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GENERAL INSPECTION STANDARDS FOR ELECTRONIC EQUIPMENTS

Erratum

Note: This Page 0 Issue 1, is to be filed immediately in front of Page 1, Issue 3 dated Oct 70.

1. The following amendments must be made to the regulation.
2. Add new para 8:

'The three standards defined in para 7 have now been discontinued. New standards are being written and will be published in EMER T&M A 028 Chapters 007 and 620'.

MAN/74/2/Tels

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GENERAL INSPECTION STANDARDS FOR ELECTRONIC EQUIPMENTS

Note: This Issue supersedes Issue 2 Pages 1 to 9 dated 9 Jul 69. The regulation has been revised.

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Definition of conventions used in this EMER

'is to' and 'are to': The words, 'is to' or 'are to', are used to convey a mandatory condition.

'should': The word 'should' is used in directives or instructions to express the requirement, leaving a measure of discretion to the inspector.

INTRODUCTION

1. This regulation lays down the standards, other than the detailed limits and tolerances quoted in the relevant equipment Inspection Standard, which are generally applicable to electronic equipment.
2. Standards and Instructions quoted in this EMER should not be detailed in equipment EMERs, a general reference to this EMER is sufficient. Where there appears to be conflict between the requirements of this EMER and the equipment EMER the latter is to take precedence.

GENERAL

3. Inspection at Unit level should not normally involve the opening of sealed assemblies, nor the dismantling of parts to ascertain the internal condition.
4. Minor adjustments are permitted in order to allow inspection to proceed.

5. When the condition of an equipment has been ascertained, it must be sentenced in accordance with the latest relevant DCI. The sentence code letter indicates either serviceability, or the level of repair required to make the equipment serviceable, and must be entered in the inspection record for that equipment. In deciding the sentence the following points should be considered:-

a. The 'Serviceable' sentence is to be given where the equipment conforms to the inspection specification. The symbol 'C' may be used where there is doubt that a serviceable item will remain so till the time of the next inspection, and a 'Repair' sentence does not seem justified. This is to direct the unit to keep the equipment under observation.

b. Before sentencing an equipment 'Repairable' or 'BLR' the ability of a Unit to effect repairs, together with the local repair facilities and resources must be considered.

6. After inspection, the relevant Inspection Record Form is to be endorsed by the Inspecting Authority as follows:-

'In addition to the specification test results, the equipment meets the requirements of EMER Tels A 779 General inspection standards for electronic equipment'.

7. This EMER quotes three standards:-

- a. Field Standard (Minimum)
- b. Field Standard (Repair)
- c. Base Standard

The definition of these three standards is to be found in EMER Mgmt 0 028. Table 1 lists the general requirements of all three standards.

Table 1 - Schedule

Serial No	Base standard	Field standard repair	Field standard minimum
	(B)	(FR)	(FM)
1	<p><u>External condition</u></p> <p>a. It is important that the general finish should be such as to encourage proper care by the user.</p> <p>b. The entire external faces should possess a good finish, paintwork in good condition and all identification plates, scales and labels undamaged and clearly legible.</p> <p>c. The external surface should be free from moisture, dust, corrosion, fungus or other foreign matter.</p> <p>d. Body coverings</p> <p>(1) Synthetic coverings should be clean, thoroughly adherent and free from chipping and flaking.</p> <p>(2) Leather or woven coverings should not be perished, torn or frayed, and be free from mould. The stitching should be sound.</p> <p>(3) Patch repairs are permissible.</p> <p>e. Paint Work</p> <p>(1) Paintwork should be intact, free from blemish and in accordance with EMERs Wksp G 500, Tels A 303, A 760, or the appropriate equipment EMER.</p> <p>f. Plating</p> <p>(1) Plating should be intact and free from surface blemish, peeling, corrosion or flaking.</p>		
		(1) Paintwork is to provide adequate protection. Minor blemishes and patch painting are permissible.	(1) Plating is to provide adequate protection. Some discoloration may be permitted (Where small areas of rust or corrosion are present on internal surfaces these may, provided no electrical connection is made to the affected area, be cleaned by wire brushing, and the area painted with paint, priming, zinc dust. After 24 hours the area is to be given one coat of H1/8010-99-943-3454 Varnish, electrical insulating finishing, with fungicide, air drying, brushing clear.)

