

**Coffs Harbour City Council**  
**Series 1 Switchboard Specifications**  
**1kw-15kw**  
**Revision 1.1**



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# **1.00 Enclosure**

## **1.01 General**

### *(a) Design layout*

Position electrical equipment and switches to provide safe and trouble-free access for operation and maintenance.

Consider functional relationships between items of equipment in lay out and design.

Consideration of any OH & S issues with layout shall be fully considered.

The Design shall include the following

- Separate control switch board to in compass telemetry and pump control
- 100A supply authority power switchboard with generator set change over facilities
- Stand to allow for correct mounting height of cabinets and cable entry and exits.

### *(b) Service conditions*

Outdoor operation

Ambient temperature range -10°C to +55°C and relative humidity up to 100%.

### *(c) Degree of protection*

Minimum: ip55

### *(d) Mounting*

Switchboard to be mounted on a concrete plinth when using mounting frame.

### *Fault levels*

Rated short-circuit currents: maximum current values at rated operational voltage, at the incoming supply terminals, excluding effects of current limiting devices is nominally <10ka but should be confirmed on a site by site basis.

### *Segregation*

Form 1.

The provision of a separate enclosure/compartment with a hinged door/escutcheon panel within the external enclosure is required for the control and indicating equipment and motor starter switchgear.

### *Connection*

Cable entries: Back entry via gland plate and cable glands into the main (internal) switchboard enclosure.

## 1.02 Size

(a) Provide a robust and rigid enclosure giving the designated separation and degree of protection. The enclosure structure and mounting fixtures shall be rated for a design wind speed of 50m/s.

- Control Switchboard: 1200 H x 600 W x 400 D (Stainless Steel)
- Supply Authority board: 600H x 600W x 300 D (Stainless Steel)
- Mounting Stand: 1800H x 600W x 300 D (Galvanised Steel powder coated)

All door hinges on right hand side.

## 1.03 Construction Materials

Control Switchboard

- Material of construction shall be 1.2/1.5mm thick 316 stainless steel.
- Surface finish N4. Protection rating IP66. Gasket to be Polyurethane

Supply Authority Switchboard

- Material of construction shall be 1.2/1.5mm thick 316 stainless steel.
- Surface finish N4. Protection rating IP66. Gasket to be Polyurethane

Mounting Stand

- Material of construction shall be Galvanised carbon steel 3.0mm thick
- Surface finish shall be powder coated. Correct application of powder coating shall occur for Galvanised carbon steel to eliminate any flake of powder coating.

## 1.04 Colour

Control Switchboard - Supply Authority board:-

- Switch board and Supply Authority board will not be painted

Supply Authority Switchboard

- Switch board and Supply Authority board will not be painted

Mounting Stand

- The switch board stand surfaces shall be suitably prepared, primed and finished with a powder coat painted finish in a DULUX No 50183 - STORM GREY ( RIPPLE FINISH ) for external and internal of Mounting Stand

## 1.05 Earthing

Provide and Effect earth bond from equipment to cabinet assembly to metal frame (including doors and covers) to the protective earth conductor.

Strip painted surfaces and coat with corrosion resistant material immediately before bolting to the earth bar.

Provide serrated washers under bolt heads and nuts at painted, structural metal-to-metal joints.

## 1.06 Lifting

Where required, provide fixings in the supporting structure and removable attachments for lifting.

## 1.07 Roof

Provide a roof to cover the control switchboard to reduce direct sunlight hitting the top of the cabinet.

## 1.08 Doors and accessories

### (a) Doors

Provide a suitable enclosure cover for the outdoor assembly. The covers shall provide effective protection from weather, vandals, etc. all doors and hinged covers (including the escutcheon panel) are to be suitably stiffened to prevent flexing or warping when in the open position.

The escutcheon panel door shall be hinged on the left hand side to provide optimum alignment of main switch and motor circuit breaker.

The door shall open min 115 degrees

'C' rails for adjustment of mounting pan and mounting of accessories shall be provided

### *Door stays*

The main external door on the control switchboard shall be fitted with a suitable rigid and robust door stay with the facility to latch the door in the open position (latched open at approximately 120°).

### *RTU/Relays viewing window*

Provide a rigid, clear, polycarbonate window in the front escutcheon to enable viewing of RTU status indication LED'S without opening the panel. Window to be at least 3mm thick. Fix polycarbonate window with Nots & bolts and double-sided tape.

