



User Manual (English)

## Symbols Glossary

1000; G	aphical symbols for use on equip-	Internal Syr	nbols
וt—Index	and synopsis		Keep unit well ventilated at all time
X	range. Reg. # 0632		Keep away from flammable materi-
			als, oil and grease.
<u>~</u>	Storage humidity range Reg. # 2620	1	Wipe connector with clean dry cloth
Ĵ	Keep away from rain, keep dry. Reg. # 0626	<sup>2</sup>	before filling.
	Name and address of manufacturer. Reg. # 3082	IEC 60417: equipment	Graphical Symbols for use on
$\hat{\mathbb{N}}$	Caution, consult accompanying docu- ments. Reg. # 0434A	Ì	Do not cover unit. These units nor- mally vent oxygen No 5641
RFF	Catalog Number. Reg. # 2493		
SN	Serial Number. Reg. # 2498	21 CFR 801 21	.15: Code of Federal Regulations Title
	This way up. Reg. # 0623		Federal law restricts this device to sale by or on the order of a physicia
	Fragile, handle with care. Reg. #	Council Dir electronic e	ective 2012/19/EU: waste electrical and quipment (WEEE)
		R R	WEFE
/010:Gr etvisions	aphical symbols—Safety colors and —Registered safety signs		WEEE
iy orgino	Frostbite may occur on contact with	Th:	• h d h
	cold liquid or gaseous oxygen or	I his produc	t may be covered by one or more pat-
*	frosted parts Warning low tempera-	ents, US and	international. Please visit our websit
	ture To warn of low temperature or	below for th	le fisting of applicable patents. Pat.:
	freezing conditions, Reg. # W010	www.caireii	nc.com/corporate/patents/ .
	The instruction manual must be read		
<b>1</b>	Reg. # M002		
	Keen away from open flame fire		
	sparks. Open ignition source and		
S	smoking prohibited Reg # P003		
	Do not smoke near unit or while		
4	operating unit Reg # P002		
	Warning Reg # W001		
<u>:\</u>			
R: Europe al Carria	an Agreement concerning the Interna- ge of Dangerous Goods by Road		
	Non-toxic gas.		
	Hazard Oxidizing substances: fire intensifying risk.		
	Pafrigarated Liquid LISD: Produced		
R: Europe Ial Carria	smoking prohibited. Reg. # P003 Do not smoke near unit or while operating unit. Reg. # P002 Warning. Reg. # W001 ean Agreement concerning the Interna- ge of Dangerous Goods by Road Non-toxic gas. Hazard Oxidizing substances: fire intensifying risk. Bofrigement Liquid LISP: Preduced		

## **Specifications**

- Mode of Operation: Continuous Flow
- Type of Protection Against Electrical Shock: Internally Powered Equipment
- Equipment not suitable for use in the presence of flammable mixtures

Product Specifications				
	EMS 20			
LOX Capacity	21.0 L 50.7 lb (23 kg)			
Gaseous Equivalent Capacity	17,337 L			
Weight, Empty	39 lb (17,96 kg)			
Weight, Filled	89.7 lb (40,69 kg)			
Height	24.5 in. (622 mm)			
Diameter	14 in. (356 mm)			
Typical use time at 2 LPM	6 days 12 hrs			
Operating Pressure	50 psi (137 kPa)			
Normal Evaporation Rate	1.8 lb/ day (0,82 kg/day)			

## Warning Information

**Important:** Read this manual thoroughly before operating the EMS 20. RX Only.



WARNING: THIS DEVICE IS NOT INTEND-ED FOR LIFE SUSTAINING USE.

WARNING: PATIENT OR OTHERS MAY BE ENTAN-GLED IN CANNULA OR OTHER TUBING CAUSING ASPHYXIATION.

WARNING: IF YOU FEEL THE EQUIPMENT IS NOT OPERATING PROPERLY, CALL YOUR HEALTH CARE PROVIDER. DO NOT ATTEMPT TO REPAIR OR ADJUST THE UNIT YOURSELF.

