

Guardian Avionics
1840 E. Valencia Rd Suite 213
TUCSON, AZ. 85706

Document No. 354-001
Date: 06-01-2023
REV ORIG.



OWNERS MANUAL

**CARBON MONOXIDE DETECTOR With Built in
BLE, Bluetooth classic and WIFI**

Models 354

Guardian Avionics
1840 E. Valencia Rd Suite 213
TUCSON, AZ. 85706

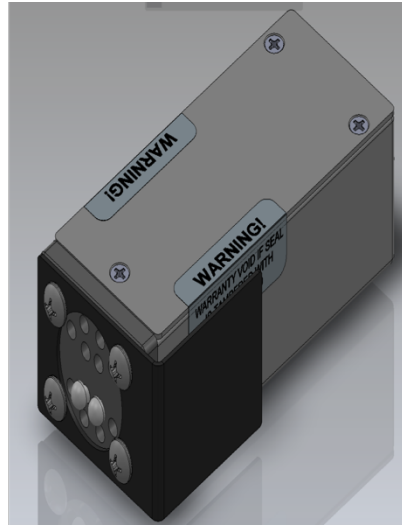
Document No. 354-001
Date: 06-01-2023
REV ORIG.

LOG OF REVISIONS

REV NO.	PAGE NO.	DATE	DESCRIPTION	APPROVED BY
A	1 thru 22	06/18/23	Initial Release	ASH VIJ



354-101



354-201

TABLE OF CONTENTS

LOG OF REVISIONS.....	2
TABLE OF CONTENTS	4
FORWARD	5
DESCRIPTION	6
1.0 GENERAL (all models)	6
2.0 PHYSICAL DESCRIPTION (all models)	6
TABLE 1 - Part Numbers	6
3.0 LEADING PARTICULARS	7
TABLE 2 - Leading Particulars	7
4.0 SCOPE (all models).....	8
5.0 SERVICE FACILITIES (all models)	9
FIGURE 1 - TYPICAL RIGHT HAND INSTRUMENT PANEL SHOWN	11
FIGURE 2 - TYPICAL PILOT INSTALLATION SHOWN	12
7.0 MAINTENANCE INSTRUCTIONS (ALL MODELS).....	13
8.0 CARBON MONOXIDE DETECTOR SCHEDULED MAINTENANCE	14
9.0 WEIGHT AND BALANCE / EQUIPMENT LIST (ALL MODELS)	14
10.0 LIMITATIONS (ALL MODELS).....	15
11.0 NORMAL PROCEDURES (Remote).....	15
NORMAL PROCEDURES (Panel Mount Units).....	15
11.1 SELF TEST SEQUENCE (Remote Light)	15
12.0 PERFORMANCE.....	15
13.0 EMERGENCY PROCEDURES	16
14.0 UNIT FAILURE INDICATION:	17
15.0 RS-232 DATA BUSS OPTION	17
16.0 Warranty	18
17.0 Installation Drawings.....	19

FORWARD

This document provides information intended for use by persons who, pursuant to current requirements, are qualified to install this equipment. Because equipment and system installations vary depending on a particular aircraft, this document is intended only as a guideline. If further information is required, contact:

Guardian Avionics
1840 E. Valencia Rd
Tucson, AZ 85756
(520) 889-1177
(800) 639-7139
www.guardianavionics.com

We welcome your comments concerning this document. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the document number, the paragraph/figure/table number, and the page number. Send your comments to the address above.

DESCRIPTION

1.0 GENERAL (all models)

This section gives a physical and functional description of the Guardian Avionics CO Detector indicator as installed in a typical reciprocating engine type aircraft. The 354 family consist of two units (354-101 and 354-201. See physical description below.

2.0 PHYSICAL DESCRIPTION (all models)

Remote mounted CO Detector part numbers are listed in Table 1.

PART NUMBER	Description	SERVICE LIFE	RS232 Output for MFD (CO, Pressure, Cabin Temp)	POWER Volts	Cabin Pressure warning Light at (10K)	BLE, Bluetooth and WIFI
354-101	Panel mount Detector	7 years	Yes	14/28	Yes	Yes
354-201	Remote mount Detector	7years	Yes	14/28	Yes	Yes

TABLE 1 - Part Numbers

The Detector must be returned to Guardian Avionics at the end of Service Life for replacement and calibration of the CO sensor to maintain airworthiness of the unit.

NOTE: The main reason for replacement of the sensor is the degradation of the sensor and dirt accumulation over the years. The replacement will be turned within five business days, see www.guardianavionics.com for exact procedures and costs.

3.0 LEADING PARTICULARS

Table 2 lists the CO Detector leading particulars and below are specs.

