PCE Instruments

PCE-SCI-U
USER'S MANUAL

Temperature
Signal
Converter

Process	Temperature °C °F Pt	Temperature °C °F NTC	Temperature °C °F tc	Potentiometer	Resistances

Signal Converter **PCE-SCI-U**

Signal converter, **isolated, multisignal**

Signal converter, isolated, multisignal . Accepts process signals (mA and Vdc) (includes excitation voltage), thermocouples J, K, N, E, T, R and S, Pt100 probes (2 and 3 wires) other Pt and Ni probes (Pt500, Pt1000, Ni100, Ni200 and Ni1000), NTC probes, resistances and potentiometers.

Output signal in 4/20 mA and 0/10 Vdc, isolated. Universal power supply 18 to 265 Vac/dc isolated. 3 way isolation between input, output and power circuits. Circuit isolation prevents ground loops and transient propagation, protecting remote equipment and signal integrity. Easy and fast configuration through configuration codes. Configuration system (digits and keypad) accessible behind the front cover. Functions to generate low and high output signals, to validate remote instrumentation. 'Password' function to block access to configuration.

Designed for industrial use, with potential integration into a wide range of applications, reduced cost, excellent quality and optional customization of the instrument.

USER'S MANUAL
INDEX

1. How to order

Ref.	**PCE-SCI-U**

2. Material included

The instrument is provided with the following elements:
- 1 x instrument **PCE-SCI-U**
- 4 x plug-in screw terminals
- 1 x quick installation guide

3. Installation and start-up

⚠ If this is the first time you are configuring this instrument, below are the steps to follow to install and configure the instrument. Read all the manual sections in order to have a full and clear view of the characteristics of the instrument. Do not forget to read the installation precautions at section 12.

1. Install the instrument at the DIN rail
2. Connect the power supply (see section 6)
   - see section 8.1 for an explanation on 'normal mode' of operation
3. Access the 'configuration system' (see section 7)
4. Configure the input signal
   - choose an input signal configuration code (see section 5)
   - introduce the code at the instrument (see section 8.2)
5. Configure the output signal (see section 8.3)
6. Block access to the 'configuration system' (see section 7)
7. Connect the output signal (see section 6)
8. Connect the input signal (see section 6)

4. Additional information

User's Manual	
Datasheet	
Quick installation guide	
CE declaration	
Warranty	
Web	www.pce-instruments.com

5. Configuration codes - Input signal

Table 1 | **Input signal - Configuration codes**

Code	Input signal range		See section ...
00 a 09	[no function assigned]		---
10	4/20 mA	Process	9.1
11	0/10 Vdc		
12	0/100 %	Potentiometer	9.2
13	0/100 KOhm	Resistance	9.3
14	0/50 KOhm		
15	0/25 KOhm		
16	0/10 KOhm		
17	0/5 KOhm		
18	0/2.5 KOhm		
19	0/1200 ºC	Thermocouple J	9.5
20	0/1000 ºC		
21	0/800 ºC		
22	0/600 ºC		
23	0/450 ºC		
24	0/300 ºC		
25	0/150 ºC		
26	0/1350 ºC	Thermocouple K	9.5
27	0/1000 ºC		
28	0/800 ºC		
29	0/600 ºC		
30	0/450 ºC		
31	0/300 ºC		
32	0/150 ºC		
33	0/1300 ºC	Thermocouple N	9.5
34	0/1000 ºC		
35	0/800 ºC		
36	0/600 ºC		
37	0/450 ºC		
38	0/300 ºC		
39	0/150 ºC		
40	[no function assigned]		---
41	0/900 ºC	Thermocouple E	9.5
42	0/600 ºC		
43	0/450 ºC		
44	0/300 ºC		
45	0/150 ºC		
46	0/400 ºC	Thermocouple T	9.5
47	0/300 ºC		
48	0/200 ºC		

