



## MHC On-Line Instrumentation

- Direct Connection of MHC 2000 and 3000 Sensors
- Permanent Monitoring of up to 16 Sensors per Instrument
- Proven in Over 10 years of Industrial Application

## MHC On-Line Instrumentation

The MHC-Point is a versatile condition monitoring module that takes the signal from 2000 and 3000 series MHC sensors, providing continuous surveillance of your critical rotating machinery based on unique and patented AE technology.

In this way, the ever vigilant MHC-Point is able to provide an early indication of a wide range of machine faults without the need for detailed design information, shaft speeds or bearing ISO numbers. It can be used as either a standalone unit or an intelligent interface to your existing SCADA and PLC systems. Signals from up to 16 MHC Sensors can be fed to a single node – MHC-Node. The signal from one or more MHC-Nodes can be fed to a permanently installed MHC Point where the signal is processed in to a format compatible with your SCADA or other PLC system. Two versions are available – MHC Point/Std or MHC-Point/Slo.

- MHC-Point/Std systems are the most common and designed for monitoring shaft speeds above about 30 rpm.
- MHC-Point/Slo systems incorporate unique MHC technology and specifically designed for very slow moving or rotating systems with speed from 60 to 0.25 rpm.

Note that permanently installed MHC sensors and instruments come in 2000 and 3000 series. The difference between these two series is the supply voltage being 10V DC for 2000 series and 24V DC for 3000 series. One MHC-Point can monitor up to 16 2000/3000 series sensors via MHC Node.



### What can MHC - Point Detect?

The versatile outputs and unique detection technology at the heart of the MHC-Point allows limitless application possibilities to most rotating machinery. Examples include:

- Lubrication Condition - alert when lubrication is inadequate (eg lack of grease or water/particulate contamination, seal failure)
- Use as part of an intelligent greasing system
- Bearing Condition - provide early warning when journal, ball and roller bearings start to deteriorate
- Provide warning of rapid failure modes to minimise secondary damage
- Gearbox Condition - provide early warning of gearbox degradation (shaft bearings and gear teeth wear)

### What Machinery does the MHC-Point Monitor?



#### MHC-Point/Std

The MHC-Point/Std is capable of monitoring virtually any rotating piece of equipment down to approximately 35 rpm, without knowing anything about the detailed design of the machinery (e.g. rpm, bearing ISO number, previous history etc).

- Fans (air cond, extraction, blowers etc).
- Motors (fixed and variable speed)
- Pumps (centrifugal, screw, lobe etc).
- Gearboxes & pulley drive systems
- Bearings (plain, ball, roller etc).



#### MHC-Point/Slo

The MHC-Point/Slo is capable of monitoring virtually any rotating piece of equipment rotating at speeds from 60 rpm down to 0.25 rpm without knowing anything about the detailed design of the machinery. This capability to monitor very slow rotational speeds in a unique attribute of AE technology, complimenting and extending the range of any existing limitation monitoring programme.

- Low speed drives
- Shaft/drum/roll support bearings
- Turntable bearings, Slew rings, Cranes
- Settling tank scrapers, Tank agitators
- Rotating kilns and lots more.

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## Key Features

### Dual Intelligent Alarms

- Designate criteria for each on Distress®, dB level or both.
- Programmable set-points and time delays (alarm hold-off).
- Manual reset (remote contact closure) or automatic.

### Versatile Outputs

- Switched NPN transistor for relays, PLC / SCADA systems etc.
- Analogue for SCADA / PC (two available, one externally selectable).
- Built-in AE Sensor Excitation

### Handheld MHC Point/Programmer (MHC - PP)

Gives security to set-up, Displays current values, Trending.

### Lost Signal Alarm

Faulty sensor wiring when signal drops below a defined limit.

### Smart Logging

- Saves processed values for the last 128 days.
- Optional memory freeze on alarm, non-volatile memory.
- No need to reset or re-configure after power interruption.
- External disable so only logs when machine is running.
- LED indication of alarm and power status.

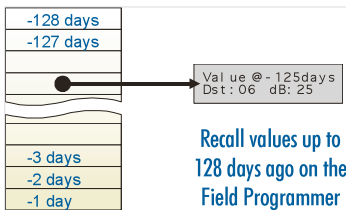
### Adaptable Sensor Options

MHC compatible, 50 ohm phantom drive, standard, waterproof and submersible sensors, structure borne or airborne detection, special sensor options also available.

