

**Polycon MP20 Series  
Hand Held Radio**

**Installation and Operation**

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## Revision history

Revision	Date	Description	List of effective pages
Issue A	2011-06-30	First release of Installation and Operation manual. Replaces Operation manual PUBL041-00 Issue 3	New document
Issue B	2011-09-07	Edit 1.6.3. Headset interface	1-6 , 1-7, 1-8
Issue C	2011-12-05	Corrected date and issue statement on first page and all footers	First page and all footers
Issue D	2012-07-09	Added MP20-02DB-456 Updated for SW version 3	Page 1-5 Section 2 Section 3
Issue E	2015-03-05	Document title change  Added MP20-01U in text and removed p/n list (table 1-1).  Charge time changed to 2-3H  Interchanged TX and RX frequencies.  Channel separation corrected to 25KHz only.  Added colour codes.	Front page  Page 1-5  Page 1-6: Charge time  Page 1-6: Frequency Page 1-7: UHF xx frequency  Page 1-7: Channel separation  Page 1-7: Colour



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## Section 1: General information

### 1.1 Introduction

The Polycon system is a wireless extension of an aircraft's ICS. The system consist of one base station and one or more handheld radios. The base station is connected to the aircraft's ICS and the handheld radios are connected to a headset. The headset can be incorporated in the helmet of the users. The base station works as a repeater station; both between the wireless crew, as well as between wireless crew connected through Polycon and crew connected to the wired ICS onboard the aircraft.

The system allows the users equipped with Polycon wireless radios to communicate with the rest of the crew as if he/she was connected to the wired part of the ICS. Due to purpose built technology and utilizing the UHF radio band the wireless users may leave the aircraft and still retain robust and dependable communication over long distances, and to some extent even when the radio is submerged.

Both the base station and the handheld units operate with Axnes Patented None Interrupted Voice activated transmission (NIVOX) solution, securing optimal VOX control of the communication. Noise cancelling electronics incorporated makes VOX operation achievable even inside or in close vicinity of the aircraft, on ground or in hover mode.

The MP20 series hand held radio is a portable waterproof radio for wireless communication with the aircraft crew while operating inside or outside of the aircraft. The MP20 series hand held radio can be connected to the winch man's helmet/headset, or used as a hand held Walkie-Talkie. The system provides two-way voice communications between the helicopter crew and SAR winch man, whilst the winch man is either outside the aircraft during winching operations or remote from the aircraft.

The system has been designed for minimum weight, size and power consumption, combined with the ruggedness and functionality required to meet the demanding environmental conditions typical for its operational use.

The MP20 series hand held radio is designed for functional integrity, providing ease of operation, while at the same time safeguarding against interruptions caused by unintentional operation.

The MP20 series hand held radio will interface with the winch man's helmet/headset to permit hands free communication.

The MP20 Series hand held radio offers casualty communication - allowing the winchman to communicate through the MP20 internal microphone with the injured person without removing the helmet/headset.

The system can be programmed with up to 16 channels in the ranges of 408,600 – 409,600 MHz (Rx of base station) and 418,600 – 419,600 MHz (Tx of base station), and in the maritime VHF band for dual band radios. To accommodate for individual customer requirements, or national radio licensing authority regulations, other frequencies outside this range may be supplied as a customization with some limitations inside the 406 to 470 MHz frequency band.



This manual describes the installation and operation of the Polycon MP20 series hand held radio. The Polycon MP20 series hand held radio will hereafter be referred to as MP20

## 1.2 Mechanical description

The outline of the mechanics is found in Figure 1-1.

The chassis is made out of painted saltwater resistant milled aluminium, and consist of two main parts, a main body and a back plate.

Helmet/headset connection is located at the top of the MP20 together with a small display, antenna and a pressure equalizer.

The channel selection buttons, a large Push to Talk (hereafter named PTT) button used when connected to the helmet/headset, as well as integral microphone and loudspeaker is located at the front of the MP20. Volume up/down and walkie talkie PTT is located at the left hand side of the MP20.

Charging connector is located in the bottom of the radio.

The mechanics are designed to withstand the robust operating environment typical demanded by winch/SAR operation.

The MP20s are designed with all control buttons flush mounted to the cabinet, protecting them from both damage and accidental operation, whilst the form and position of the front PTT key enables it to be operated with a wide variety of grip positions.