LEADING PARTICULARS/SPECS

PARAMETER	SPECIFICATION
PHYSICAL	
Dimensions (354 Family)	3.75” long. X 1.50”W in x 1.20” H (354 Family)
Weight	4.0 oz (354N family) and 4.1 oz for (354 Family)
ENVIRONMENTAL	
Cooling	Passive
Temperature and Altitude	
Temperature	
Non-operating high temperature	+85 °C
Non-operating low temperature	-55 °C
Operating high temperature	+70 °C
Operating low temperature	-20 °C
T	
Altitude Compensation with built in	
Pressure sensor	25,000’ for 354 and 354 Family
Humidity	95%
Wifi Power	<9MW
Bluetooth Power	<2mW
POWER REQUIREMENTS	
Power – 14/28 VDC Models	
Dissipation (maximum)	<1 watt

TABLE 2 - Leading Particulars

4.0 SCOPE (all models)

The Model 354 family of Carbon Monoxide Detectors are designed to detect, measure, and provide a visual alert to the crew of Reciprocating Engine type aircraft before the cockpit level of carbon monoxide (CO) reaches a critical level.

The installation consists of a single carbon monoxide detector indicator operating on aircraft DC power (14v or 28v). The aircraft supplied power and aircraft wiring is protected by a 2 ampere, resettable, trip free, type circuit breaker. The Carbon Monoxide Detector recommended location is behind the existing aircraft instrument panel.

The CO Detector installation consists of the CO Detector, a Test/Reset button, and a required amber ALERT annunciator light mounted on the cockpit instrument panel.

The carbon monoxide alarm level is calibrated to provide a visual alert within 5 minutes or less whenever the carbon monoxide level reaches 50 parts per million (PPM) by volume or greater. The warning time is shortened at higher levels of CO concentrations and becomes approximately instant should the carbon monoxide level reach 400 parts per million by volume (PPM) or greater.

In case of a carbon monoxide alert, the pilot will receive an amber Alert annunciator light that is mounted on the Pilot's instrument panel. The visual alert will remain until the carbon monoxide level is reduced below the alert level. The indicator is automatically reset when the CO level drops below 50 PPM. There is a one minute delay at startup to stabilize the sensor before the unit will accurately sense CO levels.

The 354 and 354 family have a built in pressure compensation sensor to detect cabin altitude changes up to 25,000 to give a better accuracy in CO Detection. These models also alarm if the cabin altitude goes above 10,000 feet for approximately a second, then for a second at 12,500 feet and light will stay on at 14,000 feet . These models also have RS232 output for display data of CO Level on Garmin, JPI, EI, Advance Flight Systems and other manufacturers Display. See www.guardianavionics.com to see the latest manufacturers capable of showing data on Multi Function Displays.

The 354 and 354 family have built in BLE, Bluetooth Classic and WIFI chip. The purpose of the of the chip is to take heart rate data and oxygen data from the Apple watch, Google watch, RS232 in data and data display it on multifunction display like Garmin, JPI, Advance flight system and other manufacturers. See www.guardianavionics.com to see the latest MFD display vendors and model numbers.

5.0 SERVICE FACILITIES (all models)

The operator can service all other components of the installation at an FAA certified Repair Station or by A&P mechanic. CO Detectors must be returned to Guardian Avionics for repair, calibration or overhaul. The sensor life is 7 years from date of installation.

NOTE

The sensor requires special gases for testing. If any discrepancies are found with the unit during installation or during the operational service life, the unit must be returned to Guardian Avionics for repair or replacement. The CO Detector unit must be returned to the manufacturer for CO sensor replacement and re-calibration at the end of the service life applicable to the units part number.

6.0 INSTALLATION 354-201 (Remote Units) and OPERATING LIMITATIONS

The following documents the installation criteria of the “Remote Carbon Monoxide Detector Installation family”. See installation drawing 354-001 for guidance.

NOTE: THE 354 system is not required system and may not be used as a Substitution for the certificated aircraft system.

NO Operational credit maybe taken for installation of the 354 aircraft system.

Choose a location behind the instrument panel for the installation of the CO Detector. Choose a location with space available that also meets the following criteria. The unit can be installed on any side of the instrument panel. If all possible, limit the metal around the face plate to get the maximum exposure for Bluetooth and WIFI effectiveness in the cockpit area.

