ASM-MCP02

MCP02
Master Caution Panels

INSTALLATION AND OPERATION MANUAL

REV 1.00 May. 24, 2016

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The status of this installation and operation manual is controlled by the revision shown on the title page. The status of each section is controlled by revision shown in the footer of each page. All revisions affecting sections of this manual have been incorporated.

AEM MANUAL REVISIONS

Section	Revision Number	Revision Description	Date
All	Rev: 1.00	Initial release	May. 24, 2016

Table of Contents

Section 1.0 Description

1.1 Introduction

Information in this section consists of product description, design features and specifications for the MCP02 System. Derivative product information may be contained in an applicable manual supplement, which may be obtained from AEM as required.

Review all notes, warnings and cautions.

1.2 Product Description

The MCP02 is a plug compatible replacement system for the Master Caution Panels in the Sikorsky S-61 helicopter. The MCP02 system is compatible in form, fit and function, with a reduction in box depth and weight. The MCP02 system can also be used in certain configurations of the Sea King helicopter. The MCP02 system consists of the Master Warning Panel (MCP02-0XX), and three subpanels. The subpanels consist of the No. 2 Auxiliary Panel (MCP02-107), the No. 1 Auxiliary Panel (MCP02-213), and the Engine Chip Caution Panel (MCP02-300). Herein the complete system is referred to as MCP02.

The Master Warning Panel (MCP02-0XX) is designed to be used in one of three configurations as outlined below:

a) Master Warning Panel (MCP02-0XX) in conjunction with No.2 Auxiliary Warning Panel (MCP02-107), No.1 Auxiliary Warning Panel (MCP02-213) and Engine Chip Caution Panel (MCP02-300). In this configuration, the State Recorder can be utilized to capture the indicator states of all four panels.

b) Master Warning Panel (MCP02-0XX) replaces OEM Grimes Master Caution Panel and is used in conjunction with the remaining OEM Grime units. With the Master Warning Panel (MCP02-0XX) used in conjunction with the Grimes Panels, the State Recorder can only be utilized for the Master Warning Panel (MCP02-0XX). It cannot capture the states of the OEM Grimes Panels.

c) Master Warning Panel (MCP02-0XX) in conjunction with No.2 Auxiliary Warning Panel (MCP02-107) and No.1 Auxiliary Warning Panel (MCP02-213). In this configuration, the State Recorder can be utilized to capture the indicator states of all three panels.

Figure 1 MCP02 system consisting of four panels (from left). No. 1 Auxiliary Panel (MCP02-213), Master Warning Panel (MCP02-0XX), Engine Chip Caution Panel (MCP02-300) (above), and No. 2 Auxiliary Panel (MCP02-107) (below).

1.3 Design Features

The MCP02 presents a lighted annunciator legend to the pilot/co-pilot in the event that a caution/warning signal is detected in the aircraft. There are a total of 49 warning signals that are monitored.

The MCP02 utilizes modern electronics and LED technology for annunciator indication, greatly extending the service life of the units.

The one piece display filter in each of the units prevents moisture and contaminants from entering into the front of the MCP02 panels. The front panel design also allows for individual annunciator legends to be changed.

The MCP02 includes a state recorder within the Master Warning Panel (MCP02-0XX) that logs all events that can be reviewed and analyzed by maintenance personnel. The event data can also be sent via RS-422 bus to a higher level device for real-time monitoring.

1.4 Specifications

1.4.1 Electrical Specifications

Note: The specifications mentioned below refer to the non-mixed configuration using all four MCP02 panels (MCP02-0XX, MCP02-107, MCP02-213, and MCP02-300). For the mixed configuration (MCP02-0XX with Grimes auxiliary panels and optional Engine Chip Panel) the specifications below apply only to the AEM product. Consult Grimes manuals for electrical specifications of the Auxiliary and Engine Chip Panels.

Input Operating Voltage

SYSTEM POWER (Master Warning Panel)

Normal Operating Conditions:

Nominal:	+28.0Vdc
Maximum:	+30.3Vdc
Minimum:	+22.0Vdc
Emergency:	+18.0Vdc

Abnormal Operating Conditions:

Nominal:	+28.0Vdc
Maximum:	+32.2Vdc
Minimum:	+20.5Vdc

Input Power Requirements (Master Warning Panel)

Nominal:	5A max. @ +28Vdc (internally fused @ 5A)

Input Signals

Warning Inputs

Quantity:

Master Warning Panel:	27
No. 2 Auxiliary Panel:	10
No. 1 Auxiliary Panel:	10
Engine Chip Caution Panel[1]:	2

Circuit Type:

Single-ended
Active High

Maximum Rated Input Voltage:

V_{IN_MAX}:	+32.2Vdc

Input Activation Voltage[2]:

$V_{IN\_NOMINAL}$:	+28Vdc
V_{ON_MIN}:	+16Vdc
V_{OFF_MAX}:	+10Vdc

[1] Only applies to configurations including the Engine Chip Caution Panel (MCP02-300).
[2] The warning signal inputs contain voltage detection circuits that require a minimum voltage (V_{ON_MIN}) to be present in order for the annunciators to activate. Once activated, these voltage detection circuits have built-in hysteresis which lowers the required activation voltage (V_{OFF_MAX}).

Maximum Current per Input (at $V_{IN\_NOMINAL}$):
I_{BRIGHT}: 35mA (Bright Mode)
I_{DIM}: 15mA (Dim Mode)

RESET

Quantity:
Master Warning Panel: 1
No. 2 Auxiliary Panel: 1

Circuit Type:
Single-ended
Active High

Maximum Rated Input Voltage:
V_{IN_MAX}: +32.2Vdc

Input Activation Voltage:
$V_{IN\_NOMINAL}$: +28Vdc
V_{IN_MIN}: +10Vdc

Maximum Current (at $V_{IN\_NOMINAL}$):
I_{SINK}: 1mA

State Recorder Signal Inputs[3]

Quantity:
Master Warning Panel: 22

Circuit Type:
Single-ended
Active Low

Maximum Rated Input Voltage:
V_{IN_MAX}: +32.2Vdc

Input Activation Voltage:
$V_{IN\_NOMINAL}$: + ½ SYSTEM POWER (Vdc)

Maximum Current (at $V_{IN\_NOMINAL}$):
I_{SOURCE}: 1mA

TEST

Quantity:
No. 2 Auxiliary Panel: 1
No. 1 Auxiliary Panel: 1

Circuit Type:
Single-ended
Active High

Maximum Rated Input Voltage:
V_{IN_MAX}: +32.2Vdc

[3] Only applies to inputs from MCP02-107, MCP02-213, and MCP02-300

Input Activation Voltage[4]:
- $V_{IN\_NOMINAL}$: +28Vdc
- V_{ON_MIN}: +16Vdc
- V_{OFF_MAX}: +10Vdc

Maximum Current per Panel (at $V_{IN\_NOMINAL}$):
- I_{BRIGHT}: 350mA (Bright Mode)
- I_{DIM}: 150mA (Dim Mode)

BRT

Quantity:
- No. 2 Auxiliary Panel: 1
- No. 1 Auxiliary Panel: 1
- Engine Chip Caution Panel[5]: 2

Circuit Type:
- Single-ended
- Active High – Dim Mode
- Active Low – Bright Mode

Maximum Rated Input Voltage:
- V_{IN_MAX}: +32.2Vdc

Input Activation Voltage (Bright Mode):
- $V_{IN\_NOMINAL}$: < +10Vdc

Input Activation Voltage (Dim Mode):
- $V_{IN\_NOMINAL}$: > +16Vdc

Maximum Current (at $V_{IN\_NOMINAL}$, Dim Mode):
- I_{SOURCE}: 2mA

Output Signals

MC LT

Quantity:
- Master Warning Panel: 1
- No. 2 Auxiliary Panel: 1

Circuit Type:
- Single-ended
- Active Low

Maximum Output Voltage:
- V_{OUT_MAX}: +2Vdc

Maximum Current (at V_{OUT_MAX}):
- I_{SINK}: 1.0A

DIM RLY

Quantity:
- Master Warning Panel: 1

[4] The test signal input contain voltage detection circuits that require a minimum voltage (V_{ON_MIN}) to be present in order for the annunciators to activate. Once activated, these voltage detection circuits have built-in hysteresis which lowers the required activation voltage (V_{OFF_MAX}).
[5] Only applies to configurations including the Engine Chip Caution Panel (MCP02-300).

Circuit Type:
Single-ended
Active High

Minimum Output Voltage:
V_{OUT_MIN}: (SYSTEM POWER - 4)Vdc
V_{OUT_MAX}: (SYSTEM POWER - 1)Vdc

Maximum Source Current (at V_{OUT_MIN}):
I_{SOURCE}: 1.0A

TEST

Quantity:
Master Warning Panel: 1

Circuit Type:
Single-ended
Active High

Minimum Output Voltage:
V_{OUT_MIN}: (SYSTEM POWER - 4)Vdc
V_{OUT_MAX}: (SYSTEM POWER - 1)Vdc

Maximum Source Current (at V_{OUT_MIN}):
I_{SOURCE}: 3.0A
I_{SOURCE}: 15A (Inrush <45ms)

BRT

Quantity:
Master Warning Panel: 1

Circuit Type:
Single-ended
Active Low

Maximum Output Voltage
V_{OUT_MAX}: +2Vdc

Maximum Sink Current:
I_{SINK}: 3.0A
I_{SOURCE}: 15A (Inrush <45ms)

State Recorder Signal Outputs[6]

Quantity:
No. 2 Auxiliary Panel: 10
No. 1 Auxiliary Panel: 10
Engine Chip Caution Panel: 2

Maximum Output Voltage
V_{OUT_MAX}: + ½ SYSTEM POWER (Vdc)

Circuit Type:
Single-ended
Active Low

[6] Only applies to outputs of the MCP02-0XX

Maximum Sink Current:
I_{SINK}: 1.5mA

Bidirectional Signals

Serial Communication Inputs/Outputs
Quantity:
Master Warning Panel: 2
Circuit Type:
Differential
RS-422 Protocol

1.4.2 Physical Specifications

Master Warning Panel (MCP02-0XX)

Height	4.81“ (122.2mm) max.
Depth	1.85“ (46.9mm) max. from back of mounting surface to back of connector. 0.96“ (24.9mm) max. from back of mounting surface to front of switch.
Width	6.78“ (172.2mm) max. front panel. 5.86“ (144.2mm) rear enclosure.
Weight	1.75lbs (0.80kg) max.
Mounting	4 x 8-32 screws.
Connectors	1 x 41 Pin Circular Male 1 x 25 Pin D-Sub Male 1 x 9 Pin D-Sub Female
Faceplate Legend Housing	Flame Resistant Polycarbonate
Legend Capsules	Acrylic MIL-P-5425
Material and Finish	Aluminum with Clear MIL-DTL-5541 Type II Class 3 Chromate Coating followed by Black Epoxy 37038 per FED-STD-595 Paint.

No. 2 Auxiliary Panel (MCP02-107)

Height	3.01“ (76.5mm) max.
Depth	1.67“ (42.4mm) max. from back of mounting surface to back of connector. 0.37“ (9.4mm) max. from back of mounting surface to front of DZUS fastener.
Width	5.76“ (146.3mm) max. front panel. 5.00“ (127.0mm) rear enclosure.
Weight	1.25lbs (0.57kg) max.
Mounting	4 x DZUS Mounting Fasteners
Connectors	1 x 19 Pin Circular Male 1 x 15 Pin D-Sub Female
Faceplate Legend Housing	Flame Resistant Polycarbonate
Legend Capsules	Acrylic MIL-P-5425
Material and Finish	Aluminum with Clear MIL-DTL-5541 Type II Class 3 Chromate Coating followed by Black Epoxy 37038 per FED-STD-595 Paint.

No. 1 Auxiliary Panel (MCP02-213)

Height	3.01“ (76.5mm) max.
Depth	1.67“ (42.4mm) max. from back of mounting surface to back of connector. 0.37“ (9.4mm) max. from back of mounting surface to front of DZUS fastener.
Width	5.76“ (146.3mm) max. front panel. 5.00“ (127.0mm) rear enclosure.
Weight	1.25lbs (0.57kg) max.
Mounting	4 x DZUS Mounting Fasteners
Connectors	1 x 19 Pin Circular Male 1 x 15 Pin D-Sub Male
Faceplate Legend Housing	Flame Resistant Polycarbonate
Legend Capsules	Acrylic MIL-P-5425
Material and Finish	Aluminum with Clear MIL-DTL-5541 Type II Class 3 Chromate Coating followed by Black Epoxy 37038 per FED-STD-595 Paint.

