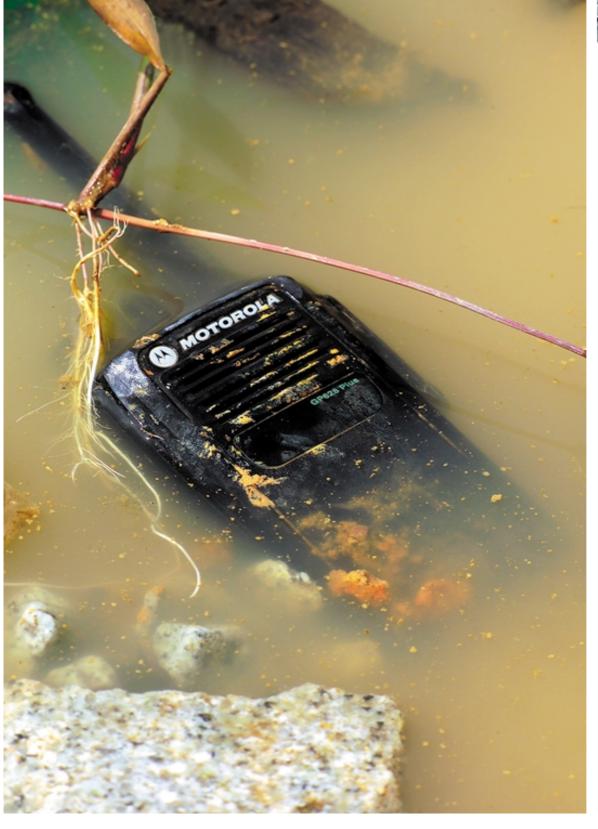# A Rugged Radio for Harsh Environments

Motorola GP628 Plus and GP638 Plus are IP67-rated*
dust-tight and water submersible

Standing up to the challenge

Imagine this scenario – The shrill scream of the fire alarm pierced the night. Within minutes, nine men assembled outside a fire engine awaiting instructions.

"This is no ordinary fire," cautioned the fire chief. "We are dealing with a burning manufacturing plant, and its storage area contains tanks which may explode if burned, so please make sure you are carrying the correct communications equipment today." The fire fighters checked their Motorola GP628 Plus radios briefly, noting the prominent green dot on the Li-ion battery pack, which identifies it as an FM-rated battery.

As they arrived at the fire scene, its extent became clear. Burning goods crackled noisily amongst the shouts of frightened plant workers. Hearing one another was going to be difficult.

The fire chief pulled on his helmet, oxygen tank and protective gloves. He was thankful for the lightweight radios– it was important not to burden his men any more than necessary. Easily finding the sculpted Push-to-Talk (PTT) button even with his gloved hands, he addressed his men.

"Fan out into 3 teams. Team Alpha, go around the back to make sure the fire does not spread to the chemicals warehouse. Team Beta, control the fire in front and around the sides. Team Charlie, follow me inside for rescue operations. Over and out," the fire chief spoke calmly into his radio. He knew he did not need to shout to make himself heard, given the audio clarity from the GP628 Plus radio.

Visibility rapidly deteriorated once they were inside the burning building. Out of the corner of his eye, the fire chief sensed something looming over him. "Collapse!" he shouted, as he and his men dived away just a split second before a 20-foot wall crumbled before them.

Picking up his axe, he searched around for his radio, and found it lying in a pool of muddy water. This did not bother him one bit – he knew the GP628 Plus was IP67-rated water submersible, thanks to its ruggedised casing. Moreover, the IP67-rated dust-tight and water submersible radio is designed and built to globally-recognised FM and MIL standards.

A Rugged Radio for Harsh Environments

Introducing the Motorola GP628 Plus non-keypad and the GP638 Plus keypad radios, the toughest from Motorola to date. Rated IP67 dust-tight and water submersible, the radios are also resistant to knocks and drops, thanks to their ruggedised exteriors. The GP628 Plus and the GP638 Plus feel right at home in the dangerous, extreme world of emergency rescue operations. Lightweight and compact, Motorola's smallest professional two-way radios have received Factory Mutual (FM) Approval and meet Military Standards (MIL) 810C, D, E and F.

IP67 Rated and FM Approved
GP628 Plus

IP67 Rated and FM Approved
GP638 Plus

Users

Fire Rescue Operations

The Motorola GP628 Plus and GP638 Plus are lightweight and compact and will not hamper you during rescue operations. Durability is ensured with IP67-rated protection against dust and water. Simple, programmable buttons enable lightning-fast communications during tense situations. A specially sculpted ergonomic PTT button, similarly IP67-rated, ensures easy operation even with gloved hands.