### *Document holder*

Provide a stainless steel document holder fixed to the rear of the main enclosure door. Provide suitable access to the bottom of the holder compartment.

### *Door hardware*

All door hinges, latching and mounting hardware shall be constructed from stainless steel or other corrosion resistant material. The main enclosure door shall be fitted with a robust three point latching mechanism.

## 1.09 Station light

Provide a blue flashing 12V neon strobe beacon mounted on the switchboard roof. The beacon is to be housed in a vandal proof fibreglass cover

## **2.00 Vermin control system**

### **2.01 Vents**

All vents are to use Termimesh Stainless Steel 316 Mesh on the inside of the cabinet these are to be bolted down with a 316 frame arrangement.

The mesh is to be applied to the frame with the use of marine grade Sikaflex then bolted to the cabinet. The frame is to be able to be removed with ease to clean or to replace damaged Termimesh.

The 316 Termimesh to be used is to provide a termite, ant proof and rust proof barrier for ventilation.

### **2.02 Cable Entry & Exits**

All cable exits and entries should be made using the correct size cable gland. Spare holes will also have a cable gland inserted and filled with silicone to block any vermin trying to enter the cabinet.

Provide a fully sealed panel between the rear of the control switchboard and the mounting stand to achieve effective "vapour barrier" isolation to the switchgear and control gear.

### **2.03 Door Seals**

The seal on the front doors shall have flat face sealing technology for a consistent seal and long seal life. The seal shall have a IP66 protection rating and shall be foamed in place using Polyurethane Gasket

## **3.00 Heating and Cooling Control System**

### **3.01 Design & Control**

The RTU shall be able to monitor the temperature via and RTU point within the cabinet in degrees C to allow for alarming and trending.

The cooling control system will have two cooling controls system provided.

1. Fan based

The fan mounting in the cabinet as per 3.02 shall be controlled by a high quality thermostats which will be settable between 0C - 60C. The thermostats shall be mounting above the heat generating devices but not directly in line with the rising heat.

2. Natural Ventilation

Natural Ventilation shall ensure the temperature rise within the cabinet does not exceed 8°C above ambient temperature at any time.

The heating cooling control system will be provide where the environment is < 0°C.

- A 100W heater shall be provided within the cabinet and shall be controlled by a high quality thermostats which will be settable between -30C + 30C

### 3.02 Fans

Fans supply within cabinet shall have ceramic bearing for long life with MTB >100000 Hrs.

Two ventilation fans with an air flow of greater than >40m<sup>3</sup>/h in total mounted on the top right hand side of the cabinet of the control switchboard.

Air intakes are to be provided in the bottom left hand side door of the control switchboard to provide at least > 40m<sup>3</sup>/h when fan operates.

## 4.00 Anti Vandalism System

### 4.01 Locking system

The cabinet will have a fully enclosed 3 point locking system on the door, preventing the door from being prised open from top or bottom as well as provided sufficient pressure on the door seal to provide IP66 sealing.

There shall be a heavy duty 316 stainless steel construction, pad lockable door swing handle which is to be located half way on the door to provide a centralised locking point within the cabinet. This shall be integrated with the 3 point door locking system provided.

### 4.02 Light Covers

The strobe light mounted on top of the roof shall be provided with a vandal proof light cover.

This cover shall be made from a multilayer translucent fibre glass construction. The cover shall have a flange with a 6 point mounting system using 316 stainless Studs welded to the cabinet with nuts provided. The cover shall be a minimum of 10mm thickness at any point.

The construction of this light cover shall be translucent enough to allow detection of the flashing strobe light during day light hours.

A UV proof and water proof EDM gasket shall be provided to mount the light cover.

The flange on the bottom of the light cover shall be machined so it provides a flat surface for mounting to the gasket provided

### 4.03 Construction

Stiffening rails to sides of door - complete with mounting looming holes shall be provided to strengthen the front door of the control cabinet as well as the supply authority cabinet.

### 4.04 Generator appliance inlet locking

A lockable PVC cover shall be provided for the generator appliance inlet. This is to suit the DS3 generator plug system

## **5.00 Backup Power Systems**

### **5.01 Generator Facilities**

A three phase generator inlet system shall be provided with the following specification

1. DS3 appliance inlet is to be provided for up to 50 amp units
2. DS3 inclined sleeve of 30 degrees is to be provided
3. DS3 lockable cover to be provided
4. Generator change over switch is to be provided this is to be a clearly identified switch with the Mains/off/Generator to be displayed.

