

Client :

BRISBANE WATER



Document Title :

**SP 239 GOWAN
GENERATOR CONNECTION
OPERATION and MAINTENANCE MANUAL
Book 1 of 1**



COMMON LOGIC PTY LTD

ACN. 011 029 262

Electrical Contractors

Contract BW.30178-02/03 Switchboard Connection Facilities for Backup Generator Sets at Sewerage PS

Electrical Manual - WB239 Gowan Road

ISSUE NO 1
AS BUILT
21/06/2004

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JH05

JH05Mj239Gowan Rd



**Brisbane
Water**



BRISBANE WATER

GENERATOR CONNECTION O & M Manual

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- ATS Connection Diagram

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- Parts List

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- Asbuilt Drawings
- Construction Markups

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- Site Testing NCS alarms
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BRISBANE WATER

GENERATOR CONNECTION O & M Manual

Section 1

Generator Connection Description

COMMON LOGIC Pty Ltd
Specialist Electrical Contractors
Electrical Manual
Subject: Semi Permanent Generator Change Over Switchgear

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JH05MC01

COMMON LOGIC Pty Ltd
Specialist Electrical Contractors**Electrical Manual**

Subject: Semi Permanent Generator Change Over Switchgear

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1.0 GENERAL

The following document describes the operation of the switchgear and relays installed into the change over switchgear cubicle.

The document does NOT describe the detailed operation of the generator PLC or the operation of the pump starters on the site.

The generator is a plug in device and can be removed from site by BW at their discretion.

All sites are identical with respect to the control mechanism with only the size of the circuit breakers and associated switchgear changing.

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2.0 OPERATIONAL DESCRIPTION

There are four components to the system. These are the Generator, RTU, Pump MCC, and the Generator change over switchgear. The last component will be described within this document in detail. The remaining devices will be described in the BW manual.

2.1 GENERATOR

The generator and associated PLC control all automatic aspects of the change over switchgear, in affect making the basic transfer switch into an Automatic Transfer switch (ATS). The ATS will only operate if the generator PLC is fully operational.

The operation of the ATS is NOT fail safe and will NOT return to a predetermined condition on failure of the generator PLC or associated wiring.

Mains fail timing and return to mains timing is all controlled within the generator PLC.

2.2 RTU

The RTU monitors several generator alarm conditions and will report these conditions to the system as required.

The RTU can remotely start and stop the generator. The remote start will initiate a change over of the station to the generator. Stopping the generator will initiate a return to mains if available.

2.3 PUMP STARTER MCC

The pump starter MCC automatically starts and stops the pumps on demand determined by the wet well levels.

The starter has not been modified in any way to accommodate the generator ATS with the exception of the re-routing of the sub-mains cabling.

2.3.1. MCC MAIN SWITCH

The Main Switch in all cases refers to the Energex supply point of isolation.

The existing main switch in the pump starter MCC, when labelled as the "Main Switch", will isolate the incoming Energex Mains Supply.

For complete isolation of the switchboards where an automatic generator system is supplied the generator must also be isolated.

This must be carried out at the generator CB in the generator canopy as well as switching the control to the "OFF" position.

Where a separate main switchboard has been installed the MCC Main Switch will

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become the MCC Main Isolator. This isolator will isolate all incoming power to the MCC regardless of the generator condition.

2.3.2. MAINS AVAILABLE INDICATOR

The mains available indicator mounted on the common control escutcheon is supplied by a 24VDC signal originating from the RTU control supply. The polarity of the signal on the unit is dependent on the type of RTU on the site.
The signal will be "ON" when the mains are healthy.

This relay does not monitor the level or the rotation of the generator supply and has no bearing on the running of the pumps.

2.3.3. MAINS FAIL IN MCC

The mains fail relay in the MCC is the only device that assures the system has the correct rotation and supply available for the pumps to operate.
When re-connecting the generator to a site it is necessary to check the rotation is also correct.

2.3.4. GENERATOR RUNNING.

The generator running indicator is supplied by a 24VDC signal from the generator battery system.
The indicator will be "ON" when the generator is running as determined by the generator PLC.

2.4 ATS CUBICLE

The ATS cubicle comprises 3 sections as described below. The control function of all sites is identical including all relays and components with the exception of the size of the transfer switch and associated connection hardware.

2.4.1. GENERATOR INTERFACE

The generator interface is via a Clipsal 27 Pin plug and socket.
The multicore cable is connected core 1 to pin 1 and 2-2 etc.
The Multicore cable is labelled wire No. 601 for core 1 to pin 1 and No.602 –Core2- Pin2 etc.
This enables simple and quick reference to all wiring between the plug and the hardware within the ATS cubicle.
All signals received from the generator are arranged to switch a relay powered from the generator 24VDC system.
The exceptio to this is the "Generator Not On Site" signal, which wires directly to the RTU via the interface terminals.

All control signals to the Generator are via clean contacts. Both sides of the contact are issued to the generator. These contacts switch relays in the generator panel and are powered via the generator 24VDC system.

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2.4.2. RTU INTERFACE

The RTU interface is via a hard wired loom or multicore cable and terminals.

The Loom cable is specially numbered with the terminal numbers within the ATS cubicle. IE Core 23 is connected to terminal 23 and is labelled wire 623.

If a Multicore cable is utilised then core 1 is connected to Terminal 23 the labelled wire No. 623 for core 2 to terminal 24 and No.624.etc.

This enables simple and quick reference to all wiring between the RTU and the hardware within the ATS cubicle.

The RTU connections are different for each site and may also have different polarities for each site according to the site hardware.

All signals received from the RTU are arranged to switch a relay powered from the RTU 24VDC system. IE Remote Start and Remote Stop only.

All signals to the RTU are via clean contacts. Both sides of the contact are issued to the RTU system. These contacts switch directly into the RTU Input cards. The voltage on these signal cables is 24VDC supplied from the RTU power supply.

2.4.3. ATS AND CONTROL

The transfer switch is a Terasaki Basic Transfer switch.

The control of this switch is only achieved from the generator PLC. The PLC controls the relays GTSM and GTSG within the ATS panel.

Energising GTSM if the Mains Volts are available will open the Generator CB and Close the Mains CB.

Energising GTSG if the Generator Volts are available will open the Mains CB and Close the Generator CB.

If volts are not available the motors in the BTS will not operate. (IE stay in the last condition.

If the BTS does not operate the PLC will remove the transfer signal and assume a fault condition. This condition required manual operator intervention.

Manual Operation:

If manual operation is desired then the following steps must be carried out.

Please note that it is not necessary to remove any covers when manually operating the CB's.

If the PLC is issuing an undesirable status then the operation of the CB motors must first be isolated. This is best achieved by switching the CB's QM2 and QG1 to the off position. This removes the motor charge and open close commands to the operators.

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If the PLC is not affecting the transfer switch these CB's may be left in the ON state.

Manual Open:

To open a CB press the trip button on the motor operator "OR" toggle the spring wind mechanism until the CB opens and the open state shows in the window.

Manual Close:

To close a CB wind the motor spring wind mechanism until the CB closes and the Closed state shows in the window.

Mains Fail detection:

The mains fail relay detects the condition of the mains and issues a mains fail start signal to the PLC.

The mains fail relay also operates the mains available indicator on the MCC common control panel.

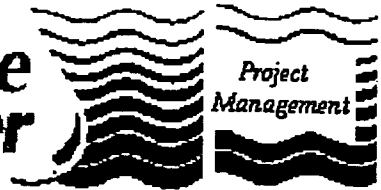
The mains fail signal also issues a condition to the RTU to indicate mains failed when the relay is de-energised.

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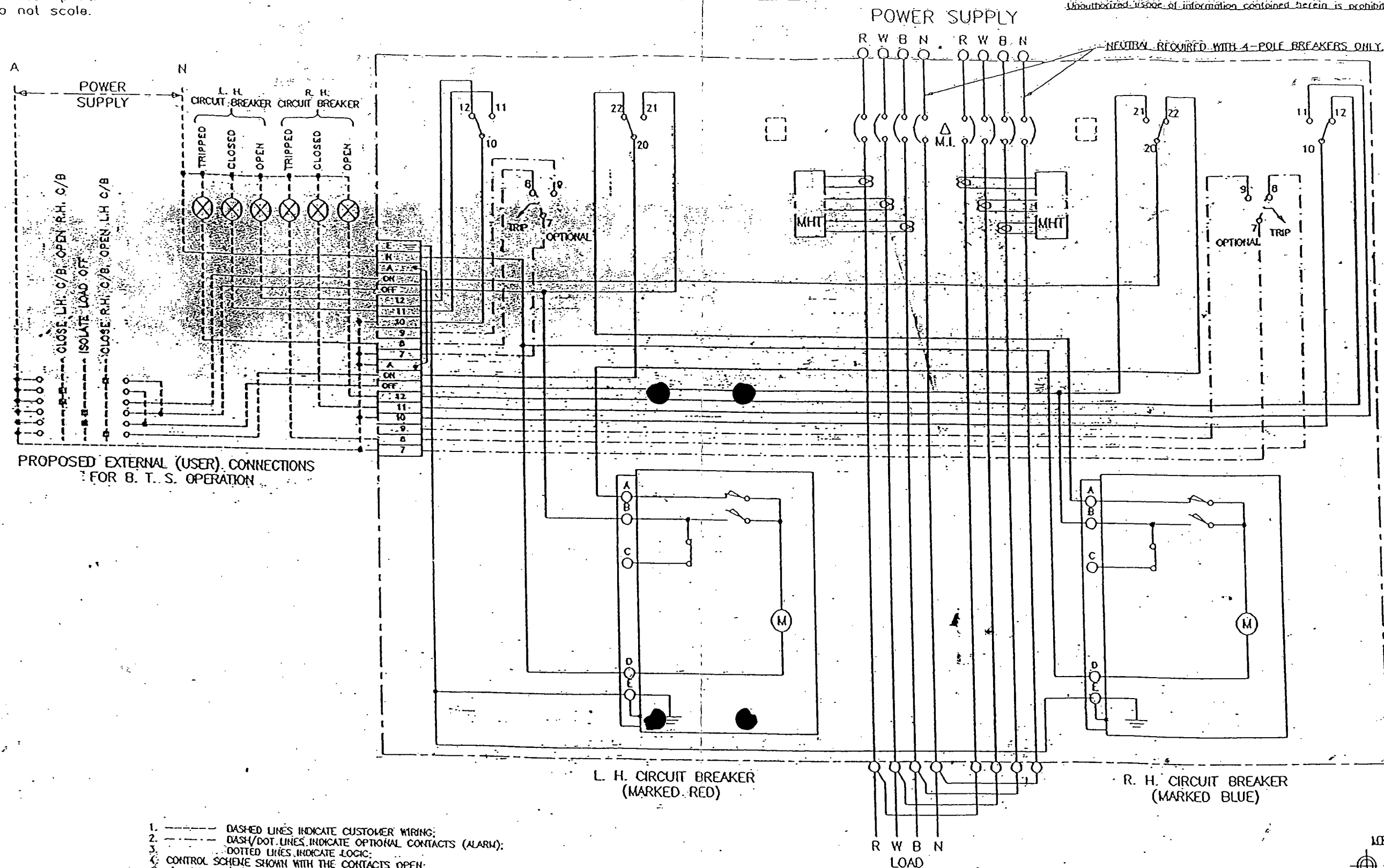
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Section 1A

ATS Connection Diagram

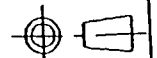
Reduced print.
Do not scale.

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1. DASHED LINES INDICATE CUSTOMER WIRING;
2. DASH/DOT LINES INDICATE OPTIONAL CONTACTS (ALARM);
3. DOTTED LINES INDICATE LOGIC;
4. CONTROL SCHEME SHOWN WITH THE CONTACTS OPEN;
5. TERMINALS ON B.T.S.;
6. EXTERNAL CONTROL SIGNALS MUST BE MECHANICALLY OR ELECTRICALLY INTERLOCKED;
7. SELECTOR SWITCH CAN BE REPLACED WITH N/O CONTACTS FROM RELAYS OR CONTACTORS;
8. TERMINALS FOR RHS LOAD & MOTOR ARE "BLUE" COLOUR;
9. TERMINALS FOR LHS LOAD & MOTOR ARE "GREY" COLOUR;
10. NEUTRAL & EARTH TERMINALS ARE FOR BOTH RHS & LHS;
11. MHT ONLY FOR ELECTRONIC BREAKER.

METRIC



C	DRAWING UPDATED - EXTERNAL CONNECTION B.T.S. OPERATION	28/4/94	P.C.T				
B	NOTE 11 ADDED	6/8/93	P.C.T				
A	DRAWING REVISED DUE TO UPDATES	20.6.91	O.V.M				
NO.	REVISION	DATE	DRWN	CHECKED			
TITLE		SCALE	SIZE	PASSED	DATE		
TemBreak CIRCUIT BREAKERS B.T.S. SCHEMATIC XMB (SMALL) MOTOR OPERATORS		NONE	A2 300 x 400		10.4.91		
NH-P		DRWN	GROUP	DRAWING No.			
INCORPORATED IN VICTORIA		TRACED	04	010			
		CHECKED	SHEET	2/2			

CAD REF: 010102

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PO BOX 10000, MELBOURNE



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GENERATOR CONNECTION O & M Manual

Section 2

Parts list

Supplier Name	Part No	Item Description	Manual Incert
ABK	CLI56AI310	APPLIANCE INLET	Clipsal Web Page
ABK	CLI56CSC310	EXTENSION SOCKETS	Clipsal Web Page
ABK	CLIWIPM27	27 CONTROL PIN W/P INSUL PLUG HI-IMPACT	Clipsal Web Page
Dore	BBLV50E	51MM INSULATOR STAND OFF	Dore Electrics Catalogue
Dore	BBLV50H	600V STAND OFF INSULATOR	Dore Electrics Catalogue
Dore	BBLV75S	600V STAND OFF INSULATOR TYPE C M10	Dore Electrics Catalogue
NHP	93.2	JUMPER LINK 20WAY SUITS 38.5	NHP Catalogue F1
NHP	96.72	2P 12AMP RELAY BASE FOR 56.32 RLY	NHP Catalogue F1
NHP	96.74	4P 12AMP RELAY BASE FOR 56.34 RLY	NHP Catalogue F1
NHP	38.51 24VDC	24V DC RELAY 1CO 6A	NHP Catalogue F1
NHP	56.32 0074 24VDC	RELAY FPIN 2CO 12A 24VDC	NHP Catalogue F1
NHP	56.34 24VDC	RELAY FPIN 4CO 12A 24VDC	NHP Catalogue F1
NHP	99.013-024	LED & DIODE MODULE PLUG-IN	NHP Catalogue F1
NHP	CS4-22Z-240VAC	2N/O 2N/C 240VAC RELAY	NHP Catalogue CA4
NHP	BS8N833(AUTO)	TRANSFER SW BTSS800NJ80033 AUTO	NHP Catalogue Page
NHP	CLSB63033	630A BUSBAR LOAD SIDE 3P X63	
NHP	D5-3NL3A	LED LAMP BLOCK C/W COUPLER AMBER 24V AC/DC	NHP Flyer D5-3NF
NHP	D5-3NL3A	LED LAMP BLOCK C/W COUPLER AMBER 24V AC/DC	NHP Flyer D5-3NF
NHP	D5P-P5	YELLOW PILOT LIGHT STANDARD	NHP Web Page
NHP	DPA-01-D-M48	PHASE FAIL/SEQ	NHP Flyer CGM
NHP	DSRCB1030P	10A 2P DIN SAFE MCB WITH PIGTAIL	NHP Catalogue Page
NHP	DSRCB1030P	10A 2P DIN SAFE MCB WITH PIGTAIL	NHP Catalogue Page
NHP	DSRCBH1030A	DINT MCB/RCD 1P 10A 30MA 10KA	NHP Catalogue Page
NHP	DSRCBH1030A	MCB/RCD 1P 10A 30MA 10KA DIN-T	NHP Catalogue Page
NHP	DSRCBH3230A	MCB/RCD 1P 32A 10KA	NHP Catalogue Page
NHP	DTCB10332C	DINT 10KA 3P 32A CB	NHP Catalogue Page
NHP	DTCB6106C	DINT 6KA 1P 6A CB	NHP Catalogue Page
NHP	DTCB6306C	DINT 6KA 3P 6A CB	NHP Catalogue Page
NHP	NV20FW	FITTING FUSE HOLDER 20A CLIPIN F/W	NHP Flyer NCF-F
NHP	OETL800K3	L/BREAK SWITCH 3P 800A C/W STD HANDLE & SHAFT	NHP Web Page
NHP	OETLZX128	SHROUDS	NHP Web Page
NHP	OXPI2X325	EXTENDED SHAFT 12/325MM	NHP Web Page
Phoenix	441504	EARTH TERMINALS	Phoenix Web Page
Phoenix	800886	E/NS35N END CLAMP DIN RAIL	Phoenix Web Page
Phoenix	3004362	UK5N 4MM FEEDTHRU TERMINAL GREY	Phoenix Web Page



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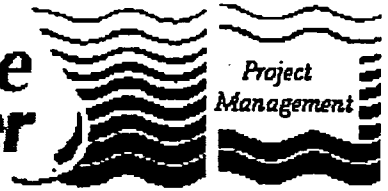
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Section 3