Engine Chip Caution Panel (MCP02-300)

Height	1.50“ (38.1mm) max.
Depth	1.67“ (42.4mm) max. from back of mounting surface to back of connector. 0.37“ (9.4mm) max. from back of mounting surface to front of DZUS fastener.
Width	5.76“ (146.3mm) max. front panel. 4.37“ (111.0mm) rear enclosure.
Weight	0.75lbs (0.34kg) max.
Mounting	4 x DZUS Mounting Fasteners
Connectors	1 x 6 Pin Circular Male 1 x 9 Pin D-Sub Male
Faceplate Legend Housing	Flame Resistant Polycarbonate
Legend Capsules	Acrylic MIL-P-5425
Material and Finish	Aluminum with Clear MIL-DTL-5541 Type II Class 3 Chromate Coating followed by Black Epoxy 37038 per FED-STD-595 Paint.

1.4.3 Environmental Specifications

Temperature	-40°C to +70°C (operating) -55°C to +85°C (survival)
Temperature Variation	5°C/min.
Altitude	25,000ft max.
Humidity	95% Non-condensing.
Operational Shock	6g for 11ms
Crash Safety Shock	20g for 11ms (impulse) 20g for 3s (sustained)
Vibration	Conforms to DO-160G category U2, curves F and F1.

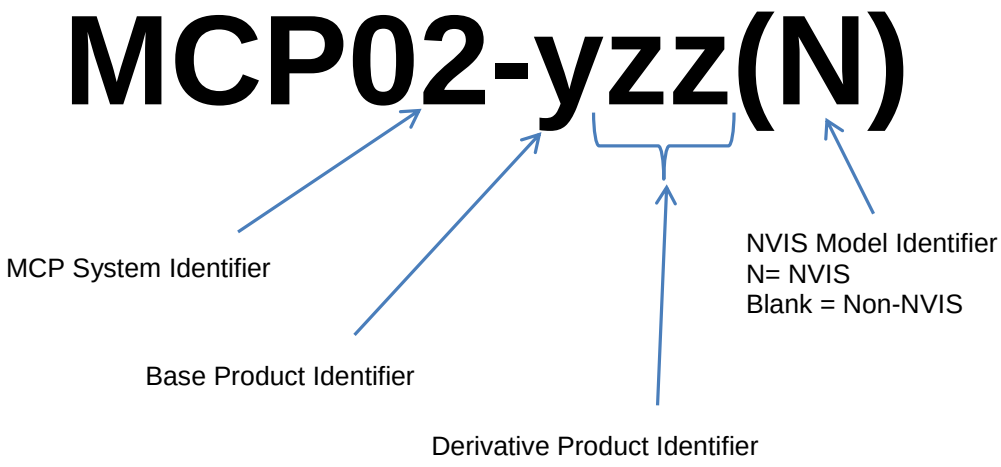
Qualification of the MCP02 Master Caution Panels completed in accordance with DO-160G Env. Cat. [B4]-BAB[U2FF1]XXXXXXZ[BXX]AB[ZC][RR]MXXXAC.

1.4.4 Product Approval/Certification

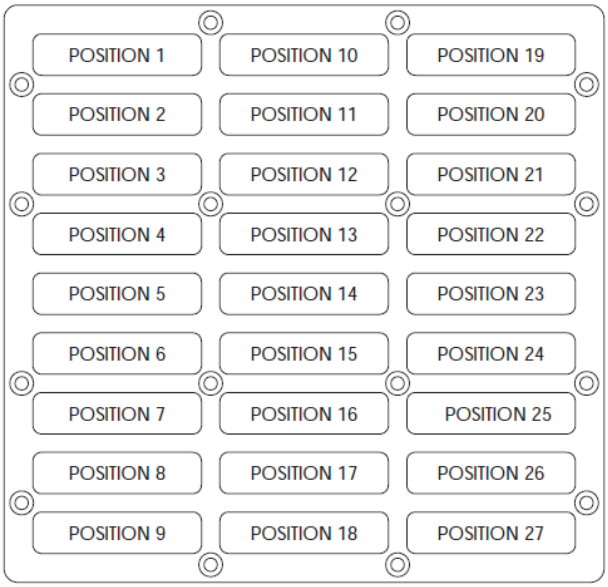
Transport Canada: Supplemental Type Certificate Approval.
Federal Aviation Administration: Supplemental Type Certificate Approval.

1.5 Unit Nomenclature

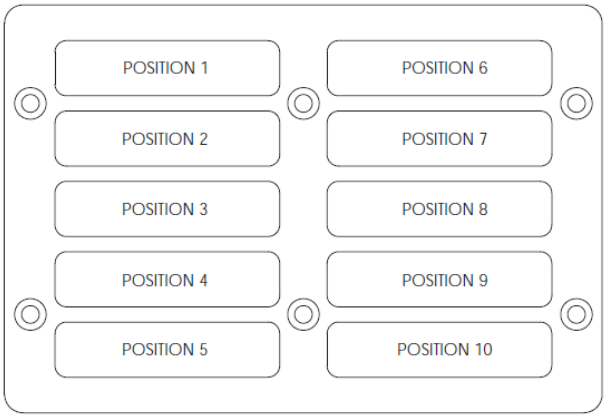
MCP02 Part Numbering Scheme:



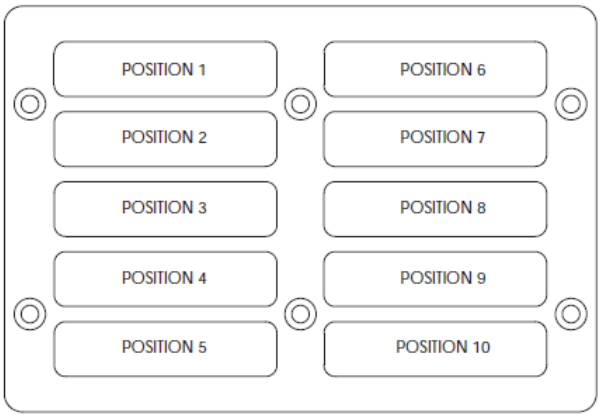
Master Warning Panel - MCP02-0XX Legend Positions



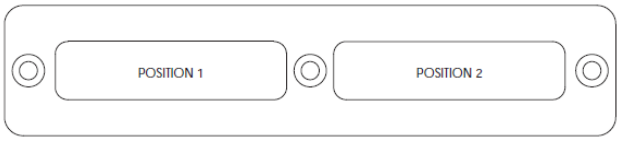
Auxiliary Warning Panel No. 2 – MCP02-107 Legend Positions



Auxiliary Warning Panel No. 1 – MCP02-213 Legend Positions



Engine Chip Caution Panel – MCP02-300 Legend Positions



1.6 Product Limitations

The MCP02 system contains a state recorder that logs all annunciator events. The state recorder data is intended for post-flight reference data analysis and is not intended to be used as the sole source for aircraft maintenance decisions.

In-flight use of the state recorder data is subject to separate system and installation approval.

1.7 Miscellaneous

When the Master Warning Panel (MCP02-0XX) is shipped from the factory, the state recorder memory may contain data. For instructions on how to clear the memory, if desired, see Section 3.4

End of Section 1.0

Section 2.0 Installation

2.1 Introduction

Information in this section consists of: unpacking and inspection procedures, installation procedures, post-installation checks, and installation drawings.

2.2 Unpacking and Inspection

Unpack the equipment carefully. Inspect the units for any visible signs of damage due to shipping and report all such claims immediately to the carrier involved. Note that each system should contain the following:

- MCP02-0XX (Master Warning Panel)[1]
- MCP02-107 (Auxiliary Warning Panel No. 2)[1]
- MCP02-213 (Auxiliary Warning Panel No. 1)[1]
- MCP02-300 (Engine Chip Caution Panel)[1]
- Product Information Card
- Certificate of Conformity or Release Certification

Verify that all items are present before proceeding and report any shortages immediately to your supplier.

2.2.1 Warranty

All Anodyne Electronics Manufacturing Corp. (AEM) products are warranted for 2 years. See the website http://www.aem-corp.com/warranty for complete details.

2.3 Installation Procedures

2.3.1 Warnings

None

2.3.2 Cautions

Circular Connectors
Connectors J1 on the MCP02-107 and J1 on the MCP02-213 panels have the same shell keying, but the pin orientations are different.
Exercise caution when mating to airframe wiring.

Fuse Rating
The MCP02-0XX SYSTEM POWER supply pin is internally fused at 5A.
Any current demands exceeding 5A may damage the fuse.

ESD Components
When replacing the SPARE legends, ensure that proper ESD Handling Procedures are followed as internal components will be exposed.

[1] Item included when specified on the order form

2.3.3 Cabling and Wiring

All wire shall be selected in accordance with the original aircraft manufacturer's Maintenance Instructions. Unshielded wire shall be AWG 22 part number M22759/43-22-9 type /34 or /44. For shielded wire applications, use Tefzel MIL-C-27500 shielded wire with solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the Top Drawing in Section 2.7 as required.

2.3.4 Post-Installation Checks

2.3.4.1 Voltage/Resistor Check (MCP02-0XX)

DO NOT ATTACH ANY OF THE MCP02 PANELS UNTIL THE FOLLOWING CONDITIONS ARE MET.

Check the following:

- Check Master Warning Panel P1 pin <Y> (system ground) for continuity to ground.
- Check Master Warning Panel P1 pin <X> (system power) for +28Vdc relative to ground.

Ensure all connectors are tight and the mechanical installation is sound.

2.3.4.2 Engine Chip Caution Panel (MCP02-300)

The Engine Chip Panel is designed to be installed in aircraft fitted with the Engine Chip Detection System. Before connecting the Engine Chip Caution Panel, ensure the Engine Chip Detector System is installed in accordance with the Sikorsky Alert Service Bulletin No. 61B30-15A section 3.C. (Configuration 2). After installation of the Engine Chip Caution panel is complete, perform the functional checkout procedure in the Sikorsky Alert Service Bulletin No. 61B30-15A section 3.D.(1) through (15).

2.3.4.3 Power-On Checks

Power up the aircraft's systems and confirm normal operation of all functions of the MCP02 System.

a. Push and hold the TEST button on the Master Warning Panel (MCP02-0XX). All of the MCP02 legend annunciators should illuminate brightly.
b. While holding the TEST button, toggle the DIM/BRIGHT switch on the Master Warning Panel (MCP02-0XX) to the DIM (down) position. All MCP02 annunciator legends should be lit dimly. The backlighting on the Master Warning Panel should illuminate.
c. While holding the TEST button, toggle the DIM/BRIGHT switch on the Master Warning Panel (MCP02-0XX) to the BRIGHT (up) position. All of the annunciator legends should illuminate brightly again. The backlighting on the Master Warning Panel should extinguish.
d. Release the TEST switch. All of the annunciator legends that were unlit prior to the test should extinguish again.

Upon satisfactory completion of all performance checks, make all required log book entries, electrical load, weight and balance amendments and other documentation as required by your local regulatory agency before releasing the aircraft for service.

2.4 Legend Replacement

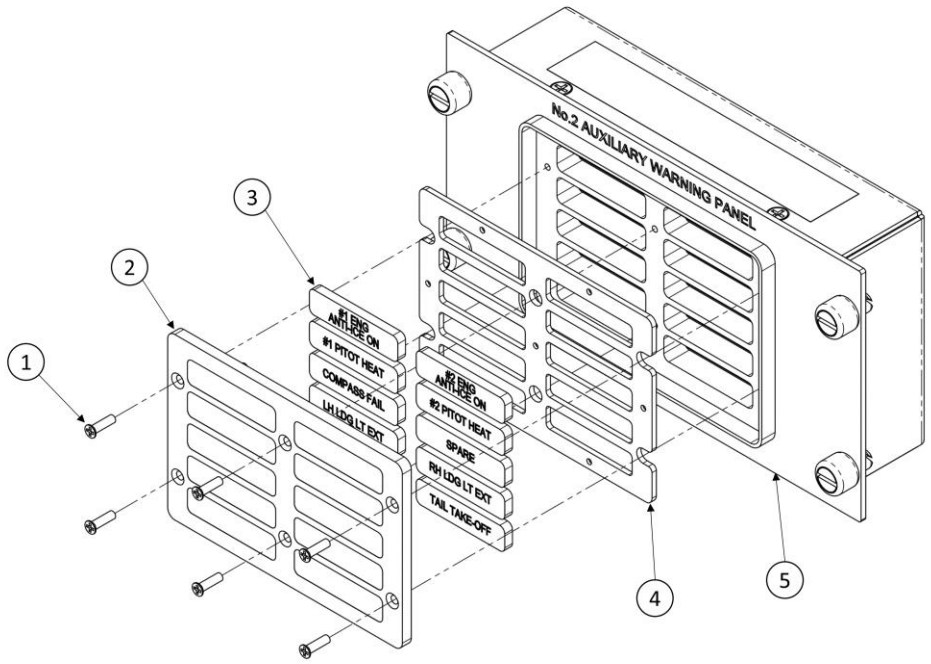
The MCP02 legends may be replaced by the customer with custom replacement legends from the factory. Replacement of the legends does not change the product part number. The replacement directions are identical for all panels.

