DEPT	INSTRUCTIONS
GP MAN SUP/OP	Read 'Instructions to Users' on pages (iv) & (iv)a. 'General and Special Servicing Notes' on page 1 'References' on page 2

INTRODUCTION

This type 100B rotary inverter with type 12 control panel incorporated is designed to provide a 115V 3 phase 400Hz supply from a nominal 28V dc input.

RECEIPT SURVEY STRIP AND CLEAN

NOTE: Unless specifically authorised maintenance of this Inverter is to be iaw Annex C Overall Maintenance Flowchart.

GP MAN /SUP

1. a. Obtain Inverter and ensure that serial number corresponds to that on MOD Form 731.

b. Ascertain reason for unserviceability, enter Invert serial number and any other relevant data from the accompanying labels on to the F720Q/1.

c. Examine Inverter sufficiently to ascertain that Depth C maintenance is practicable. If it is not, record details on F720Q/1, and re-categorise iaw Annex C Overall Maintenance Flowchart.

d. Action any Transit Damage Reports as necessary.

e. Record visual faults and deficiences on F720Q/1.

f. Refer to page 3 and record on F720Q/1 any mods, STI's or SI's which require embodiment or incorporation

2. a. Obtain Inverter and ensure that serial number corresponds to that on F720Q/1.

b. The Group Manager is to determine depth of repair required.

c. Record on F720Q/1 by MWS paragraph, maintenance required to remove the fault condition.

d. Detail Operator to carry out specific maintenance instructions as identified / authorised by group manager.

DEPT	INSTRUCTIONS
	STRIP AND CLEAN
	CONTROL UNIT
OP	3. a. Remove four 6BA screws (59) and four 6BA shakeproof washers (60). Remove regulator cover (58).
	b. Disconnect all leads from terminal block (73) and identify using numbered sleeves. (Terminal 1 is nearest to output plug).
	c. Unsolder (M7) (HAZ CHEM) leads from trimmer resistor (69).
	d. Remove 6BA screw (64) and 4BA plain nut securing rectifier (18) and bracket (55). Remove rectifier complete with bracket.
	e. Remove four 2BA hex hd screws (74) and separate inverter from control unit.
	f. Remove six 4BA ch hd screws (90) (91) (HAZ CHEM) and remove regulator from control unit.
	g. Remove trimmer adjusting screw cover nut (57).
	h. Remove two regulator screw cover plates (51).
	REGULATOR
OP	4. a. Slacken locking screw and remove pile compression screw (80). Remove carbon pile (77) and discard.
	b. Identify position of pile cooler assembly relative to one pillar.
	c. Remove resistor and bracket (72), and pile cooler assembly.
	d. Disconnect and remove regulator armature.
	Note: Bi-metal ring, brass spacing ring and copper shims are now free on face of regulator coil assembly. Care must be taken to keep them in their correct sequence and undamaged.
	INVERTOR
OP	5. a. Remove two 6BA screws (52), two 6BA spring washers (95), two 6BA plain washers (98) and remove DC end cover (41).
	b. Remove wire locking from cover screw and lift off window strap (74).
	c. Remove and discard dc brushes (62). Remove and discard ac brushes (6 and springs (19). Retain spring securing pins (28).
	d. Remove CE bearing cap (40), shims (36) and retaining screw (39). Annotate on F720K thickness of shims removed.

DEPT	INSTRUCTIONS
	f. Remove circlip (17), fan guard (16), fan nut (46), tabwasher (45) and fan (44). g. Remove ac end bearing cap (43). h. Remove two 2BA screws (93) (HAZ CHEM) securing CE frame to cradle. Withdraw grub screw (48). Remove two draw bolts at ac end and separate CE frame from yoke. If pre-mod B107 remove spacer from armature shaft. i. Remove 4BA screw (39) retaining washer (37) and spring washer ( ) from armature shaft. Remove armature from end frame, and pass to Armatur Servicing Bay to be serviced in accordance with Annex E. j. Remove bearings (15) from end frames and discard. k. Mark dc brushgear position relative to CE frame and remove.
	CLEANING
OP	6. Clean in accordance with Annex D.
SUP	7. a. Ensure that invertor serial number corresponds to that on F720K. b. Ensure that all operations detailed in paras 3 to 6 have been completed and signed for iaw instructions.
	INSPECTION, REPAIR AND REPLACEMENT (STAGE 2)
	YOKE ASSEMBLY AND CE FRAME
OP	8. a. Examine iaw General Servicing Note 1. b. Check field winding for continuity. c. Examine anti-track coating inside CE frame, inside both ends of yoke assembly and around ac brush access holes in yoke assembly. Recoat if necessary using varnish anti-tracking (M13) (HAZ CHEM).
	DC BRUSHGEAR
OP	9. a. Examine iaw General Servicing Note 1. b. With reference to Annex H, using tension gauge (ST13) check spring tension is between 136 and 164 gms. c. Refit dc brushgear to CE frame in previously identified position and secure with two 4BA x 13/32" ch hd screws (71), plain washers (23) and single spring washers (96).
	TRIMMER RESISTOR
OP	10. a. Examine iaw General Servicing Note 1.

