



ELECTRICAL DESIGN GROUP

ELECTRICAL BUILDING SERVICES CONSULTANTS

P.O. Box 15, SHERWOOD Q. 4075

Phone: (07) 3278 4375 Fax: (07) 3716 0222

Website: www.edg.net.au Email: brisbane@edg.net.au

PROJECT NAME

PROJECT NUMBER

PRE-COMMISSIONING CHECKLIST

REVISION - DATE

System name:	Area / stage:		
Installation company name:			
Address:		Phone number:	
Contact name:		Phone number:	
<p>The following pre-commissioning tasks have been completed in accordance the the contractual requirements and the commissioning plan. The items that have been commissioned have been installed in accordance with the previously agreed specification and/or functional description of the system and design intent (add reference if available) This form can be used by the commissioner and the CMO.</p>			
Check that time schedules enable the intended operation at the correct times.			
Check that any specified out-of-occupancy periods, weekend and holiday time schedules operate correctly (note that the current operating date can be changed to simulate weekend and holiday dates).			
Check that the calendar function can take leap years into account.			
Check the correct operation of the interlocks by individually switching interlocked items of plant.			
Check all safety interlocks, e.g electro-thermal links and emergency knocks off buttons etc.			
Check the specified interlocking between different control systems, for example any interlocking between a fire detection system and a BMS.			
Check that the specified temperature interlocks operate correctly, e.g low temperature frost protection.			
Check for the correct sequencing control in response to varying inputs operates in the correct order and at the desired set points.			
Check for the correct control and operation on start-up and shutdown. Check that the defined restart routine operates correctly when power is reinstated			
The control system will be checked to confirm its specified operation following a mains power supply failure. In particular the following checks as a minimum will be undertaken:			
Check that controllers preserve control strategy configuration data for a specified period when the mains power is lost.			

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Check that the condition of any volatile data protection system is regularly and automatically monitored. Check that an alarm is raised on loss of data by any controller or other device and/or failure of the monitoring system.			
Check that the control system operates correctly under generator standby and UPS power if applicable			
Check that the control system will automatically return to normal action without operator intervention restoration of the mains electrical power supply.			
Check that any specified load shedding procedures operate correctly.			
Insulation resistance measurements: on motors and major medium voltage equipment items, at 1000-volt D.C.; On cables and wiring.			
Functional checks: Full functional and operational checks on energised control equipment and circuits, including adjustments for the correct operation of			
Motor rotation: Checking and where necessary altering connections for the correct motor rotation.			
Earth resistance.			
Earthing: Confirmation of effective earthing of the exposed metal of electrical equipment.			
The application software and certify quality control off-site and again on site as part of the final commissioning. Specific items or routines to be checked include though is not limited to:			
Specified set points have been configured.			
Suitable on/off times are entered for all time schedules and are associated with the correct items of plant.			
In principle all interlocks are configured correctly.			
Life safety interlocks are hard-wired unless approved by the relevant authorities (must be performed on-site).			
Each control loop is in place and that realistic default values have been added to enable commissioning to proceed.			
Any sequence control is configured and in principle associated with the correct items of plant.			
Configured software will start-up and shutdown the specified items of plant in the correct sequence.			
The configured software will trigger automatic plant change over in response to the specified signal (plant failure or hours run etc).			
All specified alarms are configured along with any specified time delays, masking and alarm categorisation in order to avoid unwarranted alarms.			

