parameter List asbuilt attached

Description				Value
	Motor frequency	(1020)	HZ	50
Setup the following motor parameters according to the nameplate values.	Full load speed	(1030)	RPM	593
"Motor/Motor Parameter"	Motor Rated Voltage	(1040)	V	6600
	Full load current	(1050)	Α	217
	Leakage inductance	(1070)	16.0%	24.6
Use default values for the other motor parameters as shown below. For this	Stator resistance	(1080)	0.1%	0.83%
test set the stator resistance to 0.1%.	No load current	(1060)	25.0%	34%
	Inertia	(1090)	30.0 KgM <sup>2</sup>	389.1
Setup the motor overload and torque limits. Set the motor trip volts to be equal	Overload select	(1130)	Inv. Time with Speed Derate	Inv Time w Sp
	I overload pending	(1139)	105.0%	Param_List
	I overload	(1140)	110.0%	Param_List
to 120% of the motor rated voltage or to	Overload timeout	(1150)	5 Sec	Param_List
the value required by the customer. Set the over-speed parameter to be 120% or to the value required by the customer. "Motor/Limits"	Max. Motor Inertia	(1159)	0.0 KgM <sup>2</sup>	Param_List
	Motor trip volts	(1160)	4800 V	Param_List
	Over-speed	(1170)	120%	Param_List
	Motor torque limit 1	(1190)	100.0%	Param_List
	Regen torque limit 1	(1200)	-0.25%	Param_List

D	Value			
	Flux reg prop gain	(3110)	1.72	Param_List
	Flux reg integral gain	(3120)	1.00	Param_List
Verify that these control loop gains are at their default values.	Flux filter time const	(3130)	0.0667 Sec	Param_List
at their default values.	Flux demand	(3150)	1.0	Param_List
	Flux ramp rate	(3160)	0.5 Sec	Param_List
	Energy saver min flux	(3170)	100%	Param_List
Verify that these control loop gains are	Speed reg prop gain	(3210)	0.02	Param_List
at their default values.	Speed reg integral gain	(3220)	0.046	Param_List
"Stability/Output Processing/Speed	Speed reg Kf gain	(3230)	0.60	Param_List
Loop"	Speed filter time const	(3240)	0.0488 Sec	Param_List
Verify that these control loop gains are	*Current reg prop gain	(3260)	0.50	Param_List
at their default values.  "Stability/Output Processing/Current Loop"	*Current reg integral gain	(3270)	25	Param_List
Verify that these control loop gains are	Enable braking	(3360)	Off	Param_List
at their default values. "Stability/Output Processing/Braking"	Pulsation frequency	(3370)	275 Hz	Param_List
Verify that these control loop gains are	Output current scaler	(3440)	1.000000	Param_List
at their default values.  "Stability/Output Processing"	Output voltage scaler	(3450)	1.000000	Param_List
Verify that these control loop gains are	Dead time comp	(3550)	16.0 µSec	Param_List
at their default values.	Feed forward constant	(3560)	0.0000	Param_List
"Stability"	Carrier frequency	(3580)	400.0 Hz	Param_List

Description		
Verify the system operational	program (SOP) and customer interface per Customer specification.	MA
Verify that the Customer has con	pleted their entire interface testing at this time.	MA
Energize the medium voltage faults and push the button a s	feed to the VFD. Push the fault reset button on the keypad to reset econd time to acknowledge any alarms.	MA
Configure the keypad to display Speed Demand, Motor Magnetizing Current, Motor Torque Current, and Motor Voltage.		MA
Operate the Drive with a speed demand of 10%. Observe the AC output voltage feedback and motor current for phase A on testpoints VMA and IMA using an oscilloscope.	<ul> <li>If the motor is unloaded, then the current waveform should lead the voltage waveform by almost 90° (see Figure 11.1 - top frame) The hall effect current transducers introduce a negative sign since they are configured to measure the incoming current.</li> <li>If the motor is loaded then the current waveform will lead the motor voltage by an angle small than 90° (see Figure 11.1 - bottom frame).</li> <li>The motor voltage should be 10% of the motor rated voltage.</li> </ul>	MA

Description	Initial
Increase the speed demand while monitoring the motor voltage. The motor voltage should read according to the following table. See Figure 11.2 for waveforms at 100% spread (50Hz). Table 6 shows the Drive voltage scaling for signals on test-points VMA, VMB and VMC as a function speed. Table 7 lists the scaling for the currents and voltage feedback signals available on the signal conditioning board at the rated operating point of the Drive.	MA

Table 6: Scaling of Drive output voltage as a function of speed

Speed Command (%)	Motor Speed (Hz)	Motor Voltage Feedback, (V <sub>P-P</sub> ) NXG Sys Intrf Brd (NXGII Sys I/O Brd)	Motor Voltage Feedback, (V <sub>RMS</sub> )  NXG Sys Intrf Brd (NXGII Sys I/O Brd)
10	6	1.08 (0.54) V <sub>P-P</sub>	0.38 (0.19) V <sub>RMS</sub>
25	15	2.70 (1.35) V <sub>P-P</sub>	0.96 (0.48) V <sub>RMS</sub>
50	30	5.40 (2.70) V <sub>P-P</sub>	1.91 (0.96) V <sub>RMS</sub>
75	45	8.10 (4.05) V <sub>P-P</sub>	2.87 (1.44) V <sub>RMS</sub>
100	60	10.80 (5.40) V <sub>P-P</sub>	3.82 (1.91) V <sub>RMS</sub>

Table 7: Scaling of Drive input and output voltages and currents

Variable	Rated value at Drive terminals (RMS)	Feedback value under rated conditions (V <sub>P</sub> ) NXG Sys Interface Board or (NXGII Sys I/O Board)	Feedback value under rated conditions (V <sub>RMS</sub> )  NXG Sys Interface Board or (NXGII Sys I/O Board)		
Input Current	Primary Current Rating of Input CT	5.0 (2.5) V <sub>P</sub>	3.54 (1.77) V <sub>RMS</sub>		
Input Voltage	(Rated Input Voltage L-L) / 1.732	5.4 (2.7) V <sub>P</sub>	3.82 (1.91) V <sub>RMS</sub>		
Output Current	Output Current Rating = Cell Rating	5.0 (2.5) V <sub>P</sub>	3.54 (1.77) V <sub>RMS</sub>		
Output Voltage	(Rated Output Voltage L-L) / 1.732	5.4 (2.7) V <sub>P</sub>	3.82 (1.91) V <sub>RMS</sub>		
Examples: Output Current Scaling: Cell current rating = 3.54 (1.77) V <sub>RMS</sub>					

Output Voltage Scaling: [(Rated output voltage L-L) / 1.732] \* 1.414 = 5.4 (2.7) V<sub>P</sub>

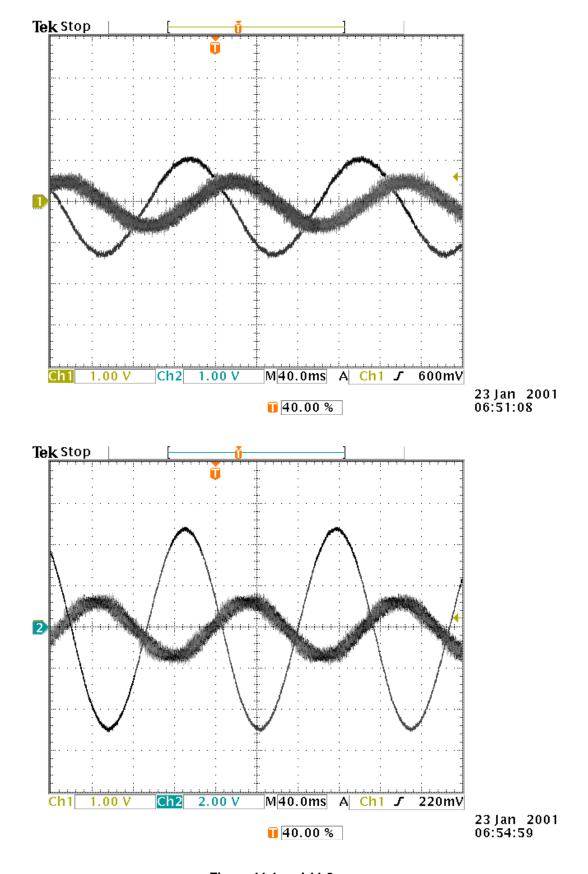


Figure 11.1 and 11.2

AC motor voltage and motor current at test-points VMA and IMA at 10% speed in Open Loop Vector Control

Top frame: Unloaded Operation

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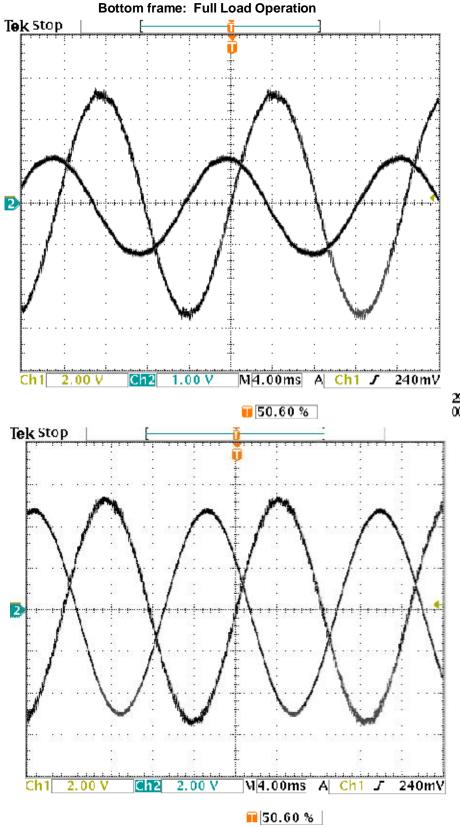


Figure 11.3 and 11.4

AC motor voltage and motor current at test-points VMA and IMA at 10% speed Open

Top frame: Unloaded Operation

Bottom frame: Full Load Operation Drive Test in Synchronous Motor Control Mode

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#### **12.0 TUNING**

Note: Spinning Load is disabled with V/Hz and OLTM control. IT is automatically enabled if fast by-pass is enabled regardless of menu settings.

Note: Spinning Load should be enabled if one or more of the following operating modes/features are selected:

- Fast By-Pass
- Auto-Restart (controlled through the auto reset parameters 7120-7150 and the SOP)
- Synchronous Motor Control (SMC and CSMC)
- Closed Loop Vector Control (CLVC)

	Description	Initial	
Use the dr	ive tool to monitor motor flux (FluxDS), motor speed, and speed reference.	MA	
Step 1: To shown.	o enable spinning load and make sure the following parameters are set to the values	MA	
Step 2: Sp	pinning Load Menu (2420)	MA	
	Spinning load mode (2430) forward or reverse, whichever is appropriate	MA	
	Scan end threshold (%) (2440) 20%	MA	
	Current level set point (%) (2450) 15% [or equal to the no-load current setting]	MA	
	Current ramp(s) (2460) 0.01 s		
	Max current (%) (2470) 50%		
	Frequency scan rate(s) (2480) 3.0 s (scan time). Check NXG Control manual for this feature	MA	
Step 3: Operate the Drive with a demand of 30%.			
Step 4: On the drive tool monitor, the speed reference and motor speed at the moment the Drive "catches" the motor.			
Repeat Steps 3-4 for different cells. Save the screen shots from tool suite noting which cell was by-passed.		NA	

# 13.0 SYNCHRONOUS TRANSFER PROCEDURE (if applicable) N/A

- This section of the startup procedure involves optional synchronous transfer checks. The Pefect Harmony may be configured for optional synchronous transfer operation, in which the Drive can be used to control multiple motors, one motor at a time. If such a configuration is not defined for the application, then this section may be skipped.
- **13.2** Use the following steps to setup the Drive control for Synchronous Transfer:

	Description	Initial
Step 1: Conf	igure Synchronous Transfer Menu parameters as shown below.	
	Synchronous Transfer (2700)	
	Phase I gain (2710) 2	

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	Phase P gain (2720) 4	
	Phase offset (2730) 2 deg	
	Phase error threshold (2740) 1.5 deg	
	Frequency Offset (2750) 0.5%	
	Up Transfer Timeout (2760) 0 sec	
	Down Transfer Timeout (2770) 0 sec	
Step 2: Enable Spinning Load by setting Spinning Load Mode (2430) to forward.		
Step 3: Set the Speed Fwd Max limit 1 (2080) to at least 105%		

#### **13.3** Go through the following checklist to complete the setup of Synchronous Transfer:

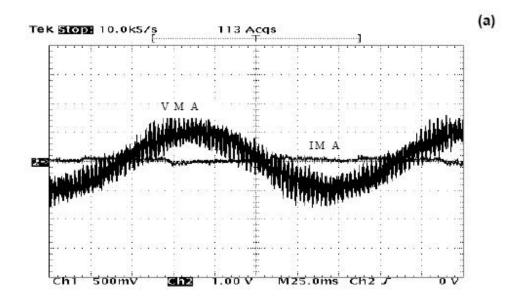
Description	Initial
Configure the Drive control as described from OLTM/CLVC	
Ensure that PLC-related hardware is properly connected (for information, see the respective PLC communications network manuals supplied by the vendor) to the analog I/O modules.	
Verify wiring of all VFD control and line control electrical contactors.	
Ensure that the system operating program for the "up transfer" and "down transfer" process logic is implemented.	
The state machines for up and down transfers reside in the Perfect Harmony's control program. These interface with the control system integrator's PLC network via the VFD system operating program to handle handshaking between each motor control center (MCC) and the VFD. All controls for the VFD and line reactors are controlled from the system integrator's PLC. Verify that these controls are operational.	
Verify all communications flags. (debugger screen)	
For Synchronous Motor (SM) synchronous transfer, an external field controller source is required when the SM is connected to the line and the Drive is disabled. This alalog source and the source from the Drive must be switched via external logic and in a digital manner, 4-20ma current loops are used for analog sources (current loops cannot be switched via a relay). The final output from the PLC must be connected to the field excitor directly. Verify that there are two sources to the PLC (one of which may be internal), and that the PLC logic is set to switch between the two sources at the appropriate time. The PLC also controls the enable of the field exciter any time the motor is active.	

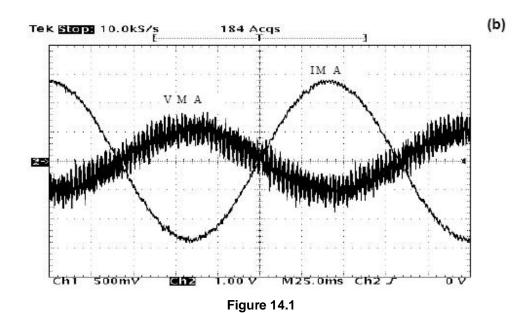
# 14.0 DRIVE TEST WITH SYNCHRONOUS MOTOR: N/A

**14.1** Procedure to verify operation of Drive with synchronous motor in Synchronous Motor Control Mode.

		Description	Initial
		ronous motor to the Drive. Enter motor parameters and use default gains wing parameters:	
1.	(1060). This par	for Field no-load current as the No-load Current setting rameter should be calculated (in %) on the basis of the leld current and the maximum capability of the field excitor.	
	a)	Example: Drive with a synchronous motor that requires 24A of no-load field current and a field supply that is tuned so that 75A is the maximum output (at 20mA command input), then the No-Load Current Parameter should be set to: No-Load Current Setting = 100% * 24/75A = 32.0%	
2.	Enable Spinning	Load (2430)	
3.	Change the Drive	e control loop type (2050) to Synchronous Motor Control.	
4.	Use default cont changed as follo	rol loop gains except for the flux loop gains that should be ws:	
	a)	Flux reg prop gain (3110) 0.50	
	b)	Flux reg integral gain (3120) 0.50	
Ī	c)	Flux Filter Time Const (3130) 0.022 sec	
	d)	Saliency (1091) .02	
5.	field supply outpo Start command t	have been modified to include the logic for controlling the ut contactor. The contactor should be ON as soon as the o the Drive is given, and should be turned OFF en the Drive trips on a Fault or when the Drive goes to le stopping).	
En	ergize medium v	oltage Drive. Run the Drive with a speed demand of 10%.	
		art command is given, the field supply first starts by applying current and During this time, lds and lqs should be zero.	
		equal to the Flux Ramp Rate parameter (3160), the Drive starts by increasing ce to the Speed Demand.	
und	der steady-state	Motors, the Drive current is always in phase with the voltage, i.3e., $lds \approx 0$ conditions. At no-load, there is very little current supplied from the Drive (on current display, ITOT $\approx 0$ ).	
		0% speed. Verify that the no-load and full load (if possible) current with the Drive voltage waveforms, areas shown in Figure 14.1)	
wa Dri syr the	veforms, along we ve output current achronous motor distortion introd	20% speed. Verify that the no-load and full-load (if possible) current with the Drive voltage waveforms, are as shown in Figure 14.2. Note that the ats at 100% speeds are distorted. This is due to the shape of the poles in the r. At low speeds, the current regulator bandwidth is sufficient to correct for luced by the motor poles as shown in 14.2 b. However, at high speeds, the ains are insufficient to maintain sinusoidal output currents when the distortion is construction.	

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AC Motor Voltage and Motor Current at Test-points VMA and IMA at 10% speed with Synchronous Motor Control (a) Unloaded and (b) 75% torque operation.

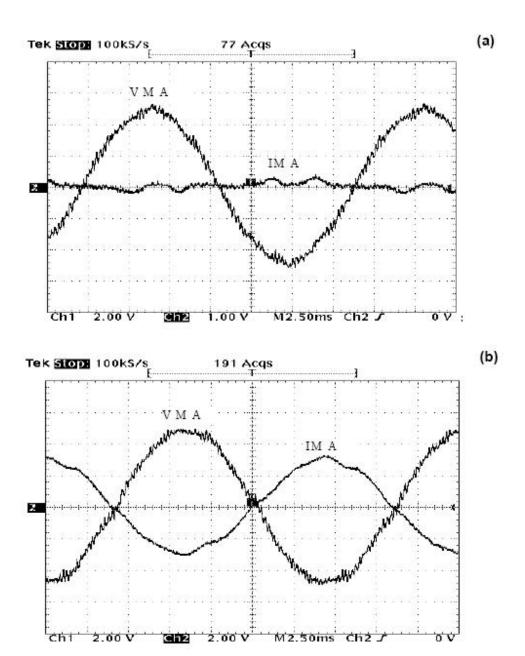


Figure 14.2

AC Motor and Motor Current at Test-point VMA and IMA at 100% speed with Synchronous Motor Control

(a) Unloaded and (b) 75% torque operation

# 15.0 ALARMS AND ADDRESSES See Param\_List attached

Description	Initial	
Verify the following parameters are set.		MA
Motor limits (1120) including phase imbalance limit (limit (1245)	1244) and ground fault	MA
Speed profile menu (4000)		MA
Bypass type menu (2590) and fast bypass menu (26	600)	MA
Critical frequency menu (2340)		MA
Drive protection menu (7)		MA
Display parameters menu (8000)		MA
The Drive is functional at this time.	MA	
Verify alarm indications per the site confirm the inpu working.	MA	
Depress local E-Stop	MA	
Measure contact status on TB2-1 & 2	MA	
Verify Fault contact on TB2-31 & 32 changes state	MA	
Verify Run contact on TB2-23 & 24 changes state	MA	
Remove Jumper on TB2-3 & 4	MA	

# The commissioning process is now complete.

The Customer's signature provides acceptance of the Siemens equipment listed on the site information page.

# 16.0 APPROVAL & ACCEPTANCE OF STARTUP & COMMISSIONING

#### 16.1 Documentation Provided

- 16.1.1 Configure keypad to display desired parameters.
- 16.1.2 Upload the parameter (configuration) file, SOP file, event log file.
- 16.1.3 Provide Customer with the following:
  - 16.1.3.1 Copy of parameter, SOP, event log file
  - 16.1.3.2 Copy of operating flash drive
  - 16.1.3.3 Copy of this checklist

I, the undersigned, validate that this system Commissioning has been completed as per this procedure. Any discrepancies have been noted alongside the appropriate steps in the document. Additionally, any outstanding items or recommendations have been listed.

SIEMENS FSR			
Print Name:	Mohamed Ayad	Ayad	Digitally signed by Ayad Mohamed DN: cn=Ayad Mohamed,
Signature:		Mohamed	o=Siemens.
Date:	Completion - 21 Februar	y 2014	
CUSTOMER RE	EPRESENTATIVE:		
Print Name:	JOHN CLA	7700	च्या हो अनुस्था के कार्य के महिल्ला के प्रशास के प्रशास के प्रशास कर है जिल्ला है जिल्ला है जो है जिल्ला है जी -
Signature:	I Clargh		
Date:	1 21/02/2	2014	
	/ /		
CUSTOMER RE	PRESENTATIVE		
Print Name:	Eore Gi	RANIC	
Signature:	A.		
Date:	17-3	2014	

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Description			ID	Lvi RH
Main - Sec. level: 7 Motor	Motor par	Motor frequency = 50.0 Hz Full load speed = 593 rpm Motor voltage = 6600 V Full load current = 217.0 A No load current = 34.0 % Motor kW Rating = 2000.0 kW Leakage inductance = 24.6 % Stator resistance = 0.83 % Inertia = 389.1 Kgm2 Current Profile  Motor current limit 1 = 100 % Speed at current limit 2 = 100 % Motor current limit 3 = 100 % Speed at current limit 3 = 100 % Motor current limit 4 = 100 % Speed at current limit 5 = 100 % Motor current limit 5 = 100 % Speed at current limit 5 = 100 % Motor current limit 6 = 100 % Speed at current limit 7 = 100 % Motor current limit 8 = 100 %	5 1 1000 *1020 *1030 *1040 *1050 *1060 *1070 *1080 *1090 1092 1193 1194 1195 1196 1197 1198 1202 1203 1204 1205 1206 1207 1208 1209 1301	DVI RH  0 00 0 00 0 00 5 10 5 10 5 10 5 10 5 00 5 0
	Limits	Speed at current lim 8 = 100 % Motor current limit 9 = 100 % Speed at current lim 9 = 100 %  Overload select = Inv Time w/ derate Overload Pending = 100.0 % Overload = 110.0 % Overload timeout = 5.0 sec Speed Derate Curve 0 Percent Break Point = 0.0 % 10 Percent Break Point = 31.6 % 17 Percent Break Point = 41.2 % 25 Percent Break Point = 50.0 % 50 Percent Break Point = 70.7 % 100 Percent Break Point = 100.0 %	1302 1303 1304 1120 1130 *1139 1140 1150 1151 1152 1153 1154 1155 1156 1157	7 00 7 00 7 00 5 00 5 00 5 00 5 00 5 00
		Motor trip volts = 8300 V Maximum Motor Inertia = 0.0 Kgm2 Overspeed = 120.0 % Underload enable = Disable I underload = 10.0 % Under load timeout = 10.0 sec Motor torque limit 1 = 100.0 % Regen torque limit 1 = -0.25 % Motor torque limit 2 = 100.0 % Regen torque limit 2 = -0.25 %	*1160 1159 1170 1180 1182 1186 1190 1200 1210 1220	5 00 5 10 5 00 5 00 5 00 5 00 5 00 7 00 7 00

Description	ID	Lvl RH
Motor torque limit 3 = 100.0 % Regen torque limit 3 = -0.25 % Phase Imbalance Limit = 40.0 % Ground Fault Limit = 5.0 % Ground Fault Time Const = 0.017 sec H/W Ground Fault Enable = Yes Peak Reduction Enable = VFD volt rating Loss of field level = 40.0 % Loss of field timeout = 10.0 sec	1230 1240 1244 1245 1246 1247 1248 1141 1142	7 00 7 00 5 00 5 00 5 00 7 10 7 00 7 00 7 00
Encoder  Encoder 1 PPR = 1024  Encoder filter gain = 0.7500  Encoder loss threshold = 5.0 %  Encoder loss response = stop (fault)  Low speed operation = Disable	1280 *1290 1300 1310 1320 1330	0 0 0 5 1 0 7 0 0 7 0 0 7 0 0 7 0 0
Drive  Drive parameters  Rated input voltage = 6600 V  Rated input current = 214.0 A  Rated output voltage = 6600 V  Rated output current = 260.0 A  Control loop type = OLVC  Parallel system = Disable	2 2000 *2010 *2020 *2030 *2040 2050 2051	0 0 0 0 0 0 7 1 0 7 1 0 7 1 0 7 1 0 7 1 0 0 0 0
Ratio control = 100.0 %  Speed fwd max limit 1 = 100.0 %  Speed fwd min limit 1 = 1.0 %  Speed fwd max limit 2 = 0.0 %  Speed fwd min limit 3 = 0.0 %  Speed fwd min limit 3 = 0.0 %  Speed fwd min limit 1 = 0.0 %  Speed rev max limit 1 = 0.0 %  Speed rev min limit 1 = 0.0 %  Speed rev max limit 2 = 0.0 %  Speed rev max limit 2 = 0.0 %  Speed rev min limit 3 = 0.0 %	2060 2070 2080 *2090 *2100 2110 *2120 2130 *2140 2150 *2160 2170 *2180 2190 2200	0 0 0 0 5 0 0 0 5 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 5 0 0 0 0 5 0
Torque reference  Sop / Menu control = Sop flag  Torque setpoint = 0.0 %  Holding torque = 0.0 %  Torque ramp increase = 1.00 sec  Torque ramp decrease = 1.00 sec  Torque command scalar = 1.00	2210 2211 2220 2230 2240 2250 2242	0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 5 0 0
Speed ramp setup  Accel time 1 = 45.0 sec  Decel time 1 = 45.0 sec  Accel time 2 = 5.0 sec  Decel time 2 = 5.0 sec	2260 *2270 *2280 2290 2300	0 0 0 5 0 0 5 0 0 7 0 0 7 0 0

Description	ID	Lvl RH
Accel time 3 = 5.0 sec Decel time 3 = 5.0 sec Jerk rate = 0.1	2310 2320 2330	7 0 0 7 0 0 7 1 0
Critical freq Skip center freq 1 = 15.0 Hz Skip center freq 2 = 30.0 Hz Skip center freq 3 = 45.0 Hz Skip bandwidth 1 = 0.0 Hz Skip bandwidth 2 = 0.0 Hz Skip bandwidth 3 = 0.0 Hz	2340 2350 2360 2370 2380 2390 2400	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Spinning load  Spinning load mode = Both Scan end threshold = 20.0 % Current Level SetPoint = 15.0 % Current ramp = 0.01 sec Max current = 50.0 % Frequency scan rate = 3.00 sec	2420 *2430 2440 2450 2460 2470 2480	0 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Cond time setup  Cond stop timer = 0.8 sec  Cond run timer = 0.8 sec	2490 2500 2510	0 0 0 5 0 0 5 0 0
Cells  Installed cells/phase = 6  Min cell count (n/3) = 6  Cell voltage = 630  Thermistor warn level = 20.0 %  Bypass type = None  Neutral connection = T1  Precharge Enable = Off	2520 *2530 *2540 2550 2560 *2590 *2630 2635	0 0 0 5 1 0 5 1 0 5 1 0 5 1 0 7 1 0 7 1 0 7 1 0
Sync transfer  Phase I gain = 2.0  Phase P gain = 4.0  Phase offset = 2.00 deg  Phase error threshold = 1.50 deg  Frequency offset = 0.5 %  Up transfer timeout = 0.0 sec  Down transfer timeout = 0.0 sec	2700 2710 2720 2730 2740 2750 2760 2770	7 0 0 7 0 0
External I/O  Analog inputs = 0  Analog outputs = 2  Digital inputs = 0  Digital outputs = 0  Wago timeout = 0.0 sec	2800 2810 *2820 2830 2840 *2850	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0
Internal I/O Int Analog In1 Hardware Span = 1.042	2805 2815 20 *2818	5 0 0 5 0 0 5 1 0
Int Analog In2 Type = 4 - 20ma	2825 2826	5 0 0 5 1 0

Description	ID	Lvl RH
Hardware Span = 1.0860	*2828	5 00
Int Analog In3 Type = 4 - 20ma Hardware Span = 1.0730	2835 2836 *2838	5 0 0 5 1 0 5 0 0
Int Analog Out1  Analog variable = Total Current Output Mode = 4-20 mA Output Min = 0.0 % Output Max = 100.0 % Hardware Span = 1.0000	2845 2846 2848 2841 2842 2844	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Int Analog Out2  Analog variable = Motor Speed  Output Mode = 4-20 mA  Output Min = 0.0 %  Output Max = 100.0 %  Hardware Span = 1.0253	2855 *2856 2858 2851 2852 *2854	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Int Test Point #28 Analog variable = None TP 28 Scaler = 0.00	2860 2861 2862	5 0 0 5 0 0 5 0 0
Int Test Point #29 Analog variable = None TP 29 Scaler = 0.00	2865 2866 2867	5 0 0 5 0 0 5 0 0
Int Test Point #31 Analog variable = None TP 31 Scaler = 0.00	2870 2871 2872	5 0 0 5 0 0 5 0 0
Int Test Point #24 Analog variable = None TP 24 Scaler = 0.00	2875 2876 2877	5 0 0 5 0 0 5 0 0
Int Test Point #25 Analog variable = None TP 25 Scaler = 0.00	2880 2881 2882	5 0 0 5 0 0 5 0 0
Int Test Point #26 Analog variable = None TP 26 Scaler = 0.00	2885 2886 2887	5 0 0 5 0 0 5 0 0
Output Connection  Filter CT sec turns = 0  Filter inductance = 0.0 %  Filter capacitance = 0.0 %  Cable resistance = 0.0 %  Cable inductance = 0.0 %  Filter damping gain = 0.50	2900 2910 2920 2930 2940 2941 2950	0 0 0 5 1 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
High starting Torque Enable high torque = Disable Torque current = 50.0 %	2960 2961 2962	7 0 0 7 1 0 5 0 0

Description		ID	Lvl RH
	Current ramp time = 0.5 sec PLL Acq time = 2.0 sec	2963 2964	5 0 0 5 0 0
	Watchdog Enable watchdog = Enable	2970 2971	7 0 0 7 0 0
Stability	Input processing PLL prop gain = 70.0 PLL integral gain = 3840.00 Input current scaler = 1.000000 CT secondary turns = 250 Input voltage scaler = 1.000000 PT secondary turns = 1 Input Attenuator Sum = 4800 kOhm	3 3000 3010 3020 3030 *3035 3040 3011 *3045	0 0 0 7 0 0 7 0 0 7 0 0 7 1 0 7 1 0 7 1 0 7 1 0
	Output processing  Low freq comp  Low Freq Wo = 12.566 Rad  Low freq com gain = 1.00  S/W compensator pole = 2.000	3050 3060 3070 3080 3090	7 0 0 7 0 0 7 1 0 7 0 0 7 0 0
	Flux control  Flux reg prop gain = 2.544  Flux reg integral gain = 3.271  Flux filter time const = 0.06461  Flux demand = 1.00  Flux ramp rate = 0.500 sec  Energy saver min flux = 100.0 %  Flux droop = 0.0 %	3100 *3110 *3120 *3130 3150 3160 3170 3195	7 00 7 00 7 00 7 00 7 00 7 00 7 00 7 00
	Speed loop Speed reg prop gain = 0.010 Speed reg integral gain = 0.020 Speed reg Kf gain = 0.600 Speed filter time const = 0.08038 Droop in % @ FL current = 0.0 %	3200 *3210 *3220 3230 *3240 3245	7 00 7 00 7 00 7 00 7 00 7 00
	Current loop Current reg prop gain = 0.745 Current reg integ gain = 19.356 Prop gain during brake = 0.149 Integ gain during brake = 3.871	3250 *3260 *3270 *3280 *3290	7 00 7 00 7 00 7 00 7 00
	Stator resis est Stator resistance est = Off Stator resis filter gain = 0.0 Stator resis integ gain = 0.00200	3300 3310 3320 3330	7 0 0 7 1 0 7 0 0 7 0 0
	Braking Enable braking = Off Pulsation frequency = 277.5 Hz Brake power loss = 0.3 % VD Loss Max = 0.250 Braking constant = 1.05	3350 3360 *3370 3390 3400 3410	7 00 7 00 7 00 7 00 7 00 7 00

Description		ID	Lvl RH
	Output current scaler = 1.000000 Output voltage scaler = 1.000000 Output Attenuator Sum = 4800 kOhm	3440 3450 *3455	7 0 0 7 0 0 7 1 0
(	Control loop test Test type = Speed Test positive = 30.0 % Test negative = -30.0 % Test time = 30.1 sec	3460 3470 3480 3490 3500	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
F	Dead time comp = 16.0000 usec Feed forward constant = 0.0000 Sampling Delay Comp = 0.0 % Carrier frequency = 601.3 Hz	3550 3560 3570 *3580	7 10 7 10 7 00 7 10
Auto	Entry point = 0.0 % Exit point = 100.0 % Entry speed = 48.0 % Exit speed = 98.3 % Auto off = 0.0 % Delay off = 0.5 sec Auto on = 0.0 % Delay on = 0.5 sec	4 4000 4010 *4020 *4030 *4040 4050 4060 4070 4080	5 0 0 5 0 0
F	Analog inputs  Analog input #1  Source = Int AI1  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4090 4100 *4105 4110 4120 4130 4140 4150 4160	5 0 0 5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
	Analog input #2  Source = Off Type = 4 - 20ma Min input = 0.0 % Max input = 100.0 % Loss point threshold = 15.0 % Loss of signal action = Preset Loss of signal setpoint = 20.0 %	4170 4175 4180 4190 4200 4210 4220 4230	5 0 0 5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
	Analog input #3  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4232 4233 4234 4235 4236 4237 4238 4239	5 00 5 10 5 10 5 10 5 10 5 10 5 10 5 00
	Analog input #4	4332	5 00

Description	ID	Lvl RH
Source = Off Type = 4 - 20ma Min input = 0.0 % Max input = 100.0 % Loss point threshold = 15.0 % Loss of signal action = Preset Loss of signal setpoint = 20.0 %	4333 4334 4335 4336 4337 4338 4339	5 10 5 10 5 10 5 10 5 10 5 10 5 00
Analog input #5  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4341 4342 4343 4344 4345 4346 4347 4348	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Auxillary input #1  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4500 4510 4520 4530 4540 4550 4560 4570	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Auxillary input #2  Source = Off Type = 4 - 20ma Min input = 0.0 % Max input = 100.0 % Loss point threshold = 15.0 % Loss of signal action = Preset Loss of signal setpoint = 20.0 %	4580 4590 4600 4610 4620 4630 4640 4650	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Analog outputs Analog output #1 Analog variable = Average Power Output module type = Unip Full range = 81.0 %	4660 4661 *4662 4663 *4664	5 00 5 00 5 00 5 00 5 00
Analog output #2 Analog variable = Motor Speed Output module type = Unip Full range = 100.0 %	4665 *4666 4667 *4668	5 0 0 5 0 0 5 0 0 5 0 0
Speed setpoints  Speed setpoint 1 = 0 rpm  Speed setpoint 2 = 0 rpm  Speed setpoint 3 = 0 rpm  Speed setpoint 4 = 0 rpm  Speed setpoint 5 = 0 rpm  Speed setpoint 6 = 0 rpm  Speed setpoint 7 = 0 rpm  Speed setpoint 8 = 0 rpm	4240 4250 4260 4270 4280 4290 4300 4310 4320	5 00 5 00 5 00 5 00 5 00 5 00 5 00 5 00

Description	ID	Lvl RH
Jog speed = 0 rpm Safety setpoint = 0 rpm	4330 4340	5 0 0 5 0 0
Incremental speed setup  Speed increment 1 = 1.00 %  Speed decrement 1 = 1.00 %  Speed increment 2 = 5.00 %  Speed decrement 2 = 5.00 %  Speed increment 3 = 10.00 %  Speed decrement 3 = 10.00 %	4970 4971 4972 4973 4974 4975 4976	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
Prop gain = 0.390 Integral gain = 0.390 Diff gain = 0.000 Min clamp = 0.0 % Max clamp = 100.0 % Setpoint = 0.0 %	4350 4360 4370 4380 4390 4400 4410	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Comparator setup Comparator 1 setup Comp 1 A in variable = Mtr Spd Comp 1 B in variable = Manual value Comp 1 manual value = 2.500 % Compare 1 type = Mag	4800 4810 *4811 4812 *4813 *4815	5 0 0 5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 2 setup  Comp 2 A in variable = Manual value  Comp 2 B in variable = Manual value  Comp 2 manual value = 0.000 %  Compare 2 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 3 setup  Comp 3 A in variable = Manual value  Comp 3 B in variable = Manual value  Comp 3 manual value = 0.000 %  Compare 3 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 4 setup  Comp 4 A in variable = Manual value  Comp 4 B in variable = Manual value  Comp 4 manual value = 0.000 %  Compare 4 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 5 setup  Comp 5 A in variable = Manual value  Comp 5 B in variable = Manual value  Comp 5 manual value = 0.000 %  Compare 5 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 6 setup  Comp 6 A in variable = Manual value  Comp 6 B in variable = Manual value  Comp 6 manual value = 0.000 %  Compare 6 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0

Description		ID	Lvl RH
	Comparator 7 setup Comp 7 A in variab Comp 7 B in variab Comp 7 manual va Compare 7 type = 0	le = Manual value 4872 lue = 0.000 % 4873	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 8 setup Comp 8 A in variab Comp 8 B in variab Comp 8 manual va Compare 8 type = 0	lue = 0.000 % 4883	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 9 setup Comp 9 A in variab Comp 9 B in variab Comp 9 manual va Compare 9 type = 0	le = Manual value 4892 lue = 0.000 % 4893	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	•		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	•		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	•		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
			5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
			5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
			5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 16 setup	4960	5 00

Description			ID	Lvl	RH
	Comp Comp	o 16 A in variable = Manual value o 16 B in variable = Manual value o 16 manual value = 0.000 % oare 16 type = Off		5 5	1 0 1 0 0 0 1 0
	Comp Comp	setup o 17 A in variable = Manual value o 17 B in variable = Manual value o 17 manual value = 0.000 % oare 17 type = Off		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp Comp	setup o 18 A in variable = Manual value o 18 B in variable = Manual value o 18 manual value = 0.000 % oare 18 type = Off		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp Comp	setup o 19 A in variable = Manual value o 19 B in variable = Manual value o 19 manual value = 0.000 % oare 19 type = Off		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp Comp	setup o 20 A in variable = Manual value o 20 B in variable = Manual value o 20 manual value = 0.000 % oare 20 type = Off		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp Comp	setup o 21 A in variable = Manual value o 21 B in variable = Manual value o 21 manual value = 0.000 % oare 21 type = Off		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp Comp	setup o 22 A in variable = Manual value o 22 B in variable = Manual value o 22 manual value = 0.000 % oare 22 type = Off		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp Comp	setup o 23 A in variable = Manual value o 23 B in variable = Manual value o 23 manual value = 0.000 % oare 23 type = Off		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp Comp	setup o 24 A in variable = Manual value o 24 B in variable = Manual value o 24 manual value = 0.000 % oare 24 type = Off		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comparator 25 s Comp	setup o 25 A in variable = Manual value	4459 e4460		0 0 1 0

Description	ID	Lvl	RH
· ·	4461 4462 4464	5	1 0 0 0 1 0
Comp 26 A in variable = Manual value4 Comp 26 B in variable = Manual value4 Comp 26 manual value = 0.000 %		5 5 5 5	0 0 1 0 1 0 0 0 1 0
Comp 27 A in variable = Manual value4 Comp 27 B in variable = Manual value4 Comp 27 manual value = 0.000 %		5 5	0 0 1 0 1 0 0 0 1 0
Comp 28 A in variable = Manual value Comp 28 B in variable = Manual value Comp 28 manual value = 0.000 %		5 5 5 5	0 0 1 0 1 0 0 0 1 0
Comp 29 A in variable = Manual value4 Comp 29 B in variable = Manual value4 Comp 29 manual value = 0.000 %		5	0 0 1 0 1 0 0 0 1 0
Comp 30 A in variable = Manual value4 Comp 30 B in variable = Manual value4 Comp 30 manual value = 0.000 %			0 0 1 0 1 0 0 0 1 0
Comp 31 A in variable = Manual value 4 Comp 31 B in variable = Manual value 4 Comp 31 manual value = 0.000 %		5 5	0 0 1 0 1 0 0 0 1 0
Comp 32 A in variable = Manual value <sup>4</sup> Comp 32 B in variable = Manual value <sup>4</sup> Comp 32 manual value = 0.000 %		5 5 5 5	0 0 1 0 1 0 0 0 1 0
Store in Event Log = On Historic log variable 1 = Mtr Speed Historic log variable 2 = Spd Dmd Historic log variable 3 = Trq I Cmd Historic log variable 4 = Trq I Fdbk Historic log variable 5 = I Total Out	6 6250 6255 6260 6270 6280 6290 6300 6310	0 7 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Description		ID	Lvl RH
	Historic log variable 7 = V Avail RMS	*6320	5 00
Drive protect I	ot	7	0 0 0
	nput protection	7000	0 0 0
	Single phasing	7010	0 0 0
	SPD prop gain = 0.0	7020	7 0 0
	SPD integral gain = 0.0010	7030	7 0 0
	SPD threshold = 50.0 %	7040	7 0 0
	Undervoltage prop gain = 0.0 Undervoltage integ gain = 0.001 1 Cyc Protect integ gain = 0.0025 1 Cycle Protect Limit = 50.0 % Excess Loss Idle = 5.0 % Excess Loss Running = 7.0 % Xformer tap setting = +5 % Xformer thermal gain = 0.0133 Xformer protection const = 0.500 Phase Imbalance Limit = 40.0 % Ground Fault Limit = 40.0 % Ground Fault Time Const = 0.200 sec	7060 7070 7080 7081 7084 7086 *7050 7090 7100 7105 7106 7107	7 00 7 00 7 00 7 00 7 00 7 00 7 10 7 00 7 0
( } } }	Orive IOC setpoint = 150.0 % Cell Overload Level = 100.0 % Auto reset enable = No Auto reset time = 1 sec Auto reset attempts = 4 Auto reset memory time = 10 sec	7110 7112 7120 7130 7140 7150	7 00 7 00 7 00 5 00 5 00 5 00
Meter [	Display params Status variable 1 = DEMD Status variable 2 = RPM Status variable 3 = ITOT Status variable 4 = KWO Status variable 5 = VAVI Status variable 6 = VLTS Status variable 7 = IMRF	8 8000 8001 8002 *8003 *8004 *8005 *8006 8007	0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 0
I	nput harmonics	8140	0 00
	Selection for HA = IA	8150	0 00
	Harmonics order = 1.0	8160	0 00
	Harmonics integral gain = 0.001	8170	0 00
	Customer order = 2133943	*8101	0 0 0
	Customer drive = 1	8110	0 0 0
Communica	ations	9	0 00
	Serial port setup	9010	0 00
	Serial port use = Local	9020	5 10
	Flow Control = Xon/Xoff	9030	5 10
	Baud rate = 9600	9040	5 10
١	Network Control	9943	7 0 0
	Net Control Type = Sop	9944	7 1 0

Description		ID	Lvl RH
	Start Stop Control = Maintained	9945	7 10
	Network 1 Configure Network 1 Type = None	9900 9901	7 0 0 7 1 0
	Network 2 Configure Network 2 Type = None	9914 9915	7 0 0 7 0 0
	SOP & serial functions  Menu based Timer setup  MenuTimer1 = 30.0 sec  MenuTimer2 = 0.0 sec  MenuTimer3 = 0.0 sec  MenuTimer4 = 10.0 sec  MenuTimer5 = 0.0 sec  MenuTimer6 = 0.0 sec  MenuTimer7 = 0.0 sec  MenuTimer8 = 0.0 sec  MenuTimer9 = 0.0 sec  MenuTimer10 = 0.0 sec  MenuTimer11 = 0.0 sec  MenuTimer12 = 0.0 sec  MenuTimer12 = 0.0 sec  MenuTimer13 = 0.0 sec  MenuTimer14 = 0.0 sec  MenuTimer15 = 0.0 sec  MenuTimer15 = 0.0 sec  MenuTimer16 = 0.0 sec	9110 9111 *9112 9113 9114 *9115 9116 9117 9118 9119 9121 9122 9123 9124 9125 9126 9127 9128	0 0 0 0 7 0 0 0 0 7 0 0 0 0 7 0 0 0 0 7 0
	Select system program = 2168985F.HEX Multiple config files = OFF	*9146 9185	7 10 5 10
	TCP/IP server name = 172.17.20.16	*9000	0 0 0
Graphing	Time scale = 10.00 sec Variable 1 Graph variable = Spd ref Offset = 0.00 Scale factor = 1.20	10 10000 10010 10020 10030 10040	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	Variable 2 Graph variable = Mtr speed Offset = 0.00 Scale factor = 1.20	10050 10060 10070 10080	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 3 Graph variable = Flux ref Offset = 0.00 Scale factor = 1.25	10090 10100 10110 10120	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 4  Graph variable = Flux DS  Offset = 0.00  Scale factor = 1.25	10130 10140 10150 10160	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 5	10170	0 0 0

Description	ID	Lvl RH
Graph variable = Ids ref Offset = 0.00 Scale factor = 1.00	10180 10190 10200	0 0 0 0 0 0 0 0 0
Variable 6 Graph variable = Ids Offset = 0.00 Scale factor = 1.00	10210 10220 10230 10240	0 0 0 0 0 0 0 0 0 0 0 0
Variable 7 Graph variable = Iqs ref Offset = 0.00 Scale factor = 1.00	10250 10260 10270 10280	0 0 0 0 0 0 0 0 0 0 0 0
Variable 8  Graph variable = Iqs  Offset = 0.00  Scale factor = 1.00	10290 10300 10310 10320	0 0 0 0 0 0 0 0 0 0 0 0
Variable 9 Graph variable = Drv State Offset = 0.00 Scale factor = 1.00	10330 10340 10350 10360	0 0 0 0 0 0 0 0 0 0 0 0
Variable 10 Graph variable = PreChrg St Offset = 0.00 Scale factor = 1.00	10370 10380 10390 10400	0 0 0 0 0 0 0 0 0 0 0 0
Select language = English	5081	0 0 0

### 1) 0110-SR11 Variable Speed Drive System

E. Ventilation System Data



Represented by: Air Design Pty. Ltd. A.B.N. 77 512 727 190 45 Nestor Drive Meadowbrook QLD 4131 Telephone: +61 (07) 3299 9888 Facsimile: +61 (07) 3299 9800 E-mail: sales@airdesign.com.au

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### FAN DATA FOR MODEL AP0804GP6/20

Fan Code: AP0804GP6/20

Requirements

6300 L/s

Static Pressure:

200 Pa

Selection Pressure: Installation Category: 200 Pa at std conditions

Temperature:

TYPE D 20 deg C

Altitude:

Volume:

0 m

Fan Data (at STP)

Type:

Hub:

In-line direct drive axial

fan

Diameter:

800 255 mm

Impeller Blades:

Pitch:

20 degrees **GRP** 

Blade Material: Speed:

24 revs/sec

Absorbed Power:

2.34 kW

Peak Power:

2.59 kW 79 %

Total Efficiency:

Fan Weight:

84.3 kg.

Motor Data (at STP)

Motor Type:

Standard

**Electrical Supply:** 

415V/3ph/50Hz D100L / 3.00 kW

Motor Frame/Power: Current FLC/Start:

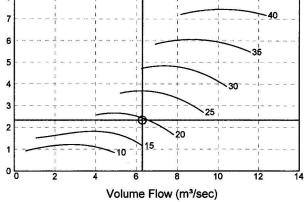
6.2A / 37.2

Motor Speed:

Single Speed (4 Pole)

Energy Efficiency, BCA Volume 1 2008, Table J5.2 compliant selection

600 sys 500 400 PdF Static Pressure 300 (Pa) 200 100 Volume Flow (m³/sec)



Density: 1.2 kg/m³

### Inlet PWL

Spectrum (Hz)	63	125	250	500	1K	2K	4K	8K	dBW	dBA @ 3m
Outlet PWL (dB)	92	86	86	84	85	81	77	73	95	68
Inlet PWL (dB)	90	86	87	85	85	81	78	73	94	69

Power (kW)

Note: Levels are quoted as in-duct values.

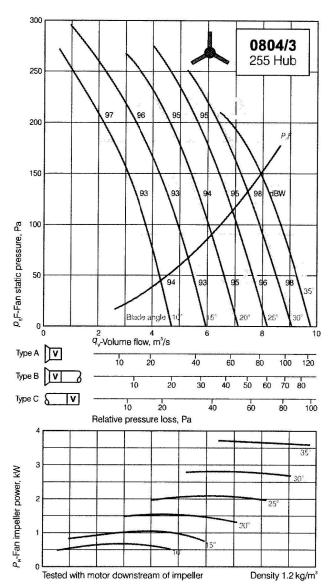
Version 4.20: On-going product improvements may result in fan data changes without notice.