WARNING: DO NOT MODIFY THIS EQUIPMENT WITHOUT AUTHORIZATION FROM THE MANUFAC-TURER.

WARNING: IF CONTINUITY OF OXYGEN SUPPLY IS REQUIRED, ENSURE THAT AN ADEQUATE SUPPLY OF OXYGEN AND/OR A SECONDARY OXYGEN SUPPLY IS AVAILABLE AT ALL TIMES DURING THERAPY.

WARNING: DO NOT ALLOW SMOKING, CANDLES, OR OPEN FLAMES WITHIN 10 FEET (3 METERS) OF THE DEVICE, OR CLOSER THAN 8 INCHES (20 CM) FROM ANY SOURCE OF IGNITION.

WARNING: KEEP YOUR UNIT IN A WELL-VENTILAT-ED AREA.

> WARNING: DO NOT STORE LIQUID OXYGEN EQUIPMENT IN A CLOSET, CAR TRUNK, OR OTHER CONFINED AREA. DO NOT PLACE BLANKETS, DRAPERIES, OR OTHER FABRICS OVER EQUIPMENT.

WARNING: THIS PRODUCT CAN EXPOSE YOU TO CHEMICALS INCLUDING NICKEL, WHICH IS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER. FOR MORE INFORMATION, GO TO WWW. P65WARNINGS.CA.GOV.

WARNING: IN THE EVENT THERE IS A SERIOUS INCIDENT OCCURRING WITH THIS DEVICE, THE USER SHOULD IMMEDIATELY REPORT THE INCIDENT TO THE PROVIDER AND/OR THE MANU-FACTURER. A SERIOUS INCIDENT IS DEFINED AS AN INJURY, DEATH, OR POTENTIAL TO CAUSE INJURY/DEATH SHOULD THERE BE A REOCCUR-RENCE OF THE INCIDENT. THE USER CAN ALSO REPORT THE INCIDENT TO THE COMPETENT AU-THORITY IN THE COUNTRY WHERE THE INCIDENT OCCURRED.



Caution: Use the EMS 20 only as directed by your doctor.

Caution: The unit contains liquid oxygen which is extremely cold, almost 300°F (-184°C). Exposure to such a low temperature can cause severe frostbite. Caution: Liquid and gaseous oxygen, though nonflammable, cause other materials to burn faster than normal. This hazard, along with the low temperature

Caution: Keep flammable materials away from this equipment. Aerosol sprays, oils and grease, including facial creams and petroleum jelly, ignite easily and may burn rapidly in the presence of oxygen.

of liquid oxygen, warrants certain safety precautions.

Caution: Smoking while wearing an oxygen cannula can cause facial burns and possibly result in death.

Removing the cannula and placing it on clothing, bedding, sofas, or other cushion material will cause a flash fire when exposed to a cigarette, heat source, spark or flame.

If you smoke please: (1) turn off the portable, (2) take off the cannula, and (3) leave the room where the device is located.

Caution: In the event of an accidental tip-over, immediately but cautiously return the unit into an upright position if possible. If any liquid oxygen is escaping, leave the area immediately and call your healthcare provider. Do not attempt to move the unit or stop the liquid oxygen from escaping.

Note: Do not touch frosted parts of any unit.

Note: Do not store or operate the portable coupled to the EMS 20.

Note: Do not allow untrained personnel to handle or operate this device.

Note: Use of this device is prohibited on commercial passenger and cargo air flights by the Federal Aviation Administration.

#### Intended Use

The CAIRE EMS 20 liquid oxygen unit is intended for the administration of supplemental oxygen. The device is not intended for life support nor does it provide any patient monitoring capabilities.

### Introduction

The CAIRE EMS 20 unit is a liquid oxygen storage and delivery system intended to be connected to an ambulance's current oxygen supply system in place of high pressure cylinders.

This operating instruction (OI) contains the instructions for using the EMS system, as well as information regarding available accessories. For detailed instructions regarding accessories, please see their respective documentation.

This device is not meant to supply oxygen directly to a patient. A regulation device must be in place between the unit and the patient.



