COMMON LOGIC PTY LTD

ACN. 011 029 262

Electrical Contractors

Contract No: BW.60095-05/06
PS292 Wirriboot Ct

Electrical Manual

ISSUE NO 1
AS BUILT
15/11/2006

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JH86

JH86Mj08

COMMON LOGIC Pty Ltd Specialist Electrical Contractors	Electrical Manual	
Subject: Wirriboot Crt SP292	Sheet: 1 Of: 10	Section 1
Page Revision No: Date: 17/11/06	Manual Issue No: 1 Date: 17/11/06	

Authorised By: Grant Kerr

COMMON LOGIC Pty Ltd Specialist Electrical Contractors	Electrical Manual	
Subject: Wirriboot Crt SP292	Sheet: 2 Of: 10	Section 1
Page Revision No: Date: 17/11/06	Manual Issue No: 1 Date: 17/11/06	

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.

Authorised By: Grant Kerr

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 controls 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.

The transfer switch is a solenoid operated load break switch. The switch has Two positions only being "A" Mains and "B" Generator. There is NO "OFF" position.

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.

2.3.2. MAINS AVAILABLE INDICATOR

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

The mains available relay does indicate availability and correct rotation after 10 seconds.

2.3.3. MAINS FAIL IN MCC

The mains fail relay in the MCC is the 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 generator voltage rotation is also correct.

2.3.4. GENERATOR RUNNING.

The generator running indicator is supplied by 24VDC originating from the RTU control supply. .
The indicator will be "ON" when the generator is running as determined by the generator PLC. IE GRR relay is on.

2.4 ATS CUBICLE

The ATS cubicle comprises sections as described below.

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. G01 for core 1 to pin 1 and No.G02 –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.

2.4.2. RTU INTERFACE

The RTU interface is via a hard wired loom or multicore cable and terminals.
The Loom cable is numbered with the terminal RTU IO numbers.
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 Exercise Generator 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 MAC-DT Solenoid operated Transfer switch.
The control of this switch is only achieved from the generator PLC. The PLC controls the relays CTSN and CTSG within the ATS panel.

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

Energising CTSG 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 solenoids must first be isolated. This is best achieved by switching the CB's QM1 and QG1 to the off position. This removes the motor charge and open close commands to the operators. If the PLC is not affecting the transfer switch these CB's may be left in the ON state.

Manual Open Mains and Close Generator:
Turn off the CB's QM1 & QG1. To change state a suitably qualified operator must open the escutcheon door and using the Yellow handled operator, place the operator on the left side square shaft and pull the handle towards the bottom of the switch. This will change the state of the switch as indicated by the windows marked "A" and "B".

Manual Open Generator and Close Mains:
Turn off the CB's QM1 & QG1. To change state a suitably qualified operator must open the escutcheon door and using the Yellow handled operator, place the operator

on the left side square shaft and pull the handle towards the bottom of the switch. This will change the state of the switch as indicated by the windows marked "A" and "B".

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.

COMMON LOGIC Pty Ltd Specialist Electrical Contractors	Electrical Manual	
Subject: Wirriboot Crt SP292	Sheet: 7 Of: 10	Section 2
Page Revision No: Date: 17/11/06	Manual Issue No: 1 Date: 17/11/06	

3.0 DRAWINGS

Authorised By: Grant Kerr

BRISBANE WATER

Solenoid Operated.

SEWAGE SYSTEM IMPROVEMENT 2005
MOTORISED TRANSFER SWITCH INSTALLATION
SP292 - WIRRIBOOT COURT, KARANA DOWNS

ELECTRICAL DRAWING INDEX

ELECTRICAL DRAWINGS INDEX									
DWG N°.	TITLE	ISSUE	REVISIONS						
	~~MOTOR OPERATED~~ - AUTOMATIC TRANSFER SWITCH - SITE SPECIFIC INSTALLATION								
486/5/7-FK700	WIRRIBOOT COURT, KARANA DOWNS - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	06.2006	~~A~~	~~B~~	~~C~~	~~D~~	E	#	# = ISSUED FOR:- EMERG'Y. GENERATOR TRANSFER SWITCH INSTALLATION
486/5/7-FK701	POWER DISTRIBUTION SCHEMATIC DIAGRAM	03.2006	~~A~~	~~B~~	~~C~~	D		#	E
486/5/7-FK702	PUMP 01 SCHEMATIC DIAGRAM	10.2003	~~A~~	~~B~~	C				
486/5/7-FK703	PUMP 02 SCHEMATIC DIAGRAM	10.2003	~~A~~	~~B~~	C				
486/5/7-FK704	COMMON CONTROL & ALARMS SCHEMATIC DIAGRAM	06.2006	~~A~~	~~B~~	C			#	
486/5/7-FK705	PLC/RTU SCHEMATIC DIAGRAM	06.2006	~~A~~	~~B~~	C			#	
486/5/7-FK706	PLC/RTU TERMINATION DIAGRAM	06.2006	~~B~~	~~C~~	~~D~~	~~E~~	F	#	
486/5/7-FK707	EQUIPMENT LIST	03.2006	~~A~~	~~B~~	~~C~~	D		#	
486/5/7-FK708	CABLE SCHEDULE	03.2006	~~A~~	~~B~~	~~C~~	D		#	
486/5/7-FK709	SWITCHBOARD LABEL SCHEDULE	11.2003	~~A~~	B					
486/5/7-FK710	SWITCHBOARD GENERAL ARRANGEMENT	03.2006	~~A~~	~~B~~	~~C~~	D		#	
486/5/7-FK711	SWITCHBOARD CONSTRUCTION NOTES	03.2006	~~A~~	~~B~~	~~C~~	D		#	
486/5/7-FK712	SWITCHBOARD CONSTRUCTION DETAILS	03.2003	A						
486/5/7-FK713	RAG REDUCTION TUBE FOR THE VEGA LEVEL PROBE	11.2003	~~A~~	B					
486/5/7-FK714	SITE LAYOUT	03.2006	~~A~~	~~B~~	~~C~~	~~D~~	E	#	
486/5/7-PS000	DRAWING INDEX - ELECTRICAL INSTALLATION	05.2006	~~0~~	~~1~~	2			#	
486/5/7-PS003	TYPICAL ~~MOTOR OPERATED~~ - AUTOMATIC TRANSFER SWITCH - WIRING SCHEMATIC DIAGRAM	05.2006	~~0~~	~~1~~	2			#	
486/5/7-PS004	TYPICAL ~~MOTOR OPERATED~~ - AUTOMATIC TRANSFER SWITCH - CUBICLE ARRANGEMENT	05.2006	~~0~~	~~1~~	2			#	
486/5/7-PS006	TYPICAL ~~MOTOR OPERATED~~ - AUTOMATIC TRANSFER SWITCH - INTERCONNECTION DIAGRAM	05.2006	~~0~~	1				#	
486/5/7-PS007	AUTOMATIC TRANSFER SWITCH - ATS EXTENSION CUBICLE - TYPICAL CONCRETE BASE ARRANGEMENT	05.2006	~~0~~	1				#	

Revise

FOR CONSTRUCTION

As Built

No.	DATE	AMENDMENT	DRN.	APD.
E	06.06	NEW BORDER. RE-DRAWN & RE-ISSUED FOR CONSTRN	M.J.L.	
D	03.06	APPROVED FOR CONSTRUCTION	M.J.L.	
C	05.05	2005 GENSET UPGRADE		

Reference Drawings

DRAFTED	H.T.	10/3/03	
DRAFTING CHECK	A.M.	--/4/03	
CAD FILE	57FK700_E		
B.C.C. FILE No.			

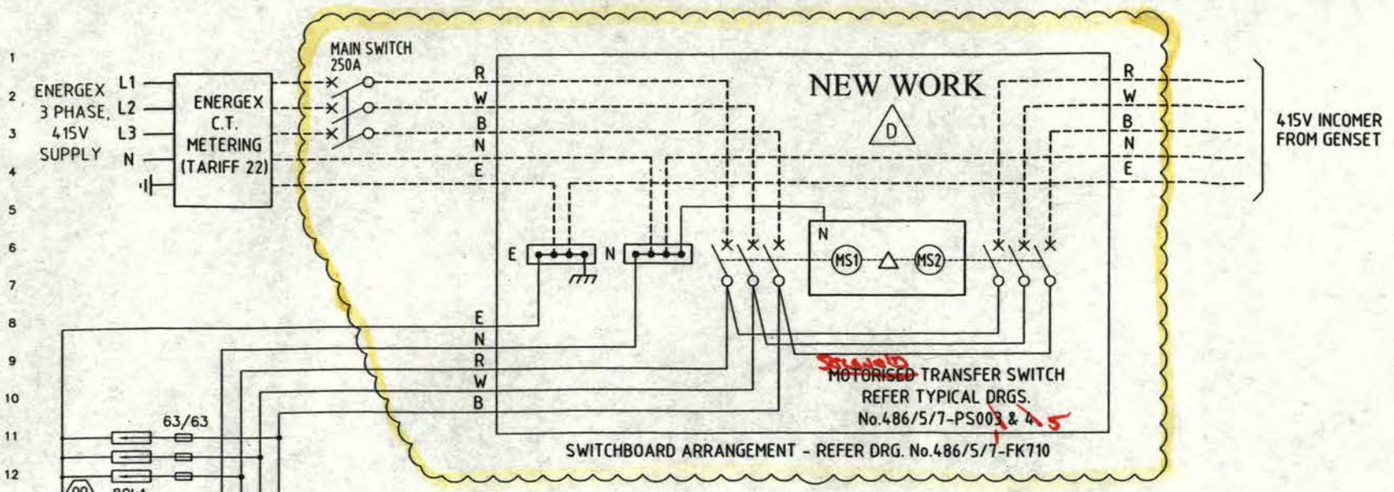
C.J. 10/3/03
DESIGN R.P.E.Q. No. DATE
DESIGN CHECK R.P.E.Q. No. DATE
PRINCIPAL DESIGN MANAGER DATE
CLIENT DELEGATE DATE

BRISBANE WATER

PROJECT
SUBMERSIBLE SEWAGE PUMP STATION
SP292 - WIRRIBOOT CT., KARANA DOWNS
SEWAGE SYSTEM IMPROVEMENT 2005

TITLE
MOTORISED TRANSFER SWITCH
ELECTRICAL INSTALLATION
ELECTRICAL DRAWING INDEX

SHEET No. 18
BRISBANE WATER DRAWING No. 486/5/7-FK700
AMEND. E



NOTES

1. INCOMING GENSET, PUMP & DIST. BOARD CIRCUIT BREAKERS ARE LINE SIDE SHROUDED.

2. CIRCUIT BREAKERS RATINGS TO SUIT FAULT LEVEL & LOAD ENSURE TYPE 2 COORDINATION WITH CONTACTORS & OVERLOADS TO IEC 947-4-1.

3. CIRCUIT BREAKER SETTINGS 100%.

4. ALL WIRES & CABLE CORES ARE FERRULED WITH GRAFOPLAST SI2000 COMPATIBLE LABELLING. THE FOLLOWING PREFIXES ARE USED:
MAIN PUMP No. 1 = 1
MAIN PUMP No. 2 = 2
COMMON WIRING = 6 (i.e. FLOW, LEVEL, PRESSURE).

5. ADD POINT OF SUPPLY.

6. ADD ACTUAL FAULT LEVEL.

7. ADD ACTUAL PUMP RATINGS.

LEGEND:

- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- R.T.U. FUSE TERMINAL
- R.T.U. LINK TERMINAL
- SWITCHBOARD TERMINAL
- CATHODIC PROTECTION TERMINAL
- DI1-01 RTU DIGITAL INPUT
- DO1-05 RTU DIGITAL OUTPUT
- AI-02 RTU ANALOG INPUT
- 00 EQUIPMENT ITEM No.

Sheet 01

FOR CONSTRUCTION

NO.	DATE	AMENDMENT	INITIALS
D	03.2006	APPROVED FOR CONSTRUCTION	
C	11.2005	SWBD GenSet Upgrade 2005	
B	30-10-03	AS BUILT	
A	27-3-03	ISSUED FOR CONSTRUCTION	AM

PRINCIPAL ENGINEER	ORIGINAL SIGNED BY A. MOONEY	R.P.E.Q. NO. 5596	DATE 4/03
MANAGER ENGINEERING			DATE
PRODUCTION / NETWORK DELEGATE			DATE

	NAME	DATE
DESIGN	C.J.	10-3-03
DRAWN	H.T.	10-3-03
CHECKED	A.M.	4/03

Brisbane City

JOB FILE	
ACAD FILE	57FK701-RevC.DWG
SURVEY No.	FIELD BOOK
SURVEYED	A.H. DATUM

Brisbane Water — Projects — Engineering

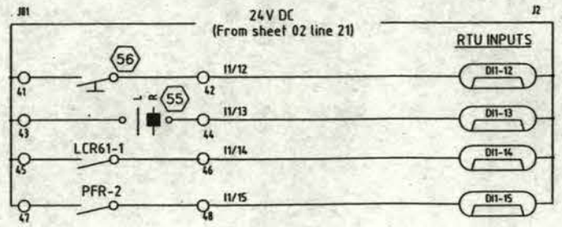
PROJECT
KARANA DOWNS
WIRRIBOOT COURT - SP292
SEWAGE PUMP STATION

TITLE
POWER DISTRIBUTION
SCHEMATIC DIAGRAM

SCALE NTS | N° 2 OF 15 SHEETS

DRAWING N° 486/5/7-FK701 | AMEND. D

ELV CONTROL



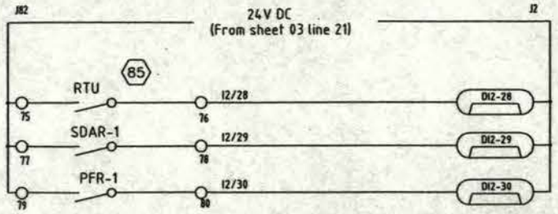
COMMON CONTROL

SITE ATTENTION ALARM RESET PUSHBUTTON

LOCAL/REMOTE STATION

SURCHARGE IMMINENT ALARM

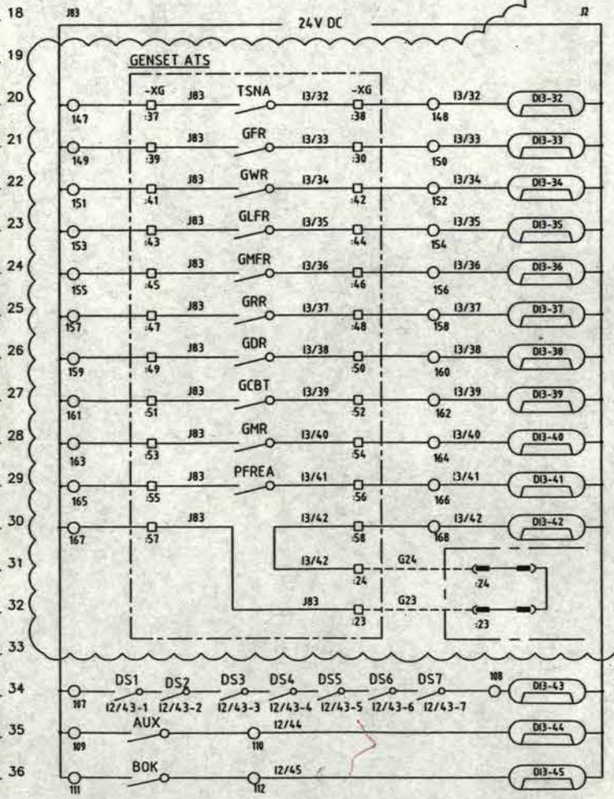
SITE POWER ON



RTU POWER OK

SURGE DIVERTER OK

ENERGEX POWER ON



NEW WORK

D

REFER DWGS:-
486/5/7-PS003 & PS006

ATS - NORMAL MODE

GENERATOR FAULT

GENERATOR WARNING

GENERATOR LOW FUEL

GENERATOR MEDIUM FUEL

GENERATOR RUNNING

GENERATOR CANOPY OPEN

GENERATOR C/B STATUS

GENERATOR MODE

ENERGEX MAINS POWER

GENERATOR ON SITE

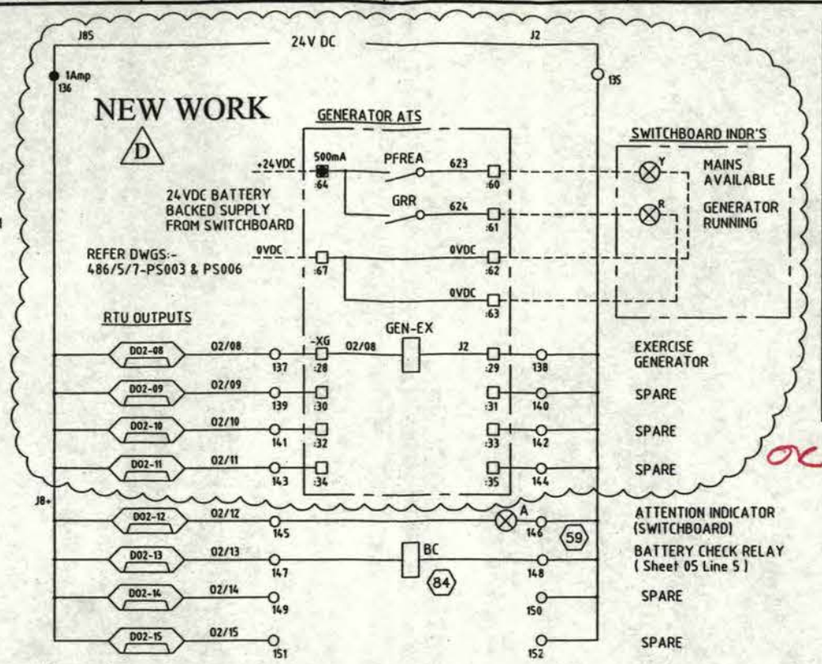
GENERATOR ON SITE
[AT GENERATOR]

SECURITY ALARM DOOR OPEN

MAIN INCOMER CB CLOSED

BATTERY SYSTEM OK

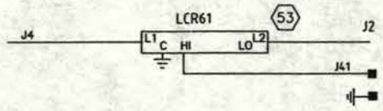
OK



OK.