### **5.02 Battery system**

A backup battery system is to be provided for the 12VDC and 24VDC control system power supplies.

An isolation DC breaker is to be provided, which is sized and capable of breaking DC current in the overload situation.

The battery backup system is to provide with a charging and discharging system to meet the specification of the batteries for charging, discharging and float charging. There shall be no overcharging or total battery discharging.

The battery back system is to be able provided power to the control system for a minimum period of 12 hours.

The battery backup system shall be in an accessible spot within the control cabinet to change and date the batteries being provided.

## **6.00 System compliance**

### **6.01 Electrical Standards**

All plant equipment and installation works shall be supplied and set into operation in accordance with the following standards.

In addition to this specification all works shall comply with AS 3000 SAA Wiring Rules (current Edition), as well as ACIF S009 latest addition for data communication and extra low voltage signal wiring.

All supply authority regulations and any other relevant standard not mentioned herein.

Where more than one standard is quoted for the same item of equipment and the provisions of each standard are in conflict, the Clients decision upon which standard takes precedence, shall be final and binding.

Standards referred to in the body of the Specification shall also be complied with.

## **1. CABLES**

### **Cable Type or Item Standard**

All copper and copper alloys AS 1574

Overhead hard-drawn copper cables AS 1746

Aluminium conductor cables AS 1125

Rubber insulated cables AS C346

AS 363

PVC cables AS C347

AS 3147

AS C363

Submersible motor cables AS 3116

Neutral screened cables AS 3155

M.I.M.S. cables AS 3187

Flexible cables AS 3191

Busways AS C151

## **2. CONDUITS**

### **Conduit Type or Item Standard**

Rigid metallic conduit AS 2052

Rigid PVC conduit AS 2053

Category 4 conduit AS 2053

Flexible PVC conduit AS 2053

## **3. INTERFERENCE STANDARDS**

Electro Magnetic Interference AS 2064

Harmonics

## **4. SUB CIRCUITS**

All sub-circuits, which contain G.P.O.'s, shall be protected by an approved earth leakage type circuit breaker or 20mA sensitivity.

# **7.00 Lighting Protection System**

## **7.01 Stage 1 Overall Switchboard protection**

A three phase surge protection device is to be provided on the three phase main bus after the overall board isolation switch. This device is to provide Stage 1 protection for the control switchboard.

This protection device shall provide clamp protection to earth for voltage above 275V for each phase.

The protection device shall provide a dry contact for when the surge protection is no longer provided surge protection to the main device.

## **7.02 Stage 2 Control board protection**

An inline 240V surge protection device shall be provided for the control board

### 7.03 Stage 3 I/O Protection

All Analog I/O shall be protected by a suitable surge protection barrier clamping any voltage above 36 Volts.

All external digital inputs shall be protected via an interface relay to the field

### 7.04 Earthing Systems

The earth conductor from the main switchboard shall be run as directly as possible to an earth stake which shall have a resistance of less than 0.5 ohms.

## 8.0 Standard Parts Systems

### 8.01 Preferred Part listing

<i>Pump current ammeters</i>	Make: IME Model: RQ72M-ADC <ul style="list-style-type: none"><li>• 90 deg instruments</li><li>• 72mm Sq.</li><li>• 0-10V movement</li><li>• DC moving coil instrument</li><li>• Removable scales</li><li>• Controlled by 4-20ma VSD output</li></ul>
<i>Incoming AC voltmeter</i>	Make: IME Model: RQ72E-VAC 500V <ul style="list-style-type: none"><li>• 90 deg.instrument</li><li>• 72mm Sq.</li><li>• 0-500V movement</li><li>• Direct connection</li><li>• AC moving iron instrument</li><li>• Removable scales</li></ul>
<i>Phase to phase voltage switch</i>	Make: Elektra Model: B2N V3-20P <ul style="list-style-type: none"><li>• Elektra PH to PH &amp; PH to N</li><li>• 20A -500V</li><li>• Panel mount</li></ul>
<i>Flow meter (optional)</i>	Make: ABB Model: Magmaster <ul style="list-style-type: none"><li>• ABB Magmaster</li><li>• 240VAC supply</li></ul>
<i>Graphic display panels</i>	Make: Telemecanique :optional Model: VW3AIP65KIT3M <ul style="list-style-type: none"><li>• Remote mounting kit for Altivar 61 drive</li><li>• IP65 protection</li></ul>