Asbuilt Drawings



**Brisbane
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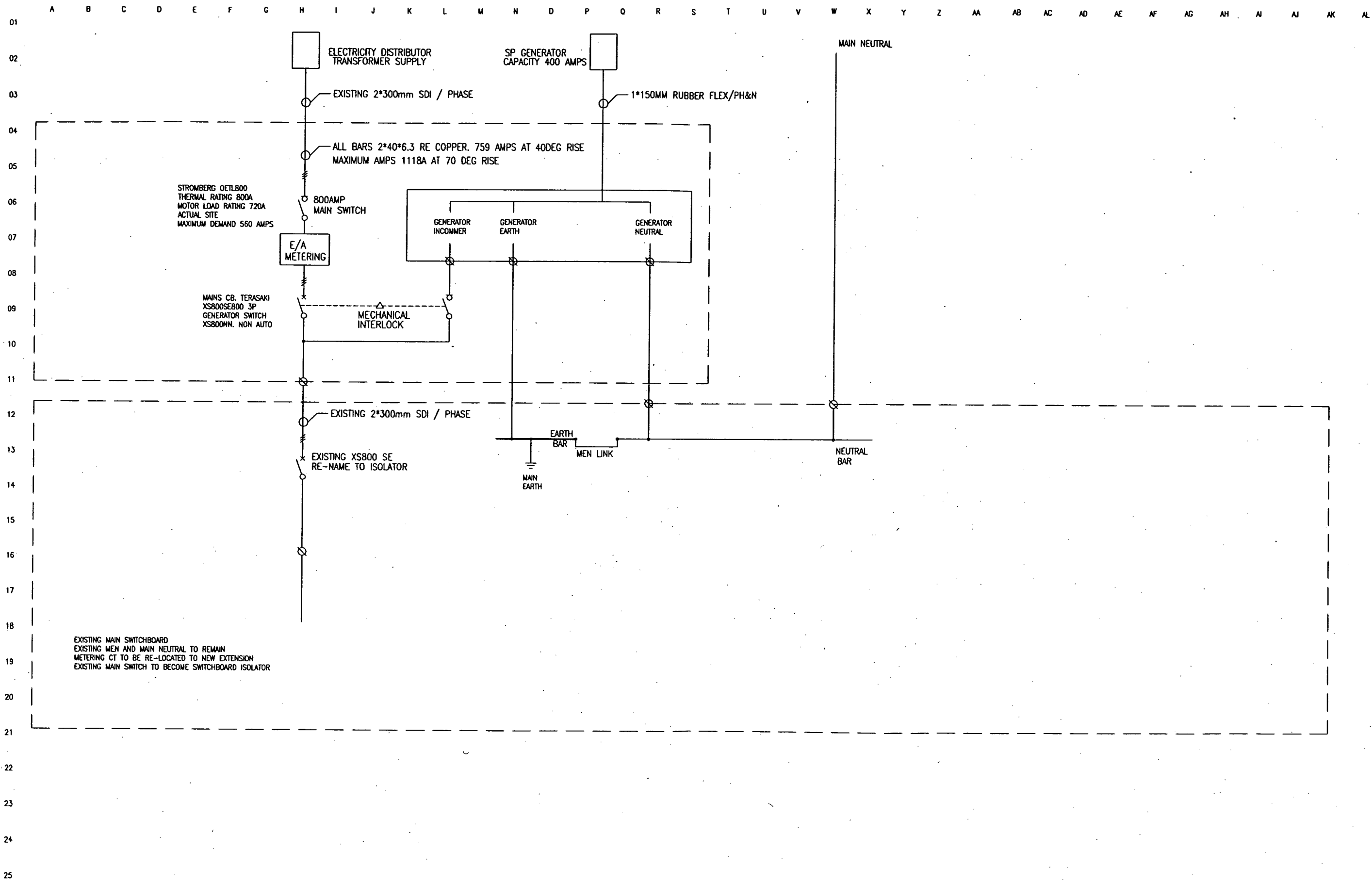
BRISBANE WATER

GENERATOR CONNECTION O & M Manual

Section 3A

Construction Markups

IF IN DOUBT, ASK.



			PWN	?
			LWN	?
			SWN	?
			FTN	?
			LTN	?
			STN	?
1/2/04	A	AS BUILT		
3/11/03	MA	ISSUED FOR APPROVAL		

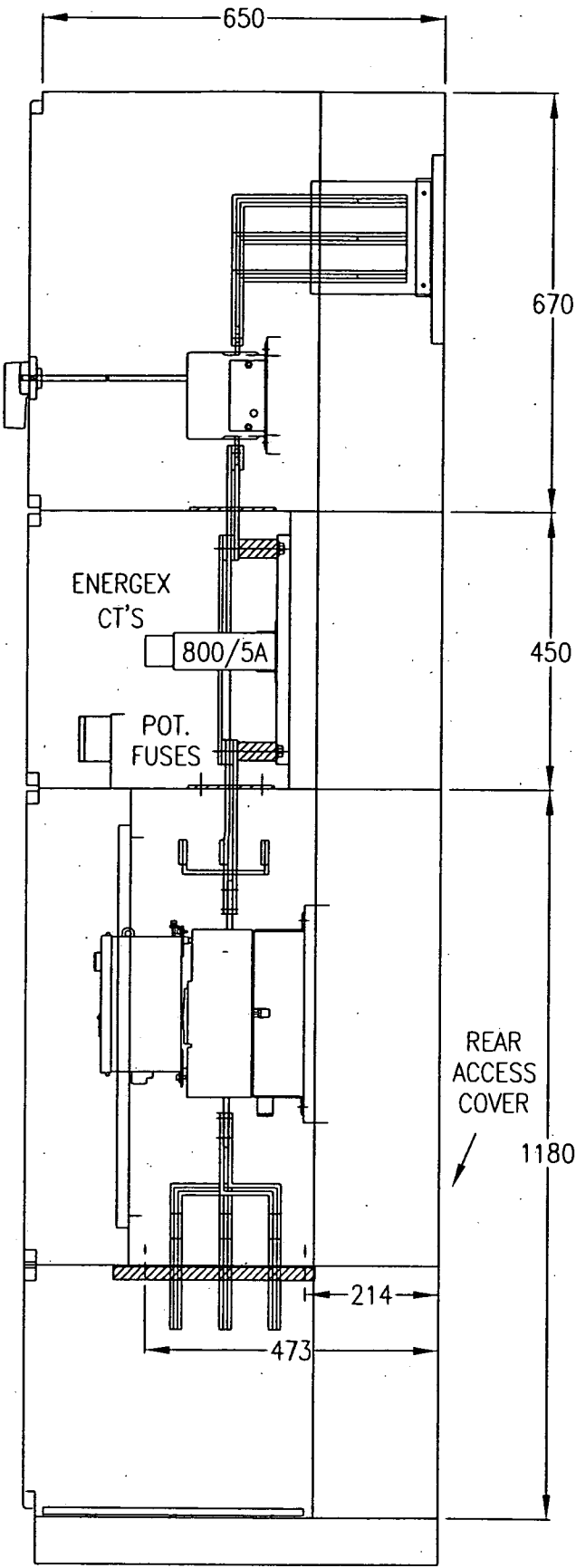
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PO. BOX 2008
Monsfield QLD. 4122
Tele: 07 3849 7449

DATE	3/11/03
DRAWN	GCK
SCALE	NTS
APPROVED	

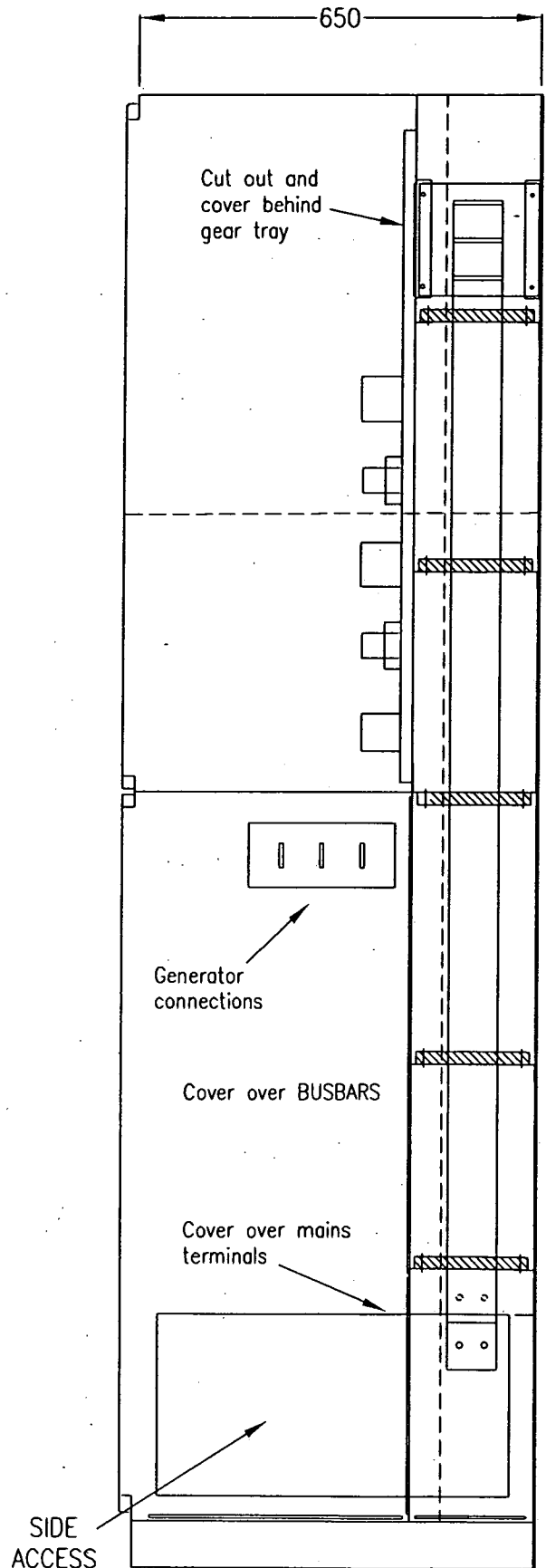
BRISBANE WATER GENERATOR UPGRADE GOWAN RD SINGLE LINE DIAGRAM		
JH05DA50	A3 sheet 1/1	ISSUE A

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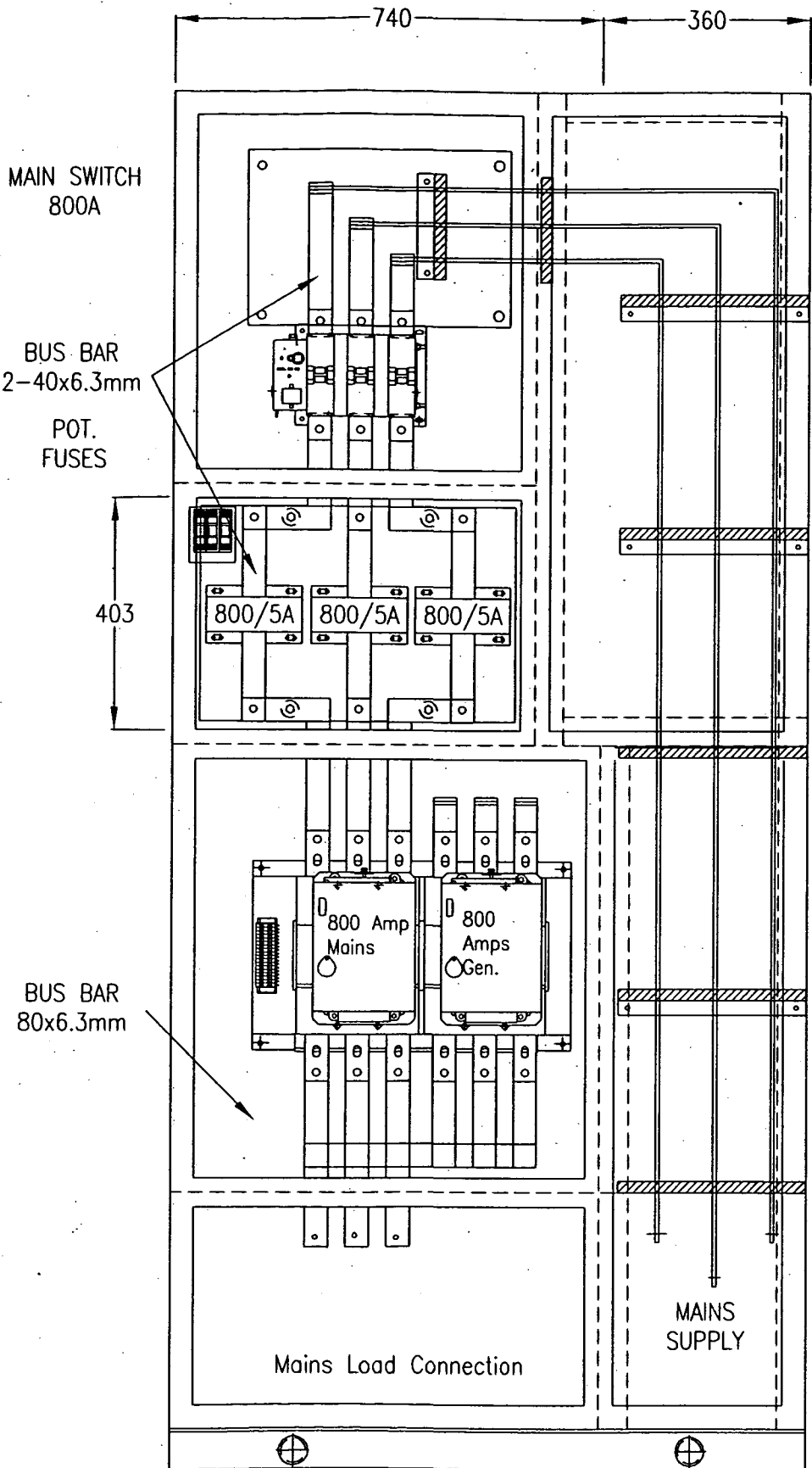
IF IN DOUBT, ASK.



SECTION A-A



SECTION B-B



FRONT VIEW
(DOORS & COVERS REMOVED)

			FWN	
			LWN	
			SWN	
1/2/04	A	AS CONSTRUCTED	PTN	
11/11/03	MB	ISSUED FOR CONSTRUCTION	LTN	
8/10/02	MA	ISSUED FOR APPROVAL	STN	

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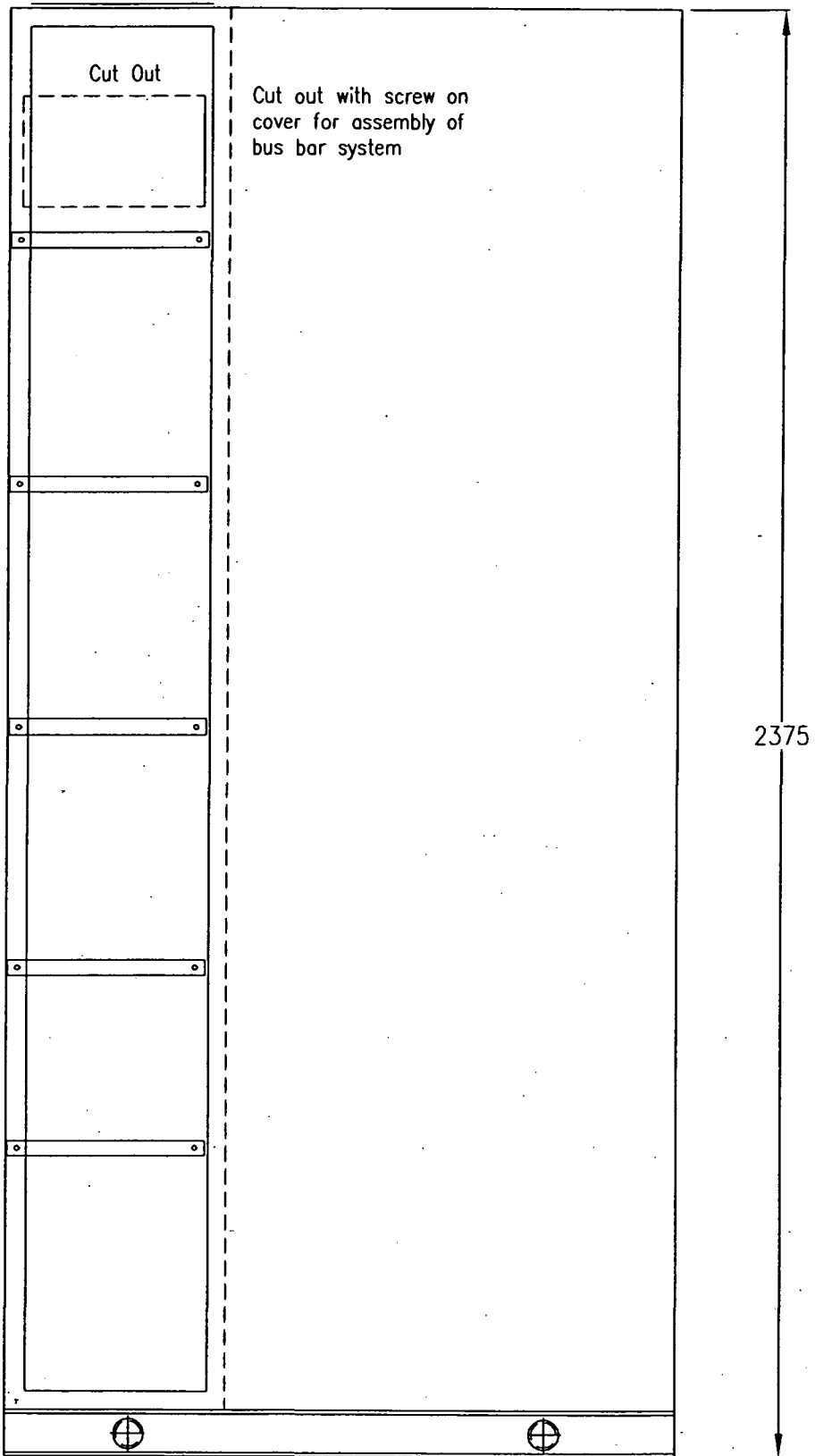
BRISBANE WATER, GOWAN ST
GENERATOR SW/BD EXTENSION SECTIONS A, B, FRONT VIEW.
JG05DJ02 A3 sheet 2/4 ISSUE A