The MP20 consists of the following main circuit board modules and electronic components:

- Radio module
- Interface processing module
- Display module
- Side key module
- Charger connector module
- Battery



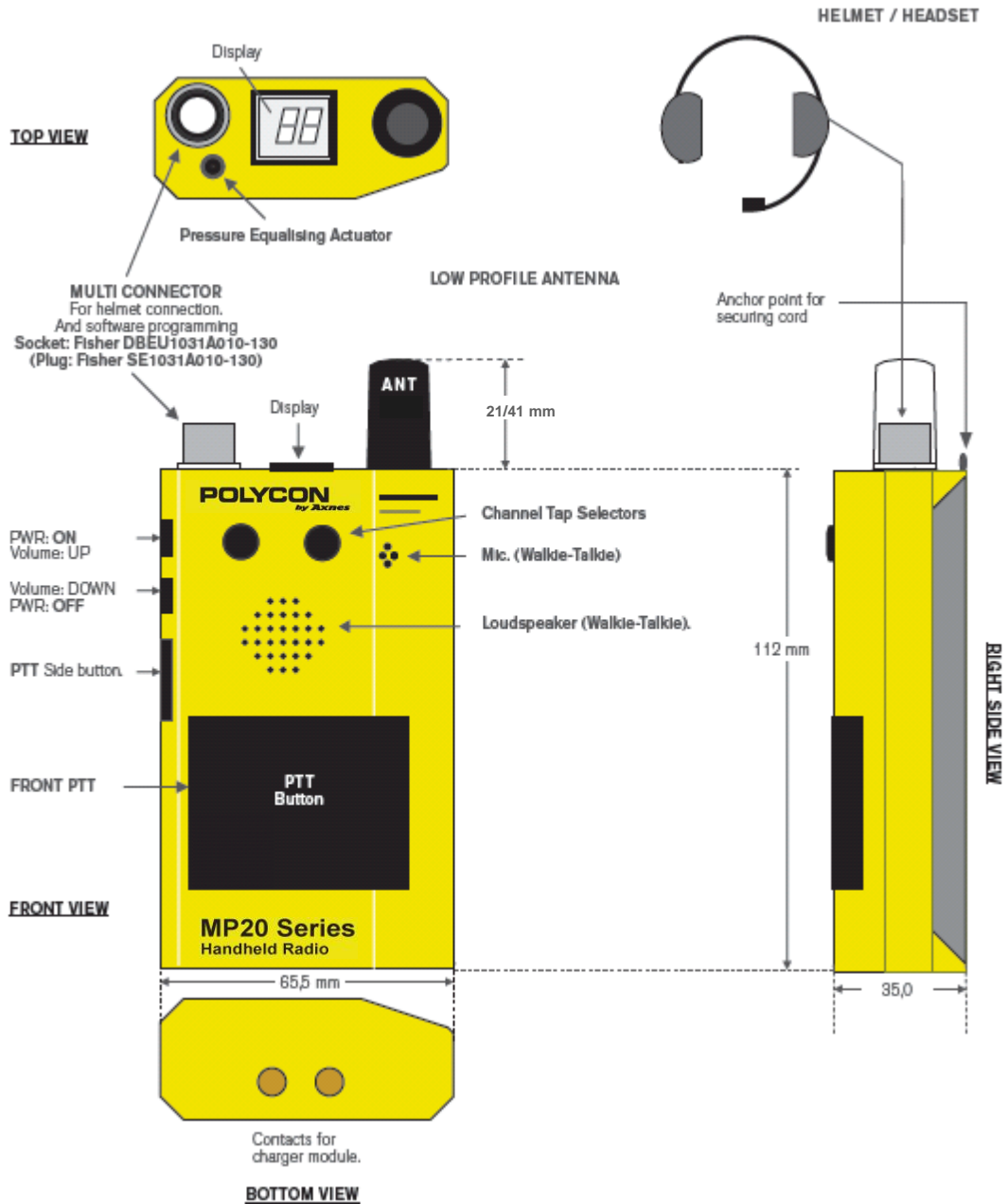


Figure 1-1: MP20 outline

### 1.3 Connectors and Control Functions

Electrical connections to the MP20 are located on the top and bottom of the MP20. The electrical connections consist of:

- Waterproof 10 pin Fisher connector for helmet/headset connection.
- Plate connector for charging





The control functions are as follows:

- Display for channel indication, and configuration menu (located on top).
- Channel selector (located on front).
- Volume and power on/off (located on the left hand side).
- Large PTT button for helmet/headset operation (located on front)
- PTT button for walkie talkie operation (located on left-hand side)
- Loudspeaker for walkie talkie operation (located on front)
- Microphone for walkie talkie and casualty communication (located on front)

## 1.4 Electrical and functional description

The MP20 is the handheld unit in a wireless extended ICS system and interacts with the Polycon 004RLI base station. A MP20 is typically connected to a winchman helmet/headset, and implements the following features:

- Wireless extension of aircraft's intercom system with significant range and robustness.
- Range up to 10 nm line of sight over water, and good ability to penetrate into structures.
- Operating in half-duplex mode and utilizes the UHF band.
- Support for selected Maritime VHF channels (MP20 dual band only)
- Programmable with up to 16 channels.
- NIVOX – Polycon patented VOX operation. Conventional Voice Operated transmission (VOX) operates by opening transmission when input has reached a certain level over a given period of time. This will normally cause 'clipping' of the first word in the transmission, and may cause difficulty in differentiating between words such as 'No' and 'Go'. Polycon implements a Non Interrupted Voice Activated transmission (NIVOX). Polycon NIVOX will ensure non-clipped transmission of all input, and full words are transmitted, without the drawback of traditional VOX.
- Adaptive NIVOX trigger level. The NIVOX will monitor the ambient noise, and through this process avoid triggering transmission based on high background noise levels. A given voice overlay to the noise is needed to trigger transmission. This functionality secures that the intercom is not flooded with the background noise.
- Easily available PTT button (designed for elbow operation)
- Protected channel select buttons.
- Protected Volume/power on/off buttons
- "Low profile" antenna
- Built-in loudspeaker and microphone for MP20 operation (Walkie-Talkie).
- Intercom from integral microphone to helmet/headset earphones for casualty communication.
- Side mounted PTT key for MP20 operation (Walkie-Talkie)
- Side-Tone function.
- Rugged and salt water resistant aluminium enclosure.
- Waterproof to 1 meter



## 1.5 Identification of article

The MP20s are labelled with a part number. A standard unit operates in the UHF band at 419/409 MHz Rx/Tx, and will be labelled MP20-00U or MP20-01U for single band and MP20-02DB-414 for the dual band. Other frequency combinations may be configured at customer request and will be labelled MP20-00U-xxx or MP20-01U-xxx for single band and MP20-02DB-xxx for dual band, where xxx denotes the centre frequency of the antenna.

Note: Some early units deviate from the product numbering scheme and a combination of the product number and the antenna label must be used to identify the customer configuration.

Note: Some customer configured units deviate from the product numbering scheme and use MP20-00U-xxx, where xxx represent an alphanumeric customer id. For those units the combination of Tx and Rx is found in the datasheet supplied with the unit.



## 1.6 Technical data

### 1.6.1 Operation

Radio:	Half duplex, dual frequency Rx/Tx
Frequency:	Tx:409±0.5 MHz Rx:419±0.5 MHz
VOX operation:	Axnes' patented NIVOX, ensures no loss and operation in high noise environment
Number of wireless users:	Unlimited
Number of Radio channels:	Up to 16
Encryption:	None
Operating temperature:	-25°C to 55°C
Storage temperature:	-40°C to 85°C
Water resistance	IEC EN60529 Edition 2.1.2001:02 IPX7 Category 1 (1 metre)
Pressure to activate front PTT:	0.5 to 1.0 Kg (Withstands a temperature drop of at least 20°C).

### 1.6.2 Power supply

Supply voltage:	Battery operated at 4.8V (1460mAH NiMh)
Operating time:	10 hours standby 8 hours receive 1.3 hours transmit (400mW)
Charge time:	2-3 hours
Charger:	CHG1236 M/S

### 1.6.3 Headset interface

Microphone sensitivity:	MP20-02DB: 0.1 – 60mVrms (0.3 – 180mVpp) MP20-00U: 0.1 – 5mVrms (0.25 – 15mVpp) MP20-00U: S/N 020765, 020781 and after as MP20-02DB.				
Microphone input impedance:	136 Ω impedance balanced				
Microphone bias:	4.1V through 2,7K series impedance (Mic+)				
Power supply in connector:	MP20-02DB: 4.8V up to 40 mA MP20-00U: Battery power through 1,5KΩ series resistor MP20-00U: S/N 020765, 020781 and after as MP20-02DB.				
Headset output (mV rms):	Vol:	0	3	6	9
	Open:	170	610	1030	1780
	9 Ω:	105	385	650	1150
	150 Ω:	160	590	995	1720
	600 Ω:	167	605	1020	1770



**1.6.4 Helmet/headset Connectors**

Connector on MP20: Fisher DBEU1031A010-130  
 Compatible cable mount : Fisher SE1031A010-130

**1.6.5 Radio characteristics**

UHF Tx frequency: 409 MHz (other frequencies as customer configurations)  
 UHF Rx frequency: 419 MHz (other frequencies as customer configurations)  
 UHF Duplex separation: 10 MHz  
 VHF Frequency band: 156-159 MHz (only MP20-02DB series)  
 Channels: 16  
 Channel separation: 25 KHz  
 Modulation: FM  
 Frequency stability: 25 KHz +/- 5 ppm  
 Receiver sensitivity <math><0.9 \mu\text{V}</math> at 12 dB SINAD (single band)  
 Output power: 400 mW (other output power as customer configurations)  
 Deviation: 5 KHz  
 Antenna impedance 50  $\Omega$

