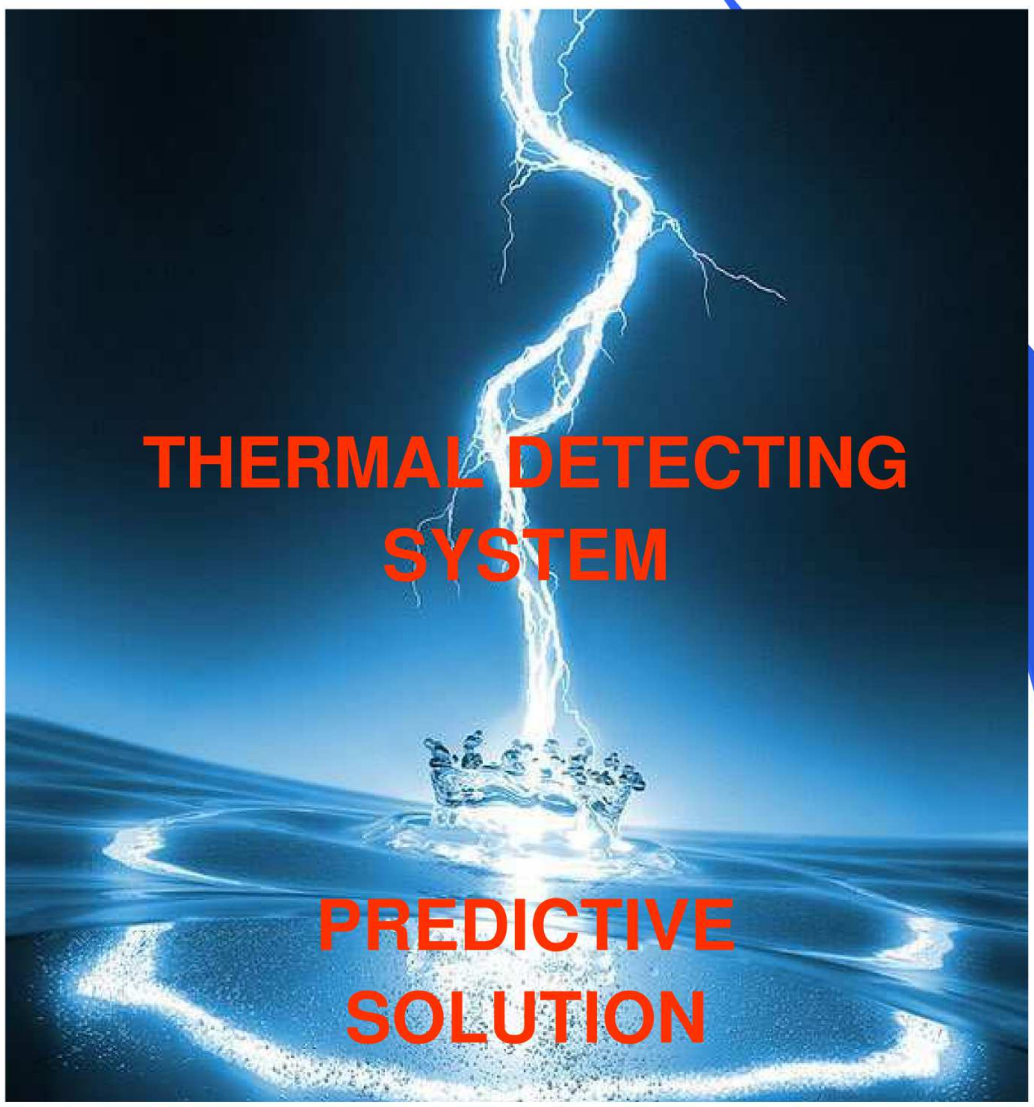
TDS thermal detecting system

TDS 10.06.2019

ELECTRONSYSTEM MD

- *Design and products for safety problem solving in low and high voltage electrical installations*



