About Gill Instruments

With headquarters in Lymington, UK, Gill Instruments Ltd supply ignition and air/fuel ratio control systems for stationary and mobile gas engines. We have over twenty years of experience in the industry, supplying SMEs and OEMs worldwide.

All of our engine control products have been developed using the very latest technology to provide the user with intelligent, efficient systems that will increase fuel economy, cut emissions and reduce engine wear.

We offer ignition modules, coils, pick-ups, diesel to CNG/LNG conversion kits and air/fuel ratio control systems, as well as CSA® certified complete ignition and air/fuel systems. An overview of the range follows in this brochure, with full specifications located at the rear. Further details, images and datasheets are available on our website: www.gill.co.uk.

Product Overview

The Gill Engine Control range is flexible enough to offer cost-effective solutions for almost any engine configuration from 1 to 12 cylinders. Our core product range encompasses ignition and air/fuel control systems, as shown in the diagram below.

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Contents

Product Overview.........................................................................2

Ignition Systems
Introduction to Gill Inductive Ignition Technology .....................4
Inductive Ignition Modules ..........................................................5
CSA Certified Ignition System .....................................................6
Spark Diagnostics ....................................................................6
Inductive Ignition Coils ...............................................................7
Inductive Pick-ups ....................................................................7
Pick-up Conversion Kits ..............................................................8
Diesel to CNG/LNG Conversion Kits .........................................8

Air/Fuel Control Systems
Introduction to Gill Air/Fuel Ratio Control Technology ...............9
Air/Fuel Ratio Control Module .....................................................10
CSA Certified Air/Fuel Control System ........................................10
Digital Display for Ignition and Air Fuel Systems .......................11
Product Specifications................................................................13
Gill ignition systems use inductive technology to ignite the air/fuel mixture. Inductive coils are generally more efficient than capacitor discharge coils as they provide longer spark duration, ensuring complete combustion, especially on lean burn and turbo charged engines. An inductive ignition coil provides just enough energy to cross the spark gap; the remaining energy from the ignition coil is used to maintain the spark. Capacitor discharge coils release almost all their energy instantaneously, therefore considerably reducing the amount of energy available to maintain the spark.

An inductive ignition system can produce a spark duration in excess of 2000 µs, compared to a maximum of 600 µs in a capacitor system. The dwell time in an inductive ignition system can be altered for differing engine applications. To improve combustion of lean mixtures, an increased dwell time will input more energy into the primary coil. Where there is more than enough spark energy to combust the mixture the dwell time can be decreased, reducing spark plug wear.

The high energy and long, programmable spark durations are a considerable advantage since they provide better ignition of lean or non-homogenous air/fuel mixtures. In many cases engines that are unable to meet emission standards with capacitive discharge systems can be brought into compliance with Gill inductive ignition systems.

Advantages of Inductive Ignition
- Longer spark duration, ensuring complete combustion
- Adjustable dwell time
- Increased spark plug life
- Reduction or elimination of mis-fires
Ignition Modules
for Engines up to 12 Cylinders

Gill ignition modules are designed to control normally aspirated, turbo-charged and lean-burn engines running on LPG, natural gas and bio gas. The GS range utilises the latest inductive ignition technology to provide a powerful spark with long duration, enabling complete combustion of low calorific value fuels as well as lean air/fuel mixtures.

The GS range has been specifically designed for the stationary gas engine market, however the igniters are also currently utilised in a wide range of more complex vehicle applications.

Features
- Ignition modules for 1 - 12 cylinder engines
- Fully programmable via Windows® based GUI software for:
  - Number of cylinders
  - Ignition point for load, speed, temperature and fuel type
  - Dwell with auto supply voltage compensation for full control of spark energy and duration
- Flexible user security feature
- Configurable for OEM engine timing disc patterns and sensors
- On-board visible status indicator
- Optional advanced spark diagnostics

Typical Applications
- CHP Engines
- Generator Set Engines
- Compressor Engines
- Commercial Vehicle Engines
- Fork Lift Truck Engines

GS4: up to 4 cylinders
GS6: up to 6 cylinders
GS8: up to 8 cylinders
GS12: up to 12 cylinders

Advanced Spark Diagnostics
Real-time Monitoring of HT Lead & Spark Plug Health through PC or IDU10 Display

Available as an optional extra on the GS8 and GS12 ignition modules, Advanced Spark Diagnostics allows the user to remotely monitor the condition of the high tension voltage supplied to the spark plugs.

Features
- Monitor health of HT leads and spark plugs
- Error condition output when value falls outside set limits
- Real-time engine condition data displayed graphically or in a table
- Increase service intervals by only changing spark plugs as and when required.
Inductive Ignition Coils

Gill Ignition Coils are available in several electrical and mechanical configurations. We have a frame mount ignition coil (FM40), designed for small petrol and gas engine applications, surface mount ignition coils (SM60 and CY90) with a higher energy output designed for gas engines and integral coils (IC6 and IC12).