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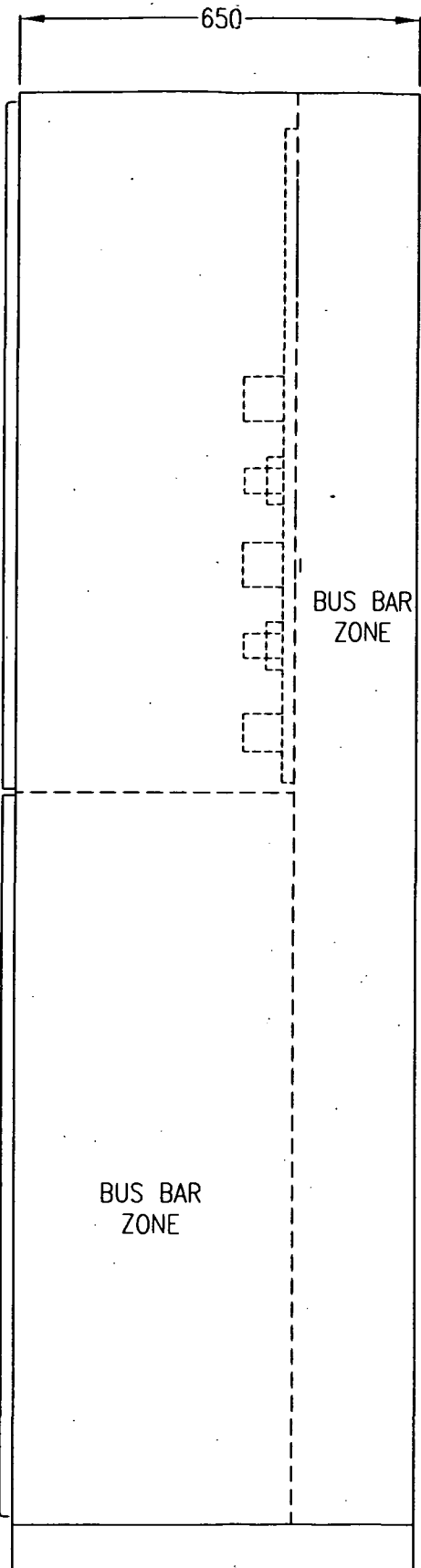
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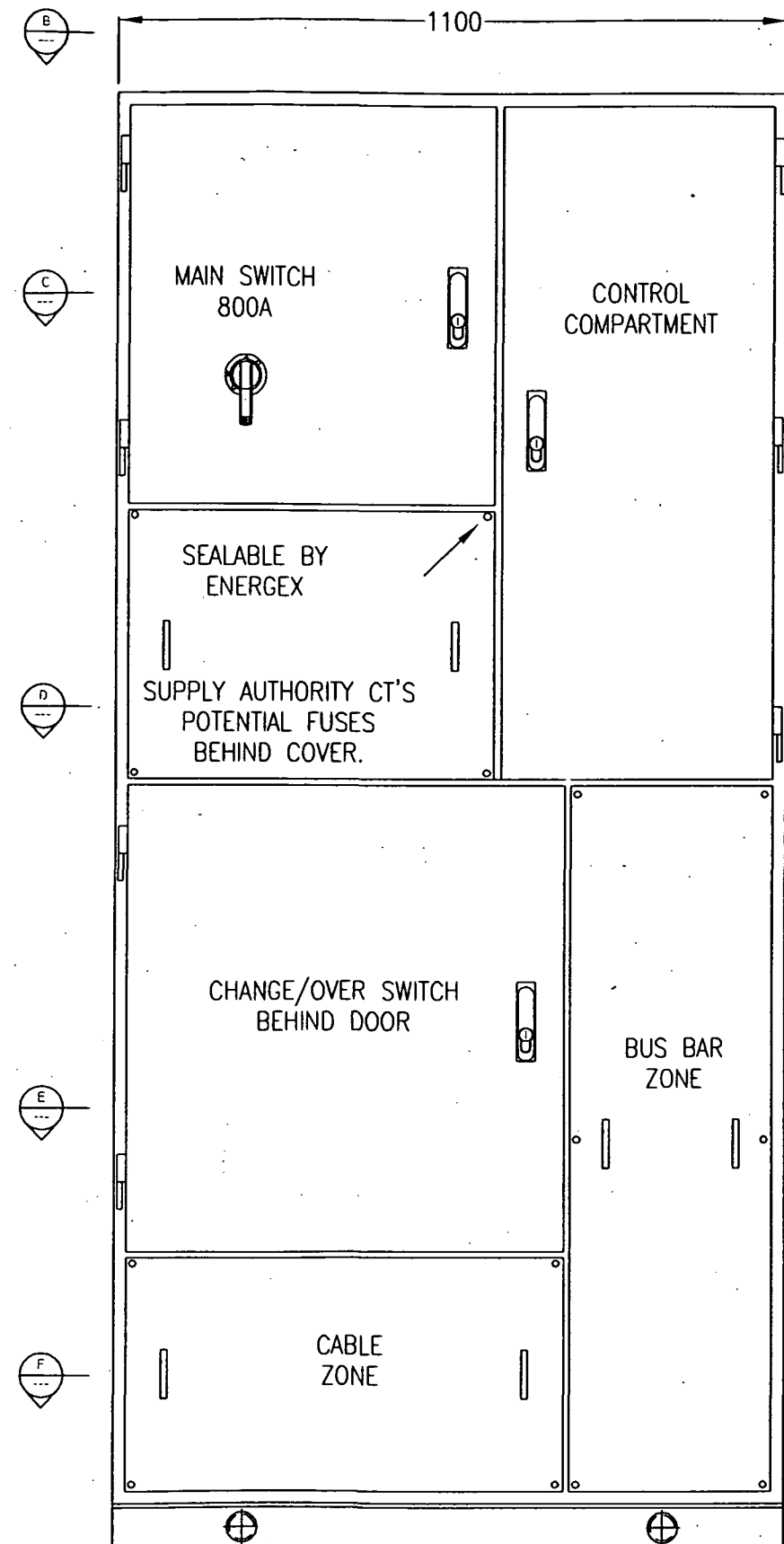
Top Access cover for bus bar installation.



REAR VIEW
(COVER REMOVED)



SIDE VIEW



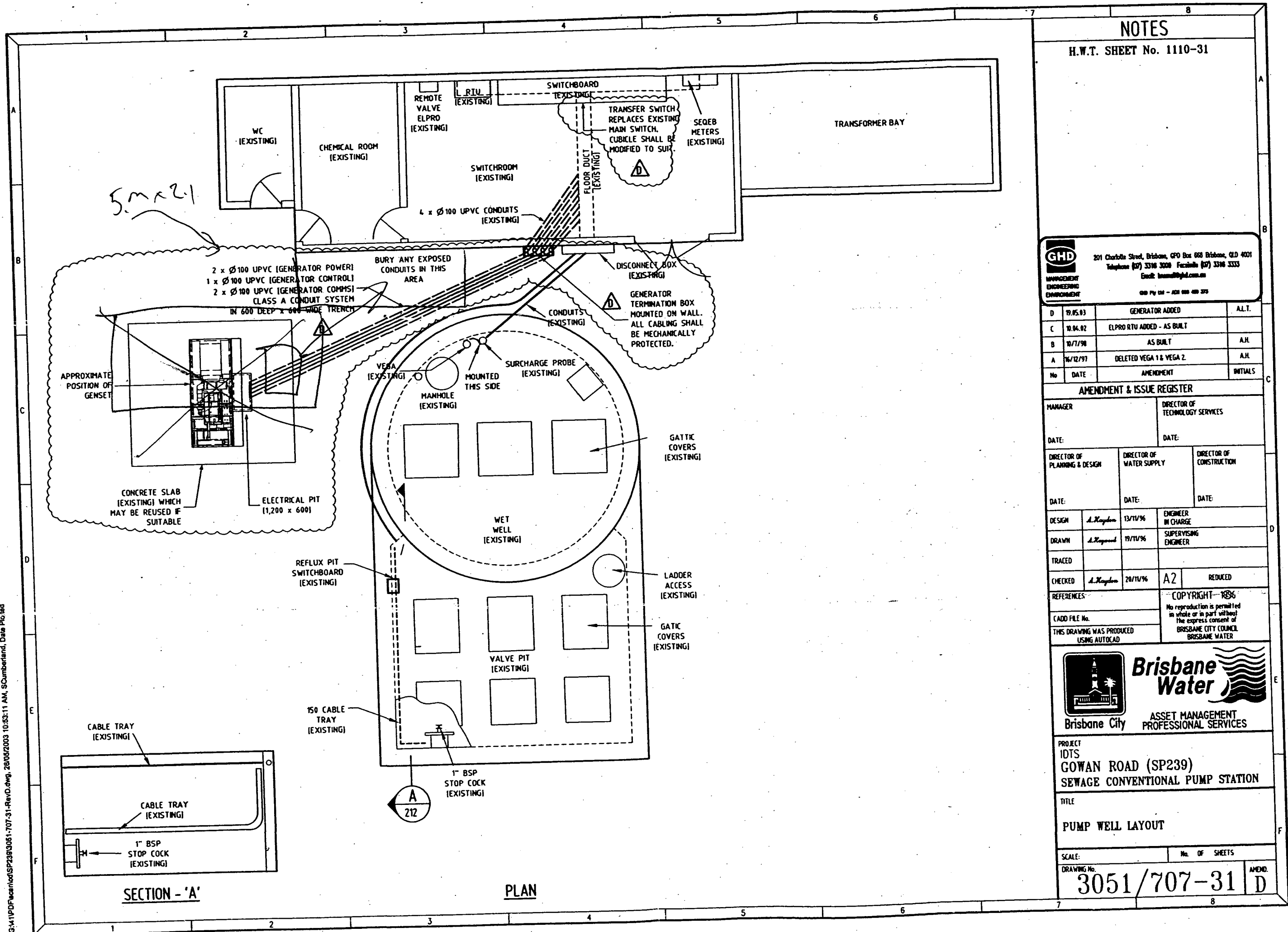
FRONT VIEW

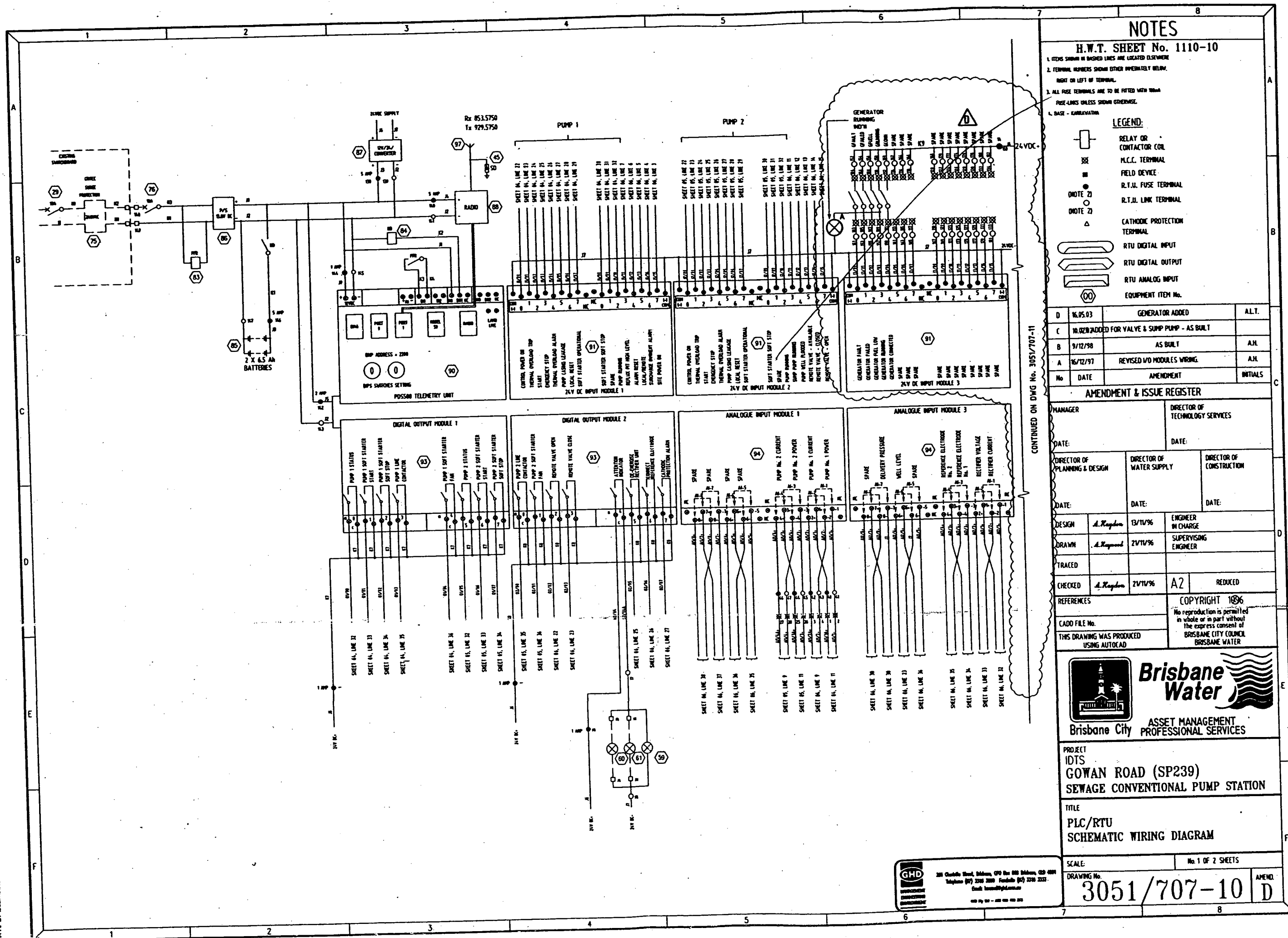
1/2/04	A	AS CONSTRUCTED	FTN		
11/11/03	MB	ISSUED FOR CONSTRUCTION	LWN		
8/10/03	MA	ISSUED FOR APPROVAL	FTN		
			LTN		
			STN		

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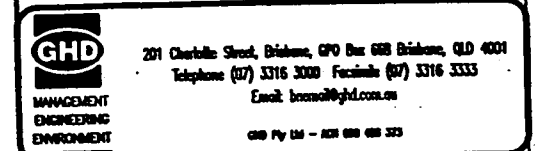
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BRISBANE WATER, GOWAN ST
GENERATOR SW/BD EXTENSION FRONT, SIDE & REAR VIEW.
JG05DJ01 A3 sheet 1/4 ISSUE A





CONTINUED ON DWG No. 3051/707-11



D	19.05.03	GENERATOR ADDED	A.L.T.
C	05.04.02	CIRCUIT BREAKER ADDED - AS BUILT	
B	10/7/98	AS BUILT	A.H.
A	16/12/97	DELETED TRANSFORMERS & TBY CONTROL	A.H.
No	DATE	AMENDMENT	INITIALS

MANAGER	DIRECTOR OF TECHNOLOGY SERVICES
DATE:	DATE:

DIRECTOR OF PLANNING & DESIGN	DIRECTOR OF WATER SUPPLY	DIRECTOR OF CONSTRUCTION
DATE:	DATE:	DATE:

DESIGN	<i>A. Kayden</i>	13/11/96	ENGINEER IN CHARGE
DRAWN	<i>A. Kayden</i>	19/11/96	SUPERVISING ENGINEER
TRACED			

CHECKED	A. Hayden	21/11/96	A2	REDUCED
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Brisbane Water

Brisbane City **ASSET MANAGEMENT**
PROFESSIONAL SERVICES

PROJECT
IDTS
GOWAN ROAD (SP239)
SEWAGE CONVENTIONAL PUMP STATION

TITLE
SWITCHBOARD
SINGLE LINE DIAGRAM


SCALE:	No. OF SHEETS
DRAWING No.	AMEND.
3051/707-02	D

The drawing consists of three views of a switchgear assembly:

- Front View (Left):** A vertical rectangle with a width of 650 and a total height of 1180. The height is divided into three sections: 670 at the top, 450 in the middle, and 1180 at the bottom. A dashed line indicates a cutout at the bottom, labeled "FLAT COVER".
- Side View (Middle):** A vertical rectangle with a width of 650. It shows the internal components from the side. A label "Cut out and cover behind gear tray" points to a specific area. A "BUS BAR 80x6.3mm" is indicated. A "SIDE ACCESS CUTOUT" is shown at the bottom. The "MAINS SUPPLY" is labeled on the right side.
- Internal Component Layout (Right):** A detailed view of the internal components. It shows a "MAIN SWITCH 800A" at the top, followed by "BUS BAR 2-40x6.3mm" and "POT. FUSES". Below these are three "800/5A" current transformers. A "Hinged Escutcheon with spanner locks" is shown. The bottom section is labeled "Mains Load Connection". To the right, there is a "GENERATOR SUPPLY" section and a "Cover over terminations". Dimensions 740 and 360 are shown for the internal layout.

			<i>FTN</i>
			<i>LWN</i>
			<i>SWN</i>
1/2/04	A	AS CONSTRUCTED	<i>FTN</i>
11/11/03	MB	ISSUED FOR CONSTRUCTION	<i>LTN</i>
8/10/03	MA	ISSUED FOR APPROVAL	<i>STN</i>

DATE	05/09/03
DRAWN	GCK
SCALE	NTS
APPROVED	

BRISBANE WATER, GOWAN ST GENERATOR SW/BD EXTENSION SECTIONS A, B, FRONT VIEW.			
	JG05DJ03	A3 sheet 3/4	ISSUE A.



BRISBANE WATER

GENERATOR CONNECTION O & M Manual

Section 4

Site Testing

COMMON LOGIC Pty Ltd
Specialist Electrical Contractors

Site Acceptance Tests

Subject: SAT for BW Generator Change Over Panels

Sheet: 1
Of: 7

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Test Carried out by.....

Signed...

Date...

Test witnessed by.....

Signed...

Date...

