

# DetCon20

## Detonation Control System



**DetCon20**  
MOTORTECH DETONATION CONTROL SYSTEM



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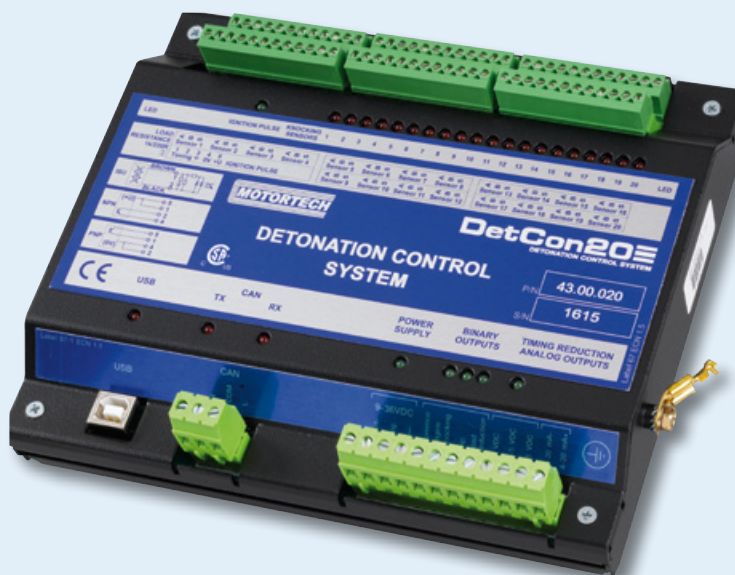
MOTORTECH DETONATION CONTROL SYSTEM

### DetCon20 – Detonation Control System

The gas engine operators are calling for increased power output from their engines. More load means higher temperatures, pressures and tougher operation. This mostly ends in catastrophic engine damages due to detonation or pre-ignition.

As MOTORTECH has proven for years, detonation can be detected professionally with the DetCon20 detonation control system. Single cylinder sensors constantly monitor the sound level of the combustion. If detonation is detected the system will take steps to eliminate detonation immediately.

Upgrade your engine and increase availability of the equipment!



### Technical Data & Features

- Prevents the engine from damages caused by knocking combustion
- Can analyze two-stroke and four-stroke engines with up to 20 cylinders
- Frequency range knock sensors: 1-20 kHz
- Easy Installation and configuration via USB interface
- DenEdit software for visualization and adjustment of firing sequences, actual knocking values or knocking history with long-term data
- Available as a built-in device for a switch cabinet or in a CSA-certified housing.
- DIN rail mounting
- Supply voltage: 9 – 36 VDC
- Can also be used on dual fuel and bi-fuel engines

### Interfaces

- USB 1.1 interface
- CAN Bus interface

### Scope of Supply

- DetCon detonation control system
- CD-ROM with software for configuring the device
- USB interface cable for connecting the device to a PC/laptop
- Operating manual
- Mounting kit (model with housing)

### Recommended Accessories

- AlphaRail wiring rails for easy installation
- PowerView3 for complete visualization of detonation data

# Functional description

## Regular Combustion

Figure 1 shows the desired combustion process of the gas/ air mixture within the combustion chamber. The gas/ air mixture is ignited by the ignition spark. The flame front spreads out evenly with the specific laminar flame speed of the gas/ air mixture. During the combustion, the cylinder pressure increases moderately.

## Knocking Combustion

A knocking combustion is the result of a self-ignition of the gas/ air mixture prior to the actual flame front 2. The main reason for pre-ignition is an uncontrolled increase in pressure and temperature caused by the pressure and temperature fronts, which move faster than the regular flame front. The pressure and temperature fronts caused by self-ignition can cause further self-ignitions.

Inside the combustion chamber high frequency shock waves arise. They are transferred from the combustion chamber to the engine structure and given off to the environment as airborne sound. This makes the knocking audible 3 – 5.

Compared to regular combustion the knocking combustion results in significantly higher peak pressure. In addition to a higher thermal load this might also lead to a damaged engine.

