

ROADS AND MARITIME SERVICES (RMS)

QA SPECIFICATION R320

MAINTENANCE OF CHANGEABLE MESSAGE SIGNS

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REVISION REGISTER

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GUIDE NOTES
(Not Part of Contract Document)



MAINTENANCE OF CHANGEABLE MESSAGE SIGNS

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VERSION FOR: DATE:

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been released as RMS Specification R320 Edition 1 Revision 0.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes have been indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***, and.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

RMS QA SPECIFICATION R320

MAINTENANCE OF CHANGEABLE MESSAGE SIGNS

1 GENERAL

1.1 SCOPE

This document sets out requirements for the Maintenance of Changeable Message Signs (CMS) (the “Services”). The Specification is formed only when this document is read together with RMS QA R300 ITS Maintenance Services – General Requirements.

CMS includes the display device and all supporting components of the system and site. The requirements herein is for Services relevant to CMS sites, so that they remain in good condition, operate as designed and meet the specified performance requirements.

Major components of a Changeable Message Signs (CMS) site are listed below:-

- a) Changeable Message Signs (CMS) as defined for all types. Includes displays, Intelligent relay I/O board, Linear actuators, Proximity switches, DC reversing contactors, ED conspicuity devices (where applicable), Facility switch, enclosures, fuses, all associated electronics, electrical and mechanical components contained there in,
- b) Controller Cabinet is structure mounted, ground mounted, integrated with CMS or other cabinets. Includes all control systems including remote control box (where used) for remote-controlled display changeover.
- c) Remote control transmitter (handheld) and receiver units (where used).
- d) Sign electronics, electrical and mechanical components. Controller or control gear, sign controller, RF receiver and motors etc.
- e) Steel, sign support structures for all types of CMSs. Includes all associated fixtures; sign enclosure, meshes, brackets, fasteners, safety rails/cables/roller hooks, fixed lifting devices, fixed ladders and surface treatments.
- f) Externally mounted fixtures i.e. Solar panels, antennas, sensors, or recording equipment installed onto CMS enclosure, support structure and controller cabinet,
- g) Electrical power distribution system from service point of supply (metered/un-metered supply point) up to the CMS. Includes all power cables, switch devices, distribution devices, voltage conversion devices, stabilization devices, fuses, glands, connectors, surge protection devices, cabling, pits/conduits and clamping fixtures,
- h) Communication distribution system from the service point of supply up to the CMS. Includes all copper & fibre cables, routers, radios, antennas, modems, splitters, converter patch boards, protection devices, glands, connectors, clamping fixtures and Radio/Wireless communication equipment,
- i) Power back up system (where provided). Includes auxiliary power generator, Uninterrupted Power Supply (UPS), Solar panels, battery(s) and charging units,
- j) Site civil infrastructure. Includes concrete pathways, platforms, retaining walls, safety barriers, handrails, drains, landscaping, and
- k) Signage at site could be static post mounted, painted or labels. Includes site identification on controller cabinets, safety signs and pavement markings.

1.2 DEFINITIONS AND ABBREVIATIONS

The following definitions and abbreviations, in combination with those listed in R300, are applicable to this Specification.

1.2.1 Definitions

Term	Description
Changeable Message Sign	A sign with a mechanically changeable message display actuated by electrically excited actuators controlled by an electronic controller, and may include, but not limited to, <ul style="list-style-type: none"> • Changeable Message Signs (CMS), and • Shutter Message Signs (SMS).
Enclosure	A housing providing an appropriate degree of environmental protection against contact with live parts (AS/NZS 60529).
Power backup equipment	Includes backup power generator, UPS, batteries and charging units, photovoltaic power supply (where applicable), power regulators, etc.
Protocol	RMS Communications Protocol For Roadside Devices (RMS Specification TSI-SP-003)
Supply Point (also known as Connection Point)	The junction of the electricity distributor's low voltage network conductors with the consumer's mains, i.e. the point at which the power supply is connected to the Utility network.
Sign	Same as Changeable Message Sign.
Supports	All structural components, brackets, clamps, straps and parts thereof, used to support the Changeable Message Sign (CMS) Equipment.
Site/work site	Changeable Message Sign (CMS) site