24V DC CONTROL

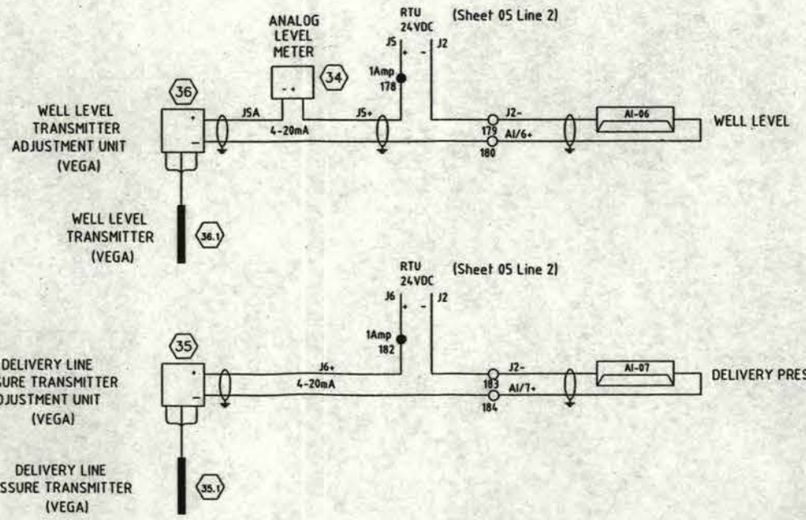
24V DC
(Sheet 05 Line 02)



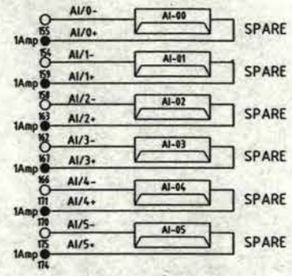
SURCHARGE IMMINENT ALARM

SURCHARGE IMMINENT ELECTRODE

RTU ANALOG INPUTS FOR INSTRUMENTS

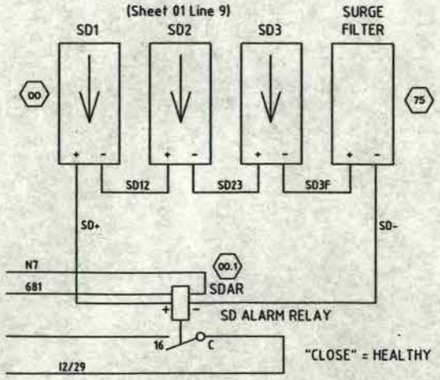


RTU ANALOG INPUTS
(NOTE 2&3)



SURGE DIVERTERS

(Sheet 01 Line 9)



NOTES

1. ALL WIRES & CABLE CORES ARE FERRULED WITH GRAFOPLAST SI2000 COMPATIBLE LABELLING.
THE FOLLOWING PREFIXES ARE USED:
MAIN PUMP No. 1 = 1
MAIN PUMP No. 2 = 2
COMMON WIRING = 6 (i.e. FLOW, LEVEL, PRESSURE)

2. TERMINAL NUMBER SHOWN EITHER IMMEDIATELY BELOW, RIGHT OR LEFT OF TERMINAL.

3. FUSE TERMINALS ARE TO BE FITTED WITH 100mA FUSE TERMINALS UNLESS OTHERWISE SHOWN.

4. DOOR SWITCHES TO BE INSTALLED ON ALL DOORS.

LEGEND:

- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- R.T.U. FUSE TERMINAL
- R.T.U. LINK TERMINAL
- SWITCHBOARD TERMINAL
- D — A.T.S. PANEL FUSED TERMINAL
- CATHODIC PROTECTION TERMINAL
- DI2-28 — RTU DIGITAL INPUT
- DO2-00 — RTU DIGITAL OUTPUT
- AI-07 — RTU ANALOG INPUT
- 00 — EQUIPMENT ITEM No.

Sheet 04

FOR CONSTRUCTION

NO.	DATE	AMENDMENT	INITIALS
D	04-2006	RE-ISSUED FOR CONSTRUCTION	
C	03-2006	APPROVED FOR CONSTRUCTION	
B	30-10-03	AS BUILT	
A	27-3-03	ISSUED FOR CONSTRUCTION	AM

PRINCIPAL ENGINEER: ORIGINAL SIGNED BY A. MOONEY — R.P.E.Q. NO. 5596 — DATE 4/03
MANAGER ENGINEERING — DATE
PRODUCTION / NETWORK DELEGATE — DATE

	NAME	DATE
DESIGN	C.J.	11-3-03
DRAWN	H.T.	11-3-03
CHECKED	A.M.	4/03

Brisbane City

JOB FILE
ACAD FILE: 57FK704.DWG
SURVEY No.
FIELD BOOK
SURVEYED
A.H. DATUM

Brisbane Water — Projects — Engineering

PROJECT: KARANA DOWNS WIRRIBOOT COURT - SP292 SEWAGE PUMP STATION

TITLE: COMMON CONTROLS AND ALARMS SCHEMATIC DIAGRAM

SCALE NTS — N° 5 OF 15 SHEETS

DRAWING N° 486/5/7-FK704 — AMEND. D

AS BUILT

24V DC SUPPLIES

SURCHARGE IMMINENT

LEVEL TRANSMITTER

PRESSURE TRANSMITTER

SPARE

240VAC FROM SUB-DISTRIBUTION BOARD (Sheet 01 Line 32)

681

BC

N7

85

240V AC

24V DC

BATT OK

POWER ON

80K

RTU

RTU POWER FAIL RELAY (Sheet 04 Line 13)

(Sheet 04 Line 23)

(Sheet 04 Line 12)

2 X 6.5 Ah BATTERIES

87

86

24V DC

13.8V DC

5 AMP

RADIO

88

Rx TBA

Tx TBA

97

45

SD

(Sheet 03 Line 29) TO SOFT STARTERS

RS485-B

RS485-A

2 AMP

ON/OFF SWITCH

TB1

POWER SUPPLY CONNECTOR

TB2

RS 485 PORTS

TB3

P3

P2

P1

RS 232 PORTS

REFER TO SHEET 6

AI/0+ AI/0- AI/1+ AI/1- AI/2+ AI/2- AI/3+ AI/3- AI/4+ AI/4- AI/5+ AI/5- AI/6+ AI/6- AI/7+ AI/7-

TB4

0 1 2 3 4 5 6 7 E4

ANALOG INPUTS

MOTHER BOARD

EXTERNAL I/O BOARD CONNECTOR

DIGITAL INPUTS MODULE No. 1

TB6

E1 COMM 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

I1/15 I1/14 I1/13 I1/12 I1/11 I1/10 I1/09 I1/08 I1/07 I1/06 I1/05 I1/04 I1/03 I1/02 I1/01 I1/00

REFER TO SHEET 6

DIGITAL OUTPUTS MODULE No. 1

TB7

7 6 5 4 3 2 1 0

E2 NO NC NO NC NO NC NO NC NO NC NO NC NO NC COMM

O1/07 O1/06 O1/05 O1/04 O1/03 O1/02 O1/01 O1/00

REFER TO SHEET 6

NOTES

1. TERMINAL NUMBER SHOWN EITHER IMMEDIATELY BELOW, RIGHT OR LEFT OF TERMINAL.

LEGEND:

- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- R.T.U. FUSE TERMINAL
- R.T.U. LINK TERMINAL
- SWITCHBOARD TERMINAL
- CATHODIC PROTECTION TERMINAL
- DI1-01 RTU DIGITAL INPUT
- DO1-05 RTU DIGITAL OUTPUT
- AI-02 RTU ANALOG INPUT
- 00 EQUIPMENT ITEM No.

NEW WORK

REFER DRG: FK704

GENERATOR A.T.S.

I3/32 I3/33 I3/34 I3/35 I3/36 I3/37 I3/38 I3/39 I3/40 I3/41 I3/42 I3/43 I3/44 I3/45 I3/46 I3/47

TB1

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 COMM E7

GENERATOR ATS - NORMAL MODE

FAULT

WARNING

LOW FUEL

MEDIUM LEVEL

RUNNING

CANOPY OPEN

C/B STATUS

CONTROL MODE

ENERGEX MAINS POWER ON SITE

DIGITAL INPUTS MODULE No. 3

EXTERNAL I/O BOARD CONNECTOR

NOT USED

AO/0+ AO/0- AO/1+ AO/1- AO/2+ AO/2- AO/3+ AO/3-

TB2

0 1 2 3 COMM E8

ANALOG OUTPUTS

EXTENSION BOARD

DIGITAL INPUTS MODULE No. 2

TB3

E5 COMM 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

I2/31 I2/30 I2/29 I2/28 I2/27 I2/26 I2/25 I2/24 I2/23 I2/22 I2/21 I2/20 I2/19 I2/18 I2/17 I2/16

REFER TO SHEET 6

DIGITAL OUTPUTS MODULE No. 2

TB4

7 6 5 4 3 2 1 0

E6 NO NC NO NC NO NC NO NC NO NC NO NC NO NC COMM

O2/15 O2/14 O2/13 O2/12 O2/11 O2/10 O2/09 O2/08

SPARE

EXERCISE GENERATOR

GENERATOR A.T.S.

REFER DRG: FK704

NEW WORK

OK.

AS BUILT

Sheet 05

APPROVED FOR CONSTRUCTION

NO.	DATE	AMENDMENT	INITIALS
D	06.2006	RE-ISSUED FOR CONSTRUCTION	
C	03.2006	APPROVED FOR CONSTRUCTION	
B	30-10-03	AS BUILT	
A	27-3-03	ISSUED FOR CONSTRUCTION	AM

PRINCIPAL ENGINEER ORIGINAL SIGNED BY A. MOONEY R.P.E.Q. NO. 5596 DATE 4/03

MANAGER ENGINEERING DATE

PRODUCTION / NETWORK DELEGATE DATE

	NAME	DATE
DESIGN	C.J.	11-3-03
DRAWN	H.T.	11-3-03
CHECKED	A.M.	4/03

Brisbane City

JOB FILE

ACAD FILE 57FK705_C.DWG

SURVEY No. FIELD BOOK

SURVEYED A.H. DATUM

Brisbane Water Projects—Engineering

PROJECT: KARANA DOWNS WIRRIBOOT COURT - SP292 SEWAGE PUMP STATION

TITLE: PLC/RTU SCHEMATIC DIAGRAM

SCALE NTS | N° 6 OF 15 SHEETS

DRAWING N° 486/5/7-FK705 | AMEND. D

RTU TERMINAL STRIP

SUPPLY FROM BATTERY J3/J2 — 240V AC/24V DC POWER SUPPLY J1/J2
SURCHARGE IMMINENT MULTITRODE J4/J2
SPARE
SPARE
SPARE J7/J2 — 24/13.8V DC POWER SUPPLY J1/J2
RTU SUPPLY J8/J2
RADIO SUPPLY J11/J12 — 13.8V DC POWER SUPPLY J9/J10
24V DC SUPPLY J2/J8
POWER ON RELAY 1K1 J81 I1/00
SPARE
EMERGENCYSTOP J81 I1/03
SPARE
SOFT STARTER FAULT RELAY 1KS J81 I1/05
LOCAL RESET J81 I1/06
PUMP RUNNING RELAY 1K3 J81 I1/07
SPARE
SPARE
SPARE
SITE ATTENTION ALARM RESET P/B J81 I1/12
STATION LOCAL/REMOTE J81 I1/13
SURCHARGE IMMINENT ALARM RELAY LC61 J81 I1/14
SITE POWER ON RELAY PFR-2 J81 I1/15
24V DC SUPPLY J2/J8
POWER ON RELAY 2K1 J82 I2/16
SPARE
EMERGENCY STOP J82 I2/19
SPARE
SOFT STARTER FAULT RELAY 2KS J82 I2/21
LOCAL RESET J82 I2/22
PUMP RUNNING RELAY 2K3 J82 I2/23
SPARE
SPARE
SPARE
SPARE
RTU POWER OK J82 I2/28
SURGE DIVERTER ALARM J82 I2/29
ENERGEX POWER ON RELAY PFR-1 J82 I2/30
SPARE

0V DC — COMM — DIGITAL INPUT MODULE 1 24V DC (I1/00 … I1/15)
0V DC — COMM — DIGITAL INPUT MODULE 2 24V DC (I2/16 … I2/31)

NEW WORK (F)
[REFER DWG FK704]
GENERATOR A.T.S.
24V DC SUPPLY J2/J8
ATS - NORMAL MODE TSNA I3/32
FAULT GFR I3/33
WARNING GWR I3/34
LOW FUEL GLFR I3/35
MEDIUM LEVEL GMFR I3/36
RUNNING GRR I3/37
CANOPY OPEN GDR I3/38
C/B STATUS GCBT I3/39
CONTROL MODE GMR I3/40
ENERGEX MAINS POWER PFREA I3/41
ON SITE G23/G24 I3/42
SECURITY ALARM DOOR OPEN [7 DOOR SWITCHES] I3/43
MAIN INCOMER CB CLOSED AUX I3/44
BATTERY SYSTEM OK BOK I3/45
SPARE
SPARE
OK

RTU TERMINAL STRIP

I3/32 … I3/47 — COMM — DIGITAL INPUT MODULE 3 24V DC

RTU TERMINAL STRIP

24V DC SUPPLY J2/J8
PUMP 1 STATUS INDICATION O1/00
PUMP 1 START / STOP RELAY 1K6 O1/01
PUMP 1 FAULT RESET RELAY 1K7 O1/02
SPARE
O1/04
O1/05
O1/06
SPARE
0V DC — COMM — DIGITAL OUTPUT MODULE 1 24V DC (O1/00 … O1/07)

GENSET A.T.S.
GEN-EX
EXERCISE GENERATOR O2/08
O2/09
SPARE
623 0VDC — MAINS AVAILABLE
624 0VDC — GENERATOR RUNNING
[REFER DWG FK704]
(SWITCHBOARD) ATTENTION INDICATOR O2/12
BATTERY CHECK RELAY BC O2/13
SPARE
SPARE
OK.
NEW WORK (F)

0V DC — XOMM — DIGITAL OUTPUT MODULE 2 24V DC (O2/08 … O2/15)

SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE

AI1/0+ AI1/0- … AI1/7+ AI1/7- — ANALOGUE INPUT MODULE (0 … 7)

WELL LEVEL TRANSMITTER J5+/J2/AI1/6+ — J5 J2 24V DC+ AI1/6+
DELIVERY LINE PRESSURE TRANSMITTER J6+/J7/AI1/7+ — J6 J2 24V DC+ AI1/7+
MAIN INSTRUMENT EARTH — E1 … E10

LEGEND:
- RELAY OR CONTACTOR COIL
- FIELD DEVICE
- R.T.U. FUSE TERMINAL
- R.T.U. LINK TERMINAL
- SWITCHBOARD TERMINAL
- CATHODIC PROTECTION TERMINAL
- RTU DIGITAL INPUT
- RTU DIGITAL OUTPUT
- RTU ANALOG INPUT
- EQUIPMENT ITEM No.

Sheet 06

FOR CONSTRUCTION

NO.	DATE	AMENDMENT	INITIALS
F	06.2006	RE-ISSUED FOR CONSTRUCTION	
E	03.2006	APPROVED FOR CONSTRUCTION	M.J.L
D	11.2005	2005 GENSET ATS UPGRADE	
C	4-11-03	AS BUILT	
B	2-6-03	START INPUTS DELETED	CJ

PRINCIPAL ENGINEER ORIGINAL SIGNED BY A. MOONEY R.P.E.Q. NO. 5596 DATE 4/03
MANAGER ENGINEERING DATE
PRODUCTION / NETWORK DELEGATE DATE

	NAME	DATE
DESIGN	C.J.	11-3-03
DRAWN	H.T.	11-3-03
CHECKED	A.M.	4/03

Brisbane City

JOB FILE
ACAD FILE 51FK706-RevD.DWG
SURVEY No. FIELD BOOK
SURVEYED A.H. DATUM

Brisbane Water — Projects — Engineering

PROJECT: KARANA DOWNS WIRRIBOOT COURT - SP292 SEWAGE PUMP STATION

TITLE: PLC/RTU TERMINATION DIAGRAM

SCALE NTS — N° 7 OF 15 SHEETS
DRAWING N° 486/5/7-FK706 — AMEND. F

ITEM No	QTY	DESCRIPTION	MANUFACTURER	CATALOGUE No	REMARKS
00	3	SURGE DIVERTER	CRITEC	TDS-180-4S-277	
00.1	1	SURGE DIVERTER ALARM RELAY	CRITEC	TSD-AR	
01	1	MAIN CIRCUIT BREAKER + SHROUD	TERASAKI	XS250NJ/250 + UXLB002NE + UXXB009080	
01.1	1	MAIN C B MECHANICAL INTERLOCK	TERASAKI/NHP	BASE PLATE + UXKB0078	
02	2	PUMP CIRCUIT BREAKER + SHROUD	TERASAKI	XS125NJ/100 + XFHA22	
03	1	~~AUTO MOTORISED TRANSFER SW~~	~~TERASAKI~~	~~[illegible]~~	~~GENSET C/B - REMOVED~~
04	1	SUB-DISTRIBUTION BOARD CBs	TERASAKI	DTCB6363C	
05	1	SUB-DISTRIBUTION BOARD CHASSIS	TERASAKI	CD-2-18/18-3	
06	4	CURRENT TRANSFORMERS INCLUDING CABLE KIT 01-282-00	EMOTRON	TO SUIT MSF-445	
07	2	PUMP CONTACTORS	SPRECHER & SCHUH	CA7-85, (SEE NOTE 2, SHT 2)	
08	2	PUMP SOFT STARTER BY-PASS CONTACTOR	SPRECHER & SCHUH	CA7-85	
09		NOT USED			
10.1	2	EXTERNAL KEYPAD KIT	EMOTRON	01-2138-00	
10.2	2	CT CABLE KIT	EMOTRON	01-2020-00	
10.3	2	PUMP SOFT STARTER *	EMOTRON	MSF-445 + MODBUS RTU SERIAL COMMS CARD	
12	2	PUMP NEUTRAL CART	ALSTOM	RS28H (WHITE)	
12A	2	PUMP NEUTRAL LINK	ALSTOM	COPPER LINK	
13	3	SURGE DIVERTER FUSES	NHP	63AMP 63MS MOTOR START	
14		NOT USED			
14.1		NOT USED			
15		NOT USED			
15.1		NOT USED			
15.2		NOT USED			
15.3		NOT USED			
15.4		NOT USED			
16		NOT USED			
17		NOT USED			
18	1	PHASE FAILURE CIRCUIT BREAKER	TERASAKI	DTCB10310C	MINIMUM 6A
19	2	PHASE FAILURE RELAY	CROMPTON INSTRUMENTS	252-PSGW	
20	1	PHASE FAILURE CIRCUIT BREAKER	TERASAKI	DTCB6306C	
21	1	3 PHASE OUTLET CIRCUIT BREAKER	TERASAKI	DTCB6332C	
22	1	1 PHASE OUTLET CIRCUIT BREAKER	TERASAKI	DSRCBH1030A	
23	1	1 PHASE OUTLET RCD C/B	TERASAKI	DSRCBH1030A	GENSET BATTERY CHARGER
24	1	RTU LAP-TOP GPO CIRCUIT BREAKER	TERASAKI	DSRCBH1030A	
25	1	SW/BD FLURO CIRCUIT BREAKER	TERASAKI	DTCB6106C	
26		NOT USED			
27		NOT USED			
28		NOT USED			
29	1	RTU CIRCUIT BREAKER	TERASAKI	DTCB6110C	
30	1	WELL CLEANING CIRCUIT BREAKER	TERASAKI	DTCB6106C	
31	3	SPARE CIRCUIT BREAKERS	TERASAKI	DTCB6106C	
32	7	SW/BD DOOR MICRO SWITCHES	CAMSCO	SM202	4 OFF IN/C 3 OFF IN/O & IN/C
33	3	SW/BD 8W INTERNAL FLURO LIGHTS	THORN	BB0108	
34	1	WELL LEVEL INDICATOR	CROMPTON INSTRUMENTS	244-0XG-HG-IP-SR 4-20mA, 0-100%, ADJ RED POINTER	
35	1	PRESSURE ADJUSTMENT UNIT	VEGA	VEGA DIS12	FREE ISSUE
35.1	1	PRESSURE TRANSMITTER	VEGA	D84	FREE ISSUE
36	1	WELL LEVEL ADJUSTMENT UNIT	VEGA	VEGA DIS12	FREE ISSUE
36.1	1	WELL LEVEL TRANSMITTER	VEGA	VEGAWELL 72	FREE ISSUE
36.2	1	RAG REDUCTION TUBE			
37	2	PUMP CONTROL CIRCUIT BREAKER	TERASAKI	DTCB6106C	
38	2	PUMP HOURS RUN METER	NATIONAL	TH639	
39		NOT USED			
40	2	PUMP START/STOP RELAY	IZUMI	RH2B-U-240VAC	
41	2	CONTROL CIRCUIT ON RELAY	IZUMI	RH2B-U-240VAC	
42	2	PUMP FAULT RELAY	IZUMI	RH2B-U-240VAC	
43		NOT USED			
44	2	PUMP STOP PUSH BUTTON	SPRECHER & SCHUH	DSP-F43LX01	
45	1	RADIO COAX. SURGE PROTECTION	POLYPHASER CORPORATION	IS-50NX-C2	FREE ISSUE
46	2	PUMP STATUS INDICATOR	SPRECHER & SCHUH	DSP-PL4 + DS-3NL3R (RED,24V)	
47	2	PUMP START PUSH BUTTON	SPRECHER & SCHUH	DSP-F13LX10	
48	2	PUMP EMERG. STOP PUSH BUTTON	SPRECHER & SCHUH	DSP-MTS343LX01/01	
49	2	PUMP RESET PUSH BUTTON	SPRECHER & SCHUH	DSP-F63LX11	
50		NOT USED			