	<ul style="list-style-type: none"> <li>• 3m cable supplied</li> </ul>
<i>Door switch</i>	<p>Make: Tobin Model: TM1703</p> <ul style="list-style-type: none"> <li>• Micro limit switch</li> <li>• 240V -15A</li> <li>• 1 C/O contact</li> </ul>
<i>Pump 1 &amp; 2 “auto-off-man” selector switches</i>	<p>Make: Telemecanique Model: ZB4-BD3</p> <ul style="list-style-type: none"> <li>• Telemecanique Harmony style 4 22mm dia</li> <li>• Standard handle 3 position stayput</li> <li>• 2 N/O contact blocks</li> </ul>
<i>Fault reset pushbutton</i>	<p>Make: Telemecanique Model: ZB4-BA26</p> <ul style="list-style-type: none"> <li>• Telemecanique Harmony style 4 22mm dia</li> <li>• Recessed black spring return</li> <li>• 2 N/O contact blocks</li> </ul>
<i>Pump 1 &amp; 2 manual speed set “increase-decrease selector switches</i>	<p>Make: Telemecanique Model: ZB4-BD5</p> <ul style="list-style-type: none"> <li>• Telemecanique Harmony style 4 22mm dia</li> <li>• Standard handle 3 position spring return to centre</li> <li>• 2 N/O contact blocks</li> </ul>
<i>Pump 1 or 2 auto pump down selector switch (depending on client RTU program)</i>	<p>Make: Telemecanique Model: ZB4-BD5</p> <ul style="list-style-type: none"> <li>• Telemecanique Harmony style 4 22mm dia</li> <li>• Standard handle 3 position spring return to centre</li> <li>• 2 N/O contact blocks</li> </ul>
<i>Well washer &amp; odour bed selector switches (optional)</i>	<p>Make: Telemecanique Model: ZB4-BD3</p> <ul style="list-style-type: none"> <li>• Telemecanique Harmony style 4 22mm dia</li> <li>• Standard handle 3 position stayput</li> <li>• 2 N/O contact blocks</li> </ul>
<i>Hand controller and on-site button/LED</i>	<ul style="list-style-type: none"> <li>• Clipsal 30MBP pushbutton</li> <li>• Clipsal 30RJ88SMA5 RJ45 socket</li> <li>• WES LED108WH super bright LED</li> </ul>
<i>Motor and load Control</i>	<p>Make: Telemecanique</p> <ul style="list-style-type: none"> <li>• LUB32 (Contract Base and Breaker 32A)</li> <li>• LUCB32FU (Control Unit)</li> </ul>
<i>Telemetry controller</i>	<p>Make: Serck controls</p> <ul style="list-style-type: none"> <li>• Serck half or full I/O 586 eNet</li> </ul>
<i>Digital radio</i>	<p>Make: Trio Model: ER-450 with Diagnostics</p> <ul style="list-style-type: none"> <li>• Digital data radio</li> <li>• 19.2kbs rate</li> <li>• 10-16VDC supply</li> <li>• 0.05-5W Tx power</li> <li>• 370-520mhz freq range</li> </ul>
<i>DC Control relays</i>	<p>Make: Finder Model: 44.62 (2 C/O) 55.34 (4 C/O)</p> <ul style="list-style-type: none"> <li>• 12VDC 10A 2C/O 40 series</li> </ul>