1.2.2 Abbreviations

Term	Description
AC	Alternating current
CMS	Changeable Message Sign
DC	Direct current
EPV	Elevated platform vehicle (same as elevated work platform)
LED	Light Emitting Diode
OEM	Original Equipment Manufacturer
O&M	Operations and Maintenance
PV	Photovoltaic
RCD	Residual current device
TFS	Tidal Flow System

SMS	Shutter Message Sign (SMS)
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1.3 RELEVANT DOCUMENTS AND ORDER OF PRECEDENCE

This document must be read together with RMS QA R300 – ITS Maintenance Services – General Requirements.

Other relevant RMS Maintenance Specifications, and O&M manuals are listed in **Annexure R320/A**.

In the event of any conflicting requirements between documents, the order of precedence must be:-

1. Statutory and legislated requirements,
2. This specification (QA Specification R320) read in conjunction with QA Specification R320,
3. Other RMS ITS Maintenance specifications - listed in Annexure R320/A,
4. RMS ITS Equipment specifications - listed in Annexure R320/A,
5. O&M manuals- listed in Annexure R320/A,
6. Australian Standards.

2 MAINTENANCE SERVICES

You must undertake maintenance services of the CMS Equipment system and site components as described in clause 1.1 and in accordance with the approved Asset Maintenance Plan and Forward Works Program.

2.1 PLANNED MAINTENANCE

Planned Maintenance Services must adhere to requirements given in QA Specification R300, ITS Maintenance Services – General Requirements. A combination of inspections/checks and preventative maintenance activities constitute planned maintenance to ensure continued serviceability and availability of a CMS asset.

Minimum planned maintenance inspection/checks are:-

- a) CMS display operation,
- b) Condition of CMS enclosure, support structure, controller cabinet and other externally mounted accessories for damage, disfigurement (including vandalism), peeling or damaged galvanizing/paint surface coating and corrosion,
- c) Presence of moisture, dirt, vermin/insects inside CMS enclosure, Controller cabinet, pits, exposed ducts and steel structure crevices, and
- d) Wearing off or damaged site infrastructure i.e. concrete pathways, platforms, retaining walls, safety barriers, handrails, drains, landscaping etc.

Annexure R320/B is a sample Planned Maintenance Service checklist for both checks/inspections and preventative maintenance items.

Planned maintenance frequency for CMS is 6 months.

2.2 REACTIVE MAINTENANCE

2.2.1 Fault Attendance Service

You must provide a fault attendance service on a twenty-four (24) hours per day, seven (7) days per week basis for all CMS faults.

Typical causes of CMS faults include, but are not limited to:-

- a) Sign Controller and associated equipment malfunctions,
- b) Remote control transmitter handheld malfunctions,
- c) Remote control receiver malfunctions,
- d) Changeable Message Sign failures,
 - Intelligent I/O relay malfunctions
 - Linear actuator malfunctions
 - Gear mechanism malfunctions
 - Proximity switch malfunctions
 - DC reversing contactor malfunctions
 - Conspicuity device failures
- e) Shutter Message Sign failures,
 - Shutter mechanism malfunctions
 - Motor malfunctions
- f) conspicuity hardware failure,
- g) power & communication equipment malfunctions,
- h) power and communication cabling and wiring damage,
- i) overheating of electronics inside sign and controller enclosures,
- j) moisture or dust ingress,
- k) accident damage,
- l) storm damage, and
- m) Vandalism.

All repair works must be in accordance with RMS Specifications listed in Clause 1.3 or as amended.

2.2.2 Procedure

You must make arrangements to continually monitor the Fault Management System(s) for CMS.

