

Procedure Description	Frequency										Comments	
	Weekly	Monthly	Bi-Monthly	Quarterly	Semi-Annually	Annually	Bi-Annually	Tri-Annually	Biennially	Quinquennial		
Closed Circuit TV												
Clean, align, and focus all cameras after tunnel washing					X							
Manufacturers O&M Manual for luminaires - Not Provided												
Emergency Lighting - Buildings												
Operate test buttons on emergency light fixtures		X										
Operate battery pack for emergency lighting for 90 minutes						X						
Electrical Switchboard and Switchgear												
<i>O&M Manual recommendations</i>												
Inspect switchgear bus and connections by infrared scanning						X						
Perform ultrasonic inspection of medium voltage switchgear bus supports, insulators, and barriers							X					
Visually inspect all equipment for unusual conditions							X					
Check tightness of all connections							X					
Remove and replace defective lighting contacts							X					
Review results of last visual, infrared, and ultrasonic inspection									X			
After power shutdown, clean entire switchgear interior									X			
Clean all bus insulators and check for cracks and chips									X			
Clean, lubricate (if applicable), and verify operation of all control switches, auxiliary relays, and devices									X			
Clean, lubricate, adjust, and add anti-oxidant grease to contacts of all disconnect switches									X			
Clean and perform insulation resistance testing on all lighting arrestors									X			
Perform insulation resistance testing on any bus bars									X			
Perform calibration test and verify proper operation of all meters									X			
Low Voltage Air Circuit Breakers												
Remove covers and thoroughly clean each breaker and contact surfaces									X			
Apply anti-oxidant grease to breaker's main contacts									X			
Lubricate and verify operation of all mechanisms									X			
Apply current equal to 90 to 110 percent of the breaker trip coil setting to verify proper pick-up of tripping mechanism									X			
Record trip times for long-time, short-time instantaneous, and ground fault breakers when passing loads equal to multiples of their listed ratings through each phase of the breaker									X			
Measure contact resistance and adjust where possible									X			
Perform and record results of insulation resistance test from each pole to other two poles and to ground									X			
Clean and lubricate breaker carriage and racking mechanism on any draw out breakers									X			
Molded Case Circuit Breakers												
Inspect breaker for proper installation									X			
Remove cover (if possible) and fully clean interior and exterior									X			
Inspect for burning, overheating, wear, and proper alignment									X			
Perform contact resistance and insulation resistance measurements and test									X			
Apply current equal to 300 percent of breaker rating to test the long-time element									X			
Test and compare any breakers with instantaneous trip units to manufacturer's characteristic curve									X			
Automatic Transfer Switch (600 Volt Class)												
After total outage is obtained, clean all contact surfaces, apply anti-oxidant contact grease, measure and record contact resistance, and make any adjustments if necessary									X			
Lubricate bearings, links, pins, and cams									X			
Perform insulation resistance test									X			
Test all settings of voltage, frequency sensing, and timing relays									X			
Low Voltage Insulated Cable (Less Than 600 Volts)												
Check all cable terminations for tightness									X			

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Perform and record results of insulation resistance test from each phase to the other two and to ground for one minute using a test voltage of 1,000 volts Direct Current (DC). Compare results with previous test.								X			QMB/QMJ/QMQB1 Fusible Switches 1. Periodically exercise the switch to ensure proper operation. This period should not exceed one year. 2. Check the cover interlock with the switch in the ON position. The cover should not open using normal hand force. 3. Inspect the switch interior for any damaged or cracked parts, and replace as necessary. 4. For fusible switch units, check the fuse mounting clips or bolted contact area for corrosion or discoloration (indicating overheating). Replace them if necessary. 5. For additional maintenance instructions, see the label on the inside of the door. After the equipment in switchgear has been lubricated, perform the following steps. 1) Inspect all components for cracks, loose parts, and weather or chemical damage. 2) If cracks or strain damage are suspected, remove the unit from service. If cracked components are detected, replace them before returning unit to use. 3) Periodically check for distortion of the traveling lifter. If distortion is found: — Verify that the rails and sections are aligned. — Verify that the carriage and winch mechanism have been installed correctly. — Verify that the cable has been fastened securely to the winch drum. — Verify that the gears are well lubricated. NOTE: For normal operation, use a heavy gear lubricant. In very dirty or gritty conditions, it is advisable to use a dry lubricant such as dry graphite to lubricate the gears. Never allow the gears to run dry. 4) If applicable, remove handling means and any obstructions from the top of the unit that could inhibit operation of the traveling lifter. 5) Thoroughly inspect the traveling lifter wire cable. Pay close attention to cable sections, such as parts passing over sheaves or wound on the drum, which are normally hidden during inspection or maintenance procedures. Contact Schneider Electric Services at 1-888-778-2733 if the cable shows any of the following signs of deterioration: — Kinking, crushing, cutting, or unstranding — Corroded, cracked, bent, or broken wires — Worn end connections 6) Always keep the exterior finish in good condition to protect against corrosive damage. When damage is noticed, remove the finish to bare metal and refinish using a high-quality primer and finish coat. 7) Be certain that all the warning labels are still in place and readable. If the warning labels become unreadable or are destroyed, contact your local Schneider Electric sales office. 8) Do not repair any parts that are worn, cracked, deformed, misaligned, or severely corroded. Repairing parts does not ensure satisfactory or safe performance. Do not substitute other manufacturers' parts. 9) Record all inspections and maintenance performed on the traveling lifter in a maintenance log. Inspect the SPD periodically to maintain reliable system performance and continued transient voltage surge suppression. Periodically check the state of the diagnostic display panel LED status indicators. Routinely use the built-in diagnostics to inspect for inoperative modules.
Masterpact NT and NW Circuit Breakers											
<i>Case</i>											
Measure insulation resistance										X	
<i>Device</i>											
Check the general condition of the device (accessory cover, trip unit, case, cradle, connections)						X					
<i>Mechanism</i>											
Open/close device manually and electrically						X					
Charge device electrically						X					
Check complete closing of device's poles						X					
Check number of device operating cycles						X					
Check spring charging motor charging time at 0.85 of rated voltage									X		
Check general condition of mechanism									X		
Check tripping forces (crescent shaped part)										X	
<i>Breaking Unit (Arc Chutes + Contacts)</i>											
Check the filters cleanliness and the attachment of the arc-chute						X					
Check condition of breaking unit									X		
Measure resistance of input/output contact										X	
<i>Control Accessories</i>											
Check auxiliary wiring and insulation						X					
Check operation of indication contacts (OF / PF / MCH)									X		
Check closing operation of control auxiliary XF									X		
Check opening operation of control auxiliary MX at 0.70 of rated voltage									X		
Check operation of control auxiliary MN/MNR between 0.35 and 0.7 of rated voltage									X		
Check delay of MNR devices at 0.35 and 0.7 of rated voltage									X		
Check MX tripping time									X		
Check the service life of the accessories XF, MX, MN										X	
Preventative replacement of control accessories										X	
<i>Trip Unit</i>											
Trip trip unit using test tool and check operation of contacts SDE and SDE2						X					
Check ground fault protection function (Micrologic 6.0)						X					
Check tripping curves using test tool, signaling LED (tripped, overload). Save results on PC									X		
Check continuity of the tripping chain by primary injection for each phase										X	
<i>Device Locking</i>											
Open and close keylocks installed on device						X					
Open and close padlock system installed on device						X					
<i>Cradle (For Drawout Circuit Breakers)</i>											
Remove device from cradle and put it back						X					
Check operation of position contacts (CE, CT, CD, EF)						X					
Check operation of safety shutters						X					
Remove dirt and any foreign material, then regrease cradle									X		
Regrease disconnecting contact clusters (specific case of corrosive									X		