NEW WORK

NEW WORK

ITEM No	QTY	DESCRIPTION	MANUFACTURER	CATALOGUE No	REMARKS
51	2	PUMP FAULT RESET RELAY	IZUMI	RH2B-U-24VDC	
52	2	PUMP START/STOP RELAY	IZUMI	RH2B-U-24VDC	
53	1	SURCHARGE ALARM RELAY	MULTITRODE	MTR-5	FREE ISSUE
54	1	SURCHARGE PROBE	MULTITRODE	0.2/1-10	FREE ISSUE
55	1	STATION CONTROL SELECTOR SW.	KRAUS & NAIMER	CA011-A369-600	
56	1	SITE ATTENTION RESET	SPRECHER & SCHUH	DSP-F63LX10	
57		NOT USED			
58		NOT USED			
59	1	SITE ATTENTION ALARM INDICATOR	SPRECHER & SCHUH	DSP-PL5 + DS-3NLA (AMBER, 24V)	
60		NOT USED			
61	1	3 PHASE OUTLET	CLIPSAL	56SO532LE	
62	1	1 PHASE OUTLET	CLIPSAL	15V + 98B (SHROUD)	
63	1	DIST. BD. NEUTRAL LINK	CLIPSAL	BPN5D18	
64	1	DIST. BD. EARTH LINK	CLIPSAL	BPN5D18	
65		SWITCHBOARD TERMINALS	PHOENIX		
65.1	16	ANALOGUE DISCONNECT	PHOENIX	UK-5	
65.2	16	END PLATE	PHOENIX	TO SUIT UK-5	
65.3	20	FUSE TERMINAL	PHOENIX	UK-5 HESI	
65.4	20	END PLATE	PHOENIX	TO SUIT UK-5 HESI	
65.5	20	FUSE CARTRIDGE	PHOENIX	FUSE 20x5mm	
65.6	141	DISCONNECT TERMINAL	PHOENIX	UK-5	
65.7	5	END PLATE	PHOENIX	TO SUIT UK-5	
65.8	9	END STOP	PHOENIX	TO SUIT UK-5	
66	1	MAIN NEUTRAL LINK	CLIPSAL	20LAE6	
67	1	MAIN EARTH LINK	CLIPSAL	20LAE6	
68	1	INSTRUMENTATION EARTH LINK	CLIPSAL	BPN5C18	
69		NOT USED			
70	4	CORROSION INHIBITOR	CORTEC	VPCI-110 OR 111	FROM AP CONTROLS
71		NOT USED			
72		NOT USED			
73		NOT USED			
74		NOT USED			
75	1	RTU SURGE REDUCTION FILTER	CRITEC	TDF-10A-240V	
76		NOT USED			
77	1	BATTERY ENCLOSURE	NETWORK	DWG 101-23 DETAIL 1	
78	1	BATTERY VENT	FIBOX	MB1056A	
79	1	RTU LAPTOP G.P.O.	CLIPSAL	15 / 443 / 449A	
80	2	DECONTACTOR	MARECHAL	DS6 (316A013 + 3160013)	
81	2	ANGLE ADAPTOR	MARECHAL	DS6 (316A053 + 31640138)	
82	2	PLUG TOP	MARECHAL		
83		NOT USED			
84	1	RTU BATTERY CHECK RELAY	IZUMI	RH2B-U-24VDC	
85	1	RTU POWER SUPPLY 24VDC	INNOVATIVE ENERGIES	SR250-24C	FREE ISSUE
86	1	RTU 24V/13.8VDC CONVERTER	INNOVATIVE ENERGIES	EX8/MV-12	FREE ISSUE
87	2	BATTERY	YUASA	NP7-12	FREE ISSUE
88	1	RADIO	TRIO	DR 9000TA0200	FREE ISSUE
89		NOT USED			
90	1	TELEMETRY UNIT	MTS	MD3311CA/2710-2F7	FREE ISSUE
91		NOT USED			
92		NOT USED			
93		NOT USED			
94		NOT USED			
95		NOT USED			
96		NOT USED			
97	1	ANTENNA	TRIO	ANTISAL YAGI 13dB 15 ELEMENT	FREE ISSUE
97.1	1	ANTENNA MAST	SWBD BUILDER		
97.2	1	COAX CABLE (INTERNAL)	R.F. INDUSTRIES	RG58	FREE ISSUE
97.3	1	COAX CABLE (EXTERNAL)	R.F. INDUSTRIES	RG213	FREE ISSUE
97.4	1	COAX PLUG	R.F. INDUSTRIES	SMA	FREE ISSUE
97.5	1	COAX PLUG	R.F. INDUSTRIES	N88 (MALE)	FREE ISSUE
97.6	2	COAX PLUG	R.F. INDUSTRIES	N87 (MALE)	FREE ISSUE
97.7	1	U CLAMPS	RF INDUSTRIES	UNV	FREE ISSUE
98	1	MAINS AVAILABLE INDR. (YELLOW)	SPRECHER & SCHUH	DSP-PS3OLO	
99	1	GENERATOR RUNNING INDR. (RED)	SPRECHER & SCHUH	DSP-P43OLO	

NEW WORK

NOTES

1. CATALOG No. TO SUIT RATING OF PUMP STATION.
2. CATALOG No. TO SUIT RATING OF PUMP FOR NORMAL SOFT STARTED DUTY.

Sheet 07

FOR CONSTRUCTION

NO	DATE	AMENDMENT	INITIALS
D	01.2006	ITEM 23 ADDED FOR GENSET	
C	4-8-05	AS BUILT	
B	2-4-03	ITEM 44 ADDED	CJ
A	27-3-03	ISSUED FOR CONSTRUCTION	AM

PRINCIPAL ENGINEER — ORIGINAL SIGNED BY A. MOONEY — R.P.E.Q. NO. 5596 — DATE 4/03

MANAGER ENGINEERING — DATE

PRODUCTION / NETWORK DELEGATE — DATE

	NAME	DATE
DESIGN	C.J.	11-3-03
DRAWN	M.T.	11-3-03
CHECKED	A.M.	4/03

Brisbane City

JOB FILE:
ACAD FILE: STPK707_D.DWG
SURVEY No.:
FIELD BOOK:
SURVEYED:

Brisbane Water — Projects - Engineering

PROJECT: KARANA DOWNS WIRRIBOOT COURT - SP292 SEWAGE PUMP STATION

TITLE: EQUIPMENT LIST

SCALE: NTS — No 8 OF 15 SHEETS

DRAWING No: 486/5/7-FK707 — AMEND. D

CABLE No.	SIZE mm²	CORES	TYPE	LENGTH (m)	FROM - TO - VIA ROUTE	CABLE FUNCTION	CORRECTLY INSTALLED	
							INITIAL	DATE
P01	NOTE 2	4	Circular		ENERGEX Supply to switchboard	Incoming Mains		
P02	10		Building wire		Switchboard to earth stake	Main Earth		
P03	NOTE 2	3+earth	Flexible		Pump 1 to Switchboard	Pump 1 Motor		
P04	NOTE 2	3+earth	Flexible		Pump 2 to Switchboard	Pump 2 Motor		
X01			Lo Loss Coax		Switchboard radio to aerial	Radio Communications		
C01			Special		Wet well level Transmitter to switchboard	Wet Well Level Signal		
C02			Special		Delivery Pressure Transmitter to switchboard	Delivery Pressure Signal		
C03			Special		Surcharge imminent probe to switchboard	Surcharge imminent signal		
P05	70	4C+E	Circular	PVC/PVC	GENSET TO SWITCHBOARD - ATS	GENSET POWER - FREE ISSUE		
P06	2.5	2C+E	Circular	PVC/PVC	GENSET TO SWITCHBOARD - DISTRIBUTION BD.	GENSET ANCILLARIES SUPPLY		
C04	1.0	24 25C+E	Circular	PVC/PVC	GENSET TO SWITCHBOARD - ATS CONTROL TERMINALS	24VDC CONTROL		

NOTE:

1 ELECTRICAL CONTRACTOR TO COMPLETE AND SUBMIT TO PRINCIPAL FOR APPROVAL PRIOR TO ORDERING AND INSTALLATION.

2. FOR CABLE SIZES REFER TO TECHNICAL SPECIFICATION.

NEW WORK
D
GENSET CABLES TO BE INSTALLED

As Built

Sheet 08

FOR CONSTRUCTION

NO	DATE	AMENDMENT	INITIALS
D	03.2006	APPROVED FOR CONSTRUCTION	
C	05.2005	24HR GENSET UPGRADE	
B	4-11-03	AS BUILT	MT
A	27-3-03	ISSUED FOR CONSTRUCTION	AH

PRINCIPAL ENGINEER: ORIGINAL SIGNED BY A. MOONEY — R.P.E.Q. NO. 5596 — DATE 4/03
MANAGER ENGINEERING — DATE
PRODUCTION / NETWORK DELEGATE — DATE

	NAME	DATE
DESIGN	C.J.	11-3-03
DRAWN	H.T.	11-3-03
CHECKED	A. M.	4/03

Brisbane City

JOB FILE
ACAD FILE — S98708-rEV.DWG
SURVEY No.
SURVEYED — FIELD BOOK — A.H. DATUM

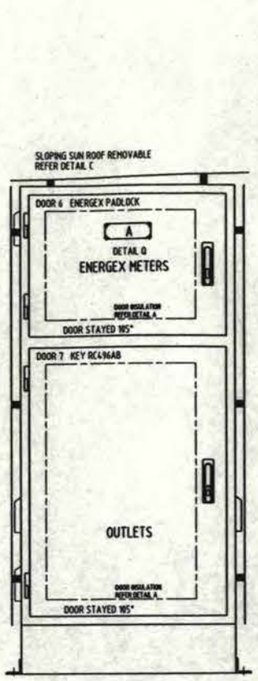
Brisbane Water — Projects + Engineering

PROJECT: KARANA DOWNS WIRRIBOOT COURT - SP292 SEWAGE PUMP STATION

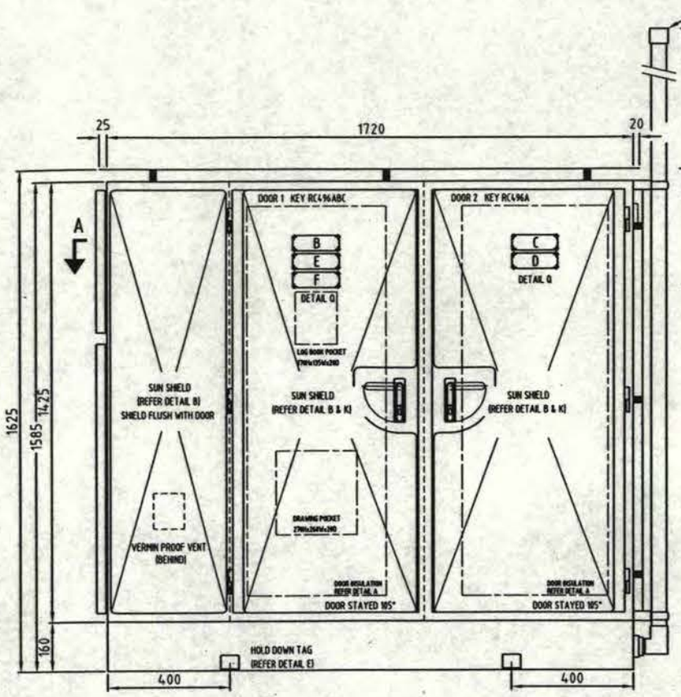
TITLE: CABLE SCHEDULE

SCALE NTS — N° 9 OF 15 SHEETS

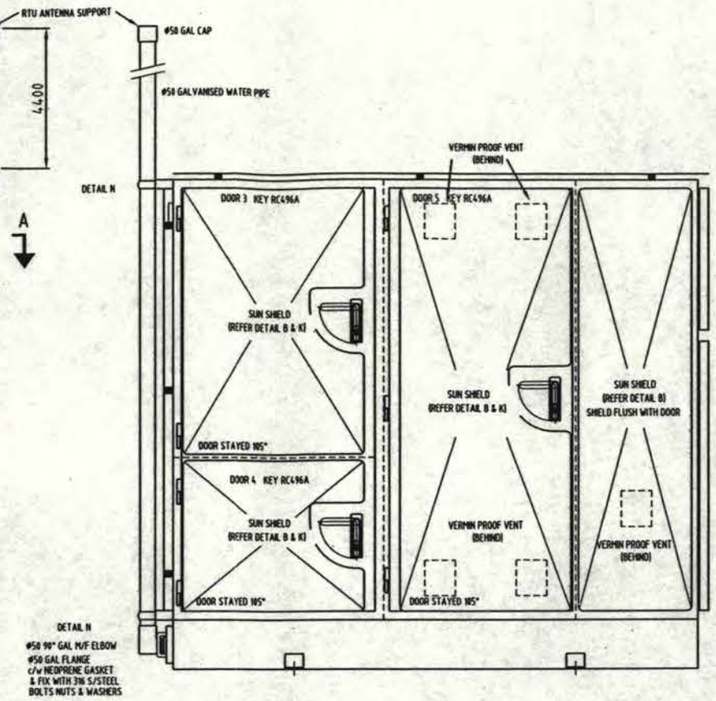
DRAWING N° 486/5/7-FK708 — AMEND. D



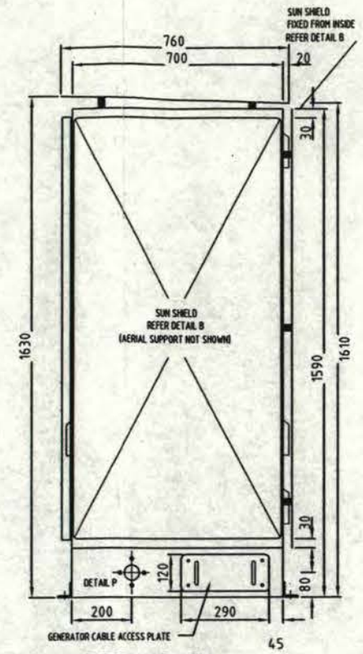
LEFT HAND VIEW



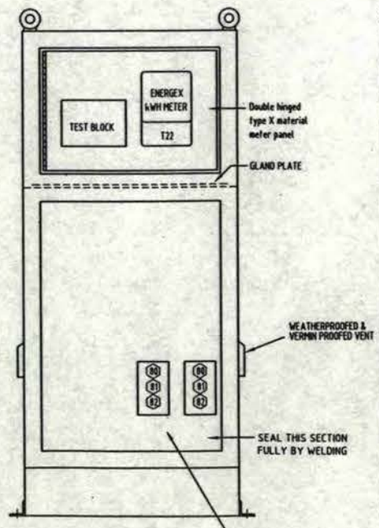
FRONT VIEW



REAR VIEW

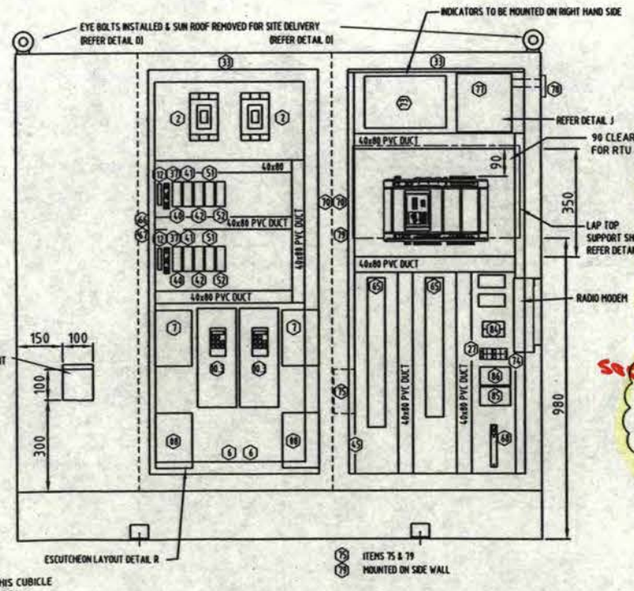


RIGHT HAND VIEW



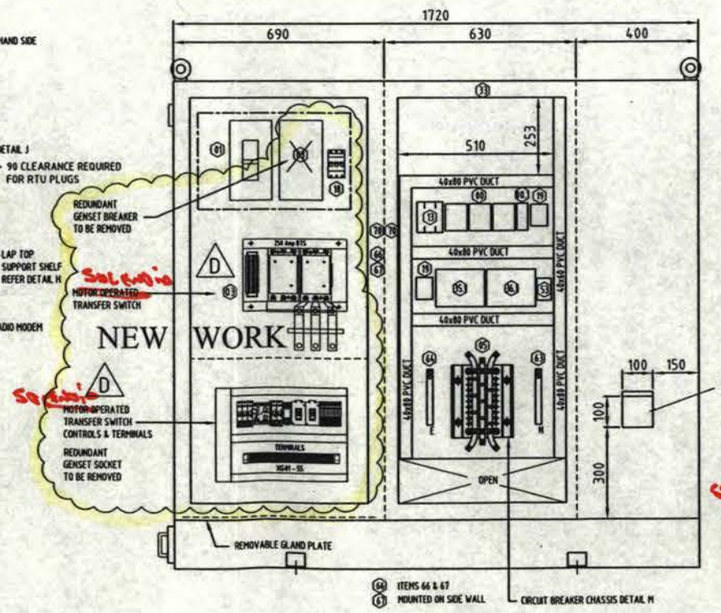
LEFT HAND ELEVATION

DOORS & SHIELDS REMOVED



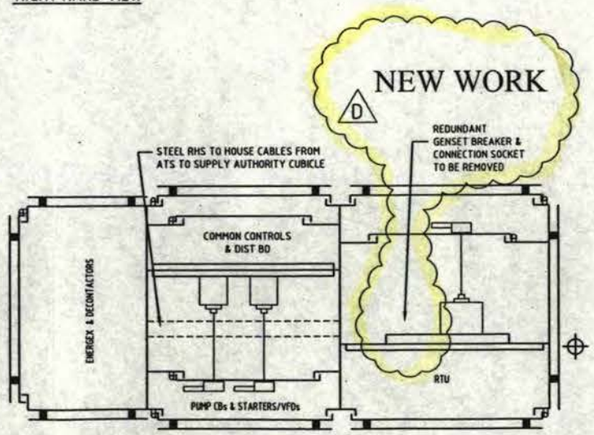
FRONT ELEVATION

DOORS & SHIELDS REMOVED



REAR ELEVATION

DOORS & SHIELDS REMOVED



SECTION A-A

NEW WORK

D

NOTE

THE MOTOR OPERATED AUTOMATIC TRANSFER SWITCH INSTALLATION MUST BE READ IN CONJUNCTION WITH THE TYPICAL DRAWINGS FOR A MOTOR OPERATED ATS UNIT CUBICLE: 486/5/7-PS803 & PS804.

