

**TWEED SHIRE COUNCIL**

**ELECTRICAL  
DESIGN  
SPECIFICATION**

**EL08**

**FIELD CONTROL PANELS**

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Table of Contents

1	Citation .....	3
2	Origin of document, Copyright .....	3
3	Versions.....	3
4	Scope of Specification.....	<b>Error! Bookmark not defined.</b>
5	Standards and Specifications .....	3
6	General Requirements .....	4
7	General Enclosure Requirements .....	5
8	Cable Gland Plates .....	5
9	Wiring.....	6
10	Termination .....	6
11	Labelling.....	<b>Error! Bookmark not defined.</b>
12	Earthing .....	6
13	Control.....	7
14	PLC.....	7

# FIELD CONTROL PANELS

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## 1 CITATION

This document is named “Tweed Shire Council, Electrical Design Specification EL08 - Field Control Panels”

## 2 ORIGIN OF DOCUMENT, COPYRIGHT

This document was originally produced for Tweed Shire Council. This document is copyright to Tweed Shire Council.

## 3 VERSIONS

VERSION	AMENDMENT DETAILS	CLAUSES AMENDED	DATE ISSUED (The new version takes effect from this date)	Authorised by the Director of Engineering Services
1.1	Original version		1 November 2005	

## 4 SCOPE OF SPECIFICATION

This specification covers the requirements for any control, switching, distribution, or marshalling panel, cubicle, or box, supplied as part of vendor supplied packaged equipment. In many cases the electrical control/switching equipment is mounted on a skid mount with the rest of the equipment.

This specification also includes any electrical panels that are not necessarily mounted on the skid mount but are part of the control of the packaged equipment.

## 5 STANDARDS AND SPECIFICATIONS

The equipment and materials supplied under this Specification must comply with the latest relevant Australian Standards, or, in their absence, with the latest relevant IEC Standards, together with the requirements of competent Authorities having jurisdiction over all or part of their manufacture, installation and operation.

In particular, all equipment and materials supplied must comply with the relevant requirements of the following Regulations, Standards and Reference Specifications.

AS 1939	Classification of Degrees of Protection Provided by Enclosures for Electrical Equipment
AS 3000 SAA	Wiring Rules

## FIELD CONTROL PANELS

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AS 3008	Electrical Installations - Selection of Cables
AS 3439	Low Voltage Switchgear and Controlgear Assemblies
EL14 -	General Switchboard Requirements

### 6 GENERAL REQUIREMENTS

The Contractor must supply a single local control panel for motor starter equipment, controls, and the marshalling of all switches and instrumentation. The control panel must be bottom entry only.

Unless otherwise specified the Contractor must supply all cabling between the control panel and the vendor supplied electrical equipment. A local emergency stop station should be provided in the case of motorised vendor supplied electrical equipment. This must be of the automatic lock off, manual reset type, mushroom headed, cast aluminium or cast iron enclosure. Control power must be obtained be external cable connection, not derived from the main power connection. The main isolating device must isolate both main and control power to the panel and be padlockable in the off position.

All cabling must be mechanically protected by enclosing in a Class B galvanised steel conduit.

In order to minimise maintenance, circuit breakers must be used instead of fuses for all applications including motor starting.

The Contractor must identify the manufacturer and model of all equipment that is not selected from the **EL03 Preferred Electrical and Instrument Equipment**.

All conduit and gland electrical threads must be metric conduit thread or have an adaptor to metric conduit thread.

The Contractor must supply an electrical schematic diagram, electrical termination diagram, cable schedule and a control panel arrangement with the tender.

All electrical equipment must be shipped with removable silica gel satchels installed to prevent oxidation during transportation to site.

All control circuits must be designed to be “fail safe”.

The system design must allow for the following tests to be readily performed:

- inspection in accordance with Clause 8.3.1. of AS 3439.1;
- insulation resistance tests;
- check of secondary wiring;
- check of safety and earthing facilities.

### 7 GENERAL ENCLOSURE REQUIREMENTS

Panels must be either a proprietary product or a fabricated type, of Form 1 construction, and preferably with one door. The minimum protection rating must be IP56 to AS 1939 for indoor use and IP65 for outdoor applications.