2.4.1 Materials and Tools Required

- Replacement legends
- Phillips #1 screw driver

2.4.2 Disassembly

1. Remove and set aside the six flathead screws (Item 1) securing the legend assembly (Items 2, 3, and 4) to the unit (Item 5).
2. Set the legend assembly (Items 2,3, and 4) face down on a clean and flat surface and carefully remove the legend isolation gasket (Item 4) from the pegs on the rear of the legend housing (Item 2).
3. Carefully remove the former legend (Item 3) from the legend housing (Item 2). This is accomplished by using a pointed tool to grab the small ledge on the back of the legend.
4. Replace the former legend (Item 3) with a new legend.



2.4.3 Reassembly

1. Install the lens isolation gasket (Item 4) onto the back of the legend assembly (Items 2 and 3). Ensure the gasket is fully seated around all mounting pegs. The lens isolation gasket has recesses for the pegs to snap into. The side with the peg recess should face the operator when being installed. The flush side of the gasket should face towards the housing.

2. Install and secure the legend assembly (Items 2, 3, and 4) to the unit (Item 5) using the six flathead screws (Item 1). Do not overtighten screws. The legend housing must not deflect or warp when installed.

2.5 Optional Accessories

The following installation kits are not supplied with the MCP02, but are required to complete the inter-box wiring harness and optional serial state recorder cable installations.

2.5.1 AD09PV-IKC

Installation kit P/N AD09PV-IKC (crimp) is required to complete the optional state recorder installation on the Master Warning Panel. If the state recorder feature is not wired or used, use the kit to cover the unused 9 pin connector. The kit consists of the following:

Quantity	Description	AEM Part No.
1	D-min 9 Plug Housing	20-11-009
9*	MS Crimp Pin	20-26-891
1	9 Pin JVL Hood/Locklever	20-29-090

* Use as required

2.5.2 D09SV-IKC

Installation kit P/N D09SV-IKC (crimp) is required to complete the inter-box wiring harness installation on the Engine Chip Caution Panel. The kit consists of the following:

Quantity	Description	AEM Part No.
1	D-min 9 Socket Housing	20-21-009
9*	MS Crimp Pin	20-26-901
1	9 Pin JVL Hood/Locklever	20-29-090

* Use as required

2.5.3 D15PV-IKC

Installation kit P/N D15PV-IKC (crimp) is required to complete the inter-box wiring harness installation on the No. 2 Auxiliary Warning Panel. The kit consists of the following:

Quantity	Description	AEM Part No.
1	D-min 15 Pin Housing	20-11-015
15*	MS Crimp Pin	20-26-891
1	15 Pin JVL Hood/Locklever	20-29-150

* Use as required

2.5.4 D15SV-IKC

Installation kit P/N D15SV-IKC (crimp) is required to complete the inter-box wiring harness installation on the No. 1 Auxiliary Warning Panel. The kit consists of the following:

Quantity	Description	AEM Part No.
1	D-min 15 Socket Housing	20-21-015
15*	MS Crimp Pin	20-26-901
1	15 Pin JVL Hood/Locklever	20-29-150

* Use as required

2.5.5 D25SV-IKC

Installation kit P/N D25SV-IKC (crimp) is required to complete the inter-box wiring harness installation on the Master Warning Panel. If the Master Warning Panel is installed in a mixed configuration, use the kit to cover the unused 25 pin connector. The kit consists of the following:

Quantity	Description	AEM Part No.
1	D-min 25 Socket Housing	20-21-025
25*	MS Crimp Pin	20-26-901
1	25 Pin JVL Hood/Locklever	20-29-250

* Use as required

2.6 Continued Airworthiness

Regular inspection of the MCP02 system should be conducted in accordance with the Sikorsky Equalized Maintenance and Inspection Program for Zone 7, Cockpit/Electronics:

1. Functional Check every Safety inspection (15 flight hours)
2. Visual Inspection every progressive period (150 flight hours)

2.7 Installation Drawings

Use of the "#" symbol in the "Rev." column indicates that the document is listed elsewhere in the manual. Refer to the applicable AEM Part No. to locate the reference document.

Document	Rev.	Description	Type	Serial No.
A-CAL-2342	IR	S-61 System Installation	Top Drawing	N/A
MCP02-521-0100	1.00	S-61 Master Caution Panels	Environ. Qual. Form	62343+
MCP02-000-405-0100	1.00	S-61 Master Warning Panel	Connector Map	62343+
MCP02-100-405-0100	1.00	No. 2 Auxiliary Warning Panel	Connector Map	62346+
MCP02-200-405-0100	1.00	No. 1 Auxiliary Warning Panel	Connector Map	62349+
MCP02-300-405-0100	1.00	Engine Chip Caution Panel	Connector Map	62352+
MCP02-000-922-0110	1.10	Master Warning Panel	Mechanical Installation	62343+
MCP02-100-922-0110	1.10	No. 2 Auxiliary Warning Panel	Mechanical Installation	62346+
MCP02-200-922-0110	1.10	No. 1 Auxiliary Warning Panel	Mechanical Installation	62349+
MCP02-300-922-0110	1.10	Engine Chip Caution Panel	Mechanical Installation	62352+

Section 2.0 ends following above documents

NOTES:

1. THIS DRAWING PROVIDES INSTRUCTIONS FOR THE INSTALLATION OF A REPLACEMENT CAUTION AND WARNING PANEL SYSTEM IN THE SIKORSKY S-61 N AND S-61 L HELICOPTERS IN ACCORDANCE WITH TRANSPORT CANADA SUPPLEMENTAL TYPE CERTIFICATE SH16-25.
2. SUBJECT TO NOTE 5 BELOW, APPROVED CONFIGURATIONS ARE LISTED IN THE BILL OF MATERIALS.
3. OPERATION: WARNING PANELS - DESCRIPTION AND OPERATION IS THE SAME AS DESCRIBED IN THE SIKORSKY MAINTENANCE MANUAL SA4045-80. SECTION 31-11-1.
4. MAINTENANCE: MAINTENANCE IS AS DESCRIBED IN THE SIKORSKY MAINTENANCE MANUAL SA4045-80. SECTION 31-11-1 EXCEPT BULB AND SEGMENT REPLACEMENT. FOR THOSE INSTRUCTIONS REFER TO COULSON INSTRUCTIONS FOR CONTINUED AIRWORTHINESS MCP02-639-0100.
5. ENGINE CHIP DETECTOR LIGHTS: FAA AIRWORTHINESS DIRECTIVE (AD) 2004-15-22; SIKORSKY AIRCRAFT CORPORATION MODEL S- 61L, S-61N, S-61-NM, AND S-61R HELICOPTERS MANDATES THE INSTALLATION OF AN ON-BOARD ENGINE CHIP DETECTOR ANNUNCIATION SYSTEM USING SIKORSKY AIRCRAFT CORPORATION ALERT SERVICE BULLETIN NO. 61B30-15, REVISION A. DATED OCTOBER 20, 2003 (ASB). THE FAA AD PROVIDES FOR AN ALTERNATIVE MEANS OF COMPLIANCE (AMOC). WHEN CONFIGURATION -01 OF THIS REPLACEMENT CAUTION PANEL SYSTEM (FOUR MCP02 PANELS PLUS THE SUPPLEMENTAL CABLE ASSEMBLY) IS INSTALLED ON AIRCRAFT THAT ALSO HAVE ASB 61B30-15A INSTALLED, A TRANSPORT CANADA AMOC (AARDG 2016/ A36) IS IN EFFECT. AIRCRAFT WITH OTHER CHIP DETECTOR SYSTEMS ARE NOT SUPPORTED BY AMOC FOR CONFIGURATION -01.
6. INSTALLATION:
   - 6.a. TURN OFF ALL ELECTRICAL POWER.
   - 6.b. REMOVE SCREWS SECURING THE MASTER WARNING PANEL. SAVE SCREWS FOR INSTALLATION OF MCP02-0XX.
   - 6.c. IF A COMPLETE MCP02 SYSTEM IS TO BE INSTALLED, UNLOCK DZUS FASTENERS FOR THE No.1 AND No.2 AUXILIARY WARNING PANELS AND THE ENGINE CHIP PANEL (IF APPLICABLE).
   - 6.d. UNPLUG THE CONNECTORS FOR EACH PANEL AND REMOVE PANELS FROM THE CONSOLE.
   - 6.e. DUE TO POSSIBLE MODIFICATIONS THAT MAY HAVE PREVIOUSLY BEEN INCORPORATED IN THE AIRCRAFT, CONFIRM BY INSPECTION THE NOMENCLATURE ON EACH CAPSULE IS THE SAME ON THE REMOVED AND NEW PANELS. REFER TO SHEET 3 OF THIS DRAWING.
   - 6.f. IF A COMPLETE MCP02 SYSTEM IS TO BE INSTALLED (CONFIG -01 AND -05), SECURE THE SMCP02 SUPPLEMENTAL CABLE ASSEMBLY IN THE CONSOLE. THE SUPPLEMENTAL CABLE ASSEMBLY IS NOT REQUIRED FOR CONFIGURATION -03.
   - 6.g. CONNECT THE AIRCRAFT CONNECTORS TO THE PANEL(S).
   - 6.h. CONNECT THE SMCP02 SUPPLEMENTAL CABLE ASSEMBLY TO THE PANEL(S).
   - 6.i. SECURE DZUS FASTENERS AND SCREWS THAT ATTACH THE PANEL(S) TO THE CONSOLE.
   - 6.j. PERFORM A FUNCTIONAL TEST IAW THE S61 MAINTENANCE MANUAL SECTION 31-11-1 PARA i. FOR CONFIGURATION -01 TEST THE ENGINE CHIP DETECTOR IAW ASB 61B30-15A, USING THE ACCOMPLISHMENT INSTRUCTIONS, PARAGRAPH 3.D., OF THE ASB.
   - 6.k. AMEND AIRCRAFT WEIGHT AND BALANCE (REF. TABLE 1) AND ELA (REF. TABLE 2) AS NECESSARY.
   - 6.l. RECORD IN THE AIRCRAFT MAINTENANCE RECORDS THAT THE WARNING PANELS HAVE BEEN REPLACED IAW THIS DRAWING AND THE APPROVING STC.
7. FOR DO-160G SPECIFICATIONS, REFERENCE DRAWING MCP02-521-O.
8. △8. REQUIRED ONLY WHERE THE MCP02-3XX ENGINE CHIP CAUTION PANEL IS INSTALLED.
9. △9. FOR RS422 SERIAL CONNECTION USE TWISTED SHIELDED PAIR. CONNECT SHIELDS TOGETHER AND GROUND TO CLEAN AIRCRAFT GROUND. CABLE LENGTH NOT TO EXCEED 50 METERS FOR RS422 SERIAL CONNECTION. ALL SHIELDED WIRE/CABLE SHOULD BE IN ACCORDANCE WITH MIL-C-27500.
10. △10. INCORPORATES NO.1 AND NO.2 ENGINE IGV ANTI-ICE SEGMENTS IN ACCORDANCE WITH SIKORSKY SB 61B55-37, FIGURE 4, SHT.3

			1	1	1	EA	14	RD9MIFJVL0	SUBMIN-D, PINS, 9 CONTACTS (OPTIONAL) (POSITRONIC)	OR MIL-DTL-24308 EQUIV (USE ON -0XX)
			60		60	FT	13	M22759/43-22-9	AWG 22 WIRE	ALTERNATES /34, /44
					1	EA	12	RD9S1FJVL0	SUBMIN-D, SOCKETS, 9 CONTACTS (POSITRONIC)	OR MIL-DTL-24308 EQUIV (USE ON -3XX)
			1		1	EA	11	RD15S1FJVL0	SUBMIN-D, SOCKETS, 15 CONTACTS (POSITRONIC)	OR MIL-DTL-24308 EQUIV (USE ON -2XX)
			1		1	EA	10	RD15M1FJVL0	SUBMIN-D, PINS, 15 CONTACTS (POSITRONIC)	OR MIL-DTL-24308 EQUIV (USE ON -1XX)
			1		1	EA	9	RD25S1FJVL0	SUBMIN-D, SOCKETS, 25 CONTACTS (POSITRONIC)	OR MIL-DTL-24308 EQUIV (USE ON -0XX)
					1	EA	8	ASB 61B30-15A	ENGINE CHIP DETECTOR RELAY PANEL (RELAY PANEL ONLY)	REF ASB 61B30-15A
				1		EA	7	ASB 61B30-15A	ENGINE CHIP DETECTOR PANEL (COMPLETE)	REF ASB 61B30-15A
				1		EA	6	80-0092-7	#2 AUX WARNING PANEL REF IPC 4045-79 FIG 197-116	GRIMES (SIKORSKY STD)
				1		EA	5	75-0074-213	#1 AUX WARNING PANEL REF IPC 4045-79 FIG 197-127	GRIMES (SIKORSKY STD)
					1	EA	4	MCP02-300	ENGINE CHIP CAUTION PANEL	AEM
			1		1	EA	3	MCP02-1XX	No. 2 AUXILIARY WARNING PANEL	AEM
			1		1	EA	2	MCP02-2XX	No. 1 AUXILIARY WARNING PANEL	AEM
			1	1	1	EA	1	MCP02-0XX	MASTER WARNING PANEL	AEM
QTY	QTY	QTY	QTY	QTY	QTY	UOM	ITEM	PART NUMBER	DESCRIPTION	VEN/ SPEC/ COMMENT
X								- 011	RESERVED	
	X							- 09	RESERVED	
		X						- 07	RESERVED	
			X					- 05	SYSTEM REPLACEMENT, NO CHIP DETECT PANEL (3 PANELS ONLY)	
				X				- 03	MASTER WARNING PANEL REPLACEMENT (1 PANEL ONLY)	
					X			- 01	CAUTION WARNING PANEL SYSTEM REPLACEMENT (4 PANELS)	