These systems, hosted by RMS, currently include:

- SMS fault notifications to OEM (where provided);
- CMCS FMS web page for fault log intranet (where provided); and

You will be provided (if available) with access (e.g. remote login via VPN) to these systems. You may also develop your own software interface to read the CMCS “flat file” which is periodically updated with CMS fault status. In that case you will be provided with access to the CMCS “flat file” and a description of its structure.

Upon fault notification, you must review the nature and urgency of the problem and prioritise your response. You must dispatch appropriately skilled resource(s)/technician(s) to attend the site as soon as possible, but in any case within the specified response time (see clause 2.2.3 for Response Time and Repair Time). Notification of the fault is either via phone callout or at the start of shift of your qualified resource(s)/technician(s). It is expected that your skilled resource(s)/technician(s) review their current faults at the start of their shift to determine their work priorities.

Upon arriving on site you must inform TMC by phone and log the time of attendance in your fault management system together with your initial findings and any other relevant information (e.g. estimated time to repair). You must also notify the TMC by phone before leaving the site.

You must assess whether the condition of the site poses any safety hazards to motorists or the public and make the site safe as a matter of priority.

In the event of a power failure, you must first contact the electricity distributor from off-site to ascertain that the cause of the outage is upstream of the CMS supply point. You must still ascertain from site that there are no other power equipment failures at the CMS site and then enter the appropriate fault response details in your fault management system.

In the event of a communications failure, you must first contact the service providers i.e. Telstra, Optus etc to ascertain that the failure is external to the CMS system. Once confirmed, you must log communications faults with the appropriate third party communications service provider and follow-up to expedite rectification of the fault. You must still ascertain from site that there are no other communication equipment failures at the CMS site and then enter the appropriate fault response details in your fault management system.

2.2.3 Response Times for Fault Attendance

Response time starts from the initial fault occurrence time stamp in the appropriate electronic Fault Management System or from the time of the fault call (whichever is earlier) and is the sum of following;

- Remote investigation time to ascertain nature of defect(s),
- Equipment/parts/materials preparation time, and
- Travel time to site.

Response times for initial site attendance upon notification of a CMS fault is guided by the criterion in **Annexure R320/C**.

Service provider to locate maintenance crews to facilitate their travel time to site.

2.2.4 Repair Time

Repair time at site is the time taken to trouble-shoot the fault, completely repair the asset and make it available for service. Asset downtime directly effects operational availability. Swift, efficient and well coordinated repairs will bring the asset back into operation quickly and positively affect performance targets.

You must inform RMS as soon as possible of any abnormal delays, reasons for delayed repairs and estimate of the time required to complete the repairs.

2.2.5 Repetitive Failures

Where the same reported fault requires callouts on three (3) occasions within a fourteen (14) day period you must carry out root cause analysis, identify and implement appropriate actions to prevent recurrence.

Where these actions recommend replacement or major renewal of the CMS asset and these works have not been included in the current Forward Works Program (FWP) you must submit a Business Case to RMS for approval. The Business Case must be based on a life cycle cost comparison of the proposed action against a “business as usual” maintenance approach. If RMS agrees with your recommendations the renewal or replacement works will be included in the next FWP.

Till the recommended and approved replacement works in the FWP are completed, the availability target (%) will be reviewed and a lower KPI may be accepted or under unsustainable operating conditions, the asset excluded from the KPI assessment until replaced.

2.2.6 Requests for RMS Assistance

Where a technical problem cannot be resolved by you, you may request assistance from RMS. When requesting assistance you must be able to demonstrate to RMS that the technical problem is complex and/or outside your scope of services, e.g. system integration issues with RMS or TMC systems.

If the technical problem cannot be resolved by RMS remotely, a site visit meeting will be arranged by RMS at a mutually agreeable time. You must attend the site with relevant documents and information related to the technical problem.

2.3 INCIDENT SUPPORT

An Incident Support report should be raised when;

- an incident is known to your team
- or when informed by the TMC
- or by the relevant SMC Service Provider.