Authorised By:

COMMON LOGIC Pty Ltd
Specialist Electrical Contractors

Site Acceptance Tests

Subject: SAT for BW Generator Change Over Panels

Sheet: 2
Of: 7

Section

Page Revision No: 0 Date: 07/05/04

Manual Issue No: 0 Date: 07/05/04

1.0 SITE ACCEPTANCE TEST

1.1 Introduction

Complete EVERY box below; if items are not applicable indicate by a N/A in the check box, any comments can be completed at the end of the checklist.

Aim: This Commissioning list is to be completed by the person/s who are undertaking the commissioning and testing of the switchboard in question. The commissioning list is designed to check the fundamental wiring of the switchboard.

Scope: This Commissioning list is designed to test the operation of the MSB and Controls only. Building wiring is subject to test by building services qualified personnel.

Legend of Symbols

☐ Check Box, ☒ Setting to be recorded, → and Action to take

1.2 Production Unit Information

Job Number	5105	Job Description	Gowan Rd
	Name	Signature	Date
Testing Officer			
Witness			

1.3 Safety precautions

Outlined below are some common safety procedures and First Aid Instruction.

SAFETY FIRST

- 1) Never test live boards alone. Always inform others of your actions and intentions.
- 2) Isolate mains or REMOVE TEST PLUG and locate close to testing area under your control.
- 3) Isolate the switchboard main switch and all circuitbreakers and fuses to completely remove all possibility of switching a live conductor when not deliberately required.
- 4) Tag all Distribution as DO NOT OPERATE removing only after tested and safe.
- 5) Insure NO LIVE WIRES are exposed at any time and a CLEAR TESTING AREA and escape route at all times.
- 6) PROTECTIVE CLOTHING and eyewear should be worn at all times when working within Live board or when appropriate.

Test Carried out by.....

Signed....

Date...

Test witnessed by.....

Signed....

Date...

Authorised By:

COMMON LOGIC Pty Ltd
Specialist Electrical Contractors

Site Acceptance Tests

Subject: SAT for BW Generator Change Over Panels

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2.0 ELECTRICAL EARTHING SYSTEM

2.1 Electrical continuity and resistance of earthing system

☒ Maximum resistance of the Earthing system within the switchboard is 0.5 ohms (AS/NZS 3000:2000)

☐ Test resistance of the Earthing system < 0.5 ohms

2.2 Continuity Test Sheet

ITEM	DETAIL	COMPARTMENT DESIGNATION AND TEST RESULT		
		Extension	Main Eth Bar	Generator
	Test resistance of Earthing system to compartment Answer in Ohms			
1	All Earth's wired and continuous	< 0.5 Ω	< 0.5 Ω	< 0.5 Ω
2	All metal work earthed where required	✓	✓	✓
3	Isolate Individual Earth Systems and check continuity.	✓	✓	Plug in

3.0 INSULATION RESISTANCE/ HIGH POT TEST

3.1 Insulation Resistance Test

Insulation resistance of whole or part of an installation must be a minimum of 1 Meg/ohm (AS/NZS 3000:2000)

☒ Insulation test conducted on all internal circuits

→ All Selector Switches, Isolators and CB's are in the off position

→ All electronic equipment susceptible to high voltage damage to be isolated.

3.2 Low Voltage Switchboards Insulation Test

MEGGAR VOLTAGE 1000V VOLTS

INSTRUMENT DETAILS 9025080

ACROSS	RESULT (M.OHM)	High Pot
Join Red, White & Blue Phases and Neutral, Test to Earth	< 0.5 Ω	
Red Phase to White, Blue & N	< 0.5 Ω	
White Phase to Red, Blue and N	< 0.5 Ω	
Blue Phase to Red, White & N	< 0.5 Ω	
N to Red, White & Blue	< 0.5 Ω	

Test Carried out by.....

Signed...

Date...

Test witnessed by.....

Signed...

Date...

Authorised By:

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Specialist Electrical Contractors

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4.0 GENERAL WIRING AND VISUAL INSPECTION

4.1 General Wiring and Visual Inspection

☐ Electrical Construction Coversheet Completed and correct.

4.2 Switchgear Visual Checklist

→ Carry out visual and mechanical checks to Switchgear

ITEM NO:	DETAIL	Switchboard compartments		
		Transfer switch compartment	Main switch area	Generator in general
1	Main Switch totally isolates SWBD	Both off	✓	See Gen
	Mains transfer switch device isolates mains from load. (IE switchboard)	Both off	—	
2	Generator transfer switch operates and isolates generator from the load. And mechanical interlock works	Manual operation OK	—	—
3	Cables tight and correct phase rotation. Colour match.	✓	✓	✓
4	Main Switch Correct Rating/Label	✓	✓	✓
5	Neutral cable connected and continuous and tight.	✓	✓	plug

ITEM	DETAIL	COMPARTMENT DESIGNATION AND TEST RESULT	
		Switchboard extension	Existing Switchboard. Where modified.
1	All CBs operate correctly	✓	✓
2	All incoming terminal numbers as per drawings	✓	✓
3	Check wire numbers to core numbers. Random selection.	✓	✓
4	All wires numbered as per drawings (random inspection)	✓	✓
5	Cables loomed and bushed correctly to all compartments.	✓	✓
6			
7			

4.3 Terminal Visual Checklist

→ Carry out visual and mechanical checks on Site terminals

Test Carried out by.....

Signed...

Date...

Test witnessed by.....

Signed...

Date...

Authorised By:

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ITEM	DETAIL	COMPARTMENT AND TEST RESULT	
		Switchboard extension	Existing Board
1	All Terminals tight (Randomly check)	✓	✓
2	Secure by End Clamps (Check All)	✓	✓
3	Labelled correctly	✓	✓
4			

4.4 Relay Visual Checklist

→ Carry out visual and mechanical checks on Relays

ITEM	DETAIL	COMPARTMENT AND TEST RESULT
1	Relays labelled correctly as per Drms	✓
2	All relay coils correct voltage	✓
3	Does relay require Diode fitted?	✓
4	Common Bus Link on relays fitted	✓
5	All numbering correct	✓

Test Carried out by.....

Signed...

Date...

Test witnessed by.....

Signed...

Date...

Authorised By:

COMMON LOGIC Pty Ltd
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Site Acceptance Tests

Subject: SAT for BW Generator Change Over Panels

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5.0 CONTINUITY & PRE-COMMISSIONING TEST

5.1 Continuity Test

- ☐ Wiring of circuits and connections are correct to constructed wiring schematics.
- ☐ Random Continuity Test using Buzzer.
- ☐ Visual Check of all wiring.

- Open all Circuit breakers and remove all fuse links
- Install Test plug in generator end.
- Install RTU terminal Plugs into terminals
- By pressing the relevant buttons and observing the relevant feedback LED all circuits will be checked.
- Test each circuit in turn with corresponding drawings

ITEM NO	Test description			Result of test
		Action	Observation	
1	Transfer to Mains	Press Button 1	Observe Relay GTSM	✓
2	Transfer to Gen	Press Button 2	Observe Relay GTSG	✓
3	Generator Failed	Press Button 3	Observe Relay GF	✓
4	Generator Fault	Press Button 4	Observe Relay GFR	✓
5	Gen Running	Press Button 5	Observe Relay GRUN	✓
			Check Door Indicator is on when relay is ON	
6	Generator Connected	Press Button 6	Observe Relay GCONN	✓
7	Doors Opened	Press Button 7	Observe Relay GOPEN	✓
8	CB Tripped	Press Button 8	Observe Relay GCBT	✓
9	Not in Auto	Press Button 9	Observe Relay GNAUTO	✓
10	Generator Not On Site	Press Button 10	Observe Indicator	✓
11	Spare			
15	Remote Start	Press Button 15	Observe Relay GSTART	✓
16	Remote Stop	Press Button 16	Observe Relay GSTOP	✓
1	Mains Failed	Close QM1	Indicator ON when PFR is ON	✓
			Check Door Indicator is ON when PFR is ON	
2	ATS to Mains	Manual Change to Mains	Indicator ON when TXS in Mains	✓
3	ATS To Gen	Manual change to Gen	Indicator ON when TSX in GEN	✓
4	Remote Start	Press PB 15	Indicator is on when PB is ON	✓
5	Remote Stop	Press PB 16	Indicator is on When PB is ON	✓
6	Generator is missing	Press PB 10	Indicator is on when PB is ON	✓

P10W

Press button 5

Test Carried out by... Rob McEwen

Signed... Date: 11.5.04

Test witnessed by... Ron McEwen

Signed... Date: 11.5.04

Authorised By:

COMMON LOGIC Pty Ltd
Specialist Electrical Contractors

Site Acceptance Tests

Subject: SAT for BW Generator Change Over Panels

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Page Revision No: 0 Date: 07/05/04

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6.0 COMPONENT OPERATIONAL TEST

6.1 Component Operation Test

- ☐ Correct Operation and Voltages
☐ All set points and parameters set to test values if required.

6.2 AC Control Systems

- Open all circuit breakers and remove all fuse links
→ Test each circuit individually, replacing fuses and closing circuit breakers in turn.

AFTER VOLTAGE APPLIED

- Apply mains supply
→ Carry out voltage and operational checks (ie switch operation etc)
→ Bridge control points to check operation as per BW commissioning Sheet
→ Apply generator voltage and check operation
→ Return to normal and fail the mains
→ Return the mains
→ Carry out a manual transfer

ITEM NO:	DETAIL	New Extension
		Test Result
1	Mains Incoming Voltage Measured OK	
2	All CB's are turned off and isolate Crts	
3	Phase Fail operates correctly	

Test Carried out by.....

Signed....

Date...

Test witnessed by.....

Signed....

Date....

Authorised By:

COMMON LOGIC Pty Ltd
Specialist Electrical Contractors**Electrical Manual**

Subject: Semi Permanent Generator Change Over Switchgear

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Manual Issue No: 1 Date: 21/06/04

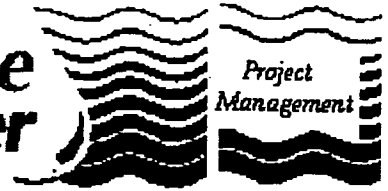
6.0 TECHNICAL INFORMATION

Authorised By: Grant Kerr

JH05MC01



**Brisbane
Water**



BRISBANE WATER

GENERATOR CONNECTION O & M Manual

Section 4A

Site Testing Functional Description



PROJECTS – ENGINEERING

Sewerage System Performance Improvements Backup Diesel Generators for Pump Stations

FUNCTIONAL SITE TESTS FOR GENERATOR, AUTOMATIC TRANSFER SWITCH, AND RTU

Prepared by : Alan Mooney
Telephone - 07 3403 3356
Facsimile - 07 3403 0205

Document ID : Genset Functional Tests

Date of Issue : June 2003

Revision : Rev 1

Actions are shown in RED

1 MANUAL MODE FUNCTIONAL TESTS

1.1 Manual Mode Start

Turn the AUTO – TEST – MAN- OFF selector switch to the MANUAL position.

Press the MANUAL START push button to start the generator.

The generator set is allowed 3 attempts to start.

If it fails to start on the third attempt, the generator is locked out on FAIL TO START Alarm.

Once the generator has started, there is a 10 second time delay for the oil pressure to stabilise.

Once the generator is running there is a 30 second warm up time before it is ready to accept load.

RESULTS: PASS/FAIL _____ NOTES _____

1.2 Stopping the generator in the Manual Mode.

Press the MANUAL STOP push button.

If the generator is still GEN ATS operation. The MANUAL TRANSFER TO MAINS is initiated.

When the GEN ATS is Open, the generator will enter the cool down time of 1 second.

After the cool down time, the generator will shut down.

RESULTS: PASS/FAIL _____ NOTES _____

2 TEST MODE FUNCTIONAL TESTS

2.1 Test Mode Start – and test of Manual Mode interruption

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the TEST position.

The generator shall begin to crank.

Change the selector MAN while the generator is operating on TEST: to test that the system shall change to MANUAL TRANSFER TO GEN.

Press the MANUAL STOP push button.

RESULTS: PASS/FAIL _____ NOTES _____

2.2 Continue Test

Select TEST operation again by turning the AUTO – TEST – MAN- OFF selector switch to the TEST position.

The generator shall begin to crank.

Once the generator has started, there is a 10 second time delay for the oil pressure to stabilise.

Once the generator is running there is a 30 second warm up time before it is ready to accept load.

After the warm up time has expired, the MAINS ATS shall Open and the GEN ATS shall Close

RESULTS: PASS/FAIL _____ NOTES _____

2.3 Stopping Generator In The Test Mode - To Test Mains Failure /Genset Restart During Shutdown

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the AUTO or OFF position.

The GEN ATS shall Open and the MAINS ATS shall Close

When the GEN ATS is Open, the generator will enter the cool down time of 5 minutes.

During this time turn off the Mains to the site

When Mains Failure occurs during the cool down period the generator shall transfer back to the GENERATOR ATS without shutting down.

RESULTS: PASS/FAIL _____ NOTES _____

2.4 Stopping generator in the Test Mode.

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the AUTO or OFF position.

The GEN ATS shall Open and the MAINS ATS shall Close

After the cool down time of 5 minutes, the generator will shut down.

RESULTS: PASS/FAIL _____ NOTES _____

2.5 Test Mode Selected with genset unavailable (fault or GEN CB off).

Make GENSET unavailable

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the TEST position.

Observe results – Genset discussion of preferred results (unit should not start?)

RESULTS: PASS/FAIL _____ NOTES _____

3 AUTOMATIC MODE FUNCTIONAL TESTS

3.1 Automatic Start

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the AUTO position.

Turn off the Mains to the switchboard.

The Phase Failure Relay from the clients switch board shall give a Start Signal for the generators to run.

Once the generator has started, there is a 10 second time delay for the oil pressure to stabilise.

Once the generator is running there is a 30 second warm up time before it is ready to accept load.

After the warm up time has expired, the MAINS ATS shall Open and the GEN ATS shall Close.

RESULTS: PASS/FAIL _____ NOTES _____

3.2 Stopping the generator in the Auto Mode –and testing genset restart for mains failure during cool-down.

Turn on the Mains to the switchboard

The Phase Failure Relay from the clients switch board shall give a Stop Signal for the generator

There is a 2 minute proving time for the Phase Failure Relay.

After the 2 minute proving time the GEN ATS shall Open and the MAINS ATS shall Close

When the GEN ATS is Open, the generator will enter the cool down time of 5 minutes.

During this time turn off the Mains to the site

When Mains Failure occurs during the cool down period the generator shall transfer back to the GENERATOR ATS without shutting down.

RESULTS: PASS/FAIL _____ NOTES _____

3.3 Stopping the generator in the Auto Mode - continued.

Turn on the Mains to the switchboard

The Phase Failure Relay from the clients switch board shall give a Stop Signal for the generator

There is a 2 minute proving time for the Phase Failure Relay.

After the 2 minute proving time the GEN ATS shall Open and the MAINS ATS shall Close

When the GEN ATS is Open, the generator will enter the cool down time of 5 minutes.

After the cool down time, the generator will shut down.

RESULTS: PASS/FAIL _____ NOTES _____

3.4 Automatic ATS Transfer To Genset- Mains ATS Failure

Disable MAINS ATS CB

Restart the generator in Auto by turning off the Mains

The MAINS ATS will fail to Open: After a 5 second delay an Alarm shall be generated and the MAINS CONNECTED indicator shall flash to indicate the Alarm.

The system shall then return back to MAINS ATS operation.

Stop the generator using the Stop button

RESULTS: PASS/FAIL _____ NOTES _____

3.5 Automatic ATS Transfer - Gen ATS Failure

Re-enable the MAINS ATS CB

Disable GEN ATS CB

Restart the generator in Auto by turning off the Mains

The GEN ATS will fail to Close: After a 5 second delay an Alarm shall be generated and the GENERATOR CONNECTED indicator shall flash to indicate the Alarm.

The system shall return back to MAINS ATS operation.

Stop the generator using the Stop button

RESULTS: PASS/FAIL _____ NOTES _____

3.6 Automatic ATS Transfer To Mains - Gen ATS Failure

Disable GEN ATS CB

Restart the generator in Auto by turning off the Mains

The GEN ATS will fail to Open.

After a 5 second delay an Alarm shall be generated and the GENERATOR CONNECTED indicator shall flash to indicate the Alarm.

The system shall return back to GEN ATS operation.

Stop the generator using the Stop button

RESULTS: PASS/FAIL _____ NOTES _____

3.7 Automatic ATS Transfer To Mains - Mains ATS Failure

Re-enable the GEN ATS CB

Disable MAINS ATS CB

Restart the generator in Auto by turning off the Mains

The MAINS ATS will fail to Close.

After a 5 second delay an Alarm shall be generated and the MAINS CONNECTED indicator shall flash to indicate the Alarm.

The system shall return back to GEN ATS operation.

RESULTS: PASS/FAIL _____ NOTES _____

3.8 Running in Auto and umbilical loses connection.

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the AUTO position.

Turn off the Mains to the switchboard.

The Phase Failure Relay from the clients switch board shall give a Start Signal for the generators to run.

Once the generator has started, there is a 10 second time delay for the oil pressure to stabilise.

Once the generator is running there is a 30 second warm up time before it is ready to accept load.

After the warm up time has expired, the MAINS ATS shall Open and the GEN ATS shall Close.

Remove umbilical plug

Observe results – Genset discussion of preferred results (ATS returns to MAINS?)

RESULTS: PASS/FAIL _____ NOTES _____

3.9 Running in Auto and genset trips or faults.

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the AUTO position.

Turn off the Mains to the switchboard.

The Phase Failure Relay from the clients switch board shall give a Start Signal for the generators to run.

Once the generator has started, there is a 10 second time delay for the oil pressure to stabilise.

Once the generator is running there is a 30 second warm up time before it is ready to accept load.

After the warm up time has expired, the MAINS ATS shall Open and the GEN ATS shall Close.

