



# I/O EXPANSION MODULES

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DITHERM, DIGRIN, DIVIT, DANOUT,  
DITEL, DIPOT, DIRES



# DITHERM

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## Auxiliary module that allows contemporary connection of different thermocouples

### DESCRIPTION

The **DITHERM** module allows up to 3 thermocouples of different types to be connected simultaneously to the insulated inputs.

This module can be connected to the genset controllers using the **canbus** interface. (more details in compatibility table below).

**DITHERM** is also available even with **RS485 Modbus RTU**.

Using this version, it is possible to monitor the measures of thermocouples, even from remote using the proper software **SICES SUPERVISOR**.

It is possible to set alarms and warnings thresholds, for each temperature input, having proper timing for warning.

You can easily select the type of thermocouple connected using the associated switches and parameters (with BoardPrg3 on your PC).

## INPUTS, OUTPUTS AND AUXILIARY FUNCTIONS



1 Digital output



3 Analogue inputs



RS232 (Ja-



CANBUS



RS485

THERMOCOUPLE INPUT				
Type	Range Min	Range Max	Resolution	Mistake %
<b>B</b>	50°C	1800°C	0,5°C	1,5
<b>R</b>	0°C	1400°C	0,5°C	1
<b>S</b>	0°C	1530°C	0,5°C	1
<b>J</b>	0°C	970°C	0,5°C	1
<b>E</b>	0°C	750°C	0,5°C	1
<b>N</b>	0°C	1300°C	0,5°C	1
<b>K</b>	0°C	1300°C	0,5°C	1
<b>T</b>	0°C	350°C	0,5°C	1

Channel number	3
Cold junction compensation	From 0°C to 60°C
Input impedance	470 KΩ
Sampling timing	300 msec

Compatible controller	Max DIGRIN/DITHERM modules connectable
GC315	2
GC310/350	2
GC400	2
GC500	2
GC600	10
HS315	2
DST4601/PX	16
DST4602	16
MC200	3
MC400	2
RN200	3

## LED INDICATORS

- > LED **ON WORK** Led running (if flashes means device operating).
- > LED **REMOTE** means communication is active.
- > LED **ALARM OUT** Common alarm / warning sensors temperature.
- > LED **TEMP 1** alarm or warning sensor temperature 1.
- > LED **TEMP 2** alarm or warning sensor temperature 2.
- > LED **TEMP 3** alarm or warning sensor temperature 3.

## READINGS

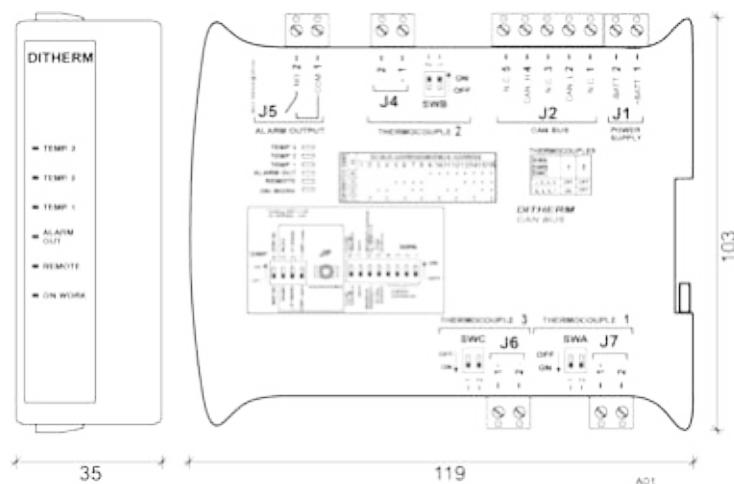
- Precision: 0.05%.
- Linearity: 0.05%.
- Thermal drift: 0.01% K.
- Response time (CAN signal): 200 ms.
- Digital acquisition resolution: 14bit.
- Reading resolution: 1/256.
- Display resolution (on DST4601PX): 1/10.
- Reading dynamics received: 0 to 100% with 8 tenth bits (1/256ths).