- a. Insure that the area around the CO Detector panel location will permit unrestricted airflow through the unit.
- b. Insure that the air intake on the front of the CO Detector is not obstructed in any manner.
- c. Install the CO Detector in a location without high or disturbed airflow movement. The CO Detector will detect the presence of CO more effectively if the unit does not have air blowing over it.
- d. Install the TEST/RESET and the amber ALERT annunciator in a location within the pilot's direct field of vision and within normal pilot's reach. See drawing 354-01 Manufacturers manuals for proper wiring guidance. A momentary switch that is a combination switch can be used in lieu of a reset and light. These units are available from our website www.guardianavionics.com

INSTALLATION 354-101 (Panel Mount)

- a. Choose a location in the instrument panel for the installation of the CO Detector. Choose a location with space available that Pilot can reach and hit the test/reset button. The unit can be installed on any side of the instrument panel.
- b. Insure that the area around the CO Detector panel location will permit unrestricted airflow through the unit.
- c. Install in a cockpit area not exposed to excessively dusty or dirty conditions.
- d. Insure that the air intake on the front of the CO Detector is not obstructed in any manner.
- e. Install the CO Detector in a location without high or disturbed airflow movement. The CO Detector will detect the presence of CO more effectively if the unit does not have air blowing over it.
- f. Insure that the CO Detector installation area meets the temperature and humidity ranges listed in the List of Particulars specifications. Temperature and humidity conditions outside the specification may affect the sensitivity of the detector.
- g. It is an option to Install the TEST/RESET and the amber ALERT annunciator in a location within the pilot's direct field of vision and within normal pilot's reach. Note: see MFG MFD installation manual if TEST/RESET and the amber ALERT annunciator unit will not be installed and the data will be displayed thru the RS232 interface with MFD.

Bluetooth Connection and setup

- a. Go to apple app store or Google play and down load Guardian Avionics APP.
- b. Launch app on the iphone and the apple watch.
- c. The unit will automatically connect to the 354 as it uses Bluetooth BLE so no other connection is required. (See Section 15.0 for Interface limitations).
- d. You should see Heart Rate, CO level and oxygen data output on the Iphone app and on the Garmin G3X or Advance Flight Systems if connected via the RS232.

NOTE: Go to www.guardianavionics.com and you can watch the you tube video on setup.

WIFI Connection (optional)

- a. Download the Guardian Avionics APP from the Apple app or Google play store.
- b. Open WIFI and choose Guardian Avionics
- c. Launch the Guardian Avionics App from the phone and the watch
- d. You should see Heart Rate, CO level and oxygen data output on the Iphone app and on the Garmin G3X if connected via the RS232.

NOTE: Go to www.guardianavionics.com and you can watch the you tube video on setup.

6.1 RECOMMENDED INSTALLATION AREAS

- Typical installation areas are depicted below in Figures 1, 2, 3, and 4.



**CO
Detectors
locations
Remote or
panel Can
Be installed
behind the
panel**

FIGURE 1 - TYPICAL RIGHT HAND INSTRUMENT PANEL SHOWN

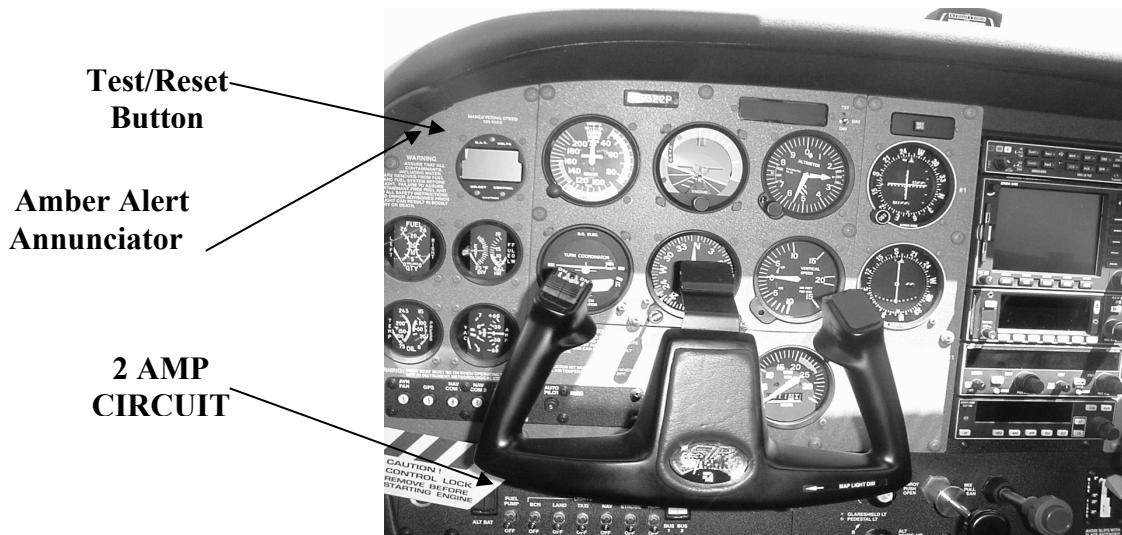


FIGURE 2 - TYPICAL PILOT INSTALLATION SHOWN

7.0 MAINTENANCE INSTRUCTIONS (ALL MODELS)

The carbon monoxide detector and associated equipment consist of certain parts, which do not require periodic scheduled servicing or periodic scheduled preventive maintenance. At every power up the system will go through a self-diagnostic check.