In the event of an incident, response time and repair time for Reactive Maintenance applies.

On site attendance, you must assess whether the condition of the site poses any safety hazards to the public and make the site safe as a matter of priority.

You must also prioritise and rectify all other faults and defects as if for Reactive Maintenance.

Upon arriving on site you must inform TMC by phone and log the time of attendance in your fault management system together with your initial findings and any other relevant information (e.g. estimated time to repair). Report form in **Annexure R320/D** may be used on site. You must also notify the TMC by phone before leaving the site.

You must assist RMS with all insurance claims and recovery actions arising from the incident.

Incident Support reports must be submitted as part of your monthly report to RMS.

3 PARTS AND EQUIPMENT

3.1 SUPPLY

You must arrange and manage supply of all parts equipment, materials and technical services from OEM suppliers for the purpose of making available the CMS site. Quality of parts, equipment and technical services from OEMs is to be assured.

When supply disruptions occur due to unavailability or obsolescence of a part or equipment, a Replacement part or equipment is to be recommended to RMS as a business case. RMS may approve use of the Replacement part or equipment after necessary technical review and testing.

3.2 HOLDING STOCK

At all times, you must hold in stock adequate minimum levels of parts and equipment to meet Planned and Reactive Maintenance needs.

Service provider is to determine minimum stock levels for parts, equipment and materials based on CMS maintenance scope.

An inventory of spares for parts, equipment, materials and technical services is to be maintained by the service provider. Inventory is to update minimum stock levels and holding stock periodically to match the CMS maintenance scope.

Inventory of spares is to be updated for Replacement parts and equipment, on approval by RMS.

3.3 DISPOSAL OF DAMAGED, DEFECTIVE, OBSOLETE OR REDUNDANT PARTS & EQUIPMENT

Due to maintenance or incidents, parts and equipment which are damaged, defective, obsolete or redundant are required to be removed from the Work Site and disposed. Such removal is to be done after formal information and agreement with RMS.

Such parts and equipment are to be distinctly and permanently marked prior to disposal by indicating their condition.

Disposal of parts and equipment is to be done as follows:-

- a) Repair or refurbish the parts or equipment and hold them as spares in store for future use. For purposes of quality assurance, repaired or refurbished parts are to be treated the same as Replacement parts & equipment (Clause 3.1). Their repair history is to be maintained and made available to RMS when requested.

b) Carry out disposal of parts or equipment that are beyond-economical-repair (BER) by recycling. Items being disposed must be physically disfigured prior to recycling at a certified facility. Certificate of disposal must be provided.

4 PERFORMANCE REQUIREMENTS (ASSET SPECIFIC)

You must meet the included Key Result Areas (KRAs) and Key Performance Indicators (KPIs) for performance of your Services.

Your asset Inspection and Planned Maintenance Services must support a design life for each CMS asset i.e. site availability should be sustained during design life for different components at a CMS site, which varies as follows:-

- CMS display, electronics and electrical components- ten (10) years.
- Steel fabricated Support Structures, Brackets and Fixtures – Fifty (50) years.
- Concrete & Masonry construction at Site – Thirty (30) years.
- Power back-up system / Batteries – Five (5) years.

As per definitions given in R300 the following performance criteria will be measured:

- a) Availability
- b) Response Time
- c) Repair effectiveness Time

Premature asset failures requiring major renewal or replacement of the asset (other than due to Incidents or Force Majeure events) may reduce your overall Stewardship Performance KPI score.

Performance requirements which are specific to CMS Equipment are detailed below.

4.1 AVAILABILITY (OPERATIONAL)

RMS QA R300 defines Availability for ITS assets. Performance calculation method is provided in the contract. The performance target for CMS availability is at least **95.0%** (if standalone) or **98%** (if part of TFS).

Availability as defined in R300 will be measured monthly by you across all CMS assets in your Zone.