TABLE 4
BILL OF MATERIALS AND CONFIGURATION

REVISIONS			
REV	DESCRIPTION	NAME	DATE
IR	INITIAL RELEASE	S BROWN	10 MAY 16

EQUIPMENT	PART NUMBER	IN / OUT	WEIGHT (lbs)	ARM (in)	MOMENT (lb·in)
MASTER WARNING PANEL	MCP02-0XX	IN	1.60	76.00	121.60
No. 1 AUXILIARY WARNING PANEL	MCP02-2XX	IN	0.79	70.00	55.30
No. 2 AUXILIARY WARNING PANEL	MCP02-1XX	IN	0.78	70.00	54.60
ENGINE CHIP CAUTION PANEL	MCP02-3XX	IN	0.40	68.00	27.20
TOTAL IN			3.57	72.46	258.70
MASTER WARNING PANEL	80-0331- ( )	OUT	-3.30	76.00	-250.80
No. 1 AUXILIARY WARNING PANEL	75-0074-213	OUT	-1.00	70.00	-70.00
No. 2 AUXILIARY WARNING PANEL	80-0092-7	OUT	-1.00	70.00	-70.00
ENGINE CHIP CAUTION PANEL	ASB 61B30-15A	OUT	-0.50	68.00	-34.00
TOTAL OUT			-5.80	73.24	-424.80
NET CHANGE			-2.23	-0.78	

TABLE 1
WEIGHT AND BALANCE DATA CONFIG -01

PANEL	GRIMES P/N	BASE AEM P/N	DERIVATIVE AEM P/N*
MASTER WARNING PANEL	80-0331-1		MCP02-001
MASTER WARNING PANEL	80-0331-3		MCP02-003
MASTER WARNING PANEL	80-0331-5		MCP02-005
No. 1 AUXILIARY WARNING PANEL	75-0074-213		MCP02-213
No. 2 AUXILIARY WARNING PANEL	80-0092-7		MCP02-107
ENGINE CHIP CAUTION PANEL	-	MCP02-300	

TABLE 2
PART NUMBER (P/N) CROSS REFERENCE
*DERIVATIVE P/N'S CONSIST OF CHANGES TO ANNUNCIATOR LEGEND TEXT ONLY. FURTHER CUSTOMIZATION OF LEGEND TEXT DOES NOT NECESSITATE THE CREATION OF NEW PART NUMBERS

DC LOAD COMPARISON (ALL SEGMENTS ILLUMINATED)	DC LOAD (A)
OEM MASTER WARNING PANELS	3.6
MCP02 (CONFIG -01, 4 PANEL SYSTEM)	1.3
MCP02-0XX + 3 OEM PANELS (CONFIG -03, MIXED SYSTEM)	2.3

TABLE 3
ELA TABLE

DRAWN BY M BEAULIEU | REV DATE 10/05/16
CHECKED BY S BROWN | COMMENTS 10/05/16
ENGR APPR BY | ENG APPR DATE
COMMENTS

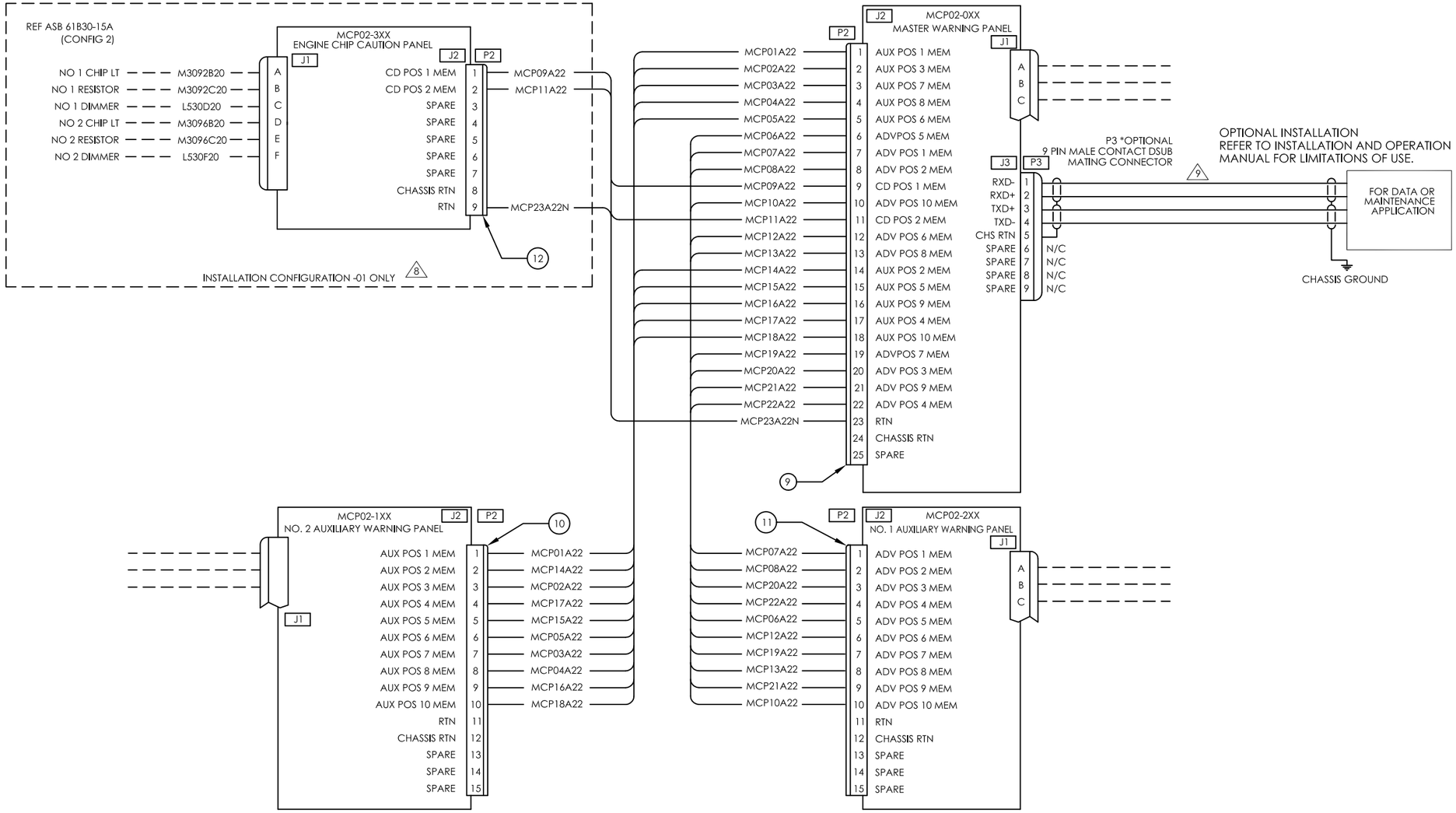
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES AND DECIMALS, TOLERANCES ARE:
.X± .XXX±
.XX± ANGLES±

WEIGHT N/A
NEXT ASSEMBLY N/A

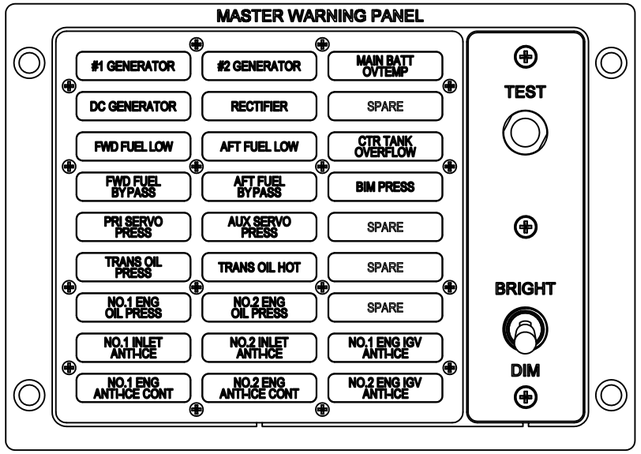
COULSON AIR CRANE

TITLE
REPLACEMENT CAUTION AND WARNING PANEL SYSTEM INSTALLATION

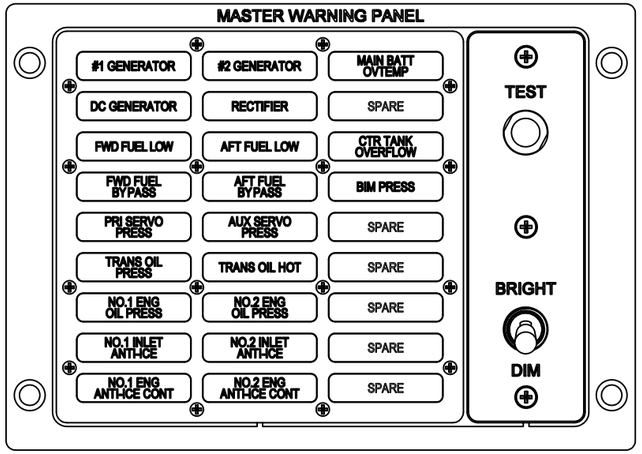
SIZE B | DWG. NO. A-CAL-2342 | REV IR
SCALE NTS | SHEET 1 OF 3 | RN



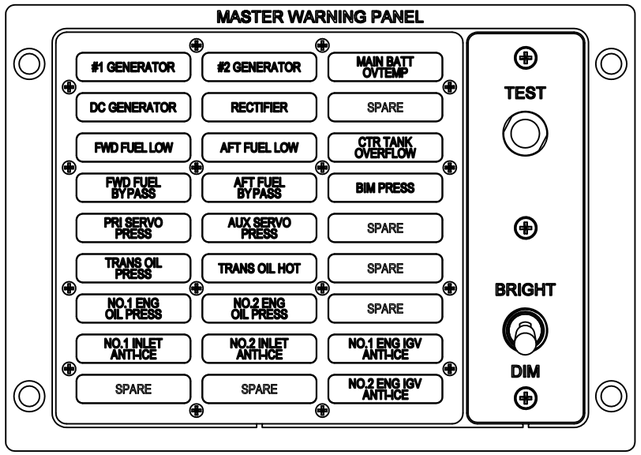
TITLE	REPLACEMENT CAUTION AND WARNING PANEL SYSTEM INSTALLATION		
SIZE B	DWG. NO. A-CAL-2342		REV IR
SCALE NTS		SHEET 2 OF 3	RN



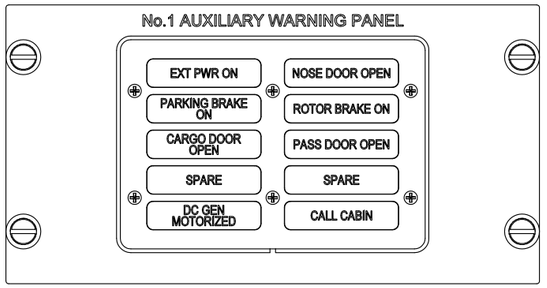
MCP02-003 / 80-0331-3 10



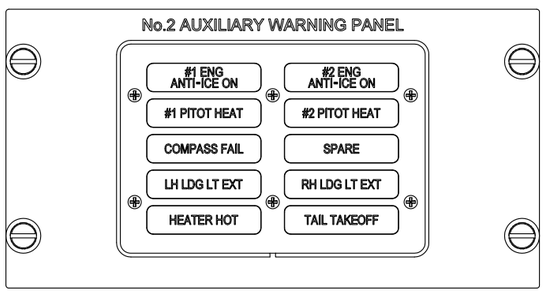
MCP02-001 / 80-0331-1



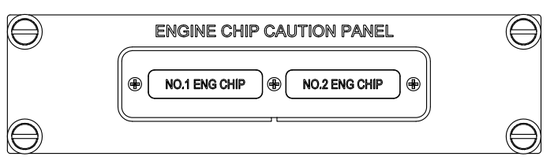
MCP02-005 / 80-0331-5 10



MCP02-213 / 75-0074-213



MCP02-107 / 80-0092-7



MCP02-300

FRONT VIEWS

COULSON AIR CRANE

TITLE
REPLACEMENT CAUTION AND WARNING PANEL SYSTEM INSTALLATION

SIZE	DWG. NO.	REV
B	A-CAL-2342	IR
SCALE NTS	SHEET 3 OF 3	RN

ENVIRONMENTAL QUALIFICATION FORM

Description: **Master Caution Panels (S-61)** Document: **MCP02-521-0100**

Part #: **MCP02-000, MCP02-100, MCP02-200, MCP02-300** TSO #: **N/A**

Manufacturer's Specification and/or Other Applicable Specification:

Manufacturer: **Anodyne Electronics Manufacturing Corp.**

Address: **#15 - 1925 Kirschner Rd., Kelowna, BC, Canada. V1Y 4N7**

Revision & Change Number of DO160: **G**

Prepared By:	Checked By:	Approved By:
KE Kris Erickson Designer Apr 29, 2016	NB Nathanael Bergmann Designer Apr 29, 2016	TB Todd Blackstock R&D Manager May 2/16

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	**4.0**	**Equipment tested to Categories B4**
Ground Survival Low Temp.	4.5.1	-55° C
Short-Time Operating Low Temp.	4.5.1	-45° C
Operating Low Temp.	4.5.2	-40° C
Ground Survival High Temp.	4.5.3	+85° C
Short-Time Operating High Temp.	4.5.3	+70° C
Operating High Temp.	4.5.4	+70° C
In-flight Loss of Cooling	4.5.5	N/A
Altitude	4.6.1	+25,000 ft (+7,620 m)
Decompression	4.6.2	N/A
Overpressure	4.6.3	N/A
Temperature Variation	**5.0**	**Equipment tested to Category B** ± 5° C/min.
Humidity	**6.0**	**Equipment tested to Category A** 95% RH for 48 hrs.
Operational Shocks and Crash Safety	**7.0**	**Equipment tested to Category B**
Operational Shocks	7.2.2	6 g for 11 ms in all axes
Crash Safety Impulse	7.3.2	20 g for 11 ms in all axes
Crash Safety Sustained	7.3.3	20 g for 3 s in all axes

Conditions	Section	Description of Conducted Tests
Vibration	**8.0**	**Equipment tested to Category U2** Profiles F and F1.
Explosive Atmosphere	9.0	Category X, no test performed.
Waterproofness	10.0	Category X, no test performed.
Fluids Susceptibility	11.0	Category X, no test performed.
Sand and Dust	12.0	Category X, no test performed.
Fungus	13.0	Category X, no test performed.
Salt Fog Test	14.0	Category X, no test performed.
Magnetic Effect	**15.0**	**Equipment tested to Category Z** Deflection of 1°: ≤0.3 m
Power Input	**16.0**	**Equipment tested to Categories BXX**
Voltage (Average Value DC)	16.6.1.1	Maximum Operating Voltage: +30.3 Vdc Nominal Operating Voltage: +28 Vdc Minimum Operating Voltage: +22 Vdc Emergency Operating Voltage: +18 Vdc
Momentary Power Interruptions (DC)	16.6.1.3	50 ms Max
Normal Surge Voltage (DC)	16.6.1.4	As per DO160G
Engine Starting Undervoltage (DC)	16.6.1.5	As per DO160G
Voltage Steady State (DC)	16.6.2.1	Maximum Operating Voltage: +32.2 Vdc Nominal Operating Voltage: +28 Vdc Minimum Operating Voltage: +20.5 Vdc
Low Voltage Conditions (DC)	16.6.2.2	As per DO160G
Momentary Undervoltage Operation (DC)	16.6.2.3	+12 Vdc for 7 s
Abnormal Surge Voltage (DC)	16.6.2.4	+60 Vdc for 100 ms, +40 Vdc for 1 s
Voltage Spike	**17.0**	**Equipment tested to Category A** 600 Vp for 10 µs Positive and negative spikes

Conditions	Section	Description of Conducted Tests
Audio Frequency Susceptibility	**18.0**	**Equipment tested to Category B** 1.6 Vp-p 0.2 to 1 kHz 4.0 Vp-p 1 to 15 kHz
Induced Signal Susceptibility	**19.0**	**Equipment tested to Category ZC**
Magnetic Fields Into Equipment	19.3.1	20 Arms @ 400 Hz
Electric Fields Into Equipment	19.3.2	170 Vrms @ 400 Hz
Magnetic Fields Into Cables	19.3.3	30 A*m @ 400 Hz to 0.8 A*m @ 15 kHz
Electric Fields Into Cables	19.3.4	1800 V*m from 380 to 420 Hz
Spikes Induced Into Cables	19.3.5	Positive and negative spikes as per DO160G
Radio Frequency Susceptibility	**20.0**	**Equipment tested to Category RR**
Conducted Susceptibility	20.4	SW/CW: 0.01 to 400 MHz
Radiated Susceptibility	20.5	SW/CW: 20 V/m from 100 to 400 MHz PM: 150 V/m from 0.4 to 8 GHz
Radio Frequency Emission	**21.0**	**Equipment tested to Category M**
Conducted RF Emission	21.4	Power lines: 150 kHz to 152 MHz Interconnecting Cables: 150 kHz to 152 MHz
Radiated RF Emission	21.5	100 MHz to 6 GHz
Lightning Induced Transient Susceptibility	22.0	Category X, no test performed.
Lightning Direct Effects	23.0	Category X, no test performed.
Icing	24.0	Category X, no test performed.
Electrostatic Discharge	**25.0**	**Equipment tested to Category A** 15,000 Vp, 10 positive and negative spikes.
Fire, Flammability	**26.0**	**Category C.** Each MCP02 LRU is constructed of metal on five sides and polycarbonate material on one side, and has no vent holes. Sample polycarbonate material is tested to Category C.

REMARKS

- Sections 4 to 8, 15 to 19 and 25 tests were conducted at Anodyne Electronics Manufacturing Corp. (AEM) in Kelowna BC.
- Section 20 and 21 were tested at Electronics Test Centre Kanata, ON.
- Section 26 sample polycarbonate was tested at Regent Aircraft Services Inc. in Calgary Alberta.
- Unless otherwise specified, the environmental performance tests listed in this section were performed on a MCP02 system with a Grimes Incandescent Load Box (AEM p/n TJ-1115) connected. This simulates an alternate worst case "Mixed Panel Configuration" where the MCP02-000 is installed with existing Grimes Auxiliary panels instead of the MCP02-100, MCP02-200 and MCP02-300. The intent of adding the Grimes Incandescent Load Box was to evaluate the effect it had on the MCP02 system while being subjected to the environmental conditions. The Grimes Incandescent Load Box itself was not subjected to these environmental conditions.
- Section 16 and 17 were tested twice. Once with the Grimes incandescent load box (TJ-1115) installed and once without the Grimes incandescent load box (TJ-1115) installed.
- In the power input test, equipment was tested to subparagraph 16.6.1.3.b.

  (Requirement for Digital Circuits)
- Section 25 ESD was tested twice. The first test was voided after the ESD Gun was found to be damaged after it had been sent for re-calibration. A different manufacturer's ESD Gun was obtained and section 25 was retested.
- The derivative part numbers in Table 1 incorporate changes to legend configurations only, and therefore this EQF is applicable to them as well.

Table 1

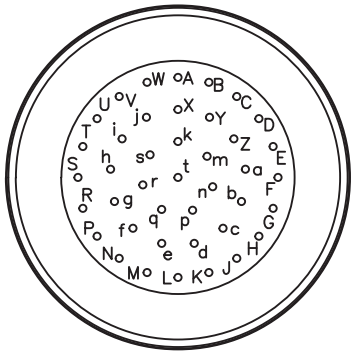
Derivative Part Number	Base Product Part Number
MCP02-001	MCP02-000
MCP02-003	MCP02-000
MCP02-005	MCP02-000
MCP02-107	MCP02-100
MCP02-213	MCP02-200

INSTALLATION NOTES

- In flight use of the optional State Recorder installation harness is subject to separate approval.
- The Master Warning Panel (MCP02-000) is designed to be used in three installation configurations as outlined below:
  a) Master Warning Panel (MCP02-000) with No.2 Auxiliary Warning Panel (MCP02-100), No.1 Auxiliary Warning Panel (MCP02-200) and optional Engine Chip Caution Panel (MCP02-300). In this configuration, the State Recorder can be utilized to capture the indicator states of all four panels.
  b) Master Warning Panel (MCP02-000) replaces OEM Grimes Master Caution Panel and is used in conjunction with the remaining OEM Grime units. With the Master Warning Panel (MCP02-000) used in conjunction with the Grimes Panels, the State Recorder can only be utilized for the Master Warning Panel (MCP02-000). It cannot capture the states of the OEM Grimes Panels.
  c) Master Warning Panel (MCP02-000) with No.2 Auxiliary Warning Panel (MCP02-100) and No.1 Auxiliary Warning Panel (MCP02-200) but no Engine Chip Caution Panel (MCP02-300). In this configuration, the State Recorder can be utilized to capture the indicator states of all three panels.

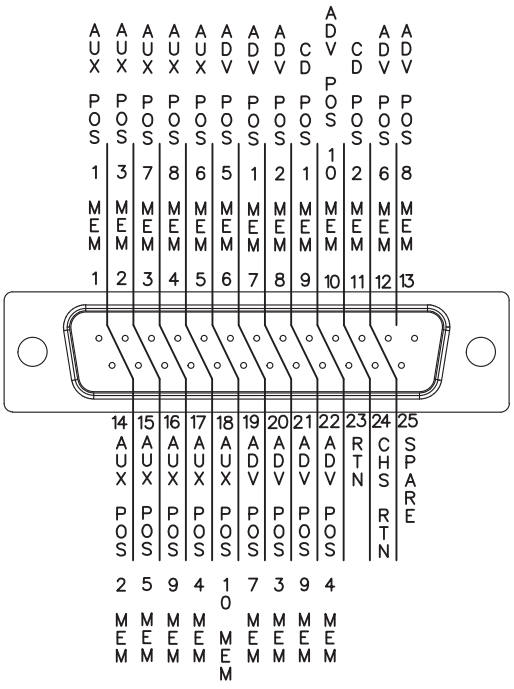
End of Environmental Qualification Form

P1
41 PIN FEMALE CONTACT CIRCULAR MATING CONNECTOR

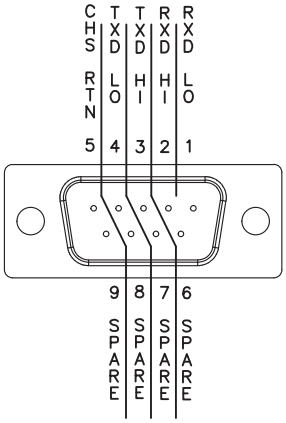


A	POS 1 (#1 GENERATOR)	Y	GROUND
B	POS 2 (DC GENERATOR)	Z	MC LT
C	POS 3 (FWD FUEL LOW)	a	RESET
D	POS 4 (FWD FUEL BYPASS)	b	DIM RLY
E	POS 5 (PRI SERVO PRESS)	c	BRT
F	POS 6 (TRANS OIL PRESS)	d	POS 18 (NO.2 ENGINE ANTI-ICE CONT)
G	POS 7 (NO.1 ENGINE OIL PRESS)	e	POS 20 (ALT BATT OVTEMP)
H	POS 8 (NO.1 INLET ANTI-ICE)	f	POS 22 (BIM PRESS)
J	POS 19 (MAIN BATT OVTEMP)	g	POS 23 (CHIP DET MAIN)
K	POS 10 (#2 GENERATOR)	h	POS 24 (CHIP DET INTMED)
L	POS 11 (RECTIFIER)	i	SPARE
M	POS 12 (AFT FUEL LOW)	j	POS 25 (CHIP DET TAIL)
N	POS 13 (AFT FUEL BYPASS)	k	POS 26 (NO.1 ENG IGV ANTI-ICE)
P	POS 14 (AUX SERVO PRESS)	m	POS 17 (NO.2 ENG IGV ANTI-ICE)
R	POS 15 (TRANS OIL HOT)	n	SPARE
S	POS 16 (NO.2 ENGINE OIL PRESS)	p	SPARE
T	POS 17 (NO.2 INLET ANTI-ICE)	q	SPARE
U	POS 21(CTR TANK OVERFLOW)	r	SPARE
V	POS 9 (NO.1 ENGINE ANTI-ICE CONT)	s	SPARE
W	TEST	t	SPARE
X	SYSTEM PWR		

P2
25 PIN FEMALE CONTACT DSUB MATING CONNECTOR



P3
9 PIN MALE CONTACT DSUB MATING CONNECTOR (OPTIONAL)



VIEW IS FROM REAR OF AIRFRAME CONNECTOR

	NAME	DATE
DRAWN	NMA/NB	Sep 09, 2015
CHECKED	NB	Sep 09/15
APPROVED	TB	Sept 9/15

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES [MM]
TOLERANCES:
FRACTIONAL_____ ±0.0625"
ANGULAR_____ ±0.5°
TWO DECIMAL PLACE___ ±0.010"
THREE DECIMAL PLACE___ ±0.005"

