



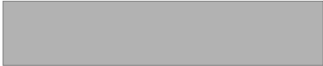

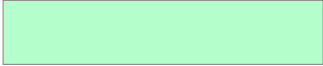



2006

Magneti Marelli
MOTORSPORT PRODUCTS
V 1.0



CONTENTS:

	Alternators, Motors and Voltage Regulators
	Fuel System and Ignition
	Sensors
	Electronic Control Systems
	Data Acquisition, Display and Lap Trigger
	Software

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ALTERNATORS, MOTORS AND VOLTAGE REGULATORS



ALTERNATORS

- ✓ A93/40A
- ✓ A93/90A
- ✓ A115I/120A
- ✓ A115I/180A
- ✓ A45 L
- ✓ A55

MOTORS

- ✓ TGE 426 R

VOLTAGE REGULATORS

- ✓ MRA23
- ✓ MVRM01

Alternators, Motors, V Regulators





ALTERNATORS

A93/40A

Wound field alternator
13.5 V - 40 A

Description

A compact alternator for sport cars.

Rewound stator with flexible connections to bridge.

Upgraded and ruggedized rectifier bridge to deal with harsh vibrational environment.

Sealed high speed & quality bearings.

Stiffer brush springs for harsh vibrational environment.

Brackets modified to prevent stator rotation.

The rear bracket can be supplied as shown or rotated by increments of 90°.*

Connection by spade connector or dedicated loom.*

* Contact factory for these options.



Main Features

- 40 A output
- 18000 rpm max speed
- Clockwise rotation
- 2.6 Kg weight

Benefits

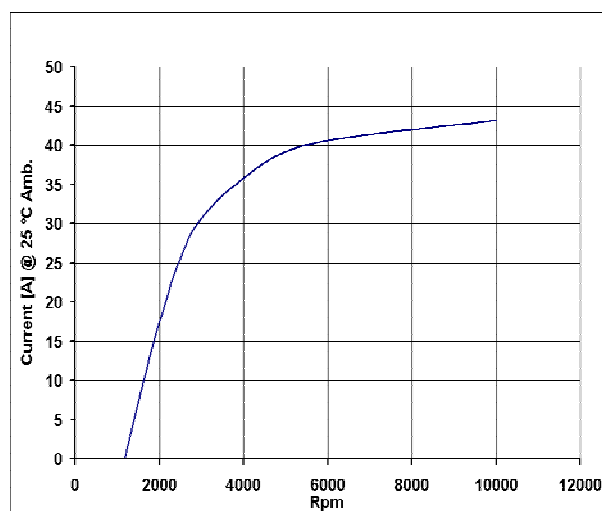
- High output to weight ratio
- Integral voltage regulator

Typical Applications

Touring car

Single seaters

Typical Performance

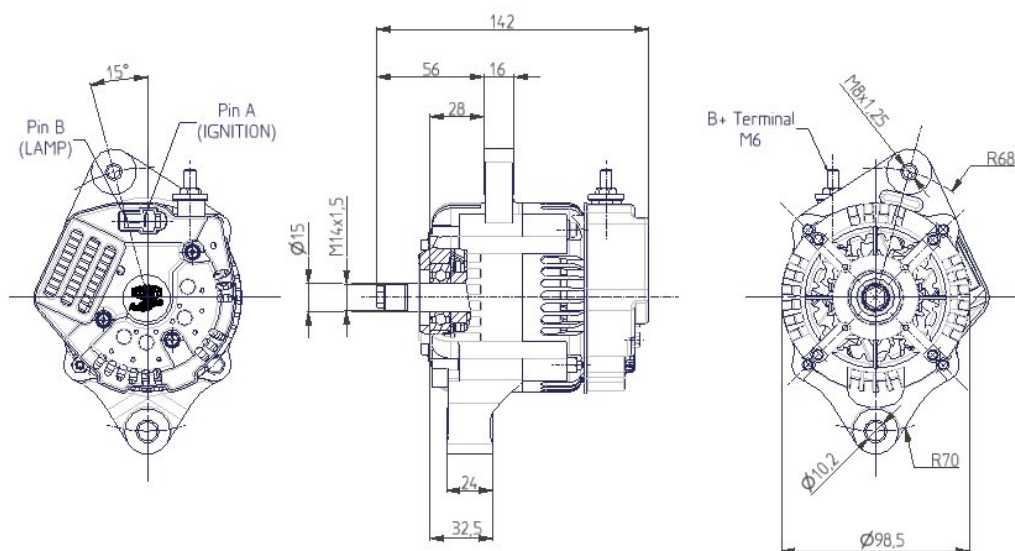


ALTERNATORS

A93/40A

Wound field alternator
13.5 V - 40 A

Dimensions

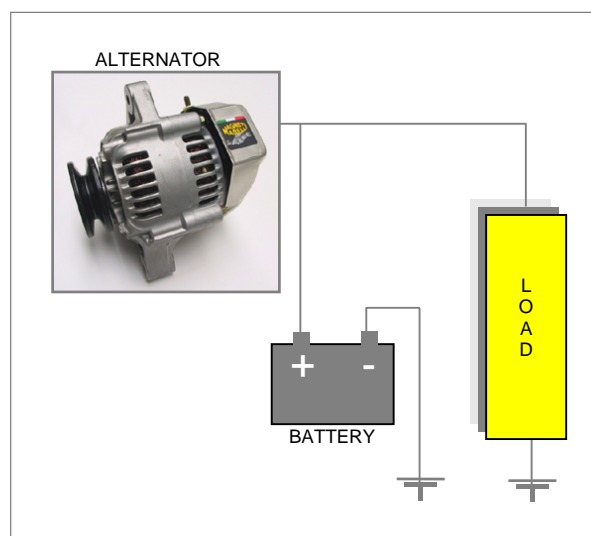


Dimensions in millimetres

Technical Characteristics

Cut in speed.....	1150	rpm
Maximum speed.....	18000	rpm
Rotation.....	Clockwise only	
Operating temperature (ambient).....	Up to 90	°C
Regulated voltage.....	13.5	V
Weight.....	2.6	Kg

Application Schematics



For further information, please contact:



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ALTERNATORS

A93/90A

Wound field alternator
13.5 V - 90 A

Description

A compact alternator for sport cars.

Rewound stator with flexible connections to bridge.

Upgraded and ruggedized rectifier bridge to deal with extra power and harsh vibrational environment.

Sealed high speed & quality bearings.

Stiffer brush springs for harsh vibrational environment.

Brackets modified to prevent stator rotation.

The rear bracket can be supplied as shown or rotated by increments of 90°.*

Connection by spade connector or dedicated loom.*

* Contact factory for these options.



Main Features

- 90 A output
- 18000 rpm max speed
- Clockwise rotation
- 2.6 Kg weight

Benefits

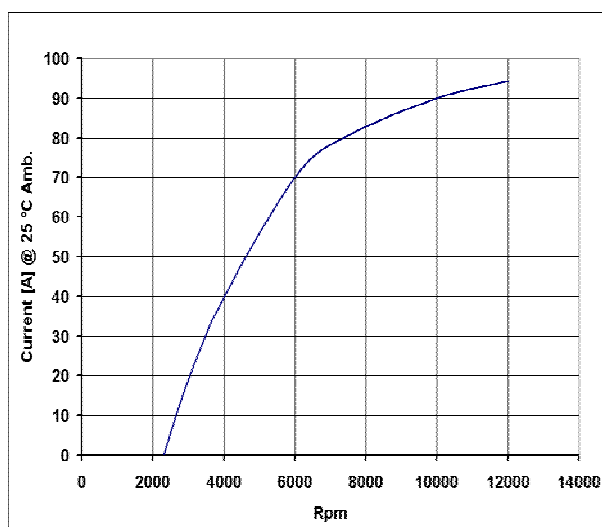
- High output to weight ratio
- Integral voltage regulator

Typical Applications

Touring car

Rally car

Typical Performance

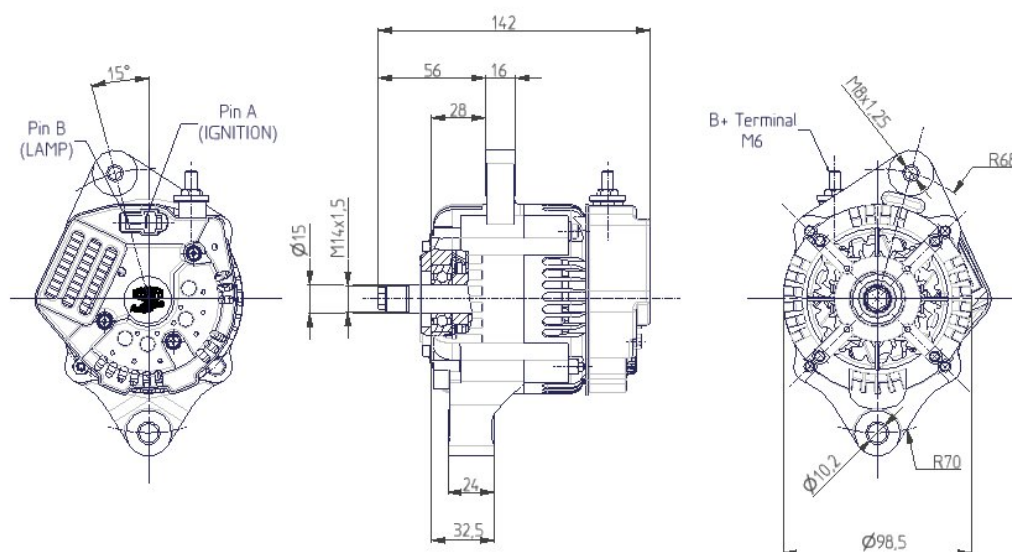


ALTERNATORS

A93/90A

Wound field alternator
13.5 V - 90 A

Dimensions

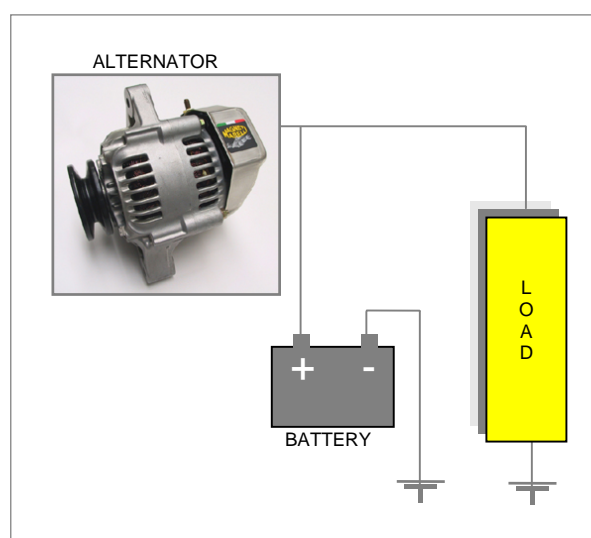


Dimensions in millimetres

Technical Characteristics

Cut in speed.....	2400	rpm
Maximum speed.....	18000	rpm
Rotation.....	Clockwise only	
Operating temperature (ambient).....	Up to 90	°C
Regulated voltage.....	13.5	V
Weight.....	2.6	Kg

Application Schematics



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ALTERNATORS

A115I/120A

Wound field alternator
13.5 V - 120 A

Description

A light weight high output alternator for rally cars.

Rewound stator.

Upgraded rectifier bridge to deal with extra power.

Sealed high speed & quality bearings.

Stiffer brush springs for harsh vibrational environment.

Contact factory for availability of other bracket configurations.

Main Features

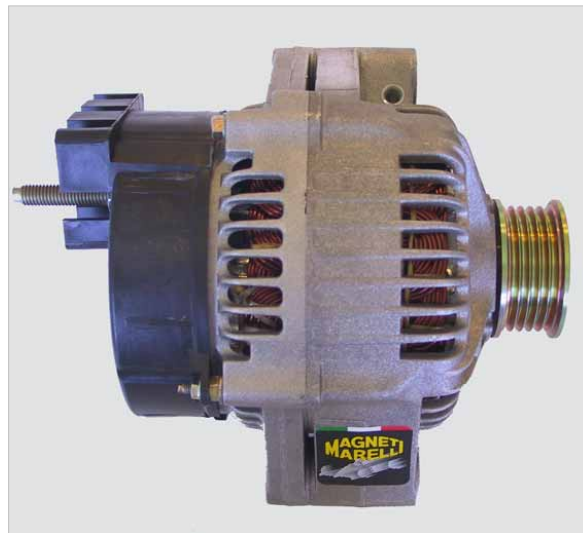
- 120 A output
- 18000 rpm max speed
- Clockwise rotation
- < 5 Kg weight

Benefits

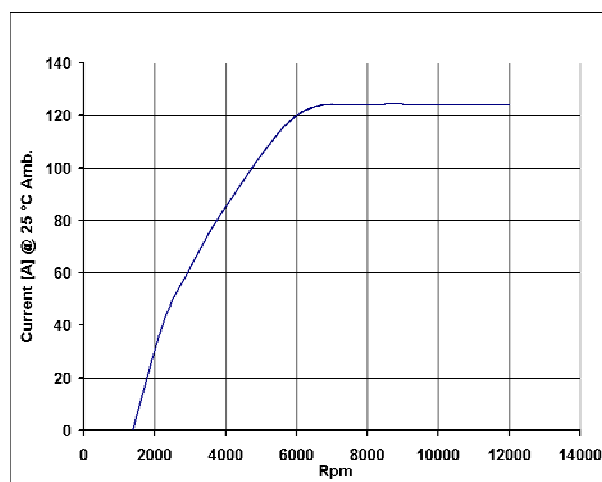
- High output to weight ratio
- Integral voltage regulator

Typical Applications

Professional circuit and rally applications



Typical Performance



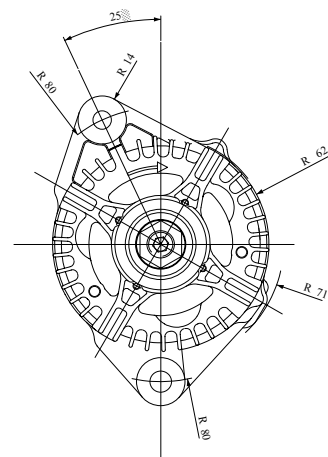
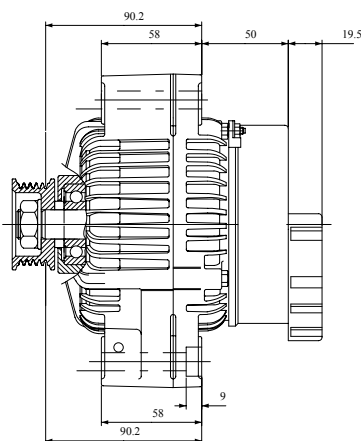
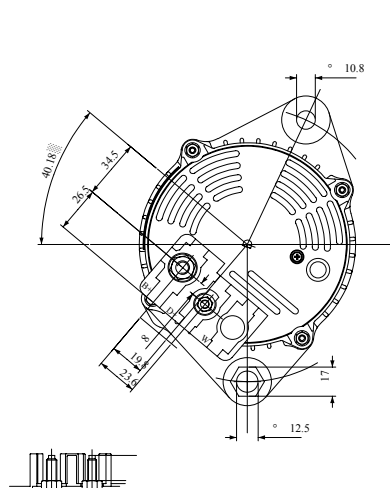
A115I/120A

A115I/120A

Wound field alternator

13.5 V - 120 A

Dimensions



B+ Terminal M6x1
D+ Terminal M5x0.8

B+ Terminal M6x1
D+ Terminal M5x0.8

Dimensions in millimetres

Technical Characteristics

Cut in speed.....	1400	rpm
Maximum speed.....	18000	rpm
Rotation.....	Clockwise only	
Operating temperature (ambient).....	Up to 90	°C
Regulated voltage.....	13.5	V
Weight.....	4.8	Kg

Maximum speed.....18000 rpm

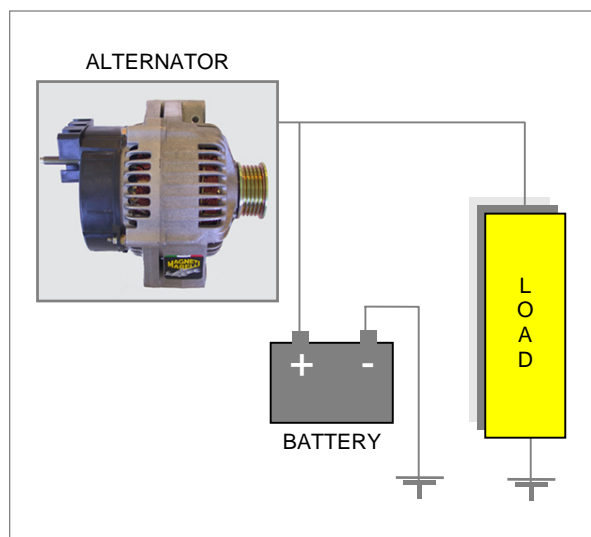
Rotation..... Clockwise only

Operating temperature (ambient)..... Up to 90 °C

Regulated voltage 13.5 V

Weight..... 4.8 Kg

Application Schematics



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ALTERNATORS

A115I/180A

Wound field alternator
13.5 V - 180 A

Description

A light weight ultra high output alternator for rally and rally-raid application.

Standard features are: rewound stator, upgraded rectifier bridge, reinforced brush holder springs.

Sealed bearings with HT grease.

A custom heat sink is fitted to deal with the extra power on rectifier bridge.

Contact factory for availability of other bracket configurations.

Main Features

- 180 A output
- 18000 rpm max speed
- Clockwise rotation
- < 5 Kg weight

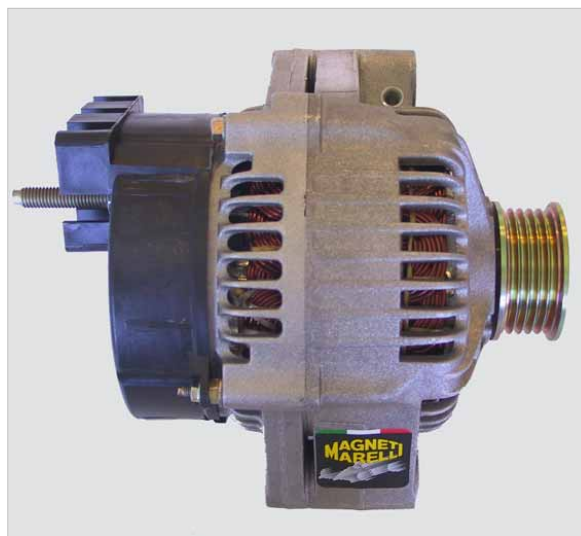
Benefits

- High output to weight ratio
- Integral voltage regulator

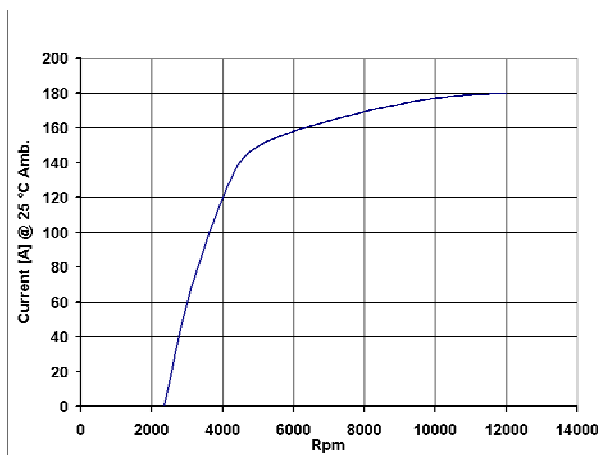
Typical Applications

Professional circuit and rally applications

Rally-raid



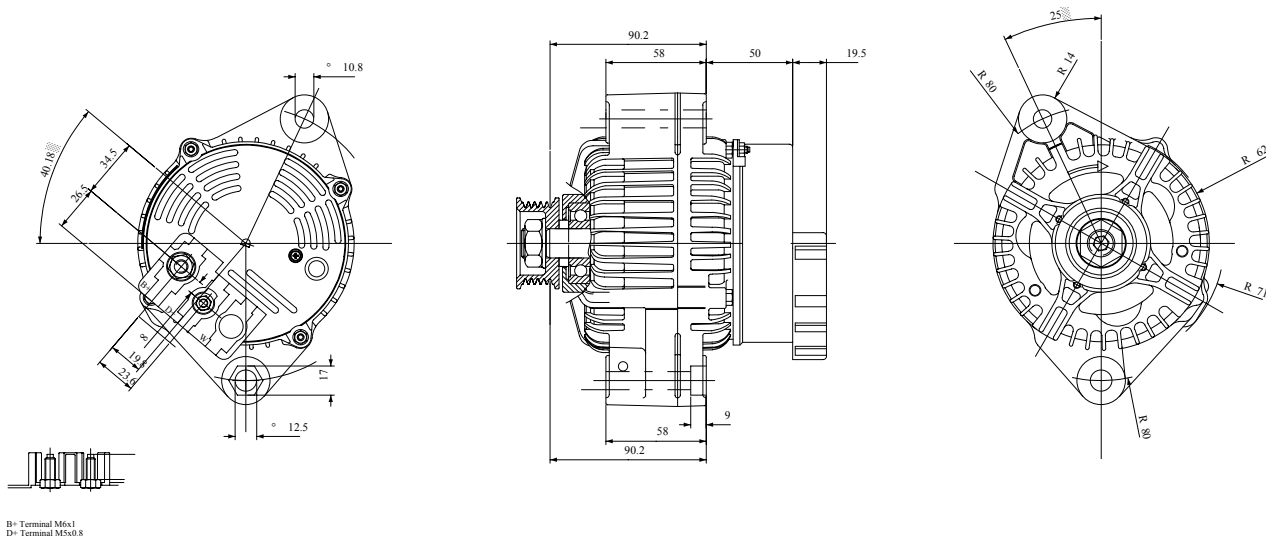
Typical Performance



A115I/180A

Wound field alternator
13.5 V - 180 A

Dimensions

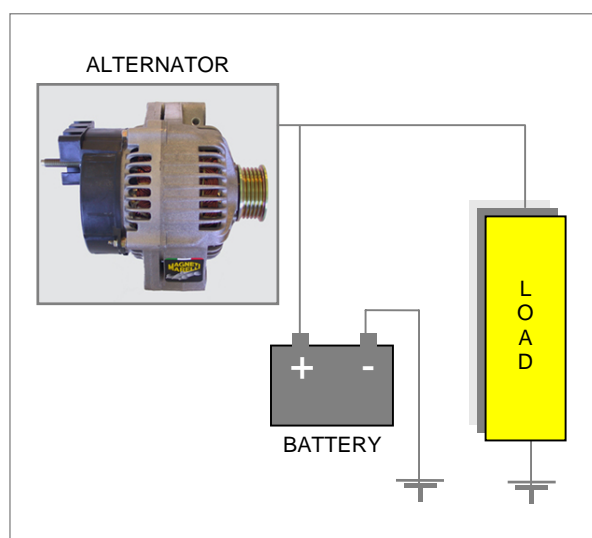


Dimensions in millimetres

Technical Characteristics

Cut in speed.....	2400	rpm
Maximum speed.....	18000	rpm
Rotation.....	Clockwise only	
Operating temperature (ambient).....	Up to 90	°C
Regulated voltage	13.5	V
Weight.....	4.9	Kg

Application Schematics



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ALTERNATORS

A45 L

Permanent magnet alternator
13.5 V - Up to 20 A

Description

A lightweight permanent magnet alternator for formula1 and top motorcycle applications.

Rare earth magnets and aircraft quality stator laminations allow maximum output with minimum size.

Machined housing and military grade stator winding allow maximum reliability even at temperatures above 100 °C.

Contact factory for suitable voltage regulators and for higher output current.



Main Features

- Up to 20 A output
- 19000 rpm max speed
- Clockwise and counterclockwise rotation
- 750 g weight

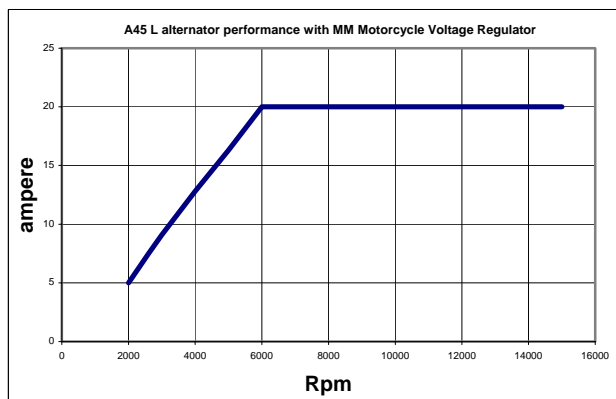
Benefits

- High output to weight ratio
- High resistance to vibrations
- No electronics on alternator

Typical Applications

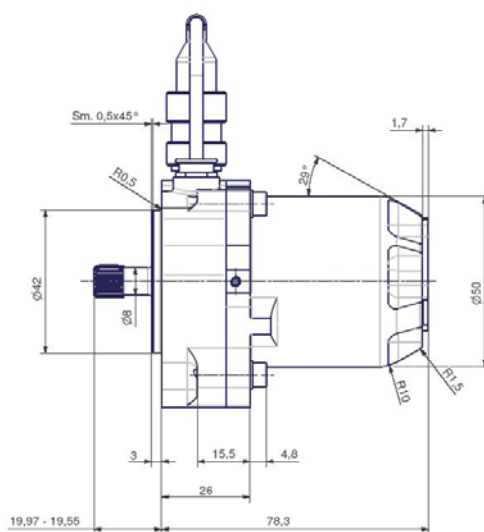
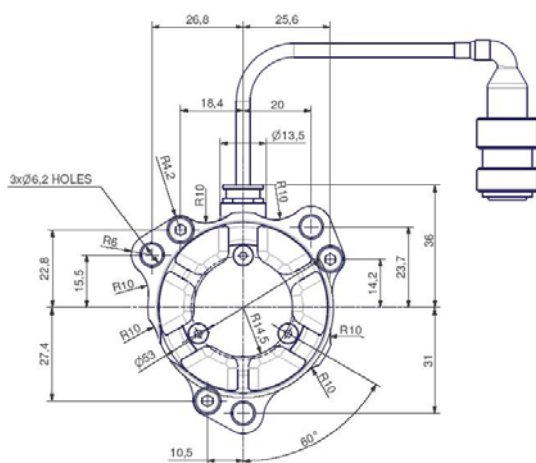
- MotoGP
- Race motorcycle application

Typical Performance



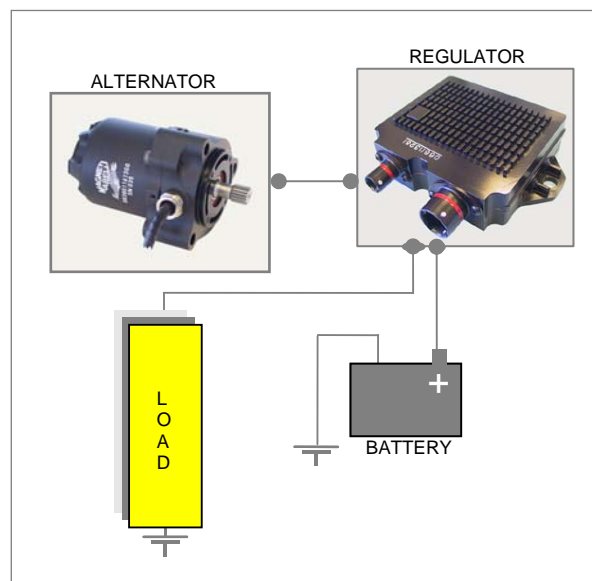
A45 L

Dimensions



Technical Characteristics

Application Schematics



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ALTERNATORS

A55

Alternator 13.5 V – Up to 35 A

Description

A lightweight permanent magnet alternator for formula1 and top motorcycle applications.

Rare earth magnets and aircraft quality stator laminations allow maximum output with minimum size.

Machined housing and military grade stator winding allow maximum reliability even at temperatures above 100 °C.

Contact factory for suitable voltage regulators.

Main Features

- Up to 35 A output
- 19000 rpm max speed
- Clockwise and counterclockwise rotation
- 940 g weight

Benefits

- High output to weight ratio
- High resistance to vibrations
- No electronics on alternator

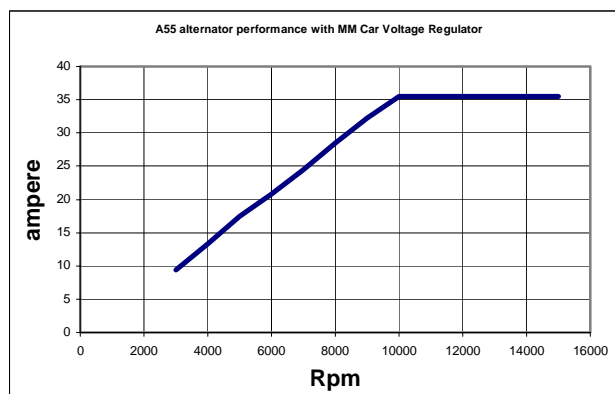
Typical Applications

Formula1

MotoGP



Typical Performance

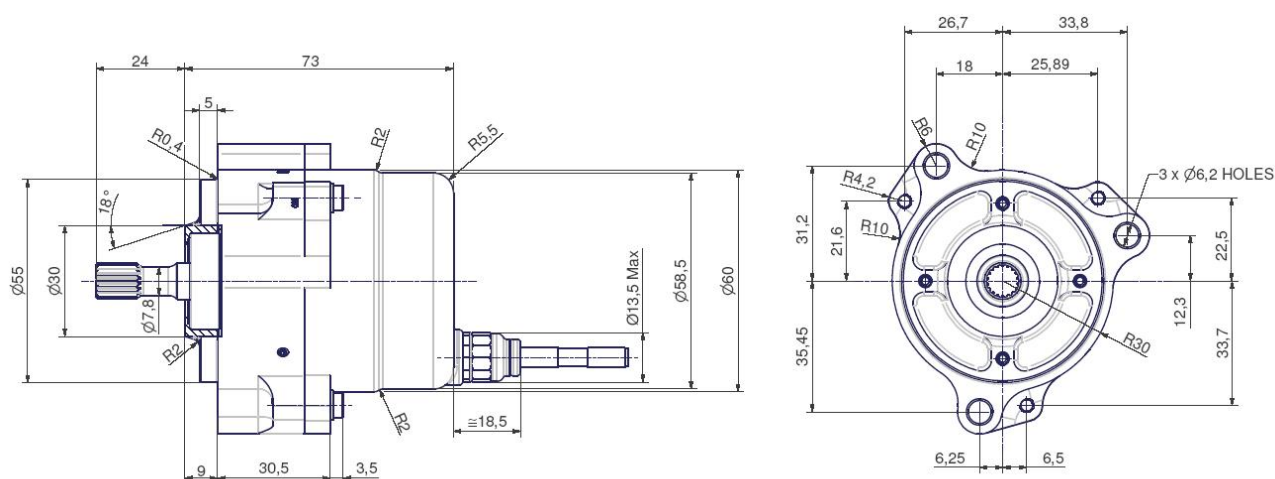


ALTERNATORS

A55

Alternator 13.5 V – Up to 35 A

Dimensions

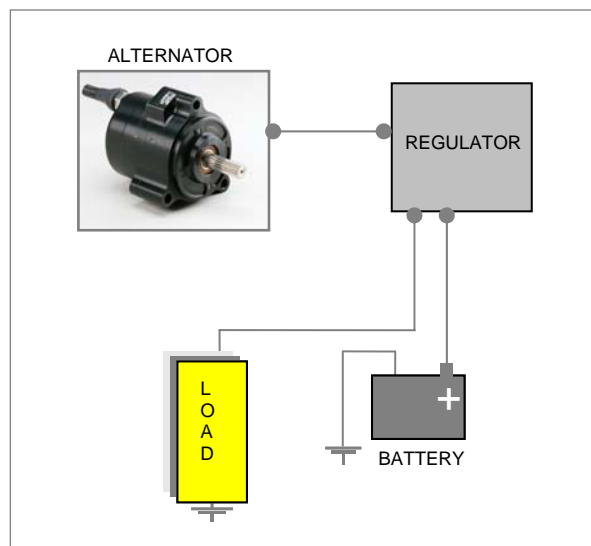


Dimensions in millimetres

Technical Characteristics

Cut in speed.....	2300	rpm
Maximum alternator speed	19000	rpm
Rotation.....	Clockwise or counterclockwise	
Operating temperature max.		
copper.....	200	°C
bearings.....	150	°C
Regulated voltage	13.5	V
Connector Type	contact factory	
Cable length.....	contact factory	
Weight.....	940	g

Application Schematics



For further information, please contact:



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MOTORS

TGE 426 R

Racing wiper motor
130° swept angle

Description

Hi-torque version of TGE 426.

Increased motor torque allows use of higher pressure wiper blade springs.