Failure to meet the Availability performance targets will impact on your Asset Performance KPI score.

4.2 RESPONSE TIME AND REPAIR EFFECTIVENESS

The measure of Response Time and Repair Effectiveness is defined in R300.

5 REPORTING AND RECORD KEEPING

5.1 REPORTING

You must provide a monthly performance report to RMS on work achievement against the FWP and asset performance statistics in an agreed format by the first week of each month.

You must report on the status of fault attendance and repairs through the appropriate Fault Management Systems in accordance with Clause 6.3 in R300.

These reports will be included in the KPI assessments every by end of every month according to the contract.

5 REPORTING AND RECORD KEEPING

5.1 REPORTING

You must provide a monthly performance report to RMS on work achievement against the FWP and asset performance statistics by the second week of the following month. The report must include the following items:

- (i) Availability
- (ii) Response Time
- (iii) Repair Effectiveness

See R300 for Availability, Response Time and Repair Effectiveness definitions.

You must report on the status of fault attendance and repairs through the appropriate Fault Management Systems in accordance with Clause 6.3 in R300.

These reports will be included in the KPI assessments by end of every month in accordance with the contract.

5.2 RECORD KEEPING

You must keep and maintain accurate records of all repairs, calibrations, replacements and design alterations made to any CMS Equipment/site.

All Reactive and Planned Maintenance service attendances must be recorded in the electronic fault management system. Details of each attendance must also be manually recorded with you and should include the date and details of service carried out with the technician's name.

You must maintain all necessary records to support the monthly evaluation of actual performance against the specific performance targets.

You must retain records, including all details for accidents/damages/repairs for a period of at least five (5) years.

ANNEXURE R320/A – REFERENCE DOCUMENTS

A1 RMS ITS Maintenance Specifications

RMS QA R305 Maintenance of Tidal Flow Systems

RMS QA R318 Maintenance of Power Backup Systems

A2 RMS ITS Equipment Specifications

TSI-SP-003 Communications Protocol For Roadside Devices

A3 O&M Manuals

Refer to respective O&M Manuals for the based on make and model number of each CMS. O&M Manual is supplied by OEM.

A4 Australian Standards

Not used.

ANNEXURE R320/B – SAMPLE PLANNED MAINTENANCE SERVICE REPORT

PILLAR ID: **LOCATION:**

REPORT DATE:

1. Mark as actioned for each item with a ✓ in the “ACTIONED” columns.
2. If any item requires further attention, write reasons in comments column and mark that item with a ✓ in the “for further action (FFA)” column.
3. Enter date in dd/mm/yy format and time in 24 hour format.

PREVENTATIVE MAINTENANCE ITEMS	ACTIONED	COMMENTS	FFA
Controller Cabinet			
Clean Cabinet and check or moisture ingress. Repair as necessary.			
Check all labels and replace as necessary			
Check Communication and Power pits for water and other damage, clean as necessary			
Check exterior for damage or graffiti. Repair damage or remove graffiti. Report date or damage to RMS.			
Check condition, replace and lubricate door locks, hinges & seals as required			
Check that log sheet and WEA drawings are complete and intact. If WAE drawings missing or damaged, prepare hand sketches at site and forward to RMS to reproduce.			
Physically check switchboard and RCD items (if provided). Reset circuit breakers.		RCD tripping current: RCD tester make and model:	

Measure RCD tripping current (in mA)			
Locate MEN connection inside the cabinet			
Visually/physically check wiring/terminations/earthing items, tighten if required.			
Check and secure Earth connection. Measure Earth insulation reading using insulation tester		Reading between Earth stake & Door : Reading between Earth stake & Mains Earth: _____	
Check if surge protector is installed		Surge protector make and model: _____	
Controller and communication equipment			
Inspect electronics of CMS controller and communication equipment for symptoms of electrical or thermal fatigue. Repair or replace as needed			
Remove mains power; verify uninterrupted controller operation. Check existing battery voltage and charger operation.		Date on battery label or proof of purchase: Date of expiry of battery OEM's warranty:	
Replace and label battery as specified, if date reached / 400 recharge cycles to 80% depth of charge.			
Check communication equipment jumper settings Use Maintenance software to check for data corruptions over the complete communications link (ISDN, Ethernet, 3G, etc). Comment findings.			
Retrieve CMS fault log. Repair or report as necessary.			
Display/Sensors			