MATERIAL: NA

FINISH: NA

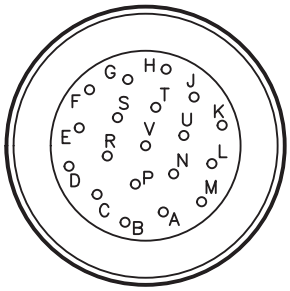
ANODYNE ELECTRONICS MANUFACTURING CORP.
KELOWNA BC CANADA
(250)-763-1088
WWW.AEM-CORP.COM

TITLE:
S-61 MASTER WARNING PANEL CONNECTOR MAP

PAPER SIZE:	CAGE CODE	PART No.:	REVISION
A	L9015	MCP02-000	1.00

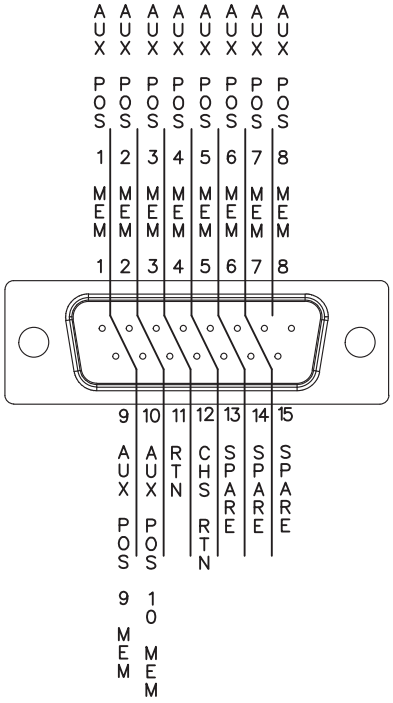
SCALE:	DO NOT SCALE DRAWING	DRAWING No.: 405-0	SHEET:1 of 1

P1
19 PIN 165° FEMALE CONTACT CIRCULAR
MATING CONNECTOR



A	POS 1 (#1 ENG ANTI–ICE ON)
B	POS 2 (#1 PITOT HEAT)
C	POS 3 (COMPASS FAIL)
D	POS 4 (LH LDG LT EXT)
E	POS 5 (HEATER HOT)
F	POS 6 (#2 ENG ANTI–ICE ON)
G	POS 7 (#2 PITOT HEAT)
H	POS 8 (SPARE)
J	POS 9 (RH LDG LT EXT)
K	POS 10 (TAIL TAKEOFF)
L	TEST
M	BRT
N	SIG RTN
P	RESET
R	SPARE
S	SPARE
T	MC LT
U	SPARE
V	SPARE

P2
15 PIN MALE CONTACT DSUB
MATING CONNECTOR



VIEW IS FROM REAR OF AIRFRAME CONNECTOR

	NAME	DATE
DRAWN	NMA/NB	Sep 09, 2015
CHECKED	NB	Sep 09/15
APPROVED	TB	Sept 9/15

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES [MM]
TOLERANCES:
FRACTIONAL_____ ±0.0625"
ANGULAR_____ ±0.5°
TWO DECIMAL PLACE____ ±0.010"
THREE DECIMAL PLACE___ ±0.005"

MATERIAL: NA

FINISH: NA

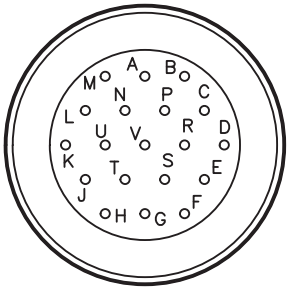
ANODYNE ELECTRONICS MANUFACTURING CORP.
KELOWNA BC CANADA
(250)-763-1088
WWW.AEM-CORP.COM

TITLE:
No.2 AUXILIARY WARNING PANEL CONNECTOR MAP

PAPER SIZE:	CAGE CODE	PART No.:	REVISION
A	L9015	MCP02-100	1.00

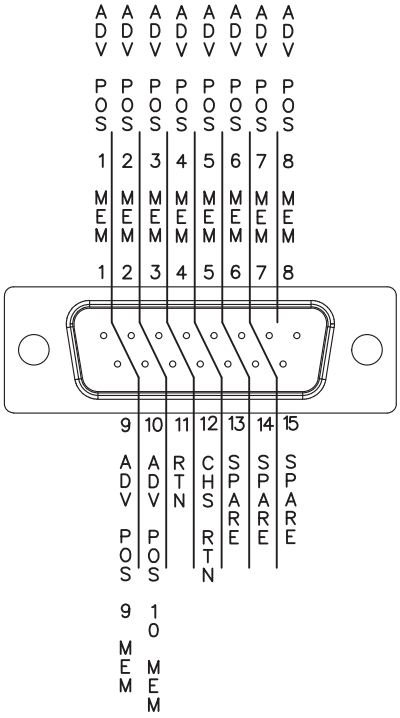
SCALE:1:1	DO NOT SCALE DRAWING	DRAWING No.: 405-0	SHEET:1 of 1

P1
19 PIN FEMALE CONTACT CIRCULAR
MATING CONNECTOR



A	POS 1 (EXT PWR ON)
B	POS 2 (PARKING BRAKE ON)
C	POS 3 (CARGO DOOR OPEN)
D	POS 4 (CTR REFUEL VALVE OPEN)
E	POS 5 (DC GEN MOTORIZED)
F	POS 6 (NOSE DOOR OPEN)
G	POS 7 (ROTOR BRAKE ON)
H	POS 8 (PASS DOOR OPEN)
J	POS 9 (SPARE)
K	POS 10 (CALL CABIN)
L	TEST
M	BRT
N	SIG RTN
P	SPARE
R	SPARE
S	SPARE
T	SPARE
U	SPARE
V	SPARE

P2
15 PIN FEMALE CONTACT DSUB
MATING CONNECTOR



VIEW IS FROM REAR OF AIRFRAME CONNECTOR

	NAME	DATE
DRAWN	NMA/NB	Sep 09, 2015
CHECKED		Sept 9/15
APPROVED		Sept 9/15

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES [MM]
TOLERANCES:
FRACTIONAL_____ ±0.0625"
ANGULAR_____ ±0.5°
TWO DECIMAL PLACE___ ±0.010"
THREE DECIMAL PLACE___ ±0.005"

MATERIAL: NA

FINISH: NA

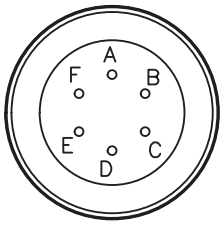
ANODYNE ELECTRONICS MANUFACTURING CORP.
KELOWNA BC CANADA
(250)-763-1088
WWW.AEM-CORP.COM

TITLE: No.1 AUXILIARY WARNING PANEL CONNECTOR MAP

PAPER SIZE:	CAGE CODE	PART No.:	REVISION
A	L9015	MCP02-200	1.00

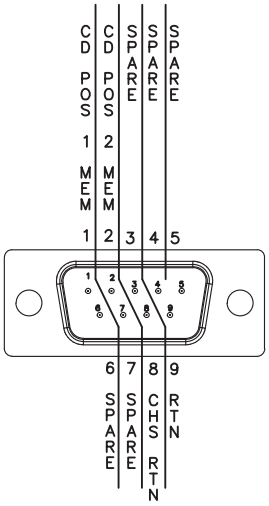
SCALE:1:1	DO NOT SCALE DRAWING	DRAWING No.: 405-0	SHEET:1 of 1

P1
6 PIN FEMALE CONTACT CIRCULAR
MATING CONNECTOR



A	POS 1 (NO. 1 ENG CHIP)
B	SPARE
C	BRT 1
D	POS 2 (NO. 2 ENG CHIP)
E	SPARE
F	BRT 2

P2
9 PIN FEMALE CONTACT DSUB
MATING CONNECTOR



VIEW IS FROM REAR OF AIRFRAME CONNECTOR

	NAME	DATE
DRAWN	NMA/NB	Sep 08, 2015
CHECKED	AEM NB	Sep 08/15
APPROVED	AEM TB	Sept 8/15

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES [MM]
TOLERANCES:
FRACTIONAL_____ ±0.0625"
ANGULAR_____ ±0.5°
TWO DECIMAL PLACE____ ±0.010"
THREE DECIMAL PLACE___ ±0.005"

MATERIAL: NA

FINISH: NA

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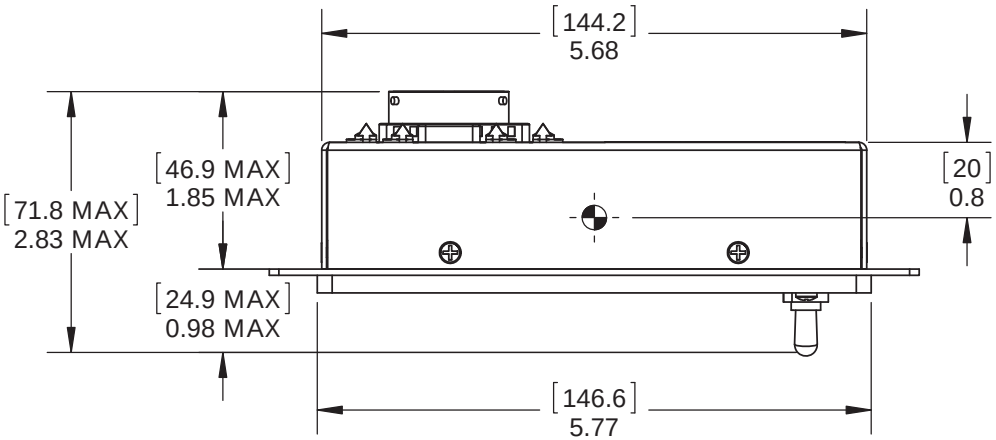
TITLE:
ENGINE CHIP CAUTION PANEL CONNECTOR MAP

PAPER SIZE:	CAGE CODE	PART No.:	REVISION
A	L9015	MCP02-300	1.00

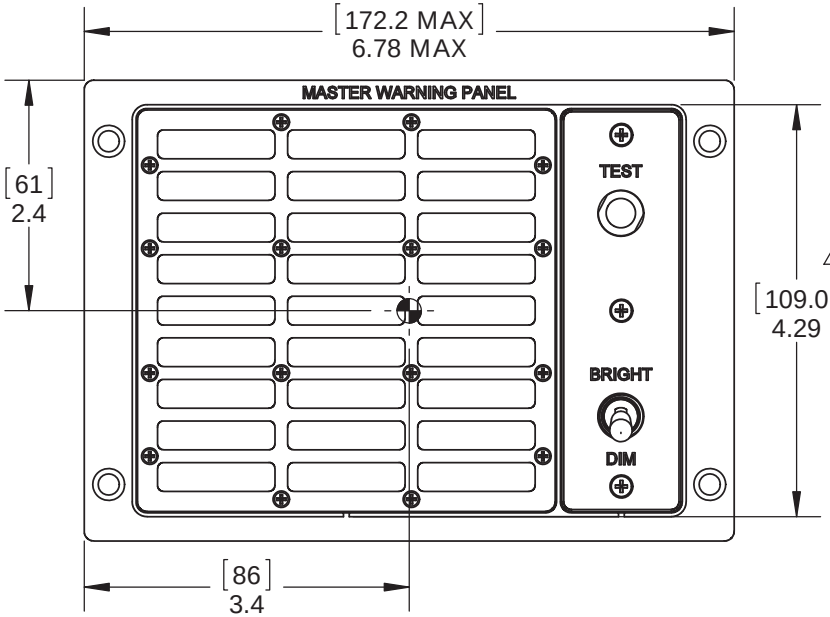
SCALE:1:1	DO NOT SCALE DRAWING	DRAWING No.: 405-0	SHEET:1 of 1

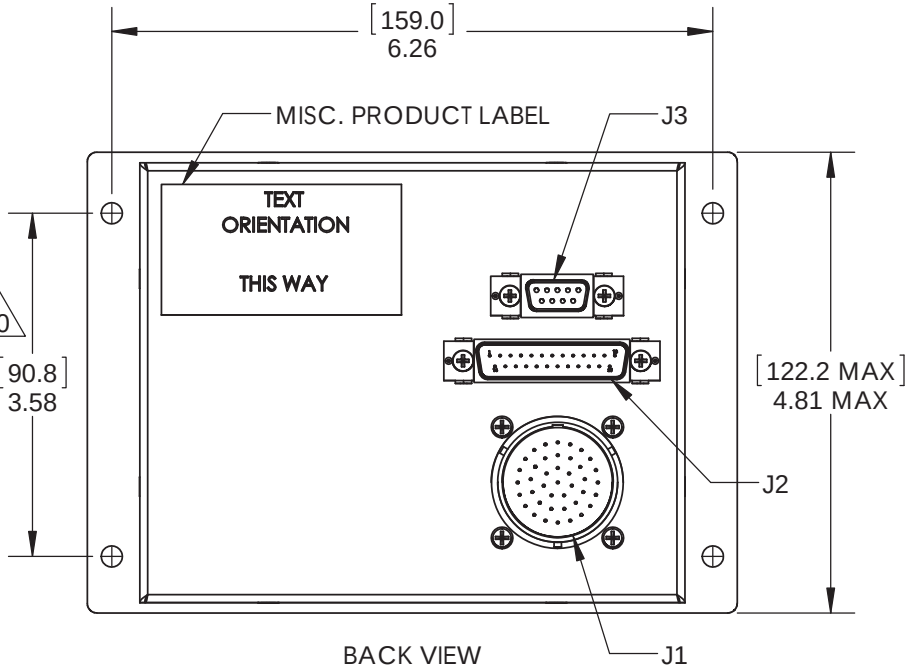
REVISIONS			
REV.	DESCRIPTION	DATE	NAME
1.10	RAS# 564 - DIMENSION CHANGES	01-Dec-15	DMF