Table 1 | **Input signal - Configuration codes**

Code	Input signal range		See section ...
49	0/100 ºC	Thermocouple T	9.5
50	0/1750 ºC	Thermocouple R	9.5
51	0/1500 ºC		
52	0/1200 ºC		
53	0/900 ºC		
54	0/1750 ºC	Thermocouple S	9.5
55	0/1500 ºC		
56	0/1200 ºC		
57	0/900 ºC		
58	[no function assigned]		---
59	0/700 ºC	Pt100	9.6
60	0/600 ºC		
61	0/500 ºC		
62	0/400 ºC		
63	0/300 ºC		
64	0/200 ºC		
65	0/100 ºC		
66	-50/+50 ºC		
67	-100/+100 ºC		
68	-200/+200 ºC		
69	0/630 ºC	Pt500	9.6
70	0/300 ºC		
71	-150/150 ºC		
72	0/630 ºC	Pt1000	9.6
73	0/300 ºC		
74	-190/190 ºC		
75	-60/180 ºC	Ni100	9.6
76	-60/120 ºC	Ni200	9.6
77	-60/180 ºC	Ni1000	9.6
78 a 80	[no function assigned]		---
81	-60/150 ºC	NTC (R_{25}=10K, β=3500)	9.4
82	-60/150 ºC	NTC (44006)	
83	0/100 ºC	NTC (44006)	
84 a 94	[no function assigned]		---
95	Function 'password'		8.5
96	Parameter 'Alpha'		8.6
97	Reset to default factory parameters		14
98	Firmware version		14
99	[no function assigned]		---
---	Exit de menu without saving changes		---

6. Connections and dimensions (mm (*inch*))

POWER **(ABC)**
18 to 265 Vac/dc isolated

108 mm (4.25")

106 mm (4.17")

OUTPUT SIGNAL **(789)**
see 'Table 3'

INPUT SIGNAL **(123 456)**
see 'Table 2'

Standard (35 mm) DIN rail mount

Pt+, Ni+, Ntc+, Resistance+
Thermocouple +, Pt100 3rd wire
Thermocouple -, Pt-, Ni-, Ntc-, Resistance-

Common 0V (or passive mA current output)
Signal 4/20 mA (mA current return)
Signal 0/10 Vdc (or active mA current output)

789

22.5 mm (0.89")

456

Vexc (+15 Vdc), Pot.+ (5 Vdc)
mA, Vdc, Potentiometer
Common, Pot.-

⚠ Fuse - This instrument does not include internal protection fuse. According to security regulation 61010-1, add a protection fuse to the power line to act as a disconnection element, easily accessible to the operator and identified as a protection device. Use time-lag fuse, with value :
• 250 mA, for voltages > 50 Vac/dc
• 400 mA, for voltages < 50 Vac/dc

Table 2 | **INPUT signal connections**

INPUT signal	Input terminals						Section ...
	1	2	3	4	5	6	
4/20 mA passive					mA-	Vexc	9.1
4/20 mA active				mA-	mA+		9.1
0/10 Vdc				common	+Vdc		9.1
0/10 Vdc with Vexc				common	+Vdc	Vexc	9.1
Potentiometer				Pot.-	Signal	Pot.+	9.2
Resistance	Res-		Res+				9.3
NTC	NTC-		NTC+				9.4
Thermocouple	tc-	tc+					9.5
Pt100 (3 wires)	Pt-	Pt- (3rd wire)	Pt+				9.6
Pt100 (2 wires)	Pt- (shortcircuit 1 and 2)		Pt+				9.6
Pt1000, Pt500	Pt-		Pt+				9.6
Ni100, Ni500, Ni1000	Ni-		Ni+				9.6

Table 3 | **OUTPUT signal connections**

OUTPUT signal	Output terminals			Connections
	7	8	9	
4/20 mA active		mA- (in)	mA+ (out)	mA- / mA+ / 7 8 9
4/20 mA passive	mA+ (out)	mA- (in)		mA+ / mA- / 7 8 9
0/10 Vdc	common		+Vdc	common / +Vdc / 7 8 9

7. Access the 'Configuration system'

ACCESS THE 'CONFIGURATION SYSTEM'

1. Remove the output signal terminal

 • make sure that there are no dangerous voltages at the input signal terminals (in case of doubt, remove also the two input signal terminals)

2. Open the front cover

3. Configure the instrument

 • locate the 'configuration digits'

 • locate the '**UP**' (▲) and '**SQ**' (■) keys

BLOCK ACCESS TO THE 'CONFIGURATION SYSTEM'

4. Close the front cover

 • remove the output signal terminal (if it was placed)

5. Connect the output signal terminal

 • when connected at place, check that the front cover can not be opened

 • if they were removed, connect the two input signal terminals

Opening the front cover reduces the security level of the operator. If dangerous voltages are connected to the input terminals, remove both input signal terminals before opening the front cover. When front cover is open :

 • the isolation between accessible parts and power supply is reduced to 'basic' level.

 • the isolation between accessible parts and input signals is temporarily disabled.

Operations must be performed by qualified operators.

When correctly connected, the output signal terminal prevents the front cover from opening.

Key 'SQ' (■)

Key 'UP' (▲)

'Configuration digits'
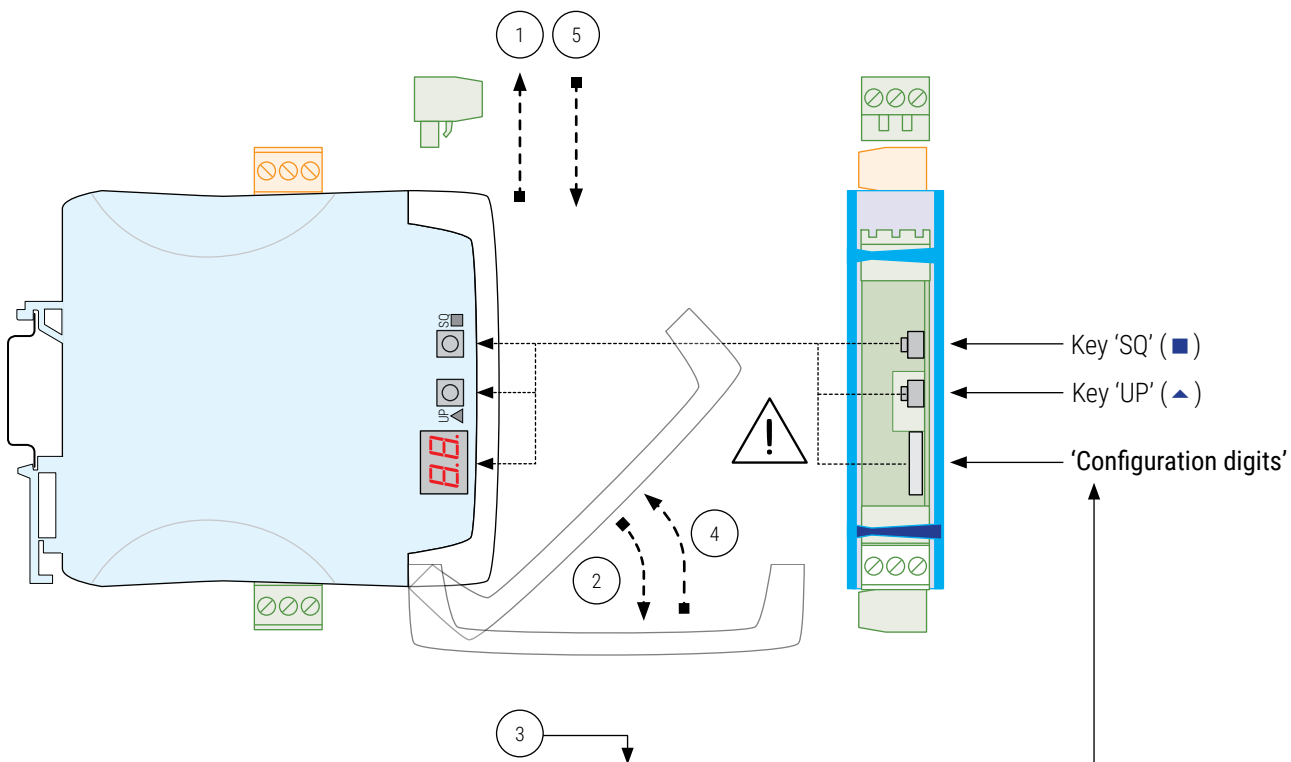
'CONFIGURATION SYSTEM'

 • the 'configuration digits' indicate the active input signal range (see section 5)
 • keys '**UP**' (▲) and '**SQ**' (■) to configure the instrument (see section 8.2)
 • the decimal point position indicates the active output signal range (see section 8.3)

UP   SQ
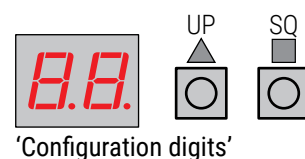
'Configuration digits'

8. Configuration system

CONFIGURATION SYSTEM

The isolated signal converters provide a fast and easy configuration system, based on function codes. Configuration is done through an internal key pad, accessible behind the front cover.

'CONFIGURATION DIGITS'

The instrument provides two numerical leds, to inform about the actual state of the instrument, active input and output signal ranges, and error codes (see section 11).

CONFIGURATION KEYS

The configuration keys are located inside the instrument, behind the removable front cover. To access the configuration keys, remove the output signal terminal, and open the front cover (see section 7). The instrument allows to block the key functions, by activating an access code ('password' function) (see section 8.5).

8.1. 'Normal mode' of operation

'NORMAL MODE'

When the power supply is connected, the instrument:

- activates the 'configuration digits', and displays the code for the actual input signal range (see section 5)
- activates the decimal point (flash), showing the actual output signal range (see section 8.3)
- the instrument is in 'normal mode' of operation

HOW TO ACCESS THE 'CONFIGURATION MODE' AND THE 'TOOLS' MENU

With the instrument in 'normal mode' of operation, there is access to the 'configuration mode' and the 'tools' menu.

- to access the 'configuration mode', press the '**SQ**' (■) key for 1 second (see section 8.2)
- to access the 'tools' menu, press the '**UP**' (▲) key for 1 second (see section 8.4)

'ECO' FUNCTION ('CONFIGURATION DIGITS' ARE AUTOMATICALLY POWERED OFF)

If there is no interaction from the operator for 60 seconds, the instrument powers off the 'configuration digits'. The decimal point remains active (flashing), indicating that the instrument is working correctly.

HOW TO POWER ON THE 'CONFIGURATION DIGITS'

To power on the 'configuration digits', press one of the front keys '**SQ**' (■) or '**UP**' (▲). This will power on the 'configuration digits', and activate the 'normal mode' of operation.

8.2. 'Configuration mode'

HOW TO ACCESS THE 'CONFIGURATION MODE'

With the instrument in 'normal mode' of operation (see section 8.1), press for 1 second the '**SQ**' (■) key. The horizontal leds lights from bottom to top. When the upper led lights, the instrument activates the 'configuration mode'.

⚠ If the key is released before activating the 'configuration mode', the horizontal leds light downwards from top to bottom, and the instrument returns to 'normal mode' of operation.

⚠ Inside the 'configuration mode' the decimal point is not active.

Inside the 'configuration mode', the 'configuration digits' display the code of the active input signal range (see section 5). Press the '**UP**' (▲) key to increase the code.

- press once to increase the value in +1
- maintain the key pressed to automatically increase the value

When the desired code is reached, press the '**SQ**' (■) key. The leds light a round shape while new configuration is stored, and the instrument returns to 'normal mode' of operation.

⚠ When exiting the 'configuration mode' without changes ('rollback' activation, selection of 'inactive codes', etc), the horizontal leds light down from top to bottom, and the instrument returns to 'normal mode' of operation.

'ROLLBACK' FUNCTION

If there is no interaction from the operator for 30 seconds, the instrument exits the 'configuration mode' and returns to 'normal mode' of operation, discarding changes.

8.3. Output 4/20 mA and 0/10 Vdc

OUTPUT 4/20 mA AND 0/10 Vdc

Instruments can be configured for 4/20 mA or 0/10 Vdc output signal. The configured output signal is identified with the active decimal point at the 'configuration digits'.

- active decimal point to the right, for 4/20 mA output
- active decimal point to the left, for 0/10 Vdc output

Table 4 **| Decimal point indicates the active output signal**

Output 0/10 Vdc (decimal point to the left)	Output 4/20 mA (decimal point to the right)

HOW TO CONFIGURE THE OUTPUT SIGNAL TO 4/20 mA AND 0/10 Vdc

With the instrument in 'normal mode' of operation, press the '**SQ**' (■) key and the '**UP**' (▲) key at the same time. The horizontal leds lights from bottom to top. When the upper led lights, the actual decimal point position is displayed. After 1 second, the new decimal point position activates. Release the two keys, and the leds light a round shape while the new configuration is stored, and the instrument returns to 'normal mode' of operation.

⚠ Connect the output terminals according to the output signal configured (see section 6).

8.4. 'Tools' menu

HOW TO ACCESS THE 'TOOLS' MENU

With the instrument in 'normal mode' of operation (see section 8.1), press for 1 second the '**UP**' (▲) key. The horizontal leds lights from bottom to top. When the upper led lights, the instrument activates the 'tools' menu.

⚠ If the key is released before activating the 'tools' menu, the horizontal leds light downwards from top to bottom, and the instrument returns to 'normal mode' of operation.

⚠ Inside the 'tools' menu, the decimal point is not active.

⚠ Inside the 'tools' menu, the 'configuration digits' indicate the code of the first function available.

• press the '**UP**' (▲) key to move to the next function.

• press the '**SQ**' (■) key to activate the selected function.

To exit the 'tools' menu, press the '**UP**' (▲) key until the parameter '- -' appears, and press the '**SQ**' (■) key (or wait 30 seconds without pressing any key to wait for the automatic 'rollback').

⚠ When exiting the 'tools' menu, the horizontal leds light down from top to bottom, and the instrument returns to 'normal mode' of operation.

'ROLLBACK' FUNCTION

If there is no interaction from the operator for 30 seconds, the instrument exits the 'tools' menu and returns to 'normal mode' of operation.

AVAILABLE FUNCTIONS

The 'Force Low' ('FL') and 'Force High' ('Fh') functions allow to temporarily force the output signal to the low and high levels of the actual output signal range selected. These tools allow to easily validate the correct function of the remote elements connected to the instrument output

• select 'Force Low' ('FL') function to set the output signal to the minimum value of the selected range (4 mA or 0 Vdc). The 'FL' flash message indicates that the function is active. Press any key to deactivate and return to the 'Force Low' ('FL') menu entry.

• select 'Force High' ('Fh') function to set the output signal to the maximum value of the selected range (20 mA or 10 Vdc). The 'Fh' flash message indicates that the function is active. Press any key to deactivate and return to the 'Force High' ('Fh') menu entry.

Table 5 **|** **'Tools' menu**

UP
▲
◯ →
```
 FL
'Force Low'
```
```
 Fh
'Force high'
```
```
 – –
Exit
```
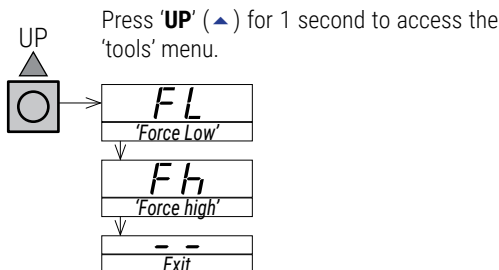
8.5. Configuration block ('password')

HOW TO BLOCK ACCESS TO 'CONFIGURATION MODE' ('PASSWORD')

Define a 'password' code to prevent access to 'configuration mode' and to 'tools' menu to unauthorized operators. The 'password' code will be requested when any key is pressed.

To activate a 'password' select code '95' inside the 'configuration mode'. The step-by-step process is indicated below.:

• access the 'configuration mode' (see section 8.2)

• access code '95'

• press the '**SQ**' (■) key to select

• the 'configuration digits' indicate code '00' flashing

• press the '**UP**' (▲) key to select the desired code (for example '73')

• press the '**SQ**' (■) key to validate or wait for the automatic 'rollback' (30 seconds) to exit without changes

• the menu returns 'normal mode' (see section 8.1)

Once the 'password' code is applied, when a key is pressed, the 'configuration digits' indicate code '00' flashing. enter the 'password' code to unlock access (code '73' in the previous example).

HOW TO DEACTIVATE THE 'PASSWORD'

To deactivate the 'password', access again to code '95' and select value '00'. Exit validating changes.

8.6. Pt100 'alpha' parameter

'ALPHA ' VALUE '385' OR '390'

The instrument can be configured to read Pt probes using 'alpha' parameter set to '0.0385' (default value) or '0.0390'. This parameter is a specification of the Pt probe (Pt100, Pt500, Pt1000) and depends on the probe manufacturer.

HOW TO SET THE 'ALPHA' PARAMETER

To configure the 'alpha' value, access code '96' inside the 'configuration mode'. The step-by-step process is indicated below.

• access the 'configuration mode' (see section 8.2)

• access code '96'

• press the '**SQ**' (■) key to select

• the 'configuration digits' indicate code '01' flashing

• press the '**UP**' (▲) key, to select value '01' for 'alpha' value of '0.0385' or select '02' for 'alpha' value of '0.0390'

• press the '**SQ**' (■) key to validate or wait for the automatic 'rollback' (30 seconds) to exit without changes

• the menu returns 'normal mode' (see section 8.1)

9. Input signals

9.1. Process

MEASURING RANGES FOR PROCESS SIGNALS

The instrument can be configured to measure process signals in 4/20 mA (active and passive) and 0/10 Vdc. The instrument provides excitation voltage to power up transducers when necessary.

To activate the desired input signal range, activate the range code (see Table 7) into 'configuration mode' (see section 8.2).

See connection examples at 'Table 6'.

OUTPUT SIGNAL

the output signal is configurable to 4/20 mA (active and passive) and 0/10 Vdc (see section 8.3).

MAXIMUM OVERSIGNAL

'Maximum oversignal' is the maximum signal accepted by the instrument. Higher signal values may cause instrument damage. Lower values are non destructive but may be out of accuracy specifications.

EXCITATION VOLTAGE (VEXC)

The instrument provides +15 Vdc excitation voltage at terminal '6'. This excitation voltage is provided to power up the transducer that generates the signal, up to a maximum of 30 mA.

9.2. Potentiometers

MEASURING RANGES FOR POTENTIOMETERS

The instrument can be configured to measure potentiometers (3 wires), with nominal value higher than 500 Ohms and below 20 KOhms.

To activate the desired input signal range, activate the range code (see Table 9) into 'configuration mode' (see section 8.2).

See connection examples at 'Table 8'.

OUTPUT SIGNAL

the output signal is configurable to 4/20 mA (active and passive) and 0/10 Vdc (see section 8.3).

EXCITATION VOLTAGE (Vexc)

The instrument provides +5 Vdc excitation voltage at terminal '6'. The excitation voltage is automatically configured when a potentiometer code is selected (see Table 9).
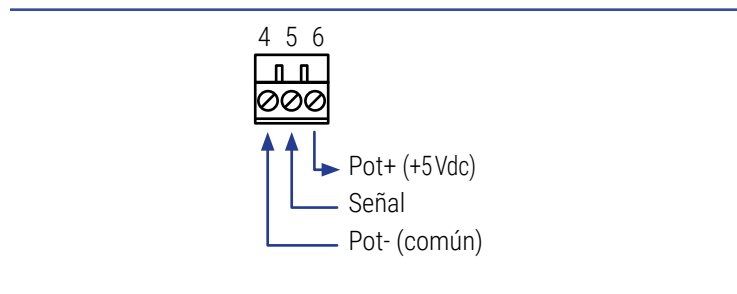

Table 6 | **Connection examples for process signals**

4 5 6
mA+ (+15 Vexc)
mA-
Signal 4/20 mA (passive)

4 5 6
mA-
mA+
Signal 4/20 mA (active)