Main Features

- Rewound rotor to maximize motor torque
- High swing rate
- Mating connector supplied with motor
- Cable exit option available on demand
- Intermittence operation possible

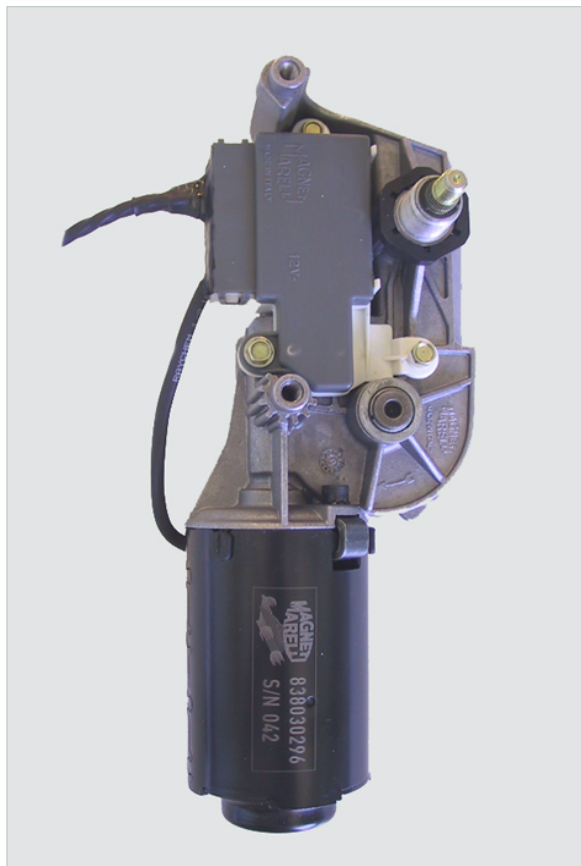
Benefits

- Adjustable rest position
- Adjustable swept angle (130° max)

Typical Applications

Touring car

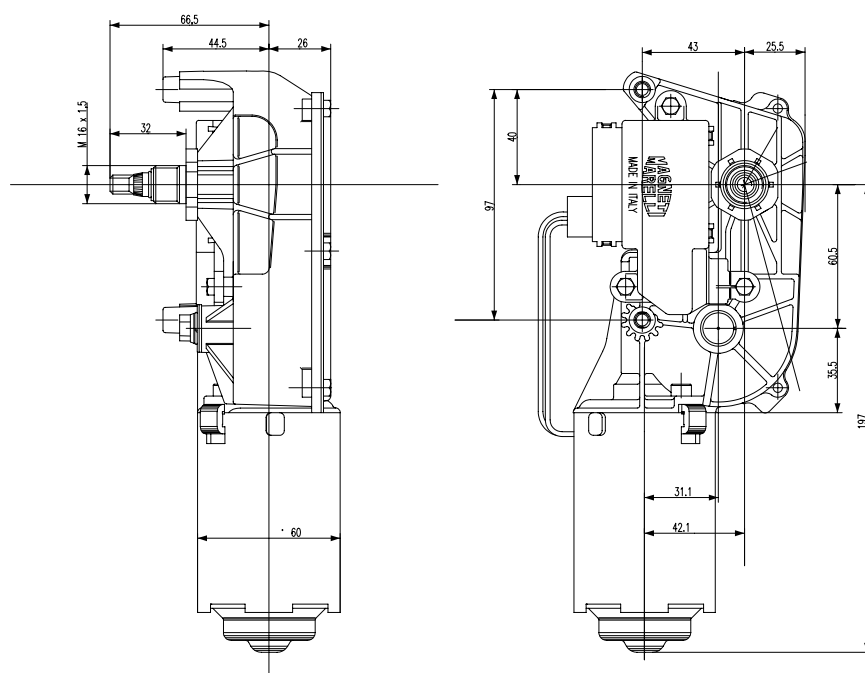
Professional circuit and rally applications



TGE 426 R

Racing wiper motor
130° swept angle

Dimensions



Dimensions in millimetres

Technical Characteristics

Swings on wet glass $75 \pm 5 \text{ min}^{-1}$
 Absorption on wet glass $< 3.2 \text{ A}$
 Intermittence frequency 15 min^{-1}
 Weight 1.45 kg

For further information, please contact:



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VOLTAGE REGULATORS

MRA23

Voltage regulator

Description

The MRA23 is a compact lightweight voltage regulator for permanent magnet alternators.

The design concept allows cool and safe operation of the alternator with a stable and smooth output.

The device has an analogue output voltage "Ireg" individually calibrated, proportional to the output current. A PT1000 output is also available to monitor operating temperature and optimise cooling.

* Contact factory for suitable matching alternator.

Main Features

- Measure of output current available
- Objective check of installation possible (PT1000)

Benefits

- Low weight
- Small outline



Typical Applications

MotoGP

SBK

Race motorcycle application

VOLTAGE REGULATORS

MRA23

Voltage regulator

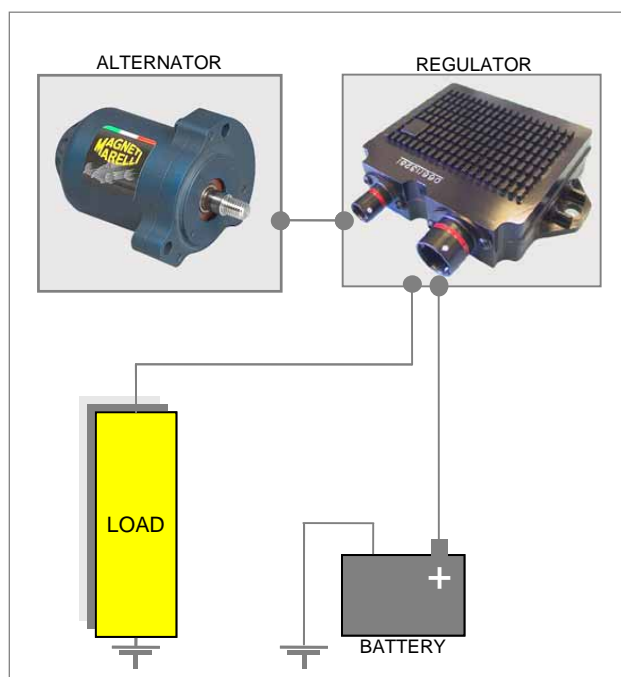
Technical Characteristics

Maximum output	20	A*
Output voltage.....	13.8	V**
Output voltage ripple	< 1	%
Operating temperature.....	* see note below	
Weight (approx.)	350	g

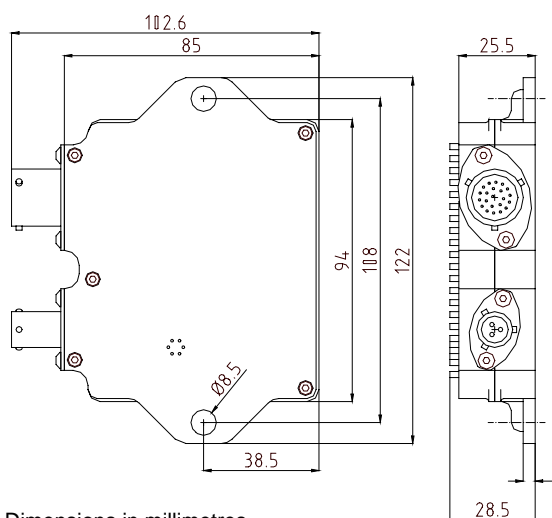
*Only with the regulator well ventilated in order to keep the PT1000 temperature signal lower than 65 °C

**Contact factory for different output voltage

Application Schematics



Dimensions



Dimensions in millimetres

For further information, please contact:



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AUXILIARY MODULES

MVRM01

High performance voltage regulator
14 V - 20 A

Description

MVRM01 is a compact lightweight voltage regulator for permanent magnet alternators (advised the used with A45 alternator).

The device has a power box section which provides 4 power outputs controlled by an on board microprocessor.

Internal signals of temperature, voltage and current are sampled and available to the ECU via CAN.

MVRM01 provides a PWM output controlled by software which can be used to reduce the load of the electrical fuel pump MGP01.

Main Features

- Power box with:
 - 2 high side driver (10 A)
 - 1 high side driver (5 A)
 - 1 PWM output (low side driver):
 - 6 A, 10 kHz, duty cycle from 0 to 100 %
 - 10 A if used as a low side driver (100 %)
- Availability of internal signals: load current, battery current and output/input voltage
- Availability of critical internal temperatures
- Small dimension & weight

Benefits

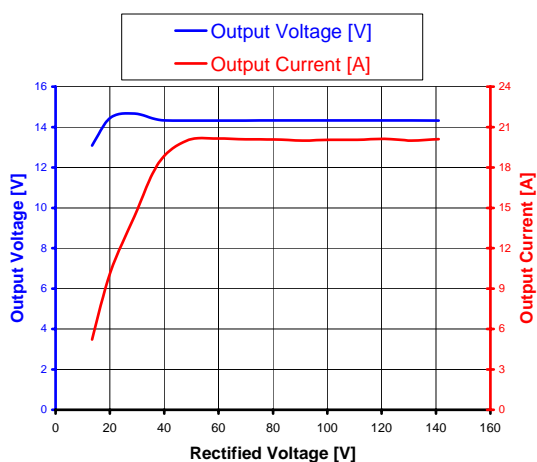
- Output voltage settable from 10 V to 16 V
- Improved efficiency (86 %)
- PWM output usable with the electrical fuel pump MGP01

Typical Applications

In MotoGP and motorbike coupled with permanent magnet alternator supplying maximum rectified voltage of 180 V



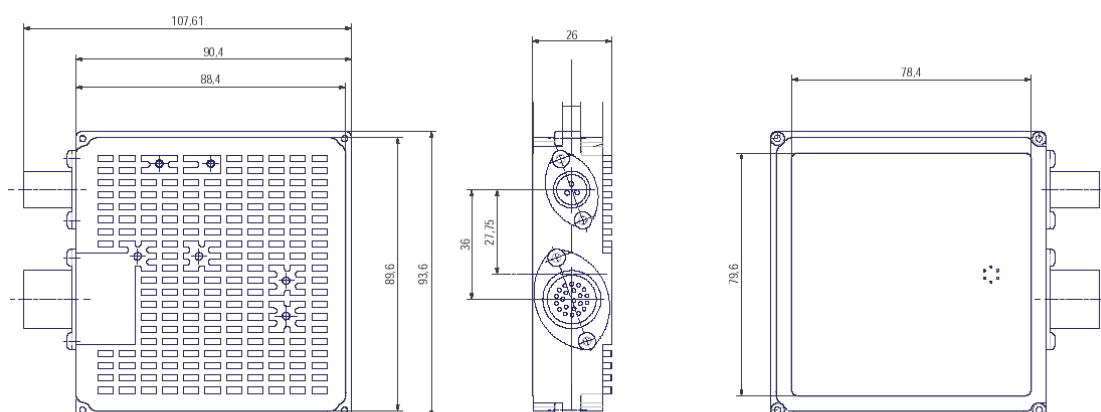
Typical Performance



MVRM01

High performance voltage regulator
14 V – 20 A

Dimensions



Dimensions in millimetres

Technical Characteristics

Maximum continuous output	20 A
Nominal output voltage	14 V
Output voltage ripple	2 %
Pressure sensor input	1
PWM	1
Protection class	IP 54
Maximum operating temperature ⁽¹⁾	80 °C

Connectors

AS 212-35 PN..... 22 pin

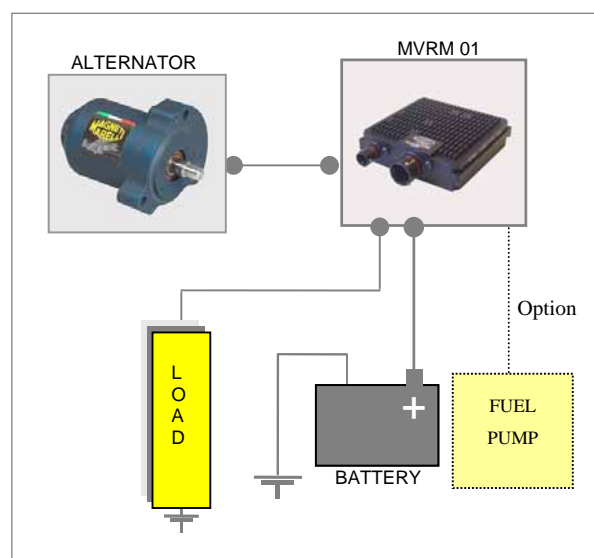
AS 208-98PN..... 3 pin

Weight (approx.) 300 g

⁽¹⁾ Measured on the aluminum case

Note: The relation between the case temperature and the internal temperatures, available via CAN, has been established and provided with the regulator once purchased.

Application Schematics



For further information, please contact:



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IGNITION COILS

- ✓ BAE801
- ✓ BAE403 RC
- ✓ BAE403 RI
- ✓ Ø 19.5
- ✓ Ø 19.5-15A

INJECTORS

- ✓ IWP
- ✓ IWPR
- ✓ GPI

PRESSURE REGULATORS

- ✓ RPM 58...74
- ✓ GPR

PUMPS

- ✓ MGP01
- ✓ FLP 004

Fuel System and Ignition





IGNITION COILS

BAE801

Double ended ignition coil

Description

A compact high energy cost effective double ended ignition coil for inductive ignition systems to be used with std. ignition modules.

Particularly suitable for four cylinder engines with "wasted spark" arrangement.

Main Features

- Simple ignition system design mainly on 4 cylinder engines

Benefits

- Low cost

Typical Applications

Atmospheric and blown engines

F3 - IRL – GT - Rally



IGNITION COILS

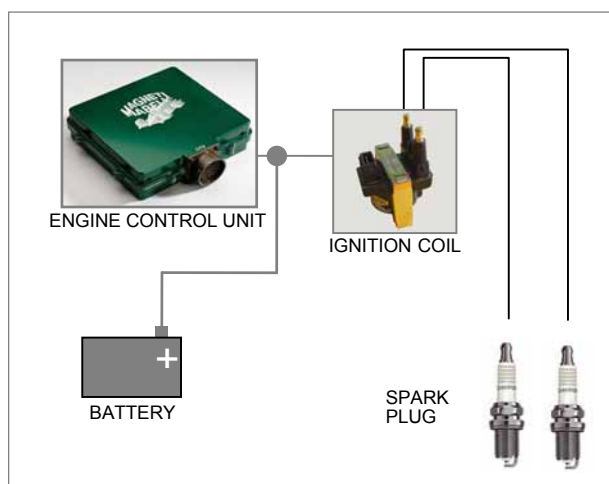
BAE801

Double ended ignition coil

Technical Characteristics

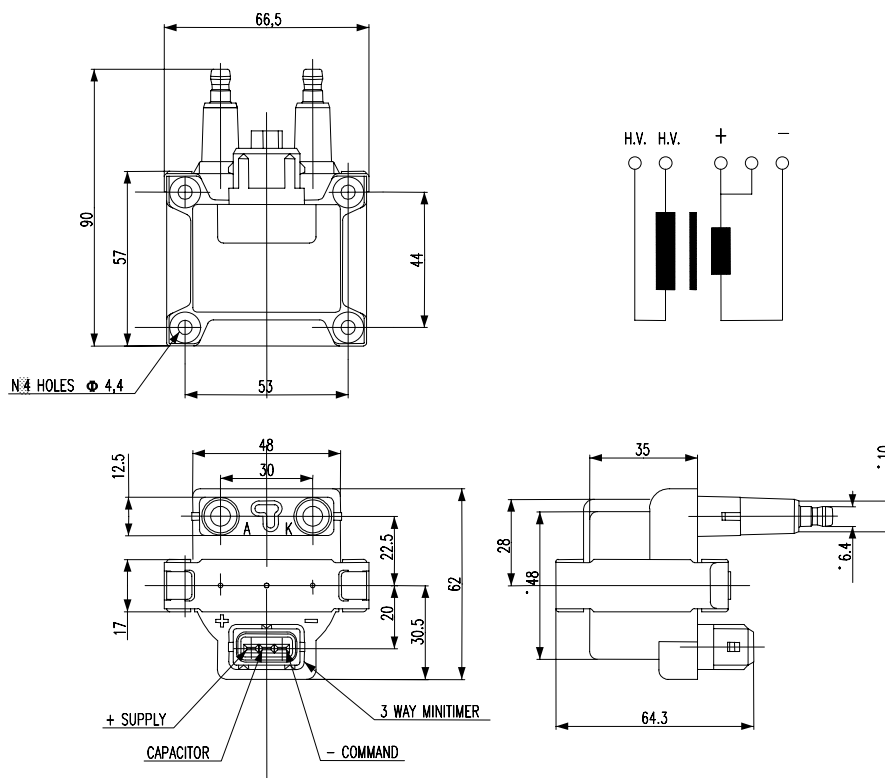
Nominal supply voltage.....	12 V
Charge current.....	6 A
Dwell	< 3.5 ms
Rise time	< 19 μ s
Sec. Voltage (under 1 M Ω)	> 25 kV
Spark duration.....	2.1 ms
Combustion energy.....	60 mJ
Connector type.....	Minitimer 3 ways
Weight.....	403 g

Application Schematics



Dimensions

Dimensions in millimetres



For further information, please contact:



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IGNITION COILS

BAE403 RC

Capacitive ignition racing coil

Description

A high power CDI ignition coil with sub compact dimensions particularly suitable for static ignition of multi-cylinder engines.

The small dimensions allow direct mounting in the cylinder head thus eliminating the need for H.V. leads.

Contact the factory for the design of different plug positions and suitable ignition drivers.

Main Features *

- Modular design
- Different plug position possible
- Different plug diameters possible
- Possibility of combination between coil head and rubber part

* Contact factory for available types

Benefits

- Small dimensions
- Low weight
- Low cost

Typical Applications

Atmospheric and blown engines

F3 - IRL – GT - Rally



IGNITION COILS

BAE403 RC

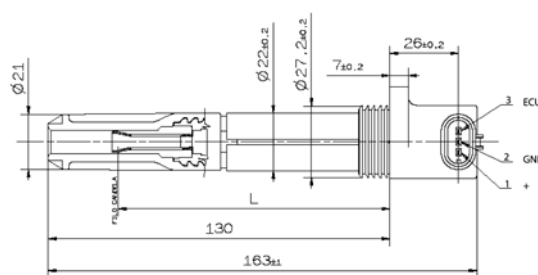
Capacitive ignition racing coil

Technical Characteristics

Rise time*	< 2 μ s
Sec. Voltage (1 M Ω load)*	42.5 kV
Spark duration*	98 ms
Spark current*	590 mA
Combustion energy*	18 mJ
Weight	180 g

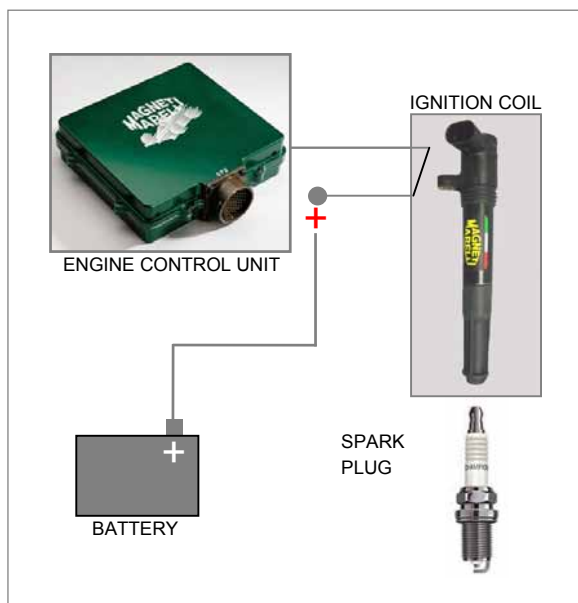
* With 1 μ F @ 400 V

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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IGNITION COILS

BAE403 RI

Inductive ignition racing coil

Description

A high power inductive ignition coil with sub compact dimensions particularly suitable for static ignition of multi-cylinder engines.

The small dimensions allow direct mounting in the cylinder head thus eliminating the need for H.V. leads.

Contact the factory for the design of different plug positions and suitable ignition drivers.

Main Features

- Modular design
- Different plug position possible
- Different plug diameters possible
- Possibility to choice all combination between coil head and rubber part

Benefits

- Small dimensions
- Low weight
- Low cost

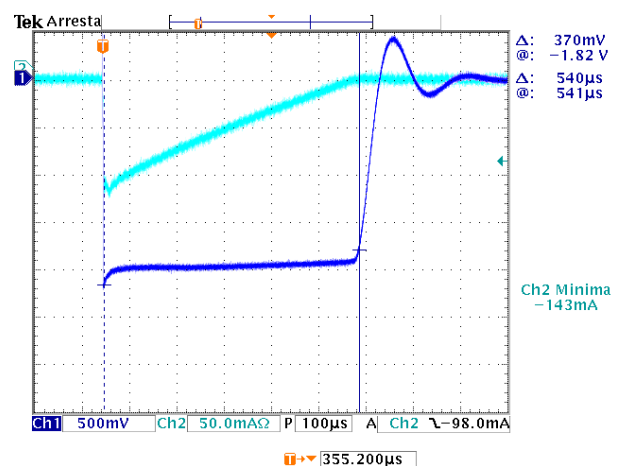
Typical Applications

Atmospheric and blown engines

F3 - IRL - GT - Rally



Typical Performance



IGNITION COILS

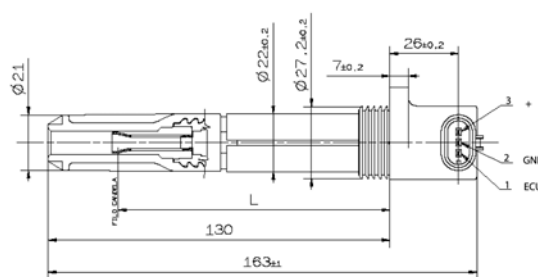
BAE403 RI

Inductive ignition racing coil

Technical Characteristics

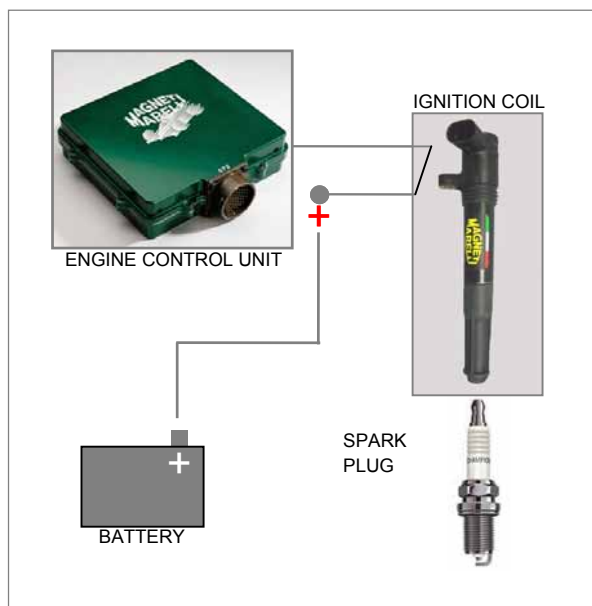
Nominal supply voltage.....	13.5 V
Charge current.....	9 A
Dwell	1.4 ms
Rise time	< 7.5 μ s
Sec. Voltage (1 M Ω +20 pF load)	30 kV
Spark duration.....	450 μ s
Spark current	120 mA
Combustion energy.....	54 mJ
Weight.....	180 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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<http://www.magnetimarelli.com>

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IGNITION COILS

Ø 19.5

Inductive Cigar Coil
13.5 V - 21 A

Description

A high power inductive ignition coil with sub compact dimensions particularly suitable for multi-cylinder engines.

The small dimensions allow direct mounting in the cylinder head thus eliminating the need for H.V. leads.

The cigar shape with small diameter gives more freedom to the design of cylinder head on custom engines.

Modular design allows the user to adjust the length for his application or this can be done at the factory prior to dispatch.

Contact the factory for the design of different plug positions and suitable ignition drivers.



Main Features

- High spark current
- Modular design
- Different plug position possible
- Different plug diameters possible

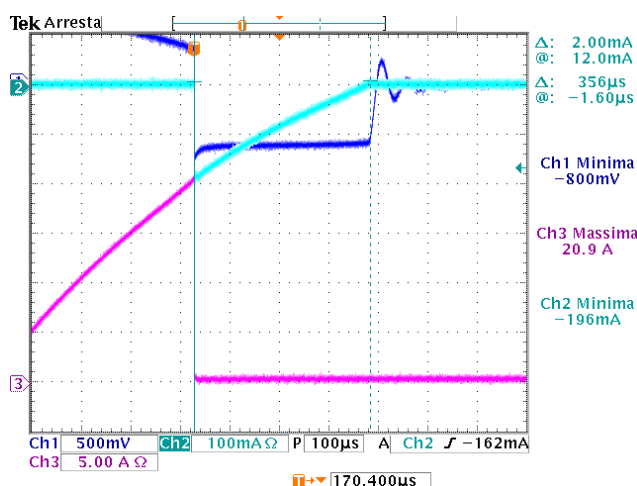
Benefits

- High performance
- Wide application range
- Small dimensions
- Low weight
- Low cost
- Same technology as F1 coils

Typical Applications

Atmospheric and mild blown engines
MotoGP - SBK - F3 – CART - IRL - GT

Typical Performance

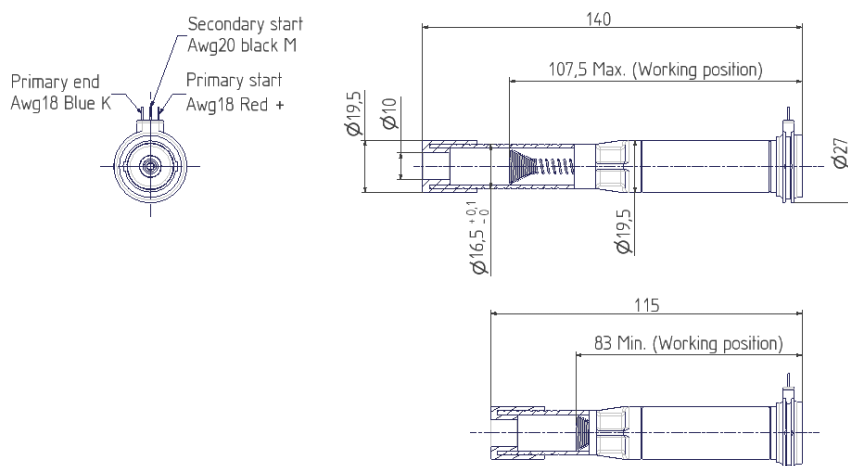


IGNITION COILS

Ø 19.5

Inductive Cigar Coil
13.5 V - 21 A

Dimensions

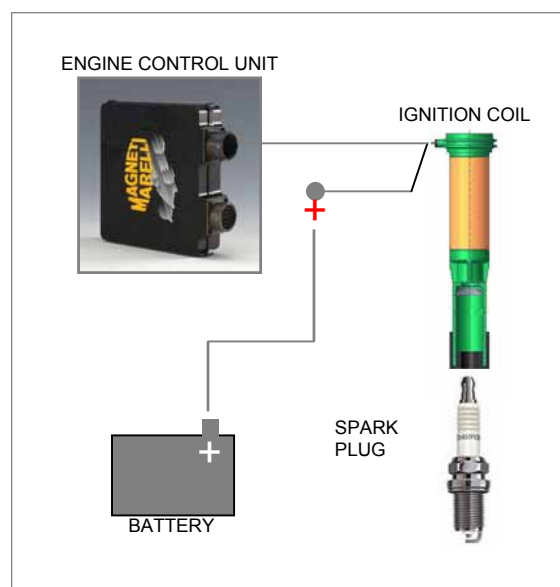


Dimensions in millimetres

Technical Characteristics

Nominal supply voltage.....	13.5 V
Charge current.....	21 A
Dwell	370 µs
Rise time	< 3.5 µs
Sec. Voltage (1 MΩ +20 pF load)	27 kV
Spark duration.....	245 µs
Combustion energy.....	23 mJ
Min. coil length (min. 83 mm working point)	115 mm
Max. coil length (max. 107.5 mm working point) .	140 mm
Weight.....	100 g

Application Schematics



For further information, please contact:



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IGNITION COILS

Ø 19.5-15 A

Inductive Cigar Coil
13.5 V - 15 A

Description

A high power inductive ignition coil with sub compact dimensions particularly suitable for multi-cylinder engines.

The small dimensions allow direct mounting in the cylinder head thus eliminating the need for H.V. leads.

The cigar shape with small diameter gives more freedom to the design of cylinder head on custom engines.

Modular design allows the user to adjust the length for his application or this can be done at the factory prior to dispatch.

Contact the factory for the design of different plug positions and suitable ignition drivers.



Main Features

- High spark current
- Modular design
- Different plug position possible
- Different plug diameters possible

Benefits

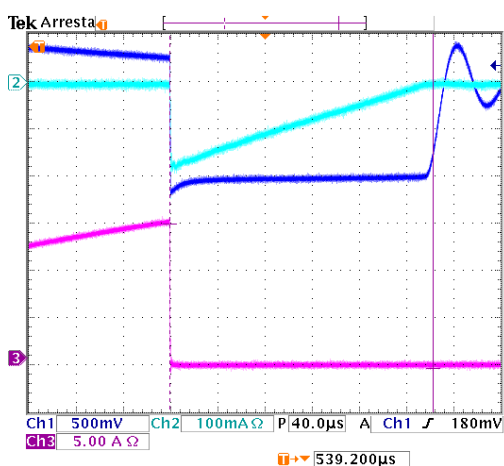
- High performance
- Wide application range
- Small dimensions
- Low weight
- Low cost
- Same technology as F1 coils

Typical Applications

Atmospheric and mild blown engines

MotoGP - SBK - F3 – CART - IRL - GT

Typical Performance



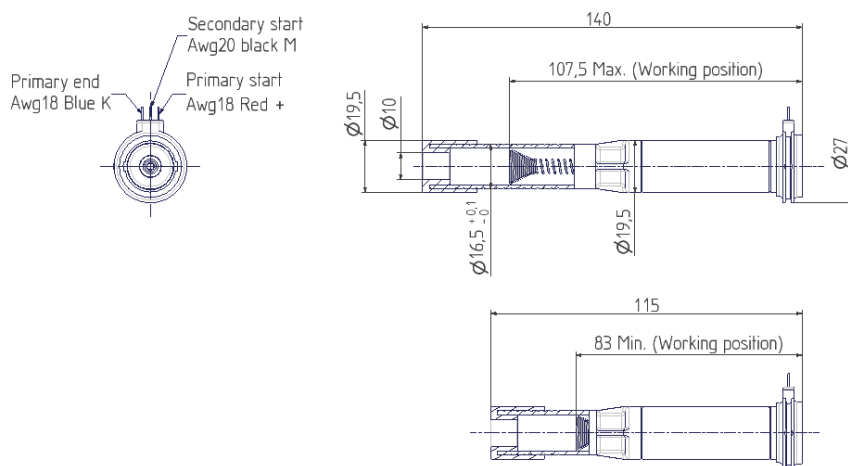
$V_{z2} = 1000V$
 $I_{2^{\circ}} = 200mA$
 $D.S. = 225\mu s$

IGNITION COILS

Ø 19.5-15 A

Inductive Cigar Coil
13.5 V - 15 A

Dimensions

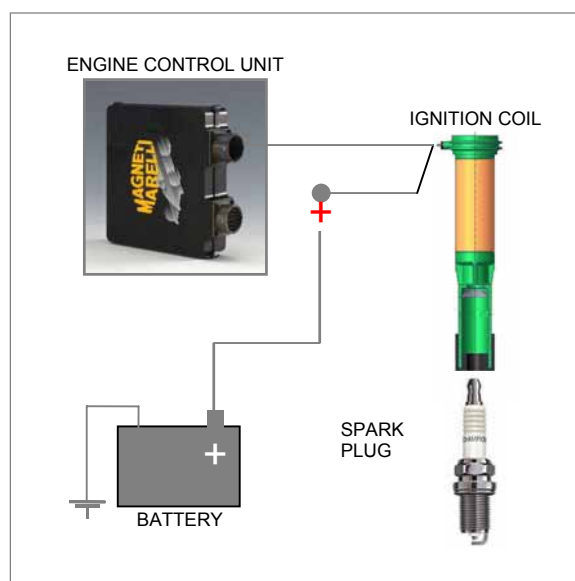


Dimensions in millimetres

Technical Characteristics

Nominal supply voltage.....	13.5 V
Charge current.....	15 A
Dwell into Plug.Well	500 μ s
Rise time	< 3 μ s
Sec. Voltage (1 M Ω +20 pF load)	27 kV
Spark duration on 1000Vz2°	225 μ s
Combustion energy.....	22 mJ
Min. coil length (83 mm min. working point)	115 mm
Max. coil length (107.5 mm max. working point) .	140 mm
Weight.....	100 g

Application Schematics



For further information, please contact:



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INJECTORS

IWP

Pico Top Feed Racing Injector
Up to 0.5 MPa - Up to 0.66 L/min

Description

The IWP "Pico" top feed injector is a standard production component, tested and selected for racing applications.

The characteristics of the injector are a fast pulse response, high precision, high dynamic range and optimum fuel atomization. These are achieved by a high performance ON-OFF actuating electromagnet with opposing expansion poles that moves an internal injector valve on high-precision ground cylindrical slides, and a high precision nozzle.

The injector has a stainless steel body, a fuel-resistant plastic connector, martensitic stainless steel internal valve and an electromagnet with a low carbon content stainless steel armature.

The electrical connection to the control unit is via a Mini-Timer plastic plug.



Main Features

- Pressure range 0.3 to 0.5 MPa
- Static flow range 0.33 to 0.66 L/min
- Driver current..... 0.8 A
- Spray shape single spray or twin jet

Benefits

- Methanol
- Multihole spray shaping
- On off driven
- High precision
- Small dimension & weight

Typical Applications

In professional circuit and rally applications

Touring car

INJECTORS

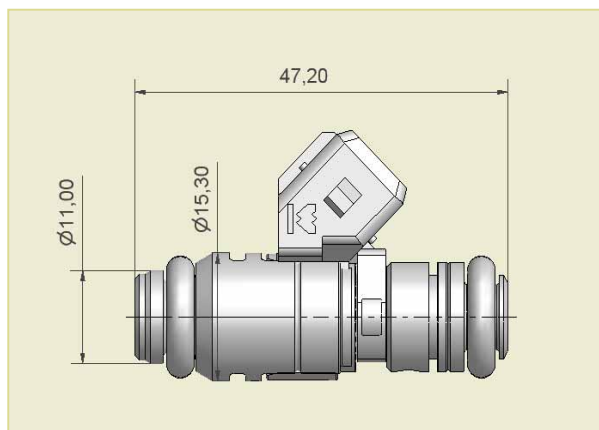
IWP

Pico Top Feed Racing Injector
Up to 0.5 MPa - Up to 0.66 L/min

Technical Characteristics

Pressure range	0.3 to 0.5	MPa
Static flow range	0.33 to 0.66	L/min
Driver current	0.8	A
Spray type	multihole	
Spray shape	single spray or twin jet	
Power supply	8 to 16	V
Operating temperature range	-30 to 110	°C
Connector type	AMP Junior 2 ways minitimer	
Weight	35	g

Dimensions



Dimensions in millimetres

Injector	IWP043	IWP063	IWP145	
Nominal pressure	500	500	500	kPa
Static flow rate	421.1	498.3	658	cm ³ /min
Spray shape	Single spray	Twin jet	Twin jet	

For further information, please contact:

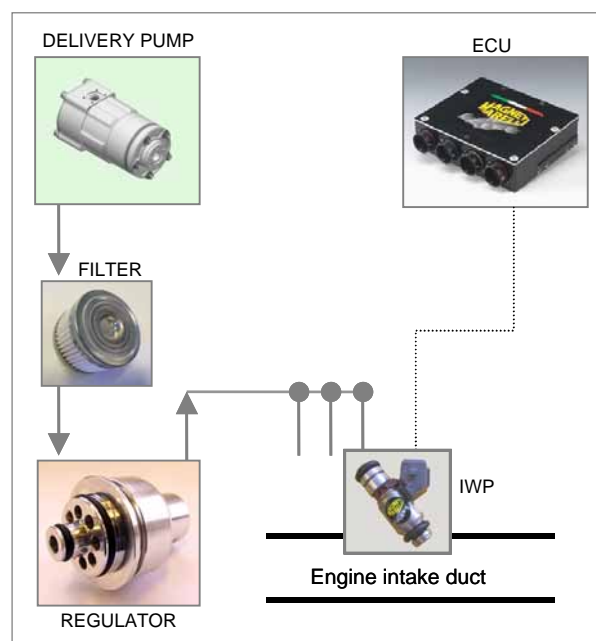


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Application Schematics





INJECTORS

IWPR

Pico Racing Fuel Injector
Up to 1.0 MPa - Up to 1.0 L/min

Description

IWPR injector has been developed to meet the market requirements for a cheap and reliable injector for medium & low level race injection systems.