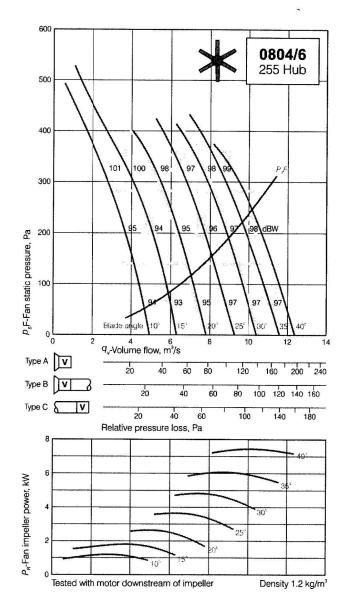
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### **AXIAL FLOW FANS PERFORMANCE DATA**









### **SOUND DATA**

	In-Duct		In-Duct Spectrum Corrections, dB								
Zone	dB	Total	63	125	250	500	1k	2k	4k	8k	dB(A)
	Inlet	1	6	10	8	6	8	13	18	24	4
	Outlet	0	4	11	10	7	10	15	19	24	6
5.	Inlet	+1	2	9	12	11	12	16	19	22	8
18	Outlet	0	2	8	10	12	12	16	18	20	8
	Inlet		***************************************			Not D	o autir		***************************************	·····	-
	Outlet					Not R	equin	eu			
-31	Inlet	1	3	10	11	10	11	13	16	22	6
72.7	Outlet	0	1	10	13	12	13	15	18	22	8
	Inlet	0	2	9	11	9	10	15	18	23	6
	Outlet	0	3	9	10	10	12	15	18	21	7
	Inlet	+1	3	9	12	10	12	16	19	22	7
	Outlet	0	3	9	11	10	11	15	17	19	7
	Inlet	1	2	10	11	10	10	13	15	21	6
	Outlet	0	2	11	12	12	12	14	17	22	7
	Inlet	0	2	9	11	10	12	15	19	24	7
5.	Outlet	0	3	9	11	11	12	16	19	23	8
×.	Inlet	+2	2	9	13	11	12	17	20	23	8
	Outlet	0	2	8	11	10	11	15	18	19	7
											-

For Free Field conditions apply the following corrections to the In-Duct figures. All figures are negative unless otherwise stated.

In/Out O/A 7 3 1 0 0 0 0 O/A

### **SOUND DATA**

Zone	In-Duct dB	Total	In-E	uct S <sub> </sub>	pectru 250	ım Co 500	rrect	ions, 2k	dB 4k	8k	dB(A)
	Inlet	1									_
			9	9	6	4	8	14	20	26	3
	Outlet	0	6	9	7	7	10	16	21	27	6
	Inlet	0	4	9	8	9	10	13	17	22	6
181	Outlet	0	4	8	8	10	10	14	16	21	6
4	Inlet	0	4	9	9	8	10	13	17	21	5
74	Outlet	0	3	9	9	9	10	13	16	19	5
191	Inlet	0	6	11	8	9	8	11	14	20	4
	Outlet	0	4	10	8	9	9	12	15	20	5
	Inlet	1	4	8	7	9	9	13	16	21	5
	Outlet	0	3	9	9	11	10	14	18	22	6
	Inlet	+1	3	9	9	10	11	15	18	22	7
	Outlet	0	3	8	8	9	11	14	17	19	6
	Inlet	+1	5	9	7	8	8	11	13	20	4
	Outlet	0	5	9	7	8	8	11	13	19	4
	Inlet	1	4	8	8	9	9	13	16	21	5
	Outlet	0	4	9	8	11	11	14	18	22	7
	Inlet	0	9	7	9	6	8	12	16	20	4
	Outlet	0	8	6	9	8	9	12	15	18	4

For Free Field conditions apply the following corrections to the In-Duct figures. All figures are negative unless otherwise stated.

In/Out O/A 7 3 1 0 0 0 0 O/A



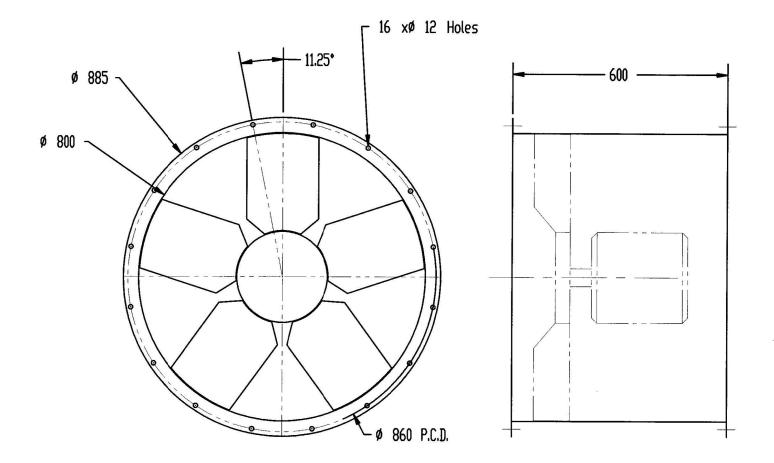
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Air Design Pty. Ltd.
A.B.N. 77 512 727 190
45 Nestor Drive
Meadowbrook QLD 4131
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Facsimile: +61 (07) 3299 9800

E-mail: sales@airdesign.com.au

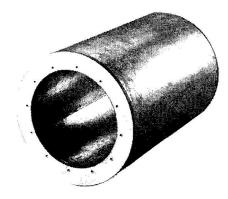
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### DRAWING FOR MODEL AP0804GP6/20

Version 4.20: On-going product improvements may result in dimensional changes without notice.



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### **FEATURES**

These notes apply to both the open and pod type attenuators.

### Construction

The units are rigidly constructed and consist of an outer cylindrical galvanised steel casing, lined internally with nonhygroscopic and incombustible soundabsorbent material. This material is retained by an inner perforated metal cylinder.

When a pod is fitted it is of perforated metal, retaining an infill of acoustic material.

An impervious lining of the acoustic infill can be provided to prevent the ingress of moisture or grease. There is a small performance penalty in high frequencies when an impervious lining is fitted. Refer to our Sales Engineers if more information is required.

Also available is the Q-Seal range which offers impervious lining with features to optimise acoustic performance.

The ends of the attenuators are drilled and tapped to match the Fantech 'AP' series of axial flow fans.

Non-standard flange drillings or sizes can be supplied to the customer's specifications.

### **Insertion Loss**

The values quoted in the table represent the difference between the sound power level (Lw) of a fan and attenuator combination and that of the fan alone.

(continued next page)

### PERFORMANCE DATA - OPEN TYPE

Matching Fan Dia.	Length		ic Insert			onov /l	U-\		
cm	mm	63	125	250	500	1k	2k	4k	8k
C1-Dia.	1 Dia	mete	r Long	ı (non	n.)				
-031	300	1	3	5	9	13	10	8	7
-035	300	2	3	5	9	13	10	8	7
-040	600	2	3	5	9	13	10	8	7
-045	600	2	3	5	10	13	10	8	7
-050	600	2	3	6	10	14	10	8	7
-056	600	2	4	6	10	14	10	8	7
-063	600	3	4	7	13	14	9	8	6
-071	900	3	4	8	14	14	9	7	6
-080	900	3	4	8	14	13	9	7	6
-090	1150	3	4	9	14	13	8	7	6
-100	1150	3	4	9	14	12	8	7	6
-125	1150	3	4	10	14	12	8	6	6
-140	1150	3	5	10	13	11	8	5	5
-160	1800	4	6	11	13	10	7	5	5
-180	1800	4	6	11	13	10	6	5	5
-200	1800	4	6	11	13	9	6	5	5
C2-Dia.	2 Diar	neter	s Lon	g (noi	m.)		***************************************	***************************************	***************************************
-031	600	3	6	9	15	21	17	14	13
-035	600	4	6	10	15	21	17	14	13
-040	900	4	6	10	16	21	18	15	13
-045	900	4	7	10	17	21	18	15	13
-050	1150	4	7	10	18	21	17	15	12
-056	1150	5	7	11	18	21	17	15	12
-063	1150	5	8	11	21	23	17	15	10
-071	1500	5	8	12	22	23	16	15	10
-080	1500	5	8	12	22	23	16	15	10
-090	1800	5	8	13	22	19	13	12	10
-100	1800	6	8	13	22	19	13	12	10
-125	2400	6	8	13	21	18	13	12	11

### **HOW TO ORDER - OPEN TYPE**

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	<u>с</u> —
C - circular	
1 - 1D long nominal 2 - 2D long nominal	
Diameter in cm	
Variations to standard  QS - Q-Seal Impervious lining (refer page H-4/5) A - aluminium construction S - stanious steel construction F - epoxy coating	

-140

-160

-180

-200

2400

3600

3600

3600

(Default is standard construction)



Represented by:
Air Design Pty. Ltd.
A.B.N. 77 512 727 190
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Telephone: +61 (07) 3299 9888
Facsimile: +61 (07) 3299 9800
F-mail: sales@airdesign.com.au

E-mail: sales@airdesign.com.au Copyright © 2010-12 Elta Group

### **Technical Data for Silencer Model C1-080**

Location:

ATT-2

Designation:

Performance - Required

**Actual** 

Air Flow:

6.30 m<sup>3</sup>/s

Velocity:

12.5 m/s

Dia.

Pressure Drop:

60 Pa

Pressure Drop: 2 Pa

Silencer Data

Catalogue Code:

Description:

C1-080 Circular 1D Open

800 mm

Diameter: Ext. Diameter:

977mm

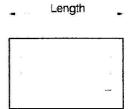
Length:

900 mm 55.0 kg

Weight:

**Sound Data** 

Spectrum (Hz)	:	63	125	250	500	1K	2K	4K	8K	
Incortion Loss (d)	D) .	2	1	ρ	1/	13	a	7	6	



Ext.

Dia.

### 1) 0110-SR11 Variable Speed Drive System

F. Ventilation System Airflow and Sound Levels report

### david@airequip.com.au

ABN 67 650 093 954

2 / 36 Randall Street Slacks Creek 4127 PO Box 542 Springwood Qld 4127 Phone: (07) 3209 4201 Facsimile: (07) 3209 4204

Friday, 28 February 2014

J. & P. Richardson Industries Pty Ltd 114 Campbell Street Wacol QLD

Attention: Chris Anderson

Reference: Urban Utilities Eagle Farm Pump Station-VSD Drive Cabinet 0110-SR11

**Verification of Airflow and Sound level Measurements** 

Required Airflow: Transformer Cabinet: 3000l/s

Cell Cabinet: 3200l/s Total: 6200l/s

**Equipment Used:** 

NATA Certified Vane Anemometer – Certificate No: WT109572

NATA Certified Lutron Sound Level Meter – Certificate No: SLM 39486

Magnehelic Gauge- Fitted to duct work

Airflow readings were taken at the filtered intake grilles on the transformer and cell cabinets with the booster fan VSD set 1180rpm as follows

Transformer Cabinet Intakes: No 1: 575l/s No 2: 485l/s No 3: 485l/s

No 4: 555l/s No 5: 395l/s No 6: 420l/s

Total: 2915l/s

Cell Cabinet Intakes: No 1: 730l/s No 2: 675l/s No 3: 715l/s

No 4: 715l/s No 5: 605l/s No 6: 725l/s

Total: 4165l/s

### With the booster fan in the off position the following airflow readings were taken using the cabinet fans only

Transformer Cabinet Intakes: No 1: 490l/s No 2: 420l/s No 3: 450l/s

No 4: 445l/s No 5: 360l/s No 6: 375l/s

Total: 2540l/s

Cell Cabinet Intakes: No 1: 675l/s No 2: 655l/s No 3: 600l/s

No 4: 560l/s No 5: 465l/s No 6: 625l/s

Total: 3580l/s

The magnehelic gauge was fitted to the duct prior to the booster fan. The gauge is to indicate the correct airflow only and at the required airflow reading the gauge was marked at 100Pa

### **Sound Level Measurements:**

Outdoor readings were taken at the boundary directly down for the fan outlet and 1 meter from the outlet face.

The background noise level was 70-75dBA due to the high traffic movement on the main road. A reading of 68.8 dBA 1 meter from the face was registered

Indoor readings were taken with the other two drive units turned off but with the pit pumping motors running. Background noise levels around the pit barrier cage were between 73-75dBA

Readings one meter out from the cabinet were between 70-71dBA but this was mainly from background noise

A reading from the side of the cabinet below the booster fan was 70.8dBA

Hoping the above report is satisfactory and if you have any queries on the information above please do not hesitate to call

Yours faithfully, Air Equipment (Sales) Pty Ltd.

David Meredith.

### 1) 0110-SR11 Variable Speed Drive System

G. Spare Part List

### **SIEMENS**

### **Perfect Harmony VSD Recommended Spare Parts List**

<b>VFD SO</b> : 3002133943	VED CNI-	Z831501002460
----------------------------	----------	---------------

Location	Part Description	Part Number	Installed	Recommended
	CPU Board	A1A10000623.00M	1	1
	I/O board	A1A10000423.00M	1	1
	Modulator Board	A1A10000350.00M	1	1
	Fiber Optic Hub Board	A1A461D85.00M	1	1
Control	Backplane	A1A098194	1	1
cabinet	Communication Board	A5E03407403	1	1
	CPS Power	A1A0100275	1	1
	Signal Conditioninig Board	A5E01708486	1	1
	Keypad	A5E02363383	1	1
	I/O breakout	A5E01649374	1	1
Blower	Cabinet Blower	LDZ10501601	4	1
Deers	Filter on Transformer Cabinet	LDZ10501351	9	9
Doors	Filter on Cell Cabinet	LDZ10501353	9	9
	Power cell	LDZ14501002.260	15	1
Cell cabinet	CCB Fuse	A1A10000432.30M	15	2
	Power Cell Input Fuse	LDZ10501435	45	3

### 1) 0110-SR11 Variable Speed Drive System

H. Drawing List



### Perfect Harmony VSD - 0110-SR11

### **Drawing Register**

Drawing Number	Description
	VSD
486/5/7-0368-001	General Arrangement 1
486/5/7-0368-002	General Arrangement 2
486/5/7-0368-003	General Arrangement 3
486/5/7-0368-004	Control and Power Overview
486/5/7-0368-005	Termination
486/5/7-0368-007	Schematic 1
486/5/7-0368-008	Schematic 2
486/5/7-0368-009	Schematic 3
486/5/7-0368-010	Schematic 4
486/5/7-0368-011	Schematic 5
486/5/7-0368-012	Schematic 6
486/5/7-0368-013	Schematic 7
	Field Control and Interface
486/5/7-0368-120	Schematic 1
486/5/7-0368-121	Schematic 2
486/5/7-0368-122	Schematic 3
486/5/7-0368-123	Schematic 4
486/5/7-0368-124	Schematic 5
	Isolator and Earthswitch Cabinet
486/5/7-0368-100	General Arrangement and Schematic
486/5/7-0368-101	Fortress Interlocking System
486/5/7-0368-102	Legend
	Ventilation
486/5/7-0368-112	General Arrangement

### 1) 0110-SR11 Variable Speed Drive System

I. Factory Acceptance Test (FAT)



### GEN III

### Factory Acceptance Test Medium Voltage Air Cooled

SO - 3002133943 Queensland urban utilities - eagle farm

FAT- A5E32168984 A

REV- AA

P/N- M6SR3

S/N- Z831501002460

MLFB- 6SR3502-6HF42-7BH0-Z

V12+Y06+K69+G22+G28+K73+M42+M38+ M12+M35+L55+L03+K50+T76+D15+D02+D 76+P31

Revision History							
Revision Level	Details	Date					
AA	Original	5/15/2013					
		0222-0224-0224-0224-024-024-024-024-024-					
MINISTER AND THE PARTY OF THE P							
Tested By	大初的19 多	70B.6.5					
Approved By	Thou Liao Jei	74/3-6-5					
	an sana an	and the second s					

### SIEMENS

Customer Name	e Queensland ur	SO 3002133943					
P/N M6SR3			S/N <u>Z83</u>	1501002460	SOP M6SR3 C		
Agency Listing			JL DCE	<b>U</b> Other	☑ No Listing		
Agency Testing Required			/ES	ØNO			
Input Voltage:	6600	V	Out	put Voltage:	660	0 V	
Input Current: 214 A		Cell	Cell Size:		260 A		
XFMR KVA: 2750 KVA		KVA	A Total # of Cell:		18		_
				25.00			

### **Table of Contents**

- I. Test Plan Contains the actual test plan with reference to associated test procedures and forms for data collection.
  - 1.1 Visual Inspection
  - 1.2 Insulation Test/Hipot
  - 1.3 Initial Power-Up
  - 1.4 System Test Without Motor
  - 1.5 System Test With Motor (Unloaded)
  - 1.6 System Load Test
  - 1.7 Final Inspection
  - 1.8 Equipment
- II. Completed Forms Contains the forms used to collect associated test data using the procedures.
- III. Analysis/Plots Data If applicable, this section contains any analysis or additional test data supplied with buy out items or data specific to a customer order and not specifically required by the FAT.

	<u>Definitions</u>								
R	Routine Test	Test to which each individual device is subjected during or after manufacturer to ascertain whether it complies with certain criteria.							
A	Acceptance Test	Contractual test to prove to the customer that the device meets certain conditions of its specification.							
0	Option Test	Test additional to type and routine test, determined to be any device or logic added to the drive that is not a pre-engineered option.							
W	Witness Test	Any of the above tests performed in the presence of the customer, the user or his representative (Reference STSI-055)							

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AND DESCRIPTION OF THE PARTY OF	Inspection			STSI-061G:4.3		
Test Type	Test Hem	Test Procedure	Test Criteria (Eng)	Signature/Value		
R		Hardware Check		Emp# 347		
	Metering	Pt. To Pt. Wire Check		Emp# <u>347</u>		
		Fiber Optics		Emp# 347		
		Ground Wires		Emp# 347		
	Measuring	Burden Resistor Value ( hall effect)	34.00 Ω,2W, .1%	34.2/34.2 Ω		
	Measuring	Input attenuator resistor value	4.8 ΜΩ	4.77/4.76/4.78 MΩ		
	Measuring	Output attenuator resistor value	4.8 ΜΩ	4.78/4.78/4.77 MΩ		
		Set Dip Switch (FR)	Pos. 2 only is "On", all			
			others "Off"	Emp# 347		
		Set Dip Switch (P)	Pos. 4 & 5 only are "On",			
			all others "Off"	Emp# 347		
		Set Address 1X	J X=1	Emp# 347		
		Set Address 10X	1()X=()	Emp# 347		
		Set Communication Board (JP1 to JP10)	JP1 & JP2 set to 2,3	Emp# 347		
			JP3,JP4&JP5 set to1,2	Emp# 347		
			JP6 set to 2,3	Emp# 347		
			JP7,JP8,JP9&JP10			
			set to 1,2	Emp# <u>347</u>		
0	Interlocks	Record all Interlock model #'s and keycode #'s for the	K2 – VFD11 - K2	Emp# 347		
		Verify correct operation of Interlocks	K3 – VFD11 - K2	Emp# 347		
		Ensure hardware and adapter plates are supplied	K3 – VIDII - K3	Emp# 347		

Test Ty	pe Test Item	Test Procedure	Test Procedure			Signature/Value	
R	MV		Applied Volt.	Pass/Fail(<0.5mA	)		
		Power circuit to GND				Emp#_	214
		L1,L2,L3 to GND	28300	25	uA	-	
		L1 with L2, L3 to GND	28300	15	_uA		
		L2 with L1, L3 to GND	28300	7	uΑ		
		L3 with L1, L2 to GND	28300	11	uA		
		T1,T2,T3 to GND	28850	104	uA		
		T1 with T2, T3 to GND	18500	16	uA		
		T2 with T1, T3 to GND	18500	19	uА		
		T3 with T1, T2 to GND	18500	27	пA		
	LV	Control Power to GND	2500VOM	2000	MΩ	Emp#	347
	Control	120Vac to GND	1000VOM	684	МΩ	Emp#	347
		24Vdc to GND	500VOM	∞		Emp#	347

Control Power   Control Power Supply   CPS,+5VDC(Slot 6 I/O Board Plug P6 Pin 1 to 4)   (5.10 to 5.15Vdc)   CPS,+5VDC(Slot 6 I/O Board Plug P6 Pin 2 to 4)   (+11.64 to +12.36Vdc)   12.   (CPS,+12VDC(Slot 6 I/O Board Plug P6 Pin 3 to 4)   (+11.64 to +12.36Vdc)   -12.   (CPS,+15 VDC (SCB Pin 2 to 6)   (+14.55 to +15.45)   15.   (CPS,-15 VDC (SCB Pin 4 to 6)   (-14.55 to +15.45)   -15.   (-15.45)   (-14.55 to +15.45)   (-15.45)   (-14.55 to +15.45)   (-15.45)   (-15.45)   (-15.45)   (-15.45)   (-14.55 to +15.45)   (-15.45)	tial Power-Up		STSI-061G:4.5	
CPS,+5VDC(Slot 6 I/O Board Plug P6 Pin 1 to 4)	ype Test Item	Item Test Procedure Te	est Criteria (Eng)	Signature/Value
CPS,+12VDC(Slot 6 I/O Board Plug P6 Pin 2 to 4)	Control Power	rol Power Control Power Supply		
CPS,-12VDC(Slot 6 I/O Board Plug P6 Pin 3 to 4)		CPS,+5VDC(Slot 6 I/O Board Plug P6 Pin 1 to 4) (5.	5.10 to 5.15Vdc)	5.13 Vde
CPS, + 15 VDC (SCB Pin 2 to 6 )		CPS,+12VDC(Slot 6 I/O Board Plug P6 Pin 2 to 4) (+	-11.64 to +12.36Vdc)	12.02 Vdc
CPS, - 15 VDC (SCB Pin 4 to 6)		CPS,-12VDC(Slot 6 I/O Board Plug P6 Pin 3 to 4) (-1	11.64 to -12.36Vdc)	-12.06 Vdc
CPS,+24VDC(I/O Board J11-11 to J11-9)		CPS, + 15 VDC (SCB Pin 2 to 6 ) (+	-14.55 to +15.45)	15.01 Vdc
CPS,Power Supply Fault   Encoder Power Supply, +15 VDC (IOB board J7-5 to J7-   (+14.25 to +15.75)   Emp#   21		CPS, - 15 VDC (SCB Pin 4 to 6) (-1	14,55 to -15,45)	-15.01 Vdc
Encoder Power Supply, +15 VDC (IOB board J7-5 to J7-   (+14.25 to +15.75)   T5 (secondary:X1-X4)   (114 to 126Vac)   Latest Version   Vers.:   5.2		CPS,+24VDC(I/O Board J11-11 to J11-9) (+:	+21.6 to+26.4Vdc)	24.04 Vdc
T5 (secondary:X1-X4)		CPS, Power Supply Fault	,	Emp# 214
Software Version #   Latest Version   Vers.: 5.2		Encoder Power Supply, +15 VDC (IOB board J7-5 to J7- (+	-14.25 to +15.75)	Emp# 15.11 Vdc
Establish Wago Communications   Set correct # of   Analog Outputs   ID 2820   2     Set correct Drive Parameters   Input Voltage   ID 2010   6600 V   Input Current   ID 2020   214 A   Output Voltage   ID 2030   6600 V   Output Current (equal to 'Cell Rating')   ID 2040   260 A   Control Loop Type   ID 2050   OLTM   Spinning Load Mode   ID 2430   Off   Installed Cells/ Phase   ID 2530   6   Cell Voltage   ID 2550   630 V   Bypass Type   ID 2590   None   Neutral Connection   ID 2630   T1		T5 (secondary:X1-X4) (1	14 to 126Vac)	114Vac
Parameters   Set correct # of   Analog Outputs   ID 2820   2     Emp# 21		Software Version # La	atest Version	Vers.; 5.2.2
Configuration		<u> </u>		Emp#214
Set correct Drive Parameters				
Input Voltage	Configuration		2	
Input Current				Emp# 214
Output Voltage		1 '		
Output Current (equal to 'Cell Rating')   ID 2040   260 A		1 .		
Control Loop Type		1 1		
Spinning Load Mode   ID 2430   Off     Installed Cells/ Phase   ID 2530   6     Cell Voltage   ID 2550   630 V     Bypass Type   ID 2590   None     Neutral Connection   ID 2630   T1				
Installed Cells/ Phase				
Cell Voltage		1 ' ~		
Bypass Type ID 2590 None Neutral Connection ID 2630 T1				
Neutral Connection ID 2630 T1				
		-26		
I Input CT Ratio ID 3035   250 - 5				
		Input CT Ratio ID 3035	250 :5	
Tap Setting (+5% typical) ID 7050 +5%		Tap Setting (+5% typical) ID 7050	+5%	

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50		99	1711 14100413		
1.3 Initial	Power-Up[continu	ued]			STSI-061G:4.5
	Test Item	Test Procedure		Test Criteria (Eng)	Signature/Value
R	Parameters	Set correct Drive Parameters (con't)		, 3,	
	Configuration	MenuTimer1	ID 9112	30 S	214
		MenuTimer4	ID 9115	10 S	214
		Program Clock	ID 8080	10 3	Emp# 214
		_		2122042	(OLYMPIA STANDON CONTRACTOR OF THE STANDON C
		Program SO	ID 8101	2133943	Emp# 214
		Program Drive Number	ID 8110	1,460,20	Emp# 214
		Download SOP		M6SR3C	Emp# 214
		Ethernet Connection Verified			Emp# 214
R	MODBUS	Connect computer to MODBUS port			
	WODBCS	Open MODBUS program and verify co	mmunication	Descipion deta Como	Emp# 214
		Open MODBOS program and verify co	mmunication	Receiving data from	Emp# 214
				Drive	
Ö	Space Heater	1. Verify VFD space heater relay CR4 e	energized 60s after		
	Control	control voltage is swtiched on.		Verify Functionality	Emp# 214
		2. Adjust thermostat(TST1) setting to n	nore than ambient	Verify I directionality	Emps 211
		temperature and verify HTR1are heater			
		less than ambient temperature and verif	-		
		liess than amorem temperature and verif	y IIIICI alo oli.		
		3. Adjust thermostat(TST2) setting to r	more than ambient		
		temperature and verify HTR2 & HTR3			
		Reset TST2 to less than ambient temper	-		
		HTR2 & HTR3 are off.	•		Emp# 214
		4. Verify VFD space heater relay CR4 r	released after		Lmpπ 214
		medium voltage is energized.	cicascu alici		
		inlediditi voltage is energized.			Emp# 214
		5. Verify Motor Heater Relay BM5 ener	rgize 60s after		(Filtrack Conference and a suppression of the suppr
		drive is not running.			Emp# 214
?		Check Blower Rotation		Verify Rotation	Emp# 347
	DI1 O	C ( OD ) A 1 OFTEN WILL (		1.66 A	T
	Blower 1 Op. XFMR Cab.	Set CB1 equal to 1.2*TBLW1 motor na	imepiate	Ia= 1.55 A	Emp# 347
	ATIVIK Cab.	current.		Ib= 1.55 A	
		Measure 3 phase line currents and verif	y actual current is	Ic= 1.56 A	
		not exceeding TOL setting.			
	Blower 2 Op.	Set CB2 equal to 1.2*TBLW2 motor na	ımeplate	Ia= 1.53 A	Emp# 347
	XFMR Cab.	current.		Ib= 1.54 A	FILL-OLD-OLD-OLD-OLD-OLD-OLD-OLD-OLD-OLD-O
		Measure 3 phase line currents and verif	y actual current is	Ic= 1.53 A	
		not exceeding TOL setting.		Control of the contro	
	Blower 1 Op.	Set CB3 equal to 1.2*CBLW1 motor na	amenlate	Ia= 1.49 A	Emp# 347
	CELL Cab.	current.	шеріас	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	LIIIPT 3"/
	CDDD Cao.		Synatual auront :-	*TOTAL CONTROL	
		Measure 3 phase line currents and veriful not exceeding TOL setting.	y actual current is	Ic= 1.48 A	
	Blower 2 Op.		umanlata	In- 150 A	Emp# 247
	CELL Cab.	Set CB4 equal to 1.2*CBLW2 motor na	шеріас	la= 1.59 A	Emp# <u>347</u>
	CELL Cau.	current.		Ib= 1.60 A	
		IN 4 2 1 1 1	L	1 (1 4	
		Measure 3 phase line currents and verifinot exceeding TOL setting.	y actual current is	Ic= <u>1.61</u> A	

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1.4 Syster	n Test Without Mo	ofor		STSI-061G:4.6
Test Typi	Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
O	Electrical Door Interlocks	Open a door to cause DIS1 open and verify that Drive trip message "TRIP - MV DOOR OPENED" displayed and check "INPUT MV BREAKER ENABLE" contact on TB2 43 & 44, 45 & 46 change state.  Repeat the test for remaining of electrical door interlock	TB2-43 & 44 Closed and TB2-45 & 46 Open when a door open	Emp# <u>347</u>
		switched DIS2~ DIS5.	:	Emp# 347
R	Backfeed Modulation & Clipping	Power Supply & Hall Effect Pwr Supply Fault Output Transorbs Note: Remove Series Link & Backfeed Cell B1 Disconnect plug P1 from SCB board	Approx. 56Vp-p	Emp# 347 Emp# 347
		Input Transorbs Verify all Cells Primary Voltage Modulation of Cells	Approx. 56Vp-p 100Vac±10% for all (0 to 100% demand)	Emp# 347 Emp# 347 Emp# 347
R	Medium Voltage Testing	With Cell Series Links Reconnected Set Motor Voltage = Drive Rating VMA, VMB, VMC   ID 2050 - OLTM 25Hz VMA, VMB, VMC   ID 2050 - OLTM 50Hz	3.0V-peak +/- 0.3V 6.0V-peak +/- 0.3V	Emp# 347 Emp# 347

1.5 System Test With Motor (Unloaded) STSI-061G:						
Test Type Test Item		Test Procedure	Test Criteria (Eng)	Signature/Value		
R	Check E-stop Logic		Open for E-stop Closed for Fault	Emp# 347 Emp# 347 Emp# 347 Emp# 347		
			Closed for Run	Emp# 347 Emp# 347 Emp# 347		

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SO	3002133943	. 1710	MOSKS	5/N <u>Z831301002460</u>
1.5 System	n Test With Motor	(Unloaded)		STSI-061G:4.7
Test Type	Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
R	Transformer	Remove alarm wire from IOB DI-3C,	Verify alarm message	Emp# 347
	Thermal Switches	1).Verify fault light blinks and keypad displays alarm		
		message.		
		2). Verify the "Drive Alarm" outputs on TB2-31&32		
		change state.	Closed for Alarm	Emp# 347
		Remove trip wire from IOB DI-0D,		
		1). Verify fault light blinks and keypad displays alarm		
		message.	Verify alarm message	Emp# 347
		2). Verify the "Drive Alarm" outputs on TB2-31&32		
		change state.	Closed for Alarm	Emp# <u>347</u>
		Remove trip both wires from IOB DI-3C & DI-0D		
		and wait for 30 seconds;		
		1). Verify Drive fault, Drive coasts to a stop and	***************************************	
		keypad displays trip message	Verify Drive Fault	Emp# 347
ľ		2). Verify the "Drive Tripped" output on TB2-33&34.	Closed for Fault	Emp# 347
R	Remote Start/Stop	Momentarily close contact between TB2-5 & 6 and		
		verify Drive starts running.		
			Drive is running	Emp# <u>347</u>
		   Momentarily close contacts between TB2-5 & 6.	Drive ramps to stop	Emp# 347
		Momentarity close contacts between 1B2-3 & 6.	Drive ramps to stop	15111p# 347
R	Remote Fault	Cause system fault and check Drive Ready contact		
	Reset	TB2-27 & 28 (changes state)	Open for Fault	Emp# 347
		Momentarily close Remote Fault Reset contact on TB2	1 -	ACTIC CONTROL
		7 & 8.	Drive should reset	Emp# 347
		Verify the "Drive Ready to Run" output on TB2-27 &	Closed for Ready to Run	
		28 changes state.		Emp#347
				F // 247
		Verify Keypad reset is functioning.		Emp# <u>347</u>
		Verify the "Fault Reset"button on the touch panel is functioning.		Emp#347
		Tunctioning.		Inpr 347
R	Local Start/Stop	Place Drive in the Local mode by pressing	Drive is running	
[	эт э	"AUTOMATIC" on keypad and depress "MANUAL		
		START" on keypad. Verify Drive is running.		Emp# 347
		Depress "MANUAL STOP" on keypad	Drive ramps to stop	Emp# 347
		Depress MANOAL STOP on Reypad	Dire ramps to stob	Lπp# 347
R	4 to 20mA	Place Drive in the Remote mode by pressing	Verify system Freq	
	Remote Freq	"AUTOMATIC" again on keypad and connect 4-	change	
	Command	20mA signal to TB2ELV-7 & 8.		
			4mA=0%Freq	
		Scale 4-20 mA signal to be proportional to 0-100% Freq.	12mA=50% Freq	
		11104.	20mA=100% Freq	Emp# 347
			Zoma 100/01/164	111PT J + /
R	4 to 20mA Spare	Program Spare Input as Remote Signal command via	4mA=0% spare	
	Input	Keypad menu and connect 4-20mA signal to TB2ELV-	12mA=50% spare	
		10 & 11. Scale 4-20 mA signal to be proportional to 0-	20mA=100% spare	
		100% output.		Emp# 347
		·		Diff Dal
		RE-PROGRAM REMOTE SIGNAL INPUT TO		
		ANALOG 1!		Emp# 347

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1.5 Syster	n Test With Motor	(Unloaded)		STSI-061G:4.7
Test Type	Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
R	4 to 20mA Motor KW Output	Monitor KW output on TB2ELV-18 & 19 and verify output	4mA=0% KW 20mA=100% KW	Emp# <u>347</u>
	AMPS Output	Monitor AMPS output on TB2ELV-1 & 2and verify output	4mA=0% Amps 20mA=100% Amps	Emp# <u>347</u>
	4 to 20mA Motor FREQ Output	Monitor FREQ output on TB2ELV-4 & 5 and verify output	4mA=0% Freq 20mA=100% Freq	Emp# 347
	4 to 20mA Spare Output	Monitor SPARE output on TB2ELV-21 & 22 and verify output	tt 4mA=0% Spare 20mA=100% Spare	Emp# <u>347</u>
D	Intervent On	With Transformer Cabinet blower TBLW1 running, trip blower		
R	Blower 1 Op. XFMR Cab.	CB and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp#347
	Blower 2 Op. XFMR Cab.	With Transformer Cabinet blower TBLW2 running, trip blower CB and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp# <u>347</u>
	Blower I Op. CELL Cab.	With Cell Cabinet blower CBLW1 running, trip blower CB and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp#347
	Blower 2 Op. CELL Cab.	With Cell Cabinet blower CBLW2 running, trip blower CB and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp# 347
R	Medium Voltage	Set Control Loop Type	OLVC	-
	Testing	With Motor Connected to the Drive Output	IMA Leads VMA by 90°	Emp# 347
			IMB Leads VMB by 90°	Emp# <u>347</u>
R	Spinning Load	<ol> <li>Enable spinning load feature (Set Spinning Load Mode true via keypad</li> <li>Run Drive at 100% speed</li> <li>Trip Drive by pressing E-Stop</li> <li>Pull out E-Stop</li> <li>Push Fault Reset</li> <li>Restart Drive</li> </ol>		
		7. Verify Drive goes back to full speed	Motor returns to full speed	Emp# <u>214</u>
R	Motor Overload Protection	Adjust motor parameters[Menu 1000]and overload settings[Menu 1120]to verify overload operates after 60s.		Emp#214
R	Non-latching Run request with No Medium Voltage Input	I.Remove Medium Voltage Power     2.Reboot NXG Control     3.Clear/Reset all fault on drive     4.Monitor SOP Runrequest flag via debugger     5.Verify that SOP Runrequest flag remains     false when all start inputs are set		Emp# <u>214</u>
R	Input Protection	Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR	Closed for fault Fault reset	Emp# 214 Emp# 214
O	Closed Loop Vector Control Testing	Set Control Loop Type ID 2050 Set Encoder 1 PPR ID 1290 Set Encoder loss response ID 1320 With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal	1024	Emp# 214 Emp# 214

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SO	3002133943	P/\*	S/N Z831501002460	
1.6 Syste	em Load Test:			STSI-061G:4.8
Test Typ	e Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
R	System Load Test	Run Load Test using Dyno Load Run at input current (full load input current)	214 Amps, 4 hrs	Emp# 214
A	Efficiency Testing	Run Drive at following speed points: 100% Speed 100% Load 100% Speed 50% Load	Record actual 96.58 % 97.21 %	TSF-056 TSF-056
A	Power Factor Testing	Run Drive at following speed points: 100% Speed 100% Load	0.95PF	TSF-006
A	Harmonic Testing	Run Drive at 100% speed and 100% load Record actual THD for Voltage & Current (Background Distortion must be THDv <2.0%)	< THD 3 %Voltage < THD 5 %Current	Emp# 153 Emp# 153
1.7 Final	Inspection			STSI-061G:4.9
	e Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
R	File Save	Save Files under the Project Files Folder SOP, HEX, Event Log, Fault Log, Parameter and Configure Files	Parameter upload (Level 7)	Emp#153
R	Flash Card	All Test versions of SOP & HEX files have been removed from Flash No Wago SOP & HEX is on Flash Final SOP is on Flash and correct Hex file is selected		Emp# 153 Emp# 153 Emp# 153
R	Disconnect Test Wires	Remove all input and output power and control wiring.		Emp#153
R	Torque Mark Check	Check that all proper torque marks exist.		Emp#153

Check that all existing torque marks are properly marked

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P/N M6SR3 SO 3002133943 S/N Z831501002460 1.8 Equipment STSI-061G:4.1 Record Hipoter Used Model Manufacturer SEDS CTN Cal. Due DH60/5 AS110720001 Lanpotronics 2013-7-19 Record Voltmeter Used Model Manufacturer SEDS CTN Cal. Due 175 **FLUKE** AS050526001 2014-05-21 789 FLUKE AS080131001 2015-03-19 / 1 / Oscilloscope Manufacturer SEDS CTN Model Cal. Due DPO3034 TEK AS090831001 2013-09-04 Clamp on C.T./Clamp-On Model Manufacturer SEDS CTN Cal. Due 2013-09-02 LH41 AMPROBE AS100826001 Humidity 65%

### 2) 0110-SR12 Variable Speed Drive System

A. MV Cable Test Sheets



### J & P RICHARDSON INDUSTRIES PTY. LTD

114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

### **HV CABLE TEST SHEET**

Project:	SIEM	ANS						Job No:	C64800	
Date of Te	est:	24/10/2013								
Cable Circuit: From: 0110-SR12 INPUT TERMINALS To: HV SW/ROOM SR12 FEEDER PANEL A24										
Type:	Type: SINGLE CORE XLPE 6.6 kV AL- 150 sq mm									
Reason for	r Test:	NEW DRIVE	E INSTALL	ATION (	Cable Tem	perature:	НОТ			
		hms (is Loop					Phasing:			
Measured				r						
Туре:			Leads:			ohms				
			,	oop			_	AS IT WAS		
Circuit		A-B	ļ	B-C	<del>                                     </del>	C-A		ASII WAS		
	Total	Net	Total	Net	Total	Net				
							$\dashv$			
Insulation	Resistance	in Megohm	s				Volts	1 Min	2 Min	
						A-Earth	5000	200,000	200,000	
Meas	ured with N	o: MOO14	8			B-Earth	5000	35,000	35,000	
	<b></b>	TITLO DE	DOX I			C-Earth	5000	14,000	14,000	
	Тур	e: KYORI	ISU			A-B	5000	200,000	200,000	
						B-C	5000	35,000	35,000	
High Volt	aga Tast Sh	eet N/A		1 Stort: 1 I	Finish Io	C - A	5000 rents in mA	14,000	14,000	
	age Test Sh Connections		Time	1 Start, 1 1	Negative		Tents in in A	Positive		
	+	Earth	Mins	kV	1 Start	1 Finish	n kV	1 Start	1 Finish	
ABC		Lartii	112110	K V		1 1 111131	I KV	1 Start	1 1 1111311	
A	В	С								
В	C	A							-	
C	A	В							2	
Weather C	onditions:	FINE		l I		Amb. Te	mp. °C:		_	
Result of T	Test: PAS	SS				Label At	tached at:			
Comment	s:									
Earth cont	inuity from 1	panel 0110-S	R12 to HV	SW/ROOM	1 SR 12 FE	EEDER PA	NEL A24=	0.01Ω		
	, , , , , , , , , , , ,								_	
						- <del></del>				
							-			
Testing Officer:	S.CUNNIN	IGHAM	Da	te: 24/10/	13 Engin	neer quired:		Date:	T - T	



### J & P RICHARDSON INDUSTRIES PTY. LTD

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### **HV CABLE TEST SHEET**

Project:	SIEMA	NS						Job No:	C64800	
Date of Test	: 24	1/010/2013								
Cable Circu	iit:	From:	0110-SR12 O	UTPUT TER	RMINALS	To:	0110-1 ISOL	ATOR/EARTH	ING PANEL	
Type: Si	INGLE COI	RE XLPE			6.6	kV	CU	J-150 sq m	m	
Reason for	Test: N	EW DRIV	E INSTALL	ATION	Cable Tem	perature:	COLI	)		
Loop Resist	ance in Oh	ms (is Loo	p Resistance	e Applicabl	le?) N/A	Yes/No	Phasing:			
Measured wi	ith No:									
Type:	1		Leads:			ohms	_			
Circuit		<i>D</i>		oop 3-C		C-A	_	ABC		
Circuit	Total	Net	Total	Net Net	Total	Net	_	RWB		
	Total	1401	Total	1401	Total	1400				
		<u> </u>								
			į.							
			41							
						ļ.,				
Insulation F	Resistance i	n Megohm	ıs				Volts	1 Min	2 Min	
3.6		1,1001	10			A-Earth	5000	100,000	100,000	
Measur	ed with No:	MOO14	18			B-Earth	5000	100,000	100,000	
	Trmo	KYORI	C-Earth A - B	5000	100,000	100,000				
	1 ype:	KTORI	150			B-C	5000	100,000	100,000	
						C-A	5000	100,000	100,000	
High Voltag	e Test She	et N/A		1 Start: 1	Finish – Le			100,000	100,000	
	nnections	1,771	1 Start; 1 Finish – Leakage Currents Time Negative					Positive		
-	+	Earth	Mins	kV	1 Start	1 Finish	kV	1 Start	1 Finish	
ABC		Ho si in								
Α	В	С								
В	С	A								
С	A	В								
Weather Cor		FINE				Amb. Te				
Result of Te	st: PASS	<u> </u>				Label At	tached at:			
Comments:										
									·	
									<del>-</del>	
									<del></del>	
						<del>-</del>			-	
Testing Officer:	S.CUNNINC	HAM	Da	te: 24/10	/13 Engi	neer quired:		Date:	1 1	



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### **HV CABLE TEST SHEET**

Project:	SIEMA	NS						Job No:	C64800
Date of Te	est: 24	1/10/2013							
Cable Circ	cuit:	From: S	R12 MOT	OR		To:	0110-1 ISOL	ATOR/EARTHI	NG PANEL
Type:	SINGLE CO	RE XLPE			6.6	kV	AI	150 sq m	m
Reason for	r Test: NI	EW DRIVE	INSTALL	ATION (	Cable Tem	perature:	НОТ	<del></del>	
Loop Resi	stance in Ohi	ms (is Loop	Resistance				Phasing:		
Measured v				**	,				
Type:		I	Leads:			ohms			
G! !.				oop		~ .	4	AS IT WAS	
Circuit		A-B	-	B-C		C-A	4	ASII WAS	
	Total	Net	Total	Net	Total	Net	-		
							-		·
						-	1		
					,1				
Insulation	Resistance in	n Megohms	<u> </u>				Volts	1 Min 1000	2 Min
A-Earth 5000									1000
Measured with No: MOO148 B-Earth 5000							1000	1000	
C-Earth 5000							1000	1000	
Type: KYORITSU A-B 5000							1000	1000	
B-C 5000								1000	1000
WY' 1 X7 14	70 4 61	et N/A		1.04 4.11		C-A	5000	1000	1000
High Volta	1 Start; 1 I			rents in mA	Dogitivo				
Connections Time - + Earth Mins				kV	1 Start	Negative  1 Start 1 Finish kV		Positive 1 Start 1 Finish	
ABC		Earui	1411113	K V	1 Start	1 PHHSI	I KV	1 Statt	1 1 1111511
A	В	С							
В	C	A							
C	A	В		-					-
Weather C		FINE				Amb. Te	mp. °C:		
Result of T						<del></del>	tached at:		
Comments	s:		•						
·Cables co	nnected to mo	tor termina	ls when tes	ting conduc	ted			<del> </del>	
:Earth cont	inuity from P	anei 0110-8	SK12 TO P	anel 0110-1	$=0.05\Omega$				
									<u>-</u>
	<del>.</del>								
						•			
Testing Officer:	S.CUNNING	HAM	Da	te: 24/10/	13 Engi	neer quired:		Date:	1 1

### 2) 0110-SR12 Variable Speed Drive System

B. LV cable Test Sheets

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# POWER CABLE INSPECTION AND TEST SHEET

CABLE No.						SIZE	ō	_О mm²
FROM	ESSENT	ESSENTIAL SERVI	8/s san	No 1 4ct	\frac{1}{V}	TYPE	AC PUC XLPEIPVG	XLPE/PVC
TO	O	0110- SKI	, 7			LENGTH	,	HOM
CORE No.			INSULATION			FAULT	FAULT LOOP	EARTH
	TO EARTH	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	a
RED	29 DMD	N/A Mn	285 MA	20 Mp	200 Mp	а	AMPS	
WHITE	290Mp	200 Min	N/A MΩ	200 Ma	OM COS	σ	AMPS	-
BLUE	200 Ma	200 Ma	200 MO	N/A Mn	200 Ma	α	AMPS	- ;
NEUTRAL		200MD	200 Ma	OM COSS	ଧ/A MΩ	O A/N	N/A AMPS	
			Verifi	Verification				
Lugs/Pin Ends		Glands	Heat (	Heat Shrink	Shro	Shrouds	Cable	Cable lable
Start End Finish End	End Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
NA V	>	>	>	>	Ą.N	>		
	CHEWATTO							
PRINI NAME	しんない。	1						
SIGNATURE	limite	i						
DATE 34	[ [0 , 13							

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## POWER CABLE INSPECTION AND TEST SHEET

CABLE No.		P23	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			SIZE	2.5	mm²
FROM		-0110	SRIO	20te	W	TYPE	PLANC	PLAJCXLPEIPVC
TO		Pump mo	MOTOR NEATER	TEAL		LENGTH	2 /	
CORE No.			INSULATION			FAULT	FAULT LOOP	EARTH CONTINUITY
	TO EARTH	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	а
RED	MD MD	N/A MD	QM	aM	M	а	AMPS	
WHITE	ì	-	N/A MD	αM	Mn —	а	AMPS	(
BLUE	ωMΩ	ΩM —	Mn	M/A MD	Mn	а	AMPS	;
NEUTRAL	١	MD	- MΩ	OW —	N/A Mo	α <b>A/N</b>	N/A AMPS	
			Verifi	Verification				
Lugs/Pin Ends		Glands	Heat S	Heat Shrink	Shro	Shrouds	Cable	Cable lable
Start End Finish End	1 End Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
4× >	y +	せる	<i>/</i>	4 N	\$ N	Ç, V	-S	せっ
PRINT NAME SIGNATURE	S. GRAFTO	, i	*	HEATING	6 ELEMENT	<u> -</u>		

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## POWER CABLE INSPECTION AND TEST SHEET

ON         LENGTH         4Om           CONTINUITY         FAULT LOOP         4Om           CONTINUITY         CONTINUITY         CONTINUITY           CONTINUITY         CONTINUITY         CONTINUITY           CONTINUITY         CONTINUITY         CONTINUITY           CACO MG         D         AMPS           CONTINUITY         D         AMPS           CACO MG         D         AMPS           CONTINUITY         D         AMPS           CALT LOOP         CONTINUITY         CONTINUITY           CACO MG         D         AMPS           CACO MG         CACO MG         CACO MG           CACO MG <th>BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  MO ZGO MO D AMPS  MO MO MO NIA AMPS  ON AM</th> <th>DELUE TO NEUTRAL IMPEDANCE PSC CONTINU  OBLUE TO NEUTRAL IMPEDANCE PSC CONTINU  ON A NIA MD AMPS OLI CONTINU  ON A Start End Finish End Finish End CONTINU  ON A START /th>	BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  MO ZGO MO D AMPS  MO MO MO NIA AMPS  ON AM	DELUE TO NEUTRAL IMPEDANCE PSC CONTINU  OBLUE TO NEUTRAL IMPEDANCE PSC CONTINU  ON A NIA MD AMPS OLI CONTINU  ON A Start End Finish End Finish End CONTINU  ON A START
TO BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  TO BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  N/A M\O COND AMPS  N/A M\O N/A AMPS  Sation  Finish End Start End Finish End Finish End  N/A N/A N/A N/A AMPS  Cable lable  Finish End Finish End Finish End  N/A N/A N/A N/A Finish End  Start End Finish End  N/A N/A N/A Finish End  Finish End  Start End  N/A N/A N/A Finish End  Finish End  Start End  N/A N/A N/A Finish End  Finish End  Finish End  Start End  Finish End  Finish End  Start End  N/A N/A N/A N/A N/A Finish End  Finish End  Start End  Start End  Finish End  Start End  Finish End  Start End  Start End  Start End  Start End  Start End  Start End  Finish End  Start End  S	TO BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  TO BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  N/A M\(\triangle M\(\triangle \text{M\(\triangle \triangle \text{M\(\triangle \triangle \text{M\(\triangle \text{M\(\triangle \triangle \text{M\(\triangle \text{M\(\triangle \text{M\(\triangle \text{M\(\triangle \text{M\(\triangle \text{M\(\triangle \text{M\(\triangle \text{M\(\triangle \triangle \triangle \text{M\(\triangle \triangle \text{M\(\triangle \triangle \triangle \text{M\(\triangle \triangle \triangle \text{M\(\triangle \triangle \t	TO BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  TO BLUE TO NEUTRAL IMPEDANCE PSC CONTINU  MA MA AMPS AMPS O.1  NIA MA NIA MA NIA AMPS  Cable lable Finish End Start End Finish End Start End  V TORQUE SETTINGS  8mm Batt 228 Nm  12mm Batt 34 Nm
TO BLUE TO NEUTRAL IMPEDANCE PSC PSC AMPS AMPS AMPS AMPS AMPS AMPS AMPS AMPS	TO BLUE TO NEUTRAL IMPEDANCE PSC  NIA MO ZEC MO D AMPS  NIA MO TO MO NIA MO NIA AMPS  Tication  Thishend Startend Finisherd Finisher  TORROUS SETTIALSS  TO BLUE PSC  A AMPS  A AMPS  O AMPS	TO NEUTRAL IMPEDANCE PSC  TO NEUTRAL IMPEDANCE PSC  TO AMPS  TO AM
10 2 MΩ Ω AMPS 10 MΩ MΩ AMPS 10 MA MΩ N/A Ω N/A AMPS 11 Start End Finish End AMPS 12 AMPS 14 AMPS 15 AMPS 16 AMPS 17 AMPS 18 AMPS 18 AMPS 19 AMPS 10	10	10 260 MD D AMPS 10 MD MD D AMPS 10 MA MD N/A AMPS 10 N/A AMPS 11 Start End 12 Start End 13 Start End 14 Start End 15 Start End 16 Start End 17 NA 18 Start End 18 Start End 19 Start End 28 NM 19
10 — MΩ Ω AMPS 10 — MΩ Ω AMPS 110 N/A MΩ Ω AMPS 110 N/A MΩ Ω AMPS 110 AMPS	N/A   MD	The May and AMPS  The May N/A AMPS  The May N/A AMPS  The May AMPS  The May AMPS  The
10 MA MO N/A AMPS 10 N/A MO N/A AMPS 11 Shrouds 12 Start End Finish End Start End 13 AAA AMPS 14 AMPS 15 AMPS 16 AMPS 17 AMPS 18 AMPS 18 AMPS 19 AMPS 10 AMPS 11 AMPS	The NIA Ma NIA AMPS  If Cation  At Shrink  Finish End  Finish End  AAA  AMPS	Shrouds Start End AAA  Start End AAA  Start End AAA  AAA  Start End AAA  AAA  AAA  AAA  AAA  AAA  AAA  A
Shrouds Cable la	Tication  At Shrink  Finish End  Finish End  AAA  N/A  N/A  N/A  N/A  N/A  N/A  N/	Shrouds Start End Start End AAA NAA NAA NAA NAA Start End AAA NAA AAA AAA AAA AAA AAA AAA AAA AA
Shrouds Cable la	Shrouds Cable la	Shrouds Cable la Start End Finish End Start End  NA NA  ORQUE SETTINGS  ROTS 28NM  M BOTS 28NM  M BOTS 34NM
Shrouds Cable la	Shrouds Cable la Start End Finish End Start End AA NA VA NA VA TORQUE SETTINGS	Shrouds Cable la  Start End Finish End Start End  VA NA NA  TORQUE SETTINGS  TORQUE SETINGS  TORQUE SETTINGS  TORQUE SETINGS  TORQUE SETTINGS  TORQUE SETINGS  TORQUE SETI
Start End Finish End Start End	Finish End Start End Finish End Start End	Finish End Start End Finish End Start End   VA NA  NA  TORQUE SETTINGS  8 mm Borts 28 Nm  12 mm Borts 34 Nm.
	1	Smm Bouts 12mm Bouts 12mm Bouts
		8mm BOLTS 10mm BOLTS 12mm BOLTS
		Bott