Manufacturing

The rugged exterior of the GP628 Plus and GP638 Plus conform to stringent Factory Mutual (FM) and Military Standards 810C, D, E and F, making them suitable for operation in potentially sensitive environments such as petrochemical and manufacturing plants. The radios have been subjected to Motorola Accelerated Life Testing (ALT) which ensures that they can withstand drop/shocks, rain, salt, fog, electro-static discharge and flame.

Rescue Operations

The IP67-rated GP628 Plus and GP638 Plus are suitable for use in typhoons, earthquakes and flood relief operations. Rescue personnel already burdened with heavy equipment and protective gear will appreciate the compact size, light weight and ergonomic design of the radios.

IP Code

The IP Code is a designation that indicates the level or amount of protection. The IP Code designation consists of the letters **IP** (International Protection) followed by two numerals – **example:**

IP67

INTERNATIONAL

PROTECTION

Degree of protection against the ingress of solid foreign objects.
6 = Dust-tight

Degree of protection against the ingress of water with harmful effects.
7 = Protection against the effects of temporary immersion in water (1m submersion for 30 minutes)

1m submersion for 30 mins

GP628 Plus and GP638 Plus Key Features and Benefits

Dust-tight, water submersible, lightweight and rugged

Advanced Audio Technology

Motorola's voice compression and low level expansion technology enable crisp, clear and loud audio, allowing you to keep communicating during critical operations.

Emergency Alarm / Siren

An easily-accessible, one-touch emergency button on the GP628 Plus or the GP638 Plus will emit a piercing alarm when pressed, for urgent communications in critical situations.

Switchable RF Power Levels

Adjusts the radio's transmitting power according to the user environment, and offers a choice between maximum coverage and battery conservation. High RF power increases transmission range, while low power conserves battery life.

Repeater / Talkaround Enable / Disable

Enjoy long-range communications via a repeater, or bypass it to communicate point-to-point. The talkaround feature is useful for maintaining communications lines when a repeater goes out of service.

Tight / Normal Squelch

Enhanced audio clarity is achieved by filtering out unwanted interference. A tight squelch gives clearer playback of messages, while a normal squelch increases coverage.

Other Features

- LED Battery Gauge
- Tone Tagging
- Internal VOX
- Priority Scan
- Enhanced Signalling Systems

GP628 Plus – Compact & Easy to Use

Palm-sized and easy-to-use, any emergency-response team or fleet will be able to familiarise themselves quickly with the GP628 Plus. Its intuitive layout and programmable buttons offer fast responsiveness in emergency situations. Time saved equals lives saved.

16 Channels

Assign up to 16 channels for easy organisation of different work groups.

LED Battery Gauge

An easily visible tri-colour battery gauge at the top of the radio provides battery level status at a glance. Green indicates a full battery; amber means half-full and red is a signal to recharge the battery.

Tone Tagging

Allows assignment of 8 different ring tones to 8 specific users or talkgroups, for audio identification of these groups.

Enhanced Signalling Features of GP628 Plus

GP628 Plus supports the following systems:

MDC1200 Signalling

- PTT-ID (encode) – Identifies your outgoing calls during transmission, so verbal identification is not necessary

- Selective Call (decode) – Allows you to receive a specific group or individual call

- Call Alert (decode) – Notifies you of incoming calls

- Radio Check (decode) – Informs other workgroups that your radio is activated or within range

- Selective Radio Inhibit (decode) – If the radio is missing or stolen, the system owner can disable it remotely

Quick Call II Signalling

DTMF Signalling

A Rugged Radio for Harsh Environments

Motorola GP628 Plus and GP638 Plus are IP67-rated*
dust-tight and water submersible

GP638 Plus – Compact & Versatile

The GP638 Plus offers a versatile two-way solution for those who require additional features to meet their expanding communication needs. Whether you are in the rugged environment of the surveillance industry or in rescue operations, the GP638 Plus is the radio of your choice.

14-Character Alpha Numeric Dot Matrix display

The 14-character alpha numeric display allows immediate communication of vital information such as PTT ID, radio strength indicator and signal strength indicator. In addition, the user-friendly icons make the information easy to read and understand. The keypad and display illuminations also provide the needed visibility to operate your radio in the dark.

Received Signal Strength Indicator

An easy to read on screen display indicator notifies users of signal strength in their vicinity.

Name & Tone Tagging

The capability of assigning 8 different ringing tones and visual caller IDs to 8 specific users/talkgroups enhances audio and visual caller identification for these groups.

Battery Strength Indicator

Easy to read on-screen LCD display indicator alerts users on low battery strength.

