

TWEED SHIRE COUNCIL

ELECTRICAL
DESIGN
SPECIFICATION

EL03

PREFERRED ELECTRICAL AND INSTRUMENT
EQUIPMENT

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PREFERRED ELECTRICAL AND INSTRUMENT EQUIPMENT

1 CITATION

This document is named "Tweed Shire Council, Electrical Design Specification E03 - Preferred Electrical and Instrument Equipment."

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	
1.2	Amended	5.3, 5.5, 5.6, 7.1, 7.2, 10.0, 11.0, 12.3, 14.2, 14.3, 16.0, 17.0.	25 May 2011	

4 STANDARDS AND STATUTORY REQUIREMENTS

Additionally, the equipment and components shall also comply with all codes and/or acts that are enforced by Government Authorities having jurisdiction over the work or the area where the equipment and/or components will be used.

In the event of a conflict between different Codes, Standards or Regulations, the highest requirement shall apply. The Contractor shall not deviate without first obtaining written permission from the Superintendent.

Where an appropriate Australian Standard does not exist, the equipment shall meet the requirements of the appropriate International Standard (ISO), and in the case of there being no applicable Australian or ISO Standard, the Principal will nominate or approve an alternative standard.

In particular, the Contractor shall observe and comply with the requirements of the most recent releases of the following regulations and standards:

4.1 Standards

- AS 1023 Low voltage switchgear and controlgear – Protection of Electric Motors.
- AS 1029 Low voltage contactors (up to and including 1,000 V AC).
- AS 1042 Direct-acting indicating electrical measuring instruments and their accessories.
- AS 1202 AC motor starters (up to and including 1,000 V).

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AS 1384	Transducers for electrical measurement.
AS 1675	Current transformers – Measurement and protection.
AS 1930	Circuit breaker for distribution circuits (up to and including 1,000 Vac and 1,200 Vdc).
AS 1939	Classification of degree of protection provided by enclosures for electrical equipment (IP Code).
AS 2005	Low voltage fuses – Fuses with enclosed fuse links.
AS 2067	Switchgear assemblies and ancillary equipment for alternating voltages above 1 kV.
AS 2184	Low voltage switchgear and controlgear – Moulded case circuit breakers for rated voltages up to and including 600Vac and 250 Vdc.
AS 3000	Electrical installations – Buildings, structures and premises (SAA wiring rules).
AS 3007	Electrical installations – Surface mines and associated processing plant.
AS 3111	Approval and test specification – Miniature overcurrent circuit breakers.
AS 3116	Approval and test specification – Electric cables – Elastomer Insulated – For working voltages up to and including 0.6/1 kV.
AS 3190	Approval and test specification – Residual current devices (Current-operated earth leakage devices).
AS 3439	Low voltage switchgear and controlgear assemblies.
AS 3947	Low voltage switchgear and control gear.

4.2 Certification

All electrical equipment and items contained within electrical equipment shall be accompanied by certificates stating compliances with the relevant Australian Standard.

5 MOTORS AND MOTOR CONTROL

5.1 Motors

All electric motors must comply with standard specification STD-ES-009.

Motors	<ul style="list-style-type: none"> • ABB, • Toshiba, • Siemens CMG
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5.2 Short Circuit Protective Devices

Air Circuit Breakers	<ul style="list-style-type: none"> • Merlin Gerin Masterpact withdrawable • Terasaki Tempower withdrawable
Motors <= 22kW	<ul style="list-style-type: none"> • Merlin Gerin NS8OH-MA • Terasaki Tembreak 'XS' Series
Motors > 22kW	<ul style="list-style-type: none"> • Merlin Gerin 'NS' Series • Terasaki Tembreak 'XS' Series

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5.3 Contactors and Motor Overloads

Contactors	<ul style="list-style-type: none">• Sprecher & Schuh CA Series• Telemecanique LC1 Series
Thermal Overloads	<ul style="list-style-type: none">• Suited to contactor• Sprecher & Schuh CT1 series• Telemecanique LR Series