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### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.	PP12-7J					SIZE			1.5mm²	
FR	MC	PUMP ENCODER				TYPE				GPR WDSC	
T	0		Pump	ENCO	DER					NA.	
CORE	No.	WIRE NUMB		UMBER FROM TERI			MINAL TO T		TO TE	RMINAL	
		·		Correct			Corr	ect	<b>♦</b>	Correct	
1	WHITE	PPI	2+157	1	3	30	V		NA		
1	BLACK		2-COM	<b>/</b>	3	3 /	V				
2	WHITE	PPI	2-B/	<b>✓</b>		28	~	/			
2	BLACK	PPI	2-B	<b>/</b>	4	29	٧				
3	WHITE	PPI	2-A1	<b>√</b>	Ź	26	\ \	/			
3	BLACK	PPI	2-A	<b>/</b>	2	27		/			
4	WHITE	^	11	<b>/</b>		2	~				
4	BLACK		VA	/		32		7			
5	WHITE	^	/A	1		32.		/			
5	BLACK		IA.	/	-	32	1				
6	WHITE		JA			2	./				
6	BLACK		VA	<b>/</b>	3	32	/				
7	WHITE										
7	BLACK										
8	WHITE										
8	BLACK										
9	WHITE										
9	BLACK										
10	WHITE										
10	BLACK										
11	WHITE										
11	BLACK										
12	WHITE										
12	BLACK										
				Verifi	cation						
Pin	ends	Gla	nds	Heat	Shrink		hro	uds	Cab	le Label	
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start E	nd	Finish End	Start En	d Finish End	
/	NA	<b>√</b>	NA	<b>V</b>	NA	N	A	NA	V	NA	

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### **CONTROL CABLE INSPECTION & TEST SHEET**

CABL	E No.		C317	2_			SIZE		1.5mm²	
FRO	MC		0110	SRR			TYPE		10 CTE	
T	0	H	1 Switc	uroom.	3362		LENGTH		NA.	
CORE	No.	WIF	RE NUMBI	ER	FROM	TERMINATB6	MINAL T		IINAL.	
				Correct		1.	rrect		Correct	
1		13	384	<b>\sqrt</b>	2	_		NA		
2		1	39L	1	2			NA.		
3		l	014			) \	/	NA		
. 4			1024		1		1	NA		
5		10	1-15		<b>S</b>	5 \		NA		
6			SP	/	·	-				
7			SP		*******	1				
8			SP	/	_					
9			SP	<b>√</b> .						
10			se							
11										
12										
13										
14										
15										
16										
17										
18										
19						1				
20										
				Verifi	cation					
Pin e	ends	Gla	nds	Heat :	Shrink	Shr	ouds	Cable	Label	
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	
	NA	<b>V</b>	NA	<b>√</b>	NA	NA	NA	/	NA	

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### **CONTROL CABLE INSPECTION & TEST SHEET**

CABL	E No.		C1-	71			SIZE	1.5mm²	
FRO	MC		0110 -	- SRIZ			TYPE	2	CHE
TO	)	Pump	C1- 0110 - P F100	R ES	TOPS		LENGTH		NA
CORE	No.		RE NUMBI		FROM	TERMINA	\L	TO TERM	IINAL
				Correct		1	rrect		Correct
1		١	01 L	<b>/</b>		7 🗸		NA	
2		10	26-1	<b>✓</b>	(	7 \		NA	
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14								· · · · · · · · · · · · · · · · · · ·	
15									
16									
17			<del></del>	5					
18							E		
19		11							
20									
				Verifi	cation				
Pin e	ends	Gla	nds	Heat	Shrink	Shr	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
1	NA	<b>√</b>	NA	$\checkmark$	WA	NA	NA	<b>V</b>	NA

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#### **CONTROL CABLE INSPECTION & TEST SHEET**

CABI	E No.		C31	2_			SI	ZE		1.5mm²
FR	OM			- SRIT	2_		TY	PE	10	2C4E
T	.0	H	HV SWITCHROOM SB62				LENGTH NA.			NA,
COR	E No.	WI	RE NUMB	ER	FROM	TERMI	NAL	,	TO TERM	INAL
				Correct			Correct			Correct
1		I.	381	<b>✓</b>	Ž	3			NA	
2		1	39L	1		3	<b>✓</b>		NA.	
3			1014			7	$\checkmark$		NA	
_ 4			1021		1	4	1		NA	
5		10	1-15		5	5	$\checkmark$		NA	
6			50	\						
7			SP							
8			SP	/						
9			SP							
10			SP							
11										
12				****						
13										
14										
15										
16			****							
17						······································				
18										
19										
20										
			,	Verifi	cation					
Pin	ends	Gla	nds	Heat \$	Shrink	Sh	rouds	,	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start En	d Finis	h End	Start End	Finish End
	NA	<b>V</b>	NA	<b>√</b>	NA	NA	^	IA	<b>√</b>	NA

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#### CONTROL CABLE INSPECTION & TEST SHEET

CABI	E No.		<b>L3</b> 1	3			SIZE		1.5mm²
FR	OM .	(	C31	SRIZ			TYPE	6	CAE
T	О	MAI	RSTALLING	CUBICLE	= MKIZ		LENGTH	TH NA	
COR	E No.	WI	RE NUMB	ER	FROM	TERMIN	AL	TO TERMINAL	
				Correct		C	orrect		Correct
1		₽¥	5-512	<b>√</b>	TB2-	4	/	NA	
2		381	<12-Z	/	TB2-	3	/	NA	
3		S	12-3 (12-5)	1	NI NI TB6- TB6-	3			
4		S	P		M	a.			
5		3K	12-3	<b>√</b>	TB6-	1	✓ ✓	NA NA	
6		BK	(12-5)	$\checkmark$	TB6-	2	<b>✓</b>	NA.	
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
			64	Verifi	cation				
Pin e	ends	Gla	nds	Heat \$	Shrink	Shr	ouds	Cable	Label
tart End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish Er
$\checkmark$	NA	1	NA	<b>√</b>	NA	NA	NA	1	NA

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#### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.		P45 BICLE	0			SIZE		1.5mm²
FR	OM	CU.	BICLE	BCO	ا ا		TYPE	DE	EKORON
Т	0	0110 -	- SR17				LENGTH		45m
COR	≣ No.	WI	RE NUMB	ER	FROM	TERMINA	L.	TO TERM	IINAL
				Correct		Cor	rect		Correct
1	WHITE	SRIZ	2 TVE	<b>✓</b>		~	A 31	7	<b>V</b>
1	BLACK	SRI	2 + VE	<b>√</b>			A = 31 $A = 3$	21	<b>V</b>
2	WHITE								
2	BLACK								
° 3	WHITE								
3	BLACK								
4	WHITE		· · · · · · · · · · · · · · · · · · ·						
4	BLACK								
5	WHITE	-							
5	BLACK								
6	WHITE			1					
6	BLACK			1					
7	WHITE			·			······································		
7	BLACK								
8	WHITE			***************************************					
8	BLACK								
9	WHITE							<del></del>	
9	BLACK		***************************************						
10	WHITE		······································	V				*,***	
10	BLACK								
11	WHITE								
11	BLACK								
12	WHITE				11				
12	BLACK								
				Verifi	cation				
Pin	ends	Gla	nds	Heat \$	Shrink	Shro	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
NA	7/	<b>✓</b>	<b>V</b>	NA	<b>√</b>	NA	NA	<b>√</b>	/

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#### CONTROL CABLE INSPECTION & TEST SHEET

CABL	E No.		LAN	12-2			SIZE 1.5mm²		
FR	OM	•	0110-	SRIZ			TYPE		1 PR
Т	0					11	LENGTH		NA
COR	E No.	WI	RE NUMBER FROM TER			TERMINA	MINAL TO TERMINAL		
				Correct		Co	rrect		Correct
1		}	/	1	7 GEHIUG	,	/	NA	
2		E	3K	<b>✓</b>	BLOC	K,	/	MA	
3		2	SU	$\checkmark$	Ja			NA	
4									
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20									
				Verifi	cation				
Pin	ends	Gla	nds	Heat \$	Shrink	Shr	Shrouds Cable Labe		Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
1	NA	1	NA	~	NA	NA	NA	1	NA

**PRINT NAME** 

**SIGNATURE** 

#### CONTROL CABLE INSPECTION & TEST SHEET

CABL	E No.		LAN	112-3		1		SIZE		1.5mm²
FR	OM		Q110.	- SR 12	-		TYPE			IPR
T	0							LENGTH		NA
CORE	No.	WII	RE NUMB	ER	FROM	TER	MINAL TO TERMINA		IINAL	
				Correct		-	Cor	rect		Correct
1		<b>&gt;</b>	/	<b>\</b>	7 GENIL	2,5		/	NA NA	
2		B	K	>	Buoc	اذ		/	NA	
3		3	H	\ \	) 3				NA	
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19									***************************************	
20										
				Verifi	cation					
Pin o	ends	Gla	nds	Heat \$	Shrink		Shro	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start	End	Finish End	Start End	Finish End
<b>✓</b>	NA	<b>√</b>	NA	1	NA	(1	A	MA	1	NA

**PRINT NAME** 

**SIGNATURE** 

#### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.		LT00	3-3J			SIZE		1.5mm²	
FRO	MC		0110	- ,3RI	2		TYPE	- E	DEKORON	
T	0		0110	0 - \$R	11		LENGTH	OFF DEKORO		
CORE	No.	WII	RE NUMB	ER	FROM	TERMINA	MINAL TO T		ERMINAL	
				Correct		Co	rrect		Correct	
1	WHITE	12	-3-1	1	35	7 0	7	NA		
1	BLACK	W	WI-	$\sqrt{}$	35	8	7	NA		
2	WHITE									
2	BLACK									
3	WHITE									
3	BLACK									
4	WHITE									
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6	WHITE			•						
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7	WHITE									
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10	WHITE									
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11	BLACK									
12	WHITE									
12	BLACK	······································								
				Verifi	cation					
Pin e	ends	Gla	nds	Heat \$	Shrink	Shr	ouds	Cabl	e Label	
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	
<b>/</b>	NA	<b>√</b>	<b>V</b>	<b>√</b>	NA	NA	NA	1	<b>\</b>	

PRINT NAME

**SIGNATURE** 

#### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABI	E No.	L	TOO	3-45	-,-,		SIZE		1.5mm²
FR	OM		0110-	- SRIZ	>		TYPE	DE	KORON
Т	O		0110-	- ईRI	3		LENGTH	6	koeon 20m
COR	E No.		RE NUMB			TERMINA	AL.	TO TERMINAL	
				Correct		Co	rrect		Correct
1	WHITE	13	-3-1	1	361	0 1	/	NA	
1	BLACK	W	-3-1 JW1-	<b>\</b>	36,	9	/	NA,	
2	WHITE			-					
2	BLACK								
3	WHITE							-	Ž.
3	BLACK								
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6	BLACK	<u> </u>							
7	WHITE								
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8	WHITE								
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9	BLACK								
10	WHITE							····	
10	BLACK								
11	WHITE								
11	BLACK						<del>                                     </del>		
12	WHITE					Ē			1
12	BLACK		-		()				
				Verifi	cation				
Pin e	ends	Gla	nds	Heat :	Shrink	Shr	ouds	Cable	e Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
<b>√</b>	NA		<b>✓</b>	<b>√</b>	NA	NA	NA	1	<b>/</b>

**PRINT NAME** 

**SIGNATURE** 

#### INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.						SIZE		1.5mm²
FR	MC	(	2110-	SR12			TYPE	4	4PR
T	0	(	0110-	SR12 1 & E;	STR		LENGTH		10m
CORE	E No.	Wil	RE NUMB	ER	FROM	IERMINA	\L	TO TERM	IINAL
				Correct			rrect		Correct
1	WHITE	32	6	/	පි			1	1
1	BLACK		3	1	13	- 4	/	3	/
2	WHITE	i	1	<b>/</b>	1 (		/	8	<b>V</b>
2	BLACK	C	7	/	9		/	14	<b>V</b>
3	WHITE	15	<u></u>	/	15		7	20	_/
3	BLACK	N	A	<b>/</b>					
4	WHITE	N	A	<b>✓</b>					
4	BLACK	N	A						
5	WHITE								
5	BLACK							·	
6	WHITE								
6	BLACK								
7	WHITE								ı
7	BLACK								
8	WHITE								
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10	BLACK								
11	WHITE				,,				
11	BLACK								
12	WHITE								
12	BLACK								
				Verifi	cation				
Pin	ends	Gla	nds	Heat S	Shrink	Shr	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
<b>\</b>	1	<b>V</b>	<b>/</b>	<b>✓</b>	/	NA	NA	NA	NA

**PRINT NAME** 

**SIGNATURE** 

DATE

10 13 24

#### 2) 0110-SR12 Variable Speed Drive System

C. Electrical Installation Report.



PO Box 1067 | Tewantin 4565 | PH:0438 394 269
EMAIL: auditor@jantec.com.au | WEB: www.jantec.com.au

#### **ELECTRICAL INSTALLATION REPORT**

REPORT No.: JPR-QUU-021-SD

Issued in accordance with the *Electrical Safety Regulation 2002* (Qld)
Section 153 for electrical work in a Hazardous Area
or on a High Voltage installation.

Occupier:	Location of Installation:
Qld Urban Utilities	Violet Street/Kingsford Smith Drive, Eagle Farm 4009

## Electrical Installation Audited (Audit Scope): Replacement of existing VVVF 0110-SR12 and new isolator & earthing panel 0110-0 ES12 to Pump Motor

Electrical Contractor Responsible for the installation:	Electrical Contractors Lic:
J&P Richardson Industries	756

# Inherent Limitations: Because of the inherent limitations of any internal control structure, it is possible non-compliance with standards may occur and not be detected. An audit is not designed to detect all weaknesses in compliance as an audit is not performed continuously throughout the period of installation. Scope Limitations: nil

Audit	t Result:
	The auditor issuing this notification reasonably believes that the installation work described in the Audit Scope above is <b>not in compliance</b> with the relevant standards.
×	I advise that the audit of the electrical installation work described in the Audit Scope above, was successfully executed and compliance with the relevant parts of AS2067 and AS/NZS3000 is demonstrated (subject to the audit limitations) at the time of the audit.
	From the evidence provided, conclusion can be drawn that the onsite test results recorded by the installer, satisfy the minimum test requirements of AS2067, AS/NZS3000 and other relevant standards.
	It is reasonable to believe that the electrical installation described in the Audit Scope above is electrically safe to connect.

Audit Date:	Auditor:	Auditors Signature:	Auditors No:	Phone No:
25/10/13	S.Downey	Dong	02/0114	0438 394 269

#### Comments/Observations:

If you are not the person having responsibility for the safety of the electrical installation/equipment identified above, it is important that you pass this report to such a person without delay.

A copy of this report must be retained in the site verification dossier and a copy is also forwarded to the relevant regulator as part of the legislative requirements for electrical auditors.

#### 2) 0110-SR12 Variable Speed Drive System

D. Commissioning Report and Parameter List

## SIEMENS

#### STARTUP & COMMISSIONING MANUAL

FOR SIEMENS
PERFECT HARMONY, AIR-COOLED,
MEDIUM VOLTAGE,
VARIABLE FREQUENCY DRIVES

A5E32168985 VSD 0110-SR12 Queensland Urban Utilities – Eagle Farm

#### **Important Note:**

These Startup & Commissioning instructions are solely intended as working instructions or information for Field Service specialist personnel of the SII DT LD, Customer Services Division.

Even where product specific information is included, these instructions are not to be regarded as operating instructions for a particular product.

Revision	Description of Change	Initials	Date

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#### Reference Material (for Siemens Personnel)

#### For Gen IV Drives:

SIEMENS Gen IV Product User Manual A5E01454341C SIEMENS Gen IV Commissioning and Maintenance Manual A5E01454341D

#### For Gen III/e Drives:

SIEMENS Perfect Harmony Gen III/e User's Manual A1A19000405A
SIEMENS Perfect Harmony Gen III/Gen III/e Startup and Advanced Topics Manual A1A19000404A
SIEMENS Perfect Harmony Gen III/e Installation Manual A1A19000403A
SIEMENS NXG Manual A1A19001588
Tech Notes (Applications)

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#### **Abbreviations**

The following abbreviations are used throughout this procedure.

Table 1: Abbreviations

Abbreviation	Description
Α	Ampere(s); Amp(s)
AC	Alternating Current
ACH	Anti-Condensation Heater
ACU	Air Conditioning Unit
СВ	Circuit Breaker
CDS	Circuit Disconnect Switch
CPS	Control Power Supply
CT	Current Transformer
DC	Direct Current
DCR	Digital Card Rack
DWG	Drawing
ES	Emergency Shutdown
ESD	Electrostatic Discharge
F	Fuse
FSR	Field Service Representative
ICP	Installation and Commissioning Procedure
GA	General Arrangement
HESPS	Hall Effect Sensor Power Supply
HMI	Human-Machine Interface
LV	Low Voltage
MV	Medium Voltage
N/A	Not Applicable
OEM	Original Equipment Manufacturer
P/N	Part Number
PDC	Power Distribution Center
PPE	Personal Protective Equipment
PSD	Process Shutdown
S/N	Serial Number
SOP	System Operating Program
TB	Terminal Block
UPS	Uninterruptible Power Supply
V	Volt(s)
VAC	Volt(s) / -Alternating Current
VDC	Volt(s) / -Direct Current
VFD	Variable Frequency Drive
WPS	Wago Power Supply

#### 1.0 INTRODUCTION

This document is for all Air-Cooled Perfect Harmony Drives with NXG Controls.

#### 1.1 Purpose of Manual

The purpose of this document is to effectively guide competent and trained Siemens personnel through Startup and Commissioning for the Air-Cooled Perfect Harmony Variable Frequency Drive (VFD). The individual checks must be performed within each of the separate sections of this procedure. Following any introductory text and precautions, each section contains a series of checkboxes that indicate the completion of the individual steps.

In addition to the checkboxes, tables may be included in some sections. Such tables are used to record information like the following: a) parameter settings; b) test point data values; c) any errors or deviations. Major sub-sections also contain initials/date fields that must be completed by the individual performing and completing that section of the Startup and Commissioning procedure.

#### 1.2 Startup Task Agenda

- 1.2.1 Punch List for Open Items During Startup & Commissioning
  - List any issues as open items. (Attachment #1, CCF-004)
  - Assign responsibility, due date, and date of completion.
  - Review with Customer and return copy to Project Manager (PM) at end of Commissioning.

#### 1.2.2 Drive Cabinet Inspections

- Installation Inspections Perform a visual inspection to detect signs of deterioration and discoloration. Inspection detects issues in the equipment where components may need replacement and/or corrective action.
- Equipment Cleanliness Check Check each of the enclosures of the equipment for cleanliness of power and control circuitry. This should include removal of installation dirt and debris.
- Connection Checks Perform a variety of connection and torque mark checks on the Drive system
  including inspection for loose wires, loose hardware, stripped or cut wires, poor/melted insulation,
  and proper torquing on the component mountings.

#### 1.2.3 Power-up Checks

- Power-up the equipment and perform a functional and operational evaluation running at various operation levels.
- Inspection verifies the equipment is in operating condition.

#### 1.2.4 Customer / Performance Review

- Meet with the customer to review the current site conditions.
- Record any issues with the installation of the Siemens equipment.
- Record training classes taken by on-site personnel and recommend any to be taken.

#### 1.2.5 Spare Parts Checkout

- Perform a visual inspection of Spare Power Cells, Spare Control PCBs, and other components.
- Spare Control PCBs or Power Cells should be installed in the Drive to verify setup and operation.
- Record recommended spare parts.
- Recommend a backup flash disk of the operating system.

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#### 1.3 Symbols and Conventions

#### 1.3.1 Symbol Definitions

The following words and symbols found throughout this manual mark special messages to alert the operator of specific information concerning of the PERSONNEL, the EQUIPMENT or the PROCESS.



Text set off in this manner provides warning notice that failure to follow these directions in this WARNING can result in bodily harm or loss of life and/or extensive damage to equipment.



Text set off in this manner provides warning notice that failure to follow these directions in this CAUTION can result in damage to equipment.



Text set off in this manner present clarifying information or specific instructions pertinent to the immediate instruction.

#### 1.3.2 Warnings and Caution Notes

WARNING	Personnel performing this procedure MUST read the entire document before beginning the procedure.
NOTE	Personnel executing this procedure shall acquire the necessary permits prior to commencing any work activity.
WARNING	Before performing this procedure, the Customer Personnel and Siemens Field Service Representative MUST conduct a job safety briefing for all participants. The briefing shall cover hazards, special precautions, energy source controls and personal protective equipment requirements.
WARNING	Always work with one hand, wear safety shoes rated electrical hazard/composite and safety glasses. Always work with another person present who is acting as a safety monitor.
WARNING	Only qualified Siemens Field Service Representatives should install, operate, troubleshoot, and maintain this Drive. A qualified individual is "one familiar with the commissioning and operation of the equipment and the hazards involved.

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WARNING	Always use extreme caution when handling or measuring components that are inside the enclosure. Be careful to prevent meter leads from shorting together or from touching other terminals.
WARNING	Use only instrumentation (e.g., meters, oscilloscopes, etc.) intended for high voltage measurements (that is, isolation is provided inside the instrument, not provided by isolating the chassis ground of the instrument).
WARNING	Never touch anything within the Perfect Harmony cabinets until verifying that it is neither thermally hot nor electrically alive.
WARNING	Never remove safety shields (marked with a HIGH VOLTAGE sign) or attempt to measure points beneath the shields.
WARNING	Never connect any grounded instrumentation (i.e., non-isolated meters or oscilloscopes) to the Perfect Harmony system.
WARNING	Never connect or disconnect wiring or printed circuit boards while the Drive is energized.
WARNING	Hazardous voltages may still exist within the Perfect Harmony cabinets even when the disconnect switch is open (off) and the supply power is shut off.
CAUTION	Be sure to make appropriate connections/disconnection to equipment in order to perform this test correctly and safely. Failure to do so may result in DAMAGE to equipment.
WARNING	Only personnel performing the test shall be in the area while the test is being performed. Test area shall be barricaded and unauthorized personnel shall not be allowed inside.
L	

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#### 2.0 SITE AND SAFETY INSTRUCTIONS

#### 2.1 Test Equipment and Tool Check

2.1.1	All test instruments, su	upporting tools, and	d accessories shall be rated for inte	ended use.	Initial
2.1.2	Perform a visual inspection of all test instruments, equipment and all associated test leads, cables, power cords, probes, and connectors for external defects and damage.				
2.1.3	Ensure that all test instruments, equipment, and their accessories are calibrated and valid throughout the ENTIRE test period.				Initial
2.1.4	Verify customer can s Commissioning activit		accessories for possible use durin	g Startup and	
	⊠Barrier	□Guards	⊠Caution Tape	☐Cell Lifter	
	Rags	Step Stool	Alcohol based Cleaning Fluid	Grease Gun	
	Air Filters	∐Ladder	Shop Vacuum	☐Soft Brush	
	☐Compressed Air	∐Hoses	☐Water & Hose		Initial

Table 2: Test Equipment and Tool List

Equipment/Tool	Manufacturer & Model Number	Serial Number	Calibration/ Inspection Date
PPE Arc Flash Jacket	Stanco Temp Test Salisbury		
	Fluke 1587, Megger		
	Fluke 43B, PQM		
	Fluke 787, Process Mtr		
Meter	Fluke 87 V, DVM		
	Simpson 260-8P		
	AEMC JM810A, 2000A		
	Fluke i400s		
	Craftsman 250 ft-lbs		
Torque Wrenches	Craftsman 250 in-lbs		
	Craftsman 50 in-lbs		
ESD Pad & Wrist Strap			

#### 2.2 Site and Safety Activities

#### 2.2.1 Meet with Site Supervisor

- Review of safety requirements.
- Site Specific Safety Training, as required.
- Plan for the day's progress.
- Discuss any open issues.
- Complete Daily Safety Log Form.

#### 2.2.2 Review the Equipment Location and Drive Information

- Be certain your work area is clear of debris.
- Confirm that barriers, guards or Caution Tape are in place to prevent. unauthorized personnel form entering into the work area.
- Collect the site and Drive information.

#### 2.2.3 Follow Lockout/Tagout Procedures

- Coordinate with customer on local Lockout/Tagout Procedures.
- If the customer has no requirements, follow Siemens' LD A Lockout/Tagout Procedures.
- Insure Personal Protection Equipment (PPE) and Safety Tools are available.

#### 5 Safety Rules of LOTO

- 1. Switch off power sources
- 2. Lock the circuit against re-closure
- 3. Establish that system is de-energized
- 4. Earth and short circuit phases
- 5. Cover or enclose "live" parts

#### 2.2.4 At the end of each day

- Clean your area.
- Pack your tools and equipment.
- Meet with the site supervisor.
- Review what was done that day.
- Equipment status at end of day.
- Determine what time you will be returning in the morning.
- Ask if there are any questions or other issues that need to be addressed.
- Complete entries in service report.

#### 2.2.5 At the end of the Startup and Commissioning service

- Review daily service reports.
- Obtain Customer signature on service report.
- Ensure any warranty or repair parts have RMAs and are shipped for return.
- Ensure any FSKits used during Startup are packaged for return. Obtain an RMA number and handle shipping back to Siemens.
- Review checklist:
  - Spare parts review
  - Customer review
  - Record follow-up items
  - Contact in-house support personnel
- Complete the Startup and Commissioning Acceptance and Sign Off Sheet.

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#### 3.0 SITE AND DRIVE INFORMATION

#### 3.1 Customer Information

Customer Name:	Queensland Urba	n Utilities		
Street Address: Eagle Farm			City, State Zip code:	Eagle Farm
Primary Contact: Jim Kirkland			Primary Phone No:	0410 548 794
Primary Fax No:			Primary Email Addr:	
Secondary Contact: Brett Lawrence			Secondary Phone No:	0400 723 752
Secondary Fax No:			Secondary Email Addr:	
Date Completed Pre-Startup Checklist:		29/10/2013	Client's Drive ID:	0110-SR12

Date: 28/10/2013

#### 3.2 Dispatch Information

Notification No:	52-199755	Original SO No:	3002133943
Field Service Rep:	Ruben Diaz	Drive Type:	Gen3
Technical Support:	SCCC: Ph. 1300 369 515	Drive P/N:	M6SR3
Project Engineer:	Pieter Taljaard (Siemens Aust.)	Drive S/N:	Z831501002461
Location of Drive:	Eagle Farm	Drive Date Code:	13-25

#### 3.3 Location Environment

Elevation:	Ft, Above Mean Sea Level	Air Conditioning:	☐ Yes
Enclosure:	☐ PDC ☐ Building	Air Conditioning:	BTU, or Ton
Room Temperature:	°C, Indoors	Heating:	☐ Yes
Ambient Temperature:	30+ °C, Outdoors	Humidity:	☐ High        Low
Outside Air Blown In:	☐ Yes	Dusty Environment:	☐ Yes
Drive Blowers Ducted Outdoors:	⊠ Yes □ No	Conductive Dusts:	☐ Yes   ☑ No
Other Influences:		Corrosive Gases:	⊠ Yes □ No
List all.			Type(s): Sewage

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#### 3.4 Drive Information

Power Load Type/Description		on	Voltage		Ampacity		Frequency	
Input Power: 2750 KVA		2750 KVA		6600V		214A		50Hz
Output Power:		2051 KW		0-6600 V		260 A		0-75Hz
Control #1 Power	r:	Control and Blower		415V 3ph		20A		50Hz
Control #2 Power	r:	Motor Heater external power (customer)		110Vac 1Ph		Power=KW		50Hz
Control #3 Power	r:							
Control #4 Power	r:							
Xfmr Blower Motors:		Voltage:	HP/KW: HP, or KW FI		FLA:	FLA: Amp RPM:		
Xfmr Blower Motor OL Settings:								
Cell Blower Moto	rs:	Voltage:	HP/KW: HP, or KW		FLA:	FLA: Amp RPM:		
Cell Blower Moto	r OL S	Settings:						
Transformer:	Mfg:	: TBA	K		KVA: 2750	√VA: 2750		
	Mod	lel No: HZ50	Part No: A5E03460937		Serial No:			
Input Voltage: 6600 V		Sec Voltage: 630 V Tap Setting: ☐ -5% ☐ 0		□ 0% ⊠ +5%				
	Rea	ason if Tap Setting is not +5%:						
Input CT'S:	Input CT'S: Ratio: 250:5		No. per Phase: 1					
Attenuator Resist	Attenuator Resistors: Input: 4.8 MΩ		Outpu	ut: 4.8 MΩ				

#### 3.5 Drive Options

Cell Bypass	☐ Yes	UPS:	☐ Yes	⊠ No
Drive Bypass:	☐ Yes ⊠ No	Communication Protocol:	□No	
			⊠ Yes	Type: Modbus RS485
Sync Motor:	☐ Yes	Sync Transfer	☐ Yes	⊠ No
Sync Motor Exciter:	Voltage:	Manufacturer:		
	Configuration:	Serial No.:		
	Model:			

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**Table 3: Cell Information** 

Power Cel	ls: VS	D P/N: <u>6SR3502</u>	2-6HF42-7BH-Z	S	Size: Amp <u>260</u>	Total No of Cells: 18	
Cell			С	ell Control Board			
Location	CEL	LS P/N	S/N		P/N	S/N	Rev.
A1	LDZ145010	02.260			A1A10000432.30M		BR
A2	LDZ145010	02.260			A1A10000432.30M		BR
А3	LDZ145010	02.260			A1A10000432.30M		BR
A4	LDZ145010	02.260			A1A10000432.30M		BR
A5	LDZ145010	02.260			A1A10000432.30M		BR
A6	LDZ145010	02.260			A1A10000432.30M		BR
B1	LDZ145010	02.260			A1A10000432.30M		BR
B2	LDZ145010	02.260			A1A10000432.30M		BR
В3	LDZ145010	02.260			A1A10000432.30M		BR
B4	LDZ145010	02.260			A1A10000432.30M		BR
В5	LDZ145010	02.260			A1A10000432.30M		BR
В6	LDZ145010	02.260			A1A10000432.30M		BR
C1	LDZ145010	02.260			A1A10000432.30M		BR
C2	LDZ145010	02.260			A1A10000432.30M		BR
C3	LDZ145010	02.260			A1A10000432.30M		BR
C4	LDZ145010	02.260			A1A10000432.30M		BR
C5	LDZ145010	02.260			A1A10000432.30M		BR
C6	LDZ145010	02.260			A1A10000432.30M		BR

#### 3.6 Motor Information

Manufacturer:	ТВА	Model Number:	
HP/KW Rating:	HP, 2000 KW	Serial Number:	
Rated Voltage:	6600 V	Type:	☐ Induction ☐ Synchronous
Full Load Data:	Amp: 217 A, Eff: , PF: 0.86	6, RPM: 593	
Locked KVA Code:		Speed Encoder:	⊠ Yes ⊠ No
Service Factor:		Encoder Model:	1024 PPR, Incremental
Motor Cooling:	Air, Other:	RTD's:	⊠ Stator ⊠ Bearings
Stator Connection:	⊠ Wye □ Delta	RTD Type:	PT100
Line Start Capability:	☐ Yes	RTD Alarm/Trip:	Stator: N/A °C, Bearing: N/A °C
Exciter Manufacturer:		Exciter Voltage:	V, □ AC □ DC
Exciter Model No:		Exciter Config:	

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#### 4.0 CUSTOMER PRE-STARTUP CHECKLIST REVIEW

#### 4.1 Customer Responsibilities

4.1.1	Customer is responsible for completing the pre-startup items on the Customer Pre-Startup Checklist (See Attachment #2).	Complete ⊠ lı	ncomplete [	$\neg$
4.2 Review an	d record checklist items status			_
4.2.1	Review each item in the checklist with the Customer and	Complete 🕅 I	ncomplete [	

#### 5.0 DRIVE PRE-POWER INSPECTIONS AND CHECKS

Description	Initial
Visually check the equipment for any shipping or installation damage.	RD
Ensure that the entire system is earth grounded at one of the system grounding points. (Customer specified where ground to be connected in VFD. Either to input or output cabinet.)	RD
Confirm Siemens drawings are the same at the Customer's drawings. Note: <i>Drawings need to be updated for new encoder connection. Obs.</i> Encoder Working properly in this drive	RD
Verify the source voltage to the Drive matches the Drive specification. The Drive's intended input voltage is specified on the foil label located inside the control panel door. (Note: This foil label may be located in the customer connection cabinet.)	RD
Ensure the control power (typically 120 VAC or 125 VDC) and auxiliary power (typically 415 or 690 VAC) sources are connected per the VFD schematics and that they match the Drive's control voltage ratings as stated on the foil label.	RD
Verify the presence of markings/labels on all terminal strips, mounted components, cell and other sub-assemblies. Notify the factory of any discrepancies.  List discrepancies: NA	RD
Verify the presence and proper installation of all protective covers.  List discrepancies: 415V for PLC I/O Transformer protection barrier to be fitted->Done!	RD
Verify the installation of the fan hood. Verify that the fan rotates freely while mounted.	RD
Check Blower Assembly installation and check hardware connections.	RD
Confirm all air gaps are blocked between cabinets.	RD
Confirm Shipping Splits are internally bolted together. n/a	RD

Confirm Shipping Splits are externally botted together (near floor). N/A  Confirm cabinet to cabinet sealing.  Confirm conduit entrance to cabinets is sealed.  RD  Confirm cabinet to floor is sealed.  RD  Confirm dabinet to floor is sealed.  RD  Verify that the ground bonding jumpers are present and connected (between shipping splits, cabinets to doors, cabinets to panels, motor).  Confirm MV and LV cables are installed in separate conduits (observe for proper spacing).  RD  Confirm MV and LV cables are installed in separate conduits (observe for proper spacing).  RD  Check all cabling for insulation nicks, splitting and/or cracking.  RD  Verify that no conductors are exposed due to chafing or other shipping abuse.  RD  Input MV Power Cables: Verify insulation voltage rating is adequate.  RD  Input MV Power cables: Verify bend radii meet NEC requirements.  RD  Input MV Power cables: Check distance from cabinet/other cables.  RD  Input MV Power cables: Verify stress cones installed/mounted properly and shields are grounded at MV Switchgear end only – not at drive end. Ensure shield ground wires are adequately separated from bus work and GTO wires.  Output MV Power cables: Verify is stress cones installed/mounted properly and shields are grounded at MV Switchgear end only – not at drive end. Ensure shield ground wires are adequately separated from bus work and GTO wires.  Output MV Power cables: Verify stress cones installed/mounted properly and shields are grounded at VSD end only – not at Motor. Ensure shield ground wires are adequately separated from bus work and GTO wires.  Quiput MV Power cables: Verify stress cones installed/mounted properly and shields are grounded at VSD end only – not at Motor. Ensure shield ground wires are adequately separated from bus work and GTO wires.  PD  Output MV Power cables: Verify stress cones installed/mounted properly. Source to input.  Quiput mV power cables: Verify stress cones installed and connected properly. Source to input.  PRD  Check and inspect Motor Terminations i	Description	Initial
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Output MV Power cables: Verify stress cones installed/mounted properly and shields are grounded at VSD end only – not at Motor. Ensure shield ground wires are adequately separated from bus work and GTO wires.  Verify that the transformer neutral is ungrounded.  RD  Check the tap jumper to be sure it is not touching the cabinet.  Ensure that control and main power are installed and connected properly. Source to input. Output to motor.  Check and inspect Motor Terminations in motor termination box. (done by JPR)  Shipping split Bus Bar terminations complete, torqued and covers in place.  N/A  Ensure that VFD electrical connections are tight and that all torque marks are present.  * Re-examine for bolts bottoming out.  Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.  Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connnections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  RD  Check Input Attenuator Resistors are the correct value for the rated voltage.	Output MV Power cables: Verify bend radii meet NEC requirements.	RD
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Check the tap jumper to be sure it is not touching the cabinet.  Ensure that control and main power are installed and connected properly. Source to input. Output to motor.  Check and inspect Motor Terminations in motor termination box. (done by JPR)  RD  Shipping split Bus Bar terminations complete, torqued and covers in place.  N/A  Ensure that VFD electrical connections are tight and that all torque marks are present. * Re-examine for bolts bottoming out.  Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.  Have the control wire plugs at each shipping split been reconnected and tie-wrapped? (Confirms that all connnections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  RD  Check Input Attenuator Resistors are the correct value for the rated voltage.	grounded at VSD end only – not at Motor. Ensure shield ground wires are adequately separated	RD
Ensure that control and main power are installed and connected properly. Source to input.  Output to motor.  Check and inspect Motor Terminations in motor termination box. (done by JPR)  RD  Shipping split Bus Bar terminations complete, torqued and covers in place.  N/A  Ensure that VFD electrical connections are tight and that all torque marks are present.  * Re-examine for bolts bottoming out.  Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.  Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  RD  Check Input Attenuator Resistors are the correct value for the rated voltage.	Verify that the transformer neutral is ungrounded.	RD
Output to motor.  Check and inspect Motor Terminations in motor termination box. (done by JPR)  RD  Shipping split Bus Bar terminations complete, torqued and covers in place.  Ensure that VFD electrical connections are tight and that all torque marks are present.  * Re-examine for bolts bottoming out.  Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.  Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connnections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  RD  Check Input Attenuator Resistors are the correct value for the rated voltage.	Check the tap jumper to be sure it is not touching the cabinet.	RD
Shipping split Bus Bar terminations complete, torqued and covers in place.  Ensure that VFD electrical connections are tight and that all torque marks are present.  * Re-examine for bolts bottoming out.  Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.  Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connnections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  RD  Check Input Attenuator Resistors are the correct value for the rated voltage.		RD
Ensure that VFD electrical connections are tight and that all torque marks are present.  * Re-examine for bolts bottoming out.  Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.  Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connnections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  RD  Check Input Attenuator Resistors are the correct value for the rated voltage.	Check and inspect Motor Terminations in motor termination box. (done by JPR)	RD
* Re-examine for bolts bottoming out.  Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.  Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connnections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  RD  Check Input Attenuator Resistors are the correct value for the rated voltage.	Shipping split Bus Bar terminations complete, torqued and covers in place.	N/A
of Amp Connector Female Sockets" and complete the associated testing form.  Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connnections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  RD  Check Input Attenuator Resistors are the correct value for the rated voltage.		RD
(Confirms that all connnections that deal with shipping splits are addressed).  Control wires (visually inspected and landed per customer connection drawings).  Check Input Attenuator Resistors are the correct value for the rated voltage.  RD	·	N/A
Check Input Attenuator Resistors are the correct value for the rated voltage.  RD		N/A
	Control wires (visually inspected and landed per customer connection drawings).	RD
Check Output Attenuator Resistors are the correct value for the rated voltage.	Check Input Attenuator Resistors are the correct value for the rated voltage.	RD
	Check Output Attenuator Resistors are the correct value for the rated voltage.	RD

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Description	Initial
Verify all Transorbs are grounded (located at/near input & output attenuator resistors).	RD
Check Fuses and Relays (inserted snugly into holders).	RD
Verify Wago wiring secure.	RD
Verify Break Out Board wiring secure.	RD
Verify Signal Conditioning Board wiring secure.	RD
Verify DCR is properly grounded to ground point.	RD
Verify Plug/Ribbon cables are secured.	RD
Verify Keypad is grounded.	RD
Verify for Communication protocol only: termination resistor.	RD
Check Fiber optics (point to point) and verify that bend radii are acceptable. A3 fiber bent at Modulator Board End, light goes through.	RD
External air path in/out (distance from blower 30mm (minimum) - pass/fail. Pass	RD
Inlet/outlet located opposite side of room. ok	RD
All covers and doors installed and secured with the correct fasteners and ground straps.	RD
All Safety Interlock hardware (Fortress Locks) are installed and properly aligned.	RD
All Doors open/close properly.	RD
Drive door filters.	RD
Verify all components match the drawings: component location, labels, wire tags and Drive labels. (The drawing must reflect the Drive and vice-versa – internal connections only).	RD
Adjust Blower Motor Thermal OL's to correct settings.	RD

#### 6.0 CONTROL POWER CHECKS

Description	Initial	
Ensure that all control power sources are available for Drive operation.	RD	
Verify free rotation of cell and transformer blowers. (A double-check before closing the cabinets.)	RD	
Verify Network Cabling is the correct type and landed on the correct terminals.		
Verify Speed Controls are terminated correctly (4-20 mA speed control or network control).	RD	
Verify Start/Stop commands terminated correctly (digital input or network control).	RD	

Energize the Control Power Circuits feeding the drive.

#### DON'T energize MV Power.

	Rated input current (2020)	214 A
Confirm the following parameters and document	Rated output current (2040)	260 A
values:	Neutral connection (2630)	T2
	CT turns (3035)	250 :5
Measure all control power voltage sources being	415 $V_{AC}$ (373 $V_{AC}$ to 466 $V_{AC}$ )	433 V <sub>AC</sub>
fed to the Drive. Verify that these voltages match	240 $V_{AC}$ (220 $V_{AC}$ to 260 $V_{AC}$ )	NA V <sub>AC</sub>
the drawings.	120 $V_{AC}$ (110 $V_{AC}$ to 130 $V_{AC}$ )	127 V <sub>AC</sub>
If supplied, verify the UPS voltage.	120 V <sub>AC</sub> (110V <sub>AC</sub> to 130V <sub>AC</sub> )	NA V <sub>AC</sub>

Energize the control power circuits at the drive – close breakers and fuse holders.

Description	Initial
Verify phasing for the blower motor power circuit (verified by checking that suction holds a sheet of paper firmly on drive cabinet filters).	RD

Record Drive address.	TCP/IP Address:	172.017.020.16	
Verify <b>DCS</b> or <b>PLC</b> addresses across communication link, if applicable.	TCP/IP Address:	NA	
PLC via Network2			
Modbus TCP			
	+5 V <sub>DC</sub> (+5.1	10 to +5.13 V <sub>DC</sub> )	5.07 V <sub>DC</sub>
	-5 V <sub>DC</sub> (-4.8	35 to -5.15 V <sub>DC</sub> )	5.10 V <sub>DC</sub>
Power supply voltage checks.  Please see FAT docs.	+12 V <sub>DC</sub> (+11.	<b>12.1</b> V <sub>DC</sub>	
	-12 V <sub>DC</sub> (-11.	-12.1 V <sub>DC</sub>	
Thouse dee Title deed.	+15 V <sub>DC</sub> (+14.	15.2 V <sub>DC</sub>	
	-15 V <sub>DC</sub> (-14.	30 to -15.70 V <sub>DC</sub> )	-15.3 V <sub>DC</sub>
	24 V <sub>DC</sub> (21	<b>24.05</b> V <sub>DC</sub>	
	+5 V <sub>DC</sub>		5.12 V <sub>DC</sub>
DCB valtage checks:	-5	-5.14 V <sub>DC</sub>	
DCR voltage checks:	+1	12.07 V <sub>DC</sub>	
	-1:	-12.06 V <sub>DC</sub>	

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#### DON'T ENERGIZE MV POWER - FURTHER CHECKS REQUIRED IN SECTION 10.

#### Table 4: SOP, Parameters and Fault Logs

Upload/Review:	Initials		Upload:	Initials
SOP File: A5E32168985D	RD		Historical Log:	RD
Parameter File (Level 7 Security):	RD		Fault Log:	RD
Check Clock Time: to AEST only	RD		Event Log (NXG only):	RD
			Cell Fault Log (Legacy only):	NA
Were any existing issues found after reviewing SOP, Parameters and Logs?	Digital I/O Added to Sw yet to	wi SC be	missioning code modification. iring modified as per Asbuilt drawings. DP, DI-0B for Keypad local control, wiring fitted. ock for Ventilation running DI.	and Key-

Verify the following are functional under control power:			
MV Input Protection Interlock:	⊠ Yes □ No		
	⊠ Yes □ No		

#### 7.0 SOFTWARE AND FIRMWARE VERSION RECORDING

Record the SOP Software (DRCTRY File) and	Software Ver:	Version 4.39
NXG Firmware (8090) version.	(8090) Firmware Ver:	Ver 5.2.3
Record HMI software version, if applicable. NA	Software Version:	NA
	Firmware Version:	NA
	Windows Version:	NA

#### 8.0 BYPASS CONTACTOR TEST

#### 8.1 Reference Bypass Contactor Procedure located in Bypass Contactor Kit.

Table 5: By-Pass Contactor Testing. Dynamic test pulling FO off for each cell, and then reset from parameter ID:XXXX.

#### NOT FITTED.

Contactor Name	Voltage	Initial
DDI/A4	Pick-up Voltage:	
BPKA1	Drop-out Voltage:	
DDKAO	Pick-up Voltage:	
BPKA2	Drop-out Voltage:	
BPKA3	Pick-up Voltage:	
DI IVAS	Drop-out Voltage:	
BPKA4	Pick-up Voltage:	
DI TO CF	Drop-out Voltage:	
BPKA5	Pick-up Voltage:	
5110.0	Drop-out Voltage:	
BPKA6	Pick-up Voltage:	
511010	Drop-out Voltage:	
BPKB1	Pick-up Voltage:	
DI NOT	Drop-out Voltage:	
BPKB2	Pick-up Voltage:	
211.02	Drop-out Voltage:	
BPKB3	Pick-up Voltage:	
	Drop-out Voltage:	
BPKB4	Pick-up Voltage:	
	Drop-out Voltage:	
BPKB5	Pickup Voltage:	
	Drop-out Voltage:	
BPKB6	Pick-up Voltage:	
	Drop-out Voltage:	
BPKC1	Pick-up Voltage: Drop-out Voltage:	
	Pick-up Voltage:	
BPKC2	Drop-out Voltage:	
_	Pick-up Voltage:	
BPKC3	Drop-out Voltage:	
DDI(O)	Pick-up Voltage:	
BPKC4	Drop-out Voltage:	
PDVCE	Pick-up Voltage:	
BPKC5	Drop-out Voltage:	
BPKC 6	Pick-up Voltage:	
Di NO 0	Drop-out Voltage:	
Confirm Customer I/O and communications Confirm Customer hard wiring into the VFD	This is the time to fine tune what is being received and if changes need to be done.	

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Description	
Install the covers and button up the Drives.	
Prepare the Drive for full input power. (Remove test equipment, motor free, etc.)	

#### 9.0 OPEN LOOP TESTS

#### N/A

The following steps verify operation of the Drive (without a motor) in Open Loop Test Mode (No motor current feedback).

Warning! Do not connect a grounded PC or laptop to a communications board with an isolator or while the Drive is running. To do so could damage the computer and/or the digital control rack.

Description	Initial
Review and follow safety procedures per Daily Safety Log.	
Make sure all safety grounds have been removed from input.	
Re-energize the AC or DC control power.	
Connect the PC/Laptop to the Ethernet Port (for access to the CPU Board). Connect Tool-Suite and the Debug Tool.	
Set the control loop type (2050) to Open Loop Test Mode (OLTM).	
Verify that the input current (3030) and input voltage (3040) scalers (stability →input processing) are set to the default values of 1.0.	
DISABLE spinning load using Drive → spinning load (2420) → spinning load mode (2430).	
Make sure the fast by-pass (2600) is DISABLED. Access this parameter through Drive $\rightarrow$ cells $\rightarrow$ fast by-pass.	
Configure the keypad to display input voltage (VDIN), input frequency (FRIN), and motor voltage (VLTS). – function of keypad	
Set the motor rated voltage (1040) parameter	
Energize MV Power to the system.	
(Everyone should leave the room the first time MV is applied to the Drive.)	