## About the MHC-Point Technology

MHC-Point has internal non-volatile memory storing the processed signal characterisations for the last 128 days (Distress® and dB Level for MHC-Point/Std and dB Level, Peak, Intensity & Extent® for MHC-Point/Slo). Each reading represents the most significant value that the machine generated in each 24 hours of operation. Logging can be on a 'First In First Out' basis or can be automatically frozen whenever an alarm condition is met. The critical trends of the pertinent signal characterisations over the last 128 days are instantly available to be viewed on the Point Programmer (MHC-PP) at any time.

In addition, the internal status of an MHC-Point is unaffected by interruptions to the power supply. When power is restored, the MHC-Point carries on from where it left off; same alarm set-points and time delay, same alarm status, same logger memory contents etc.

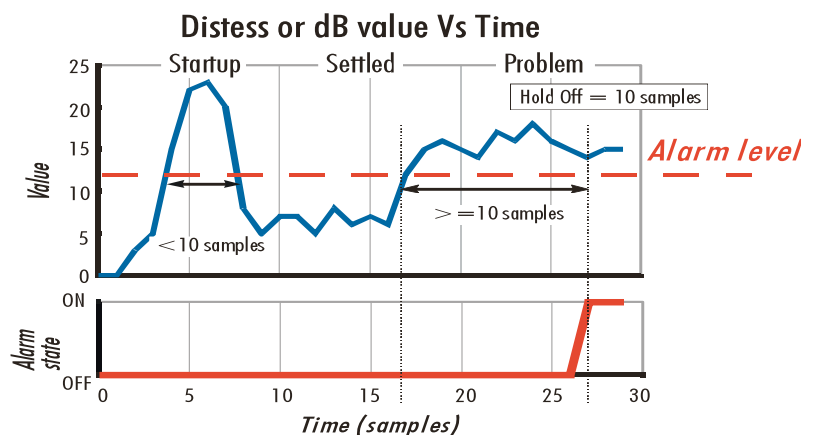


MHC-Point units come with two switching outputs which have independent settings so that two severity levels can be set (e.g. one as warning and the other as an alarm for action). The set-points for each of these outputs is independent and can operate on an individual signal characterisation or all characterisations simultaneously (using an OR function). as in the example below for MHC-Point/Std:

Alarm Function MHC-Point/Std		Alarm Function MHC-Point/Slo	
Alarm if value	> Distress® set-point value	Alarm if value	> dB Level set-point value
	> dB Level set-point value		> Peak set-point value
	> Alarm time delay (hold-off)		> Intensity set-point value
			> Extent® set-point value
			> Alarm time delay (hold-off)

In the example shown, the alarm state (lower trace) only changes when 10 consecutive values for Distress® or dB Level exceed the alarm level, thereby ignoring transient activity. The alarm function of MHC-Point/Slo operates in a similar way but on its dB Level, Peak, Intensity and Extent® signal characterisations.

An additional feature unique to the MHC-Point/Std is a 'Low Signal Level' alarm which is activated if the dB Level falls and stays below 5 dB for 24 hours. In this way short term power interruptions are ignored but attention is drawn to long term drops in signal due to cable damage etc. This feature can be inhibited if not required.



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## MHC-Point - Technical Specifications

<b>Outputs</b>	Alarm Outputs :	2 qty. NPN transistor outputs - current sinking (1.6V @ full 0.1A DC load current) with manual or automatic reset
	Alarm O/P's 1 & 2 :	MHC-Point/Std operates on Distress® & dB Level with optional low dB level alarm when signal level < 5dB. MHC-Point/Slo operates on dB Level, Peak, Intensity & Extent®
	Analogue Outputs :	0 to +2 VDC (max) scaled at 19.5 mV / unit updated every measurement cycle (10 secs for MHC-Point/Std and 9 machine revolutions for MHC-Point/Slo
	Analogue O/P1 :	MHC-Point/Std default is Distress® MHC-Point/Slo default is Intensity (MPX changes to dB Level)
	Analogue O/P2 :	MHC-Point/Std default is dB Level MHC-Point/Slo default is Extent® (MPX changes to Peak)
		Option to toggle analogue outputs via hardwired MPX multiplex feature
		Point Programmer interface (15 pin 'D' type)
<b>Internal Logging</b>		Continuous logging with option to freeze in alarmed state
		Stores processed max values of signal characteristics in each 24 hour period of continuous operation
		128 sets of max values values stored in non-volatile FIFO memory
<b>Set-Up</b>		Primarily via Point Programmer (MHC-PP)
		Programmable (non-volatile) switching set-points (0 to 99)
		Programmable (non-volatile) time delay & alarm hold-off (0 to 255 readings)
		Hardwired external reset & disable
		Hardwired external switching of signal characterisation on analogue outputs (MPX)
<b>Inputs</b>		Internal 20 dB gain reduction
		AE Sensor input - MHC compatible 10 VDC sensor excitation on /2000 series variants, 50 ohm impedance. 24 VDC phantom drive on /3000 series variants
<b>Physical</b>		Dimensions (mm) 110 (l) x 75 (h) x 50 (w)
		Front panel screw terminal connections for inputs, outputs & power supply
<b>Mounting</b>		DIN46277-2, DIN46277-3 rail or wall/panel
<b>Electrical</b>		+24 VDC @ 50 mA (typical with outputs unloaded) from a low noise power supply (< 40mV pk-pk ripple & noise)