- 1. Liquid Level Gauge
- 2. Liquid Level Switch
- 3. Output Valve
- 4. Fill Connection
- 5. Vent Valve



CAIRE EMS 20 shown.



## **Operating Instructions**

#### Setup Instructions

 Remove from shipping carton and remove plugs from quick disconnect valve (QDV) and oxygen gas outlet.



WARNING: THESE CONNECTION MUST BE DRY, BECAUSE MOISTURE CAN CAUSE THE EQUIPMENT TO FREEZE TOGETHER AND MAY CAUSE LEAKAGE IN THE FILL CONNECTOR.

- Position and secure EMS unit in vehicle compartment. Optional Caire mounting bracket.
- Attach vent line from vent outlet to exterior of vehicle compartment (see Accessories section for more info).
- 4. Attach vehicle's oxygen plumbing.
- 5. Attach condensate bottle bracket to EMS unit.
- 6. Slide condensate bottle into bottle bracket or run condensate drain tube to exterior of vehicle.
- 7. Fill equipment with liquid oxygen and test vehicle's oxygen delivery systems.

Note: Fill source must contain liquid oxygen saturated between 75 psi (5.2 bar) and 100 psi (6.9 bar). Optimal saturation pressure is 85 psi (5.9bar)

8. Record location of equipment inside vehicle for future reference.

#### Fill Instructions

- 1. Weigh unit as required by local and federal standards.
- 2. Wipe reservoir fill connector and fill source with lint-free rag.
- 3. Open liquid use valve on fill source and purge transfer line by pressing QDV poppet (at end of transfer line) against non-painted surface for a few seconds.
- 4. Connect pressure gauge to oxygen outlet and open outlet valve.
- 5. Open vent valve on EMS unit.
- Connect transfer line from fill source to EMS to fill. During fill, throttle the vent valve to keep pressure at oxygen outlet at approximately 50psi (3.5 bar).
- When liquid spurts from vent outlet, perform the following steps in order: close EMS vent valve, turn off outlet valve, disconnect pressure gauge, close liquid fill source, and purge transfer line.

#### **Basic Operations**

1. Use the following chart as a guideline to determine the length of time the EMS 20 will operate:

Model	L-20
Off	Nominal
0.25	34-17
0.5	24-16
0.75	16-11
1	12-8
1.5	8-5
2	6-4
2.5	4-22
3	3-2
4	2-11
5	2-1
6	1-12
8	1-5
10	1-0
12	0-19
15	0-19

Note: Times are in days and hours (format 00-00).

Note: The "Nominal" times are for ideal conditions, i.e. maximum fill, exact flow rates, good loss rate, EMS 20 not being moved, etc. These times are the maximum expected.

Note: Your individual results will vary.

2. Use the following chart as a guideline to the recommended tubing length.

FLOW SETTING	MAXIMUM (RECOMMENDED) TUBING LENGTH*			
(LPM)	20 psig	50 psig		
1-6	100 Ft. (30.5 m)	100 Ft. (30.5 m)		
8	100 Ft. (30.5 m)	75 Ft. (22.9 m)		
10	50 Ft. (15.2 m)	50 Ft. (15.2 m)		
12	25 Ft. (7.6 m)	50 Ft. (15.2 m)		
15	25 Ft. (7.6 m)	25 Ft. (7.6 m)		

\*Length is oxygen tubing only. Does not include a 7 Ft. cannula.

- 3. Verify functionality of the gauge
- Depress button to display level. If level is displayed and Low Battery Indicator is not illuminated, battery level is acceptable.
- 4. To verify the level of liquid oxygen in the unit with the liquid level gauge:
- Depress the push button on top of the unit for two seconds minimum. Read the LED to indicate contents level.

## Caution: The EMS 20 is empty if only the first red LED is lit.

 If the Low Battery Indicator lights up when the button is depressed, inform your health care provider the next time your EMS 20 is filled.





Gen 4 Meter

5. Under certain environmental conditions and with continuous use, the EMS 20 may develop an excessive amount of ice on the warming and breathing coils within the shroud. You should defrost the unit between liquid oxygen fills to prevent this ice build-up.