## DetCon20 – Detonation Control System

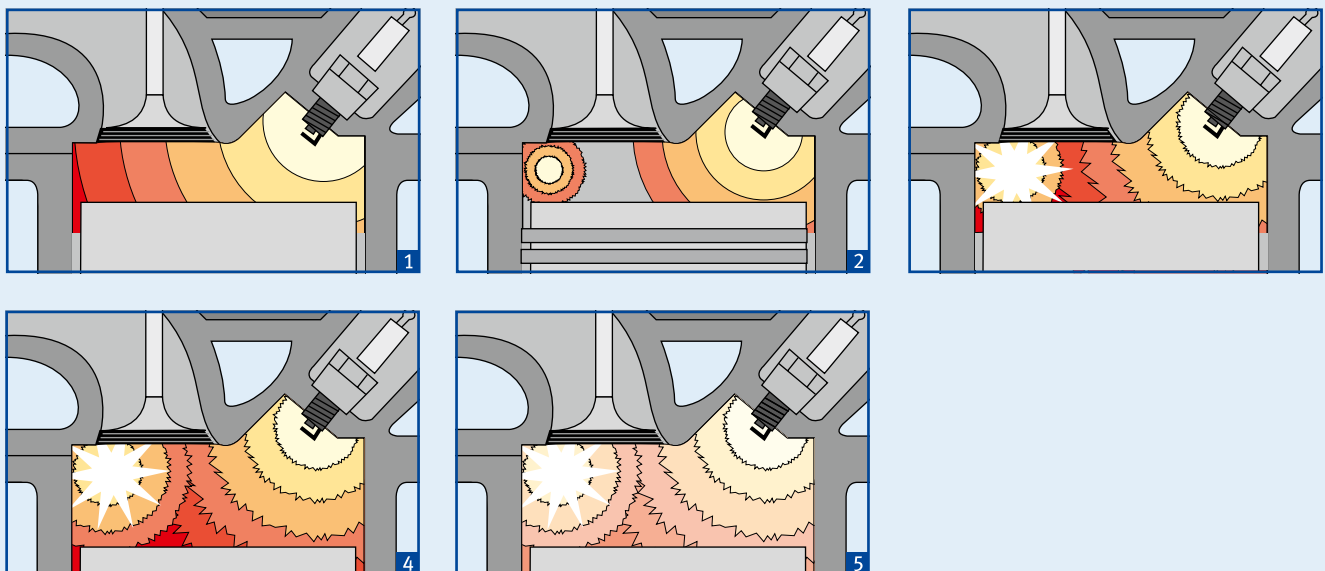
The geometry of the combustion chamber leads to engine-specific sounds of knocking combustion. The DetCon20 detonation control system measures the frequency spectrum of each power cycle with structure-borne sound sensors and compares it with engine specific parameters.

If knocking is detected in a cylinder's power cycle, the DetCon20 detonation control system attempts to stop knocking by setting a later ignition timing. If knocking is no longer detected, the ignition is set back to an early timing.