It is available in the basic configuration, customized in spray shape and in fuel flow and selected in narrow precision classes.

Main Features

- Delivery pressure range 0.3 to 0.8 MPa
(Up to 1.0 MPa with supply voltage > 10 V)
- Static flow range 0.15 to 1.0 L/min
- Driver current 0.8 A

Benefits

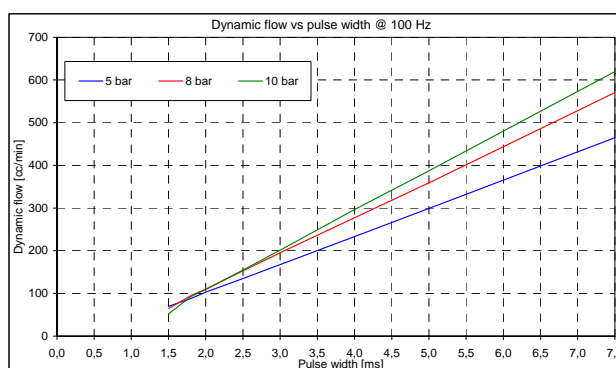
- Multihole spray shaping
- Under request, custom spray configuration can be studied
- On/Off driven
- High precision
- Can be used also with methanol
- Small dimension & weight

Typical Applications

In circuit and rallies medium & low level application
Race motorcycle application



Typical Performance



INJECTORS

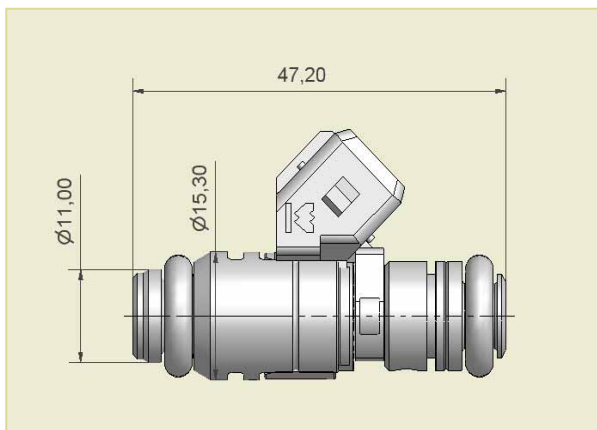
IWPR

Pico Racing Fuel Injector
Up to 1.0 MPa - Up to 1.0 L/min

Technical Characteristics

Delivery pressure range.....	0.3 to 0.8	MPa
(Up to 1 MPa with supply voltage > 8 V)		
Static flow range	0.15 to 1.0	L/min
Driver current	0.8	A
Single Jet bent angle	0° to 15°	
Power supply	8 to 16	V
Operating temperature range.....	-20 to 120	°C
Connector type.....	AMP Junior 2 ways minitimer	
Weight.....	35	g

Application Schematics



Dimensions in millimetres

Injector	IWPR1	IWPR2	IWPR3	IWPR4	IWPR5	IWPR6	
Nominal pressure	1000	1000	1000	1000	1000	1000	kPa
Static flow rate	690	935	740	1005	485	1160	cm ³ /min
Spray shape	Single spray	Single spray	Single spray	Twin jet	Helliptical cone	Single spray	

Note: flow rate in n-heptane

For further information, please contact:

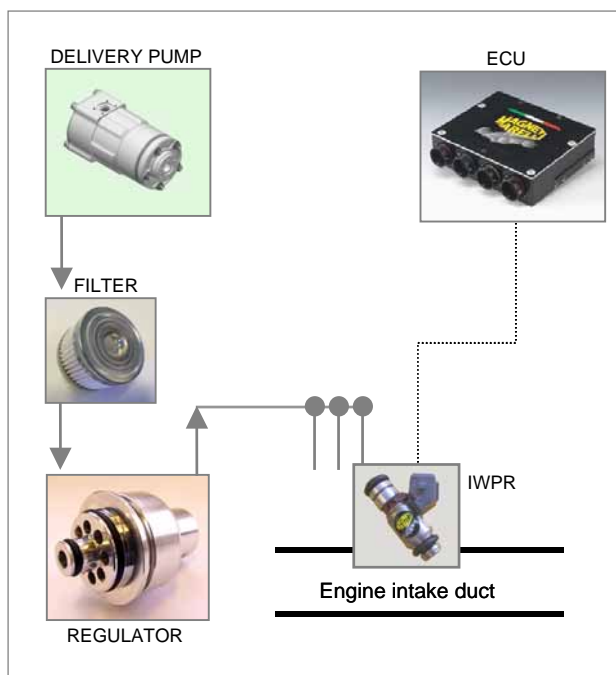


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Dimensions





INJECTORS

GPI

Grand Prix Fuel Injector
Up to 3.0 MPa - Up to 2.2 L/min
Multihole technology

Description

GPI injector has been developed to meet the market requirements for a cost effective injector for high performance racing injection systems.

Incorporating Formula 1 technology, it is available in basic configuration or customized in spray shape and flow rate and will be selected in narrow precision classes.

Main Features

- Delivery pressure range 0.3 to 3 MPa
- Static flow range 0.15 to 2.2 L/min
- Spray pattern multihole
- Driver On/Off or Peak & Hold

Benefits

- Multihole spray shaping
- Custom spray configurations can be developed on request
- On/Off or Peak & Hold driven
- High precision
- Suitable for use with Methanol
- Small dimension & weight

Typical Applications

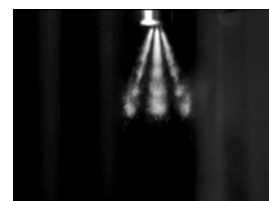
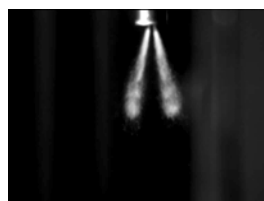
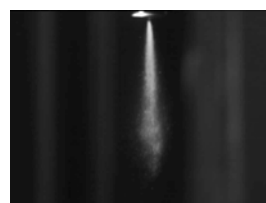
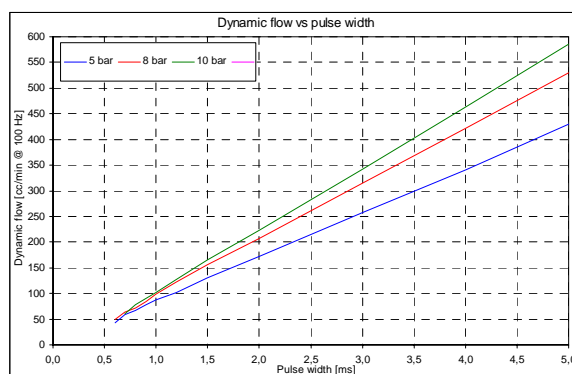
IRL

In circuit and rallies application

Race motorcycle application



Typical Performance



INJECTORS

GPI

Grand Prix Fuel Injector

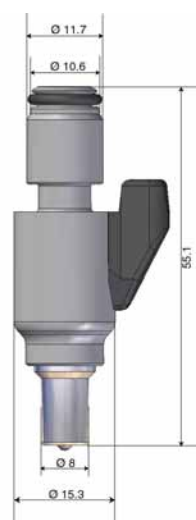
Up to 3.0 MPa - Up to 2.2 L/min

Multihole technology

Technical Characteristics

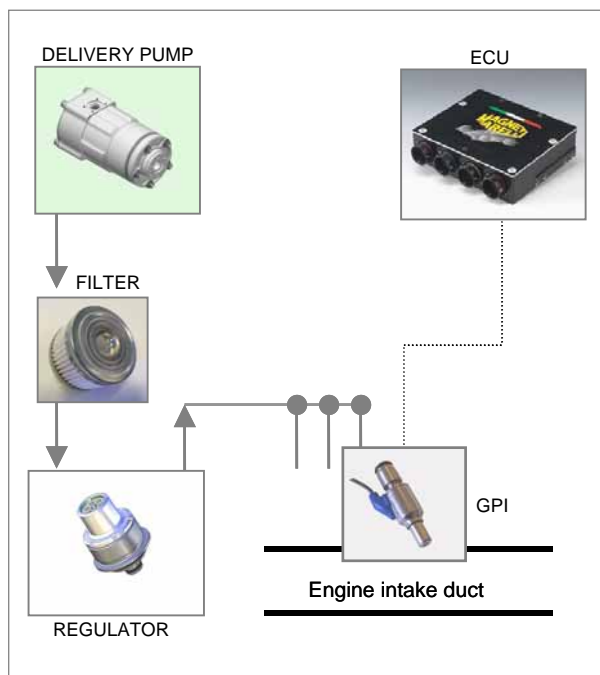
Delivery pressure range.....	0.3 to 3	MPa
Static flow range	0.15 to 2.2	L/min
Driver current	< 3	A
Spray angle.....	up to 75°	
Power supply	8 to 16	V
Operating temperature range.....	-20 to 120	°C
Connector type.....	cable 2 x 0.3 mm ² /37	
Weight.....	38	g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:

GPI-0838XXXXXX00



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PRESSURE REGULATORS

RPM 58...74

Fuel pressure regulators
350 to 500 kPa - 5 to 300 L/h

Description

The RPM series is a family of constant fuel regulating devices for fuel-rail co-axial mounting.

The regulator comprises a sealing valve joined to an elastic membrane which by means of a compression spring compensates the pressure inside the regulator, adjusting the fuel flow.

The body and the cover are made of stainless steel, as are all internal parts in contact with fuel, the membrane is fabric-reinforced vulcanized-rubber.

A version is available that is compatible with methanol fuels.

Main Features

- Fast response
- Very good precision
- Good integration
- Can be installed on the engine or in the tank

Benefits

- Little dimensions
- Low weight
- Cost effective solution



Typical Applications

In circuit and rallies medium level
SBK & motorcycles race

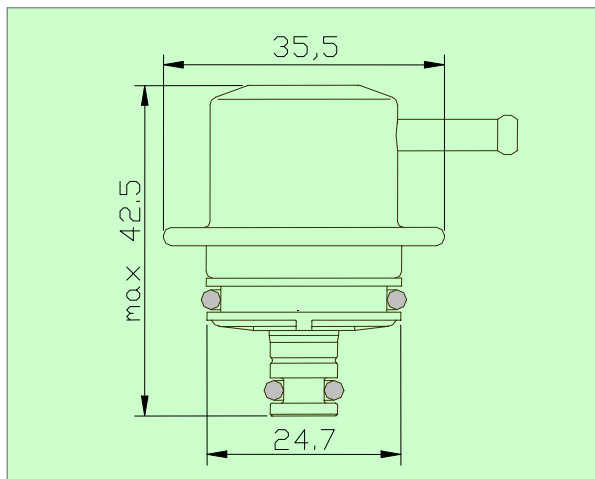
PRESSURE REGULATORS

RPM 58...74

Fuel pressure regulators

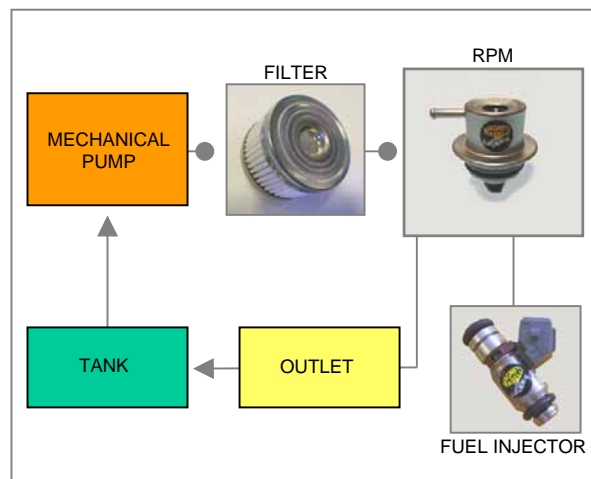
350 to 500 kPa - 5 to 300 L/h

Dimensions



Dimensions in millimetres

Application Schematics



Technical Characteristics

Set up pressure range 350 to 500 kPa
Flow range 5 to 300 L/h
Adjustment slope (20 L/h to 170 L/h) < 0.2 kPa/(L/h)
Max. vibration (peak) 30 g
Temperature range -10 to 110 °C
Fuel filter mesh dimension 100 µm
Fuel commercial and F1
Weight 37 g

Fuel pressure regulator	RPM58	RPM73	RPM74	
Nominal pressure	350	450	500	kPa
@ Flow rate	80	80	80	L/h
Methanol resistant	no	yes	yes	

For further information, please contact:



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PRESSURE REGULATORS

GPR

High performance for racing injection systems
0.5 to 3 MPa - 25 to 600 L/h

Description

GPR fuel pressure regulator has been developed to meet the market requirements for a cost effective regulator for high performance racing injection systems.

It combines good precision, high flow handling capability, little dimension and fast response.

The GPR design can be installed on the engine or in the tank assembly.

The regulator can be used also with supercharged engines.

Main Features

- Fast response
- High precision
- Good integration
- Can be installed on the engine or in the tank

Benefits

- Small dimensions
- Low weight
- Cost effective solution

Typical Applications

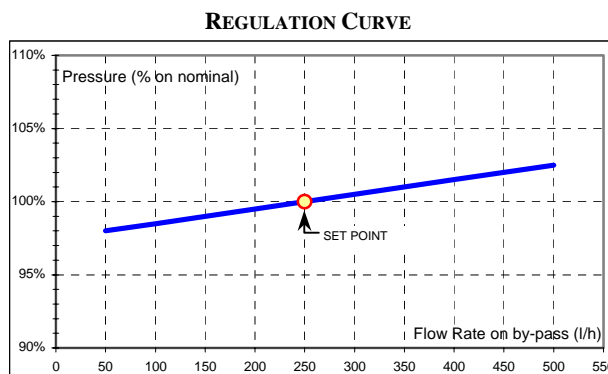
IRL

In circuit and rallies application

Race motorcycle application



Typical Performance

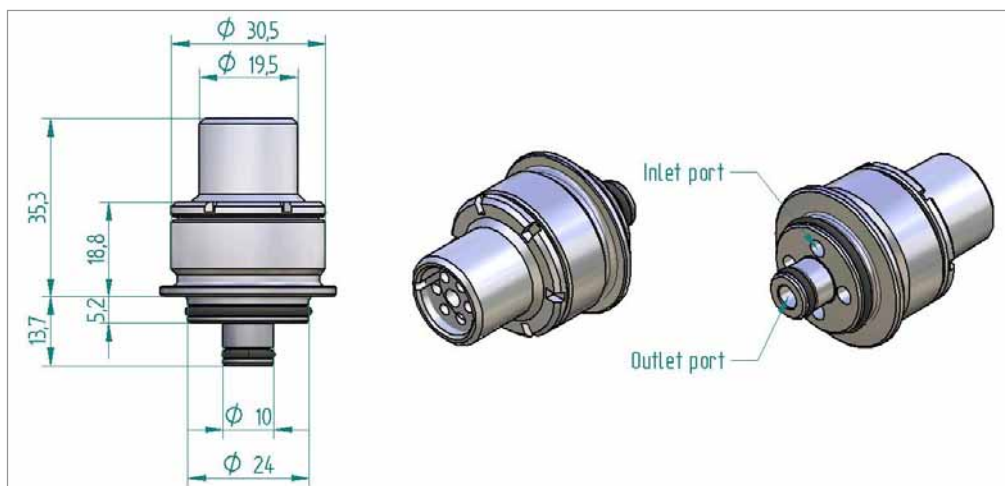


PRESSURE REGULATORS

GPR

High performance for racing
injection systems
0.5 to 3 MPa - 25 to 600 L/h

Dimensions

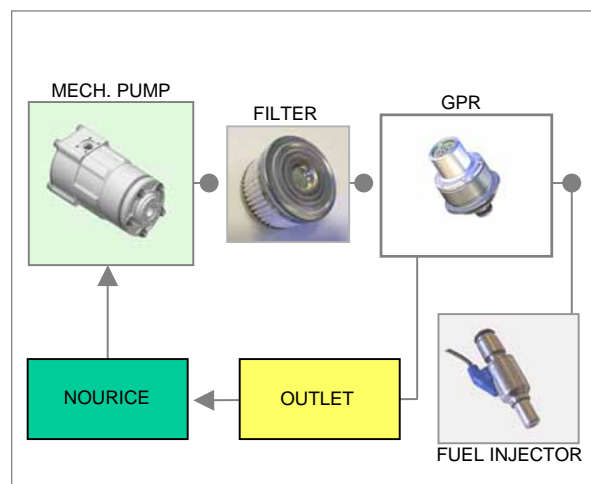


Dimensions in millimetres

Technical Characteristics

Set up pressure range 0.5 to 3 MPa
Flow range 25 to 600 L/h
Regulation slope < 0.01 %/(L/h)
Max. vibration (peak) 60 g
Temperature range -10 to 110 °C
Fuel commercial, methanol and F1
Weight < 60 g

Application Schematics



Fuel pressure regulator	GPR001	GPR002	GPR003	GPR004	
Nominal pressure	500	1000	2000	3000	kPa
@ Flow rate	TBD	TBD	TBD	TBD	L/h

For further information, please contact:



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PUMPS

MGP01

Electrical fuel pump
110 L/h @ 1 MPa

Description

A compact gear fuel pump coupled with a rugged dc motor allows reliable operation with limited current absorption.

The installation must be done inside the fuel tank.

Main Features

- Suitable to be PWM controlled

Benefits

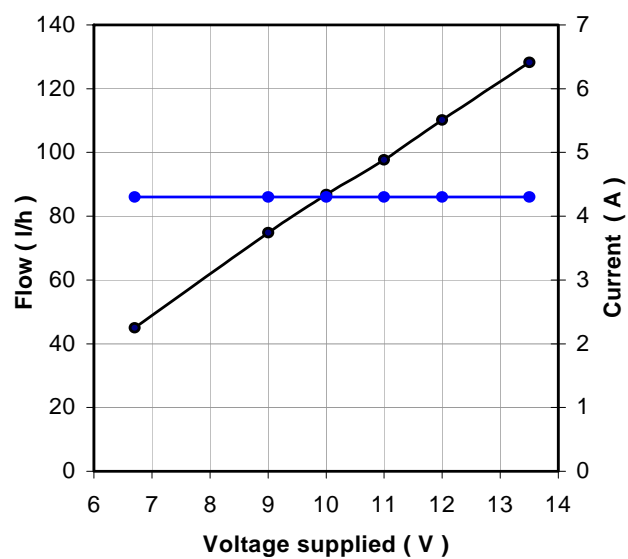
- Low weight
- Total efficiency about 60%

Typical Applications

MotoGP



Typical Performance at 1 MPa

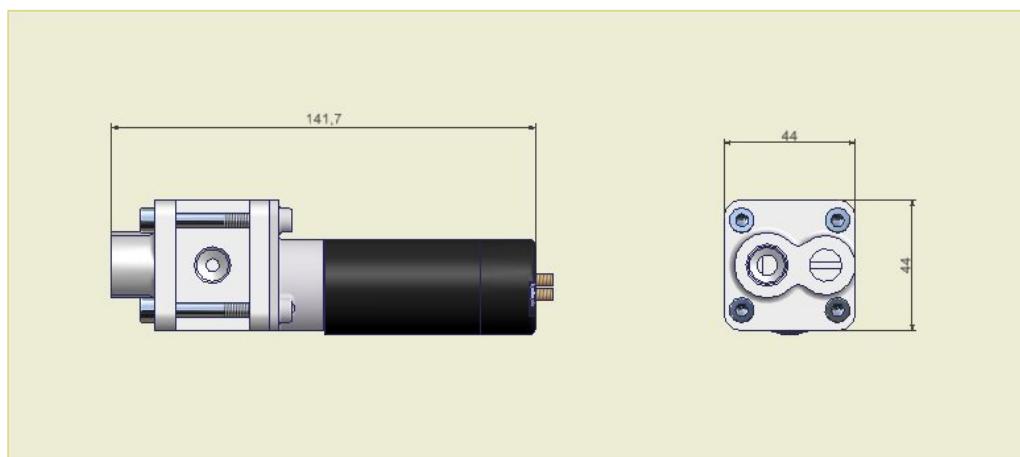


PUMPS

MGP01

Electrical fuel pump
110 L/h @ 1 MPa

Dimensions



Dimensions in millimetres

Technical Characteristics

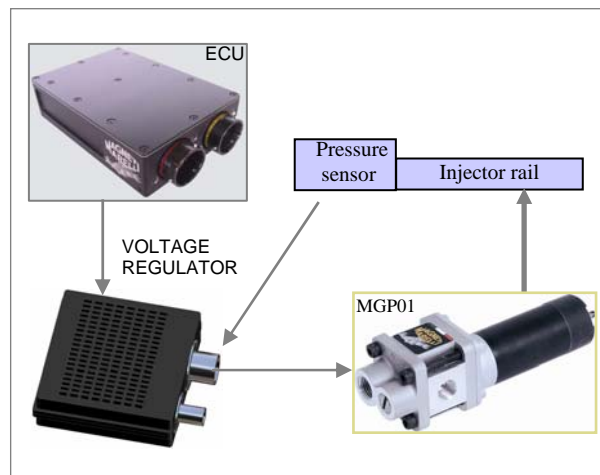
Supply Voltage.....	13.5 V
Flow rate	
@ 1 MPa	110 L/h
@ 0.5 MPa	118 L/h
Consumption	
@ 1 MPa	4.3 A
@ 0.5 MPa	2.7 A
Weight.....	526 g

Other Information

Joined with the MVRM 01 motorcycle voltage regulator the pump can be PWM controlled in order to achieve the fuel flow requirement. Reducing the duty cycle the electrical power consumption and the heat release to fuel can be reduced.

A closed loop control on the fuel pressure can be performed with the MVRM 01 voltage regulator as well.

Application Schematics



For further information, please contact:



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PUMPS

FLP 004

Fuel lift pump
90 L/h @ 50 kPa

Description

A compact lightweight low pressure fuel pump for catchtank filling.

A rugged dc motor allows reliable operation with limited current absorption.

Main Features

- The pump has a NRV valve to prevent catchtank emptying
- Special design and surface treatment of moving parts allow reliable operation also with partially empty tank

Benefits

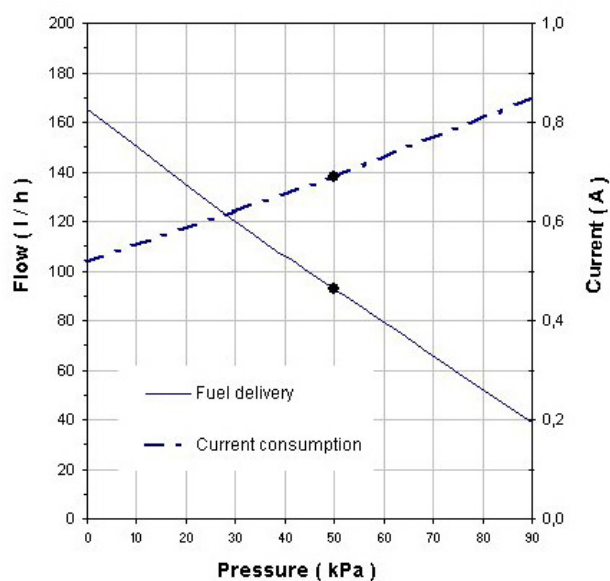
- Self priming
- Fuel delivery capability up to 300 Hp
- Customizable inlet and outlet ports
- Dry operation possible without damage

Typical Applications

Race motorcycle application



Typical Performance at 13.6 V



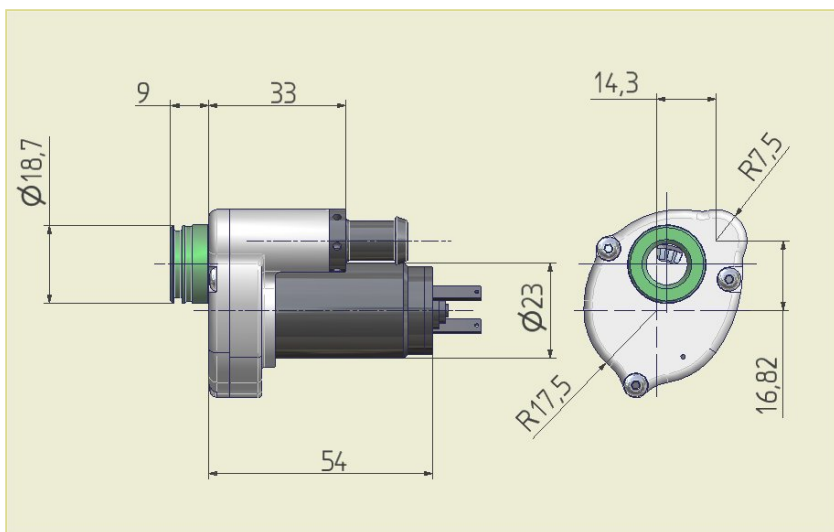
(Test fluid Metryl 421)

PUMPS

FLP 004

Fuel lift pump
90 L/h @ 50 kPa

Dimensions

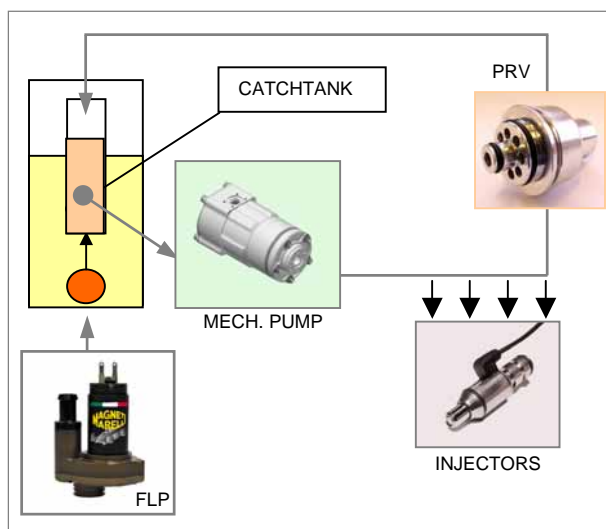


Dimensions in millimetres

Technical Characteristics

Fuel delivery (@ 50 kPa)	90 L/h
Nominal supply voltage.....	13.6 V
Current consumption (@ 50 kPa)	0.7 A
Weight.....	160 g

Application Schematics



For further information, please contact:



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OXYGEN SENSORS

- ✓ UEGO

PRESSURE SENSORS

- ✓ PRT 02/03/06
- ✓ P002...P010
- ✓ OPS04
- ✓ XKP1290 CABLE
- ✓ XKP1290 CONNECTOR

TEMPERATURE SENSORS

- ✓ ATs 04
- ✓ NTC
- ✓ PT1000
- ✓ Tc-K
- ✓ WTs 05

ROTARY POTENTIOMETER

- ✓ RPT98
- ✓ W1051 44°
- ✓ W1051 100°
- ✓ W1059

SPEED SENSORS

- ✓ SEN 8D-8K





SENSORS

UEGO

Linear oxygen sensor

Description

Proportional oxygen sensor compatible with controllers built-in most Magneti Marelli ECUs for accurate reading of mixture.

Contact the factory for matching ECUs and/or for stand alone controllers and loom.

Version with special heat resistant sleeves and military connectors are available on request.

Main Features

- High signal level
- Calibrated for rich mixtures typical of racing engines

Benefits

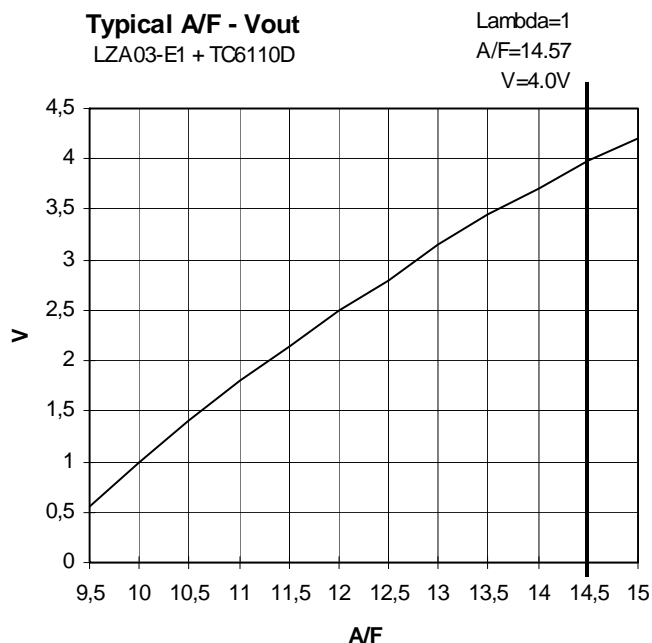
- Available in stock - short delivery time

Typical Applications

Racing engines



Typical Performance



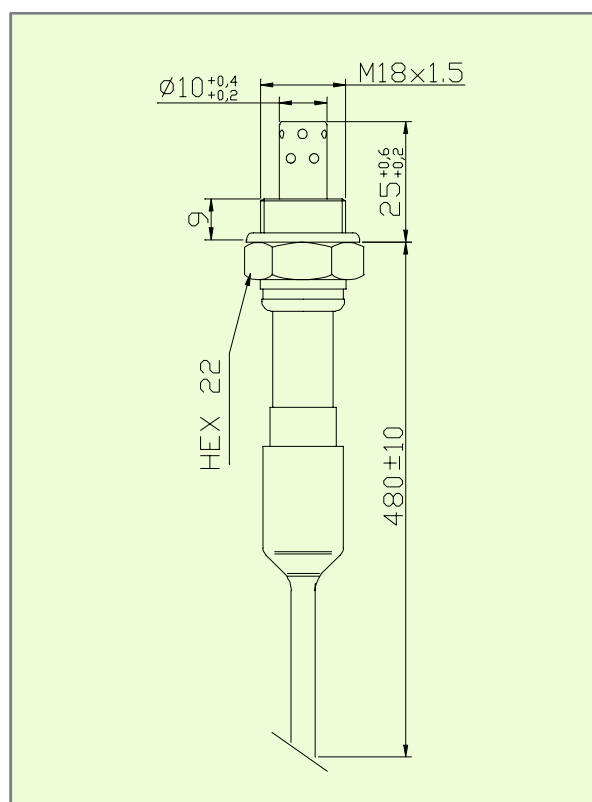
UEGO

Linear oxygen sensor

Technical Characteristics

Sensor element tip temperature. 750 to 950 °C
 Connector temperature 120 °C
 Storage temperature range..... -40 to 100 °C
 Weight..... 100 g

Dimensions



Dimensions in millimetres

For further information, please contact:



Magneti Marelli Holding S.p.A.
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SENSORS

PRT 02/03/06

Air pressure transducers
105 to 250 kPa

Description

The PRT 02/03/06 series devices are high-accuracy and reliability analogue absolute pressure sensors.

Main Features

- Active devices are housed in hermetically sealed plastic protective casing
- Splash resistant to standard motorsport fluids
- Thermal compensation and noise reduction circuitry

Benefits

- Low cost

Typical Application

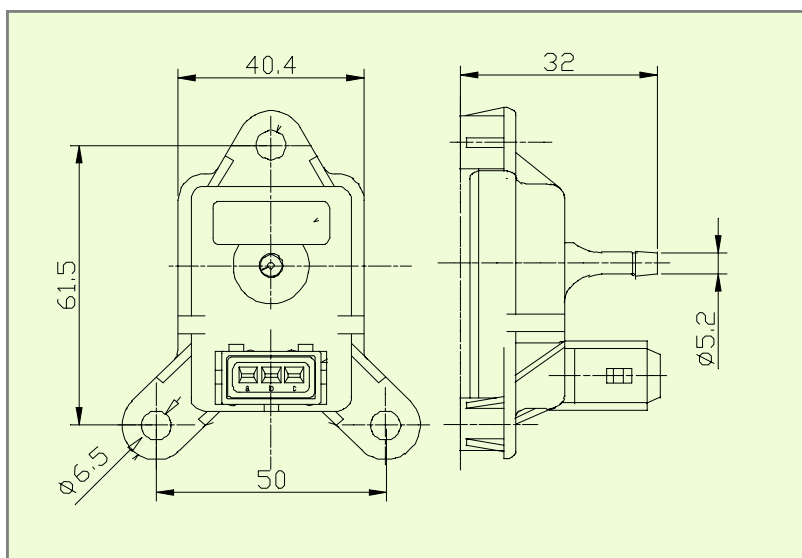
Manifold pressure measure



PRT 02/03/06

Air pressure transducers
105 to 250 kPa

Dimensions



Technical Characteristics

Power supply (± 0.5 V).....	5	V
Null offset (5 V)	0.25	V
Full scale output (5 V).....	4.75	V
Output impedance.....	less than 10	Ω
Pressure ranges		
PRT 02	200	kPa
PRT 03	105	kPa
PRT 06	250	kPa
Operating temperature range.....	-40 to 125	$^{\circ}\text{C}$
Response time	less than 7	ms
Accuracy (including non-linearity, hysteresis and repeatability)		
	1	% f.s.o
Overpressure	200	%
Weight.....	30	g

Connector Pin Out

PIN	Description	
1	+ 5Vdc	
2	GN	
3	Signal	



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SENSORS

P002...P010

Pressure sensor 0.2 to 1 MPa

Description

A series of high output amplified pressure sensor.

Particularly suited for use in the harsh automotive ambient.

The kit includes a pre wired mating connector with 300 mm leads and JIC to JIC 3/8"- 24 stainless steel adapter.