DEPT	INSTRUCTIONS
OP	**VOLTAGE REGULATOR** 11. a. Examine for damage. b. Examine ceramic tube for cleanliness. c. Examine carbon inserts for serviceability. If unserviceable replace with new inserts (79).

DEPT	INSTRUCTIONS
	INSULATION TESTS
OP	12. Using Insulation Tester (ST22) set to 250 volt range, carry out an insulation test between the following points. Minimum permissable reading 0.5 megohms. a. All field connections and frame. b. AC brush connections and frame. c. DC brushgear and end frame. d. Voltage regulator coil and frame. e. Pile compression end bracket and cooling fin assembly. f. Regulator armature and carbon insert. g. DC input pin 'A' and frame.
	CAPACITORS
OP	13. Test iaw Annex F.
SUP	14. Detail non-routine work.
OP	15. Carry out non-routine work as detailed.
SUP	16. a. Inspect all components and ensure that all Mods and STIs which are applicable at this stage have been embodied. b. Ensure that non-routine work detailed has been completed and signed for. c. Ensure that invertor serial number corresponds to that on F720K. d. Ensure that operations detailed in paras 8 to 15 have been completed and signed for iaw instructions.
	REBUILD INVERTOR (STAGE 3)
	BEARINGS
OP	17. a. Referring to Annex H, select ac and dc end bearings (15) which are a clearance fit in housings without any tendency for outer race to rotate when inner race is spun by hand, and a clearance fit on armature shaft without any tendency for inner race to rotate when outer race is spun by hand. b. Clean bearings using trichloroethane (M11) (HAZ CHEM), and fill ⅓rd full with grease XG (M16) (HAZ CHEM). c. Fit bearings (15) into housings.

DEPT	INSTRUCTIONS
	d. Refit ac end outer bearing cap (43). Secure with four 6BA x [illegible] ch hd screws (52) and single spring washers (95).
	e. If pre-mod B107, refit spacer to ac end of armature shaft.
	BRUSH PREFORMING
AL/15 OP	18. a. (with ref to Annex H.) Fit new ac brush springs (19) brushes (63) to retaining pins (28).
	b. Prepare armature slip rings and commutator for brush preforming.
	c. Re-assemble armature yoke and CE frame.
	d. Carry out brush preforming in accordance with Annex 'G' to this MWS.
	FINAL ASSEMBLY
OP	19. a. Refit armature to yoke.
AL/15	b. Refit CE frame (35). Secure with two draw bolts (42), single spring washers (94) and plain washer (14). Secure to cradle with two 2BA x [illegible] ch hd screws (93), (when fitted) single spring washers (94) and grub screw (49). Where different lengths of screws are used to secure end frame, shorter screw to be fitted behind field coil.
	CE BEARING SHIMS
OP	20. a. Refit 4BA x [illegible] ch hd retaining screw (39), retaining washer (37), and single spring washer (38) to comm end of armature shaft.
	b. Refit correct thickness of shims (36) between bearing and bearing cap (40). Take up end play on armature shaft with shims. Secure CE bearing cap with four 6BA x [illegible]" ch hd screws (52) and single spring washers (95).
	FAN
OP	21. a. Refit fan (44) to armature shaft. Secure with fan nut (46) and tabwasher (45).
	b. Fit fan guard (16) and secure with new circlip (17).
	BRUSHES
OP	22. a. Fit preformed ac brushes in previously identified positions and secure.
AL/13	b. Fit preformed dc brushes in previously identified positions and secure with four 6BA x 7/32" ch hd brass screws (24) and double spring washers (25). Connect and secure field leads and brush tags.
AL/18	N.B ENSURE BRUSH (62) IS FITTED TO 100B INVERTER (PRE MOD)