## TECHNICAL DATA

- Input voltage: 7...32Vdc.
- Current absorbed: 200mA (@ 13V).
- Consumption: Max 2,4W.
- Thermocouple input Insulation: 1000V.
- Mounting and shape: standard DIN Rail mounting system.
- Dimensions: 101(H) x 35(L) x 119(D)mm
- Weight: 165g

## ENVIRONMENTAL CONDITIONS

- > Operating temperature: -20°C +60°C.
- > Humidity: From 30 to 90 % (condensate free).
- > Temperature warehousing: -20°C +70°C.
- > Protection degree: IP20





# DIGRIN

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**Three insulated channels auxiliary module, for contemporary connection between PT 100 thermo-resistances.**

## DESCRIPTION

**DIGRIN** module allows to connect 3 independent and galvanic insulated thermo-resistances **PT100** type.

**DIGRIN** is available even in version **RS485** with **Modbus RTU** protocol. In that way it's possible to visualize the measures commencing from **PT100** using a supervision system like **SicesSupervisor** or similar.

This additional module is available for SICES controllers using **CANBUS** connection.

(More details in compatibility table below).

By means a configuration switch it's possible to select the protocol type (i.e. **J1939** or Ex-bus, Sices 'proprietary protocol).

It's possible to set thresholds of alarms and warnings for each temperature input having proper timing for warning.

## INPUTS, OUTPUTS AND AUXILIARY FUNCTIONS



1 Digital output  
(relay)



3 Analogue inputs



RS232  
(Jack-plug)



CANBUS



RS485

## CONNECTIONS

### J1939

Using J1939 protocol it's possible to use Nr.2 modules and with a maximum of 5 thermo-resistances for measuring bearing and windings alternator temperatures.

### RS485 Modbus RTU

DIGRIN is available even in version RS485 with Modbus RTU protocol. In that way it's possible to visualize the measures commencing from Pt100 using a supervision system like SicesSupervisor or similar.

### CANBUS Ex-bus protocol Sices 'proprietary protocol

Depending of the controller connected, using Ex-bus protocol, it's possible to connect up to 16 modules, as following.

Compatible controller	Max DIGRIN/DITHERM modules connectable
GC315	2
GC310/350	2
GC400	2
GC500	2
GC600	10
HS315	2
DST4601/PX	16
DST4602	16
MC200	3
MC400	2
RN200	3

## LED INDICATORS

- > LED **ON WORK** Led running (it flashes meaning the device is operating-
- > LED **REMOTE** It means the communication is active.
- > LED **ALARM OUT** Common alarm/warning sensors temperature.
- > LED **TEMP 1** It means alarm or warning sensor temperature 1.
- > LED **TEMP 2** It means alarm or warning sensor temperature 2.
- > LED **TEMP 3** It means alarm or warning sensor temperature 3.

## READINGS

### Thermo-resistance:

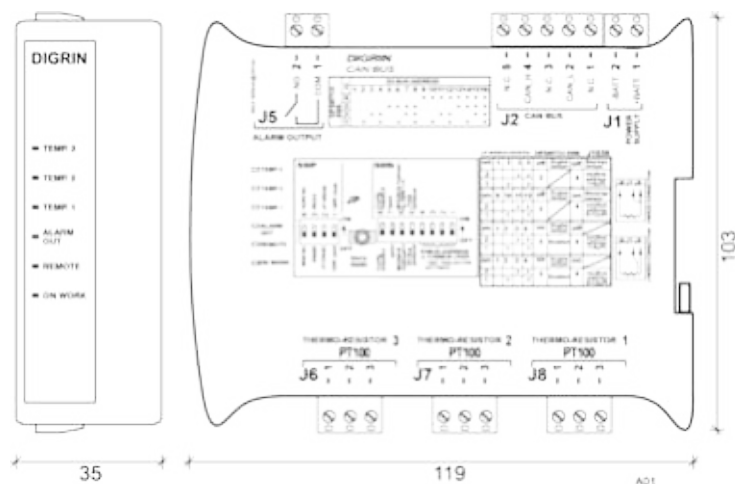
- Input type PT100.
- Range Min -70°C.
- Range Max 650°C.
- Resolution 0.1°C.
- Error 2 %.
- Channel number 3.
- Insulated 1000V.