(B)	(FR)	(FM)
<p>g. Equipment cases</p> <p>(1) Equipment cases are to be free from cracks, corrosion or distortion.</p> <p><u>Note:</u> This includes all items such as cases, screens, chassis, panels, supporting framework, cabinets, carriers, etc.</p> <p>(2) Welding, rivets and permanent bolts are to be sound, and tight.</p> <p>(3) Wooden cases are to be free from damage, warping or splitting and infestation.</p> <p>(4) Interior fittings, and fasteners are to be complete, and correctly arranged to hold items securely. All padding is to be securely fastened.</p> <p>(5) Hinges, slides and fasteners are to operate correctly, maintaining alignment with parent item.</p>	<p>(1) Equipment cases are to be free from cracks. Small areas of rust or corrosion are to be cleaned and treated as in 1c(1) (FR) or 1f(1) (FR). Minor dents and distortion should be permitted provided the function is unimpaired.</p> <p>(2) Welding, rivets and permanent bolts are to be sound, and tight.</p> <p>(3) Cracks in hardwoods should be permitted provided they are adequately treated, and the structure is sound. Minor dents and blemishes should be permitted so long as the function is unimpaired.</p> <p>(4) Interior fittings should hold items securely.</p>	<p>(1) All transparent covers should be clean, and free from cracks.</p> <p>(2) Blemishes should be permitted providing vision of the scale or interior is not affected.</p>
<p>h. Windows, meter glasses etc.</p> <p>(1) All transparent covers or glasses are to be free from cracks and scratches, clean and secure.</p>		

(B)	(FR)	(FM)
<p>j. Sealing</p> <p>(1) All gaskets and bushes used in a sealed equipment are to be undamaged, resilient and provide an effective seal.</p> <p>(2) Desiccators and desiccant are to show no sign of moisture.</p>	<p>(2) Desiccators should indicate blue or some degree of blue.</p>	
<p>k. Identification and Mod plates</p> <p>(1) Ident, Mod plates and legends are to be clearly legible, the engraving correctly filled and free from all but superficial damage.</p>	<p>(1) Ident, Mod plates and legends should be legible, so that confusion in reading cannot occur.</p>	
<p>l. Rubber and artificial rubber fittings</p> <p>(1) All rubber or artificial rubber fittings are to be unperished, resilient, clean and undamaged.</p> <p>(2) Where such fittings are bonded to metal, the bond is to be fully adherent.</p>	<p>(1) All such fittings should be clean and unperished. Minor blemishes should be permitted.</p>	
<p>m. Accessories and spares</p> <p>(1) All accessories and spares less those accounted for separately, are to be complete and serviceable.</p>	<p>(1) All accessories are to be complete and serviceable, deficiencies in spares should be noted.</p>	

	(B)	(FR)	(FM)
2	<p><u>Mechanical condition</u></p> <p><u>Note:</u> Superficial damage should be accepted providing the equipment functions as laid down in the appropriate equipment EMER. The aim is to ensure that mechanical failure is unlikely to occur.</p> <p>a. Controls, handles/knobs</p> <p>(1) All such fittings are to be undamaged and secure on their shafts.</p> <p>(2) Pointers are to be rigidly attached.</p> <p>(3) Pointers and index marks are to be correctly aligned mechanically and electrically, and on rotating controls concentric with the appropriate markings on the panel.</p> <p>(4) Index marks and scales are to be clearly legible.</p>		<p>(1) Should be secure, and where pointers are included should be correctly aligned electrically and mechanically.</p> <p>(2) Index marks, and scales should be clearly legible.</p>
	<p>b. Limit stops</p> <p>(1) Are to provide a positive stop.</p> <p>(2) Are to operate at the correct limits of travel.</p>		