Description	Figures and Records	Initial
Verify that the keypad or drive tool displays the correct value of drive input voltage and frequency. At rated primary voltage, the AC input voltage feedback on Test Points VIA VIB, and VIC should be 5.4Vpp or 1.9Vrms.		
See the figure in the Comments Section.	Talk Stop	
These test points are on the system interface card. Perform the following corrective step if the input (or line) voltage is too high or too low.	VIB VIC VIA	
If the input voltage to the Drive is too high, then this needs to be corrected. Harmony Drives are shipped with the transformer tap set to +5%, which reduces the voltage by that percentage on the secondary side of the transformer.	Confirm Values using an oscilloscope and digital multimeter.	
If the voltage is low (5% less than rated), then change the tap on the transformer to the neutral ("O") or if the voltage is lower than 5% less than rated then change the tap on the transformer to -5% tap.		
If the input frequency is displayed as a negative number, then one pair of input phases has to be switched to change the phase rotation.		
Enter a speed demand of 25% and give the RUN command. The AC output voltage feedback signals on Test-Points VMA, VMB, and VMC should be 1.35Vpp ±0.27V (measure the average peak-to-peak voltage) or 0.48 Vrms ±0.20V.  See the figure in the Comments Section for signals on TestP-points VMA and VMB at 25% speed (15Hz).	Confirm Values using an oscilloscope and digital multimeter	
Increase the speed demand to 50% (30 Hz). The output voltage feedback signals should increase in proportion for both frequency and amplitude.		
Note that in Open Loop Test Mode, the flux regulator is not enabled and hence the output voltage will read higher or lower than calculated value corresponding to 50% of rated voltage. Adjust the flux demand parameter (3150) so that the motor voltage (on the keypad or tool) is approximately equal to 50% of rated voltage.		
Further increase the speed demand to 100% (60 Hz). The AC output voltage on Test-Points VMA, VMB, and VMC should be 5.4Vpp ±0.27V or 1.9 Vrms ±0.20V. The motor voltage on the keypad should read the rated value output voltage ±5%.		

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#### 10.0 DRIVE TEST IN OPEN LOOP TEST MODE WITH MOTOR CONNECTED

The following steps verify operation of the Drive (with a motor connected at its output) in Open Loop Test Mode (No Current Feedback). This test is required only when the operation of the output Hall Effect Transducers requires to be verified. During this test the motor should be unloaded. If this test is not required then proceed to the next test.

Description [This procedure	not followed, OLVC n	nethod used]		Initial
Disconnect control voltage and medium volta	ge sources & follow LC	TO procedures	S.	
Connect the motor feeder cables or enable m	otor contactor.			
Re-energize the AC or DC control power.				
Set the motor rated voltage (1040) and freque  → motor parameters) to be equal to the motor		s (access it thro	ough motor	
Make sure that spinning load mode (2430)	and fast by-pass (260	0) are DISABLI	ED.	
Slow down Drive acceleration and deceleration. Set to 60 Sec or greater.	Accel time 1	(2270)	Sec	
"Drive/Speed Ramp Setup"	Decel time 1	(2280)	Sec	
DON"T operate the drive beyond 10% speed "Stability/Output F	d without reducing the I Processing/Flux Control		3150) to 0.5.	
Energize the medium voltage feed to the VFD reset faults and push the button a second time			eypad to	
If the mode on the keypad display reads RLB open loop vector control and exit out of the m keypad to change back to mode. Then <b>chan loop test mode</b> .	enu entry. This should	I force the RLB	K on the	
Configure the keypad to display motor magne voltage.	etizing current, motor to	orque current ar	nd motor	
Spin the motor at 1% and observe proper rota	ation.			1
Motor rotation correct or corrected: ☐ Yes [				
Operate the Drive with a speed demand of 10 motor current for phase A on test-points VMA			edback and	
Since the motor is unloaded the current waveform should lead the voltage waveform by almost 90°. The hall effect current transducers introduce a negative sign since they are configured to measure the incoming current. Check test-points VMB, IMB and VMC, IMC for similar waveforms. See Figure 10.1				

IMA

VMA

VMA

100 V Ch2 1.00 V M40.0ms A Ch1 Z 600mV

Figure 10.1 Open Loop Test Mode operation at 10% speed with an unloaded motor.

(AC motor voltage and motor current at test-points VMA and IMA are shown.)

### 11.0 DRIVE TEST IN OPEN LOOP VECTOR CONTROL MODE FOR UNLOADED MOTOR APPLICATION

11.1 At this point the VFD is ready for actual (induction) motor operation. The following steps verify operation of the Drive and the load induction motor in open loop vector control mode.

Description	Initial
Re-energize the AC or DC control power, if de-energized.	
Change the Drive control loop type (2050) to open loop vector control.	

Description			Value
Setup the speed ramp parameters according to the following recommendations:	Accel time 1	(2270)	45 Sec
The acceleration and deceleration rate for a fan should be set to around 60 seconds and for a pump around 30 seconds. "Drive/Speed Ramp Setup"	Decel time 1	(2280)	45 Sec
Verify that fast (cell) by-pass is DISABLED at this time if you have that option	Fast by-pass	(2600)	NA Sec

**11.2** Verify that the following parameters are set correctly – default values are shown.

\*Note: Auto-Tuning modifies the italicized menu items.

\*\*Note: Param\_List= Please see Completed Parameter List asbuilt attached

Description				Value
	Motor frequency	(1020)	HZ	50
Setup the following motor parameters according to the nameplate values.	Full load speed	(1030)	RPM	593
"Motor/Motor Parameter"	Motor Rated Voltage	(1040)	V	6600
	Full load current	(1050)	Α	217
	Leakage inductance	(1070)	16.0%	24.4
Use default values for the other motor	Stator resistance	(1080)	0.1%	0.78%
parameters as shown below. For this test set the stator resistance to 0.1%.	No load current	(1060)	25.0%	34%
	Inertia	(1090)	30.0 KgM <sup>2</sup>	389.1
Setup the motor overload and torque limits. Set the motor trip volts to be equal to 120% of the motor rated voltage or to	Overload select	(1130)	Inv. Time with Speed Derate	Inv Time w Sp
	I overload pending	(1139)	105.0%	Param_List
	I overload	(1140)	110.0%	Param_List
	Overload timeout	(1150)	5 Sec	Param_List
the value required by the customer. Set the over-speed parameter to be 120% or	Max. Motor Inertia	(1159)	0.0 KgM <sup>2</sup>	Param_List
to the value required by the customer.  "Motor/Limits"	Motor trip volts	(1160)	4800 V	Param_List
	Over-speed	(1170)	120%	Param_List
	Motor torque limit 1	(1190)	100.0%	Param_List
	Regen torque limit 1	(1200)	-0.25%	Param_List

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Description				Value
	Flux reg prop gain	(3110)	1.72	Param_List
	Flux reg integral gain	(3120)	1.00	Param_List
Verify that these control loop gains are at their default values.	Flux filter time const	(3130)	0.0667 Sec	Param_List
at trieli deladit valdes.	Flux demand	(3150)	1.0	Param_List
	Flux ramp rate	(3160)	0.5 Sec	Param_List
	Energy saver min flux	(3170)	100%	Param_List
Verify that these control loop gains are	Speed reg prop gain	(3210)	0.02	Param_List
at their default values.	Speed reg integral gain	(3220)	0.046	Param_List
"Stability/Output Processing/Speed	Speed reg Kf gain	(3230)	0.60	Param_List
Loop"	Speed filter time const	(3240)	0.0488 Sec	Param_List
Verify that these control loop gains are	*Current reg prop gain	(3260)	0.50	Param_List
at their default values.  "Stability/Output Processing/Current Loop"	*Current reg integral gain	(3270)	25	Param_List
Verify that these control loop gains are	Enable braking	(3360)	Off	Param_List
at their default values. "Stability/Output Processing/Braking"	Pulsation frequency	(3370)	275 Hz	Param_List
Verify that these control loop gains are	Output current scaler	(3440)	1.000000	Param_List
at their default values. "Stability/Output Processing"	Output voltage scaler	(3450)	1.000000	Param_List
Verify that these control loop gains are	Dead time comp	(3550)	16.0 µSec	Param_List
at their default values.	Feed forward constant	(3560)	0.0000	Param_List
"Stability"	Carrier frequency	(3580)	400.0 Hz	Param_List

	Description	Initial
Verify the system operational	program (SOP) and customer interface per Customer specification.	RD
Verify that the Customer has con	npleted their entire interface testing at this time.	RD
	feed to the VFD. Push the fault reset button on the keypad to reset econd time to acknowledge any alarms.	RD
Configure the keypad to display Speed Demand, Motor Magnetizing Current, Motor Torque Current, and Motor Voltage.		RD
Operate the Drive with a speed demand of 10%. Observe the AC output voltage feedback and motor current for phase A on testpoints VMA and IMA using an oscilloscope.	<ul> <li>If the motor is unloaded, then the current waveform should lead the voltage waveform by almost 90° (see Figure 11.1 - top frame) The hall effect current transducers introduce a negative sign since they are configured to measure the incoming current.</li> <li>If the motor is loaded then the current waveform will lead the motor voltage by an angle small than 90° (see Figure 11.1 - bottom frame).</li> <li>The motor voltage should be 10% of the motor rated voltage.</li> </ul>	RD

Description	Initial
Increase the speed demand while monitoring the motor voltage. The motor voltage should read according to the following table. See Figure 11.2 for waveforms at 100% spread (50Hz). Table 6 shows the Drive voltage scaling for signals on test-points VMA, VMB and VMC as a function speed. Table 7 lists the scaling for the currents and voltage feedback signals available on the signal conditioning board at the rated operating point of the Drive.	RD

Table 6: Scaling of Drive output voltage as a function of speed

Speed Command (%)	Motor Speed (Hz)	Motor Voltage Feedback, (V <sub>P-P</sub> ) NXG Sys Intrf Brd (NXGII Sys I/O Brd)	Motor Voltage Feedback, (V <sub>RMS</sub> )  NXG Sys Intrf Brd (NXGII Sys I/O Brd)
10	6	1.08 (0.54) V <sub>P-P</sub>	0.38 (0.19) V <sub>RMS</sub>
25	15	2.70 (1.35) V <sub>P-P</sub>	0.96 (0.48) V <sub>RMS</sub>
50	30	5.40 (2.70) V <sub>P-P</sub>	1.91 (0.96) V <sub>RMS</sub>
75	45	8.10 (4.05) V <sub>P-P</sub>	2.87 (1.44) V <sub>RMS</sub>
100	60	10.80 (5.40) V <sub>P-P</sub>	3.82 (1.91) V <sub>RMS</sub>

Table 7: Scaling of Drive input and output voltages and currents

Variable	Rated value at Drive terminals (RMS)	Feedback value under rated conditions (V <sub>P</sub> ) NXG Sys Interface Board or (NXGII Sys I/O Board)	Feedback value under rated conditions (V <sub>RMS</sub> )  NXG Sys Interface Board or (NXGII Sys I/O Board)
Input Current	Primary Current Rating of Input CT	5.0 (2.5) V <sub>P</sub>	3.54 (1.77) V <sub>RMS</sub>
Input Voltage	(Rated Input Voltage L-L) / 1.732	5.4 (2.7) V <sub>P</sub>	3.82 (1.91) V <sub>RMS</sub>
Output Current	Output Current Rating = Cell Rating	5.0 (2.5) V <sub>P</sub>	3.54 (1.77) V <sub>RMS</sub>
Output Voltage	(Rated Output Voltage L-L) / 1.732	5.4 (2.7) V <sub>P</sub>	3.82 (1.91) V <sub>RMS</sub>

Examples: Output Current Scaling: Cell current rating =  $3.54 (1.77) V_{RMS}$ Output Voltage Scaling: [(Rated output voltage L-L) / 1.732] \*  $1.414 = 5.4 (2.7) V_{P}$ 

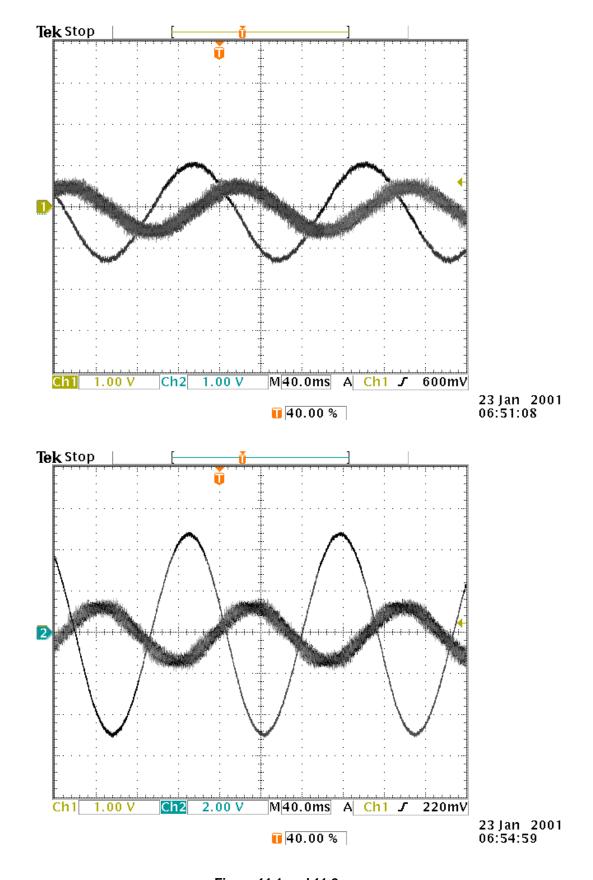


Figure 11.1 and 11.2

AC motor voltage and motor current at test-points VMA and IMA at 10% speed in Open Loop Vector Control

Top frame: Unloaded Operation

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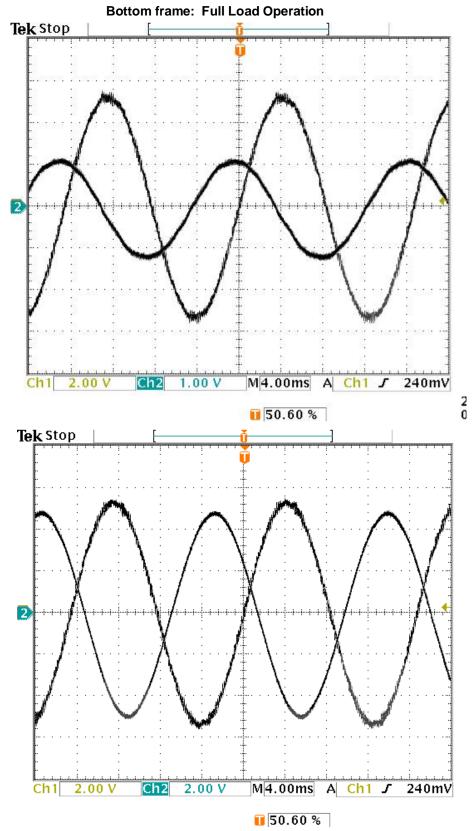


Figure 11.3 and 11.4

AC motor voltage and motor current at test-points VMA and IMA at 10% speed Open

Top frame: Unloaded Operation

Bottom frame: Full Load Operation Drive Test in Synchronous Motor Control Mode

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#### **12.0 TUNING**

Note: Spinning Load is disabled with V/Hz and OLTM control. IT is automatically enabled if fast by-pass is enabled regardless of menu settings.

Note: Spinning Load should be enabled if one or more of the following operating modes/features are selected:

- Fast By-Pass
- Auto-Restart (controlled through the auto reset parameters 7120-7150 and the SOP)
- Synchronous Motor Control (SMC and CSMC)
- Closed Loop Vector Control (CLVC)

	Description	Initial		
Use the dr	ive tool to monitor motor flux (FluxDS), motor speed, and speed reference.	RD		
Step 1: To shown.	o enable spinning load and make sure the following parameters are set to the values	RD		
Step 2: Sp	pinning Load Menu (2420)	RD		
	Spinning load mode (2430) forward or reverse, whichever is appropriate	RD		
	Scan end threshold (%) (2440) 20%			
	Current level set point (%) (2450) 15% [or equal to the no-load current setting]			
	Current ramp(s) (2460) 0.01 s			
	Max current (%) (2470) 50%			
	Frequency scan rate(s) (2480) 3.0 s (scan time). Check NXG Control manual for this feature	RD		
Step 3: Operate the Drive with a demand of 30%.		RD		
Step 4: On the drive tool monitor, the speed reference and motor speed at the moment the Drive "catches" the motor.				
Repeat Steps 3-4 for different cells. Save the screen shots from tool suite noting which cell was by-passed.				

## 13.0 SYNCHRONOUS TRANSFER PROCEDURE (if applicable) N/A

- This section of the startup procedure involves optional synchronous transfer checks. The Pefect Harmony may be configured for optional synchronous transfer operation, in which the Drive can be used to control multiple motors, one motor at a time. If such a configuration is not defined for the application, then this section may be skipped.
- **13.2** Use the following steps to setup the Drive control for Synchronous Transfer:

Description		
Step 1: Configure Synchronous Transfer Menu parameters as shown below.		
	Synchronous Transfer (2700)	
	Phase I gain (2710) 2	

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	Phase P gain (2720) 4	
	Phase offset (2730) 2 deg	
	Phase error threshold (2740) 1.5 deg	
	Frequency Offset (2750) 0.5%	
	Up Transfer Timeout (2760) 0 sec	
	Down Transfer Timeout (2770) 0 sec	
Step 2: Enable Spinning Load by setting Spinning Load Mode (2430) to forward.		
Step 3: Set the Speed Fwd Max limit 1 (2080) to at least 105%		

### **13.3** Go through the following checklist to complete the setup of Synchronous Transfer:

Description	Initial
Configure the Drive control as described from OLTM/CLVC	
Ensure that PLC-related hardware is properly connected (for information, see the respective PLC communications network manuals supplied by the vendor) to the analog I/O modules.	
Verify wiring of all VFD control and line control electrical contactors.	
Ensure that the system operating program for the "up transfer" and "down transfer" process logic is implemented.	
The state machines for up and down transfers reside in the Perfect Harmony's control program. These interface with the control system integrator's PLC network via the VFD system operating program to handle handshaking between each motor control center (MCC) and the VFD. All controls for the VFD and line reactors are controlled from the system integrator's PLC. Verify that these controls are operational.	
Verify all communications flags. (debugger screen)	
For Synchronous Motor (SM) synchronous transfer, an external field controller source is required when the SM is connected to the line and the Drive is disabled. This alalog source and the source from the Drive must be switched via external logic and in a digital manner, 4-20ma current loops are used for analog sources (current loops cannot be switched via a relay). The final output from the PLC must be connected to the field excitor directly. Verify that there are two sources to the PLC (one of which may be internal), and that the PLC logic is set to switch between the two sources at the appropriate time. The PLC also controls the enable of the field exciter any time the motor is active.	

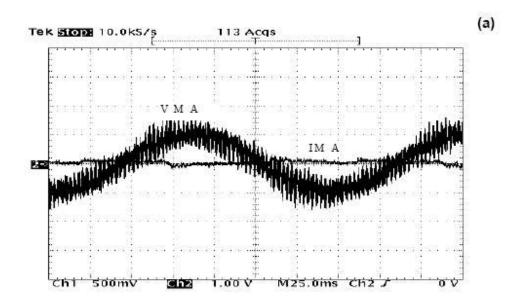
## 14.0 DRIVE TEST WITH SYNCHRONOUS MOTOR: N/A

**14.1** Procedure to verify operation of Drive with synchronous motor in Synchronous Motor Control Mode.

		Description	Initial
		ronous motor to the Drive. Enter motor parameters and use default gains wing parameters:	
1.	(1060). This par	tor Field no-load current as the No-load Current setting rameter should be calculated (in %) on the basis of the leld current and the maximum capability of the field excitor.	
	a)	Example: Drive with a synchronous motor that requires 24A of no-load field current and a field supply that is tuned so that 75A is the maximum output (at 20mA command input), then the No-Load Current Parameter should be set to: No-Load Current Setting = 100% * 24/75A = 32.0%	
2.	Enable Spinning	Load (2430)	
3.	Change the Drive	e control loop type (2050) to Synchronous Motor Control.	
4.	Use default cont changed as follo	rol loop gains except for the flux loop gains that should be ws:	
	a)	Flux reg prop gain (3110) 0.50	
Ī	b)	Flux reg integral gain (3120) 0.50	
	c)	Flux Filter Time Const (3130) 0.022 sec	
	d)	Saliency (1091) .02	
5.	field supply outports Start command to	have been modified to include the logic for controlling the ut contactor. The contactor should be ON as soon as the to the Drive is given, and should be turned OFF en the Drive trips on a Fault or when the Drive goes to ille stopping).	
En	ergize medium v	oltage Drive. Run the Drive with a speed demand of 10%.	
		art command is given, the field supply first starts by applying current and During this time, lds and lqs should be zero.	
		equal to the Flux Ramp Rate parameter (3160), the Drive starts by increasing ce to the Speed Demand.	
un	der steady-state	Motors, the Drive current is always in phase with the voltage, i.3e., $lds \approx 0$ conditions. At no-load, there is very little current supplied from the Drive (on current display, ITOT $\approx 0$ ).	
		0% speed. Verify that the no-load and full load (if possible) current with the Drive voltage waveforms, areas shown in Figure 14.1)	
wa Dri syr the	veforms, along vove output current chronous motor distortion introd	20% speed. Verify that the no-load and full-load (if possible) current with the Drive voltage waveforms, are as shown in Figure 14.2. Note that the ats at 100% speeds are distorted. This is due to the shape of the poles in the r. At low speeds, the current regulator bandwidth is sufficient to correct for duced by the motor poles as shown in 14.2 b. However, at high speeds, the ains are insufficient to maintain sinusoidal output currents when the distortion is construction.	

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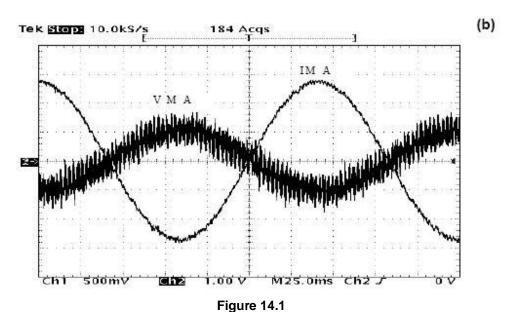


Figure 14

AC Motor Voltage and Motor Current at Test-points VMA and IMA at 10% speed with Synchronous Motor Control (a) Unloaded and (b) 75% torque operation.

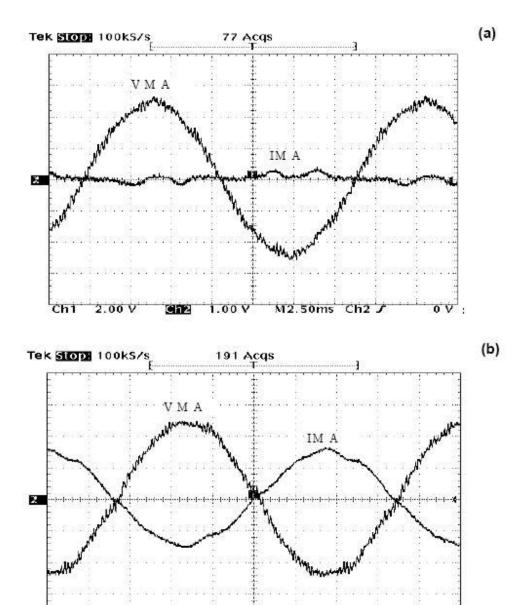


Figure 14.2

AC Motor and Motor Current at Test-point VMA and IMA at 100% speed with Synchronous Motor Control

(a) Unloaded and (b) 75% torque operation

## 15.0 ALARMS AND ADDRESSES See Param\_List attached

Description	Initial	
Verify the following parameters are set.		RD
Motor limits (1120) including phase imbalance limit (limit (1245)	RD	
Speed profile menu (4000)		RD
Bypass type menu (2590) and fast bypass menu (26	600)	RD
Critical frequency menu (2340)		RD
Drive protection menu (7)		RD
Display parameters menu (8000)		RD
The Drive is functional at this time.	RD	
Verify alarm indications per the site confirm the inpu working.	RD	
Depress local E-Stop	VFD coast to stop	RD
Measure contact status on TB2-1 & 2	RD	
Verify Fault contact on TB2-31 & 32 changes state	RD	
Verify Run contact on TB2-23 & 24 changes state	RD	
Remove Jumper on TB2-3 & 4	VFD coasts to stop	RD

## The commissioning process is now complete.

The Customer's signature provides acceptance of the Siemens equipment listed on the site information page.

### 16.0 APPROVAL & ACCEPTANCE OF STARTUP & COMMISSIONING

#### 16.1 Documentation Provided

- 16.1.1 Configure keypad to display desired parameters.
- 16.1.2 Upload the parameter (configuration) file, SOP file, event log file.
- 16.1.3 Provide Customer with the following:
  - 16.1.3.1 Copy of parameter, SOP, event log file
  - 16.1.3.2 Copy of operating flash drive
  - 16.1.3.3 Copy of this checklist

I, the undersigned, validate that this system Commissioning has been completed as per this procedure. Any discrepancies have been noted alongside the appropriate steps in the document. Additionally, any outstanding items or recommendations have been listed.

SIEMENS FSR	
Print Name:	Ruben Diaz
Signature:	R.D.
Date:	Completion - 30 October 2013
CUSTOMER RE	PRESENTATIVE
Print Name:	JOHN CLAYTON.
Signature:	9 Clayton
Date:	30/10/2013,
CUSTOMER RE	PRESENTATIVE
Print Name:	FORE CRANC
Signature:	Class.
Date:	14-3-2014

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QUU-SR12 - Parameter Dump......Page 1
Drive Software - Version 5.2.2 5-18-12 February 21, 2014 2:10 P.M.

Description			ID	Lvl RH
Main - Sec. level: 7 Motor			5 1	0 0 0 0 0 0 0 0
	Motor par	rameter	1000	0 0 0
		Motor frequency = 50.0 Hz	*1020	5 10
		Full load speed = 593 rpm	*1030	5 10
		Motor voltage = 6600 V	*1040	5 10
		Full load current = 217.0 A	*1050	5 10
		No load current = 33.4 %	*1060	5 0 0
		Motor kW Rating = 2000.0 kW	*1010	5 10
		Leakage inductance = 24.7 %	*1070	5 0 0
		Stator resistance = 0.81 %	*1080	5 0 0
		Inertia = 388.5 Kgm2	*1090	5 0 0
		Current Profile	1092	0 0 0
		Motor current limit 1 = 100 %	1193	7 0 0
		Speed at current lim 1 = 100 %	1194	7 0 0
		Motor current limit 2 = 100 %	1195	7 0 0
		Speed at current lim 2 = 100 %	1196	7 0 0
		Motor current limit 3 = 100 %	1197	7 0 0
		Speed at current lim 3 = 100 %	1198	7 0 0
		Motor current limit 4 = 100 %	1202	7 0 0
		Speed at current lim 4 = 100 %	1203	7 0 0
		Motor current limit 5 = 100 %	1204	7 0 0
		Speed at current lim 5 = 100 %	1205	7 0 0
		Motor current limit 6 = 100 %	1206	7 0 0
		Speed at current lim 6 = 100 %	1207	7 0 0
		Motor current limit 7 = 100 %	1208	7 0 0 7 0 0
		Speed at current lim 7 = 100 % Motor current limit 8 = 100 %	1209 1301	7 0 0
		Speed at current lim 8 = 100 %	1301	7 0 0
		Motor current limit 9 = 100 %	1302	7 0 0
		Speed at current lim 9 = 100 %	1304	7 0 0
		opeca at carrent min 7 100 70	1001	, 00
	Limits	0	1120	5 0 0
		Overload select = Inv Time w/ derate	1130	5 0 0
		Overload Pending = 100.0 %	*1139	5 0 0
		Overload = 110.0 %	1140	5 0 0
		Overload timeout = 5.0 sec	1150	5 0 0
		Speed Derate Curve 0 Percent Break Point = 0.0 %	1151 1152	5 0 0 5 0 0
		10 Percent Break Point = 0.0 %	1152	5 0 0
		17 Percent Break Point = 41.2 %	1153	5 0 0
		25 Percent Break Point = 50.0 %	1155	5 0 0
		50 Percent Break Point = 70.7 %	1156	5 0 0
		100 Percent Break Point = 100.0 %	1157	5 0 0
		Motor trip volts = 8300 V	*1160	5 0 0
		Maximum Motor Inertia = 0.0 Kgm2	1159	5 1 0
		Overspeed = 120.0 %	1170	5 0 0
		Underload enable = Disable	1180	5 0 0
		I underload = 10.0 %	1182	5 0 0
		Under load timeout = 10.0 sec	1186	5 0 0
		Motor torque limit 1 = 100.0 %	1190 1200	5 0 0 5 0 0
		Regen torque limit 1 = -0.25 % Motor torque limit 2 = 100.0 %	1200	7 0 0
		Regen torque limit 2 = -0.25 %	1210	7 0 0
		Regentorque milit 2 = -0.20 /0	1220	, 00

Description	ID	Lvl RH
Motor torque limit 3 = 100.0 % Regen torque limit 3 = -0.25 % Phase Imbalance Limit = 40.0 % Ground Fault Limit = 5.0 % Ground Fault Time Const = 0.017 sec H/W Ground Fault Enable = Yes Peak Reduction Enable = VFD volt rating Loss of field level = 40.0 % Loss of field timeout = 10.0 sec	1230 1240 1244 1245 1246 1247 1248 1141 1142	7 00 7 00 5 00 5 00 5 00 7 10 7 00 7 00 7 00
Encoder  Encoder 1 PPR = 1024  Encoder filter gain = 0.7500  Encoder loss threshold = 5.0 %  Encoder loss response = stop (fault)  Low speed operation = Disable	1280 *1290 1300 1310 1320 1330	0 0 0 5 1 0 7 0 0 7 0 0 7 0 0 7 0 0
Drive  Drive parameters  Rated input voltage = 6600 V  Rated input current = 214.0 A  Rated output voltage = 6600 V  Rated output current = 260.0 A  Control loop type = OLVC  Parallel system = Disable	2 2000 *2010 *2020 *2030 *2040 2050 2051	0 0 0 0 0 0 7 1 0 7 1 0 7 1 0 7 1 0 7 1 0 0 0 0
Ratio control = 100.0 %  Speed fwd max limit 1 = 100.0 %  Speed fwd min limit 1 = 1.0 %  Speed fwd max limit 2 = 0.0 %  Speed fwd min limit 3 = 0.0 %  Speed fwd min limit 3 = 0.0 %  Speed fwd min limit 1 = 0.0 %  Speed rev max limit 1 = 0.0 %  Speed rev min limit 1 = 0.0 %  Speed rev max limit 2 = 0.0 %  Speed rev max limit 2 = 0.0 %  Speed rev min limit 3 = 0.0 %	2060 2070 2080 *2090 *2100 2110 *2120 2130 *2140 2150 *2160 2170 *2180 2190 2200	0 0 0 0 5 0 0 0 5 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 5 0 0 0 0 5 0
Torque reference  Sop / Menu control = Sop flag  Torque setpoint = 0.0 %  Holding torque = 0.0 %  Torque ramp increase = 1.00 sec  Torque ramp decrease = 1.00 sec  Torque command scalar = 1.00	2210 2211 2220 2230 2240 2250 2242	0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 5 0 0
Speed ramp setup  Accel time 1 = 45.0 sec  Decel time 1 = 45.0 sec  Accel time 2 = 5.0 sec  Decel time 2 = 5.0 sec	2260 *2270 *2280 2290 2300	0 0 0 5 0 0 5 0 0 7 0 0 7 0 0

Description	ID	Lvl RH
Accel time 3 = 5.0 sec Decel time 3 = 5.0 sec Jerk rate = 0.1	2310 2320 2330	7 0 0 7 0 0 7 1 0
Critical freq Skip center freq 1 = 15.0 Hz Skip center freq 2 = 30.0 Hz Skip center freq 3 = 45.0 Hz Skip bandwidth 1 = 0.0 Hz Skip bandwidth 2 = 0.0 Hz Skip bandwidth 3 = 0.0 Hz	2340 2350 2360 2370 2380 2390 2400	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Spinning load  Spinning load mode = Both Scan end threshold = 20.0 % Current Level SetPoint = 15.0 % Current ramp = 0.01 sec Max current = 50.0 % Frequency scan rate = 3.00 sec	2420 *2430 2440 2450 2460 2470 2480	0 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Cond time setup  Cond stop timer = 0.8 sec  Cond run timer = 0.8 sec	2490 2500 2510	0 0 0 5 0 0 5 0 0
Cells  Installed cells/phase = 6  Min cell count (n/3) = 6  Cell voltage = 630  Thermistor warn level = 20.0 %  Bypass type = None  Neutral connection = T1  Precharge Enable = Off	2520 *2530 *2540 2550 2560 *2590 *2630 2635	0 0 0 5 1 0 5 1 0 5 1 0 5 1 0 7 1 0 7 1 0 7 1 0
Sync transfer  Phase I gain = 2.0  Phase P gain = 4.0  Phase offset = 2.00 deg  Phase error threshold = 1.50 deg  Frequency offset = 0.5 %  Up transfer timeout = 0.0 sec  Down transfer timeout = 0.0 sec	2700 2710 2720 2730 2740 2750 2760 2770	7 0 0 7 0 0
External I/O  Analog inputs = 0  Analog outputs = 2  Digital inputs = 0  Digital outputs = 0  Wago timeout = 0.0 sec	2800 2810 *2820 2830 2840 *2850	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0
Internal I/O Int Analog In1 Hardware Span = 1.086	2805 2815 60 *2818	5 0 0 5 0 0 5 1 0
Int Analog In2 Type = 4 - 20ma	2825 2826	5 0 0 5 1 0

Description	ID	Lvl RH
Hardware Span = 1.0635	*2828	5 10
Int Analog In3 Type = 4 - 20ma Hardware Span = 1.0705	2835 2836 *2838	5 0 0 5 1 0 5 1 0
Int Analog Out1  Analog variable = Total Current Output Mode = 4-20 mA Output Min = 0.0 % Output Max = 150.0 % Hardware Span = 1.0120	2845 2846 2848 2841 *2842 *2844	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Int Analog Out2  Analog variable = Motor Speed  Output Mode = 4-20 mA  Output Min = 0.0 %  Output Max = 100.0 %  Hardware Span = 1.0030	2855 *2856 2858 2851 2852 *2854	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Int Test Point #28 Analog variable = None TP 28 Scaler = 0.00	2860 2861 2862	5 0 0 5 0 0 5 0 0
Int Test Point #29 Analog variable = None TP 29 Scaler = 0.00	2865 2866 2867	5 0 0 5 0 0 5 0 0
Int Test Point #31 Analog variable = None TP 31 Scaler = 0.00	2870 2871 2872	5 0 0 5 0 0 5 0 0
Int Test Point #24 Analog variable = None TP 24 Scaler = 0.00	2875 2876 2877	5 0 0 5 0 0 5 0 0
Int Test Point #25 Analog variable = None TP 25 Scaler = 0.00	2880 2881 2882	5 0 0 5 0 0 5 0 0
Int Test Point #26 Analog variable = None TP 26 Scaler = 0.00	2885 2886 2887	5 0 0 5 0 0 5 0 0
Output Connection  Filter CT sec turns = 0  Filter inductance = 0.0 %  Filter capacitance = 0.0 %  Cable resistance = 0.0 %  Cable inductance = 0.0 %  Filter damping gain = 0.50	2900 2910 2920 2930 2940 2941 2950	0 0 0 5 1 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
High starting Torque Enable high torque = Disable Torque current = 50.0 %	2960 2961 2962	7 0 0 7 1 0 5 0 0

Description			ID	Lvl RH
		mp time = 0.5 sec me = 2.0 sec	2963 2964	5 0 0 5 0 0
	Watchdog Enable wa	itchdog = Enable	2970 2971	7 00 7 00
Stability	Input curre CT second Input volta PT second	gain = 70.0 al gain = 3840.00 ent scaler = 1.000000 dary turns = 250 ge scaler = 1.000000 dary turns = 1 nuator Sum = 4800 kOhm	3 3000 3010 3020 3030 *3035 3040 3011 *3045	0 0 0 7 0 0 7 0 0 7 0 0 7 1 0 7 1 0 7 1 0 7 1 0 7 1 0
	Output processing Low freq c	omp Low Freq Wo = 12.566 Rad Low freq com gain = 1.00 S/W compensator pole = 2.000	3050 3060 3070 3080 3090	7 0 0 7 0 0 7 1 0 7 0 0 7 0 0
	Flux contro	Flux reg prop gain = 2.552 Flux reg integral gain = 3.208 Flux filter time const = 0.06561 Flux demand = 1.00 Flux ramp rate = 0.500 sec Energy saver min flux = 100.0 % Flux droop = 0.0 %	3100 *3110 *3120 *3130 3150 3160 3170 3195	7 0 0 7 0 0
	Speed loo	Speed reg prop gain = 0.010 Speed reg integral gain = 0.020 Speed reg Kf gain = 0.600 Speed filter time const = 0.08038 Droop in % @ FL current = 0.0 %	3200 *3210 *3220 3230 *3240 3245	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
	Current loo	Current reg prop gain = 0.750 Current reg integ gain = 18.861 Prop gain during brake = 0.150 Integ gain during brake = 3.772	3250 *3260 *3270 *3280 *3290	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
	Stator resi	s est Stator resistance est = Off Stator resis filter gain = 0.0 Stator resis integ gain = 0.00200	3300 3310 3320 3330	7 0 0 7 1 0 7 0 0 7 0 0
	Braking	Enable braking = Off Pulsation frequency = 277.5 Hz Brake power loss = 0.3 % VD Loss Max = 0.250 Braking constant = 1.05	3350 3360 *3370 3390 3400 3410	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0

Description	ID	Lvl RH
Output current scaler = 1.000000 Output voltage scaler = 1.000000 Output Attenuator Sum = 4800 kOhm	3440 3450 *3455	7 0 0 7 0 0 7 1 0
Control loop test  Test type = Speed  Test positive = 30.0 %  Test negative = -30.0 %  Test time = 30.1 sec	3460 3470 3480 3490 3500	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
Dead time comp = 16.0000 usec Feed forward constant = 0.0000 Sampling Delay Comp = 0.0 % Carrier frequency = 601.3 Hz	3550 3560 3570 *3580	7 1 0 7 1 0 7 0 0 7 1 0
Auto  Speed profile  Entry point = 0.0 %  Exit point = 100.0 %  Entry speed = 48.0 %  Exit speed = 98.3 %  Auto off = 0.0 %  Delay off = 0.5 sec  Auto on = 0.0 %  Delay on = 0.5 sec	4 4000 4010 *4020 *4030 *4040 4050 4060 4070 4080	5 0 0 5 0 0
Analog inputs  Analog input #1  Source = Int AI1  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4090 4100 *4105 4110 4120 4130 4140 4150 4160	5 0 0 5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Analog input #2  Source = Off Type = 4 - 20ma Min input = 0.0 % Max input = 100.0 % Loss point threshold = 15.0 % Loss of signal action = Preset Loss of signal setpoint = 20.0 %	4170 4175 4180 4190 4200 4210 4220 4230	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Analog input #3  Source = Off Type = 4 - 20ma Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4232 4233 4234 4235 4236 4237 4238 4239	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Analog input #4	4332	5 00

Description	ID	Lvl RH
Source = Off Type = 4 - 20ma Min input = 0.0 % Max input = 100.0 % Loss point threshold = 15.0 % Loss of signal action = Preset Loss of signal setpoint = 20.0 %	4333 4334 4335 4336 4337 4338 4339	5 10 5 10 5 10 5 10 5 10 5 10 5 00
Analog input #5  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4341 4342 4343 4344 4345 4346 4347 4348	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Auxillary input #1  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4500 4510 4520 4530 4540 4550 4560 4570	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Auxillary input #2  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4580 4590 4600 4610 4620 4630 4640 4650	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Analog outputs Analog output #1 Analog variable = Average Power Output module type = Unip Full range = 81.0 %	4660 4661 *4662 4663 *4664	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Analog output #2 Analog variable = Motor Speed Output module type = Unip Full range = 100.0 %	4665 *4666 4667 *4668	5 0 0 5 0 0 5 0 0 5 0 0
Speed setpoints  Speed setpoint 1 = 0 rpm Speed setpoint 2 = 0 rpm Speed setpoint 3 = 0 rpm Speed setpoint 4 = 0 rpm Speed setpoint 5 = 0 rpm Speed setpoint 6 = 0 rpm Speed setpoint 7 = 0 rpm Speed setpoint 8 = 0 rpm	4240 4250 4260 4270 4280 4290 4300 4310 4320	5 00 5 00 5 00 5 00 5 00 5 00 5 00 5 00

Description	ID	Lvl RH
Jog speed = 0 rpm Safety setpoint = 0 rpm	4330 4340	5 0 0 5 0 0
Incremental speed setup  Speed increment 1 = 1.00 %  Speed decrement 1 = 1.00 %  Speed increment 2 = 5.00 %  Speed decrement 2 = 5.00 %  Speed increment 3 = 10.00 %  Speed decrement 3 = 10.00 %	4970 4971 4972 4973 4974 4975 4976	7 00 7 00 7 00 7 00 7 00 7 00 7 00
PID select  Prop gain = 0.390  Integral gain = 0.390  Diff gain = 0.000  Min clamp = 0.0 %  Max clamp = 100.0 %  Setpoint = 0.0 %	4350 4360 4370 4380 4390 4400 4410	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Comp 1 B in variable = Manual value Comp 1 manual value = 2.500 %	4800 4810 *4811 4812 *4813 *4815	5 0 0 5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 2 setup  Comp 2 A in variable = Manual value  Comp 2 B in variable = Manual value  Comp 2 manual value = 0.000 %  Compare 2 type = Off	4820 4821 4822 4823 4825	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 3 setup  Comp 3 A in variable = Manual value  Comp 3 B in variable = Manual value  Comp 3 manual value = 0.000 %  Compare 3 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 4 setup  Comp 4 A in variable = Manual value  Comp 4 B in variable = Manual value  Comp 4 manual value = 0.000 %  Compare 4 type = Off	4840 4841 4842 4843 4845	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 5 setup  Comp 5 A in variable = Manual value  Comp 5 B in variable = Manual value  Comp 5 manual value = 0.000 %  Compare 5 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 6 setup  Comp 6 A in variable = Manual value  Comp 6 B in variable = Manual value  Comp 6 manual value = 0.000 %  Compare 6 type = Off	4860 4861 4862 4863 4865	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0

Description		ID	Lvl RH
	Comparator 7 setup  Comp 7 A in variable = Manual of Comp 7 B in variable = Manual of Comp 7 manual value = 0.000 of Compare 7 type = Off	value 4872	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 8 setup  Comp 8 A in variable = Manual of Comp 8 B in variable = Manual of Comp 8 manual value = 0.000 of Compare 8 type = Off	value 4882	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 9 setup  Comp 9 A in variable = Manual of Comp 9 B in variable = Manual of Comp 9 manual value = 0.000 % Compare 9 type = Off	value 4892	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 10 setup  Comp 10 A in variable = Manua  Comp 10 B in variable = Manua  Comp 10 manual value = 0.000  Compare 10 type = Off	l value4902	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 11 setup  Comp 11 A in variable = Manua  Comp 11 B in variable = Manua  Comp 11 manual value = 0.000  Compare 11 type = Off	l value4912	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 12 setup  Comp 12 A in variable = Manua  Comp 12 B in variable = Manua  Comp 12 manual value = 0.000  Compare 12 type = Off	l value4922	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 13 setup  Comp 13 A in variable = Manua  Comp 13 B in variable = Manua  Comp 13 manual value = 0.000  Compare 13 type = Off	l value4932	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 14 setup  Comp 14 A in variable = Manua  Comp 14 B in variable = Manua  Comp 14 manual value = 0.000  Compare 14 type = Off	l value4942	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 15 setup  Comp 15 A in variable = Manua  Comp 15 B in variable = Manua  Comp 15 manual value = 0.000  Compare 15 type = Off	l value4952	5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 16 setup	4960	5 00

Description			ID	Lvl RH
		Comp 16 A in variable = Manual valu Comp 16 B in variable = Manual valu Comp 16 manual value = 0.000 % Compare 16 type = Off		5 10 5 10 5 00 5 10
	Compara	ator 17 setup Comp 17 A in variable = Manual valu Comp 17 B in variable = Manual valu Comp 17 manual value = 0.000 % Compare 17 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Compara	ator 18 setup Comp 18 A in variable = Manual valu Comp 18 B in variable = Manual valu Comp 18 manual value = 0.000 % Compare 18 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Compara	ator 19 setup Comp 19 A in variable = Manual valu Comp 19 B in variable = Manual valu Comp 19 manual value = 0.000 % Compare 19 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Compara	ator 20 setup Comp 20 A in variable = Manual valu Comp 20 B in variable = Manual valu Comp 20 manual value = 0.000 % Compare 20 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Compara	ator 21 setup Comp 21 A in variable = Manual valu Comp 21 B in variable = Manual valu Comp 21 manual value = 0.000 % Compare 21 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Compara	ator 22 setup  Comp 22 A in variable = Manual valu  Comp 22 B in variable = Manual valu  Comp 22 manual value = 0.000 %  Compare 22 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Compara	ator 23 setup Comp 23 A in variable = Manual valu Comp 23 B in variable = Manual valu Comp 23 manual value = 0.000 % Compare 23 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Compara	ator 24 setup Comp 24 A in variable = Manual valu Comp 24 B in variable = Manual valu Comp 24 manual value = 0.000 % Compare 24 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Compara	ator 25 setup Comp 25 A in variable = Manual valu	4459 e4460	5 0 0 5 1 0

Description		ID	Lv	I RH
	Comp 25 B in variable = Manual value Comp 25 manual value = 0.000 % Compare 25 type = Off	24461 4462 4464	5 5 5	1 0 0 0 1 0
	Comparator 26 setup  Comp 26 A in variable = Manual value  Comp 26 B in variable = Manual value  Comp 26 manual value = 0.000 %  Compare 26 type = Off		5 5 5 5 5	0 0 1 0 1 0 0 0 1 0
	Comparator 27 setup  Comp 27 A in variable = Manual value  Comp 27 B in variable = Manual value  Comp 27 manual value = 0.000 %  Compare 27 type = Off		5 5 5 5 5	0 0 1 0 1 0 0 0 1 0
	Comparator 28 setup  Comp 28 A in variable = Manual value  Comp 28 B in variable = Manual value  Comp 28 manual value = 0.000 %  Compare 28 type = Off		5 5 5 5	0 0 1 0 1 0 0 0 1 0
	Comparator 29 setup  Comp 29 A in variable = Manual value  Comp 29 B in variable = Manual value  Comp 29 manual value = 0.000 %  Compare 29 type = Off		5 5 5 5	0 0 1 0 1 0 0 0 1 0
	Comparator 30 setup  Comp 30 A in variable = Manual value  Comp 30 B in variable = Manual value  Comp 30 manual value = 0.000 %  Compare 30 type = Off		5 5 5 5 5	0 0 1 0 1 0 0 0 1 0
	Comparator 31 setup  Comp 31 A in variable = Manual value  Comp 31 B in variable = Manual value  Comp 31 manual value = 0.000 %  Compare 31 type = Off		5 5 5 5 5	0 0 1 0 1 0 0 0 1 0
	Comparator 32 setup  Comp 32 A in variable = Manual value  Comp 32 B in variable = Manual value  Comp 32 manual value = 0.000 %  Compare 32 type = Off		5 5 5 5 5	0 0 1 0 1 0 0 0 1 0
Logs Historic Io	Store in Event Log = On Historic log variable 1 = Mtr Speed Historic log variable 2 = Spd Dmd Historic log variable 3 = Trq I Cmd Historic log variable 4 = Trq I Fdbk Historic log variable 5 = I Total Out	6 6250 6255 *6260 6270 *6280 *6290 *6310	0 7 5 5 5 5 5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Description		ID	Lvl RH
	Historic log variable 7 = V Avail RMS	*6320	5 00
Drive pro	tect Input protection Single phasing SPD prop gain = 0.0 SPD integral gain = 0.0010 SPD threshold = 50.0 %	7 7000 7010 7020 7030 7040	0 0 0 0 0 0 0 0 0 7 0 0 7 0 0 7 0 0
	Undervoltage prop gain = 0.0 Undervoltage integ gain = 0.001 1 Cyc Protect integ gain = 0.0025 1 Cycle Protect Limit = 50.0 % Excess Loss Idle = 5.0 % Excess Loss Running = 7.0 % Xformer tap setting = +5 % Xformer thermal gain = 0.0133 Xformer protection const = 0.500 Phase Imbalance Limit = 40.0 % Ground Fault Limit = 40.0 % Ground Fault Time Const = 0.200 sec	7060 7070 7080 7081 7084 7086 *7050 7090 7100 7105 7106 7107	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 1 0 7 0 0 7 0 0 7 0 0 7 0 0
	Drive IOC setpoint = 150.0 % Cell Overload Level = 100.0 % Auto reset enable = No Auto reset time = 1 sec Auto reset attempts = 4 Auto reset memory time = 10 sec	7110 7112 7120 7130 7140 7150	7 0 0 7 0 0 7 0 0 5 0 0 5 0 0 5 0 0
Meter	Display params  Status variable 1 = DEMD  Status variable 2 = RPM  Status variable 3 = ITOT  Status variable 4 = KWO  Status variable 5 = IMRF  Status variable 6 = IMRF  Status variable 7 = IMRF	8 8000 8001 8002 *8003 *8004 8005 8006 8007	0 0 0 0 0 0
	Input harmonics Selection for HA = IA Harmonics order = 1.0 Harmonics integral gain = 0.001	8140 8150 8160 8170	0 0 0 0 0 0 0 0 0 0 0 0
	Customer order = 2133943 Customer drive = 1	*8101 8110	0 0 0 0 0 0
Commun	ications Serial port setup Serial port use = Remote Baud rate = 9600	9 9010 *9020 9040	0 00 0 00 5 10 5 10
	Network Control  Net Control Type = Sop  Start Stop Control = Maintained	9943 9944 9945	7 0 0 7 1 0 7 1 0

Description		ID	Lvl RH
	Network 1 Configure Network 1 Type = None	9900 9901	7 0 0 7 1 0
	Network 2 Configure Network 2 Type = None	9914 9915	7 0 0 7 0 0
	SOP & serial functions Menu based Timer setup  MenuTimer1 = 30.0 sec  MenuTimer2 = 0.0 sec  MenuTimer3 = 0.0 sec  MenuTimer4 = 10.0 sec  MenuTimer5 = 0.0 sec  MenuTimer6 = 0.0 sec  MenuTimer7 = 0.0 sec  MenuTimer8 = 0.0 sec  MenuTimer9 = 0.0 sec  MenuTimer10 = 0.0 sec  MenuTimer11 = 0.0 sec  MenuTimer11 = 0.0 sec  MenuTimer12 = 0.0 sec  MenuTimer12 = 0.0 sec  MenuTimer13 = 0.0 sec  MenuTimer14 = 0.0 sec  MenuTimer15 = 0.0 sec  MenuTimer15 = 0.0 sec	9110 9111 *9112 9113 9114 *9115 9116 9117 9118 9119 9121 9122 9123 9124 9125 9126 9127 9128	0 0 0 0 7 0 0 0 0 7 0 0 0 0 7 0 0 0 0 7 0
	Select system program = 2168985F.HEX Multiple config files = OFF	*9146 9185	7 1 0 5 1 0
	TCP/IP server name = 172.17.20.16	*9000	0 0 0
Graphing	Time scale = 10.00 sec  Variable 1  Graph variable = Spd ref  Offset = 0.00  Scale factor = 1.20	10 10000 10010 10020 10030 10040	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	Variable 2 Graph variable = Mtr speed Offset = 0.00 Scale factor = 1.20	10050 10060 10070 10080	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 3 Graph variable = Flux ref Offset = 0.00 Scale factor = 1.25	10090 10100 10110 10120	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 4 Graph variable = Flux DS Offset = 0.00 Scale factor = 1.25	10130 10140 10150 10160	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 5 Graph variable = Ids ref Offset = 0.00	10170 10180 10190	0 0 0 0 0 0 0 0 0

Description	ID	Lvl RH
Scale factor = 1.00	10200	0 0 0
Variable 6 Graph variable = Ids Offset = 0.00 Scale factor = 1.00	10210 10220 10230 10240	0 0 0 0 0 0 0 0 0 0 0 0
Variable 7 Graph variable = Iqs ref Offset = 0.00 Scale factor = 1.00	10250 10260 10270 10280	0 0 0 0 0 0 0 0 0 0 0 0
Variable 8  Graph variable = Iqs  Offset = 0.00  Scale factor = 1.00	10290 10300 10310 10320	0 0 0 0 0 0 0 0 0 0 0 0
Variable 9 Graph variable = Drv State Offset = 0.00 Scale factor = 1.00	10330 10340 10350 10360	0 0 0 0 0 0 0 0 0 0 0 0
Variable 10 Graph variable = PreChrg St Offset = 0.00 Scale factor = 1.00	10370 10380 10390 10400	0 0 0 0 0 0 0 0 0 0 0 0
Select language = English	5081	0 0 0

# 2) 0110-SR12 Variable Speed Drive System

E. Ventilation System Data



Represented by: Air Design Pty. Ltd. A.B.N. 77 512 727 190 45 Nestor Drive Meadowbrook QLD 4131 Telephone: +61 (07) 3299 9888 Facsimile: +61 (07) 3299 9800 E-mail: sales@airdesign.com.au

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#### FAN DATA FOR MODEL AP0804GP6/20

600

Fan Code: AP0804GP6/20

Requirements

Volume:

6300 L/s 200 Pa

Static Pressure: Selection Pressure:

200 Pa at std conditions

Installation Category:

TYPE D 20 deg C

Temperature: Altitude:

0 m

Fan Data (at STP)

Type:

In-line direct drive axial

fan

Diameter:

800 Hub: 255 mm

Impeller Blades:

Pitch:

20 degrees

Blade Material:

**GRP** 

Speed: Absorbed Power: 24 revs/sec 2.34 kW

Peak Power:

2.59 kW

Total Efficiency:

79 %

84.3 kg.