Inspect CMS for symptoms of electrical or thermal fatigue. Repair or replace as necessary.			
CMS enclosure			
Check CMS support post and walkway platform structure (where provided) including ladder for damage / corrosion / peeling galvanisation or paint.			
Check CMS sign view from target distance; Clear tree branches if interfering with CMS.			
Check maintenance walkway for bridging plates security.			
Clean/vacuum gantry walk way/bridging plates of leaves etc.			
Check outside of sign enclosure for any peeling of paint, damage, graffiti or corrosion. Remove defect as necessary			
Check inside of CMS enclosure for water leakage or presence of moisture damage. Locate leakage point, report and repair as necessary.			
Clean CMS switch/sensor cover. Reseal if needed or replace if damaged.			
Check conspicuity doors or access points for rusted screws, replace if necessary			
Remove any weeds or grass near cabinet and equipment			
Inspect for damaged or missing covers, doors or hatches and replace as necessary.			

1. Mark condition of each item with a ✓ in “PASSED/FAILED/REPAIRED” columns.
2. Mark condition CF or NCF in the FAILED column to categorize.
3. If any item requires further attention, write reasons in comments column and mark item with a ✓ in the “for further action (FFA)” column.
4. Enter date in dd/mm/yy format and time in 24 hour format.

CMS – Tri Vision Type					
FUNCTIONAL INSPECTION ITEMS	PASSED	FAILED	REPAIRED	COMMENTS	FFA
Preliminary					
Before going to site, contact TMC for Road Occupancy License (ROL)				ROL number: _____	
Contact TMC for clearance for maintenance					
Sign functions					
Establish type of switching mechanism used Remote Control or Signal Controller.				Switching Type: _____ _____	
Where used, identify remote control make, model and serial number. Measure remote control battery. Check voltage reading of battery. Replace battery if voltage is low, as specified.				Remote control make: _____ model: _____ S/N: _____ Battery voltage: _____ V	
Where used, swap intelligent I/O relay(s) with Input Switch I/O relay(s) Press button(s) or toggle Input Switch I/O relay 'ON', visually check and verify change of sign message. Repeat for all sign positions. Forward direction Message 1 Message 2				Message 1 displayed: _____ _____	

<p>Message 3</p> <p>Reverse direction</p> <p>Message 3</p> <p>Message 2</p> <p>Message 1</p> <p>Repair or replace as necessary; then Check operation.</p> <p>Swap Input Switch I/O relay(s) with intelligent I/O relay(s).</p>			<p>Message 2 displayed: _____ _____</p> <p>Message 3 displayed: _____ _____</p> <p>Message 3 displayed: _____ _____</p> <p>Message 2 displayed: _____ _____</p> <p>Message 1 displayed: _____ _____</p> <p>Date: _____</p> <p>Status: _____ _____</p>	
<p>Visually inspect operation of LED/lantern conspicuity devices.</p> <p>Repair or replace as necessary.</p>				
<p>Where used, turn facility switch to AM PEAK; visually check that correct message is displayed; and verify CMCS message setting validation stamp.</p> <p>Repair or replace as necessary.</p>			<p>Message displayed: _____ _____ _____</p> <p>Date: _____</p>	
<p>Where used, turn facility switch to PM PEAK; visually check that correct message is displayed; and verify CMCS message setting validation stamp.</p> <p>Repair or replace as necessary.</p>			<p>Message displayed: _____ _____ _____</p> <p>Date: _____</p>	
<p>Where used, turn facility switch to OTHER TIMES; visually check that correct message is displayed; and verify CMCS message setting validation</p>			<p>Message displayed: _____ _____</p>	