## TECHNICAL DATA

- Voltage feeder: 7...32Vdc.
- Current consumption: Max 2,4W.
- Power consumption: 100 mA (@ 13V).
- Insulation: 1000V.
- Mounting and shape: standard DIN Rail mounting system.
- Dimensions: 101(H) x 35(L) x 119(D)mm.
- Weight: 165g.

## ENVIRONMENTAL CONDITIONS

- > Operating temperature: -20°C +60°C.
- > Humidity: From 30 to 90 % (condensate free).
- > Temperature warehousing: -20°C +70°C.
- > Protection degree: IP20





# DIVIT

## Auxiliary module for voltage and current signals acquisitions With 4 different, insulated channels.

### DESCRIPTION

**DIVIT** is an auxiliary module able to acquire voltage and current signals 0..05V - 0...10V and 0...10mA - 0...20mA current loop using four different and galvanic insulated channels and power lines.

**DIVIT** module can be used for acquiring 4 different measures by using the proper parameter set point.

For each channel, one descriptive alphanumeric string, can be set on the genset controller and define the measurement unit value acquired by the sensor. Both active and passive sensors can be used.

**DIVIT** is available in two versions: **Canbus** or Modbus **RS485** communication. Both versions have galvanic insulated communications lines.

An additional **RS232** interface (not insulated) is available by means jack for setting the device.

**DIVIT** is connected to SICES controllers via **Canbus**, using a proper **EX-BUS protocol**.

(More details in compatibility table below).

**DIVIT** module has a output connector for controlling the optional device **DITEL** module (8 additional output) either 12V or 24V.

In addition, by means **DIVIT** module it's possible to control 8 dry outputs/relays which are activated through thresholds and conditions, setting different parameters by means one RS232 serial port and Sices Board programming.

The device is mounted using a **standard DIN Rail mounting system** allowing a quick and simple installation.



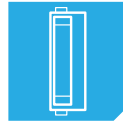
## INPUTS, OUTPUTS AND AUXILIARY FUNCTIONS



**RS232**  
*(jack-plug)*



**4 Analogue inputs**



**DITEL expansion module output**



**CANBUS version or RS485 version**

Compatible controller	Max. number of DIVIT modules connectable
<b>GC315</b>	1
<b>GC310/350</b>	1
<b>GC400</b>	1
<b>GC500</b>	1
<b>GC600</b>	5
<b>HS315</b>	1
<b>DST4601/PX</b>	8
<b>DST4602</b>	16
<b>MC200</b>	2
<b>MC400</b>	1
<b>RN200</b>	2

## READINGS

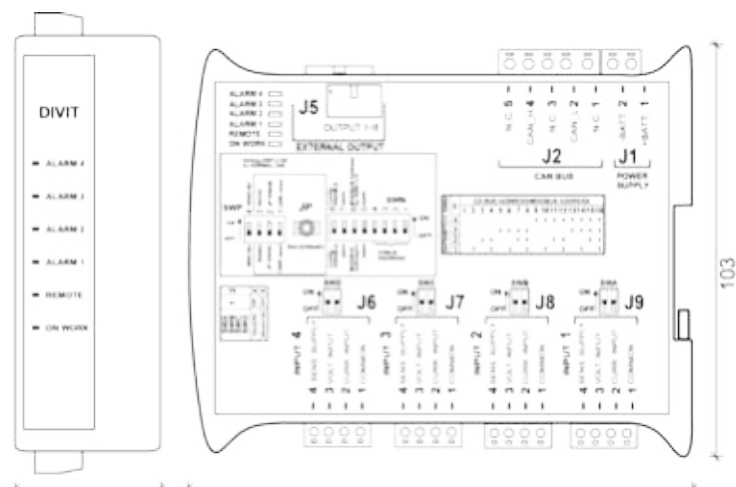
- Precision: 0.05%.
- Linearity: 0.05%.
- Thermal drift: 0.01% K.
- Response time (CAN signal): 400 ms.
- Digital acquisition resolution: 15bit.
- Reading resolution: 1/32.
- Reading dynamics transmitted from -273 to +1735 units with one decimal figure; position of decimal point position can be set.