Fan Weight:

Motor Data (at STP)

Motor Type:

Standard

**Electrical Supply:** 

415V/3ph/50Hz D100L / 3.00 kW

Motor Frame/Power:

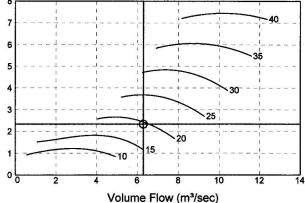
6.2A / 37.2

Current FLC/Start: Motor Speed:

Single Speed (4 Pole)

Energy Efficiency, BCA Volume 1 2008, Table J5.2 compliant selection

sys 500 400 PdF Static Pressure 300 (Pa) 200 100 Volume Flow (m³/sec)



Density: 1.2 kg/m³

#### Inlet PWL

Spectrum (Hz)	63	125	250	500	1K	2K	4K	8K	dBW	dBA @ 3m
Outlet PWL (dB)	92	86	86	84	85	81	77	73	95	68
Inlet PWL (dB)	90	86	87	85	85	81	78	73	94	69

Power (kW)

Note: Levels are quoted as in-duct values.

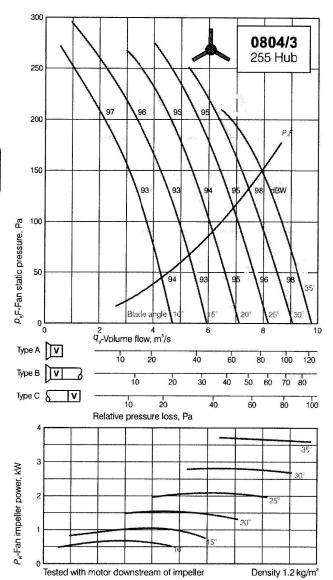
Version 4.20: On-going product improvements may result in fan data changes without notice.

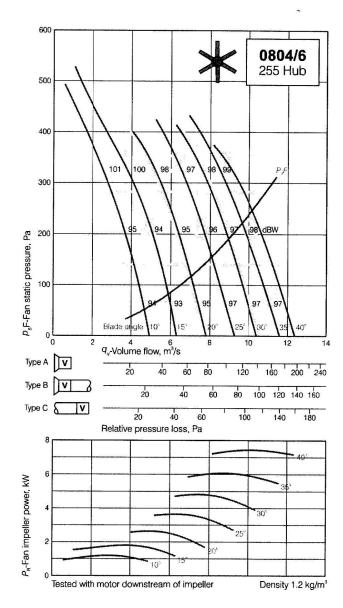
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# **AXIAL FLOW FANS PERFORMANCE DATA**









## **SOUND DATA**

	In-Duct		In-D								
Zone	dB	Total	63	125	250	500	1k	2k	4k	8k	dB(A)
	Inlet	1	6	10	8	6	8	13	18	24	4
	Outlet	0	4	11	10	7	10	15	19	24	6
•••••	Inlet	+1	2	9	12	11	12	16	19	22	8
28	Outlet	0	2	8	10	12	12	16	18	20	8
	Inlet		***************************************		•	Not R	oquir		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	<del></del>	···
	Outlet					INOLIT	equire	eu	· · · · · · · · · · · · · · · · · · ·		
ed)	Inlet	1	3	10	11	10	11	13	16	22	6
124	Outlet	0	1	10	13	12	13	15	18	22	8
	Inlet	0	2	9	11	9	10	15	18	23	6
	Outlet	0	3	9	10	10	12	15	18	21	7
	Inlet	+1	3	9	12	10	12	16	19	22	7
121	Outlet	0	3	9	11	10	11	15	17	19	7
	Inlet	1	2	10	11	10	10	13	15	21	6
1	Outlet	0	2	11	12	12	12	14	17	22	7
11	Inlet	0	2	9	11	10	12	15	19	24	7
E.	Outlet	0	3	9	11	11	12	16	19	23	8
ii.	Inlet	+2	2	9	13	11	12	17	20	23	8
	Outlet	0	2	8	11	10	11	15	18	19	7

For Free Field conditions apply the following corrections to the In-Duct figures. All figures are negative unless otherwise stated.

In/Out O/A 7 3 1 0 0 0 0 0 O/A

### **SOUND DATA**

	In-Duct		In-Duct Spectrum Corrections, dB									
Zone	dB	Total	63	125	250	500	1k	2k	4k	8k	dB(A)	
	Inlet	1	9	9	6	4	8	14	20	26	3	
	Outlet	0	6	9	7	7	10	16	21	27	6	
	Inlet	0	4	9	8	9	10	13	17	22	6	
	Outlet	0	4	8	8	10	10	14	16	21	6	
47	Inlet	0	4	9	9	8	10	13	17	21	5	
	Outlet	0	3	9	9	9	10	13	16	19	5	
	Inlet	0	6	11	8	9	8	11	14	20	4	
	Outlet	0	4	10	8	9	9	12	15	20	5	
***************************************	Inlet	1	4	8	7	9	9	13	16	21	5	
	Outlet	0	3	9	9	11	10	14	18	22	6	
	Inlet	+1	3	9	9	10	11	15	18	22	7	
	Outlet	0	3	8	8	9	11	14	17	19	6	
	Inlet	+1	5	9	7	8	8	11	13	20	4	
	Outlet	0	5	9	7	8	8	11	13	19	4	
	Inlet	1	4	8	8	9	9	13	16	21	5	
	Outlet	0	4	9	8	11	11	14	18	22	7	
	Inlet	0	9	7	9	6	8	12	16	20	4	
	Outlet	0	8	6	9	8	9	12	15	18	4	

For Free Field conditions apply the following corrections to the In-Duct figures. All figures are negative unless otherwise stated.

In/Out O/A 7 3 1 0 0 0 0 O/A



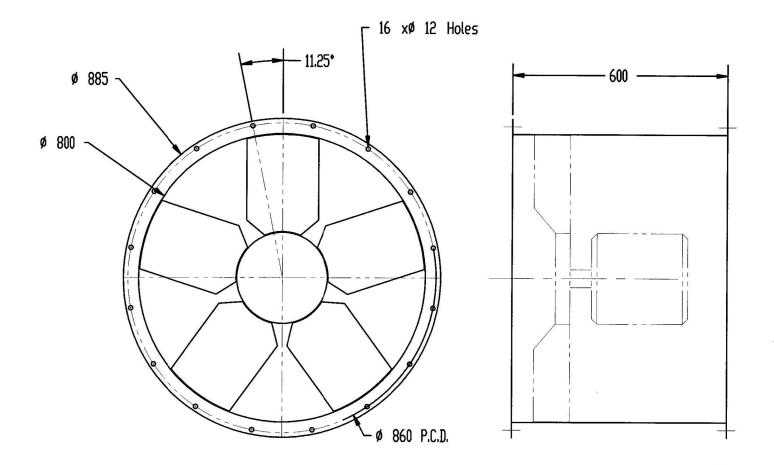
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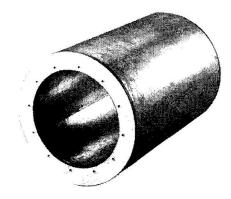
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## DRAWING FOR MODEL AP0804GP6/20

Version 4.20: On-going product improvements may result in dimensional changes without notice.



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#### **FEATURES**

These notes apply to both the open and pod type attenuators.

#### Construction

The units are rigidly constructed and consist of an outer cylindrical galvanised steel casing, lined internally with non-hygroscopic and incombustible sound-absorbent material. This material is retained by an inner perforated metal cylinder.

When a pod is fitted it is of perforated metal, retaining an infill of acoustic material.

An impervious lining of the acoustic infill can be provided to prevent the ingress of moisture or grease. There is a small performance penalty in high frequencies when an impervious lining is fitted. Refer to our Sales Engineers if more information is required.

Also available is the Q-Seal range which offers impervious lining with features to optimise acoustic performance.

The ends of the attenuators are drilled and tapped to match the Fantech 'AP' series of axial flow fans.

Non-standard flange drillings or sizes can be supplied to the customer's specifications.

#### **Insertion Loss**

The values quoted in the table represent the difference between the sound power level  $(L_{\text{W}})$  of a fan and attenuator combination and that of the fan alone.

(continued next page)

### **PERFORMANCE DATA - OPEN TYPE**

Matching Fan Dia. cm	Length mm		ic Insert ave Band 125			ency (I	Hz) 2k	4k	8k
C1-Dia.	1 Dia	mete	r Long	(non	n.)	***************************************	71.		***************************************
-031	300	1	3	5	9	13	10	8	7
-035	300	2	3	5	9	13	10	8	7
-040	600	2	3	5	9	13	10	8	7
-045	600	2	3	5	10	13	10	8	7
-050	600	2	3	6	10	14	10	8	7
-056	600	2	4	6	10	14	10	8	7
-063	600	3	4	7	13	14	9	8	6
-071	900	3	4	8	14	14	9	7	6
-080	900	3	4	8	14	13	9	7	6
-090	1150	3	4	9	14	13	8	7	6
-100	1150	3	4	9	14	12	8	7	6
-125	1150	3	4	10	14	12	8	6	6
-140	1150	3	5	10	13	11	8	5	5
-160	1800	4	6	11	13	10	7	5	5
-180	1800	4	6	11	13	10	6	5	5
-200	1800	4	6	11	13	9	6	5	5
C2-Dia.	2 Diar	neter	s Long	g (no	m.)	***************************************	***************************************	**************************************	
-031	600	3	6	9	15	21	17	14	13
-035	600	4	6	10	15	21	17	14	13
-040	900	4	6	10	16	21	18	15	13
-045	900	4	7	10	17	21	18	15	13
-050	1150	4	7	10	18	21	17	15	12
-056	1150	5	7	11	18	21	17	15	12
-063	1150	5	8	11	21	23	17	15	10
-071	1500	5	8	12	22	23	16	15	10
-080	1500	5	8	12	22	23	16	15	10
-090	1800	5	8	13	22	19	13	12	10
-100	1800	6	8	13	22	19	13	12	10
-125	2400	6	8	13	21	18	13	12	11
***************************************							·		

#### **HOW TO ORDER - OPEN TYPE**

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17

17

11

11

10

10

11

9

9

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10

8

8

8

-140

-160

-180

-200

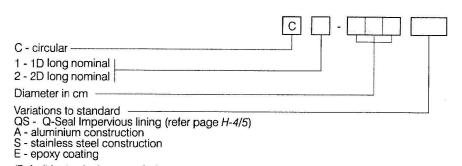
2400

3600

3600

3600

(Default is standard construction)





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E-mail: sales@airdesign.com.au

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#### **Technical Data for Silencer Model C1-080**

Location:

ATT-2

Designation:

Performance - Required

**Actual** 

Air Flow:

6.30 m<sup>3</sup>/s

Velocity:

12.5 m/s

Dia.

Pressure Drop:

60 Pa

Pressure Drop: 2 Pa

Silencer Data

Catalogue Code:

Description:

C1-080 Circular 1D Open

Diameter:

Ext. Diameter:

800 mm

977mm

Length:

900 mm

Weight:

55.0 kg

**Sound Data** 

8K Spectrum (Hz) 63 125 250 500 1K 2K 4K Insertion Loss (dB) : 3 4 8 14 13 9 7

Length

Ext.

Dia.

## 2) 0110-SR12 Variable Speed Drive System

F. Ventilation System Airflow and Sound Levels report

david@airequip.com.au

ABN 67 650 093 954

Phone: (07) 3209 4201

Facsimile: (07) 3209 4204

2 / 36 Randall Street Slacks Creek 4127 PO Box 542 Springwood Qld 4127

Wednesday 4<sup>th</sup> December 2013

J. & P. Richardson Industries Pty Ltd 114 Campbell Street Wacol QLD

Attention: Chris Anderson

Reference: Urban Utilities Eagle Farm Pump Station-VSD Drive Cabinet 0110-SR12

**Verification of Airflow and Sound level Measurements** 

Required Airflow: Transformer Cabinet: 3000l/s

Cell Cabinet: 3200l/s Total: 6200l/s

#### **Equipment Used:**

NATA Certified Vane Anemometer – Certificate No: WT109572

NATA Certified Lutron Sound Level Meter – Certificate No: SLM 39486

Magnehelic Gauge- Fitted to duct work

Initial airflow readings were taken at the filtered intake grilles on the transformer and cell cabinets with the booster fan VSD set at 50Hz. The VSD was adjusted back to 39Hz and readings taken at all points as follows

Transformer Cabinet Intakes: No 1: 620l/s No 2: 590l/s No 3: 540l/s

No 4: 575l/s No 5: 510l/s No 6: 490l/s

Total: 3325l/s

Cell Cabinet Intakes: No 1: 730l/s No 2: 690l/s No 3: 640l/s

No 4: 660l/s No 5: 630l/s No 6: 580l/s

Total: 3930l/s

The magnehelic gauge was fitted to the duct prior to the booster fan. The gauge is to indicate the correct airflow only and at the required airflow reading the gauge was marked at 75Pa

#### **Sound Level Measurements:**

Outdoor readings were taken at the boundary directly down for the fan outlet and 1 meter from the outlet face.

The background noise level was 70-75dBA due to the high traffic movement on the main road. On the odd occasion when there was no vehicle's directly outside the building we registered a reading of 63dBA at the boundary and 68 dBA 1 meter from the face

Indoor readings were taken with the other two drive units turned off but with the pit pumping motors running. Background noise levels around the pit barrier cage were between 71-73dBA

Readings one meter out from the cabinet were between 70-71dBA but this was mainly from background noise

A reading from the side of the cabinet below the booster fan was 69dBA

Hoping the above report is satisfactory and if you have any queries on the information above please do not hesitate to call

Yours faithfully, Air Equipment (Sales) Pty Ltd.

David Meredith.

# 2) 0110-SR12 Variable Speed Drive System

G. Spare Part List

# **SIEMENS**

# **Perfect Harmony VSD Recommended Spare Parts List**

Location	Part Description	Part Number	Installed	Recommended
	CPU Board	A1A10000623.00M	1	1
	I/O board	A1A10000423.00M	1	1
	Modulator Board	A1A10000350.00M	1	1
	Fiber Optic Hub Board	A1A461D85.00M	1	1
Control	Backplane	A1A098194	1	1
cabinet	Communication Board	A5E03407403	1	1
	CPS Power	A1A0100275	1	1
	Signal Conditioninig Board	A5E01708486	1	1
	Keypad	A5E02363383	1	1
	I/O breakout	A5E01649374	1	1
Blower	Cabinet Blower	LDZ10501601	4	1
Danie	Filter on Transformer Cabinet	LDZ10501351	9	9
Doors	Filter on Cell Cabinet	LDZ10501353	9	9
	Power cell	LDZ14501002.260	15	1
Cell cabinet	CCB Fuse	A1A10000432.30M	15	2
	Power Cell Input Fuse	LDZ10501435	45	3

## 2) 0110-SR12 Variable Speed Drive System

H. Drawing List



# Perfect Harmony VSD - 0110-SR12

# **Drawing Register**

Drawing Number	Description
	VSD
486/5/7-0368-014	General Arrangement 1
486/5/7-0368-015	General Arrangement 2
486/5/7-0368-016	General Arrangement 3
486/5/7-0368-017	Control and Power Overview
486/5/7-0368-018	Termination
486/5/7-0368-020	Schematic 1
486/5/7-0368-021	Schematic 2
486/5/7-0368-022	Schematic 3
486/5/7-0368-023	Schematic 4
486/5/7-0368-024	Schematic 5
486/5/7-0368-025	Schematic 6
486/5/7-0368-026	Schematic 7
	Field Control and Interface
486/5/7-0368-130	Schematic 1
486/5/7-0368-131	Schematic 2
486/5/7-0368-132	Schematic 3
486/5/7-0368-133	Schematic 4
486/5/7-0368-134	Schematic 5
	Isolator and Earthswitch Cabinet
486/5/7-0368-103	General Arrangement and Schematic
486/5/7-0368-104	Fortress Interlocking System
486/5/7-0368-105	Legend
	Ventilation
486/5/7-0368-111	General Arrangement

# 2) 0110-SR12 Variable Speed Drive System

I. Factory Acceptance Test (FAT)



# GEN III

# Factory Acceptance Test Medium Voltage Air Cooled

SO - 3002133943 Queensland urban utilities - eagle farm

FAT- A5E32168984 A

REV- AA

P/N- M6SR3

S/N- Z831501002461

MLFB- 6SR3502-6HF42-7BH0-Z

V12+Y06+K69+G22+G28+K73+M42+M38+ M12+M35+L55+L03+K50+T76+D15+D02+D 76+P31

	Revision History	
Revision Level	Details	Date
AA	Original	5/15/2013
	10000000000000000000000000000000000000	
Tested By	术为以及	2013-6-6
Approved By	12 13/2 M	7917-6-6

# SIEMENS

	***************************************	eagle farm			002133943
23	10.0	S/N <u>Z8315</u>	01002461	SOP	M6SR3 C
□ CSA	UL	<b>П</b> СЕ	□ Other		No Listing
red	□ YES		⊠NO		
6600 V		Outpu	ıt Voltage:	6600	V
214 A		Cell S	ize:	260	A
2750 K	VA	Total	# of Cell:	18	
	6600 V 214 A	CSA DUL red DYES	☐ CSA ☐ UL ☐ CE red ☐ YES  6600 V	□ CSA □ UL □ CE □ Other  red □ YES □ NO  6600 V	□ CSA         □ UL         □ CE         □ Other         □           red         □ YES         □ NO           6600 V         Output Voltage:         6600           214 A         Cell Size:         260

# **Table of Contents**

- I. Test Plan Contains the actual test plan with reference to associated test procedures and forms for data collection.
  - 1.1 Visual Inspection
  - 1.2 Insulation Test/Hipot
  - 1.3 Initial Power-Up
  - 1.4 System Test Without Motor
  - 1.5 System Test With Motor (Unloaded)
  - 1.6 System Load Test
  - 1.7 Final Inspection
  - 1.8 Equipment
- II. Completed Forms Contains the forms used to collect associated test data using the procedures.
- III. Analysis/Plots Data If applicable, this section contains any analysis or additional test data supplied with buy out items or data specific to a customer order and not specifically required by the FAT.

	managet für liefe (15 GE) 1999 (1998 as 1994, 5 de 18 SE) as 16 SE) as 16 SE au 16 S	<u>Definitions</u>
R	Routine Test	Test to which each individual device is subjected during or after manufacturer to ascertain whether it complies with certain criteria.
A	Acceptance Test	Contractual test to prove to the customer that the device meets certain conditions of its specification.
0	Option Test	Test additional to type and routine test, determined to be any device or logic added to the drive that is not a pre-engineered option.
W	Witness Test	Any of the above tests performed in the presence of the customer, the user or his representative (Reference STSI-055)

REV# AA

SO 3002133943 P/N M6SR3 S/N Z831501002461

	\	**************************************	***************************************	
	ual Inspection			STSI-061G:4.3
Test Ty	pc Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
R		Hardware Check		Emp# 347
	Metering	Pt. To Pt. Wire Check		Emp# 214
		Fiber Optics		Emp# 214
		Ground Wires		Emp# 214
	Measuring	Burden Resistor Value ( hall effect)	34.00 Ω,2W, .1%	34.2/34.2 Ω
	Measuring	Input attenuator resistor value	4.8 ΜΩ	4.79/4.77/4.78 MΩ
	Measuring	Output attenuator resistor value	4.8 ΜΩ	4.16/4.76/4.75 MΩ
		Set Dip Switch (FR)	Pos. 2 only is "On", all	
			others "Off"	Emp# 347
		Set Dip Switch (P)	Pos. 4 & 5 only are "On",	
			all others "Off"	Emp# 347
		Set Address 1X	1 X=1	Emp# 347
		Set Address 10X	10X=0	Emp# 347
		Set Communication Board (JP1 to JP10)	JP1 & JP2 set to 2,3	Emp# 347
			JP3,JP4&JP5 set to1,2	Emp# 347
			JP6 set to 2,3	Emp# 347
			JP7,JP8,JP9&JP10	
			set to 1,2	Emp# 347
0	Interlocks	Record all Interlock model #'s and keycode #'s for the	K2 –VFD12 - K2	Emp# 347
		Verify correct operation of Interlocks	K3 –VFD12 - K3	Emp# 347
		Ensure hardware and adapter plates are supplied		Emp#347
l				

