

MIL-R-23761/IA(AS)

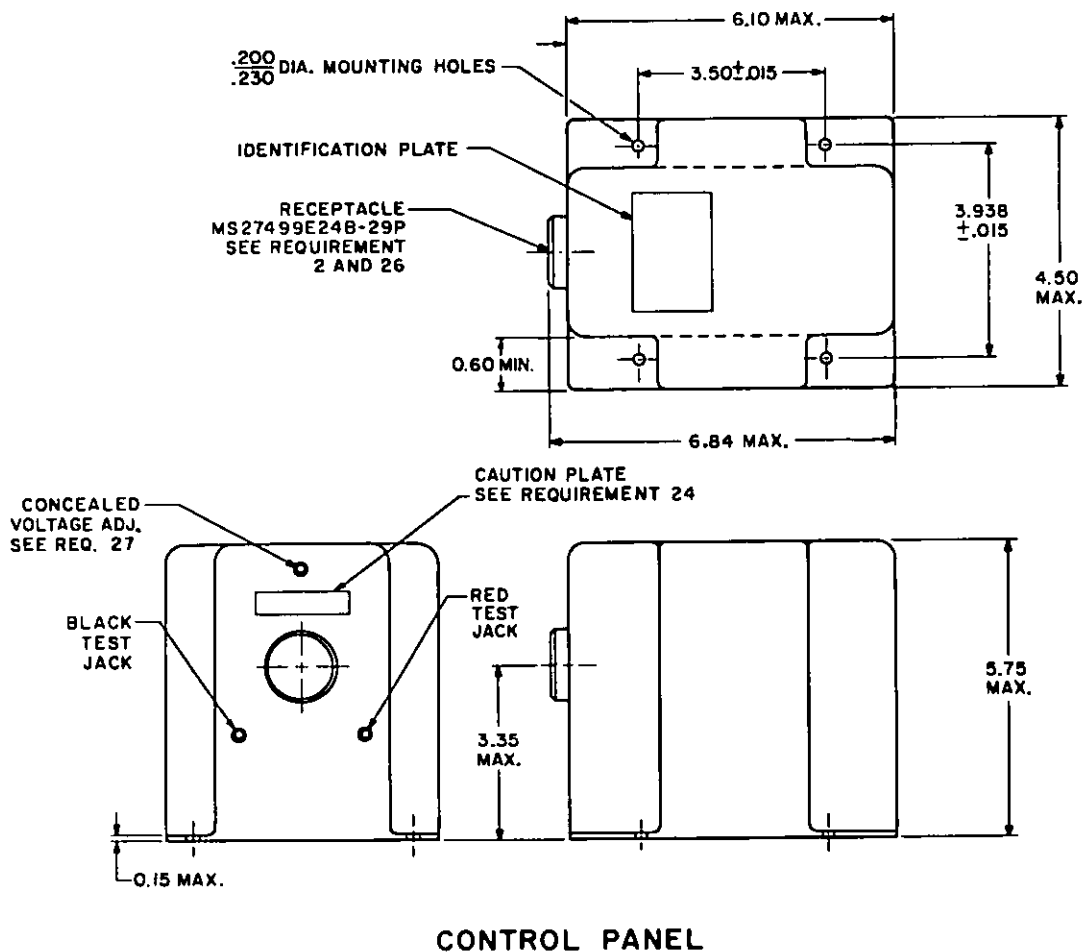
30 JUNE 1977
 SUPERSEDING
 MIL-R-23761/1
 14 OCTOBER 1975