As Builts

Sheet 10

FOR CONSTRUCTION

NO.	DATE	AMENDMENT	INITIALS
D	03.2006	APPROVED FOR CONSTRUCTION	
C	11.2005	2005 GENSET UPGRADE	
B	28-8-03	LAYOUT REVISED	CJ
A	27-3-03	ISSUED FOR CONSTRUCTION	

PRINCIPAL ENGINEER A. MOONEY R.P.E.Q. NO. 5596 DATE 4/03
MANAGER ENGINEERING DATE
PRODUCTION / NETWORK DELEGATE DATE

	NAME	DATE
DESIGN	C.J.	11-3-03
DRAWN	H.T.	11-3-03
CHECKED	A.M.	4/03

Brisbane City

JOB FILE
ACAD FILE S3FK710-RevC.DWG
SURVEY No. FIELD BOOK
SURVEYED A.H. DATUM

Brisbane Water Projects + Engineering

PROJECT
KARANA DOWNS
WIRRIBOOT COURT - SP292
SEWAGE PUMP STATION

TITLE
SWITCHBOARD
GENERAL ARRANGEMENT

SCALE 1:10 | N° 11 OF 15 SHEETS
DRAWING N° 486/5/7-FK710 | AMEND. D

CONSTRUCTION

Cubicle construction 3mm Marine grade Aluminium (5251).
Plinth construction 160x60 channel 6061 T6 Grade Aluminium.
Folded, "Pulse MIG" & "TIG welded with all visible seams and joints fully welded, free from splatter and ground smooth where needed.
External doors and covers fitted with Emka 1011-207 self grip seal.
"D" Handles fitted where indicated on the drawings.
M6 Earth studs fixed to the interior of all doors and hinged escutcheons and on adjacent cubicle interior surfaces.
Door stiffeners, door stays, cable straps, and document holders etc fitted where shown on the drawings.
Lift-off covers and mounting panels fixed with M8 studs & chrome acorn nuts.
Gland plates manufactured from 6mm Bakelite.
Gland plate openings reinforced with 25x6mm flat aluminium bar.
Gland plate seals attached to cubicle not gland plate.
Gland plate fixings are NOT more than 150 mm apart (refer Detail F)
Hinges Selectrix Hi-B650.
Star washers fitted under all hinge screws.
Locks Doors 1-5, 7
Selectrix 1107 - PSCU1 handle
Selectrix 1107-U123 3pt cam
Lockwood 71 Barrel Lock
Emka 1049-U3 roller rod
Key Codes RC496A, RC496AB, RC496ABC refer to each door for clarification.

Lock Door 6
Selectrix 1107-PSC01 handle
ectrix 1107-U123 3pt cam
ka 1049-U3 roller rod
ENERGEX Lockwood No234B brass pin tumbler padlock.
Hinged escutcheons fixed with Emka 1/4 turn 1000-U142

OPERATING PARAMETERS

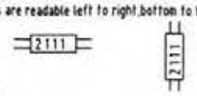
Standard	AS 3439.1
Current & Frequency	AC 50Hz
Rated Operational Voltage Ue	415 VAC
Rated Insulation Voltage Ui	660 V
Rated Auxiliary Voltage	24 VDC / 240 VAC
Rated Current (Main Bus)	400 AMPS
Short Circuit Current Isc	35 kA
Duration of Isc	1 sec
Degree of Protection	IP 55 to AS 1939
Measure of Protection by barriers and enclosures	
Service Conditions	Outdoors
Mass	Not exceeding 2000kg
Forms of Segregation	Form 1
Earthing System	TN-S

PAINTING

Aluminium Surface Preparation.
Finish smooth all exposed welds, clean, descale, and degrease all surfaces.
Surfaces pretreatment in accordance with AS 1580 & AS 3715 using
Novox LF acid etch cleaner, Novacoat 12 conversion coating, & clean water rinses
Apply DULUX ALPHATECH 3000 powder coat to manufacturer's recommendations.
CUBICLE & EXTERNAL COMPONENTS :- DULUX Mist Green (36648) matt finish.
INTERIOR ITEMS (mounting panels, escutcheons, etc.) :- DULUX Bright White (32166)
Minimum Dry Film Thickness all surfaces 50 microns.

WIRING

All wiring to be PVC V90 HT 0.6/1Kv Grade with tinned conductor.
Control and instrumentation wiring has flexible copper conductors, and is colour coded as detailed below, numbered each end, and terminated by the use of appropriate pre-insulated crimp lugs.
Power wiring to be minimum 2.5sqmm stranded copper conductors, phase colour coded as detailed below.
Low level instrumentation signals & 4-20mA signals wired in shielded pair minimum size 0.5sqmm. Earthed at one end only.
Earth cables minimum 2.5sqmm flexible.
Doors and hinged escutcheons bonded with 4sqmm flexible earth strap.
Wire numbering will be equal to Grafoplast SI2000 system.
Wire numbers are readable left to right,bottom to top as shown.



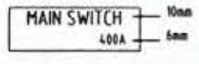
COLOUR CODE

Phase wiring (A,B &C)	Red, White, Blue	2.5sqmm (min)
Potential Metering (240/415 VAC)	Red, White, Blue, Black	1.5sqmm
Current Metering (Secondary)	Red, White, Blue, Grey	2.5sqmm
240 VAC Control Active	Red	1.5sqmm
240 VAC Neutral	Black	1.5sqmm
24 V ELV Positive	Orange	1.5sqmm
24 V ELV Negative	Violet	1.5sqmm
24 V RTU Positive	Orange	0.5sqmm
24 V RTU Negative	Violet	0.5sqmm
RTU Wiring	Grey	0.5sqmm
Intrinsically safe wiring	Blue	1.5sqmm
Earth	Green/Yellow	2.5sqmm (min)
Door & Escutcheon Earth Bonds	Green/Yellow	4 sqmm

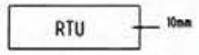
LABELS

Internal labels W/B/W engraved traffolyte to label schedule.
Warning labels R/W/R engraved traffolyte.

Main switch labels — Material B/W/B



Compartment labels — Material W/B/W



Warning labels — Material R/W/R

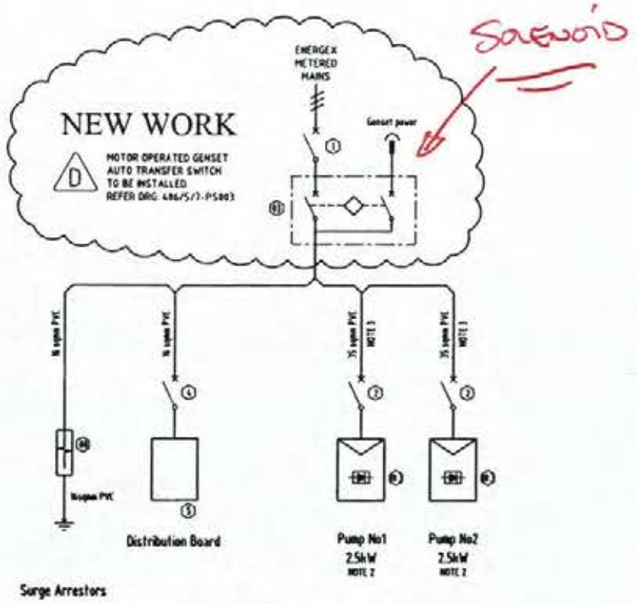
Other labels — Material W/B/W

Internal labels secured by M3 chrome plated metal threads.
Labels obstructed by switchboard wiring are relocated to adjacent duct lid.
The duct lid is secured by a single cable tie at one corner.
External labels secured by M3 316 stainless steel metal threads.

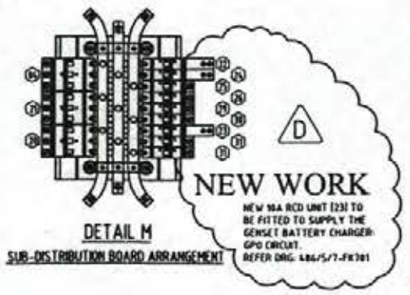
LABEL	TEXT	TEXT HEIGHT	PAINT FILL LETTERING	DIMENSIONS	QUANTITY
A	SUPPLY AUTHORITY METER PANEL	10mm	Black	300x250	1
B	SPWater®	20mm	Black	150x35	1
C	WARNING THIS SITE IS MONITORED BY NETWORK CONTROL PLEASE INFORM THE OPERATOR BEFORE ISOLATING PUMPS OR STATION	8mm	Black	250x100	1
D	PLEASE CHECK THAT THE PUMPS ARE IN REMOTE MODE BEFORE LEAVING SITE	8mm	Black	200x60	1
E	DANGER 415V	8mm	Red	120x75	1
F	ELECTRONIC SOFT STARTERS No.1 & No.2	10mm	Black	300x225	1

External Labels 1mm thk. 316 grade stainless steel.
Fixed with M3 316 stainless steel metal threads.

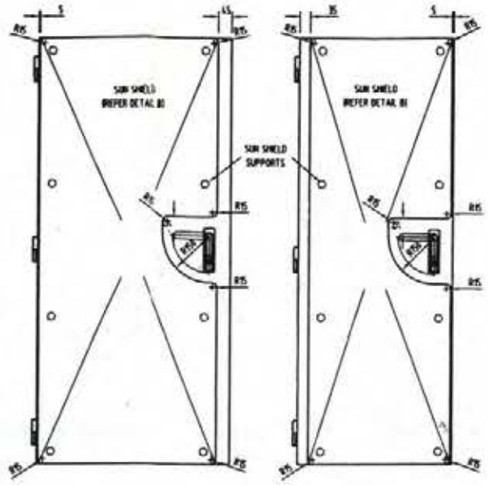
DETAIL Q
(EXTERNAL STAINLESS STEEL LABEL DETAIL)



POWER WIRING DETAIL



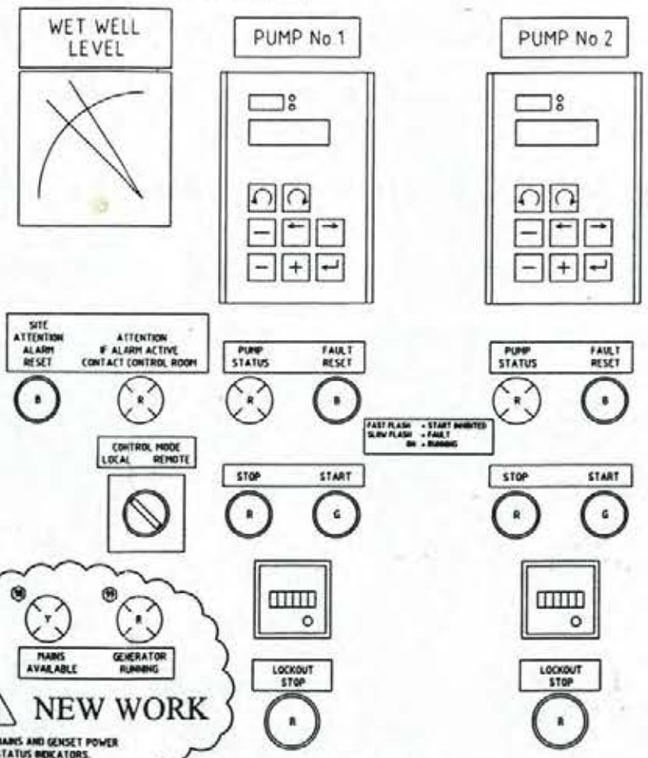
DETAIL M
SUB-DISTRIBUTION BOARD ARRANGEMENT



DETAIL K
(DOOR SUN SHIELD DETAIL)

NOTES

1. ADD CORRECT PUMP No.
2. ADD CORRECT PUMP RATINGS.
3. ADD CORRECT WIRE SIZE



TYPICAL ESCUTCHEON LAYOUT

PUMPS INTERLOCKED

WIRRIBOOT COURT	
ACTUAL SURCHARGE	??%
SURCHARGE IMMINENT	??%
START DUTY PUMP	??%
STOP DUTY PUMP	??%
LEVEL PROBE LENGTH	??%
LEVEL PROBE RANGE	??%

Sheet 11

FOR CONSTRUCTION
AS BUILT

NO	DATE	AMENDMENT	INITIALS
D	01.2016	APPROVED FOR CONSTRUCTION	MJF
C	01.2015	2015 GENSET UPGRADE	
B	7-4-03	ESCUTCHEON LAYOUT REVISED	RT
A	11-3-03	ISSUED FOR CONSTRUCTION	AH

	NAME	DATE
DESIGN	C.J.	11-3-03
DRAWN	H.T.	11-3-03
CHECKED	A.H.	6/03

PRINCIPAL ENGINEER: ORIGINAL SIGNED BY A. MOONEY R.P.E.Q. NO. 5596 6/03 DATE
MANAGER ENGINEERING: DATE
PRODUCTION / NETWORK DELEGATE: DATE

Brisbane City

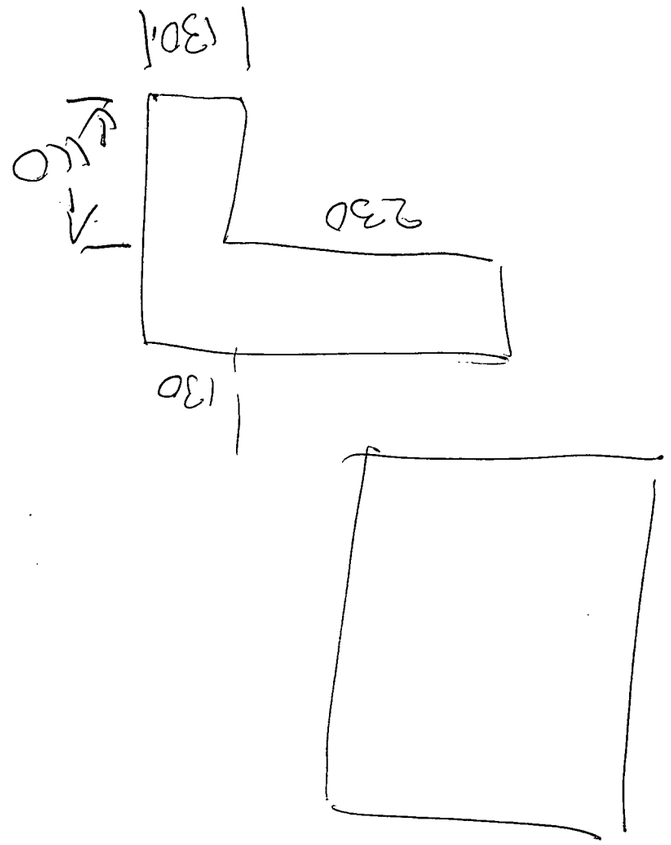
JOB FILE
ACAD FILE: S7FK711-Revc.DWG
SURVEY No.
SURVEYED
FIELD BOOK
A.H. DATUM

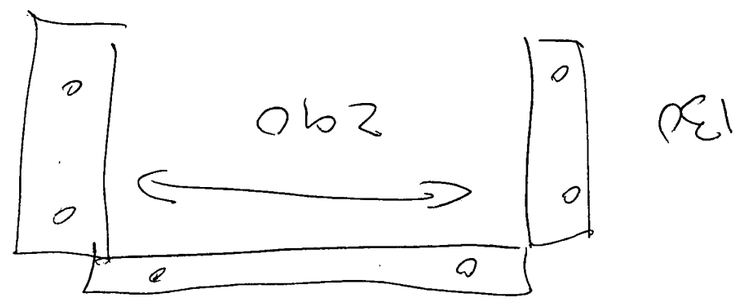
Brisbane Water — Projects + Engineering

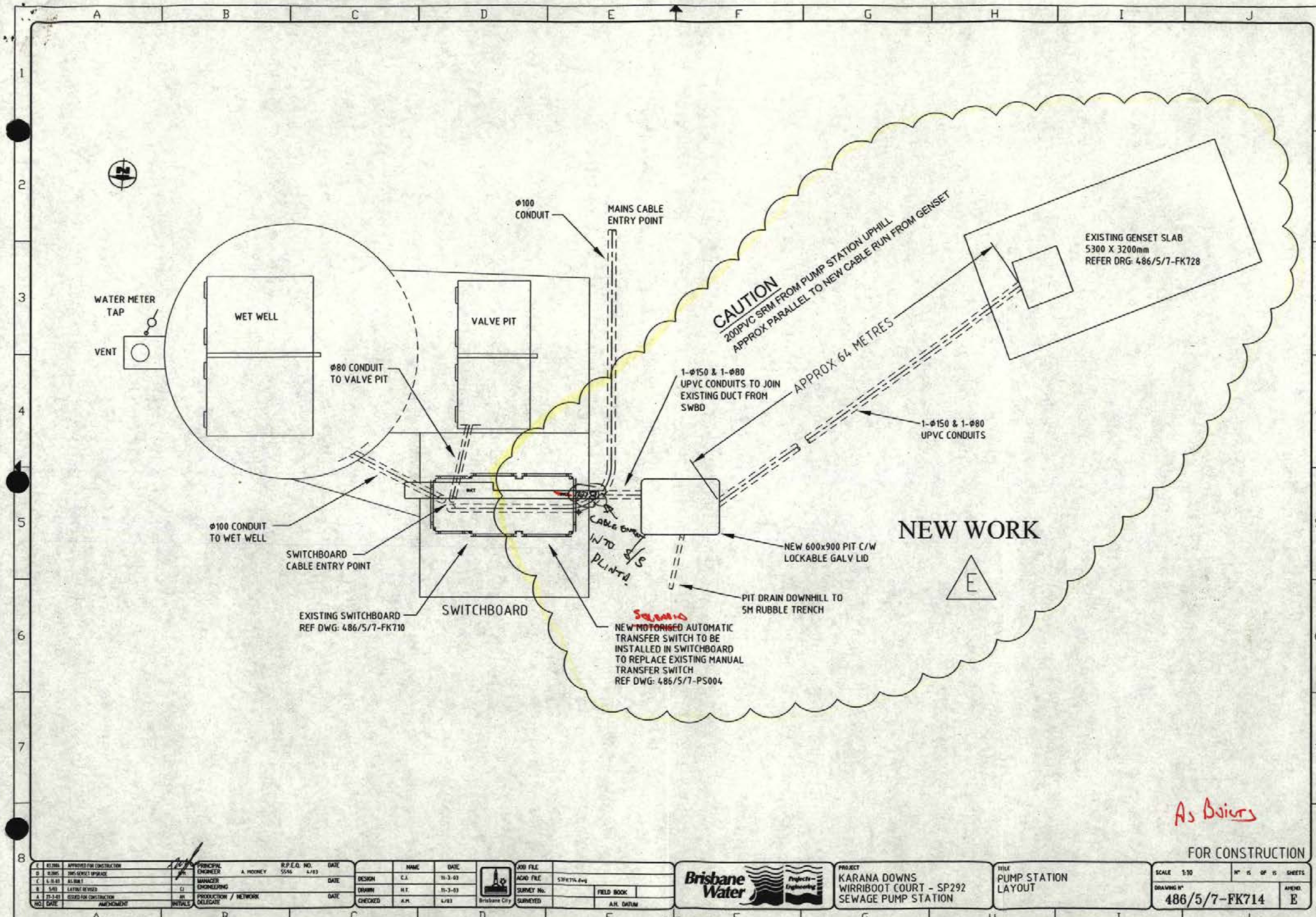
PROJECT: KARANA DOWNS WIRRIBOOT COURT - SP292 SEWAGE PUMP STATION

TITLE: SWITCHBOARD CONSTRUCTION NOTES

SCALE: NTS — N° 12 OF 15 SHEETS
DRAWING N°: 486/5/7-FK711
AMEND: D


130
230
130


290
130


WATER METER TAP
VENT
WET WELL
VALVE PIT
Ø100 CONDUIT
MAINS CABLE ENTRY POINT
Ø80 CONDUIT TO VALVE PIT
Ø100 CONDUIT TO WET WELL
SWITCHBOARD CABLE ENTRY POINT
EXISTING SWITCHBOARD REF DWG: 486/5/7-FK710
SWITCHBOARD
CAUTION
200PVC SRM FROM PUMP STATION UPHILL
APPROX PARALLEL TO NEW CABLE RUN FROM GENSET
APPROX 64 METRES
EXISTING GENSET SLAB
5300 X 3200mm
REFER DRG: 486/5/7-FK728
1-Ø150 & 1-Ø80 UPVC CONDUITS TO JOIN EXISTING DUCT FROM SWBD
1-Ø150 & 1-Ø80 UPVC CONDUITS
CABLE ENTRY INTO S/S PLINTH
NEW WORK
E
NEW 600x900 PIT C/W LOCKABLE GALV LID
PIT DRAIN DOWNHILL TO 5M RUBBLE TRENCH
NEW MOTORISED AUTOMATIC TRANSFER SWITCH TO BE INSTALLED IN SWITCHBOARD TO REPLACE EXISTING MANUAL TRANSFER SWITCH
REF DWG: 486/5/7-PS004
As Builts
FOR CONSTRUCTION
PRINCIPAL ENGINEER A. MOONEY R.P.E.Q. NO. 5596 4/03
MANAGER ENGINEERING
PRODUCTION / NETWORK DELEGATE
DESIGN C.J. 11-3-03
DRAWN H.T. 11-3-03
CHECKED A.M. 4/03
Brisbane City
JOB FILE
ACAD FILE
SURVEY No.
SURVEYED
FIELD BOOK
A.H. DATUM
Brisbane Water
PROJECT
KARANA DOWNS
WIRRIBOOT COURT - SP292
SEWAGE PUMP STATION
TITLE
PUMP STATION
LAYOUT
SCALE 1:10
DRAWING N°
486/5/7-FK714
AMEND. E