WARNING: If all Models show a flashing remote Amber light every 4 seconds, return the unit to Guardian Avionics for repair or replacement. See MFG Manual if Remote light is displayed on the MFD.

Field repair or service is allowable on all of the installed system components except for the CO Detector Indicator itself. The CO Detector must be returned to Guardian Avionics for all service.

The aircraft wiring harness, circuit breaker, Alert annunciator, and Test/Reset switch shall be included maintenance instructions for general visual inspections for system integrity, installation security, corrosion and chaffing.

8.0 CARBON MONOXIDE DETECTOR SCHEDULED MAINTENANCE

Scheduled Maintenance Program tasks to be added to the aircraft operator's appropriate airplane maintenance program are as follows:

MAINTENANCE TASK	INTERVAL
a. Recommended Periodic Scheduled Servicing Tasks:	None Required.
b. Recommended Periodic Scheduled Preventative Maintenance test/checks to determine system condition and/or latent failures: Note: Be sure the vent on the faceplate is free of obstructions. Any failures of the system are evident to the pilot through a flashing remote Amber light approximately every 4 seconds.	Each time the unit is turned ON.
c. Recommended Periodic Inspections:	None Required.
d. Recommended Periodic Structural Inspections	None Required.
e. Required CO Sensor replacement and calibration.	At end of Service Life (Reference Par. 2.0)

NOTE

The unit must be returned to the manufacturer for sensor replacement and recalibration at the end of the unit service life.

NO FIELD SERVICE OR OVERHAUL OF MODELS IS AUTHORIZED.

9.0 WEIGHT AND BALANCE / EQUIPMENT LIST (ALL MODELS)

The Aero 354 family 's CO Detector installation weighs 0.125 lbs. Reference the aircraft weight and balance manual for moment arm.

10.0 LIMITATIONS (ALL MODELS)

The 354 family of Detectors may not replace any existing instrument or indicator required by the type design or operating limits.

11.0 NORMAL PROCEDURES (Remote)

When the airplane master battery switch is selected ON, the Remote CO Detector goes through a self-test routine. The self-test checks for functionality of critical components such as the CO sensor, temperature sensor, pressure sensor, and integrity of the system and remote display will remain off if everything working properly. The RS232 MFD will show no CO on the CO Detector page.

NORMAL PROCEDURES (Panel Mount Units)

When the airplane master battery switch is selected ON, the panel mount Detector goes through a self-test routine. The self-test checks for functionality of critical components such as the CO sensor, temperature sensor, pressure sensor, and integrity of the system and green light will be displayed on the unit is working properly. The RS232 MFD will show no CO on the CO Detector page.

11.1 SELF TEST SEQUENCE (Remote Light)

You will notice the following test sequence:

- The Amber CO ALERT light will flash twice and then remain OFF until there is a CO ALERT, a failure of the unit, or another self-test is performed.

A self-test can be performed when desired by depressing the TEST/RESET button.

12.0 PERFORMANCE

No Change

13.0 EMERGENCY PROCEDURES

If the CO Detector ALERT annunciator activates in flight, press the TEST/RESET button to reset the alert annunciator from the s. If the ALERT light continues to illuminate:

- Shut off the heater, air conditioning or any other opening to the engine compartment.
- Open a fresh air source immediately.
- Don't smoke.
- Use 100% oxygen, if possible.
- Land as soon as conditions permit.
- Be sure the source of the contamination is corrected before further flight.

NOTE: The remote Amber light will stay on until the CO level goes above 50 parts per million (PPM) by volume of carbon monoxide concentration within five minutes. The unit is also designed to go off with one minute if the CO is above 100 PPM and within seconds if it goes above 400 PPM.

SEE MFD manual if the “ALERT” display is integrated with the Manufacturers MFD.

DO NOT recycle the unit through the circuit breaker if CO alarm is activated. Re-setting the Circuit Breaker will make the unit go through entire boot up cycle and delays before re-alarmed.

14.0 UNIT FAILURE INDICATION:

A failure of the CO Sensor, Temperature Sensor, or the Micro-controller will result in the following failure indications:

- The remote Amber light will flash at an approximate rate of one flash each four (4) seconds until the failure is cleared or power is removed from the unit. NOTE: SEE MFG manual if the fault data is integrated with the MFG MFD for fault analysis.

In case of a failure indication, attempt to clear the failure condition by resetting the CO Detector. Should the failure condition continue, remove the CO Detector power by pulling the CO Detector circuit breaker.

15.0 RS-232 DATA BUSS OPTION

The RS-232 Data Buss option is currently available on numerous MFD units. The RS-232 data buss output will couple CO Detector status information to electronic display systems with RS-232 input capability.

This approval does not authorize interface with external devices; therefore this unit may only be interfaced with external devices under separate approval.

See Multi-Function display manufacturers Installation Manual for allowed interface and guidance. The CO ALERT can be reset through the RS-232 interface provided the Multi-Function system contains the reset capability.