DEPT	INSTRUCTIONS
	REGULATOR
OP	23. a. Re-connect lead to armature assembly, ensuring there is a minimum of tension between lead and armature. Secure with one 6BA x $\frac{1}{4}$" ch hd screw (64), plain nut (87) and shakeproof washer (60). Nut and washer must be fitted to coil side of armature assembly and cable termination on other side. Lock **nut and screw** using varnish (K15)(HAZCHEM).
	b. Refit cooling assembly in previously identified position and secure with three 4BA thin nuts (86) and shakeproof washers (56). Lock nuts using varnish (K15)(HAZCHEM).
	c. Refit bracket and resistor (72) to pillars. Secure with two 4BA plain nuts (88), plain washers (100) and single spring washers (96), ensuring that base of bracket is parallel to regulator mounting. Lead to terminal block passes through hole in cooling fan assy. Lock nuts using varnish (K15)(HAZCHEM).
	d. Fit a new pile stack (77) and refit pile compression screw (80).
	e. Unscrew magnet core screw until 2 threads are showing, turn pile compression screw until pile is fully compressed.
	NOTE: Do not use undue force or damage to pile will result. Turn core screw clockwise until resistance to further movement is felt. Turn pile compression screw $\frac{3}{4}$ turn counter-clockwise, turn core screw $\frac{1}{4}$ turn counter-clockwise. Temporarily lock core and compression screws.
	CONTROL UNIT
OP	24. a. Refit regulator (82) to control unit. Secure with four 4BA x 9/16" ch hd screws (91), two 4BA x $\frac{1}{2}$" ch hd screws (90)(HAZCHEM), six plain washers (100) and four single spring washers (96). Lock screws using varnish (K15)(HAZCHEM).
	b. Lock screws securing inverter to cradle using varnish (K15)(HAZCHEM). Refit inverter to control unit, with CE frame towards Breeze plugs. Secure with four 2BA x 17/32" hex hd screws (74) and shakeproof washers (97).
	c. Position rectifier (18) in control unit over leads to terminal block. Reconnect terminal block (73) and secure leads with 6BA x $\frac{1}{4}$" ch hd screws (70) and double spring washers (25) fitted under terminations. (Terminal No 1 is nearest output plug).

DEPT	INSTRUCTIONS
	d. Secure rectifier to control box with one 6BA x ¼" ch hd screw (64), one 4BA plain nut (88) and shakeproof washer (56). Fit nut and domed cap 4BA (101) to protect external thread of rectifier assembly. e. Resolder (M7) (HAZ CHEM) two leads to trimmer resistor (69) and paint connections using varnish electrical insulation (M12) (HAZ CHEM).
	ASSEMBLY CHECK
SUP	25. a. Inspect invertor for correct assembly, armature for freedom of rotation and components for security of attachment. b. Ensure that operations detailed in paras 17 to 24 have been complete and signed for iaw instructions.
	INSULATION CHECKS
OP	26. a. Disconnect earth lead from terminal block in control unit, and using Insulation Tester (ST22) set to 250 volt range, check insulation resistance between pin 'A' of dc input plug and frame. Minimum permissable reading 0.5 megohms. Reconnect earth lead. b. Using Insulation Tester (ST22) set to 250 volt range, check between following points and record readings obtained on F720K. Minimum permissable reading 2 megohms. (1) Pin 'A' of ac output plug and frame. (2) Pin 'A' of ac output plug and Pin 'A' of dc input plug.
	BRUSH BEDDING
	Note: Brush bedding is to be carried out iaw Annex G and controlled airblast cooling is to be employed.
OP	27. a. Fit regulator pile shorting link between terminals 1 and 7 on terminal block. b. Connect invertor to brush bedding circuit, using adaptor cable (ST27). c. Switch on the invertor input and adjust to 27V. Switch 'ON' the loading circuit. d. Run invertor until brushes are bedded over their full thickness and over 50% of their axial width for ac brushes and over 80% of their axial width for dc brushes.