MILITARY SPECIFICATION SHEET

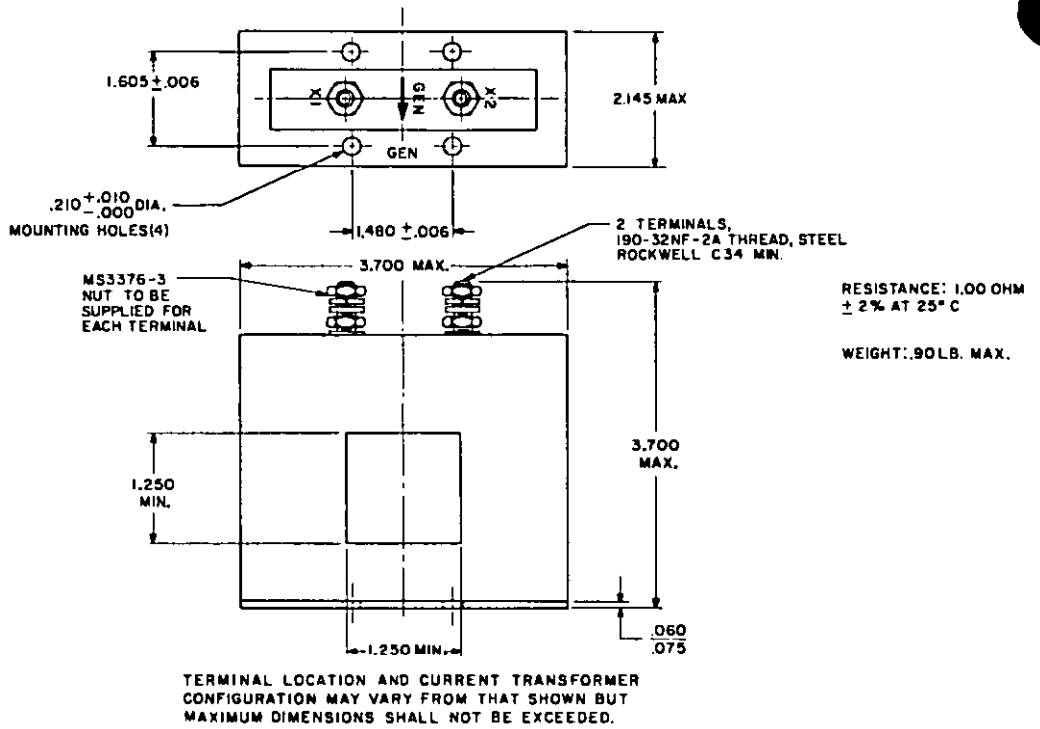
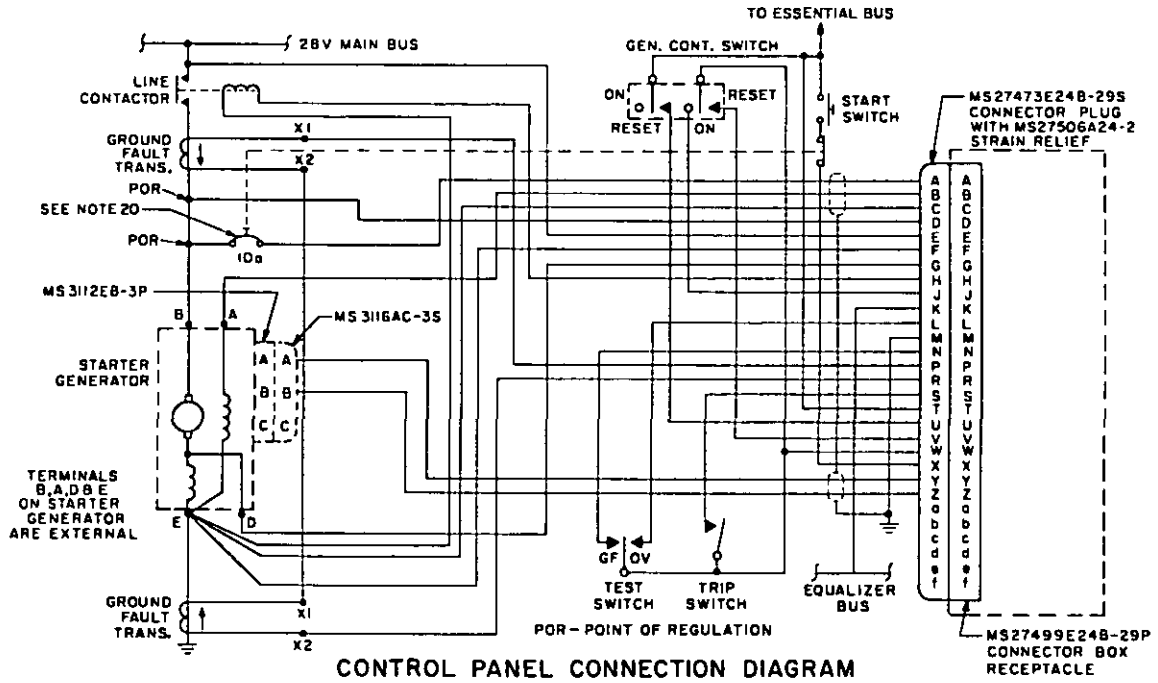
REGULATOR CONTROL PANEL, AIRCRAFT
 DIRECT CURRENT GENERATOR, 28 VOLT