**1.6.6 Dimensions**

Physical dimensions: 112 x 65.5 x 35 mm  
 Weight: 395g

**1.6.7 Material**

Material: Aluminium 5052 (Salt Water Resistant)  
 Paint: Layer1: 2 comp. Wash primer CR, Sikkens/Akzo Nobel  
 Layer2: 2 comp. Auto Nova – None Sanding.  
 Sikkens/Akzo Nobel  
 Layer3: 2 comp. Cooler Polyurethane Sikkens BT,  
 Sikkens/Akzo Nobel  
 Colour BT429DS(yellow)/BT499G3(grey)



## 1.7 Type approvals and records

### 1.7.1 Type approvals

The Polycon MP20 series MP20s have been tested against general radio terminal specifications, as defined in:

- ETSI EN301 843-2 V1.1.1 Electro Magnetic Compatibility (EMC) standard for marine radio equipment and services; Part 2: Specific conditions for radiotelephone transmitters and receivers
- ETSI EN 300 720-2 V1.2.1 Ultra-High Frequency (UHF) on-board vessels communications systems and equipment; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive
- ETSI EN 300 178-1 V1.3.1 Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands (for non-GMDSS applications only)
- IEC EN 60529 Edition 2.1 2001-02 Degrees of Protection Provided by Enclosures (IP code): IPX7 Category 1
- IEC EN 60950-1:2006 Information technology equipment – Safety

### 1.7.2 Type Records

The Design Authority will submit a Declaration of Design Performance (DDP).

The DDP will reference the following:

- Design Specification.
- Equipment Specification Number and Issue Number.
- General Assembly Drawings and Aircraft Equipment installation information.
- Master Record Index.
- List of Type Test Reports.

## 1.8 Accessories

Article	Part no:
Battery charger CHG1236M/S	AX-CHG-0010
Battery charger CHG1236M/S, power supply w/AUS plug	AX-CHG-0020
Battery charger CHG1236M/S, power supply w/EU plug	AX-CHG-0030
Battery charger CHG1236M/S, power supply w/UK plug	AX-CHG-0040
Battery charger CHG1236M/S, power supply w/US plug	AX-CHG-0050

**Table 1-1: Accessories**

Axnes Aviation can supply a number of accessories related to MP20 series handheld radios, ranging from adaptor cables to helmets. For details please visit:

<http://www.axnes.com/products>



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## Section 2: Installation

### 2.1 General

The MP20 series handheld radios do not require any installation, but depending on aircraft, operational environment and microphone configuration, some radio parameters may need adjustment to ensure optimal performance.

Care should be taken when selecting helmet/headset microphone to ensure Polycon MP 20 compatibility.

### 2.2 Inspection before installation

Before taking MP20 radios into use, carry out visual inspection for any transport damage, paying particular attention to the following:

- Dirt, dents, scratches, corrosion, broken attaching parts on the housing and housing parts.
- Dirt and scratches on the identification plate, and marking.
- Dirt, bent or broken pins, cracked connector inserts.
- Missing screws or pressure relief pin.

### 2.3 Recommended maintenance

The MP20 should be serviced by an Axnes Aviation certified service centre according to the recommended maintenance schedule. Recommended according to service letter published at Axnes resource website:

<http://www.axnes.com/resource-center/service-letters/>

Axnes Aviation certified service centres are found at:

<http://www.axnes.com/support>

or contact Axnes Aviation A/S at:

Phone: +47 37 04 08 00

FAX: +47 37 04 07 99

E-mail: [service@axnes.com](mailto:service@axnes.com)

The MP20 hand held radio should always be thoroughly cleaned and stored in a dry and ventilated location. After use, immersion in salt water or exposure to salt laden or dusty atmosphere, the hand held radio must be washed in clean running water and dried off with a soft cloth.



Plug connections should be blown dry with clean dry air (low pressure) and protected with acid-free Silicone grease Type “NOVA G624” or similar after drying. Always recharge the hand held radio after use.

Although the connector arrangement is a waterproof type, under certain circumstances it is possible for water to seep between the plug and the socket, causing undesirable interference. This may be avoided by liberal application of silicone grease.

Do not carry the radio by the helmet/headset connecting lead.

Do not try to disconnect the helmet/headset connector by snatching or pulling the lead.