Main Features

- Compatible with most fluid in automotive environment

Benefits

- Small size
- High output
- High reliability



Typical Applications

Manifold pressure

Oil pressure

Fuel pressure

Product Range

Nominal Pressure*	PSI MPa	a	30 0.20	a	50 0.35	g	50 0.35	g	150 1.00
Burst Pressure	PSI MPa		1000 7		1000 7		1000 7		3000 21
Pressure Overload	* N.P.		x 5		x 5		x 5		x 3

Note:

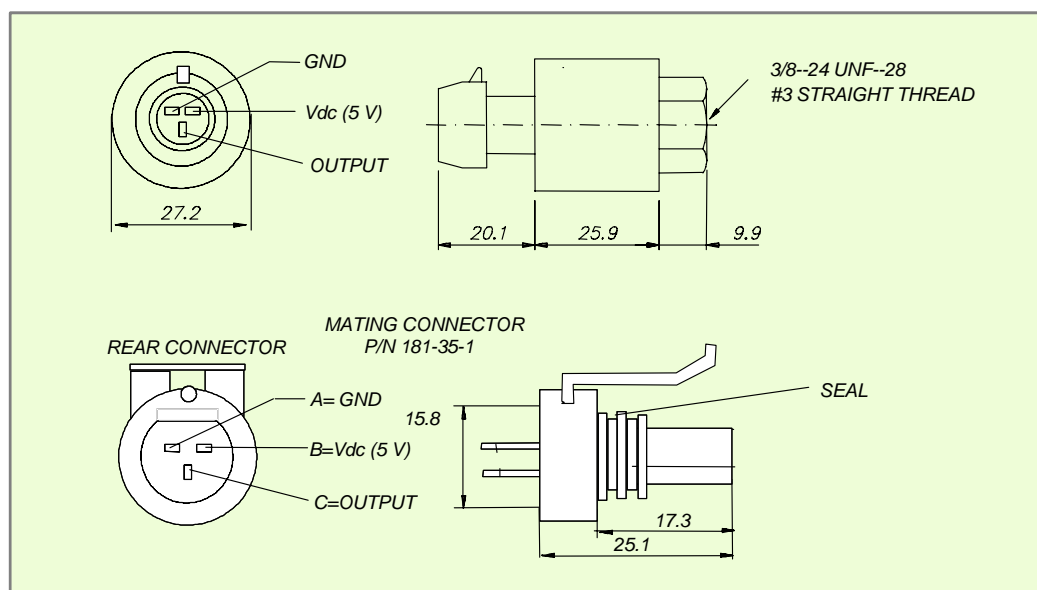
a = abs

g = gage

P002...P010

Pressure sensor 0.2 to 1 MPa

Dimensions



Dimensions in millimetres

Technical Characteristics

Power supply	5	V
Supply current (@ 5 V)	< 4	mA
Null offset	0.5 ± 0.06	V
Full scale output	4.5 ± 0.06	V
Output impedance	100	Ω
Nominal pressure range	(See table)	
Operating temperature range	-40 to 125	°C
Response time	10	ms
Accuracy (f.s.o. and Null offset)		
@ -30 °C to 100 °C	± 4	% f.s.o.
@ 0 °C to 85 °C	± 2	% f.s.o.
Weight	70	g

For further information, please contact:



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SENSORS

OPS04

Hydraulic pressure transducers
0.1 to 8.1 MPa

Description

The OPS04 device is a reliable analogue gauge pressure sensor with fluorosilicone seal.

Integral signal conditioning electronics incorporating a custom designed integrated circuit provide an accurate, stable signal over a wide operating temperature range (-40 to 135°C).

Main Features

- Active devices are housed in hermetically sealed plastic protective casing
- Compatible with most fluids in pressure-based standard motorsport systems
- Compact design

Benefits

- Low cost
- High reliability



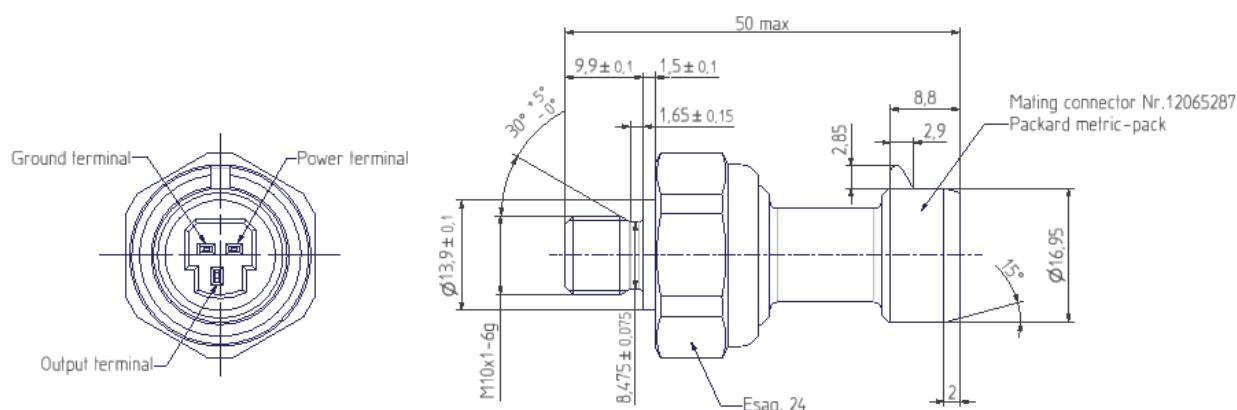
Typical Applications

Fluids measure

OPS04

Hydraulic pressure transducers
0.1 to 8.1 MPa

Dimensions



Dimensions in millimetres

Technical Characteristics

Power supply (± 0.5 V).....	5	V
Supply current (@ 5 V)	< 10	mA
Null offset (5 V)	0.5	V
Full scale output (5 V).....	4.5	V
Pressure ranges.....	0.1 to 8.1	MPa
Operating temperature range.....	-40 to 130	°C
Response time.....	less than 10	ms
Accuracy (including non-linearity, hysteresis and repeatability)	2	% f.s.o
Burst pressure.....	15	MPa
Weight.....	40	g

For further information, please contact:



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SENSORS

XKP1290 CABLE

1 MPa pressure sensor

Description

Gauge amplified pressure sensor.

Particularly suited for use in the harsh automotive environment.

Main Features

- Compatible with most fluids in automotive environment
- Fast response time

Benefits

- Small size
- High output
- High reliability



Typical Applications

Oil pressure

Fuel pressure

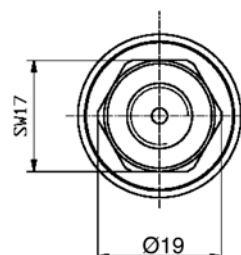
XKP1290 CABLE

1 MPa pressure sensor

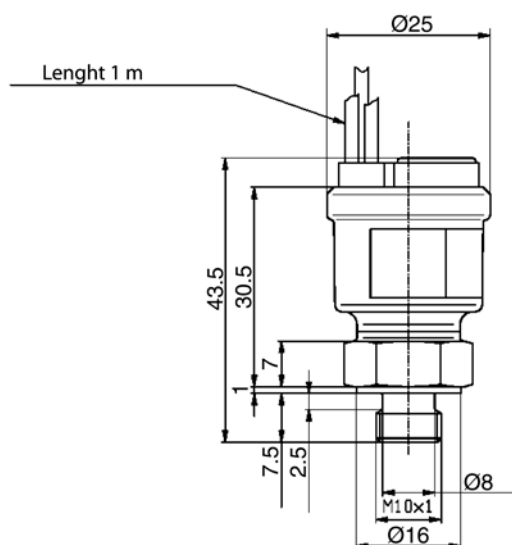
Technical Characteristics

Power supply	8 to 30	V
Supply current.....	< 20	mA
Null offset.....	0.5	V
Full scale output (@ Nominal Pressure)	4.5	V
Nominal pressure.....	1	MPa
Operating temperature range.....	-40 to 140	°C
Response time.....	< 2	ms
Accuracy (f.s.o. and Null offset)		
@ -40 °C to 0 °C.....	max. ± 2.5	% f.s.o.
@ 0 °C to 90 °C.....	max. ± 1	% f.s.o.
@ 90 °C to 125 °C.....	max. ± 3	% f.s.o.
Burst Pressure	3 x Nominal Pressure	
Vibrations range tested		
@ 147 Hz to 1000 Hz	30	g
@ 1000 Hz to 2000 Hz	20	g
Protection class.....	IP 67	
Weight (approx.)	50	g

Dimensions



Red: Supply voltage
Green: Signal
Blue: GND



Dimensions in millimetres

For further information, please contact:



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SENSORS

XKP1290 CONNECTOR

1 MPa pressure sensor

Description

Gauge amplified pressure sensor.

Particularly suited for use in the harsh automotive environment.

The kit includes a mating part connector.

Main Features

- Compatible with most fluids in automotive environment
- Fast response time

Benefits

- Small size
- High output
- High reliability



Typical Applications

Oil pressure

Fuel pressure

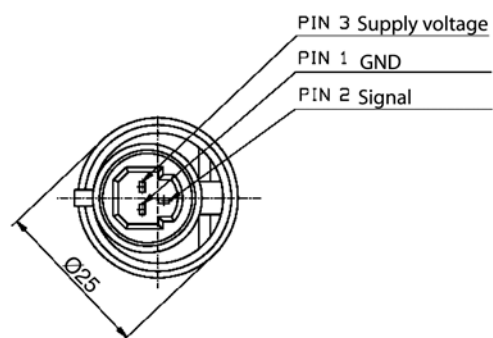
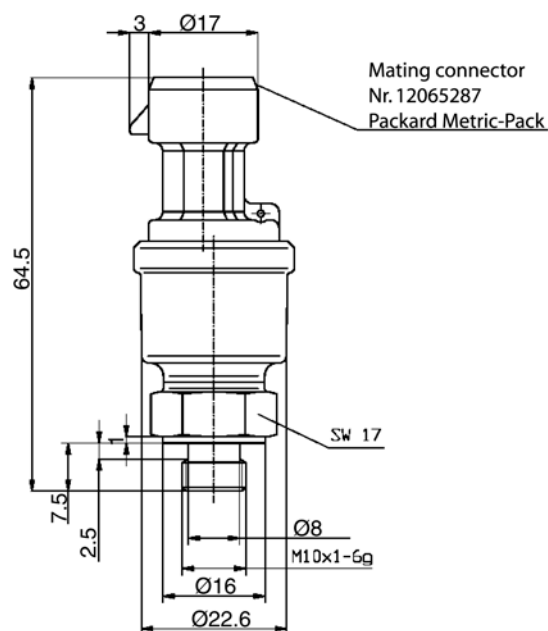
XKP1290 CONNECTOR

1 MPa pressure sensor

Technical Characteristics

Power supply	5	V
Supply current.....	< 15	mA
Null offset.....	0.5	V
Full scale output (@ Nominal Pressure)	4.5	V
Nominal pressure.....	1	MPa
Operating temperature range.....	-40 to 140	°C
Response time.....	< 2	ms
Accuracy (f.s.o. and Null offset)		
@ -40 °C to 0 °C.....	max. ± 3	% f.s.o.
@ 0 °C to 90 °C.....	max. ± 1.5	% f.s.o.
@ 90 °C to 125 °C.....	max. ± 3	% f.s.o.
Burst Pressure	3 x Nominal Pressure	
Vibrations range tested		
@ 147 Hz to 1000 Hz	30	g
@ 1000 Hz to 2000 Hz	20	g
Protection class.....	IP 67	
Weight (approx.)	47	g

Dimensions



Dimensions in millimetres

For further information, please contact:



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SENSORS

ATS 04

3 k Ω Air Temperature Sensor

Description

The ATS 04 is a low cost analogue temperature sensor with an NTC sensing element.

Main Features

- Sensing element exposed to airflow for fast response time
- Mini-Timer connector

Benefits

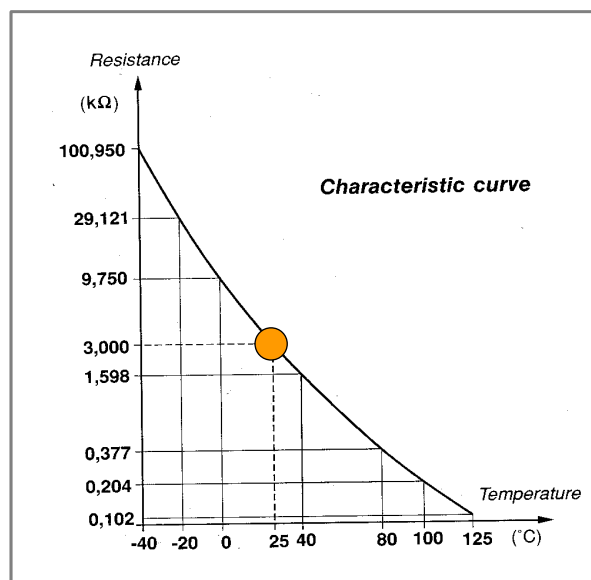
- High signal level
- Low cost

Typical Applications

Touring cars intake air temperature



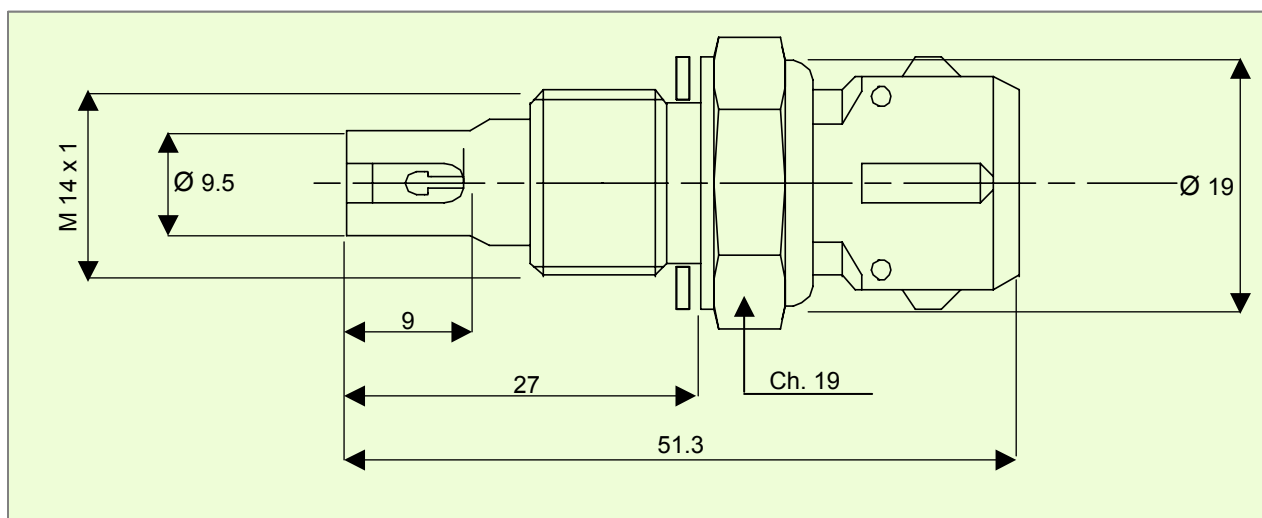
Typical Performance



ATS 04

3 k Ω Air Temperature Sensor

Dimensions

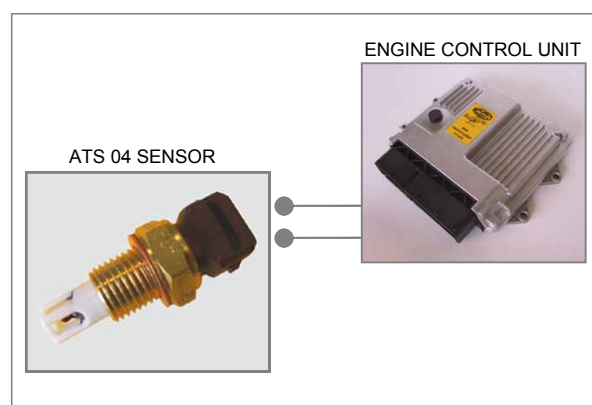


Dimensions in millimetres

Technical Characteristics

Resistance (@ 25 °C).....	3	k Ω
Input voltage	5	V
Accuracy from nominal values		
@ -40 °C to 125 °C.....	5	%
Connector (2 ways).....	Mini-Timer	
Weight.....	25	g

Application Schematics



For further information, please contact:



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SENSORS

NTC

2252 Ω Air-fluid temperature sensor

Description

A miniature sensor designed for fast response temperature measurement.

Suitable for air, water, oil & fuel temperature measurement.

Main Features

- AISI 316 housing for improved mechanical strength
- Splash resistant to standard motorsport fluids
- Miniature tip
- High strength teflon coated leads

Benefits

- High signal level
- Little dimensions
- Low weight



Typical Applications

Racing engines

Temperature resistance table

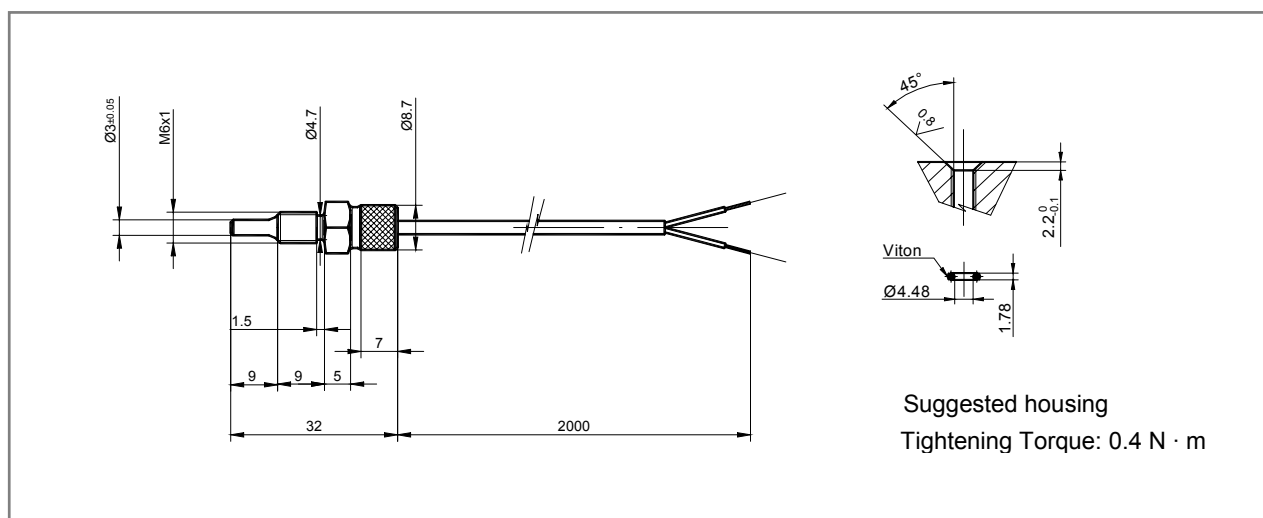
NTC 2252 Ω

Temp. °C	Rt/R25	Temp. °C	Rt/R25	Temp. °C	Rt/R25
10	1.99000	50	0.36020	100	0.06792
20	1.24900	60	0.24880	110	0.05108
25	1.00000	70	0.17510	120	0.03894
30	0.80580	80	0.12560	130	0.03006
40	0.53260	90	0.09164	140	0.02348

NTC

2252 Ω Air-fluid temperature sensor

Dimensions

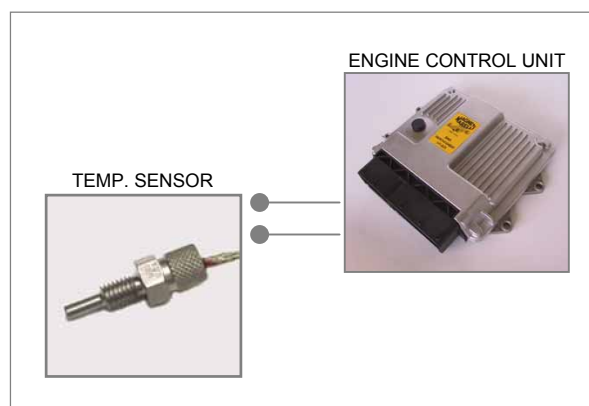


Dimensions in millimetres

Technical Characteristics

Typical applicationAir, oil, water and fuel temp.
 Temperature range-20 to 150 °C
 Weight..... 35.5 g

Application Schematics



For further information, please contact:

NTC-083813067600



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SENSORS

PT1000

Air-fluid temperature sensor

Description

A miniature sensor designed for fast response temperature measurement.

Suitable for air, water, oil & fuel temperature measurement.

Main Features

- AISI 316 housing for improved mechanical strength
- Splash resistant to standard motorsport fluids
- Miniature tip
- High strength teflon coated leads

Temperature resistance table

°C	Ω	$\Omega/^{\circ}\text{C}$
-20	921.3	3.94
-10	960.7	3.93
± 0	1000.0	3.90
10	1039.0	3.89
20	1077.9	3.88
30	1116.7	3.87
40	1155.4	3.86
50	1194.0	3.84
60	1232.4	3.83
70	1270.7	3.82
80	1308.9	3.81
90	1347.0	3.80
+100	1385.0	3.78
110	1422.8	3.78
120	1460.6	3.76
130	1498.2	3.75
140	1535.7	3.75
150	1573.2	3.73



Benefits

- High signal level
- Little dimensions
- Low weight

Typical Applications

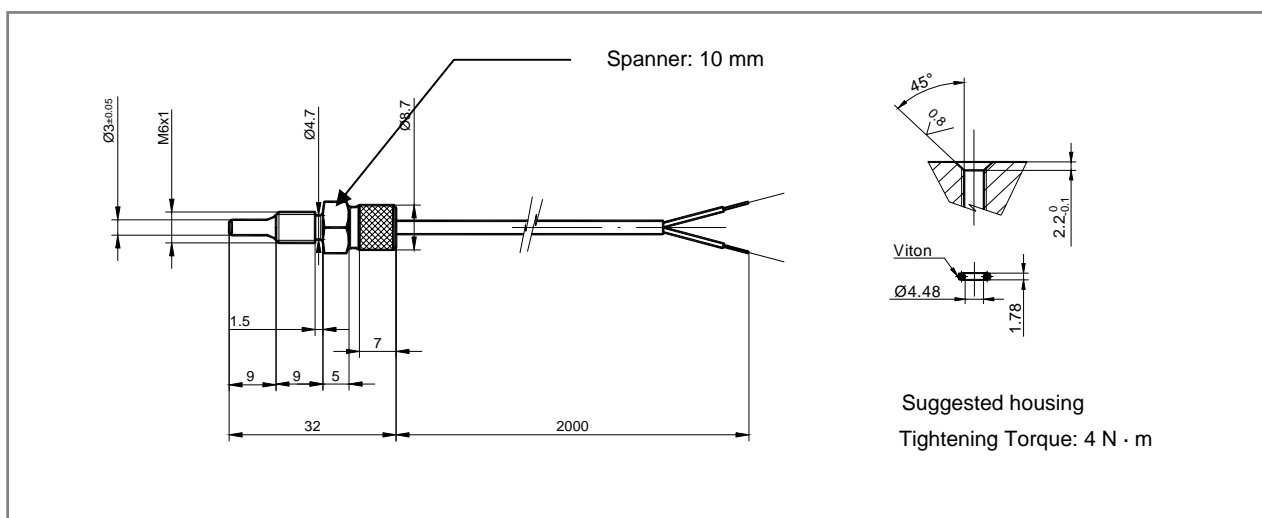
Racing engines

SENSORS

PT1000

Air-fluid temperature sensor

Dimensions

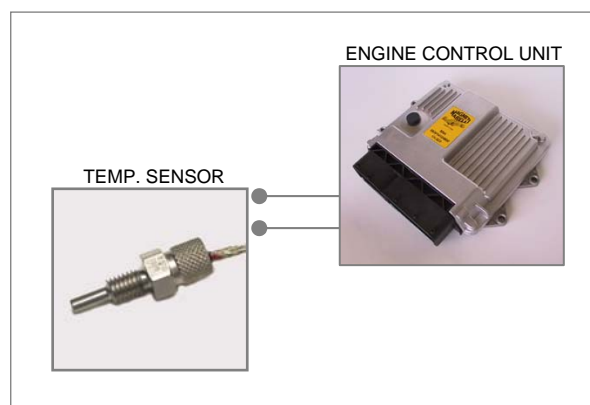


Dimensions in millimetres

Technical Characteristics

Typical application Oil, water and fuel temp.
Temperature range -20 to 150 °C
Accuracy ± 1 °C
Weight..... 35.5 g

Application Schematics



For further information, please contact:



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SENSORS

TC-K

K-Type Thermocouple
Exhaust Gas Temp. Sensor (Cr/Al)

Description

Reinforced sheathed k-type thermocouple for exhaust gas temperature, low response time.

Main Features

- MgO insulation
- Strength at very high pressure and temperature, compensated cable with Kapton insulation and stainless steel braid

Benefits

- Small dimensions
- Low weight
- Fast response time



Typical Applications

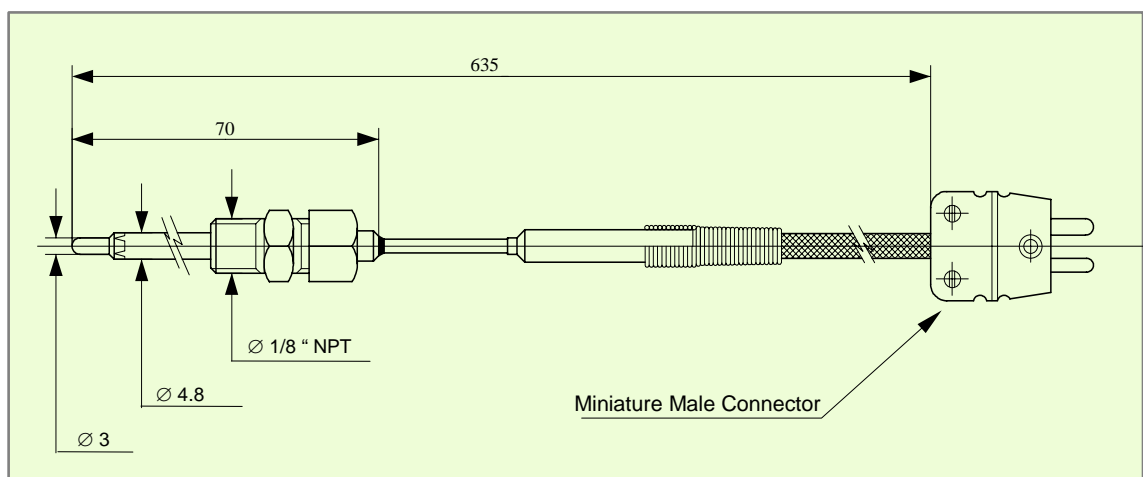
Exhaust gas temperature measurement on all kind of racing engines

SENSORS

TC-K

K-Type Thermocouple
Exhaust Gas Temp. Sensor (Cr/Al)

Dimensions

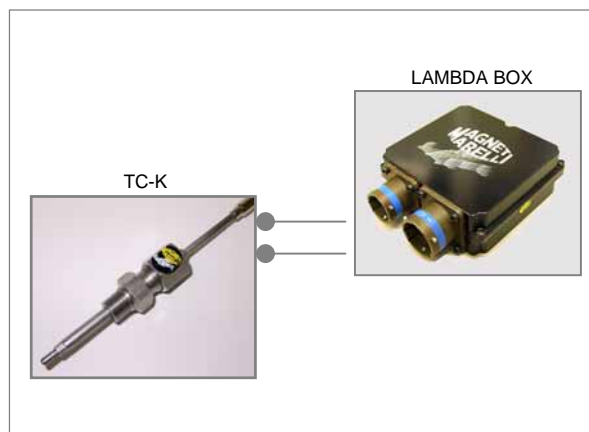


Dimensions in millimetres

Technical Characteristics

Typical application Exhaust gas temp.
Thermocouple type K to DIN 43710
Operating temp. range 0 to 1150 °C
Weight 70 g

Application Schematics



For further information, please contact:



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SENSORS

WTS 05

3 k Ω Water Temperature Sensor

Description

The WTS 05 is a low cost analogue temperature sensor with an NTC sensing element.

Main Features

- Mini-Timer connector
- Fast response time

Benefits

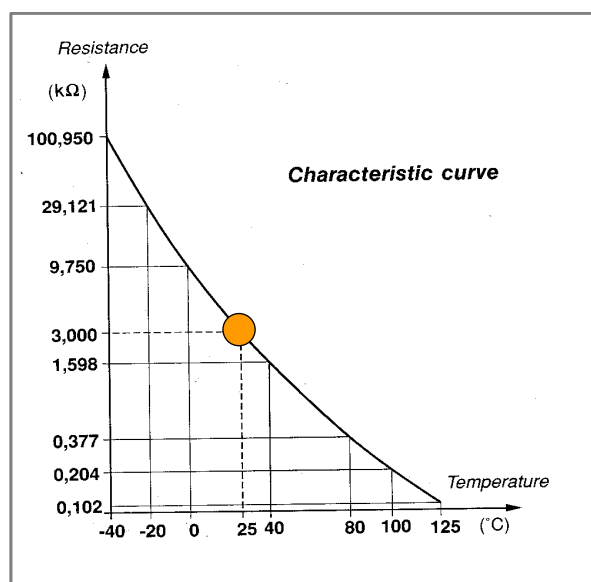
- High signal level
- Low cost

Typical Applications

Touring cars water-oil temperature measurement



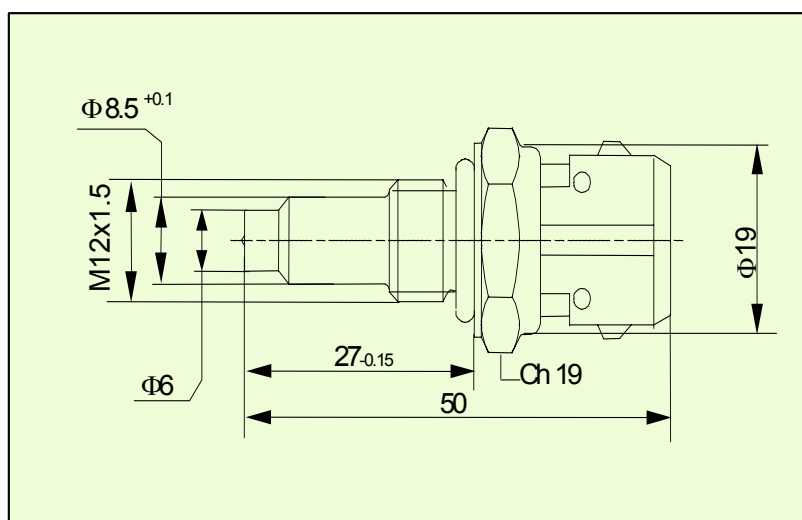
Typical Performance



WTS 05

3 k Ω Water Temperature Sensor

Dimensions

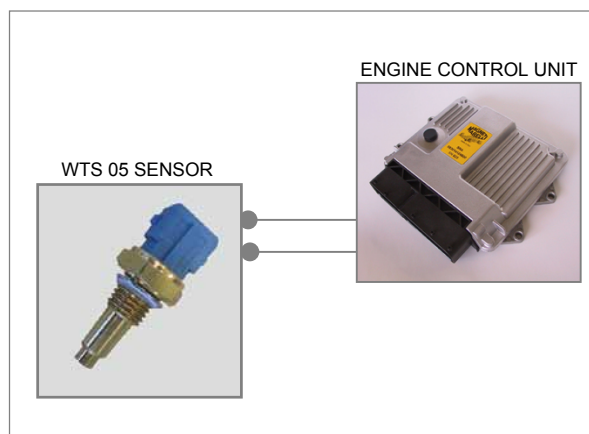


Dimensions in millimetres

Technical Characteristics

Resistance (@ 25 °C).....	3	k Ω
Input voltage	5	V
Accuracy from nominal values		
@ -40 °C to 125 °C.....	5	%
Connector (2 ways).....	Mini-Timer	
Weight.....	26	g

Application Schematics



For further information, please contact:



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SENSORS

RPT98

98° Rotary position transducer

Description

High precision rotary throttle potentiometer.

Main Features

- Reinforced plastic housing
- Slots for adjustable position
- DR25 jacket and military connectors available with cable length to customer requirements
- Available with two connector types (see Connector Pin Out)

Benefits

- Raw parts available in stock
- High precision

Typical Applications

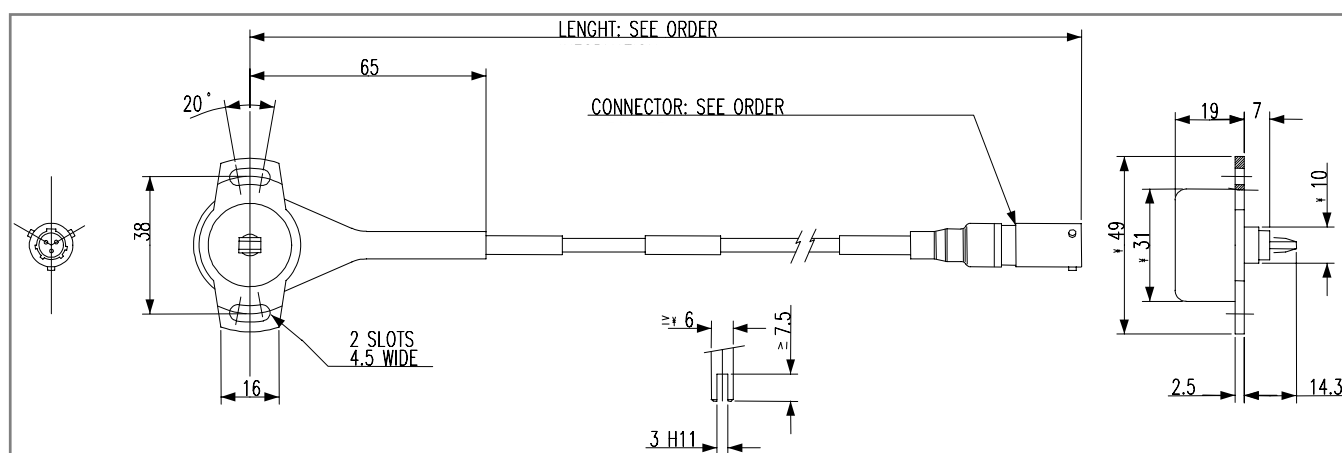
Throttle position sensing in racing engines



RPT98

98° Rotary position transducer

Dimensions



Dimensions in millimetres

Technical Characteristics

Typical application Throttle position
 Operating temperature
 potentiometer..... -40 to 150 °C
 connector..... -10 to 125 °C
 Resistance 3 kΩ
 Linearity (typ.) ± 0.5 % f.s.
 Electrical angle..... 98°
 Weight..... 70 g

Connector Pin Out

PIN	SJT 00 RT 8-98 P	KPSE-6E8-33P-DN
A	+ 5V	+ 5V
B	Signal	GND
C	GND	Signal

For further information, please contact:



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SENSORS

W1051

44° Contactless rotary position transducer

Description

Contactless clockwise rotary position sensor.

