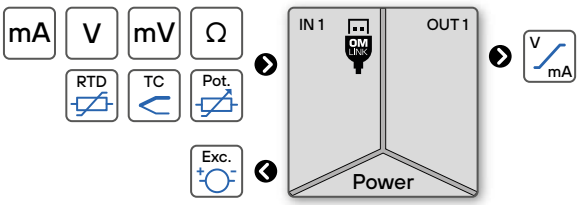
OMX 311UNI

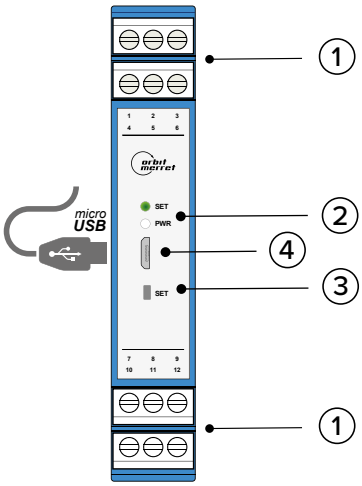
Digital DIN rail mounted signal convertor

MULTIFUNTION INPUT (DC, PM, RTD, T/C, DU)



1 Description

- Multifunction input (DC, PM, RTD, T/C, DU)
- Configurable type and measuring range
- Analogue output, passive/active
- Quick configuration by DIP switch
- PC configurable via USB port
- Excitation 24 VDC
- Galvanic isolation 2.5 kVAC
- Simple instalation to DIN rail



Legend

① Connectors
② RGB Status LED
③ Control button
④ microUSB port for PC connection

LED INDICATION

PWR	SET	STATUS
●		Device is running
●		Device error - processor
●	○	Tare function is activated
●	●	Sensor error
●	●	Simulation mode is activated

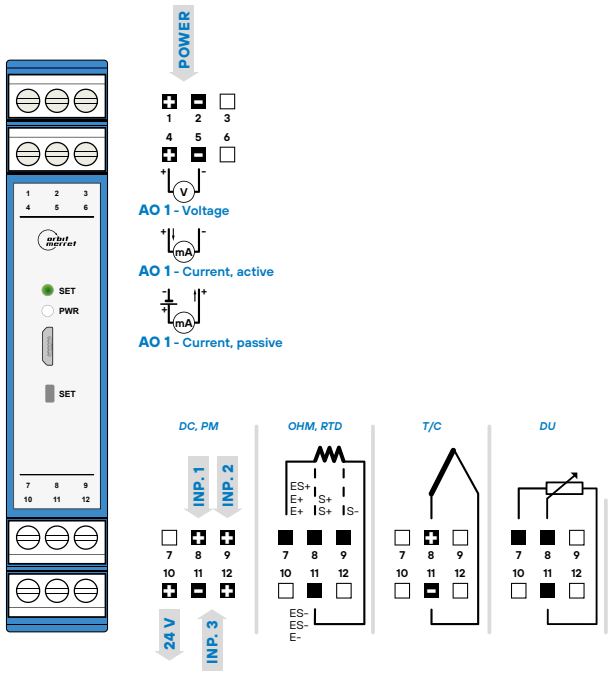
Note

There is galvanic connection between USB connector and input!
In case you need to configure the unit while the input signal is connected, the use of a galvanic isolated OM USB-ISO convertor is recommended..

⚠ DANGER ⚠	⚠ WARNING ⚠
HAZARD OF ELECTRICAL SHOCK - Disconnect all power and other supply lines before servicing equipment Failure to follow this instruction may result in death or serious injury.	**EQUIPMENT OPERATION HAZARD** - Do not use this product in safety critical system - Do not disassemble, repair or modify this product - Do not operate beyond the recommended operating environment Failure to follow these instructions may result in death, serious injury, or equipment damage.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by ORBIT MERRET for any consequences arising out of the use of this device.