## MHC-Point Programmer (MHC-PP)

The MHC-Point Programmer is the user's interface to the MHC-Point. It allows the MHC-Point to be tailored to the specific requirements of the operator and provides a means to access stored values of Distress® and dB Level. It also provides a level of anti-tampering as no unauthorized changes to the operation of the MHC-Point can be made without it. Using the MHC-PP for viewing and programming is easy using the built-in keypad to respond to the menus displayed on the LCD alphanumeric display. Alarms are transistor output (NPN) and can be reset with the MHC-PP, remote contact closure (e.g. manual reset button) or automatically, using pre-programmed reset timing.

Importantly, with just one MHC-PP you can set-up and interrogate any number of MHC-Set Point Instruments



## MHC - Point Programmer (MHC-PP)

I/O socket :	15 pin 'D' type connector
Display :	LCD, 2 x 16 alphanumeric characters
Keypad :	4 button (Up, Down, Menu/Cancel, OK)
Power Source :	Drawn from MHC-SetPoint
Physical (sizes in mm) :	Size 190(l) x 110(w) x 32(h)

### Sensors

Suitable for 2000 and 3000 series MHC Sensors in permanent installation (non-interchangeable)

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## Set Up of an MHC-Point

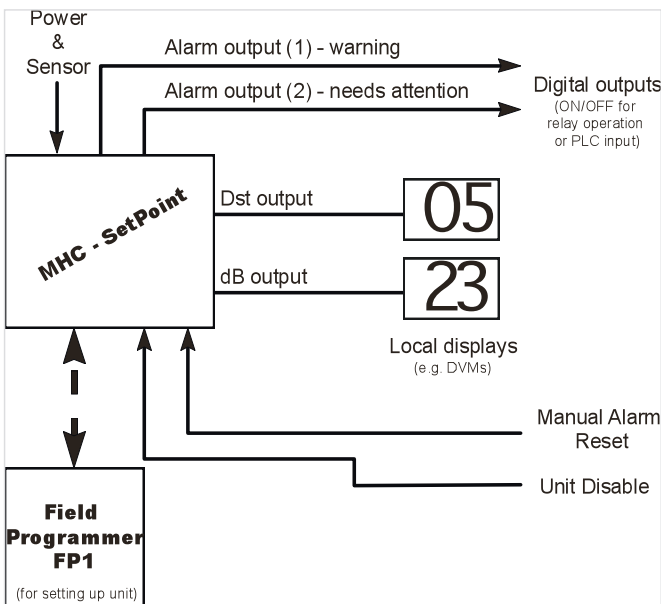
Setting up MHC-Point units couldn't be easier since the internal memory automatically stores the maximum values of the signal. Intelligent alarms can then be simply set with knowledge of the values associated with normal running and the programmable time delay (i.e. alarm hold-off to prevent false alarms), ensuring it only alerts to sustained changes in machine condition. These sophisticated alarms have independently programmed set points and switching criteria based on parameter combinations. To prevent tampering with the MHC-Point settings, all of the programmable features can only be modified through the Point Programmer (MHC-PP) since there are no other interfaces on the main unit front panel.

Analogue outputs of the processed signal characteristics are also provided to allow simple interfacing to SCADA, PC or dedicated data acquisition systems.

## How does the MHC-Point work?

MHC-Point units operate unsupervised in a standalone mode where machinery is continuously checked for deterioration. A typical setup is shown below in the uppermost schematic where the user requires alarms for early and late failures and optional displays of signal characteristics (Distress<sup>®</sup> and dB Level in the example shown which is for the MHC-Point/Std).