5.4 Variable Speed Controllers

Variable Speed Drives	<ul style="list-style-type: none">• Telemecanique - Altivar• Allen Bradley
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5.5 Electronic Soft Starters

Soft Starters	<ul style="list-style-type: none">• Telemecanique Altistart• Allen Bradley
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5.6 Isolators

External Local Control Stations	<ul style="list-style-type: none">• B&R Pilbara Series
Decontactor	<ul style="list-style-type: none">• Marachel

6 PROTECTIVE DEVICES

6.1 Circuit Breakers

Incomers	<ul style="list-style-type: none">• Merlin Gerin 'NS' Series• Terasaki Tembreak 'XS' Series
General	<ul style="list-style-type: none">• Merlin Gerin C60N and NCI00H• Terasaki Tembreak DIN-T

6.2 Fuses and Switch/Fuse Units

Combination Switch Fuse Units	<ul style="list-style-type: none">• Stromberg 'OESA' Series• GEC
Fuse Cartridges	<ul style="list-style-type: none">• G.E.C. - Type "NS"• NHP
Fuse Holders	<ul style="list-style-type: none">• GEC - Safeclip• NHP Compact

7 CONTROL DEVICES

7.1 Relays and control devices

Control Relays – Multi Pole C/O	<ul style="list-style-type: none">• AC - Omron G2R-2-SN
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	<ul style="list-style-type: none"> • DC - Omron G2R-2-SND
Thermistor Relays	<ul style="list-style-type: none"> • Sprecher & Schuh - RT3-A
Electronic Shear Pin Relays	<ul style="list-style-type: none"> • Emotron ELFI
Signal Loop Isolators	<ul style="list-style-type: none"> • Red Lion IAMA • Weidmuller DFI/4-20mA/4-20mA/12-50dc • Moore Industries ECT /4-20 / 4-20/12-24 V d.c.
Signal Transient Barriers	<ul style="list-style-type: none"> • 24V dc - Erico UTB30
Surge Protection - Instrumentation	<ul style="list-style-type: none"> • Novaris SL36
Surge Diverters	<ul style="list-style-type: none"> • Novaris SDD3-100-275-A
Surge Reduction Filter (20A 1 phase)	<ul style="list-style-type: none"> • Erico - TDF10A240V
Surge Reduction Filter (above 20A 3 phase)	<ul style="list-style-type: none"> • Erico - TSG SRF140 (40A) • Erico - TSG SRF163 (63A)
Thermostat Controllers	<ul style="list-style-type: none"> • Honeywell T631C 1160 (20 - 60 deg) • NHP FZK01100
Timers Electronic	<ul style="list-style-type: none"> • Sprecher & Schuh • Omron

7.2 Push Button and Indicators

Indication Lights 24 VDC	<ul style="list-style-type: none"> • Telemecanique • NHP
Pushbutton Assemblies (22.5 mm)	<ul style="list-style-type: none"> • Telemecanique, • Sprecher & Schuh

7.3 Switches

Limit Switches	<ul style="list-style-type: none"> • Omron proximity switches
Level Switches	<ul style="list-style-type: none"> • Multitrode MTR
Flow Switch	<ul style="list-style-type: none"> • IFM Effector
Pressure Switches	<ul style="list-style-type: none"> • Square D 0-10M & 0-20M • Yokogawa GM-PS-K
Panel Mount Selector Switches (24 VDC)	<ul style="list-style-type: none"> • Kraus & Naimer CAD12 Series with FT2 mounting and V845 locking
Panel Mount Selector Switches (240 VAC)	<ul style="list-style-type: none"> • Kraus & Naimer CA10 Series with FT2 mounting and V845 locking