2 Connection



CONNECTION

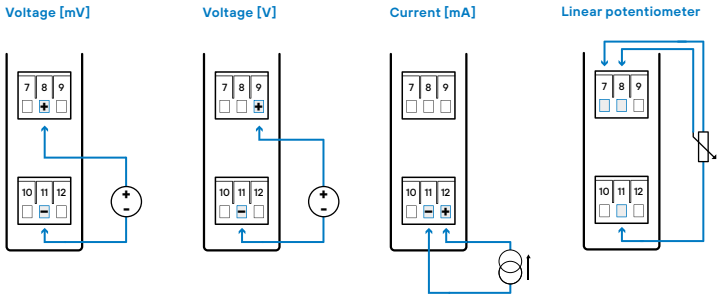
TYPE	INPUT U1	INPUT U2	INPUT I
DC	±60/±75/±100/± 150 mV ±300/± 1000 mV	±20/±40 V	±100 mA
PM		±2/±5/±10 V	0...5/20 mA, 4...20 mA
OHM	0...0.1/0.3/1/3/10/30/100/300 kΩ		
Pt	Pt 50/100/500/1000		
Cu	Cu 50/100		
Ni	Ni 1000/10000		
NTC	NTC 2/2.2/10/12/20kΩ		
PTC	KTY 81		
T/C	J/K/T/E/B/S/ R/N/L		
DU	Linear potentiometer, > 500 Ω		

mm *in*	mm / *in.* 8 / *0.32*
mm² / AWG	0.05...2.5 / 30...12
1.5 Nm *13.2 lb-in*	Ø 3.5 mm *0.14 in*

Note

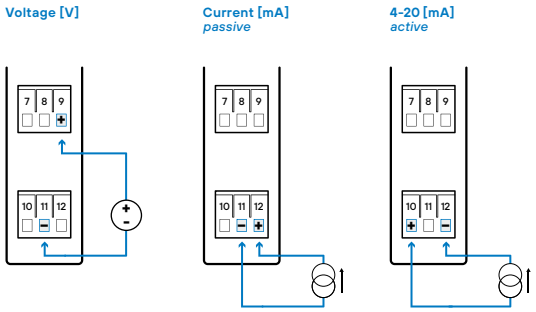
Contactors, high power electric motors, frequency drives and other power devices should not be in a close proximity of the meter. Input signal leads (measured value) should be seperated from all power lines and power devices. Even though the device has been designed and tested according to standards for industrial environment, we strongly advise to adhere to the above presented rules.

Input wiring diagram for type DC and DU



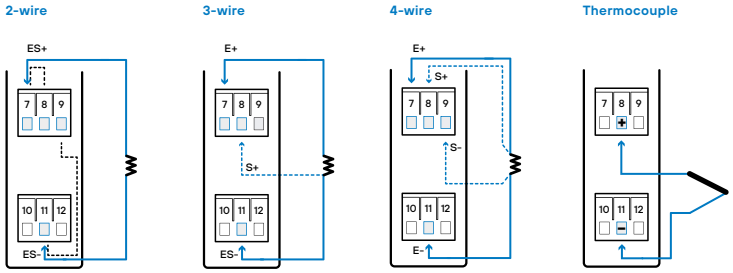
RANGE		DC
0...60/75/100/150/300 mV 0...1000 ±60/±75 mV ±100/150/300 mV ±1000	Input 1	8
0...20/±40 V ±20/±40 V	Input 2	9
0...100 mA ±100 mA	Input 3	12

Input wiring diagram for type PM



RANGE		PM
Passive 0...5/20 mA ±5/±20 mA 4...20 mA	Input 3	12
Active 4...20 mA	Input 3	10
0...2/5/10 V ±2/±5/±10 V	Input 2	9

Input wiring diagram for type OHM, Pt, Ni, Cu, PTC, NTC and TC



In case 2-wire connection is used either for RTD or for OHM measurement, it is absolutely essential to interconnect the unconnected terminals (7+8 / 9+11)

RANGE		T/C
J/K/T/E/B/S/R/N/L/XK	Input 1	8

3 Device setting

For a quick and simple set-up you can use the DIP switch

1	2	3	4	5	Input - Type
					Setting via OM Link
•					Voltage [V]
•	•				Current [mA]
•		•			Voltage [mV]
	•	•			Resistance 2/4 w
•	•	•			Resistance 3 w
			•		Linear potentiometer
•			•		Pt100/3850 ppm, 2/4 w [EU]
	•		•		Pt100/3850 ppm, 3 w [EU]

1	2	3	4	5	Input - Type
•	•		•		Pt100/3920 ppm, 2/4 w [US]
		•	•		Pt100/3920 ppm, 3 w [US]
•		•	•		Pt100/3910 ppm, 2/4 w [RU]
	•	•	•		Pt100/3910 ppm, 3 w [RU]
•	•	•	•		Pt1000/3850 ppm, 2/4 w [EU]
				•	Pt1000/3850 ppm, 3 w [EU]
•				•	Ni1000/5000, 2/4 w
	•		•	•	Ni1000/5000, 3 w
•			•	•	Ni1000/6180, 2/4 w
		•		•	Ni1000/6180, 3 w