Frame & Surface Mount Coils

- FM40
- SM60 A & SM60 T
- CY90 F Flange model
- CY90 T Stud model
- CY90 S CSA® Approved

Integral Coils

- IC6
- IC12

Inductive Engine Position Sensors / Pickups

Our range of inductive ignition pickups is compatible with our engine control systems and has been designed to give reliable performance even in the most demanding applications. We can also supply non-contact linear and rotary position sensors which are designed for use in harsh environments.

Pickup Conversion Kits

Convert your Altronic® III and Altronic® V ignition systems to a fully programmable advanced Gill ignition system. Kits are available to allow these units to use the existing housings and some gear parts and substitute a magnetic pick-up to identify engine position, this single pick-up is then connected to a Gill GS ignition module either mounted on a side bracket or elsewhere on the engine. Additionally, substituting existing CDI coils with Gill inductive ignition coils provides the system benefits as described on page 4.

A3 Conversion Kit
Application
Converts existing Altronic® III units to a single pickup timing kit

A5 Conversion Kit
Application
Converts existing Altronic® V units to a single pickup timing kit

Diesel to CNG/LNG Conversion Kits

Ignition Systems for 4 - 6 Cylinder OEM Gas Engines

Gill Diesel to CNG/LNG Conversion Kits have been designed for use on compressed natural gas (CNG) or propane (LNG) applications and are ideal for use by OEMs on new gas engines or for conversion of existing diesel engines. All components in the kits have been optimised to work together, producing a very efficient system.

Kits Include
- Ignition Module (GS4 or GS6 - see p.5)
- Ignition Coils (SM60A - see p.7)
- Timing Disc
- Pick-up
- Wiring Harness

654 Ignition Kit
for 4 cylinder engines

656 Ignition Kit
for 6 cylinder engines
**Air/Fuel Ratio Control**

*One Controller for Lean Burn and Stoichiometric Engines*

The Gill air/fuel ratio control system provides cost effective emissions control for gaseous fuelled engines used in demanding industrial applications. The system is designed to accurately control the air/fuel ratio of stoichiometric engines fitted with a three way catalytic converter, and lean burn engines with or without a cat.

- Automatically controls optimum air/fuel ratio
- Reduces engine emissions
- Prolongs catalyst life
- Improves engine efficiency
- No need for constant manual engine tuning

**Typical Applications**

- CHP Engines
- Generator Set Engines
- Compressor Engines
- Commercial Vehicle Engines
- Fork Lift Truck Engines

The Gill AF120 system uses a wide band oxygen sensor (UGEO) that provides a consistent linear output, in relation to percentage of oxygen in an engine’s exhaust. This provides accurate measurement from very fuel rich air/fuel mixtures up to 21% Oxygen concentration (Atmospheric concentration) – see graph below. This sensor can be used in both stoichiometric and lean burn configurations and allows the use of proportional control systems.

**Pump Current (lp) vs %O₂, for a UEGO type sensor**

As the UEGO sensor provides such an accurate measurement of the oxygen concentration, for example when an engine experiences a change in load, the AF120 system is able to measure the change in O₂ and make adjustments to the valve position accordingly leading to a faster and more accurate response to load steps. Engines using the Gill AF120 system have shown that the system is capable of keeping an engine’s emissions below strict requirements such as those in California, for over six months, without the operator making changes to the engine—a major improvement over older narrow band systems.

**AF120 Air/Fuel Control Module**

The AF120 control module can be used within a variety of control systems. In the carburettor bypass configuration the Gill AF120 fuel valve can be utilised. Alternatively the module can be used to control fuel pressure regulator systems and systems requiring turbo waste gate control.

**Features**

- Outputs to stepper or current controlled bypass valves.
- Fast start up due to heating of UEGO sensor.
- Programmable via easy to use Windows based GUI
- Controls Lambda value to set-point by means of proportional, integral control loop
- Programmable valve start position and offset
- Programmable load map
- The 4-20 mA output can drive pneumatic control valves on engines fitted with turbo waste gate.

**EH12 Shielded Air/Fuel Control System**

The Gill EH12 is a CSA® approved shielded enclosure housing the AF120 Air/Fuel Ratio Control Module. This unit allows easy internal wiring termination negating the need for additional junction boxes.

**Features**

- CSA® Certified Class 1, DIV 2, Groups C & D
- Compatible with AF120 Air/Fuel Control Module
- Optional remote display
- Header-type connectors for quick and simple installation
The IDU10 Display is designed for use with Gill ignition and air/fuel control systems (factory configured for the application type). The unit is available in both panel-mount and surface-mount configurations, with a robust case sealed to IP65 and clear, intuitive menu structure.