## TECHNICAL DATA

- Input voltage: 7...32Vdc.
- Current absorbed: 100mA (@ 13V).
- Consumption: Max 2,4W.
- Reading channels insulation: 1000V.
- Live inputs: Monopole - Two Scales 0...5V and 0...10V - Input impedance < 1MΩ.
- Current inputs: Monopole - Two Scales 0...10mA and 0...20mA - Input impedance < 10Ω.
- Max input voltage: 25V.
- Max input current: 30mA.
- Mounting and shape: standard DIN Rail mounting system.
- Dimensions: 101(H) x 35(L) x 119(D)mm.
- Weight: 165g .

## ENVIRONMENTAL CONDITIONS

- > Operating temperature: -20°C +60°C.
- > Humidity: From 30 to 90 % (condensate free).
- > Temperature warehousing: -20°C +70°C.
- > Protection degree: IP20.





# DANOUT

**Auxiliary module able to provide voltage and current signals.**

## DESCRIPTION

**DANOUT** is an auxiliary module able to provide the following signals using four different channels and power lines:

- Voltage **0...5V** e **0...10V**
- Current loop **0...10mA** - **0...20mA** in modalità attiva o passiva.

This module is available in two versions: **Canbus** (using the proper EX-BUS protocol) or **Modbus RS485** communication.

Both versions have galvanic insulated communications lines. An additional **RS232** (not insulated) is available by means jack for setting the device.

Parameters setting can be managed directly from the front panel of the controller, or from the free **BOARDPRG3** programming software.

**DANOUT** can be connected to the following SICES genset controllers:

Compatible controller	Max. number of DANOUT modules connectable
GC315	1
GC310/350	1
GC400	1
GC500	1
GC600	4
HS315	1
DST4601/PX	0
DST4602	8
MC200	1
MC400	1
RN200	1

# INPUTS, OUTPUTS AND AUXILIARY FUNCTIONS



4 Analogue outputs



RS232 (Jack-plug)



CANBUS



RS485

## TECHNICAL DAT

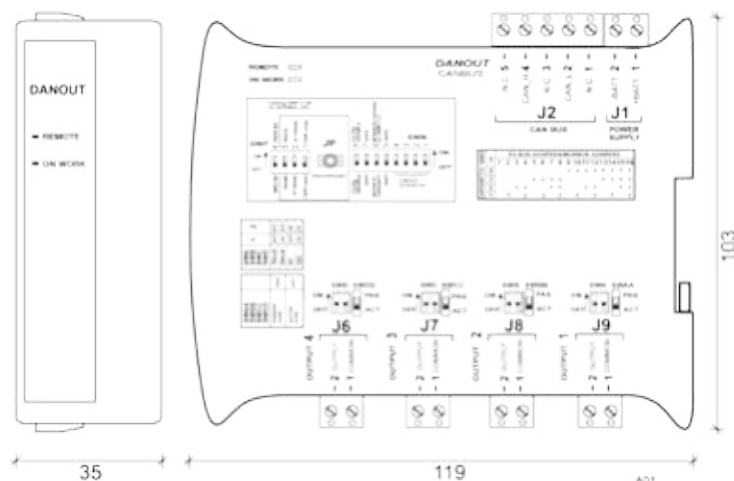
- Power supply voltage: 7...32Vdc.
- Current absorbed: Typ. 3.7W - Max 4.9W.
- Power supply consumption: Typ. 280mA (@ 13V) - Max 380 mA (@ 13V).
- Insulation of Input reading channels: 1000V.
- Voltage outputs: Monopolar; Two scales: 0...5V - 0...10V min. load impedance 20kΩ.
- Current outputs: Monopolar; Two scales: 0...10mA - 0...20mA max. load impedance 500kΩ.
- Mounting and shape: standard DIN Rail mounting system.
- Dimensions: 101(H) x 35(L) x 119(D)mm.
- Weight: 165g