1	2	3	4	5	Input - Type
•		•		•	NTC 10k/3435, 2/4 w
	•	•		•	NTC 10k/3435, 3 w
•	•	•		•	NTC 20k/4263, 2/4 w
			•	•	NTC 20k/4263, 3 w
			•	•	Thermocouple - B
	•		•	•	Thermocouple - E
•	•		•	•	Thermocouple - J
	•	•	•	•	Thermocouple - K
•	•	•	•	•	Thermocouple - R
	•	•	•	•	Thermocouple - S
			•	•	Thermocouple - T

6	7	8	Input - Range Voltage [V]	Voltage [mV]	Current	Resistance	Pt/Ni	T/C	NTC/PTC
			0...5 V	0...60 mV	0...5 mA	100 Ω	0°...100°C	0°...100°C	0°...50°C
•			0...10 V	0...150 mV	0...20 mA	300 Ω	0°...200°C	0°...200°C	0°...100°C
	•		0...20 V	0...1000 mV	4...20 mA	1 kΩ	0°...300°C	0°...500°C	0°...200°C
•	•		0...40 V	±60 mV	5...0 mA	3 kΩ	0°...400°C	0°...800°C	-50°...50°C
		•	5...0 V	±150 mV	20...0 mA	10 kΩ	0°...500°C	0°...1000°C	-50°...100°C
•		•	10...0 V	±1000 mV	20...4 mA	30 kΩ	0°...800°C	-100°...100°C	
	•	•	±5 V		±5 mA	100 kΩ	0°...1000°C	-100°...200°C	
•	•	•	±10 V		±20 mA	300 kΩ	-50°...100°C	-100°...300°C	

9	10	Output - Range
		0...10 V
•		0...20 mA [Act.]
	•	4...20 mA [Act.]
•	•	4...20 mA [Pas.]

Analogue input range setting, TEACH-IN

1. by a long press (>2s) of the **SET** button enter the configuration mode - LED **PWR** yellow and LED **SET** turquoise
2. connect the signal of the desired value for the minimum of the range **RNG.MIN.** to the input of the converter (for example 5 mA)
3. by a long press (>2s) of the **SET** button this value is set - LED **PWR** yellow, LED **SET** purple
4. connect the signal of the desired value for the maximum of the range **RNG.MAX.** to the input of the converter (for example 19,5 mA)
5. by a long press (>2s) of the **SET** button this value is set - LED **PWR** yellow, LED **SET** green
6. by a short press of the **SET** button return to the standard working mode - LED **PWR** green

Setting of **Analogue input TEACH-IN** is active only when DIP switches No. 1-5 are in the "0" position, i.e. **Setting via OM Link**

Tare settings

1. by a short press of the **SET** button enter configuration of Tare - LED **PWR** white and LED **SET** turquoise
2. by a long press (>2s) of the **SET** button set the current value of Tare - LED **PWR** white, LED **SET** green
3. by a short press of the **SET** button return to the standard working mode with active Tare - LED **PWR** green, LED **SET** white

Minimum range of **Analogue output** for U/I inputs signals is pre-set as unipolar, i.e. "0 V/mA" or "4 mA".
If required, it is also possible to enter a negative value of the maximum in the minimum, i.e. zero will be in the middle of the selected range.

A short press at any time during the calibration will end the calibration without saving. After one minute of inactivity, the calibration is terminated without saving and both LEDs return to the basic state