Cause Genset trip or fault

Observe results – Genset discussion of preferred results (ATS returns to MAINS?)

RESULTS: PASS/FAIL _____ NOTES _____

4 REMOTE START/STOP TESTS

4.1 Remote start command.

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the AUTO position.

Initiate a Remote Start Command from the BW Control Room

Once the generator has started, there is a 10 second time delay for the oil pressure to stabilise. Once the generator is running there is a 30 second warm up time before it is ready to accept load.

After the warm up time has expired, the MAINS ATS shall Open and the GEN ATS shall Close.

RESULTS: PASS/FAIL _____ NOTES _____

4.2 Remote stop command.

Initiate a Remote Start Command from the BW Control Room

The GEN ATS shall Open and the MAINS ATS shall Close

When the GEN ATS is Open, the generator will enter the cool down time of 5 minutes.

After the cool down time, the generator will shut down.

RESULTS: PASS/FAIL _____ NOTES _____

4.3 Remote Start with genset unavailable.

Make GENSET unavailable

Initiate a Remote Start Command from the BW Control Room

Observe results – Genset discussion of preferred results (unit should not transfer to MAINS?)

RESULTS: PASS/FAIL _____ NOTES _____

4.4 Remote Stop with when running with MAINS not available unavailable.

Select this operation by turning the AUTO – TEST – MAN- OFF selector switch to the AUTO position.

Turn off the Mains to the switchboard.

The Phase Failure Relay from the clients switch board shall give a Start Signal for the generators to run.

Once the generator has started, there is a 10 second time delay for the oil pressure to stabilise.

Once the generator is running there is a 30 second warm up time before it is ready to accept load.

After the warm up time has expired, the MAINS ATS shall Open and the GEN ATS shall Close.

Initiate a Remote Start Command from the BW Control Room

Observe results – Genset discussion of preferred results (unit should not transfer to MAINS?)

RESULTS: PASS/FAIL _____ NOTES _____

5 SPECIFIC PROBLEM CHECKS (Variations to Functional Spec)

5.1 RTU IO and IDTS Alarms

The assumption is that all RTU IO and alarms have been proven by NCS.

5.2 From discussions on Indooroopilly Rd:

If the Genset ATS trips when genset is running - will ATS switch back to Mains?

If the Genset ATS trips when genset is running (medium alarm) - will ATS switch back to Mains?

If the Genset on-board CB trips when genset is running - will ATS switch back to Mains?

If the Mains ATS trips when genset is not running - will the genset start?

Eg Monitor the Mains ATS and allow the Gen ATS to take load when the Mains ATS is tripped. The problem is that genset start is initiated by PFR above the ATS.

If Mains trips and no genset start is initiated (?) and then Remote Start signal is sent will unit start and then transfer to GENSET

Does a Remote start "reset" the tripped ATS CB or provide a "work-around"?

5.3 From M&E:

The remote start (from control room) was sent with the Generator C/B in the off / tripped position.

The generator started and the ATS Switched to generator supply.

The generator continued to run with out supplying the site (C/B was off) and failed to transfer back to the available Energex supply with out a remote stop signal.

5.4 From Contract:

Performance guarantee of not less than 0.8pu at alternator terminals during startup - measure volts drop on start-up of load.

6 FAULTS - TO BE TESTED WHERE REQUIRED

6.1 HIGH HIGH Alarm Operation.

The Generator CB is Opened immediately.

The generator is shut down immediately.

The following alarms will initiate a HIGH HIGH Alarm condition :-

Emergency Stop Fault

MEN Fault

Low Oil Pressure Shutdown Fault, 10 Seconds Startup Delay

High Engine Temperature Shutdown Fault, 30 second Startup Delay

Low Radiator Level Fault, 5 Second Delay

Over Speed Fault

6.2 HIGH Alarm Operation

The Generator CB is Opened immediately.

Once the generator circuit breaker is opened, the generator will run through its normal cool down time and shut down.

The following alarms will initiate a HIGH Alarm condition:-

Generator Under Speed Fault, 5 Second Delay

Alternator Under Voltage Fault, 5 Second Delay

Alternator Over Voltage Fault, 5 Second Delay

Generator CB Tripped Fault

Alternator High Temperature Fault, 30 Second Startup Delay

6.3 MEDIUM Alarm Operation.

A Normal Shutdown shall be Initiated.

If the GEN ATS does not Open then the Generator CB is Opened.

The following alarms will initiate a MEDIUM Alarm condition :-

Fuel Empty Level Fault, 5 Second Delay

Fail To Start Fault, 3 Attempts

6.4 LOW Alarm Operation.

A Warning has occurred on the generator. The generator will not shut down for this level of alarm.

The following alarms will initiate a LOW Alarm condition :-

Low Oil Pressure Warning Alarm, 10 Seconds Startup Delay

High Engine Temperature Warning Alarm, 30 Second Startup Delay

Fuel Low Level Alarm, 5 Second Delay

Battery Charger AC Supply Failed Alarm, 60 Second Delay

Control Battery Low Volts Alarm, 30 Second Delay

Start Battery Low Volts Alarm, 60 Second Delay

AT A LATER DATE??**3. NON-PERMANENT SITE, MANUAL MODE**

- 3.1. To operate G1 in a Non-Permanent Site Location in MANUAL Mode.
- 3.2. Connect the generator cables to the site generator CB ensuring the site generator CB is OFF. See BCC procedures.
- 3.3. A plug with shorting links is required to be installed. It is required to be plugged into the 27 Pin Station Plug.
 - 3.3.1. Pins 11 and 12 are required to be connected. This is to indicate that the Mains ATS is Closed. If they are not connected a MAINS ATS Alarm shall be indicated.
- 3.4. Select from the AUTO – TEST – MAN- OFF selector switch to the MANUAL position.
- 3.5. Press the MANUAL START push button to start the generator.
- 3.6. The generator will begin to crank.
 - 3.6.1. If it fails to start within the 10 seconds, the starter motor is stopped and a delay of 10 seconds before it will attempt to restart.
 - 3.6.2. The generator set is allowed 3 attempts to start.
 - 3.6.3. If it fails to start on the third attempt, the generator is locked out on FAIL TO START Alarm.
 - 3.6.4. When the generator starts, the starter motor is stopped by a stop cranking input which measures the speed of the generator.
 - 3.6.5. Once the generator has started, there is a 10 second time delay for the oil pressure to stabilise.
 - 3.6.6. If the oil pressure is not up to pressure after the 10 second time delay, the generator shall shut down on LOW OIL PRESS Alarm.
 - 3.6.7. Once the generator is running there is a 5 second warm up time before it is ready to accept load.
- 3.7. To connect the generator to the site load.
 - 3.7.1. Manually switch over to the generator supply via the site CB's. See BCC procedures.
 - 3.7.2. Do not use the MANUAL TRANSFER TO GEN or the MAN TRANSFER TO MAINS push buttons.
- 3.8. To disconnect the generator from the site load.
 - 3.8.1. Manually switch over to the mains supply via the site CB's. See BCC procedures.
 - 3.8.2. Do not use the MANUAL TRANSFER TO GEN or the MAN TRANSFER TO MAINS push buttons.
- 3.9. To stop the generator in the MANUAL Mode.
 - 3.9.1. When the generator is running, it may be stopped by pressing the MANUAL STOP push button.
 - 3.9.2. The generator will enter the cool down time of 1 second.
 - 3.9.3. After the cool down time, the generator will shut down.
 - 3.9.4. Once the generator has shut down there is a 15 second delay before it may be restarted. This is to ensure the engine has mechanically stopped.



**Brisbane
Water**



BRISBANE WATER

GENERATOR CONNECTION O & M Manual

Section 4B

**Site Testing
NCS Alarms**



BRISBANE WATER

Network Control Systems

IDTS POINT COMMISSIONING SHEET AND GENERATOR SUPPLY OPERATIONAL CHECKS

Pump Station Generator Connection Project (STTX- I910)

DATE: 10/5/04

Site Name: SP239 Witton

NOTE: Some (or all) of the Generator associated IDTS points may be Scan Inhibited in the IDTS system. Remove the Scan Inhibit from these points before proceeding with these tests

IDTS Point : Generator Offsite

Action	Observation	Result
Connect the Control interface lead to the station	Confirm that GENERATOR OFFSITE alarm return to normal is received by IDTS	✓ VES
Disconnect the Control interface lead to the station	Confirm that GENERATOR OFFSITE alarm is received by IDTS	✓ VES
Reconnect the Control interface lead to the station		✓ VES

IDTS Point : Security Door_limit_switch

Action	Observation	Result
Open a canopy door on the Generator	Confirm that SECURITY DOOR_LIMIT_SWITCH alarm is received by IDTS	✓ VES
Close the canopy door	Confirm that SECURITY DOOR_LIMIT_SWITCH alarm return to normal is received by IDTS	✓ VES

IDTS Point : Generator Low_fuel

Action	Observation	Result
Make the Generator low fuel warning alarm active	Confirm that GENERATOR LOW_FUEL alarm is received by IDTS	✓ VES
Deactivate the Generator low fuel warning alarm	Confirm that GENERATOR LOW_FUEL alarm return to normal is received by IDTS	✓ VES

IDTS Point : Generator Warning

Action	Observation	Result
Make the Generator warning alarm active (except by low fuel)	Confirm that GENERATOR WARNING alarm is received by IDTS	✓ VES
Deactivate the Generator warning alarm	Confirm that GENERATOR WARNING alarm return to normal is received by IDTS	✓ VES

IDTS Point : Generator Common_fault

Action	Observation	Result
Make the Generator common fault alarm active	Confirm that GENERATOR COMMON_FAULT alarm is received by IDTS	✓ VES
Deactivate the Generator common fault alarm	Confirm that GENERATOR COMMON_FAULT alarm return to normal is received by IDTS	✓ VES

Brisbane Water – Network Control Systems Section

IDTS Point : Generator Automatic

Action	Observation	Result
Turn the generator to local mode	Confirm that GENERATOR AUTOMATIC alarm is received by IDTS	✓ Yes
Return the generator to automatic mode	Confirm that GENERATOR AUTOMATIC alarm return to normal is received by IDTS	✓ Yes

IDTS Point : Generator CB_tripped

Action	Observation	Result
Trip the Generator circuit breaker	Confirm that GENERATOR CB_TRIPPED alarm is received by IDTS	✓ Yes
Reset the Generator circuit breaker	Confirm that GENERATOR CB_TRIPPED alarm return to normal is received by IDTS	✓ Yes

IDTS Point : Generator Running

Action	Observation	Result
Start the Generator (off line only)	Confirm that GENERATOR RUNNING alarm is received by IDTS	✓ Yes
Stop the Generator	Confirm that GENERATOR RUNNING alarm return to normal is received by IDTS	✓ Yes

***IDTS Control Points : Generator Remote_run_request
& Generator Remote_stop_request***

Action	Observation	Result
Confirm the Generator is available to run, but not running		✓ Yes
Set the IDTS control point GENERATOR REMOTE_RUN_REQUEST and send to the site	Confirm that the Generator starts and runs off-line	✓ Yes
	Confirm that GENERATOR RUNNING alarm is received by IDTS	✓ Yes
Set the IDTS control point GENERATOR REMOTE_STOP_REQUEST and send to the site	Confirm that the Generator stops	✓ Yes
	Confirm that GENERATOR RUNNING alarm return to normal is received by IDTS	✓ Yes

IDTS Point : Power_supply Energex_power

Action	Observation	Result
Turn the generator to local mode		✓ Yes
Fail the Energex power	Confirm that POWER_SUPPLY ENERGEX POWER alarm is received by IDTS	✓ Yes
Restore the Energex power	Confirm that POWER_SUPPLY ENERGEX POWER alarm return to normal is received by IDTS	✓ Yes

IDTS Point : Generator Connected, and**Generator supply operational checks**

NOTE: The purpose of these operational checks is;

- to confirm Generator is capable of starting all available pumps on site “simultaneously” (each pump start separated only by the RTU / PLC minimum pump start separation time), and running all pumps continuously for at least one minute.
- to confirm the pumps are interlocked under Generator supply (where required)
- to confirm the code changes have not interfered with the operation of the Surge Imminent probe.

Action	Observation	Result
Ensure the Generator is in Automatic mode		✓ Yes
Ensure the pumps are selected for local mode		✓ Yes
Ensure there is enough sewage in the well for the pumps to run continuously for one minute		✓ Yes
Fail the Energex power to the Generator	Confirm that the Generator starts and supplies power to the station	✓ Yes
	Confirm that GENERATOR CONNECTED alarm is received by IDTS	✓ Yes
Press all pumps local start buttons together	Confirm that all pumps (available under Generator supply) start	✓ Yes
<u>Sites:</u> Billan St, Musgrave Rd, Centenary Hwy / Kooringal Dr, Manet St, Sanananda St and Sinnamon Rd.	Confirm the RTU will run a maximum of one pump under generator supply.	✓ Yes
<u>Site:</u> Creek Rd / Oldfield Rd	Confirm the RTU will run a maximum of two pumps under generator supply.	N/A
Restore Energex power and record the time taken for the Generator controller to return the station power to Energex supply	Time for station power to return to Energex supply	121 Secs
	Confirm that GENERATOR CONNECTED alarm return to normal is received by IDTS	✓ Yes
Record time taken for the Generator to stop after station power to returns to Energex supply	Time for Generator to stop after station power to returns to Energex supply	300 Secs

Brisbane Water – Network Control Systems Section

***Pump Automatic operation, and
Surcharge Imminent operation under Generator supply***

Action	Observation	Result
Fail the Energex power to the Generator	Confirm that the Generator starts and supplies power to the station	✓/Yes
Ensure the pumps are selected for remote mode	<u>Fixed speed pump sites:</u> Confirm that the duty pump lowers the well to the Duty A stop level and stops	✓/Yes
	<u>Variable speed pump sites:</u> Confirm that the duty pump operates on variable speed control satisfactorily	✓/Yes
Ensure the well level is below the Duty A start level using pump local control as required		✓/Yes
Ensure the pumps are selected for remote mode and are stopped		✓/Yes
Activate the surcharge imminent probe for at least 10 sec	Confirm that WET_WELL SURCHARGE_IMMINENT alarm is received by IDTS	✓/Yes
	Confirm that all pumps (available under Generator supply) start	✓/Yes
Ensure the well does not fall below the Duty A stop level by selecting local mode for the pumps as required		✓/Yes
Return the surcharge imminent probe to normal	Confirm that WET_WELL SURCHARGE_IMMINENT alarm return to normal is received by IDTS	✓/Yes
Restore Energex power indication to the Generator and allow the Generator controller to return the station power to Energex supply		✓/Yes

Commissioning Notes:

1. Tested and Site Left In On/Auto Position (10-5-04)
2. Unable to run pump 1 as generator will not carry load (10-5-04)
3. Generator looked at by SE Power 20-5-04
4. Pump 1 run on Generator 5 times to prove
5. Site left in Auto (20-5-04)

IDTS Points and Generator Supply

Operational Checks commissioned by ...**Peter Rennex** **Date 10/5/04**



**Brisbane
Water**



BRISBANE WATER

GENERATOR CONNECTION O & M Manual

Section 4C

Site Testing Generator

**SE Power Equipment**

47 Proprietary Street, Tingalpa, Qld 4173
 Telephone: (07) 3890 1744
 PO Box 3306 Tingalpa B.C. Qld 4173

**DIESEL GENERATOR SET
 CONTROL FUNCTION TEST REPORT**

SEP 009/B

CLIENT: BRISBANE WATER SP239
 SERIAL NO: 0308006
 ENGINE TYPE: BF6M1015
 ALTERNATOR TYPE: HCI 534F

DATE: 25/08/03.
 JOB NO: 14291
 ENG. SERIAL NO: 9147641
 ALT. SERIAL NO: 26020

GENSET CONTROL FUNCTIONS	FUNCTION	LAMP	REMARKS
Engine High Temp. Alarm	✓	✓	
Engine High Temp. Shutdown	✓	✓	EMR
Low Water Level Alarm	✓	✓	
CB Tripped/Alt., Overload	✓	✓	
Low Oil Pressure Alarm	✓	✓	EMR
Low Oil Pressure Shutdown	✓	✓	
Emergency Stop	✓	✓	
Start Fail Alarm	✓	✓	
Genset Running	✓	✓	
MEN Fault	✓	✓	
Starter Motor Relay	✓	✓	
Fuel Low	✓	✓	
Fuel Empty	✓	✓	
Engine Gauges	✓	✓	
Status Lamps/Controls	✓	✓	
Underspeed Shutdown	✓	✓	
Overspeed Shutdown	✓	✓	
Remote Start/Stop	✓	✓	
Lamp Test	✓	✓	
Alarm Shutdown	✓	✓	
Alt Undervolts	✓	✓	
Alt Overvolts	✓	✓	
Larger AC Failed	✓	✓	
Control Batt. Low Volts	✓	✓	
Start Batt. Low volts	✓	✓	
Canopy doors Open	✓	✓	
Audible Alarm/Mute	✓	✓	
Remote ATS Controls	✓	✓	
Alternator High Temperature	✓	✓	

CUSTOMER TESTING OFFICER: _____

TESTING OFFICER: HAYDEN BOTT



47 Proprietary Street
Tingalpa Q 4173
BRISBANE AUSTRALIA

DIESEL GENERATOR SET LOAD TEST REPORT

SEP 0064/D

CLIENT: BLIS. WATER SP239 DATE: 25/08/03
 SERIAL NO: 0308006 JOB NO/CONTRACT NO: 14291
 ENGINE TYPE: BF6M1015 ENG. SERIAL NO: 9147641
 ALTERNATOR TYPE: H2534F ALT. SERIAL NO: 26020
 GOVERNOR TYPE: EMR STARTER MOTOR: DEUTZ
 OVERSPEED TYPE: " UNDERSPEED TYPE: EMR
 SHUTDOWN SOLENOID: " HIGH WATER: "
 LOW OIL PRESSURE SHUTDOWN: "