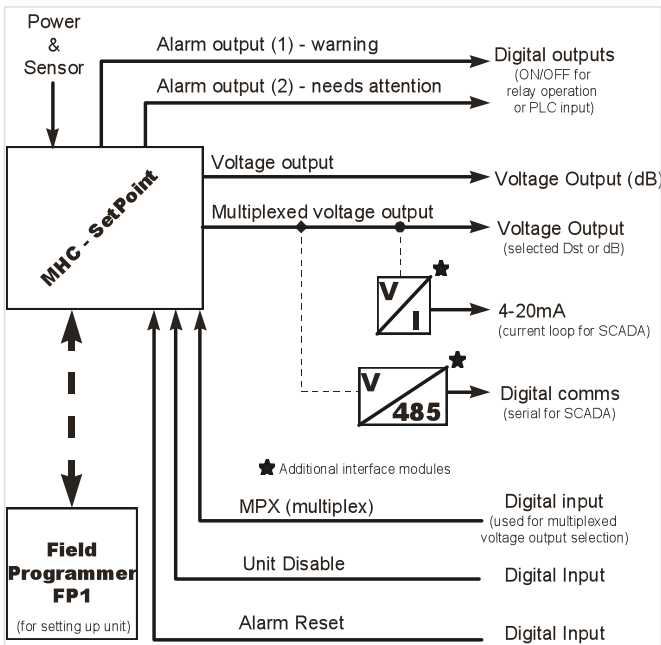
When the alarm is activated by the MHC-Point unit use the MHC-PP to instantly review the trend of readings over the last 128 days.



The MHC-Point will also operate in conjunction with standard PLC, SCADA & PC based data collection systems. To reduce the cost of processing multiple analogue channels, MHC-Point units can, if required, multiplex analogue outputs (MHC-Points /Std : Distress<sup>®</sup> & dB Level on Analogue 1, MHC-Point/Slo : Intensity or dB Level on Analogue 1 and Extent<sup>®</sup> or Peak on Analogue 2) to reduce the number of A to D converter channels required.

In the second example, shown in the lower schematic, the user has opted to use the MHC-Point/Std to interface to a control system to take not only live readings of machine condition (through a single analogue port so that it can be sampled by a single ADC) but also to give local alarms of machine condition via dedicated relays (alarm outputs 1 & 2).

Wide dynamic range circuitry, diffuse field detection and proprietary signal processing methods combine to make the MHC approach second to none. Whilst no CM technique can guarantee to provide early warning of all possible fault conditions, the patented MHC approach has an exceptional track record on all types of rotating machinery.



High frequency Acoustic Emission (AE) signals are detected and processed to characterise both transient activity (Distress<sup>®</sup>, Peak, Intensity and Extent<sup>®</sup> parameters) and overall magnitude (dB Level parameter). Signal levels are strongly affected by machinery fault processes including friction and impacts. In general rotating machinery in very good condition produces minimal transient activity (resulting in Distress<sup>®</sup> and Extent<sup>®</sup> values less than 5) and an increase in Distress<sup>®</sup> or Extent<sup>®</sup> is often the first sign of problems (e.g. from increased impacts due to poor lubrication or damaged surface condition).

The power of the Distress<sup>®</sup> and Extent<sup>®</sup> parameters lies not only in their extreme sensitivity to developing faults, but also in their direct and near universal interpretation across rotating machinery. Since it does this without the need for empirically derived look-up tables or calculated defect frequency information, it provides a less ambiguous monitoring parameter than competitive methods.

dB Level provides a useful means of detecting more continuous activity associated with both accumulated damage and increased friction within moving parts. Peak and Intensity add further to the interpretation at slow rotational speeds (MHC-Point/Slo only).

**Related products** • MHC-2000 and MHC-3000 series AE Sensors • Spares and Accessories

#### **About Kittiwake Holroyd Ltd**

Holroyd are part of the Kittiwake group of companies. If your business is about condition monitoring of machinery, maintenance of industrial fuels and lubricants or monitoring of exhaust gases then Kittiwake operate in your field of expertise. Established in 1993, Kittiwake has grown into a leading global provider of monitoring and testing technology solutions with offices in the UK, Germany, India, USA, and Asia. Innovative technology solutions that make a real difference to your operations. Have a look at our information center on [www.condition-monitoring.com](http://www.condition-monitoring.com) for hints and tips on how to maximize the benefits from your maintenance budget.



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