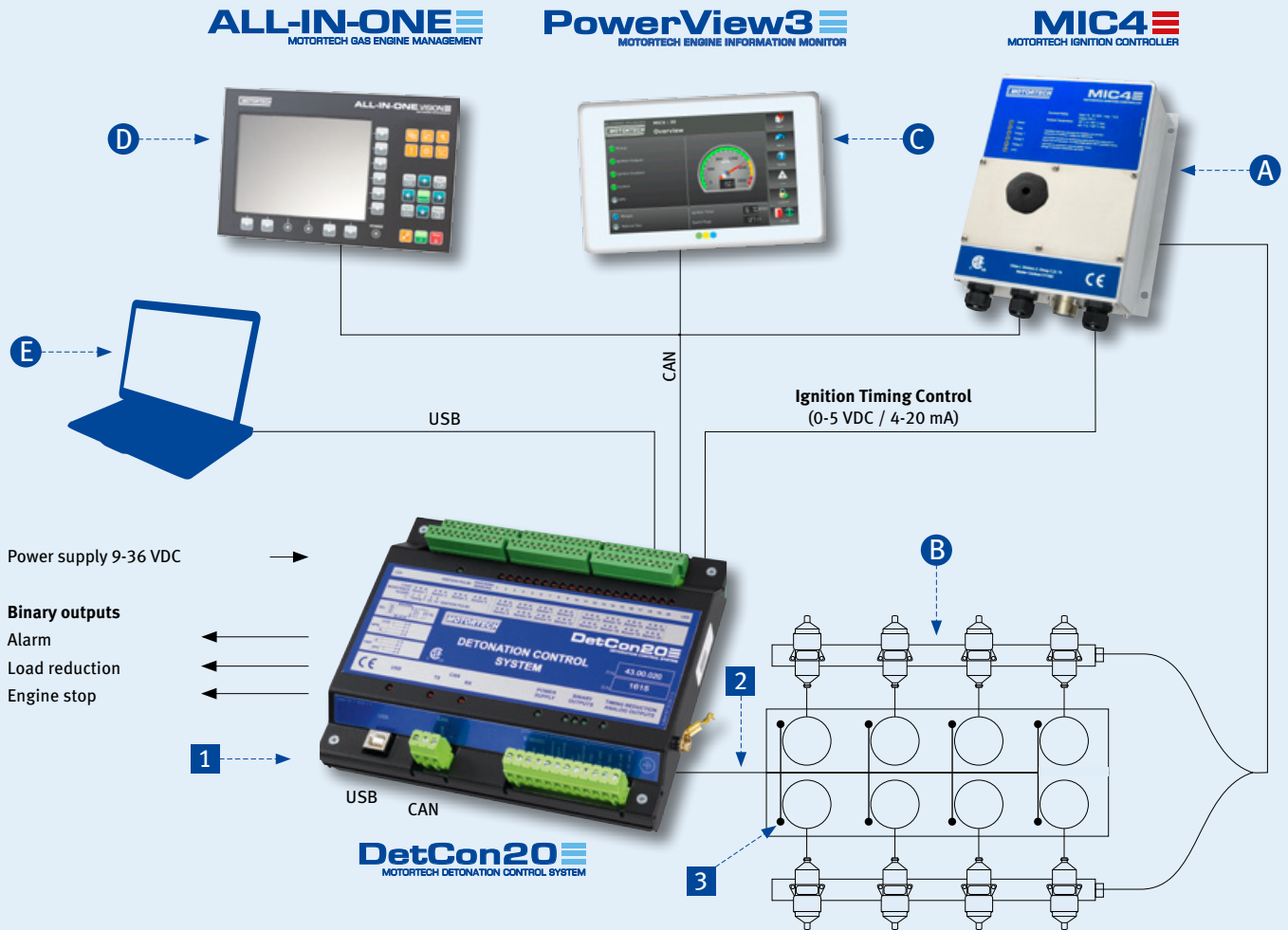
If stronger knocking is detected or the retarded timing has no effect, the signal for load reduction is sent to a superior engine controller.

The signal for engine shutdown is sent to the superior engine controller when the load reduction is unable to stop the knocking.

The result is a reliable protection of the engine against damages caused by knocking combustion.



# System Overview



## Required Accessories

- 1 DetCon20
- 2 Knock sensor wiring
- 3 Knock sensor

## Accessories

- A Ignition controller
- B Wiring rail (ignition)
- C PowerView3\*
- D ALL-IN-ONE\*
- E Laptop

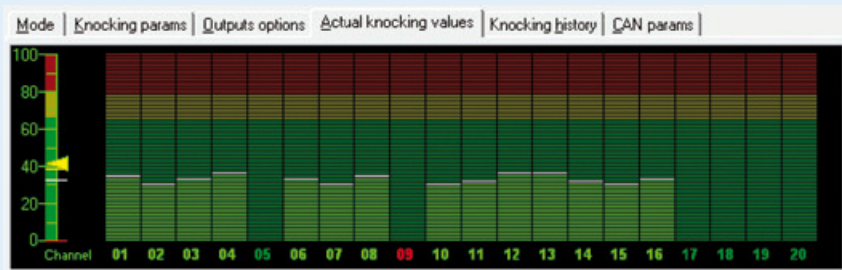
\* Visualization via MOTORTECH PowerView3, alternatively with MOTORTECH ALL-IN-ONE