Main Features

- Contactless technology
- Low weight sensor
- High temperature range

Benefits

- No contact wear
- High precision

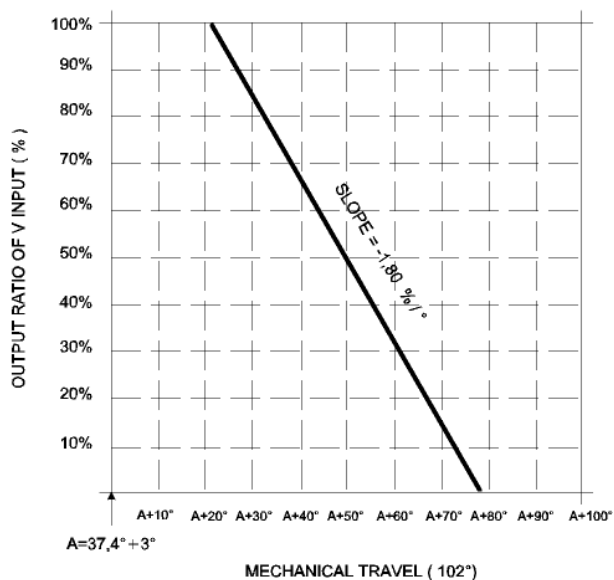
Typical Applications

Throttle, pedal, clutch position sensing in racing engines and vehicle



Typical Performance

GRAPH OF NOMINAL ELECTRICAL OUTPUT



W1051

44° Contactless rotary position transducer

Technical Characteristics

Typical application Throttle and pedal position

Power supply

normal working range $5 \pm 10\%$ V

reverse voltage protection -14.5 V

Operating temperature

functional -40 to 150 °C

Spring return torque

minimum return..... 20-50 mN·m

maximum wind up..... 160 mN·m

Vibration range tested (60 Hz to 1500 Hz) 15 g

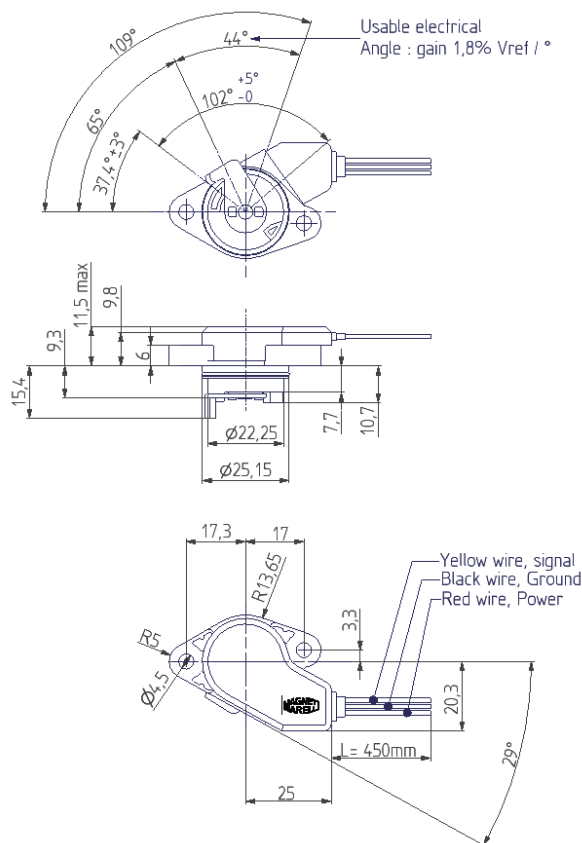
Protection class..... IP 67

Linearity (typ.) $\pm 1.5\%$ f.s.

Electrical angle..... 44°

Weight..... 40 g

Dimensions



Dimensions in millimetres

For further information, please contact:



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SENSORS

W1051

100° Contactless rotary position transducer

Description

Contactless counterclockwise rotary position sensor.

Main Features

- Contactless technology
- Low weight sensor
- High temperature range

Benefits

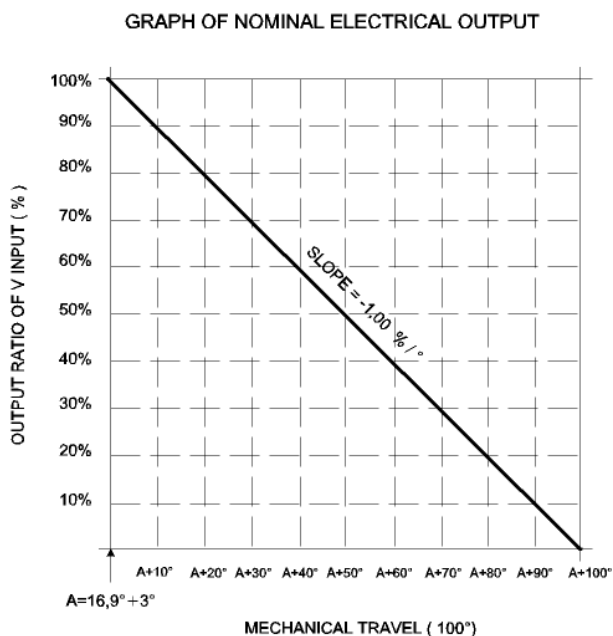
- No contact wear
- High precision

Typical Applications

Throttle, pedal, clutch position sensing in racing engines and vehicle



Typical Performance



W1051

100° Contactless rotary position transducer

Technical Characteristics

Typical application Throttle and pedal position

Power supply

normal working range $5 \pm 10\%$ V

reverse voltage protection -14.5 V

Operating temperature

functional -40 to 150 °C

Spring return torque

minimum return..... 20-50 mN·m

maximum wind up..... 160 mN·m

Vibration range tested (60 Hz to 1500 Hz) 15 g

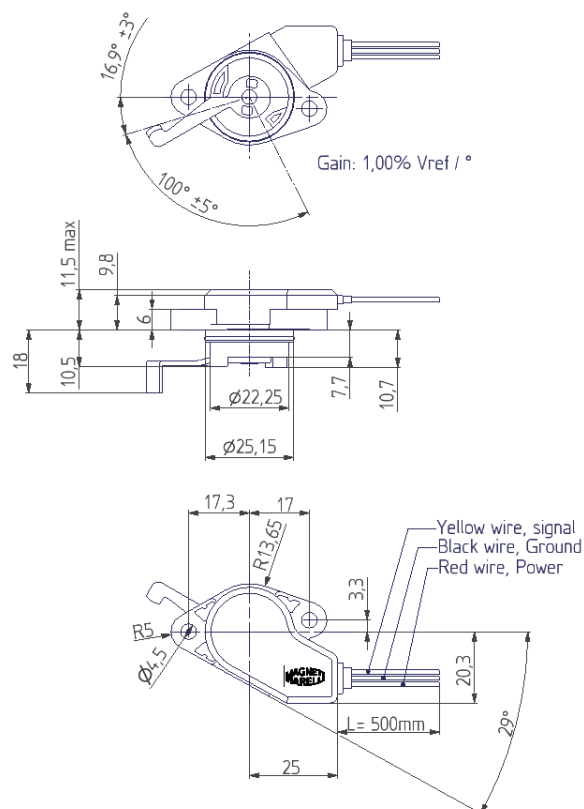
Protection class..... IP 67

Linearity (typ.) $\pm 1.5\%$ f.s.

Electrical angle..... 100°

Weight..... 40 g

Dimensions



Dimensions in millimetres

For further information, please contact:



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SENSORS

W1059

108° Contactless rotary position transducer

Description

Contactless clockwise rotary position sensor.

Main Features

- Contactless technology
- Low weight sensor
- Flying lead (Raychem AWG 24)

Benefits

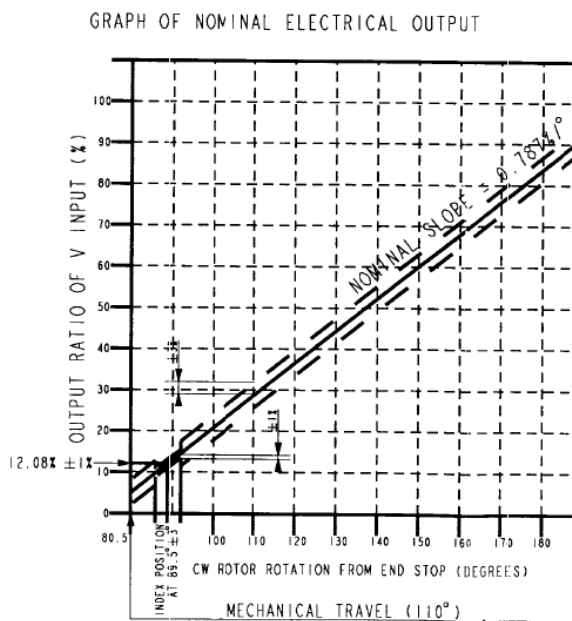
- No contact wear
- High precision

Typical Applications

Throttle and pedal position sensing in racing engines and vehicle



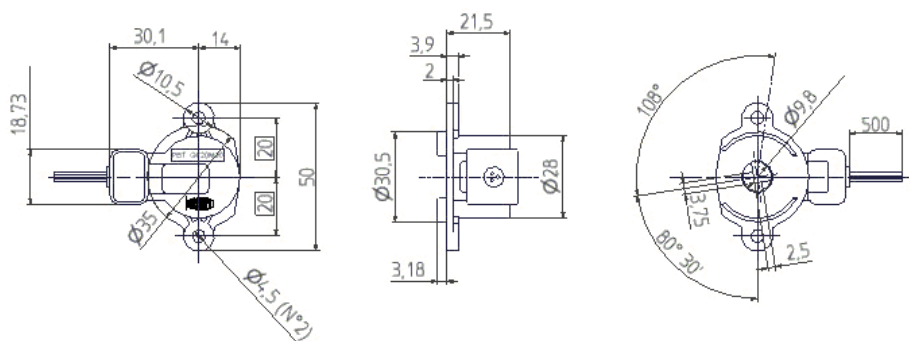
Typical Performance



W1059

108° Contactless rotary position transducer

Dimensions



Dimensions in millimetres

Technical Characteristics

Typical application Throttle and pedal position

Power supply

normal working range $5 \pm 10\%$ V

over voltage 18 V

reverse voltage protection -14.5 V

Operating temperature

functional -30 to 120 °C

storage -40 to 140 °C

Spring return torque

minimum return 20 mN·m

maximum wind up 130 mN·m

Vibration range tested (30 Hz to 1500 Hz) 15 g

Protection class

mechanical IP 55

electronic IP 57

Linearity (typ.) $\pm 1.0\%$ f.s.

Electrical angle 108°

$V_{out} = (0.05 + \text{gradient} \times \text{angle}) \times V_{ref}$

Output gradient 0.767 to 0.807

Weight 41 g

Connector Pin Out

Wire colour table

Red	Supply voltage
Black	GND
Blue	Signal





SENSORS

SEN 8D-8K

Ø 15 mm VR revolution sensor

Description

A cost effective VR sensor for speed detection of toothed wheels.

Main Features

- Case in PA 6.6 GFR, manufactured in silicone sleeving for operation in automotive environment
- High electrical signal level

Benefits

- Available in stock
- Low cost

Typical Applications

Racing engines crank and camshaft speed-position sensing



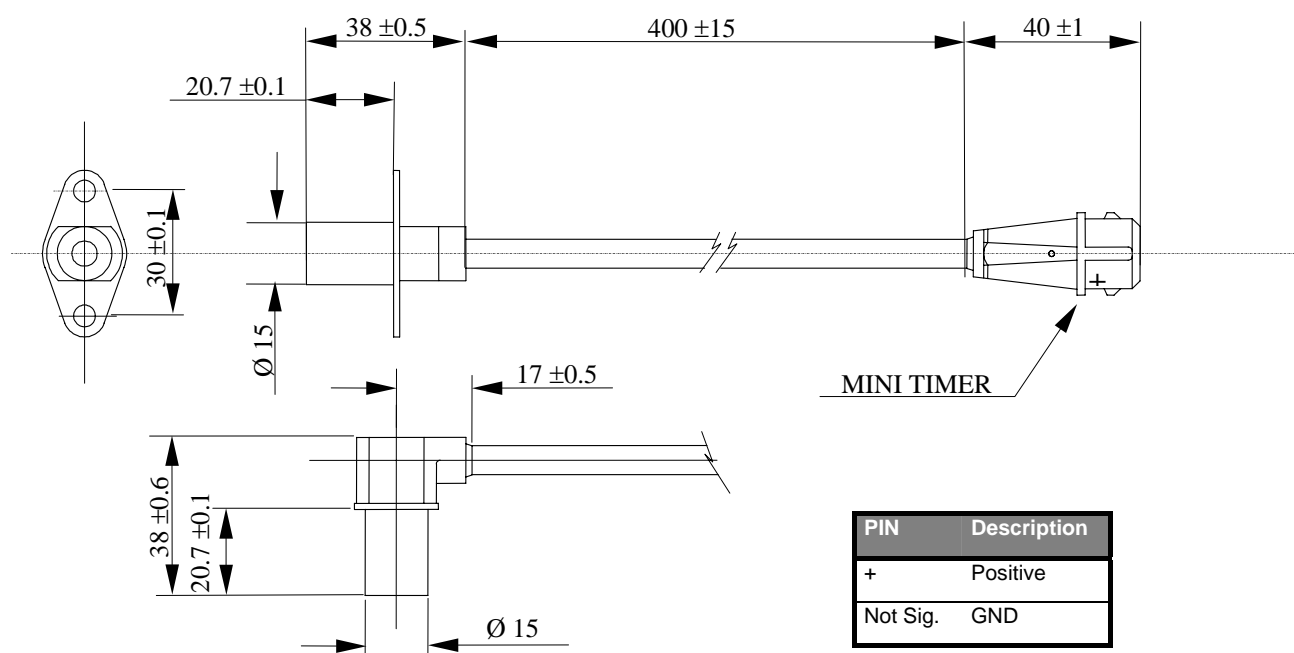
Option

SEN 8K (90° cable exit) available

SEN 8D-8K

Ø 15 mm VR revolution sensor

Dimensions

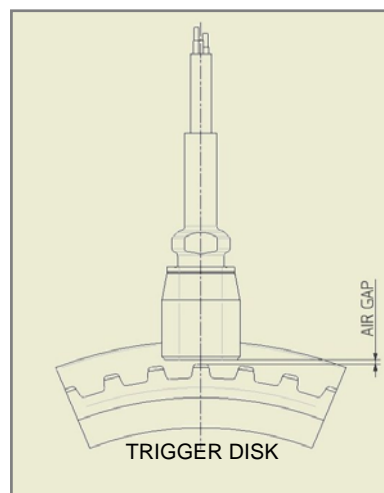


Dimensions in millimetres

Technical Characteristics

Typical application Crank, Cam, Wheel
 Max. operating temperature..... 125 °C
 Air gap..... 0.5 to 1 mm
 Speed range 40 to 12000 rpm
 Output @ 40 rpm (peak to peak) > 400 mV
 Weight..... 60 g

Application Schematics



For further information, please contact:



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ENGINE CONTROL UNIT

- ✓ SRA-E
- ✓ SRA-EDL4/8
- ✓ SRT-E
- ✓ SRT-EDL16/32
- ✓ MARVEL4
- ✓ MARVEL8

AUXILIARY MODULES

- ✓ AMC 6 ENC
- ✓ PC-DISPLAY CABLE

Electronic Control Systems





ENGINE CONTROL UNIT

SRA-E

DBW control

High number of Inputs/Outputs

Ethernet line

Description

SRA-E is a dedicated Engine Control Unit. A single unit can drive up to eight injectors and six ignition coils. SRA-E can also drive logic command coils (SW option).

Communication from the PC based configuration tool and to other units (such as dashboard and logger) is by the 2 CAN lines and an asynchronous serial line.

Inside the unit there is a high performance RISC microcontroller and an FPGA for diagnostic purposes.

SRA-E provides analogue inputs for single-ended, differential, temperature and knock-sensor as well as an interface for a switching lambda sensor. The unit also provides an H-Bridge output stage for use with suitable "Drive by Wire" actuators.

6 configurable speed sensor inputs (inductive or Hall) provide full flexibility of configuration for engine angle detection as well as other frequency inputs such as wheel or shaft speed.

SRA-EDL4/8 is a version of the SRA-E with an internal 4/8 Mbyte data logger.

SRA-E is supplied with the mating connector (loom side).



Main Features

- 8 Single-ended
- 6 Pick-ups or Hall effect
- 6 Inductive or logic command ignition drivers (SW option)
- 8 On/Off injector drivers
- 1 H-Bridge: DC-Motor driver for "Drive by Wire" control
- 4 PWM (Current controlled PWM)
- 1 On/Off or Linear Lambda sensor
- 2 Knock input for detonation control accelerometers
- 2 CAN communication buses
- 1 Ethernet line

Benefits

- Flexible setup by means of a high number of Inputs/Outputs
- The logic command coils option is available on request
- SW selectable NTC/PT1000 temperature sensor
- Floating point data management
- Direct management of Marelli dashboard display
- Compatible with a wide range of professional Marelli software tools
- Easy to install

Typical Applications

One make race series

ENGINE CONTROL UNIT

SRA-E

DBW control

High number of Inputs/Outputs

Ethernet line

Technical Characteristics

Inputs

Analogue Single-ended	8
On/Off or Linear Lambda sensor	1
Knock sensor (multiplexed).....	2
K-type thermocouple	2
NTC/PT1000 temperature sensor (selectable)	4
NTC internal temperature sensor	1
V battery injector.....	1
VR Pick-ups or Hall effect	6
On/Off digital	6
Lap Trigger.....	1
"Code Load" enable pin	1

Outputs

On/Off injector drivers.....	8
Inductive or logic command ignition drivers (SW option) ..	6
H-Bridges	1
Lambda heater drivers	1
PWM	4
Low-side On/Off	2
Voltage references.....	2

Communications

CAN line (1 Mbit/s (*)).....	2
Ethernet line (100 Mbit/s).....	1
Serial current loop.....	1

(*) Configurable on request

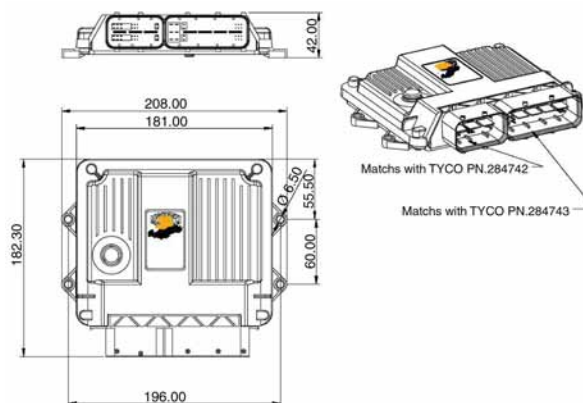
Logic Core

Microcontroller (80 MIPS RISC).....	1
FPGA (50k gates)	1
Flash E2PROM (microcontroller)	1 Mbyte
RAM memory (microcontroller)	48 Kbyte
RAM memory	512 Kbyte
E2PROM parallel	64 Kbyte
E2PROM serial	4 Kbyte
Time keeper	1

Other Characteristics

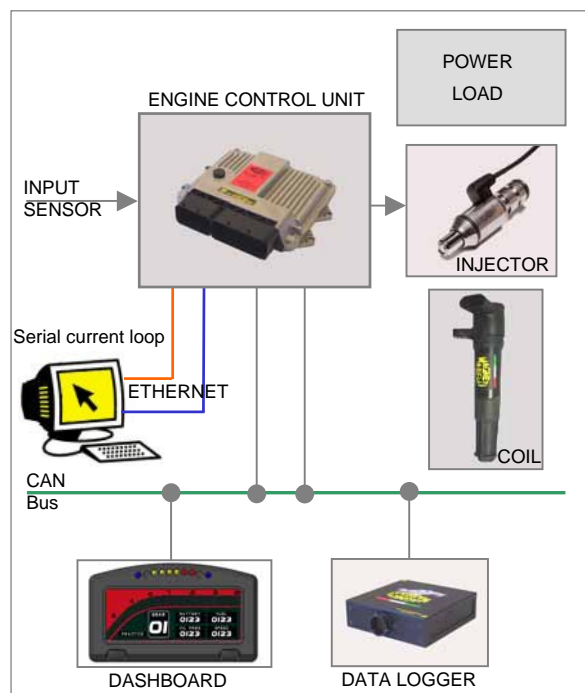
Power supply	6 to 16 V
Operating temperature range (internal)	-20 to 85 °C
Protection class.....	IP 65
Dimensions	
with connectors.....	208 x 182.30 x 42 mm
Weight (approx.)	960 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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ENGINE CONTROL UNIT

SRA-EDL4/8

Internal data logger, DBW control
High number of Inputs/Outputs
Ethernet line

Description

SRA-EDL4/8 is a dedicated Engine Control Unit. A single unit can drive up to eight injectors and six ignition coils. SRA-EDL4/8 can drive logic command coils (SW option).

SRA-EDL4/8 is an engine control unit which includes data logger and a very high speed Ethernet line to download data. Communication from the PC based configuration tool and to other units (such as dashboard and logger) is by the 2 CAN lines and an asynchronous serial line.

Inside the unit there is a high performance RISC microcontroller with a logging capability of 4 or 8 Mbyte and an FPGA for diagnostic purposes.

SRA-EDL4/8 provides analogue inputs for single-ended, differential, temperature and knock-sensor as well as an interface for a switching lambda sensor. The unit also provides an H-Bridge output stage for use with suitable "Drive by Wire" actuators.

6 configurable speed sensor inputs (inductive or Hall) provide full flexibility of configuration for engine angle detection as well as other frequency inputs such as wheel or shaft speed.

SRA-EDL4/8 is supplied with the mating connector (loom side).



Main Features

- 8 Single-ended
- 6 Pick-ups or Hall effect
- 6 Inductive or logic command ignition drivers (SW option)
- 8 On/Off injector drivers
- 1 H-Bridge: DC-Motor driver for "Drive by Wire" control
- 4 PWM (Current controlled PWM)
- 1 On/Off or Linear Lambda sensor
- 2 Knock input for detonation control accelerometers
- 4 or 8 Mbyte internal data logger
- Up to 128 logged channels
- Up to 10 Kbyte/s logging rate
- Sampling rates up to 200 Hz
- 2 CAN communication buses
- 1 Ethernet line

Benefits

- No need of external data logger
- Extremely reduce data download time by means of Ethernet link
- The logic command coils option is available on request
- SW selectable NTC/PT1000 temperature sensor
- Flexible setup by means of a high number of Inputs/Outputs
- Floating point data management
- Direct management of Marelli dashboard display
- Pick-up inputs for wheel speed and distance measurement
- Requires Wintax3 analysis software (compatible Win2K/XP)
- Requires Axon logging setup tool
- Easy to install

Typical Applications

One make race series

ENGINE CONTROL UNIT

SRA-EDL4/8

Internal data logger, DBW control
High number of Inputs/Outputs
Ethernet line

Technical Characteristics

Inputs

Analogue Single-ended	8
On/Off or Linear Lambda sensor	1
Knock sensor (multiplexed).....	2
K-type thermocouple.....	2
NTC/PT1000 temperature sensor (selectable)	4
NTC internal temperature sensor	1
V battery injector.....	1
VR Pick-ups or Hall effect.....	6
On/Off digital.....	6
Lap Trigger.....	1
"Code Load" enable pin	1

Outputs

On/Off injector drivers.....	8
Inductive or logic command ignition drivers (SW option) ..	6
H-Bridges	1
Lambda heater drivers.....	1
PWM	4
Low-side On/Off	2
Voltage references.....	2

Communications

CAN line (1 Mbit/s (*)).....	2
Ethernet line (100 Mbit/s).....	1
Serial current loop.....	1

(*) Configurable on request

Logic Core

Microcontroller (80 MIPS RISC).....	1
FPGA (50k gates)	1
Flash E2PROM (microcontroller)	1 Mbyte
RAM memory (microcontroller)	48 Kbyte
RAM memory	512 Kbyte
E2PROM parallel	64 Kbyte
E2PROM serial	4 Kbyte
Time keeper	1

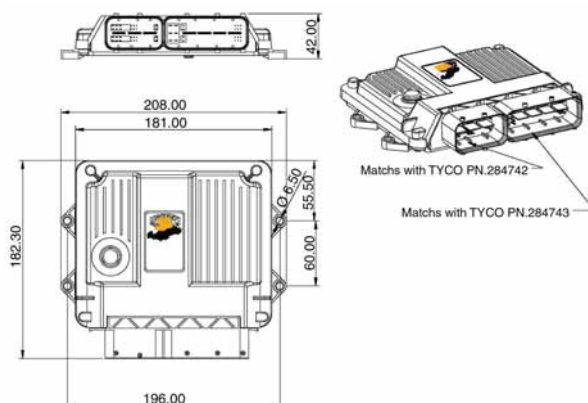
Logging

Flash disk memory.....	4 or 8 Mbyte
Logged channels.....	up to 128
Logging rate	up to 10 Kbyte/s
Sampling rate.....	up to 200 Hz

Other Characteristics

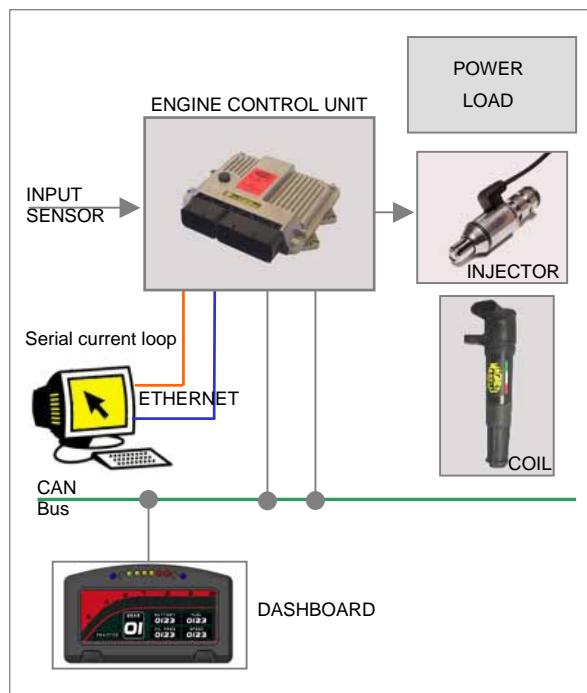
Power supply	6 to 16 V
Operating temperature range (internal)	-20 to 85 °C
Protection class.....	IP 65
Dimensions	
with connectors.....	208 x 182.30 x 42 mm
Weight (approx.)	960 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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ENGINE CONTROL UNIT

SRT-E

Professional engine control
High performances

Description

SRT-E is an evolution of the SRA Engine Control Unit with greater input/output and communications capability in a reduced package size and having more robust external connections.

SRT-E is a dedicated Engine Control Unit. A single SRT-E can drive up to eight injectors and six ignition coils. It is compatible with a wide range of sensors and actuators (especially F1 products) such as coils, injectors and sensors. SRT-E can also drive logic command coils (HW option).

Communication from the PC based configuration tool and to other units (such as dashboard and logger) is possible by 2 CAN lines and an asynchronous serial line.

Inside the unit there is a high performance RISC microcontroller and an FPGA for diagnostic purposes.

SRT-E provides analogue inputs for single-ended, differential, temperature and knock-sensor as well as an interface for a linear wide band lambda sensor. The unit also provides 2 H-Bridge output stages for use with suitable "Drive by Wire" or Trumpet Control actuators.

6 configurable speed sensor inputs (up to 3 inductive) provide full flexibility of configuration for engine angle detection as well as other frequency inputs such as wheel or shaft speed.

SRT-EDL is a version of the SRT E Engine Control Unit with an internal 16 or 32 Mbyte data logger.

Main Features

- 14 Single-ended
- 3 Pick-ups or Hall effect
- 3 Hall effect
- 6 Inductive or logic command ignition drivers (HW option)
- 8 On/Off injector drivers
- 2 H-Bridge: DC-Motor driver for "Drive by Wire" control
- 4 PWM
- 2 Linear Lambda
- 2 Knock input for detonation control accelerometers
- 2 CAN communication buses
- 1 Ethernet line



Benefits

- Accurate engine control by means of high computation power
- Compatible with F1 products (injectors, coils, sensors, etc.)
- The logic command coils option is available on request
- SW selectable NTC/PT1000 temperature sensor
- Floating point data management
- Direct management of Marelli dashboard display
- Compatible with a wide range of professional software tools
- Introduced circular connectors
- Very compact design and easy to install

Typical Applications

Professional circuit and rally applications
One make race series

ENGINE CONTROL UNIT

SRT-E

Professional engine control
High performances

Technical Characteristics

Inputs

Analogue Single-ended	14
Linear Lambda sensor	2
Knock sensor	2
K-type thermocouple	2
NTC/PT1000 temperature sensor (selectable)	4
NTC internal temperature sensor	1
V battery injector	1
VR Pick-ups or Hall effect	3
Hall effect	3
Lap trigger	1
"Code Load" enable pin	1
Syncro (Iso9141)	1

Outputs

On/Off injector drivers	8
Inductive or logic command ignition drivers (HW option) ..	6
H-Bridges	2
Lambda heater drivers	2
PWM	4
Voltage references	3

Communications

CAN line (1 Mbit/s (*))	2
Ethernet line (100 Mbit/s)	1
Serial current loop	1

(*) Configurable on request

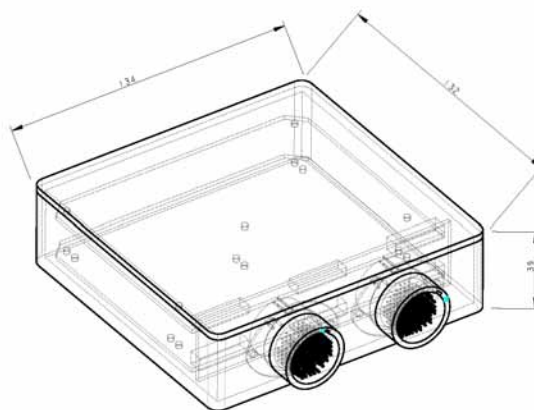
Logic Core

Microcontroller (80 MIPS RISC)	1
FPGA (50k gates)	1
Flash E2PROM (microcontroller)	1 Mbyte
RAM memory (microcontroller)	48 Kbyte
RAM memory	512 Kbyte
E2PROM	64 Kbyte
Time keeper	1

Other Characteristics

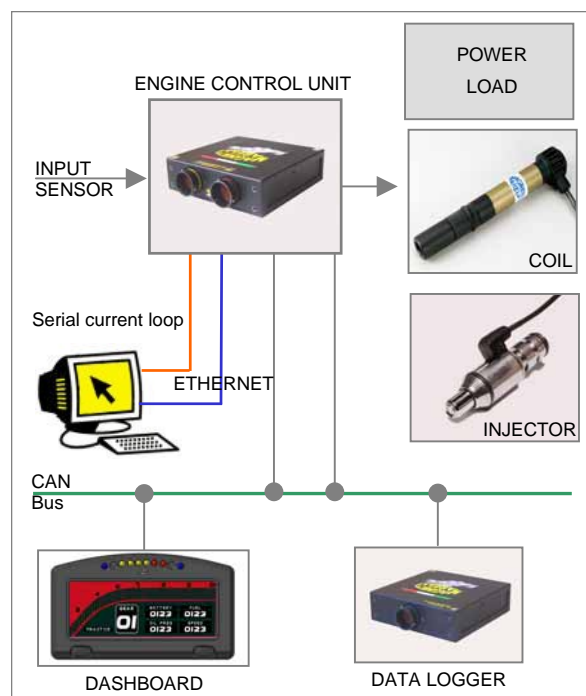
Power supply	7 to 16 V
Operating temperature range (internal)	-20 to 85 °C
Protection class	IP 54
Dimensions	
without connectors	134 x 132 x 39 mm
Weight (approx.)	700 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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ENGINE CONTROL UNIT

SRT-EDL16/32

Internal data logger
Professional engine control
High performances

Description

SRT-EDL16/32 combines the performance of the SRT-E Engine Control Unit with an internal 16/32 Mbyte data logger with a very high speed Ethernet connection for data download. The engine control capability of the SRT-EDL16/32 is an evolution of the SRA Engine Control Unit with greater input/output and communications capability in reduced package size and having more robust external connections.

Like the SRT-E, SRT-EDL16/32 is a dedicated Engine Control Unit. A single SRT-EDL16/32 can drive up to eight injectors and six ignition coils. It is compatible with a wide range of sensors and actuators (especially F1 products) such as coils, injectors and sensors. SRT-EDL16/32 can also drive logic command coils (HW option).

In addition to the very high speed Ethernet connection for data download, communications from the PC based configuration tool and to other units (such as dashboard and logger) is possible by 2 CAN lines and an asynchronous serial line.

Inside the unit there is a high performance RISC microcontroller and an FPGA for diagnostic purposes.

SRT-EDL16/32 provides analogue inputs for single-ended, differential, temperature and knock-sensor as well as an interface for a linear wide band lambda sensor. The unit also provides 2 H-Bridge output stages for use with suitable "Drive by Wire" or Trumpet Control actuators.

6 configurable speed sensor inputs (up to 3 inductive) provide full flexibility of configuration for engine angle detection as well as other frequency inputs such as wheel or shaft speed.