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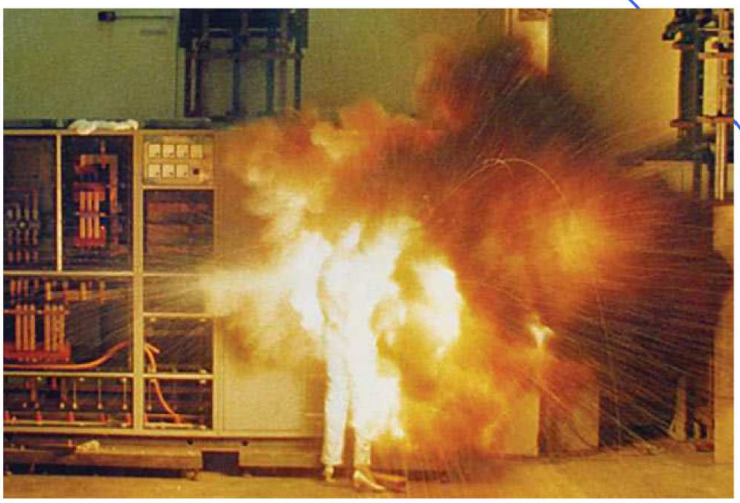
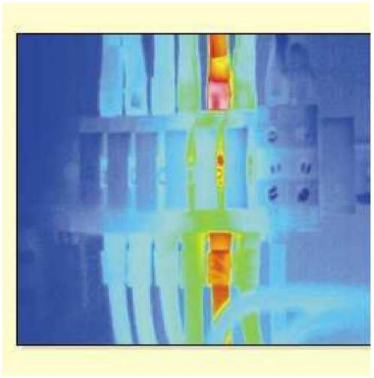
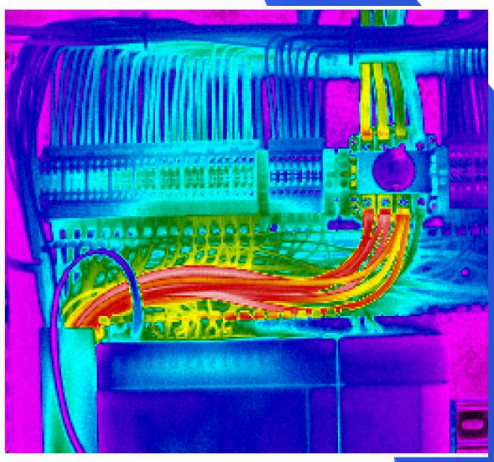


THERMAL DETECTING SYSTEM





PREDICTIVE SOLUTION

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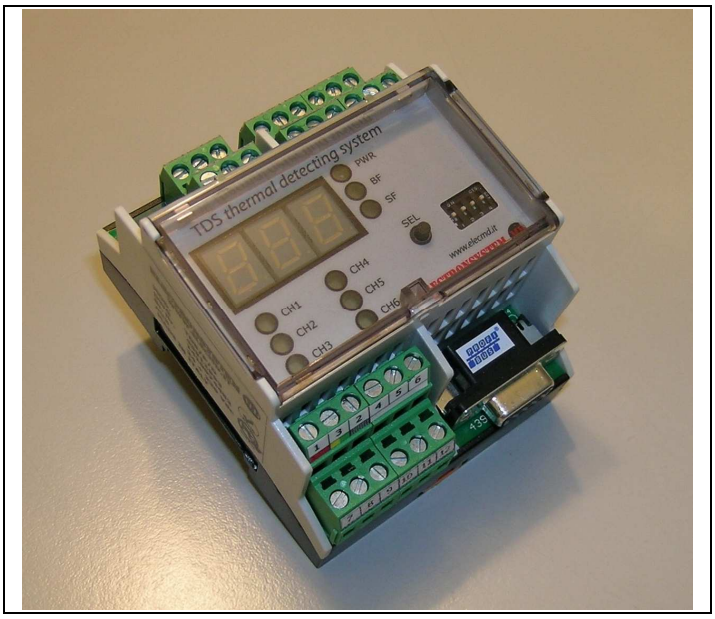


TDS devices are useful to detect the temperature of hazard part or live part of medium and high voltage apparatus due to contact-less technology.