- To Defrost the Unit
- 1. Close the EMS 20 output valve and allow the unit to warm to room temperature, as indicated by the melting of all ice from the unit.
- Check the condensation collection bottle frequently during defrosting and empty as required.

#### **Battery Care and Maintenance**

• Depress button to display level. If level is displayed and Low Battery Indicator is not illuminated, battery level is acceptable.



• If the Low Battery Indicator lights up when the contents button is depressed, call your Service Provider to replace the battery.

### Maintenance

Clean the fill connectors on both the stationary and portable units with a clean, dry, lint-free cloth between each fill to prevent freezing and possible equipment failure.

There are no user-serviceable parts in the EMS 20s.

Your service provider is responsible for any maintenance that my be required per the technical manual of this device. Call your service provider for any maintenance requirements.

The expected service life is a minimum of five years.

## Troubleshooting

Issue	Solution			
Inadequate Flow	Verify liquid oxygen is in unit			
	Verify if cannula is kinked or pinched			
	Verify if cannula is properly connected to unit			
	NOTE: If issues persists, contact your service provider.			
The liquid level meter does not work or is not accurate.	The battery may need to be replaced or the meter re-calibrated. Contact service provider for assistance.			
The low battery LED illuminated on liquid level meter.	Contact service provider for assistance.			
Frosting on coils of EMS 20.	Frosting on coils is normal operation when breathing off of EMS 20.			
There is frosting on tank or side of EMS 20.	Frosting on outside of tank is abnormal; contact service provider for assistance.			
There is a hissing sound emanating from EMS 20.	• During normal operation the unit's primary relief valve will open from time to time to relieve excess pressure, especially soon after filling.			
	<ul> <li>If hissing is persistent or abnormal, this could indicate excess pressure being vented off or a leak in the system. Contact service provider for assistance.</li> </ul>			
Liquid Oxygen evacuating from blue QDV.	<ul> <li>The QDV may have frozen open. Open windows if possible and evacuate area immediately. Contact service provider.</li> </ul>			
	<ul> <li>To prevent frozen QDV, be sure to wipe QDV with dry lint free cloth before and after filling your portable.</li> </ul>			
Condensation or water pooling up on floor.	<ul> <li>As the frost melts on the coils, water may accumulate on the floor if the condensate bottle is not used or is full. Verify that condensate bottle is installed properly and emptied as needed.</li> </ul>			
Portable takes a long time to fill.	<ul> <li>It could take several minutes to fill portable device if the portable device is warm or hasn't been used recently.</li> </ul>			
	Consult user manual for your portable liquid oxygen device.			
Portable not filling.	<ul> <li>Ensure reservoir tank has sufficient liquid to fill your portable device. Ensure portable device is pushed onto QDV correctly and the portable vent valve lever is held in the open position.</li> </ul>			
	<ul> <li>Consult user manual for your portable liquid oxygen device.</li> </ul>			

#### **Cleaning Standard**



#### WARNING: CLEAN ONLY AFTER THE UNIT IS EMPTY.

- Clean using a solution of mild dish washing detergent and water.
- Apply cleaning solution directly to a lint-free cloth. Approved cleaners include HydroPure and HydroKlean. Do not spray cleaners directly on the EMS 20.
- Wipe the outside surface with the lint-free cloth until the outside surface is clean.



Caution: Do not use high temperature and high pressure washing equipment to clean these units.

- Do not get cleaner on any internal components or valves.
- Allow the unit to dry thoroughly before using.

Note: Note to health care provider – for reprocessing procedures, see applicable service manual.

## Disposal

Always return EMS 20, including all components, to your homecare provider for proper disposal. You can also contact your local city or town offices for instructions on proper disposal of the battery.

#### WEEE

This symbol is to remind the equipment owners to return it to a recycling facility at the end of its life,



/ per Waste Electrical and Electronic Equip-/ ment (WEEE) Directive.

## **Transport and Storage**

The device should be stored in the upright position, and be well ventilated. Do not allow the device to lie on its side. Humidity up to 95% noncondensing. Temperatures range from -40°F to 158°F (-40°C to 70°C).