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Check connection/disconnection torque										X	
Clean and regrease racking screw										X	
Cradle Locking											
Open and close keylocks installed on cradle											
Operate padlocking system						X					
Power connections											
Check and tighten loose connections						X			X		
Electrical Transformer											
Inspect transformer connections by infrared scanning						X					
Perform ultrasonic inspection of medium voltage bus supports, insulators, and barriers						X					
Visually inspect all equipment for unusual conditions						X					
Test transformer and circuit breaker insulating oil						X					
Dry-Type											
Remove cover and visually inspect all cable/bus connections for evidence of overheating or burning, check for tightness and clean windings						X		X			O&M Manual recommendation for dry location 1. Perform routine inspections, maintenance, and testing after any severe electrical short circuit, ground fault, or environmental event (e.g., flooding) to determine the operational status of the transformer. 2. Perform the inspections, maintenance and testing if the transformer has been out of service for an extended period of time. Place strip heaters to maintain the transformer temperature above ambient to prevent condensation from forming in the transformer during extended down time.
Fire Alarm System											
<i>Perform all tests and inspections in accordance with NFPA 72</i>											
<i>Make and file a permanent record of all inspections and tests conducted</i>											
Open primary power supply to fire alarm panel and note sounding of trouble alarm and light		X									
Perform fire drill by user of drill switch on fire alarm panels, and check that all visual and audible signal emit a sound and tunnel SCADA system (if any) receives alarm		X									
Visually inspect all supervisory and water flow alarm on any standpipe systems		X									
Test all heat detectors with calibrated heat source and replace all failed units						X					O&M Manual recommendation
Test all smoke detectors by measuring and recording sensitivity; replace all failed units						X					O&M Manual recommendation
Clean all smoke and heat detector housings and check battery voltage under load					X						
Verify that proper alarm devices operate for the appropriate initiating device circuit					X						
Verify that all remote annunciators operate						X					O&M Manual recommendation
Check all lamps, alarm devices, and printers for proper operation				X							
Make a discharge test of batteries to determine capacity for operating system for 24 hours					X						O&M Manual recommendation
Visually inspect control panels						X					
Visually inspect batteries					X						
Visually inspect fiber optic connections						X					
Visually inspect emergency voice/alarm equipment					X						
Visually inspect remote annunciators					X						
Visually inspect air sampling					X						
Visually inspect duct detectors					X						
Visually inspect HVAC control dampers					X						
Visually inspect suppression release systems					X						
Visually inspect heat detectors					X						
Visually inspect smoke detectors					X						
Visually inspect waterflow and tamper				X							
Visually inspect post indicator valves				X							
Visually inspect alarm notification appliances				X							

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	Weekly	Monthly	Bi-Monthly	Quarterly	Semi-Annually	Annually	Bi-Annually	Tri-Annually	Biennially	Quinquennial	
Visually inspect dialers and interface equipment					X						
Test control panels						X					
Test batteries					X						
Test fiber optic connections						X					
Test emergency voice/alarm equipment					X						
Test remote annunciators						X					
Test air sampling						X					
Test duct detectors						X					
Test HVAC control dampers						X					
Test suppression release systems						X					
Test heat detectors						X					
Test smoke detectors						X					
Test waterflow and tampers					X						
Test post indicator valves				X							
Test alarm notification appliances						X					
Test dialers and interface equipment						X					
Tunnel Lights											Manufacturers O&M Manual for luminaires - Not Provided
Verify proper operation of the lighting fixtures in the tunnel areas	X										
Count and record number of lights out on night lighting and day lighting	X										
Replace any inoperable components	X										
Clean exterior of lenses on all lighting fixtures in the tunnel				X							
If required clean interior of lenses				X							
Perform group replacement for any luminaires that have failed						X					