The very small and reliable sensor can be easily mounted near target zone and is remoted to control unit by electrical shielded cable.

The control unit is locally operated and can manage up to 6 independent channels-sensors in order to cover a wide area of cubicle.

The local indication allow operator to have a clear and fast understanding of thermal situation inside cubicle.

Each alarm is indicated by red led and a selectable led display could be scrolled to show in real time the temperature detected by each sensor.

A customization of alarm and lock temperature is available on front of device by selecting the dip-switch.

Digital transmission by Modbus RTU or Profibus DP-V0 is available if a net is required.

Standard changeover contacts are also available for remoting over-temperature dangerous signalling.

A realtime diagnostic supervises both the device and sensors and allow to get a safe system: if a failure is occurring a specific changeover contact is operated.

TDS/x/x

Technical features

Rated input voltage :.....24÷220 VDC
Power consumption:…….. 2W max
Input :.....…1-6 Thermopile sensors
Output:……1x changeover contact for alarm
……1x changeover contact for lock
……1x changeover contact for failure
Digital output: …Modbus RTU RS485, Profibus DPV0
Local indication: …… PWR aux power on
1-6 CHX led with multicolour indication
Green: temperature OK
Yellow: temperature ALARM
Red: temperature LOCK
Temperature Thresholds:..... selectable by dip.swtich
Electrical connection: …..electrical shielded bus cable
Max distance link:……10m
Temperature range :..... -30°C ÷ 70°C
IP degree protection :.....control unit IP54
…… sensor IP65
Mounting arrangement:……DIN RAIL

Sensor Features
Technology:…microcontrolled contactless pyrometer
Output:……amplified and compensated signal
Temperature reading: .....-30°C – 250°C
Factory temperature compensation
Accuracy……+/- 5°C typical @ mid range
Spot to ratio: ……8:1
Type of measurement: ….....area integration on spot
Response time:……..0.2s
Max link distance: ……10m
Surface of object:……dark and matt*
* other reflective surfaces could reduce accuracy

Relay features
Contact material :.....Ag+Au clad
Rated current /Max peak current: ……1A
Rated voltage/Max switching voltage:……30/110 Vdc
Breaking capacity DC1 30/110:…….. 1/ 0.3 A
Minimum switching load:……....10microA 10mVDC
Mechanical life:……5*10^7 cycles
Electrical life @ 1A 30Vdc:…… 2X*10^5 cycles
Insulation between coil and contacts:……..1,8kVrms
Dielectric strength between open contacts:..0,75kVrms