BRISBANE WATER

SEWAGE SYSTEM IMPROVEMENT 2005
GENERATOR EMERGENCY POWER
AUTOMATIC TRANSFER SWITCHES

ELECTRICAL DRAWING INDEX

ELECTRICAL DRAWINGS INDEX			
DWG N°.	TITLE	ISSUE	REVISIONS
486/5/7-PS000	DRAWING INDEX - ELECTRICAL INSTALLATION	05.2006	~~0~~ ~~1~~ ~~2~~ 3
486/5/7-PS001	TYPICAL SOLENOID OPERATED - AUTOMATIC TRANSFER SWITCH - WIRING SCHEMATIC DIAGRAM	05.2006	~~0~~ ~~1~~ 2
486/5/7-PS002	TYPICAL SOLENOID OPERATED - AUTOMATIC TRANSFER SWITCH - CUBICLE ARRANGEMENT	05.2006	~~0~~ ~~1~~ 2
486/5/7-PS003	TYPICAL MOTOR OPERATED - AUTOMATIC TRANSFER SWITCH - WIRING SCHEMATIC DIAGRAM	05.2006	~~0~~ ~~1~~ 2
486/5/7-PS004	TYPICAL MOTOR OPERATED - AUTOMATIC TRANSFER SWITCH - CUBICLE ARRANGEMENT	05.2006	~~0~~ ~~1~~ 2
486/5/7-PS005	TYPICAL SOLENOID OPERATED - AUTOMATIC TRANSFER SWITCH - INTERCONNECTION DIAGRAM	05.2006	~~0~~ 1
486/5/7-PS006	TYPICAL MOTOR OPERATED - AUTOMATIC TRANSFER SWITCH - INTERCONNECTION DIAGRAM	05.2006	~~0~~ 1
486/5/7-PS007	AUTOMATIC TRANSFER SWITCH - ATS EXTENSION CUBICLE - TYPICAL CONCRETE BASE ARRANGEMENT	05.2006	~~0~~ 1
	SOLENOID OPERATED - AUTOMATIC TRANSFER SWITCH - SITE SPECIFIC INSTALLATIONS		
486/5/7-KI440	RADNOR STREET INDOOROOPILLY - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	03.2006	~~A~~ ~~B~~ ~~C~~ D
486/7/85-KJT070	BRISBANE STREET TOOWONG - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	03.2006	~~A~~ ~~B~~ C
486/5/7-QT200	RAUBERS ROAD NORTHGATE - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	03.2006	~~A~~ ~~B~~ C
486/5/7-TQ035	SUGARMILL ROAD MEEANDAH - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	03.2006	~~A~~ ~~B~~ ~~C~~ ~~D~~ E
486/5/7-FD015	LAGOON CRESCENT BELLBOWRIE - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	03.2006	~~A~~ ~~B~~ C
	MOTOR OPERATED - AUTOMATIC TRANSFER SWITCH - SITE SPECIFIC INSTALLATIONS		
486/5/7-FD410	BIRKIN ROAD BELLBOWRIE - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	03.2006	~~C~~ ~~D~~ ~~E~~ ~~F~~ G
486/5/7-FD135	PIONEER CRESCENT BELLBOWRIE - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	03.2006	~~A~~ ~~B~~ ~~C~~ ~~D~~ E
486/5/7-FK700	WIRRIBOOT COURT KARANA DOWNS - GENSET A.T.S. INSTALLATION - ELECTRICAL DRAWING INDEX	03.2006	~~A~~ ~~B~~ ~~C~~ ~~D~~ E

SOLENOID OPERATED

As Built

FOR CONSTRUCTION

No	DATE	AMENDMENT	DRN.	APD.
3	06.06	RE-ISSUED FOR CONSTRUCTION. REVISION UPDATES	MJL	
2	05.06	NEW BORDER. RE-ISSUED FOR CONSTRUCTION	MJL	
1	04.06	DRAWINGS PS005, 6 AND 7 ADDED	MJL	

Reference Drawings

DRAFTED M.J. LIGHTBODY
DRAFTING CHECK
CAD FILE 57PS000_3
B.C.C. FILE No.

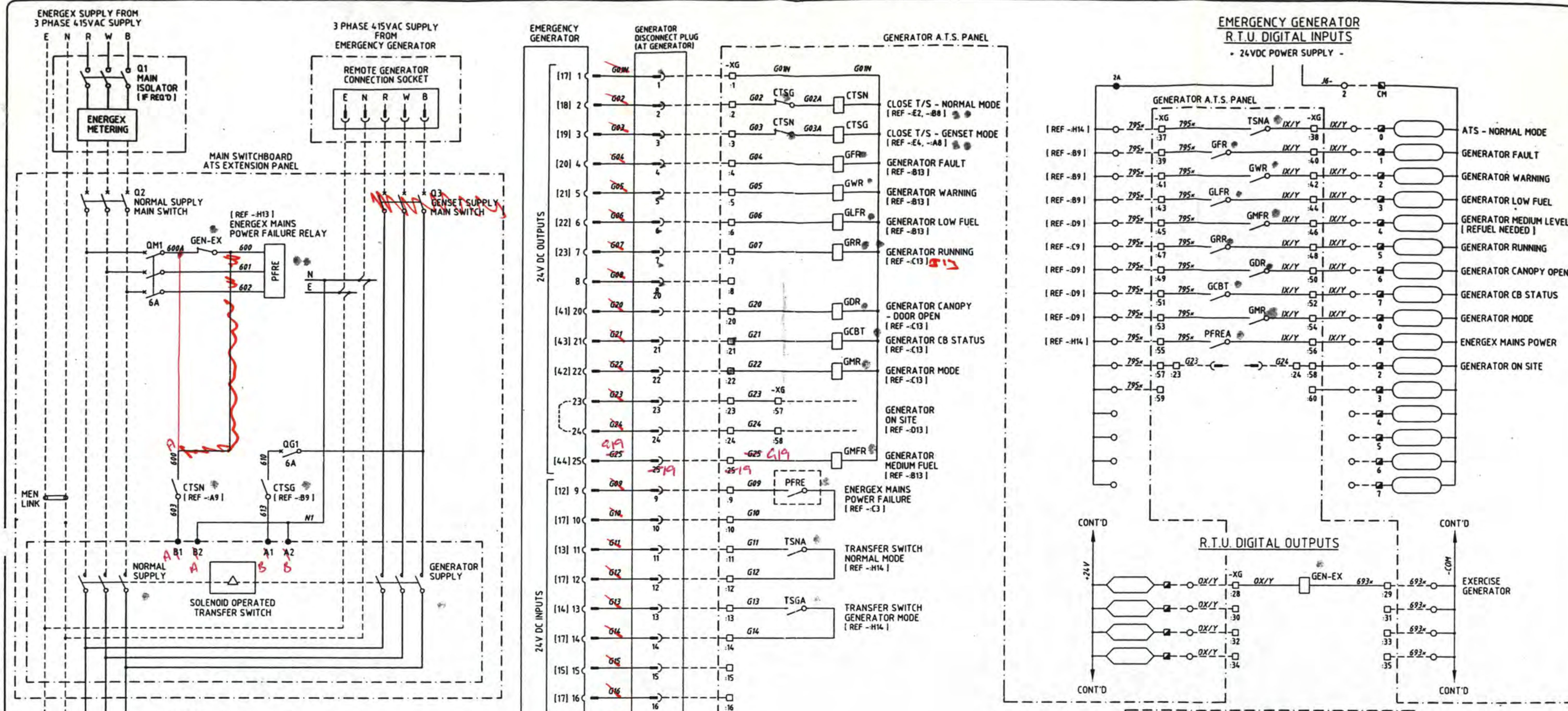
DESIGN R.P.E.Q. No. DATE
DESIGN CHECK R.P.E.Q. No. DATE
PRINCIPAL DESIGN MANAGER DATE
CLIENT DELEGATE DATE

BRISBANE WATER

PROJECT
SEWAGE SYSTEM IMPROVEMENT 2005
STANDBY GENERATORS

TITLE
AUTOMATIC TRANSFER SWITCH
ELECTRICAL INSTALLATION
ELECTRICAL DRAWING INDEX

SHEET No. 18
BRISBANE WATER DRAWING No. 486/5/7-PS000
AMEND. 3



ENERGEX SUPPLY FROM 3 PHASE 415VAC SUPPLY
3 PHASE 415VAC SUPPLY FROM EMERGENCY GENERATOR
REMOTE GENERATOR CONNECTION SOCKET
Q1 MAIN ISOLATOR (IF REQ'D)
ENERGEX METERING
MAIN SWITCHBOARD ATS EXTENSION PANEL
Q2 NORMAL SUPPLY MAIN SWITCH
Q3 GENSET SUPPLY MAIN SWITCH
ENERGEX MAINS POWER FAILURE RELAY
SOLENOID OPERATED TRANSFER SWITCH
NORMAL SUPPLY
GENERATOR SUPPLY
MEN LINK
415V TO MAIN SWBD CCTS
EMERGENCY GENERATOR
GENERATOR DISCONNECT PLUG (AT GENERATOR)
24V DC OUTPUTS
24V DC INPUTS
SPARE
GENERATOR A.T.S. PANEL
CLOSE T/S - NORMAL MODE
CLOSE T/S - GENSET MODE
GENERATOR FAULT
GENERATOR WARNING
GENERATOR LOW FUEL
GENERATOR RUNNING
GENERATOR CANOPY - DOOR OPEN
GENERATOR CB STATUS
GENERATOR MODE
GENERATOR ON SITE
GENERATOR MEDIUM FUEL
ENERGEX MAINS POWER FAILURE
TRANSFER SWITCH NORMAL MODE
TRANSFER SWITCH GENERATOR MODE
EMERGENCY GENERATOR R.T.U. DIGITAL INPUTS
+ 24VDC POWER SUPPLY -
ATS - NORMAL MODE
GENERATOR MEDIUM LEVEL (REFUEL NEEDED)
GENERATOR CANOPY OPEN
ENERGEX MAINS POWER
R.T.U. DIGITAL OUTPUTS
EXERCISE GENERATOR
+ 24VDC POWER SUPPLY - (BATTERY BACKED) FROM MAIN SWITCHBOARD
TRANSFER SWITCH AUXILIARIES
T/S IN NORMAL POSITION AUXILIARY RELAY
T/S IN GENSET POSITION AUXILIARY RELAY
ENERGEX PHASE FAILURE AUXILIARY RELAY
MAINS AVAILABLE
GENERATOR RUNNING
INDICATORS ON SWITCHBOARD
240VAC FROM SWBD. DB
DOOR SW
8W FLUORESCENT
SWITCHBOARD INTERNAL LIGHT CCT.

NOTES

1. ALL FUSES ARE 500mA UNLESS NOTED OTHERWISE.
2. REFER DWG: 486/5/7-PS005 FOR INTERCONNECTION DIAGRAM.
3. R.T.U. DIGITAL I/O ADDRESSES TO BE DERIVED FROM SITE SPECIFIC DRAWING REFERENCE TABLE.
4. GENERATOR STARTED & STOPPED
   (a) AUTOMATICALLY UNDER POWER FAILURE CONDITIONS VIA PFRE PHASE FAILURE RELAY.
   (b) SIMULATED PHASE FAILURE VIA R.T.U. AND GEN-EX RELAY.
5. R.T.U. PRESENTATION IS GENERIC. WIRE NUMBERS AND I/O ADDRESSES SHALL BE DERIVED FROM THE SITE SPECIFIC DRAWINGS LISTED IN THE REFERENCE TABLE AS SHOWN BELOW.
6. CONTACT/COIL LOCATION REFS:
   REF -:C3 = REFER THIS DWG., GRID REF C3
   REF 05:H11 = REFER DWG. PS005, GRID REF H11

SITE SPECIFIC DRAWING REFERENCES:

SEWAGE PUMP STATION SITE:	SITE DWG INDEX:	RTU I/O REF DWG:
RADNOR STREET - INDOOROOPILLY	486/5/7-KI440	486/5/7-KI445
BRISBANE STREET - TOOWONG	486/7/85-KJT070	486/7/85-KJT075
RAUBERS ROAD - NORTHGATE	486/5/7-QT200	486/5/7-QT209
SUGARMILL ROAD - MEEANDAH	486/5/7-TQ035	486/5/7-TQ040
LAGOON CRESCENT - BELLBOWRIE	486/5/7-FD610	486/5/7-FD614

FOR CONSTRUCTION

No	DATE	AMENDMENT	DRN.	APD.
2	05.06	REDRAWN. SCHEMATIC UPGRADED.		
1	03.06	APPROVED FOR CONSTRUCTION	MJL	
0	11.05	REDRAWN FROM GHD DRAWING		

Reference Drawings

DRAFTED: M.J. LIGHTBODY
DRAFTING CHECK
CAD FILE: 57PS001_2
B.C.C. FILE No.

DESIGN — R.P.E.Q. No. — DATE
DESIGN CHECK — R.P.E.Q. No. — DATE
PRINCIPAL DESIGN MANAGER — DATE
CLIENT DELEGATE — DATE

BRISBANE WATER

PROJECT: SEWAGE SYSTEM IMPROVEMENT 2005 STANDBY GENERATORS

TITLE: TYPICAL SOLENOID OPERATED AUTOMATIC TRANSFER SWITCH WIRING SCHEMATIC DIAGRAM

SHEET No. 18

BRISBANE WATER DRAWING No. 486/5/7-PS001 — AMEND. 2

GENERATOR

GENERATOR 24VDC INPUTS/OUTPUTS [FROM DWG: 05.15016-600]

NEG. -24VDC SUPPLY	17
CLOSE MAINS ATS	18
CLOSE GENSET ATS	19
GENSET FAULT	20
GENSET WARNING ALARM	21
LOW FUEL	22
GENSET RUNNING	23
GENSET CONNECTED	24
PHASE FAILURE	12, 17
MAINS ON LINE	13, 17
GENSET ON LINE	14, 17
REMOTE START GENSET	15, 17
REMOTE STOP GENSET	16, 17
[NO CONNECTION]	
GENSET CANOPY DOORS OPEN	41
GENSET C/B - OFF / TRIPPED	43
GENSET IN AUTO	42
GENSET CONTROLS CONNECTED	
REFUEL NEEDED	44
[NO CONNECTION]	
[NO CONNECTION]	

GENERATOR P.L.C.