128 Channels

Provides up to a maximum of 128 channels, allowing greater flexibility in organising different work groups.

Menu Keys

The easy to navigate menu keys allow users to select the relevant functionalities at their fingertips.

Dual Tone Multiple Frequency (DTMF) Encode

Allows users easy access to local landline telephone networks or to make a private calls to other radio system users from one radio.

Dual Priority Scanning

Allows activity on different channels to be monitored, and 2 channels can be designated as priority channels which are monitored more frequently.

Enhanced Signalling Features of GP638 Plus

GP638 Plus supports the following signalling protocol:

I) MDC1200 Signalling

PTT-ID (encode/decode)

Every time the PTT button is pushed, it enables the transmission of the caller's ID and the decoding of the sender's ID.

Status/Messages (decode)

This feature enables you to replace frequently used voice calls with status messages, saving you valuable communication time.

Call Alert (encode/decode)

If your call to a radio has no response, the radio will emit an alert tone until the other party takes action.

Voice Selective Call (encode/decode)

The radio users receive a unique individual or group voice message with an alert to indicate that it is a selective call.

II) Quick Call II Signalling

III) DTMF Signalling

Enhance Your Radio's Capabilities

A comprehensive range of accessories is available so that the radio can be customised to suit your needs. Using it with the proper headsets, microphones, batteries, chargers or carrying cases can enhance your operational productivity. Motorola's accessories are specially engineered to ensure maximum performance of your radio, no matter what profession you are in.

PMMN4023
Remote Speaker Microphone
IP57-Rated (Mic Head only)

PMNN4073
1350mAH FM LiIon Battery
IP67-rated

Single-Unit Charger

PMNN4074
1400mAH LiIon Battery
IP67-rated

Multi-Unit Charger

(order 6 battery inserts PMLN5010 separately,
to charge IP67 radios in Multi-unit charger)

A comprehensive range of accessories for GP628 Plus and GP638 Plus

Antennas:

NAD6566	Antenna VHF Helical 136-150.8MHz
NAD6567	Antenna VHF Helical 150.8-162Mhz
NAD6568	Antenna VHF Helical 162-174Mhz
PMAD4056	Whip Antenna 330-368MHZ
PMAD4057	Whip Antenna 370-400MHZ
PMAE4022	Whip Antenna 403-470MHZ
PMAE4025	Whip Antenna 450-527MHZ

Single Unit Chargers:

PMTN4024	120V Single Unit Rapid Charger / US Plug
PMTN4025	230V Single Unit Rapid Charger / Euro Plug
PMTN4026	230V Single Unit Rapid Charger / UK Plug
HTN3006	230V Single Unit Rapid Rate Charger / Australia Plug

Multi-Unit Chargers:

WPLN4187	Impres MUC, Non-Display, 110-230V, US Cord
WPLN4189	Impres MUC, Non-Display, 110-230V, EU Cord
WPLN4188	Impres MUC, Non-Display, 110-230V, UK Cord
WPLN4190	Impres MUC, Non-Display, Australia Cord
PMLN5010A	Multi-Unit Charger Insert (Required to charge radios with IP67 batteries)
WPLN4197	Impres MUC, Non-Display base only

Batteries (capacity specified is typical value):

PMNN4074	Li-Ion 1400MAH, IP67 battery

Batteries - Intrinsically Safe (FM Approved) (capacity specified is typical value):

PMNN4073	Li-Ion 1350MAH, FM IP67 battery
	(Rated Intrinsically Safe for use in Division 1, Classes I,II,III, Groups CDEFG and Nonincendive, Division 2, Class I, Groups ABCD).

Audio Accessories:

The following audio accessories are available for use with the radio in a non-IP67 environment.

The radio is only IP67 rated when used without audio accessories.

Remote Speaker Microphones:

PMMN4022	Remote Speaker Microphone With 3.5 mm Audio Jack (IP54)
PMMN4023	Remote Speaker Microphone Without Audio Jack (IP57)

Optional Remote Speaker Microphone Accessories:

PMLN4620	D-Shell RSM Earpiece

Standard Earpieces / Earsets:

BDN6781	Earbud (receive only)
PMLN4519	Earbud with Combined Mic/PTT
PMLN4657	D-Style Earset with Boom Microphone Tube
PMLN5002	D-Style Earpiece with Mic/PTT
BDN6780	Earbud with Combined Mic/PTT (requires PMLN4455)
NMN6246	Ultra-Light Headset w/ Boom Mic and in-line PTT, Earbud style receiver (requires PMLN4455)

Headsets:

JMMN4066	Lightweight Headset w/ Boom Microphone and in-line PTT
RLN5590	Lightweight Headset w/ Boom Microphone (VOX compatible)
BDN6645	Heavy Duty Noise Cancelling Boom Mic Headset w/ PTT Earcup (requires RKN4093)
BDN6635	Heavy Duty Noise Cancelling Boom Mic Headset w/Vox (requires RKN4093)
NMN6245	Lightweight Single Muff Adjustable Headset w/Swivel Boom Mic and in-Line PTT switch (requires PMLN4455)
PMLN4585	Temple Transducer Headset
RMN5015	Racing Headset - Heavy Duty, Behind the Head Headset with Noise Cancelling Swivel Boom Microphone (requires RKN4093)

Earbud with combined Mic/PPT

D-Shell RSM Earpiece

D-Style Earset with Boom- Mic

Ultra-Light headset w/Boom Mic and in-line PTT

Lightweight Headset w/Boom Mic and in-line PTT

Heavy Duty Noise Cancelling Boom Mic w/ PTT Earcup

Temple Transducer Headset

Racing Headset - Heavy Duty

Surveillance Kits:

PMLN4608	2-Wire Surveillance Kit with Clear Acoustic Earpiece
PMLN4605	Clear Acoustic Earpiece (For PMLN4294, PMLN4418, PMLN4519)
PMLN4998	2-Wire Surveillance Earpiece w/ Combined Mic/PTT, Beige
PMLN4999	2-Wire Surveillance Earpiece w/ Combined Mic/PTT, Black

The following Surveillance Kits Requires PMLN4455 Adapter which attaches to the Radio. They are compatible with NTN8370 and NTN8371.

The 2-W and 3-W kits are compatible with the RLN4922.

BDN6664	Receive Only Earpiece Beige
BDN6726	Receive Only Earpiece Black
BDN6665	Receive Only Earpiece, Xtra Loud, Beige
BDN6727	Receive Only Earpiece, Xtra Loud, Black
BDN6666	Receive Only Earpiece with Volume Control, Beige
BDN6728	Receive Only Earpiece with Volume Control, Black
BDN6667	2-Wire Surveillance Earpiece w/ Combined Mic/PTT, Beige
BDN6729	2-Wire Surveillance Earpiece w/ Combined Mic/PTT, Black
BDN6669	2-Wire Surveillance Xtra Loud Earpiece w/ Combined Mic/PTT, Beige
BDN6731	2-Wire Surveillance Xtra Loud Earpiece w/ Combined Mic/PTT, Black
BDN6668	3-Wire Surveillance Earpiece w/ Separate MIC & PTT, Beige
BDN6730	3-Wire Surveillance Earpiece w/ Separate MIC & PTT, Black
BDN6670	3-Wire Surveillance Earpiece, Xtra Loud, w/ Separate MIC & PTT, Beige
BDN6732	3-Wire Surveillance Earpiece, Xtra Loud, w/ Separate MIC & PTT, Black
NTN8370	Extreme NoiseKit Clear Acoustic Tube
NTN8371	Low Noisekit Clear Acoustic Tube
RLN4922	Wireless Discreet Earpiece

Wireless Discreet Earpiece

Ear Microphone System:

JMMN4064	Ear Microphone VOX/PTT Radio Interface Module
BDN6768	Standard Ear Microphone, Black (for noise levels up to 95dB)
BDN6769	Standard Ear Microphone, Biege (for noise levels up to 95dB)
BDN6770	High Noise Ear Microphone, Gray (for noise levels up to 105dB)
0180358B38	Remote PTT for Ear Microphone System (optional)
0180300E83	Remote Body Push-to Talk Switch for Ear Microphone System (optional)

Ear Mic VOX/PPT Interface Module

Remote Body PTT Switch for Ear Mic

Audio Adapters:

RKN4093	Radio Adapter Cable (required for indicated headsets)
PMLN4455	Audio Accessory Adapter (required for indicated audio accessories)

Carry Accessories:

JMZN4023	Plastic carry Holder with Belt clip
PMLN5089	Nylon Carry Case For Minnow IP67, Display
PMLN5090	Nylon Carry Case For Minnow IP67, Plain
JMZN4020	Hand Strap for radio
NTN5243	Shoulder Strap
HLN9985	Waterproof Bag