255 + 10% KW: 184 + 10%

TECHNICIAN: PAUL HLAVKA

INSPECTOR: _____

TIME	1130	1145	1200	1230	1300	1330	1345	1400		
OIL PRESSURE	500	500	500	500	460	450	450	460		
OIL TEMPERATURE	NA	NA	NA	NA	NA	NA	NA	NA		
JACKET WATER TEMPERATURE	0	60	80	80	85	85	85	80		
POS	0	60.7	128.6	190.4	255	255	280	0		
VOLTS	<u>415</u> 240 240	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓		
AMBIENT TEMPERATURE	20	20	22	22	23	24	24	24		
HZ	50	50	50	50	50	50	50	50		
KW	0	42.7	91.8	135.9	184	184	200.4	0		
LOAD%	0	25%	50%	75%	100%	100%	110%	0		
REMARKS										

Generator_Load_Test_Report.doc

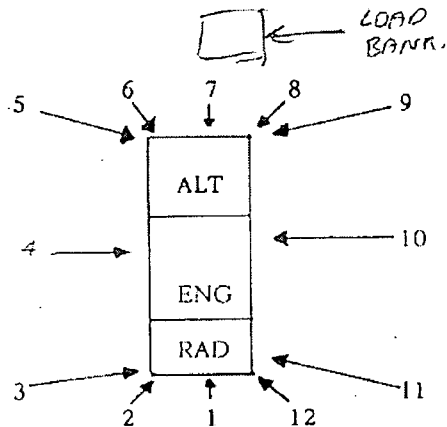


GENERATOR SET **SOUND PRESSURE LEVEL TEST REPORT**

SEP 0023/D

47 Proprietary Street
Tingalpa Q 4173
BRISBANE AUSTRALIA

CLIENT: BRIS. WATER SP239 DATE: 25/08/08
SERIAL NO: 0308006 JOB NO: 14291
ENGINE TYPE: BFBM1015 ENG. SERIAL NO: 9147641
ALTERNATOR TYPE: H2534F ALT. SERIAL NO: 26020
SOUND LEVEL INSTRUMENT: RION



Position Layout

Remarks:

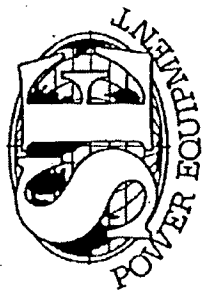
Distance: 7 mHeight: 1.5 m

POSITION	SOUND LEVEL dB(A)	LOAD %				
		25	50	75	100	110
1	66				✓	
2	66				✓	
3						
4	68				✓	
5	68				✓	
6						
7						
8						
9						
10						
11						
12	66.				✓	
Average						

QUALITY ASSURANCE OFFICER: _____

CUSTOMER TESTING OFFICER: _____

TESTING OFFICER: PAUL HLAVKAWITNESS TESTING OFFICER: DAVID COOPER



47 Proprietary Street
Tingalpa Qld 4173
PH: (07) 3890 1744

SEP0084

TRANSIENT LOAD RESPONSE TEST SHEET

Transient response for load changes: Load PF 0.8

	0-25	0-50	0-75	0-100	100-0	75-0	50-0	25-0
% Change Electrical kW								
Change in Electrical kW								
% Change HZ	.8	1.5	.6	3.5	1.4	1.5	.7	.1
% Change Volts	0	1	1	3	0	0	0	1
Recovery secs	3	4	5	5	3	3	1	1

CLIENT: BRISBANE WATER SP239

S/N: 0308006

Job No: 14291

47 Proprietary Street
Tingalpa Q 4173
BRISBANE AUSTRALIA



SEP 0013

FINAL INSPECTION CHECKLIST

This form is to be completely filled out before any generating set leaves the factory.

It is to be signed by the person doing the inspection and by their immediate supervisor. In the case of a non-standard job it must also be signed by the Special Projects Manager or the Engineering Manager.

A copy of this form is to be sent out with the plant concerned.

Please neatly tick in the boxes provided where applicable and note any comments in the space provided.

MODEL: BW SP239 SERIAL NO: 0308006 ENGINE NO: 9147641
JOB NO: 14291 DATE: 25/08/03 CUSTOMER: B.W.

BASE

- (1) All welds continuous, neat and clean.
- (2) All bolts tightened.
- (3) Bearers completely secured.
- (4) No sharp corners.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>

RADIATOR

- (1) Radiator correctly mounted.
- (2) All pipework included and secure.
- (3) Drain plug in place.
- (4) Water removed from radiator.
- (5) Clamps on hoses tight.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>

ENGINE

- (1) Fan is correctly mounted.
- (2) All guards in place and secure.
- (3) Wiring loom is correct to drawing, securely fixed and marked and is terminated in an appropriate terminal box.
- (4) Battery leads attached and secure and long enough for termination to battery.
- (5) Air cleaner is properly mounted.
- (6) Magnetic pickup is fitted and set to correct depth.
- (7) Exhaust pipe and silencer (where required) are fitted correctly.
- (8) Dip stick in place.
- (9) Oil removed from engine.
- (10) All fuel and oil unions completely tightened.
- (11) All ordered options are fitted and function correctly.
- (12) All parts secure, no damage.
- (13) All earths less than 0.1 ohms.
- (14) Cables and hoses secure for transport.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
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<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>

CONTROL SYSTEM (where applicable)

- (1) Control functions as ordered.
- (2) Control is mounted correctly.
- (3) All leads, terminals, fuses, printed circuit boards and switchgear are completely secure and marked correctly.
- (4) Dust seals are fitted around doors.
- (5) Doors hinged correctly.
- (6) All earths less than 0.1 ohms.
- (7) Red Danger labels in cubicle.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>

FINAL INSPECTION CHECKLIST

PAGE 2

CONTROL SYSTEM (cont)

- (8) Perspex shield secure, clean and no sharp corners.
- (9) Cables correct, no damage.
- (10) Locks and keys satisfactory.

ALTERNATOR

- (1) Alternator is correctly mounted.
- (2) Alternator leads are correctly mounted inside terminal box and marked correctly.
- (3) A.V.R. is mounted, connected properly and set to correct setting.
- (4) Coupling and adaptor are properly fastened between engine and alternator with correct size and tensile grade bolts.
- (5) All options ordered are fitted and function properly.
- (6) Alternator is correctly wired for the appropriate voltage as per either Order or Bills of Material.
- (7) Earth stud fitted.

FINISH

- (1) Plant is painted to correct colour.
- (2) All blemishes in finish, especially paint runs, are completely removed.

GENERAL INSPECTION

- (1) Genset is manufactured to correct engine/alternator/radiator/bases configuration as specified on Bill of Materials.
- (2) All documents are in a sealed plastic bag and secured inside alternator terminal box.
 - a) Engine Handbook
 - b) Alternator Handbook
 - c) Warranty Card
 - d) Packing List
 - e) Test Sheet
- (3) No Oil/No Water label is attached to positive battery lead.
- (4) All labels are straight and in correct location.

SIGNED: PAUL HAVKA INSPECTOR_____
QUALITY ASSURANCE

COMMENTS: _____



**Brisbane
Water**



BRISBANE WATER

GENERATOR CONNECTION O & M Manual

Section 4D

Electrical Testing Certificate

Variation To Fixed Price Proj

Cost Plus Labour Proj

Call Out

Service

CUSTOMER

Project No. SP239

Name and Surname

Position

Date

Signature of Consultant

Power Authority Forms

Pre-Start Safety Mtg

Risk Assessment

C/E Name and Surname

Position

Date

Mobile Phone No.

START	FINISH	DETAILS	Hrs	No. MEN	TOTAL	RATE	CHARGED
		TRAVEL TO SITE					
		Changeover mains for					
		emergency generator					
		Gowan Road SP239					

PLEASE SEE ATTACHED FORM FOR ADDITIONAL ☐ TOTAL LABOUR CHARGED:

ITEM No:	PART No:	ITEM DESCRIPTION	No. ITEM	COST ITEM	TOTAL COST	%	CHARGED
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							

PLEASE SEE ATTACHED FORM FOR ADDITIONAL ☐ TOTAL MATERIALS:PROGRESS CLAIM
WORKS NOT COMPLETED
AND NOT TESTEDFURTHER WORK
REQUIRED TO
COMPLETE PROJECT.PROJECT COMPLETED
NO FURTHER ACTION
REQUIRED

WHITE COPY - CUSTOMER

YELLOW COPY - OFFICE

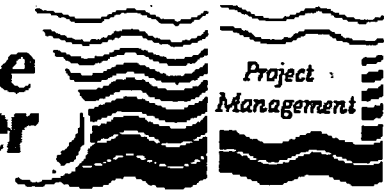
I Certify that the Electrical work listed above
has been tested in accordance with the
prescribed procedure and that such work
complies with the requirements of the State
Electricity Act.

Signature: *Canale*

POLARITY TEST.
INSULATION RES. TEST.
ETH CONTINUITY TEST
FUNCTIONAL TEST



**Brisbane
Water**



BRISBANE WATER

GENERATOR CONNECTION O & M Manual

Section 5

Parts Information

ACO CABLEMATE

Type 66H Polymer Concrete Pit

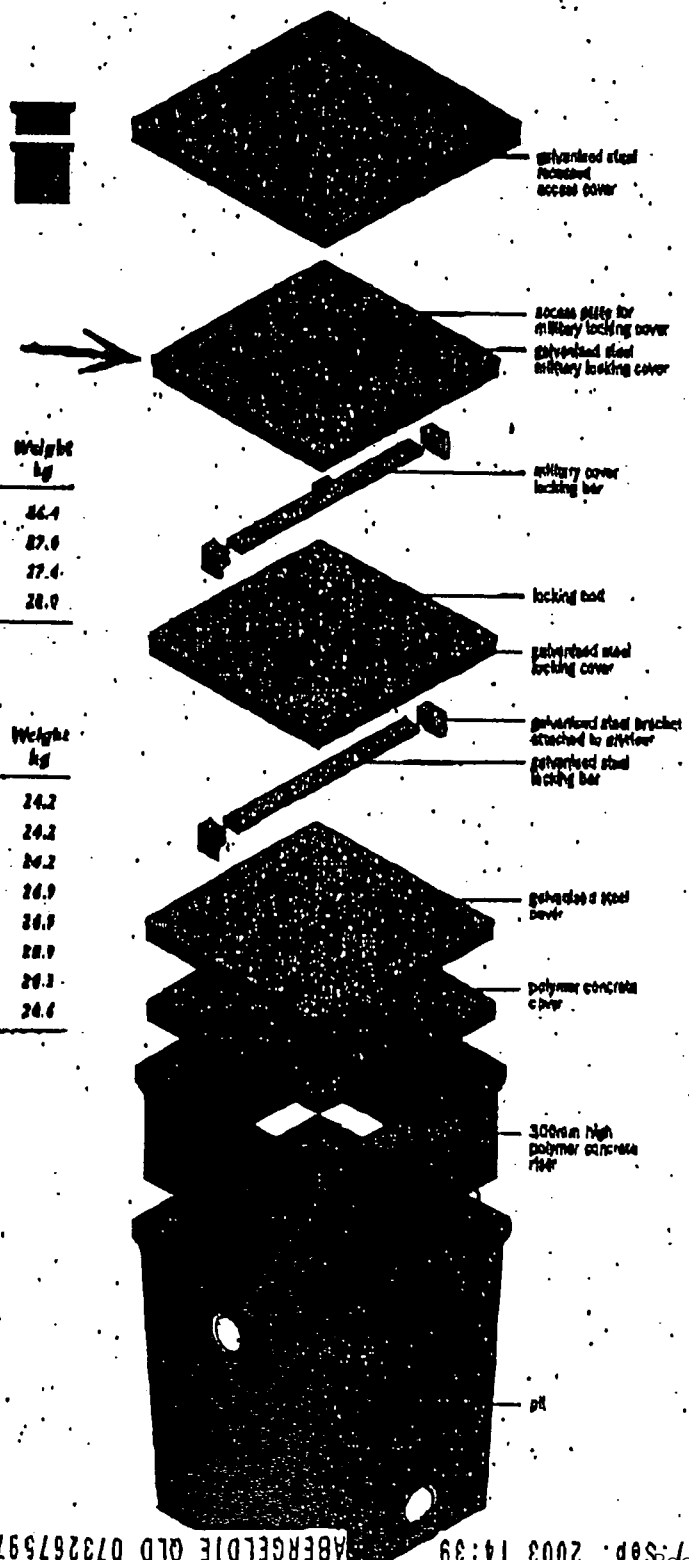
667mm x 667mm x 915mm depth

Pit Data

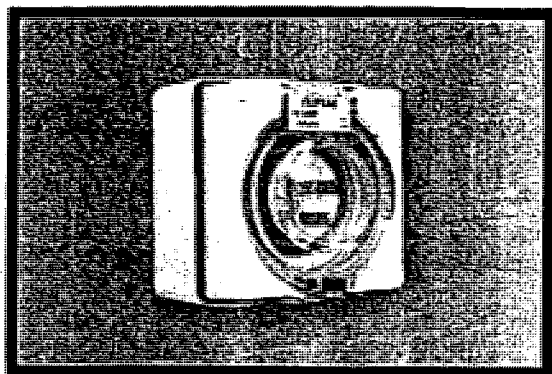
Description	Part No.	Weight kg
Type 66H Polymer Concrete Pit	75124	86.4
Type 66H Polymer Concrete Pit for Locking Cover	75125	87.0
Type 66 Polymer Concrete Extension Riser	75126	27.4
Type 66 Polymer Concrete Extension Riser for Locking Cover	75133	28.0

Cover Data

Description	Part No.	Weight kg
Type 66 Polymer Concrete Lid - Work	75145	24.2
Type 66 Polymer Concrete Lid - Communications	75154	24.2
Type 66 Polymer Concrete Lid - Electricity	75169	24.2
Type 66 Galvanised Steel Cover	75177	26.9
Type 66 Locking Galvanised Steel Cover	75185	26.9
Type 66 Military Locking Galvanised Steel Cover	75193	28.9
Type 66 Light Duty Recased Access Cover - Lock & Seal	75201	28.3
Type 66 Med Duty Recased Access Cover - Lock & Seal	75210	28.6



Catalogue No. 56AI310



Colour Options

- ☐ GY Grey
☐ RO Resistant Orange

More colour options may be available. Please check with your nearest Clipsal office.

Description:

Appliance Inlets, 250V 10A - 3 Flat pins

Item Type

02 Industrial Products

Business Area

40 Industrial Switchgear

Product Group

400 56 Series Industrial Switchgear

Item Group

40001 Appliance Inlets

Brochures Available:

56AI Series installation instructions

56 Series flyer

56 and 66 Series technical data

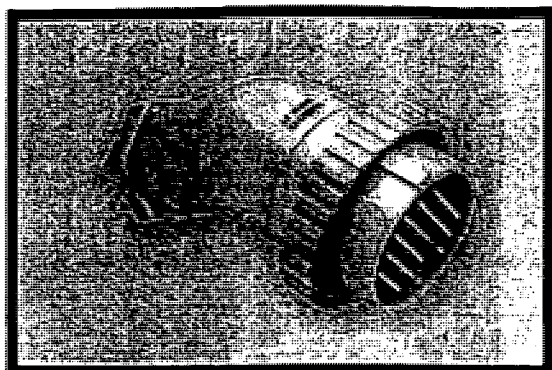
56 Series Features

A Specifiers guide to Clipsal Industrial

A Specifiers guide to Clipsal Industrial

A Specifiers guide to Clipsal Industrial

Catalogue No. WIPM27



Colour Options

- ☐ No colour options
- ☐ TR Transparent

More colour options may be available. Please check with your nearest Clipsal office.

Description:

Plugs And Extension Sockets - Wilco, Low Voltage, Multipin - 27 pin maximum

Item Type

02 Industrial Products

Business Area

40 Industrial Switchgear

Product Group

403 Wilco Hi-Impact Industrial Switchgear

Item Group

40303 Plugs & Extension Sockets

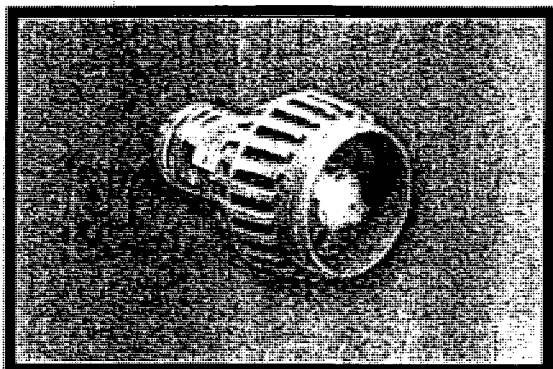
Brochures Available:

A Specifiers guide to Clipsal Industrial

A Specifiers guide to Clipsal Industrial

A Specifiers guide to Clipsal Industrial

Catalogue No. 56CSC310



Colour Options

- | | |
|----|------------------|
| EO | Electric Orange |
| RO | Resistant Orange |

More colour options may be available. Please check with your nearest Clipsal office.