THE RESERVE OF THE PARTY OF THE	tion Test/Hipot Test Item	Test Procedure		la de la como		rsi-061G:4.4
``````````````````````````````````````	MV			Test Criteria (Eng) Pass/Fail(<0,5mA)	Sign	ature/Value
		Power circuit to GND			Emp	¥ 331
		L1,L2,L3 to GND	28300	25 u	ıA .	
		L1 with L2, L3 to GND	28300	10 u	ıA	
		L2 with L1, L3 to GND	28300	6 u	ıA	
		L3 with L1, L2 to GND	28300	4 u	ıA	
		T1,T2,T3 to GND	28850	83 u	ıA	
		T1 with T2, T3 to GND	18500	32 u	ıA	
		T2 with T1, T3 to GND	18500	23 u	ıA	
		T3 with T1, T2 to GND	18500	25 u	ıA	
	LV	Control Power to GND	2500VOM	800 N	иΩ Етрі	¥ 153
	Control	120Vac to GND	1000VOM	392 N	dΩ Empi	153
		24Vdc to GND	500VOM		Emp	153

	ial Power-Up				STSI-061G:4,5
Test Ty	pe Test Item	Test Procedure		Test Criteria (Eng)	Signature/Value
R	Control Power	Control Power Supply			
		CPS,+5VDC(Slot 6 I/O Board Plug P6 Pin 1	to 4)	(5.10 to 5.15Vdc)	5.13 Vdc
		CPS,+12VDC(Slot 6 I/O Board Plug P6 Pin	2 to 4)	(+11.64 to +12.36Vdc)	12,10Vdc
		CPS,-12VDC(Slot 6 I/O Board Plug P6 Pin	3 to 4)	(-11.64 to -12.36Vdc)	-12.07 Vdc
		CPS, + 15 VDC (SCB Pin 2 to 6 )		(+14.55 to +15.45)	15.01 Vdc
		CPS, - 15 VDC (SCB Pin 4 to 6)		(-14.55 to -15.45)	-15.01 Vdc
		CPS,+24VDC(I/O Board J11-11 to J11-9)		(+21.6 to+26.4Vdc)	24.03 Vdc
		CPS, Power Supply Fault			Emp# 214
		Encoder Power Supply, +15 VDC (IOB boar	d J7-5 to J7-	(+14.25 to +15.75)	Emp# 15.08 Vdc
		T5 (secondary:X1-X4)		(114 to 126Vac)	114 Vac
		Software Version #		Latest Version	Vers: 5.2.2
		Establish Wago Communications			Emp# 214
	Parameters	Set conrect # of			
	Configuration	Analog Outputs	ID 2820	2	
		Set correct Drive Parameters			Emp# 214
		Input Voltage	ID 2010	6600 V	
		Input Current	ID 2020	214 A	
		Output Voltage	ID 2030	6600 V	
		Output Current (equal to 'Cell Rating')	ID 2040	260 A	
		Control Loop Type	ID 2050	OLTM	
		Spinning Load Mode	ID 2430	Off	
		Installed Cells/ Phase	ID 2530	6	
		Cell Voltage	ID 2550	630 V	
		Bypass Type	ID 2590	None	
		Neutral Connection	ID 2630	TI	
		Input CT Ratio	ID 3035	250 :5	
		Tap Setting (+5% typical)	ID 7050	+5%	

Customer Name Queensland urban utilities - eagle farm

REV# AA

P/N M6SR3 S/N Z831501002461 SO 3002133943 STSI-061G:4.5 1.3 Initial Power-Up[continued] Test Criteria (Eng) Signature/Value Test Type Test Item Test Procedure R Parameters Set correct Drive Parameters (con't) Configuration ID 9112 30 S 214 MenuTimer1 ID 9115 10 S 214 MenuTimer4 ID 8080 Emp# 214 Program Clock 214 Program SO ID 8101 2133943 Emp# Emp# 214 ID 8110 Program Drive Number M6SR3C Emp# 214 Download SOP Emp# 214 Ethernet Connection Verified R MODBUS Connect computer to MODBUS port Open MODBUS program and verify communication Receiving data from Emp# 214 Drive 1. Verify VFD space heater relay CR4 energized 60s after O Space Heater Control control voltage is swtiched on. Verify Functionality Emp# 214 2. Adjust thermostat(TST1) setting to more than ambient temperature and verify HTR1 are heater up. Reset TST1 to less than ambient temperature and verify HTR1 are off. 3. Adjust thermostat(TST2) setting to more than ambient temperature and verify HTR2 & HTR3 are heater up. Reset TST2 to less than ambient temperature and verify HTR2 & HTR3 are off. Emp# 214 4. Verify VFD space heater relay CR4 released after medium voltage is energized. Emp# 214 5. Verify Motor Heater Relay BM5 energize 60s after drive is not running. 214 Emp# R Emp# Check Blower Rotation Verify Rotation 347 1.57 Emp# 347 Blower 1 Op. Set CB1 equal to 1.2\*TBLW1 motor nameplate Ia= A XFMR Cab. Ib= 1.56 current. 1.53 Measure 3 phase line currents and verify actual current is Ic= not exceeding TOL setting. Emp# Blower 2 Op. Set CB2 equal to 1.2\*TBLW2 motor nameplate Ia= 1.49 347 XFMR Cab. Ib= 1.51 current. 1.51 Measure 3 phase line currents and verify actual current is Ic= not exceeding TOL setting. Set CB3 equal to 1.2\*CBLW1 motor nameplate Ia= 1.46 Emp# 347 Blower 1 Op. CELL Cab. Ib= 1.47 current. Measure 3 phase line currents and verify actual current is Ic= 1.44 not exceeding TOL setting. Set CB4 equal to 1.2\*CBLW2 motor nameplate la= 1.55 Emp# 347 Blower 2 Op. 1.55 CELL Cab. Ib= 1.56 Measure 3 phase line currents and verify actual current is Ic= not exceeding TOL setting.

Customer Name Queensland urban utilities - eagle farm

REV# AA

SO 3002133943

P/N M6SR3

S/N Z831501002461

1 4 Syst	em Test Without Mo	plor		STS1-061G:4.6
	pe Test Item		Test Criteria (Eng)	Signature/Value
O	Electrical Door Interlocks	Open a door to cause DIS1 open and verify that Drive trip message "TRIP - MV DOOR OPENED" displayed and check "INPUT MV BREAKER ENABLE" contact on TB2 43 & 44, 45 & 46 change state.	TB2-43 & 44 Closed and TB2-45 & 46 Open when a door open	Emp#347
		Repeat the test for remaining of electrical door interlock switched DIS2~ DIS5.		Emp#347
R	Backfeed Modulation & Clipping	Power Supply & Hall Effect Pwr Supply Fault Output Transorbs Note: Remove Series Link & Backfeed Cell B1 Disconnect plug P1 from SCB board	Approx. 56Vp-p	Emp# 347 Emp# 347
		Input Transorbs Verify all Cells Primary Voltage Modulation of Cells	Approx. 56Vp-p 100Vac±10% for all (0 to 100% demand)	Emp# 347 Emp# 347 Emp# 347
R	Medium Voltage Testing	With Cell Series Links Reconnected Set Motor Voltage = Drive Rating VMA, VMB, VMC   ID 2050 - OLTM 25Hz VMA, VMB, VMC   ID 2050 - OLTM 50Hz	3.0V-peak +/- 0.3V 6.0V-peak +/- 0.3V	Emp# 347 Emp# 347

1.5 System	1 Test With Mot	or (Unloaded)		STSI-061G:4.7
Test Type	Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
	Check E-stop Logic		Open for E-stop Closed for Fault	Emp# 214 Emp# 214 Emp# 214 Emp# 214
		Depress"FAULT RESET"on keypad and Restart Drive Verify Run contact on TB2-29 & 30 changes state Remove Jumper on TB2-1 & 2 - Remote E-Stop Verify Drive coasts to stop and fault message displayed	Closed for Run	Emp# 214 Emp# 214 Emp# 214

REV# AA

SO 3002133943

P/N M6SR3

S/N Z831501002461

1.5 Systen	n Test With Motor	(Unloaded)		STSI-061G:4.7
	Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
R	Transformer Thermal Switches	Remove alarm wire from IOB DI-3C, 1). Verify fault light blinks and keypad displays alarm message.	Verify alarm message	Emp# <u>347</u>
		2). Verify the "Drive Alarm" outputs on TB2-31&32 change state.  Remove trip wire from IOB DI-0D,	Closed for Alarm	Emp#347
		1). Verify fault light blinks and keypad displays alarm message. 2). Verify the "Drive Alarm" outputs on TB2-31&32	Verify alarm message	Emp#347
		change state.	Closed for Alarm	Emp# <u>347</u>
		Remove trip both wires from IOB DI-3C & DI-0D and wait for 30 seconds;  1). Verify Drive fault, Drive coasts to a stop and keypad displays trip message  2). Verify the "Drive Tripped" output on TB2-33&34.	Verify Drive Fault Closed for Fault	Emp# 347 Emp# 347
R	Remote Start/Stop	Momentarily close contact between TB2-5 & 6 and		
R	Remote Start/Stop	verify Drive starts running.		
		TD0 5 0 6	Drive is running	Emp# 347
		Momentarily close contacts between TB2-5 & 6.	Drive ramps to stop	Emp# <u>347</u>
R	Remote Fault Reset	Cause system fault and check Drive Ready contact TB2- 27 & 28 (changes state) Momentarily close Remote Fault Reset contact on TB2-	Open for Fault	Emp#347
		7 & 8.  Verify the "Drive Ready to Run" output on TB2-27 & 28 changes state.	Drive should reset Closed for Ready to Run	Emp# 347 Emp# 347
		Verify Keypad reset is functioning.		Emp# 347
		Verify the "Fault Reset"button on the touch panel is functioning.		Emp# 347
R	Local Start/Stop	Place Drive in the Local mode by pressing "AUTOMATIC"on keypad and depress "MANUAL START" on keypad. Verify Drive is running.	Drive is running	Emp# 347
		Depress "MANUAL STOP" on keypad	Drive ramps to stop	Emp# <u>347</u>
R	4 to 20mA Remote Freq Command	Place Drive in the Remote mode by pressing "AUTOMATIC" again on keypad and connect 4- 20mA signal to TB2ELV-7 & 8.	Verify system Freq change	
		Scale 4-20 mA signal to be proportional to 0-100% Freq.	4mA=0%Freq 12mA=50% Freq 20mA=100% Freq	Emp# 347
R	4 to 20mA Spare Input	Program Spare Input as Remote Signal command via Keypad menu and connect 4-20mA signal to TB2ELV-10 & 11.Scale 4-20 mA signal to be proportional to 0-100% output.	4mA=0% spare 12mA=50% spare 20mA=100% spare	Emp# 347
		RE-PROGRAM REMOTE SIGNAL INPUT TO ANALOG 1!		Emp# <u>347</u>
R	4 to 20mA Spare Input	Program Spare Input as Remote Signal command via Keypad menu. Using connect 4-20mA or 0-10V signal (See Customer Drawings) to TB2ELV-13 & 14 and debug Screen. Scale 4-20 mA signal to be proportional to 0-100% output.	4mA=0% spare 12mA=50% spare 20mA=100% spare	Emp# 347
		RE-PROGRAM REMOTE SIGNAL INPUT TO ANALOG 1!		Emp# 347
	American Commission Co			

Customer Name Queensland urban utilities - eagle farm

REV# AA

SO

3002133943

P/N M6SR3

S/N Z831501002461

50	3002133943		IVIODICO	Dire	831301002401
TO SERVICE STATE OF THE PROPERTY OF THE PROPER	a Test With Motor				I-061G:4.7
	Test Item	Test Procedure	Test Criteria (Eng)	Signatu	re/Value
R	4 to 20mA Motor	Monitor KW output on TB2ELV-18 & 19 and verify output	4mA=0% KW		
	KW Output		20mA=100% KW	Emp# _	347
	4 to 20mA Motor	Monitor AMPS output on TB2ELV-1 & 2and verify output	4mA=0% Amps	r "	2.17
	AMPS Output	NA 1 CDPO A A TROPINAL OF A 1 A 16 A A	20mA=100% Amps	Emp#	347
	4 to 20mA Motor	Monitor FREQ output on TB2ELV-4 & 5 and verify output	4mA=0% Freq 20mA=100% Freq	E#	347
	FREQ Output 4 to 20mA Spare	   Monitor SPARE output on TB2ELV-21 & 22 and verify output	1	Emp#	347
	Output	Within of ARD output on Ababes v. 21 to 22 and verify output	20mA=100% Spare	Emp#	347
- Charles and the Control of the Con	Очирае		Zomi Tooya oparo		
R	Blower 1 Op.	With Transformer Cabinet blower TBLW1 running, trip blower			
	XFMR Cab.	CB and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp#	347
	Blower 2 Op.	With Transformer Cabinet blower TBLW2 running, trip blower			
	XFMR Cab.	CB and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp#	347
		·	2111 o cousis to stop	Empii	MANAGEMENT AND
	Blower 1 Op.	With Cell Cabinet blower CBLW1 running, trip blower CB			0.45
	CELL Cab.	and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp# _	347
	Blower 2 Op.	With Cell Cabinet blower CBLW2 running, trip blower CB			
	CELL Cab.	and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp# _	347
R	Medium Voltage	Set Control Loop Type	OLVC		
	Testing			P "	2.47
		With Motor Connected to the Drive Output	IMA Leads VMA by 90°	Emp# _	347
			IMB Leads VMB by 90°	Emp#	347
R	Spinning Load	1. Enable spinning load feature (Set Spinning Load Mode true)			
		via keypad			
		Run Drive at 100% speed     Trip Drive by pressing E-Stop			
		4. Pull out E-Stop			
		5. Push Fault Reset			
		6. Restart Drive			
		7. Verify Drive goes back to full speed	Motor returns to full	Emp#	214
			speed	***************************************	
				I	
R	Motor Overload  Protection	Adjust motor parameters[Menu 1000]and overload		F "	014
	Protection	settings[Menu 1120]to verify overload operates after 60s.		Emp# _	
R	Non-latching Run	1.Remove Medium Voltage Power			
	request with No	2.Reboot NXG Control		Emp#	214
	Medium Voltage	3.Clear/Reset all fault on drive		-	
	Input	4.Monitor SOP Runrequest flag via debugger			
		5.Verify that SOP Runrequest flag remains		İ	
		false when all start inputs are set			
R	Input Protection	Simulate IP trip and verify "input MV breaker enable"			
	тристически	output contact on TB2-43 & 44 changes state	Closed for fault	Emp#	214
		The fault only reset via keyed pushbutton KR	Fault reset	Emp#	214
		The resit only reset the region publication res		Lp"	
О	Closed Loop	Set Control Loop Type ID 2050	CLVC		
	Vector Control	Set Encoder 1 PPR 1D 1290	1024		
	Testing	Set Encoder loss response ID 1320	Stop		
		With Motor Connected to the Drive Output		1	
		Connected the encoder signal to TB2ELV-26-31			
		Scale 4-20 mA signal to 50% and 100% speed	12. 4-500/ 0	F "	214
		Verify the Drive and Motor Speed output if normal	12mA=50% Speed	Emp#	214
			20mA=100% Speed	Emp#	214

Customer Name Queensland urban utilities - eagle farm

REV# AA

SO	3002133943	P/N	M6SR3	S/N <u>Z831501002461</u>
1.6 Syst	em Load Test:			STSI-061G:4.8
Test Typ	oe Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
R	System Load Test	Run Load Test using Dyno Load Run at input current (full load input current)	214 Amps, 4 hrs	Emp#214
A	Efficiency Testing	Run Drive at following speed points: 100% Speed 100% Load 100% Speed 50% Load	Record actual 96.91 % 96.98 %	TSF-056 TSF-056
A	Power Factor Testing	Run Drive at following speed points: 100% Speed 100% Load	0.95PF	TSF-006
A	Harmonic Testing	Run Drive at 100% speed and 100% load Record actual THD for Voltage & Current (Background Distortion must be THDv <2.0%)	< THD 3 %Voltage < THD 5 %Current	Emp# 153 Emp# 153
1770:	r T			0.000.000.000
1./ rina	l Inspection			STSI-061G:4.9
	rest Item	Test Procedure	Test Criteria (Eng)	Signature/Value
		Test Procedure Save Files under the Project Files Folder SOP, HEX, Event Log, Fault Log, Parameter and Configure Files	Test Criteria (Eng) Parameter upload (Level 7)	
Test Typ	e Test Item	Save Files under the Project Files Folder SOP, HEX, Event Log, Fault Log, Parameter and	Parameter upload	Signature/Value
Test Ty <sub>1</sub> R	rile Save	Save Files under the Project Files Folder SOP, HEX, Event Log, Fault Log, Parameter and Configure Files  All Test versions of SOP & HEX files have been removed from Flash No Wago SOP & HEX is on Flash	Parameter upload	Signature/Value

REV# AA

SO 3002133943 P/N M6SR3 S/N Z831501002461 1.8 Equipment STSI-061G:4.1 Record Hipoter Used Manufacturer SEDS CTN Cal. Due Model DH60/5 Lanpotronics AS110720001 2013-7-19 Record Voltmeter Used Cal. Due Model Manufacturer SEDS CTN 175 FLUKE AS050526001 2014-05-21 FLUKE AS080131001 789 2015-03-19 / / Oscilloscope Model Manufacturer SEDS CTN Cal. Due DPO3034 TEK AS090831001 2013-09-04 Clamp on C.T./Clamp-On Model Manufacturer SEDS CTN Cal. Due LH41 **AMPROBE** AS100826001 2013-09-02 Humidity

65%

# 3) 0110-SR13 Variable Speed Drive System

A. MV Cable Test Sheets



# J & P RICHARDSON INDUSTRIES PTY. LTD

114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

# **HV CABLE TEST SHEET**

Project:	SIEM	IANS						Job No:	C64800
Date of To	est:	05/09/2013							
Cable Cir	cuit:	From:	SR13 FEED	ER PANE	L A25	To:	0110-SR13	INPUT TER	MINALS
Type:	SINGLE CO	ORE XLPE			6.6	kV	A	L- 95 sq m	m
Reason fo	r Test:	NEW DRIVE	E INSTALL	ATION (	Cable Tem	perature:	ТОН		
		hms (is Loop	p Resistance	Applicabl	e?) N/A	Yes/No	Phasing:		
Measured	with No:	Milmiterative data and experience and							
Type:			Leads:	·		ohms			
Circuit		A.D.		00p I-C	T		4	AS IT WAS	
Circuit	Total	A-B Net	Total	Net	Total	C-A Net	-	AOTI WAS	
	Total	INCL	Total	Net	Total	Net	-		
					<del> </del>		-		
			<del>  </del>			<del> </del>	1		
	NOTE: 120 - 270-227 AND 2011 AND								
Insulation	Resistance	in Megohm	S				Volts	1 Min	2 Min
						A-Earth	5000	40,000	40,000
Meas	ured with N	o: MOO13	1			B-Earth	5000	40,000	40,000
						C-Earth	5000	40,000	40,000
	Typ	e: KYORI	ΓSU			A - B	5000	40,000	40,000
		***************************************				B-C	5000	40,000	40,000
						C-A	5000	40,000	40,000
	age Test Sh			1 Start; 1 J		akage Curr	ents in mA		
(	Connections		Time		Negative			Positive	
-	+	Earth	Mins	kV	1 Start	1 Finish	kV	1 Start	1 Finish
ABC									
A	В	С							
В	С	A							
С	Α	В							
Weather C		FINE				Amb. Ten			
Result of 7	est: PAS	SS				Label Att	ached at:		
Comment	s:								
All bolts ti	ghtened to t	he following	torque setti	ngs and ma	rked with p	permanent i	marker		
8mm-22N	m								
10mm-27N	Vm								
12mm-341	lm							***	
	<del></del>	<del></del>							
								, , , , , , , , , , , , , , , , , , ,	
		-					***************************************		
Testing									COLUMN CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONT

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# J & P RICHARDSON INDUSTRIES PTY. LTD

114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

# **HV CABLE TEST SHEET**

Project:	SIEN	MANS						Job No:	C64800
Date of T	est:	05/09/2013							
Cable Ci	rcuit:	From:	0110-SR13 O	JTPUT TER	MINALS	То:	0110-1 ISOL	ATOR/EARTHIN	NG PANEL
Type:	SINGLE C	ORE XLPE			6.6	kV	1	AL- 95 sq m	ım
Reason fo	or Test:	NEW DRIV	E INSTALL	ATION	Cable Ten	perature:	НОТ	<u>_</u>	
Loop Res	sistance in (	Ohms (is Loo	p Resistance			•	Phasing:		
Measured	l with No:								
Type:			Leads:	······································		ohms			
Circuit	,	A.D.		оор		¬ _	4	AS IT WAS	3
Circuit	Tota	A-B l Net	Total	-C Net	Total	C-A Net	-	AOII WA	,
<u> </u>	1014	- Not	Total	NCt	10tai	Net	1		
<u> </u>								T	
Insulation	n Kesistanc	e in Megohm	IS			1 77	Volts	1 Min	2 Min
Man	cured with N	No: MOO13	1			A-Earth B-Earth	5000 5000	200,000	200,000
IVICa	Suicu with i	NO. [MOO13	) <u> </u>			C-Earth	5000	200,000	200,000
	Tvi	pe: KYORI	TSU			A - B	5000	200,000	200,000
	• 71	po. Triona	100			B-C	5000	200,000	200,000
						C-A	5000	200,000	200,000
High Vol	tage Test Sl	heet N/A		1 Start; 1	Finish – Le	akage Curi	ents in mA		
	Connections		Time		Negative			Positive	
-	+	Earth	Mins	kV	1 Start	I Finish	kV	1 Start	1 Finish
ABC									
A	В	C							
В	C	A							
С	A	В							
	Conditions:	FINE				Amb. Ter			
Result of		35				Label Att	ached at:		
Commen					<del></del>				
All bolts t	ightened to	the following	torque setti	ngs and m	arked with	permanent	marker		
8mm-22N	lm	20 X 10 X	ocens the service of the Anna Sol			NOTE:			
10mm-27	Nm	***************************************		·/···	·····	*****	***		
12mm-34	Nm				<del></del>				
**************************************	****	<del></del>							
				· · · · · · · · · · · · · · · · · · ·					
		***************************************		*************************		wee	e e e e e e e e e e e e e e e e e e e		
Testing Officer:	S.CUNNII	NGHAM	Dat	e: 05/09	/13 Engi	neer quired:		Date:	1 1

# 源

# J & P RICHARDSON INDUSTRIES PTY. LTD

114 Campbell Avenue, WACOL QLD 4076 Ph: (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

# **HV CABLE TEST SHEET**

Project:	SIEMA	NS						Job No:	C64800
Date of Te	st: 0:	5/09/2013							
Cable Circ	cuit:	From:	SR13 MOTO	OR		То:	0110-1 ISOL	ATOR/EARTHIN	IG PANEL
Type:	SINGLE COI	RE XLPE	·········		6.6	kV	A	L-95 sq m	m
Reason for			E INSTALL	ATION (	Cable Tem	nerature:	НОТ		
	stance in Oh					Yes/No	Phasing:		
Measured v		(10 200]	p	· · · · · · · · · · · · · · · · · · ·	.,				
Type:	antenna in vincia.		Leads:			ohms			
				оор			]	10 70 77110	
Circuit		<b>\-</b> B		-C		C-A		AS IT WAS	•
·········	Total	Net	Total	Net	Total	Net			
		<u> </u>					-		
				····	-		4		
			-				1		
		<b> </b>					1		
Insulation	Resistance i	n Megohm	S				Volts	1 Min	2 Min
				825		A-Earth	5000	200,000	200,000
Measu	ared with No:	MOO13	1			B-Earth	5000	200,000	200,000
						C-Earth	5000	200,000	200,000
	Type:	KYORI	TSU			A-B	5000	200,000	200,000
		***************************************				B-C	5000	200,000	200,000
						C-A	5000	200,000	200,000
High Volta	age Test Shee	et N/A		1 Start; 1	Finish – Le	akage Curr	ents in mA		
C	Connections		Time		Negative	<del></del>		Positive	
Ŋ -	+	Earth	Mins	kV	1 Start	1 Finish	kV	1 Start	1 Finish
ABC									
Α	В	<u>C</u>							
В	С	A							
C	A	В							
Weather Co		FINE	······································			Amb. Ter			
Result of T	est: PASS	<u> </u>				Label Att	ached at:		
Comments	8:								
All bolts tig	ghtened to the	e following	torque setti	ngs and ma	arked with	permanent	marker		
8mm-22Nn	n						· · · · · · · · · · · · · · · · · · ·		
10mm-27N			~						
12mm-34N	lm								
	A.	<u> </u>					······································	***************************************	
								***************************************	
								177	
		00				4			
Testing Officer:	S.CUNNING	GHAM	Dat	te: 05/09	/13 Engi	neer quired:		Date:	1 1

# 3) 0110-SR13 Variable Speed Drive System

B. LV cable Test Sheets

J & P RICHARDSON INDUSTRIES PTY LTD A.B.N. 23 001 952 325 114 Campbell Avenue, WACOL QLD 4076

114 Campbell Avenue, WACOL QLD 4076 Ph. (07) 3271 2911 - Fax: (07) 3271 3623 E-mail: jpr@jpr.com.au

# POWER CABLE INSPECTION AND TEST SHEET

CABLE No.	E No.	REPLACES	4129 S		40	40.42	SIZE	ō	mm²
FROM	MC	ESSENTIAL	SERVICES	58	NOI PUCT	Prefore	TYPE		XLPE/PVC
T0	C	0	0110 - SR13	13			LENGTH	3.	35m
CORE No.	No.		Command	INSULATION			FAULT	FAULT LOOP	EARTH
		TO EARTH	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	а
	RED	200 Mat	N/A MD	200 Mn t	200 Mat	250 Mat	а	AMPS	
	WHITE	200 Mat	200 Mat	N/A MΩ	200 Mat	200 Mat	а	AMPS	0
	BLUE	200 Mat	200 Mpt	200 Mat	N/A Mn	200 Mat	С	AMPS	,
	NEUTRAL	700 Mat	200 Mat	200 Mat	200 Mn +	N/A MΩ	N/A	N/A AMPS	
				Verification	ation				
Lugs/Pin Ends	n Ends	Glands	spı	Heat Shrink	hrink	Shrouds	spn	Cable	Cable lable
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
`,	>	>	>	せて	>	NA	>	g	CN
PRINT NAME SIGNATURE DATE	C. CER.	G. CERVETTS SN.		ř vb	5mm BOUTS MAIN TORRUED TO		Switch 22NM		

# POWER CABLE INSPECTION AND TEST SHEET

CABI	CABLE No.		P236		20	2ctE	SIZE	2.5	mm²
FR	FROM	0	0110 - 5213	3	PAC	PIC/PIC	TYPE		XLPE/PVC
L	TO	~	MOTOR	HEATER			LENGTH		2
COR	CORE No.		_	INSULATION	_		FAULT	FAULT LOOP	EARTH CONTINUITY
		то еактн	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	а
	RED	200 Mat	N/A MD	Ma	M	200 Ma+	а	AMPS	
	WHITE	aM -	1	N/A MD	Mn	Mn —	a	AMPS	
	BLUE	Mp	MD	Mn -	N/A MΩ	MD	α	AMPS	
	NEUTRAL	200 Ma+	AMO —	MΩ	MD	N/A MD	N/A D	N/A AMPS	
		-		Verifi	Verification				
Lugs/P	Lugs/Pin Ends	Glands	spu	Heat (	Heat Shrink	Shro	Shrouds	Cabl	Cable lable
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
>	AA	1	NA	NA	AN	NA	4A	>	NA
PRINT NAME SIGNATURE DATE	9 6	G. CERVETO							

# POWER CABLE INSPECTION AND TEST SHEET

CABL	CABLE No.	Р	P235		20	2c4E	SIZE	2.5	mm²
FR	FROM	ESSENTAL	ESSENTIAL SERVICES	SB NO	1 PJC,	PICIONC	TYPE		XLPE/PVC
ř	TO		2-0110	SRI3			LENGTH	35m	'n
CORE No.	No.			INSULATION	_		FAULT	FAULT LOOP	EARTH
		TO EARTH	TO RED	TO WHITE	TO BLUE	TO NEUTRAL	IMPEDANCE	PSC	Q
	RED	200 Mat	N/A Min	αM	MD	250 Mat	а	AMPS	
	WHITE	g₩ }	MD	N/A Mn	→ MΩ	ΔMΩ	a	AMPS	(
	BLUE	MΩ	Mn	Mn —	N/A MΩ	ΔMΩ	σ	AMPS	0,3
	NEUTRAL	Mp	200 Mat	- Ma	Mn —	N/A MΩ	Ω <b>A/N</b>	N/A AMPS	
				Verific	Verification				
Lugs/Pi	Lugs/Pin Ends	Glands	spu	Heat §	Heat Shrink	Shrc	Shrouds	Cable	Cable lable
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
42	>	4 Z	>	NA	NA	NA	NA	>	NO.
PRINT NAME		G CERVETS							-
DATE	0	9 (3							

## INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.		13-				SIZE		1.5mm²
FR	OM	01	10 - SR	13			TYPE	6	PR
Т	0	-	TACHO.				LENGTH		?
COR	≣ No.	wı	RE NUMB	ER	FROM	TERMINA	AL	TO TERM TACHO	INAL
				Correct	TBZELV	/ Co	rrect £	Rose	Correct
1	WHITE	PP 13	+151		30	V			
1	BLACK	PP13	- Com		31	V			
2	WHITE	PP 13	-B/		29	_	1		
2	BLACK	PP13			28	- /	′		
3	WHITE		-A/		27				
3	BLACK	PP 13			26		/		
4	WHITE	_	_	/	3.2				
4	BLACK	-	_	/	37				
5	WHITE				37				
5	BLACK	_	_		37				
6	WHITE	_	_	1	37				
6	BLACK	-	_	/	37				
7	WHITE								
7	BLACK								
8	WHITE								
8	BLACK								
9	WHITE								
9	BLACK								
10	WHITE								
10	BLACK								
11	WHITE								
11	BLACK								
12	WHITE								
12	BLACK								
				Verifi	cation				
Pin e	ends	Gla	nds	Heat	Shrink	Shr	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish En
<b>✓</b>	NA	<b>✓</b>	NA	<b>✓</b>	NA	NA	NA	<b>J</b>	NA

PRINT NAME

G. CERVETTO

SIGNATURE

DATE

10 9 1 13

# CONTROL CABLE INSPECTION & TEST SHEET

CABL	E No.		C/72				SIZE		l.5mm²
FR	OM	(	0110-	SR13			TYPE	20	24E
Т	0	PUMP	FLEOR	2 ESTE	OP.		LENGTH		2
CORI	E No.	WII	RE NUMBI	ER	FROM	TERMINA	L ·	TO TERM	INAL
				Correct		Con	rect		Correct
1		108	2 N-2	<b>✓</b>	7	~			
2			2N-1	<b>/</b>	6	•			
3									
4									
5									
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7									
8									
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10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20					10000				
				Verifi	cation				
Pin	ends	Gla	nds	Heat :	Shrink	Shro	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
<b>√</b>	NA	<b>✓</b>	NA	<b>✓</b>	NA	NA	NA .	/	NA

**PRINT NAME SIGNATURE** DATE

# **CONTROL CABLE INSPECTION & TEST SHEET**

CAB	LE No.		C 315	5			SIZE		1.5mm²
FF	ROM	0	110 - 8	R 13			TYPE		OCTE
-	го	HV S	WITCHRO	om A	25		LENGTH		
COR	E No.	W	RE NUMB	ER	FROM	TERMINA	AL	TO TERM	IINAL
				Correct		Co	rrect		Correct
•		138	3~	1	2		1		
	!	130			3		/		
:	<b>.</b>	10		/	9		<b>/</b>		
4			2 N	1	3 9 4 5		<b>/</b>		
	;		2N-1	1	5	,	/		
6			SO	~					
7		3	SP	1					
8		5	P	1				-	
9			e	/		-			
10			P						
11		-							
12									
13									
14									
15									
16									
17									
18									
19									
20									
				Verifi	cation				
Pin	ends	Gla	nds	Heat S	Shrink	Shr	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish En
✓	NA	✓	NA	1	NA	NA	NA	~@	NA

**PRINT NAME** 

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**SIGNATURE** 

DATE

# **CONTROL CABLE INSPECTION & TEST SHEET**

CAB	LE No.		C316	>			SIZE		1.5mm²
FF	ROM	C	0110-	SR13			TYPE	6	CHE
1	го		laune (		NKB		LENGTH		?
COR	E No.	W	IRE NUMB	ER	FROM	TERMINA	AL	TO TERM	INAL
				Correct		Co	rrect	***************************************	Correct
1	9.100 Bareton	BK	13-2	/	TBZ	-4			
2	!		13-7		TB2-	3 .			
3		5	P	1	TB2-	7			
4	,		P		MA				
5	1	BK	13-3	1	1		/		
6		BK	13-5	V	2		/		
7									
8									
9								****	
10	1								
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17									
18									
19		<del></del>							
20			***						
				Verifi	cation				•
Pin	ends	Gla	nds	Heat S	Shrink	Shr	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End
<b>/</b>	NA	<b>✓</b>	NA	<b>✓</b>	NA	NA	NA	/	NA

G. GERVETTO **PRINT NAME SIGNATURE** DATE

# INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABL	E No.		P44	7	***************************************			SIZE		1.5mm²
FR	OM	0	110 - :	SR13				TYPE	1	PR
Т	0	CUB	ICLE	BC61				LENGTH		
COR	≣ No.	WI	RE NUMB	ER	FROM	/ TERN	/INA	L	TO TERM	IINAL
				Correct		T	Cor	rect		Correct
1	WHITE	SRI:	BIVE	<b>✓</b>	32	0	V			
1	BLACK	SR13	B-VE	<b>~</b>	32			/		
2	WHITE									
2	BLACK									
3	WHITE									
3	BLACK									
4	WHITE	A CONTRACTOR OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF TH								
4	BLACK									
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9	BLACK									
10	WHITE									
10	BLACK					-				
11	WHITE							_		
11	BLACK									
12	WHITE							_		
12	BLACK									
		L		Manifi	4:					1
				verition	cation	,			_	
Pin e	nds	Gla	nds	Heat S	Shrink	S	Shro	uds	Cable	Label
tart End	Finish End	Start End	Finish End	Start End	Finish End	Start E	End	Finish End	Start End	Finish End
1	NA	<b>√</b>	NA	1	NA	N	A	NA	10	NA
		<u> </u>		L	L	.1			No	THROUG
INT NA	ME	G. C	ERVETTS	2					0	THROUG BOX

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DATE

# INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABI	E No.		LAN 13	3-2			SIZE	×	1.5mm²
FR	OM	0	LAN 13	SR13			TYPE		IPR
7	0						LENGTH		
COR	E No.	WI	RE NUMB	ER	FROM	TERMINA	AL	TO TERM	INAL
				Correct		Co	rrect		Correct
YLW 1	WHITE	N	A		GENIU	3 '			
1		~	4		MODU	LE.	/		
2	WHITE								
2	BLACK								
3	WHITE								
3	BLACK	1757 / N. OVIVIA 4000							
4	WHITE								
4	BLACK								
5	WHITE								
5	BLACK								
6	WHITE							1689	
6	BLACK								
7	WHITE								
7	BLACK								
8	WHITE								
8	BLACK								
9	WHITE							***************************************	
9	BLACK								
10	WHITE								
10	BLACK								
11	WHITE								
11	BLACK								
12	WHITE								
12	BLACK								
				Verifi	cation				
Pin	ends	Gla	nds	Heat	Shrink	Shr	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish En
<b>✓</b>	NA	<b>√</b>	NA	<b>✓</b>	NA	NA	NA	No	NA

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# INSTRUMENTATION CABLE INSPECTION TEST SHEET

CAB	_E No.		LA13-	3			SIZE		1.5mm²	
FR	OM		0110 -	SR13			TYPE		IPR	
TO CORE No.		LA13-3 0110-SR13				LENGTH		IPR 2		
		WIRE NUMBER		FROM	TERMINA	AL	TO TERMINAL			
			3 2 2 20	Correct		Co	rrect		Correct	
YLW 1	WHITE	-	VA VA		GENIU.	S				
1	BLACK	-	VA		GENIU.	E	/			
2	WHITE									
2	BLACK									
3	WHITE									
3	BLACK									
4	WHITE									
4	BLACK									
5	WHITE									
5	BLACK									
6	WHITE									
6	BLACK	consequent								
7	WHITE									
7	BLACK							***************************************		
8	WHITE									
8	BLACK									
9	WHITE									
9	BLACK	**************************************								
10	WHITE									
10	BLACK									
11	WHITE									
11	BLACK									
12	WHITE									
12	BLACK									
				Verifi	cation	1				
Pin	ends	Gla	nds	Heat	Shrink	Shr	ouds	Cable	Label	
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	
<b>✓</b>	NA	<b>√</b>	NA	1	NA	NA	NA	V	NA	

PRINT NAME **SIGNATURE** DATE

# INSTRUMENTATION CABLE INSPECTION TEST SHEET

CABLE No. LT 003 - 4J			3 - 47			SIZE		1.5mm <sup>2</sup>	
FR	OM	0110-SR13				TYPE		IPR	
1	0	WET WELL NOT LEVEL TX			LENGTH				
COR	E No.	WIRE NUMBER		ER	FROM	TERMIN	AL	TO TERMINAL	
				Correct		Co	orrect		Correct
1	WHITE	13 WV	3-1	<b>✓</b>	35°	7	V		
1	BLACK	WV	<b>U</b> -	1	35	8	V		
2	WHITE								
2	BLACK								
3	WHITE								
3	BLACK								
4	WHITE								
4	BLACK								
5	WHITE								
5	BLACK		***************************************						
6	WHITE								
6	BLACK								
7	WHITE								
7	BLACK								
8	WHITE								
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9	BLACK								
10	WHITE								
10	BLACK								
11	WHITE								
11	BLACK								
12	WHITE								
12	BLACK								
				Verifi	cation			***************************************	
Pin e	ends	Gla	nds	Heat	Shrink	Shr	ouds	Cable	Label
Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish En
<b>✓</b>	NA	<b>✓</b>	NA	<b>√</b>	NA	NA	NA	NO	NA

**PRINT NAME** 

G. CERVETTO

**SIGNATURE** 

DATE

JBOX

# INSTRUMENTATION CABLE INSPECTION TEST SHEET

CAB	LE No.						SIZE		1.5mm²
FR	ROM	1,	0-5R	13			TYPE	-	4PR
TO  CORE No.		0	110-5R13 0110-1 \$ E\$13				LENGTH		12m
			WIRE NUMBER			TERMIN	AL	TO TERM	IINAL
				Correct	TB	2_ Cc	orrect		Correct
1	WHITE	32	6	1	10		1,	7, 13, 19	V
1	BLACK	13		/	13				1
2	WHITE	11		/	11			9	1
2	BLACK	9						14	~
3	WHITE	15	S		9			20	1
3	BLACK	53	0	1					
4	WHITE	S		/					
4	BLACK	SA		/					
5	WHITE								
5	BLACK								<del> </del>
6	WHITE								
6	BLACK								
7	WHITE							-	
7	BLACK								
8	WHITE								
8	BLACK								
9	WHITE								
9	BLACK								
10	WHITE								
10	BLACK								<del> </del>
11	WHITE								
11	BLACK								
12									
12									
				Verifi	cation				<u> </u>
Pin (	ends	Gla	nds	Heat S	Shrink	Shr	ouds	Cable	Label
tart End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish End	Start End	Finish Er
<b>✓</b>	<b>V</b>	<b>✓</b>	<b>V</b>	V	/	NA	NA	NO	No

PRINT NAME

G. CERVETTO

**SIGNATURE** 

DATE

# 3) 0110-SR13 Variable Speed Drive System

C. Electrical Installation Report.



PO Box 1067 | Tewantin 4565 | PH:0438 394 269
EMAIL: auditor@jantec.com.au | WEB: www.jantec.com.au

# ELECTRICAL INSTALLATION REPORT

REPORT No.: JPR-QUU-020-SD

Issued in accordance with the *Electrical Safety Regulation 2002* (Qld)

Section 153 for electrical work in a Hazardous Area
or on a High Voltage installation.

Occupier:	Location of Installation:
Qld Urban Utilities	Violet Street/Kingsford Smith Drive, Eagle Farm 4009

# Electrical Installation Audited (Audit Scope): Replacement of existing VVVF and new isolator & earthing panel to SR13 Pump Motor

Electrical Contractor Responsible for the installation:	Electrical Contractors Lic:
J&P Richardson Industries	756

## **Audit Limitations**

## Inherent Limitations:

Because of the inherent limitations of any internal control structure, it is possible non-compliance with standards may occur and not be detected. An audit is not designed to detect all weaknesses in compliance as an audit is not performed continuously throughout the period of installation.

### Scope Limitations:

nil

Au	di	16	P	20	11	14.
MU	u	u	n	ซ๖	u	u.

he auditor issuing this notification reasonably believes that the installation work described in the Audit Scope above	is
not in compliance with the relevant standards.	

I advise that the audit of the electrical installation work described in the Audit Scope above, was successfully executed and compliance with the relevant parts of AS2067 and AS/NZS3000 is demonstrated (subject to the audit limitations) at the time of the audit.

From the evidence provided, conclusion can be drawn that the onsite test results recorded by the installer, satisfy the minimum test requirements of AS2067 , AS/NZS3000 and other relevant standards.

It is reasonable to believe that the electrical installation described in the Audit Scope above is electrically safe to connect.

Audit Date:	Auditor:	Auditors Signature:	Auditors No:	Phone No:
12/09/13	S.Downey	Dance	02/0114	0438 394 269

## Comments/Observations:

If you are not the person having responsibility for the safety of the electrical installation/equipment identified above, it is important that you pass this report to such a person without delay.

A copy of this report must be retained in the site verification dossier and a copy is also forwarded to the relevant regulator as part of the legislative requirements for electrical auditors.

# 3) 0110-SR13 Variable Speed Drive System

D. Commissioning Report and Parameter List

# SIEMENS

# STARTUP & COMMISSIONING MANUAL

FOR SIEMENS
PERFECT HARMONY, AIR-COOLED,
MEDIUM VOLTAGE,
VARIABLE FREQUENCY DRIVES

A5E32168985 VSD 0110-SR13 Queensland Urban Utilities – Eagle Farm

# **Important Note:**

These Startup & Commissioning instructions are solely intended as working instructions or information for Field Service specialist personnel of the SII DT LD, Customer Services Division.

Even where product specific information is included, these instructions are not to be regarded as operating instructions for a particular product.

Revision	Description of Change	Initials	Date

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# Reference Material (for Siemens Personnel)

## For Gen IV Drives:

SIEMENS Gen IV Product User Manual A5E01454341C SIEMENS Gen IV Commissioning and Maintenance Manual A5E01454341D

## For Gen III/e Drives:

SIEMENS Perfect Harmony Gen III/e User's Manual A1A19000405A
SIEMENS Perfect Harmony Gen III/Gen III/e Startup and Advanced Topics Manual A1A19000404A
SIEMENS Perfect Harmony Gen III/e Installation Manual A1A19000403A
SIEMENS NXG Manual A1A19001588
Tech Notes (Applications)

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# **Abbreviations**

The following abbreviations are used throughout this procedure.

Table 1: Abbreviations

Abbreviation	Description
Α	Ampere(s); Amp(s)
AC	Alternating Current
ACH	Anti-Condensation Heater
ACU	Air Conditioning Unit
СВ	Circuit Breaker
CDS	Circuit Disconnect Switch
CPS	Control Power Supply
CT	Current Transformer
DC	Direct Current
DCR	Digital Card Rack
DWG	Drawing
ES	Emergency Shutdown
ESD	Electrostatic Discharge
F	Fuse
FSR	Field Service Representative
ICP	Installation and Commissioning Procedure
GA	General Arrangement
HESPS	Hall Effect Sensor Power Supply
HMI	Human-Machine Interface
LV	Low Voltage
MV	Medium Voltage
N/A	Not Applicable
OEM	Original Equipment Manufacturer
P/N	Part Number
PDC	Power Distribution Center
PPE	Personal Protective Equipment
PSD	Process Shutdown
S/N	Serial Number
SOP	System Operating Program
TB	Terminal Block
UPS	Uninterruptible Power Supply
V	Volt(s)
VAC	Volt(s) / -Alternating Current
VDC	Volt(s) / -Direct Current
VFD	Variable Frequency Drive
WPS	Wago Power Supply

#### 1.0 INTRODUCTION

This document is for all Air-Cooled Perfect Harmony Drives with NXG Controls.

#### 1.1 Purpose of Manual

The purpose of this document is to effectively guide competent and trained Siemens personnel through Startup and Commissioning for the Air-Cooled Perfect Harmony Variable Frequency Drive (VFD). The individual checks must be performed within each of the separate sections of this procedure. Following any introductory text and precautions, each section contains a series of checkboxes that indicate the completion of the individual steps.

In addition to the checkboxes, tables may be included in some sections. Such tables are used to record information like the following: a) parameter settings; b) test point data values; c) any errors or deviations. Major sub-sections also contain initials/date fields that must be completed by the individual performing and completing that section of the Startup and Commissioning procedure.

### 1.2 Startup Task Agenda

- 1.2.1 Punch List for Open Items During Startup & Commissioning
  - List any issues as open items. (Attachment #1, CCF-004)
  - Assign responsibility, due date, and date of completion.
  - Review with Customer and return copy to Project Manager (PM) at end of Commissioning.

#### 1.2.2 Drive Cabinet Inspections

- Installation Inspections Perform a visual inspection to detect signs of deterioration and discoloration. Inspection detects issues in the equipment where components may need replacement and/or corrective action.
- Equipment Cleanliness Check Check each of the enclosures of the equipment for cleanliness of power and control circuitry. This should include removal of installation dirt and debris.
- Connection Checks Perform a variety of connection and torque mark checks on the Drive system
  including inspection for loose wires, loose hardware, stripped or cut wires, poor/melted insulation,
  and proper torquing on the component mountings.

# 1.2.3 Power-up Checks

- Power-up the equipment and perform a functional and operational evaluation running at various operation levels.
- Inspection verifies the equipment is in operating condition.

#### 1.2.4 Customer / Performance Review

- Meet with the customer to review the current site conditions.
- Record any issues with the installation of the Siemens equipment.
- Record training classes taken by on-site personnel and recommend any to be taken.

#### 1.2.5 Spare Parts Checkout

- Perform a visual inspection of Spare Power Cells, Spare Control PCBs, and other components.
- Spare Control PCBs or Power Cells should be installed in the Drive to verify setup and operation.
- Record recommended spare parts.
- Recommend a backup flash disk of the operating system.

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### 1.3 Symbols and Conventions

#### 1.3.1 Symbol Definitions

The following words and symbols found throughout this manual mark special messages to alert the operator of specific information concerning of the PERSONNEL, the EQUIPMENT or the PROCESS.



Text set off in this manner provides warning notice that failure to follow these directions in this WARNING can result in bodily harm or loss of life and/or extensive damage to equipment.



Text set off in this manner provides warning notice that failure to follow these directions in this CAUTION can result in damage to equipment.



Text set off in this manner present clarifying information or specific instructions pertinent to the immediate instruction.

#### 1.3.2 Warnings and Caution Notes

	T
WARNING	Personnel performing this procedure MUST read the entire document before beginning the procedure.
NOTE	Personnel executing this procedure shall acquire the necessary permits prior to commencing any work activity.
WARNING	Before performing this procedure, the Customer Personnel and Siemens Field Service Representative MUST conduct a job safety briefing for all participants. The briefing shall cover hazards, special precautions, energy source controls and personal protective equipment requirements.
WARNING	Always work with one hand, wear safety shoes rated electrical hazard/composite and safety glasses. Always work with another person present who is acting as a safety monitor.
WARNING	Only qualified Siemens Field Service Representatives should install, operate, troubleshoot, and maintain this Drive. A qualified individual is "one familiar with the commissioning and operation of the equipment and the hazards involved.

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WARNING	Always use extreme caution when handling or measuring components that are inside the enclosure. Be careful to prevent meter leads from shorting together or from touching other terminals.
WARNING	Use only instrumentation (e.g., meters, oscilloscopes, etc.) intended for high voltage measurements (that is, isolation is provided inside the instrument, not provided by isolating the chassis ground of the instrument).
WARNING	Never touch anything within the Perfect Harmony cabinets until verifying that it is neither thermally hot nor electrically alive.
WARNING	Never remove safety shields (marked with a HIGH VOLTAGE sign) or attempt to measure points beneath the shields.
WARNING	Never connect any grounded instrumentation (i.e., non-isolated meters or oscilloscopes) to the Perfect Harmony system.
WARNING	Never connect or disconnect wiring or printed circuit boards while the Drive is energized.
WARNING	Hazardous voltages may still exist within the Perfect Harmony cabinets even when the disconnect switch is open (off) and the supply power is shut off.
CAUTION	Be sure to make appropriate connections/disconnection to equipment in order to perform this test correctly and safely. Failure to do so may result in DAMAGE to equipment.
WARNING	Only personnel performing the test shall be in the area while the test is being performed. Test area shall be barricaded and unauthorized personnel shall not be allowed inside.
L	

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# 2.0 SITE AND SAFETY INSTRUCTIONS

# 2.1 Test Equipment and Tool Check

2.1.1 2.1.2	All test instruments, supporting tools, and accessories shall be rated for intended use.  Perform a visual inspection of all test instruments, equipment and all associated test						
2.1.2	leads, cables, power cords, probes, and connectors for external defects and damage.						
2.1.3	Ensure that all test instruments, equipment, and their accessories are calibrated and valid throughout the ENTIRE test period.						
2.1.4	Verify customer can s Commissioning activit  ☐ Barrier ☐ Rags ☐ Air Filters ☐ Compressed Air		accessories for possible use durin  Caution Tape Alcohol based Cleaning Fluid Shop Vacuum Water & Hose	g Startup and  Cell Lifter Grease Gun Soft Brush	Initial		

Table 2: Test Equipment and Tool List

Equipment/Tool	Manufacturer & Model Number	Serial Number	Calibration/ Inspection Date
PPE Arc Flash Jacket	Stanco Temp Test Salisbury		
	Fluke 1587, Megger		
Meter	Fluke 43B, PQM		
	Fluke 787, Process Mtr		
	Fluke 87 V, DVM		
	Simpson 260-8P		
	AEMC JM810A, 2000A		
	Fluke i400s		
Torque Wrenches	Craftsman 250 ft-lbs		
	Craftsman 250 in-lbs		
	Craftsman 50 in-lbs		
ESD Pad & Wrist Strap			

#### 2.2 Site and Safety Activities

#### 2.2.1 Meet with Site Supervisor

- Review of safety requirements.
- Site Specific Safety Training, as required.
- Plan for the day's progress.
- Discuss any open issues.
- Complete Daily Safety Log Form.

#### 2.2.2 Review the Equipment Location and Drive Information

- Be certain your work area is clear of debris.
- Confirm that barriers, guards or Caution Tape are in place to prevent. unauthorized personnel form entering into the work area.
- Collect the site and Drive information.

#### 2.2.3 Follow Lockout/Tagout Procedures

- Coordinate with customer on local Lockout/Tagout Procedures.
- If the customer has no requirements, follow Siemens' LD A Lockout/Tagout Procedures.
- Insure Personal Protection Equipment (PPE) and Safety Tools are available.

#### 5 Safety Rules of LOTO

- 1. Switch off power sources
- 2. Lock the circuit against re-closure
- 3. Establish that system is de-energized
- 4. Earth and short circuit phases
- 5. Cover or enclose "live" parts

#### 2.2.4 At the end of each day

- Clean your area.
- Pack your tools and equipment.
- Meet with the site supervisor.
- Review what was done that day.
- Equipment status at end of day.
- Determine what time you will be returning in the morning.
- Ask if there are any questions or other issues that need to be addressed.
- Complete entries in service report.

#### 2.2.5 At the end of the Startup and Commissioning service

- Review daily service reports.
- Obtain Customer signature on service report.
- Ensure any warranty or repair parts have RMAs and are shipped for return.
- Ensure any FSKits used during Startup are packaged for return. Obtain an RMA number and handle shipping back to Siemens.
- Review checklist:
  - Spare parts review
  - Customer review
  - Record follow-up items
  - Contact in-house support personnel
- Complete the Startup and Commissioning Acceptance and Sign Off Sheet.

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# 3.0 SITE AND DRIVE INFORMATION

### 3.1 Customer Information

Customer Name:	Queensland Urba	Queensland Urban Utilities				
Street Address:	Eagle Farm		City, State Zip code:	Eagle Farm		
Primary Contact:	Jim Kirkland		Primary Phone No:	0410 548 794		
Primary Fax No:			Primary Email Addr:			
Secondary Contact:	Brett Lawrence		Secondary Phone No:	0400 723 752		
Secondary Fax No:			Secondary Email Addr:			
Date Completed Pre-Startup Checklist:		17/09/2013	Client's Drive ID:	0110-SR13		

Date: 16/09/2013

# 3.2 Dispatch Information

Notification No:	52-199755	Original SO No:	3002133943
Field Service Rep:	Ruben Diaz	Drive Type:	Gen3
Technical Support:	SCCC: Ph. 1300 369 515	Drive P/N:	M6SR3
Project Engineer:	Pieter Taljaard (Siemens Aust.)	Drive S/N:	Z831501002462
Location of Drive:	Eagle Farm	Drive Date Code:	13-24

### 3.3 Location Environment

Elevation:	Ft, Above Mean Sea Level	Air Conditioning:	☐ Yes
Enclosure:	☐ PDC ☐ Building	Air Conditioning:	BTU, or Ton
Room Temperature:	°C, Indoors	Heating:	☐ Yes
Ambient Temperature:	30+ °C, Outdoors	Humidity:	☐ High        Low
Outside Air Blown In:	☐ Yes	Dusty Environment:	☐ Yes
Drive Blowers Ducted Outdoors:	⊠ Yes □ No	Conductive Dusts:	☐ Yes   ☑ No
Other Influences:		Corrosive Gases:	⊠ Yes □ No
List all.			Type(s): Sewage

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# 3.4 Drive Information

Power		Load Type/Description		Voltage		Ampacity		Frequency
Input Power:		2750 KVA		6600V		214A		50Hz
Output Power: 2051 KW			0-6600 V		260 A		0-75Hz	
Control #1 Powe	r:	Control and Blower		415V 3ph		20A		50Hz
Control #2 Powe	r:	Motor Heater external power (customer)		110Vac 1Ph		Power=KW		50Hz
Control #3 Powe	r:							
Control #4 Powe	r:							
Xfmr Blower Motors:		Voltage:	HP/KW	/: HP, or	KW	FLA:	Amp	RPM:
Xfmr Blower Motor OL Settings:		Settings:						
Cell Blower Moto	ors:	Voltage:	HP/KW	HP/KW: HP, or KW FLA: Amp		RPM:		
Cell Blower Moto	or OL S	Settings:						
Transformer:	Mfg	: TBA			K	VA: 2750		
	Mod	lel No: HZ50	Part No: A5E03460937		Serial No:			
	Inpu	ıt Voltage: 6600 V	Sec Vo	oltage: 630 V	Т	Tap Setting: ☐ -5% ☐ 0% ⊠ +5%		□ 0% ⊠ +5%
	Rea	son if Tap Setting is not +5%	son if Tap Setting is not +5%:					
Input CT'S:		Ratio: 250:5	No. per Phase: 1					
Attenuator Resis	tors:	Input: 4.8 MΩ	Outpu	ıt: 4.8 MΩ				

# 3.5 Drive Options

Cell Bypass	☐ Yes	UPS:	☐ Yes	⊠ No
Drive Bypass:	☐ Yes	Communication Protocol:	□No	
			⊠ Yes	Type: Modbus RS485
Sync Motor:	☐ Yes	Sync Transfer	☐ Yes	⊠ No
Sync Motor Exciter:	Voltage:	Manufacturer:		
	Configuration:	Serial No.:		
	Model:			

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**Table 3: Cell Information** 

Power Cel	ls: VSD P/N: <u>6</u>	SR3502-6HF42-7BH-Z	5	Size: Amp <u>260</u>	Total No of Cells: 18	
	Cell			С	ell Control Board	
Location	CELLS P/N	S/N		P/N	S/N	Rev.
A1	LDZ14501002.260	130212		A1A10000432.30M	L11090XXXBR	BR
A2	LDZ14501002.260	130209		A1A10000432.30M	L11090187BR	BR
А3	LDZ14501002.260	130204		A1A10000432.30M	L11090222BR	BR
A4	LDZ14501002.260	130199		A1A10000432.30M	L11090244BR	BR
A5	LDZ14501002.260	130196		A1A10000432.30M	L11090237BR	BR
A6	LDZ14501002.260	130201		A1A10000432.30M	L11090140BR	BR
B1	LDZ14501002.260	130210		A1A10000432.30M	L11090241BR	BR
B2	LDZ14501002.260	130211		A1A10000432.30M	L11090155BR	BR
В3	LDZ14501002.260	130213		A1A10000432.30M	L11090158BR	BR
B4	LDZ14501002.260	130205		A1A10000432.30M	L11090224BR	BR
В5	LDZ14501002.260	130202		A1A10000432.30M	L11090219BR	BR
В6	LDZ14501002.260	130201		A1A10000432.30M	L11090208BR	BR
C1	LDZ14501002.260	130206		A1A10000432.30M	L11090207BR	BR
C2	LDZ14501002.260	130203		A1A10000432.30M	L11090147BR	BR
C3	LDZ14501002.260	130208		A1A10000432.30M	L11090210BR	BR
C4	LDZ14501002.260	130198		A1A10000432.30M	L11090217BR	BR
C5	LDZ14501002.260	130197		A1A10000432.30M	L11090218BR	BR
C6	LDZ14501002.260	130200		A1A10000432.30M	L11090233BR	BR

# 3.6 Motor Information

Manufacturer:	ТВА	Model Number:	
HP/KW Rating:	HP, 2000 KW	Serial Number:	
Rated Voltage:	6600 V	Type:	☐ Induction ☐ Synchronous
Full Load Data:	Amp: 217 A, Eff: , PF: 0.86	6, RPM: 593	
Locked KVA Code:		Speed Encoder:	⊠ Yes ⊠ No
Service Factor:		Encoder Model:	, 1024 PPR, Incremental
Motor Cooling:	Air, Other:	RTD's:	⊠ Stator ⊠ Bearings
Stator Connection:	⊠ Wye □ Delta	RTD Type:	PT100
Line Start Capability:	☐ Yes	RTD Alarm/Trip:	Stator: N/A °C, Bearing: N/A °C
Exciter Manufacturer:		Exciter Voltage:	V, □ AC □ DC
Exciter Model No:		Exciter Config:	

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# 4.0 CUSTOMER PRE-STARTUP CHECKLIST REVIEW

#### 4.1 Customer Responsibilities

	• • • • • • • • • • • • • • • • • • • •				
	4.1.1	Customer is responsible for completing the pre-startup items			
		on the Customer Pre-Startup Checklist (See Attachment #2).	Complete $oxtimes$	Incomplete [	
4.2	Review an				
	4.2.1	Review each item in the checklist with the Customer and			
		record status of completion in the Attachment #2.	Complete X	Incomplete	

### 5.0 DRIVE PRE-POWER INSPECTIONS AND CHECKS

Description	Initial
Visually check the equipment for any shipping or installation damage.	RD
Ensure that the entire system is earth grounded at one of the system grounding points. (Customer specified where ground to be connected in VFD. Either to input or output cabinet.)	RD
Confirm Siemens drawings are the same at the Customer's drawings. Note: <i>Drawings need to be updated for new encoder connection. Obs.</i> Encoder not Working properly in this drive	RD
Verify the source voltage to the Drive matches the Drive specification. The Drive's intended input voltage is specified on the foil label located inside the control panel door. (Note: This foil label may be located in the customer connection cabinet.)	RD
Ensure the control power (typically 120 VAC or 125 VDC) and auxiliary power (typically 415 or 690 VAC) sources are connected per the VFD schematics and that they match the Drive's control voltage ratings as stated on the foil label.	RD
Verify the presence of markings/labels on all terminal strips, mounted components, cell and other sub-assemblies. Notify the factory of any discrepancies.  List discrepancies: NA	RD
Verify the presence and proper installation of all protective covers.  List discrepancies: 415V for PLC I/O Transformer protection barrier to be fitted->Done!	RD
Verify the installation of the fan hood. Verify that the fan rotates freely while mounted.	RD
Check Blower Assembly installation and check hardware connections.	RD
Confirm all air gaps are blocked between cabinets.	RD
Confirm Shipping Splits are internally bolted together. n/a	RD

Description	Initial
Confirm Shipping Splits are externally bolted together (near floor). N/A	RD
Confirm cabinet to cabinet sealing.	RD
Confirm conduit entrance to cabinets is sealed.	RD
Confirm cabinet to floor is sealed.	RD
Confirm gland plates are installed properly.	RD
Verify that the ground bonding jumpers are present and connected (between shipping splits, cabinets to doors, cabinets to panels, motor).	N/A
Confirm MV and LV cables are installed in separate conduits (observe for proper spacing).	RD
Confirm LV (415V & 120V) and Analog Signal cables are installed in separate conduits.	RD
Check all cabling for insulation nicks, splitting and/or cracking.	RD
Verify that no conductors are exposed due to chafing or other shipping abuse.	RD
Input MV Power Cables: Verify insulation voltage rating is adequate.	RD
Input MV Power cables: Verify bend radii meet NEC requirements.	RD
Input MV Power cables: Check distance from cabinet/other cables.	RD
Input MV Power cables: Verify stress cones installed/mounted properly and shields are grounded at MV Switchgear end only – not at drive end. Ensure shield ground wires are adequately separated from bus work and GTO wires.	RD
Output MV Power Cables: Verify insulation voltage rating is adequate.	RD
Output MV Power cables: Verify bend radii meet NEC requirements.	RD
Output MV Power cables: Check distance from cabinet/other cables.	RD
Output MV Power cables: Verify stress cones installed/mounted properly and shields are grounded at VSD end only – not at Motor. Ensure shield ground wires are adequately separated from bus work and GTO wires.	RD
Verify that the transformer neutral is ungrounded.	RD
Check the tap jumper to be sure it is not touching the cabinet.	RD
Ensure that control and main power are installed and connected properly. Source to input. Output to motor.	RD
Check and inspect Motor Terminations in motor termination box. (done by JPR)	RD
Shipping split Bus Bar terminations complete, torqued and covers in place.	N/A
Ensure that VFD electrical connections are tight and that all torque marks are present.  * Re-examine for bolts bottoming out.	RD
Check Amp connector pins. Refer to "Test Procedure for Holding Tension Testing of Amp Connector Female Sockets" and complete the associated testing form.	N/A
Have the control wire plugs at each shipping split been reconnected and tie-wrapped?  (Confirms that all connnections that deal with shipping splits are addressed).	N/A
Control wires (visually inspected and landed per customer connection drawings).	RD
Check Input Attenuator Resistors are the correct value for the rated voltage.	RD
Check Output Attenuator Resistors are the correct value for the rated voltage.	RD

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Description	Initial
Verify all Transorbs are grounded (located at/near input & output attenuator resistors).	RD
Check Fuses and Relays (inserted snugly into holders).	RD
Verify Wago wiring secure.	RD
Verify Break Out Board wiring secure.	RD
Verify Signal Conditioning Board wiring secure.	RD
Verify DCR is properly grounded to ground point.	RD
Verify Plug/Ribbon cables are secured.	RD
Verify Keypad is grounded.	RD
Verify for Communication protocol only: termination resistor.	RD
Check Fiber optics (point to point) and verify that bend radii are acceptable. A3 fiber bent at Modulator Board End, light goes through.	RD
External air path in/out (distance from blower 30mm (minimum) - pass/fail. Pass	RD
Inlet/outlet located opposite side of room. ok	RD
All covers and doors installed and secured with the correct fasteners and ground straps.	RD
All Safety Interlock hardware (Fortress Locks) are installed and properly aligned.	RD
All Doors open/close properly.	RD
Drive door filters.	RD
Verify all components match the drawings: component location, labels, wire tags and Drive labels. (The drawing must reflect the Drive and vice-versa – internal connections only).	RD
Adjust Blower Motor Thermal OL's to correct settings.	RD

# 6.0 CONTROL POWER CHECKS

Description	Initial
Ensure that all control power sources are available for Drive operation.	RD
Verify free rotation of cell and transformer blowers. (A double-check before closing the cabinets.)	RD
Verify Network Cabling is the correct type and landed on the correct terminals.	N/A
Verify Speed Controls are terminated correctly (4-20 mA speed control or network control).	RD
Verify Start/Stop commands terminated correctly (digital input or network control).	RD

Energize the Control Power Circuits feeding the drive.

### DON'T energize MV Power.

Confirm the following parameters and document	Rated input current (2020)	214 A
	Rated output current (2040)	260 A
values:	Neutral connection (2630)	T2
	CT turns (3035)	250 :5
Measure all control power voltage sources being fed to the Drive. Verify that these voltages match the drawings.	415 $V_{AC}$ (373 $V_{AC}$ to 466 $V_{AC}$ )	435 V <sub>AC</sub>
	240 $V_{AC}$ (220 $V_{AC}$ to 260 $V_{AC}$ )	NA V <sub>AC</sub>
	120 V <sub>AC</sub> (110V <sub>AC</sub> to 130V <sub>AC</sub> )	129 V <sub>AC</sub>
If supplied, verify the UPS voltage.	120 V <sub>AC</sub> (110V <sub>AC</sub> to 130V <sub>AC</sub> )	NA V <sub>AC</sub>

Energize the control power circuits at the drive – close breakers and fuse holders.

Description	Initial
Verify phasing for the blower motor power circuit (verified by checking that suction holds a sheet of paper firmly on drive cabinet filters).	RD

Record Drive address.	TCP/IP Address:	172.017.020.16		
Verify <b>DCS</b> or <b>PLC</b> addresses across communication link, if applicable.	TCP/IP Address:	NA		
PLC via Network2				
Modbus TCP				
	+5 V <sub>DC</sub> (+5.1	10 to +5.13 V <sub>DC</sub> )	5.15 V <sub>DC</sub>	
	-5 V <sub>DC</sub> (-4.8	-5 V <sub>DC</sub> (-4.85 to -5.15 V <sub>DC</sub> )		
	+12 V <sub>DC</sub> (+11.	+12 V <sub>DC</sub> (+11.64 to +12.36 V <sub>DC</sub> )		
Power supply voltage checks.  Please see FAT docs.	-12 $V_{DC}$ (-11.64 to -12.36 $V_{DC}$ )		-12.1 V <sub>DC</sub>	
Thouse dee Title deed.	+15 V <sub>DC</sub> (+14.	30 to +15.70 V <sub>DC</sub> )	15.6 V <sub>DC</sub>	
	-15 V <sub>DC</sub> (-14.	30 to -15.70 V <sub>DC</sub> )	-15.4 V <sub>DC</sub>	
	24 V <sub>DC</sub> (21.6 to 26.4 V <sub>DC</sub> )		<b>24.3</b> V <sub>DC</sub>	
	+5	5.2 V <sub>DC</sub>		
DCB valtage checks:	-5 V <sub>DC</sub> +12 V <sub>DC</sub>		-5.15 V <sub>DC</sub>	
DCR voltage checks:			12.04 V <sub>DC</sub>	
	-1:	2 V <sub>DC</sub>	-12.07 V <sub>DC</sub>	

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#### DON'T ENERGIZE MV POWER - FURTHER CHECKS REQUIRED IN SECTION 10.

### Table 4: SOP, Parameters and Fault Logs

Upload/Review:	Initials		Upload:	Initials
SOP File: A5E32168985D	RD		Historical Log:	RD
Parameter File (Level 7 Security):	RD		Fault Log:	RD
Check Clock Time: to AEST only	RD		Event Log (NXG only):	RD
			Cell Fault Log (Legacy only):	NA
Were any existing issues found after reviewing SOP, Parameters and Logs?	Digital I/O Added to s sw yet to I	wi SC be	missioning code modification. iring modified as per Asbuilt drawings. DP, DI-0B for Keypad local control, wiring fitted. ock for Ventilation running DI.	and key-

Verify the following are functional under control power:		
MV Input Protection Interlock:	⊠ Yes □ No	
	⊠ Yes □ No	

# 7.0 SOFTWARE AND FIRMWARE VERSION RECORDING

Record the SOP Software (DRCTRY File) and	Software Ver:	Version 4.39
NXG Firmware (8090) version.	(8090) Firmware Ver:	Ver 5.2.3
Record HMI software version, if applicable. NA	Software Version:	NA
	Firmware Version:	NA
	Windows Version:	NA

# 8.0 BYPASS CONTACTOR TEST

# 8.1 Reference Bypass Contactor Procedure located in Bypass Contactor Kit.

Table 5: By-Pass Contactor Testing. Dynamic test pulling FO off for each cell, and then reset from parameter ID:XXXX.

#### NOT FITTED.

Contactor Name	Voltage	Initial
DDI/A4	Pick-up Voltage:	
BPKA1	Drop-out Voltage:	
DDKAO	Pick-up Voltage:	
BPKA2	Drop-out Voltage:	
BPKA3	Pick-up Voltage:	
DI IVAS	Drop-out Voltage:	
BPKA4	Pick-up Voltage:	
DI TO CF	Drop-out Voltage:	
BPKA5	Pick-up Voltage:	
5110.0	Drop-out Voltage:	
BPKA6	Pick-up Voltage:	
511010	Drop-out Voltage:	
BPKB1	Pick-up Voltage:	
BI NOT	Drop-out Voltage:	
BPKB2	Pick-up Voltage:	
211.02	Drop-out Voltage:	
BPKB3	Pick-up Voltage:	
	Drop-out Voltage:	
BPKB4	Pick-up Voltage:	
	Drop-out Voltage:	
BPKB5	Pickup Voltage:	
	Drop-out Voltage:	
BPKB6	Pick-up Voltage:	
	Drop-out Voltage:	
BPKC1	Pick-up Voltage: Drop-out Voltage:	
	Pick-up Voltage:	
BPKC2	Drop-out Voltage:	
_	Pick-up Voltage:	
BPKC3	Drop-out Voltage:	
DDI(O)	Pick-up Voltage:	
BPKC4	Drop-out Voltage:	
PDVCE	Pick-up Voltage:	
BPKC5	Drop-out Voltage:	
BPKC 6	Pick-up Voltage:	
Di NO 0	Drop-out Voltage:	
Confirm Customer I/O and communications Confirm Customer hard wiring into the VFD	This is the time to fine tune what is being received and if changes need to be done.	

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Description	
Install the covers and button up the Drives.	
Prepare the Drive for full input power. (Remove test equipment, motor free, etc.)	

# 9.0 OPEN LOOP TESTS

# N/A

The following steps verify operation of the Drive (without a motor) in Open Loop Test Mode (No motor current feedback).

Warning! Do not connect a grounded PC or laptop to a communications board with an isolator or while the Drive is running. To do so could damage the computer and/or the digital control rack.

Description	Initial
Review and follow safety procedures per Daily Safety Log.	
Make sure all safety grounds have been removed from input.	
Re-energize the AC or DC control power.	
Connect the PC/Laptop to the Ethernet Port (for access to the CPU Board). Connect Tool-Suite and the Debug Tool.	
Set the control loop type (2050) to Open Loop Test Mode (OLTM).	
Verify that the input current (3030) and input voltage (3040) scalers (stability →input processing) are set to the default values of 1.0.	
DISABLE spinning load using Drive → spinning load (2420) → spinning load mode (2430).	
Make sure the fast by-pass (2600) is DISABLED. Access this parameter through Drive $\rightarrow$ cells $\rightarrow$ fast by-pass.	
Configure the keypad to display input voltage (VDIN), input frequency (FRIN), and motor voltage (VLTS). – function of keypad	
Set the motor rated voltage (1040) parameter	
Energize MV Power to the system.	
(Everyone should leave the room the first time MV is applied to the Drive.)	

Description	Figures and Records	Initial
Verify that the keypad or drive tool displays the correct value of drive input voltage and frequency. At rated primary voltage, the AC input voltage feedback on Test Points VIA VIB, and VIC should be 5.4Vpp or 1.9Vrms.		
See the figure in the Comments Section.	Tiels, Stop	
These test points are on the system interface card. Perform the following corrective step if the input (or line) voltage is too high or too low.	VIB VIC VIA	
If the input voltage to the Drive is too high, then this needs to be corrected. Harmony Drives are shipped with the transformer tap set to +5%, which reduces the voltage by that percentage on the secondary side of the transformer.	Confirm Values using an oscilloscope and digital multimeter.	
If the voltage is low (5% less than rated), then change the tap on the transformer to the neutral ("O") or if the voltage is lower than 5% less than rated then change the tap on the transformer to -5% tap.		
If the input frequency is displayed as a negative number, then one pair of input phases has to be switched to change the phase rotation.		
Enter a speed demand of 25% and give the RUN command. The AC output voltage feedback signals on Test-Points VMA, VMB, and VMC should be 1.35Vpp ±0.27V (measure the average peak-to-peak voltage) or 0.48 Vrms ±0.20V.  See the figure in the Comments Section for signals on TestP-points VMA and VMB at 25% speed (15Hz).	Confirm Values using an oscilloscope and digital multimeter	
Increase the speed demand to 50% (30 Hz). The output voltage feedback signals should increase in proportion for both frequency and amplitude.		
Note that in Open Loop Test Mode, the flux regulator is not enabled and hence the output voltage will read higher or lower than calculated value corresponding to 50% of rated voltage. Adjust the flux demand parameter (3150) so that the motor voltage (on the keypad or tool) is approximately equal to 50% of rated voltage.		
Further increase the speed demand to 100% (60 Hz). The AC output voltage on Test-Points VMA, VMB, and VMC should be 5.4Vpp ±0.27V or 1.9 Vrms ±0.20V. The motor voltage on the keypad should read the rated value output voltage ±5%.		

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# 10.0 DRIVE TEST IN OPEN LOOP TEST MODE WITH MOTOR CONNECTED

The following steps verify operation of the Drive (with a motor connected at its output) in Open Loop Test Mode (No Current Feedback). This test is required only when the operation of the output Hall Effect Transducers requires to be verified. During this test the motor should be unloaded. If this test is not required then proceed to the next test.

Description [This procedure	not followed, OLVC n	nethod used]		Initial
Disconnect control voltage and medium voltage	ge sources & follow LC	TO procedures	S.	
Connect the motor feeder cables or enable m	otor contactor.			
Re-energize the AC or DC control power.				
Set the motor rated voltage (1040) and freque  → motor parameters) to be equal to the moto		s (access it thro	ough motor	
Make sure that spinning load mode (2430) a	and fast by-pass (260	0) are DISABL	ED.	
Slow down Drive acceleration and deceleration. <b>Set to 60 Sec or greater.</b>	Accel time 1	(2270)	Sec	
"Drive/Speed Ramp Setup"	Decel time 1	(2280)	Sec	
DON"T operate the drive beyond 10% speed "Stability/Output P	d without reducing the I rocessing/Flux Control		3150) to 0.5.	
Energize the medium voltage feed to the VFD. Push the fault reset button on the keypad to reset faults and push the button a second time to acknowledge any alarms.				
If the mode on the keypad display reads RLB open loop vector control and exit out of the m keypad to change back to mode. Then <b>changloop test mode</b> .	enu entry. This should	force the RLB	K on the	
Configure the keypad to display motor magne voltage.	etizing current, motor to	orque current ar	nd motor	
Spin the motor at 1% and observe proper rota	ation.			
Motor rotation correct or corrected:   Yes	No			
Operate the Drive with a speed demand of 10 motor current for phase A on test-points VMA			edback and	
Since the motor is unloaded the current waveform should lead the voltage waveform by almost 90°. The hall effect current transducers introduce a negative sign since they are configured to measure the incoming current. Check test-points VMB, IMB and VMC, IMC for similar waveforms. See Figure 10.1				

IM A

VM A

VM A

Ch 2 1.00 V M40.0ms A ch 7 600mV

Figure 10.1 Open Loop Test Mode operation at 10% speed with an unloaded motor.

(AC motor voltage and motor current at test-points VMA and IMA are shown.)

# 11.0 DRIVE TEST IN OPEN LOOP VECTOR CONTROL MODE FOR UNLOADED MOTOR APPLICATION

11.1 At this point the VFD is ready for actual (induction) motor operation. The following steps verify operation of the Drive and the load induction motor in open loop vector control mode.

Description	Initial
Re-energize the AC or DC control power, if de-energized.	
Change the Drive control loop type (2050) to open loop vector control.	

Description			Value
Setup the speed ramp parameters according to the following recommendations:	Accel time 1	(2270)	45 Sec
The acceleration and deceleration rate for a fan should be set to around 60 seconds and for a pump around 30 seconds. "Drive/Speed Ramp Setup"	Decel time 1	(2280)	45 Sec
Verify that fast (cell) by-pass is DISABLED at this time if you have that option	Fast by-pass	(2600)	NA Sec

**11.2** Verify that the following parameters are set correctly – default values are shown.

\*Note: Auto-Tuning modifies the italicized menu items.

\*\*Note: Param\_List= Please see Completed Parameter List asbuilt attached

Description				Value
	Motor frequency	(1020)	HZ	50
Setup the following motor parameters according to the nameplate values.	Full load speed	(1030)	RPM	593
"Motor/Motor Parameter"	Motor Rated Voltage	(1040)	V	6600
	Full load current	(1050)	А	217
	Leakage inductance	(1070)	16.0%	24.4
Use default values for the other motor	Stator resistance	(1080)	0.1%	0.78%
parameters as shown below. For this test set the stator resistance to 0.1%.	No load current	(1060)	25.0%	34%
	Inertia	(1090)	30.0 KgM <sup>2</sup>	389.1
	Overload select	(1130)	Inv. Time with Speed Derate	Inv Time w Sp
Setup the motor overload and torque	I overload pending	(1139)	105.0%	Param_List
limits. Set the motor trip volts to be equal	I overload	(1140)	110.0%	Param_List
to 120% of the motor rated voltage or to	Overload timeout	(1150)	5 Sec	Param_List
the value required by the customer. Set the over-speed parameter to be 120% or	Max. Motor Inertia	(1159)	0.0 KgM <sup>2</sup>	Param_List
to the value required by the customer.	Motor trip volts	(1160)	4800 V	Param_List
"Motor/Limits"	Over-speed	(1170)	120%	Param_List
	Motor torque limit 1	(1190)	100.0%	Param_List
	Regen torque limit 1	(1200)	-0.25%	Param_List

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D	escription			Value
	Flux reg prop gain	(3110)	1.72	Param_List
	Flux reg integral gain	(3120)	1.00	Param_List
Verify that these control loop gains are at their default values.	Flux filter time const	(3130)	0.0667 Sec	Param_List
at their default values.	Flux demand	(3150)	1.0	Param_List
	Flux ramp rate	(3160)	0.5 Sec	Param_List
	Energy saver min flux	(3170)	100%	Param_List
Verify that these control loop gains are	Speed reg prop gain	(3210)	0.02	Param_List
at their default values.	Speed reg integral gain	(3220)	0.046	Param_List
"Stability/Output Processing/Speed	Speed reg Kf gain	(3230)	0.60	Param_List
Loop"	Speed filter time const	(3240)	0.0488 Sec	Param_List
Verify that these control loop gains are	*Current reg prop gain	(3260)	0.50	Param_List
at their default values.  "Stability/Output Processing/Current Loop"	*Current reg integral gain	(3270)	25	Param_List
Verify that these control loop gains are	Enable braking	(3360)	Off	Param_List
at their default values. "Stability/Output Processing/Braking"	Pulsation frequency	(3370)	275 Hz	Param_List
Verify that these control loop gains are	Output current scaler	(3440)	1.000000	Param_List
at their default values.  "Stability/Output Processing"	Output voltage scaler	(3450)	1.000000	Param_List
Verify that these control loop gains are	Dead time comp	(3550)	16.0 µSec	Param_List
at their default values.	Feed forward constant	(3560)	0.0000	Param_List
"Stability"	Carrier frequency	(3580)	400.0 Hz	Param_List

	Description	Initial
Verify the system operational	program (SOP) and customer interface per Customer specification.	RD
Verify that the Customer has con	npleted their entire interface testing at this time.	RD
	feed to the VFD. Push the fault reset button on the keypad to reset econd time to acknowledge any alarms.	RD
Configure the keypad to display Speed Demand, Motor Magnetizing Current, Motor Torque Current, and Motor Voltage.		RD
Operate the Drive with a speed demand of 10%. Observe the AC output voltage feedback and motor current for phase A on testpoints VMA and IMA using an oscilloscope.	<ul> <li>If the motor is unloaded, then the current waveform should lead the voltage waveform by almost 90° (see Figure 11.1 - top frame) The hall effect current transducers introduce a negative sign since they are configured to measure the incoming current.</li> <li>If the motor is loaded then the current waveform will lead the motor voltage by an angle small than 90° (see Figure 11.1 - bottom frame).</li> <li>The motor voltage should be 10% of the motor rated voltage.</li> </ul>	RD

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Description	Initial
Increase the speed demand while monitoring the motor voltage. The motor voltage should read according to the following table. See Figure 11.2 for waveforms at 100% spread (50Hz). Table 6 shows the Drive voltage scaling for signals on test-points VMA, VMB and VMC as a function speed. Table 7 lists the scaling for the currents and voltage feedback signals available on the signal conditioning board at the rated operating point of the Drive.	RD

Table 6: Scaling of Drive output voltage as a function of speed

Speed Command (%)	Motor Speed (Hz)	Motor Voltage Feedback, (V <sub>P-P</sub> ) NXG Sys Intrf Brd (NXGII Sys I/O Brd)	Motor Voltage Feedback, (V <sub>RMS</sub> ) NXG Sys Intrf Brd (NXGII Sys I/O Brd)
10	6	1.08 (0.54) V <sub>P-P</sub>	0.38 (0.19) V <sub>RMS</sub>
25	15	2.70 (1.35) V <sub>P-P</sub>	0.96 (0.48) V <sub>RMS</sub>
50	30	5.40 (2.70) V <sub>P-P</sub>	1.91 (0.96) V <sub>RMS</sub>
75	45	8.10 (4.05) V <sub>P-P</sub>	2.87 (1.44) V <sub>RMS</sub>
100	60	10.80 (5.40) V <sub>P-P</sub>	3.82 (1.91) V <sub>RMS</sub>

Table 7: Scaling of Drive input and output voltages and currents

Variable	Rated value at Drive terminals (RMS)	Feedback value under rated conditions (V <sub>P</sub> ) NXG Sys Interface Board or (NXGII Sys I/O Board)	Feedback value under rated conditions (V <sub>RMS</sub> )  NXG Sys Interface Board or (NXGII Sys I/O Board)
Input Current	Primary Current Rating of Input CT	5.0 (2.5) V <sub>P</sub>	3.54 (1.77) V <sub>RMS</sub>
Input Voltage	(Rated Input Voltage L-L) / 1.732	5.4 (2.7) V <sub>P</sub>	3.82 (1.91) V <sub>RMS</sub>
Output Current	Output Current Rating = Cell Rating	5.0 (2.5) V <sub>P</sub>	3.54 (1.77) V <sub>RMS</sub>
Output Voltage	(Rated Output Voltage L-L) / 1.732	5.4 (2.7) V <sub>P</sub>	3.82 (1.91) V <sub>RMS</sub>

Examples: Output Current Scaling: Cell current rating =  $3.54 (1.77) V_{RMS}$ Output Voltage Scaling: [(Rated output voltage L-L) / 1.732] \*  $1.414 = 5.4 (2.7) V_{P}$ 

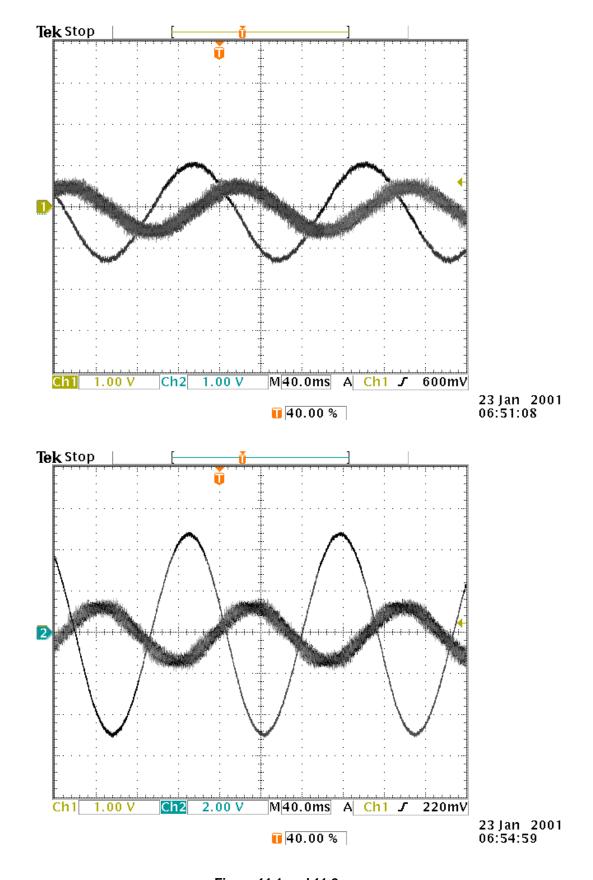


Figure 11.1 and 11.2

AC motor voltage and motor current at test-points VMA and IMA at 10% speed in Open Loop Vector Control

Top frame: Unloaded Operation

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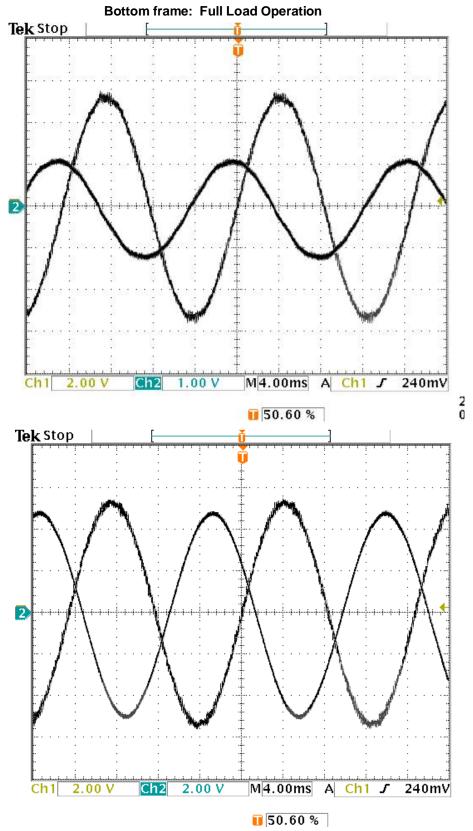


Figure 11.3 and 11.4

AC motor voltage and motor current at test-points VMA and IMA at 10% speed Open

Top frame: Unloaded Operation

Bottom frame: Full Load Operation Drive Test in Synchronous Motor Control Mode

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#### **12.0 TUNING**

Note: Spinning Load is disabled with V/Hz and OLTM control. IT is automatically enabled if fast by-pass is enabled regardless of menu settings.

Note: Spinning Load should be enabled if one or more of the following operating modes/features are selected:

- Fast By-Pass
- Auto-Restart (controlled through the auto reset parameters 7120-7150 and the SOP)
- Synchronous Motor Control (SMC and CSMC)
- Closed Loop Vector Control (CLVC)

	Description	Initial
Use the dr	ive tool to monitor motor flux (FluxDS), motor speed, and speed reference.	RD
Step 1: To shown.	enable spinning load and make sure the following parameters are set to the values	RD
Step 2: Sp	oinning Load Menu (2420)	RD
	Spinning load mode (2430) forward or reverse, whichever is appropriate	RD
	Scan end threshold (%) (2440) 20%	RD
	Current level set point (%) (2450) 15% [or equal to the no-load current setting]	RD
	Current ramp(s) (2460) 0.01 s	RD
	Max current (%) (2470) 50%	RD
	Frequency scan rate(s) (2480) 3.0 s (scan time). Check NXG Control manual for this feature	RD
Step 3: Op	perate the Drive with a demand of 30%.	RD
	n the drive tool monitor, the speed reference and motor speed at the moment the thes" the motor.	RD
Repeat Stewas by-pas	eps 3-4 for different cells. Save the screen shots from tool suite noting which cell ssed.	NA

# 13.0 SYNCHRONOUS TRANSFER PROCEDURE (if applicable) N/A

- This section of the startup procedure involves optional synchronous transfer checks. The Pefect Harmony may be configured for optional synchronous transfer operation, in which the Drive can be used to control multiple motors, one motor at a time. If such a configuration is not defined for the application, then this section may be skipped.
- **13.2** Use the following steps to setup the Drive control for Synchronous Transfer:

Description		
Step 1: Configure Synchronous Transfer Menu parameters as shown below.		
	Synchronous Transfer (2700)	
	Phase I gain (2710) 2	

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	Phase P gain (2720) 4	
	Phase offset (2730) 2 deg	
	Phase error threshold (2740) 1.5 deg	
	Frequency Offset (2750) 0.5%	
	Up Transfer Timeout (2760) 0 sec	
	Down Transfer Timeout (2770) 0 sec	
Step 2: Enable Spinning Load by setting Spinning Load Mode (2430) to forward.		
Step 3: Set th	e Speed Fwd Max limit 1 (2080) to at least 105%	

# **13.3** Go through the following checklist to complete the setup of Synchronous Transfer:

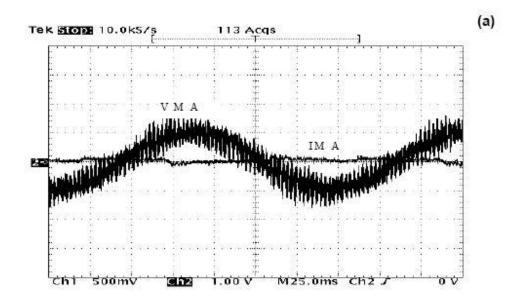
Description	Initial
Configure the Drive control as described from OLTM/CLVC	
Ensure that PLC-related hardware is properly connected (for information, see the respective PLC communications network manuals supplied by the vendor) to the analog I/O modules.	
Verify wiring of all VFD control and line control electrical contactors.	
Ensure that the system operating program for the "up transfer" and "down transfer" process logic is implemented.	
The state machines for up and down transfers reside in the Perfect Harmony's control program. These interface with the control system integrator's PLC network via the VFD system operating program to handle handshaking between each motor control center (MCC) and the VFD. All controls for the VFD and line reactors are controlled from the system integrator's PLC. Verify that these controls are operational.	
Verify all communications flags. (debugger screen)	
For Synchronous Motor (SM) synchronous transfer, an external field controller source is required when the SM is connected to the line and the Drive is disabled. This alalog source and the source from the Drive must be switched via external logic and in a digital manner, 4-20ma current loops are used for analog sources (current loops cannot be switched via a relay). The final output from the PLC must be connected to the field excitor directly. Verify that there are two sources to the PLC (one of which may be internal), and that the PLC logic is set to switch between the two sources at the appropriate time. The PLC also controls the enable of the field exciter any time the motor is active.	

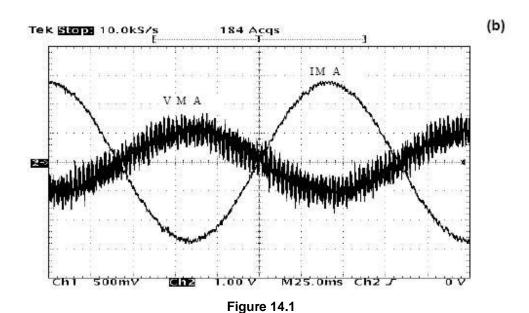
# 14.0 DRIVE TEST WITH SYNCHRONOUS MOTOR: N/A

**14.1** Procedure to verify operation of Drive with synchronous motor in Synchronous Motor Control Mode.

		Description	Initial
		ronous motor to the Drive. Enter motor parameters and use default gains wing parameters:	
1.	(1060). This par	tor Field no-load current as the No-load Current setting rameter should be calculated (in %) on the basis of the leld current and the maximum capability of the field excitor.	
	a)	Example: Drive with a synchronous motor that requires 24A of no-load field current and a field supply that is tuned so that 75A is the maximum output (at 20mA command input), then the No-Load Current Parameter should be set to: No-Load Current Setting = 100% * 24/75A = 32.0%	
2.	Enable Spinning	Load (2430)	
3.	Change the Drive	e control loop type (2050) to Synchronous Motor Control.	
4.	Use default cont changed as follo	rol loop gains except for the flux loop gains that should be ws:	
	a)	Flux reg prop gain (3110) 0.50	
Ī	b)	Flux reg integral gain (3120) 0.50	
	c)	Flux Filter Time Const (3130) 0.022 sec	
	d)	Saliency (1091) .02	
5.	field supply outports Start command to	have been modified to include the logic for controlling the ut contactor. The contactor should be ON as soon as the to the Drive is given, and should be turned OFF en the Drive trips on a Fault or when the Drive goes to ille stopping).	
En	ergize medium v	oltage Drive. Run the Drive with a speed demand of 10%.	
		art command is given, the field supply first starts by applying current and During this time, lds and lqs should be zero.	
		equal to the Flux Ramp Rate parameter (3160), the Drive starts by increasing ce to the Speed Demand.	
un	der steady-state	Motors, the Drive current is always in phase with the voltage, i.3e., $lds \approx 0$ conditions. At no-load, there is very little current supplied from the Drive (on current display, ITOT $\approx 0$ ).	
		0% speed. Verify that the no-load and full load (if possible) current with the Drive voltage waveforms, areas shown in Figure 14.1)	
wa Dri syr the	veforms, along vove output current chronous motor distortion introd	20% speed. Verify that the no-load and full-load (if possible) current with the Drive voltage waveforms, are as shown in Figure 14.2. Note that the ats at 100% speeds are distorted. This is due to the shape of the poles in the r. At low speeds, the current regulator bandwidth is sufficient to correct for duced by the motor poles as shown in 14.2 b. However, at high speeds, the ains are insufficient to maintain sinusoidal output currents when the distortion is construction.	

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AC Motor Voltage and Motor Current at Test-points VMA and IMA at 10% speed with Synchronous Motor Control (a) Unloaded and (b) 75% torque operation.

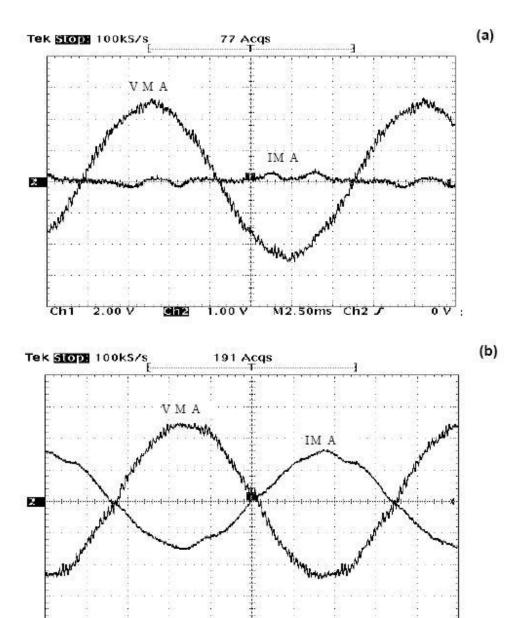


Figure 14.2

AC Motor and Motor Current at Test-point VMA and IMA at 100% speed with Synchronous Motor Control

(a) Unloaded and (b) 75% torque operation

# 15.0 ALARMS AND ADDRESSES See Param\_List attached

Description	Initial		
Verify the following parameters are set.		RD	
Motor limits (1120) including phase imbalance limit (limit (1245)	Motor limits (1120) including phase imbalance limit (1244) and ground fault limit (1245)		
Speed profile menu (4000)		RD	
Bypass type menu (2590) and fast bypass menu (26	600)	RD	
Critical frequency menu (2340)		RD	
Drive protection menu (7)		RD	
Display parameters menu (8000)		RD	
The Drive is functional at this time.	RD		
Verify alarm indications per the site confirm the inpu working.	Verify alarm indications per the site confirm the input protection E-stop is working.		
Depress local E-Stop	VFD coast to stop	RD	
Measure contact status on TB2-1 & 2	RD		
Verify Fault contact on TB2-31 & 32 changes state	RD		
Verify Run contact on TB2-23 & 24 changes state	RD		
Remove Jumper on TB2-3 & 4	VFD coasts to stop	RD	

# The commissioning process is now complete.

The Customer's signature provides acceptance of the Siemens equipment listed on the site information page.

# 16.0 APPROVAL & ACCEPTANCE OF STARTUP & COMMISSIONING

#### 16.1 Documentation Provided

- 16.1.1 Configure keypad to display desired parameters.
- 16.1.2 Upload the parameter (configuration) file, SOP file, event log file.
- 16.1.3 Provide Customer with the following:
  - 16.1.3.1 Copy of parameter, SOP, event log file
  - 16.1.3.2 Copy of operating flash drive
  - 16.1.3.3 Copy of this checklist

I, the undersigned, validate that this system Commissioning has been completed as per this procedure. Any discrepancies have been noted alongside the appropriate steps in the document. Additionally, any outstanding items or recommendations have been noted on Form CCF-004 – Punch list for Witness Testing and/or Commissioning.

SIEMENS FSR	
Print Name:	Ruben Diaz
Signature:	723
Date:	24th September, 2013
CUSTOMER RE	PRESENTATIVE
Print Name:	JOHN MLAYTON
Signature:	a clayfor
Date:	/ 30/9/2013.
CUSTOMER RE	PRESENTATIVE
Print Name:	LDDIE (PRANIS)
Signature:	- Chi
Date:	4/11/2013

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Description			ID	Lvl RH
Main - Sec. level: 7			5	0 0 0
Motor	Motor par	rameter	1 1000	0 0 0
	Motor par	Motor frequency = 50.0 Hz	*1020	5 10
		Full load speed = 593 rpm	*1030	5 10
		Motor voltage = 6600 V	*1040	5 10
		Full load current = 217.0 A	*1050	5 10
		No load current = 34.0 %	*1060	5 0 0
		Motor kW Rating = 2000.0 kW	*1010	5 10
		Leakage inductance = 24.4 %	*1070	5 0 0
		Stator resistance = 0.78 %	*1080 *1090	5 0 0 5 0 0
		Inertia = 389.1 Kgm2 Current Profile	1090	0 00
		Motor current limit 1 = 100 %	1193	7 0 0
		Speed at current lim 1 = 100 %	1194	7 0 0
		Motor current limit 2 = 100 %	1195	7 0 0
		Speed at current lim 2 = 100 %	1196	7 0 0
		Motor current limit 3 = 100 %	1197	7 0 0
		Speed at current lim 3 = 100 %	1198	7 0 0
		Motor current limit 4 = 100 %	1202	7 0 0
		Speed at current lim 4 = 100 % Motor current limit 5 = 100 %	1203 1204	7 0 0 7 0 0
		Speed at current lim 5 = 100 %	1204	7 0 0
		Motor current limit 6 = 100 %	1205	7 0 0
		Speed at current lim 6 = 100 %	1207	7 0 0
		Motor current limit 7 = 100 %	1208	7 0 0
		Speed at current lim 7 = 100 %	1209	7 0 0
		Motor current limit 8 = 100 %	1301	7 0 0
		Speed at current lim 8 = 100 %	1302	7 0 0
		Motor current limit 9 = 100 %	1303	7 0 0
		Speed at current lim 9 = 100 %	1304	7 0 0
	Limits		1120	5 0 0
		Overload select = Inv Time w/ derate	1130	5 0 0
		Overload Pending = 100.0 %	*1139	5 0 0
		Overload = 110.0 % Overload timeout = 5.0 sec	1140 1150	5 0 0 5 0 0
		Speed Derate Curve	1151	5 00
		0 Percent Break Point = 0.0 %	1152	5 0 0
		10 Percent Break Point = 31.6 %	1153	5 0 0
		17 Percent Break Point = 41.2 %	1154	5 0 0
		25 Percent Break Point = 50.0 %	1155	5 0 0
		50 Percent Break Point = 70.7 %	1156	5 0 0
		100 Percent Break Point = 100.0 %	1157	5 0 0
		Motor trip volts = 8300 V	*1160	5 0 0
		Maximum Motor Inertia = 0.0 Kgm2	1159	5 10
		Overspeed = 120.0 %	1170	5 0 0
		Underload enable = Disable	1180	5 0 0
		I underload = 10.0 %	1182 1106	5 0 0
		Under load timeout = 10.0 sec Motor torque limit 1 = 100.0 %	1186 1190	5 0 0 5 0 0
		Regen torque limit 1 = -0.25 %	1200	5 0 0
		Motor torque limit 2 = 100.0 %	1210	7 0 0
		Regen torque limit 2 = -0.25 %	1220	7 0 0
		•		

Description	ID	Lvl RH
Motor torque limit 3 = 100.0 % Regen torque limit 3 = -0.25 % Phase Imbalance Limit = 40.0 % Ground Fault Limit = 5.0 % Ground Fault Time Const = 0.017 sec H/W Ground Fault Enable = Yes Peak Reduction Enable = VFD volt rating Loss of field level = 40.0 % Loss of field timeout = 10.0 sec	1230 1240 1244 1245 1246 1247 1248 1141 1142	7 00 7 00 5 00 5 00 5 00 7 10 7 00 7 00 7 00
Encoder  Encoder 1 PPR = 1024  Encoder filter gain = 0.7500  Encoder loss threshold = 5.0 %  Encoder loss response = stop (fault)  Low speed operation = Disable	1280 *1290 1300 1310 1320 1330	0 0 0 5 1 0 7 0 0 7 0 0 7 0 0 7 0 0
Drive  Drive parameters  Rated input voltage = 6600 V  Rated input current = 214.0 A  Rated output voltage = 6600 V  Rated output current = 260.0 A  Control loop type = OLVC  Parallel system = Disable	2 2000 *2010 *2020 *2030 *2040 2050 2051	0 0 0 0 0 0 7 1 0 7 1 0 7 1 0 7 1 0 7 1 0 0 0 0
Ratio control = 100.0 %  Speed fwd max limit 1 = 100.0 %  Speed fwd min limit 1 = 1.0 %  Speed fwd max limit 2 = 0.0 %  Speed fwd min limit 3 = 0.0 %  Speed fwd min limit 3 = 0.0 %  Speed fwd min limit 1 = 0.0 %  Speed rev max limit 1 = 0.0 %  Speed rev min limit 1 = 0.0 %  Speed rev max limit 2 = 0.0 %  Speed rev max limit 2 = 0.0 %  Speed rev min limit 3 = 0.0 %  Speed rev min limit 3 = 0.0 %  Speed rev min limit 3 = 0.0 %  Speed rev min limit 3 = 0.0 %  Speed rev min limit 3 = 0.0 %	2060 2070 2080 *2090 *2100 2110 *2120 2130 *2140 2150 *2160 2170 *2180 2190 2200	0 0 0 0 5 0 0 0 5 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 7 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Torque reference  Sop / Menu control = Sop flag  Torque setpoint = 0.0 %  Holding torque = 0.0 %  Torque ramp increase = 1.00 sec  Torque ramp decrease = 1.00 sec  Torque command scalar = 1.00	2210 2211 2220 2230 2240 2250 2242	0 0 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 5 0 0
Speed ramp setup  Accel time 1 = 45.0 sec  Decel time 1 = 45.0 sec  Accel time 2 = 5.0 sec  Decel time 2 = 5.0 sec	2260 *2270 *2280 2290 2300	0 0 0 5 0 0 5 0 0 7 0 0 7 0 0

Description	ID	Lvl RH
Accel time 3 = 5.0 sec Decel time 3 = 5.0 sec Jerk rate = 0.1	2310 2320 2330	7 0 0 7 0 0 7 1 0
Critical freq Skip center freq 1 = 15.0 Hz Skip center freq 2 = 30.0 Hz Skip center freq 3 = 45.0 Hz Skip bandwidth 1 = 0.0 Hz Skip bandwidth 2 = 0.0 Hz Skip bandwidth 3 = 0.0 Hz	2340 2350 2360 2370 2380 2390 2400	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Spinning load  Spinning load mode = Both  Scan end threshold = 20.0 %  Current Level SetPoint = 15.0 %  Current ramp = 0.01 sec  Max current = 50.0 %  Frequency scan rate = 3.00 sec	2420 *2430 2440 2450 2460 2470 2480	0 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Cond time setup  Cond stop timer = 0.8 sec  Cond run timer = 0.8 sec	2490 2500 2510	0 0 0 5 0 0 5 0 0
Cells  Installed cells/phase = 6  Min cell count (n/3) = 6  Cell voltage = 630  Thermistor warn level = 20.0 %  Bypass type = None  Neutral connection = T1  Precharge Enable = Off	2520 *2530 *2540 2550 2560 *2590 *2630 2635	0 0 0 5 1 0 5 1 0 5 1 0 7 1 0 7 1 0 7 1 0
Sync transfer  Phase I gain = 2.0  Phase P gain = 4.0  Phase offset = 2.00 deg  Phase error threshold = 1.50 deg  Frequency offset = 0.5 %  Up transfer timeout = 0.0 sec  Down transfer timeout = 0.0 sec	2700 2710 2720 2730 2740 2750 2760 2770	7 0 0 7 0 0
External I/O  Analog inputs = 0  Analog outputs = 2  Digital inputs = 0  Digital outputs = 0  Wago timeout = 0.0 sec	2800 2810 *2820 2830 2840 *2850	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0
Internal I/O Int Analog In1 Hardware Span = 1.0640	2805 2815 *2818	5 0 0 5 0 0 5 1 0
Int Analog In2 Type = 4 - 20ma	2825 2826	5 0 0 5 1 0

Description	ID	Lvl RH
Hardware Span = 1.0860	*2828	5 0 0
Int Analog In3 Type = 4 - 20ma Hardware Span = 1.0730	2835 2836 *2838	5 0 0 5 1 0 5 0 0
Int Analog Out1  Analog variable = Total Current Output Mode = 4-20 mA Output Min = 0.0 % Output Max = 150.0 % Hardware Span = 1.0000	2845 2846 2848 2841 *2842 2844	5 00 5 00 5 00 5 00 5 00 5 00
Int Analog Out2 Analog variable = Motor Speed Output Mode = 4-20 mA Output Min = 0.0 % Output Max = 100.0 % Hardware Span = 1.0253	2855 *2856 2858 2851 2852 *2854	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Int Test Point #28 Analog variable = None TP 28 Scaler = 0.00	2860 2861 2862	5 0 0 5 0 0 5 0 0
Int Test Point #29 Analog variable = None TP 29 Scaler = 0.00	2865 2866 2867	5 0 0 5 0 0 5 0 0
Int Test Point #31 Analog variable = None TP 31 Scaler = 0.00	2870 2871 2872	5 0 0 5 0 0 5 0 0
Int Test Point #24 Analog variable = None TP 24 Scaler = 0.00	2875 2876 2877	5 0 0 5 0 0 5 0 0
Int Test Point #25 Analog variable = None TP 25 Scaler = 0.00	2880 2881 2882	5 0 0 5 0 0 5 0 0
Int Test Point #26 Analog variable = None TP 26 Scaler = 0.00	2885 2886 2887	5 0 0 5 0 0 5 0 0
Output Connection  Filter CT sec turns = 0  Filter inductance = 0.0 %  Filter capacitance = 0.0 %  Cable resistance = 0.0 %  Cable inductance = 0.0 %  Filter damping gain = 0.50	2900 2910 2920 2930 2940 2941 2950	0 0 0 5 1 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
High starting Torque Enable high torque = Disable Torque current = 50.0 %	2960 2961 2962	7 0 0 7 1 0 5 0 0

Description			ID	Lvl RH
		amp time = 0.5 sec time = 2.0 sec	2963 2964	5 0 0 5 0 0
	Watchdog Enable w	atchdog = Enable	2970 2971	7 0 0 7 0 0
Stability	PLL integ Input curr CT secon Input volt PT secon	gain = 70.0 yral gain = 3840.00 rent scaler = 1.000000 ndary turns = 250 age scaler = 1.000000 ndary turns = 1 enuator Sum = 4800 kOhm	3 3000 3010 3020 3030 *3035 3040 3011 *3045	0 0 0 7 0 0 7 0 0 7 0 0 7 1 0 7 1 0 7 1 0 7 1 0
	Output processing Low freq	comp Low Freq Wo = 12.566 Rad Low freq com gain = 1.00 S/W compensator pole = 2.000	3050 3060 3070 3080 3090	7 0 0 7 0 0 7 1 0 7 0 0 7 0 0
	Flux conti	Flux reg prop gain = 2.544 Flux reg integral gain = 3.271 Flux filter time const = 0.06461 Flux demand = 1.00 Flux ramp rate = 0.500 sec Energy saver min flux = 100.0 % Flux droop = 0.0 %	3100 *3110 *3120 *3130 3150 3160 3170 3195	7 0 0 7 0 0
	Speed loo	Speed reg prop gain = 0.010 Speed reg integral gain = 0.020 Speed reg Kf gain = 0.600 Speed filter time const = 0.08038 Droop in % @ FL current = 0.0 %	3200 *3210 *3220 3230 *3240 3245	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
	Current Id	Current reg prop gain = 0.741 Current reg integ gain = 18.600 Prop gain during brake = 0.148 Integ gain during brake = 3.720	3250 *3260 *3270 *3280 *3290	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
	Stator res	Sis est Stator resistance est = Off Stator resis filter gain = 0.0 Stator resis integ gain = 0.00200	3300 3310 3320 3330	7 00 7 10 7 00 7 00
	Braking	Enable braking = Off Pulsation frequency = 277.5 Hz Brake power loss = 0.3 % VD Loss Max = 0.250 Braking constant = 1.05	3350 3360 *3370 3390 3400 3410	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0

Description		ID	Lvl RH
	Output current scaler = 1.000000 Output voltage scaler = 1.000000 Output Attenuator Sum = 4800 kOhm	3440 3450 *3455	7 0 0 7 0 0 7 1 0
	Control loop test  Test type = Speed  Test positive = 30.0 %  Test negative = -30.0 %  Test time = 30.1 sec	3460 3470 3480 3490 3500	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
	Dead time comp = 16.0000 usec Feed forward constant = 0.0000 Sampling Delay Comp = 0.0 % Carrier frequency = 601.3 Hz	3550 3560 3570 *3580	7 10 7 10 7 00 7 10
Auto	Speed profile  Entry point = 0.0 %  Exit point = 100.0 %  Entry speed = 48.0 %  Exit speed = 98.3 %  Auto off = 0.0 %  Delay off = 0.5 sec  Auto on = 0.0 %  Delay on = 0.5 sec	4 4000 4010 *4020 *4030 *4040 4050 4060 4070 4080	5 0 0 5 0 0
	Analog inputs  Analog input #1  Source = Int AI1  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4090 4100 *4105 4110 4120 4130 4140 4150 4160	5 0 0 5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
	Analog input #2  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4170 4175 4180 4190 4200 4210 4220 4230	5 0 0 5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
	Analog input #3  Source = Off Type = 4 - 20ma Min input = 0.0 % Max input = 100.0 % Loss point threshold = 15.0 % Loss of signal action = Preset Loss of signal setpoint = 20.0 %	4232 4233 4234 4235 4236 4237 4238 4239	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
	Analog input #4	4332	5 00

Description	ID	Lvl RH
Source = Off Type = 4 - 20ma Min input = 0.0 % Max input = 100.0 % Loss point threshold = 15.0 % Loss of signal action = Preset Loss of signal setpoint = 20.0 %	4333 4334 4335 4336 4337 4338 4339	5 10 5 10 5 10 5 10 5 10 5 10 5 00
Analog input #5  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4341 4342 4343 4344 4345 4346 4347 4348	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Auxillary input #1  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4500 4510 4520 4530 4540 4550 4560 4570	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Auxillary input #2  Source = Off  Type = 4 - 20ma  Min input = 0.0 %  Max input = 100.0 %  Loss point threshold = 15.0 %  Loss of signal action = Preset  Loss of signal setpoint = 20.0 %	4580 4590 4600 4610 4620 4630 4640 4650	5 0 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 1 0 5 0 0
Analog outputs Analog output #1 Analog variable = Average Power Output module type = Unip Full range = 81.0 %	4660 4661 *4662 4663 *4664	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Analog output #2 Analog variable = Motor Speed Output module type = Unip Full range = 100.0 %	4665 *4666 4667 *4668	5 0 0 5 0 0 5 0 0 5 0 0
Speed setpoints  Speed setpoint 1 = 0 rpm Speed setpoint 2 = 0 rpm Speed setpoint 3 = 0 rpm Speed setpoint 4 = 0 rpm Speed setpoint 5 = 0 rpm Speed setpoint 6 = 0 rpm Speed setpoint 7 = 0 rpm Speed setpoint 8 = 0 rpm	4240 4250 4260 4270 4280 4290 4300 4310 4320	5 00 5 00 5 00 5 00 5 00 5 00 5 00 5 00

Description	ID	Lvl RH
Jog speed = 0 rpm Safety setpoint = 0 rpm	4330 4340	5 0 0 5 0 0
Incremental speed setup  Speed increment 1 = 1.00 %  Speed decrement 1 = 1.00 %  Speed increment 2 = 5.00 %  Speed decrement 2 = 5.00 %  Speed increment 3 = 10.00 %  Speed decrement 3 = 10.00 %	4970 4971 4972 4973 4974 4975 4976	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
Prop gain = 0.390 Integral gain = 0.390 Diff gain = 0.000 Min clamp = 0.0 % Max clamp = 100.0 % Setpoint = 0.0 %	4350 4360 4370 4380 4390 4400 4410	5 0 0 5 0 0 5 0 0 5 0 0 5 0 0 5 0 0
Comparator setup Comparator 1 setup Comp 1 A in variable = Mtr Spd Comp 1 B in variable = Manual value Comp 1 manual value = 2.500 % Compare 1 type = Mag	4800 4810 *4811 4812 *4813 *4815	5 0 0 5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 2 setup Comp 2 A in variable = Manual value Comp 2 B in variable = Manual value Comp 2 manual value = 0.000 % Compare 2 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 3 setup Comp 3 A in variable = Manual value Comp 3 B in variable = Manual value Comp 3 manual value = 0.000 % Compare 3 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 4 setup  Comp 4 A in variable = Manual value  Comp 4 B in variable = Manual value  Comp 4 manual value = 0.000 %  Compare 4 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 5 setup  Comp 5 A in variable = Manual value  Comp 5 B in variable = Manual value  Comp 5 manual value = 0.000 %  Compare 5 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
Comparator 6 setup  Comp 6 A in variable = Manual value  Comp 6 B in variable = Manual value  Comp 6 manual value = 0.000 %  Compare 6 type = Off		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0

Description		ID	Lvl RH
	•		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
			5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
			5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	•		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	•		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	•		5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
			5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
			5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
			5 0 0 5 1 0 5 1 0 5 0 0 5 1 0
	Comparator 16 setup	4960	5 00

Description		ID	Lvl	RH
	• • • • • • • • • • • • • • • • • • •		5 5	1 0 1 0 0 0 1 0
	Comp 17 A in variable = Manual value Comp 17 B in variable = Manual value Comp 17 manual value = 0.000 %		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp 18 A in variable = Manual value Comp 18 B in variable = Manual value Comp 18 manual value = 0.000 %		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp 19 A in variable = Manual value Comp 19 B in variable = Manual value Comp 19 manual value = 0.000 %		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp 20 A in variable = Manual value Comp 20 B in variable = Manual value Comp 20 manual value = 0.000 %		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp 21 A in variable = Manual value Comp 21 B in variable = Manual value Comp 21 manual value = 0.000 %		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp 22 A in variable = Manual value Comp 22 B in variable = Manual value Comp 22 manual value = 0.000 %		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp 23 A in variable = Manual value Comp 23 B in variable = Manual value Comp 23 manual value = 0.000 %		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comp 24 A in variable = Manual value Comp 24 B in variable = Manual value Comp 24 manual value = 0.000 %		5 5 5	0 0 1 0 1 0 0 0 1 0