The radio should be secured to the vest or pocket by means of a lanyard connected to the dedicated lanyard ring on the radio back plate.

If the MP20 is not operating normally, check indicator lights and channel settings. Check also connectors for proper attachment.

A malfunction may also be corrected by switching the system OFF for a few seconds and then ON again.

If you have trouble making the MP20 operate and before declaring the unit unserviceable, it is recommended to go through the reset procedure found in the document “AX-SVS-PRC-0002 Reset Procedure”. This procedure will restore the unit to factory defaults and possibly clear any setting made accidentally, causing the unit not to operate properly. The reset document can be downloaded from:

<http://www.axnes.com/support>

All repairs are to be undertaken by Axnes Aviation A/S certified repair centres only.

## 2.4 Mechanical installation

No mechanical installation of MP 20 is required.

The radio, including the batteries, is capable of immediate use even after storage in its original packing for up to 2 years at temperatures within the range -40°C to +50°C. However the equipment should first allow being acclimatised to within the operational temperature range (-25°C to +55°C).

## 2.5 Installation wiring consideration

No aircraft wiring is needed for the installation of the MP20 series radio.

## 2.6 Dimensions Polycon MP20 series hand held radio

Please Refer to Figure 1-1: MP20 outline.





## 2.7 Location of connectors and pin assignment

MP20 series has two connectors, one for helmet/headset and one for charging.

Charging connector is located in the bottom of the unit and is of the plate type. The helmet/headset connector is located at the top of the unit. Both connections are water proof.

### 2.7.1 Helmet/headset connection pin assignment

The helmet/headset connector pin-out is listed in Table 2-1: 10 Pin waterproof helmet/headset connector. For electrical specification of the pins, please refer to 1.6.3 Headset interface.

Pin	Function
1	Mic+
2	Mic-
3	Speaker +
4	Speaker -
5	GND
6	Manufacturing use
7	Manufacturing use
8	Manufacturing use/PTT <sup>1</sup>
9	DC out
10	Manufacturing use

**Table 2-1: 10 Pin waterproof helmet/headset connector**

The connector on the Polycon MP20 is:

Water proof Fisher 10 Pin, panel mount, part no.: AX-CON-0010 (alt. part no.: DBEU1031A010-130).

The compatible connector for helmet/headset wiring:

Water proof Fisher 10 Pin plug, cable mount, part no.: AX-CON-0010 (alt. part no.: SE1031A010-130).

## 2.8 Microphone compatibility

Care should be taken when selecting a microphone to be used with the MP20s. The MP20 input levels are specified in technical data section 1.6.3. It should be noted the supply voltage to bias the microphone is limited.

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<sup>1</sup> Valid for units with software version 3.0 or higher. Units with software version 3.0 or higher will show the software version as two digits in the display at startup.



The MP20 will detect a headset/helmet connection through a change of the impedance over the microphone terminals. The DC resistance through the microphone line is required to be less than 10 kΩ.

**Note:** Some types of electret microphones change their DC resistance when subjected to very high sound input. This can cause the impedance to go over the threshold of the headset/helmet operation mode (10K).

## 2.9 Post installation calibration

When the MP20 is taken into use, normally no adjustments are needed, and factory values can be used. In some cases adjustment might be needed as listed below:

**White noise in headset.** Adjust the squelch – Pre software version 3.0<sup>2</sup>: To adapt the squelch on the Polycon MP20, press the large front PTT button and simultaneously operate 'volume up' or 'volume down'. Squelch setting is displayed in the display.

Software version 3.0<sup>2</sup> and higher: Press the Volume up and Channel down once simultaneously to enter menu mode. To browse through the menu press channel up/down. Select option "SL" – the display will change to display the value of the set squelch level. The squelch level can be adjusted by using the Vol up / down buttons to set as required.

When optimal level is found press the side PTT button to save and exit.

It is recommended to note down the optimal level for future reference in the calibration parameter sheet found in Appendix A.

Factory squelch level: Individual values, normally between 18-21.

**NIVOX transmission from Polycon MP20 series hand held radio not triggered or triggered by noise.** Adjust Analogue trigger level – Analogue trigger level is the level of the voice on top of the background noise needed to trigger VOX transmission. Lowering the analogue trigger level will make the VOX operation of the radio more sensitive to rapid changes in the background noise, and will require a lower voice overlay level to trigger transmission. Increasing the setting will make the radio VOX operation more robust to rapid changes in the background noise, but will require higher levels of voice overlay to trigger transmission.

Note: The when the noise environment or analogue level change the radio needs a few seconds to adapt the new noise level. It is recommended to adjust the analogue level in a noise environment similar to the operational environment.