Description:

Plugs And Extension Sockets, 250V 10A - 3 Flat pins

Item Type

02 Industrial Products

Business Area

40 Industrial Switchgear

Product Group

400 56 Series Industrial Switchgear

Item Group

40004 Plugs & Extension Sockets

Brochures Available:

56CSC and 56PO series wiring instructions

56CSC310, 56CSC315 wiring instructions

56 Series flyer

56 and 66 Series technical data

56 Series Features

A Specifiers guide to Clipsal Industrial

A Specifiers guide to Clipsal Industrial

A Specifiers guide to Clipsal Industrial

PRICE BOOK JUNE 2003**DORE ELECTRICS**

PH: 07 3349 5300 FAX: 07 3349 5344

Insulators (Stand-Off)

SCHEDULE 1

600Volts Rated - Compression Moulded - Glass Re-Inforced Polyester Material

- High Dielectric Strength
- Arc Quenching and Non Tracking
- Non Flammable
- Wear and Corrosion Resistant
- Chemical and Oil Resistant
- High Mechanical Strength
- Dimensional Stability
- Moulded In Brass Inserts
- Metric and Imperial Thread Sizes
- Quality Finish and Appearance

Part No.	Type	Height	Thread	Price
BBLV25	A	25mm	M6	\$5.50
BBLV25H	H	25mm	M6	\$5.88
BBLV30H	H	30mm	M8	\$5.88
BBLV35D	D	35mm	M8	\$5.98
BBLV35E	E	35mm	M8	\$6.00
BBLV35	B	35mm	M8	\$8.00
BBLV35M10	B	35mm	M10	\$8.00
BBLV38	B	38mm	M8	\$8.35
BBLV40H8	H	40mm	M8	\$6.10
BBLV40H	H	40mm	M10	\$6.10
BBLV45	B	45mm	M10	\$8.50
BBLV50	B	50mm	M10	\$8.60
BBLV50H	H	50mm	M10	\$6.20
BBLV50E	E	51mm	M8	\$6.10
BBLV50S	C	50mm	M10	\$7.80
BBLV60H	H	60mm	M12	\$6.96
BBLV63S	C	63mm	M10	\$8.10
BBLV75D	D	75mm	M10	\$6.96
BBLV75D12	D	75mm	M12	\$7.00
BBLV75S	C	75mm	M10	\$8.35
BBLV75	B	75mm	M10	\$11.50
BBLV76E	E	76mm	M10	\$7.56



Type A



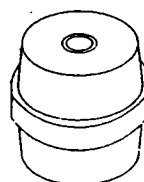
Type B



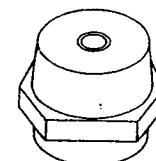
Type C



Type E



Type D



Type H

Bracket (Horizontal - Vertical)

SCHEDULE 1

Part No.	Description	Price
ACCP2	For Transformation Horizontal - Vertical	\$5.00

Standoff with foot

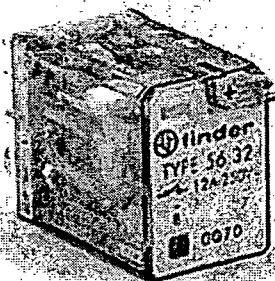
SCHEDULE 1

Part No.	Type	Height	Thread	Price
NBB745	F	30mm	M8	\$8.10



NHP Item Info

NHP E-Cat online website
Friday, June 18, 2004 4:12:30 PM
User: Not logged in



Catalogue Number:

56.32.0070 24VDC

Description:

PLEASE ORDER 5632007424VDC

List Price \$ (Not including GST):



Unit of Measure:

EA

Price Schedule:

B2

Relays-plug-in type

Flat pin

Contact arrangement

2 C/O

Voltage

24V DC

Number of pins

8

Features

- 2 pole changeover contacts rated at 12 amps (250VAC-AC1).
- LED and press to test as standard.
- 4.8mm x 0.5mm flat pins suitable for plug-in sockets.
- Available in 11 AC/DC coil voltages.
- PCB mounting as option.
- Designed and manufactured to common standards.
- Small dimensions.
- Approved by international standards.
- A large range of bases and sockets including various types of mounting such as Din rail, rear connected panel mounting, plug-in PCB mounting.
- Selection of options include manual test button, flange mounting, high temperature versions and hermetically sealed versions.

Benefits

- Capable of switching a number of substantial loads.
- Visual indication for coil operation and latching enables simultaneous testing.
- Can fit directly onto printed circuit boards for power switching.
- Reduced panel space required to keep switchboard costs to a minimum.
- This relay can be offered to manufacturers who export equipment that require these compliance approvals.

Ordering Information

- DC supply version also available without LED - 563224VDC

Copyright NHP Electrical Engineering Products Pty. Ltd.

All prices are exclusive of GST.

Basic Transfer Switches (BTS) with motor

MCCBs used	Ampere Range	Interrupting cap. (415 V)		OCR type	Overall 3 pole ¹⁾ dimensions (mm)			Cat. No. ¹⁾ 3 pole BTS	Cat. No. ¹⁾ 4 pole BTS
		Icu	Ics		W	H ²⁾	D		
XS125CJ	40-63	18	9	Therm Mag	305	209	235	BS1C633	BS1C644
XS125CJ	63-100	18	9	Therm Mag	305	209	235	BS1C133	BS1C144
XS125CJ	79-125	18	9	Therm Mag	305	209	235	BS1C233	BS1C244
XS125NJ	40-63	30	15	Therm Mag	305	209	235	BS1N633	BS1N644
XS125NJ	63-100	30	15	Therm Mag	305	209	235	BS1N133	BS1N144
XS125NJ	79-125	30	15	Therm Mag	305	209	235	BS1N233	BS1N244
XH125NJ	40-63	50	25	Therm Mag	305	209	235	BH1N633	BH1N644
XH125NJ	63-100	50	25	Therm Mag	305	209	235	BH1N133	BH1N144
XH125NJ	79-125	50	25	Therm Mag	305	209	235	BH1N233	BH1N244
XH125PJ	40-63	50	50	Therm Mag	305	209	235	BH1P633	BH1P644
XH125PJ	63-100	50	50	Therm Mag	305	209	235	BH1P133	BH1P144
XH125PJ	79-125	50	50	Therm Mag	305	209	235	BH1P233	BH1P244
XH160PJ	100-160	50	50	Therm Mag	336	237	258	BH2P133	BH2P144
XS250NJ	100-160	35	18	Therm Mag	336	237	241	BS2N133	BS2N144
XS250NJ	163-250	35	18	Therm Mag	336	237	241	BS2N233	BS2N244
XH250NJ	100-160	50	25	Therm Mag	336	237	258	BH2N133	BH2N144
XH250NJ	100-250	50	25	Therm Mag	336	237	258	BH2N233	BH2N244
XS400CJ	100-250	35	18	Therm Mag	500	323	325	BS4C233	BS4C244
XS400CJ	250-400	35	18	Therm Mag	500	323	325	BS4C433	BS4C444
XS400NJ	163-250	50	25	Therm Mag	500	323	325	BS4N233	BS4N244
XS400NJ	250-400	50	25	Therm Mag	500	323	325	BS4N433	BS4N444
XH400PJ	250-400	65	50	Therm Mag	500	323	325	BH4P433	BH4P444
XS400SE	125-250	50	25	Electronic	500	323	325	BS4S233	BS4S244
XS400SE	200-400	50	25	Electronic	500	323	325	BS4S433	BS4S444
XH400SE	125-250	65	33	Electronic	500	323	325	BH4S233	BH4S244
XH400SE	200-400	65	33	Electronic	500	323	325	BH4S433	BH4S444
XH400PE	125-250	65	50	Electronic	500	323	325	BH4P233	BH4P244
XH400PE	200-400	65	50	Electronic	500	323	325	BH4P433	BH4P444
XS630CJ	250-400	45	23	Therm Mag	550	433	341	BS6C433	BS6C444
XS630CJ	400-630	45	23	Therm Mag	550	433	341	BS6C633	BS6C644
XS630NJ	250-400	65	33	Therm Mag	550	433	341	BS6N433	BS6N444
XS630NJ	400-630	65	33	Therm Mag	550	433	341	BS6N633	BS6N644
XH630PJ	250-400	85	50	Therm Mag	550	433	341	BH6P433	BH6P444
XH630PJ	400-630	85	50	Therm Mag	550	433	341	BH6P633	BH6P644
XS630SE	315-630	65	33	Electronic	550	433	341	BS6S633	BS6S644
XH630SE	315-630	65	33	Electronic	550	433	341	BH6S633	BH6S644
XH630PE	315-630	65	50	Electronic	550	433	341	BH6P633	BH6P644
XS800NJ	500-800	65	33	Therm Mag	550	433	341	BS8N833	BS8N844
XH800PJ	500-800	85	50	Therm Mag	550	433	341	BH8P833	BH8P844
XS800SE	400-800	50	25	Electronic	550	433	341	BS8S833	BS8S844
XH800PE	400-800	65	50	Electronic	550	433	341	BH8P833	BH8P844
XS1250SE	500-1000	65	49	Electronic	553	530	300	BS12S1033	BS12S1044
XS1250SE	625-1250	65	49	Electronic	553	530	300	BS12S1233	BS12S1244
XS1600SE	800-1600	85	64	Electronic	553	570	320	BS16S1633	BS16S1644
XS2000SE	1000-2000	100	64	Electronic	774	490	361 ³⁾	BS20E2033	BS20E2044
XS2500SE	1250-2500	100	64	Electronic	774	490	361 ³⁾	BS25E2533	BS25E2544
TL100NJ	40-63	85	85	Therm Mag	305	300	235	BT1N633	BT1N644
TL100NJ	63-100	85	85	Therm Mag	305	300	235	BT1N133	BT1N144
TL250NJ	163-250	100	100	Therm Mag	500	323	325	BT2N233	BT2N244
TL400NE	200-400	100	100	Electronic	500	323	325	BT4E433	BT4E444
TL630NE	315-630	125	70	Electronic	553	490	320	BT6E633	BT6E644
TL800NE	400-800	125	70	Electronic	553	490	320	BT8E833	BT8E844
TL1250NE	625-1250	125	65	Electronic	553	490	320	BT12E1233	BT12E1244

Note: ¹⁾ Ordering sheet refer page 9 - 21

²⁾ Height includes attached busbar on sizes 630 A & above.

³⁾ Depth does not include rear connect busbars.

⁴⁾ Detailed dimensions 3/4 pole refer following pages.

sprecher+
schuh

*The ultimate
in pushbuttons*

NHP

*Full voltage,
superior brightness
and long life*

D5-3N

Integrated LED Lamp Blocks

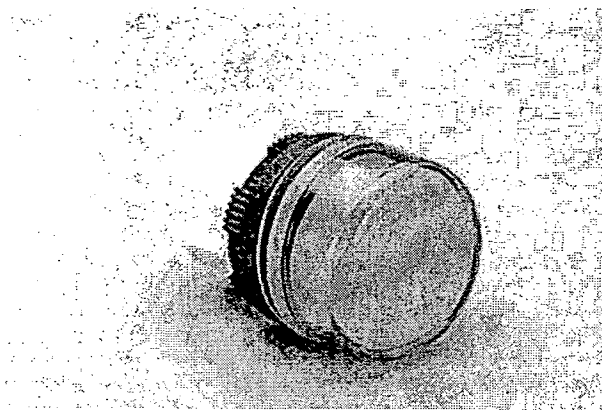
- 5 Colour choices
- Available in voltages up to 240 V AC
- 11 year lamp life (100,000 hours)
- Maintenance free
- Vibration and shock resistant
- Snap lock fit to existing D5 coupling latch
- Superior illumination qualities
- IP 20 finger protection on live components
- Clear identification of function
- Suitable for use with existing D5 illuminated operators and pilot lights

NHP

ELECTRICAL ENGINEERING PRODUCTS PTY LTD

NHP Item Info

NHP E-Cat online website
 Friday, June 18, 2004 2:59:42 PM
 User: Not logged in

**sprecher+
schuh**

Catalogue Number:

D5P-P5

Description:

PILOT LIGHT ELEMENT YELLOW

List Price \$ (Not including GST):



Unit of Measure:

EA

Price Schedule:

A2**Pushbutton Products****Pilot Light and Buzzer****Mounting Size**

22.5mm

Specification

Lamp Body Only

Shape

Round

Style / Frame

Standard

Colour

Yellow

Lamp Block

Operator Only

Features

- SiPart of the vast D5 range of matching 22.5 mm. control and signalling units providing IP 66 front protection
- Assembled round plastic pilot light front element
- Standard yellow lens cap with diffuser
- 4 other colours available
- Easy to mount
- Accepts coupling plate with clip-on standard lamp holder
- Wide range of legends available to complete the assembly
- Individually packaged component

Benefits

- The D5 range combines aesthetic appeal with robust flexibility to suit heavy-duty industrial control applications
- Readily visible
- Choice of pre-assembled clip-on rear elements
- When fixing pilot light it will hold in place without a notched panel hole,
- Saves time and allows fitting by one person only
- Simplified ordering and spares holding

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All prices are exclusive of GST.

Din-Safe MCBs (RCBO)

- ┌ Standard AS/NZ 61009.
- ┌ Approval N17482.
- ┌ Mines Department Approval – Pending.
- ┌ Short circuit, overcurrent and earth leakage protection.
- ┌ Handle sealable and padlockable.
- ┌ DIN Rail mounting.

Din-Safe MCB with pigtail

Poles	Amp rating	Voltage	Short circuit	Phase	Trip ¹⁾ Sens.	Cat. No
2	6	240	10 kA	1+N ¹⁾	30 mA	<input type="checkbox"/> DSRCB0630P
2	10	240	10 kA	1+N ¹⁾	30 mA	DSRCB1030P
2	16	240	10 kA	1+N ¹⁾	10 mA	DSRCB1630P
2	20	240	10 kA	1+N ¹⁾	30 mA	DSRCB2030P
2	25	240	10 kA	1+N ¹⁾	30 mA	DSRCB2530P
2	32	240	10 kA	1+N ¹⁾	30 mA	DSRCB3230P
2	40	240	10 kA	1+N ¹⁾	30 mA	DSRCB4030P

Din-Safe MCB standard terminal configuration

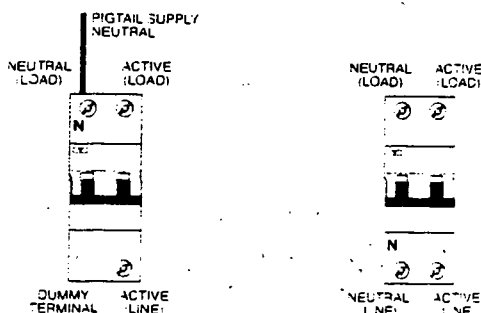
Poles	Amp rating	Voltage	Short circuit	Phase	Trip ¹⁾ Sens.	Cat. No ¹⁾
2	6	240	10 kA	1+N ¹⁾	10 mA	<input type="checkbox"/> DSRCB0610A
2	6	240	10 kA	1+N ¹⁾	30 mA	<input type="checkbox"/> DSRCB0630
2	10	240	10 kA	1+N ¹⁾	10 mA	<input type="checkbox"/> DSRCB1010A
2	10	240	10 kA	1+N ¹⁾	30 mA	DSRCB1030
2	10	240	10 kA	1+N ¹⁾	100 mA	<input type="checkbox"/> DSRCB10100
2	16	240	10 kA	1+N ¹⁾	10 mA	<input type="checkbox"/> DSRCB1610A
2	16	240	10 kA	1+N ¹⁾	30 mA	DSRCB1630
2	16	240	10 kA	1+N ¹⁾	100 mA	<input type="checkbox"/> DSRCB16100
2	20	240	10 kA	1+N ¹⁾	10 mA	<input type="checkbox"/> DSRCB2010A
2	20	240	10 kA	1+N ¹⁾	30 mA	DSRCB2030
2	20	240	10 kA	1+N ¹⁾	100 mA	<input type="checkbox"/> DSRCB20100
2	25	240	10 kA	1+N ¹⁾	30 mA	DSRCB2530
2	32	240	10 kA	1+N ¹⁾	30 mA	DSRCB3230
2	40	240	10 kA	1+N ¹⁾	30 mA	DSRCB4030

Application

Din-Safe MCB is a combined MCB/RCD providing thermal overload, short circuit and earth leakage protection in the one integral unit.

Din-Safe MCBs are suitable for use in residential, commercial and light industrial applications.

Terminal configuration



NEW



DIN-Safe MCB with neutral pigtail suits standard 3 phase chassis



DIN-Safe MCB standard terminal configuration

Characteristics

- ┌ Width: 2 modules.
- ┌ For type AC residual currents.
- ┌ Rated voltage: 240 V/50-60 Hz.
- ┌ Tripping characteristics of MCB part: IEC 898 - C curve.
- ┌ Short circuit capacity: 10 kA.
- ┌ Terminal capacity: 25 mm².
- ┌ High immunity to transient current.
- ┌ Profile as per Din-T MCB.
- ┌ Test button for periodic testing.

Accessories	Page
Auxiliary/Alarm	Page 1 - 31
Shunt trip	Page 1 - 29
Padlock bracket	Page 1 - 33
Link bars and terminals	Page 1 - 33, 39
Enclosures	Section 2

Technical data	
Tripping characteristics	Page 3 - 29
Dimensions	Page 3 - 45
Technical data	Section 3

- Notes:**
- ¹⁾ Unprotected neutral, not switched.
 - ²⁾ Unprotected neutral, switched.
 - ³⁾ Fits Din-T chassis (special configuration) refer page TBA.
 - ⁴⁾ Mines department approval applies to 30 mA only.

Nuisance tripping may be experienced in VFD and motor starting applications refer NHP.

☐ Available on indent only.

Din-Safe single pole width residual current circuit breaker (RCBO)

- ☐ Standards AS/NZ 1009.
- ☐ Approval N17482.
- ☐ Mines department approval - Pending.
- ☐ One module wide (18 mm).
- ☐ Short circuit, overcurrent and earth leakage protection.
- ☐ Short circuit protection 10 kA.
- ☐ Sensitivity 10 and 30 mA.
- ☐ Din rail mount.
- ☐ Suits CD chassis.