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stamp. Repair or replace as necessary.				_____	
				Date: _____	
Where used, turn facility switch to FALLBACK; visually check that correct message is displayed; and verify CMCS message setting validation stamp. Repair or replace as necessary.				Message displayed: _____	

				Date: _____	
Where used, turn facility switch to OFF; visually check that correct message is displayed; and verify CMCS message setting validation stamp. Repair or replace as necessary.				Message displayed: _____	

				Date: _____	
Where used, turn facility switch to AUTO; visually check that correct message is displayed; and verify CMCS message setting validation stamp. Repair or replace as necessary.				Message displayed: _____	

				Date: _____	
Retrieve sign fault log; verify fault log is reporting sign and controller errors					
Turn all circuit-breakers OFF and reset; sign should report a fault log entry and clearance indicating the related power failure					
Check for high resistance joints					
Check for damaged cables					
Clean and lubricate all mechanical components then cover to test functionality					
Check MEN and earthing					
Retrieve CMS fault log; verify fault log is reporting sign and controller errors					

R320**Maintenance of Changeable Message Signs****TECHNICIAN:** **COMPANY:****SIGNATURE:** **DATE SIGNED:****DATE SENT TO RMS:**

CMS – Shutter Type					
FUNCTIONAL INSPECTION ITEMS	PASSED	FAILED	REPAIRED	COMMENTS	FFA
Preliminary					
Before going to site, contact TMC for Road Occupancy License (ROL)				ROL number: _____	
Contact TMC for clearance for maintenance					
Sign functions					
Where used, identify remote control make, model and serial number. Measure remote control battery. Check voltage reading of battery. Replace battery if voltage is low, as specified.				Remote control make: _____ model: _____ S/N: _____ Battery voltage: _____ V	
Check shutter position prior to test (opened or closed)?				Shutter position: _____	
Press button(s) and visually check shutter position as follows; First press: check shutter operation and position (opened or closed)? Ensure shutter completes operation. Wait at least 1 minute after first operation completes, then				Shutter position: _____	

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Second press: check shutter operation and position (opened or closed)? Repair or replace as necessary; then Check operation.				Shutter position: _____ Date: _____ Status: _____ _____	
Verify shutter position at end of check is as initial position recorded in item 5 above.				Shutter position: _____	
Check for high resistance joints					
Check for damaged cables					
Clean and lubricate all mechanical components then cover to test functionality					
Check MEN and earthing					
Retrieve CMS fault log; verify fault log is reporting sign and controller errors					

TECHNICIAN: **COMPANY:**

SIGNATURE: **DATE SIGNED:**

DATE SENT TO RMS:

ANNEXURE R320/C – FAULT CODES AND RESPONSE TIMES

Response times for initial site attendance upon notification of CMS faults are detailed in R300 (Clause 6.2.1 Response Times and **Annexure D**). R300 categorizes ITS assets as either High Priority or Normal Priority and assigns suitable response times.

ANNEXURE R320/D – SAMPLE INCIDENT SUPPORT REPORT

SIGN ID: **LOCATION:**

INCIDENT DATE: **REPORT DATE:**

Incident Details	
When reported	
Who reported	
Was Incident or fault a dangerous situation? (Y/N)	
Police attendance? (Yes/No) Police Report #:	
Details of any vehicles involved	
Attending supervisor and team at site. Date and time.	
Immediate Safety measures taken. Date & time.	

Power Supply Point / post identification number	
Initial Repair undertaken. Date & time	
Details of long term repair. Whom forwarded to for action.	
Description of replaced equipment and cost of equipment plus materials	
Number of hours claimed for complete repair	
Notes & Comments	

TECHNICIAN: **COMPANY:**

SIGNATURE: **DATE SIGNED:**

DATE SENT TO RMS: