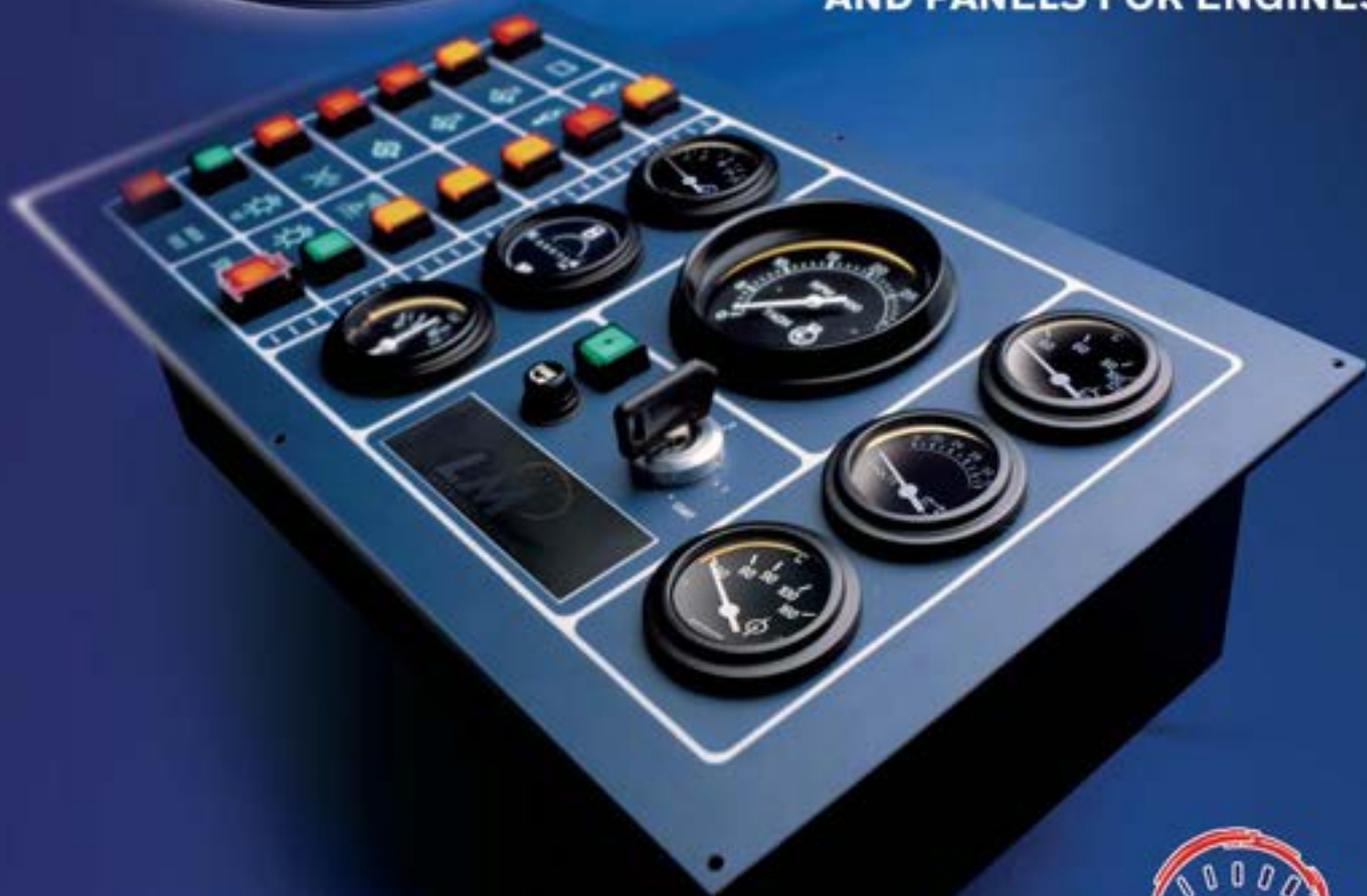




**INSTRUMENTS,
SENDERS, SWITCHES
AND PANELS FOR ENGINES**





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LM Instrumentation Dashboards

LM Instrumentation develop and manufacture custom and standard dashboards

Standard dashboards

To "built in"

220 x 140



330 x 160



445 x 260



Wall mounting

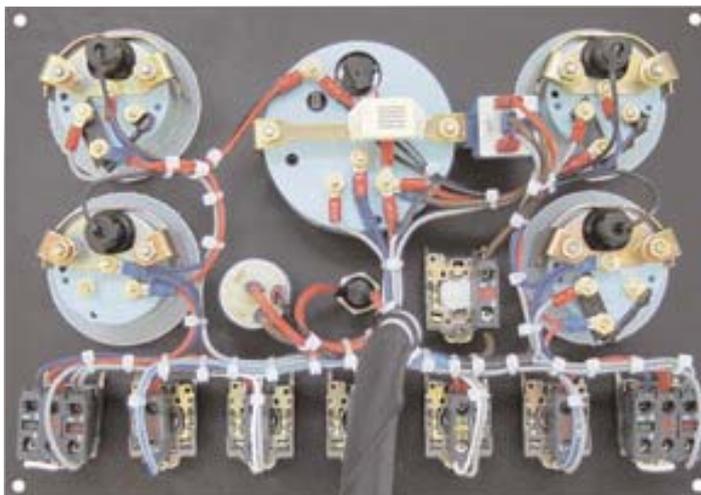
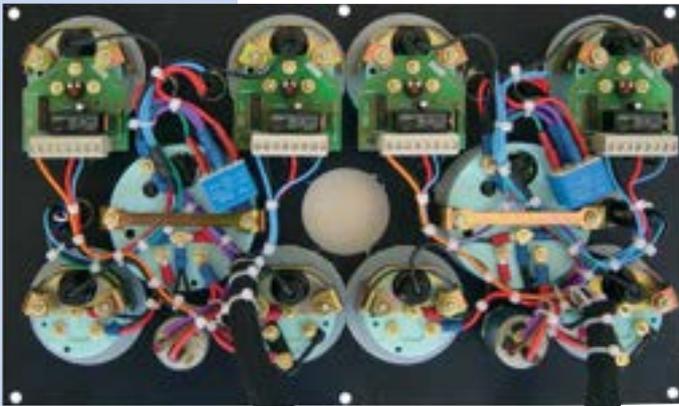


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Custom dashboards



Complete panels sets

Main control panel
Machinery panel
Harnesses



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Complete panels sets



Maxima Technologies Clusters

Maxima Technologies develop and manufacture clusters for OEM's appliances (minimum quantity required).

We can supply custom solutions and adjustable standards (limited development and investment)

Universal Standard (minimum quantity required)



Compatino Standard (minimum quantity required)



Custom Cluster (minimum quantity required)



MC 704

The MC 704 has been designed to suit extreme working conditions of mobile and stationary engines.

This compact unit performs two critical cost saving functions:

- it automatically shuts down the engine due to failure
- it informs the operator what caused the malfunction via one of the four led's

Technical data

- Dimensions: 72x72x110mm
- Cut for flush mount: 66x66mm
- Flange mount or panel mount
- Rugged aluminium housing
- Operating voltage 8 to 32V
- Current input 30mA
- Sealing class IP54
- Temperature range -40 to +85°C
- Electrical connection via one locked multiple plug :

Output : (3.5A short circuit protected): solenoid (fuel shut off), alarm (audible, visual).

Inputs : oil pressure switch, temperature switch, alternator / D+, auxiliary (air filter, V-belt, water pressure switch...), remote stop.



Temporary errors will be ignored and stay accumulated for 10 seconds. If they exceed 3 seconds in total in this time the engine will be shut down automatically and the alarm will be activated.

	Hourmeter	Preheat
P/N 4842	•	•
P/N 4843	•	
P/N 4142		•
P/N 4756		

CANbus MULTI-FUNCTION DISPLAY

CANtrak

The CANtrak has established a new standard for intelligent, multi-function displays.



The ideal man-machine interface, it is easily configured via the application of user-friendly software, to measure, display, store, process and transmit data.

2 versions available:

- GEM (for monitoring J1939 and J1587 Engine Data)
- 2600 OPEN

Display features

Large FSTN display, 160x128 pixels

Adjustable contrast and backlight

Soft function push-keys for rapid display selection, fault handling and set-up

Audible alarm: 4 Khz internal sounder

Communications: Full CAN 2.0B controller/part. RS232 / RS422.RS485

Power input 10 to 32VDC

Power consumption: max 300mA at 12VDC

Connection: Integral Deutsch 12 way connector (DT04-12PA)

Degree of protection: IP67

Operating temperature: -25°C to +75°C

Storage temperature: -40°C to +80°C

Shock resistance: 30g

Vibration resistance: 3g

Color: anthracite grey

Dimensions: 110mmx110mmx38,5mm deep

Mounting: front or rear

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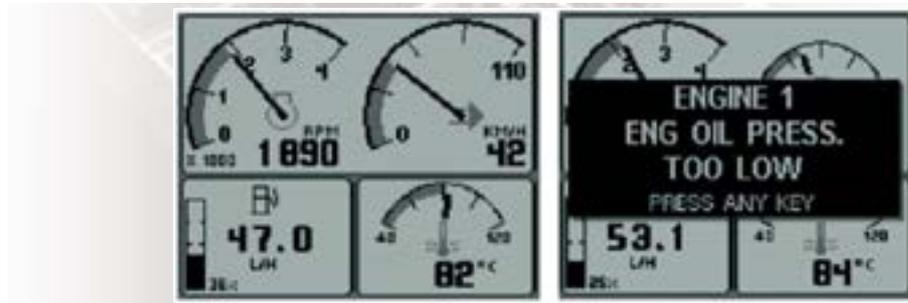
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FOR YOUR ENGINE

CANtrak GEM (Generic Engine Monitoring)

Plug-and-go solution for the display of J1939 and J1587-transmitted engine and transmission data.



The GEM offers user selectable icon based display layouts as well as including a comprehensive multi language text based fault warning and acknowledgement system.

Key features

Displayed data if received from the engine and transmission ECU's:

Electrical

Fuel

Distance

Pressure

Temperature

Percentage

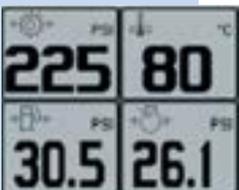
Speed

Time

Faults: (suspect parameter number) available with relevant message such as too high / too low.

Fuel pressure, water in fuel, coolant level, engine speed...

GEM Software can be fully customised to meet exact requirements. From adding customised logos to adding parameters and screen formats for example.



CANtrak 2600

CANtrak 2600 "OPEN" version is an ideal man-machine interface. It is easily configured via the application of user-friendly software, to measure, display, store, process and transmit data.

Key features

Micro Controller Siemens 164 16bit/20Mhz

FLASH Memory : 512K bytes

RAM : 128K bytes

EEPROM: 128 bytes

Communications: Full CAN 2.0B controller / port.RS232 / RS422. RS485

If needed we can also supply you a CANtrak Configurable Input Module (CCIM) which is a programmable sensor module that interfaces between various electronic sensors and J1939 or NMEA 2000 Network.



Self programming by customer :

Software Development Kit (SDK):

- All software for CANtrak 2600/2610 is written in "C"
- The SDK makes available an extensive library that covers all the aspects required to develop and create a new application.

Programming by our team:

Do not hesitate to contact us with your project. Our development team can ensure software development and also training.



CANtrak GEM (J.1939)

P/N : 07.5895

CANtrak OPEN

P/N : 6020

Connector kit for CANtrak

P/N : 6023

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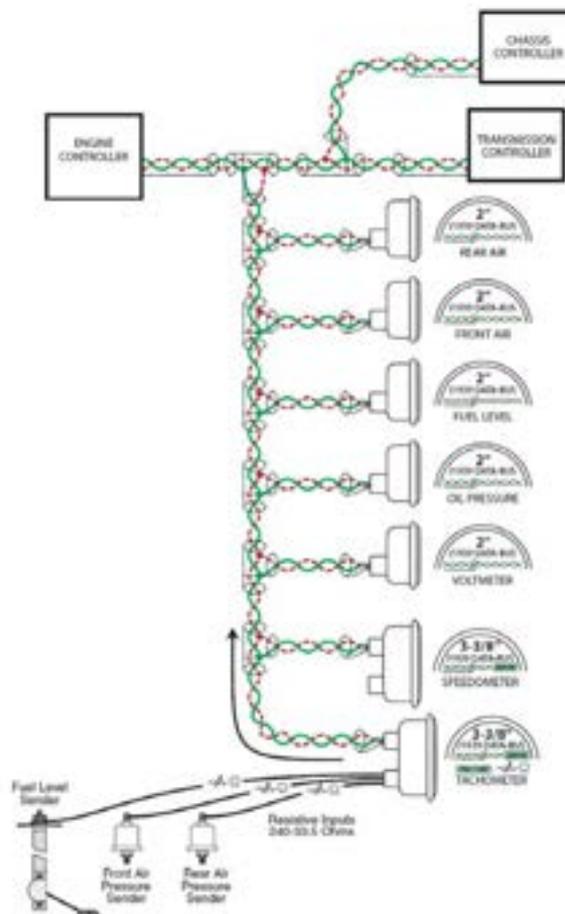
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DIRECT DATA-BUS INSTRUMENTS : DDBI

DDBI (gauges, tachometers and speedometers) provides a direct connection to the SAE J1939 or J1708/1587 vehicle bus. No instrument controller or "gateway" required. Units can be individually connected to the bus or run in series. This architecture ensures easy installation and lower installed- system cost.

General Features :

- J1939 x J1708/1587 inputs
- Reinforced plastic case
- Integral 6 or 12 pin sealed Deutsch connectors
- Led black lighting (amber)
- Lighted pointer
- Plastic diffuser for standard black dials, white on blackgraphics
- Stepper motor drivers, 270° sweep
- Operating voltage 12 VDC (10-16) x 24 VDC (20-32)
- Operating temperature: -40°C to + 85°C
- 270° sweep when power on
- Black anodized SAE step bezel
- Other specifications according to SAE



- Tachometer 0-3500 RPM with LCD display (shows fault codes and various engine operating parameters, including hourmeter)

12V **P/N 30.5611**

24V **P/N 30.5612**



- Diameter 86 mm

- Oil pressure gauge 0-10 Bars with integral led warning light (pre-set at 0.7 Bar)

12V **P/N 15.5616**

24V **P/N 15.5615**



- Diameter 52 mm

- Water temperature gauge 40-120°C with integral led warning light (pre-set at 105°C)

12V **P/N 14.5614**

24V **P/N 14.5613**



- Diameter 52 mm

Accessory :

Deutsch 270mm harness with 6 pin connector.

P/N 13.5617



Consult us for other DDBI instruments :

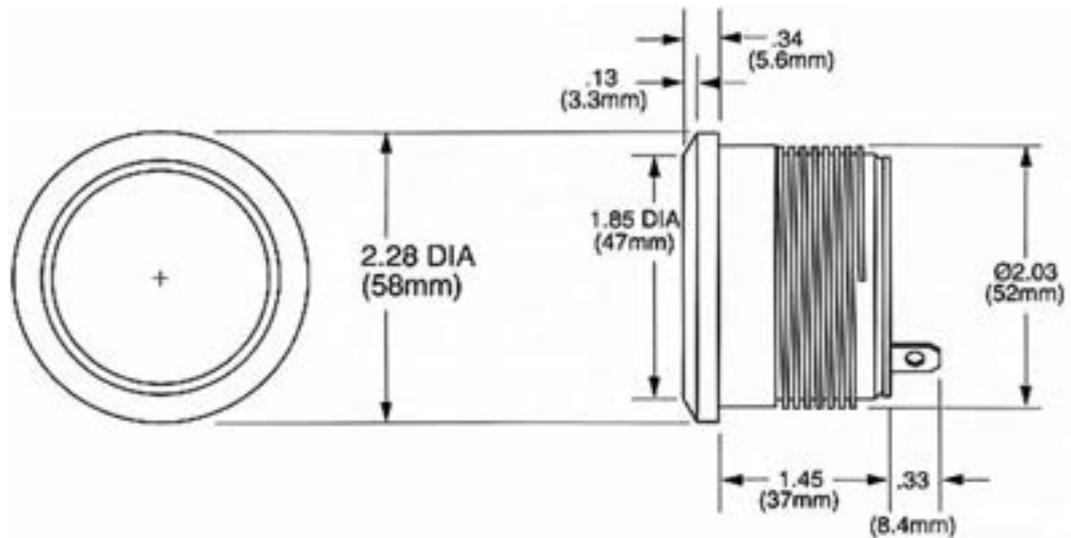
- Speedo-odometer 0-120 km/h
- Fuel level gauge (bus or analog input)
- Voltmeter

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HOURMETERS

Electronic Quartz Hourmeter P/N : 11.0264

- 52 mm diameter
- Record to: 99.999,9 hours, operation warning
- Operating voltage: 10/32 VDC
- Mounting ring
- Water resistant front
- Operating temperature: -40°C + 85°C
- Electrical connections: 6.35 TAB Terminals



Hourmeter with pointer

- 52 mm diameter
- Operating voltage : 10-80 VDC
- Record to 99 999 hours
- 1 pointer rotation = 1 hour
- Operating temperature: -40° + 80°C
- Mounting by bracket
- Water resistant front IP65
- Connection: 2 x 6.35 mm Tabs



P/N : 11.5101

LCD Hourmeter

- 52 mm diameter
- Record to: 99 999,9 hours
- Operating voltage: 8/28 VDC
- Operating temperature: -40°/ +85°C
- 6 digits LCD display
- Connection: 2 x 6.35mm tabs
- Mounting by bracket



P/N : 11.5365

Engine powered hourmeters

Those hourmeters do work with W alternator or battery ignition signal input.

- 52 mm diameter
- Record to: 99 999,9 hours
- Mounting by automatic bracket
- Waterproof on front
- Operating temperature -40/ +80 °C
- Connection on 6.35mm tabs

- Connection on Magneto Ignition

- Connection on W alternator



P/N 11.3286

P/N 11.3340

Vibration hourmeter

The hourmeter records the running time of engines, vehicles, machines, which vibrate during operations.

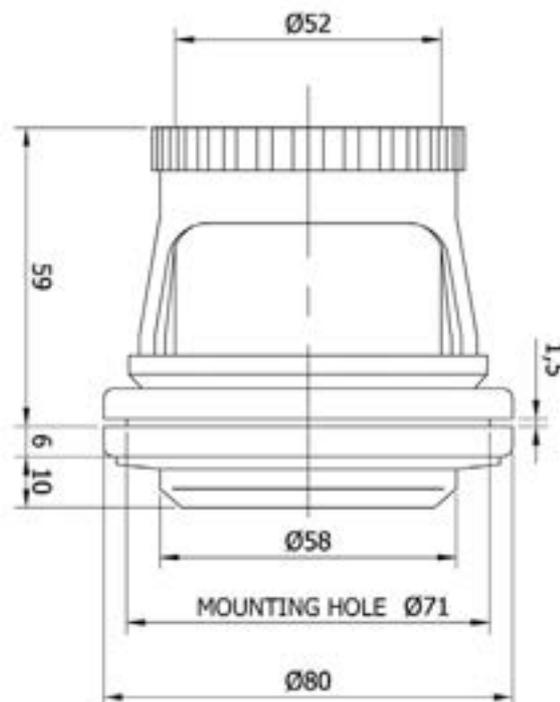
- 52 mm diameter
- Record to 99 999 hours
- Mounting by bracket
- Water resistant front IP65
- Do not need any power input

Supplied with damping ring.



P/N 11.1599

Dimensions



LCD vibration hourmeter

- 6 digits LCD display
- 52 mm diameter
- Record to 99 999,9 hours
- Mounting by bracket
- Do not need any power input

P/N 11.5647

Hourmeter for alternating current 50Hz

Features

- Dimensions on front: 52x52mm
- Diameter hole 50,2mm or square 45,2mm
- Record to 99999,99 hours



Hourmeter 52x52mm 24VAC 50Hz **P/N 11.2709**

Hourmeter 52x52mm 48VAC 50Hz **P/N 11.5500**

Hourmeter 52x52mm 110VAC 50Hz **P/N 11.2934**

Hourmeter 52x52mm 220VAC 50Hz **P/N 11.2733**

Hourmeter 52x52mm 380VAC 50Hz **P/N 11.2734**

Accessorie

Gasket for hourmeter 52x52mm **P/N 11.2710**

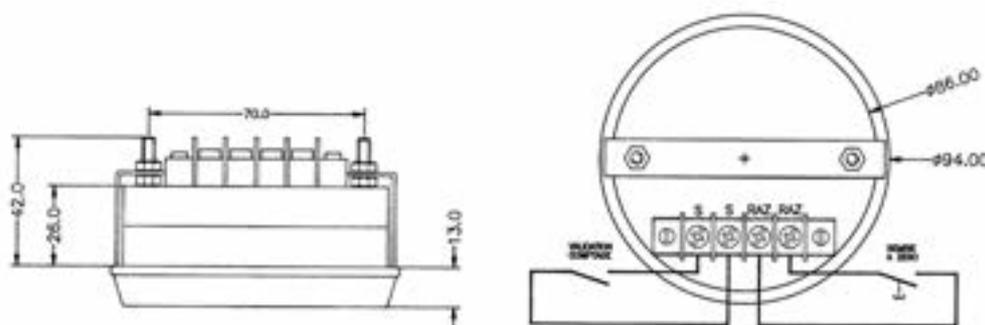
Hourmeter self power

- Type LM25
- Diameter: 86mm
- Record to: 999 999,99 hours
- Mounting bracket
- Water-resistant front
- Operating temperature: 0°C +50°C
- Autonomy 8 years lithium battery
- Totals when its terminals are connected
- Reset



P/N 11.0521

Dimensions and connections



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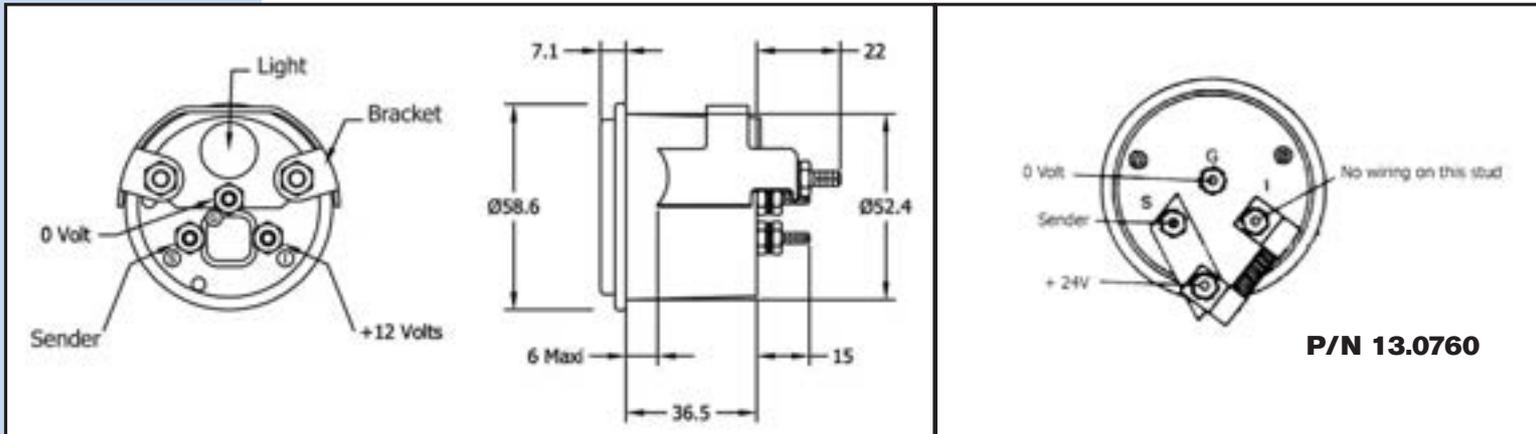
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VOLTAGE, CURRENT, TEMPERATURE, PRESSURE, LEVEL AND ACCESORIES

52 mm diameter gauges. Presentation

Outlook

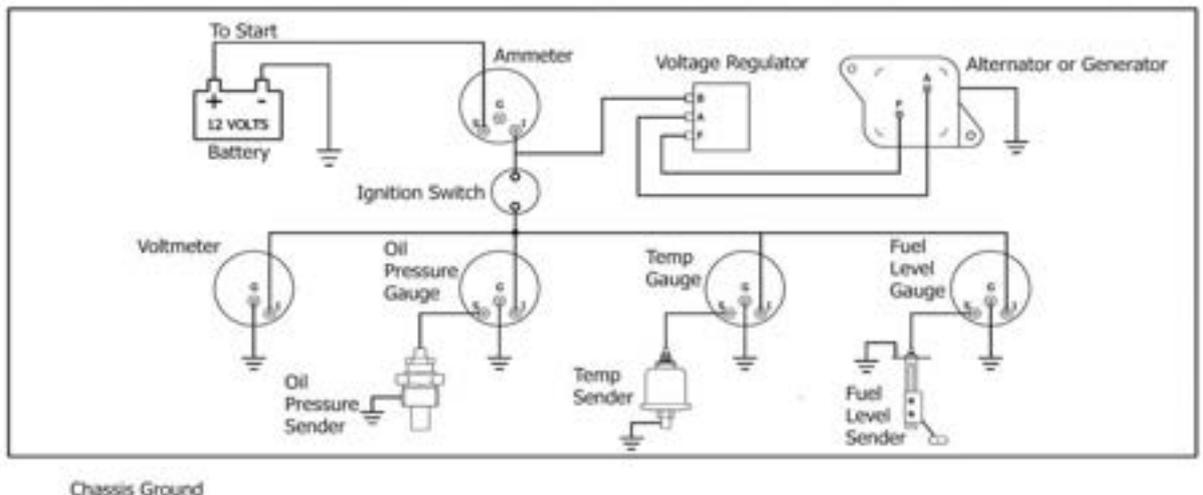
- Glass fiber plastic housing, shock-resistant
- Wtareproof front
- Glass lenses
- White on black lettering/ symbols
- SAE anodised aluminium bezel
- Connection threads
- Installation hardware: mounting brackets and nuts



Features

- Operating voltage for 12 volts instruments: 10 to 16 VDC
- also works in 24 Volts with adapter P/N 13.0760.
- Angular degrees: 90° for pressure and level gauges, 100° for temperature gauges.
- Operating temperature: -40° C +85° C

Typical gauge installation



Ammeters - Voltmeters

Ammeters

· 20 A	P/N 12.0777
· 40 A	P/N 12.0778
· 60 A	P/N 12.0779



Beyond 60A, use ammeters with a shunt.

Scale	P/N Ammeter	P/N Shunt
100 A	12.4026	12.4027
150 A	12.0767	12.0773
200 A	12.2368	12.2369
300 A	12.2364	12.2365

Voltmeters

· 8-18 Volts	P/N 12.0775
· 16-36 Volts	P/N 12.0776



Accessories

· Light kit 12 volts :	P/N 13.2643
· Light kit 24 Volts :	P/N 13.2322
· Water resistant gasket for 52 mm diameter gauge :	P/N 13.0545



Battery discharge gauges

Those gauges do control the battery discharge with or without alarm.

Features

- All type of battery
- 52 mm diameter gauge
- Operating voltage for 12, 24 or 36 volts (please consult us for other voltage)
- Installation hardware: mounting brackets and nuts
- 4 leds displays state of charge (3 yellow, 1 red)
- Current rating 2A at 12 or 24 Volts
- Sealing class: IP65 in front
- In option: empty alarm at 20-25 % residual capacity of battery.
- Normally open alarm



Voltage	P/N No alarm	P/N With alarm
12 Volts	12.2671	12.2672
24 Volts	12.1405	12.1406
36 Volts	12.1200	12.1827

Temperature gauges

Water temperature gauge

- 40-120°C **P/N 14.0780**



Oil temperature gauges

- 40-120°C **P/N 14.0781**
- 60-160°C **P/N 14.0782**



Accessories

- Light kit 12 volts **P/N 13.2643**
- Light kit 24 volts **P/N 13.2322**
- Water resistant gasket for 52mm diameter gauge **P/N 13.0545**
- Voltage adapter 24 volts (connection page 18) **P/N 13.0760**



Temperature senders

Earth return temperature senders

	1/8"NPTF	1/4"NPTF	3/8"NPTF	5/8"NPTF	1/2"NPTF	M14X150	M16X150	M18X150
Dedicated to P/N 14.0780 or P/N 14.0781 (40-120°C range)	14.2296	14.0634	14.0734	14.2072	14.0735	14.2297	14.1947	14.2306
Dedicated to P/N 14.0782 (60-160°C range)	14.0736	14.1536	14.0737	14.2074	14.0738	14.0743	14.0740	14.0741

Insulated temperature senders

	1/8"NPTF	M14X150	M18X150	1/2"NPTF
Dedicated to P/N 14.0780 or P/N 14.0781 (40-120°C range)	14.1419	14.1385	14.1384	14.1383
Dedicated to P/N 14.0782 (60-160°C range)	14.1420	14.0633	14.1386	14.1387



Exhaust gas temperature monitoring sets

- Self-powered 0-650°C gauge without auxiliary voltage (features described page 18 are not applicable) **P/N 14.1088**
- Thermocouple type K, 1 / 4" NPT **P/N 14.1089**
- Thermocouple cable, sold by meter **P/N 14.0707**



Temperature switches

Insulated temperature switches standard range
(for water, oil, air...)

Features

- Current rating 4A/12VDC 2A/24VDC
- Electrical connections: 6.35mm TAB Terminals
- Operating temperature (environment):
-18°C to +162°C
- Set point tolerance +/- 2,8°C



P/N	Set point	Circuit form	Thread	Dimensions (mm)		
				H	L	Hex
14.4145	30°C	NC	M14x150	12	23	19
14.4146	30°C	NC	M18x150	12	25	26
14.4147	30°C	NC	1/4" NPT	12	26	14
14.4148	30°C	NC	5/8" NPT	18	28	18
14.4149	30°C	NC	1/2" NPT	12	30	22
14.4150	55°C	NC	M14x150	12	23	19
14.4151	55°C	NC	M18x150	12	25	26
14.4152	55°C	NC	1/4" NPT	12	26	14
14.4153	55°C	NC	5/8" NPT	18	28	18
14.4154	55°C	NC	1/2" NPT	12	30	22
14.4155	90°C	NO	M14x150	12	23	19
14.4156	90°C	NO	M18x150	12	25	26
14.4157	90°C	NO	1/4" NPT	12	26	14
14.4158	90°C	NO	5/8" NPT	18	28	18
14.4159	90°C	NO	1/2" NPT	12	30	22
14.4160	95°C	NO	M14x150	12	23	19
14.4161	95°C	NO	M18x150	12	25	26
14.4162	95°C	NO	1/4" NPT	12	26	14
14.4163	95°C	NO	5/8" NPT	18	28	18
14.4164	95°C	NO	1/2" NPT	12	30	22
14.4165	100°C	NO	M14x150	12	23	19
14.4166	100°C	NO	M18x150	12	25	26
14.4167	100°C	NO	1/4" NPT	12	26	14
14.4168	100°C	NO	5/8" NPT	18	28	18
14.4169	100°C	NO	1/2" NPT	12	30	22
14.4170	110°C	NO	M14x150	12	23	19
14.4171	110°C	NO	M18x150	12	25	26
14.4172	110°C	NO	1/4" NPT	12	26	14
14.4173	110°C	NO	5/8" NPT	18	28	18
14.4174	110°C	NO	1/2" NPT	12	30	22
14.4175	120°C	NO	M14x150	12	23	19
14.4176	120°C	NO	M18x150	12	25	26
14.4177	120°C	NO	1/4" NPT	12	26	14
14.4178	120°C	NO	5/8" NPT	18	28	18
14.4179	120°C	NO	1/2" NPT	12	30	22

Insulated temperature switches standard range Thread: 1/8"NPT

- Electrical connection by wire: 150mm
- Current rating 4A/12VDC 2A/24VDC
- Operating temperature (environment): -18°C to +162°C
- Set point tolerance +/- 2,8°C

Dimensions (mm) :

- H : 25
- L : 36
- Hex : 14



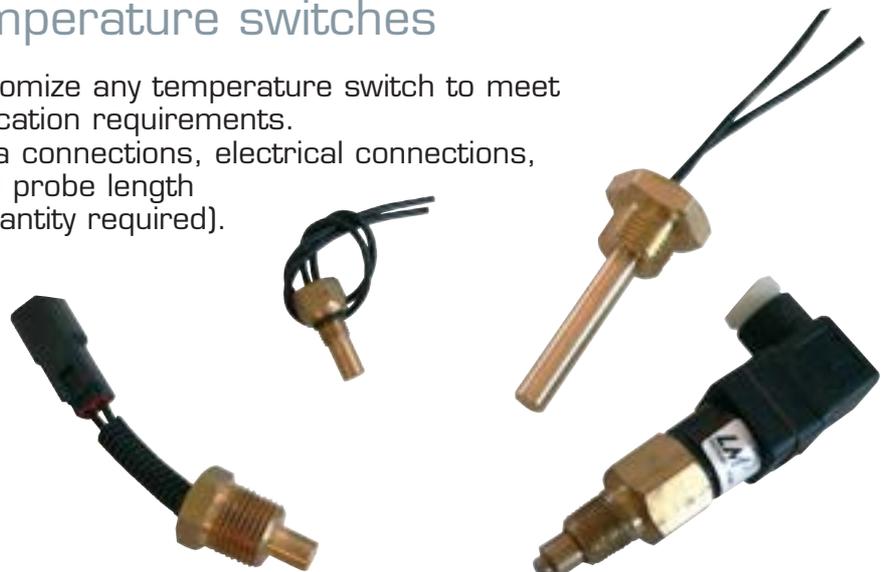
P/N	Set point	Circuit Form	Thread
14.5522	34°C	NC	1/8"NPTF
14.5523	40°C	NC	1/8"NPTF
14.5524	50°C	NC	1/8"NPTF
14.5525	55°C	NC	1/8"NPTF
14.5526	55°C	NO	1/8"NPTF
14.5527	60°C	NO	1/8"NPTF
14.5528	70°C	NO	1/8"NPTF
14.5529	80°C	NO	1/8"NPTF
14.5530	90°C	NO	1/8"NPTF
14.5531	95°C	NO	1/8"NPTF
14.5532	100°C	NO	1/8"NPTF
14.5533	110°C	NO	1/8"NPTF
14.5534	120°C	NO	1/8"NPTF
14.5535	130°C	NO	1/8"NPTF

Thread adapters page 26

Custom temperature switches

We can customize any temperature switch to meet specific application requirements.

Special media connections, electrical connections, set point and probe length (minimum quantity required).



Pressure gauges

Turbo air pressure gauge

- 0 à 2,8 bars **P/N 15.2288**



Engine oil pressure gauges

- 0 à 7 bars : **P/N 15.0783**
- 0 à 10 bars : **P/N 15.0784**



Air pressure gauge

- 0 à 10 bars : **P/N 15.0785**



Transmission oil pressure gauge

- 0 à 28 bars : See page 41



Accessories

- Light kit 12 Volts : **P/N 13.2643**
- Light kit 24 Volts : **P/N 13.2322**
- Voltage adapter 24 volts (connection page 18) : **P/N 13.0760**
- Water resistant gasket for 52mm diameter gauge: **P/N 13.0545**



Pressure senders

Earth return pressure senders

- Thread 1/8" NPTF.

· Turbo air pressure 0-2,8 bar :	P/N 15.0748
----------------------------------	--------------------

· Engine oil pressure 0-7 bars :	P/N 15.1337
----------------------------------	--------------------

· Engine air or oil pressure 0-10 bar :	P/N 15.1227
---	--------------------



Insulated pressure senders

- Thread 1/8" NPTF.

- Electrical connections: 6,35mm TAB terminals.

· Turbo air pressure 0-2,8 bars :	P/N 15.1340
-----------------------------------	--------------------

· Engine oil pressure 0-7 bars :	P/N 15.1335
----------------------------------	--------------------

· Engine oil pressure 0-10 bars :	P/N 15.1281
-----------------------------------	--------------------



Pressure switches

Earth return pressure switch

- Thread 1/8" NPTF

- Electrical connections: 6,35mm TAB Terminals

· 0,8 bars, falling	P/N 15.0380
---------------------	--------------------



Insulated pressure switches

- Thread 1/8" NPTF

- Electrical connections: 6,35mm TAB Terminals

- Maximum operating pressure :
17 bars (expect 15.0409-A: 41 bars)

- Operating temperature: -40°C to +110°C

- Current rating: 5A (resistive)

- Circuit SPDT NO/NC

- Set point :

· 0,2Bars	P/N 15.0695-A
-----------	----------------------

· 0,7Bars	P/N 15.0342-A
-----------	----------------------

· 1,1Bars	P/N 15.0372-A
-----------	----------------------

· 2,5Bars	P/N 15.2127-A
-----------	----------------------

· 6,9Bars	P/N 15.0409-A
-----------	----------------------



Insulated pressure switches (adjustable)

- Thread: 1/8" NPTF
- Electrical connections: 6,35mm TAB terminals
 - Circuit SPDT NO/NC adjustable 0,21 to 0,48 Bars (preset 0,27B) **P/N 15.5168**
 - Circuit SPDT NO/NC adjustable 0,55 to 0,89 Bars (preset 0,69B) **P/N 15.5399**
 - Circuit SPDT NO/NC adjustable 0,96 to 1,65 Bars (preset 1,1B) **P/N 15.4921**
 - Circuit SPDT NO/NC adjustable 1,72 to 3,45 Bars (preset 2,76B) **P/N 15.5398**
 - Circuit SPDT NO/NC adjustable 3,5 to 6,2 Bars (preset 4,1B) **P/N 15.5138**



Thread adaptor

See page 26

Custom pressur switches

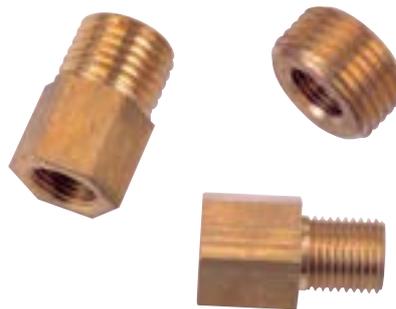
We can customize any pressure switch to meet specific application requirements.

Special media connections, set point, thread... (minimum quantity required)



Thread adaptors

Description		P/N
Male	Female	
1/4"-18 NPTF	1/8"-27 NPTF	13.0903
3/8"-18 NPTF	1/8"-27 NPTF	13.0906
5/8"-18 NPTF	1/8"-27 NPTF	13.0453
M10X1.00	1/8"-27 NPTF	13.2062
M12X1.50	1/8"-27 NPTF	13.2220
M14X1.50	1/8"-27 NPTF	13.0487
M16X1.50	1/8"-27 NPTF	13.2644
M18X1.50	1/8"-27 NPTF	13.2388
1/2"-18 NPTF	1/8"-27 NPTF	13.6712
M14X1.50	5/8"-18 NPTF	13.0031
M16X1.50	5/8"-18 NPTF	13.5554
1/2"-18 NPTF	5/8"-18 NPTF	13.0037
M18X1.50	5/8"-18 NPTF	13.0038
M20x1.50	M14x1.50	13.4374
M22x1.50	M14x1.50	13.4268



T adaptor kit

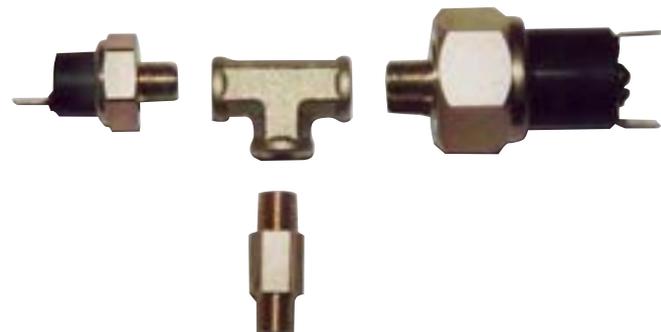
Function

With this adaptor, you can connect two pressure senders or switches on a same engine plug

P/N 13.4273

Technical specifications

- 1 male input 1/8" NPTF ·
- 2 female outputs 1/8" NPTF
- For any other thread, see thread adaptors (above)



Mechanical gauges

40-140°C temperature gauges

Gauge 40-140°C/ 100-280°F and 1 / 2 NPTF threaded cable

- 0,9m long cable : **P/N 14.1931**
- 2,43m long cable : **P/N 14.1460**
- 3,65m long cable : **P/N 14.1946**
- 5,48m long cable : **P/N 14.3153**

Please contact us for any other thread



Thread adapters

Description		
Male	Female	P/N
M14X1.50	5/8"-18 NPTF	13.0031
M16X1.50	5/8"-18 NPTF	13.5554
M18X1.50	5/8"-18 NPTF	13.0038

Mechanical pressure gauges

1/8" NPTF thread

- 0-2 Bars / 0 to 30PSI **P/N 15.1957**
- 0-10 Bars / 0 to 150PSI **P/N 15.1458**
- 0-28 Bars / 0 to 400PSI **P/N 15.1748**



Tube kit

- 4,9m long tube **P/N 15.1306**
- 1/8" NPTF M10x100 thread adapter **P/N 13.2062**

Accessories

- Light kit 12 volts : **Code 13.2643**
- Light kit 24 volts : **Code 13.2322**
- Water resistant gasket for 52mm diameter gauge : **Code 13.0545**



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Fuel level

Fuel level gauge

· 52mm diameter gauges / 12 Vdc
(24 Vdc with voltage adaptor P/N 13.0760)

· We can add a warning function with a factory calibrated level switch point using 1 or 2 electronic switch modules. See page 50-51.

Code 16.0787



Fuel level senders

Features

· Supply/ operating voltage 12 or 24 VDC with gauge : P/N 16.0787

· Adjustable from 150 to 610mm.

· Mounting hole: 41,5mm.

· Include gasket.

· 5 holes flange sender.
Earth return

P/N 16.0747

· 5 holes flange sender.

· Type LM 02350.00S.

· insulated.

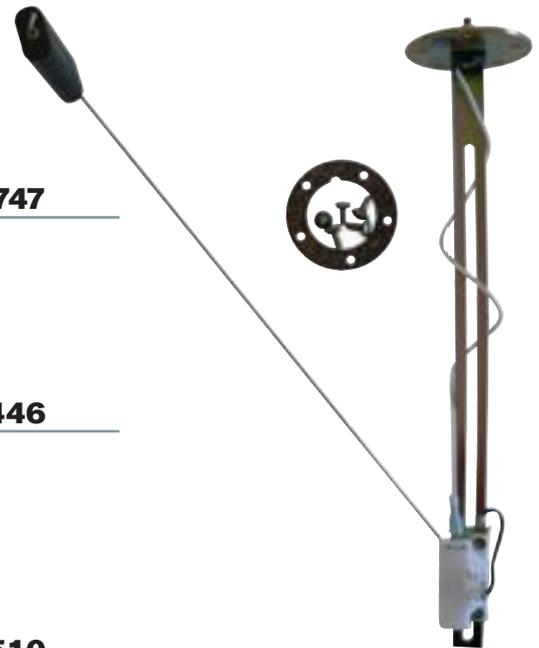
P/N 16.0446

· 3 holes flange sender.

· Type LM 02350.00 S3.

· Earth return.

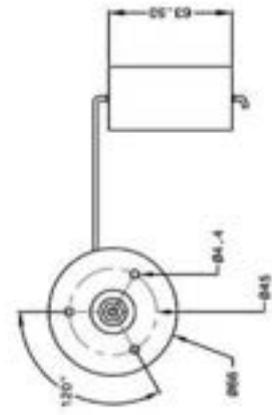
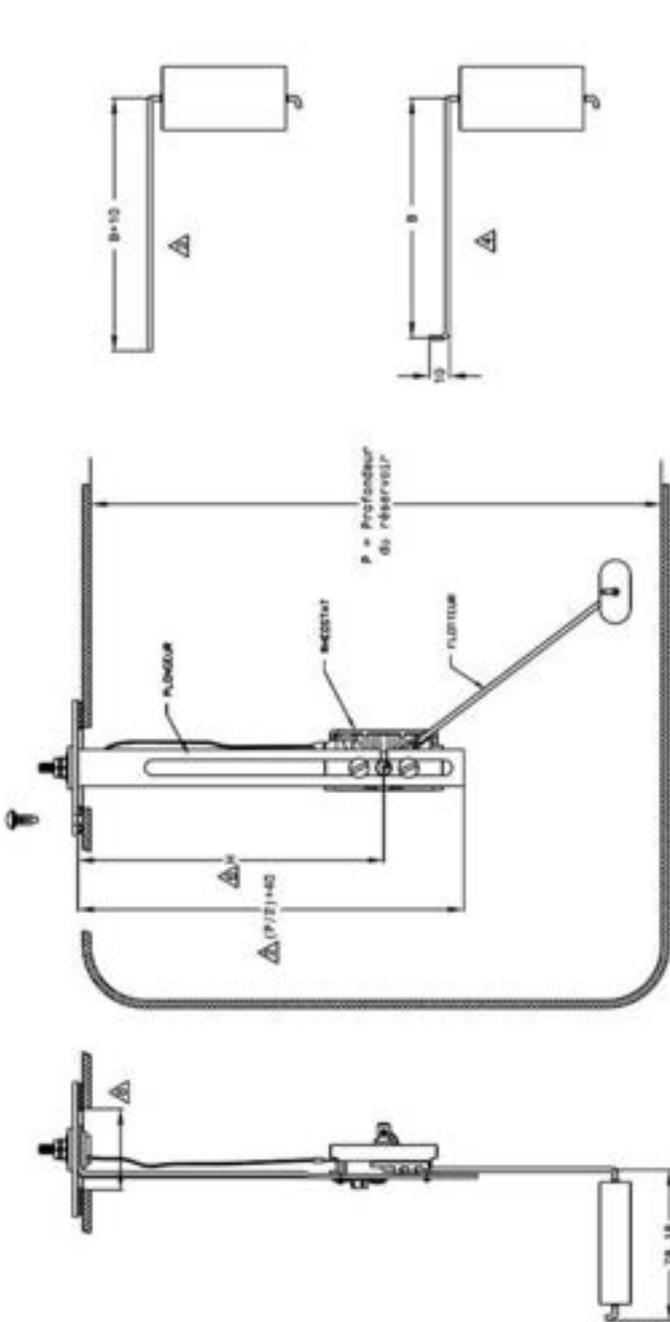
P/N 16.1510



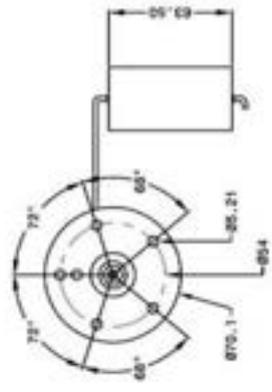
Ask for custom sender (minimum quantity required).



PROFONDEUR RESERVOIR "P" (mm)	CORRECTION "C" (mm)
152	70
165	76
178	83
190	89
203	92
216	98
229	114
241	127
254	133
267	140
279	146
292	152
305	159
318	165
330	178
343	191
356	197
368	203
381	210
394	216
406	222
419	235
432	241
445	248
457	260
470	267
483	273
495	279
508	282
521	298
533	305
546	311
559	324
572	330
584	337
597	343
610	356



MOUNTING 3 HOLES
16.1510



MOUNTING 5 HOLES
16.0747 et 16.0446

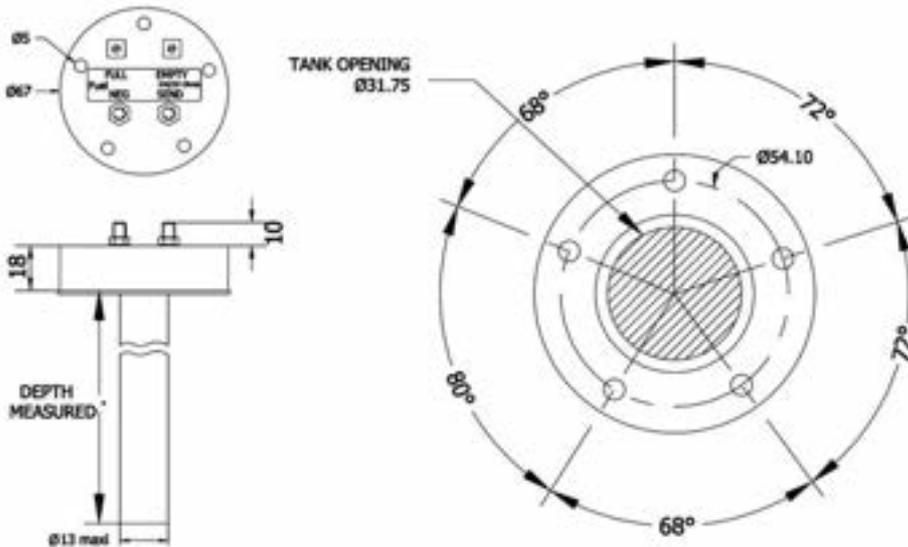
CALIBRATION PROCEDURE :
H : 1/2 tank depth + 41mm
P : tank depth
B : see table
C : C=P - 35

Capacitive fuel level senders.

Features

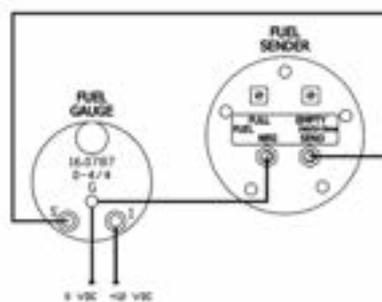
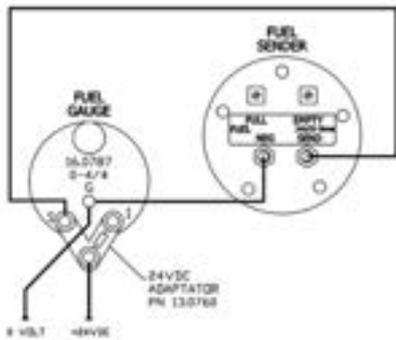
- 5 holes flange
- no moving parts
- cut and adjust with 2 potentiometers . mini/maxi
- insulated
- work with gauge **P/N 16.0787**
- power consumption : 5mA with sender only, 100mA with gauge

- 102 to 304 mm : **P/N 16.2689**
- 330 to 609 mm : **P/N 16.2690**
- 635 to 914 mm : **P/N 16.3207-A**
- 939 to 1219 mm : **P/N 16.2925**
- 1244 to 1524 mm : **P/N 16.2926**
- 1549 to 1828 mm : **P/N 16.5265**
- 1854 to 2184 mm : **P/N 16.4458**



CALIBRATION OF THE FUEL SENDER :

- cut the outside tube to the specified length, that shorter than 939mm.
- cut the center tube to the same length.
- place the insulator on the center tube to prevent it from touching the outside tube.
- ensure fixation of the isolator
- make the wiring connection as shown on the wiring diagram
- turn the power ON
- with sender out of tank :
 - turn the FULL and EMPTY SCREWS to the full clockwise position (do not force the screws)
 - slowly turn the EMPTY SCREW until the pointer of the gauge is on EMPTY MARK.
- with sender in tank (Full of Fuel)
 - slowly turn the FULL SCREW until the pointer of the gauge is on FULL MARK.
- check the calibration by removing the sender from the tank
- this complete calibration.



Capacitive fuel level senders (Signal 4-20 MA)

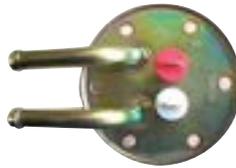
Same features as classic capacitive fuel sender (see opposite), excepted for the signal: 4-20mA.

Length	12V	24V
102 to 304 mm	P/N : 16.6610	P/N : 16.6215
330 to 609 mm	P/N : 16.6468	P/N : 16.6113
635 to 914 mm	P/N : 16.6125	P/N : 16.6184

· For signal 0-10V or other, please contact us.

Fuel level sender with tubes

- 6 holes flange
- earth return
- adjustable 135 to 560mm
- low level alarm
- suction pipe diameter: 8mm length: 554mm
- return pipe diameter: 8mm length: 25mm



P/N 16.4874

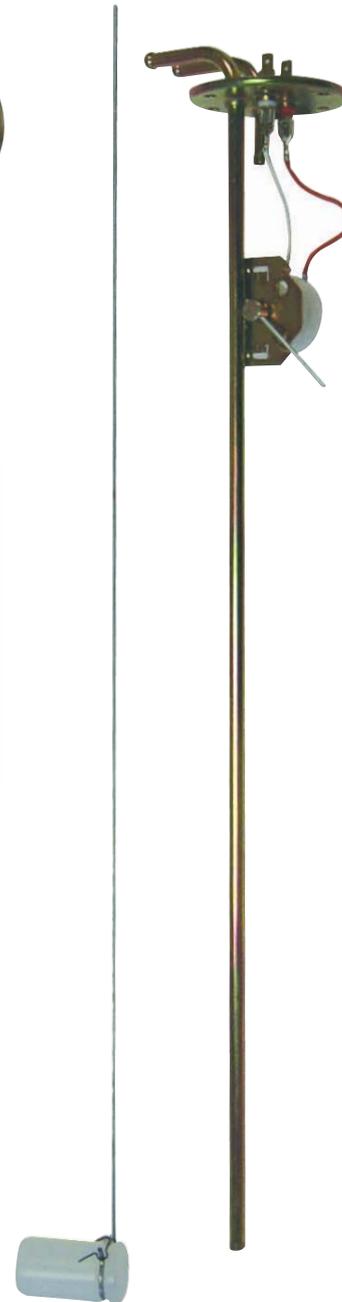
Work with AST gauges :

· 12 VDC : **P/N 16.2478**

· 24 VDC : **P/N 16.2476**



Please contact us for any specific request.



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Water level

Water level gauge

- Diameter 52mm / 12 Vdc
(24 Vdc with voltage adaptor P/N 13.0760)
- Scale E, 1 / 2, F : **P/N 16.1407**



Capacitive water level sender

- No moving parts
- Cut and adjust with 2 potentiometers
- 5 holes flange
-
- 102 to 304mm : **P/N 16.1532**
- 330 to 609mm : **P/N 16.1592**
- 635 to 914mm : **P/N 16.4073**
- 939 to 1219mm : **P/N 16.4847**
- 1244 to 1524mm : **P/N 16.6912**

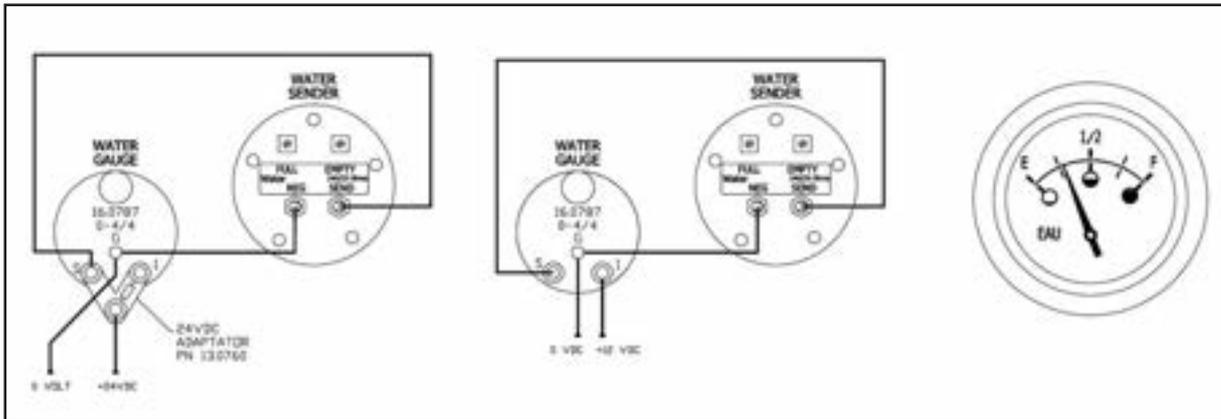
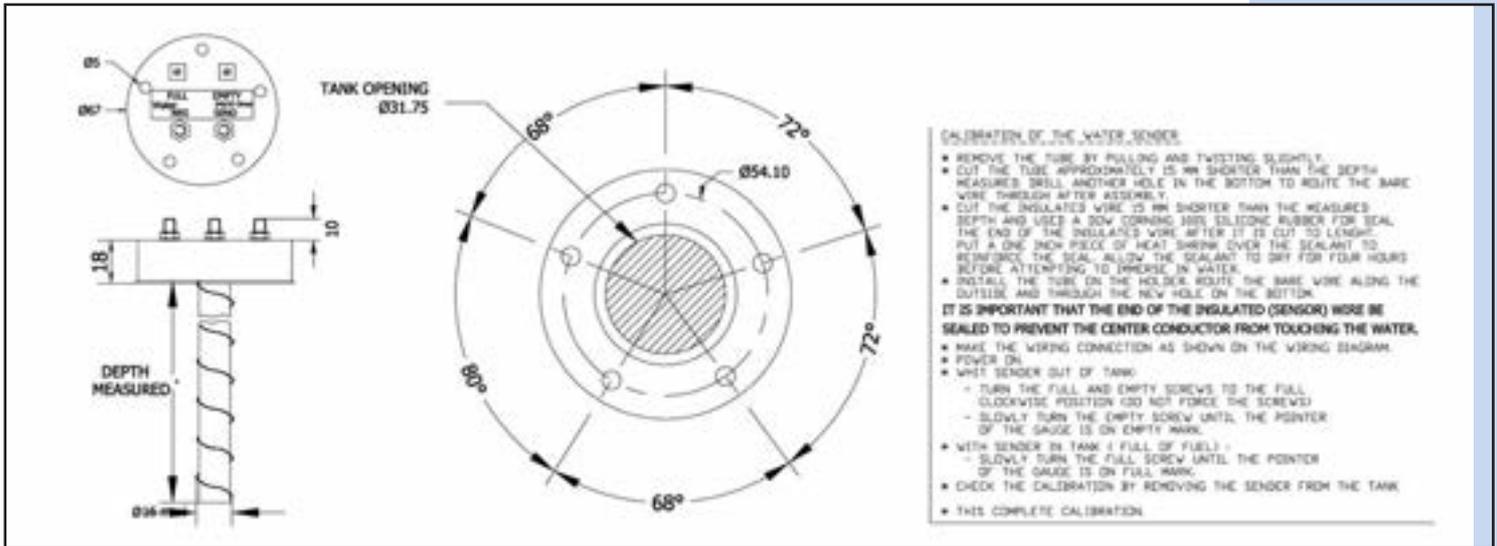


For signal 4-20mA and 0-10V please contact us.

Accessories for gauges

- Light kit 12 V : **P/N 13.2643**
- Light kit 24 V : **P/N 13.2322**
- Voltage adapter 24 V
(connection page 18) : **P/N 13.0760**
- Water resistant gasket
for 52mm diameter gauge : **P/N 13.0545**





Level switches water, fuel

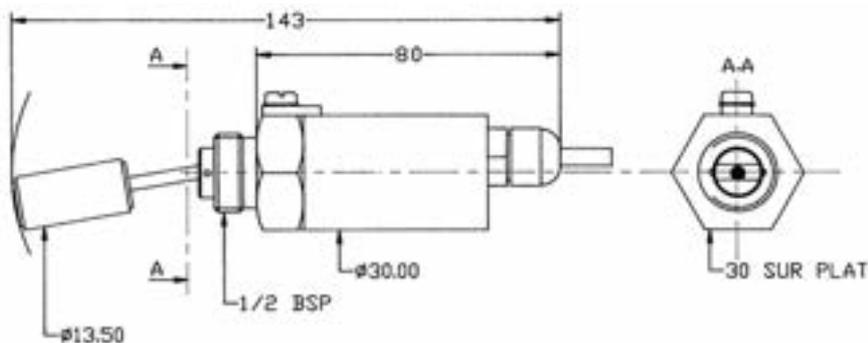
Horizontal level switch

- Contact NO or NC
- Thread: 1 / 2" BSP
- Material : stainless steel
- Current rating: 0,5A



P/N 16.1102

Dimensions



To protect the contact effects of self; a diode type 4007 must be mounted in parallel across the relay coil.

Level switches for water, fuel, and oil

Horizontal fitting

- Material : stainless steel
- Contact NO or NC
- Operating temperature: 120°C max
- Thread: 1 / 2" NPT
- Current rating: 0,5A



P/N 16.3277

- Material: polyamid
- Contact NO or NC
- Thread: 1 / 2" NPT
- Operating temperature: 80°C max
- Current rating: 0,5A



P/N 16.2715

- Material : polyamid
- Operating temperature: 80°C max
- Grommet (hole diameter 23mm)
- Current rating: 0,5A



P/N 16.4377

Cap gauges

- 1/4 turn fitting.

P/N	Length	Thread adapter
16.1775	200 mm	1/4"
16.1213	254 mm	1/4"
16.2096	267 mm	1/4"
16.1353	318 mm	1/4"
16.0686	419 mm	1/4"



Bayonet adapter 1 / 4" : **P/N 16.1454**

Minimum quantity required

Please ask for any other length.

Multi-contact Level Switches

Vertical mounting for water, fuel and oil

- Type LM70
- 1 to 4 contacts (1 common for 4 contacts),
- Power maxi : 10 W
- Current maxi. : 0,5 A
- Voltage maxi : 200 Vcc
- Waterproof connector for 1 or 2 contacts, cable output for 3 to 4 contacts.

- Type of contact: NO or NC (specify with the order)
- Thread : 1" BSP (NEW additional thread : M18x1.50)
- Maximum operating temperature: +110°C

1N4007 diode must be parallel mounted on the coil relay to protect the module against the self effects.



Contact us for more contacts

Please send a drawing with your order (next page)

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· Level switch LM70

How to order :

Please specify:

- Total length
- Switch contact level
- NO or NC switch
- Fitting from the top or the bottom of the tank

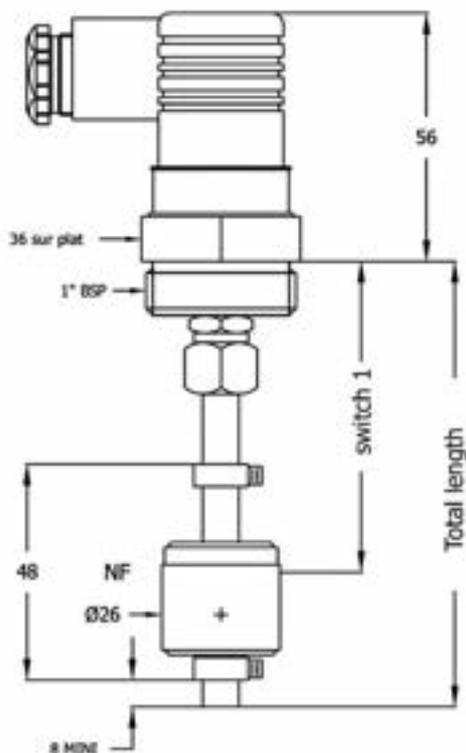
Construction :

- Tube and adaptors : brass
- Float : buna-N
- Strap : stainless steel

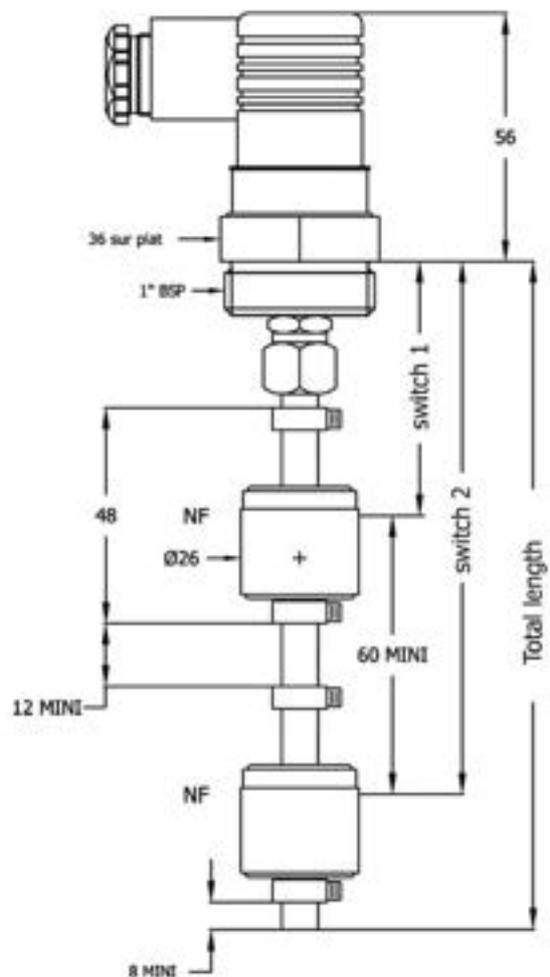
Connection :

- Switch 1 : 1 & 3
- Switch 2 : 2 & (logo masse)

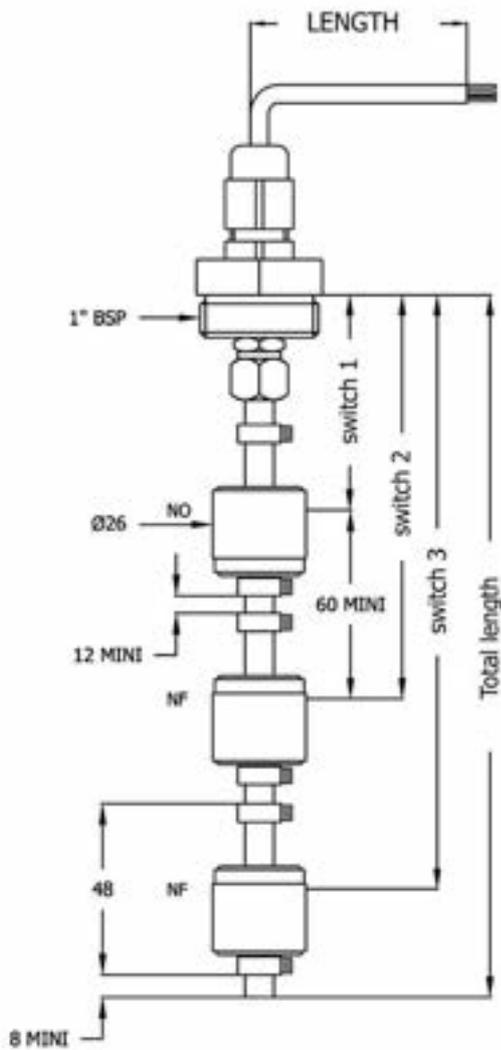
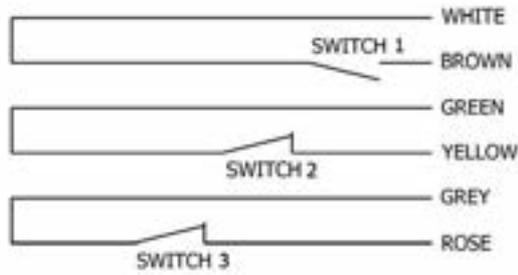
LM70 1 SWITCH



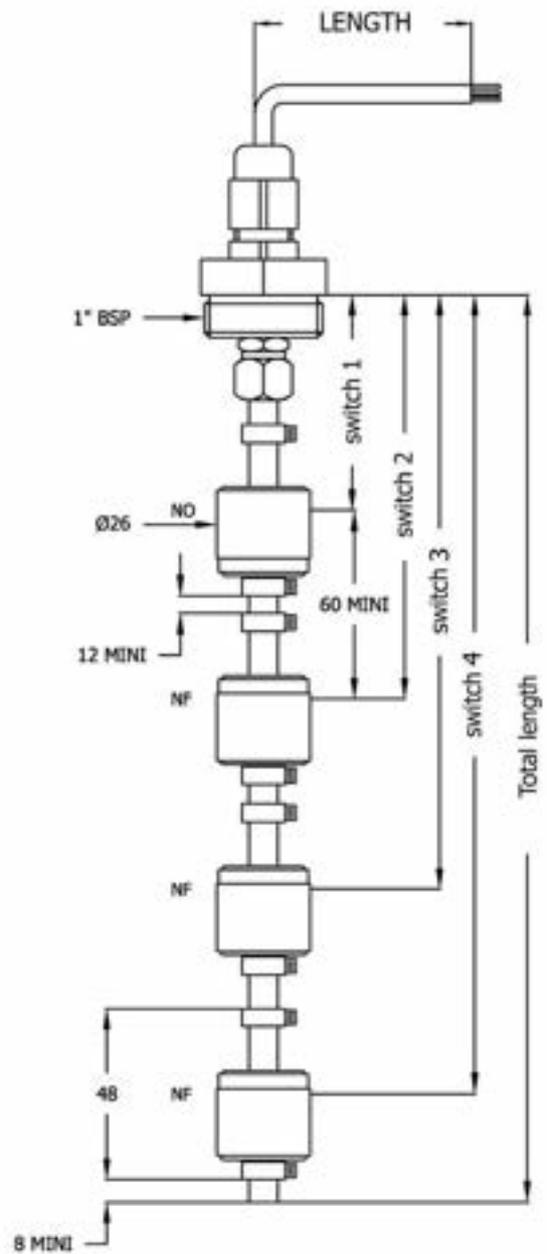
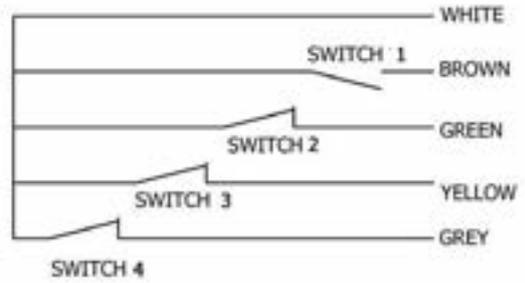
LM70 2 SWITCHES



LM70 3 SWITCHES



LM70 SWITCHES 6 wires maximum



Capacitive liquid level switch

Water capacitive level switch

- No moving parts, fully electronic
- Designed for heavy duty appliances
- Alarm delay time : 10 seconds to avoid liquid turbulence
- Easy to install : horizontal or vertical mounting
- Insulated
- Operating temperature : -40°C to 130°C

Detection "lack of liquid" (available also with detection « presence of liquid », please contact us)

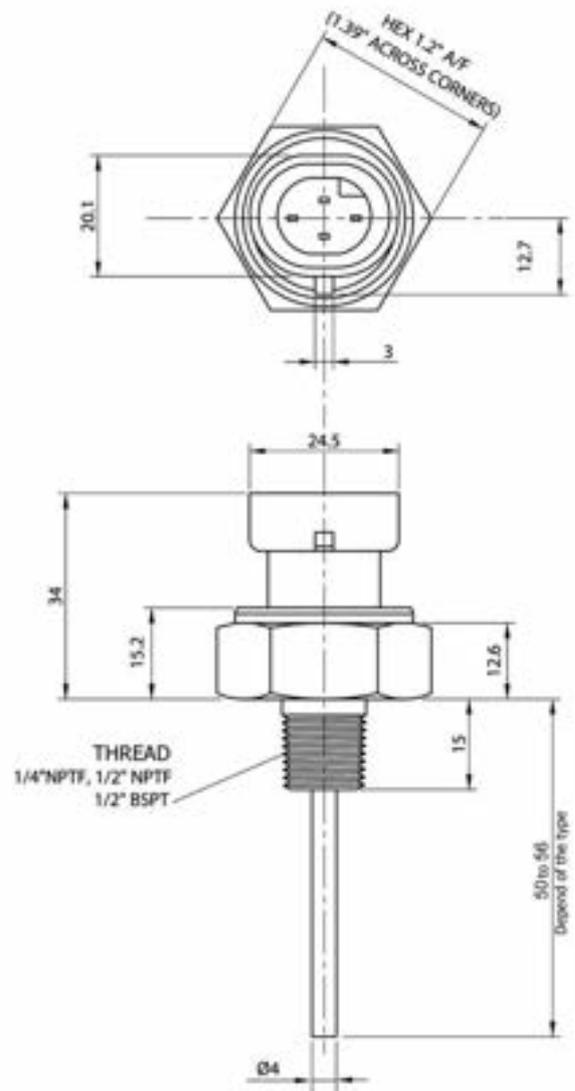
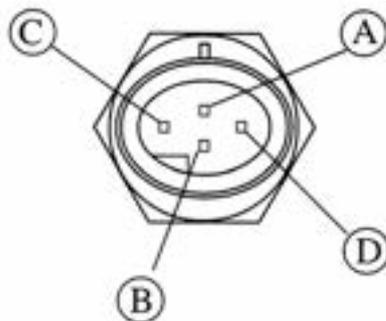


Thread	P/N
1/4" NPTF	16.5358
1/2" NPTF	16.5359
14 x 1.50	16.3284-A

Connector kit: **P/N 16.5366**

Connection :

- A : Option
- B : -
- C : + (12/24 Vdc)
- D : Transistor switched to GND

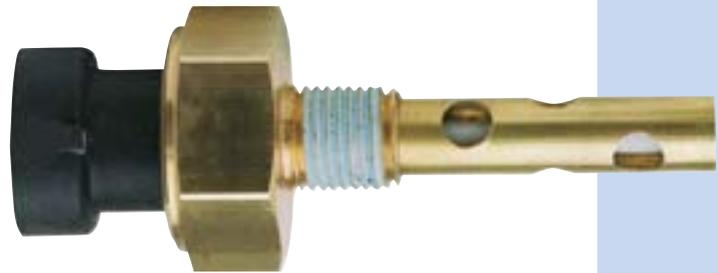


Oil and fuel capacitive level switch

- No moving parts, fully electronic
- Designed for heavy duty appliances
- Alarm delay time : 10 seconds to avoid liquid turbulence
- Easy to install (horizontal or vertical mounting)
- Earth return
- Operating temperature : -40°C to 130°C

Detection « lack of liquid » (also available : detection « presence of liquid », contact us)

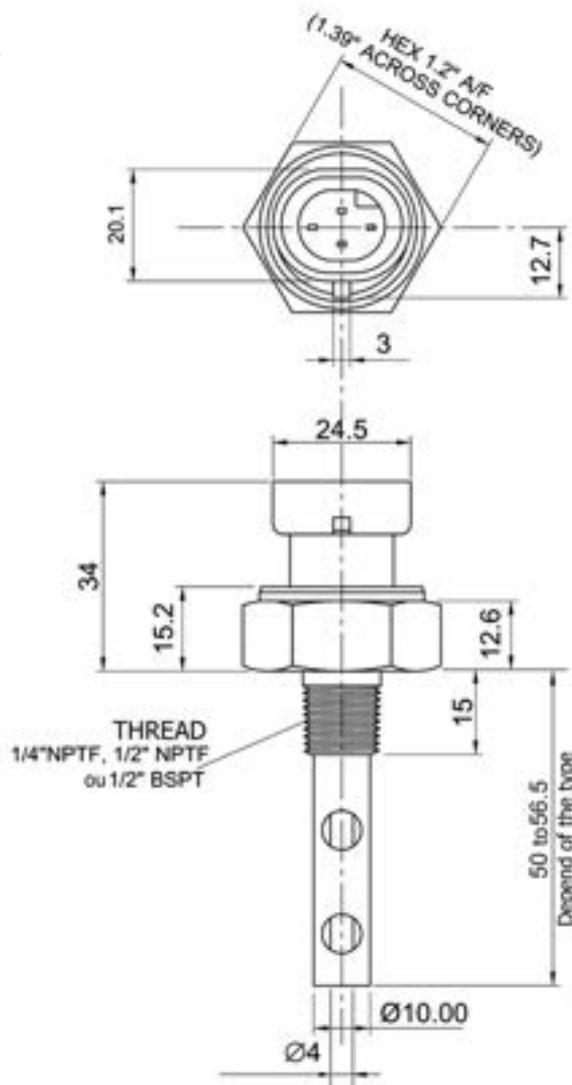
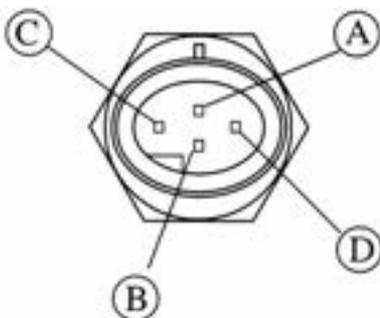
Thread	P/N
1/4" NPTF	16.5361
1/2" NPTF	16.5362



Connector kit : **P/N 16.5366**

Connection :

- A : Option
- B : -
- C : + (12/24 Vdc)
- D : Transistor switched to GND

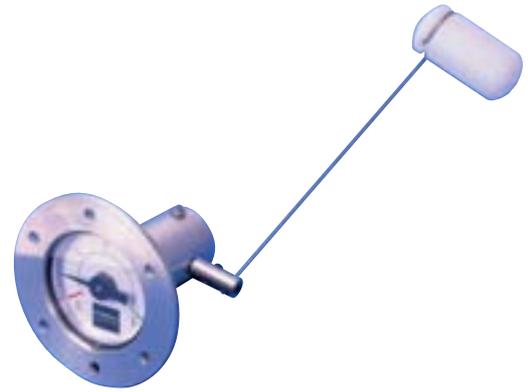


Level gauges direct reading

Horizontal mechanical level

- Mounting horizontal side of the tank
- Size of the tank : 200 to 1000mm

P/N 16.2346

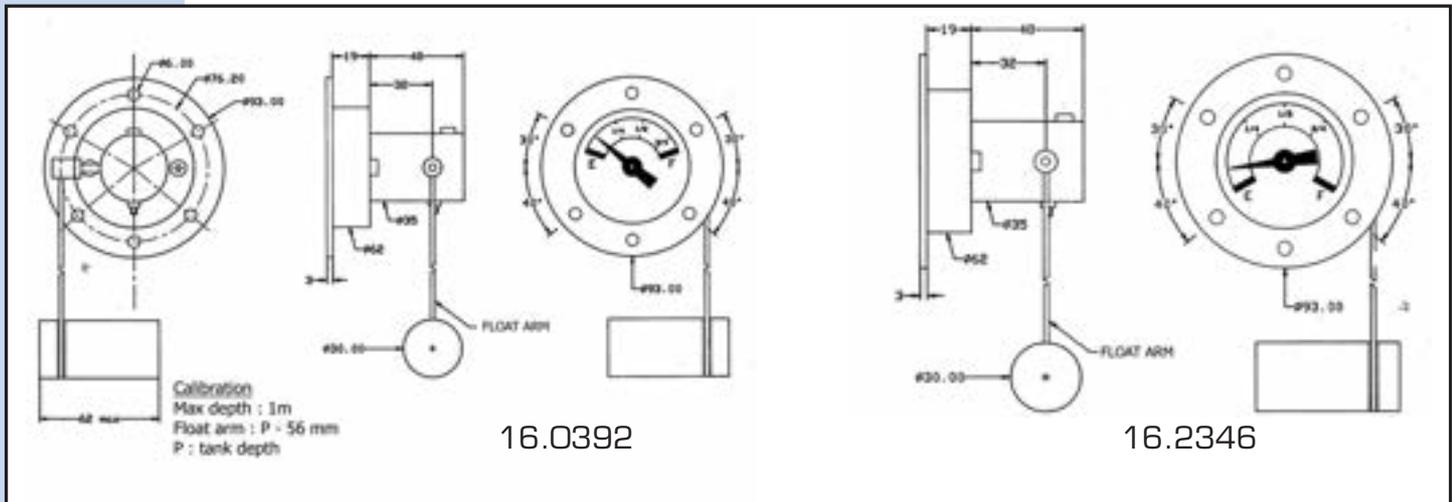


Vertical mechanical level

- Mounting vertical side of the tank
- Size of the tank : 100mm to 1400mm

P/N 16.0392

Dimensions



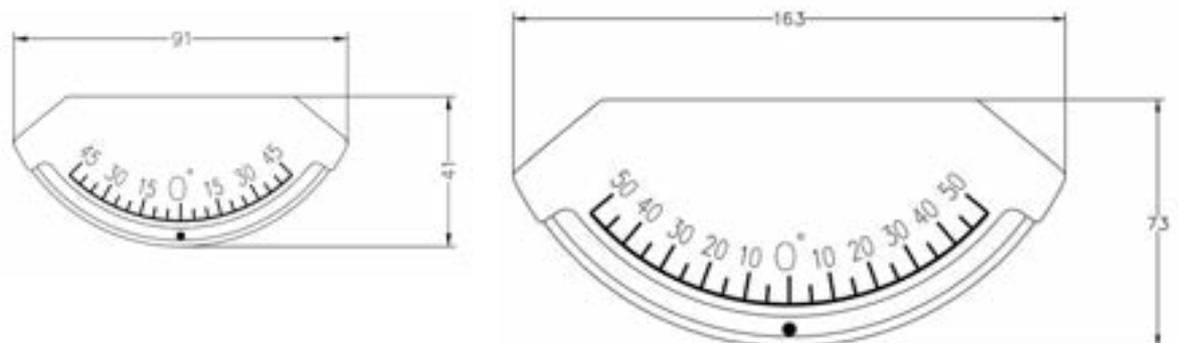
Inclinometers

· Large : **P/N 16.0146**

· Small : **P/N 16.0122**



Dimensions



VDO match gauges

Water temperature gauge

· Dual scale : 40-120°C / 100-250°F **P/N 14.2862**



Oil temperature gauge

· Dual scale : 50-150°C / 140-300°F **P/N 14.5287**



Pressure gauges

· Single scale : 0-5B **P/N 15.1600**

· Dual scale : 0-10B / 0-150PSI **P/N 15.2861**

· Single scale : 0-25B **P/N 15.1602**



Level gauge

P/N 16.1641



Accessories

· Light kit 12 Volts : **P/N 13.2643**

· Light kit 24 Volts : **P/N 13.2322**

· Water resistant gasket 52mm diameter : **P/N 13.0545**

· Adapter connection VDO : **P/N 13.2107**

· Voltage adapter 24V : **P/N 13.0760**
(connection page 18)



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Insulated senders for VDO match gauges

Insulated temperature senders 1/8" NPTF

· 40-120°C **P/N 14.1657**

· 50-150°C **P/N 14.1658**



Earth return temperature sender 1/8" NPTF

· 40-120°C **P/N 14.5498**

Insulated pressure sender 1/8" NPTF

· 0-5 bars **P/N 15.1655**

· 0-10 bars **P/N 15.1656**

· 0-25 bars **P/N 15.0159**



Thread adaptors page 26

Insulated level sender

· For tank depths 150 to 600mm :

P/N 16.1654

*Pressure and temperature senders
with alarm VDO match.
Please contact us.*



Electronic switch module for gauge VDO match

- Mounted at the rear of the gauge (see page 50)
- Rail DIN mounting (see page 51)

AST JORDA gauges

Standard level

- Fuel level gauge
- 12V
- 52mm diameter

P/N 16.2478



- Fuel level gauge
- 24V
- 52mm diameter

P/N 16.2476

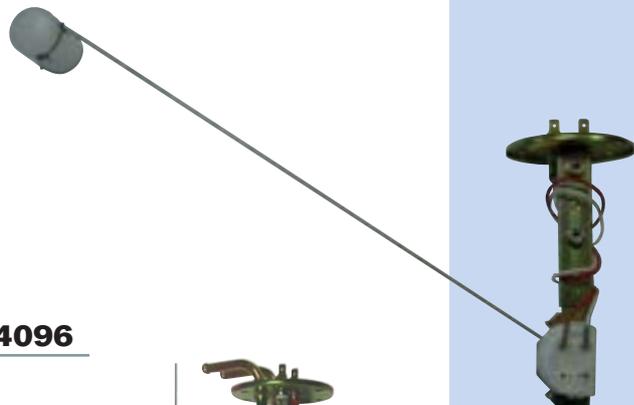
- Fuel level sender
- Adjustable 250 to 390mm
- 5 holes flange
- 12/24V
- Jaeger match in 12V (exclusively)
- Earth return
- Low level alarm

P/N 16.2515



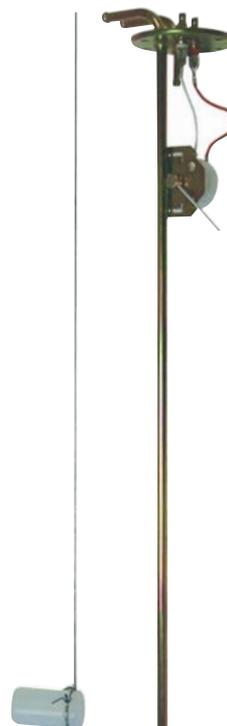
- Fuel level sender
- Adjustable 250 to 390mm
- 6 holes flange
- 12/24V
- Jaeger match in 12V (exclusively)
- Earth return
- Low level alarm

P/N 16.4096



- Fuel level sender
- Adjustable 155 to 560mm
- 5 holes flange
- 12/24V
- Jaeger match in 12V (exclusively)
- Earth return
- With pipes
- Low level alarm

P/N 16.4874

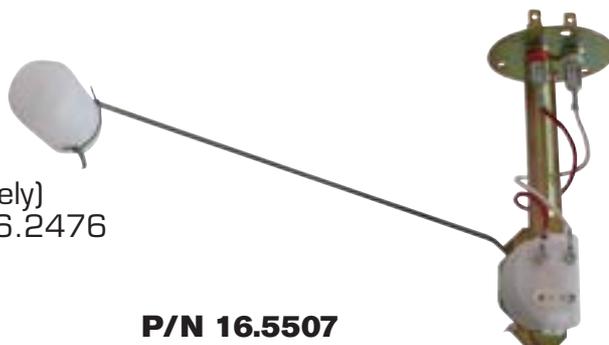


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Specific level

- Fuel level sender
- 340mm
- 3 holes flange
- 24V
- Jaeger match in 24V (exclusively)
- Do not work with the gauge 16.2476
- Earth return
- Low level alarm



P/N 16.5507

- Fuel level sender
- 600mm
- 3 holes flange
- 24V
- Jaeger match in 24V (exclusively)
- Do not work with the gauge 16.2476
- Earth return



P/N 16.5697

Temperature

- Temperature gauge 40-120°C 52mm diameter



- 12 Volts

P/N 14.2470

- 24 Volts

P/N 14.2469

- Contact temperature sender 40-120°C, earth return

P/N 14.2500



Earth return temperature senders :

40-120°C	1/2" NPTF	M14x150	M16x150	M18x150
	14.5305	14.4406	14.4636	14.2505



Pressure

Pressure gauges 52mm diameter

	0-6B	0-8B	0-10B
12V	15.5551	15.2486	15.3240
24V	/	15.2485	15.4279



Earth return pressure senders

- 0-6 Bars 10x100

P/N 15.5552

- 0-8 Bars 10x100

P/N 15.4084

Tacho-hourmeters 80mm diameter

· Tacho-hourmeter 4000RPM / W alternator 12VDC
P/N 30.4120

· Tacho-hourmeter 4000RPM / W alternator 24VDC
P/N 30.3233

· Tacho-hourmeter 3000RPM / W alternator 12VDC
P/N 30.4705

· Tacho-hourmeter 3000RPM / W alternator 24VDC
P/N 30.5880



Square Tacho-hourmeters 100x100mm

· Tacho-hourmeter 4000RPM / W alternator 12VDC
P/N 30.2518

· Tacho-hourmeter 3000RPM / W alternator 24VDC
P/N 30.3026



**We can supply tachometers
and tacho-hourmeters with diameters
80mm, 100mm or 100x100mm.
Please contact us.**

Voltmeter AST Classic Serie (52mm diameter)

· 8-18 Volts
P/N 4136

· 16-36 Volts
P/N 4137



Accessories for 52mm diameter gauges excepting tachometer and range AST Jorda

· **Voltage adapter 24 Volts**

P/N 13.0760



· **Water resistant gasket**

P/N 13.0545



· **Chrome bezel**

P/N 13.0791



· **Mounting kit**

P/N 13.2286

· **Light kit**

12 Volts : P/N 13.2643

24 Volts : P/N 13.2322



· **Plastic washer
for insulated mounting**

P/N 13.0259



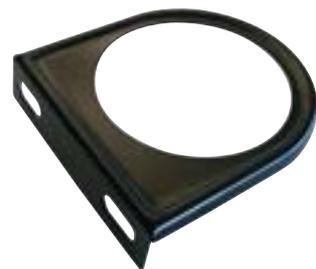
· **Molded socket**

P/N 13.0765



· **Plastic adapter
for 60mm diameter gauge**

P/N 13.0101



· **1 hole panel kit**

P/N 13.1439

Accessories for tachometer 52mm diameter (see page 59)

Digital display pressure or temperature gauges

Features

- Mounting hole : 86mm
- 4-digit LCD, 13mm high, great contrast, retro-light included
- Water-resistant front
- Shock and vibration resistant
- Operating temperature : 0+50°C

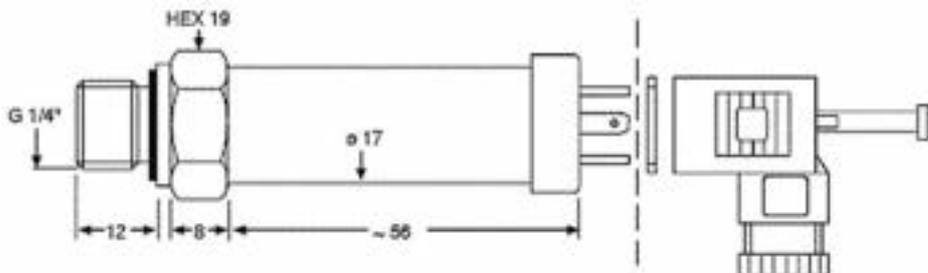
Digital pressure gauge

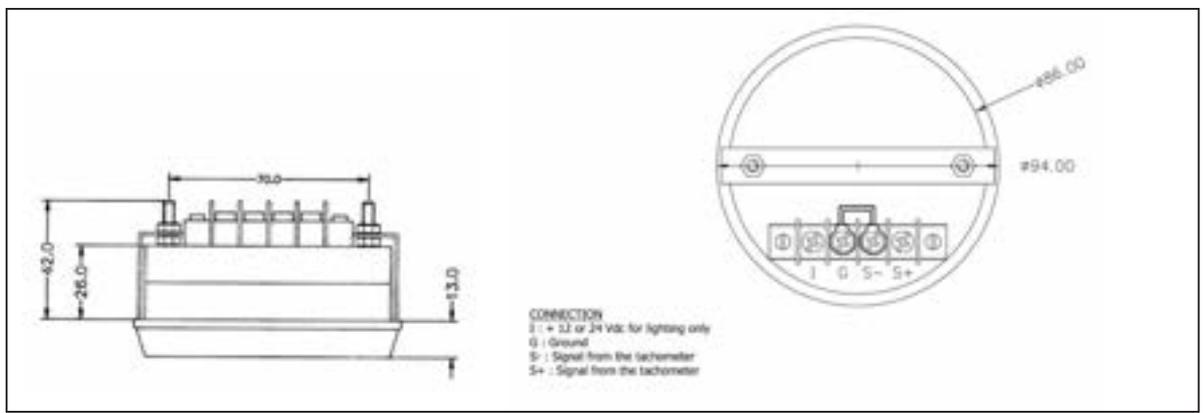
- Type LM40
- Pressure range : 0.1 to 600B, on demand
- Comma point if requested
- Current consumption 23mA / 12Vdc
- Current consumption 52mA / 24Vdc
- Signal input : 0-10Vdc
- (With power input 12Vdc (+/- 10%) : input signal 0-5Vdc or 0-4Vdc)
- Power input : +24Vdc +/-10%
- Retro-light included



Pressure gauges type LM40 works with pressure sender 0-10V

Measuring range	LM40 P/N	Sender P/N	Switch type
0-5 B	15.5187	15.5188	RG51
0-10 B	15.1666	15.1768	RG51
0-40 B	15.4129	15.2868	RG51
0-400 B	15.4869	15.1791	RG51





Digital temperature gauge PT100

- Type LM26 PT100
- Temperature range : -50°C to +400°C
- 3 measures per second
- Temperature derive : 0.05°C per °C at 25°C
- Accuracy : +/- 1% of the read out
- Current consumption : 23mA / 12Vdc
- Current consumption : 73mA / 24Vdc
- Power input +12Vdc or +24Vdc +/-10%
- Retro-light included



P/N 14.4403

Temperature sender PT100 :

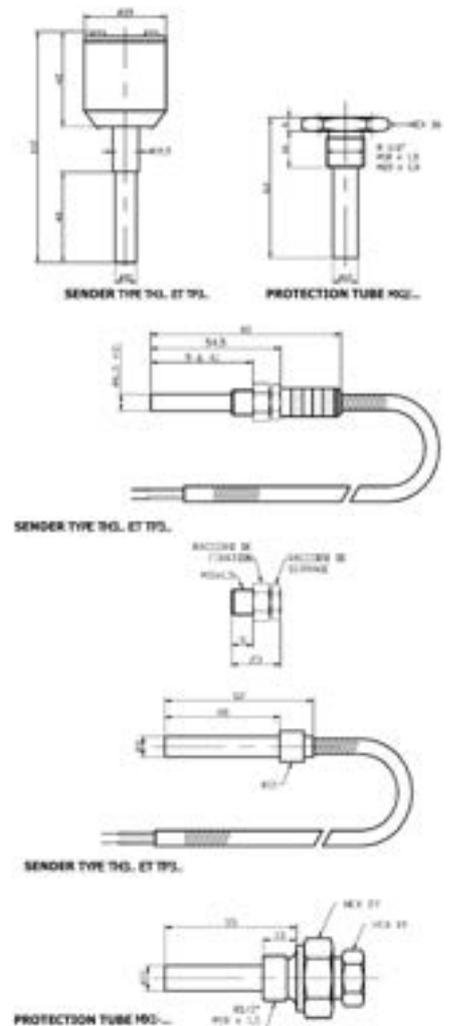
0-120°C	Type	P/N
	TP31	40.1786

Protection tube G 1/2	Type	P/N
	MX2-R12	40.0726
	MX2-M18	40.0724
Protection tube M18x150	MX2-M20	40.1364

0-200°C	Type	P/N
	TP13	40.1124

0-200°C	Type	P/N
	TP23	40.1126

Protection tube G 1/2	Type	P/N
	MX1-R12	40.0723
	Protection tube M18x150 MX1-M18	40.0722
	Protection tube M20x150 MX1-M20	40.1323
Protection tube M16x150	40.2586	



Digital temperature gauge

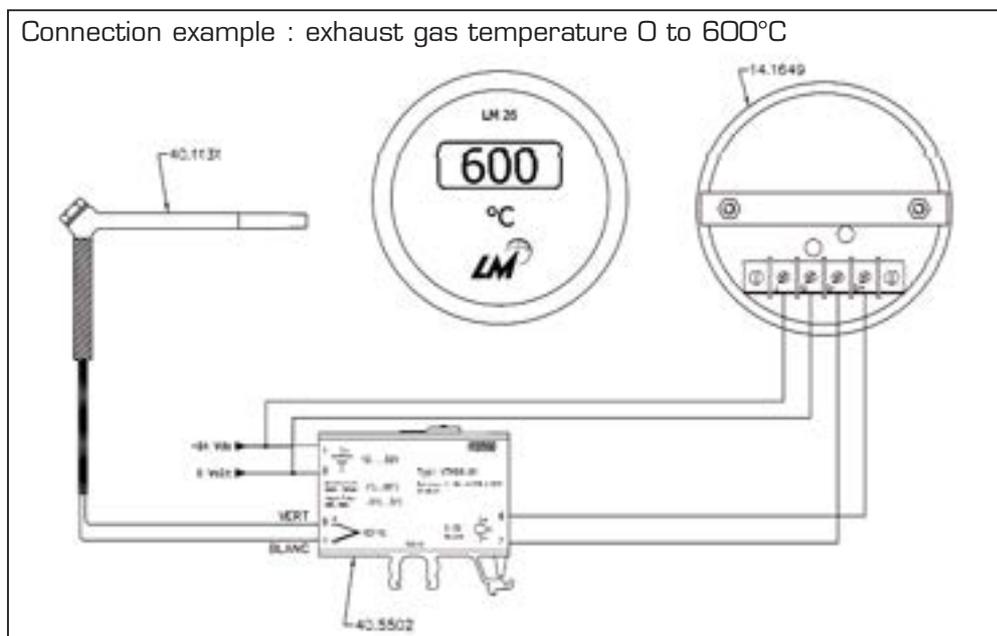
- Type LM26
- Temperature range : 0-150°C, 0-600°C, 0-800°C
- Accuracy : 0.5% of the read out
- Current consumption : 23mA/12Vdc
- Current consumption : 52mA / 24Vdc
- Input signal : 0-10Vdc
- (With power input 12Vdc (+/- 10%) :
input signal 0-5Vdc or 0-4Vdc)
- Power input : +24Vdc +/-10%
- Retro-light included



Digital temperature gauge LM26 works with senders and converters below :

Temperature Gauges	Gauge P/N	Sender P/N	Converter P/N	Switch type
0-150° C	14.2819	40.1126	VP51-G1	RG51
0-600° C	14.1649	40.1131	VTK58-G1	RG51
0-800° C	14.1647	40.1131	VTK59-G1	RG51

- Thread adaptors for 40.1126 page 48 / for 40.1131 page 82



ELECTRONIC SWITCH MODULE FOR 52MM DIAMETER GAUGES

The electronic switch module can be used with 52mm diameter gauges to manage one or several switch set points.

Applications :

- Pre-alarm for pressure, temperature, level
- Manage a pump for tank automatic filling

Information required :

- Application
- Number of switches
- Mounting

Direct mounting electronic switch module

To be mounted directly at the rear of the gauge.

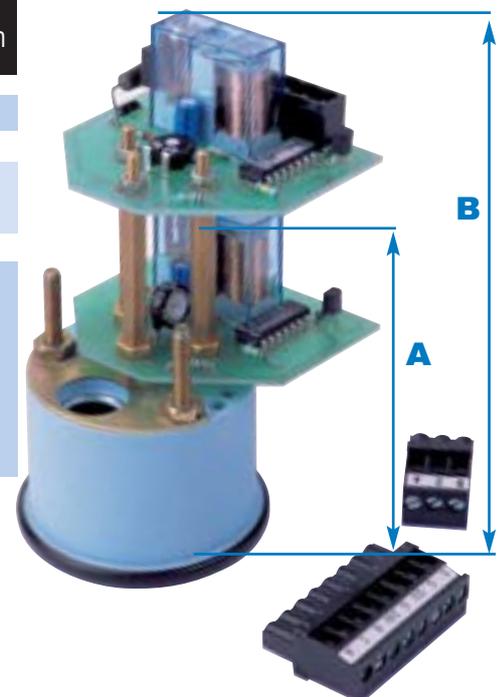


Specifications :

- Power input : 12 to 24VDC
- Current : 110mA
- Switching current : 6A/24Vdc
- Operating temperature : -10°C to +50°C

- Mounting on Datcon gauge :

	Mounting gauge signal Datcon	Mounting gauge signal VDO match
1 switch	20.0564	20.3025
1 switch adjustable reset differential	20.2190	20.5521
2 switches set :		
· 1st switch	20.0567	20.3173
· 2nd switch	20.0569	20.3174
· mounting kit	20.0571	20.0571



Required depth :

- A (1 switch) : 70mm
- B (2 switches) : 115mm

Din Rail switch module

Features :

- Operating voltage : 12 to 24Vdc
- current : 110mA
- Switching capacity : 6A / 24Vdc
- 1 contact close on rise
- Operating temperature : -10°C to +50°C
- Dimensions : 90x53x58mm



	Work with gauge	Work without gauge
1 switch Module (Datcon Match)	20.5485	20.5486
1 switch Module (Datcon Match) adjustable reset differential	20.2654*	20.2653*
Module 1 switch (VDO Match)	20.5487	20.5488

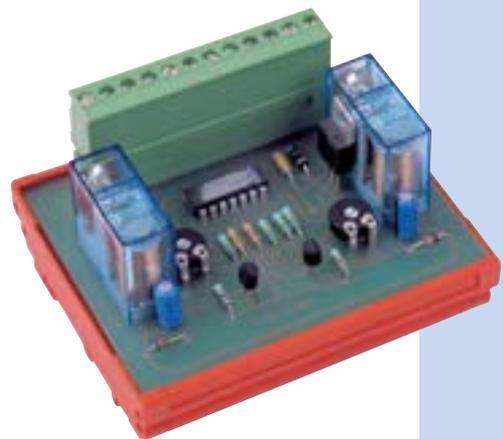
* Pre-alarm only for pressure and level

DIN Rail 2 switches module

Electronic 2 switches (adjustable) module (2 x NONC) for pressure, temperature or level.
DIN rail mounting.

Features :

- Operating voltage : 12Vdc or 24Vdc
- Power input :
 - 12Vdc I=95mA
 - 24Vdc I = 110mA
- Switching capacity : 6A / 24Vdc
- Operating temperature : -10°C to +50°C
- Dimensions : 75x89mm



	Work with gauge	Work without gauge
2 switches Module, 12V (Datcon Match)	20.2209	20.2657
2 switches Module, 24V (Datcon Match)	20.2210	20.2658

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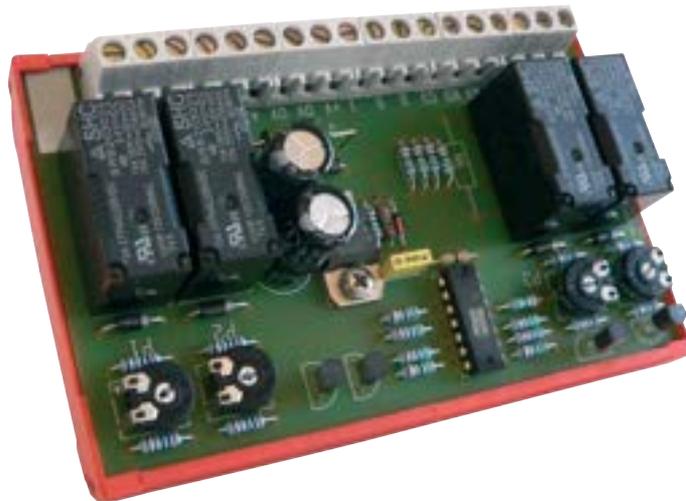
DIN rail 4 switches module

Electronic 4 switches (adjustable) module (2 x NONC) for pressure, temperature or level.
DIN rail mounting.

Features :

- Operating voltage : 12Vdc or 24Vdc
- Power input :
 - 12Vdc I = 220mA
 - 24Vdc I = 142mA
- Switching capacity : 6A/24Vdc
- Operating temperature : -10°C to +50°C
- Dimensions : 75x114mm

	Work with gauge	Work without gauge
4 switches Module, 12V (Datcon Match)	20.2655	20.2659
4 switches Module, 24V (Datcon Match)	20.2066	20.2660



Please contact us for any specific module request.

Testing module

- Type LM18
- Replace the sender signal in order to check that the switch modules and the gauges are working properly.

P/N 20.0508



TACHOMETERS AND SPEEDOMETERS

Tachometers and analogical tacho-hourmeters 86mm diameter

General outlook

- Pointer : as voltage is applied the pointer will snap to zero
- Mounting hole : 86mm diameter
- Mounting position : any
- Glass fiber reinforced plastic housing, shock-resistant
- Water-resistant front
- Glass lens
- White-on-black lettering / symbols
- SAE anodized aluminium bezel
- Terminals : 6.32 threads
- Installation hardware : mounting brackets and nuts
 - Standard scale : 600, 1200, 1500, 2000, 3000, 4000, 6000, 8000 RPM.



Other silkscreen printings (serigraphy) on demand.

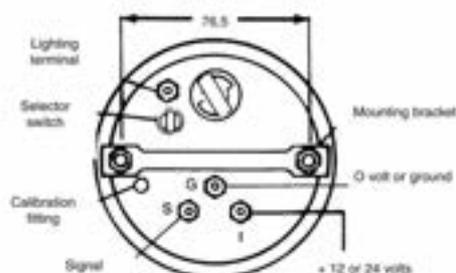
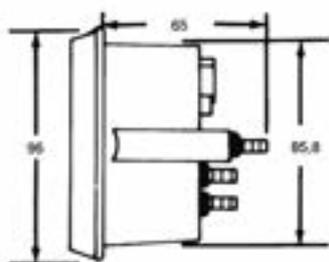
Features :

- Sealing class : IP65 in front
- Operating voltage from 12 to 32 Vdc
- 270° pointer sweep
- Digit : 9999,99 hours
- Operating temperature : -40°C to +85°C
- Connection :
 - W terminal of the alternator
 - Coil ignition
 - Magnetic sensor
 - Pulse generator

Calibration tachometer :

- Engine or machine running at a constant speed
- Read out with a portable tachometer P/N : 19.0369 (page 70)
- When voltage is applied first use the selector switch on the back of the instrument (only 4, 6 and 8 position, don't use A and B position)
- To make final adjustment, use a 2mm hex wrench on « CAL » calibration potentiometer fitting.
- Pointer fall to zero quickly and after go back at the same position. The calibration has succeeded. (If the pointer doesn't fall to zero quickly, the calibration is a failure, try again.)

Sizes and connections



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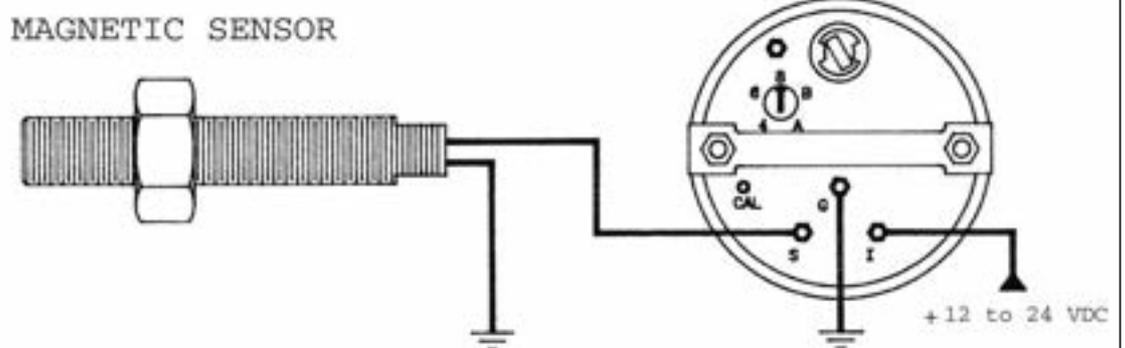
www.lminstrumentation.fr

Connection on a magnetic sensor

Tachometers			Tacho-hourmeters		
Scale	0-3000 RPM	0-4000 RPM	0-3000 RPM	0-4000 RPM	0-6000 RPM
4 to 16 teeth	30.0860	30.0861	30.0867	30.0868	30.1663
15 to 30 teeth	30.0869	30.0870	30.0871	30.0872	
90 to 180 teeth	30.0857	30.0858	30.0865	30.0866	

4 to 30 teeth : use just magnetic sensor P/N 30.0616.
 For any special scale : please contact us
 Magnetic sensor : see page 61

Connection :



Connection on the W terminal of the alternator

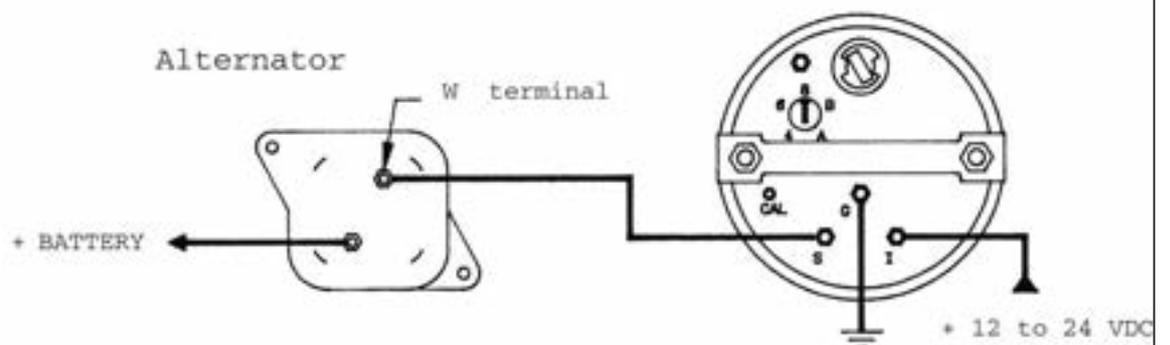
Tachometers				Tacho-hourmeters		
Scale	0-3000 RPM	0-4000 RPM	0-6000 RPM	0-3000 RPM	0-4000 RPM	0-6000 RPM
P/N	30.0853	30.0854	30.0837	30.0862	30.0863	30.1673

Palley ratio:

- 4 poles : 2.7 to 5.3
- 6 poles : 1.8 to 3.5
- 7 poles : 1.6 to 3
- 8 poles : 1.4 to 2.6

For any special scale : please contact us

Connection :



Connection on tachogenerator 60 poles

Tachometers

Scale	3000 RPM	0-4000 RPM
P/N	30.0869	30.0870

Tacho-hourmeters

0-3000 RPM	0-4000 RPM
30.0871	30.0872

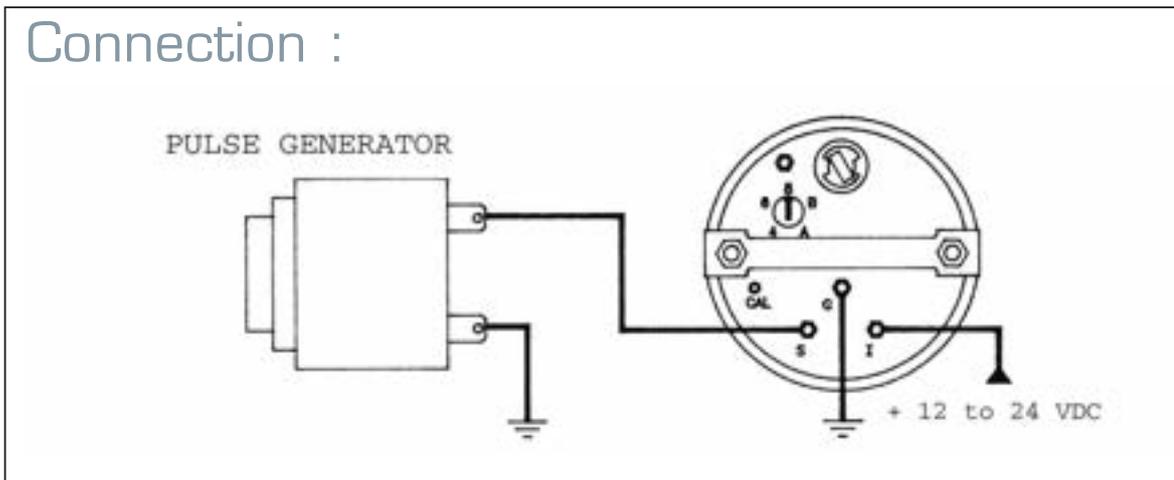
Ratio:

· 1/2 selector switch on 4

· 1/1 selector switch on 8

For any special scale : please contact us

Connection :



Connection on fuel engine with coil ignition device.

Tachometers

Scale	0-3000 RPM	0-4000 RPM	0-6000 RPM	0-8000 RPM
P/N	30.2173	30.0814	30.0855	30.0856

Tacho-hourmeters

0-3000 RPM	0-4000 RPM	0-6000 RPM
30.0635	30.0864	30.1634

4 cycles :

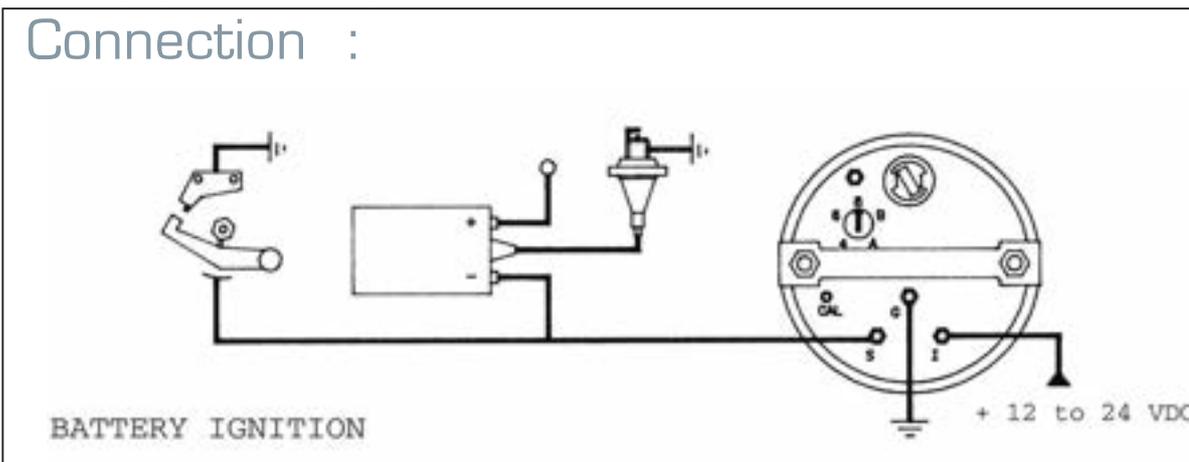
- 4 cylinders : selector switch on 4
- 6 cylinders : selector switch on 6
- 8 cylinders : selector switch on 8

2 cycles :

- 2 cylinders : selector switch on 4
- 3 cylinders : selector switch on 6
- 4 cylinders : selector switch on 8

For any special scale : please contact us

Connection :



Accessories for 86mm diameter range

Water-resistant gasket

P/N 13.0546



Chrome bezel

P/N 13.0801



Mounting kit

P/N 13.0816



Light kits :

· 12 Volts : **P/N 13.2321**

· 24 Volts : **P/N 13.2320**



Molded socket

P/N 13.0765



Tachometer 52mm diameter

Smaller part, 270° pointer sweep, signal input from pick up or W alternator.

Features

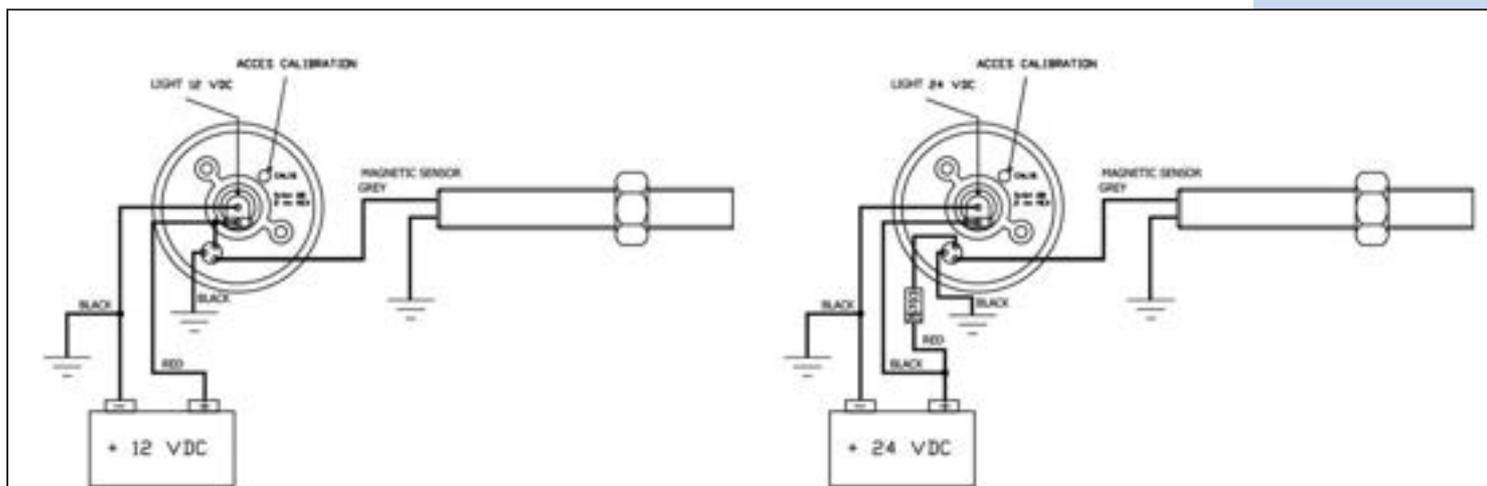
- Protection : IP65 in front
- Operating voltage 12VDC or 24VDC
- Light kit integrated



Connection on a magnetic sensor

Scale	0-3000 RPM		0-4000 RPM	
	12VDC	24VDC	12VDC	24VDC
7 to 16 teeth	30.5512	30.6286	30.5514	30.6289
15 to 30 teeth	30.5513	30.6287	30.5515	30.6290
90 to 180 teeth	30.5014	30.6288	30.5581	30.6291

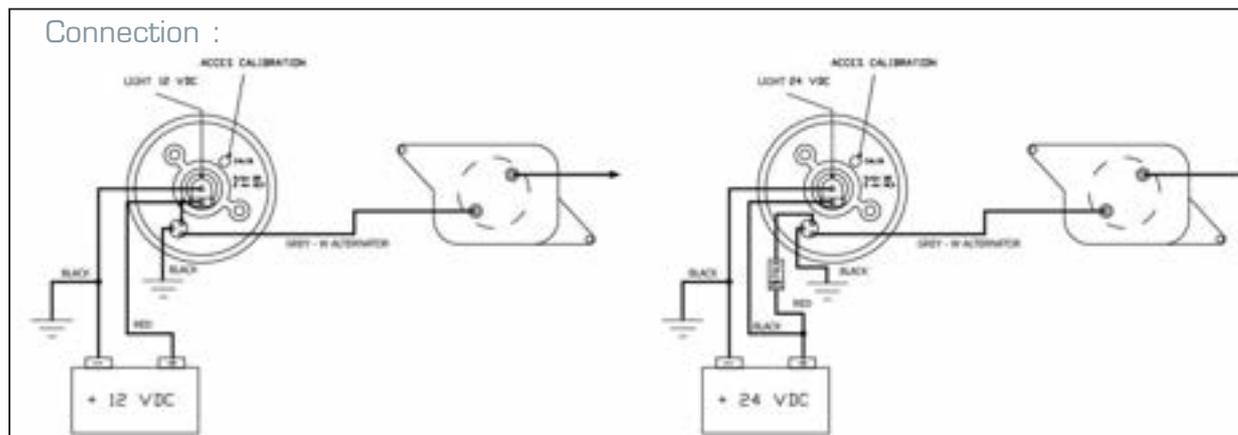
Connection :



Connection on the W terminal of the alternator

Scale	0-3000 RPM		0-4000 RPM		0-6000 RPM	
	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
P/N	30.5516	30.5230	30.5517	30.6284	30.5518	30.6285

Connection :

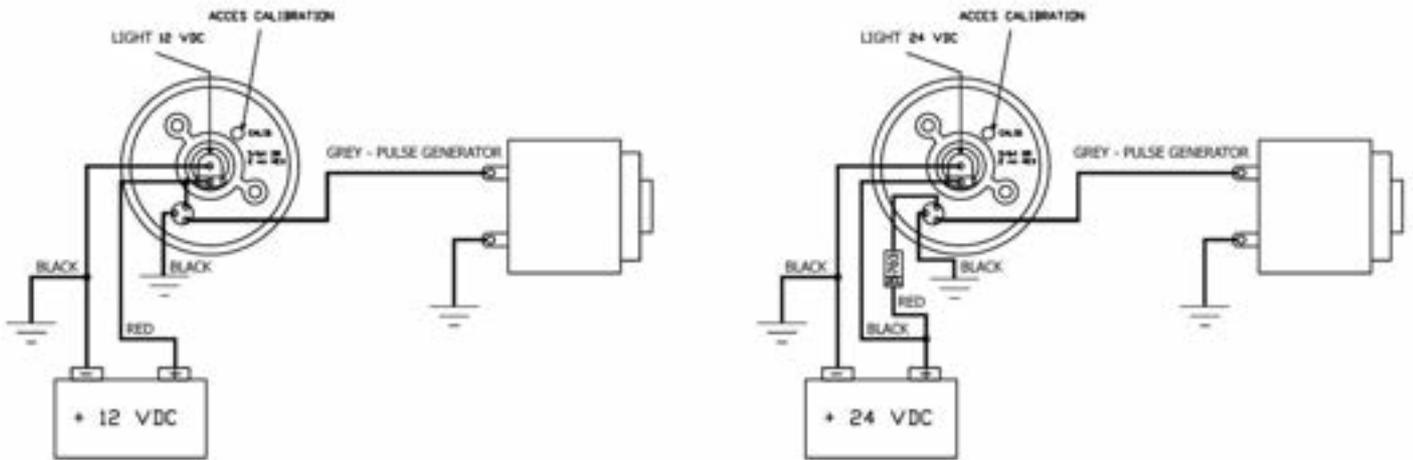


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Connection on tachogenerator

Scale	0-3000 RPM		0-4000 RPM	
	12VDC	24VDC	12VDC	24VDC
P/N	30.5519	30.6292	30.5520	30.6293

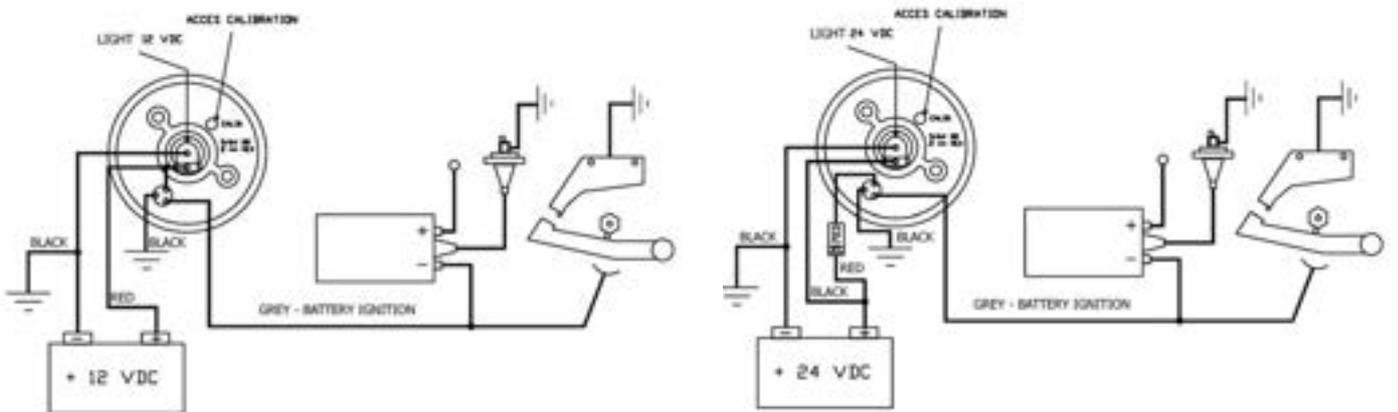
Connection :



Connection on fuel engine with coil ignition device

Scale	0-3000 RPM		0-4000 RPM		0-6000 RPM		0-8000 RPM	
	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
P/N	30.6283	30.6294	30.5745	30.6295	30.6282	30.6296	30.5264	30.6297

Connection :



For tachometers and tacho-hourmeters 80mm diameter and 100x100mm : see page 45 (AST)

Accessories for 52mm diameter tachometer

Water resistant gasket

P/N 13.0545



Chrome bezel :

P/N 13.0791



Plastic adapter for 60mm diameter

P/N 13.0101



1 hole panel kit

P/N 13.1439



Analogical speedometers

Speedometers with or without odometer

- Mounting hole : 86mm
- Sizes : same of tachometer (see page 53)
- 270° pointer sweep
- Operating voltage : 12 to 32 Vdc
- Signal source : magnetic or inductive sensor or tachogenerator

Specification of the speedometer according to :

- Maximum speed
- Diameter of the wheel
- Number of pulses read by the sender for 1 revolution



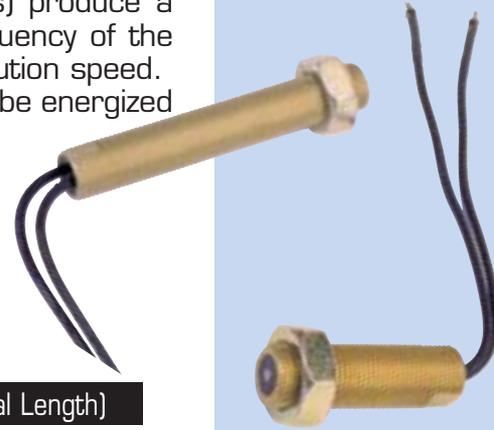
Contact us

Together we can specify your speedometer.

Magnetic sensors

How does a sensor work ?

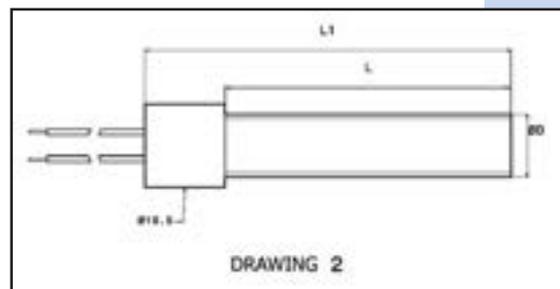
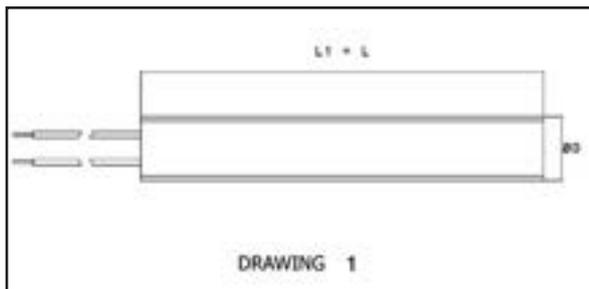
Sensors consists of a coil and a permanent magnet. Ferrous objects passing within the range of the magnet (teeth, screw heads, drilled holes) produce a varying magnetic field providing a signal through the coil. The frequency of the signal provided is proportional to the number of holes and the revolution speed. Several tachometers and speed limit switches type LM16 HRD may be energized by the same sensor.



P/N :

P/N	Thread	Drawing	L (Thread length)	L1 (Total Length)
30.1487	3/4" - 16 UNF	1	60	60
30.0808	3/4" - 16 UNF	1	100	100
30.0820	5/8" - 18 UNF	1	60	60
30.0821	5/8" - 18 UNF	1	100	100
30.5023	M16 X 1.5	2	40	60
30.4925	M16 X 1.5	2	80	100
30.5024	M18 X 1.5	2	40	60
30.4926	M18 X 1.5	2	80	100

Dimensions :



Sensors include 1 mounting nut.

Magnetic sensor for low speed

Magnetic sensor 3 / 4" 60mm

P/N 30.0616

Additional mounting nuts for sensors

Thread	P/N
3/4" - 16 UNF	30.0618
5/8" - 18 UNF	30.1892
M 16x150	30.4802
M 18x150	30.4927



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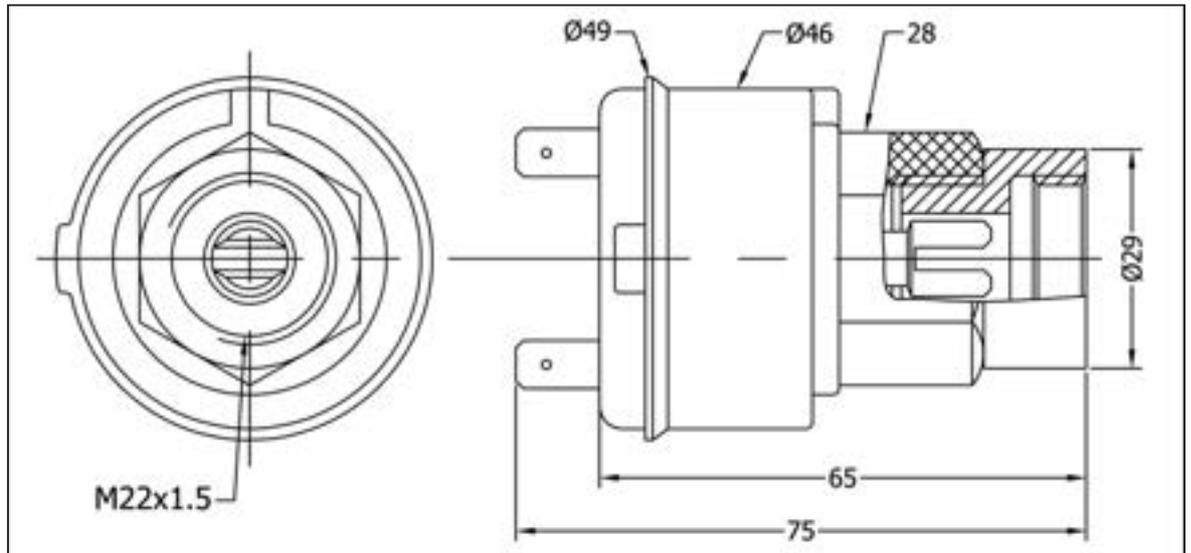
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Tacho generators

Features

- 30 pulses per revolution
- units ranging from 20 to 4000RPM
- Thread torque : 22.6 Newton meter
- Several tachometers and speed limit switches may be energized by the same generator
- Different connection and mounting types



Generator 60 pulses DIN 22x150

- Electrical connections : Faston 6.35mm
- Mechanical connection DIN22x150 female

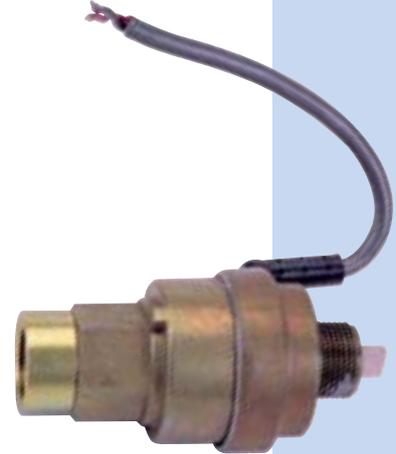
P/N 30.0700



Generator 60 pulses male female DIN 22x150

- Wires output
- Mechanical connection DIN22x150 male or female

P/N 30.1079



Generator 60 pulses for AC drive tang 7 / 8" – 18

- Electrical connections Faston 6.35mm
- Mechanical connection : AC drive tang

P/N 30.1073



Accessories

- AC drive tang 4mm diameter: **P/N : 30.1074**
- AC drive tang 5mm diameter: **P/N : 30.1075**
- AC drive tang 6mm diameter: **P/N : 30.1076**

Wide range of generator thread adapters in stock for multiple installations.



**For mechanical cable for tachometer or speedometer made :
please contact us.**

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Electronic speed switches without relay

The LM16 electronic speed switches are used to control the frequency of a signal from W alternator, tachogenerator or magnetic sensor.

Applications

- overspeed
- security on turning machines
- bus rear door locking, etc.

Type	P/N	Frequency
LM 16-2HRD	30.1545	12 Hz-68Hz
LM 16-3HRD	30.1546	69Hz-357Hz
LM 16-4HRD	30.1547	358Hz-1330Hz
LM 16-5HRD	30.1548	1331Hz-8000Hz
LM 16-51HRD	30.1549	5500Hz-10000Hz



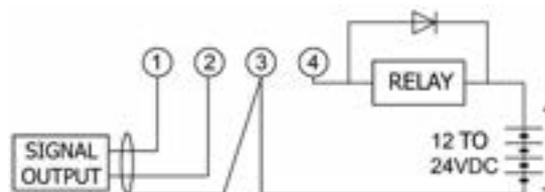
Features

- Minimum input signal : 0.7 VAC for 22Kohms.
- Operating voltage : 10 to 30 Vdc
- Output :
 - 12 volt relay, coil resistance from 14 to 330Ω
 - 24 volt relay, coil resistance from 28 to 1200Ω
- Switching capacity 1A dc maximum
- Reset point : 10 to 30% of the switch point frequency
- Operating temperature : -30°C to +70°C
- Dimensions : 50 x 125 x 44mm

Electrical connection and adjustment

Warning : never directly connect terminal 4 with + battery. This would definitely damage the speed switch module. The relay coil must be connected between terminal 4 and the + battery (12 or 24 volts).

Moreover a 1N4007 diode must be parallel mounted on the coil relay to protect the module against the self effects.



Terminal 1 and 2 : signal input (terminal 2 and 3 are connected)

Terminal 3 : Battery

Terminal 4 : Relay coil

- Turn trimmer « seuil » to set the switch point

- Turn trimmer « hysteresis » to come back to the initial state of the relay

Relays

· 12 volt relay 1RT :

P/N 18.0227

· 24 volt relay 1RT :

P/N 18.2064

Electronic speed switches with relay

12 VDC

Type	P/N	Frequency
DIN 12 V	30.4378	12 Hz-68 Hz
LMI16-3 DIN 12 V	30.4379	69 Hz-357 Hz
LMI16-4 DIN 12 V	30.4380	358 Hz-1330 Hz
LMI16-5 DIN 12 V	30.4381	1331 Hz-8000 Hz
LMI16-51 DIN 12 V	30.4382	5500 Hz-10000 Hz



24 VDC

Type	P/N	Frequency
DIN 24 V	30.3198	12 Hz-68 Hz
LMI16-3 DIN 24 V	30.3199	69 Hz-357 Hz
LMI16-4 DIN 24 V	30.3200	358 Hz-1330 Hz
LMI16-5 DIN 24 V	30.3201	1331 Hz-8000 Hz
LMI16-51 DIN 24 V	30.3202	5500 Hz-10000 Hz



Features

- Integrated relay
- DIN rail mounting
- Red led to inform switching relay
- Minimum input signal : 0.7 Vac for 22K Ω
- Reset point : 10 to 30% of the switch point frequency
- Operating temperature : -30°C to +70°C
- Dimensions : 90x71x58mm

Digital speedometer programmable

Features

- Operating voltage : 9 to 28 Vdc
- Function : tachometer or speedometer with or without odometer (totalizing and trip)
- Scale factor 0.0001 to 99.999
- Water-resistant : front IP65
- Dimensions : 75x39x35 mm
- Input signal frequency minimum 0.01 Hz
- Input signal frequency maximum 10 KHz
- 6 digits LCD
- Operating temperature 0°C to +60°C (working with inductive sensor NPN or PNP, W alternator or magnetic sensor except for odometer).

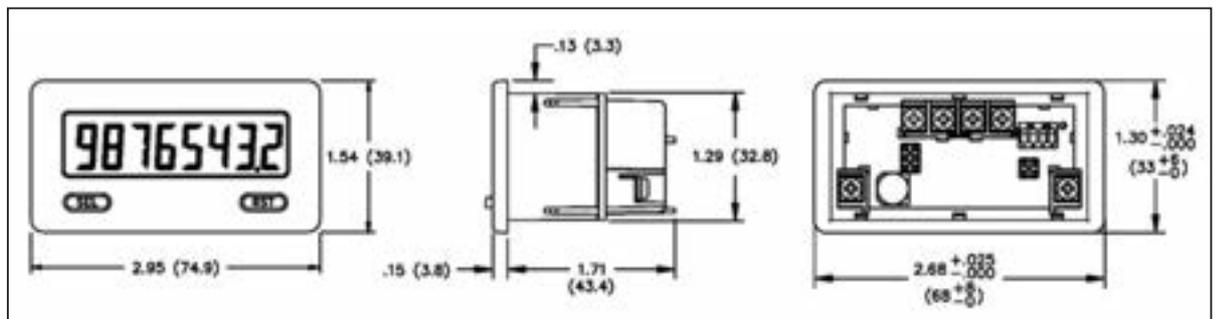


This digital speedometer is dedicated to low speed appliances.

Programming by our team.

Information required :

- maximum speed
 - diameter of the wheel
 - number of pulses read by the sender for 1 revolution
 - type of sensor (NPN or PNP)
-
- Black display : **P/N 30.3339**
 - Red/green display : **P/N 30.5947**
 - Electronic card speed switch : **P/N 30.6141**



- Inductive sensor 10/65V M18X150 – PNP
Frequency maximum 550Hz: **P/N 30.4470**

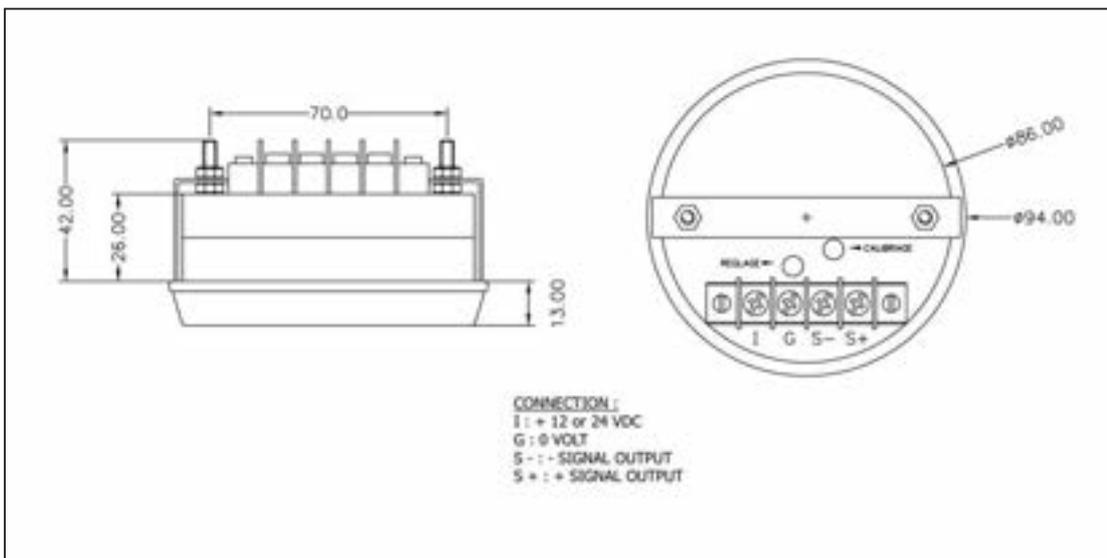
- Other inductive sensors see page 87

Digital tachometers and speedometers

Indicate with accuracy engine RPM's, or vehicle speed. « Self-powered » means that the digital indicators are energized by either a magnetic sensor or a tachogenerator.

Features

- Mounting hole : 86mm.
- High vibration and shock resistance.
- Protected against interference.
- Front : water-resistant.
- 4 digit LCD, 13mm high, great contrast.
- Self-powered (except lighting).
- Lighting 12 or 24 Vdc.
- Input signal frequency : $10 \text{ Hz} \leq F \leq 12000 \text{ Hz}$.
- Minimum speed : 50 RPM.
- Input signal : between 1.5 and 30 Volts peak to peak, with 15 pulses /rotation minimum
- Current consumption : 0.20mA under 1.5 Volts.
- Insulated input terminal and circuits.
- Gate time are : $0.26\text{s} \leq T \leq 5.7\text{s}$ (4 ranges)
- Operating temperature : -20°C to $+60^{\circ}\text{C}$



Digital tachometer

- Type LM 10H.
- 12 or 24V
- Inhibited hourmeter with frequency signal input

P/N 30.3056



Digital tachometers

- Type LM10

P/N 30.1875



Digital speedometers

- Type LM 10 DE

P/N 30.2227



Calibration

To calibrate a LM10 in a field it is necessary to select the appropriate gate time range on the 4-position switch and adjust the potentiometer to obtain the precise read-out :

Example : sensing a ring gear with a 113-teeth revolution at 1 800 RPM gives a frequency of :

$$F = 113 \times 1\,800 / 60 = 3\,390 \text{ Hz}$$
$$\text{Gate Time } T = 60/113 = 0.5 \text{ s.}$$

The instruments can be calibrated by applying a signal source of precisely 3 390 Hz setting the gate time range switch to position number 1 and adjusting the potentiometer to obtain a read-out of precisely 1 800.

Similarly it could be calibrated in the actual application by first selecting the right gate time range on the switch and then adjusting the potentiometer until the read-out matches with another portable tachometer or digital tachometer.

Self powered digital counter

This counter can totalize : manufactured products, distance in meter or kilometer...

Reset as option.

Use with switch type ILS P/N 30.1146 ou 30.0432.

Features

- Type LM 20.
- Mounting hole : 86mm
- Dimensions : see page 67
- Water-resistant front
- Record to 99 999 999 pulses
- Digit LCD, 8mm high
- 8 years autonomy lithium battery
- Operating temperature 0°C +50°C



P/N 30.0510

Stop rotation switch

This switch associated with ILS switch can control a stop rotation and can start an alarm visual or sound.

Appliance : detected stuck in conveyor belt

Features

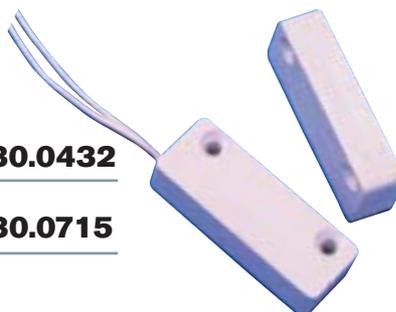
- Type LM11.
- Operating voltage : 12 or 24 V.
- current consumption : 6mA / 12V.
- Maximum load current : 0.5A.
- Maximum time between each sequence : 3 seconds.



P/N 30.0480

ILS Switches

- Contact when the magnet is detected: **P/N 30.0432**
- Additional magnet : **P/N 30.0715**



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Portable tachometer

Hand-held tachometer for non-contact measuring of revolution of engines, shafts etc. Low cost and efficient Hand-held model 5 digit LCD 12mm high. Liquid crystals. Memory. Laser beam.



P/N 19.0369

Features

Measuring range	6-99 999 min ⁻¹
Accuracy :	6 - 599 ±1 min ⁻¹ ±1 digit 600 - 99999 min ⁻¹ ±0.01 % of readings ±1 digit
Measuring Unit :	min ⁻¹ (RPM)
Operating temperature :	5-45° C
Memory:	Stock and memorize during 5 minutes 14 reading (last one, middle, maximum and minimum)
Laser class 2 :	Maximum distance is 2 meters
Battery :	3 x 1.5V type AA During around 35 hours
Display:	Liquid crystals 5 digits. 12mm high
Auto power off :	After 5 minutes in pause
Humidity :	85% RH maximum
Housing :	Plastic (ABS)
Dimensions :	116x64x32
Weight:	Around 170g (390g)

Delivery with carrying case, 3 batteries, calibration certificate (specify with your order), 35 reflective tapes.

Model with contact

· Type PH200LC

P/N 19.4795

Accessorie

· 4 Set of 35 reflective tapes

P/N 19.0312

Portable thermometer (contact or immersion)

Thermometer

- Scale -60°C to $+1000^{\circ}\text{C}$
- Battery 9 Volts

P/N 19.2229

Case

- InPVC

P/N 19.2375

Sender for portable thermometer

- Scale : -60°C to $+400^{\circ}\text{C}$

- Contact sender:

P/N 19.2374

- Immersion sender :

P/N 19.2436

- Wire sender :

P/N 19.2312

- Scale : -60°C to $+1000^{\circ}\text{C}$

- Immersion sender :

P/N 19.2767



Contact us for other senders (different length or temperature)

IR portable thermometer

IR portable thermometer 32-545°C



P/N 19.5144

Thermometer P/N 19.5144 is compact, robust and easy to use. Just aim and press the trigger. Instantly you can read the temperature. Safely you can measure and control surface temperatures of burning objects, dangerous or difficult to access, without contact.

Features

- Circular laser taking aim : 8 points
- LCD backlight
- Display maximum temperature
- Ergonomic and resistant

Technical specification

Scale:	-32 to 545° C
Accuracy at 23°C :	+/- 1% above 23°C +/- 2°C from -18°C to +23°C +/- 2.5°C from -26 to <-18°C +/-3.0°C from -32 to <-26°C
Repeatability :	<+/-0.5% measurement with a minimum +/-1°C
Response time :	<500msec
Operating temperature :	0 to 50° C
Battery :	Alkaline 9V
Weight :	320 g

DASHBOARDS COMPONENTS

Key switches

Key switch without preheating and with re-start inhibit

- mounting hole : 22,3mm : 22,3mm

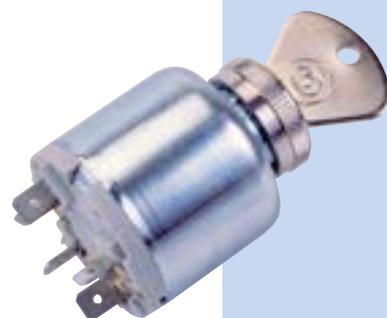
P/N 18.1313



Key switch without preheating

- 3 positions
- mounting hole : 22,3mm

P/N 18.0084

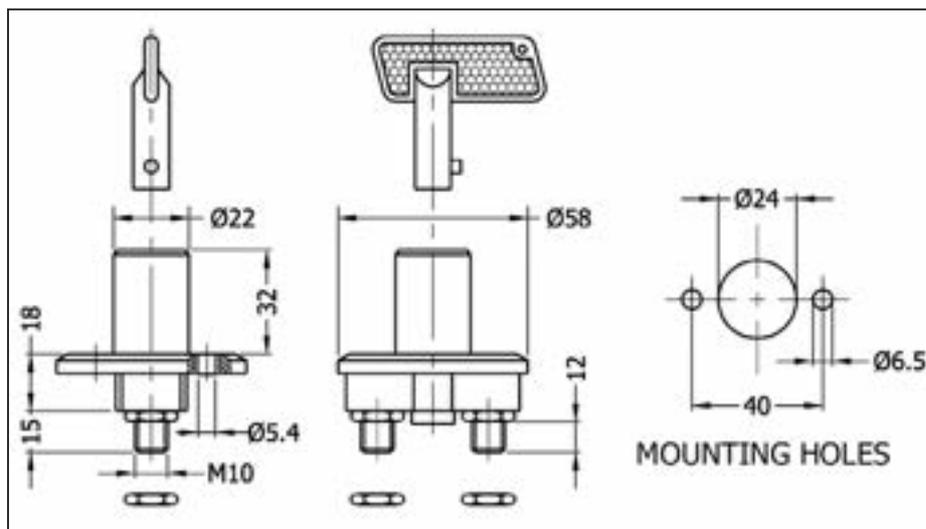


Key switch with preheating

- mounting hole : 22.3mm : **P/N 18.0086**
-

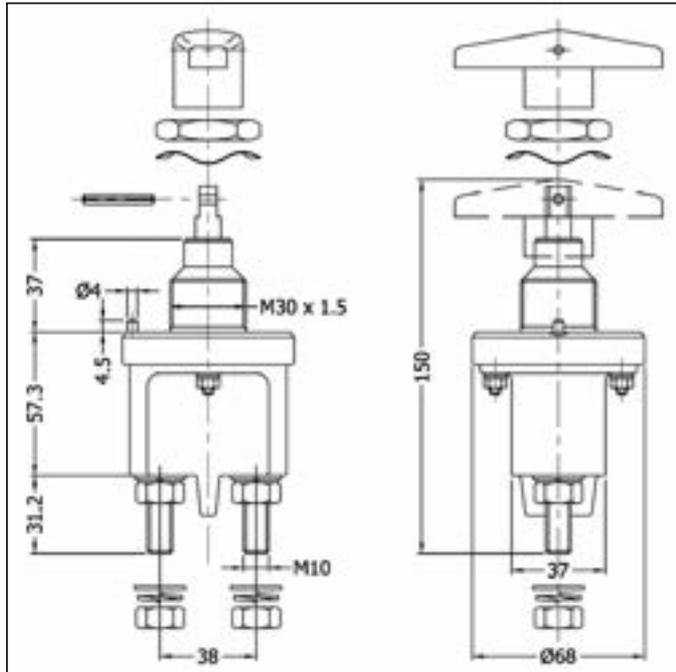
Battery switch 100A continuous 500A / 5 seconds

P/N 18.2821



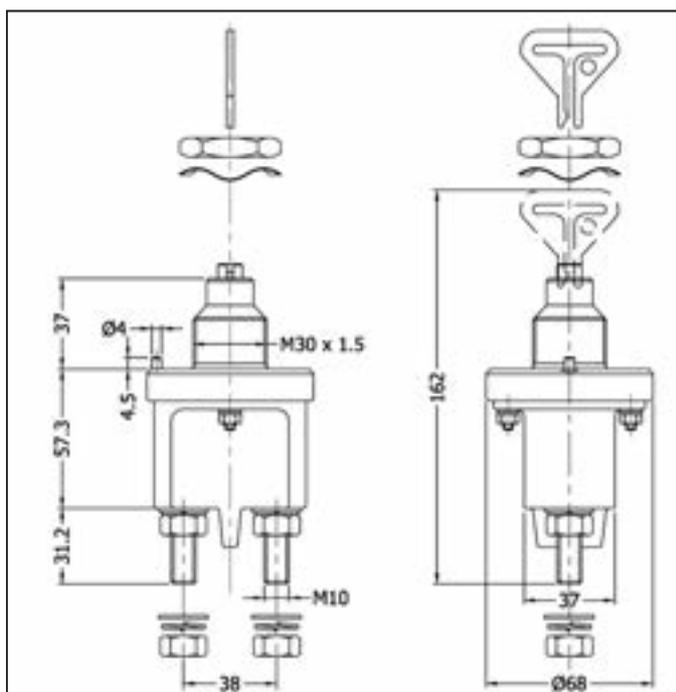
**Battery switch 250A continuous
2500A / 5 seconds**

P/N 18.3325



**Key Battery switch 250A continuous
2500A / 5 secondes**

P/N 18.4214



Toggle switches

- Mounting hole : 12,5mm
- Electrical connections : Faston 6,35mm

Toggle switch and push-button

- On / Off (single pole, single throw) **P/N 18.0218**
- On / On (single pole, double throw) **P/N 18.0222**
- Mom.On / Off (single pole, double throw) **P/N 18.1218**
- Mom.On / Off / mom.On (single pole, double throw) **P/N 18.0224**
- On / Off (double pole, double throw) **P/N 18.0229**
- Push-button **P/N 18.0078**
- Water resistant cap **P/N 18.1134**



Waterproof (IP67) switches

- Type LM 513015
- Mounting hole : 16,2mm
- Square model 18x18mm

- Green 1NO-1NC : **P/N 18.2391**
- Blue 1NO-1NC : **P/N 18.2578**
- Red 1NO-1NC : **P/N 18.2396**
- Orange 1NO-1NC : **P/N 18.2572**



The switches do not include lamps.

We can add a symbol between the top of the switch and the glass.

For additional switches please contact us (maximum of switches 4NO-4NC).

Waterproof (IP67) push switches

- Type LM503015.
- Mounting hole : 16,2mm
- Square model : 18x18mm

- Green 1NO-1NC : **P/N 18.2596**
- Blue 1NO-1NC : **P/N 18.2599**
- Red 1NO-1NC : **P/N 18.2597**
- Orange 1NO-1NC : **P/N 18.2598**



The switches do not include lamps.

We can add a symbol between the top of the switch and the glass.

For additional switches please contact us (maximum of switches 4NO-4NC).

Accessories

· 12 Volts : **P/N 18.0729**

· 24 Volts : **P/N 18.0730**



Silver contact element

· 1NO + 1NC : **P/N 18.0208**

· 2NO + 2NC : **P/N 18.0209**



Colored

· Green : **P/N 18.0203-A**

· Blue : **P/N 18.0204-A**

· Red : **P/N 18.0205-A**

· Orange : **P/N 18.0206-A**

· Indicator body : **P/N 18.0200-A**



Warning lights

Waterproof (IP67) warning lights

- Type LM 553015.
- Mounting hole : 16,2mm
- Square model 18x18mm

· Green : **P/N 18.2313**

· Blue : **P/N 18.2362**

· Red : **P/N 18.2316**

· Orange : **P/N 18.2333**



*The warning lights do not include lamps.
We can add a symbol between the top of the switch and the glass.*

· Lamp 12 Volts : **P/N 18.0729**

· Lamp 24 Volts : **P/N 18.0730**



Warning lights 16mm diameter

- 16mm diameter (overall)
- Mounting hole : 12,5mm
- Maximum panel thickness : 4mm
- Round shape
- 12 or 24 Volts lamp 6.35mm TAB terminal

· Red :	P/N 18.0185
· Green:	P/N 18.0186
· Orange :	P/N 18.0187
· Lamp 12 Volts :	P/N 18.0130
· Lamp 24 Volts :	P/N 18.0131



4 Lights clusters

- 52mm diameter
- water-resistant front
- symbols : temperature, pressure, fuel, battery

· 12 Vdc :	P/N 18.2065
· 24 Vdc :	P/N 18.2102

For any other symbols : please contact us



Neutral 4 Lights clusters

- 52mm diameter
- water-resistant front
- custom symbols
 - 12 Vdc : please contact us
 - 24 Vdc : **P/N : 18.5610**



Relays

Relay SPDT (single pole, double throw)

- 12-volt relay with bracket 30A :

P/N 18.0227

- 24-volt relay with bracket 20A :

P/N 18.2064



Start relay SPST (single pole, single throw)

- 12-volt relay with bracket 70A :

P/N 18.2063

- 24-volt relay with bracket 50A :

P/N 18.1884



Hole blanks

Quick mounting hole blanks

- 52mm diameter : **P/N 18.0143**

- 22mm diameter: **P/N 18.0142**

- 14mm diameter : **P/N 18.0141**

- 8mm diameter : **P/N 18.0144**



Hole blank with mounting bracket

- Type LM63

- 52mm diameter : **P/N 18.0594**



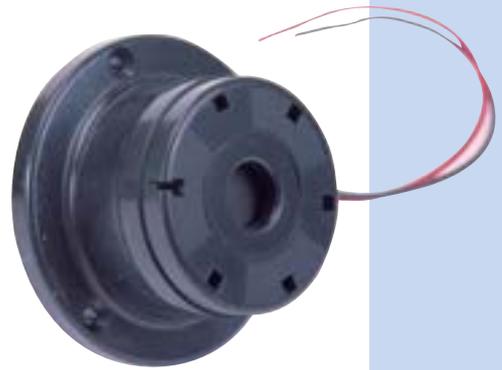
Buzzers

Buzzers 110 db

- Sound output at 1 meter : 110db at 2500Hz
- For outside exposure
- Intermittent sound : 2500/1000Hz
- Current consumption ; 200mA maximum
- Operating temperature : -20°C to +50°C

· 12 VDC Buzzer : **P/N 18.0310**

· 24 VDC Buzzer : **P/N 18.0311**



Buzzers 105 db

- Sound output at 1 meter : 105db at 2500Hz
- For outside exposure
- Intermittent sound : 2400/1000Hz
- Current consumption ; 180mA maximum
- Operating temperature : -20°C to +50°C

· 12 VDC Buzzer : **P/N 18.4783**

· 24 VDC Buzzer : **P/N 18.4784**

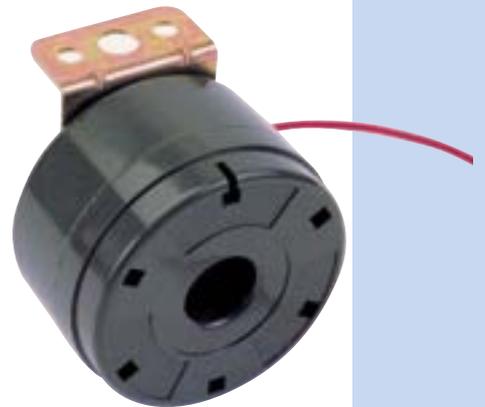


Backup alarms

- Sound output at 1 meter : 110db at 2500Hz
- For outside exposure
- Beeper sound
- Current consumption ; 200mA under 24 Vdc
- Operating temperature : -20°C to +50°C

· 12 VDC Buzzer : **P/N 18.1985**

· 24 VDC Buzzer : **P/N 18.2667**

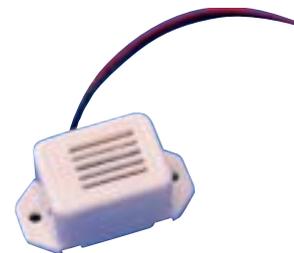


Electronical buzzers

- Sound output at 20cm : 85db
- Frequency : 300Hz to 500Hz
- Current consumption ; 30mA
- Operating temperature : -40°C to +65°C

· 12 VDC wire Buzzer : **P/N 18.0363**

· 24 VDC wire Buzzer : **P/N 18.0364**

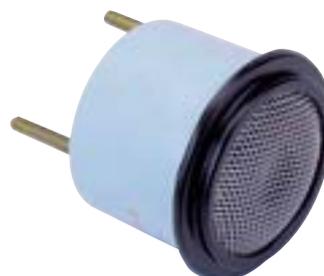


Buzzers 52mm diameter

- Sound output at 30cm : 65db
- Frequency : 300Hz to 500Hz
- Current consumption ; 30mA

· 12 Vdc : **P/N 18.0554**

· 24 Vdc : **P/N 18.2075**



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Présentation

Founded in 1925, the NORIS company, located in Nurnberg-Germany, is specialized in measure, control and automation for powerful diesel engines.

NORIS standard products include a wide range of :

- senders, converters, indicators for speed, temperature, pressure...
- intelligent systems to supervise shipboard machinery.

Most of the NORIS products have marine or railway approvals (GL, ABS, BV...). LM Instrumentation provide NORIS products sales and support in France for 30 years.

Please do not hesitate to contact us for any details.

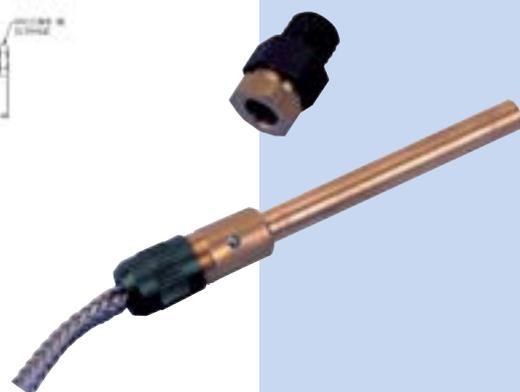
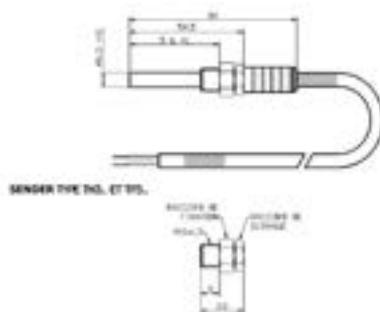
Temperature senders

Type TH1 and TP1

Sensors

P/N	Type	Range	Resistance element
40.1115	TH12	0/70°C	Thermistor
40.1114	TH11	40/120°C	Thermistor
40.1124	TP13	0/200°C	PT100

Connection : Teflon-insulated
Cable 2x0.75mm², steel-wire braided, 2,30m long.
Mounting : by screw nipple and damping screw.



Type TH2 and TP2

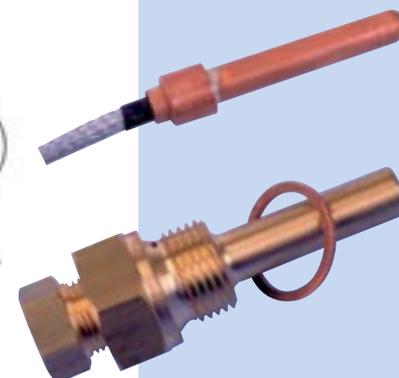
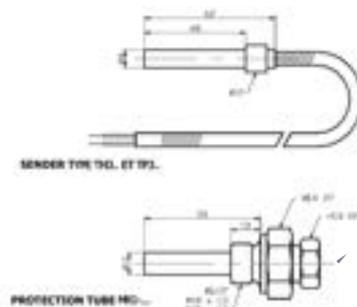
Sensors

P/N	Type	Range	Resistance element
40.1118	TH22	0/70°C	Thermistor
40.1117	TH21	40/120°C	Thermistor
40.1126	TP23	0/200°C	PT100

Protection tubes

P/N	Type	Thread
40.0723	MX1-R12	1 / 2"
40.0722	MX1-M18	M18 X 1.50
40.1323	MX1-M20	M20 X 1.50

Connection : Teflon-insulated cable 2 x 0.75mm², steel-wire braided, 2,30m long.



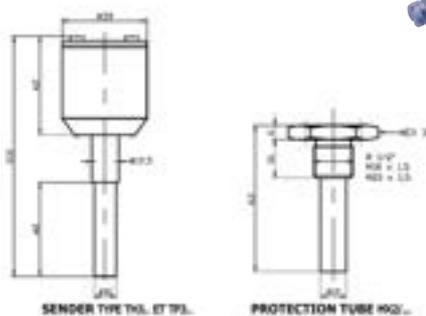
Type TH3 and TP3

Sensors

P/N	Type	Range	Resistance element
40.1932	TH32	0/70°C	Thermistor
40.1639	TH31	40/120°C	Thermistor
40.1786	TP31	0/120°C	PT100

Protection tubes

P/N	Type	Thread
40.0726	MX2-R12	1 / 2"
40.0724	MX2-M18	M18 X 1.50
40.1364	MX2-M20	M20 X 1.50



TH31 (40.1639) is homologated BV and GL.
TH32 (40.1632) is homologated BV and LR.
Please contact us for any specific request.

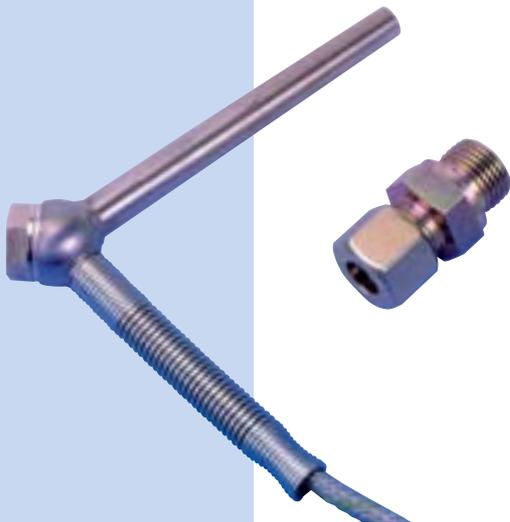
Thermocouple temperature sensors for engine gaz exhaust measure

The thermocouple consists of the sensing probe and the mechanical parts including the sensor sheath, clamping screw, connector and an additional protection tube, if required.

Type : K

Temperature range : 0-800°C.

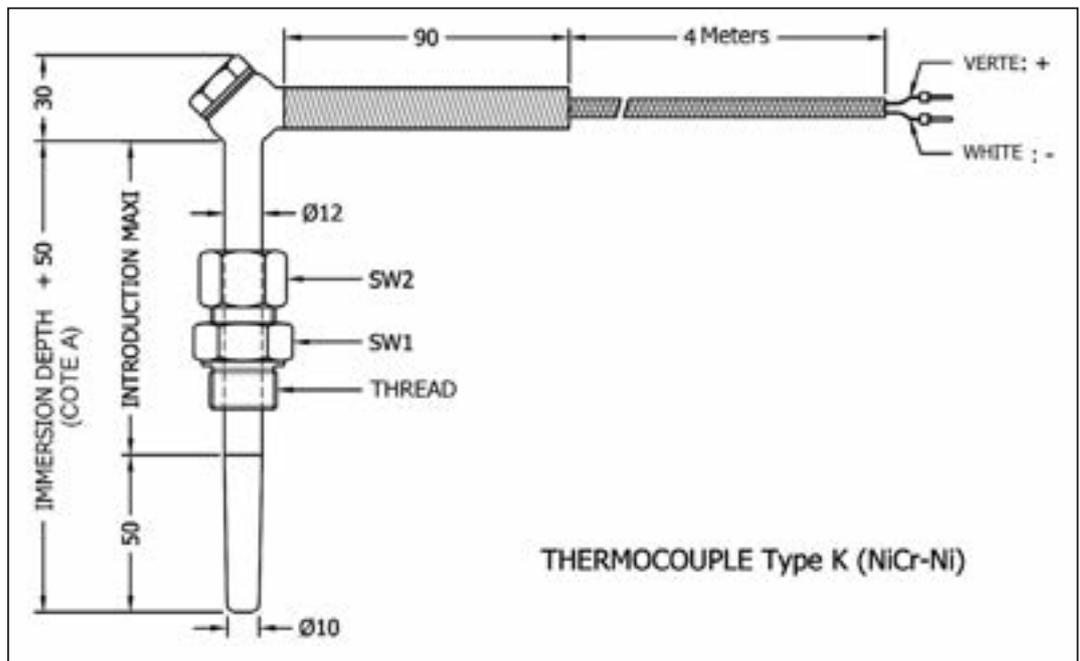
P/N	Type	Immersion depth in mm	Total length	Construction
40.1131	TWK6-8-100	100	150	Selon figure 1
40.1132	TWK6-8-150	150	200	Sans fourreau protecteur
40.1442	TWK6-8-200	200	250	



Threaded union			
Thread	G 1/2"	M18x150	G 3/4"
Type	R12-12S	M18-12S	R34-12S
P/N	40.0913	40.0713	40.2244

Sensors are supplied with 4.00m compensation cable. Please contact us for any other length.

Dimensions



Pressure transmitters output 4-20mA or 0-10Vdc

Pressure transmitter, output 4-20mA, 2 wires

- Type VD71.
- Pressure range : from 0-1 bar to 0-1000 bars
- Power supply : 10 to 30 Vdc
- Protection class : from IP65 to IP67
- Permissible fluid temperature : -40°C to +100°C
- Connection : DIN43650 or cable outlet.

Please contact us for P/N creation.

STANDARDS :

VD71	P/N
0-10 bars 4-20mA output DIN 43650-A connection 1/4 NPT	40.2814

VD71	P/N
0-4 bars 4-20mA output DIN 43650-A connection 1/4 NPT	40.3347



Pressure transmitters relative or absolute Output 4-20mA or 0-10Vdc

- Serie PGE.
- Relative pressure range : from 0-1 bar to 0-20 bars
- Absolute pressure range : from 0-10 bars to 0-600 bars
- Power input : 10 to 30 Vdc
- Connection 2,00m cable outlet or connector

Please contact us for P/N creation.



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Tachogenerator

Tachogenerators, single-phase AC or two-phase AC, are dedicated to speed measurement and detection.

- Maximum speed from 1000 to 6000RPM
- Signal output depending on the type :
 - 1000RPM : 20 VAC
 - 1500RPM : 60 VAC
 - 6000RPM : 60 VAC
- 6 pairs of poles
- protection class : IP66
- Working temperature : -20°C to 80°C

Please contact us for the definition of the part.



Inductive speed sensor

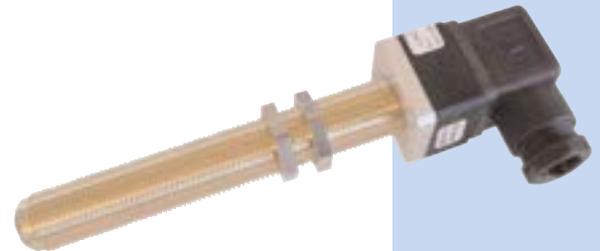
Présentation

Those sensors are designed for speed sensing. The rotation of ferromagnetic toothed wheels is detected by a sensing coil and converted by a signal amplifier into a rectangular-pulse signal. The frequency signal is proportional to speed (from 10 to 10 000Hz).

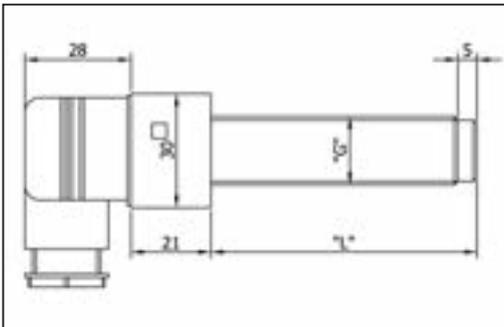
Scannable objects can be : ferromagnetic materials in motion : toothed wheels > m1, holes diameter > 4mm / d > 4mm, webs and grooves W>4mm.

P/N

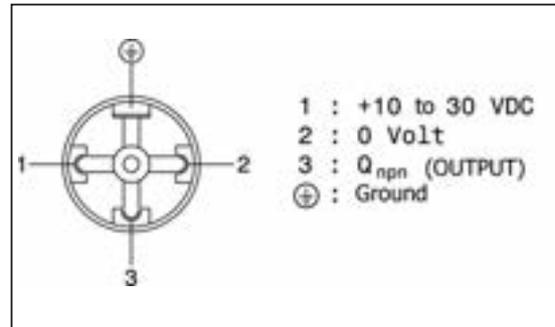
P/N	Thread	Length "L"
40.3087	M18 x 1,5	115
40.1905	M18 x 1,5	70
40.2542	M18 X 1	70



Dimensions



Connection



Technical data

Operating voltage	10 to 32 Vdc	Climatic test	DIN CE1 68-T2-1/-2/-30
Output current	20 mA	Vibrations	10g, 25 at 100Hz DIN CE 1-68-T2-6
Power consumption	15 mA	Material	Head/aluminium body/brass
Frequency range	10 to 10 000Hz	Protection Level	P.L65
Working temperature	-25°C to 100°C	Approvals	CE, GL, BV, LR, ABS, DNV)
Storage temperature	-45°C to 100°C	Output signal	Rectangular pulse standard Noris output

The Noris standard signal

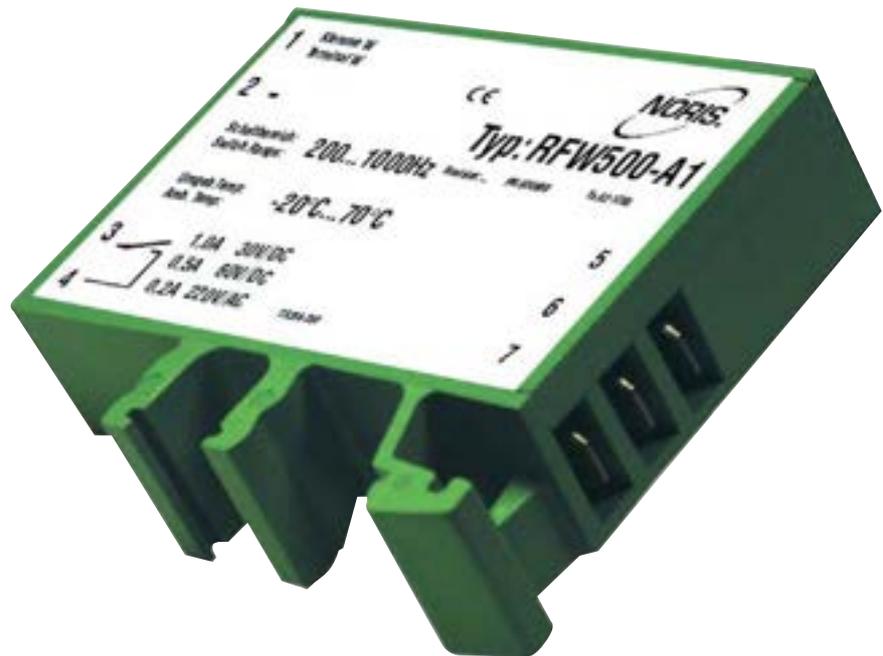
The development of this signal was based on Noris extensive experience with electronic speed measuring systems. This has led to sensors being developed with built-in-pulse-shaping stages (« drivers ») which provide a strong signal and lend themselves also to use under conditions of high ambient temperatures. This « NORIS standard signal » meets the following requirements :

- The signal available is immune to electrical interference
- Different types of sensors generate compatible signal outputs
- The signal evaluating devices are provided with compatible input stages
- All devices of the NORIS range can be readily interchanged and combined
- Multiple operation of indicators, switching devices and transmitters possible (up to 10)
- Regular wiring material can be used even under severe conditions (« high-interference environments »). Under very bad conditions, however, screening is recommended for distances exceeding about 20m.
- Installation, maintenance and fault finding do not call for special electronic skills or sophisticated equipment
- Very high degree of electromagnetic compatibility

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Limit value switches and transducers



Applications :

- **Temperature**
- **Current**
- **DC Voltage**
- **Frequency**
- **Speed**

Those are dedicated to monitor and process or convert electric input values. Their main assets are

- Straight forward applications
- Suitable for severe conditions
- Accuracy
- Compact construction
- DIN rail mounting

Those modules are designed to integrate engine control panels and machinery control unit.

Limit value switches

Presentation

The switches are designed to monitor and process electric measured variables.

Working principle

When the actual value of the measuring signal supplied reaches the set point, the built-in relay will operate. The switching status of the relay contact may, for instance, be monitored or individually processed by a machine controller.

Relay position and led code

Green led lighting : module powered / no failure detected

Red led lighting : failure detected

As option :

Green led flashing : wire break or short circuit detected

Volt-free relay contact, closed-circuit or open-circuit version

A volt-free relay contact is provided as a make-and-break contact for outputting and further processing. In addition, there is a choice between closed-circuit and open-circuit devices.

In the case of closed-circuit devices, the output relay is pulled up in the normal state of operation with the operating voltage applied. It drops off upon the limit-value being exceeded or if the operating voltage fails.

In the open-circuit variant, the output relay pulls up when the limit-value is exceeded with the operating voltage applied. Failure of the voltage will not result in any switching function below the switching point.

Sonser monitoring

	Green LED blinking	Relay powered	Failure
Thermistor		X	short circuit
	X	X	wire break
Pt100/Pt1000	X	X	short circuit
		X	wire break
Current 4/20mA	X	X	short circuit
	X	X	wire break
Voltage 2/10V	X	X	short circuit
	X	X	wire break
Current 0/20mA		No signalisation	
Voltage 0/10V		No signalisation	
Frequency		No signalisation	

Electric isolation

The operating voltage and sensor input are electrically isolated from the output signal. Therefore, multiple operation of amplifiers and evaluation devices is possible at the same operating voltage and from only one sensor.

Technical datas

Operating voltage :10/32 V.d.c
 RH./RP. 18/32 Vd.c.
 RFW./VFW. 18/32 V.d.C.

Output contact : volt-free make-and-break contact, closed circuit or open circuit.

Maximal switching capacity : 30W (1A 30V/ 0.5A 60V DC) 40W (0.2A/ 220V AC)

Switching point : adjustable with tamper-proof drum

Reproducibility : +/- 0.2%

Hysteresis : Approx. 1.5%

Power consumption : approx 40mA (24Vdc)

Operating temperature :20°C/+70°C

Storage temperature :-45°C/+85°C

Connection :DIN 46244 flat connector gold plated A6.3x0.8

Mounting:snap-fit on top-hat channel or G-channel

Protection class :IP20

Electromagnetic :complied with CE requirements

Approvals :GL, LR, ABS, DNV, BV.

Limit value switches for temperature

Type	Input signal	Temp rage	Output	Volt-free relay
RP51	PT100 RTD*	0 / 120°C	NONC	Closed circuit
RP51A				Open circuit
RP52		0 / 150°C		Closed circuit
RP52A				Open circuit
RP53		0 / 200°C		Closed circuit
RP53A				Open circuit
RH51	Thermistor CTN	40 / 120°C	NONC	Closed circuit
RH51A				Open circuit
RH52		5 / 70°C		Closed circuit
RH52A				Open circuit
RTK58	Thermocouple Type K*	0 / 600°C	NONC	Closed circuit
RTK58A				Open circuit
RTK59		0 / 800°C		Closed circuit
RTK59A				Open circuit

* Line compensation

Access is provided to a trimming potentiometer to permit a line compensation to be applied for PT100 RTD limit-value switches.

For satisfactory working of RTK5 serie, it is necessary that the compensating line be extended to the limit-value switch.

Limit value switches input direct current

Type	Input signal	Output	Volt free relay
RI51	0 / 20mA	NONC	Closed circuit
RI51A			Open circuit
RI52	4/20 mA		Closed circuit
RI52A			Open circuit

Limit value switches input DC voltage

Type	Input signal	Output	Volt free relay
RG51	0 / 10V	NONC	Closed circuit
RG51A		NONC	Open circuit
RG51S*		NO with self-holding	Open circuit
RG52	2 / 10V	NONC	Closed circuit
RG52A		NONC	Open circuit

*Special Testing and self-holding function of RG51-S

The Type RG51-S has the integrated special functions testing and self-holding.

The testing function offers while the contacts 2 and 5 are connected, the limit-value signal selected on the drum scale is lowered by about 15%. In a speed monitoring application, this means that an overspeed condition can be simulated within the normal range without it being necessary to run the machine in the critical range.

The self-holding function of the RW5...-S devices hold the output relay to be kept latched after the switching operation until the relay is unlatched. The unlatching function is activated when the operating voltage as been interrupted for at least 500 ms. After activation of the unlatching function, the limit-value switch will return to its normal operating condition and will be fully operational after approximately 3 seconds.

Limit value switches for speed

Type	Input signal	Input range	Output	Volt free relay
RW53	AC Voltage	2 / 20V	NONC	Closed circuit
RW53A			NONC	Open circuit
RW53S*			No with self-holding	Closed circuit
RW54		2 / 60V	NONC	Closed circuit
RW54A			NONC	Open circuit
RW54S*			No with self-holding	Open circuit
RW55		2 / 90V	NONC	Closed circuit
RW55A			NONC	Open circuit
RW55S*			No with self-holding	Closed circuit
RF50-1	Frequency (NORIS sensor)	10 - 100 Hz (RF500)	NF	Closed circuit
RF50-A1		20 - 1000 Hz (RF501)		Open circuit
RF50-2		200 - 10 000 Hz (RF502)	NO	Closed circuit
RF50-A2				Open circuit
RFW50-1	W alternator	0 - 100 Hz (RFW500)	NF	Closed circuit
RFW50-A1				Open circuit
RFW50-2		0 - 1200 Hz (RFW501)	NO	Closed circuit
RFW50-A2				Open circuit
RFS50-R1	Frequency (magnetic sensor)	10 - 100 Hz (RFS500)	NF	Closed circuit
RFS50-A1		20 - 1000 Hz (RFS501)		Open circuit
RFS50-R2		200 - 10 000 Hz (RFS502)	NO	Closed circuit
RFS50-A2				Open circuit

* Specific testing and self-holding function of RW5..-S and RW5..-A2

The Types RW5..-S have the integrated special functions testing and self-holding. The Types RW5..-A2 have only the special function testing.

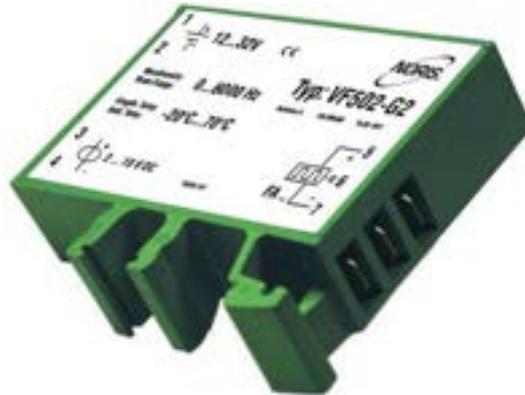
The testing function offers while the contacts 2 and 5 are connected, the limit-value signal selected on the drum scale is lowered by about 15%. In a speed monitoring application, this means that an overspeed condition can be simulated within the normal range without it being necessary to run the machine in the critical range.

The self-holding function of the RW5..-S devices hold the output relay to be kept latched after the switching operation until the relay is unlatched. The unlatching function is activated when the operating voltage has been interrupted for at least 500 ms. After activation of the unlatching function, the limit-value switch will return to its normal operating condition and will be fully operational after approximately 3 seconds

Specificity for RF serie

- Factory-set maximum range frequency adjustment between 50 Hz and 10 kHz (maximum range frequency corresponds to 100 % of drum scale)
- Trimming potentiometer for re-adjustment of measuring range
- Switching point setpoint adjustable by means of drum scale from 5 ... 100%
- Lowest switching point: 50 Hz (RF500..), 100 Hz (RF501..), 1,000 Hz (RF502..)

Transducers



Presentation

Application

Measuring transducers are designed to convert electric input values (PT100, thermocouple, speed sensor, W alternator...) into standardised output signals (0/20mA, 4/20mA, 0/10V or 2/10V).

The output signal is proportional to the input.

Final adjustment

Switching point freely adjustable by drum scale

Operating status display by LED

The green LED will be lit when the operating voltage is applied and the device is working normally.

Monitoring for integrity

The devices come equipped with sensor monitoring for sensorlead breakage. In the event of any fault, the output signal setting is 22 mA or, respectively 11.5 V.

Electric isolation

Sensor input and output signals are electrically isolated from the operating voltage. Multiple operation of amplifiers and evaluation devices is therefore possible at the same operating voltage. The sensor only supplies one amplifier device.

Technical datas

Operating voltage :	10/32Vdc (except RP/RH/RFW/VFW : 18/32Vdc)
Output variants :	0/20mA, 4/20mA, 0/10V or 2/10V
Reproducibility:	< +/- 0.1%
Linearity :	< +/- 0.3%
Noise voltage :	approx 20mV
Power consumption :	approx 30mA (24Vdc)
Operating temperature :	20°C/+70°C
Storage temperature :	-45°C/+85°C
Connection:	DIN 46244 float connector gold plated A6.3x0.8
Mounting :	snap-fit on top-hat channel or G-channel
Protection class :	IP20
Electromagnetic :	complied with CE requirements
Approvals :	GL, LR, ABS, DNV.

Measuring transducer for speed

Type	Input Signal	Input range	Output
VF50-I1	Frequency (NORIS sensor)	10 - 100 Hz (VFX500) 20 - 1000 Hz (VFX501) 200 - 10 000 Hz (VFX502)	0 / 20 mA
VF50-I2			4 / 20 mA
VF50-G1			0 / 10V
VF50-G2			2 / 10V
VFS50-I1	1 / 20 Vpp (magnetic sensor)		0 / 20 mA
VFS50-I2			4 / 20 mA
VFS50-G1			0 / 10V
VFS50-G2			2 / 10V
VFG50-I1	6 / 200 Vpp		0 / 20 mA
VFG50-I2			4 / 20 mA
VFG50-G1			0 / 10V
VFG50-G2			2 / 10V
VFW50-I1	W alternator	0 / 20 mA	
VFW50-I2		4 / 20 mA	
VFW50-G1		0 / 10V	
VFW50-G2		2 / 10V	

Notes

For Noris speed sensors, see page 84 and 85.

Factory set adjustment.

Measuring transducers for temperature, direct current, or DC voltage input

Types	Signal input	Temp range	Output
VP51-I1	PT100 RTD	0 / 120°C	0 / 20 mA
VP51-I2			4 / 20 mA
VP51-G1			0 / 10V
VP51-G2			2 / 10V
VP511-I2		-30 / 120°C	0 / 20 mA
VP511-I			4 / 20 mA
VP511-G1			0 / 10V
VP511-G2			2 / 10V
VP52-I1		0 / 150°C	0 / 20 mA
VP52-I2			4 / 20 mA
VP52-G1			0 / 10V
VP52-G2			2 / 10V
VTK58-I1	Thermocouple Type K	0 / 600°C	0 / 20 mA
VTK58-I2			4 / 20 mA
VTK58-G1			0 / 10V
VTK58-G2			2 / 10V
VTK59-I1		0 / 800°C	0 / 20 mA
VTK59-I2			4 / 20 mA
VTK59-G1			0 / 10V
VTK59-G2			2 / 10V

Compensating line

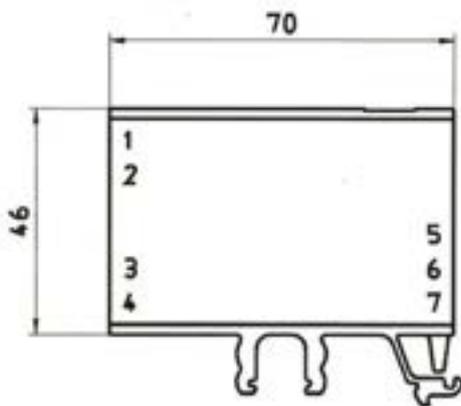
Necessary for PT100 transducers. Adjustable by potentiometer

Thermocouple transducers have integrated compensation line.

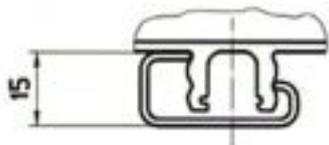
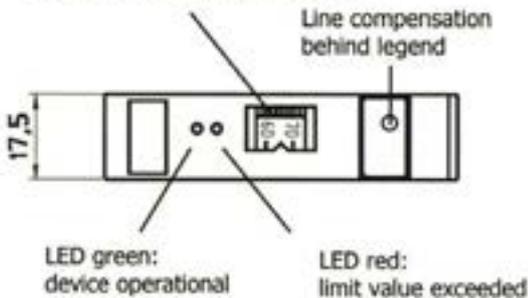
For satisfactory working of the device, it is necessary that the compensating line be extended to the transducer.

Connection for limit value switches and transducers

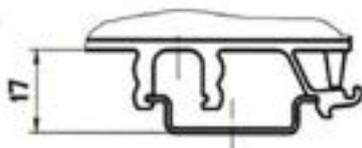
Dimensions



Drum scale for limit value setting



TS32 DIN EN50035



TS35 DIN EN50022

Connections

(for A 6.3 x 0.8 DIN EN 500 35 push-on connector)

Power supply 1 (+) 2 (-)

Limit value switch with Pt100 / PT1000 RTD, thermocouple, NTC-thermistor, current, voltage, AC-voltage.

Sensor input:

Pt100, PT1000 RTD, NTC-thermistor, or

AC-voltage 3 / 4

Thermocouple, current, voltage 3 (+) 4 (-)

Output:

change-over switch 5 / 6 / 7

(NEC: NCC 5 / 6, NOC 6 / 7)

(NDC: NOC 5 / 6, NCC 6 / 7)

Special feature of RG51-S, RW5-S:

Output is only a NOC 6 / 7

Test operation: connect 4 to 5

Transducer with Pt100, PT1000 RTD, or thermocouple:

Sensor input:

Pt100, PT1000 RTD 3 / 4

Thermocouple 3 (+) 4 (-)

Output:

current or voltage 6 (+) 7 (-)

Limit value switch and transducer for frequency/speed:

Sensor 5 (+) 6 (Q) 7 (-)

Transducer output (current or voltage) 3 (+) 4 (-)

Limit value switch output: NOC or NCC 3 / 4

Limit value switch and transducer for speed/terminal W

Power supply and sensor 1 / 2

Transducer output (current or voltage) 3 (+) 4 (-)

Limit value switch output: NOC or NCC 3 / 4

Analog indicators

Measure feature :

High accuracy and reliability.

Stepping motor technology (except R60 and RQ72)

Full scale deflection: 250°

Performance is independent of the position in which they are installed (except R60 and RQ72, permissible deviation: +/-30°).

Dials :

Standard: black lettering on white dials

Specific: please contact us

Construction :

Anodized aluminium

Chrome plated bezel for R60, NR80, NR100, NR130 and NR160.

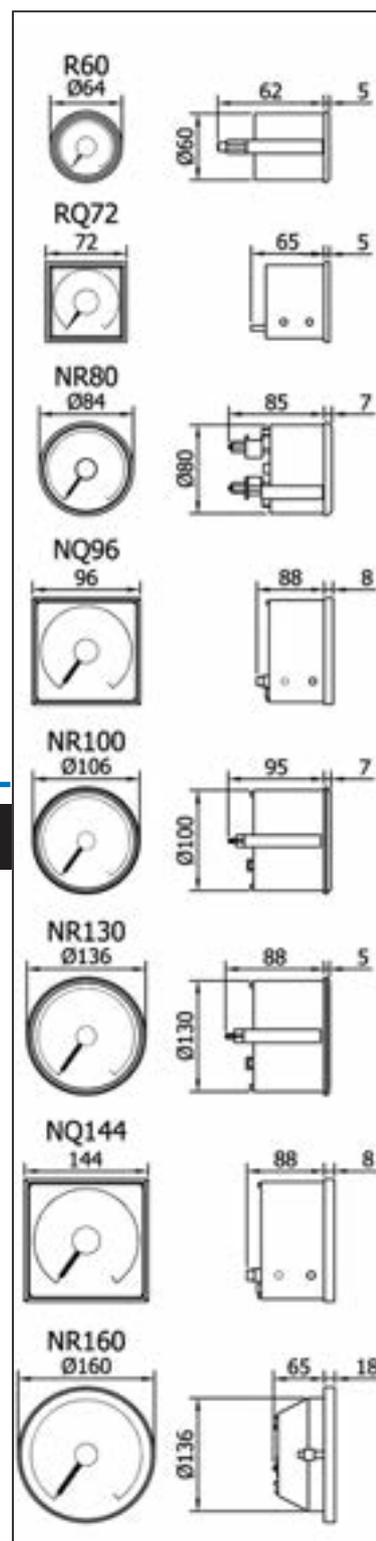
Black bezel for RQ72, NQ96 and NQ144

Option :

Hourmeter, event counter for NR80 and NR100

2 versions

	Indicator with built in convertor	Indicator with separate convertor
Signal input:	NORIS Signal Maxi range: from 30 Hz to 20KHz	0,20 mA, 4/20 mA 0/10, 2/10V -20/0/+20mA, -10/0/+10 V
Error class:	1,0% CE1 51 (R60 & RQ72, 2%)	0,5% (R60 & RQ72, 1,5%)
Error due to:		
• Temperature	0,2% per 10°K	+/-0,15% per 10°K
• Linearity	< 0,5% per 10°K	+/-0,15% of max. value
Power input:	10 to 32 VDC	same
Storage temperature:	-40 to + 85° C	same
Working Temperature:	-40 to + 85° C	same
Humidity:	96%	same
Vibrations:	4 g DIN CEI 68 Curve 2 - 6 (10 to 100Hz)	same
EMC:	CE	same



Analog indicator for speed (RPM)

Standard scale : 0-500 / 0-1000 / 0-1200 / 0-1500
0-2000 / 0-2500 / 0-3000 RPM

Special scales : please contact us.

For ordering please provide :

<u>Type</u>	<u>Scale</u>	<u>Signal input</u>
Example :		
PRQ96	0-2500 RPM	50Vac



Analog indicator for temperature

Standard scale : 0-70°C / 40-120°C / 0-150°C / 0-200°C
110-200°C / 0-600°C / 0-800°C

Special scales : please contact us.

For ordering please provide :

Option : H=built-in amplifier

<u>Type</u>	<u>Scale</u>	<u>Signal input</u>	<u>Option</u>
Example :			
R800	0-600°C	0-10Vdc	



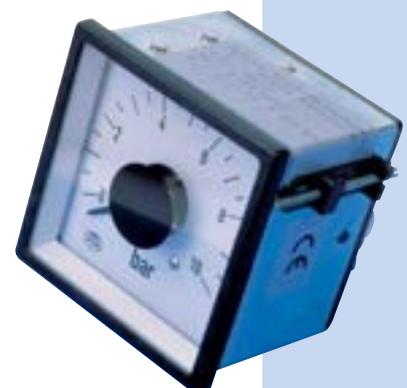
Analog indicator for pressure

Standard scale : 0-2 bars / 0-10 bars / 0-30 bars
0-40 bars / 0-400 bars

Special scales : please contact us.

For ordering please provide :

<u>Type</u>	<u>Scale</u>	<u>Signal input</u>
Example :		
RQ72	0-10 bars	4-20mA

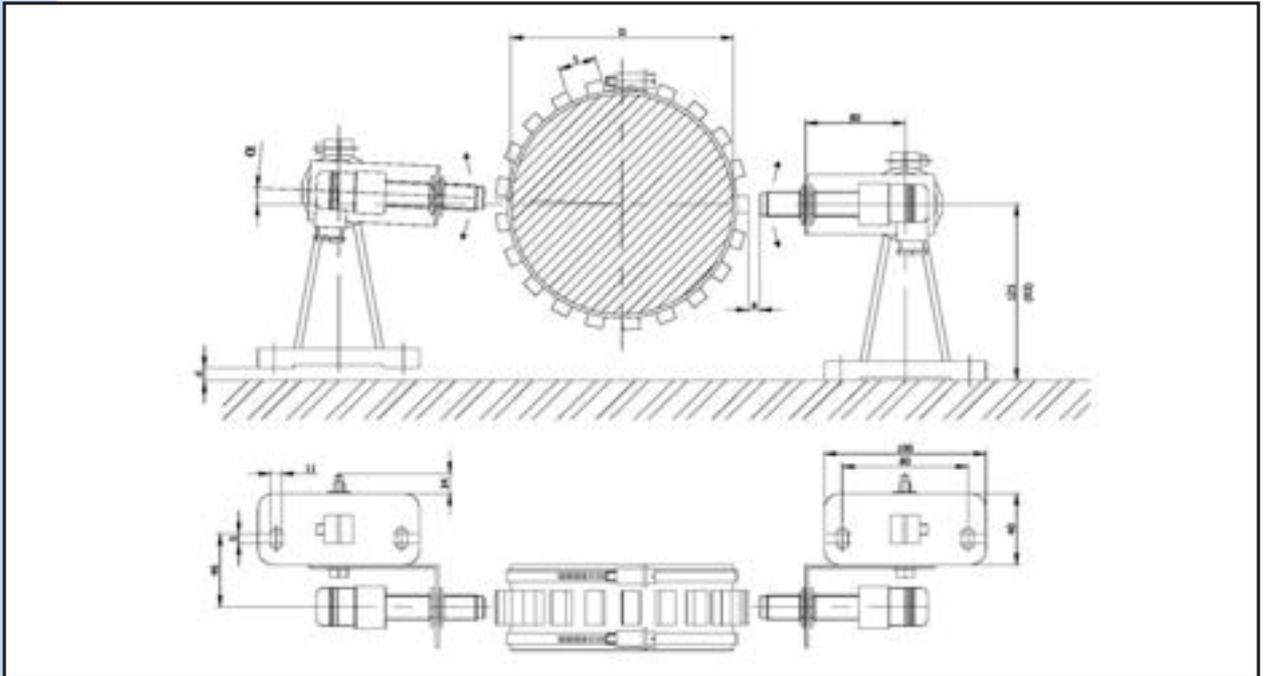


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Shaft rotation speed measure

Speed measure with pulse-generating band and speed sensor with or without direction detection.



For speed measuring applications without direction detection, a speed sensor is installed close to the pulse-generating band on a mounting angle WI31 and a bracket HA8-, for speed-measuring applications with direction detection, a second sensor is fitted. In order to detect the direction of rotation, it is necessary that the second sensor be offset against the first one by $1 / 4$ tooth pitch t (offset d).

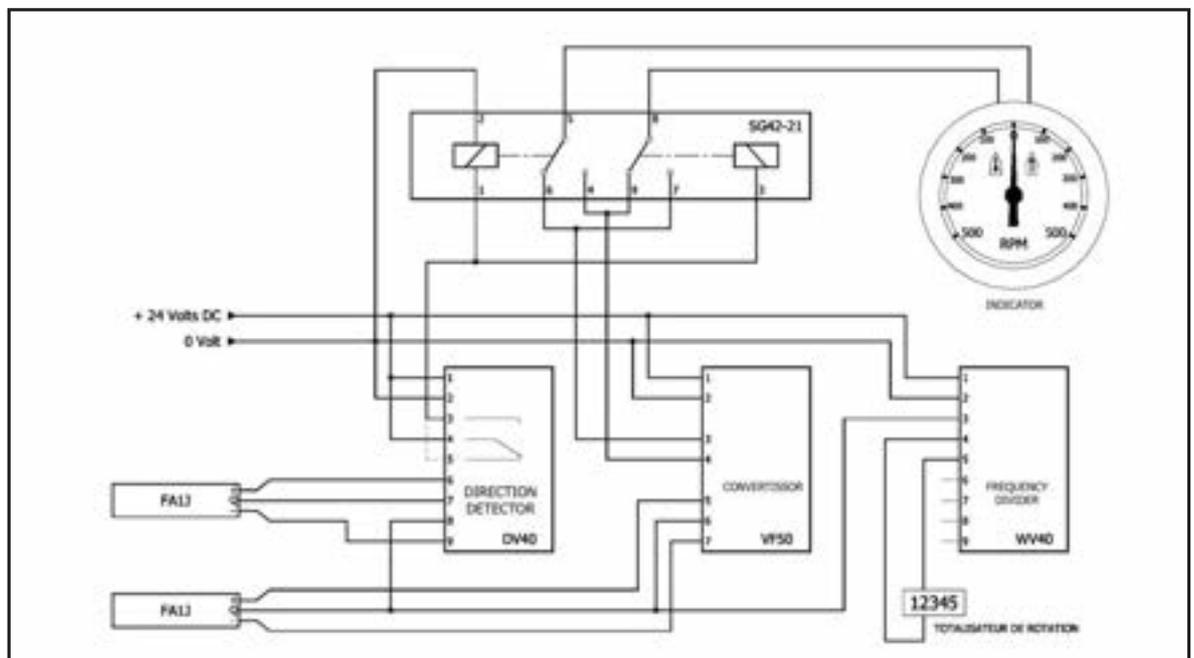
Example: tooth pitch $t = 20\text{mm}$, $1 / 4t \sim d = 5\text{mm}$.

The distance "a" between the sensor and the pulse band should be approx 1-2mm.

The bracket HA8-, is available in two sizes.

HA8-1 height of axis 63mm

HA8-2 height of axis 125mm



BATTERY CHARGER

The battery charger (type SENTRY or MONITOR) provides automatic, current limited and thyristor controlled charging of vented lead acid or NiCd batteries. The units may be used in a wide range of industrial charging applications, including standby engines, pumps and generators.

Specification

- Float charging
- Current control
- Open frame construction

Options :

- Charge fail indication
- Boost voltage



Type Sentry

Nominal current	Nominal voltage	P/N
5 A	12 V	3261
5 A	24 V	3266

Input voltage (VAC) : 230V
Other voltage : contact us.

Type Monitor

Nominal current	Nominal voltage	P/N
16 A	12 V	5472
30 A	12 V	5473
9 A	24 V	5474
15 A	24 V	4555

Input voltage (VAC) : 230V
Other voltage : contact us.



Other battery chargers. Contact us for more information.



NASON TEMPERATURE AND PRESSURE SWITCHES



APPLICATIONS : HYDRAULIC, PNEUMATIC AND ENGINE

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Please ask for our specific catalogue**



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