4 Configuration from PC using OM Link SW

Inputs

Reset of internal values	CLEAR	CL. TAR. / CL. LEA.	Clear tare, Clear resistance of 2-wire leads
Sampling rate	READ./S.	1 / 2 / 5 / 10 / 20 / 50 / 100	
Type of measurement	TYPE	DC / PM / OHM / Temperature / Potentiometer	
Measuring range	M.RANGE	60mV / 75mV / 100mV / 150mV / 300mV / 1000mV / 20V / 40V / 100mA	Measuring range selection (Type of measurement - DC)
	M.RANGE.	2V / 5V / 10V / 0-5mA / 0-20mA / 4-20mA	Measuring range selection (Type of measurement - PM)
	M.RANGE	100 / 300 / 1 k / 3 k / 10 k / 30 k / 100 k / 300 k	Measuring range selection (Type of measurement - OHM)
	M.RANGE.	0-100%	Measuring range selection (Type of measurement - Potenciometr)
Temperature sensor	SENSOR	Pt / Ni / Cu / NTC / PTC / T/C	Temperature sensor selection (Type of measurement - Temperature)
Temperature sensor type	TM. TYPE	EU 100 / EU 500 / EU1000 / US 100 / RU 46 / RU 50 / RU 100	Temperature sensor selection (Temperature sensor - Pt)
	TM. TYPE	5.0 1k / 6.2 1k / 5.0 10k / 6.2 10k	Temperature sensor selection (Temperature sensor - Ni)
	TM. TYPE	4.26 50 / 4.28 50 / 4.26 k1 / 4.28 k1	Temperature sensor selection (Temperature sensor - Cu)
	TM. TYPE	NTC 1 / NTC 2 / NTC 3 / NTC 4 / NTC 5 / NTC 6	Temperature sensor selection (Temperature sensor - NTC)
	TM. TYPE	KTY82.1	Temperature sensor selection (Temperature sensor - PTC)
	TM. TYPE	B / E / J / K / L / N / R / S / T / XK	Temperature sensor selection (Temperature sensor - T/C)
Connection	CONN.	2-WIRE / 3-WIRE / 4-WIRE	OHM, Temperature - Pt, Ni, Cu, NTC, PTC
	CONN.	1TC-IN / 2TC-IN / 1TC-EX / 2TC-EX	Cold junction compensation, (Temperature - T/C)
Temperature unit	T. UNIT.	°C / °F	Temperature
Cold junction compensation	CJC	0...99,9 °C	Temperature - T/C
Input offset	R. ADD.	0...99,9 Ohm	OHM, Temperature - Pt, Ni, Cu, NTC, PTC
2-wire leads resist.compensation	LEADS	YES	Short-circuit leads on the sensor side and select "YES"
Minimum of range	RNG.MIN.	-99999...4...999999	For the minimum of the selected input range
Maximum of range	RNG.MAX.	-99999...20...999999	For the maximum of the selected input range
Advanced input settings	TEACH-IN	T.IN.LO / T-IN.HI	
	MANUAL	MAN. LO / MAN. HI	
Filter mode	F. MODE	NO / AVER. / FL. AVR. / EXPON. / ROUND	
Filter constant	F.CONST.	0...9999	Setting the constant for the filter
Preset tare	P. TAR.	-99999...0...99999	Setting of fixed tare

Cold junction compensation, (Temperature - T/C)

1TC-IN	1x T/C, internal compensation
2TC-IN	2x T/C, internal compensation
1TC-EX	1x T/C, external compensation
2TC-EX	2x T/C, external compensation

Advanced input settings

T.IN.LO	LO input signal connection confirmation
YES	for MIN
T-IN.HI	Hi input signal connection confirmation
YES	for MAX

Filter mode

MAN. LO	Setting the LO input signal value
4.02	for MIN (example: 4,02 mA)
MAN. HI	Setting the HI input signal value
19.97	for MAX (example: 19,97 mA)

Functions

Input of mathematical function	INP. M.F.	OFF / INPUT / FILTER	Input selection for the math function
	TYPE M.F.	POL. / IN. POL. / LOGAR. / EXPON. / POWER / ROOT	
	CONST. A ... F	0...99	Setting constants for mathematical functions
Input of linearization table	INP. L.T.	OFF / Input / FILTER	Input selection for the linearization table
	N.OF.PTS.	2...100	Number of points in the table
	VALUES	-9999...99999	Values of X/Y

POL.	Polynomial	$Ax^5+Bx^4+Cx^3+Dx^2+Ex+F$
IN. POL.	Inverse polynomial	$\frac{A}{x^5}+\frac{B}{x^4}+\frac{C}{x^3}+\frac{D}{x^2}+\frac{E}{x}+F$
LOGAR.	Logarithmic	$A\cdot\ln\left(\frac{Bx+C}{Dx+E}\right)+F$
EXPON.	Exponential	$A\times e^{\left(\frac{Bx+C}{Dx+E}\right)}+F$
POWER	Power	$A\times(Bx+C)^{(Dx+E)}+F$
ROOT	Square root	$A\times\sqrt{\frac{Bx+C}{Dx+E}}+F$