To adjust the analogue trigger level, press the Volume up and Channel down once simultaneously to enter menu mode. To browse through the menu press channel up/down.

Select option "AL" – the display will change to display the value of the set analogue level. The analogue level can be adjusted by using the Vol up / down buttons to set as required.

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<sup>2</sup> Units with software version 3.0 or higher will show the software version as two digits in the display at startup.



When optimal level is found press the side PTT button to save and exit.

The standard factory setting is 78, but this does depend on the type and output of the microphone used and the noise levels in the operating environment.

Experience has showed that a value between 60 and 80 will work in most cases. When the optimal level has been found, it should be used as the new default setting. It is recommended to note down the optimal level for future reference in the calibration parameter sheet found in Appendix A.

Factory setting AL: 78.



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## Section 3: Operation

### 3.1 MP20 series charging

Please make sure to fully charge the MP20 before using the unit the first time. The MP20 is equipped with NiMh batteries and a charge cycle will normally take approximately 3 hours from when the battery is empty.

The MP20 will indicate a low battery condition at approximately 10% remaining battery capacity. This will be indicated with a low battery warning tone in the helmet/headset or loudspeaker.

The MP20 must be charged using the Polycon CHG 1236 M/S charging unit. The charging cradle is designed to fit the radio and to keep the radio stable and secure while charging. A green indicator in the charger will illuminate during charging, and will start flashing when the charging cycle is complete, and the radio is fully charged.

**MAKE SURE THE MP20 IS SWITCHED OFF DURING CHARGING.**

If fully discharged, the charging might needed to be restarted after the unit has been in the charger for a few minutes. Please do so by lifting the unit out of the charger and putting it back in again to ensure a correct charge cycle.

### 3.2 Power Up/Down Sequence

Power ON/OFF and Volume is controlled by two buttons located on the side of the cabinet. The upper button controls the ON- and Volume-UP functions, while the lower button controls the OFF and Volume-DOWN functions.

To turn the radio on, press the “On/Volume UP” button. The radio will be switched on, and a long start-up indication tone will be heard. The unit will then be in stand by mode, set to a pre-defined Power-Up volume setting. Units with software version 3.0 and higher will do a display test showing ‘8.8.’ in the display followed by the software version displayed as a two digit code.

To turn the unit OFF, press the Off/Volume Down button until the volume is at 0 and continue holding it until a long “beep” tone is heard. The display will be switched off and indicate that the unit is turned off.

The Volume can be controlled by rapidly pushing the volume buttons step-by-step, or by holding the button. When adjusting the volume it will be indicated on the unit display as well as by a corresponding beep tone volume.



When the unit is switched on it will automatically load the following settings:

- Transmit power level : 'Normal'<sup>3</sup>
- Automatic Gain Control: As set at power down<sup>4</sup>
- Squelch: As set at power down
- Volume: Set to factory programmed power up volume setting
- NIVOX/PTT mode: As programmed by user. Factory default 'NIVOX'<sup>4</sup>
- Channel: As set at power down

### 3.3 Change channel

Up to 16 channels may be pre-programmed and selected stepwise by pressing the channel up and channel down button on the front of the MP20. On the first operation of the channel buttons, the display will change mode to show the active channel, and repeated pushes will let you browse through the pre-programmed channels.

Note: For dual band version of the MP20 it is recommended to configure the UHF channels with display text 90-99 to be able to differ the UHF channels from the maritime VHF channels. The display text is defined by customer when ordering the units, but limited to 2 decimal numbers.

Units with software version 3.0<sup>4</sup> or higher will indicate VHF channel by an illuminated dot in the display.

### 3.4 Walkie-Talkie mode

When no headset is connected to the MP20, the unit can be operated in Walkie-Talkie mode. In this mode the internal microphone and loudspeaker is utilised and the transmission is controlled by the side PTT button.

### 3.5 Helmet/Headset connection

Connect the helmet/headset to the 10 pin connector on the MP20 top panel. Align the two red marks on the plug and receptacle and push until the plug locks.

The plug cannot be removed by pulling the wire, but must be unlocked by pulling the outer case of the plug, releasing the locking mechanism.

When a helmet/headset is connected, to the MP20 unit, the Walkie-Talkie function is disabled (MP20 internal microphone and loudspeaker), and the operational mode is set to NIVOX or PTT according to the selected default mode<sup>4</sup>.

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<sup>3</sup> EP transmit power level is only valid for MP20-00U series and should not be altered for MP20-02DB series.

<sup>4</sup> Possibility of changing Automatic gain control, default NIVOX/PTT mode, and display orientation is not available for software version 3.0 and higher. Units with software version 3.0 or higher will show the software version as two digits in the display at startup.