Main Features

- 14 Single-ended
- 3 Pick-ups or Hall effect
- 3 Hall effect
- 6 Inductive or logic command ignition drivers (HW option)
- 8 On/Off injector drivers
- 2 H-Bridge: DC-Motor driver for "Drive by Wire" control
- 4 PWM
- 2 Linear Lambda
- 2 Knock input for detonation control accelerometers
- 16 or 32 Mbyte internal data logger
- Up to 256 logged channels
- Up to 40 Kbyte/s logging rate
- Sampling rates up to 1000 Hz
- 2 CAN communication buses
- 1 Ethernet line



Benefits

- No need of external data logger
- Extremely reduce data download time by means of Ethernet link
- Accurate engine control by means of high computation power
- Compatible with F1 products (injectors, coils, sensors etc.)
- The logic command coils option is available on request
- SW selectable NTC/PT1000 temperature sensor
- Floating point data management
- Direct management of Marelli dashboard display
- Pick-up inputs for wheel speed and distance measurement
- Requires Wintax3 analysis software (compatible Win2K/XP)
- Requires Axon logging setup tool
- Introduced circular connectors
- Very compact design and easy to install

Typical Applications

Professional circuit and rally applications
One make race series

ENGINE CONTROL UNIT

SRT-EDL16/32

Internal data logger
Professional engine control
High performances

Technical Characteristics

Inputs

Analogue Single-ended	14
Linear Lambda sensor	2
Knock sensor	2
K-type thermocouple	2
NTC/PT1000 temperature sensor (selectable)	4
NTC internal temperature sensor	1
V battery injector	1
VR Pick-ups or Hall effect	3
Hall effect	3
Lap trigger	1
"Code Load" enable pin	1
Syncro (Iso9141)	1

Outputs

On/Off injector drivers	8
Inductive or logic command ignition drivers (HW option) ..	6
H-Bridges	2
Lambda heater drivers	2
PWM	4
Voltage references	3

Communications

CAN line (1 Mbit/s (*))	2
Ethernet line (100 Mbit/s)	1
Serial current loop	1
(*) Configurable on request	

Logic Core

Microcontroller (80 MIPS RISC)	1
FPGA (50k gates)	1
Flash E2PROM (microcontroller)	1 Mbyte
RAM memory (microcontroller)	48 Kbyte
RAM memory	512 Kbyte
E2PROM	64 Kbyte
Time keeper	1

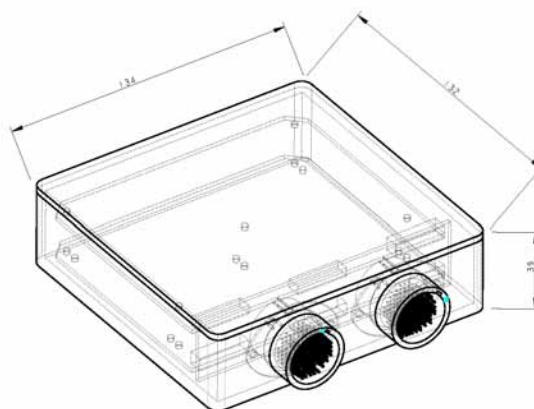
Logging

Flash disk memory	16 or 32 Mbyte
Logged channels	up to 256
Logging rate	up to 40 Kbyte/s
Sampling rate	up to 1000 Hz

Other Characteristics

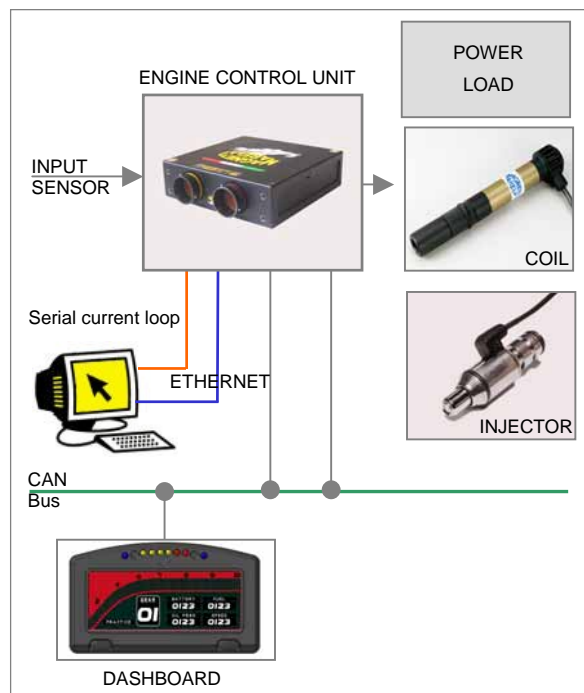
Power supply	7 to 16 V
Operating temperature range (internal)	-20 to 85 °C
Protection class	IP 54
Dimensions	
without connectors	134 x 132 x 39 mm
Weight (approx.)	700 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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ENGINE CONTROL UNIT

MARVEL4

4 cylinders with double injection
and internal data logger

Description

MARVEL4 is dedicated to race applications that need high performances in a limited range of costs.

MARVEL4 is a modular design engine control system which includes an internal data logger.

It integrates two microprocessors and a DSP plus two FPGA to achieve great computation power. A very high speed Ethernet line is dedicated to data download, while an ARCNet line and two full CAN lines allow connections with others control devices.

It is compatible with a very wide range of actuators/sensors, especially F1 products, such as coils, injectors, and it's intended for universal installation from single up to 4 cylinders engine applications with double injection. It's possible to select overcurrent and feedback threshold according to the type of coils used.

Output stages provide also a double DC-motor control such as simple Drive by Wire or trumpets control. MARVEL4 is provided with some analogue inputs, all of them with 10 bit resolution, including integrated UEGO linear lambda with heater and knock controllers that provide full engine diagnostics and controls.

Note:

For different solution (e.g. 3 CAN lines, Lap trigger pulled down or pulled up, etc) contact our sale department.



Main Features

- 17 Single-ended
- 3 Pick-ups or Hall effect
- 2 Hall effect
- 4 Inductive ignition drivers
- 8 On/Off injector drivers
- 2 H-Bridge: DC-Motor driver for "Drive by Wire" control
- 2 PWM
- 2 Linear Lambda sensor
- 2 Knock input for detonation control accelerometers
- 128 Mbyte internal data logger
- Up to 512 logged channels
- Up to 64 Kbyte/s logging rate
- Sampling rates up to 1000 Hz
- 2 CAN communication buses
- 1 ARCNet line
- 1 Ethernet line

Benefits

- No need of external data logger
- Accurate engine control by means of high computation power
- Extremely reduce data download time by means of Ethernet link
- Compatible with F1 products (injectors, coils, sensors etc.)
- SW adjustable coil's overcurrent and feedback threshold
- SW selectable NTC/PT1000 temperature sensor
- Floating point data management
- Direct management of Marelli dashboard display
- Pick-up inputs for wheel speed and distance measurement
- Requires Wintax3 analysis software (compatible Win2K/XP)
- Requires Axon logging setup tool
- Very compact design and easy to install

Typical Applications

MotoGP

Professional circuit and rally applications

ENGINE CONTROL UNIT

MARVEL4

4 cylinders with double injection
and internal data logger

Technical Characteristics

Inputs

Analogue Single-ended	17
Linear Lambda sensor	2
Knock sensor	2
K-type thermocouple	2
NTC/PT1000 temperature sensor (selectable)	6
NTC internal temperature sensor	1
V battery injector	1
VR Pick-ups or Hall effect (exclusive)	3
Hall effect	2
On/Off digital	1
Lap Trigger	1
"Code Load" enable pin	1

Outputs

On/Off injector drivers	8
Low-side On/Off	2
Inductive ignition drivers	4
H-Bridges	2
Lambda heater drivers	2
PWM	2
Voltage references	3

Communications

CAN line (1 Mbit/s (*))	2
ARCNet line (10 Mbit/s)	1
Ethernet line (10/100 Mbit/s)	1
Serial current loop or RS 485 (exclusive)	1

* Configurable on request

Logic Core

Microcontroller (40 MIPS RISC)	2	
DSP (80 MFLOPS)	1	
Dual port RAM (16 Kword)	1	
FPGA (10k gates)	1	
FPGA (100k gates)	1	
Flash E2PROM (microcontroller)	2 x 512	Kbyte
RAM memory (microcontroller)	2 x 32	Kbyte
RAM memory (DSP)	512	Kbyte
Flash E2PROM	2 x 512	Kbyte
RAM memory	2 x 512	Kbyte
E2PROM	512	Kbyte
Time keeper	1	

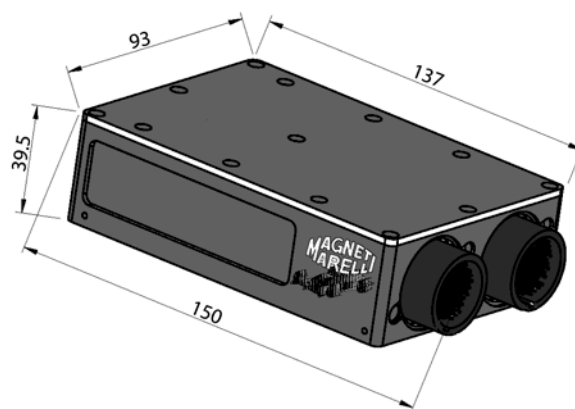
Logging

Flash disk memory	128	Mbyte
Logged channels	up to 512	
Logging rate	up to 64	Kbyte/s
Sampling rate	up to 1000	Hz

Other Characteristics

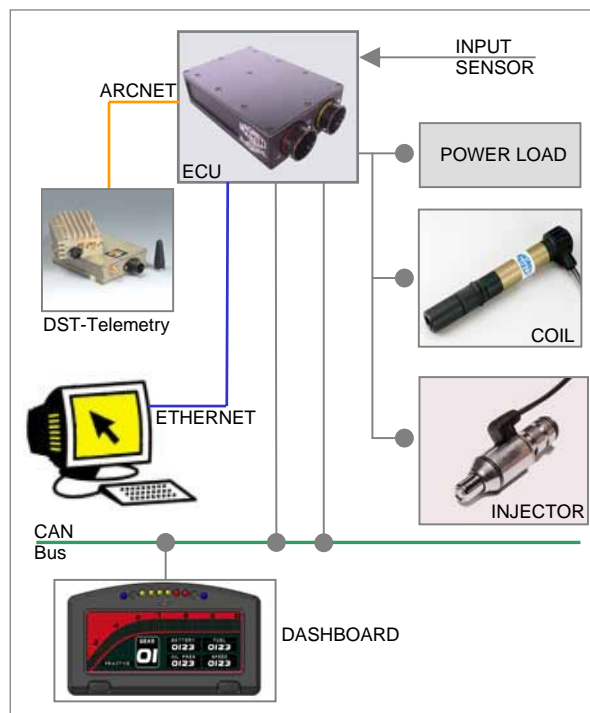
Power supply		
total system operating	8 to 16	V
logic core operating	6 to 16	V
Operating temperature range (internal)	-20 to 85	°C
Protection class	IP 54	
Dimensions		
without connectors	93 x 137 x 39.5	mm
Weight (approx.)	590	g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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ENGINE CONTROL UNIT

MARVEL8

8 cylinders with double injection
Internal data logger
Engine and Gear control

Description

Marvel8 is dedicated to race applications that need high performances in a limited range of costs.

Marvel8 is a modular design engine and gear control system which includes an internal data logger and a high number of Inputs/Outputs to allow a flexible setup.

It integrates two microprocessors and a DSP plus two FPGA to achieve great computation power. A very high speed Ethernet line is dedicated to data download, while an ARCNet line and four full CAN lines allow connections with others control devices.

It is compatible with a very wide range of actuators/sensors, especially F1 products, such as coils, injectors and sensors, and it's intended for universal installation from single up to 8 cylinders engine applications with double injection. It's possible to select overcurrent and feedback threshold with regard to the type of coils used.

Output stages provide also a triple DC-motor control such as simple Drive by Wire or trumpets control. Proportional PWM allow you to drive gear box electrovalves. Marvel8 is provided with some analogue inputs with 12 bit resolution, integrated UEGO linear lambda with heater and knock controllers that provide full engine diagnostics and controls.

Main Features

- 24 Single-ended (4 @ 12 bit resolution)
- 4 Differential (@ 12 bit resolution)
- 3 Pick-ups or Hall effect
- 4 Hall effect
- 8 Inductive ignition drivers
- 18 On/Off injector drivers
- 3 H-Bridges: for DC-Motor driver
- 6 PWM: proportional PWM for gear box control
- 2 Linear Lambda sensor
- 4 Knock input for detonation control accelerometers
- 128 Mbyte internal data logger
- Up to 512 logged channels
- Up to 64 Kbyte/s logging rate
- Sampling rates up to 1000 Hz
- 4 CAN communication buses
- 1 ARCNet line
- 1 Ethernet line



Benefits

- No need of external data logger
- Great computation power, precise actuations and gear control
- High number of Inputs/Outputs allows a flexible setup
- Extremely reduce data download time by means of Ethernet link
- Some sensors acquire with high accuracy
- Compatible with F1 products (injectors, coils, sensors etc.)
- SW adjustable coil's overcurrent and feedback threshold
- Floating point data management
- Direct management of Marelli dashboard display
- Pick-up inputs for wheel speed and distance measurement
- Requires Wintax3 analysis software (compatible Win2K/XP)
- Requires Axon logging setup tool
- Very compact design and easy to install

Typical Applications

Professional circuit and rally applications

IRL

Formula2

ENGINE CONTROL UNIT

MARVEL8

8 cylinders with double injection
Internal data logger
Engine and Gear control

Technical Characteristics

Inputs

Analogue Single-ended (4 @ 12 bit resolution)	24
Linear Lambda sensor	2
Knock sensor	4
K-type thermocouple	2
Differential (@ 12 bit resolution)	4
NTC/PT1000 temperature sensor (selectable)	6
NTC internal temperature sensor	1
V battery injector	1
VR Pick-ups or Hall effect (exclusive)	3
Hall effect	4
On/Off digital	4
Lap Trigger	1
"Code Load" enable pin	1

Outputs

On/Off injector drivers	18
Inductive ignition drivers	8
H-Bridges	3
Lambda heater drivers	2
PWM (proportional)	6
Voltage references	6

Communications

CAN line (1 Mbit/s (*))	4
ARCNet line (10 Mbit/s)	1
Ethernet line (10/100 Mbit/s)	1
Serial current loop or RS 485 (exclusive)	1

(*) Configurable on request

Logic Core

Microcontroller (40 MIPS RISC)	2
DSP (80 MFLOPS)	1
Dual port RAM (16 Kword)	1
FPGA (10k gates)	1
FPGA (100k gates)	1
Flash E2PROM (microcontroller)	2 x 512 Kbyte
RAM memory (microcontroller)	2 x 32 Kbyte
RAM memory (DSP)	512 Kbyte
Flash E2PROM	2 x 512 Kbyte
RAM memory	2 x 512 Kbyte
E2PROM	512 Kbyte
Time keeper	1

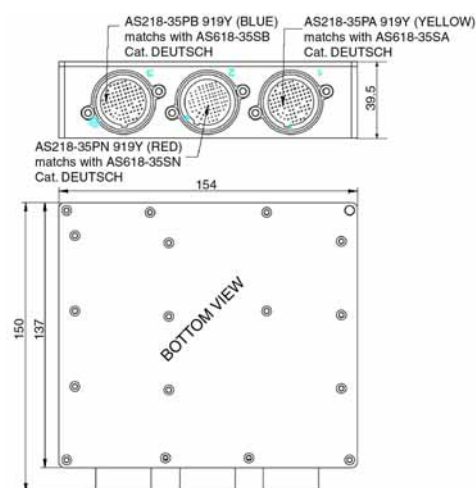
Logging

Flash disk memory	128 Mbyte
Logged channels	up to 512
Logging rate	up to 64 Kbyte/s
Sampling rate	up to 1000 Hz

Other Characteristics

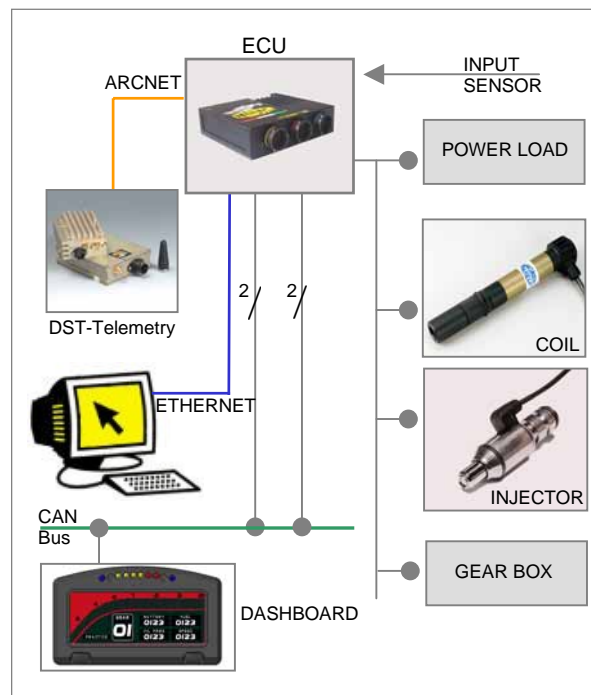
Power supply	
total system operating	8 to 16 V
logic core operating	6 to 16 V
Operating temperature range (internal)	-20 to 85 °C
Protection class	IP 54
Dimensions	
without connectors	154 x 137 x 39.5 mm
Weight (approx.)	870 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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AUXILIARY MODULES

AMC 6 ENC

Slew box (6-encoders)

Description

The AMC 6 ENC slew box is a six potentiometer-like encoders device with a serial interface for connection to a PC allowing rapid calibration of fundamental engine parameters controlled by the ECU.

All potentiometer are VISION programmable. As default configuration, injection time and spark advance are adjusted with two large knobs allowing smooth and precise regulation, a big central one is reserved for additional regulations (e.g. turbo pressure), three little knobs are for injection phase of the high and low injection banks and additional function (AUX1), defined by the application software on specific requests.

The encoders have the advantage that user doesn't need to "zero" the knob position from a point to the subsequent, allowing a faster engine mapping.

The AMC 6 ENC contains the current loop/RS 232 interface which connects the PC directly to the ECU and retransmits commands between the two.

AMC 6 ENC back panel holds a couple of DB9 connector, one of them must be connected to the PC (with the provided RS 232 cable) and, if used, the other must be connected direct to the ECU.

Main Features

- Compatible with VISION4 and VISION4 LITE tools
- Versatile in software programming of the encoders
- Direct interface with low cost ECU



Benefits

- Fast engine mapping
- More precision calibration
- Easy to use by means of VISION tools

Typical Applications

Usable as "dyno" in all applications

AUXILIARY MODULES

AMC 6 ENC

Slew box (6-encoders)

Technical Characteristics

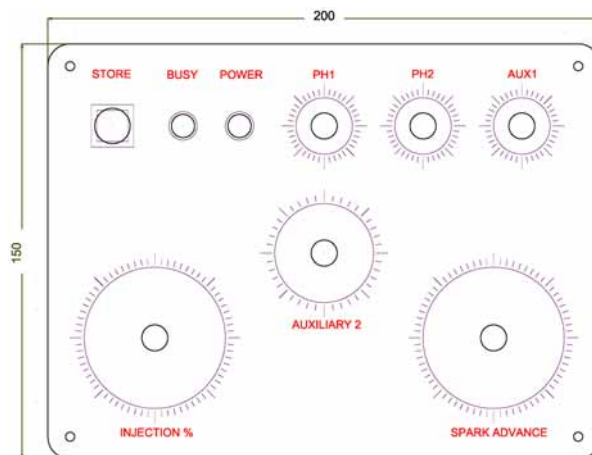
Communications

RS 232	1
bit rate	19200 baud
Serial current loop	1
bit rate	19200 Baud

Other Characteristics

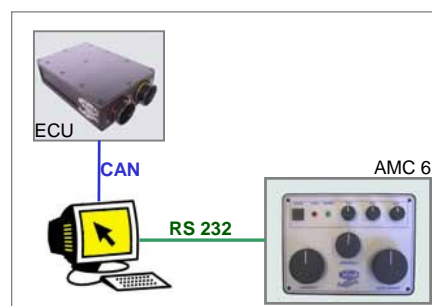
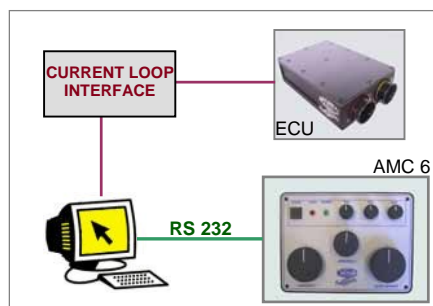
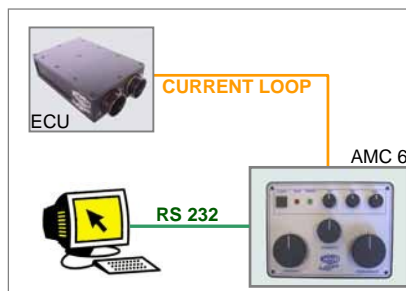
Power supply	8 to 14 V
with adapter (Vac)	220 V
.....	50 Hz
PH1, 2 and AUX1	graduated scale 32 step, 11.25°
AUX2	graduated scale 64 step, 5.62°
Injection	graduated scale 128 step, 2.81°
Spark advance	graduated scale 128 step, 2.81°
Knobs, leds and button dimensions	
Injection % & Spark advance	50 mm
PH1, 2 and AUX1	20 mm
AUX2	35 mm
STORE	12 mm
BUSY	5 mm
POWER	5 mm
Connectors	
RS 232	DB 9 female
Serial current loop	DB 9 male
Dimensions approx.	
without connectors	200 x 150 x 38 mm
Weight (approx.)	1100 g

Dimensions



Dimensions in millimetres

Application Schematics



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AUXILIARY MODULES

PC-DISPLAY CABLE

Current-Loop RS 232 Interface

Description

The PC-Display interface cable is used for monitoring and programming Marelli engine control units together with the proprietary calibration software supplied with the units. The current loop line allows interference-free communications even over the long lengths of cable typically used on a test bed or at the race track.

Main Features

- Monitoring and programming
- Mainly dedicated to Marelli ECUs programming

Benefits

- A single interface for multiple uses:
 - Downloading data
 - Loading software
 - Monitoring ECUs
- Easy to install



Typical Applications

In all application according to the specific ECU used

AUXILIARY MODULES

PC-DISPLAY CABLE

Current-Loop RS 232 Interface

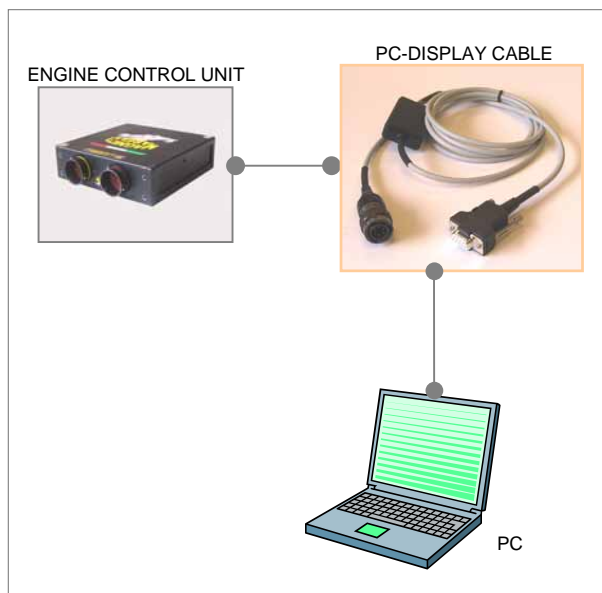
Technical Characteristics

Power supply 6.25 to 26 V
Consumption 100 mA
Operating temperature 0 to 70 °C
Cable lengths
 PC side 350 mm
 ECU side 1800 mm
Container plastic
Weight (approx.) 150 g

Application Schematics

MM MFx & MRx ECU Interface			
DB9 RS232		VPT06GSE10-6P	
PIN	Description	PIN	Description
1	Do not connect	A	ECU/TXD
2	PC/RXD	B	ECU/RXD
3	PC/TXD	C	VBATT
4	Do not connect	D	WREN
5	GND	E	GND
6	Do not connect	F	Do not connect
7	PC/RTS	G	Do not connect
8	Do not connect	H	Do not connect
9	Do not connect	K	Do not connect
		J	Do not connect

Connector Pin Out



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DATA ACQUISITION, DISPLAY AND LAP TRIGGER



DATA LOGGER

- ✓ RDL
- ✓ HRDL-1

DATA DISPLAY

- ✓ DDU 101
- ✓ DDU 210
- ✓ DDU 310-DL32/64
- ✓ MT940/1/B1/BW
- ✓ SDU102/122
- ✓ GDU 110
- ✓ GDU 121

LAP TRIGGER

- ✓ MT906/D
- ✓ MT907/D

AUXILIARY MODULES

- ✓ AAM-I16

Data Acquisition, Display and Lap Trigger





DATA LOGGER

RDL

Racing Data Logger
Up to 32 Mbyte internal memory

Description

RDL is a data logger developed by Magneti Marelli for racing applications which includes a very high speed Ethernet line to download data.

Interconnection with the box can be obtained using 2 CAN lines and an asynchronous current loop serial line.

On the box are present a high performance RISC microcontroller and a FPGA for diagnostic purposes.

RDL is provided with analogue inputs including: Single-ended, temperatures, K-type thermocouple and linear Lambda.

Furthermore the device provides lap trigger and wheel speed inputs.

Main Features

- 12 Single ended
- 3 Pick-ups or Hall effect
- 3 Hall effect
- 2 Linear Lambda sensor inputs
- Up to 32 Mbyte internal data logger
- Up to 256 logged channels
- Up to 40 kbyte/s logging rate
- Sampling rates up to 1000 Hz
- 2 CAN communication buses
- 1 Ethernet line



Benefits

- Extremely reduce data download time by means of Ethernet link
- SW selectable NTC/PT1000 temperature sensor
- Floating point data management
- Direct management of Marelli dashboard display
- Pick-ups inputs for wheel speed and distance measurement
- Requires Wintax3 analysis software (compatible Win2K/XP)
- Requires Axon logging setup tool
- Robust design, easy to install

Typical Applications

Professional circuit and rally applications

One make race series

Formula series

DATA LOGGER

RDL

Racing Data Logger
Up to 32 Mbyte internal memory

Technical Characteristics

Inputs

Analogue Single-ended	12
Linear Lambda sensor	2
K-type thermocouple	2
NTC/PT1000 temperature sensor (selectable)	3
NTC internal temperature sensor	1
VR Pick-ups or Hall effect	3
Hall effect	3
Lap trigger	1
"Code Load" enable pin	1
Syncro (Iso9141)	1

Outputs

Outputs (for indicator LEDs)	2
Lambda heater drivers	2
Voltage references	3

Communications

CAN line (1 Mbit/s (*))	2
Ethernet line (100 Mbit/s)	1
Serial current loop	1

(*) Configurable on request

Logic Core

Microcontroller (80 MIPS RISC)	1
FPGA (50k gates)	1
Flash E2PROM (microcontroller)	1 Mbyte
RAM memory (microcontroller)	48 Kbyte
RAM memory	512 Kbyte
E2PROM	64 Kbyte
Time keeper	1

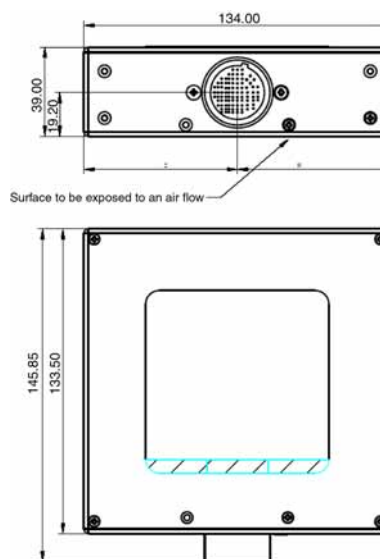
Logging

Flash disk memory	16 or 32 Mbyte
Logged channels	up to 256
Logging rate	up to 40 Kbyte/s
Sampling rate	up to 1000 Hz

Other Characteristics

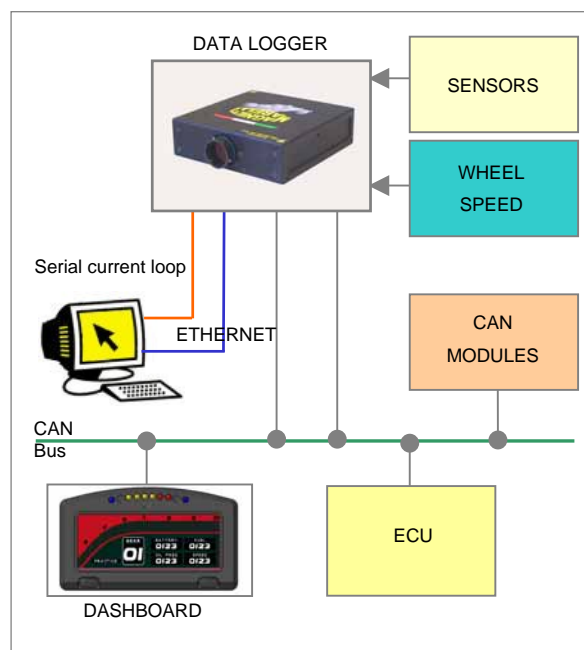
Power supply	7 to 16 V
Operating temperature range (internal)	-20 to 85 °C
Protection class	IP 54
Dimensions	
without connectors	134 x 133.5 x 39 mm
Weight (approx.)	680 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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DATA LOGGER

HRDL-1

High-performance Racing Data Logger
Up to 512 Mbyte internal memory

Description

HRDL-1 is an evolution of Magneti Marelli successful DAS4 EVO to increase logging performances (higher data throughput and logged channels number), the number of Inputs (to allow a flexible set up) and to reduce the dimensions and weight.

HRDL-1 is intended to enhance the new Magneti Marelli data logger product range, started with RDL.

HRDL-1 is a versatile data acquisition unit developed for racing applications which require high resolution data from a large number of channels.

Interconnection with the box can be obtained using two CAN lines, a ARCNet line and a RS 232 line while a Ethernet line is dedicated to data download.

On the box is present a high performance RISC microcontroller.

HRDL-1 is provided with analogue inputs including: Single-ended, differential, temperatures and K-type thermocouple.

Furthermore the device provides lap trigger and wheel speed inputs.



Main Features

- 12 Single ended @ 12 bit resolution
- 4 Single ended @ 10 bit resolution
- 4 Differential @ 12 bit resolution (selectable gain: 1 or 100). Configurable on request as Single-ended (@ 12 bit resolution)
- 1 Pick-ups or Hall effect
- 4 Hall effect
- Up to 512 Mbyte internal data logger
- Up to 300 logged channels
- Up to 128 kbyte/s logging rate
- Sampling rates up to 1000 Hz
- 2 CAN communication buses
- 1 ARCNet line
- 1 Ethernet line

Benefits

- Data download via Ethernet link
- SW selectable NTC/PT1000 temperature sensor
- Floating point data management
- Direct management of Marelli dashboard display
- Pick-ups inputs for wheel speed and distance measurement
- Requires Wintax3 analysis software (compatible Win2K/XP)
- Requires Axon logging setup tool
- Very compact design
- Robust design, easy to install

Typical Applications

Professional circuit and rally applications

One make race series

Industrial application

Formula series

DATA LOGGER

HRDL-1

High-performance Racing Data Logger
Up to 512 Mbyte internal memory

Technical Characteristics

Inputs

Analogue Single-ended (@ 12 bit resolution)	12
Analogue Single-ended (@ 10 bit resolution)	4
Differential (*) (@ 12 bit resolution)	4
K-type thermocouple	2
NTC/PT1000 temperature sensor (selectable)	4
NTC internal temperature sensor	1
VR Pick-ups or Hall effect	1
Hall effect	4
Lap trigger (**)	1
"Code Load" enable pin	1
Syncro (Iso9141)	1
(*) Selectable gain: 1 or 100. Configurable on request as Single-ended (@ 12 bit resolution)	
(**) Configurable on request	

Outputs

Voltage references	4
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Communications

CAN line (1 Mbit/s (***))	2
Ethernet line (100 Mbit/s)	1
ARCNet line (10 Mbit/s)	1
RS 232	1
(***) Configurable on request	

Logic Core

Microcontroller (80 MIPS RISC)	1
Flash E2PROM (microcontroller)	1 Mbyte
RAM memory (microcontroller)	48 Kbyte
RAM memory	512 Kbyte
E2PROM	4 Kbyte
Time keeper	1

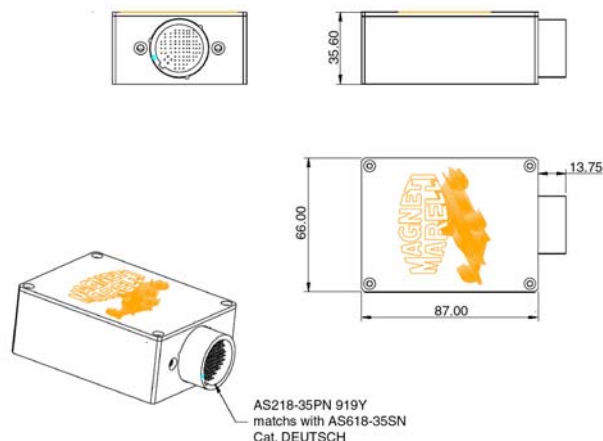
Logging

Flash disk memory	64, 128, 256 or 512 Mbyte
Logged channels	up to 300
Logging rate	up to 128 Kbyte/s
Sampling rate	up to 1000 Hz

Other Characteristics

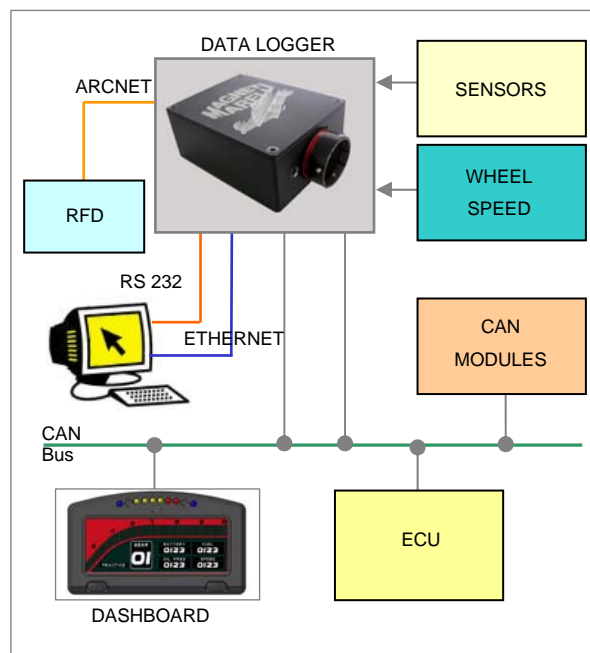
Power supply	8 to 18 V
Operating temperature range (internal)	-40 to 85 °C
Temperature range during data download	0 to 70 °C
Protection class	IP 54
Dimensions	
without connector	66 x 87 x 35.6 mm
Weight (approx.)	230 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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DATA DISPLAY

DDU 101

Dashboard - TFT color display
(no case)

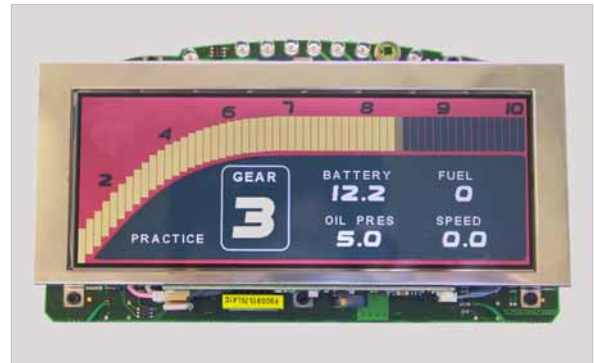
Description

The DDU 101 is a combined dashboard and input module for use as an integral part of a complete data acquisition and monitoring system for use in the demanding environment to be found in motorsports vehicles.

The DDU 101 is equipped with digital inputs and up to ten-page liquid crystal display with configurable windows for an easily configured and personalised screen layout (e.g. RPM, gear number, etc.). A graphical bar indicator is typically used for representing engine revs.

As part of the Magneti Marelli data acquisition and telemetry system, the DDU 101 can communicate over a CAN network with a range of data loggers receiving and displaying data from the logger as well functioning as an additional input module.

DDU 101 is supplied with the mating connector (loom side).



Main Features

- Page and channel name labels
- Gear number display
- Easy to use and configure
- Designed for rugged applications

Benefits

- TFT 6.2" transfective dot matrix color display
- Graphical engine revolution counter with configurable non-linear scale
- Alarm condition displays channel name and value (with priorities for multiple alarms)
- Backlight regulation based on internal photocell
- 2 push-buttons for page selection (5 normal, 5 mechanic mode), alarm level set, rpm/speed conversions, message hold time
- 6 high-brightness warning lights yellow/red for gear change (with programmable threshold) and 2 blue for general alarm condition indication

CAN communication

- Display 48 internal channels plus an additional 48 channels from CAN bus line (e.g. data logger/ECU)
- Transmit internal diagnostic over CAN bus
- 48 additional alarm channels programmed from data logger
- Lap time message received from data logger via CAN bus and displayed on dedicated page

Typical Applications

- Professional circuit and rally applications
- One make race series
- Touring car

DATA DISPLAY

DDU 101

Dashboard - TFT color display
(no case)

Technical Characteristics

Inputs

NTC internal temperature sensor	1
On/Off digital (page scroll and confirm)	2
"Code Load" enable pin	1

Outputs

Shift Lamp (adjustable brightness)	6
Alarm (adjustable brightness)	2

Communications

CAN line (1 Mbit/s (*))	1
-------------------------------	---

(*) Configurable on request

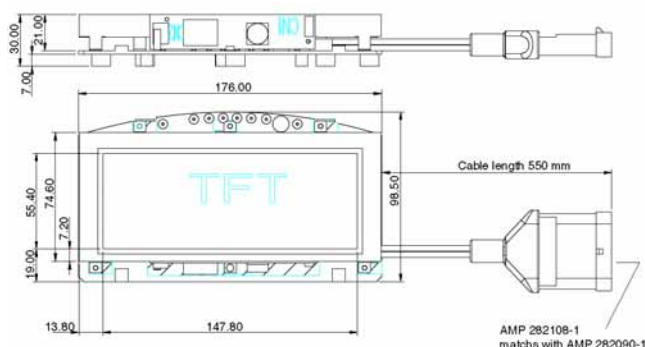
Logic Core

Microcontroller A (80 MIPS RISC)	1
Microcontroller B (64 MIPS RISC)	1
FPGA (50k gates)	1
Graphic display controller	1
DPR	32 Kbyte
Flash E2PROM (microcontroller A)	1 Mbyte
RAM memory (microcontroller A)	48 Kbyte
Flash memory (microcontroller B)	512 Kbyte
Ram memory (microcontroller B)	4 Kbyte
Flash NV Ram	32 Mbyte
RAM memory	512 Kbyte
E2PROM	32 Kbyte
Time keeper	1

Other Characteristics

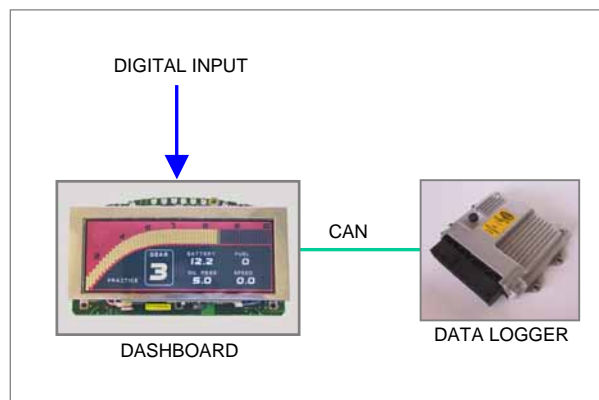
Power supply	10 to 18 V
Operating internal temperature	0 to 60 °C
Transflective dot matrix color display	TFT 6.2"
Dimensions	176 x 98.5 x 30 mm
Weight (approx.)	380 g

Dimensions



Dimensions in millimetres

Application Schematics





DATA DISPLAY

DDU 210

Dashboard - TFT color display

Description

The DDU 210 is a combined dashboard and input module for use as a stand-alone display unit or as an integral part of a complete data acquisition and monitoring system for use in the demanding environment to be found in motorsports vehicles.

The DDU 210 is equipped with a complete range of analogue and digital inputs and ten-page liquid crystal display with configurable windows for an easily configured and personalised screen layout. A graphical bar indicator is typically used for representing engine revs.

As part of the Magneti Marelli data acquisition and telemetry system, the DDU 210 can communicate over a CAN network with a range of data loggers receiving and displaying data from the logger as well functioning as an additional input module.

It is also available a version (DDU 310-DL32/64) with internal data logger (32 or 64 Mbyte).

Main Features

- 5 Single-ended
- 1 Pick-ups or Hall effect
- 3 Hall effect
- 2-axis internal accelerometer, ± 10 g
- Page and channel name labels
- Transmit internal diagnostic over CAN bus
- 48 alarm channels with programmable thresholds
- Display dedicated to 48 internal channels
- Lap time message displayed on dedicated page
- PC interface via Ethernet for loading graphical layout
- Easy to use and configure
- Designed for rugged applications

Benefits

- TFT 6.2" transfective dot matrix color display
- Graphical engine revolution counter with configurable non-linear scale
- Alarm condition displays channel name and value (with priorities for multiple alarms)
- Backlight regulation based on internal photocell
- Inputs configurable to suit all sensors in the product range
- 2 push-button on the front panel for page selection, alarm level set, rpm/speed conversions, message hold time
- 6 high-brightness warning lights yellow/red for gear change (with programmable threshold) and 2 blue for general alarm condition indication
- 2 outputs for external warning lamps with short-circuit protections
- Floating point data management



Stand alone mode

- Direct connection to 11 sensors (active and passive)
- Beacon input for lap time measurement
- Lap total counter

CAN communication

- Partial time (only for SRA DL) up to 16 sections
- Differential time (only for SRA DL) between current partial time and the one of the best lap

Typical Applications

- MotoGP
- Professional circuit and rally applications
- One make race series
- Race motorcycle application
- Touring car

DDU 210

Stand-alone Dashboard

Technical Characteristics

Inputs

Single-ended.....	5
NTC/PT1000 temperature sensor.....	2
NTC internal temperature sensor.....	1
2-axis internal accelerometer (± 10 g).....	1
VR Pick-ups or Hall effect (RPM).....	1
Hall effect (wheelspeed).....	3
On/Off digital (page scroll and confirm).....	2
Lap Trigger.....	2
"Code Load" enable pin.....	1

Outputs

Voltage references (@ 5 V).....	1
Low-side (@ 12 V).....	2
Shift Lamp (adjustable brightness).....	6
Alarm (adjustable brightness).....	2

Communications

CAN line (1 Mbit/s (*)).....	2
Ethernet line (10/100base T).....	1
RS232.....	1

(*) Configurable on request

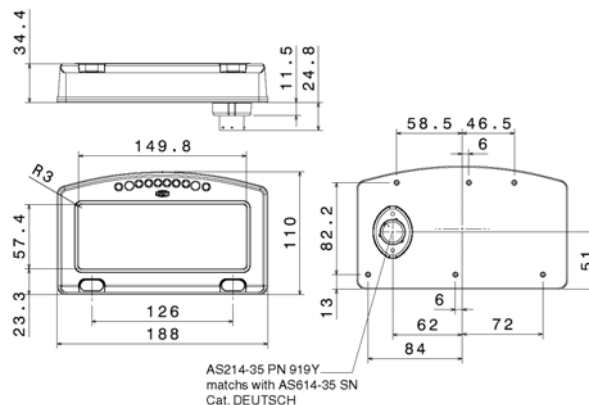
Logic Core

Microcontroller A (80 MIPS RISC).....	1
Microcontroller B (64 MIPS RISC).....	1
FPGA (50k gates).....	1
Graphic display controller.....	1
DPR.....	32 Kbyte
Flash E2PROM (microcontroller A).....	1 Mbyte
RAM memory (microcontroller A).....	48 Kbyte
Flash memory (microcontroller B).....	512 Kbyte
Ram memory (microcontroller B).....	4 Kbyte
Flash NV Ram.....	32 Mbyte
RAM memory.....	512 Kbyte
E2PROM.....	32 Kbyte
Time keeper.....	1

Other Characteristics

Power supply.....	10 to 18 V
Operating internal temperature.....	0 to 60 °C
Protection class.....	IP 65
Transflective dot matrix color display.....	TFT 6.2"
Dimensions	
without connector.....	188 x 110 x 34.4 mm
with connector.....	188 x 110 x 59.2 mm
Weight (approx.).....	580 g

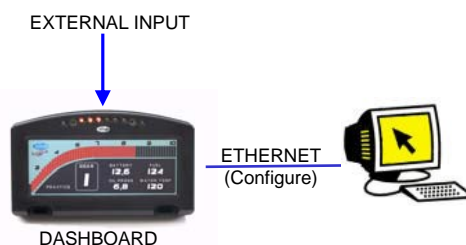
Dimensions



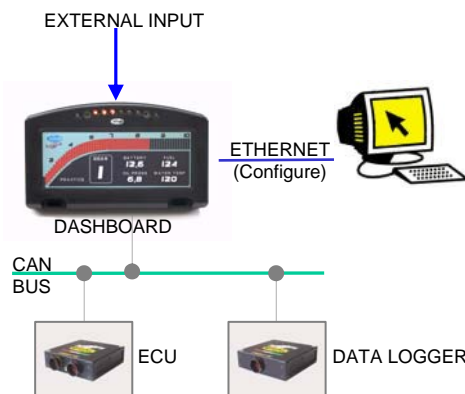
Dimensions in millimetres

Application Schematics

STAND-ALONE MODE



CAN COMMUNICATION



For further information, please contact:



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DATA DISPLAY

DDU 310-DL32/64

Dashboard with data logger
TFT color display

Description

The DDU 310-DL32/64 is a combined dashboard and input module for use as a stand-alone display and data logger unit or as an integral part of a complete data acquisition and monitoring system for use in the demanding environment to be found in motorsports vehicles.

The DDU 310-DL32/64 is equipped with a complete range of analogue and digital inputs and ten-page liquid crystal display with configurable windows for an easily configured and personalised screen layout. A graphical bar indicator is typically used for representing engine revs.

A fast Ethernet bus is used for graphical layout load, channels' configuration and data download. As part of the Magneti Marelli data acquisition and telemetry system, the DDU 310-DL32/64 (with internal data logger) can communicate over a CAN network with a range of additional data loggers receiving and displaying data from the logger as well functioning as an additional input module.



Main Features

- 5 Single-ended
- 1 Pick-ups or Hall effect
- 3 Hall effect
- 32 or 64 Mbyte internal data logger
- Up to 128 logged channels
- Up to 48 Kbyte/s logging rate
- Sampling rates up to 1000 Hz
- Page and channel name labels
- Transmit internal diagnostic over CAN bus
- 48 alarm channels with programmable thresholds
- Display dedicated to 48 internal channels
- Lap time message displayed on dedicated page
- PC interface via Ethernet for loading graphical layout
- Easy to use and configure
- Designed for rugged applications

Stand alone mode

- Direct connection to 11 sensors (active and passive)
- Beacon input for lap time measurement
- Lap total counter

CAN communication

- Partial time (only for SRA DL) up to 16 sections
- Differential time (only for SRA DL) between current partial time and the one of the best lap

Benefits

- TFT 6.2" transfective dot matrix color display
- Graphical engine revolution counter with configurable non-linear scale
- Alarm condition displays channel name and value (with priorities for multiple alarms)
- Backlight regulation based on internal photocell
- Inputs configurable to suit all sensors in the product range
- 2 push-button on the front panel for page selection, alarm level set, rpm/speed conversions, message hold time
- 6 high-brightness warning lights yellow/red for gear change (with programmable threshold) and 2 blue for general alarm condition indication
- 2 outputs for external warning lamps with short-circuit protections
- Floating point data management
- Pick-up inputs for wheel speed and distance measurement
- Requires Wintax3 analysis software (compatible Win2K/XP)
- Requires Axon logging setup tool

Typical Applications

- MotoGP
- Professional circuit and rally applications
- One make race series
- Race motorcycle application
- Touring car

DATA DISPLAY

DDU 310-DL32/64

Dashboard with data logger
TFT color display

Technical Characteristics

Inputs

Single-ended.....	5
NTC/PT1000 temperature sensor.....	2
NTC internal temperature sensor	1
VR Pick-ups or Hall effect (RPM).....	1
Hall effect (wheelspeed)	3
On/Off digital (page scroll and confirm)	2
Lap Trigger.....	2
"Code Load" enable pin	1

Outputs

Voltage references (@ 5 V)	1
Low-side (@ 12 V)	2
Shift Lamp (adjustable brightness)	6
Alarm (adjustable brightness)	2

Communications

CAN line (1 Mbit/s (*)).....	2
Ethernet line (10/100base T)	1
RS232	1

(*) Configurable on request

Logic Core

Microcontroller A (80 MIPS RISC)	1
Microcontroller B (64 MIPS RISC)	1
FPGA (50k gates)	1
Graphic display controller	1
DPR	32 Kbyte
Flash E2PROM (microcontroller A).....	1 Mbyte
RAM memory (microcontroller A).....	48 Kbyte
Flash memory (microcontroller B).....	512 Kbyte
Ram memory (microcontroller B)	4 Kbyte
Flash NV Ram.....	32 Mbyte
RAM memory	512 Kbyte
E2PROM.....	32 Kbyte
Time keeper	1

Logging

Flash disk memory.....	32 or 64 Mbyte
Logged channels.....	up to 128
Logging rate	up to 48 Kbyte/s
Sampling rate.....	up to 1000 Hz

Other Characteristics

Power supply	10 to 18 V
Operating internal temperature	0 to 60 °C
Protection class.....	IP 65
Transflective dot matrix color display.....	TFT 6.2"

Dimensions

without connector	188 x 110 x 34.4 mm
with connector	188 x 110 x 59.2 mm
Weight (approx.)	580 g

For further information, please contact:

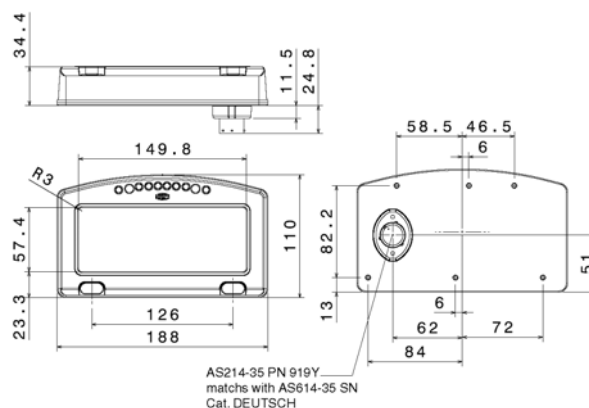


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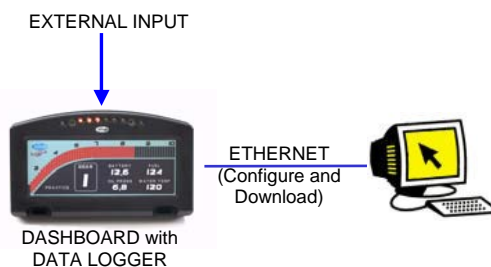
Dimensions



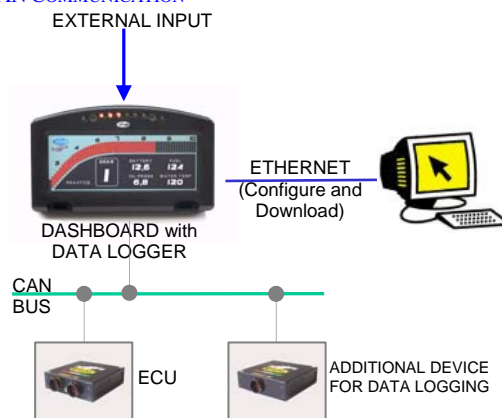
Dimensions in millimetres

Application Schematics

STAND-ALONE MODE



CAN COMMUNICATION





DATA DISPLAY

MT940/1

Stand-alone Dashboard

Description

The MT940/1 is a combined dashboard and input module for use as a stand-alone display unit or as an integral part of a complete data acquisition and monitoring system for use in the demanding environment to be found in motorsports vehicles.

The MT940/1 is equipped with a complete range of analogue and digital inputs and a three-page liquid crystal display with five windows for an easily configured and personalised screen layout. A graphical bar indicator is typically used to represent engine revs.

As part of the Magneti Marelli data acquisition and telemetry system, the MT940/1 can communicate over a CAN network with a range of data loggers receiving and displaying data from the logger as well functioning as an additional input module.

Versions backlight (MT940/B1) and watertight (MT940/BW) are available.

Main Features

- Page and channel name labels
- Direct connection to 4 sensors (active and passive)

STAND ALONE MODE

- 8 alarm channels with programmable limits
- Display dedicated to 10 internal channels
- Track marker input for lap time measurement (MT906/D)
- Lap total counter

CAN MODE

- Display 10 internal channels plus an additional 12 channels from CAN bus line (e.g data logger/ECU)
- Transmit internal channels over CAN bus
- 8 additional alarm channels programmed from data logger
- Lap time received from data logger via CAN bus (internal lap time and total disabled)
- Partial time (only for DAS4 EVO) up to 16 sections
- Differential time (only for DAS4 EVO) between current partial time and the one of the best lap



Benefits

- Graphical engine revolution counter (81 segment) with configurable non-linear scale
- Alarm condition displays channel name and value (with priorities for multiple alarms)
- High contrast display available also in backlight version
- Inputs configurable to suit all sensors in the product range
- Multi-purpose push-button on front of panel for page selection (Race, Warm up, Practice), alarm level set, rpm/speed conversions, message hold time
- 2 high-brightness warning lights: green for gear change (with programmable limit) and red for general alarm condition indication
- 5 V DC reference voltage output at connector
- 2 outputs for external warning lamps with short-circuit protections

Typical Applications

MotoGP

In circuit and rallies top application

One make race series

Touring car

DATA DISPLAY

MT940/1

Stand-alone Dashboard

Technical Characteristics

Inputs

Analogue Single-ended	4
Speed.....	1
RPM.....	1
Beacon.....	1

Outputs

Voltage references (70 mA)	1
Lamp drivers (max. 200 mA).....	2

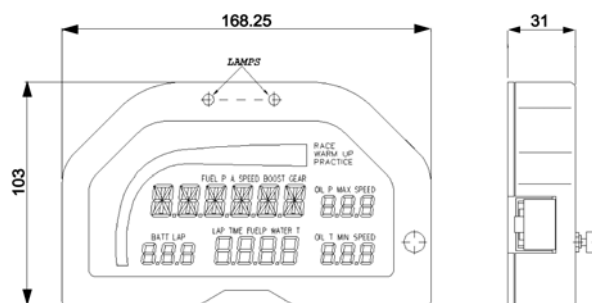
Communications

CAN (1 Mbit/s)	1
----------------------	---

Other Characteristics

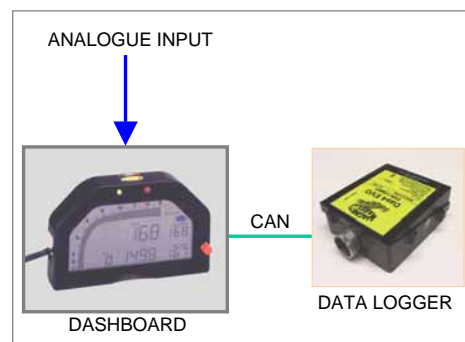
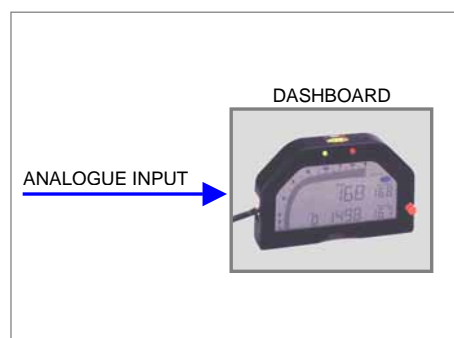
High-brightness warning lights.....	2
Power supply	9 to 16 V
.....	120 to 190 mA
Operating temperature range.....	0 to 65 °C
Container	ABS
Dimensions (approx.).....	168.25 x 103 x 31 mm
Weight (approx.)	330 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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DATA DISPLAY

SDU 102

Steering wheel display unit

Description

SDU 102 is a combined dashboard and input module as an integral part of a complete data acquisition and monitoring system.

Seven-pages are available: four for data, one for circuit, one for lap time and one for Alarm messages. LEDs (must be external cablated) typically used to for representing engine revs and to monitoring others conditions.

As part of the Magneti Marelli data acquisition and telemetry system, SDU 102 can communicate over a CAN network with a range of data loggers or ECUs receiving and displaying data from the logger as satellite module.

It is also available a version with aluminum case (SDU 122).



Main Features

- 7 LEDs (5 for RPM, 1 for PIT LIMITER, 1 for alarm conditions)
- 1 Scroll Push Button
- Receive and display data from data logger or ECU via CAN line
- Messages available to monitoring conditions

Benefits

- 7 different pages (4 Data, 1 Circuit, 1 Laptime, 1 Alarms)
- Configurable data pages
- High-brightness
- 1 CAN line
- LCD grafico 128 x 128 pixel

Typical Applications

GP2

Touring car

In circuit and rallies top application

One make race series

DATA DISPLAY

SDU 102

Steering wheel display unit

Technical Characteristics

Inputs

On/Off digital 2

Outputs

Open collector 7

Communications

CAN line (1 Mbit/s) 1

RS 232 1

Other Characteristics

Power supply 8 to 18 V

Operating temperature range (internal) -20 to 70 °C

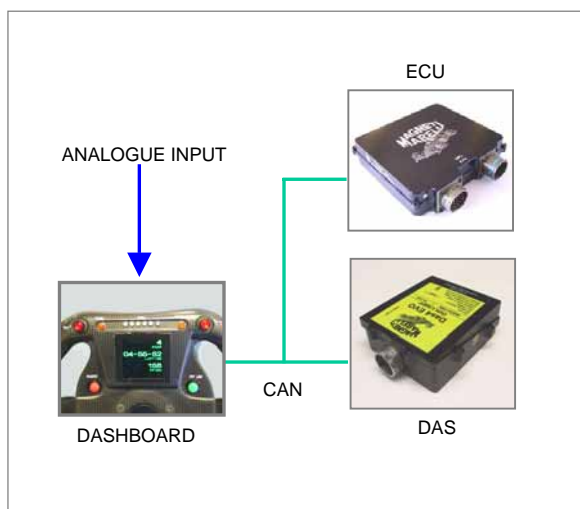
Dimensions 78 x 76 x 21 mm

Weight (approx.) 100 g

Connector Pin Out

Connector 8 pin		1 2 3 4 5 6 7 8
1	Violet	Digital Input 2
2	Pink	Digital Input 1 (scroll)
3	White	CAN P
4	Green	CAN N
5	Orange	TX RS 232
6	Blu	RX RS 232
7	Black	GND
8	Red	Supply Voltage (12 V)

Application Schematics



Connector 14 pin		1 2 3 4 5 6 7 8 9 10 11 12 13 14
1	Yellow	led 0
2	Red	Supply voltage (12 V)
3	Pink	led 1
4		Do not connect
5	Violet	led 2
6		Do not connect
7	White	led 3
8		Do not connect
9	Blu	led 4
10		Do not connect
11	Green	led 5
12		Do not connect
13	Orange	led 6
14		Do not connect

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DATA DISPLAY

GDU 110

Gear display unit plastic case

Description

GDU 110 is a satellite and input module as an integral part of a complete data acquisition to monitor system showing gear number, RPM and PIT LIMITER condition.

As part of the Magneti Marelli telemetry system, GDU 110 can communicate over a CAN network with Marelli ECUs receiving and displaying all available information or using analogue inputs or digital inputs.

Main Features

- 2 Analogue Single-ended
- 2 digital inputs
- Receive and display data from CAN line or analogue inputs (gear position) or digital inputs (Rpm/Speed)
- LEDs managed only via CAN

Benefits

- Selectable high-brightness
- 1 CAN line
- Easy to use and to configure



Typical Applications

In circuit and rallies top application

One make race series

GDU 110

Gear display unit plastic case

Technical Characteristics

Inputs

Single-ended..... 2

On/Off digital 2

Outputs

Voltage references..... 1

Communications

CAN line (1 Mbit/s)..... 1

RS 232..... 1

Other Characteristics

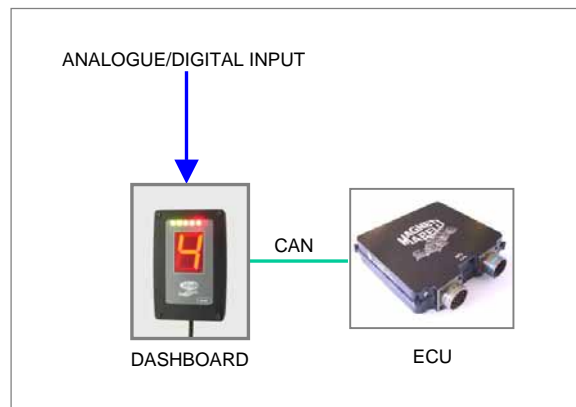
Power supply	8 to 18 V
--------------------	-----------

Operating temperature range (internal) -20 to 70 °C

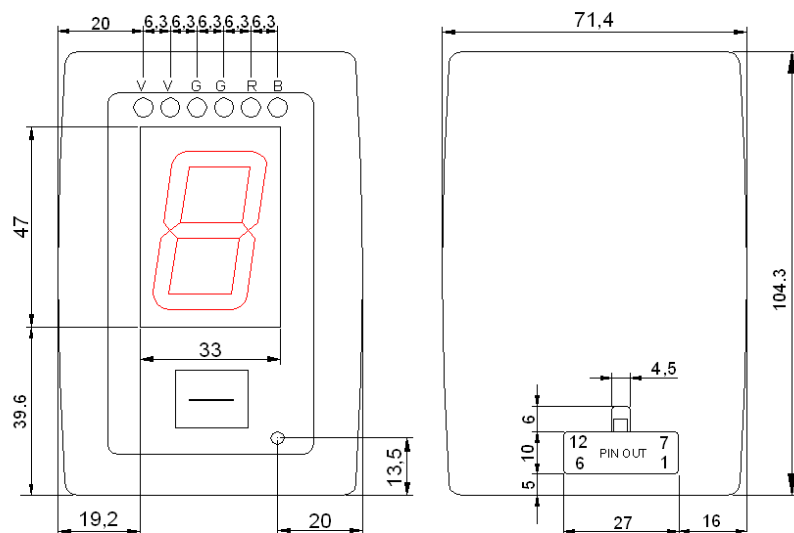
Dimensionssee drawing

Weight (approx.) 110 g

Dimensions



Application Schematics



PIN OUT	
HOUSING MOLEX MINI FIT RJ 5557-12R	
PIN	DESCRIPTION
1	Input Capture n.1 (RPM)
2	Power supply 8-18V
3	Digital Input 1
4	Analog Input n.1
5	CAN H
6	Tx232
7	Input Capture n.2 (SPEED)
8	Power Ground
9	Analog Vref 5V MAX 50 mA
10	Analog Input n.2
11	CAN L
12	Rx232

LED: V = GREEN
G = YELLOW
R = RED
B = BLUE

Dimensions in millimetres



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DATA DISPLAY

GDU 121

Gear display unit aluminium case

Description

GDU 121 is a satellite and input module as an integral part of a complete data acquisition to monitor system showing gear number, RPM and PIT LIMITER condition.

As part of the Magneti Marelli telemetry system, GDU 121 can communicate over a CAN network with Marelli ECUs receiving and displaying all available information.

Main Features

- 1 digital inputs
- Receive and display data from CAN line (gear number)
- LEDs managed only via CAN

Benefits

- Selectable high-brightness
- 1 CAN line
- Easy to use and to configure



Typical Applications

In circuit and rallies top application

One make race series

DATA DISPLAY

GDU 121

Gear display unit aluminium case

Technical Characteristics

Inputs

On/Off digital 1

Communications

CAN line (1 Mbit/s) 1

RS 232 1

Other Characteristics

Power supply 8 to 18 V

Operating temperature range (internal) -20 to 70 °C

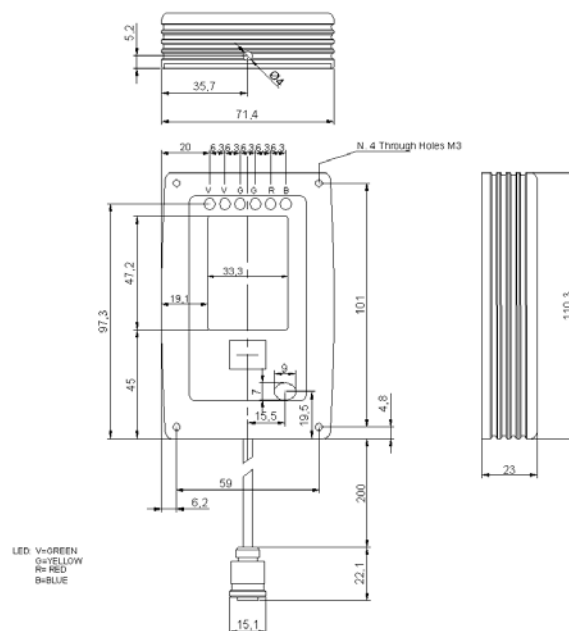
Dimensions see drawing

Weight (approx.) 210 g

Connector Pin Out

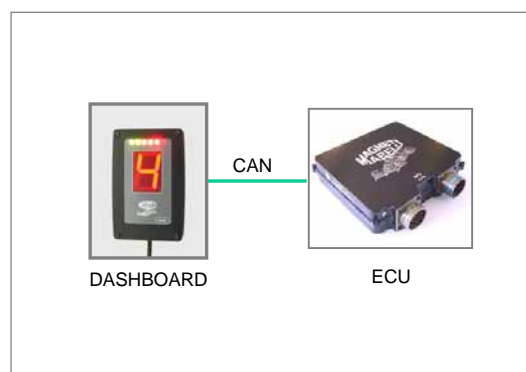
PIN OUT	
HOUSING DEUTCH uAS – AS606-05PN-HE	
PIN	DESCRIPTION
1	+V BAT
2	CAN P
3	CAN N
4	GND
5	T CAN (close to CAN P)

Dimensions



Dimensions in millimetres

Application Schematics





LAP TRIGGER

MT906/D

Infra-red track marker transmitter

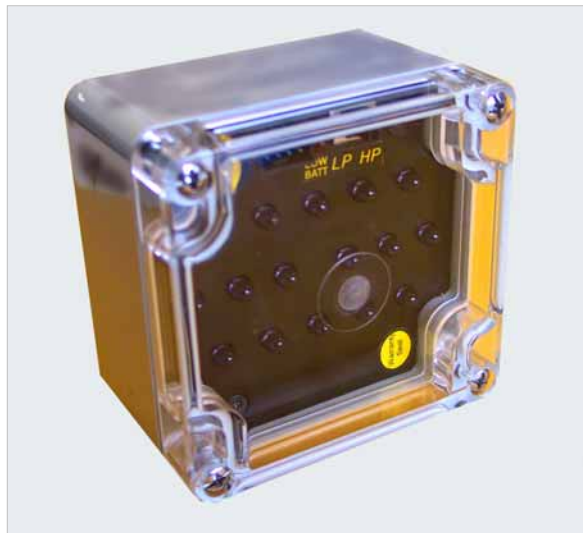
Description

The MT906/D is a 16-LED infra-red optical transmitter unit used in telemetry and data acquisition systems.

The device continuously transmits a coded infra-red signal to trigger the MT907/D on-board receiver which provides the data acquisition system with a spatial reference point.

Two transmission power levels are available, to adjust the coverage range according to the needs.

The unit is enclosed in a watertight polycarbonate container and has a low-battery/fail indicator lamp. Connection to an external battery (*not supplied*) is made via two leads ending with crocodile clips.



Main Features

- IR optical transmitter
- Coded binary sequence (team-code) modulator
- Low-battery/fail indicator

Benefits

- Two different power levels selectable
- Light, compact, robust design

Typical Applications

MotoGP

Professional circuit and rally applications

Race motorcycle application

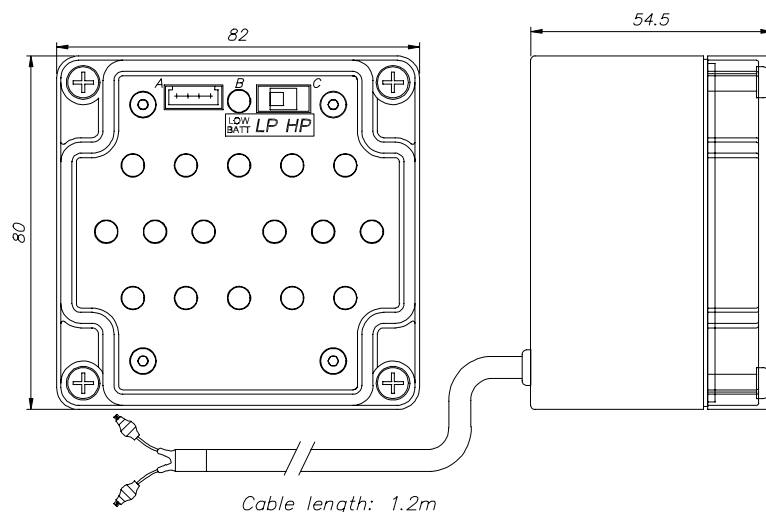
Touring car

LAP TRIGGER

MT906/D

Infra-red track marker transmitter

Dimensions



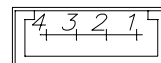
Dimensions in millimetres

Technical Characteristics

Range 1 to 25 m
Cone angle @ distance x
x > 15 m..... $\pm 6^\circ$
5 > x > 15 m..... $\pm 10^\circ$
x < 15 m..... $\pm 40^\circ$
Power supply (V DC) 10 to 15 V
Low battery warning lamp < 11 V
Current @ 13.2 V
high power 260 mA
low power 160 mA
Protection..... polarity inversion
..... short to GND & Vbatt
Ambient operating temperature -20 to 70 °C
Battery connector..... Crocodile clips
Container sealed polycarbonate
Cable length..... 1.2 m
Dimensions (approx.)..... 82 x 80 x 54.5 mm
Weight (approx.) 260 g

Connector Pin Out

Transmitter MT906/D		
Pin	Name	Description
1	N.C.	Not connected
2	ProgP	Reserved MM
3	ProgN	Reserved MM
4	GND	Ground
Power		
Pin	Colours	Description
	RED	Power supply
	BLACK	Ground



For further information, please contact:



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LAP TRIGGER

MT907/D

Infra-red track marker receiver

Description

The MT907/D is an infra-red optical beacon receiver used in combination with the MT906/D IR binary coded sequence transmitters.