NOTES:

1. WEIGHT: 1.75 lbs MAX [0.80 kg MAX]
2. ⊕ DENOTES CENTER OF GRAVITY EST.





	NAME	DATE
DRAWN	LAC	02-Sep-15
CHECKED	NB	01-Dec-15
APPROVED		Dec 2/15

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES [MM]
TOLERANCES:
ANGULAR ±0.5°
FRACTIONAL ±0.0625"
ONE DECIMAL PLACE ±0.100"
TWO DECIMAL PLACE ±0.030"
THREE DECIMAL PLACE ±0.010"

MATERIAL: N/A

FINISH: N/A
-

ANODYNE ELECTRONICS MANUFACTURING CORP.
15-1925 KIRSCHNER RD.
KELOWNA BC V1Y 4N7
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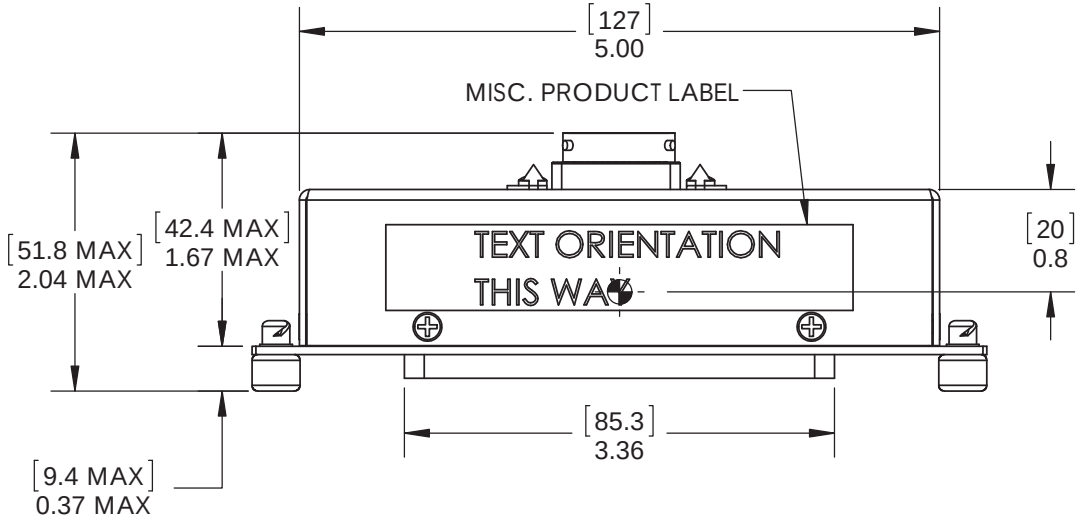
TITLE:
MCP02-000, MASTER WARNING PANEL MECHANICAL INSTALLATION

PAPER SIZE:	CAGE CODE	PART No. :	REVISION
A	L9015	MCP02-000	1.10

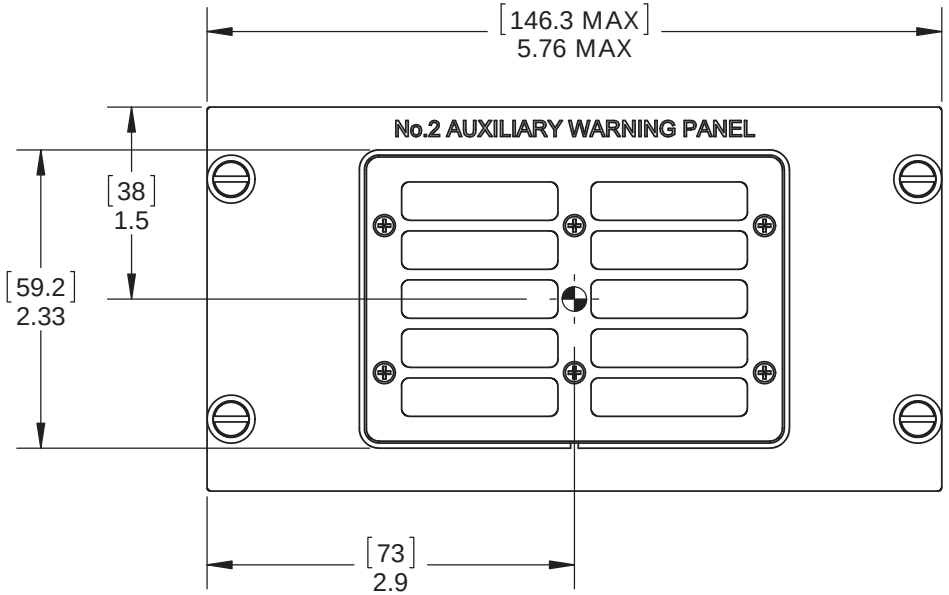
SCALE: 1:2	DO NOT SCALE DRAWING	DRAWING No. : 922-0	SHEET: 1 OF 1

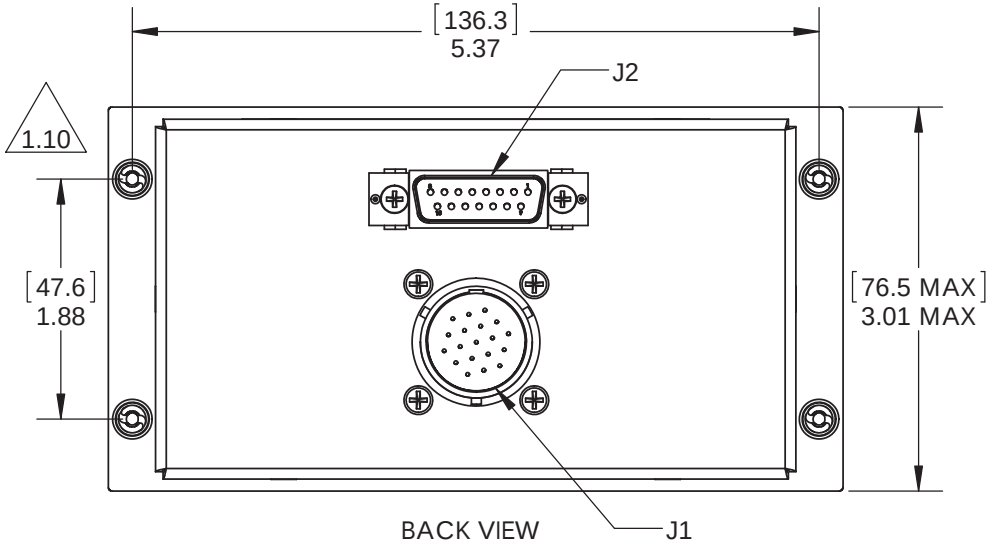
REVISIONS			
REV.	DESCRIPTION	DATE	NAME
1.10	RAS# 564 - DIMENSIONAL CHANGES	01-Dec-15	DMF



NOTES:

1. WEIGHT: 1.25 lbs MAX [0.57 kg MAX]
2. ⊕ DENOTES CENTER OF GRAVITY EST.





	NAME	DATE
DRAWN	LAC	02-Sep-15
CHECKED	NB	01-Dec-15
APPROVED		Dec 2/15

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES [MM]
TOLERANCES:
ANGULAR ±0.5°
FRACTIONAL ±0.0625"
ONE DECIMAL PLACE ±0.100"
TWO DECIMAL PLACE ±0.030"
THREE DECIMAL PLACE ±0.010"

MATERIAL: N/A

FINISH: N/A
-

ANODYNE ELECTRONICS MANUFACTURING CORP.
15-1925 KIRSCHNER RD.
KELOWNA BC V1Y 4N7
(250)-763-1088
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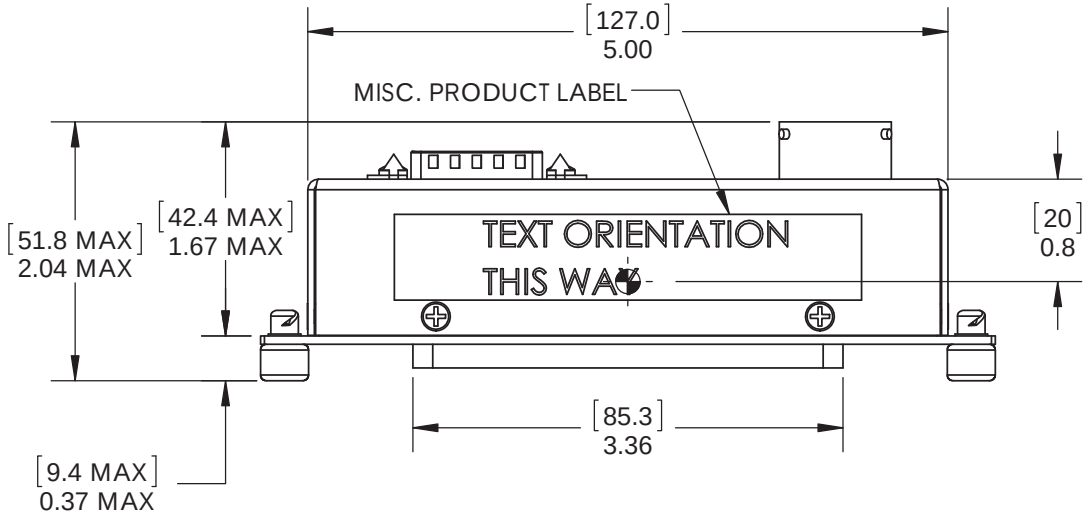
TITLE:
MCP02-100, No.2 AUXILIARY WARNING PANEL MECHANICAL INSTALLATION

PAPER SIZE:	CAGE CODE	PART No. :	REVISION
A	L9015	MCP02-100	1.10

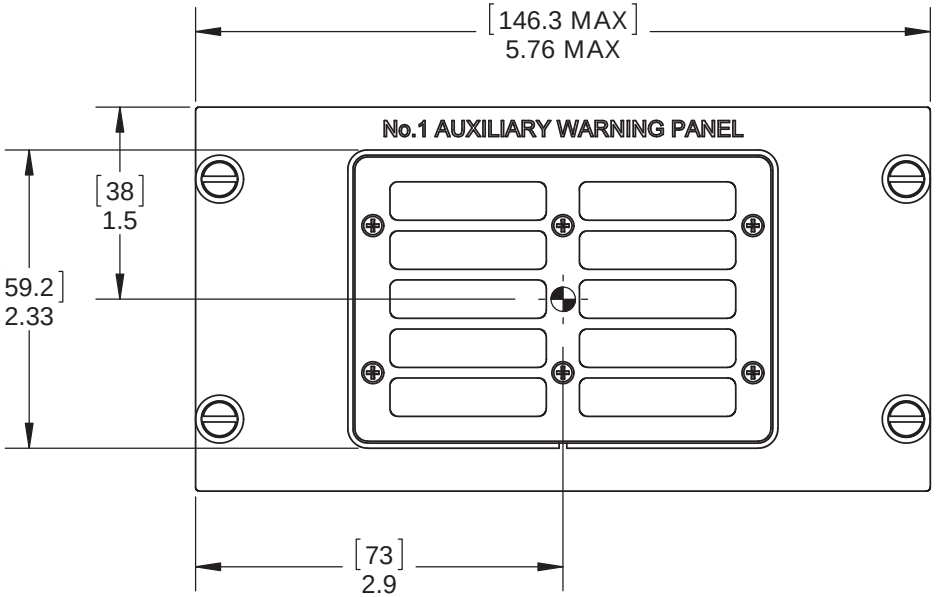
SCALE: 2:3	DO NOT SCALE DRAWING	DRAWING No. : 922-0	SHEET: 1 OF 1