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The use of mnemonics and abbreviations be checked between the display and the graphics to avoid inconsistencies.			
Data logging routines and parameters are set up in accordance with the control system specification.			
The binding of graphics with monitored points.			
Specific items or routines to be checked off-site and again on site as part of the final commissioning include though are not limited to:.			
The finish to ensure there are no sharp edges.			
The metalwork: hinges on doors, flush doors, opening and closing doors, no sagging or drooping of doors when open, interlocking of doors.			
The door seals and gland plate gaskets are in place and securely fixed.			
The common key for all panels.			
For secure operation of door locks.			
That safe access to the control equipment is possible without having to isolate the control panel where specified.			
That the physical arrangement of the panel will allow transport to site and mounting in the final location.			
If the completed panel weighs more than 50kg check that eyebolts are fitted.			
The location and labelling of switches and indicators (including colour).			
That plastic rivets or screws are used to mount labels.			
The scale of analogue devices and the status of digital devices.			
That all doors on any panel containing exposed dangerous voltages are provided with interlocking isolators so that the door cannot be opened except with the isolator in the 'off' position.			
That equipment that requires on-line adjustment and testing by non-electrically qualified personnel is accessible and usable without interrupting the supply or overriding the safety interlocks. (In general, outstations must not be located within control panels where isolation is necessary to gain access.)			
Access for incoming cables			
Access for outgoing power and control cables			
Provision of suitable gland plates			
All doors/gland plates to be earthed by cable links			
Bus bars and power cabling as specified			
Anti-condensation heaters and thermostats are included and correctly set where specified			

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Ventilation grills, filters and fans and thermostats are included and correctly set where specified			
Panel ventilation is adequate for the heat load			
Tightness of all connections, bolted power connections and bus-bar bolts tightened to the correct torque			
Neatness of cable looms with no pinching			
Sufficient spare capacity in all cable trunking to comply with BS 7671(13).			
Colour coding and numbering of all cables where specified and corresponding with numbering of terminals.			
Numbering of all terminals			
Shrouding and labelling of non-isolated equipment			
Shrouding of switches, lamps etc on doors if low voltage			
Segregation of power cabling and switch-gear from control cabling and electronic equipment			
Trunking lids cross referenced			
Connections between panel sections are numbered as specified, accessible and physically simple to connect/disconnect.			
Link type terminals for control system cables if specified			
Spare fuses and fuse ways if specified			
Drawing holder			
Fuses (type and ratings) against fuse chart			
Layout of equipment against drawings			
Ensure spare back panel space is provided as specified			
Ensure no equipment is mounted on the bottom or sides of the panel (similarly terminations) unless back/side plates are fitted			
Labelling of equipment in panel			
Access to all equipment especially devices requiring adjustment			
Power outlet is provided complete with 30 mA RCD protection			
Flexible looms connecting door mounted to interior mounted components will not weaken or break with repeated door opening. Check that the loom is arranged to avoid pinching or looping when the door is closed and is fully supported at each end.			
Screen and earth connections associated with the control system equipment comply with the manufacturer's installation requirements			

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Conduct a flash test of all mains powered equipment. All isolators must be closed and power fuses fitted. However, control fuses and other low voltage equipment fuses are to be removed for the duration of the test to avoid damaging any extra-low voltage equipment. Note that flash tests should be performed for mains powered equipment only.			
General Function test			
The lamp test facility, if specified.			
Wiring interlocks by progressively energising or de-energising relay contacts, switches, timers etc in each circuit. Switches must be used to test that the system operates correctly in response to input signals.			
All indicators and signals out of the panel, e.g. those used to switch items of plant or to send status signals to the control system. Safety interlocks, e.g. coil freeze protection and fire overrides, must be checked in 'manual', 'off' and 'auto' switch modes.			
Fuse or circuit breaker frame size, trip unit type and settings against the drawings.			
Correct labelling has been provided.			
Energise the starter/contactors by 'making' the control circuit and ensure the starter operates correctly and that power is provided to outgoing terminals.			
Trip the starter and check that it de-energises and the trip indicator lights up.			
If the control panel is left on site for a long period then undertake adequate steps to ensure that it is protected from dirt, damage and moisture (e.g. by the use of anti-condensation heaters).			
When the field wiring is complete to the power section, repeat the flash test before closing the main isolator.			
Check all new connections into the panel and the interlocks re-checked before the power is switched on and is operated.			
Perform a complete panel test on-site if the panel has not been tested in the factory, or if a multi-section panel has been received on-site having been split for shipment.			
Undertake the following checks and tests on all wiring:			
Cable type as specified			
Cable identified at both ends			