# Software

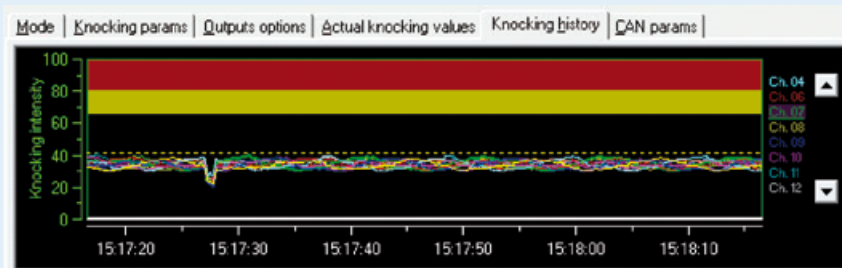
## DenEdit – DetCon Software

You can configure the DetCon device to display the current knocking values of the engine and determine the values off-line using the DenEdit software application.



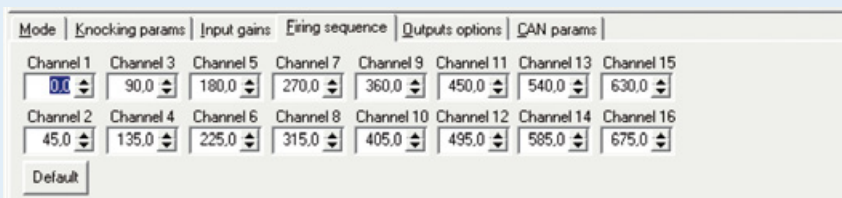
### Actual knocking value

In this example the current knocking values for every cylinder are shown. The background color indicates the set limits (yellow area – ignition timing adjustment -> load reduction, red area – engine shut-down).



### Knocking history

This screen gives an overview of all sensor activity during the last minute. It is possible to display individual cylinders or, as seen in the diagram, all cylinders. This makes it easy to analyze deviations.



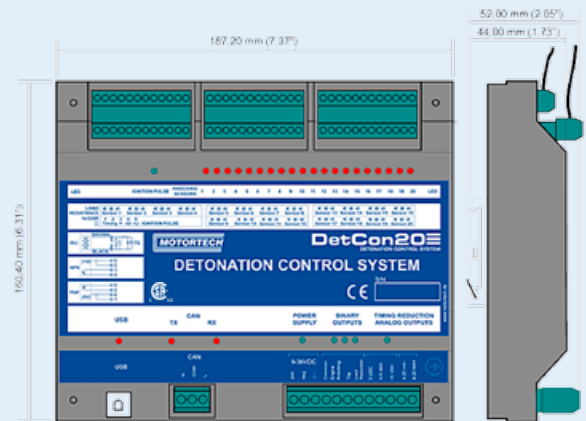
Channel 1	Channel 3	Channel 5	Channel 7	Channel 9	Channel 11	Channel 13	Channel 15
0.0	90.0	180.0	270.0	360.0	450.0	540.0	630.0
Channel 2	Channel 4	Channel 6	Channel 8	Channel 10	Channel 12	Channel 14	Channel 16
45.0	135.0	225.0	315.0	405.0	495.0	585.0	675.0

### Timing sequences

This menu provides the option to enter a freely definable firing sequence.

# Mechanical Data

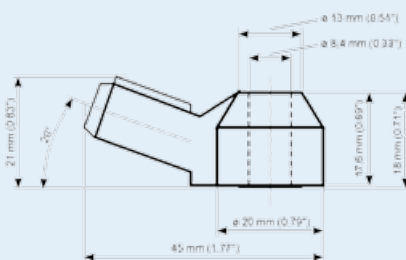
Property	Value
Dimensions of the device (incl. DIN rail clamps)	DetCon20 160 x 187 x 52 mm (6.3 x 7.37 x 2.05") Model with enclosure 400 x 300 x 125 mm (15.75 x 11.81 x 4.92") (length x width x height)
Mounting the electric unit	DIN rail mounting
Weight	0,74 kg (1.63 lbs)
Protection class	Protection class: IP 20
Environmental conditions	Operation -10° C to 60° C max. (14° F to 140° F) Storage -40° C to 70° C max. (-40° F to 158° F) max. 95% humidity without condensation