WARRANTY COVERAGE: GUARDIAN AVIONICS LLC. WARRANTS TO THE ORIGINAL CONSUMER PURCHASER, THAT THIS DETECTOR WILL BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM DATE OF PURCHASE. THE MANUFACTURER'S LIABILITY HEREUNDER IS LIMITED TO REPLACEMENT OF THE PRODUCT, REPAIR OF THE PRODUCT OR REPLACEMENT OF THE PRODUCT WITH A REPAIRED PRODUCT AT THE DISCRETION OF THE MANUFACTURER. THIS WARRANTY IS VOID IF THE PRODUCT HAS BEEN DAMAGED BY ACCIDENT, UNREASONABLE USE, NEGLIGENCE, TAMPERING OR OTHER CAUSES NOT ARISING FROM DEFECTS IN MATERIAL OR WORKMANSHIP. THIS WARRANTY EXTENDS TO THE ORIGINAL CONSUMER PURCHASER OF THE PRODUCT ONLY.

Warranty Disclaimers: Any implied warranties arising out of this sale, including but not limited to the implied warranties of description, merchantability and fitness for a particular purpose, are limited in duration to the above warranty period. In no event shall the Manufacturer be liable for loss of use of this product or for any indirect, special, incidental or consequential damages, or costs, or expenses incurred by the consumer or any other user of this product, whether due to a breach of contract, negligence, strict liability in tort or otherwise. The manufacturer shall have no liability for any personal injury, property damage or any special, incidental, contingent or consequential damage of any kind resulting from gas leakage, fire or explosion.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Some states do not allow the exclusion or limitation of consequential or incidental damages, so the above limitations or exclusions may not apply to you.

Legal Remedies: This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

Warranty Performance: During the above warranty period, your product will be replaced with a comparable product if the defective product is returned, postage prepaid, to Guardian Avionics, Customer Service Department, 1951 East Airport Drive, Tucson, AZ 85706, together with proof of purchase date. Please include a note describing the problem when you return the unit. The replacement product will be in warranty for the remainder of the original warranty period or for six months whichever is longer. Other than the cost of postage, no charge will be made for replacement of the defective product.

Important: Do not attempt to open unit. If unit is opened, warranty will be void.

Your Carbon Monoxide Alarm is not a substitute for property, disability, life or other insurance of any kind. Appropriate insurance coverage is your responsibility. Consult your insurance agent.

NOTE

The warranty will be void if the unit is opened or tampered with

17.0 Installation Drawing Reference (see 354-001 for latest)

REV.	DESCRIPTION	DATE
A	Initial Release	6/6/2023

GENERAL NOTES:

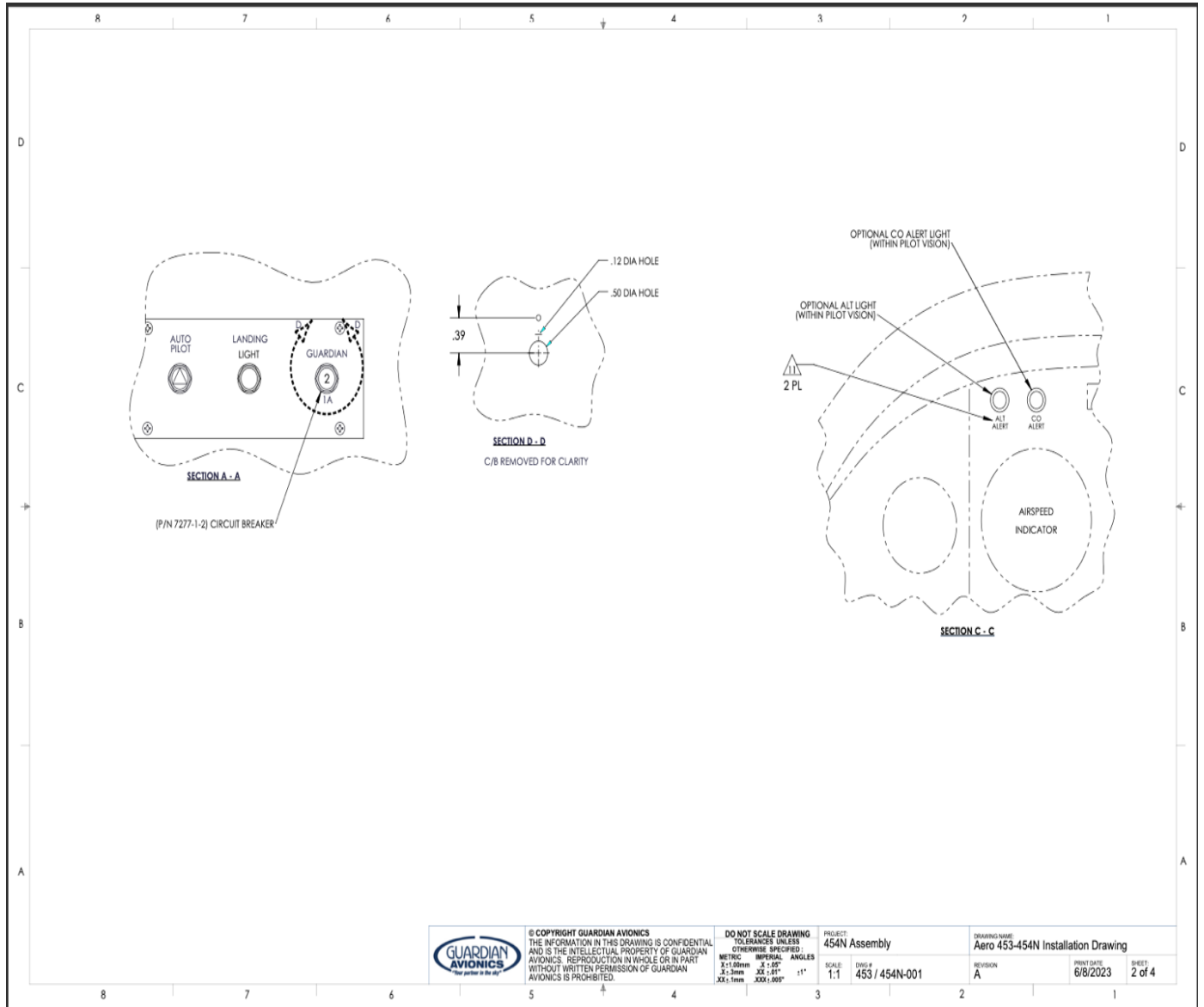
1. EXISTING EQUIPMENT
2. PERMISSIBLE TO TRIM PARTS CREATED BY THIS DRAWING ON INSTALLATION AS REQUIRED
3. TOUCH UP ALL BARE ALUMINUM SURFACES WITH ALODINE PER MIL-C-5541 CLASS 3
4. PARENTHETICAL ENTITIES ARE FOR REFERENCE ONLY.
5. LOCATION CIRCUIT BREAKER IN THE SAME GENERAL AREA WITH EXISTING CIRCUIT BREAKERS. LABEL AS SHOWN USING STANDARD ENGRAVING, SILKSCREEN, OR OTHER TECHNIQUES. LETTERING TO BE THE SAME HEIGHT AS EXISTING C/B LETTERING.
6. ----- DENOTES EXISTING EQUIPMENT
7. GROUND TWISTED-PAIR POWER RETURN WIRE NEAR CIRCUIT BREAKER PANEL. TWISTED-PAIR TO BE 6 TURNS PER FOOT OR GREATER.
8. TIE INTO EXISTING BUS BAR NEAR LOCATION OF NEW CIRCUIT BREAKER. IF A JUMPER WIRE IS REQUIRED, USE 20 GAUGE 20 GAUGE MIL-W-22759/XX TYPE. BEST COMMERCIAL EQUIVALENT MAY BE SUBSTITUTED FOR THIS PART.
9. THE INSTALLATION OF WIRING TO BE PERFORMED IN ACCORDANCE WITH AZ 43.13-1B, 2A ACCEPTANCE METHODS, TECHNIQUES, AND PRACTICES - AIRCRAFT ALTERATIONS, CHAPTER 11. ALL WIRE TO BE MIL-W-22759/16 OR EQUIVALENT.
10. LETTERING TO BE 0.10 HIGH MINIMUM, WHITE, HELVETICA, LOCATED APPROXIMATELY AS SHOWN. USE STANDARD SILKSCREENING, UNGRAVING, OR PLACARD TECHNIQUES.
11. OPTIONAL MOUNTING SCREW / MOUNTING HOLE
12. SEE OWNERS MANUAL FOR INSTALLATION CRITERIA.
13. SEE MFG INSTALLATION MANUAL FOR RS-232 HOOKUP (OPTIONAL)
14. COMMON GROUND TO MFG MFD DISPLAY IF CONNECTED TO RS232
15. MFD CONTROLLED BY RS232 REMOTE TEST/RESET
16. LIGHT LOCATION IN THE AREA OF PILOTS VIEW. CAN BE INTEGRATED TO MASTER CAUTION PANEL LIGHTS.
17. THE FOLLOWING IS A GUIDE FOR UNSWITCHED AUDIO PINOUTS. PINOUTS MUST BE VERIFIED WITH LATEST MANUFACTURING DRAWINGS.


