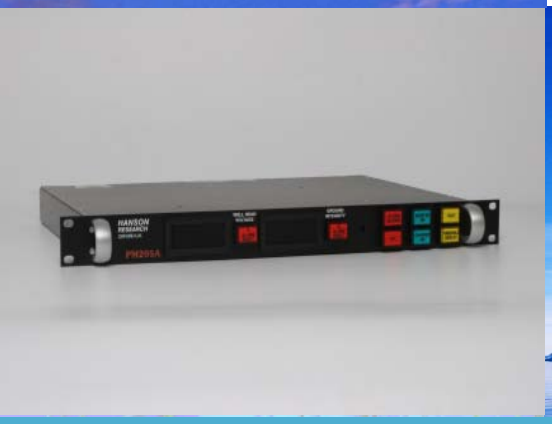

# PM205 Potential Monitor

## Continuous Stray Voltage, Ground Integrity and RF Monitoring during Well Perforation

The operation of well perforation is extremely hazardous; perforation charges are highly dangerous and historically have been prone to misfire. At best this can be costly if the downhole tubing is perforated in the wrong place and at worst highly dangerous for the perforation team.

The causes of perforation gun misfires are well publicised and understood and preventative action plans are embedded in safety standards. The three largest threats are:

- Poor **Grounding** between the wireline truck or logging area, wellhead and Derek/Rig metallic structures, allowing potential differences to occur between structures.
- **Stray Voltage** pickup on cables.
- High energy Radio Frequency Interference (**RF**), caused by RF networks and transmitters.

Potentially hazardous stray signals can develop at any time and without warning and only continual monitoring can provide the perforation engineers with the confidence and peace of mind required to perform the job safely, efficiently and to code.

The PM205 provides the confidence to operate to the recommended safe working system, helping to ensure a safer working environment. As well as monitoring stray currents and voltages, the PM205 continuously monitors the ground line integrity. The ground line keeps the wireline unit electrically bonded to the rig and wellhead, and is a key feature for safe operations, if this is not installed properly, or is impaired during operations, the PM205 will alarm. Poor clamp connections, due to paint or rust on the rig, broken cables, and forgetting to plug the ground line into the truck, can all cause problems with the its integrity. The PM205 measures the instantaneous potential, ground resistance and RF with reference to pre-set thresholds, if the value of the threshold is exceeded an alarm condition is indicated audibly and visually.

With a 20 year track record and over 900 units installed worldwide the PM205 offers the premier solution to your perforation safety problems.

### Safe Working Systems and Standards

The PM205 is designed to meet the American Petroleum Institute (API)RP67, the Occupational Health and Safety Code (OHS Code) and the Society of Petroleum Engineers (SPE 20635) requirements.

The OHSC with reference to the API RP67 sets maximum allowable values and provides guidance and methods for safe and correct practice for the perforation process. These standards are recognized by every major wireline operator offering perforation services. SPE 20635 describes how potential stray currents and radio waves affect the ability for safe perforating.

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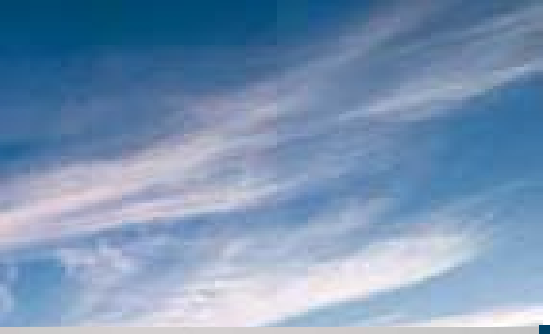

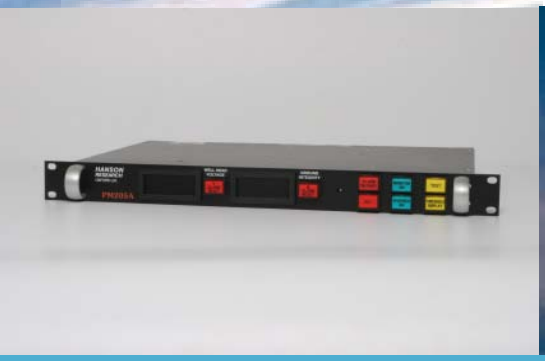

## Options

The PM205 can be configured to meet a range of power and connection requirements. Intertek-CAPCIS has an in house design team that can also add additional features for specific client requirements.

- Power - 110 Vac, 240 Vac or 12 Vdc
- Battery Back Up
- Alarm Relay - self powered or externally powered options
- Hazardous Area - IECx/ATEX Zone 2 units available
- Packaging - for larger unit volumes we are happy to accommodate variations to package colours and handle designs to fit with your requirements.

While not all option combinations are available, we will be happy to discuss your specific requirements.

Operation of the unit also requires a number of compatible peripheral components (RF antenna, cables, alarm sounder, alarm strobe) as part of its installation. While these components are not all directly supplied by us we are happy to advise on their selection.

## Certifications, Standards and Approvals

Intertek-CAPCIS offers an unmatched level of commitment to 3rd party certification of the PM205 product.

Products are built to the IPC610 international standard for printed circuit board manufacture as part of an ISO 9001:2000 quality control system. In addition to this Intertek-CAPCIS is subject to 3rd party product manufacture audits by an international certification body operating under the International Electrotechnical Commission code.

The PM205 is certified/conforms to the following standards:

**Electrical Safety:**

LVD (73/23/EEC): BS EN 61010-1 2001 BS EN 60950-1 2002

**EMC / Emissions:**

EMC Directive (89/336/EEC):

| | |
|---|---|
| BS EN 12895:2000 [VEHICLES] | BS EN 55012-2002 [VEHICLES] |
| BS EN 61000-4-4 | BS EN 61000-4-4 FTB |
| BS EN 61000-4-5 | BS EN 61000-6-2 |
| BS EN 61000-6-3 | BS EN 61000-6-4 |
| FCC Part 15 Verified | |

**Intrinsic Safety Hazardous Area (Zone 2 version only):**

International Electrotechnical Commission (IECEx) and ATEX.

| | |
|---|---|
| IEC 60079-0 : 2007 -10 | Explosive Atmospheres General Requirements |
| IEC 60079-11 : 2006 | Explosive Atmospheres intrinsic safety “i” |

For more information, Pricing and to discuss your requirements please contact Intertek-CAPCIS.

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