## Accessories

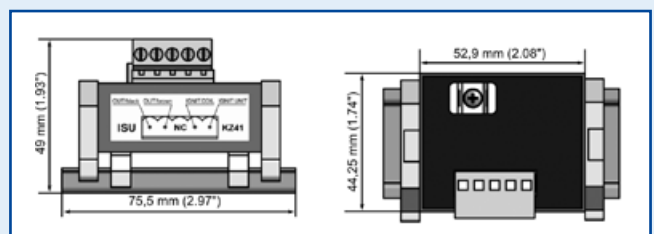
### Knock Sensors

Can be installed on any cylinder head bolt or stud. Measures the combustion signal and transfers it to the controller.



### ISU – Ignition Sensor Unit

When used with ignition controllers that are not part of the MIC3/ MIC4/ MIC5/ MIC850 series, an additional ignition impulse sensor is required.



## Accessories

### PowerView3 MOTORTECH ENGINE INFORMATION MONITOR

#### PowerView3 – HMI Module

The operating data of DetCon20 Detonation Control System is completely visualized by the HMI module (Human Machine Interface). The overview screen shows the relevant information such as engine knocking, knock intensity and status for activated load reduction or emergency shutdown of the engine.

The control buttons guarantee easy navigation through different display pages and menus. Thus, the PowerView3 HMI module is also able to provide error diagnostics on-site without requiring a laptop!

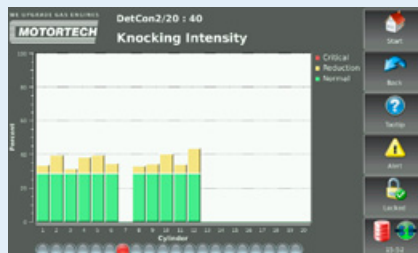


#### Sample Screens



##### DetCon Overview

Screen shows the most important operating data of the connected DetCon control unit.



##### Knocking Intensity

Visualization of knocking intensity of each monitored cylinder. Different colors inform about the system status (Normal – Reduction – Critical).



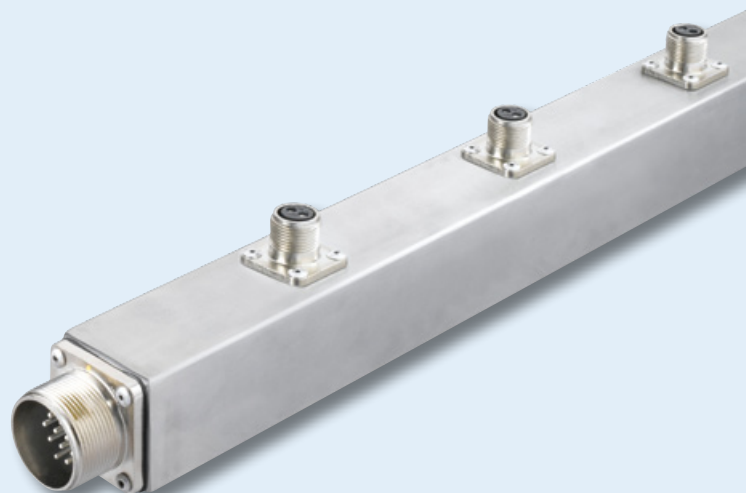
##### Trend of the Knocking Intensity

Visualization of knocking intensity trend data for each individual cylinder.

### AlphaRail MOTORTECH WIRING RAIL SYSTEM

#### MOTORTECH AlphaRail – Wiring Rail System for Detonation Control

MOTORTECH Stainless Steel, vibration resistant rail assembly will withstand any harsh environment commonly found in oil & gas industry. Our proven design is made for engine manufacturers and the global aftermarket. Do not go low-tech and take the risk of engine down time because of equipment being under repair. Eliminate the need for constant rewiring, connector exchanges or straightening out weak and bent aluminum wiring rails.



When things get hot our Service Team is at your site quickly.



Regardless of which part of the globe we need to travel to. We know that the stakes are high, and therefore we outperform the others. That is because we want everything to run smoothly at your site, everywhere and at any time.



This is entirely in keeping with our motto: Let us drop everything and work on your problem!



Distribution partner for DENSO spark plugs



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