**Ignition Control**

The IDU10 Display is compatible with Gill GS8 and GS12 Ignition Modules and can be used as a remote unit with the EH12 shielded protective enclosure. The unit offers users comprehensive display and control functions including:

- Engine RPM and ignition angle
- Coil diagnostics (if optional spark diagnostics fitted to the ignition module)
- Allows engine timing adjustment via PIN lockable keypad
- Status flags

**Air/Fuel Control**

The IDU10 Display is compatible with the Gill AF120 Air/Fuel Control Module and can be used as a remote unit with the EH12 shielded protective enclosure. The unit offers users comprehensive display and control functions including:

- Lambda (mA)
- Lambda Heater Resistance (Ohms)
- Valve Position (% open)
- Allows Setpoint (mA) adjustment via PIN lockable keypad
- Status Flags

When used with the EH12 shielded enclosure, the IDU10 display is CSA* Certified to Class 1, Div. 2, Groups C and D.

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**SPECIFICATIONS ON P.14**

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[Image of IDU10 Display and control panel]
### Inductive Pickups / Engine Position Sensors

**G56**
- **Number of Cylinders**: 4
- **Ignition Points**: Fully programmable for engine speed, load, temperature, and fuel type
- **Timing Maps**: Typically 15, programmable to 6000 RPM
- **Ignition/Fuel Line Limits**: Fully programmable to 6000 RPM
- **Spark Energy / Duration**: Full user control via selectable dwell time with automatic supply voltage compensation
- **Temperature Mapping**: Option
- **Inputs**: 7/16 or MAF sensors for load, thermometer for temperature mapping
- **Outputs**: On-board variable speed indicator, optional fuel valve drive, Torino / Speed signal
- **Communications**: RS232 for programming via Windows® based GUI
- **Power Supply**: 12V or 24VDC
- **Environmental**: -40 °C to + 90 °C, sealed to IP65
- **Certification**: CSA® Certified Class 1, Div. 2, Groups C and D

**G58**
- **Number of Cylinders**: 8
- **Ignition Points**: Fully programmable for engine speed, load, temperature, and fuel type
- **Timing Maps**: Typically 15, programmable to 6000 RPM
- **Ignition/Fuel Line Limits**: Fully programmable to 6000 RPM
- **Spark Energy / Duration**: Full user control via selectable dwell time with automatic supply voltage compensation
- **Advanced Spark Diagnostics**: Option
- **Inputs**: 7/16 or MAF sensors for load, thermometer for temperature mapping, ignition inhibit /enable switch, optional fuel valve drive, Torino / Speed signal
- **Outputs**: On-board variable speed indicator, optional fuel valve drive, Torino / Speed signal
- **Communications**: RS232 for programming via Windows® based GUI
- **Power Supply**: 12V or 24VDC
- **Environmental**: -40 °C to + 90 °C, sealed to IP65
- **Certification**: CSA® Certified Class 1, Div. 2, Groups C and D

### Ignition Coils

**FM40**
- **Primary resistance**: 0.75 ohms nominal
- **Primary inductance**: 1.5H
- **Peak current**: 5A
- **Typical Spark Duration**: 20μs
- **Spark energy**: 80mJ
- **Secondary voltage**: 30kV max
- **Options**: IDU10 Control Panel Mount
- **Environmental**: -40 °C to + 90 °C, sealed to IP65

**SM40 T, SM40 A**
- **Primary resistance**: 0.75 ohms nominal
- **Primary inductance**: 1.5H
- **Peak current**: 5A
- **Typical Spark Duration**: 20μs
- **Spark energy**: 80mJ
- **Secondary voltage**: 30kV max
- **Options**: IDU10 Control Panel Mount
- **Environmental**: -40 °C to + 90 °C, sealed to IP65

### Air/Fuel Ratio Control Module

**AF120 Air/Fuel Ratio Control Module**
- **Input**: Wideband UEGO sensor for exhaust oxygen measurements
- **AF120 air/fuel ratio control module**
- **Options**: IDU10 Control Panel Mount
- **Environmental**: -40 °C to + 90 °C, sealed to IP65
- **Supply Voltage**: 12 - 24VDC

### Air/Fuel Valve

**AF120 Air/Fuel Valve**
- **Input**: Voltage input stepper motor with over 200 steps driven from the AF120 air/fuel ratio control module
- **Connection**: Connector and output connectors via 1/4 NPT thread

### Digital Display

**OUI1 Display**
- **Option**: IDU10 Control Panel Mount
- **Environmental**: -40 °C to + 90 °C, sealed to IP65

### CSA Certified Enclosure

**EH12 Enclosure - CSA Certified Class 1, Div. 2, Groups C and D**
- **Options**: Ignition for housing Gill SM, GS, or G12 Ignition Modules
- **Communications**: RS232 available through a gland on the MS connectors mounted on the side of the enclosure
- **Power Supply**: Rated for 10-30VDC, 15W Max

**BM12 Enclosure**
- **Options**: Ignition for housing Gill SM, GS, or G12 Ignition Modules
- **Environmental**: 95% max, humidity, 85% relative humidity
- **Glove Box**: 24VDC (10V to 36VDC, 12V to 120VAC (12V to 144VDC)

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*Specifications may be subject to change without prior notice*