	<ul style="list-style-type: none"> <li>• 12VDC 7A 4C/O 50 series</li> <li>• Plug in LED and diode module</li> </ul>
<i>Timer relay</i>	<p>Make: Telemecanique Model: TEERE11-RMMW</p> <ul style="list-style-type: none"> <li>• 12-240VAC/DC 1 C/O contact</li> </ul>
<i>Thermostat</i>	<p>Make: B&amp;R Model: AAFT012</p> <ul style="list-style-type: none"> <li>• 0-60 deg range</li> <li>• 1 N/O contact</li> <li>• 240VAC -10A</li> </ul>
<i>Phase failure/phase reversal relay</i>	<p>Make: Telemecanique Mode: RM17TG20</p> <ul style="list-style-type: none"> <li>• LED indication of correct phase sequence</li> <li>• 415V 3PH+NE supply voltage</li> <li>• 3VA power consumption</li> <li>• 2 C/O contacts 250VAC 5A</li> </ul>
<i>Pump seal failure relays</i>	<p>Make: ATC Model: Series 78562</p> <ul style="list-style-type: none"> <li>• Green LED indicates power on &amp; seals ok</li> <li>• Red LED indicates water ingress into bearing housing</li> <li>• 240VAC-50Hz supply voltage</li> <li>• 1 N/O &amp; 1 N/C contact 250VAC -5A40k <math>\omega</math> sensitivity</li> <li>• 15V AC peak/peak electrode voltage</li> </ul>
<i>Signal protection (for analog signals)</i>	<p>Make: Novaris Model: SL4DIN-36</p> <ul style="list-style-type: none"> <li>• Multistage transient barrier 4 way</li> <li>• 7.5-200V working voltage</li> <li>• 350mA-2A max load current</li> <li>• 20kA peak surge handling</li> </ul>
<i>Surge filters (for PSU)</i>	<p>Make: Novaris Model: SF105DIN</p> <ul style="list-style-type: none"> <li>• Equipment surge protection</li> <li>• 200-280VAC RMS working voltage</li> <li>• 2A-20A max load current</li> <li>• 8-40kA peak surge handling</li> </ul>
<i>Surge diverter</i>	<p>See section "Circuit breakers" Make: Critec Model: DSD380-TNS</p> <ul style="list-style-type: none"> <li>• 3PH + N</li> <li>• 275V to 350V max voltage</li> <li>• 0-60Hz</li> <li>• 80kA max discharge</li> <li>• 1 C/O contacts</li> <li>• Visual indication of life status</li> </ul>
<i>Power supply dual voltage Psu/battery charger</i>	<p>Make: Omniflex Mode: PTL50C-D</p> <ul style="list-style-type: none"> <li>• 12VDC 1A and 24VDC 2A</li> <li>• Battery overcharge cutout</li> </ul>
<i>Transformer 24vac</i>	<p>Make: Legrand Mode: 422-31</p> <ul style="list-style-type: none"> <li>• Optional for solenoid valves</li> </ul>

	<ul style="list-style-type: none"> <li>• Pri 230-400V S24-48V 40vA</li> </ul>
<b>Backup batteries</b>	<p>Make: Panasonic  Mode: LC-R127R2P1</p> <ul style="list-style-type: none"> <li>• 2 off 12VDC 7.5aH</li> <li>• Maintenance free sealed lead acid (SLA)</li> </ul>
<b>MiniCAS relay (for Flygt pumps only)</b>	<p>Make: Flygt  Model: 835857</p> <ul style="list-style-type: none"> <li>• 24V AC/DC supply voltage</li> <li>• 1 C/O leakage alarm contact</li> <li>• 1 C/O temperature alarm contact</li> <li>• Used with Flygt CLS sensor</li> </ul>
<b>Earth link</b>	<ul style="list-style-type: none"> <li>• 12 tunnel 1 screw</li> <li>• Suit 16mm<sup>2</sup> cable 165A</li> </ul>
<b>Neutral link</b>	<ul style="list-style-type: none"> <li>• 11 hole to suit 25mm<sup>2</sup> cable</li> <li>• Cover to suit</li> </ul>
<b>Cable terminals</b>	<p>Make: Legrand  Model: Viking 3</p> <ul style="list-style-type: none"> <li>• 2.5mm<sup>2</sup> and 4mm<sup>2</sup> type</li> <li>• 1 Single connection type</li> <li>• 3 level sensor type</li> <li>• To suit TS35 DIN rail</li> </ul>
<b>Main switch Control Board</b>	<p>Make: Telemecanique</p> <ul style="list-style-type: none"> <li>• Load break switch operator red 90 x 90mm KCF3PZ</li> <li>• Sealing Gasket kit for V4 KZ67</li> <li>• Shaft Extension VZ18</li> <li>• V3/V4 Door interlock KZ74</li> </ul>
<b>AC/DC Isolators</b>	<p>Make: HAGER  Model :NT110C/ NT101C/ NT120C/ NT104C</p> <ul style="list-style-type: none"> <li>• AC/DC 1Amp/4Amp/10amp/20amp circuit breakers</li> </ul>

## 8.02 Drawings standards

Completed drawings shall be submitted to the Council for acceptance prior to manufacture of switchboards, motor load centres, distribution boards and the like.

Minimum level of drawing presentation shall be to current editions of AS 1000, AS 1100, AS 1101 and AS 1102.

These drawings, in a table format, shall show layouts, dimensions, construction details, equipment electrical ratings, system and circuit diagrams, distribution system protective device co-ordination with sizes and settings of protective devices, maximum demand, cable types and sizes.