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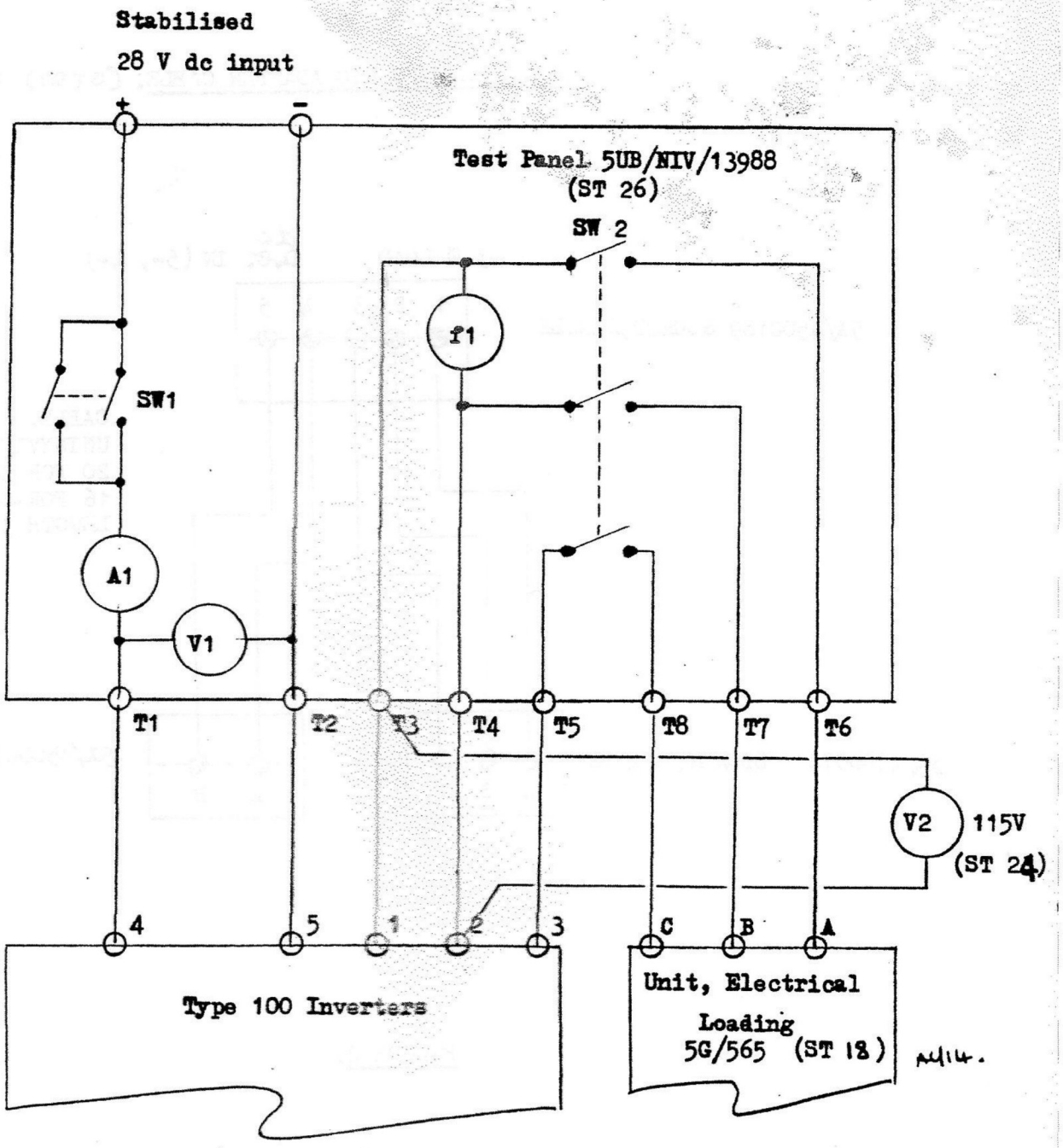
DEPT	INSTRUCTIONS
OP	28. Visually examine ac and dc brushes to ensure they are bedded iaw para 27.
SUP	29. a. Inspect all components and ensure that all Mods and STIs which are applicable at this stage have been embodied. b. Ensure that non-routine work detailed has been completed and signed for. c. Ensure that inverter serial number corresponds to that on F720K. d. Ensure that operations detailed in paras 26 to 28 have been completed and signed for iaw instructions.
	PRELIMINARY AND FINAL TEST (STAGE 4)
OP	30. a. Connect inverter to test circuit Fig 1. Set trimmer resistor to mid position. b. Switch on supply and set input to 27 volts. Use (ST21) to check for correct phase sequence (A-B-C) of output. Run for 20 minutes on no load to dry out carbon pile. (Unless inverter is hot from brush bedding), ensuring regulator does not hunt during this period. Note: All adjustments to pile must be made using Non- Magnetic Screwdriver (S c. Unlock magnetic core screw and pile compression screw. Turn pile compression screw in, use (ST11) until output voltage rises. Turn pile compression screw out until output voltage falls to a minimum value and just starts to rise. Lock pile compression screw. d. Turn magnetic core screw in appropriate direction until output voltage reaches 115V. Switch off inverter supply and lock magnetic core screw. e. Switch on inverter supply and repeat operation c and d then proceed to para f. f. Switch on supply and check that output voltage is 119 to 121 volts. If this figure is not obtained repeat operations c to f inclusive.
OP	31. a. Adjust input voltage to 19 volts and switch on supply. b. Increase input until output voltage is 115 volts. Check that input voltage is 21 volts to 22.5 volts. c. Increase input voltage until output voltage stops increasing. Check that output voltage is 119 to 121 volts. d. Increase input to 35 volts and check that output voltage is ±0.5 volts of the value obtained in para 31c. Switch 'OFF' supply.