INSTRUMENT PANEL
 TYPICAL INSTALLATION,
 VIEW LOOKING FWD

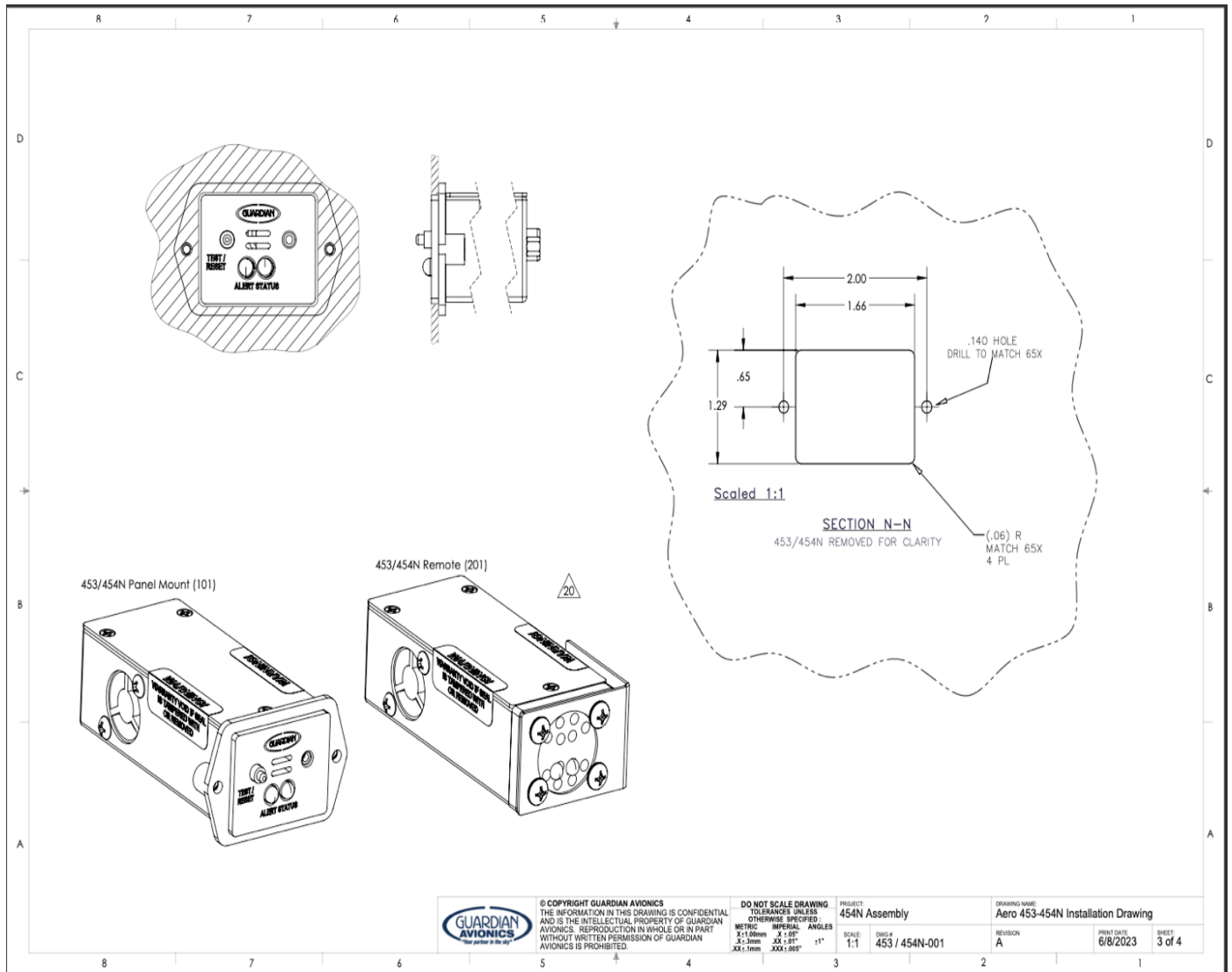
	KMA	KMA	GMA	9MA
AURAL TONE	24	28	340	7000
UNSWITCHED INPUT	J1 T	J1 T	J1 31	J1 6