	Comparator 25 setup Comp 25 A in variable = Manual value	4459 4460		0 0 1 0

Description	ID Lv	<u>/I RH</u>
· ·	1462 5	1 0 0 0 1 0
Comp 26 A in variable = Manual value4 Comp 26 B in variable = Manual value4 Comp 26 manual value = 0.000 % 4	1467 5	1 0 1 0 0 0
Comp 27 A in variable = Manual value4 Comp 27 B in variable = Manual value4 Comp 27 manual value = 0.000 % 4	1472 5 1473 5	1 0 0 0
Comp 28 A in variable = Manual value4 Comp 28 B in variable = Manual value4 Comp 28 manual value = 0.000 % 4	1479 5	1 0 1 0 0 0
Comp 29 A in variable = Manual value4 Comp 29 B in variable = Manual value4 Comp 29 manual value = 0.000 % 4	1485 5	1 0 1 0 0 0
Comp 30 A in variable = Manual value4 Comp 30 B in variable = Manual value4 Comp 30 manual value = 0.000 % 4	1490 5 1491 5	0 0
Comp 31 A in variable = Manual value4 Comp 31 B in variable = Manual value4 Comp 31 manual value = 0.000 % 4	1498 5	1 0 1 0 0 0
Comp 32 A in variable = Manual value4 Comp 32 B in variable = Manual value4 Comp 32 manual value = 0.000 % 4		1 0 1 0 0 0
Store in Event Log = On Historic log variable 1 = Mtr Speed Historic log variable 2 = Spd Dmd Historic log variable 3 = Trq I Cmd Historic log variable 4 = Trq I Fdbk Historic log variable 5 = I Total Out  6  6  7  7  8  8  8  8  8  8  8  8  8  8  8	5250 0	0 0 0 0 0 0 0 0

Description		ID	Lvl RH
	Historic log variable 7 = V Avail RMS	*6320	5 00
Drive pro	otect Input protection Single phasing SPD prop gain = 0.0 SPD integral gain = 0.0010 SPD threshold = 50.0 %	7 7000 7010 7020 7030 7040	0 0 0 0 0 0 0 0 0 7 0 0 7 0 0 7 0 0
	Undervoltage prop gain = 0.0 Undervoltage integ gain = 0.001 1 Cyc Protect integ gain = 0.0025 1 Cycle Protect Limit = 50.0 % Excess Loss Idle = 5.0 % Excess Loss Running = 7.0 % Xformer tap setting = +5 % Xformer thermal gain = 0.0133 Xformer protection const = 0.500 Phase Imbalance Limit = 40.0 % Ground Fault Limit = 40.0 % Ground Fault Time Const = 0.200 sec	7060 7070 7080 7081 7084 7086 *7050 7090 7100 7105 7106 7107	7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 1 0 7 0 0 7 0 0 7 0 0 7 0 0
	Drive IOC setpoint = 150.0 % Cell Overload Level = 100.0 % Auto reset enable = No Auto reset time = 1 sec Auto reset attempts = 4 Auto reset memory time = 10 sec	7110 7112 7120 7130 7140 7150	7 0 0 7 0 0 7 0 0 5 0 0 5 0 0 5 0 0
Meter	Display params Status variable 1 = DEMD Status variable 2 = RPM Status variable 3 = ITOT Status variable 4 = KWO Status variable 5 = IMRF Status variable 6 = IMRF Status variable 7 = IMRF	8 8000 8001 8002 *8003 *8004 8005 8006 8007	0 0 0 0 0 0
	Input harmonics Selection for HA = IA Harmonics order = 1.0 Harmonics integral gain = 0.001	8140 8150 8160 8170	0 0 0 0 0 0 0 0 0 0 0 0
	Customer order = 2133943 Customer drive = 1	*8101 8110	0 0 0 0 0 0
Commun	serial port setup Serial port use = Local Flow Control = Xon/Xoff Baud rate = 9600	9 9010 9020 9030 9040	0 0 0 0 0 0 5 1 0 5 1 0 5 1 0
	Network Control Net Control Type = Sop	9943 9944	7 0 0 7 1 0

Description		ID	Lvl RH
	Start Stop Control = Maintained	9945	7 10
	Network 1 Configure Network 1 Type = None	9900 9901	7 0 0 7 1 0
	Network 2 Configure Network 2 Type = None	9914 9915	7 0 0 7 0 0
	SOP & serial functions  Menu based Timer setup  MenuTimer1 = 30.0 sec  MenuTimer2 = 0.0 sec  MenuTimer3 = 0.0 sec  MenuTimer4 = 10.0 sec  MenuTimer5 = 0.0 sec  MenuTimer6 = 0.0 sec  MenuTimer7 = 0.0 sec  MenuTimer8 = 0.0 sec  MenuTimer9 = 0.0 sec  MenuTimer10 = 0.0 sec  MenuTimer11 = 0.0 sec  MenuTimer12 = 0.0 sec  MenuTimer12 = 0.0 sec  MenuTimer13 = 0.0 sec  MenuTimer14 = 0.0 sec  MenuTimer15 = 0.0 sec  MenuTimer15 = 0.0 sec  MenuTimer16 = 0.0 sec	9110 9111 *9112 9113 9114 *9115 9116 9117 9118 9119 9121 9122 9123 9124 9125 9126 9127 9128	0 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0 7 0 0
	Select system program = 2168985F.HEX Multiple config files = OFF	*9146 9185	7 1 0 5 1 0
	TCP/IP server name = 172.17.20.16	*9000	0 0 0
Graphing	Time scale = 10.00 sec Variable 1 Graph variable = Spd ref Offset = 0.00 Scale factor = 1.20	10 10000 10010 10020 10030 10040	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	Variable 2 Graph variable = Mtr speed Offset = 0.00 Scale factor = 1.20	10050 10060 10070 10080	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 3 Graph variable = Flux ref Offset = 0.00 Scale factor = 1.25	10090 10100 10110 10120	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 4  Graph variable = Flux DS  Offset = 0.00  Scale factor = 1.25	10130 10140 10150 10160	0 0 0 0 0 0 0 0 0 0 0 0
	Variable 5	10170	0 0 0

Description	ID	Lvl RH
Graph variable = Ids ref Offset = 0.00 Scale factor = 1.00	10180 10190 10200	0 0 0 0 0 0 0 0 0
Variable 6 Graph variable = Ids Offset = 0.00 Scale factor = 1.00	10210 10220 10230 10240	0 0 0 0 0 0 0 0 0 0 0 0
Variable 7 Graph variable = Iqs ref Offset = 0.00 Scale factor = 1.00	10250 10260 10270 10280	0 0 0 0 0 0 0 0 0 0 0 0
Variable 8  Graph variable = Iqs  Offset = 0.00  Scale factor = 1.00	10290 10300 10310 10320	0 0 0 0 0 0 0 0 0 0 0 0
Variable 9  Graph variable = Drv State Offset = 0.00 Scale factor = 1.00	10330 10340 10350 10360	0 0 0 0 0 0 0 0 0 0 0 0
Variable 10 Graph variable = PreChrg St Offset = 0.00 Scale factor = 1.00	10370 10380 10390 10400	0 0 0 0 0 0 0 0 0 0 0 0
Select language = English	5081	0 0 0

## 3) 0110-SR13 Variable Speed Drive System

E. Ventilation System Data



Represented by: Air Design Pty. Ltd. A.B.N. 77 512 727 190 45 Nestor Drive Meadowbrook QLD 4131 Telephone: +61 (07) 3299 9888 Facsimile: +61 (07) 3299 9800 E-mail: sales@airdesign.com.au

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#### FAN DATA FOR MODEL AP0804GP6/20

600

Fan Code: AP0804GP6/20

Requirements

Volume:

6300 L/s

Static Pressure: Selection Pressure:

200 Pa 200 Pa at std conditions

Installation Category:

TYPE D 20 deg C

Temperature: Altitude:

0 m

Fan Data (at STP)

Type:

In-line direct drive axial

fan

Diameter:

Hub:

800 255 mm

Impeller Blades:

Pitch:

20 degrees **GRP** 

Blade Material: Speed:

24 revs/sec

Absorbed Power:

Peak Power:

Total Efficiency:

Fan Weight:

2.34 kW

2.59 kW

79 %

84.3 kg.

Power (kW)

#### Motor Data (at STP)

Motor Type:

Standard

**Electrical Supply:** 

415V/3ph/50Hz D100L / 3.00 kW

Motor Frame/Power:

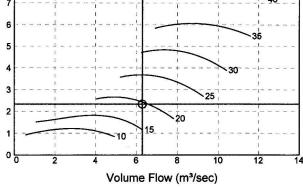
6.2A / 37.2

Current FLC/Start: Motor Speed:

Single Speed (4 Pole)

Energy Efficiency, BCA Volume 1 2008, Table J5.2 compliant selection

sys 500 400 PdF Static Pressure 300 (Pa) 200 100 Volume Flow (m³/sec)



Density: 1.2 kg/m³

#### Inlet PWL

Spectrum (Hz)	63	125	250	500	1K	2K	4K	8K	dBW	dBA @ 3m
Outlet PWL (dB)	92	86	86	84	85	81	77	73	95	68
Inlet PWL (dB)	90	86	87	85	85	81	78	73	94	69

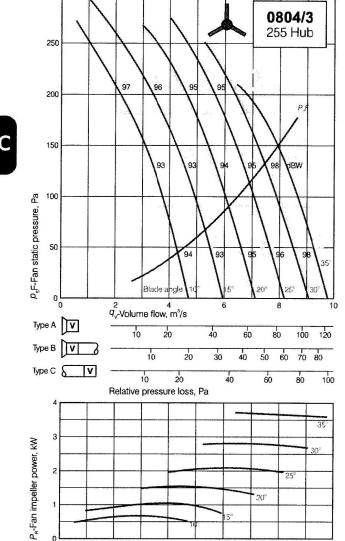
Note: Levels are quoted as in-duct values.

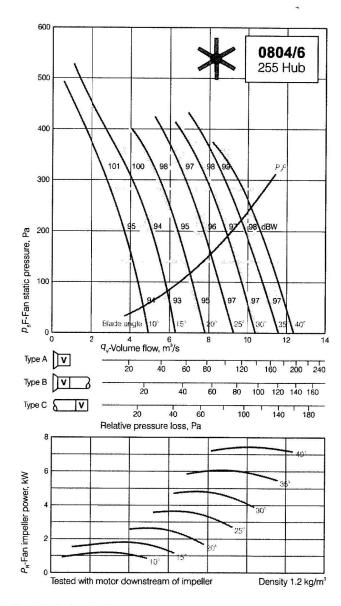
Version 4.20: On-going product improvements may result in fan data changes without notice.

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## **AXIAL FLOW FANS PERFORMANCE DATA**







#### **SOUND DATA**

Tested with motor downstream of impeller

	In-Duct		In-Duct Spectrum Corrections, dB								
Zone	dB	Total	63	125	250	500	1k	2k	4k	8k	dB(A)
	Inlet	1	6	10	8	6	8	13	18	24	4
	Outlet	0	4	11	10	7	10	15	19	24	6
······································	Inlet	+1	2	9	12	11	12	16	19	22	8
À	Outlet	0	2	8	10	12	12	16	18	20	8
	Inlet	••••••	***************************************		•••••	Not D	o a uir			***************************************	
	Outlet					Not R	equire	eu			
- ji	Inlet	1	3	10	11	10	11	13	16	22	6
	Outlet	0	1	10	13	12	13	15	18	22	8
	Inlet	0	2	9	11	9	10	15	18	23	6
	Outlet	0	3	9	10	10	12	15	18	21	7
	Inlet	+1	3	9	12	10	12	16	19	22	7
	Outlet	0	3	9	11	10	11	15	17	19	7
************	Inlet	1	2	10	11	10	10	13	15	21	6
	Outlet	0	2	11	12	12	12	14	17	22	7
	Inlet	0	2	9	11	10	12	15	19	24	7
1.	Outlet	0	3	9	11	11	12	16	19	23	8
R	Inlet	+2	2	9	13	11	12	17	20	23	8
	Outlet	0	2	8	11	10	11	15	18	19	7

For Free Field conditions apply the following corrections to the In-Duct figures. All figures are negative unless otherwise stated.

> In/Out O/A 7 0 O/A 0 0

#### **SOUND DATA**

Zone	In-Duct dB	Total	63	uct S <sub>l</sub> 125	250		1k	2k	4k	8k	dB(A)
	Inlet	1	9	9	6	4	8	14	20	26	3
	Outlet	0	6	9	7	7	10	16	21	27	6
	Inlet	0	4	9	8	9	10	13	17	22	6
	Outlet	0	4	8	8	10	10	14	16	21	6
4	Inlet	0	4	9	9	8	10	13	17	21	5
	Outlet	0	3	9	9	9	10	13	16	19	5
	Inlet	0	6	11	8	9	8	11	14	20	4
	Outlet	0	4	10	8	9	9	12	15	20	5
***************************************	Inlet	1	4	8	7	9	9	13	16	21	5
	Outlet	0	3	9	9	11	10	14	18	22	6
	Inlet	+1	3	9	9	10	11	15	18	22	7
	Outlet	0	3	8	8	9	11	14	17	19	6
2.2	Inlet	+1	5	9	7	8	8	11	13	20	4
	Outlet	0	5	9	7	8	8	11	13	19	4
á a	Inlet	1	4	8	8	9	9	13	16	21	5
	Outlet	0	4	9	8	11	11	14	18	22	7
	Inlet	0	9	7	9	6	8	12	16	20	4
	Outlet	0	8	6	9	8	9	12	15	18	4

For Free Field conditions apply the following corrections to the In-Duct figures. All figures are negative unless otherwise stated.

In/Out O/A 7 0 0 O/A

20

Density 1.2 kg/m3



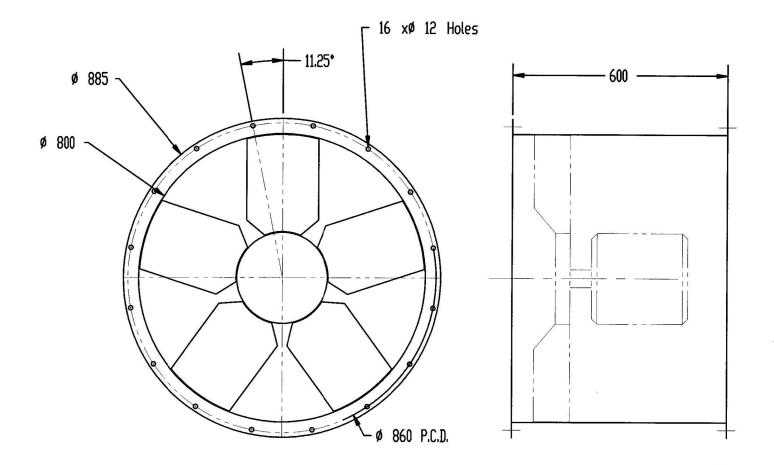
Represented by:
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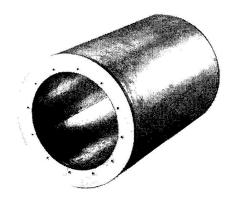
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#### DRAWING FOR MODEL AP0804GP6/20

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#### **FEATURES**

These notes apply to both the open and pod type attenuators.

#### Construction

The units are rigidly constructed and consist of an outer cylindrical galvanised steel casing, lined internally with non-hygroscopic and incombustible soundabsorbent material. This material is retained by an inner perforated metal cylinder.

When a pod is fitted it is of perforated metal, retaining an infill of acoustic material.

An impervious lining of the acoustic infill can be provided to prevent the ingress of moisture or grease. There is a small performance penalty in high frequencies when an impervious lining is fitted. Refer to our Sales Engineers if more information is required.

Also available is the Q-Seal range which offers impervious lining with features to optimise acoustic performance.

The ends of the attenuators are drilled and tapped to match the Fantech 'AP' series of axial flow fans.

Non-standard flange drillings or sizes can be supplied to the customer's specifications.

#### **Insertion Loss**

The values quoted in the table represent the difference between the sound power level  $(L_{\text{W}})$  of a fan and attenuator combination and that of the fan alone.

(continued next page)

#### **PERFORMANCE DATA - OPEN TYPE**

Matching Fan Dia.	Length		ic Insert ave Band			ency /	Hz)		
cm	mm	63	125	250	500	1k	2k	4k	8k
C1-Dia.	1 Dia	mete	r Long	ı (non	n.)				***************************************
-031	300	1	3	5	9	13	10	8	7
-035	300	2	3	5	9	13	10	8	7
-040	600	2	3	5	9	13	10	8	7
-045	600	2	3	5	10	13	10	8	7
050	600	2	3	6	10	14	10	8	7
-056	600	2	4	6	10	14	10	8	7
063	600	3	4	7	13	14	9	8	6
071	900	3	4	8	14	14	9	7	6
080	900	3	4	8	14	13	9	7	6
-090	1150	3	4	9	14	13	8	7	6
-100	1150	3	4	9	14	12	8	7	6
125	1150	3	4	10	14	12	8	6	6
140	1150	3	5	10	13	11	8	5	5
160	1800	4	6	11	13	10	7	5	5
180	1800	4	6	11	13	10	6	5	5
200	1800	4	6	11	13	9	6	5	5
C2-Dia.	2 Diar	nete	rs Lon	g (no	m.)	•		**************************************	
031	600	3	6	9	15	21	17	14	13
035	600	4	6	10	15	21	17	14	13
040	900	4	6	10	16	21	18	15	13
045	900	4	7	10	17	21	18	15	13
050	1150	4	7	10	18	21	17	15	12
056	1150	5	7	11	18	21	17	15	12
063	1150	5	8	11	21	23	17	15	10
071	1500	5	8	12	22	23	16	15	10
080	1500	5	8	12	22	23	16	15	10
090	1800	5	8	13	22	19	13	12	10
100	1800	6	8	13	22	19	13	12	10
125	2400	6	8	13	21	18	13	12	11
140	2400	7	9	15	21	18	11	11	10
1.00	~~~~								

#### **HOW TO ORDER - OPEN TYPE**

8

8

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17

11

10

10

9

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9

8

8

8

3600

3600

3600

(Default is standard construction)

-160

-180

-200

C - circular — 1 - 1D long nominal 2 - 2D long nominal	C - T
Diameter in cm	
Variations to standard  QS - Q-Seal Impervious lining (refer page H-4/5)  A - aluminium construction  S - stainless steel construction  E - epoxy coating	



Represented by: Air Design Pty. Ltd. A.B.N. 77 512 727 190 45 Nestor Drive Meadowbrook QLD 4131 Telephone: +61 (07) 3299 9888 Facsimile: +61 (07) 3299 9800 E-mail: sales@airdesign.com.au

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#### **Technical Data for Silencer Model C1-080**

Location:

ATT-2

Designation:

Pressure Drop:

Performance - Required

**Actual** 

Air Flow:

6.30 m<sup>3</sup>/s 60 Pa

Velocity: 12.5 m/s

Pressure Drop: 2 Pa

Silencer Data

Catalogue Code:

Description:

Circular 1D Open

Diameter:

Ext. Diameter:

800 mm 977mm

C1-080

Length:

900 mm

Weight: 55.0 kg

**Sound Data** 

8K Spectrum (Hz) 63 125 250 500 1K 2K 4K Insertion Loss (dB) : 3 4 8 14 13 9 7

Length Ext. Dia.

Dia.

## 3) 0110-SR13 Variable Speed Drive System

F. Ventilation System Airflow and Sound Levels report

david@airequip.com.au

ABN 67 650 093 954

2 / 36 Randall Street Slacks Creek 4127 PO Box 542 Springwood Qld 4127 Phone: (07) 3209 4201 Facsimile: (07) 3209 4204

Monday 18<sup>th</sup> November 2013

J. & P. Richardson Industries Pty Ltd 114 Campbell Street Wacol QLD

Attention: Chris Anderson

Reference: Urban Utilities Eagle Farm Pump Station-VSD Drive Cabinet 0110-SR13

**Verification of Airflow and Sound level Measurements** 

Required Airflow: Transformer Cabinet: 3000l/s

Cell Cabinet: 3200l/s Total: 6200l/s

#### **Equipment Used:**

NATA Certified Vane Anemometer – Certificate No: WT109572 NATA Certified Lutron Sound Level Meter – Certificate No: SLM 39486 Magnehelic Gauge- Fitted to duct work

Initial airflow readings were taken at the filtered intake grilles on the transformer and cell cabinets with the booster fan VSD set at 50Hz. The VSD was adjusted back to 39Hz and readings taken at all points as follows

Transformer Cabinet Intakes: No 1: 585l/s No 2: 550l/s No 3: 500l/s

No 4: 520l/s No 5: 450l/s No 6: 415l/s

Total: 3020l/s

Cell Cabinet Intakes: No 1: 590l/s No 2: 550l/s No 3: 550l/s

No 4: 570l/s No 5: 560l/s No 6: 550l/s

Total: 3370l/s

The magnehelic gauge was fitted to the duct prior to the booster fan. The gauge is to indicate the correct airflow only and at the required airflow reading the gauge was marked at 75Pa

#### **Sound Level Measurements:**

Outdoor readings were taken at the boundary directly down for the fan outlet and 1 meter from the outlet face.

The background noise level was 75-83dBA due to the high traffic movement on the main road. On the odd occasion when there was no vehicle's directly outside the building we registered a reading of 63dBA at the boundary and 69 dBA 1 meter from the face

Indoor readings were taken with the other two drive units turned off but with the pit pumping motors running. Background noise levels around the pit barrier cage were between 76-81dBA

Readings one meter out from the cabinet were between 70-72.7dBA but this was mainly from background noise

A reading from the side of the cabinet below the booster fan was 68dBA

Hoping the above report is satisfactory and if you have any queries on the information above please do not hesitate to call

Yours faithfully, Air Equipment (Sales) Pty Ltd.

David Meredith.

## 3) 0110-SR13 Variable Speed Drive System

G. Spare Part List

# **SIEMENS**

## **Perfect Harmony VSD Recommended Spare Parts List**

Location	Part Description	Part Number	Installed	Recommended
	CPU Board	A1A10000623.00M	1	1
	I/O board	A1A10000423.00M	1	1
	Modulator Board	A1A10000350.00M	1	1
	Fiber Optic Hub Board	A1A461D85.00M	1	1
Control	Backplane	A1A098194	1	1
cabinet	Communication Board	A5E03407403	1	1
	CPS Power	A1A0100275	1	1
	Signal Conditioninig Board	A5E01708486	1	1
	Keypad	A5E02363383	1	1
	I/O breakout	A5E01649374	1	1
Blower	Cabinet Blower	LDZ10501601	4	1
Deers	Filter on Transformer Cabinet	LDZ10501351	9	9
Doors	Filter on Cell Cabinet	LDZ10501353	9	9
	Power cell	LDZ14501002.260	15	1
Cell cabinet	CCB Fuse	A1A10000432.30M	15	2
	Power Cell Input Fuse	LDZ10501435	45	3

## 3) 0110-SR13 Variable Speed Drive System

H. Drawing List



# Perfect Harmony VSD - 0110-SR13

# **Drawing Register**

Drawing Number	Description
	NOD
	VSD
486/5/7-0368-027	General Arrangement 1
486/5/7-0368-028	General Arrangement 2
486/5/7-0368-029	General Arrangement 3
486/5/7-0368-030	Control and Power Overview
486/5/7-0368-031	Termination
486/5/7-0368-033	Schematic 1
486/5/7-0368-034	Schematic 2
486/5/7-0368-035	Schematic 3
486/5/7-0368-036	Schematic 4
486/5/7-0368-037	Schematic 5
486/5/7-0368-038	Schematic 6
486/5/7-0368-039	Schematic 7
	Field Control and Interface
486/5/7-0368-140	Schematic 1
486/5/7-0368-141	Schematic 2
486/5/7-0368-142	Schematic 3
486/5/7-0368-143	Schematic 4
486/5/7-0368-144	Schematic 5
	Isolator and Earthswitch Cabinet
486/5/7-0368-106	General Arrangement and Schematic
486/5/7-0368-107	Fortress Interlocking System
486/5/7-0368-108	Legend
	Ventilation
486/5/7-0368-112	General Arrangement

## 3) 0110-SR13 Variable Speed Drive System

I. Factory Acceptance Test (FAT)



## GENIII

# Factory Acceptance Test Medium Voltage Air Cooled

SO - 3002133943 Queensland urban utilities - eagle farm

FAT- A5E32168984 A

REV- AA

P/N- M6SR3

S/N- Z831501002462

MLFB- 6SR3502-6HF42-7BH0-Z

V12+Y06+K69+G22+G28+K73+M42+M38+ M12+M35+L55+L03+K50+T76+D15+D02+D 76+P31

	Revision History	
Revision Level	Details	Date
AA	Original	5/15/2013
		9955//C0056
Tested By	PA 302/3	2013.6.7
Approved By	13 VE de	231.6.7

# SIEMENS

Customer Name	e Queensland urba	SO 3002133943					
P/N	M6SR3	S/N Z831501002462		SOP	M6SR3 C		
Agency Listing			□ CE □ Other		☑ No Listin		
Agency Testing Required		□ YES	S ⊠NO				
Input Voltage:	6600 V		Outpi	ıt Voltage:	660	) V	
Input Current: 214 A			Cell Size:		260 A		
XFMR KVA: 2750 KVA		Total # of Cell:		18			

#### **Table of Contents**

- I. Test Plan Contains the actual test plan with reference to associated test procedures and forms for data collection.
  - 1.1 Visual Inspection
  - 1.2 Insulation Test/Hipot
  - 1.3 Initial Power-Up
  - 1.4 System Test Without Motor
  - 1.5 System Test With Motor (Unloaded)
  - 1.6 System Load Test
  - 1.7 Final Inspection
  - 1.8 Equipment
- II. Completed Forms Contains the forms used to collect associated test data using the procedures.
- III. Analysis/Plots Data If applicable, this section contains any analysis or additional test data supplied with buy out items or data specific to a customer order and not specifically required by the FAT.

Economic Systems and the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of	<u>Definitions</u>							
R	Routine Test	Test to which each individual device is subjected during or after manufacturer to ascertain whether it complies with certain criteria.						
A	Acceptance Test	Contractual test to prove to the customer that the device meets certain conditions of its specification.						
0	Option Test	Test additional to type and routine test, determined to be any device or logic added to the drive that is not a pre-engineered option.						
W	Witness Test	Any of the above tests performed in the presence of the customer, the user or his representative (Reference STSI-055)						

SO 3002133943

P/N M6SR3

S/N Z831501002462

	5002133713	1717 1770017.5	0/14	2031301002402
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Test Typ	re Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
R		Hardware Check		Emp# 149
	Metering	Pt. To Pt. Wire Check		Emp# 172
		Fiber Optics		Emp# 172
		Ground Wires		Emp# 172
	Measuring	Burden Resistor Value ( hall effect)	34.00 Ω,2W, .1%	34.1/34.2 Ω
	Measuring	Input attenuator resistor value	4.8 ΜΩ	4.77/4.76/4.77 MΩ
	Measuring	Output attenuator resistor value	4.8 ΜΩ	4.78/4.77/4.76 MΩ
		Set Dip Switch (FR)	Pos. 2 only is "On", all	
			others "Off"	Emp# 149
		Set Dip Switch (P)	Pos. 4 & 5 only are "On",	
			all others "Off"	Emp# 149
		Set Address TX	1 X=1	Emp# 149
		Set Address 10X	10X=0	Emp# 149
		Set Communication Board (JP1 to JP10)	JP1 & JP2 set to 2,3	Emp# 149
			JP3,JP4&JP5 set to1,2	Emp# 149
			JP6 set to 2,3	Emp# 149
			JP7,JP8,JP9&JP10	
			set to 1,2	Emp# 149
)	Interlocks	Record all Interlock model #'s and keycode #'s for the	IV2 VED12 V2	Emp# 149
		Verify correct operation of Interlocks	K2 – VFD13 - K2	Emp# 149
		Ensure hardware and adapter plates are supplied	K3 –VFD13 - K3	Emp# 149

Fest Type	Test Item	Test Procedure		Test Criteria (Eng.)	l Si	mati	re/Value
R	MV		Applied Volt.	Pass/Fail(<0,5mA)			
		Power circuit to GND			En	ıp#	172
		L1,L2,L3 to GND	28300	38 ı	ıΑ		
		L1 with L2, L3 to GND	28300	12 ı	ıA		
		L2 with L1, L3 to GND	28300	10 1	ıΑ		
		L3 with L1, L2 to GND	28300	13 ι	ıΑ		
		T1,T2,T3 to GND	28850	173	ıΑ		
		T1 with T2, T3 to GND	18500	47 ı	ıA		
		T2 with T1, T3 to GND	18500	35 ı	ıA		
		T3 with T1, T2 to GND	18500	40 ı	ıA		
	LV	Control Power to GND	2500VOM	500 1	MΩ En	ıp#	149
	Control	120Vac to GND	1000VOM	537	MΩ En	1p#	149
		24Vdc to GND	500VOM	∞	En	 1p#	149

1.3 Initial		STSI-061G:4.5			
Test Type	Test Item	Test Procedure		Test Criteria (Eng)	Signature/Value
R	Control Power	Control Power Supply			
		CPS,+5VDC(Slot 6 I/O Board Plug P6 Pin	to 4)	(5.10 to 5.15Vdc)	5.13Vdc
		CPS,+12VDC(Slot 6 I/O Board Plug P6 Pin	2 to 4)	(+11.64 to +12.36Vdc)	12.01 Vdc
		CPS,-12VDC(Slot 6 I/O Board Plug P6 Pin	3 to 4)	(-11.64 to -12.36Vdc)	-12.03 Vdc
		CPS, + 15 VDC (SCB Pin 2 to 6)		(+14.55 to +15.45)	15.00 Vdc
		CPS, - 15 VDC (SCB Pin 4 to 6)		(-14.55 to -15.45)	-15.00 Vdc
		CPS,+24VDC(I/O Board J11-11 to J11-9)		(+21.6 to+26.4Vdc)	24.02 Vdc
		CPS,Power Supply Fault			Emp# 172
		Encoder Power Supply, +15 VDC (IOB boa	rd J7-5 to J7-	(+14.25 to +15.75)	15.04 Vdc
		T5 (secondary:X1-X4)		(114 to 126Vac)	114Vac
		Software Version #		Latest Version	Vers.: 5.2.3
		Establish Wago Communications			Emp# 153
	Parameters	Set corrrect # of			
	Configuration	Analog Outputs	ID 2820	2	
		Set correct Drive Parameters			Emp# 153
		Input Voltage	ID 2010	6600 V	
		Input Current	ID 2020	214 A	
		Output Voltage	ID 2030	6600 V	
		Output Current (equal to 'Cell Rating')	ID 2040	260 A	
		Control Loop Type	ID 2050	OLTM	
		Spinning Load Mode	ID 2430	Off	
		Installed Cells/ Phase	ID 2530	6	
		Cell Voltage	ID 2550	630 V	
		Bypass Type	ID 2590	None	
		Neutral Connection	ID 2630	TI	
		Input CT Ratio	ID 3035	250 :5	
		Tap Setting (+5% typical)	ID 7050	+5%	

Customer Name Queensland urban utilities - eagle farm

REV# AA

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P/N M6SR3

S/N Z831501002462

30	3002,133743	anna .	1/14 WOSKS	·	3/11 Z63130100Z40Z
1.3 Initial	l Power-Up[contin	ued			STSI-061G:4.5
Test Type	e Test Item	Test Procedure		Test Criteria (Eng)	Signature/Value
R	Parameters	Set correct Drive Parameters (con't)			
	Configuration	MenuTimer1	ID 9112	30 S	172
		MenuTimer4	ID 9115	10 S	172
		Program Clock	ID 8080		Emp# 172
		Program SO	ID 8101	2133943	Emp# 172
		Program Drive Number	ID 8110	2133713	Emp# 172
		Download SOP	110 0110	M6SR3C	Emp# 172
		Ethernet Connection Verified		MOSICSC	*
		Emerner Connection Verified			Emp#172
3	MODBUS	Connect computer to MODBUS port			
	11100000	Open MODBUS program and verify co	ymmunication	Receiving data from	Emp# 172
		Open MODBOS program and verify ec	mmumeation	Drive	E1119# 172
				Drive	
)	Space Heater	1. Verify VFD space heater relay CR4	energized 60s after		
	Control	control voltage is swtiched on.		Verify Functionality	Emp# 172
		2. Adjust thermostat(TST1) setting to r	pore than ambient	verify runctionality	172
		temperature and verify HTR1are heater			
		less than ambient temperature and veri	•		
		less than amoient temperature and veri	ly III KI ale oii.		
		3. Adjust thermostat(TST2) setting to	more than ambient		
		temperature and verify HTR2 & HTR3			
		Reset TST2 to less than ambient temperature and verify TTR2 to TTR3	-		
		HTR2 & HTR3 are off.	erature and verify		
					Emp# 172
		4. Verify VFD space heater relay CR4	released after		
		medium voltage is energized.			Emp# 172
		5. Verify Motor Heater Relay BM5 ene	rgize 60s after		in the second
		drive is not running.	- B.D. 0 0 D WITH		Emp# 172
ξ		Check Blower Rotation		Verify Rotation	Emp# 331
	Blower 1 Op.	Set CB1 equal to 1.2*TBLW1 motor na	ameplate	Ia= 1.53 A	Emp# 331
	XFMR Cab.	current.	•	Ib= 1.57 A	
		Measure 3 phase line currents and verif	Fy actual current is	**************************************	
		not exceeding TOL setting.	,	#ETT 0.3 (0.00 TO 0.3 State Collection and American State Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collection Collecti	
	Dlaws 2.0		1. 4	1.00	F " 25.1
	Blower 2 Op.	Set CB2 equal to 1.2*TBLW2 motor na	amepiate	Ia= 1.52 A	Emp# 331
	XFMR Cab.	current.		Ib= 1.58 A	
		Measure 3 phase line currents and verif	y actual current is	Ic= 1.49 A	
		not exceeding TOL setting.			
	Blower 1 Op.	  Set CB3 equal to 1.2*CBLW1 motor na	ameplate	Ia= 1.46 A	Emp# 153
	CELL Cab.	current.		Ib= 1.51 A	2
		Measure 3 phase line currents and verif	vactual current is	to the All Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of	
		not exceeding TOL setting.	y actual cult the IS	1.77 A	
	Blower 2 Op.	Set CB4 equal to 1.2*CBLW2 motor na	•	Ia= 1.53 A	Emp# 153
	CELL Cab.	current.		Ib= 1.52 A	
		13.4		1.00 4	1
		Measure 3 phase line currents and verif	y actual current is	lc= 1.58 A	

Customer Name Queensland urban utilities - eagle farm

REV# AA

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P/N M6SR3

S/N <u>Z831501002462</u>

Francisco de la constitución				
1.4 System	n Test Without Ma	ofor		STS1-061G:4.6
Test Type	Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value
O	Electrical Door Interlocks	Open a door to cause DIS1 open and verify that Drive trip message "TRIP - MV DOOR OPENED" displayed and check "INPUT MV BREAKER ENABLE" contact on TB2 43 & 44, 45 & 46 change state.  Repeat the test for remaining of electrical door interlock switched DIS2~ DIS5.	TB2-43 & 44 Closed and TB2-45 & 46 Open when a door open	Emp# <u>149</u> Emp# <u>149</u>
R	Backfeed Modulation & Clipping	Power Supply & Hall Effect Pwr Supply Fault Output Transorbs Note: Remove Series Link & Backfeed Cell B1 Disconnect plug P1 from SCB board Input Transorbs Verify all Cells Primary Voltage Modulation of Cells	Approx. 56Vp-p  Approx. 56Vp-p  100Vac±10% for all  (0 to 100% demand)	Emp# 149 Emp# 149 Emp# 149 Emp# 149 Emp# 149 Emp# 149
R	Medium Voltage Testing	With Cell Series Links Reconnected Set Motor Voltage = Drive Rating VMA, VMB, VMC   ID 2050 - OLTM 25Hz VMA, VMB, VMC   ID 2050 - OLTM 50Hz	3.0V-peak +/- 0.3V 6.0V-peak +/- 0.3V	Emp#153 Emp#153

1.5 System Test With Motor (Unloaded) STSI-061G:4.7				
Criter	est Criteria (Eng) Signatur	Signature/Value		
	Emp#	331		
for E-	pen for E-stop Emp#	331		
d for I	osed for Fault Emp#	331		
	Emp#	331		
d for I	osed for Run Emp#	331		
	Emp#	331		
	Emp#	331		
	Emp	***************************************		

SO 3002133943

P/N M6SR3

S/N <u>Z831501002462</u>

	n Test With Moto Test Item	r (Unloaded)  Test Procedure	Total Contract (F. A.	STSI-061G:4.7
R	Transformer	Remove alarm wire from IOB DI-3C,	Test Criferia (Eng) Verify alarm message	Signature/Value Emp# 331
	Thermal Switches	1). Verify fault light blinks and keypad displays alarm message.		enconstantina anno
		2). Verify the "Drive Alarm" outputs on TB2-31&32 change state.	Closed for Alarm	Emp# <u>331</u>
		Remove trip wire from IOB DI-0D,  1). Verify fault light blinks and keypad displays alarm		
		message. 2). Verify the "Drive Alarm" outputs on TB2-31&32 change state.	Verify alarm message  Closed for Alarm	Emp# 331 Emp# 331
		Remove trip both wires from IOB DI-3C & DI-0D and wait for 30 seconds;	Closed for Marin	SST SST SST SST SST SST SST SST SST SST
		1). Verify Drive fault, Drive coasts to a stop and keypad displays trip message 2). Verify the "Drive Tripped" output on TB2-33&34.	Verify Drive Fault Closed for Fault	Emp# 331 Emp# 331
R	Remote Start/Stop	Momentarily close contact between TB2-5 & 6 and verify Drive starts running.		
			Drive is running	Emp# 153
		Momentarily close contacts between TB2-5 & 6.	Drive ramps to stop	Emp#153
R	Remote Fault Reset	Cause system fault and check Drive Ready contact TB2 27 & 28 (changes state)	Open for Fault	Emp# 331
		Momentarily close Remote Fault Reset contact on TB2-7 & 8.  Verify the "Drive Ready to Run" output on TB2-27 &	Drive should reset Closed for Ready to Run	Emp#331
		28 changes state.	Closed for Ready to Run	Emp# 331
		Verify Keypad reset is functioning.  Verify the "Fault Reset"button on the touch panel is		Emp#331
MINISTER CONTROL OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPER		functioning.		Emp# 331
R	Local Start/Stop	Place Drive in the Local mode by pressing "AUTOMATIC"on keypad and depress "MANUAL START" on keypad. Verify Drive is running.	Drive is running	Emp# 153
70000		Depress "MANUAL STOP" on keypad	Drive ramps to stop	Emp# 153
	4 to 20mA Remote Freq Command	Place Drive in the Remote mode by pressing "AUTOMATIC" again on keypad and connect 4- 20mA signal to TB2ELV-7 & 8.	Verify system Freq change	
		Scale 4-20 mA signal to be proportional to 0-100% Freq.	4mA=0%Freq 12mA=50% Freq 20mA=100% Freq	Emp#153
	4 to 20mA Spare Input	Program Spare Input as Remote Signal command via Keypad menu and connect 4-20mA signal to TB2ELV-10 & 11.Scale 4-20 mA signal to be proportional to 0-100% output.	4mA=0% spare 12mA=50% spare 20mA=100% spare	Emp# 153
		RE-PROGRAM REMOTE SIGNAL INPUT TO ANALOG 1!		Emp# 153
1	4 to 20mA Spare Input		4mA=0% spare 12mA=50% spare 20mA=100% spare	Emp# 153
		RE-PROGRAM REMOTE SIGNAL INPUT TO ANALOG 1!		Emp#153
L	DALASE0250206	27 L 72 X 1 L 12		Daga Price 280

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P/N M6SR3

S/N Z831501002462

Protection settings[Menu 1120] to verify overload operates after 60s.    Emp# 153	30	3002133343		N MIOSK3	3/1V Z	.831501002462
See Journ's Modeline R.W. output on TB2ELV-18 & 19 and verify output   Ann. Pick K.W.   Emp# 331						
R.W. Output   An April And Data About   An April Output   An Apr					Signatu	re/Value
An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An APPS Output   An A	K	i .	Monitor R w output on 1B2ELV-18 & 19 and verify output		rc //	221
AMPS Output			Monitor AMPS output on TR2FLV-L& 2and verify output		Emp#	331
Ac 20mA Motor   Monitor FEEQ output on TB2ELV-14 & 5 and verify output   Stand-90% Freq   Compared   Monitor SPARE output on TB2ELV-21 & 22 and verify nutput   Monitor SPARE output on TB2ELV-21 & 22 and verify nutput   Monitor SPARE output on TB2ELV-21 & 22 and verify nutput   Monitor Spare   Compared   Monitor Spare   Monitor Spare   Compared   Monitor Spare		1	World S output on 18282 (*1 & Zana verry output	*	Emp#	221
FREQ Output   Monitor SPARE output on TB2ELV-21 & 22 and verify output   And A-094 Spare   Contact   Con		1	Monitor FREO output on TB2ELV-4 & 5 and verify output	1	Emp# _	331
A to 20mA Spare   Output   Monitor SPARE output on TR2ELV-21 & 22 and verify output   MonA=096 Spare   Emp#   331			l same to the compact	*	Emp#	331
Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   Doubut   D		1 -	Monitor SPARE output on TB2ELV-21 & 22 and verify output		Sinp#	
Blower   Op.   With Transformer Cabinet blower TDL-W1 numing, trip blower   Drive coasts to stop   Blower 2 Op.   With Transformer Cabinet blower TBL-W2 numing, trip blower   Drive coasts to stop   Drive coasts to stop   Blower Op.   CB and verify Drive will be faulted in 10 seconds.   Drive coasts to stop   Drive coasts to stop   Blower Op.   CB and verify Drive will be faulted in 10 seconds.   Drive coasts to stop   Drive coasts to stop   Drive coasts to stop   Blower Op.   CELL Cab.   Drive coasts to stop   Drive Cab   Drive coasts to stop   Drive Cab   Dri		Output		1	Emp#	331
XFMR Cab.   CB and verify Drive will be faulted in 10 seconds.   Drive coasts to stop   Emp# 331	posteriore de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya del companya de la companya del companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya					
Blower 2 Op.   With Transformer Cathinet blower TBLW2 running, trip blower CB   Blower 1 Op.   With Cell Cabinet blower CBLW1 running, trip blower CB   Blower 1 Op.   With Cell Cabinet blower CBLW2 running, trip blower CB   Blower 2 Op.   With Cell Cabinet blower CBLW2 running, trip blower CB   Blower 2 Op.   With Cell Cabinet blower CBLW2 running, trip blower CB   Blower 2 Op.   With Cell Cabinet blower CBLW2 running, trip blower CB   Blower CBL Cab.   Blower 2 Op.   With Cell Cabinet blower CBLW2 running, trip blower CB   Blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip blower CBLW2 running, trip bl	R			r		
XFMR Cab.   CB and verify Drive will be faulted in 10 seconds.   Drive coasts to stop   Emp# 331		XFMR Cab.	CB and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp#	331
Blower 1 Op. CELL Cab. with Cell Cabinet blower CB.W1 running, trip blower CB and verify Drive will be faulted in 10 seconds.  R Medium Voltage Testing With Motor Connected to the Drive Output Drive coasts to stop CLVC With Motor Connected to the Drive Output Drive coasts to stop Motor Presing With Motor Connected to the Drive Output Drive coasts to stop Motor Presing Drive coasts to stop ClvC With Motor Connected to the Drive Output Drive Cab May be posed Sarrip Drive at 100% speed Sarrip Drive Cab May be posed Sarrip Drive at 100% speed Sarrip Drive at 100% speed Sarrip Drive at 100% speed Sarrip Drive Cab Motor Present Drive Trip Drive Drive at 100% speed Sarrip Drive Cab Motor Present Drive Trip Drive Drive Sarrip Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Driv		Blower 2 Op.	With Transformer Cabinet blower TBLW2 running, trip blower	r		
CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CLVC With Motor Councated to the Drive Output IMA Leads VMA by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp#		XFMR Cab.	CB and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp#	331
CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CELL Cab. Blower 2 Op. CLVC With Motor Councated to the Drive Output IMA Leads VMA by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp# 153 IMB Leads VMB by 90° Emp#		Blower I Op.	With Cell Cabinet blower CBLW1 running, trip blower CB		PATCHES.	
Blower 2 Op.   CELL Cab.   and verify Drive will be faulted in 10 seconds.   Drive coasts to stop   Samp# 331				Drive coasts to stop	Emp#	331
CELL Cab.   and verify Drive will be faulted in 10 seconds.   Drive coasts to stop   Emp#   331		Dlamar 2 On		Divid doubles to stop	Emp#	331
Medium Voltage Testing   Set Control Loop Type   With Motor Connected to the Drive Output   IMA Leads VMA by 90°   Emp# 153   Emp# 153   IMB Leads VMB by 90°   Emp# 153   Emp# 153   Emp# 153   Emp# 153   Emp# 153		-				
Testing With Motor Connected to the Drive Output   MA Leads VMA by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     MB Leads VMB by 90°   Emp# 153     Emp# 153     Motor Overload   Emp# 153     Mator O			and verify Drive will be faulted in 10 seconds.	Drive coasts to stop	Emp#	331
Spinning Load   I. Enable spinning load feature (Set Spinning Load Mode true) via keypad   2. Run Drive at 100% speed   3. Trip Drive by pressing E-Stop   4. Pull out E-Stop   5. Push Fault Reset   6. Restart Drive   7. Verify Drive goes back to full speed   Motor returns to full   Emp# 153	R		Set Control Loop Type	OLVC		
R Spinning Load 1. Enable spinning load feature (Set Spinning Load Mode true) via keypad 2. Run Drive at 100% speed 3. Trip Drive by pressing E-Stop 4. Pull out E-Stop 5. Push Fault Reset 6. Restart Drive 7. Verify Drive goes back to full speed		Testing	With Motor Connected to the Drive Output	IMA Leads VMA by 90°	Emp#	153
R Spinning Load  1. Enable spinning load feature (Set Spinning Load Mode true) via keypad 2. Run Drive at 100% speed 3. Trip Drive by pressing E-Stop 4. Pull out E-Stop 5. Push Fault Reset 6. Restart Drive 7. Verify Drive goes back to full speed  Motor Overload Protection  R Motor Overload Protection  Adjust motor parameters[Menu 1000]and overload settings[Menu 1120]to verify overload operates after 60s.  Emp#			·			***************************************
via keypad 2. Run Drive at 100% speed 3. Trip Drive by pressing E-Stop 4. Pull out E-Stop 5. Push Fault Reset 6. Restart Drive 7. Verify Drive goes back to full speed  R  Motor Overload Protection  R  Motor Overload Protection  R  Non-latching Run request with No Medium Voltage Input  R  Input Protection  Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR  Closed Loop Vector Control Testing  Set Control Loop Type Set Encoder I PPR Set Encoder I PPR Set Encoder I PPR Set Encoder I Serpen ID 1290 Set Encoder I Serpen ID 1290 With Motor Connected to the Drive Output Connected the encoder signal to TB2-U-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal    Verify Drive and Motor Speed output if normal   Verify Input All Drive and I I I I I I I I I I I I I I I I I I I				INIB Leads VIVIB by 90°	Emp#	153
via keypad 2. Run Drive at 100% speed 3. Trip Drive by pressing E-Stop 4. Pull out E-Stop 5. Push Fault Reset 6. Restart Drive 7. Verify Drive goes back to full speed  R  Motor Overload Protection  R  Motor Overload Protection  R  Non-latching Run request with No Medium Voltage Input  R  Input Protection  Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR  Closed Loop Vector Control Testing  Set Control Loop Type Set Encoder I PPR Set Encoder I PPR Set Encoder I PPR Set Encoder I Serpen ID 1290 Set Encoder I Serpen ID 1290 With Motor Connected to the Drive Output Connected the encoder signal to TB2-U-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal    Verify Drive and Motor Speed output if normal   Verify Input All Drive and I I I I I I I I I I I I I I I I I I I	R	Spinning Load	1. Enable spinning load feature (Set Spinning Load Mode true)			
2. Run Drive at 100% speed 3. Trip Drive by pressing E-Stop 4. Pull out E-Stop 5. Push Fault Reset 6. Restart Drive 7. Verify Drive goes back to full speed  Motor Overload Protection  R Motor Overload Protection  Adjust motor parameters[Menu 1000]and overload settings[Menu 1120]to verify overload operates after 60s.  R Non-latching Run request with No Medium Voltage Input  Amoitor SOP Runrequest flag via debugger 5. Verify that SOP Runrequest flag remains false when all start inputs are set  Closed for fault Fault reset  Emp# 153  Emp# 153  Closed Loop Vector Control Testing  Set Control Loop Type Set Encoder 1 PPR ID 1200 Set Encoder 1 PPR Set Encoder 1 Sersponse With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal    Notor returns to full						
3. Trip Drive by pressing E-Stop 4. Pull out E-Stop 5. Push Fault Reset 6. Restart Drive 7. Verify Drive goes back to full speed  Motor Overload Protection  R Motor Overload Protection  I.Remove Medium Voltage Power 2. Reboot NXG Control Medium Voltage Input  I.Remove Medium Voltage Power 3. Verify that SOP Runrequest flag remains false when all start inputs are set  Input Protection  Simulate IP trip and verify "input MV breaker enable" output contact on "IB2-43 & 44 changes state The fault only reset via keyed pushbutton KR  Closed for fault Fault reset Emp# 153  Emp# 153  Emp# 153  Closed for fault Emp# 153  Emp# 153  Emp# 153  Closed for fault Fault reset Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153  Emp# 153						
S. Push Fault Reset   6. Restart Drive   7. Verify Drive goes back to full speed   Motor returns to full speed   Emp# 153			· · · · · · · · · · · · · · · · · · ·			
6. Restart Drive 7. Verify Drive goes back to full speed  Motor returns to full speed  R Motor Overload Protection  R Non-latching Run request with No Medium Voltage Power 2. Reboot NXG Control 3. Clear/Reset all fault on drive 4. Monitor SOP Runrequest flag remains false when all start inputs are set  R Input Protection  Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR  Closed Loop Vector Control Testing  Closed Loop With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal  Motor returns to full speed  Emp# 153			•			
R   Motor Overload   Adjust motor parameters[Menu 1000] and overload   Settings[Menu 1120] to verify overload operates after 60s.   Emp#						
Motor Overload   Adjust motor parameters[Menu 1000]and overload   settings[Menu 1120]to verify overload operates after 60s.     Emp# 153						
Motor Overload   Protection   Adjust motor parameters[Menu 1000]and overload   Settings[Menu 1120]to verify overload operates after 60s.   Emp#			7. Verify Drive goes back to full speed		Emp#	153
Protection settings[Menu 1120] to verify overload operates after 60s.    Emp#153				speed		
Protection settings[Menu 1120] to verify overload operates after 60s.    Emp#153	R	Motor Overload	Adjust motor parameters[Menu 1000]and overload			
R Non-latching Run request with No Medium Voltage Power 2.Reboot NXG Control 3.Clear/Reset all fault on drive 4.Monitor SOP Runrequest flag via debugger 5.Verify that SOP Runrequest flag remains false when all start inputs are set  R Input Protection Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR Fault reset Emp# 153  C Closed Loop Vector Control Testing Set Encoder 1 PPR ID 1290 1024  Testing Set Encoder loss response ID 1320 Stop  With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal 12mA=50% Speed Emp# 153	l I	1			Emp#	153
Prequest with No Medium Voltage Input   Closed Loop Vector Control Set Encoder 1 PPR   ID 1290   Set Encoder 1 PPR   ID 1290   Set Encoder 1 Set Encoder 1 Set Encoder 1 Set Encoder 1 Set Encoder 1 Set Encoder 1 Set Encoder 1 Set Encoder 1 Set Encoder 1 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal   IzmA=50% Speed   Emp# 153   Emp# 15						
Medium Voltage Input  3. Clear/Reset all fault on drive 4. Monitor SOP Runrequest flag via debugger 5. Verify that SOP Runrequest flag remains false when all start inputs are set  R  Input Protection  Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR  Closed for fault Fault reset  Emp# 153  Emp# 153  CLVC Vector Control Set Encoder 1 PPR ID 1290 Testing Set Encoder loss response With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal  12mA=50% Speed Emp# 153		<del>-</del>				
Input 4.Monitor SOP Runrequest flag via debugger 5.Verify that SOP Runrequest flag remains false when all start inputs are set  R Input Protection Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR Fault reset Emp# 153 Emp# 153  C Closed Loop Vector Control Set Control Loop Type Set Encoder 1 PPR ID 1290 1024 Testing Set Encoder loss response ID 1320 Stop  With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal 12mA=50% Speed Emp# 153					Emp#	153
Set Encoder 1 PPR   ID 1290   Vector Control   Testing   Set Encoder loss response   With Motor Connected the encoder signal to TB2ELV-26-31   Scale 4-20 mA signal to 50% and 100% speed   Verify the Drive and Motor Speed output if normal   I2mA=50% Speed   Emp#153						
R Input Protection Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR Fault reset Emp# 153 Emp# 153  Closed Loop Vector Control Set Encoder 1 PPR ID 1290 1024 Testing Set Encoder loss response ID 1320 Stop  With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal 12mA=50% Speed Emp# 153						
R Input Protection Simulate IP trip and verify "input MV breaker enable" output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR Fault reset Emp# 153 Emp# 153  Closed Loop Vector Control Set Encoder 1 PPR ID 1290 1024 Testing Set Encoder loss response ID 1320 Stop With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal 12mA=50% Speed Emp# 153			· · · · · · · · · · · · · · · · · · ·			
Output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR  Closed for fault Fault reset  Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153			raise when an start inputs are set	Side of the same o	·	
Output contact on TB2-43 & 44 changes state The fault only reset via keyed pushbutton KR  Closed for fault Fault reset  Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153 Emp# 153	R	Input Protection	Simulate IP trip and verify "input MV breaker enable"			
The fault only reset via keyed pushbutton KR  Fault reset  Emp# 153  Closed Loop Vector Control Set Encoder 1 PPR Testing Set Encoder loss response With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal  Testing Fault reset  Emp# 153  CLVC  Stop  Stop  Testing Fault reset  Emp# 153				Closed for fault	Emp#	153
Closed Loop   Set Control Loop Type   ID 2050   CLVC   Vector Control   Set Encoder 1 PPR   ID 1290   1024   Testing   Set Encoder loss response   ID 1320   Stop   With Motor Connected to the Drive Output   Connected the encoder signal to TB2ELV-26-31   Scale 4-20 mA signal to 50% and 100% speed   Verify the Drive and Motor Speed output if normal   12mA=50% Speed   Emp# 153			The fault only reset via keyed pushbutton KR	!	· wante	
Vector Control Testing Set Encoder 1 PPR Set Encoder loss response ID 1290 With Motor Connected to the Drive Output Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal  12mA=50% Speed Emp# 153						
Testing Set Encoder loss response ID 1320 Stop  With Motor Connected to the Drive Output  Connected the encoder signal to TB2ELV-26-31  Scale 4-20 mA signal to 50% and 100% speed  Verify the Drive and Motor Speed output if normal 12mA=50% Speed Emp# 153		•				
With Motor Connected to the Drive Output  Connected the encoder signal to TB2ELV-26-31  Scale 4-20 mA signal to 50% and 100% speed  Verify the Drive and Motor Speed output if normal  12mA=50% Speed  Emp# 153	1					
Connected the encoder signal to TB2ELV-26-31 Scale 4-20 mA signal to 50% and 100% speed Verify the Drive and Motor Speed output if normal  12mA=50% Speed Emp# 153		_		Stop		
Scale 4-20 mA signal to 50% and 100% speed  Verify the Drive and Motor Speed output if normal 12mA=50% Speed Emp# 153		1	·			
Verify the Drive and Motor Speed output if normal 12mA=50% Speed Emp# 153			-			
		i	·	12mA=50% Speed	Emp#	153
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SO	3002133943	P/N M6SR3		S/N <u>Z831501002462</u>	
1.6 Sys	tem Load Test:	STSI-061G:4.8			
AND THE RESERVE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF	pe Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value	
R	System Load Test	Run Load Test using Dyno Load Run at input current (full load input current)	214 Amps, 4 hrs	Emp# <u>153</u>	
A	Efficiency Testing	Run Drive at following speed points: 100% Speed 100% Load 100% Speed 50% Load	Record actual 97.08 % 97.29 %	TSF-056 TSF-056	
A	Power Factor Testing	Run Drive at following speed points: 100% Speed 100% Load	0.95PF	TSF-006	
A	Harmonic Testing	Run Drive at 100% speed and 100% load Record actual THD for Voltage & Current (Background Distortion must be THDv <2.0%)	< THD 3 %Voltage < THD 5 %Current	Emp# 153 Emp# 153	
1.7 Fina	I Inspection			STSI-061G:4.9	
Test Ty	pe Test Item	Test Procedure	Test Criteria (Eng)	Signature/Value	
R	File Save	Save Files under the Project Files Folder SOP, HEX, Event Log, Fault Log, Parameter and Configure Files	Parameter upload (Level 7)	Emp#153	
R	Flash Card	All Test versions of SOP & HEX files have been removed from Flash No Wago SOP & HEX is on Flash Final SOP is on Flash and correct Hex file is selected		Emp# 153 Emp# 153 Emp# 153	
R	Disconnect Test Wires	Remove all input and output power and control wiring.		Emp#153	
R					

SO

3002133943

P/N M6SR3

S/N <u>Z831501002462</u>

1.8 Equipment				STSI-061G;4.1
Record Hipot	ter Used			
	Model	Manufacturer	SEDS CTN	Cal. Due
	DH60/5	Lanpotronics	AS110720001	2013-7-19
		Acceptable Control of the Control of	#*************************************	
Record Voltm	neter Used			
	Model	Manufacturer	SEDS CTN	Cal. Due
	175	FLUKE	AS050526001	2014-05-21
	789	FLUKE	AS080131001	2015-03-19
		Philosophia and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second sec		A STATE AND ADDRESS OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STAT
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Oscilloscope				
осотпосовре				
	Model	Manufacturer	SEDS CTN	Cal. Due
	DPO3034	TEK	AS090831001	2013-09-04
			SERVICE TO THE TOTAL TO THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT OF THE COLUMN ASSESSMENT	477790400000 to the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of
Clamp on C.T.	/Clamp-On			
	Model	Manufacturer	CEDC CTM	C.I.D.
	Model	Manufacturei	SEDS CTN	Cal. Due
	LH41	AMPROBE	AS100826001	2012 00 02
	AAA 1 1	AND ROBL	A0100020001	2013-09-02
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Humidity				
	65%			