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8 METERING

Hour Run Meters	<ul style="list-style-type: none"> National Matsushita
Ammeters	<ul style="list-style-type: none"> Crompton Instruments 244-026G Q96 Direct Connect or 5A CT Connect
Power Meter	<ul style="list-style-type: none"> IME Nemo 96/35-DP (NHP)
Power Meter Test Block	<ul style="list-style-type: none"> Clipsal 1008
Transducers	<ul style="list-style-type: none"> Crompton 4-20 mA

9 EARTHING/LIGHTNING PROTECTION EQUIPMENT

Earthing pit	<ul style="list-style-type: none"> Erico PIT03
Electrodes	<ul style="list-style-type: none"> Eritech 1.8m 15 mm diameter - 615860
Earth clamps	<ul style="list-style-type: none"> Erico 15mm rod RTC1220
Copper tape (earth grid & downconductor)	<ul style="list-style-type: none"> Erico 25mm x 3mm strap 30m roll – TCEC1253
Grounding enhancement material	<ul style="list-style-type: none"> Erico GEM25A
Lightning rod (finial)	<ul style="list-style-type: none"> Erico CAR2015

10 FIBRE OPTIC EQUIPMENT

Fibre Optic Patch Panels	<ul style="list-style-type: none"> Optical Fibre Systems OFS-200-ST-A
Media Converter 10BaseT-10BFL/ST Multimode	<ul style="list-style-type: none"> N-Tron Managed Switch

11 INSTRUMENTS:

Dissolved Oxygen	<ul style="list-style-type: none"> E & H Transmitter - LiquilineCM442 E & H Sensor – Oxymax W COS51D
Magnetic Flowmeter (Fluid)	<ul style="list-style-type: none"> ABB Siemens Endress & Hauser
Temperature	<ul style="list-style-type: none"> Endress & Hauser – iTemp TMT 184 Rosemount
Hydrostatic Pressure	<ul style="list-style-type: none"> Vega – D80 Endress & Hauser – Delta pilot
Sludge Blanket	<ul style="list-style-type: none"> Endress & Hauser Pulsar

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Pressure	<ul style="list-style-type: none"> • Endress & Hauser – Cerabar PMP/PMC • Vega
Differential Pressure	<ul style="list-style-type: none"> • Endress & Hauser - Deltabar S PMP/FMD • Vega
Ultrasonic Flow	<ul style="list-style-type: none"> • Endress & Hauser Prosonic • Pulsar
Ultrasonic Level	<ul style="list-style-type: none"> • Endress & Hauser – Prosonic M FMU40/41/43 • Pulsar Black Box –A130-KP db 10-10
Ultrasonic Flow (open Channel)	<ul style="list-style-type: none"> • Vega • Pulsar • Endress & Hauser Prosonic Flow
Wire Guided Radar	<ul style="list-style-type: none"> • Endress & Hauser – Levelflex FMP40 • Vega
Non Contact Radar	<ul style="list-style-type: none"> • Endress & Hauser – Micropilot FMR240 or 244 • Vega
PH & ORP	<ul style="list-style-type: none"> • E & H Transmitter - LiquilineCM442 Sensor - Orbisint CPS11DDanfoss – ph4100 & Redox4100
Turbidity	<ul style="list-style-type: none"> • Endress & Hauser - Liquisys M CUM253 • Hach SC100
Nitrate	<ul style="list-style-type: none"> • Endress & Hauser – Stamosens CNS70/CNM750 • Danfoss INSITU 5100 NH4 0-200ppm
Ammonia	<ul style="list-style-type: none"> • Endress & Hauser - Stamolys CA71PH • Danfoss INSITU 4100 NH4
Phosphate	<ul style="list-style-type: none"> • Endress & Hauser - Stamolys CA71PH • Danfoss INSITU 4100 PO4
Chlorine	<ul style="list-style-type: none"> • Wallace & Tiernan Deplox3 • Endress & Hauser CCE1

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Load Cell	<ul style="list-style-type: none"> Yokogawa – SQB-200KG
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12 MISCELLANEOUS