Output

Analogue output	A.O. INP.	INPUT / FILTER / MAT.FNC / LIN.TAB	
	A.O. TYPE	0-20 mA / 4-20 mA / P.4-20 / E.4-20 / 0-10 V	
	A.O. MIN.	-99999...4...99999	
	A.O. MAX.	-99999...20...99999	

P.4-20	4...20 mA, passive
E.4-20	4...20 mA, with broken loop indication (< 3,6 mA)

Service

Sett password	PASSW.	0...9999	Password to connect the device to PC. If it is set to "0", access is not blocked..
Save user settings	SAV.SET.	YES	Saves the current device settings
Load user settings	LOA.SET.	YES	Loads the user settings into the device
Factory reset	FACT.ST.	YES	Loads the original factory settings, restores the initial settings (blue texts)
Erase user calibration	CLR.CAL.	YES	Clears user calibration, restores factory calibrations (after user calibration via OM Link SW had been performed)
Key lock	KEY.LCK.	ON / OFF	Disables the push button(s) on the front panel of the device
Simulation of input signal	MIN.	MIN / MAX → -99999...99999	Setting the range for the input signal simulation
	STEP	-99999...99999	Setting of increment/step value
	TIME	0...999,9 ms	Setting the increment/step duration time
	START	YES	Start of simulation
	STOP	YES	End of simulation

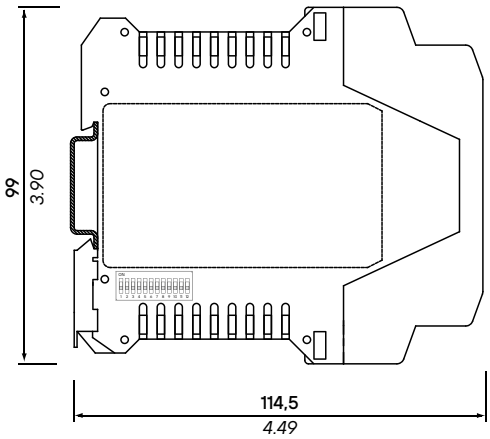
The USB connector is galvanically connected to the input! USB-to-USB Isolator must be used when input signal is connected to the device.

DANGER OF COMPUTER DAMAGE

5 Instrument dimensions and installation

Front view

Side view



Top view

mm
inch

Installation to DIN rail of 35 mm width

6 Technical data

INPUT

No. of inputs	1 The range is selectable either by DIP switch or by OM Link free SW from PC		
DC Range	±60 mV	> 10 MΩ	Input 1
	±75 mV	> 10 MΩ	Input 1
	±100 mV	> 10 MΩ	Input 1
	±150 mV	> 10 MΩ	Input 1
	±300 mV	> 10 MΩ	Input 1
	±1000 mV	> 10 MΩ	Input 1
	±20 V	1 MΩ	Input 2
	±40 V	1 MΩ	Input 2
	±100 mA	< 200 mV	Input 3
PM Range	±5 mA	< 200 mV	Input 3
	±20 mA	< 200 mV	Input 3
	4...20 mA	< 200 mV	Input 3
	±2 V	1 MΩ	Input 2
	±5 V	1 MΩ	Input 2
	±10 V	1 MΩ	Input 2
OHM Range	0...100 / 300 Ω 0...1 / 3 / 10 / 30 / 100 kΩ 0...300 kΩ (only 2- and 4-wire)		
Connection	2-, 3- and 4-wire with broken cable/sensor detection		
RTD Range	Pt 100/500/1000, 3851 ppm/°C	-50°...450°C	
	Pt 100, 3 920 ppm/°C	-50°...450°C	
	Pt 50, 3 910 ppm/°C	-200°...1100°C	
	Pt 100, 3 910 ppm/°C	-200°...450°C	
Connection	2-, 3- and 4-wire with broken cable/sensor detection		
Ni Range	Ni 1 000/10 000, 5 000 ppm/°C	-50°...250°C	
	Ni 1 000/10 000, 6 180 ppm/°C	-200°...250°C	
Connection	2-, 3- and 4-wire with broken cable/sensor detection		
Cu Range	Cu 50/100, 4 260 ppm/°C	-50°...200°C	
	Cu 50/100, 4 280 ppm/°C	-200°...200°C	
Connection	2-, 3- and 4-wire with broken cable/sensor detection		
NTC Range	NTC 1 2k2, $B_{25/85}$ = 3600	-40°...125°C	
	NTC 2 2k0, $B_{25/85}$ = 3528	-40°...125°C	
	NTC 3 10k, $B_{25/85}$ = 3435	-40°...125°C	
	NTC 4 10k, $B_{25/85}$ = 3977	-40°...125°C	
	NTC 5 12k, $B_{25/85}$ = 3740	-40°...125°C	
	NTC 6 20k, $B_{25/85}$ = 4263	-40°...125°C	
Connection	2-, 3- and 4-wire with broken cable/sensor detection		
PTC Range	KTY 81/210	-55°...150°C	
Connection	2-, 3- and 4-wire with broken cable/sensor detection		
T/C Range	J (Fe-CuNi)	-200°...900°C	
	K (NiCr-Ni)	-200°...1 300°C	
	T (Cu-CuNi)	-200°...400°C	
	E (NiCr-CuNi)	-200°...690°C	
	B (PtRh30-PtRh6)	300°...1 820°C	
	S (PtRh10-Pt)	-50°...1 760°C	
	R (Pt13Rh-Pt)	-50°...1 740°C	
	N (Omegalloy)	-200°...1 300°C	
	L (Fe-CuNi)	-200°...900°C	
	XK (Chromel-Copel)	-200°...800°C	
	with broken cable/sensor detection		
CJC	adjustable: -20°...99°C or automatic		
DU Power	1.65 VDC/3 mA, potentiometer resistance > 500 Ω		