This specification has been approved by the Naval
 Air Systems Command, Department of the Navy.

The complete requirements for procuring the control panel described
 herein shall consist of this document and latest issue of MIL-R-23761.



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REQUIREMENTS:

1. **Dimensions** - The control panel shall conform to the dimensions shown. All dimensions are in inches. Tolerances are as shown. Regulator control panel configuration may vary from that shown but maximum dimensions shall not be exceeded. Mounting dimensions shall be as specified.

2. **Connector** - Connector pin designation functions and values shall be as follows:

<u>PIN</u>	<u>FUNCTION</u>	<u>VALUE</u>
A	Power Input	28 Volt, Input
B	Generator Field Power	28 Volt, Output
C	Field Energy Return	Zero Volts
D	Sensing, Point of Regulation	28 Volt, Input
E	Differential Voltage Sensing	28 Volt, Input
F	System Neutral	Zero Volts
G	Current Sensing	+ 5 Volts
H	Line/Start Contactor	28 Volt, Output (3 Amp Peak Outrush)
J	"On", Reset/On Switch	28 Volt, Input
K	Equalizer Bus	+ 5 Volts
L	"Overvoltage", Self Test Switch	28 Volt, Input
M	Chassis Ground	Zero Volts
N	"Ground Fault", Self Test Switch	28 Volt, Input
P	Current Transformer (Ground Fault)	Zero Volts
R	Current Transformer (Ground Fault)	Zero Volts
S	Manual Trip Switch	28 Volt, Input
T	Essential Bus	28 Volt, Input
U	Anticycle Lockout	28 Volt, Input
V	"Reset", Reset/On Switch	28 Volt, Input
W	"Common", Test Switch Trip Switch, Reset/On Switch	28 Volt, Input
X	Start Switch	28 Volt, Input
Y	Speed Sensing	Zero Volts
Z	Speed Sensing	Zero Volts
a	Reserved	See Requirement 21
b		
c		
d		
e		
f		

3. **Voltage Test Jacks** - Two test jacks shall be included on the front surface of the control panel. One jack shall be black and connected internally to contact "P" of the connector and be marked with an adjacent minus sign. The other jack shall be red and connected internally to contact "D" of the connector and marked with an adjacent plus sign. The jacks shall accommodate .0782, 002 diameter by 1/2 inch long test prods.

4. **Voltage Adjustment** - A rotary voltage adjustment shall be included behind the front surface of the control panel and be readily accessible for adjustment in the aircraft. The adjustment shall be operable by a small flat blade screwdriver. Clockwise rotation of the adjustment shall increase the voltage. The voltage adjustment shall not change during shock and vibration, and shall be accessible without removal of the panel cover.

5. **Parallel Operation** - The control panel shall be operable in parallel with one or more control panels conforming to this standard. No adjustment shall be necessary for proper operation.

6. **Nameplate Location** - The nameplate shall be located on the top surface of the control panel and contain the information specified in the general specification.