12.1 Terminals

Fused	<ul style="list-style-type: none"> Phoenix UK 5 HESI (3004100)
Disconnect	<ul style="list-style-type: none"> Phoenix UK 5 MTK-P/P (3004032)
Feed through	<ul style="list-style-type: none"> Phoenix UK-5 N (3004362) (Or suitably sized for cable installation)
High Current	<ul style="list-style-type: none"> Phoenix UKH
End Plate	<ul style="list-style-type: none"> Phoenix D-UK4/10
Group Markers	<ul style="list-style-type: none"> Phoenix KLM-A

12.2 Enclosure Hardware

Cubicle Cooling Fans and Filters	<ul style="list-style-type: none"> Rittal 'SK' Series
Door Switch	<ul style="list-style-type: none"> Burgess Moeller
Meter Boxes	<ul style="list-style-type: none"> B & R IP 2121 2/S c/w hinged panel type IP HP 2121 Swing handles for meter cabinets model 1107SBC01 30mm shaft and 10mm Hasp.

12.3 Miscellaneous

Earth & Neutral Bars	<ul style="list-style-type: none"> Clipsal BP165C Series
Cable Glands	<ul style="list-style-type: none"> Alco nylon
Indoor cable number tags	<ul style="list-style-type: none"> Black/Yellow Mark Pammer Pty Ltd
Outdoor cable number tags	<ul style="list-style-type: none"> Black/316 Stainless Laserit Pty Ltd
Wire Number system	<ul style="list-style-type: none"> Grafoplast SI 2000
PVC Ducting	<ul style="list-style-type: none"> NHP IBOCO
Power Supply 24 VDC	<ul style="list-style-type: none"> Puls
Power Outlets (Single and Polyphase switched)	<ul style="list-style-type: none"> Clipsal 56 Series
Internal Switchboard GPO	<ul style="list-style-type: none"> Clipsal 25
External Area Power Outlets	<ul style="list-style-type: none"> Clipsal 56 Series Single Phase – 15A Three Phase – 32A

13 LIGHTING

Fluorescent (Cubicles)	<ul style="list-style-type: none"> Lanson LBB-113 (18W)
Fluorescent (Outdoor)	<ul style="list-style-type: none"> Norka HAMM 08 Reflector

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Fluorescent (Indoors)	<ul style="list-style-type: none">• Thorn, Pierlite
Discharge	<ul style="list-style-type: none">• Norka Saturn Eye

14 CONTROL SYSTEM EQUIPMENT

14.1 PLC

PLC	<ul style="list-style-type: none">• Omron CJ1M series or SC1 series
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14.2 PLC I/O

Digital input cards	<ul style="list-style-type: none">• Omron CJ2M series or CS1 series
Digital output cards	<ul style="list-style-type: none">• Omron CJ2M series or CS1 series
Analog inputs	<ul style="list-style-type: none">• Omron CJ2M series or CS1 series
Analog outputs	<ul style="list-style-type: none">• Omron CJ2M series or CS1 series

14.3 PLC Hardware

PLC I/O Wiring Looms	<ul style="list-style-type: none">• Omron
PLC Interface Relays – Single Pole C/O	<ul style="list-style-type: none">• Omron G2RSND
PLC Ethernet	<ul style="list-style-type: none">• Omron EIP
PLC Switch	<ul style="list-style-type: none">• NTron Managed switch
PLC Interface Relays – Multi Pole C/O	<ul style="list-style-type: none">• Omron MY2N
Human Machine Interface (HMI)	<ul style="list-style-type: none">• Omron NS series

15 UNINTERRUPTIBLE POWER SUPPLIES

UPS	<ul style="list-style-type: none">• MGE
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16 TELEMETRY

Radio	<ul style="list-style-type: none">• Trio ER 450H -51A01-EHO
RTU	<ul style="list-style-type: none">• Control Microsystems ScadaPack

17 ACTUATORS

Electric

Rotork – with failsafe option