## READINGS

- Precision: 0.05%.
- Linearity: 0.05%.
- Thermal drift: 0.01% K.
- Response time (CAN signal): 200 ms.
- Digital acquisition resolution: 14bit.
- Reading resolution: 1/256.
- Display resolution (on DST4601PX): 1/10.
- Reading dynamics received: 0 to 100% with 8 tenth bits (1/256).

## ENVIRONMENTAL CONDITIONS

- > Operating temperature: -20°C +60°C.
- > Humidity: From 30 to 90 % (condensate free).
- > Temperature warehousing: -20°C +70°C.
- > Protection degree: IP20,





# DITEL

## Additional expansion module for the digital inputs and outputs on supported SICES controllers.

### DESCRIPTION

**DITEL** is an electronic module able to extend the number of digital input/outputs of SICES genset controllers, available in two versions: **RS485** with Modbus RTU protocol and **CANBUS**.

Available **DITEL** modules:

- **CPU 16 Inputs module** (Code art. E61020944XXXX): Main **DITEL** module, includes **16 INPUTS**.
- **8 Outputs module** (Code art. E61020935XXXX): optional, needs the CPU module, includes **8 OUTPUTS**.

Maximum **two output modules can be contemporary connected** to one **DITEL** with CPU.

**DITEL** with CPU is always necessary even in case only some additional outputs, are required.

Each module is equipped with LED indicators which signal the status of the output or input.

Using **RS485** serial port or the proprietary **CANBUS** protocol, all status and I/O managed by **DITEL** are available even for external logics.

As alternative, **DITEL** allows to active the outputs based on the status received by the genset controller, it's connected to.

Regarding to the Inputs, **DITEL** CPU has 16 insulated Inputs having proper filters.

**DITEL** can be managed by any Control Device (PC or PLC and others) which use the same protocol.

The device is mounted using a **standard DIN Rail mounting system** allowing a quick and simple installation.

**DITEL** module is connectable with the following controllers:

Compatible controller	Max. number of DITEL modules connectable
GC315	2
GC310/350	1
GC400	2
GC500	1
GC600	4
HS315	2
DST4400	1
DST4601	1
DST4601/PX	2
DST4602	10
MC200	2
MC400	2
RN200	2

## INPUTS, OUTPUTS AND AUXILIARY FUNCTIONS

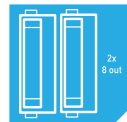


CANBUS version or RS485 version



16 Digital inputs

RS232  
(Jack-plug)



16 Digital outputs

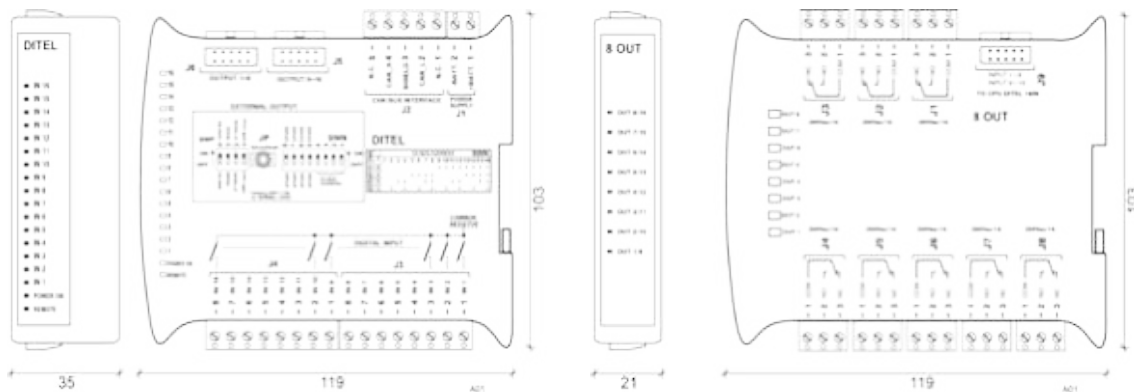
Up to 2x  
(8 Digital outputs modules) connectable