7. **Color** - The color of all visible parts of the control panel cover except the test jacks, nameplate and markings shall be white and conform to FED-STD-595, color number 17875.

8. **Overload Current** - The overload current shall be 12 amperes.

9. **Reverse Current** - Reverse current sensing shall be accomplished through sensing of the generator equalizer signal and shall be in accordance with MIL-R-23761.

10. **Feeder Fault** - Feeder fault sensing shall be accomplished through sensing of the specified externally mounted current transformers.

11. **Overvoltage** - The control panel shall include an overvoltage protective function. If any component of the control panel fails and the regulated voltage exceeds the following specified time the control panel shall open the field of the generator. In parallel operation of the overvoltage device shall selectively trip the

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faulty system and shall not cause nuisance tripping of other systems on the line.

VOLTAGE	TIME (SEC.) MAX
30	10
32	3.5
35	1.65
40	0.73
45	0.48
50	0.36
55	0.29
60	0.24
65	0.21
70	0.18

12. The control panel shall contain a standard size type A, B, or H metal nameplate in accordance with MIL-P 15024, securely attached to the panel. The nameplate shall contain the following information. Abbreviations are permissible:

DC Generator Control Panel

DC Voltage - 28 volts
 Field Current - 8 amperes
 Military Part No. - M23761/1-1
 Manufacturer's Part No. or Model No. -
 Manufacturer's Name or Trademark -
 Serial No. -
 Federal Stock No. -
 Date of Manufacturer -
 Acceptance Stamp -

13. **Field Weakening** - The generator control unit shall provide that the no load speed of 5500 ± 500 rpm is achieved during the start cycle through shunt field weakening. Using a battery source for starter power, the shunt field shall be weakened so as to require the batteries to deliver power to the starter terminals at the voltage and current representative of maximum available battery power. Field weakening shall be adjustable but shall not be considered normal maintenance. Field weakening adjustment shall only be necessary when the generator control panel is transferred to another aircraft with different starting characteristics. To make this adjustment it shall be necessary to remove the control panel from the aircraft.
14. **Starter Cut Out** - The control panel shall automatically terminate the start cycle at 5500 ± 500 rpm. The starter cut out speed shall be adjustable but shall not be considered normal maintenance. The starter cut out speed shall be adjusted only when the control panel is being transferred to an aircraft with a different starter cut out speed requirement. To make this adjustment it shall be necessary to remove the control panel from the aircraft. The starter cut out speed shall be adjustable from 2800 rpm to 6000 rpm.
15. **Resetting Protective Functions** - Each protective function shall have provisions for remotely resetting the generator field circuit after activation of a protective function. A common switch for resetting of the protective functions is mandatory. This switch shall also incorporate the "on" or normal function of the line contactor for generator operation.
16. **Weight** - The weight of the generator control panel shall not exceed 3.75 pounds.
17. **Temperature Rating** - The maximum continuous ambient operating temperature rating shall be 71°C.
18. **Field Current Rating** - The generator control panel shall be rated at 8 amperes continuous field current, 12 amperes overload field current (1 hour rating).
19. **Regulation Limits** - The regulating limits shall be as follows:
- | | | |
|----------------|---|---------------------|
| Fixed Ambient | - | 27.75 to 28.5 Volts |
| All Conditions | - | 27.0 to 28.5 Volts |
20. **Circuit Breaker** - The 10 ampere circuit breaker M39019/02-249 located in the "A" lead of the generator control unit is optional for system design and shall have a set of mechanical contacts located in series with the start switch ("X" lead) which will open the "X" lead when the circuit breaker is tripped.
21. **Reserved Contacts** - Contact "a" shall be reserved for a start lock-in circuit.
22. **Aircraft Identification Plate** - The control unit shall be equipped with an additional aircraft usage identification plate which may be changed in accordance with different calibration requirements of starter cutout speed and field weakening, for use in other installations.
23. **Installation** -
- Wire Size** - Leads from contacts "A", "B" and "C" shall be AWG 16, remaining leads shall be AWG 20.
 - Shielding** - Leads from contacts "A", "B", "C", "Y" and "Z" shall be shielded.
 - Connection** - The generator control panel shall not be connected or disconnected while the generator is in motion.
 - Sensing Leads** - Leads from contacts "D" and "E" are sensing leads and shall be connected as close to the studs of the line contactor as possible. The lead from contact "F" is a sensing lead and must not be combined with the lead from contact "C".
 - Ground Fault Leads** - Leads from contacts "P", "R", "Y" and "Z" are low level signal leads and shall not be routed in the high noise or power conducting bundles.
 - Ground Fault Transformers** - Ground fault transformers shall be wired as specified.
 - Test Switch** - The test switch for ground fault and overvoltage test is not mandatory for aircraft installation.
24. **Caution Plate** - The caution plate shall read as follows: "Caution do not connect/disconnect unit while generator is rotating".
25. Generator failure indication requirement, paragraph 3.4.5.2.4 of MIL-R-23761, does not apply to this control panel.
26. **Receptacle Location** - Centerline of receptacle shall be located not more than 0.65 inches from the vertical centerline of regulator control panel.