(B)	(FR)	(FM)
<p>c. Friction clutches</p> <p>(1) Are to provide a positive drive which is smooth and free from slipping.</p> <p>(2) Are to slip smoothly at limit stops.</p> <p>(3) Are to operate within the torque limits quoted in the appropriate EMER.</p>	<p>(1) Are to provide a positive drive and slip smoothly at the limit stops.</p> <p>(2) Are to operate within the torque limits quoted in the appropriate EMER.</p>	
<p>d. Flick mechanisms</p> <p>(1) Are to provide positive location of the drive when in use.</p> <p>(2) Are to lock the drive positively when in use.</p> <p>(3) Are to release the drive completely when in the flick position.</p> <p>(4) The location of the flick stop position is to be adjusted to the accuracy required in the appropriate EMER.</p> <p>(5) Backlash in the mechanism is to be within the limits specified in the appropriate EMER.</p>		<p>(1) Should provide positive location of the drive when in use.</p> <p>(2) Should release the drive when in the flick position.</p>
<p>e. Clamping devices</p> <p>(1) Are to provide an effective clamping action at any point in the movement of the control.</p> <p>(2) The action of clamping is not to cause any change in the electrical parameter set by the control.</p>		<p>(1) Should provide an effective clamp at any point in the movement of the control.</p> <p>(2) The action of clamping should not cause any change in the electrical parameter set by the control.</p>

(B)	(FR)	(FM)
<p>f. Slow motion drives</p> <p>(1) Are to operate smoothly and accurately over the limits of travel.</p> <p>(2) There is to be no slipping.</p> <p>(3) Backlash and setting accuracy is to be within the limits specified in the appropriate EMER.</p> <p>(4) Are to operate within the required torque limits specified in the appropriate EMER.</p>		<p>(1) Should operate smoothly and accurately without slip over the limits of travel.</p>
<p>g. Gearboxes</p> <p>(1) Are to operate smoothly.</p> <p>(2) Backlash is to be within the limits specified in the appropriate EMER.</p> <p>(3) Are to operate within the required torque limits specified in the appropriate EMER.</p> <p>(4) Oil seals, if fitted are to be free from damage and prevent leakage.</p>		<p>(4) Oil seals should prevent leakage.</p>
<p>h. Glands, gaskets</p> <p>(1) Are to be undamaged and form an effective seal.</p>		<p>(1) Should form an effective seal.</p>
<p>j. Sliding trays or hinged units</p> <p>(1) Are to be free running and operate without fouling other parts or wiring.</p> <p>(2) They are to be firmly locked in the closed position, and if so designed, in the open position.</p> <p>(3) Hinges are to operate easily and maintain alignment with parent unit.</p> <p>(4) Fasteners are to operate correctly without strain.</p>		<p>(1) Should be free running and are to operate without fouling other parts or wiring.</p> <p>(2) Fasteners/locks should operate correctly without strain.</p> <p>(3) Hinges should operate smoothly and maintain alignment with parent unit.</p>

	(B)	(FR)	(FM)
3	<p><u>Electrical condition</u></p> <p>a. Components</p> <p>(1) All components are to be securely mounted and of the correct pattern as specified.</p> <p>(2) Identifying markings painted on or near components should be legible; deterioration in such markings may be permitted if adequate component location diagrams are available.</p> <p>(3) Tag boards, tag strips etc., are to be clean and free from tracking.</p> <p>b. Identification sleeves</p> <p>(1) These should provide a clear indication either by letters, figures or colour.</p> <p>c. Soldered connections</p> <p>(1) Soldered joints should be made so that subsequent disconnection is not difficult.</p> <p>(2) Excess solder and flux are not to be present.</p> <p>(3) Careful examination should be made for dry joints. See EMERs Tels A 411, A 412 and A 522.</p> <p>d. Wiring</p> <p>(1) Wiring is to be to the same specification as originally issued, or according to a later authorised instruction.</p> <p>(2) Where wires pass through metal, bushes or grommets should be provided.</p> <p>(3) Sufficient slack is to be allowed to prevent tension on conductor wires.</p> <p>(4) Binding methods used to make up cable forms are not to damage insulation.</p> <p>(5) Faulty insulation should be repaired by covering with insulating sleeving of the correct colour.</p> <p>(6) Where a considerable length of insulation is faulty, a new wire should be bound to the cable form and the ends of the faulty wire cut back, unless spare wires are included.</p>		