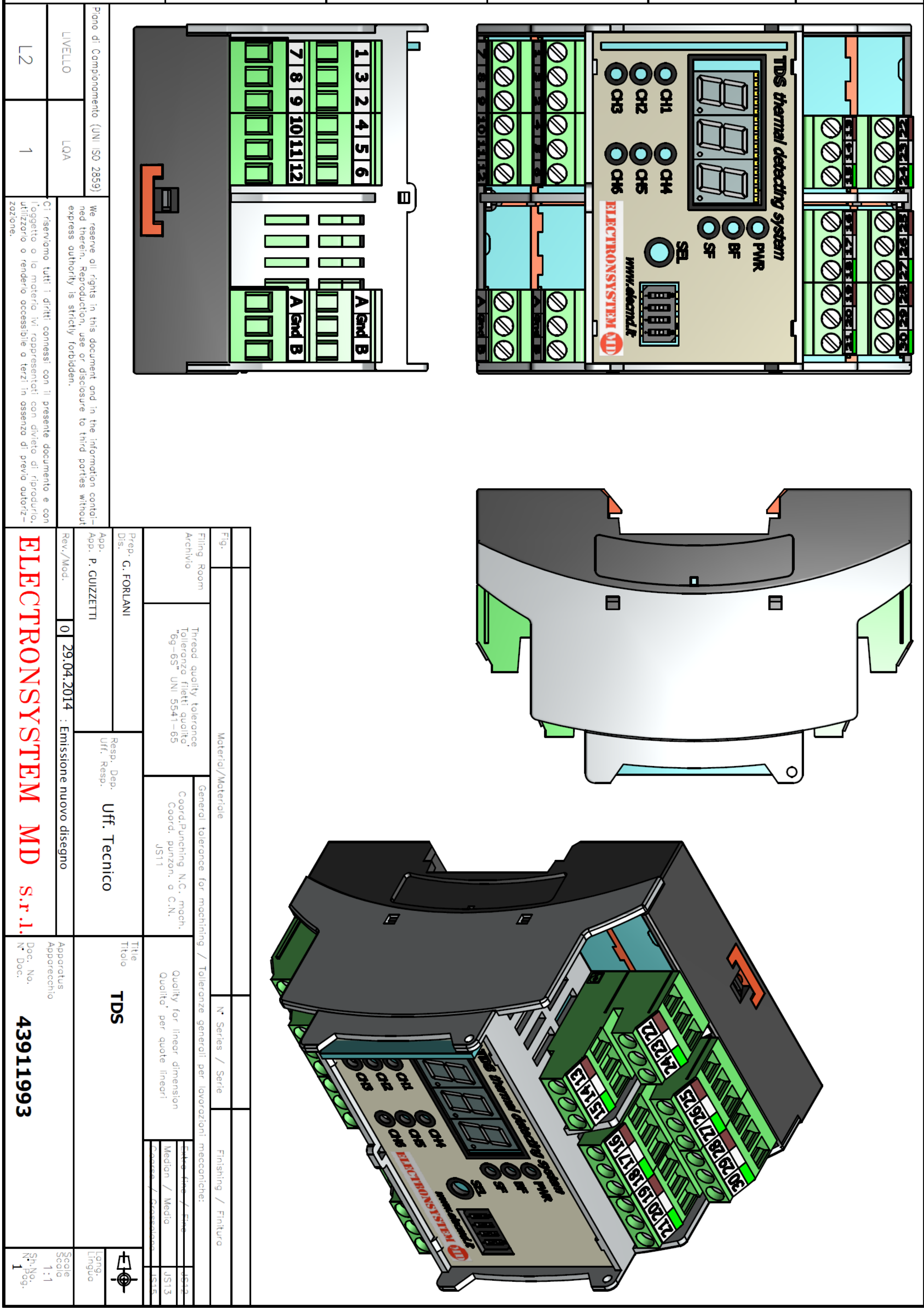
Directives and standards applicable

EMC directive :…… 2004/108/EC
RoHS directive :…… 2002/95/EC
Low voltage directive: ……2006/95/EC
EN 55011: ……(ISM) radio-frequency equipment
EN 61000-4-2: ……Imm. to electrostatic discharge (ESD)
EN 61000-4-3: …Imm. to radiated RF electromagnetic fields
EN 61000-4-4:……Imm. to electrical fast transients - Burst
EN 61000-4-5: ……Immunity to Surge
EN 61000-4-6: ……Imm. to induced by RF fields
EN 61000-4-11: .Imm. to voltage dips and short interruptions
EN 61000-6-2:2005: ……(EMC) - Industrial emission
EN 61000-6-3:2007: ……(EMC) - Residential emission
EN 61000-3-3:2002: ……(EMC) - Flicker

TDS thermal detecting system

TDS 10.06.2019

Rev./Mod	Data	Descrizione
A	20.10.2014	FIXED AUX PIN CONNECTOR UPDATED TABLE BUS
B	21.10.2014	FIXED PIN CONNECTOR
C	10.06.2019	ADD MODBUS VERSION