### 3.6 NIVOX/Push to Talk (PTT) Operation

When a helmet/headset is connected to the MP20, the NIVOX (Non Interrupted Voice Operated X-mission) or PTT function is automatically activated according to the default setting<sup>5</sup>.

In Axnes' patented NIVOX mode, transmission will be voice activated, and transmission will stay open for a pre-programmed hang time after voice audio input has ended. The MP20 will monitor the ambient noise levels and use this to differentiate voice input from ambient noise. This feature will allow the Polycon MP20 to adapt and operate in NIVOX mode even in high noise environments far better than traditional VOX systems.

In PTT mode the transmission is controlled by pressing the large front PTT. In both PTT mode and NIVOX mode, transmission is indicated in the display as 'oo'.

When the MP20 operates in NIVOX mode, pressing the front PTT button will change the MP20 operational mode from NIVOX to PTT mode. In the PTT mode the large front PTT will have to be pressed in order to start audio transmission.

To move back to NIVOX mode, the side PTT can be pressed twice. The first press will set the MP20 to Person to Person mode (indicated in the display with 'PP'), and the second will set the MP20 back to NIVOX (indicated in the display with '--' in standby or 'oo' if transmission is triggered).

When default mode is set to PTT, NIVOX can be activated by press and hold side PTT button and Front PTT button simultaneously for about 5 seconds, until a short beep is being heard.

Disconnecting and re-connecting the headset will set the MP20 back to default PTT/NIVOX setting<sup>5</sup>.

### 3.7 Person to Person / Casualty Communication mode

Person to Person- or Casualty Communication mode enables the Polycon user wearing a noise attenuating helmet/headset to hear nearby conversation through the MP20 internal microphone in the helmet/headset without removing the same.

Setting the MP20 in person to person mode, will disable the NIVOX mode and open the microphone in the MP20 so that surrounding audio is picked up and transferred to the local headset. The communication received from the base station in the aircraft, is still audible in the headset and mixed with the person to person communication.

Any audio picked up in the internal MP20 microphone with the person to person mode activated is NOT transferred back to the helicopter.

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<sup>5</sup> Possibility of changing Automatic gain control, default NIVOX/PTT mode, and display orientation is not available for software version 3.0 and higher. Units with software version 3.0 or higher will show the software version as two digits in the display at startup.



To enable the person to person communication, make sure helmet/headset is connected, and press the side PTT button once. 'PP' will be indicated in the display.

In person to person mode, the transmission from MP20 is disabled, while reception will continue on the selected channel.

If the front PTT is pressed while in person to person mode, the MP20 is changed to PTT mode and transmission is activated.

To change back to person to person mode, the side PTT must be pressed once, and 'PP' will be displayed indicating that the person to person mode is active.

To change from PP mode to NIVOX mode, press the side PTT once, and '- -' will be displayed indicating the unit is in standby mode.

### 3.8 Display orientation<sup>6</sup>

The display orientation may be rotated by pushing the two channel selector buttons simultaneously. This feature may be used to orient the display according to the operational needs and enable the user to get the correct orientation independent from how the MP 20 is carried.

### 3.9 Output Power Settings

The Polycon MP20 has a standard power output at about 300mW. When the battery is discharged the output power may be reduced (single band only), and to manually compensate for this there is an option to enable an "emergency" full power output setting to ensure maximum range at the end of battery charge cycle.

Emergency power is entered in menu mode by pressing channel up and volume down. Then press channel up or down until 'nP' or 'EP' is displayed.

Normal power is indicated as 'nP' and emergency power is indicated as 'EP'.

To change between normal power and emergency power, press volume up or down.

To store the selection and leave menu mode, press the side PTT button.

Note: Under normal operation and charge status, radios should be operated in 'nP'.

Note: The EP setting should never be set in MP20-02DB series radios. MP20-02DB series radios has specified output power until end of battery capacity. The EP setting has been disabled for MP20-02DB series radios with software version 3.0<sup>6</sup> and higher.

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<sup>6</sup> Possibility of changing Automatic gain control, default NIVOX/PTT mode, and display orientation is not available for software version 3.0 and higher. Units with software version 3.0 or higher will show the software version as two digits in the display at startup.

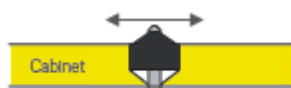




### 3.10 Pressure Equalizing Actuator

Significant changes in altitude and/or temperature may make the PTT button difficult to press or may unintentionally activate the transmitter due to over or under pressure within the MP20. To overcome this the "Pressure Equalising Actuator" located on the top of the transmitter should be manually operated by pushing the centre pin to one side with a finger. The pressure inside and outside of the MP20 will be equalised, see illustration below.