24V DC OUTPUTS	[17]	1
	[18]	2
	[19]	3
	[20]	4
	[21]	5
	[22]	6
	[23]	7
NOT USED		8
24V DC INPUTS	[12]	9
	[17]	10
	[13]	11
	[17]	12
	[14]	13
	[17]	14
NOT USED		15
NOT USED		16
NOT USED		17
NOT USED		18
NO CONN.		19
24V DC OUTPUTS	[41]	20
	[43]	21
	[42]	22
		23
		24
	[44]	25
SPARE		26
SPARE		27

GENERATOR DIS-CONNECT PLUG

1	G01N	1
2	G02	2
3	G03	3
4	G04	4
5	G05	5
6	G06	6
7	G07	7
	SP	8
8	G09	9
9	G10	10
10	G11	11
11	G12	12
12	G13	13
13	G14	14
14	G15	15
15	G16	16
16	G17	17
17	G18	18
18	SP G19	19
19	G20	20
20	G21	21
21	G22	22
22	G23	23
23	G24	24
24	G25	25
25	SP	26
26	SP	27
27		

C04

24VDC DIGITAL OUTPUT MODULE

[GEN-EX]	EXERCISE GENSET	1
[STRG]	START GENSET	2
[STPG]	STOP GENSET	3
	SPARE OUTPUT	4

7960 OX/00 OX/01 OX/02 OX/03 OX/04 OX/05 OX/06 OX/07 0V DC 693x

OX/Y 693x W Bk

XXX

24VDC DIGITAL INPUT MODULE

[TSNA]	T/S AT NORMAL POS'N.	1
[GFR]	GENSET FAULT	2
[GWR]	GENSET WARNING	3
[GLFR]	GENSET LOW FUEL	4
[GMFR]	GENSET MEDIUM FUEL	5
[GRR]	GENSET RUNNING	6
[GDR]	GENSET CANOPY OPEN	7
[GCBT]	GENSET C/B STATUS	8
[GMR]	GENSET CONTROL MODE	9
[PFRE]	ENERGEX MAINS POWER	10
[GOS]	GENSET ON SITE	11
	SPARE INPUT	12

IX/00 IX/01 IX/02 IX/03 IX/04 IX/05 IX/06 IX/07 IX/08 IX/09 IX/10 IX/11 IX/12 IX/13 IX/14 IX/15

795x 24V DC+ IX/Y 795x W Bk

XXX

MAIN SWITCHBOARD
R.T.U. - SECTION

NOTE:-
R.T.U. WIRE NUMBERING VARIES FROM SITE TO SITE. WIRE Nos: *OX/Y & IX/Y* AND *795x & 693x* SHALL BE REPLACED BY SITE SPECIFIC WIRE NUMBERS. [REFER TO NOTE 5]

MAIN SWITCHBOARD

CONTROL PANEL STATUS INDICATORS

MAINS AVAILABLE — Y — 623 — 0VDC — R
GENERATOR RUNNING — R — 624 — 0VDC — B, W, Bk

XXX

R.T.U. SECTION - POWER SUPPLY

BATTERY BACKED 24VDC SUPPLY — +24VDC — 0VDC — R, Bk

POINT OF SUPPLY TO BE DETERMINED ON SITE

XXX

MAIN SWITCHBOARD [EXISTING] - EXTENSION PANEL
GENERATOR A.T.S. PANEL

NOTE:- T/S = TRANSFER SWITCH

-XG

1	G01N	1	G01N	COMMON
2	G02	2	CTSG CTSN G02A	CTSN — CLOSE T/S TO NORMAL [REF -B12, 01:E2]
3	G03	3	G03A	CTSG — CLOSE T/S TO GENERATOR [REF -B11, 01:E3]
4	G04	4	G04	GFR — GENERATOR FAULT [REF -F11]
5	G05	5	G05	GWR — GENERATOR WARNING [REF -F11]
6	G06	6	G06	GLFR — GENERATOR LOW FUEL [REF -F11]
7	G07	7	G07	GRR — GENERATOR RUNNING [REF -F11, -H11]
8	G08	8		
9	G09	9	G09	PFRE — ENERGEX MAINS POWER FAILURE [REF 01:C3]
10	G10	10	G10	
11	G11	11	G11	TSNA — T/S AT NORMAL POSITION [REF 01:H14]
12	G12	12	G12	
13	G13	13	G13	TSGA — T/S AT GENERATOR POSITION [REF 01:H14]
14	G14	14	G14	
15	G15	15		
16	G16	16		
17	G17	17		
18	G18	18		
19	G19	19	G19	
20	G20	20	G20	GDR — GENERATOR CANOPY OPEN [REF -G11]
21	G21	21	G21	GCBT — GENERATOR CB STATUS [REF -G11]
22	G22	22	G22	GMR — CONTROL MODE [REF -G11]
23	G23	23	G23	
24	G24	24	G24	
25	G25	25	G25	GMFR — GENERATOR MEDIUM FUEL [REF -F11]
26	G26	26		
27	G27	27		
1 W Bk	OX/Y 693x	28	OX/Y 693x	GEN-EX — EXERCISE GENERATOR [REF 01:C3]
2 W Bk	OX/Y 693x	29		
3 W Bk	OX/Y 693x	30		
4 W Bk	OX/Y 693x	31		
1 W Bk	795x IX/Y	32		SPARE OUTPUTS
2 W Bk	795x IX/Y	33	795x IX/Y	TSNA [REF 01:H14]
3 W Bk	795x IX/Y	34	795x IX/Y	GFR [REF -B13]
4 W Bk	795x IX/Y	35	795x IX/Y	GWR [REF -B13]
5 W Bk	795x IX/Y	36	795x IX/Y	GLFR [REF -B13]
6 W Bk	795x IX/Y	37	795x IX/Y	GMFR [REF -D13]
7 W Bk	795x IX/Y	38	795x IX/Y	GRR [REF -B13]
8 W Bk	795x IX/Y	39	795x IX/Y	GDR [REF -D13]
9 W Bk	795x IX/Y	40	795x IX/Y	GCBT [REF -D13]
10 W Bk	795x IX/Y	41	795x IX/Y	GMR [REF -D13]
11 W Bk	795x IX/Y	42	795x IX/Y	PFREA [REF -H12]
12 W Bk	795x IX/Y	43	795x IX/Y	
R	623	44	G23	
W	624	45	G24	
B	0VDC	46		
Bk	0VDC	47		
R	+24VDC	48		SPARE INPUT
		49	623	PFREA [REF -H12]
		50	624	GRR [REF -B13]
		51	0VDC	
		52		
		53		
		54		
		55		
		56		
		57		
		58		
		59		
		60	+24VDC	
		61	+24VDC	PFRE [REF 01:C3] — 622 — PFREA — ENERGEX PHASE FAILURE AUXILIARY RELAY [REF -G11, -H11]
		62	+24VDC	
		63	0VDC	
		64	0VDC	
		65	0VDC	
		66		
		67		TSN — 620 — TSNA — TRANSFER SWITCH IN NORMAL POSITION [REF -G11, -H11]
		68		TSG — 621 — TSGA — IN GENSET POSITION [REF -G11, -H11]
		69		
		70		

LEGEND:

- C?? — CABLE IDENTIFIER
- DISCONNECT PLUG
- FUSE TERMINAL
- DISCONNECT LINK TERMINAL

NOTES

1. ALL WIRES & CABLE CORES ARE FERRULED WITH GRAFOPLAST SI2000 COMPATIBLE LABELLING.
2. ALL FUSES ARE 500mA UNLESS NOTED OTHERWISE.
3. REFER DWG: 486/5/7-PS001 FOR SCHEMATIC PRESENTATION.
4. GENERATOR STARTED & STOPPED
   (a) AUTOMATICALLY UNDER POWER FAILURE CONDITIONS VIA PFRE PHASE FAILURE RELAY.
   (b) SIMULATED PHASE FAILURE VIA R.T.U. AND GEN-EX RELAY.
5. R.T.U. PRESENTATION IS GENERIC. WIRE NUMBERS SHALL BE DERIVED FROM THE SITE SPECIFIC DRAWINGS AS LISTED IN THE REFERENCE TABLE ON DWG No: 486/5/7-PS001.
6. CONTACT/COIL LOCATION REFS:
   REF 01:E2 = REFER DWG. PS001, GRID REF E2
   REF -:H11 = REFER THIS DWG., GRID REF H11

OK

AS BUILT

FOR CONSTRUCTION

No	DATE	AMENDMENT	DRN.	APD.
1	05.06	REDRAWN. NEW BORDER. RELAY CONFIG. UPGRADED.	M.J.	
0	04.06	CONSTRUCTION ISSUE.	M.J.	

Reference Drawings

DRAFTED	M.J. LIGHTBODY
DRAFTING CHECK	
CAD FILE	S7PS005_1
B.C.C. FILE No.	

DESIGN — R.P.E.Q. No. — DATE
DESIGN CHECK — R.P.E.Q. No. — DATE
PRINCIPAL DESIGN MANAGER — DATE
CLIENT DELEGATE — DATE

BRISBANE WATER

PROJECT: SEWAGE SYSTEM IMPROVEMENT 2005 STANDBY GENERATORS

TITLE: TYPICAL SOLENOID OPERATED AUTOMATIC TRANSFER SWITCH INTERCONNECTION DIAGRAM

SHEET No. 18

BRISBANE WATER DRAWING No. 486/5/7-PS005

AMEND. 1

COMMON LOGIC Pty Ltd Specialist Electrical Contractors	Electrical Manual	
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4.0 PART LIST

Authorised By: Grant Kerr

Electrical Manual

17/11/2006

Supplier Name	Part No	Item Description	Quant
ABK Electrical Wholesale	CLIWIPM27	27 CONTROL PIN W/P INSUL PLUG HI-IMPACT	1
Crompton Instruments	252-PSGW	415V NOMINAL VOLTAGE SENSING RELAY	1
NHP Electrical Engineering	96.72	2P 12AMP RELAY BASE FOR 56.32 RLY	2
NHP Electrical Engineering	38.51 24VDC	24V DC RELAY 1CO 6A	8
NHP Electrical Engineering	56.32 0074 24VD	RELAY FPIN 2CO 12A 24VDC	2
NHP Electrical Engineering	62W3FD240VAC	SOLENOID OPERATED TRANSFER SWITCH NC	1
NHP Electrical Engineering	D5PP43NL3R	KIT D5 INT LED RED IND 24VAC/DC	1
NHP Electrical Engineering	D5PP53DLO	YELLOW PILOT LIGHT ROUND MAX 130V	1
NHP Electrical Engineering	D5PP53NL3A	KIT D5 INT LED YELLOW IND 24VAC/DC	1
NHP Electrical Engineering	DSRCBH1030A	DINT MCB/RCD 1P 10A 30MA 10KA	1
NHP Electrical Engineering	DTCB6106C	DINT 6KA 1P 6A CB	1
NHP Electrical Engineering	DTCB6306C	DINT 6KA 3P 6A CB	1
Phoenix Contact Pty Ltd	PH0441504	USLKG5 EARTH TERMINAL 4MM	2
Phoenix Contact Pty Ltd	PH3004100	UK5-HESI FUSE TERMINAL M205	4
Phoenix Contact Pty Ltd	PH3004362	UK5N 4MM FEEDTHRU TERMINAL GREY	40
Ramelec Pty Ltd	017216-0000	SAKR/35 LINK TERMINAL	32
Ramelec Pty Ltd	047456-0000	ASK1 FUSE TERMINAL	2

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5.0 TEST SHEETS

Authorised By: Grant Kerr

COMMON LOGIC Pty Ltd

A.C.N. 011 029 262

Job Card Number: 0447

ELECTRICAL CONTRACTORS LICENCE NO: 9564

Variation To Fixed Price Proj	
Cost Plus Labour Proj.	
Call Out	
Service	

CUSTOMER: Brisbane Water | Project No: SP292

Representative Name: RALPH BERRY

Position: SUPERINTENDENT | Date: 16/10/06

Signature on Completion:

Power Authority Forms	
Pre-Start Safety Mtg.	
Risk Assessment	

C/L Representative: Jeff Allan

Position: Electrician | Date: 16/10/06

Mobile Phone No: 0419 585 660

START	FINISH	DETAILS	Hrs.	No MEN	TOTAL	RATE	CHARGED
		TRAVEL TO SITE					
		Wirraboot Street					
		Mounted extra ATS Panel					
		Cut in Submains to ATS					
		Connected Generator &					
		Control cabling					
		Installed RTU fuses &					
		wiring					

PLEASE SEE ATTACHED FORM FOR ADDITIONAL ☐ TOTAL LABOUR CHARGED:

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

PLEASE SEE ATTACHED FORM FOR ADDITIONAL ☐ TOTAL MATERIALS:

PROGRESS CLAIM WORKS NOT COMPLETED AND NOT TESTED ☐

FURTHER WORK REQUIRED TO COMPLETE PROJECT. ☑

PROJECT COMPLETED NO FURTHER ACTION REQUIRED ☐

WHITE COPY -- CUSTOMER *YELLOW COPY -- OFFICE*

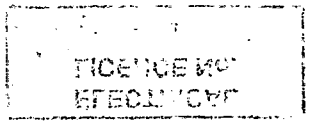
I Certify that the Electrical work listed above has been tested in accordance with the prescribed procedure and that such work complies with the requirements of the State Electricity Act.

ELECTRICAL LICENCE No. 40134

Signature: .....

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

Common Logic Pty Ltd Unit 9/58 Wecker Road, Mansfield 4122 • Ph: (07) **3849 7449** • Fax: (07) 3343 5210



COMMON LOGIC Pty Ltd
Specialist Electrical Contractors

Site Acceptance Tests

Subject: SAT for BW Generator Change Over Panels | Sheet: 1 Of: 7 | Section

Page Revision No: 0 Date: 29/08/06 Manual Issue No: 0 Date: 29/08/06

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: 29/08/06	Manual Issue No: 0 Date: 29/08/06	

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	JH86	**Site Name**	SP292 CWIRIBOOT CRT
	Name	**Signature**	**Date**
Testing Officer	GRANT KERR.		16/10/06.
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... 16/10/06.
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: 3 Of: 7	Section
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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 1.5Ω ohms

2.2 Continuity Test Sheet

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

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

GENERATOR LEADS.

MEGGAR VOLTAGE 1000 VOLTS

INSTRUMENT DETAILS _____

ACROSS	RESULT (M.OHM)	High Pot
Join Red, White & Blue Phases and Neutral, Test to Earth	>200 mΩ	
Red Phase to White, Blue & N	>200 mΩ	
White Phase to Red, Blue and N	>200 mΩ	
Blue Phase to Red, White & N	>200 mΩ	
N to Red, White & Blue	>200 mΩ	

Test Carried out by..... Grant Kerr Signed... Date... 16/10/06

Test witnessed by..... Signed... Date...

Authorised By:

COMMON LOGIC Pty Ltd **Specialist Electrical Contractors**	Site Acceptance Tests	
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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	✓	—	✓
	Mains transfer switch device isolates mains from load. (IE switchboard)	✓	—	—
2	Generator transfer switch operates and isolates generator from the load. And mechanical interlock works	✓	—	✓
3	Cables tight and correct phase rotation. Colour match.	✓	✓	✓
4	Main Switch Correct Rating/Label	✓	—	✓
5	Neutral cable connected and continuous and tight.	✓	—	—

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			

Test Carried out by.... Grant Kerr Signed... Date... 16/10/06

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: 5 Of: 7 | Section

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4.3 Terminal Visual Checklist

→ Carry out visual and mechanical checks on Site terminals

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 Drns	✓
2	All relay coils correct voltage	✓
3	Does relay require Diode fitted?	NO
4	Common Bus Link on relays fitted	✓
5	All numbering correct	✓

Test Carried out by... Grant Kerr Signed... Date... 16/10/06

Test witnessed by..... Signed... Date...

Authorised By:

COMMON LOGIC Pty Ltd **Specialist Electrical Contractors**	Site Acceptance Tests	
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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
→ Bridge each interface and test each output.
→ Install RTU terminal Plugs into terminals
→ By bridging the relevant pins and observing the relevant RTU IO feedback all circuits will be checked.
→ Test each circuit in turn with corresponding drawings

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

Test Carried out by... Grant Kerr Signed... Date... 16/10/06

Test witnessed by..... Signed... Date...

Authorised By:

COMMON LOGIC Pty Ltd **Specialist Electrical Contractors**	Site Acceptance Tests	
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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 generator 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	OK
2	Unplug set and check alarm	OK
3	Open doors	OK
4	Trip CB	OK
5	Engine temperature/Alarm	NA
6	Turn set to Auto and Manual	OK
7	Low fuel alarm	OK
8	Fuel empty alarm	OK
9		
10	Manually initiate generator start	OK
11	Manually restore to mains	OK
12	Remote start	OK
13	Remote stop	NA
14	Mains fail Start	OK
15	Return to mains	OK
16	Mains fail and then fail generator	OK (RETURNS TO MAINS)
17	Check return to to mains if gen fails	OK
18		
19		
20		

Test Carried out by.....Grant Kerr Signed... Date...16/10/06

Test witnessed by..... Signed... Date...

Authorised By:

Brisbane City

Brisbane Water

BRISBANE WATER

Network Control Systems

IDTS POINT COMMISSIONING SHEET AND GENERATOR SUPPLY OPERATIONAL CHECKS

Pump Station Generator Connection

SITE TYPE & NO. SP292

Site Name. Wirriboot.

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 is returned to normal by IDTS	✓ Yes
Disconnect the Control interface lead to the station	Confirm that GENERATOR OFFSITE alarm is received by IDTS	☐✓ Yes
Reconnect the Control interface lead to the station		☐✓ OK

IDTS Point : Generator Unsecured

Action	Observation	Result
Open a canopy door on the Generator	Confirm that GENERATOR UNSECURED alarm is received by IDTS	☐✓ Yes
Close the canopy door	Confirm that GENERATOR UNSECURED alarm return to normal is received by IDTS	☐ ✓ Yes

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	☐✓ Yes
Deactivate the Generator low fuel warning alarm	Confirm that GENERATOR LOW_FUEL alarm return to normal is received by IDTS	☐ ✓ Yes

IDTS Point : Generator Med_fuel

Action	Observation	Result
Make the Generator medium fuel warning alarm active	Confirm that GENERATOR MED_FUEL alarm is received by IDTS	☐ ✓ Yes
Deactivate the Generator medium fuel warning alarm	Confirm that GENERATOR MED_FUEL alarm return to normal is received by IDTS	☐ ✓ Yes

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	☐ ✓ Yes
Deactivate the Generator warning alarm	Confirm that GENERATOR WARNING alarm return to normal is received by IDTS	☐ ✓ Yes

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	☐✓ Yes
Deactivate the Generator common fault alarm	Confirm that GENERATOR COMMON_FAULT alarm return to normal is received by IDTS	☐ ✓ Yes

IDTS Point : Generator Automatic

Action	Observation	Result
Turn the generator to local mode	Confirm that GENERATOR AUTOMATIC alarm is RETURNED TO NORMAL by IDTS	☐✓ Yes
Return the generator to automatic mode	Confirm that GENERATOR AUTOMATIC alarm 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 Exercise

Action	Observation	Result
Confirm the Generator is available to run, but not running		☐ ✓ OK
Set the IDTS control point GENERATOR START EXERCISE 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 STOP EXERCISE 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		☐ ✓ OK
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 : ATS Closed , and Generator supply operational checks

NOTE: The purpose of these operational checks is;

- *To confirm the pumps are interlocked under Generator supply (where required)*
- *To confirm the code changes have not interfered with the operation of the Surcharge Imminent probe.*

Action	Observation	Result
Ensure the Generator is in Automatic mode		☐✓ OK
Ensure the pumps are selected for local mode		☐✓ OK
Ensure there is enough sewage in the well for the pumps to run continuously for one minute		☐✓ OK
Fail the Energex power to the Generator	Confirm that the Generator starts and supplies power to the station	☐ ✓ Yes
	Confirm that ATS CLOSED alarm is received by IDTS	☐✓ Yes
Generator Interlocking	Confirm the RTU will run a maximum of one pump under generator supply.	☐ Yes
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	...300..... Secs
	Confirm that ATS CLOSED 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

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	Fixed speed pump sites: Confirm that the duty pump lowers the well-to-the Duty A stop-level and stops	☐ Yes
	Variable speed pump sites: 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		☐✓ OK
Ensure the pumps are selected for remote mode and are stopped		☐✓ OK
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		☐✓ OK
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		☐ ✓ OK

IDTS Points and Generator Supply

Operational Checks commissioned by .....Dan Vowles.....30/10/2006..... Date

.....

COMMON LOGIC Pty Ltd Specialist Electrical Contractors	Electrical Manual	
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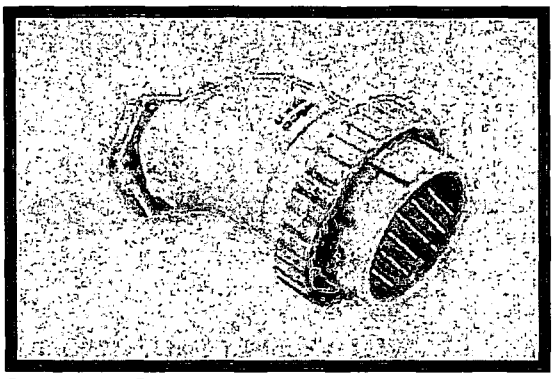
6.0 TECHNICAL INFORMATION

Authorised By: Grant Kerr

Catalogue No. WIPM27



Colour Options

	No colour options
TR	Transparent

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

Description:

Low Voltage Multipin - 27 Pin Maximum. Wilco Industrial Hi-Impact Insulated Angle Plug. Wilco Industrial Hi-Impact Insulated Plugs One Piece Angle With Screw Ring - IP56

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

tyco Electronics Energy Division — INSTALLATION INSTRUCTIONS

Ref: IW250PMSH – Rev 6 – Sept 02

Protector Trip Relays
DIN Rail & Wall Mounted 250 Series
Thermistor Trip, Speed Sensing & Phase Angle

Models Covered

252-PMM	252-PMT	252-PSF	252-PSG
253-PH3	252-PMM	252-PMT	

Introduction

Thermistor Trip Relay (252-PMM & 252-PMT).
The trip inputs are monitored within settable limits. In the event of the input moving outside these limits, the unit will initiate a trip signal via a double pole changeover relay. An illuminated green LED indicates when the thermistor temperature is within normal working limits. The unit is designed such that the alarm relay is energised when normal temperatures are reached.
Model 252-PMM has the facility for manual resetting, so that the trip condition remains after normal operating temperature is reached, until manual intervention occurs.