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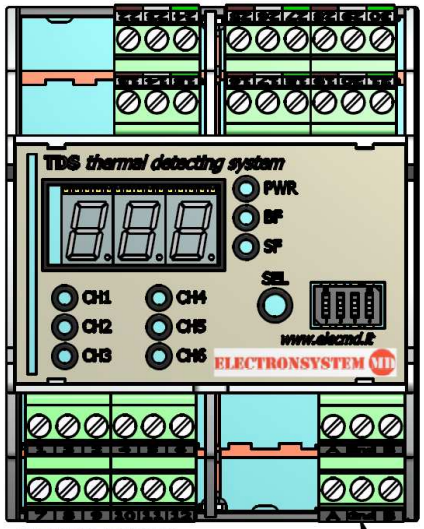
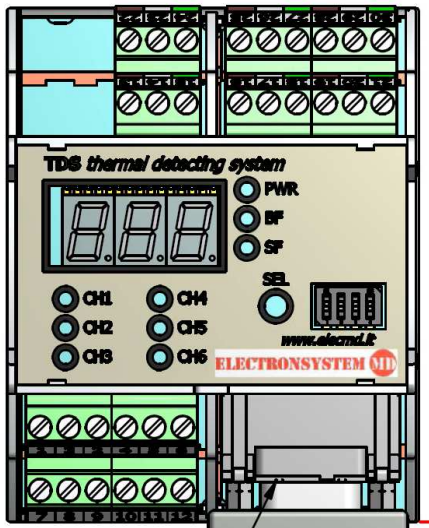


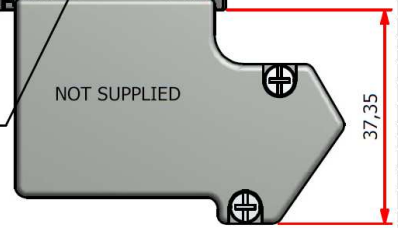
TDS/M/D MODBUS

MODBUS CONNECTION



TDS/P/D PROFIBUS

PROFIBUS CONNECTION



FEATURES

- 6 x indipendents temperature input sensors dwg. 43911994 IR contactless sensor
- Wide aux voltage: 24÷220 Vdc
- Local indications of alarm and lock for each input channel
- 1 x remote contact for indication of over heating alarm
- 1 x remote contact for indication of over heating lock
- LED display for local indication of temperature for each channel
- 3 x preset thresholds for alarm
- 3 x preset thresholds for lock

PURCHASE CODE

Description : Thermal Detecting System

Code : TDS/ □ / □

- D: version with LED Dislpay
- _: version without LED display
- C: output contacts
- P: output contacts + Profibus
- M: output contacts + Modbus

BF	SF	FAULT CONDITION
Off	Off	Everything OK
On Blinking	Off	No communication
Off	On	Parameter NOT OK
On	Off	Configuration NOT OK

Contact scheme

1 (+)	AUX + (24 ÷ 220 Vdc)	
2 (−)	AUX −	
3 ⏚	Earth	
5 / 4	6 ERROR	(normally open, close with error or without auxilary power)
8 / 7	9 ALARM	(normally open, close with alarm)
11 / 10	12 LOCK	(normally open, close with alarm)
13 (+)	INPUT SENSOR 1	dwg 43911994
14 (−)		
15 (OUT)		
16 (+)	INPUT SENSOR 2	dwg 43911994
17 (−)		
18 (OUT)		
19 (+)	INPUT SENSOR 3	dwg 43911994
20 (−)		
21 (OUT)		
22 (+)	INPUT SENSOR 4	dwg 43911994
23 (−)		
24 (OUT)		
25 (+)	INPUT SENSOR 5	dwg 43911994
26 (−)		
27 (OUT)		
28 (+)	INPUT SENSOR 6	dwg 43911994
29 (−)		
30 (OUT)		
A	A(+)/TR(+)	MODBUS CONNECTION
GND	Modbus GND	
B	B(−)/TR(−)	

Front panel indication

- PWR: Auxiliary power on
  - Green blinking: OK
  - Red: error
- BF: Bus Fault
- SF: System Fault
- CHx
  - Alarm CHx indication
    - Green: CH OK
    - Red: CH over heated lock
    - Yellow: CH heated alarm
- SEL
  - Single press: Reset/address⬆
  - Continuous Press: Set IP address

Temperature Threshold selection

Alarm	Lock
ON 1 2 — 90° C	3 4 — 110° C
ON 1 2 * — 115° C	3 4 * — 120° C
ON 1 2 — 120° C	3 4 — 140° C