(B)	(FR)	(FM)
<p>e. Switches, general</p> <ol style="list-style-type: none"> (1) Switches are to be positive in operation. (2) The switch action is to operate in the correct sequence. (3) There are to be no signs of tracking. (4) Contacts should be unpitted and contact resistance within the limits when specified in the appropriate EMER. 		
<p>f. Gate and safety switches</p> <ol style="list-style-type: none"> (1) Safety devices are to operate positively before access can be gained to the compartment protected. (2) The mechanical operation is to be as specified in the appropriate EMER. (3) Keys are to be securely held in lock when gate switches are ON, or when panels are withdrawn. 		
<p>g. Biased switches</p> <ol style="list-style-type: none"> (1) Spring loaded switches are to return to the static position on release, and be positive in operation. 		
<p>h. Rotary switches</p> <ol style="list-style-type: none"> (1) Switches are to be positive in operation, with contact wholly made in each position. 		
<p>j. Relays, contactors, time delay switches</p> <ol style="list-style-type: none"> (1) These are to be free from contact chatter. (2) Spring adjustments and settings are to be as specified in the appropriate EMER. (3) Dash-pots where fitted are to be free from seepage and filled with the correct grade of oil. (4) Time delay devices are to be capable of operation over the appropriate interval. 		

(B)	(FR)	(FM)
<p>k. Slip rings, commutators</p> <p>(1) Slip rings and commutators are to be free from scoring or burrs.</p> <p>(2) Commutators are to have the insulators undercut to the depth specified in the appropriate EMER.</p> <p>(3) Brushes are to be of the correct grade and length, and bedded in.</p> <p>(4) Brush pressure is to be as specified in the appropriate EMER.</p>	<p>(1) They should be free from scoring or burrs.</p> <p>(2) Commutators should have the insulators undercut to the depth specified in the appropriate EMER.</p>	<p>(3) Brushes should be of the correct grade not below minimum length, and bedded in.</p>
<p>1. Meters</p> <p>(1) The zero adjuster is to provide adequate movement of the pointer.</p> <p>(2) The pointer is to be straight and undamaged.</p> <p>(3) Luminous markings are to be effective and show no signs of flaking.</p> <p>(4) Scale markings are to be clearly legible, the scale clean and free from scratches or other defacements.</p> <p>(5) The calibration is to be within the limits specified in the appropriate EMER.</p>		<p>(1) Should have adequate zero adjustment and where applicable effective luminosity.</p> <p>(2) Scale markings should be clearly legible.</p>

(B)	(FR)	(FM)
<p>m. Indicator lamps/counter tubes</p> <p>(1) The legend when illuminated is to be clearly visible.</p> <p>(2) Counter tubes are to operate correctly on all digits, only one of which to be clearly visible at the appropriate time.</p>	<p>(1) Should function correctly. Minor scratches or markings are to be permitted provided the legend remains clearly visible and confusion can not occur.</p>	
<p>n. Fuse holders and fuses</p> <p>(1) Fuse holders are to be secure and undamaged.</p> <p>(2) Fuses are to be of the correct pattern and rating, and show no sign of overheating.</p>		
<p>o. Connectors, plugs and sockets</p> <p>(1) The shell of connectors are to be complete and undamaged, the contacts undistorted and free from pitting and overheating.</p> <p>(2) The insulation portions are to be clean and show no sign of tracking or cracking.</p> <p>(3) Cable grips are to hold the cable securely.</p>		
<p>p. Pre-set controls</p> <p>(1) Where locks/seals are provided on pre-set controls, the locks/seals are to be effective. See 2e.</p> <p>(2) Pre-set controls are to be checked to ensure that adequate adjustments are available, as specified in the appropriate EMER.</p>		

	(B)	(FR)	(FM)	
				<p>q. Bonding</p> <p>(1) Where bonding is required good electrical contact and reliable mechanical attachment is to be made at all points. Plating is not to be removed. The overall resistance to earth, ie chassis, frame or rack, unless otherwise specified is not to exceed 0.1Ω.</p>
4				<p><u>Miscellaneous</u></p> <p>a. Modification and miscellaneous instructions.</p> <p>(1) Modifications and miscellaneous instructions as detailed in current EMERs have been carried out.</p> <p>(2) Unauthorised modifications are not permitted.</p> <p>b. Packing</p> <p>(1) Packing is to be to the requirement of MOD (A) repair programme, or to the specification detailed in relevant publications/requisitions for the subject equipment.</p>