NEW



Amp rating	Modules (18mm)	Voltage AC	Short circuit	Trip Sensitivity ³⁾	Cat. No ¹⁾ ²⁾
6	1	240	10 kA	30 mA	DSRCBH0630A
10	1	240	10 kA	30 mA	DSRCBH1030A
16	1	240	10 kA	30 mA	DSRCBH1630A
20	1	240	10 kA	30 mA	DSRCBH2030A
25	1	240	10 kA	30 mA	DSRCBH2530A
32	1	240	10 kA	30 mA	DSRCBH3230A
40	1	240	10 kA	30 mA	DSRCBH4030A
6	1	240	10 kA	10 mA	DSRCBH0610A
10	1	240	10 kA	10 mA	DSRCBH1010A
16	1	240	10 kA	10 mA	DSRCBH1610A
20	1	240	10 kA	10 mA	DSRCBH2010A
25	1	240	10 kA	10 mA	DSRCBH2510A
32	1	240	10 kA	10 mA	DSRCBH3210A
40	1	240	10 kA	10 mA	DSRCBH4010A

Note: ¹⁾ Neutral not switched
²⁾ Will not accept side mounting accessories

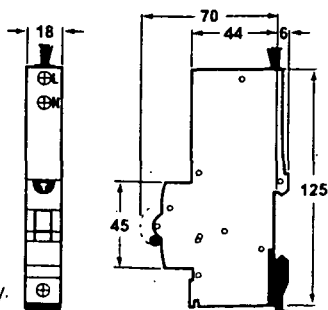
³⁾ Mines Dept. approval applies to 30 mA units only.

Operation

This unit combines the overload and short circuit protection of an MCB with earth leakage protection of an RCD. The unit occupies one, sub-circuit (one pole) of the distribution board and provides single phase protection against overload, short circuit and earth leakage current.

- The MCB element provides thermal and magnetic tripping protection which is rated to 10 kA prospective fault current.
- The RCD element of the device provides core-balance detection of the difference between the active and neutral currents and amplification to provide high sensitivity. The rated residual operating current ($I_{\Delta n}$) is 10 mA or 30 mA.
- The green/yellow earth reference cable in case of loss of supply neutral ensures the device will continue to provide earth leakage protection and will operate normally upon detection of an earth leakage current.

Dimensions (mm)

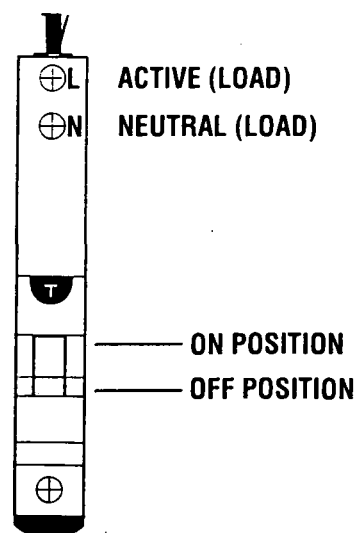


☐ Available on indent only.

Application

The Din-Safe single pole width residual current circuit breaker will fit the standard Din-T chassis for use in NHP panelboards. The design makes it possible to provide an MCB complete with earth leakage protection in an 18 mm wide module which allows a greater number of devices to be fitted into a distribution board.

Connection diagram



Accessories

Padlock bracket	Page 1 - 33
Link bars and terminals	Page 1 - 33, 39
Enclosures	Section 2

Technical data

Tripping characteristics	Page 3 - 29
Technical data / wiring	Page 3 - 35

Note: Nuisance tripping may be experienced in VFD and motor starting applications refer NHP.

Din-T 6 series 6 kA MCB

- Standards AS3111, IEC 898.
- Approval No. N17481.
- Current range 2-63 Amps 1, 2 and 3 pole.
- Sealable and lockable handle.
- Available in curve type C and D.
- Mounts on CD chassis (250 A and 355 A).

DTCB6
1 pole

1 pole 1 module

In (A)	C - Curve 5-10In	D - Curve 10-20In
2	DTCB6102C	DTCB6102D
4	DTCB6104C	DTCB6104D
6	DTCB6106C	DTCB6106D
10	DTCB6110C	DTCB6110D
13	□ DTCB6113C	□ DTCB6113D
16	DTCB6116C	DTCB6116D
20	DTCB6120C	DTCB6120D
25	DTCB6125C	DTCB6125D
32	DTCB6132C	DTCB6132D
40	DTCB6140C	DTCB6140D
50	DTCB6150C	DTCB6150D
63	DTCB6163C	DTCB6163D

2 pole 2 modules

2	DTCB6202C	DTCB6202D
4	DTCB6204C	DTCB6204D
6	DTCB6206C	DTCB6206D
10	DTCB6210C	DTCB6210D
13	□ DTCB6213C	□ DTCB6213D
16	DTCB6216C	DTCB6216D
20	DTCB6220C	DTCB6220D
25	DTCB6225C	DTCB6225D
32	DTCB6232C	DTCB6232D
40	DTCB6240C	DTCB6240D
50	DTCB6250C	DTCB6250D
63	DTCB6263C	DTCB6263D

3 pole 3 modules

2	DTCB6302C	□ DTCB6302D
4	DTCB6304C	□ DTCB6304D
6	DTCB6306C	□ DTCB6306D
10	DTCB6310C	DTCB6310D
13	□ DTCB6313C	□ DTCB6313D
16	DTCB6316C	DTCB6316D
20	DTCB6320C	DTCB6320D
25	DTCB6325C	DTCB6325D
32	DTCB6332C	DTCB6332D
40	DTCB6340C	DTCB6340D
50	DTCB6350C	DTCB6350D
63	DTCB6363C	DTCB6363D

Short circuit capacity 6 kA

In (A)	2 - 63
1P	240 V AC
2P	240 - 415 V AC
3P	240 - 415 V AC

DC use

	1P	2P '1)
Short circuit	20 kA	25 kA
Max.voltage (DC)	60 V	125 V

Use at DC

When using Din-T6 in a DC application the magnetic tripping current is approximately 40 % higher than in AC 50/60 Hz.

Shock resistance (In X, Y, Z directions).

20 g with shock duration 10 ms (minimum 18 shocks).
40 g with shock duration 5 ms (minimum 18 shocks).

Vibration resistance (In X, Y, Z directions).

3 g in frequency range 10 to 55 Hz
(operating time at least 30 min).
According to IEC 60068-2-6.

Storage temperature

From -55 °C to +55 °C, according to IEC 88 part 2 - 1
(duration 96 hours).

Operating temperature

From -25 °C to +55 °C, according to
VDE 0664 parts 1 and 2.

Use at 400 Hz

At 400 Hz the magnetic trip current is approximately
50 % higher than in AC 50/60 Hz.

Accessories	Section
Add on RCD	1 - 21
Auxiliary/alarm	1 - 31
Shunt trip	1 - 29
UVT	1 - 30
Padlockable bracket	1 - 33
Link bars & terminals	1 - 33, 39
Enclosures	2
Busbar chassis	2 - 35

Technical data	Section
Technical data	3
Tripping characteristics	3 - 6, 8
Dimensions	3 - 22

Notes: '1) 2 pole MCB connected in series.

The line side is the "OFF" (bottom) side of the MCB.

□ Available on indent only.

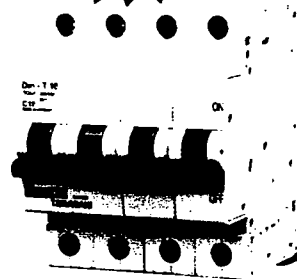
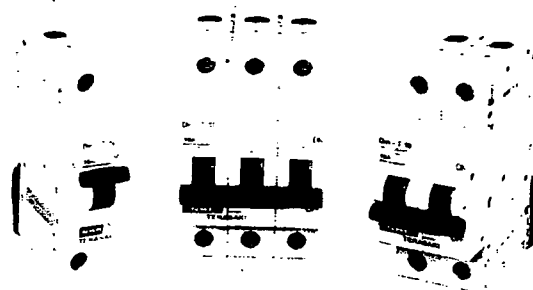
Din-T10 series 10 kA MCB (cont.)

3 pole 3 modules

In (A)	B - Curve 3-5 In	C - Curve 5-10 In	D - Curve 10-20 In
0.5	DTCB10305B	<input type="checkbox"/> DTCB10305C	<input type="checkbox"/> DTCB10305D
1	DTCB10301B	<input type="checkbox"/> DTCB10301C	<input type="checkbox"/> DTCB10301D
2	DTCB10302B	DTCB10302C	<input type="checkbox"/> DTCB10302D
4	DTCB10304B	DTCB10304C	<input type="checkbox"/> DTCB10304D
6	DTCB10306B	DTCB10306C	<input type="checkbox"/> DTCB10306D
10	DTCB10310B	DTCB10310C	DTCB10310D
13	<input type="checkbox"/> DTCB10313B	<input type="checkbox"/> DTCB10313C	<input type="checkbox"/> DTCB10313D
16	DTCB10316B	DTCB10316C	DTCB10316D
20	DTCB10320B	DTCB10320C	DTCB10320D
25	DTCB10325B	DTCB10325C	DTCB10325D
32	DTCB10332B	DTCB10332C	DTCB10332D
40	DTCB10340B	DTCB10340C	DTCB10340D
50	DTCB10350B	DTCB10350C	DTCB10350D
63	DTCB10363B	DTCB10363C	DTCB10363D

4 pole 4 modules ¹⁾

6	DTCB10406B	DTCB10406C	<input type="checkbox"/> DTCB10406D
10	DTCB10410B	DTCB10410C	<input type="checkbox"/> DTCB10410D
13	<input type="checkbox"/> DTCB10413B	<input type="checkbox"/> DTCB10413C	<input type="checkbox"/> DTCB10413D
16	DTCB10416B	DTCB10416C	<input type="checkbox"/> DTCB10416D
20	DTCB10420B	DTCB10420C	<input type="checkbox"/> DTCB10420D
25	DTCB10425B	DTCB10425C	<input type="checkbox"/> DTCB10425D
32	DTCB10432B	DTCB10432C	<input type="checkbox"/> DTCB10432D
40	DTCB10440B	DTCB10440C	DTCB10440D
50	DTCB10450B	DTCB10450C	DTCB10450D
63	DTCB10463B	DTCB10463C	DTCB10463D

DTCB10
1 - 4 pole types

Accessories	Section
Add on RCD	1 - 21
Auxiliary/alarm	1 - 31
Shunt trip	1 - 29
UVT	1 - 30
Padlock bracket	1 - 33
Link bars and terminals	1 - 33, 39
Enclosures	2
Busbar chassis	2 - 35

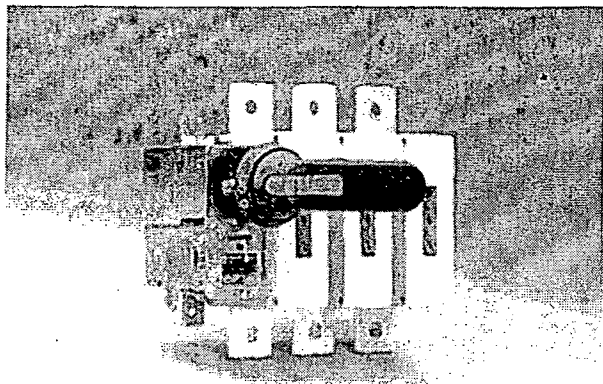
Technical data	Section
Technical data	3
Tripping characteristics	3 - 6, 8
Dimensions	3 - 22

Notes: ¹⁾ All poles include over-current and short circuit protection.☐ Available on indent only

NHP Item Info

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Strömberg



Catalogue Number:

OETL 800K3

Description:

SWITCH LOAD,3P 800A

List Price \$ (Not including GST):

8

Unit of Measure:

EA

Price Schedule:

B2

Load-break switches

Base mount

Current AC21

800

Current AC23

720

Power AC23

355

No. of poles

3

Handle pos.

Outboard

Switch style

Standard

Features

- Compact modular design to IEC and Aus. Standards
- High short-circuit rating
- Made from track-resistant materials
- Strong black plastic operating handle to IP65
- Door interlocked in ON position
- Positive switch position indication ON-OFF / I-O
- Adjustable shaft length
- Up to 3 padlocks can be fitted in Off position
- Visible contacts through removable windows
- Facility to add multiple positive break aux. switches
- Keyhole mounting holes
- Terminal bolt kits included
- Availability to fit many different accessories, eg. Change-over mechanisms, mechanical and electrical interlocks, parallel operation and motor operation

Benefits

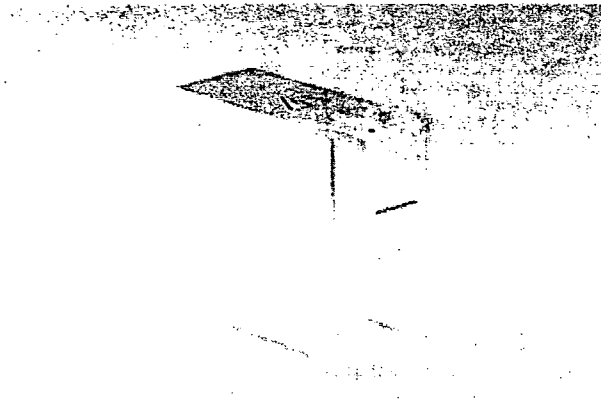
- Proven reliable performance under the most arduous of operating conditions
- Minimum space requirements
- Dust and hose proof at handle sealing
- Designed for maximum operator safety
- Contacts can be seen to be open and secured with padlocks by up to 3 different trades people for maximum safety.
- Simple and flexible mounting and connecting facilities
- Easily adapted to suit different cubicle depths
- Adequate provision of remote status indication
- Can be adapted for many special applications including remote control

Ordering Information

NHP Item Info

NHP E-Cat online website
Tuesday, June 22, 2004 9:52:56 AM
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Strömberg



Catalogue Number:

OETL ZX128

Description:

SHROUD TERM,1P OETL200..315

List Price \$ (Not including GST):

0

Unit of Measure:

EA

Price Schedule:

B2

Load-break switches

Shrouds

Type

Terminal

To suit

OETL 200-315

Mounting pos.

Lineside or Loadside

No. of poles

1

Features

- Terminal shroud ZX 128, to suit OETL 200... 315A loadbreak switches.
- The clear, insulated shrouds cover line and/or load side terminals. They are individual or 1 pole shrouds.
- Three pole requires 6 pieces for full protection, four pole requires 8 pieces.

Benefits

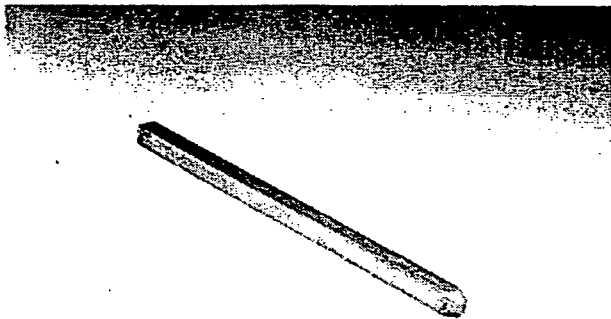
- Terminal shrouds offer touch protection against accidental contact at the point of termination.
- Each shroud carries a brightly coloured warning label.

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Strömberg**Catalogue Number:****OXP 12X325****Description:****SHAFT, 12/325****List Price \$ (Not including GST):****8****Unit of Measure:****EA****Price Schedule:****B2****Load-break switches****Shafts****Type**

12mm

To suit

OETL 400-1600, OS 200-800

Length (mm)

325mm

Features

- Extended square shaft to suit OETL 400... 1600 loadbreak switches.
- Shaft size: 12mm.
- Shaft length: 325mm.
- Accessories available to suit shafts include:
 - shaft extension sockets,
 - adaptors for extension sockets,
 - handle support brackets and
 - 90deg angle kits.

Benefits

- These high quality metal shafts can be ordered separately or at the time of switch purchase. Naturally they are available as spare or replacement parts.
- The shafts can be cut to length depending on requirements.

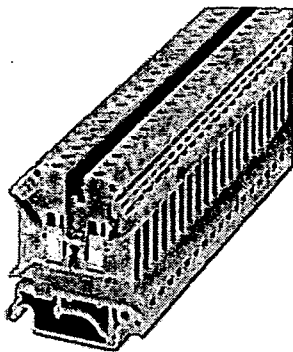
Ordering Information

- Shafts can be cut down to size.

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All prices are exclusive of GST.

UK 5 N



Universal terminal block with screw connection, cross section: 0.2 - 4 mm², AWG: 30 - 10, width: 6.2 mm, color: gray

-  Accessories
-  Technical data
-  Certificates
-  PDF File



add to cart

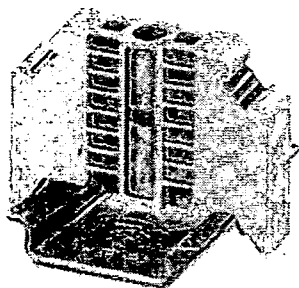


view cart

General data

Order number	3004362
Type	UK 5 N
Barcode number	4017918090760
Unit pack	50 Pcs.
Customs tariff	85369010000
Max. conductor cross section, flexible	4 mm ²
Conductor cross section, rigid max.	6 mm ²
Conductor cross section AWG/kcmil max	10
Nominal current I _N	41 A


E/NS 35 N



End bracket, width: 9.5 mm, color: gray

-  Accessories
-  Technical data
-  Drawings
-  PDF File



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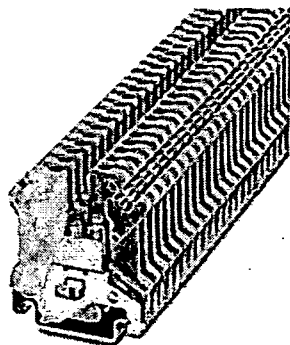


 view cart

General data

Order number	0800886
Type	E/NS 35 N
Barcode number	4017918129309
Unit pack	50 Pcs.
Customs tariff	85369010000
Color	gray

USLKG 5



Ground terminal block with screw connection, cross section: 0.2 - 4 mm², AWG: 26 - 10, width: 6.2 mm, color: green-yellow

-  Accessories
-  Technical data
-  PDF File



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General data

Order number	0441504
Type	USLKG 5
Barcode number	4017918002190
Unit pack	50 Pcs.
Customs tariff	85369010000
Max. conductor cross section, flexible	4 mm ²
Conductor cross section, rigid max.	4 mm ²
Conductor cross section AWG/kcmil max	12