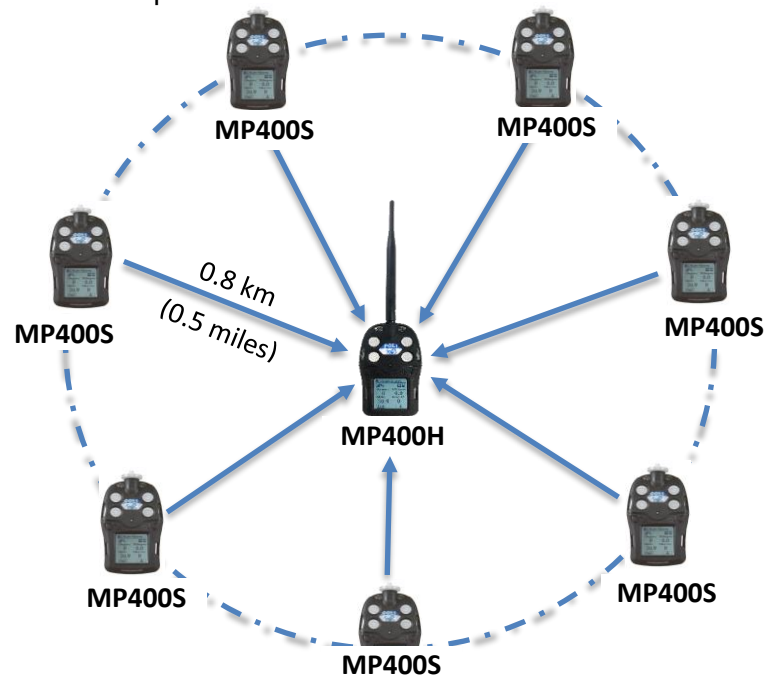# mSQUAD

mPower Electronics
Making Powerful Senses

Mobile Wireless Multi-Gas Team Warning System

The mSquad System is a quickly-deployable set of mobile multi-gas meters that communicate wirelessly to a Squad leader up to 0.8 km (0.5 miles) distant. The system is ideal for Hazmat Response, firefighters, temporary venue protection, etc. An mSquad consists of one Head monitor (MP400H) and up to 7 Soldier monitors (MP400S) that communicate with each other. Each 4- or 5-gas monitor has options for a full range of sensors for toxic gases, oxygen (O_2), combustibles (LEL) and carbon dioxide (CO_2). The MP400S can also have a PID for volatile organic compounds (VOCS). In addition to high gas concentration alarms, all Squad units receive any Man-Down alarms to notify them remotely of a worker in distress. All the Squad monitors are Class I Division I certified to operate in hazardous zones. The entire mSquad is mobile, running on batteries for up to 12 hours. The MP400S and MP400H have rugged construction and easy-to-learn 2-button operation.

Features, Functions and Benefits

- Remote, wireless real-time readings and alarms including Man-down
- Up to 8 remote 4- or 5-gas monitors
- Up to 0.8 km (0.5 miles) distance to Squad Head
- All mSquad units alarm if any one unit has an alarm condition
- Mobile system operation
- 12-hour continuous operation on single Li-ion battery charge.
- USB Micro cable for battery charging and direct PC communication
- Wide selection of sensor types