DEPT	INSTRUCTIONS
OP	32. a. Adjust input to 27 volts and switch on supply. b. check that output is 119 to 121 volts. c. Check that output frequency is 395 Hz. Adjust if necessary using shunt field resistor in inverter base. d. Switch on full load and check that output does not fall below 115 volts. e. Switch load 'ON' and 'OFF' three times. Frequency is to remain at 393 to 397 Hz. If frequency falls on load, brushgear is to be moved in a clockwise direction. If frequency rises, move brushgear in a counte clockwise direction. Repeat until frequency remains stable. f. Adjust frequency to 395 Hz using shunt resistor, lock screw with varnish anti-track red (M13) (HAZ CHEM). Secure resistor cover (61) with two 4BA x 5/16" ch hd screws (92) (HAZ CHEM) and shakeproof washer (56). Switch OFF load. g. Repeat operations in sub-paras b to f inclusive. h. Increase input to 35 volts and check that frequency does not exceed 400 Hz and that output voltage does not exceed 121 volts. i. Lift each dc brush in turn and check that sparking is not excessive on the opposite brush. Switch off supply. j. Lock pile compression and magnet core locking screws using varni anti-track red (M13) (HAZ CHEM). FINAL TEST
OP	33. a. Switch on inverter supply and adjust to 27 volts. Ensure output is 119 to 121 volts. b. Switch off supply.
OP	34. a. Adjust input to 19 volts. Switch on supply. b. Increase input voltage until output is 115 volts. Ensure input voltage is now 21 to 22.5 volts. c. Increase input until output voltage stops rising. Ensure that this figure is 119 to 121 volts. d. Increase input to 35 volts. Check output is ±0.5 volts of the value obtained in operation c. e. Switch off supply.
OP	35. a. Adjust supply to 27 volts and switch on. b. Check output voltage is 119 to 121 volts

DEPT	INSTRUCTIONS
	c. Ensure frequency is 395 Hz.
	d. Switch on full load. Check voltage does not fail below 115 volts.
	e. Switch load 'ON' and 'OFF' three times and ensure frequency remains at 393 to 397 Hz.
	f. Increase input to 35 volts. Check that frequency does not exceed 400 Hz and voltage 121 volts.
	g. Lift each ac brush in turn and ensure that sparking is not excessive on the opposite brush.
	h. Switch off supply and disconnect from test circuit.
OP	36. a. Disconnect earth lead from terminal block in control unit and using insulation tester (ST22) set to 250 volt range, check between pin 'A' of dc input plug and frame. Minimum permissable reading 0.5 megohms. Reconnect earth lead.
	b. Using insulation tester (ST22) set to 250 volt range, check between following points and record values obtained on F720K.
	Pin 'A' of ac output plug and frame.
	Pin 'A' of ac output plug and pin 'A' of dc input plug.
SUP	37. a. Ensure that all minor rectifications carried out during test have been signed for and that the inverter serial number corresponds with that on the F720K.
	b. Ensure that all operations detailed in paras 30-36 have been complete and signed for in accordance with instructions.
	PREPARATION FOR DESPATCH AND FINAL INSPECTION (STAGE 5)
OP	38. Remove circlip and fanguard. Lock fan tabwasher and lock ac end bearing cap screws and two drawbolts using varnish (M15) (HAZ CHEM).
OP	39. Using varnish (M15) (HAZ CHEM) lock dc brushgear fixing screws, dc end bearing cover screws, rectifier mounting screw and nut, all terminal block screws, and any screws or nuts removed during non routine work.
SUP	40. Carry out a loose article check.