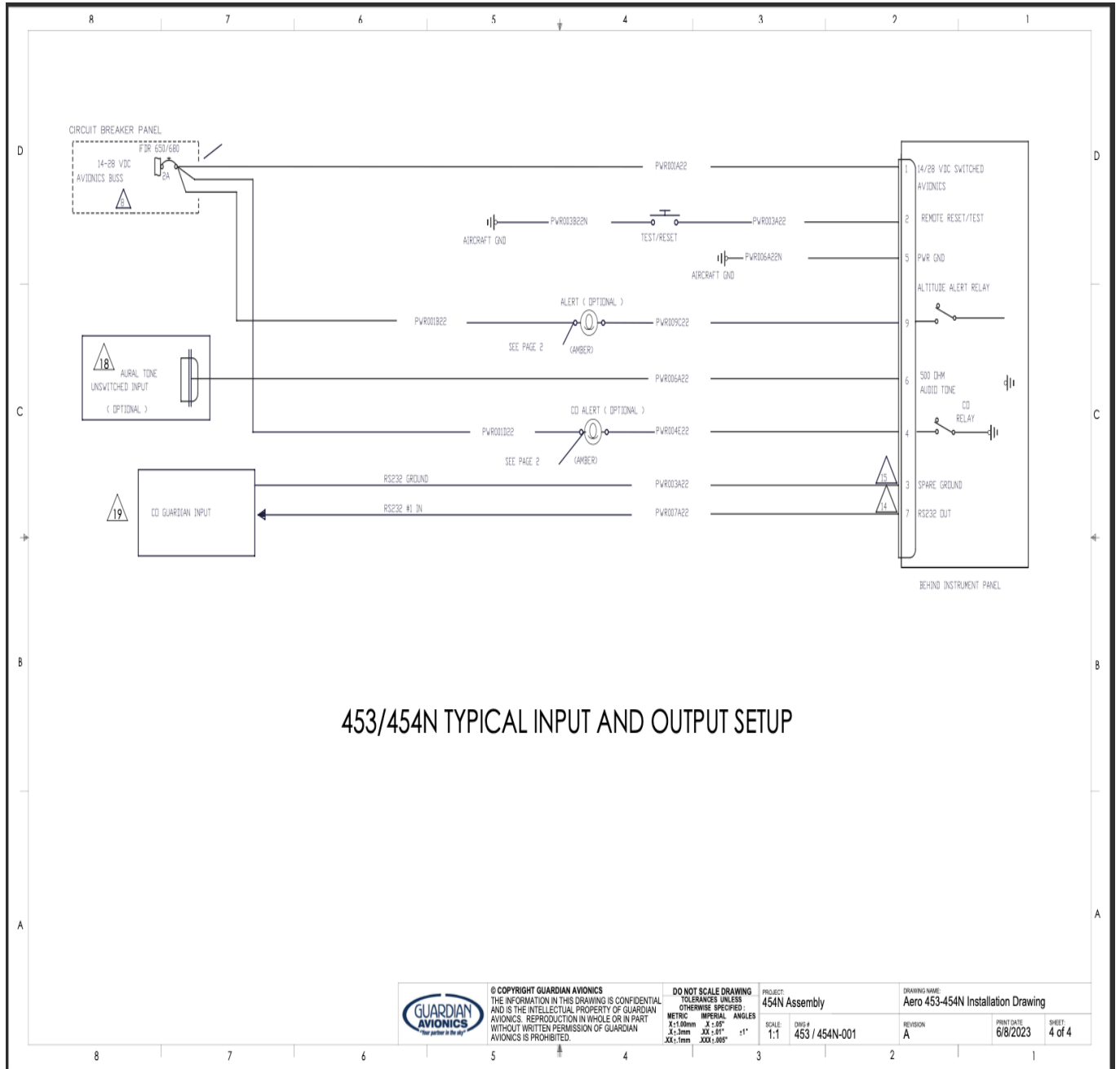
J1 P1 500 OHM AUDIO TONE

18. TYPICAL INPUTS/OUTPUTS FOR GARMIN/JPI/EI/AFS AND OTHER OEM'S. SEE MANUAL FOR PINOUT
19. INSTALL REMOTE UNIT BEHIND A/C PANEL. WHERE THERE IS STILL AIR AND FACEPLATE IS NOT NEAR METAL FOR GOOD BLUETOOTH / WIFI SIGNAL.



	© COPYRIGHT GUARDIAN AVIONICS THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND IS THE INTELLECTUAL PROPERTY OF GUARDIAN AVIONICS. REPRODUCTION IN WHOLE OR IN PART WITHOUT WRITTEN PERMISSION OF GUARDIAN AVIONICS IS PROHIBITED.	DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED: METRIC IMPERIAL ANGLES ±.150mm ±.005" ±.5° ±.30mm ±.01" ±1° ±.1mm ±.001" ±.005°	PROJECT: 454N Assembly SCALE: 1:1 DWG # 453 / 454N-001	DRAWING NAME: Aero 453-454N Installation Drawing REVISION: A PRINT DATE: 6/8/2023 SHEET: 2 of 4
---	---	---	--	--





	© COPYRIGHT GUARDIAN AVIONICS THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND IS THE INTELLECTUAL PROPERTY OF GUARDIAN AVIONICS. REPRODUCTION IN WHOLE OR IN PART WITHOUT WRITTEN PERMISSION OF GUARDIAN AVIONICS IS PROHIBITED.	DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED: METRIC IMPERIAL ANGLES ±.15/0.006 X .18° .X-.3mm XX .01° ±1° .XX-.1mm XXX .005°	PROJECT: 454N Assembly	DRAWING NAME: Aero 453-454N Installation Drawing
			SCALE: 1:1 DWG.# 453 / 454N-001	REVISION: A