Push sideways to activate the Equalizing.



**CAUTION**  
Do not operate the Pressure Equalizing Actuator when exposed to water

### 3.11 Default Settings

The MP20 is configured with the following default settings:

- Automatic Gain Control: Factory default 'On'<sup>7</sup>
- Squelch: Factory default 19
- Power on volume: Factory default 4 (not changeable in field)
- NIVOX/PTT mode: Factory default 'NIVOX'
- Analogue level: Factory default 78

Changing the defaults is described in the following.

#### 3.11.1 Select NIVOX or PTT default<sup>7</sup>.

When a helmet/headset is connected to the MP20, the mode of operation will be activated according to a default setting.

To select PTT as default configuration when a helmet/headset is connected: Press and hold the front PTT button simultaneously with power up. The MP20 is now set to default PTT mode.

To select NIVOX as default configuration when a helmet/headset is connected: Press and hold the side PTT button simultaneously with power up. The MP20 is now set to NIVOX mode.

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<sup>7</sup> Possibility of changing Automatic gain control, default NIVOX/PTT mode, and display orientation is not available for software version 3.0 and higher. Units with software version 3.0 or higher will show the software version as two digits in the display at startup.



### 3.11.2 Squelch

Per software version 3.0<sup>8</sup>: The squelch can be adjusted by pushing the front PTT button and simultaneously operate the “Volume-UP” or “Volume-DOWN” buttons.

Software version 3.0<sup>8</sup> and higher: Press the Volume up and Channel down once simultaneously to enter menu mode. To browse through the menu press channel up/down. Select option “ SL ” – the display will change to display the value of the set squelch level. The squelch level can be adjusted by using the Vol up / down buttons to set as required.

When optimal level is found press the side PTT button to save and exit.

Correct squelch setting is depending on the operation environment. Typically the squelch setting is set between 20–27.

### 3.11.3 Automatic Gain Control (AGC)<sup>8</sup>

The MP20 features an Automatic Gain Control (AGC) on the microphone input, to secure optimal performance in environments where the background noise varies. The AGC is central for the MP20 performance in noisy environments and should always be activated.

It is possible to toggle the AGC setting by pressing the Volume up and Volume down once simultaneously. The display will show either “On” or “OF”, indicating the AGC status. It is not recommended to turn AGC off.

**Note1:** Please note that each time you actuate the buttons to check the AGC setting - you toggle the setting on or off.

**Note2: Experience shows that toggling AGC on/off may happen inadvertently. It is therefore strongly recommended that the users of the equipment know how to check the AGC status, to secure optimal performance of the equipment.**

### 3.11.4 Analogue Trigger Level (NIVOX Threshold)

Analogue trigger level is the level of the voice overlaid on the background noise needed to trigger VOX. Lowering the analogue trigger level will make the VOX operation of the radio more sensitive to rapid changes in the background noise, and will require less voice overlay to trigger transmission. Increasing the setting will make the radio VOX operation more robust to rapid changes in the background noise, but will require higher levels of voice overlay to trigger transmission.

To adjust the analogue trigger level, press the Volume up and Channel down once simultaneously to enter menu mode. The display should show “AL”.

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<sup>8</sup> Possibility of changing Automatic gain control, default NIVOX/PTT mode, and display orientation is not available for software version 3.0 and higher. Units with software version 3.0 or higher will show the software version as two digits in the display at startup.



Note: To browse through the menu press channel up/down. The menu has two entries, one for adjusting the power setting, displayed as 'nP' or 'EP', and one for adjusting the analogue level displayed as 'AL'.

Select option "AL" – the display will change to display the value of the set analogue level. The analogue level can be adjusted by using the Vol up / down buttons to set as required.

When optimal level is found press the side PTT button to save and exit.

The standard factory setting is 78, but the optimal setting will depend on the type and output of the microphone used and the noise levels in the operating environment. Typically a setting between 60 and 80 will be used.



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## Appendix A Calibration parameters

The MP20 is calibrated and configured with default parameters at the factory. Additional channels and custom frequencies are available on request, and will be configured as part of the custom production process.

Some parameters are possible to change in the field and are described further in the table below.

Changes to parameters should only be done by qualified personnel only

Aircraft: \_\_\_\_\_

MP20 serial number: \_\_\_\_\_

Parameter	Description	Factory setting	Customer calibration
Squelch	Squelch setting for receiver [0-99]	18-21	
AGC (Automatic Gain Control)	Automatic gain control on/off. AGC 'on' ensures optimal performance of MP20 in noisy environments [On/Off]	ON	
Analogue trigger level – NIVOX	Voice overlay level needed to trigger NIVOX.	78	