Complete equipment schedule information shall also be provided at that time. The submittal shall list the manufacturer, trade name and model (where applicable) and any other information which may be required by the Council in identifying the item and determining its acceptability.

## 9.00 Electrical Systems

### 9.01 Cabling and Wiring

All control wiring shall be 0.6-1kV PVC insulated. Conductors shall be multi- stranded copper with a minimum conductor cross sectional area of 0.75 mm<sup>2</sup>. All wires shall be terminated with a suitable crimp ferrule or lug.

All cables to be identified using the Legrand marking system or equivalent. All field cables shall be suitably labelled at their termination point in the switchboard.

#### **Colours**

##### *LV*

A phase – Red  
B phase – White  
C phase - Blue  
Neutral – Black  
Earth –Yellow/Green  
Active – White

##### *ELV*

DC+ - Brown  
DC- - Grey  
Analog+ -White  
Analog- -Black  
Telemetry –Violet

## **9.02 Field equipment**

### **1. Earthing**

Supply and install a new earth electrode adjacent to the switchboard mounting Slab or in the slab. The earth electrode shall be a copper bonded rod (nominally 12mm Diameter x .5 m long) driven to a depth of not less than 1.2m.

The main earth conductor at sites shall be a green/yellow PVC Insulated, multi-stranded copper cable with a cross sectional area of 6 mm<sup>2</sup> .

Suitable mechanical protection shall be provided for the main earth conductor outside the switchboard and its connection to the earth electrode to prevent possible damage from activity around the switchboard (eg. vandalism, mowers, weed trimmers, vehicles, etc.)

### **2. Analogue level sensor**

Supply and install a 4-20mA analogue level transducer. The type and make/model of the required analogue level sensing system will be Vegawell 72. Calibrated to 0-1 bar or 0-10 Metres.

The field cable from the transducer in the wet well is to be routed via a suitable cable gland in the switchboard gland plate.

Instrumentation installation and cabling is to be fully compliant with the manufacturer's recommendations.

In particular, the installation shall ensure suitable electromagnetic compatibility for instrumentation operation.

### **3. Float switches**

Supply and install 1 only Nivafloat NL100 or equivalent float switch (N/O contacts) for critical well level

Suitable cable lengths and float installation depths are to be implemented by the contractor based on the wet well and operating level parameters to be advised for each site.

### **4. Switchboard mounting and conduit entries**

In general, the switchboard is to be mounted on a concrete slab. The concrete slab area is to provide a clear, flat, stable work platform with a minimum dimension as shown on drawings attached.

Specific requirements for the switchboard mounting location and associated concrete works will be provided for each site

### **5. Switchboard fixing**

As a minimum, each corner of the switchboard base shall be fitted with a 10mm 316 stainless steel dyna bolt or equivalent for fixing to the concrete slab. Dyna bolts shall be inserted to a minimum depth of 70mm in to the concrete Slab

## **6. Well washer and Odour bed solenoid valves**

Supply and install a 24VAC water solenoid valve Asco SCD210D9 type or equiv.

### **9.03 Circuit breakers**

#### **1. Motor circuit breakers**

Each motor/drive circuit shall be fitted with a dedicated TSYS motor circuit breaker. The motor circuit breaker shall be suitably sized for the motor rating both for thermal overload and magnetic overload.

Each motor circuit breaker shall incorporate short circuit and thermal overload protection with visible indication and differentiation of the "tripped" and "isolated" states(eg. Telemecanique TSYS series or equivalent).

Motor circuit breaker isolation and/or trip reset functions are to be accessible from the operator front panel via a suitable, panel mounted, rotary handle and short extension rod as required.

The front panel mounted motor circuit breaker actuators are to be lockable in the off position.

#### **2. Load break switch**

Provide a load break switch upstream from the motor breakers capable of breaking the full load current of both pumps and ancillary circuits

#### **3. General circuit breakers**

Provide miniature circuit breakers for each circuit. Minimum fault rating 10kA (Hager NC type or equiv.)

### **9.04 Supply Authority metering panel**

#### **1. General**

- Council service fuses (100A)
- 12 way sub-board,
- 4 pole Generator changeover switch
- Clipsal power outlet with RCD
- Consumer and council neutral links

## 9.05 Labeling

### Component labelling

- All components are to be clearly labelled underneath which indicates there part no. as per the electrical drawings supplied.
- The labels shall me made from Trefolyte and bolted to either the escutcheon panels or cable conduit within the cabinet.
- All danger labels shall be red in colour on white lettering; all other labels shall be white in colour with black lettering.