Operating temperature ranges from  $14^{\circ}F$  to  $104^{\circ}F$  (10°C to 40°C). Relative humidity range from 30% to 75% noncondensing.

Note: The atmospheric pressure range is 700 hPa to 1060 hPa (elevation of 10,000 Ft. to -1,000 Ft.).

## Accessories



• Vent Kit (PN 13399524)

Mounting Bracket (PN 13187265)

### Safety

WARNING: PORTABLE RF COMMUNICATIONS EQUIPMENT (INCLUDING PERIPHERALS SUCH AS ANTENNA CABLES AND EXTERNAL ANTENNAS) SHOULD BE USED NO CLOSER THAN 30 CM (12 INCHES) TO ANY PART OF THE EMS 20) INCLUDING CABLES SPECIFIED BY THE MANUFACTUREN. OTHERWISE, DEGRADATION OF THE PERFORMANCE OF THIS EQUIPMENT COULD RESULT.         WARNING: USE OF ACCESSORIES, TRANSDUCERS AND CABLES OTHER THAN THOSE SPECIFIED OR PROVIDED BY THE MANUFACTURER OF THIS EQUIPMENT COULD RESULT IN INCREASED ELECTROMAG- NETIC EMISSIONS OR DECREASED ELECTROMAGNETIC IMMUNITY OF THIS EQUIPMENT AND RESULT IN IMPROPER OPERATION.         WARNING: USE OF THIS EQUIPMENT ADJACENT TO OR STACKED WITH OTHER EQUIPMENT SHOULD BE AVOIDED BECAUSE IT COULD RESULT IN IMPROPER OPERATION. IF SUCH USE IS NECESSARY, THIS EQUIPMENT AND THE OTHER EQUIPMENT SHOULD BE OBSERVED TO VERIFY THAT THEY ARE OPERATION. NORMALLY.         Image: Continue in the interment needs special precautions regarding Electromagnetic compat- ibility (EMC) and needs to be installed and put into service according to the EMC information provided in this manual.         Caution: Medical Electrical Equipment needs special precautions equipment can affect Medical Electrical Equipment.         Caution: The EMS 20 should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the EMS 20 should be observed to verify normal operation in the configuration in which it will be used.         Table 1       Guidance and Manufacturer's declaration—electromagnetic emissions The EMS 20 should assure that it is used in such an environment.         Emissions test       Compliance       Electromagnetic environment.         Emissions GISPR 11       Claus B Harmonic emissions The EMS 20 is suitable fo			
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Table 2\*

#### Recommended separation distances between portable and mobile RF communications equipment and the EMS 20

The EMS 20 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the EMS 20 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the EMS 20 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter	Separation distance according to frequency of transmitter				
W	150 kHz to 80 MHz	150 kHz to 80 MHz 80 MHz and 800 MHz			
	d=1.2√P	d=1.2 √P	d=2.3 √P		
0,01	0.12 m	0.12 m	0.23 m		
0,1	0.38 m	0.38 m	0.73 m		
1	1.2 m	1.2 m	2.3 m		
10	3.8 m	3.8 m	7.3 m		
100	12 m	12 m	23 m		

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 at 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

\* This table is included as a standard requirement for equipment which has been tested to specific test levels and over specific frequency ranges and been found compliant with regulations.