INSTRUMENT SPECIFICATIONS

TC	50 ppm/°C
Accuracy	±0.1 % of the range (for 20 meas./s) ±0.15 % of the range (OHM - 100k/300k)
Rate	1...100 measurements/s
Overload capacity	10x (t < 30 ms), 2x
Compensation of conduct	max. 30 Ω (RTD)
Measurement accuracy CJC	±1.5°C (T/C)
Functions	Teach-in, Tare, Math functions, Simulation
Digital filters	exponential / floating / arithmetic average, rouding
Math functions	polynomial / inverse polynomial / logarithm / exponential / power / root
Linearization	linear interpolation in 100 points (only via OM Link)
OM Link	company communication interface for operation, setting and update of instruments. (microUSB)
Watch-dog	reset after 500 ms
Calibration	at 25°C and 40 % r.h.

ANALOGUE OUTPUT

No. of outputs	1
Type	isolated, configurable with a resolution of 10 000 parts, type and range are selectable in the menu
Non-linearity	0.1 % of FS
TC	15 ppm/°C
Rate	response to change of value < 3,5 ms
Ranges	0...10 V, 10...0 V resistive load < 2,6 kΩ 0...20 mA/20...0 4...20/20...4 mA (active/passive) compensation of leads' resist. < 600 Ω/12 V

EXCITATION

Fixed voltage	24 VDC/35 mA, isolated

POWER SUPPLY

Power	10...30 VDC/24 VAC, ±10 %, 2.5 VA, PF≥ 0.4, I_{STP}< 40 A/1 ms, isolated *- fuse inside (T500mA)*

MECHANIC PROPERTIES

Material	PA66, incombustible UL 94 V-0, blue
Dimensions	114.5 x 99.0 x 17.5 mm
Installation	to DIN rail 35 mm wide

OPERATING CONDITIONS

Connection	connector terminal blocks, section < 2.5 mm²
Stabilization period	within 5 minutes after switch-on
Working temp.	-20°...60°C
Working humidity	< 95 % r.h., non condensing
Storage temp.	-20°...85°C
Protection	IP20
Construction	safety class I
El. safety	EN 61010-1, A2
Dielectric strength	2.5 kVAC for 1 min. between power supply and signal input 2.5 kVAC for 1 min. between signal input and outputs
Insulation resist.*	for pollution degree II, measurement cat. III power supply > 300 V (PI), 255 V (DI) Input/outputs > 300 V (PI)
EMC	EN 61326-1 (Industrial area)
Seismic qualification	IEC/IEEE 60980-344 Edition 1.0, 2020, par. 6, 9
Mechanical resistance	EN 60068-2-6 ed. 2:2008

* PI - Primary insulation, DI - Double insulation

Measuring instruments of the OMX 311UNI series conform to the European regulation 2014/30/EU and 2014/35/EU

This product must be installed, connected and used in compliance with prevailing standards and/or installation regulations.
As standards, specifications and designs develop from time to time, always ask for confirmation of the information given in this publication.

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