Phase Balance Relay (252-PSF & 252-PSG)
Trip inputs are monitored within settable limits. In the event of the input moving outside these limits, the unit will initiate a trip signal via a double pole changeover relay. An illuminated red LED indicates that the supply is within limits.

Speed Sensing Relay (253-PH3)
Trip inputs are monitored within settable limits. In the event of the input moving outside these limits, the unit will initiate a trip signal. The illuminated red LED's indicates that the single pole output relays are in an energised state and at normal running speed all three relays should be energised. Units are factory adjusted for normal running speed = 0-75mA output. The meter adjust pot on the product front is used for this requirement, which also ensures the trip levels are set to the calibrated values. Terminal 8 is connected to terminal 5 internally. Terminals 15 and 16 give a 0/1mA signal proportional to speed.

No.1 Relay energises on rising speed
No.2 Relay energises on rising speed
No.3 Relay de-energises on rising speed

This product is designed for use only with magnetic coil inductive sensors.

Warning

- During normal operation, voltages hazardous to life may be present at some of the terminals of this unit. Installation and servicing should be performed only by qualified, properly trained personnel abiding by local regulations. Ensure all supplies are de-energised before attempting connection or other procedures.
- It is recommended adjustments be made with the supplies de-energised, but if this is not possible, then extreme caution should be exercised.
- Terminals should not be user accessible after installation and external installation provisions must be sufficient to prevent hazards under fault conditions.
- This unit is not intended to function as part of a system providing the sole means of fault protection - good engineering practice dictates that any critical function be protected by at least two independent and diverse means.

Never open circuit the secondary winding of an energised current transformer.

Installation
The Protector should be installed in a dry position, not in direct sunlight and where the ambient temperature is reasonably stable and will not be outside the range 0 to 60 degrees Celsius. Mounting will normally be on a vertical surface but other positions will not affect the operation. Vibration should be kept to a minimum. The Protectors are designed for mounting on a 35mm rail to DIN 46277. Alternatively they may be screw fixed, a special adaptor is supplied to mount 252 types.

To mount a protector on a DIN rail, the top edge of the cutout on the back is hooked over one edge of the rail and the bottom edge carrying the release clip clicked into place. Check that the unit is firmly fixed. Removal or repositioning may be achieved by levering down the release clip and lifting the unit up and off the rail.

Connection diagrams should be carefully followed to ensure correct polarity and phase rotation where applicable. External voltage transformers may be used on 252-PSF and 252-PSG to extend the range.

252-PMM, 252-PMT & 253-PH3
Pick up, input and output leads should be kept separate from any other wiring.

Setting Controls (252-PSF, 252-PSG)
These products have two calibration facilities that can be set to suit operating requirements and they are factory calibrated as follows:-

1. % unbalance set points
   Voltages of and below 380 volts L-L are calibrated to 1.0% class index of rated voltage. Voltages above 380 volts L-L are calibrated to 1.5% class index of rated voltage.
2. Time Delay
   For all voltage ranges 10% maximum delay.
3. Voltage Withstand
   Continuous overload = 1.35 x rated voltage

Setting Up (all other models)
The calibration marks around the controls are provided as a guide if the installer does not have access to accurate equipment. The maximum error of the calibration marks is typically 10% of the span of the control concerned.

Maintenance
The unit should be inspected to normal standards for this class of equipment. For example remove accumulations of dust and check all connections for tightness and corrosion. In the unlikely event of a repair being necessary it is recommended that the unit be returned to the factory or to the nearest Crompton Instruments Service Centre

Electromagnetic Compatibility
This unit has been designed to provide protection against EM (electro-magnetic) interference in line with requirements of EU and other regulations. Precautions necessary to provide proper operation of this and adjacent equipment will be installation dependent and so the following can only be general guidance:-

- Avoid routing wiring to this unit alongside cables and products that are, or could be, a source of interference.

Crompton INSTRUMENTS

INSTALLATION INSTRUCTIONS

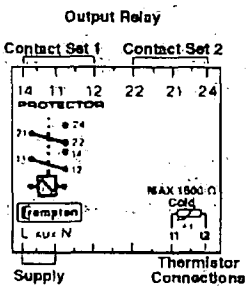
Ref: IW250PMSH – Rev 6 – Sept 02

Protector Trip Relays
DIN Rail & Wall Mounted 250 Series
Thermistor Trip, Speed Sensing & Phase Angle

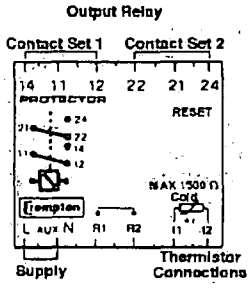
- The auxiliary supply to the unit should not be subject to excessive interference. In some cases, a supply line filter may be required.
- To protect the product against incorrect operation or permanent damage, surge transients must be controlled. It is good EMC practice to suppress differential surges to 2kV or less at the source. The unit has been designed to automatically recover from typical transients, however in extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 5 seconds to restore correct operation.
- Screened communication and small signal leads are recommended and may be required. These and other connecting leads may require the fitting of RF suppression components, such as ferrite absorbers, line filters etc., if RF fields cause problems.

It is good practice to install sensitive electronic instruments that are performing critical functions in EMC enclosures that protect against electrical interference causing a disturbance in function.

252-PMT

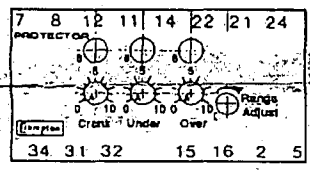


252-PMM

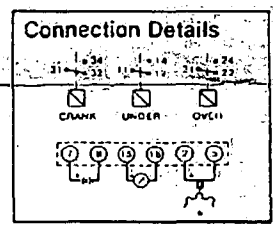


252-PMM can operate in either an automatic or a manual reset mode.
For automatic the reset link R1-R2 is to be disconnected.
For manual the reset link R1-R2 must be inserted.

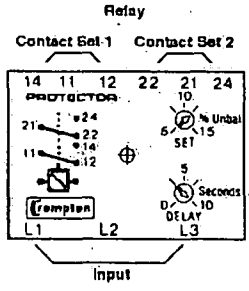
253-PH3



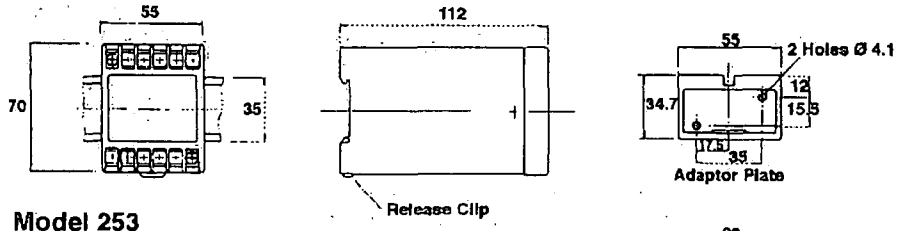
253-PH3



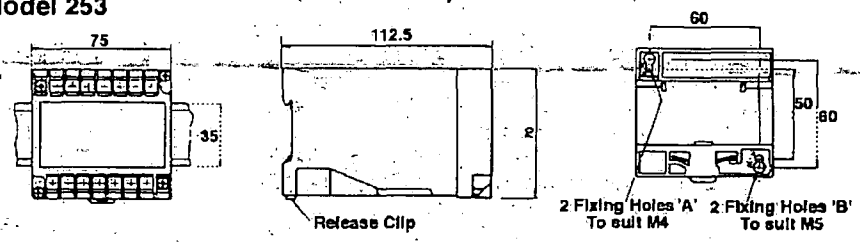
252-PSF
252-PSG



Model 252

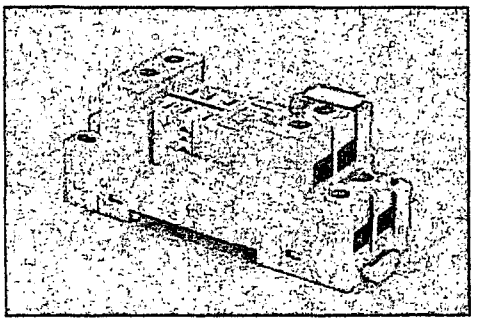


Model 253



Tyco Electronics UK Limited
Crompton Instruments
Freebournes Road, Witham, Essex, CM8 3AH, UK
Phone: +44 1376 509 509 Fax: +44 1376 509 511
http://energy.tycoelectronics.com

finder



Representative Image Only

Catalogue Number:	96.72
Description:	SKT FOR 56.32 RLY + LED MOD
List Price:	Refer to our eCatalogue
Unit Of Measure:	EA
Price Schedule:	B2

All prices are exclusive of GST

Relays / Accessories

Brand: Finder
Accessory type: Plug-in base

Features

- DIN rail mounting socket with open terminals, to suit miniature power relays, flat pin 2 C/O (8 pin), eg 56.32.
- This socket also accepts the 99 series LED modules.

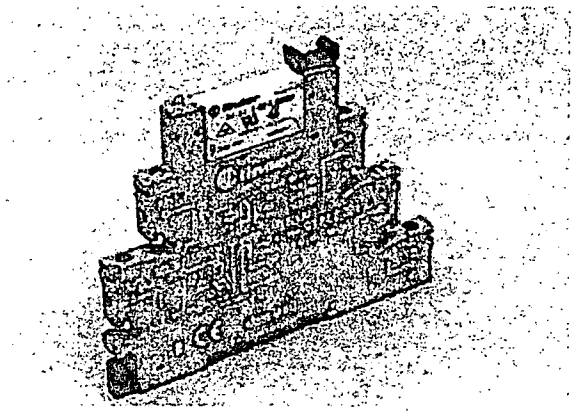
Benefits

- The 96.72 series sockets are designed for DIN rail mounting, with the added benefit of incorporating an LED indicator in the same socket as the relay.
- Provides a space saving relay / indicator combination.
- Relay retaining clips also available.

NHP Item Info

NHP E-Cat online website
Tuesday, November 14, 2006 1:48:00 PM
User: skerr

finder



Catalogue Number:

38.51 24VDC

Description:

PLEASE ORDER 385124VACDC

List Price $ (Not including GST):

46.55

Unit of Measure:

EA

Price Schedule:

B2

Relays Interface Module

Relays Interface Module

Contact arrangement

1 C/O 6A AC1 250VAC

Voltage

24V DC

Number of pins

3

Features

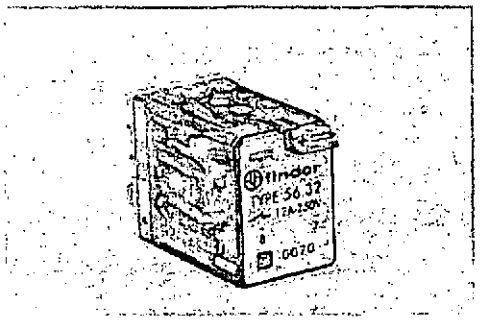
- Miniature Din rail mounting type Relay interface module
- Supply voltage: 24V DC
- 1 C/O contact, 6A, 250V AC 1

Benefits

- Compact Din mount presentation
- Low coil consumption

All prices are exclusive of GST.

finder



Representative Image Only

Catalogue Number:	56.32.0074 24VDC
Description:	RLY W/PB+LED+FLG FPIN 2CO 12A
List Price:	Refer to our eCatalogue
Unit Of Measure:	EA
Price Schedule:	B2

All prices are exclusive of GST

Relays-plug-in type / Flat pin

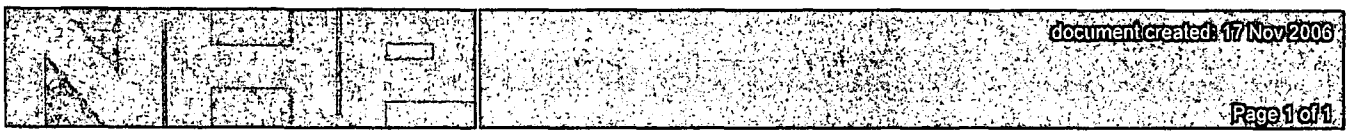
Brand: Finder
Contact arrangement: 2 C/O
Voltage: 24V DC
Number of pins: 8

Features

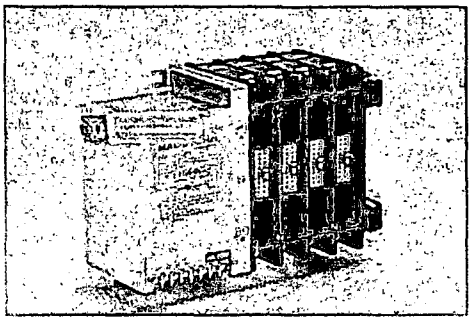
- 24VDC, 12A.
- 2 C/O contacts.
- Flat pins.

Benefits

- Lockable test button.
- Mechanical flag indicator and LED.



Aichi



Representative Image Only

Catalogue Number:	62W-3FD 240VAC
Description:	TRANS.SW.NO OFF 200A3POLE240VA
List Price:	Refer to our eCatalogue
Unit Of Measure:	EA
Price Schedule:	A4

All prices are exclusive of GST

Transfer switches / Basic (BTS)

Brand: Aichi
Amp rating: 200
kA rating: 25

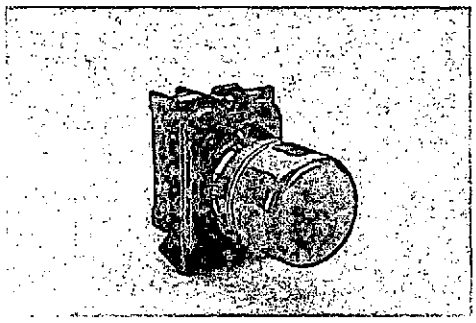
Features

- Single coil operation "W" series.
- Simple mechanical operation.
- 100A to 5000A switch range.
- Pulsed DC coil system.
- Load terminals common.
- Manual operating handle supplied for use in the event of control voltage failure.
- 125V DC 1 ratings to 2000A (each pole).
- All terminal covers provided.
- Control circuit "MOVs" provided, protects control circuit from 'spikes'.
- Can be used with Terasaki logic panel.
- 2 C / O Auxiliaries fitted as standard (extra on request).

Benefits

- External mechanical interlock unnecessary.
- Maintained coil supply not required.
- Additional load connections not required.
- DC switching capability.

sprecher+schuh



Representative Image Only

Catalogue Number:	D5P-P43NL3R
Description:	KIT D5 INT LED RED IND 24VAC
List Price:	Refer to our eCatalogue
Unit Of Measure:	EA
Price Schedule:	A2

All prices are exclusive of GST

Pushbutton Products / Pilot Light and Buzer

Brand: Sprecher + Schuh
Mounting Size: 22.5mm
Specification: Complete
Shape: Round
Style / Frame: Standard
Colour: Red
Lamp Block: Full Voltage

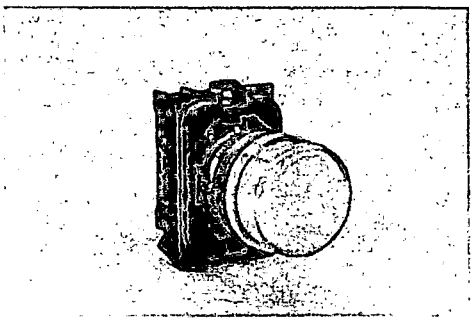
Features

- Part of the vast D5 range of matching 22.5 mm. control and signalling units providing IP 66 front protection.
- Assembled round plastic pilot light fitted with coupling plate and clip-on LED.
- Easy to mount.
- 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.
- Pre-assembly saves time.
- When fixing pliot 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.

sprecher+ schuh



Representative Image Only

Catalogue Number:	D5P-P53NL3A
Description:	KIT D5 INT LED YLW IND 24VAC
List Price:	Refer to our eCatalogue
Unit Of Measure:	EA
Price Schedule:	A2

All prices are exclusive of GST

Pushbutton Products / Pilot Light and Buzer

Brand: Sprecher + Schuh
Mounting Size: 22.5mm
Specification: Complete
Shape: Round
Style / Frame: Standard
Colour: Yellow
Lamp Block: Full Voltage

Features

- Part of the vast D5 range of matching 22.5 mm. control and signalling units providing IP 66 front protection.
- Assembled round plastic pilot light fitted with coupling plate and clip-on LED.
- Easy to mount.
- 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.
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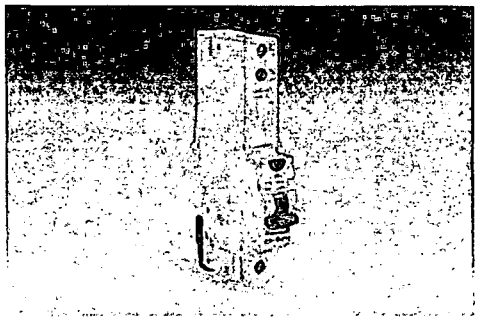
TERASAKI



Representative Image Only

Catalogue Number:	DSRCBH1030A
Description:	MCB/RCD 1P 10A 30MA 10KA DIN-T
List Price:	Refer to our eCatalogue
Unit Of Measure:	EA
Price Schedule:	T3

All prices are exclusive of GST

Circuit breakers - Earth Leakage / ELCB Din

Brand: Terasaki
Current rating: 10A
Number of poles: 1P + N
Modules: 1 (18)
Trip sensitivity: 30mA
Voltage: 240V AC

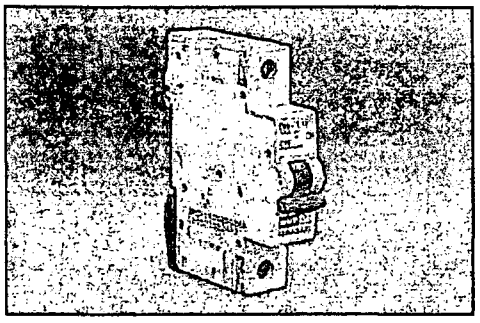
Features

- Short circuit protection 10kA.
- 50kA and 65kA fuse back up.
- Sensitivities 10mA and 30mA.
- 6A, 10A, 16A, 20A, 25A, 32A & 40A Current ratings.
- Type A RCD.
- On and Off indication with colour coding.
- Handle can be sealed and locked in "on" or "off" position.
- IP20 finger protection.
- Wide range of accessories.
- Information clearly labeled on front of RCD.
- Flexible 1.2m long neutral pigtail.

Benefits

- Space saving, same width Din-T MCB.
- Can be directly retrofitted replacing a Din-T MCB.
- High level of short circuit protection.
- Wide range of current settings.
- Approved for use in Australia and New Zealand.
- Conforms to international standards.
- Terminals clearly labeled for easy connection.