Panels must have a sloping protective hood which protrudes forward of the door edge to provide additional protection to the upper door seal.

Panel materials must be manufactured from stainless steel. The control panel must be of rigid construction and must be suitable for floor mounting onto supporting steelwork. Additional mounting holes must be provided at the top of the panel to enable the panel to be rigidly fixed into position.

Doors must open 160 degrees and must be provided with heavy duty neoprene dust seals. Seals must be glued and held in place by continuous retaining strips.

T-type handles must be provided, except where 240/415 VAC equipment is within and door locks requiring a special tool must be provided in this case. The electrical design and implementation must be to AS 3000, AS 3007 and AS 3008 and must include the following elements:

- an interface terminal strip must be provided for incoming and outgoing control/instrument cables immediately (but no less than 150mm) above the gland plate;
- all 240/415 VAC terminals must be fully shrouded and all 240/415 VAC equipment must be physically segregated from lower voltage equipment. Shrouding on the live side of the main isolating device must be labelled “DANGER LIVE EQUIPMENT ISOLATE ELSEWHERE”;
- the control supply must have a main isolating device which is mechanically interlocked with the panel door such that the device must be in “isolated” position for the door to open;
- temperature detection relays are required for drives above 37 kW;
- motor protection is thermal up to 37kW and electronic above 37 kW;
- internal wiring must be run in slotted ducts wherever possible;
- running indicator lights;
- healthy/ready lights;
- fault indicator lights;
- caution indicator lights;
- function indicator lights;
- cabling must be provided from the line side of the main isolator to shrouded and segregated terminals at the bottom of the panel for all connections;
- all indicator lights must be LED clusters for greater reliability in the vibrating environment and visible in full sunlight.

### 8 CABLE GLAND PLATES

Removable cable gland termination plate(s) of 6mm thick brass must be provided at the bottom only of panels.

The gland plate(s) must be solidly bonded to the earth bus with earth conductors.

A suitable neoprene gasket must be fitted between the cabinet surface and the gland plate.

### 9 WIRING

The panel wiring must comply with **Standard Specification EL01**.

### 10 TERMINATION

All wire terminations at the equipment itself and terminal blocks must be by means of pre-insulated crimp lugs, slotted crimp lugs and crimp pin connectors as required.

Terminal blocks for power and control wiring must be clip-on rail mounted tunnel type. Power wiring terminals must be sized in accordance with the cable rating and identified as indicated on drawings and cable schedules.

Each wire must be crimped individually.

Panel wiring must be such that not more than two wires must be connected to any one terminal (one wire per side). Incoming and outgoing cable terminal blocks must be such that each incoming cable core is the only core terminated to that side of the terminal.

Numbered ferrules must be fitted to each end of all control wires inside the switchboards, in accordance with the termination drawings and control schematics. They should be black numbers with a glossy finish to prevent adhesion of dirt. Clip-on type ferrules must not be used.

Arc barriers must be fitted between terminal blocks which have different voltages on them.

A minimum of 20% spare terminal capacity must be provided.

### 11 LABELLING

Labelling must comply with **Standard Specification EL01**.

### 12 EARTHING

Panels must have separate earth and neutral bars. There must be no neutral-earth connection.

The earth bar must be provided with 4 mm diameter holes at regular 20 mm spacings.

All metal parts of panels including panels, doors, switch/circuit breakers unit frames, terminal strip mounting channels, gland plates, screens of screened transformers etc, must be bonded to the main earth bar.

All secondary windings of current transformers must have one lead earthed.

## FIELD CONTROL PANELS

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All connections to the main earth bar must be readily accessible without disturbing other internal or external wiring.

### 13 CONTROL

The Contractor is to provide their standard control system applicable to the machine in question. In any case facility for remote start and stop, remote run indication and remote fault indication must be provided.

All remote signals must be via voltage free contacts.

All instruments such as gauges, switches etc. normally applied to this type of machinery are to be provided.

### 14 PLC

Where the panel contains a PLC, that PLC must satisfy the conditions of Standard EL04 - Installation of Electrical and Instrumentation Works, EL03 - Preferred Electrical Equipment and EL22 - PLC/SCADA/HMI