#### Table 3

#### Guidance and manufacturers declaration-electromagnetic immunity

The EMS 20 is intended for use in the electromagnetic environment specified below. The customer or the user of the EMS 20 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment—guidance
Electrostatic	+- 8kV Contact	+- 8kV Contact	Floors should be wood, concrete or ceramic
discharge (ESD)	+- 2 kV, +-4 kV,	+- 2 kV, +-4 kV,	tile. If floors are synthetic, the relative
IEC 61000-4-2	+- 8 kV, +- 15 kV air	+- 8 kV, +- 15 kV air	humidity should be at least 30%.**
Electrical fast	±2 kV for power	Not applicable	Not applicable
transient/burst	supply lines	DC powered device	
IEC 610004-4	±1 kV for	Not applicable	
	input/output lines	No data input/output lines	
Surge	±1 kV line(s) to line(s)	Not Applicable	Not Applicable
IEC 61000-4-5	±2 kV line(s) to earth	DC powered device	
Voltage dips,	<5% UT (>95% dip in UT)		
short interruptions	for 0,5 cycle		
and voltage	40% UT (60% dip in UT)	Not Applicable	Not Applicable
variations on	for 5 cycles	DC powered	
power supply	70% UT (30% dip in UT)	device	
input lines	for 25 cycles		
IEC 61000-4-11	<5% UT (>95% dip in UT) for 5	Sec	
Power frequency	30 A/m	30 A/m	Power frequency magnetic fields should be
(50/60 Hz)	50/60 Hz	50/60 Hz	that of a typical commercial or hospital
magnetic field			environment.
IEC 61000-4-8			

Note: UT is the a.c. mains voltage prior to application of the test level.

\*\* This statement indicates that the required testing was performed in a controlled environment and the EMS 20 are found to be compliant with regulations.

#### Table 4

#### Guidance and Manufacturer's Declaration—Immunity ME Equipment and ME Systems

Guidance and Manufacturer's Declaration-Immunity

The EMS 20 is intended for use in the electromagnetic environment specified below. The customer or user of the EMS 20 should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment—Guidance
Conducted RF IEC 61000-4-6	3 Vrms 6 Vrms (In ISM Bands) 150 kHz to 80 MHz	Not applicable Battery powered device, No SIP/SOP	Portable and mobile RF communications equip- ment should be used no closer to any part of the EMS 20, including cables, than the recom- mended separation distance calculated from the equation applicable to the frequency of the transmitter.
			Recommended separation distance d = 1,2 $\sqrt{P}$
Radiated RF IEC 61000-4-3	80 MHz to 2.7 GHz	10 V/m 80 MHz—2,7 GHz 80 % AM at 1 kHz	$\begin{array}{l} d=1,2\;\forallP\\ d=2,3\;\forallP\\ \text{where }P\text{ is the maximum output power rating}\\ \text{of the transmitter in watts (W) according to the}\\ \text{transmitter manufacturer and }d\text{ is the recommended separation distance in meters (m)}. \end{array}$
			Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey <sup>e</sup> , should be less than the compliance level in each frequency range <sup>e</sup> .
			Interference may occur in the vicinity of equip- ment marked with the following symbol:
			((···))

Test frequency (MHz)	Band <sup>a)</sup> (MHz)	Service <sup>a)</sup>	Modulation <sup>b)</sup>	Maximum power (W)	Distance (m)	Immunity Test Level (V/m)
385	380–390	TETRA 400	Pulse modulation <sup>b)</sup> 18 Hz	1.8	0.3	27
450	430–470	GMRS 460, FRS 460	FM <sup>c)</sup> ±5 kHz deviation 1 kHz sine	2	0.3	28
710			Dulas madulatiant)	0.2	0.3	9
745	704–787	LTE Band 13, 17	Pulse modulation <sup>®</sup> 217 Hz			
780						
810		GSM 800/900, TETRA 800, IDEN 820, CDMA 850, LTE Band 5	Pulse modulation <sup>b)</sup> 18 Hz	2	0.3	28
870	800–960					
930						
1720	1700	GSM 1800: CDMA 1900:				
1845	1700-	GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	217 Hz	2	0.3	28
1970	1000					
2450	2400– 2570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation <sup>b)</sup> 217 Hz	2	0.3	28
5240	- 100					
5500	5100-	WLAN 802.11 a/n	Pulse modulation <sup>b)</sup> 217 Hz	0.2	0.3	9
5785						

NOTE: If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the EMS 20 may be reduced to 1m. The 1m test distance is permitted by IEC 61000-4-3.

<sup>a</sup> For some services, only the uplink frequencies are included.

<sup>c</sup> As an alternative to FM modulation, 50% pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.

<sup>&</sup>lt;sup>b</sup> The carrier shall be modulated using a 50% duty cycle square wave signal.

#### Notes

Notes







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