Ver 1.04

MP400S and MP400H Specifications

Size	5.7 x 3.3 x 1.7 in (140 x 84 x 42 mm) w/o Antenna
Weight	15.5 oz (435 g)
Sensors	Interchangeable and field-replceable: PID for VOCs (MP400S only), EC for Toxic & O_2, Pellistor for LEL, and NDIR for LEL, Vol% & CO_2
Response time (t90)	• 15 s (LEL/CO/H_2S/O_2) MP400S • 20 s (LEL/CO/H_2S/O_2) MP400H • Others vary up to 120 s
Sampling	MP400S - Internal pump; MP400H - Diffusion
Battery	8-36 hr (depending on sensors and pump installed)
Direct Readout	• Real-time reading of gas concentration • PID measurement gas and correction factor, • Battery status • STEL, TWA, peak and minimum values • Man-Down alarm on/off
Display	128 x 128 graphical LCD, 1.77 x 1.73 in (45 x 44 mm), with LED backlight and auto "flip" screen
Range	0.8 km (1/2 mile) between MP400H and MP400S
Frequency	ISM band (902-928 MHz) FCC Part 15 approved
Calibration	Zero and span calibration. Single or multiple sensor simultaneous calibration settings
Monitors	Up to 8 per mSquad (1 MP400H plus 7 MP400S)
Alarms	• Audible (95 dB @ 30 cm) • Visual (flashing bright red LEDs) • Vibration • On-screen indication of alarm conditions • Man-Down alarm and manual Panic alarm
Wireless Alarm Notification	Alarm on any monitor sent to all others in mSquad for 5 seconds, then remains on at MP400H
Datalogging	Continuous datalogging (6 months for 4 sensors at 1-minute intervals, 24 hours/day and 7 days/week)
Direct PC Comm and Charging	USB cable for charging, data download, instrument setup and firmware upgrades on PC or 100-240V AC charger, or CaliCase.
Temperature	-4° to 122°F (-20° to 50°C)
Humidity	0% to 95% Relative humidity (non-condensing)
IP Rating	IP-65 MP400S (pump); IP-67 MP400H (diffusion)
Safety Certifications	(UL) Class I, Div 1, Group ABCD T4, -20°C ≤ T_{amb} ≤ +50°C **IECEx** Ex ia IIC T4 Ga ATEX II 1G Ex ia IIC T4 Ga CE European Conformity
EMC/RFI	EMC directive: 2014/30/EU
Warranty	• 2 Years on instruments • 2 Years on sensors for pellister LEL, and O_2, CO, H_2S, SO_2, HCN, NO, NO_2, and PH_3 EC sensors • 1 Year on other sensors

Sensor Options

Sensor		Range	Resolution
PID		0-200 ppm 0-2000 ppm	0.01 ppm 0.1 ppm
Oxygen (O_2)	Lead Wool Lead-Free	0-30%Vol 0-30%Vol	0.1%Vol 0.1%Vol
Combustibles (LEL%)		0-100%LEL	1%LEL
Hydrocarbons (Vol%)		0-100%Vol	0.1%Vol
Dual-Range LEL%/Vol%		0-100%Vol	1%LEL
CO_2 (Carbon Dioxide)		0-50000 ppm	100 ppm
CO (Carbon Monoxide)		0-1000 ppm	1 ppm
H_2S (Hydrogen Sulfide)		0-100 ppm 0-1000 ppm	0.1 ppm 1 ppm
CO + H_2S	CO H_2S	0-500 ppm 0-200 ppm	1 ppm 0.1 ppm
SO_2 + H_2S	SO_2 H_2S	0-20 ppm 0-100 ppm	0.1 ppm 0.1 ppm
NH_3 (Ammonia)		0-100 ppm 0-500 ppm	1 ppm 1 ppm
Cl_2 (Chlorine)		0-50 ppm	0.1 ppm
ClO_2 (Chlorine Dioxide)		0-1 ppm	0.01 ppm
H_2 (Hydrogen)		0-1000 ppm	1 ppm
HCl (Hydrogen Chloride)		0-15 ppm	0.1 ppm
HF (Hydrogen Fluoride)		0-20 ppm	0.1 ppm
HCN (Hydrogen Cyanide)		0-100 ppm	0.1 ppm
NO (Nitric Oxide)		0-250 ppm	1 ppm
NO_2 (Nitrogen Dioxide)		0-20 ppm	0.1 ppm
PH_3 (Phosphine)		0-20 ppm 0-1000 ppm	0.01 ppm 1 ppm
SO_2 (Sulfur Dioxide)		0-20 ppm 0-100 ppm	0.1 ppm 0.1 ppm
C_2H_4O (Acetaldehyde)		0-20 ppm	0.1 ppm
ETO (Ethylene Oxide)		0-100 ppm	0.1 ppm
CH_3SH (Methyl Mercaptan)		0-10 ppm	0.1 ppm
THT (Tetrahydrothiophene)		0-40 ppm	0.1 ppm

Typical Battery Run Times

Sensor Configuration	Monitor	Pump	Time
NDIR **LEL/VOL/O_2/CO/H_2S**	MP400H MP400S MP400S	None Off On	36 hr 36 hr 24 hr
NDIR **LEL/VOL/PID/O_2/CO+H_2S**	MP400H MP400S MP400S	None Off On	20 hr 20 hr 15 hr
Pellistor **LEL/O_2/CO/H_2S**	MP400H MP400S MP400S	None Off On	12 hr 12 hr 10 hr
Pellistor **LEL/PID/O_2/CO+H_2S**	MP400H MP400S MP400S	None Off On	10 hr 10 hr 8 hr

* Due to ongoing research and product improvement, specifications are subject to change without notice *