## TECHNICAL DATA

- Supply voltage: Main board: 7...32 Vdc.
- 12V Relay board: 9..16Vdc (holding voltage 3V).
- 24V Relay board: 18..30Vdc (holding voltage 5V).
- Power consumption: 5W (non-active inputs and outputs all active).
- Contacts outputs: 1NO, 1NC, 1COM.
- Contact rating: 5 A max, 250 V max.
- Operating temperature: -20 °C to 60 °C.
- Weight: 500g.
- Overall dimension: 85Wx120Lx125D mm.
- Panel mounting: by DIN bar EN50022.
- EMC: conformity to EN61326-1.
- Safety: built in conformity to EN61010-1.

## ENVIRONMENTAL CONDITIONS

- > Operating temperature: -20°C +60°C.
- > Humidity: From 30 to 90 % (condensate free).
- > Temperature warehousing: -20°C +70°C.
- > Protection degree: IP20





# DIPOT

## Digital potentiometer for current loop output signal

### DESCRIPTION

**DIPOT** (Digital Potentiometer) is an electronic device able to provide a current loop output signal up to  $\pm 20\text{mA}$ .

**DIPOT** can be used in many applications as an **alternative to traditional motorized potentiometers**, considering the signal output is galvanically isolated from the voltage of the device and from all the signalling commands.

**DIPOT** can be connected to different devices like speed governor and AVRs which needs a voltage or current inputs.

The adjustment of the output can be done with UP/DOWN commands via **Modbus** or either **CANBUS J1939**.

### INPUTS, OUTPUTS AND AUXILIARY FUNCTIONS



CANBUS version only



RS485 Version only



2 Analogue inputs



4 Digital inputs  
(as push buttons)



1 Analogue output  
(Current loop mA)

## CONFIGURATION

Three configurations available:

- From 0 to +20mA.
- From -10mA to +10mA.
- From -20mA to +20mA.

Available versions:

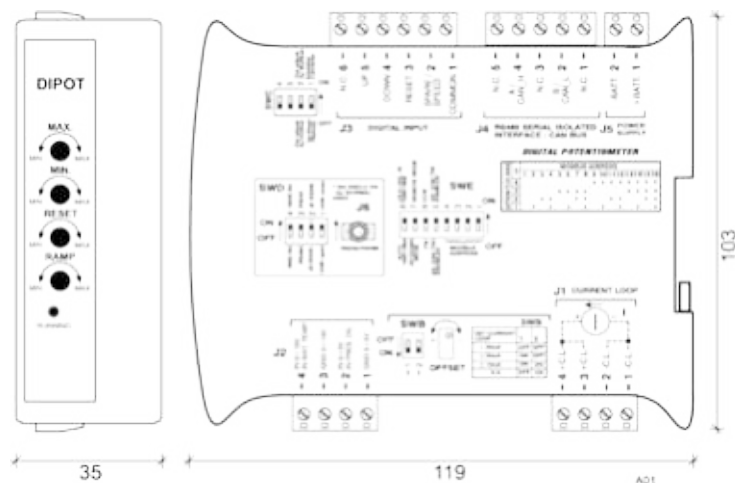
- **DIPOT RS485** 0...5V - 0...10V  
Cod. E6102094300XX.
- **DIPOT RS485** Temperature and Pressure VDO  
Cod. E6102094301XX.
- **DIPOT CANBUS** 0...5V - 0...10V  
Cod. E6102094302XX.
- **DIPOT CANBUS** Temperature and Pressure VDO  
Cod. E6102094303XX.