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Cable cores identified at both ends if not self numbered or colour coded			
Security of fixing/protection of cables to walls etc where surface-run			
Cable carrier/container in accordance with the specification (tray, basket, conduit/trunking etc)			
Cable management in accordance with the specification			
Cables not damaged			
Secure termination of wires (using ferrules)			
Screening continuity			
Cable only earthed at one end (field controller) or as specified			
Electrical continuity ('belling out')			
Correct polarity where applicable			
Correct input/output (by briefly disconnecting cable)			
Correct and secure termination			
Separation of mains and signals cables			
No short circuits line-to-line and line-to-earth			
Volt-free contacts are volt-free (prior to the installation of the field controllers).			
The following on site communications network checks and tests will be undertaken:			
All network devices such as routers and bridges are installed correctly.			
All control devices can be addressed over the communication network.			
When used in conjunction with an office IT network ensure that permission has been granted from the IT manager. All network data routing is correctly set up by the IT department including allocation of the appropriate TCP/IP addresses and default router addresses.			
For structured cabling systems ensure that all outlets are properly labelled and assigned. Ensure that any changes to the cabling system are reflected in the updated documentation.			
The following on site insitu sensor checks and tests using NATA approved testing equipment will be undertaken:			
Correct location and orientation of the sensor			
Adequate access for the commissioning engineer(s) and future maintenance requirements			
Type of sensor as specified			
Appropriate sensor identification			
Sensor wired correctly			
Confirm the sensor output indicated by the control system with the reading on the test instrument.			



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If there are no suitable test points the sensor is to be removed and then tested (with the exception of velocity sensors). If a sensor is not linear over its working range check the sensor at the upper, middle and lower points of its normal working range.			
The following on site insitu actuator checks and tests using NATA approved testing equipment will be undertaken:			
Correct location			
Adequate access for the commissioning engineer(s) and future maintenance requirements			
Type of actuator as specified			
Actuator linkage connected and adjusted			
Correct identification			
Valves are ported correctly.			
Operate the device using the control system by applying a 100% signal, followed by a 0% signal. Check that the actuator moves smoothly over the full control range. Repeat the test under operating conditions, i.e. pumps or fans operating under normal operating conditions. (Not applicable for self-tuning actuators.)			
Check that the actuator has the correct movement to give the required travel of the final control device and that any mechanical and/or electronic travel ranges and limits have been set.			
Permanently mark reversible actuators with an 'as commissioned' switch position.			
Ensure that any linkage adjustment for rotation, lift or close-off have been suitably set.			
For actuators with spring return motors check that the position assumed upon interruption of the power supply is correct.			
If battery-backed actuators are used check that a battery is installed and the appropriate links are fitted.			
The following on site insitu digital input / output checks and tests using NATA approved testing equipment will be undertaken:			
The signal at each configured digital input is sensed correctly by the control system.			
Each contact assumes its correct normally open or closed state and that it changes in response to the relevant item of the plant being switched.			
Each digital output switches the correct item of plant with the correct sense. Ensure that the associated status signal (if any) functions correctly.			
Ensure that each check is entered on the relevant checklist.			



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The pulsed output from any specified utility meter is correctly processed and scaled to record the correct figure.			
The following on site insitu checks and tests using NATA approved testing equipment will be undertaken on all field control devices (controllers, outstations and unitary controllers etc):			
Type as specified			
Size as specified			
Enclosures as specified			
Number and location (height, access) as specified			
Adequate mechanical fixing			
Identification by mnemonic labelling			
All cables terminated and identified			
All terminals used (check that any unused terminals are intended to be spare)			
Continuous power available and of an appropriate quality			
Fuse correct type/spares if specified			
Hardware configuration agrees with the specification			
All printed circuit boards in place			
All connection cables plugged in			
Document wallet containing wiring diagram where appropriate, i.e when located in a control panel			
Installer:			
Witnessed by:		Position: Designer	

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