27. Voltage Adjustment - The concealed voltage adjustment shall be labeled on exterior cover "Volt Adj. (Inc.)"
28. Maintainability - The generator control panel shall have the minimum number of parts consistent with reliability. It's design shall permit, where practical, easy assembly, disassembly, location of trouble sources, and maintenance without the use of special tools.
29. Reliability - The specified reliability shall be 10,000 hours MTBF (mean time between failures) for each control panel. The minimum acceptable MTBF shall be not less than 5,000 hours (discrimination ratio 2.0).
30. Logic Circuits - The generator control unit shall provide a nominal 28 volt output rated three amperes continuous and 10 amperes in rush to control a bus contactor. The voltage sensing and logic control shall energize the bus contactor only if the generator voltage exceeds 18 volts and is 0.35 to 0.65 volts greater than the bus voltage.

TESTS:

- Qualification Tests are to be performed by the qualified activity to the requirements of the latest version of MIL-G-6162 or as modified herein.
- Voltage Setting - The regulated voltage shall be set at 28.0 volts at minimum speed for regulation (7500 RPM) with full rated load on the generator.
- Transient Voltage - The transient voltage shall be within the limits shown in MIL-STD-704, Figure 8.
- Reverse Polarity and Field Flashing - The generator control unit shall not be damaged by the application of reverse polarity voltage due to reversal of generator residual flux (10 volts). To insure generator buildup the generator control unit shall flash the generator shunt field each time the generator control switch is cycled through the reset position.
- Generator Control Switch - The generator control unit shall control the generator or starter generator according to the following generator control switch logic. The generator control switch shall be a single pole, double throw switch (on, off, on type). The switch positions shall be marked "reset", "on", and "trip", respectively. The generator control switch will be incorporated by the qualifying activity during testing but aircraft installation will not be limited to this design.
- Ripple Voltage - The generator control unit shall be operated to control the M6162/1 starter generator and ripple voltage recorded over the rated generator speed range with the load varied from no load to full load. There shall be no increase in ripple voltage above that which is inherent to the generator when controlled by a fixed field resistance. The frequency components of the ripple voltage shall not exceed the limits specified in MIL-STD-704.

ITEM	PART NUMBER
CONTROL PANEL	M23761/1-1
CURRENT TRANSFORMER	M23761/1-2

Preparing Activity
Navy - AS
(Project No. 6110-N207)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval
No. 22-R255

INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.

DOCUMENT IDENTIFIER AND TITLE

MIL-R-23761/1A(AS)

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

 DIRECT GOVERNMENT CONTRACT SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

3. IS THE DOCUMENT RESTRICTIVE?

 YES NO (If "Yes", in what way?)

4. REMARKS

SUBMITTED BY (Printed or typed name and address - Optional)

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1 JAN 72

REPLACES EDITION OF 1 JAN 66 WHICH MAY BE USED

5/N 0102-014-1802