## TECHNICAL DATA

- Power supply voltage: 7,5...32 Vdc.
- Voltage feeder: 12Vdc or 24Vdc.
- Consumption: 8mA - 10V.
- Dimensions: 35Wx119Lx101mm.
- Weight: 500g.
- Mounting and shape: standard DIN Rail mounting system.
- EMC: conformity to EN61326-1.
- Safety: built in conformity to EN61010-1.

## ENVIRONMENTAL CONDITIONS

- > Operating temperature: -20°C +60°C.
- > Humidity: From 30 to 90 % (condensate free).
- > Temperature warehousing: -20°C +70°C.
- > Protection degree: IP20







# DIRES

## Digital resistor for motorized resistor devices

### DESCRIPTION

**DIRES** is an electronic and digital resistor whose functions can be compared to a motorized resistor as well.

If the AVR needs a motorized resistor, which is often an expensive product, now it's possible to replace it using the electronic resistor called **DIRES**.

**DIRES** is totally controlled by an electronic micro logic and it uses **R-2R** operation logic.

The resistors switching is made by means relays, which are guarantee of a complete insulation either of feeder and control line both digital and serial ones.

### INPUTS, OUTPUTS AND AUXILIARY FUNCTIONS



RS485



4 Digital inputs  
(as push buttons)



1 Analogue output  
(Variable resistor)

## FEATURES

In total 8 switch relays are used, allowing therefore 256 regulation levels.

The available versions have the following nominal resistance values: **640Ω - 1.3kΩ - 2.6kΩ - 5kΩ - 10kΩ**.

The minimum obtainable resistance value, independently of the resistor nominal value, is fixed at about 5Ω for the **640Ω** version; while is **20Ω** for the other versions.

Each step of up and down increases or decreases linearly the value of the resistance of 1/256 of the nominal value.

**DIRES** can be used either 12V or 24V.

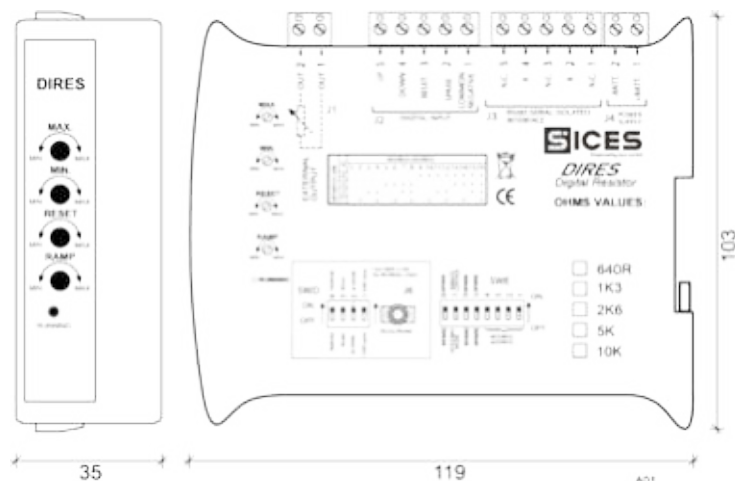
The device is mounted using a DIN guide.

## TECHNICAL DATA

- Input Voltage 7,5 ÷ 32Vdc.
- Current absorbed 80mA (@ 10V).
- Dimensions: 103(H) x 35(L) x 119(D)mm.
- Weight 165g.
- Protection degree IP 20.

## ENVIRONMENTAL CONDITIONS

- > Operating temperature: -20°C +60°C.
- > Humidity: From 30 to 90 % (condensate free)
- > Temperature warehousing: -20°C +70°C.





[sices.eu](http://sices.eu)

## **S.I.C.E.S. SRL**

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100% PROUDLY ITALIAN

A small graphic of the Italian flag, consisting of three horizontal stripes of green, white, and red, is positioned below the text.