* standar settings

** different thresholds on request

Piano di Campionamento (UNI ISO 2859)	
LIVELLO	LQA
L2	1

Fig. | Material/Materiale | N° Series / Serie | Finishing / Finitura

Filing Room Archivio | Thread quality tolerance Tolleranza filetti qualita' "6g-6S" UNI 5541-65 | General tolerance for machining / Tolleranze generali per lavorazioni meccaniche: Coord.Punching N.C. mach. Coord. punzon. a C.N. JS11 | Quality for linear dimension Qualita' per quote lineari | Extra fine / Fine JS12 | Median / Media JS13 | Coarse / Grossolana JS15

Prep. Dis. G. FORLANI

App. App. P. GUIZZETTI

Resp. Dep. Uff. Resp. Uff. Tecnico

Title Titolo **TDS**

Lang. Lingua

Rev./Mod. 0 29.04.2014 : Emissione nuovo disegno

Apparatus Apparecchio

Scale Scala 1:1

Doc. No. N° Doc. **43911993**

Sh.No. N° Pag. 2

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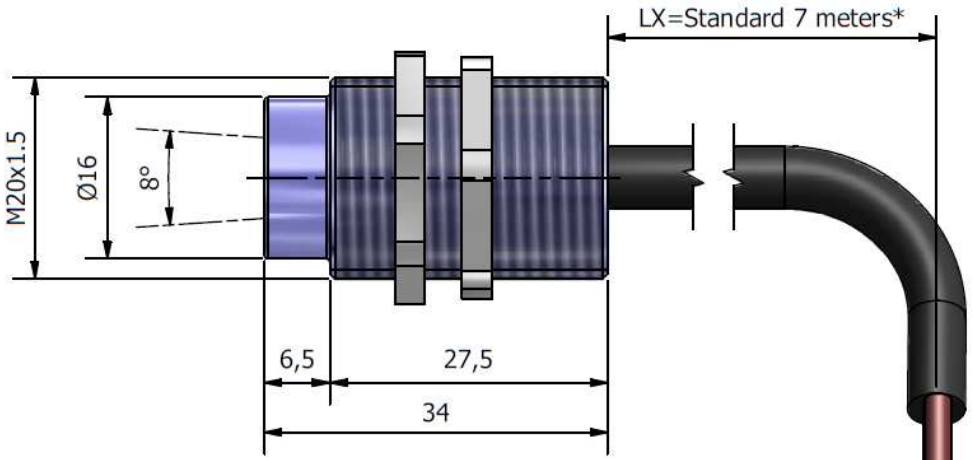

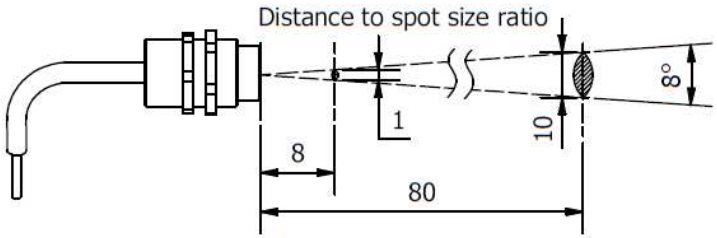

Distance to spot size ratio	
Distance	Spot size
8	1
80	10
160	20

Green	Out
White	- Vdc
Brown	+ Vdc

FEATURES:
- Small
- Low cost
- Non contact infrared sensor
- Ambient temperature compensated
- Factory calibrated
- Amplified output - > robust output signal even with EMI
- Thermopile technology
- Immune to sun or halogen lamp* (G9 filter on request)

DATA:
- Max temperature object: 300°C
- Response time: 150 msec
- Optical view cone: 8°
- Distance to spot size ratio: 8:1
- Factory calibrated
- Output: amplified analog signal
- Input: 3 wireS

Note: for a better accuracy the target spot must be matt and dark; black tape is suggested
* other lenghts on request