DEPT	INSTRUCTIONS
OP	41. a. Ensure dc brush tags will be clear of CE cover, fit CE cover (41) and secure with two 6BA x 3/8" ch hd screws (52), plain washers (98) and single spring washedrs (95). b. Fit window strap (47) and lock with wire (M6). c. Refit fanguard (16) and circlip (17). d. Refit core and compression screw covers (51) and secure with six BA x 13/32" ch hd screws (52) and plain washers (98). e. Refit base cover (58) and secure with four 6BA x 3/8" ch hd screws (59) and shakeproof washers (60). f. Lock all screws fitted in a, d and e above using varnish (M15) (HAS). g. Refit trimmer resistor cover nut (57). h. Fit caps (84) to ac and dc plugs.
SUP	42. Inspect inverter for security and correct locking of all visible locking devices.
OP	43. a. Mark component with numbers of all Mods, SIs, STIs and LEIs embodied during servicing. b. Affix 30MU transfer. c. Complete two MOD Form 731s. d. Paint over all markings using Varnish (M15)(HAS). e. Mask off all openings. f. Pass component and completed MOD FOrm 731s to Line Supervisor.
SUP	44. a. ensure that details on MOD Form 731s correspond to those on Form 720Q/1. b. Ensure component serial number corresponds with that on Form 720Q/1. c. Enusre that all operations detialed in paras 38 - 43 have been completed and signed for iaw instructions.
OP	45. a. Affix one MOD Form 731 to component mask off base plate, DC end cover and fan guard, using masking tape (M10) and enclose in polythene bag. b. Affix one MOD Form 731 to outside of protective packaging (M24). c. Enclose component in protective packaging (M24) and pass to Line Supervisor.



INVERTER TEST CIRCUIT FIGURE 1

MWS SERIAL NO. .. 30MU/SC/105805

ISSUE NO. 4

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BRUSH BEDDING RIG ADAPTER CABLE. (STAT) AL17