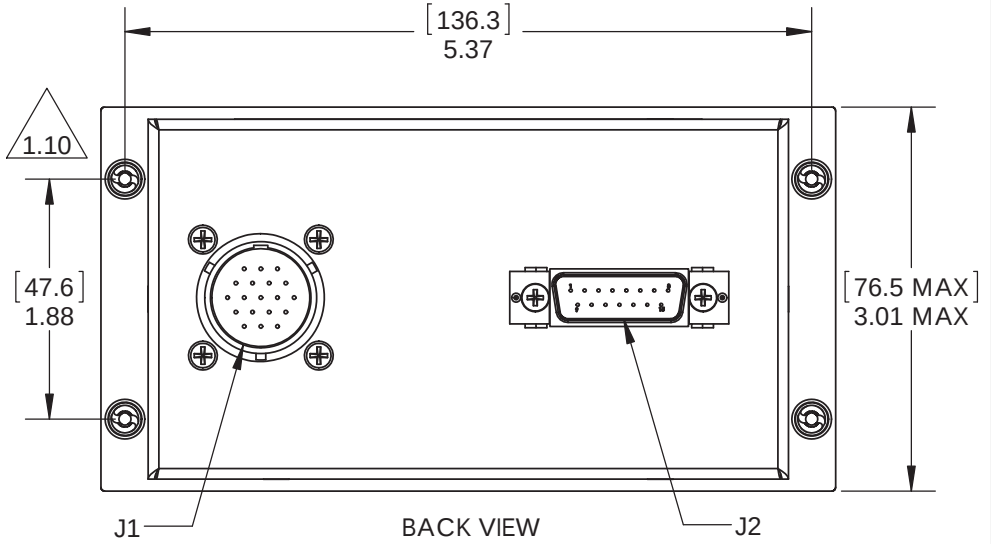
REVISIONS			
REV.	DESCRIPTION	DATE	NAME
1.10	RAS# 564 - DIMENSION CHANGES	01-Dec-15	DMF



NOTES:

1. WEIGHT: 1.25 lbs MAX [0.57 kg MAX]
2. ⊕ DENOTES CENTER OF GRAVITY EST.





	NAME	DATE
DRAWN	LAC	02-Sep-15
CHECKED	NB	01-Dec-15
APPROVED	TB	Dec 2/15

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES [MM]

TOLERANCES:

ANGULAR	±0.5°
FRACTIONAL	±0.0625"
ONE DECIMAL PLACE	±0.100"
TWO DECIMAL PLACE	±0.030"
THREE DECIMAL PLACE	±0.010"

MATERIAL: N/A

FINISH: N/A

-

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15-1925 KIRSCHNER RD.
KELOWNA BC V1Y 4N7
(250)-763-1088
WWW.AEM-CORP.COM

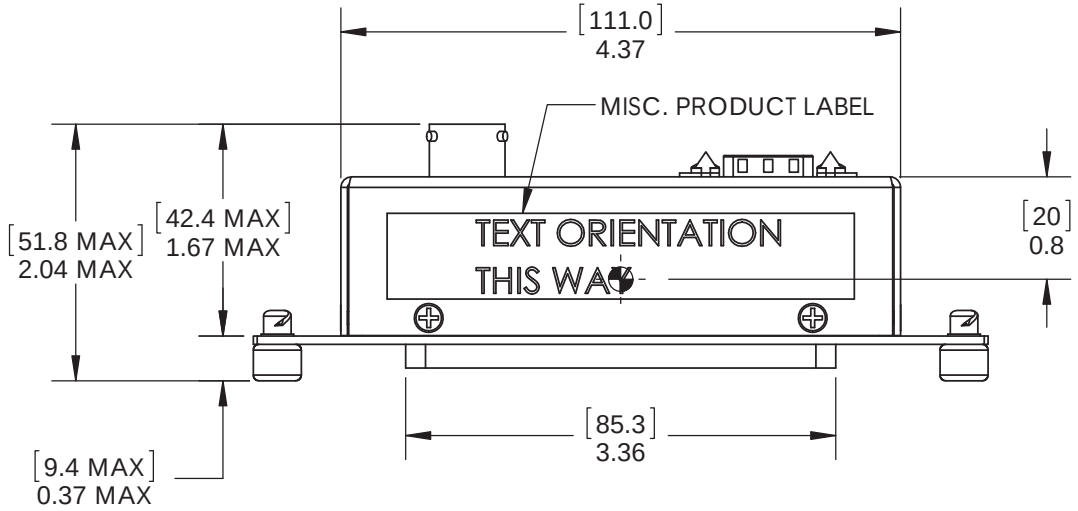
TITLE:

MCP02-200, No.1 AUXILIARY WARNING PANEL MECHANICAL INSTALLATION

PAPER SIZE:	CAGE CODE	PART No. :	REVISION
A	L9015	MCP02-200	1.10

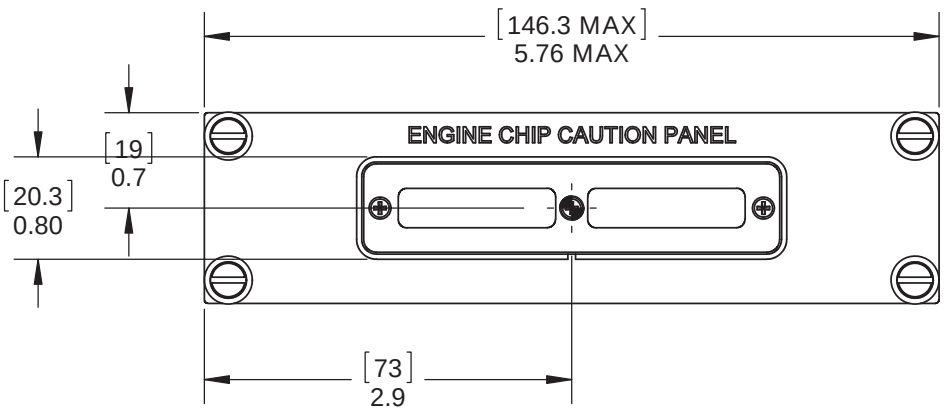
SCALE: 2:3	DO NOT SCALE DRAWING	DRAWING No. : 922-0	SHEET: 1 OF 1

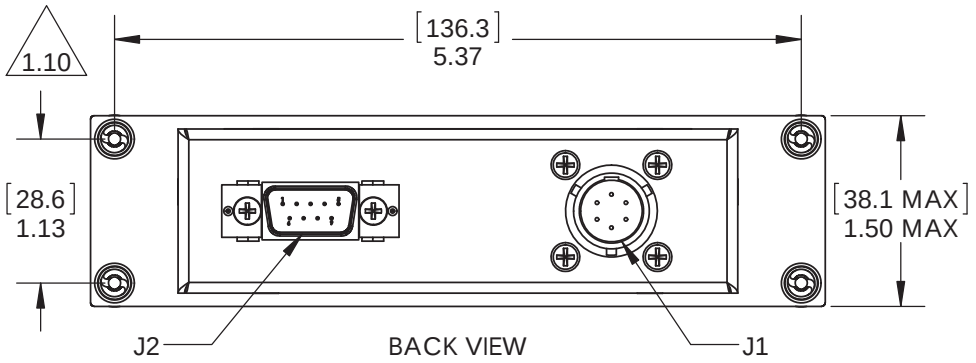
REVISIONS			
REV.	DESCRIPTION	DATE	NAME
1.10	RAS# 564 - DIMENSION CHANGES	01-Dec-15	DMF



NOTES:

1. WEIGHT: 0.75 lbs MAX [0.34 kg MAX]
2. ⊕ DENOTES CENTER OF GRAVITY EST.





	NAME	DATE
DRAWN	LAC	02-Sep-15
CHECKED	NB	01-Dec-15
APPROVED		Dec 2/15

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES [MM]
TOLERANCES:
ANGULAR ±0.5°
FRACTIONAL ±0.0625"
ONE DECIMAL PLACE ±0.100"
TWO DECIMAL PLACE ±0.030"
THREE DECIMAL PLACE ±0.010"

MATERIAL: N/A

FINISH: N/A
-

ANODYNE ELECTRONICS MANUFACTURING CORP.
15-1925 KIRSCHNER RD.
KELOWNA BC V1Y 4N7
(250)-763-1088
WWW.AEM-CORP.COM

TITLE:
MCP02-300, ENGINE CHIP CAUTION PANEL MECHANICAL INSTALLATION

PAPER SIZE:	CAGE CODE	PART No. :	REVISION
A	L9015	MCP02-300	1.10

SCALE: 2:3	DO NOT SCALE DRAWING	DRAWING No. : 922-0	SHEET: 1 OF 1

Section 3.0 Operation

3.1 Introduction

Information in this section consists of functional and operational procedures for the MCP02 Master Caution Panels.

3.2 General

3.2.1 Annunciator Lighting

When illuminated, the annunciator legends are red text on a black background. All legends have the same appearance regardless of the legend or panel.

All annunciator legends are daylight readable (>150fL) in BRIGHT mode.

All annunciator legends operate at two brightness levels, BRIGHT, and DIM. The mode may be switched by toggling the DIM/BRIGHT switch located on the Master Warning Panel (MCP02-0XX).

3.2.2 Panel Lighting

The white text on the front panel of the Master Warning Panel (MCP02-0XX) is backlight illuminated by white LEDs. The backlight illuminates when the system is operated in DIM mode.

3.2.3 Caution/Warning Signal Detection

The MCP02 system monitors the status of a total of 49 warning signals. Upon detection of a warning signal, the MCP02 lights the corresponding annunciator legend.

If the warning signal illuminates a legend on the Master Warning Panel (MCP02-0XX), or the No. 2 Auxiliary Panel (MCP02-107), they will activate the external Master Caution Light (MC LT) until the external RESET input is activated or the warning signal that triggered it becomes inactive. Activating the external RESET signal extinguishes the external Master Caution Light (MC LT), however the MCP02 legend will remain lit until the corresponding warning signal becomes inactive.

If the warning signal illuminates a legend on the No. 1 Auxiliary Panel (MCP02-213), the external Master Caution Light (MC LT) is not activated. The legend will remain active until the warning signal becomes inactive.

If the warning signal illuminates a legend on the Engine Chip Caution Panel (MCP02-300), the external Master Caution Light (MC LT) and Engine Chip Caution Panel annunciator legend will be activated as outlined in the Sikorsky Alert Service Bulleting No. 61B30-15A Section 3.D.

3.2.4 Bright Mode

When the Master Warning Panel (MCP02-0XX) front panel BRIGHT/DIM switch is toggled to the BRIGHT (up) position, the MCP02 latches all annunciators to BRIGHT mode. In BRIGHT mode, the Master Warning Panel (MCP02-0XX) disables the DIM RLY output pin.

By default, the MCP02 is in BRIGHT mode at the initial application of power.

3.2.5 Dim Mode

When the Master Warning Panel (MCP02-0XX) front panel BRIGHT/DIM switch is toggled to the DIM (down) position, the MCP02 latches all annunciators to DIM mode. The Master Warning Panel (MCP02-0XX) also provides an active high output at the DIM RLY pin.

In dim mode, the legends will all illuminate dimly with a luminance of 3±2fL.

Toggling the BRIGHT/DIM switch back to the BRIGHT (up) position, reverts the system to BRIGHT mode.

3.3 Controls and Indicators

The MCP02 contains two switches located on the front panel of the Master Warning Panel (MCP02-0XX). The TEST switch is a momentary push-button switch and the DIM/BRIGHT switch is a momentary DPDT centre-on switch.

3.3.1 TEST

When pushed, the TEST switch simulates an active warning signal at all warning inputs for the duration that TEST is pushed. TEST also activates the MC LT (Master Caution Light) for the duration that TEST is pushed.

3.3.2 BRIGHT/DIM

Bright: All legends are illuminated brightly. Typically used for day time operation.

Dim: All legends illuminated dimly. Typically used for night time operation. External lamps remain illuminated brightly.

3.4 State Recorder

The State Recorder monitors the state of all annunciator legends. Any time a legend illuminates or extinguishes, the State Recorder performs two functions:

1) Stores the state of all legends in non-volatile memory in a single event. The stored data event is time stamped in seconds from power-up of the MCP02.
2) Outputs the current state of all legends to the external serial communication port with a time stamp in seconds from power-up of the MCP02.

Powering up the MCP02 is considered a state change and therefore an event is recorded by the state recorder each time the unit is powered up.

The State Recorder also has a “heart beat” every two minutes in which the current state of all legends is recorded in an event and sent to the external serial communications port. This occurs regardless of any new state changes.

There is a section of memory that is reserved for the serial number which is entered at the factory.

The number of events that the recorder can retain is 2047. When the number of events recorded exceeds 2047, the oldest events will be overwritten. This results in 34 hours of recorded state changes at a rate of one event per minute or 68 hours if only the heart beats are recorded.

The contents of the non-volatile memory can be accessed from the external serial port using the MCP-DAS software. When a download command is initiated by the MCP-DAS software and received by the State Recorder, it transmits the entire contents of the non-volatile memory to the external serial port.

An externally accessible MEM CLEAR push button switch allows the user to clear the entire contents of the non-volatile memory, with the exception of the stored serial number. It is recommended to use MEM CLEAR during the transfer of the MCP02 from one aircraft to another, or during new installations.

To perform a memory clear the MCP02 needs to be powered on. Depress and hold the MEM CLEAR switch, located at the side of the Master Warning Panel (MCP02-0XX) back enclosure, for 10 seconds. Release the MEM CLEAR switch and cycle the power off and on again.

End of Section 3.0