Fig.	Material/Materiale	N° Series / Serie	Finishing / Finitura
Filing Room Archivio	Thread quality tolerance Tolleranza filetti qualita' "6g-6S" UNI 5541-65	General tolerance for machining / Tolleranze generali per lavorazioni meccaniche: Coord.Punching N.C. mach. Coord. punzon. a C.N. JS11	Quality for linear dimension Qualita' per quote lineari: Extra fine / Fine JS12; Median / Media JS13; Coarse / Grossolana JS15
Prep. Dis. M. Vescovi App. App. M. Bosisio	Resp. Dep. Uff. Resp. Uff. Tecnico	Title Titolo **INFRARED SENSOR**	Lang. Lingua
Rev./Mod. 0 13/06/2014 : Emissione nuovo disegno		Apparatus Apparecchio	Scale Scala 1:1
ELECTRONSYSTEM MD S.r.l.		Doc. No. N° Doc. **43911994**	Sh.No. N° Pag. 1

Piano di Campionamento (UNI ISO 2859)	
LIVELLO	LQA
L2	1

ELECTRONSYSTEM MD

TDS thermal detecting system

TDS 10.06.2019

Table of Telegram

Registry	Information	Type	Function
Reg_0	ID slave	Signed Int	Read/Write
Reg_1	Temperature CH1 [°C/10]	Signed Int	Read only
Reg_2	Temperature CH2 [°C/10]	Signed Int	Read only
Reg_3	Temperature CH3 [°C/10]	Signed Int	Read only
Reg_4	Temperature CH4 [°C/10]	Signed Int	Read only
Reg_5	Temperature CH5 [°C/10]	Signed Int	Read only
Reg_6	Temperature CH6 [°C/10]	Signed Int	Read only
Reg_7	CH1 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	Signed Int	Read only
Reg_8	CH2 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	Signed Int	Read only
Reg_9	CH3 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	Signed Int	Read only
Reg_10	CH4 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	Signed Int	Read only
Reg_11	CH5 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	Signed Int	Read only
Reg_12	CH6 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	Signed Int	Read only
Reg_13	Alarm CH1-CH6 (1=ON, 0=OFF)	Binary	Read only
Reg_14	Lock CH1-CH6 (1=ON, 0=OFF)	Binary	Read only
Reg_15	Alarm status (1=ON, 0=OFF)	Signed Int	Read only
Reg_16	Lock status (1=ON, 0=OFF)	Signed Int	Read only
Reg_17	Alarm level [°C/10]	Signed Int	Read only
Reg_18	Lock level [°C/10]	Signed Int	Read only
Reg_19	Life signal (seconds)	Signed Int	Read only
Reg_20	Rev.	Signed Int	Read only

Protocol settings

ADDRESS	**130 default**
Protocol	**Modbus RTU**
Speed	**19200 Baud**
Data	**8 bit**
Parity	**Even parity**
Stop	**1 bit stop**

Example

Registry	Description	Bit reading [bit]	Value	Unit
0	ID slave	130	130	
1	Temperature CH1 [°C/10]	168	16,8	[°C]
2	Temperature CH2 [°C/10]	210	21	[°C]
3	Temperature CH3 [°C/10]	480	48	[°C]
4	Temperature CH4 [°C/10]	1212	121,2	[°C]
5	Temperature CH5 [°C/10]	150	15	[°C]
6	Temperature CH6 [°C/10]	1800	180	[°C]
7	CH1 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	1	1	
8	CH2 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	1	1	
9	CH3 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	1	1	
10	CH4 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	2	2	
11	CH5 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	1	1	
12	CH6 Sensor status (1=OK, 2=NOT OK, 4=HIGH)	4	4	
13	Alarm CH1-CH6 (1=ON, 0=OFF)	0000 0000 0010 1000		
14	Lock CH1-CH6 (1=ON, 0=OFF)	0000 0000 0010 0000		
15	Alarm status (1=ON, 0=OFF)	1	1	
16	Lock status (1=ON, 0=OFF)	1	1	
17	Alarm level [°C/10]	1200	120	[°C]
18	Lock level [°C/10]	1400	140	[°C]
19	Life signal (seconds)	615	615	[seconds]
20	Rev.	1	1	

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Accessory to facilitate the installation of IR probes