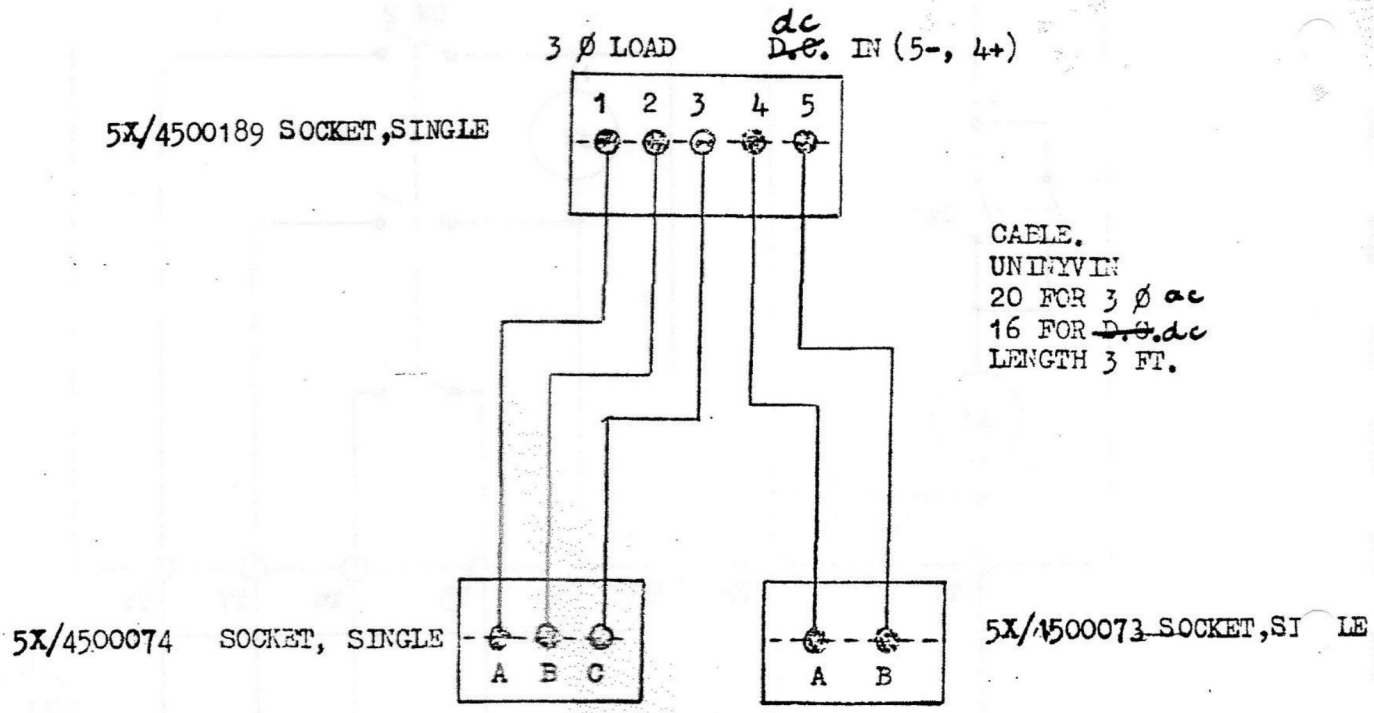
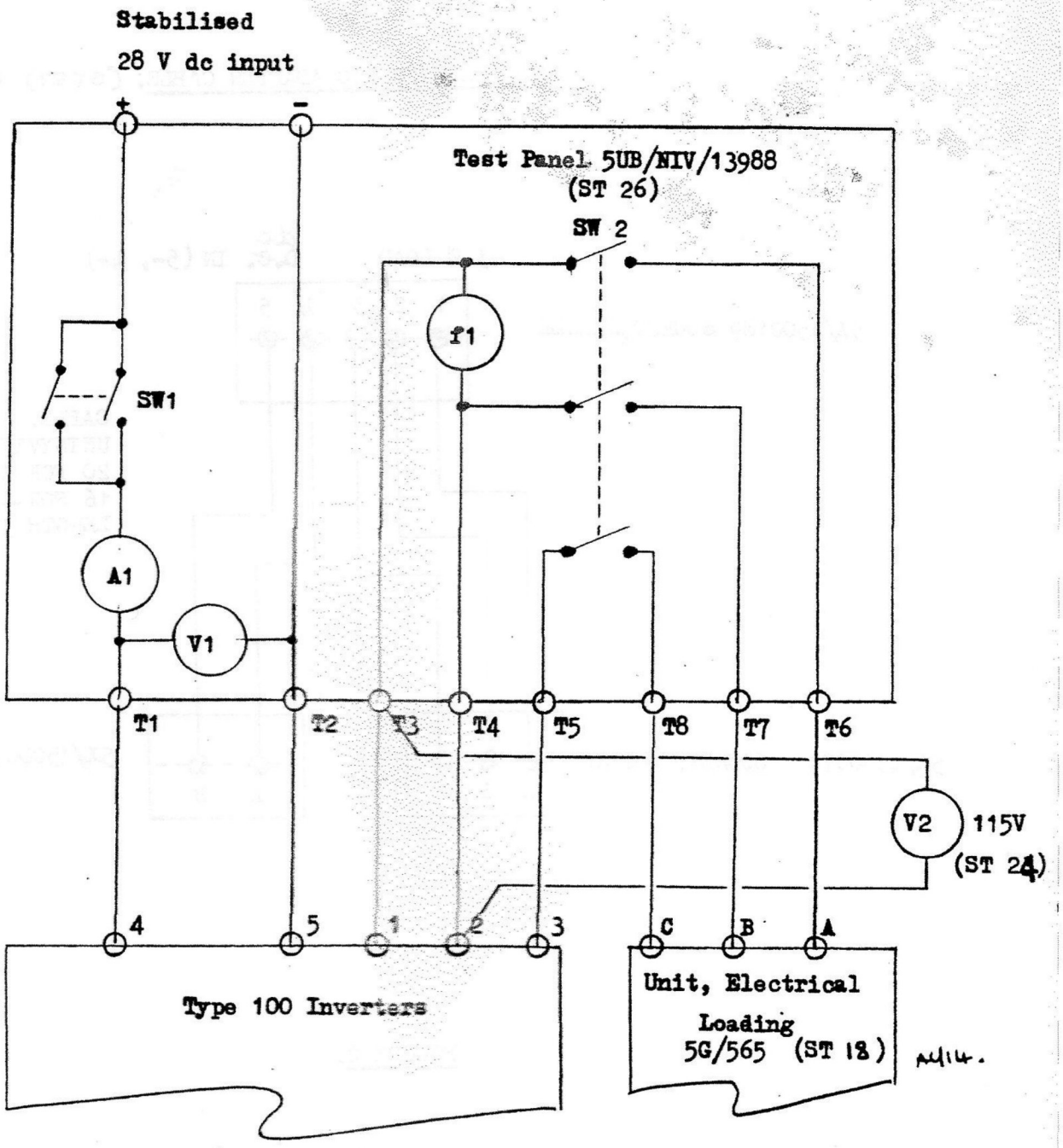
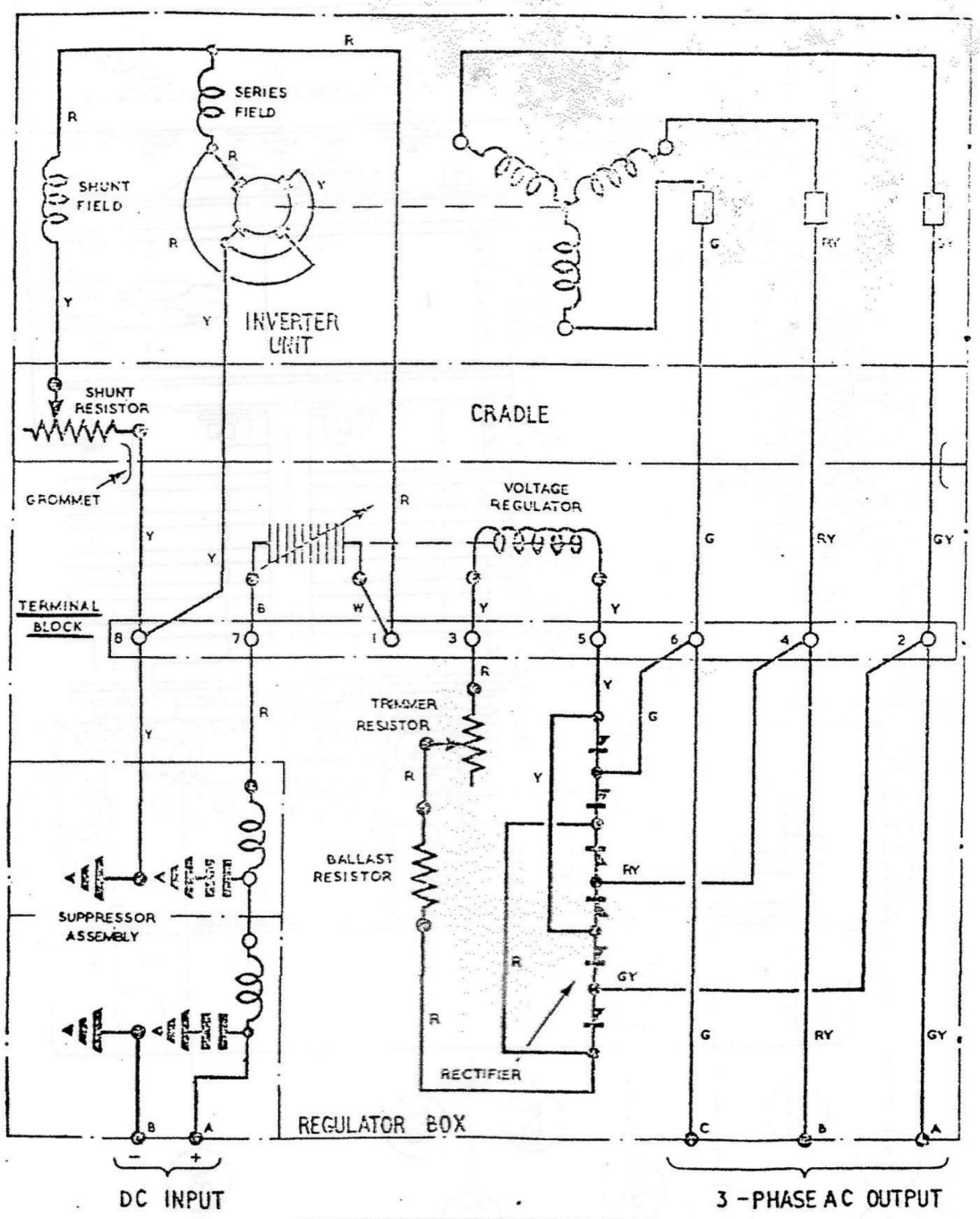


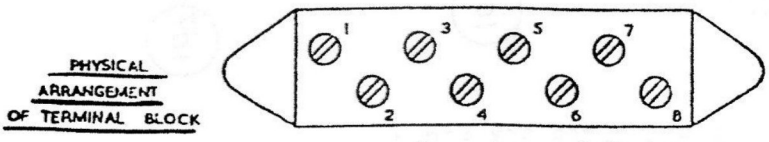
FIGURE 2.

MWS Serial No 30MU/SC/105805
Issue 4
(Issued with AL 3)



INVERTER TEST CIRCUIT FIGURE 1





PHYSICAL ARRANGEMENT OF TERMINAL BLOCK

WIRING COLOUR CODE

G - Green
R - Red
RY - Red/Yellow
GY - Grey
W - White
Y - Yellow
B - Black

INVERTERS TYPE 100B AND 100D, CIRCUIT.

FIGURE 3.