TERASAKI



Representative Image Only

Catalogue Number:	DTCB6106C
Description:	MCB 6KA 1P 6A C CURVE DIN
List Price:	Refer to our eCatalogue
Unit Of Measure:	EA
Price Schedule:	T1

All prices are exclusive of GST

Circuit breakers-miniature / MCB DIN 6 kA

Brand: Terasaki
Current rating: 6A
Number of poles: 1 Pole
Curve type: C Curve

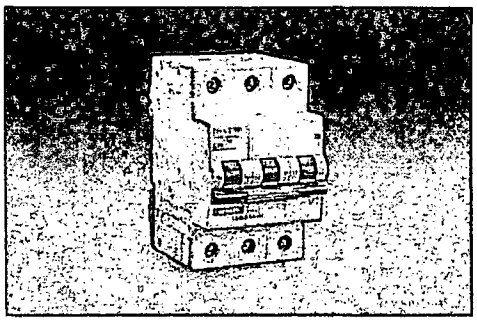
Features

- 6kA, 10kA & 15kA short circuit breaking capacities available.
- 50kA and 65kA fuse backup.
- On and Off indication with colour coding.
- Handle can be sealed and locked in "on" or "off" position.
- High speed operation and rapid arc quenching.
- Consistant line and load terminal height for Din-T 6, 10 & 15 MCB's.
- IP20 finger protection.
- 35mm2 capacity terminals.
- Wide range of accessories.
- Conformity to Australian and International standards.
- Versatility in mounting, distribution boards, switchgear panels and consumer units.
- High selectivity figures.
- Information clearly labeled on front of breaker.

Benefits

- Elimates confusion regarding the operating state of the MCB.
- Increased protection as contacts open through overload or short circuit even when handle is sealed in the "on" position.
- Saves cost, allows for a fuseless system and confines power outages to the effected circuit preventing wide spread loss of power.
- Can fit larger cables.
- Provides greater flexibilty of use.
- Security on conformitiy.
- Special data very accessible.

TERASAKI



Representative Image Only

Catalogue Number:	DTCB6306C
Description:	MCB 6KA 3P 6A C CURVE DIN
List Price:	Refer to our eCatalogue
Unit Of Measure:	EA
Price Schedule:	T1

All prices are exclusive of GST

Circuit breakers-miniature / MCB DIN 6 kA

Brand: Terasaki
Current rating: 6A
Number of poles: 3 Pole
Curve type: C Curve

Features

- 6kA, 10kA & 15kA short circuit breaking capacities available
- 50kA and 65kA fuse backup
- On and Off indication with colour coding
- Handle can be sealed and locked in "on" or "off" position
- High speed operation and rapid arc quenching
- Consistant line and load terminal height for Din-T 6, 10 & 15 MCB's
- IP20 finger protection
- 35mm2 capacity terminals
- Wide range of accessories
- Conformity to Australian and International standards
- Versatility in mounting, distribution boards, switchgear panels and consumer units
- High selectivity figures
- Information clearly labeled on front of breaker

Benefits

- Elimates confusion regarding the operating state of the MCB
- Increased protection as contacts open through overload or short circuit even when handle is sealed in the "on" position
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- Can fit larger cables
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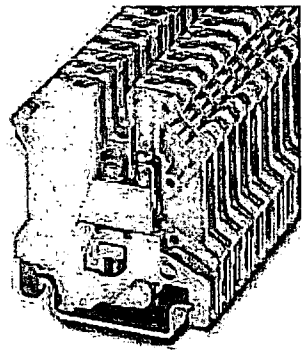
- Special data very accessible

PHOENIX CONTACT
INNOVATION IN INTERFACE

Universal Ground Terminal Block USLKG



Article description	USLKG 5
Order No.	0441504 USLKG 5 0441517 USLKG 5-1
EC Prototype certificate no.	KEMA 99ATEX4487U
Assembly on mounting rails	NS 32 acc. to EN 60715-G 32 NS 35 acc. to EN 60715-TH 35
Assembly instructions	See page 2
Temperature range of use	-40 °C to +90 °C

Technical data according to EN 50019 (Increased Safety "e")

Connection capacity

Rated cross section	4 mm²	AWG 12
Max. conductor cross section	4 mm²	AWG 12
Connectable conductor cross sections	0.2 - 4 mm² rigid and flexible	AWG 24 - 12

Explosion protection data

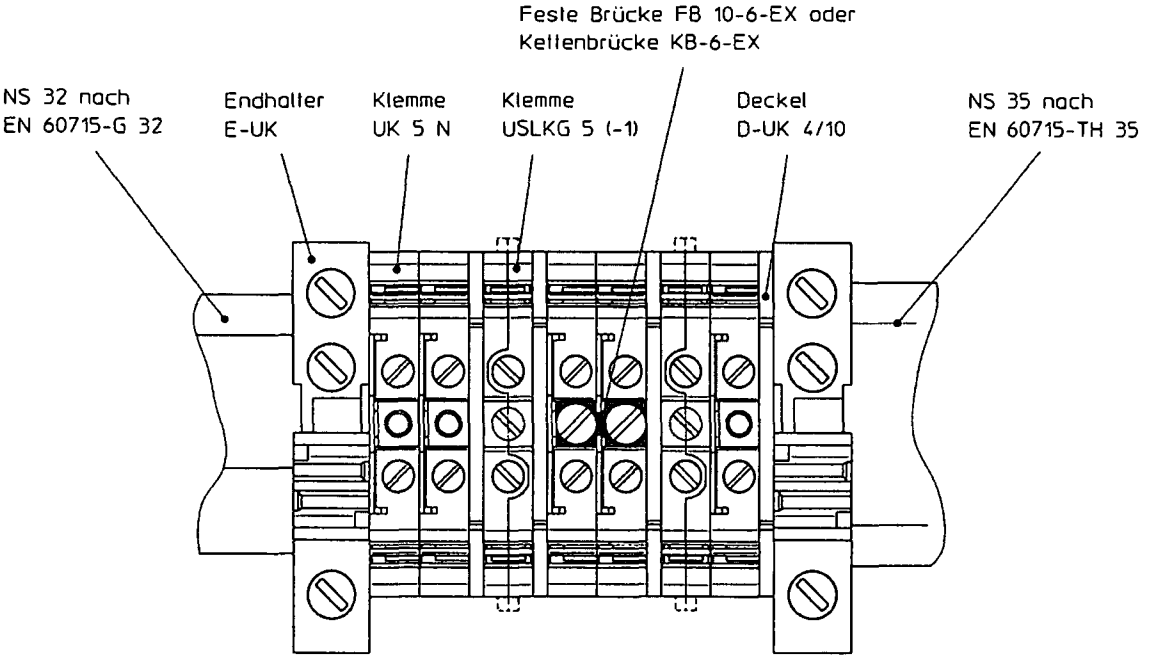
Max. operating voltage	550 V on NS 32 750 V on NS 35	Mounted in rows with UK 5 N

Data of insulation material

Description	PA 6.6	
Creep resistance acc. to IEC 60112 / material group	CTI 600 / I	

Important assembly instructions – increased safety "e"

When adding other series and sizes of terminal blocks and using additional accessories, the required air and creepage distances have to be observed.



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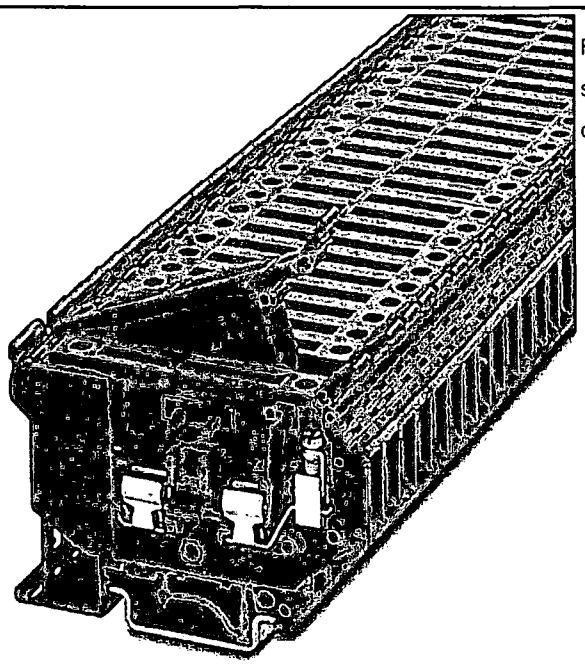
www.phoenixcontact.com

UK 5-HESI

Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation at http://www.download.phoenixcontact.com. The General Terms and Conditions of Use apply to Internet downloads.

Extract from the online catalog



Fuse terminal block for cartridge fuse insert, cross section: 0.2 - 4 mm², AWG: 26 - 10, width: 8.2 mm, color: black

Order No.	3004100
Ord designation	UK 5-HESI
EAN	4017918090623
Pack	50 Pcs.
Customs tariff	85363010
Weight/Piece	0,018509 KG
Catalog page information	Page 266 (CL-2005)

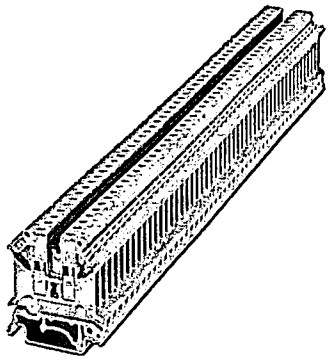
Product notes

WEEE/RoHS-compliant since: 01/01/2003

IMPORTANT : This date is valid for Customers in Germany only. Date Format is MM/DD/YYYY.Please contact your local in-country Phoenix Contact location or designated business partner for a Logistics Compliant date in your area.In order to guarantee delivery of RoHS-Compliant product, please purchase Phoenix Contact parts from authorized Phoenix Contact representatives and distributors.

PHOENIX CONTACT
INNOVATION IN INTERFACE

Feed-Through Modular Terminal Block



Article description	UK 5 N
Order No.	3004362
EC Prototype certificate no.	**KEMA 98ATEX1651U**
Identification	0344 ⟨Ex⟩ II 2 GD EEx e II KEMA 98ATEX1651U
Assembly on mounting rails	NS 32 acc. to EN 60715-G 32 NS 35 acc. to EN 60715-TH 35
Assembly instructions	See page 2
Temperature range of use	-40 °C to +80 °C

Technical data according to EN 50019 / EN 50020

Max. operating voltage - Increased safety "e" - Intrinsic safety "i"	750 V 60 V	550 V on NS 32
Nominal current	30 A	
Max. load current	38 A	
Connection capacity		
Rated cross section	4 mm²	AWG 12
Max. conductor cross section	6 mm²	AWG 10
Connectable conductor cross sections	0.2 – 6 mm² V	AWG 24 – 10

Multi-conductor connection (two conductors with same cross section)

Rigid / flexible	0.2 – 1.5 mm² V	AWG 24 – 16

Data of insulation material

Description	PA 6.6
Creep resistance acc. to IEC 60112 / material group	CTI 600 / I

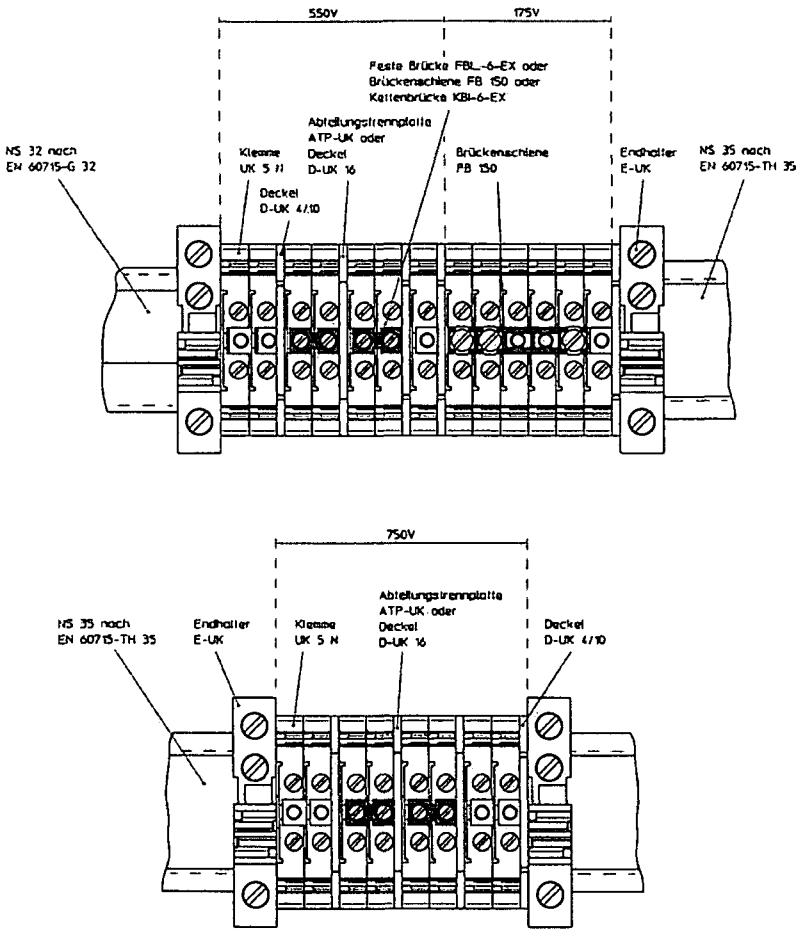
Accessories	**Description**	**Order No.**	
Cover	D-UK 4/10	3003020	
Cover	D-UK 16	3006027	
Partition plate	ATP-UK	3003224	
Fixed bridge	FBI 10-6-EX	0203519	Max. 37 A acc. to EN 50019
Chain bridge	KBI-6-EX	0711849	Max. 37 A acc. to EN 50019
Bridge rail	FB 150	0201595	Max. 27 A acc. to EN 50019

Important assembly instructions – increased safety "e"

When adding other series and sizes of terminal blocks and using additional accessories, the required air and creepage distances have to be observed.

If fixed bridges and chain bridges are used, a cover is necessary between bridges which make direct contact, as well as at the beginning and end of each bridge, in order to maintain the insulation distances.

If the fixed bridges are used for creating bridging between non-adjacent terminals, the max. working voltage is reduced to 175 V.



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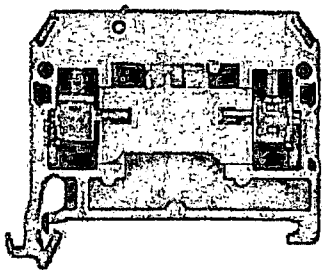
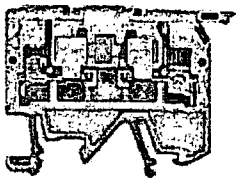


General ordering data	
Order No.	0172160000
Short text for material	SAKR/35
EAN	4008190030445
Qty	100
Product notes	
Note, ordering data	SAKR/35 2 StB order No. 0183360000
Note, technical data	Tightening torque for the test sockets 0.5 -0.7 Nm
Additional technical data	
Type of connection	screwed
No. of identical terminals	1
Version	Disconnect terminal
Type of mouting	clipped
JL 94 flammability rating of insulation material	V2
Installation advice	TS 35
Colour of insulating material	beige
Insulating material	PA 66
Open sides	right
Operating temperature range	- 50 °C, + 100 °C
Connection direction	on side
Product range	SAK Series
No. of levels	1
Levels cross-connected internally	No
No. of terminal strips per level	2
End plate required	Yes
CSA rating data	
Max. cross-section (CSA)	AWG 12
Min. cross-section (CSA)	AWG 22
Voltage CSA	300 V
CSA current	10 A
Conductors for clamping (rated connection)	
Stripping length	8 mm
Type of connection	Screw connection

No. of connections	2
Torque level with DMS electric screwdriver	2
Tightening torque range	0.5...1.0 Nm
Solid, max.	4 mm²
Flexible, max.	4 mm²
flexible w. ferrule AEH, max. DIN 46228-1	2.5 mm²
flexible w. ferrule AEH, min. DIN 46228-1	0.5 mm²
Clamping range, max.	4 mm²
Clamping range, min.	0.13 mm²
Clamping screw	M 3
Blade size	0.6 x 3.5 mm
Gauge to IEC 60947-1	A3
AWG conductor size, max.	3.31 mm²
AWG conductor size, max.	AWG 12
Stranded, max.	4 mm²
Stranded, min.	1.5 mm²
AWG conductor size, min.	0.13 mm²
AWG conductor size, min.	AWG 26
Connection direction	on side
Flexible, min.	0.5 mm²
2nd type of connection	screwed
Solid, min.	0.5 mm²
Twin wire-end ferrule, min.	0.50 mm²
Zwillings-AEH, max.	1.50 mm²
Dimensions	
Width	6.5 mm
Height of lowest version	40.5 mm
Length	42 mm
TS 32 offset	4 mm
Disconnect terminals	
Torque level with DMS electric screwdriver	2
Slitting	pivoting
Integral test socket	No
EN 60079-7 rating data	
Current Ex e	10 A
Rating data	
Rated cross-section	4 mm²
Rated voltage	400 V
Rated impulse withstand voltage	6 kV
Rated current	10 A



General ordering data	
Order No.	0474560000
Short text for material	ASK 1/EN
EAN	4008190020880
Qty	100
Product notes	
Note, technical data	The rated cross-section is reduced to max. 2.5 mm² when using cross-connection bridges.
Additional technical data	
Type of connection	screwed
No. of identical terminals	1
Version	Fuse terminal
Type of mouting	clipped
UL 94 flammability rating of insulation material	V2
Installation advice	TS 35 + TS 32
Colour of insulating material	beige
Insulating material	PA 66
Open sides	right
Operating temperature range	- 50 °C, + 100 °C
Connection direction	on side
Product range	SAK Series
No. of levels	1
Levels cross-connected internally	No
No. of terminal strips per level	2
End plate required	Yes
CSA rating data	
Max. cross-section (CSA)	AWG 12
Min. cross-section (CSA)	AWG 26
Voltage CSA	300 V
CSA current	6.3 A
Conductors for clamping (rated connection)	
Stripping length	9 mm
Type of connection	Screw connection
No. of connections	2
Torque level with DMS electric screwdriver	2

Tightening torque range	0.6...0.8 Nm
Solid, max.	4 mm²
Flexible, max.	4 mm²
flexible w. ferrule AEH, max. DIN 46228-1	4 mm²
Flexible, max., ferrule with plastic collar (DIN 46228 pt 4)	2.5 mm²
flexible w. ferrule AEH, min. DIN 46228-1	0.5 mm²
Flexible, min., ferrule with plastic collar (DIN 46228 pt 4)	0.5 mm²
Clamping range, max.	4 mm²
Clamping range, min.	0.13 mm²
Clamping screw	M 3
Blade size	0.6 x 3.5 mm
Gauge to IEC 60947-1	A3
AWG conductor size, max.	3.31 mm²
AWG conductor size, max.	AWG 12
Stranded, max.	4 mm²
Stranded, min.	0.5 mm²
AWG conductor size, min.	0.13 mm²
AWG conductor size, min.	AWG 26
Connection direction	on side
Flexible, min.	0.5 mm²
2nd type of connection	screwed
Solid, min.	0.5 mm²
Twin wire-end ferrule, min.	0.50 mm²
Zwillings-AEH, max.	1.50 mm²
Dimensions	
Width	8 mm
Height of lowest version	34 mm
Length	58 mm
TS 32 offset	11 mm
TS 35 offset	9 mm
Disconnect terminals	
Torque level with DMS electric screwdriver	2
Display element	
Type of voltage for indicator	AC/DC
Operating voltage for indicator, max.	500 V
Fuse terminals	
Display	without LED
Operating voltage, max.	500
Fuse holder (cartridge holder)	detachable