Plastic Carry Holder w/Belt-clip

Surveillance Kits

Portable Military Standards 810 C, D, E and F

Applicable MIL-STD	810 C Methods	810 C Procedures	810 D Methods	810 D Procedures	810 E Methods	810 E Procedures	810 F Methods	810 F Procedures
Low Pressure	500.1	1	500.2	2	500.3	2	500.4	2
High Temp	501.1	1, 2	501.2	1, 2	501.3	1, 2	501.4	1, 2
Low Temp	502.1	1	502.2	1, 2	502.3	1, 2	502.4	1, 2
Temp. Shock	503.1	1	503.2	1	503.3	1	503.4	1
Solar Radiation	505.1	1	505.2	1	505.3	1	505.4	1
Rain	506.1	1, 2	506.2	1, 2	506.3	1, 2	506.4	1, 3
Humidity	507.1	2	507.2	2, 3	507.3	2, 3	507.4	–
Salt Fog	509.1	1	509.2	1	509.3	1	509.4	–
Dust	510.1	1	510.2	1	510.3	1	510.4	1
Vibration	514.2	8, 10	514.3	1	514.4	1	514.5	1
Shock	516.2	1, 2, 5	516.3	1, 4	516.4	1, 4	516.5	1, 4

Factory Mutual Approval
The GP628 Plus and GP638 Plus radio units are certified by Factory Mutual Approvals as intrinsically safe for use in Division 1, Class I, II, III, Groups C,D,E,F,G and Division 2, Class I, Groups A,B,C,D, when ordered with the Factory Mutual approved battery option.

IP67 Rated and FM Approved
GP628 Plus and GP638 Plus

GP628 Plus and GP638 Plus Specifications

GENERAL SPECIFICATION	VHF / UHF		
**Frequency (MHz)	136-174 / 330-400 / 403-470 / 450-527		
Channel Capacity	16 Channels **(GP628 Plus)**	128 Channels **(GP638 Plus)**	
Power Supply	Provided through rechargeable battery - 7.5V		
Dimensions (Radio footprint height excluding knobs)	**H** x	**W** x	**D**
	101.5 mm	56.5 mm	37 mm
Weight			
With LiIon (Hicap)Battery:	305 gm **(GP628 Plus)**	320 gm **(GP638 Plus)**	
Average Battery Life @ 5/5/90 Cycle	**Low Power**		**High Power**
With LiIon (Hicap)Battery:	13 hours		10 hours
Sealing	Withstands rain testing per MIL-STD 810 C/D/E/F and IP67		
Shock and Vibration	Protection provided via impact resistant housing exceeding		
	MIL-STD 810 C/D/E/F and TIA/EIA 603		
Dust and Humidity	Protection provided via environment resistant housing exceeding		
	MIL-STD 810 C/D/E/F and TIA/EIA 603		

TRANSMITTER SPECIFICATION	VHF / UHF
**Frequency (MHz)	136-174 / 330-400 / 403-470 / 450-527
Frequency Separation	Full bandsplit
Channel Spacing	12.5 / 20 / 25kHz
Freq Stability (-30°C to 60°C, +25°C Ref.)	2.5 ppm
Power Output	5W (VHF) 4W (UHF)
Modulation Limiting	±2.5 @ 12.5kHz, ±4.0 @ 20kHhz, ±5.0 @ 25kHz
FM Hum & Noise	-40 dB
Conducted/Radiated Emission	-36 dBm < 1 GHz / -30 dBm > 1 GHz
Modulation FCC Type	12.5 kHz 11K0F3E , 25 kHz 16K0F3E
Audio Response (from 6 dB/octave pre-emphasis 300-3000Hz)	+1 to -3 dB
Audio Distortion	3%

RECEIVER SPECIFICATION	VHF / UHF
**Frequency (MHz)	136-174 / 330-400 / 403-470 / 450-527
Frequency Separation	Full bandsplit
Sensitivity (12dB SINAD) EIA	.25µV
Intermodulation (EIA)	70 dB
Adjacent Channel Selectivity	60 dB @ 12.5kHz, 70 dB @ 25 kHz
Spurious Rejection	70 dB
Rated Audio	500 mW
Audio Distortion	3%
Hum & Noise	-40 dB
Audio Response (300-3000Hz)	+1 to -3 dB
Conducted Spurious Emission	-57 dBm < 1GHz, -47 dBm > 1GHz, FCC Part 15

** Availability subject to country law and regulations.
Radios meet applicable regulatory requirements.
All specifications shown are subject to change without notice. Specifications are not representative of all radios and may vary in different radios.
All Motorola products are manufactured under ISO 9001 standards and are subjected to Accelerated Life Testing (ALT). A series of stringent tests simulating five years of usage on the field, ALT ensures that the products survive drops/shocks, dust, rain, harsh chemicals and radiation.
Our Intrinsically Safe products meet formal safety agency certifications, such as Factory Mutual Research Corporation (FM) and Military Standard (MIL).

* Dust-tight and water submersible are tested as per criteria in IEC (International Electrotechnical Commission) 60529 IP67

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