The MT907/D triggers a 5 V pulse only when the received matching team-code is recognised.

This IR beacon receiver is compatible with most of the Magneti Marelli data loggers, dashboards and ECUs, for which the end-of-lap reference is of the outmost importance.

An indicator LED on the back end of the receiver lights up when the transmitter code is detected.

Main Features

- IR optical receiver
- Received team-code recognition
- LED for easy check-up and installation



Benefits

- Compatible with Magneti Marelli data loggers, dashboard and ECUs
- Compact, robust design

Typical Applications

MotoGP

Professional circuit and rally applications

Race motorcycle application

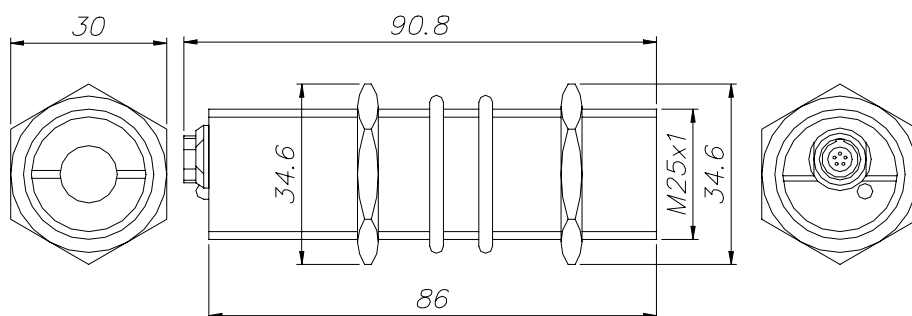
Touring car

LAP TRIGGER

MT907/D

Infra-red track marker receiver

Dimensions



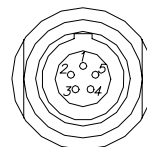
Dimensions in millimetres

Technical Characteristics

Range 1 to 25 m
Detection angle $\pm 37^\circ$
Code detect time 5 ms
Output
 sleep mode 0 V
 trigger 5 V
 duration 0.5 s
Red LED code detection indicator
Power supply (V DC) 10 to 15 V
Low battery warning lamp < 11 V
Current @ 13.2 V 50 mA
Protection polarity inversion
 short to GND & Vbatt
Ambient operating temperature -20 to 70 °C
Connector LEMO PHGOB305 5 pole
Container blue anodised aluminium
Cable length 330 mm
Dimensions (approx.) (see drawing) $\varnothing 25 \times 86$ mm
Weight (approx.) 60 g

Connector Pin Out

LEMO PHGOB305 5 pole		
Pin	Name	Description
1	VBAT	Power supply
2	ProgP	Reserved MM
3	ProgN	Reserved MM
4	GND	Ground
5	OUT	Signal



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AUXILIARY MODULES

AAM-I16

16 inputs acquisition module

Description

The AAM-I16 is a high specification analogue expansion module for use with Magneti Marelli data loggers and ECUs.

The unit has 4 differential analogue inputs with hardware gain for K-type thermocouple and 12 single-ended. Data analysis is done with 10 and 12 bit A/D.

The module communicates over the CAN bus and has a sampling frequency up to 200 Hz for each of the 16 channels using a configurable software filter to prevent aliasing problems.

Main Features

- 12 Single-ended (4 @ 12 bit resolution)
- 4 differential (@ 12 bit resolution) for TC-K
- 2 CAN communication buses
- Selectable frequency (using CAN PCMCIA)
- Dedicated software filtering for each input
- Transmission data through CAN line
- Extended working temperature range (up to 120°C)

Benefits

- Floating point data management
- More inputs for ECU and Data Logger
- High precision
- ID customizable (using CAN PCMCIA)
- Easy to use and configure
- Robust design and easy to install



Typical Applications

- Formula application
- Professional circuit and rally applications
- Race motorcycle application
- Touring car

AUXILIARY MODULES

AAM-I16

16 inputs acquisition module

Technical Characteristics

Inputs

Single-ended (4 @ 12 bit resolution)	12
Differential (@ 12 bit resolution)	4
NTC internal temperature sensor	1
"Code Load" enable pin	1

Outputs

Voltage references	4
--------------------------	---

Communications

CAN line (1 Mbit/s (*))	2
-------------------------------	---

* Configurable on request

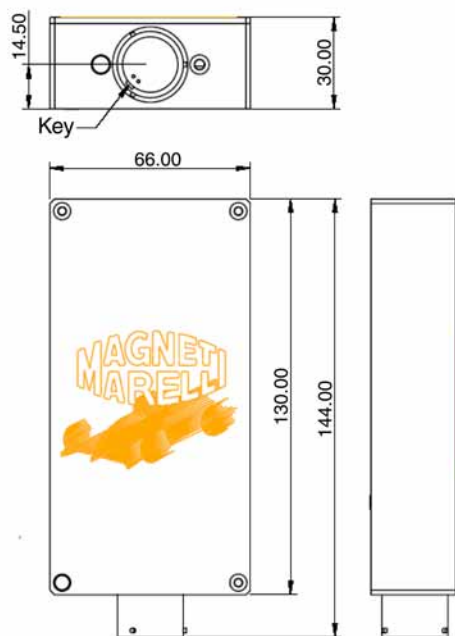
Logic Core

Microcontroller (80 MIPS RISC)	1	
Flash E2PROM (microcontroller)	1	Mbyte
RAM memory (microcontroller)	48	Kbyte
E2PROM	4	Kbyte

Other Characteristics

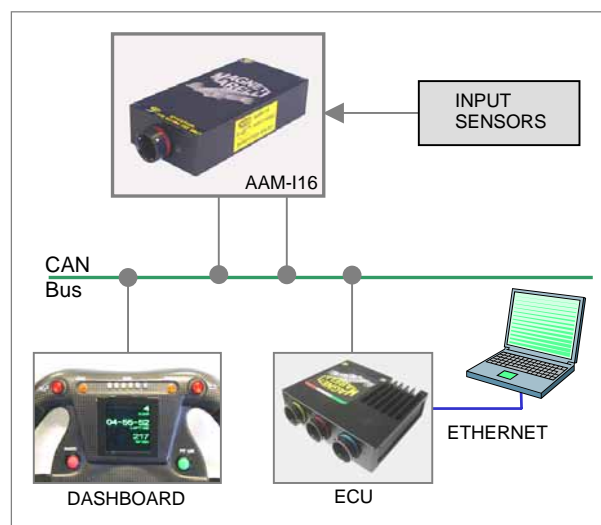
Power supply	10 to 18 V
Operating internal temperature	0 to 120 °C
Protection class	IP 54
Dimensions	
without connector	66 x 130 x 30 mm
Weight (approx.)	220 g

Dimensions



Dimensions in millimetres

Application Schematics



For further information, please contact:



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VISION

- ✓ VISION

WINTAX

- ✓ WINTAX JUNIOR
- ✓ WINTAX USER
- ✓ WINTAX TEAM

FAST PRO

- ✓ FAST PRO

Software





SOFTWARE

VISION4

Display and calibration tool

Description

VISION4 provides a flexible control interface for electronic devices based on the Magneti Marelli Competition communication protocol.

After opening the configuration file, Vision allows the access to a set of channels resulting from real time ECUs calculations.

Different kind of windows can be included in the screen layout in order to support both read and write operations. The display screen may be customized, adapted to the context and saved: VISION4 includes DSETUP, a tool for the management of the configuration files.

The ECU calibration can be performed by editing the maps saved in .PTA files. If a potentiometer desk is connected to PC it is possible to start the automatic mapping procedure.

The principal PC-ECU communication links are CAN, 100BaseT Ethernet and RS 232.

Moreover VISION4 permits MultiBOX/MultiPC interconnections.

Main Features

- Channels representation in *Display* and *Potentiometer* windows (Read or Read/Write)
- Configurability of screen layout according to the end user preferences (Pages/windows/channels)
- Proprietary communication protocol for a fast and reliable PC-ECU link
- Real time ECUs monitoring
- Mapping ECU
- Calibration tables management tools
- Communication support for additional devices: potentiometer desk, dynamometric bench



Benefits

- Connection via different physical links
- Customisable screen layouts
- Notification of out of range channels
- Support for user-defined diagnostics and alarms
- Real time graphical reproduction of channels
- Graphic editor and compare tools for calibration tables
- Links to external tools (e.g. Excel)
- Compatible with Windows® 98/ME/2000/XP

Typical Applications

In all applications with Magneti Marelli proprietary protocol on board

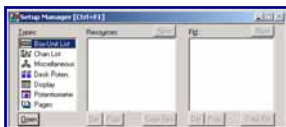
VISION4

Display and calibration tool

Main characteristics

DSetup

DSETUP can either create a new configuration or load an existing configuration for modification.



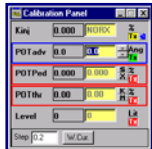
The configuration file is based on the concepts of *Page/Window/Channel*: the Setup Manager provides all the tools for a flexible layout design.

Display window

The *Display* windows present each channel as a label followed by its instantaneous value, measurement unit and an optional color bar graph. Values are re-read at each refresh cycle.



Potentiometer window



Potentiometer windows display two fields: one field for containing the value read in the electronic device, the other for entering a replacement value, then sent to the electronic device.

Diagnostic and Alarm window

The *Diagnostic* window displays messages describing the bit mapped diagnostics calculated in the electronic device.

The *Alarm* window displays messages when a channel (from the "Channel List") reaches a value set as an alarm level.

Read/Write window

This window allows the users to *read/write* any software variable allocated in the ECU memory, once protection rules are met.



Oscilloscope

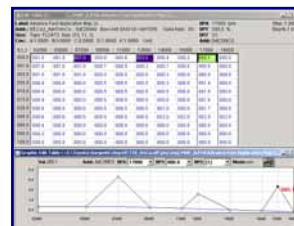
The *Oscilloscope* window allows to show graphically the evolution of the selected channels.



E2PROM configuration

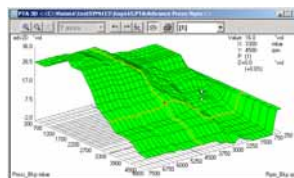


Vision can read and write the full contents of the electronic device's E2PROM to and from *.TAB files.



Another format (.PTA file) is used for browsing and editing the calibration maps resident on partial areas of memory.

You may display the data both in the numerical and in the graphical format; the numerical table and the graphic window are linked: in this way the map values result up-to-date in both representations.



Map presentations are available on 2D and 3D graphs; it is then possible to execute either 2D and 3D tables' comparisons.

Different operations are available on .TAB and .PTA files: read from ECU, write to ECU, modify, compare and print.

Maths channels window

This window shows virtual channels resulting from user defined functions applied to acquired channels.

Minimum PC requirements

- PC x86 running Windows® 98/ME/2000/XP
- One free PCMCIA slot (for CAN card) or Ethernet-TCP/IP network interface or RS 232

For further information, please contact:



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SOFTWARE

WINTAX JUNIOR

Data acquisition and analysis
Entry level

Description

WINTAX JUNIOR is the entry level of Magneti Marelli's data analysis software package which is based on experience in professional motorsport at top-level racing.

Data downloaded from a Marelli data logging system can be presented in a variety of formats tailored to race car performance analysis.

Quick, easy-to-use commands for creating customised screen layouts, graphs and reports, combined with powerful functions for comparing lap data make WINTAX JUNIOR an essential tool at the race track.

All of this is supplied free of any licence or access key restrictions.



Main Features

- Distance and time plots
- XY plots, lap reports, circuit maps
- Lap-by-lap data comparison
- Cursor connect links position on the track to data points on the graphs
- Supports math channels (created by licensed WINTAX versions)
- *AutoDownload* function to automatically download the latest data as soon as the logger is connected to the PC
- Data export to ASCII format
- Download interfaces for MM loggers (CAN card or Ethernet)

Benefits

- Includes all the functions needed to perform essential performance analysis
- Customisable screen layouts and graphs
- Fast and easy to use
- Compatible with Windows® 95/98/NT/2000/XP

Typical Applications

One make race series

WINTAX JUNIOR

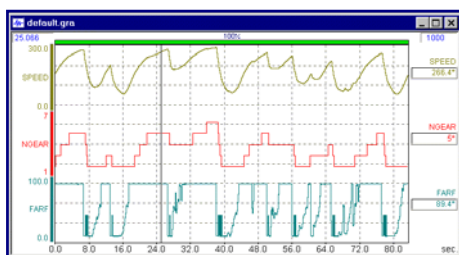
Data acquisition and analysis
Entry level

Main characteristics

The main screen area of WINTAX JUNIOR can contain one each of a selection of graphs or alphanumeric reports in which logged data may be represented in a variety of different ways. Commonly-used combinations of analysis windows can be saved as user-defined Layouts.

Graphs

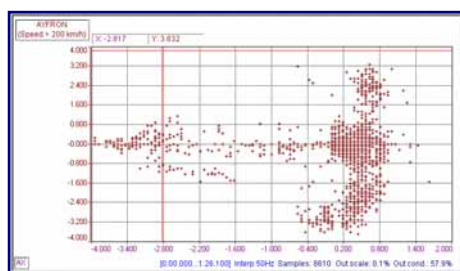
The *Graphs* window allows you to plot any of up to 20 channels against time or distance.



- Different plot modes allow you to arrange the traces to suit particular analysis needs
- Advanced zooming and cursor features help focus on details in the data

XY Plot

The XY window is used to analyse how the values of up to four channels vary with changes in another.



Virtual channels

WINTAX JUNIOR allows you to load maths channel libraries created with licensed versions of WINTAX (USER, TEAM, PRO).

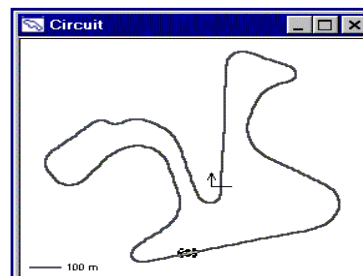
Channels window

A quick way of viewing the values at the cursor position of all logged channels together.

Time	A_X	A_Y	CARTER	DELTA	GEAR	POIL	POIL2	RPM	SPEED
0:000	0.25	-0.31	-0.208	7	4	5.00	5.73	6393	161.2
1:000	0.20	-0.02	-0.204	6	4	5.00	5.65	6750	170.5
2:000	-0.08	-0.09	-0.205	3	4	5.00	5.63	7078	178.7
3:000	0.23	-0.21	-0.210	0	4	5.00	5.59	7342	186.2
4:000	0.18	-0.56	-0.215	-1	4	5.00	5.55	7614	193.0
5:000	0.03	-0.13	-0.218	0	5	5.00	5.68	6318	196.1
6:000	-0.05	-0.54	-0.215	1	5	5.00	5.70	6504	201.2
7:000	-0.50	0.09	-0.213	8	5	5.00	5.74	6410	202.7
8:000	-0.58	1.16	-0.228	21	5	5.00	5.73	6043	185.7
9:000	0.31	1.26	-0.231	25	5	5.00	5.74	5802	180.2
10:000	0.13	0.97	-0.228	32	5	5.00	5.69	5800	179.5
11:000	0.36	1.01	-0.215	31	5	5.00	5.55	5935	183.4
12:000	0.06	1.12	-0.206	27	5	5.00	5.71	6048	188.7

Circuit window

Shows the position of the car on the track corresponding to the cursor position. The circuit is created from basic logged channels: lateral acceleration, speed and distance.



Lap Report

A lap-by-lap summary of important parameters. Freely configurable to show the min., max. and average of any channel values as well as start- and end-of-lap values.

Minimum PC requirements

- PC x86 running Windows® 95/98/ME/2000/XP
- Ethernet-TCP/IP network interface
- One free PCMCIA slot (for CAN card)

For further information, please contact:





SOFTWARE

WINTAX USER

Data acquisition and analysis
Expert level

Description

Magneti Marelli's WINTAX USER combines a full set of top-level data analysis functions with a clear and intuitive user interface to provide a complete package for expert race engineers.

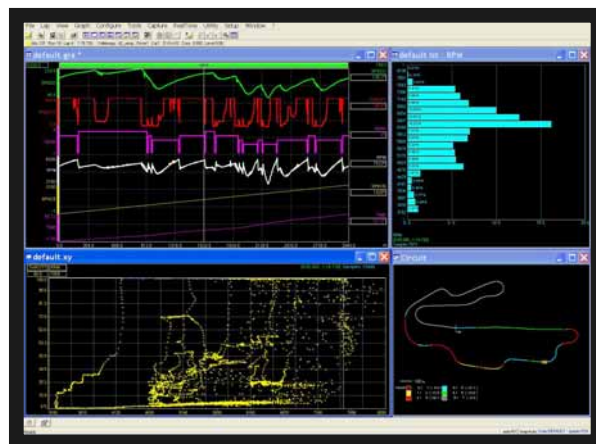
Data downloaded from a Marelli data logging system can be presented in a wide variety of formats while extensive maths channel functions allow in-depth analysis of all aspects of race car performance.

Quick, easy-to-use commands for creating customised screen layouts, containing multiple graphs and reports, together with powerful lap comparison options make WINTAX USER an essential tool at the race track and at the dyno.

For the expert race engineer, WINTAX USER is a vital addition to the data logging system.

Main Features

- Distance and time plots
- XY & XYZ plots, lap reports, circuit maps, histograms, PSD spectrum, lap-by-lap trend
- Lap-by-lap data comparison
- Cursor connect links position on the track to data points on the graphs
- Maths channel editor
- *Autodownload* function to automatically download the latest data as soon as the logger is connected to the PC
- Data export to ASCII, binary and DTX format
- Download interfaces for MM loggers (CAN card or Ethernet)
- Multi-user configurations



Benefits

- Full performance analysis functionality
- Customisable screen layouts and graphs
- Fast and easy to use
- Compatible with Windows® 95/98/NT/2000/XP

Technical support

- Annual license includes software updates and fixes
- Each license includes four installations

Typical Applications

One make race series
Bikes
Touring car

WINTAX USER

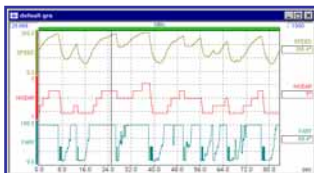
Data acquisition and analysis
Expert level

Main characteristics

The main screen area of WINTAX USER can contain any combination of graphs or reports in which logged data may be represented in a variety of different ways. Commonly-used combinations of analysis windows can be saved as user-defined Layouts.

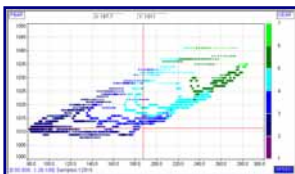
Graphs

The *Graphs* window allows you to plot any of up to 20 channels against time or distance.



- Different plot modes allow you to arrange the traces to suit particular analysis needs
- Advanced zooming and cursor features help focus on details in the data

XY - XYZ Plot



The XY window is used to analyse how the values of up to four channels vary with changes in another. XYZ graphs are coloured contour plots showing how three channels vary together.

Virtual channels

Virtual channels are generated from user-defined functions of logged data channels. A wide variety of trig, exponential, Boolean and algebraic functions are available.

Trend window

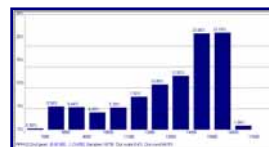
The *trend* windows is used to plot the lap-by-lap trend of channel statistics (such as min, max, mean values) and end-of-lap data to provide an overview of the whole run or session.

Lap Report

A lap-by-lap summary of important parameters. Freely configurable to show the min., max. and average of any channel values as well as start- and end-of-lap values.

Histograms

Histogram bins can be either time or percent.



Channels window

A quick way of viewing the values at the cursor position of all logged channels together.

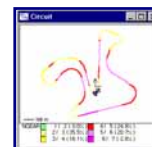
Time	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10
0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.000	0.20	0.02	0.200	6	4	5.00	5.00	4.750	170.5	170.5
2.000	0.08	0.08	0.305	3	4	5.00	5.63	7076	176.7	176.7
3.000	0.23	0.21	0.210	0	4	5.00	5.99	7342	186.2	186.2
4.000	0.18	0.16	0.215	-1	4	5.00	5.95	7514	193.0	193.0
5.000	0.03	0.13	0.298	0	5	5.00	5.60	6216	186.1	186.1
6.000	0.05	0.14	0.215	1	5	5.00	5.70	6554	201.2	201.2
7.000	0.50	0.09	0.213	8	5	5.00	5.74	6410	202.7	202.7
8.000	0.58	1.16	0.228	21	5	5.00	5.72	6543	185.7	185.7
9.000	0.21	1.25	0.225	35	5	5.00	5.74	6562	180.2	180.2
10.000	0.13	0.97	0.238	33	5	5.00	5.69	5900	179.5	179.5
11.000	0.36	1.01	0.218	31	5	5.00	5.66	5636	183.4	183.4
12.000	0.05	1.02	0.205	27	5	5.00	5.71	6040	180.2	180.2

PSD analysis

The *Power Spectral Density* window is used to show the frequency components of a channel signal.

Circuit window

Shows the position of the car on the track corresponding to the cursor position. The circuit is created from basic logged channels: lateral acceleration, speed and distance.



Conditions

Logical *conditions* (such as *Engine_running: (rpm > 300)*) can be used to suppress/enable alarms or to filter out data in XYZ graphs.

Alarm

The *Alarms* window is used to detect a critical condition on any channel. A coloured text box flags up any alarms showing the values and names of any channel which goes out of range during the lap.

Minimum PC requirements

- PC x86 running Windows® 95/98/ME/2000/XP
- Ethernet-TCP/IP network interface
- One free PCMCIA slot (for CAN card)

For further information, please contact:



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SOFTWARE

WINTAX TEAM

Data acquisition and analysis
Multi-user license

Description

The TEAM license builds on the comprehensive range of data analysis tools offered by WINTAX and provides extra features which are indispensable to a professional motorsport team.

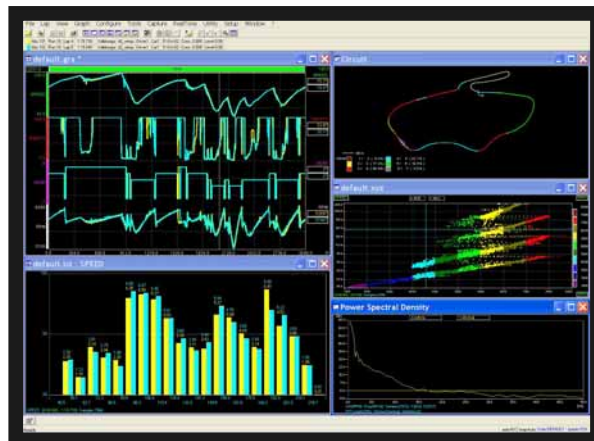
Each license can be tailored to the specific needs of the team to suit the individual logging and analysis requirements.

Advanced users have the option to add-on a variety of extra modules: a file converter for importing data, the TELDATA interface for reading the WINTAX archive, support for real time telemetry, and more.

When sensitive development work is concerned, the TEAM license ensures that your data cannot be read by other users of WINTAX and the password-protected installation gives you control over who has access to the data.

Main Features

- Distance and time plots
- XY & XYZ plots, lap reports, circuit maps, histograms, PSD spectrum, lap-by-lap trend
- Lap-by-lap data comparison
- Cursor connect links position on the track to data points on the graphs
- Maths channel editor
- *AutoDownload* function to automatically download the latest data as soon as the logger is connected to the PC
- Data export to ASCII, binary and DTX format
- Download interfaces for MM loggers (CAN or Ethernet)
- Multi-user configurations
- Automatic Run archive management
- Compatible with TELDATA data interface and other add-ons
- Data protection



Benefits

- Full performance analysis functionality
- Customisable screen layouts and graphs
- Fast and easy to use
- Compatible with Windows® 95/98/NT/2000/XP
- Support for telemetry (narrow band)

Technical support

- Possibility to develop custom solutions
- Personalised support (advice, fixes, etc.)
- Annual update on renewal of license
- Multi-user license

Typical Applications

MotoGP, Superbikes
Touring car
GT
Rally

WINTAX TEAM

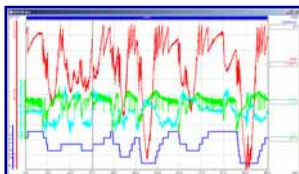
Data acquisition and analysis
Multi-user license

Main characteristics

The main screen area of WINTAX TEAM can contain any combination of graphs or reports in which logged data may be represented in a variety of different ways. Commonly-used combinations of analysis windows can be saved as user-defined Layouts.

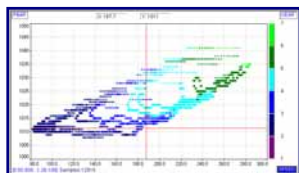
Graphs

The *Graphs* window allows you to plot any of up to 20 channels against time or distance.



- Different plot modes allow you to arrange the traces to suit particular analysis needs
- Advanced zooming and cursor features help focus on details in the data

XY - XYZ Plot



The XY window is used to analyse how the values of up to four channels vary with changes in another. XYZ graphs are coloured contour plots showing how three channels vary together.

Virtual channels

Virtual channels are generated from user-defined functions of logged data channels. A wide variety of trig, exponential, Boolean and algebraic functions are available.

Trend window

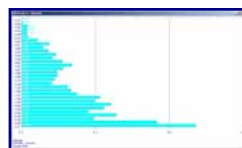
The *trend* windows is used to plot the lap-by-lap trend of channel statistics (such as min, max, mean values) and end-of-lap data to provide an overview of the whole run or session.

Lap Report

A lap-by-lap summary of important parameters. Freely configurable to show the min., max. and Avg. of any channel values as well as start- and end-of-lap values.

Histograms

Histogram bins can be either time or percent.



Channels window

A quick way of viewing the values at the cursor position of all logged channels together.

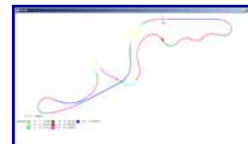
Time	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10	CH11	CH12	CH13	CH14	CH15	CH16	CH17	CH18	CH19	CH20
0.000	0.20	-0.02	0.204	6	4	5.00	5.05	6790	170.5											
1.000	0.06	-0.09	0.026	3	4	5.00	5.63	7076	178.7											
2.000	0.23	-0.21	0.275	0	4	5.00	6.99	7342	186.2											
3.000	0.18	-0.56	0.295	-1	4	5.00	5.55	7614	193.0											
4.000	0.00	-0.13	0.278	0	5	5.00	5.60	6769	186.1											
5.000	0.05	-0.54	0.395	1	5	5.00	5.70	6904	191.2											
6.000	0.50	0.09	0.213	8	5	5.00	5.74	6410	202.7											
7.000	0.06	1.16	0.228	27	6	5.00	5.73	6543	189.7											
8.000	0.21	1.26	0.221	25	5	5.00	5.74	5882	188.2											
9.000	0.13	0.97	0.228	32	5	5.00	5.69	5880	179.5											
10.000	0.36	1.01	0.215	31	5	5.00	5.69	6695	183.4											
11.000	0.05	1.12	0.206	27	5	5.00	5.71	6249	188.7											

PSD analysis

The *Power Spectral Density* window is used to show the frequency components of a channel signal.

Circuit window

Shows the position of the car on the track corresponding to the cursor position. The circuit is created from basic logged channels: lateral acceleration, speed and distance.



Conditions

Logical conditions (such as *Engine_running: (rpm > 300)*) can be used to suppress/enable alarms or to filter out data in XYZ graphs.

Alarm

The *Alarms* window is used to detect a critical condition on any channel. A coloured text box flags up any alarms showing the values and names of any channel which goes out of range during the lap.

Minimum PC requirements

- PC x86 running Windows® 95/98/ME/2000/XP
- Ethernet-TCP/IP network interface
- One free PCMCIA slot (for CAN card)

For further information, please contact:





SOFTWARE

FASTPRO

Automatic code generation

Description

FASTPRO (contraction of FAST PROTOTYPING) is designed for automatically build up application code running in Magneti Marelli ECUs, starting from a Simulink/Stateflow model.

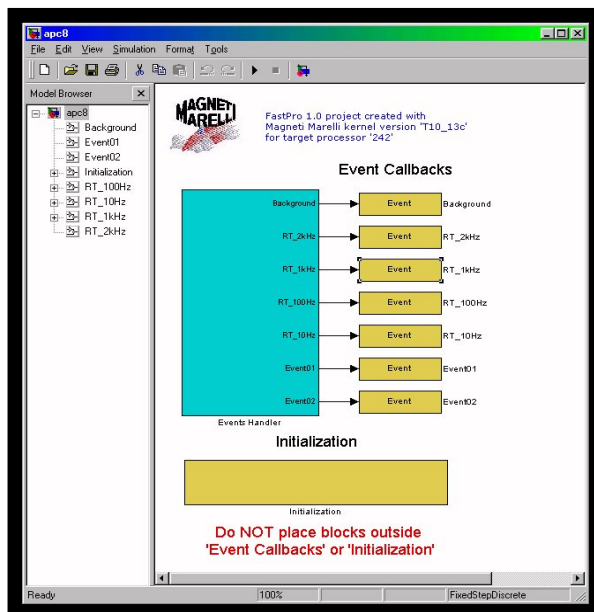
In our vision, fast prototyping means that engine/vehicle engineers who concept the control strategy are made able to immediately test it in a standard ECU (on HIL bench or directly on the car or on the bike).

This huge reduction in the time needed from the conception phase to the testing, makes FastPro the ideal solution for the Motorsport environment, where control strategies are continuously updated and improved.

FASTPRO adds rapid-prototyping features to the ECU usually employed in the races, without the needing of purchasing a new hardware dedicated to rapid-prototyping and without making a "porting" of the C-code (like happens with other commercial products for automatic code generation).

Main Features

- Automatic generation of downloadable code (very quick, minimize error generation)
- Allow immediate test of a control strategy in a standard ECU
- Complete integration of code generated by FASTPRO with existing "C" code
- Very high level Software development, debug and validation (error minimization)
- High level graphical programming



Benefits

- Ideal solution for racing environment
- Reduction in development costs and times
- Code generation does not need high programming skills from the user

Typical Applications

Magneti Marelli ECUs with DSP "Sharc" on board

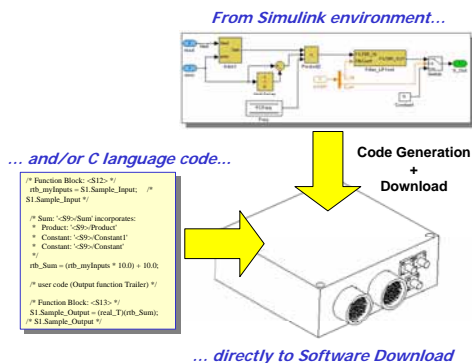
FASTPRO

Automatic code generation

Main Characteristics

From Simulink environment directly to software download

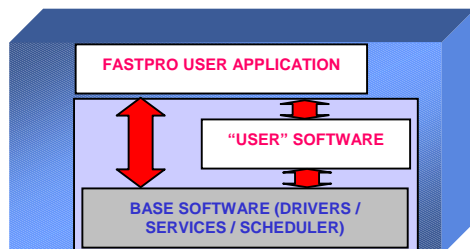
FASTPRO enables an automatic generation of "C-language" code from the custom application written as a Simulink diagram. The code can be directly downloaded in the ECU using the standard Marelli tools (WinCL).



Hardware and Software Layout

FASTPRO can run in any DSP "Sharc" of Magneti Marelli ECU. The code generated by FASTPRO coexists in the ECU together with existing C code (Base software and Customer Application software). In other words, it will be possible to write part of the software using C-language and another part in a form of a Simulink/Stateflow model.

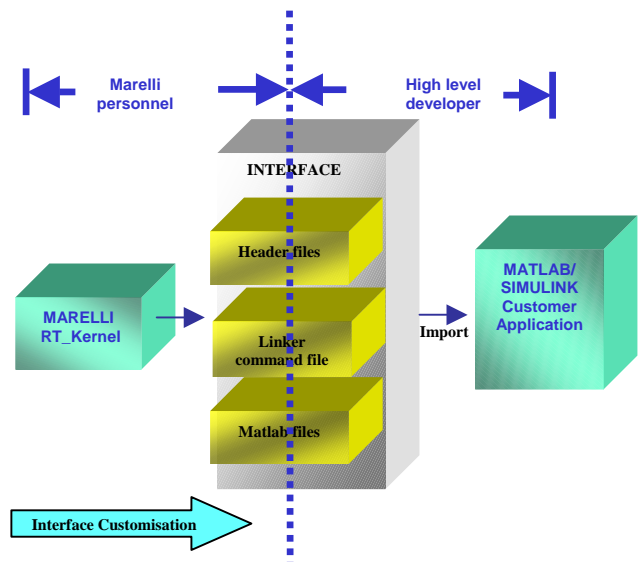
FASTPRO is not intended as a full replacement of all existing C code. Its best use is as an add-on tool enabling high-level Simulink graphical programming of diagnostic or control strategies. In a broad range of situations this is a very powerful feature for writing ECU high-quality software in a really short amount of time.



For further information, please contact:

Import of RT Kernel resources

The complete integration of FASTPRO with Magneti Marelli Kernel (MMK) means that, during strategy implementation at Simulink level, the user can link to resources and services of MMK (variables, Real Time tasks, asynchronous user tasks, data stored in E2PROM, Vision channels, Data Logger channels, communications, etc).



System requirements

- Windows® NT4.0 / 2000 / XP
- Pentium III or higher
- RAM 256 Mbyte (512 recommended)
- 25 Mbyte of Hard Disk space needed for installation
- MATLAB 7.0.4 (R14 Service Pack 2) including:
 - ✓ Simulink
 - ✓ Real Time Workshop
 - ✓ Stateflow and Stateflow Coder
- VISUAL DSP++ release 1.0



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