4 5 6
+Vdc
común
Signal 0/10 Vdc

4 5 6
+15 Vexc
común
+Vdc
Signal 0/10 Vdc
with excitation voltage

Table 8 | **Connection examples for potentiometers**

4 5 6
Pot+ (+5 Vdc)
Señal
Pot- (común)
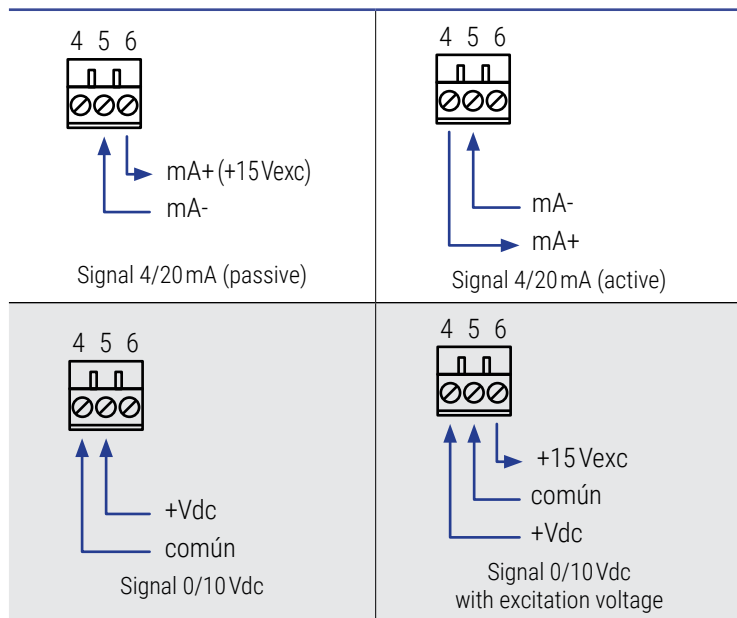
Table 7 | **Input ranges for process signals**

Input signal	Code	Accuracy (% FS)	Max. overvoltage	Zin
4/20 mA	10	<0.30 %	25 mA	4.7 Ohm
0/10 Vdc	11	<0.30 %	25 Vdc	1 M

Table 9 | **Input ranges for potentiometer signals**

Input signal	Code	Accuracy (% FS)	Potentiometers accepted
0/100 %	12	<1 %	from 0/500 Ohms up to 0/20 KOhms

9 Input signals (cont.)

9.3. Resistances

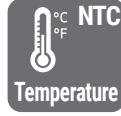**MEASURING RANGES FOR RESISTANCES**

The instrument can be configured to measure resistance signals. Measurement uses 2 wires.

To activate the desired input signal range, activate the range code (see Table 11) into 'configuration mode' (see section 8.2).

See connection examples at 'Table 10'.

OUTPUT SIGNAL

the output signal is configurable to 4/20 mA (active and passive) and 0/10 Vdc (see section 8.3).

9.4. NTC probes

NTC PROBES ACCEPTED

The instrument can be configured to measure temperature from common NTC probes.

Accepts NTC probes with R_{25}=10K and β=3500 and NTC types 44006.

To activate the desired input signal range, activate the range code (see Table 13) into 'configuration mode' (see section 8.2).

See connection examples at 'Table 12'.

OUTPUT SIGNAL

the output signal is configurable to 4/20 mA (active and passive) and 0/10 Vdc (see section 8.3).

SENSOR BREAK DETECTION

The instrument displays an error message in case of sensor break (see section 11).

Table 10 | **Connection examples for resistances**
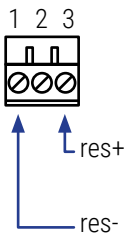
Table 12 | **Connection examples for NTC probes**

Connections for NTC
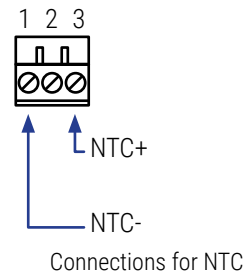
Table 11 | **Input ranges for resistances**

Input signal	Code	Accuracy (% FS)
0/100 KOhm	13	
0/50 KOhm	14	
0/25 KOhm	15	
0/10 KOhm	16	<1 % FS
0/5 KOhm	17	
0/2.5 KOhm	18	

Table 13 | **Temperature ranges for NTC probes**

Input signal	Code	Measurement range		Total error
NTC (R_{25}=10K y β=3500)	81	-60/150 ºC	-76/302 ºF	
NTC (44006)	82	-60/150 ºC	-76/302 ºF	<2º
NTC (44006)	83	0/100 ºC	32/212 ºF	
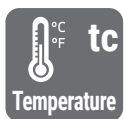
9.5. Thermocouples

MEASURING RANGES FOR THERMOCOUPLES

The instrument can be configured to measure temperature from thermocouple probes, types J, K, N, E, T, R and S. The instrument automatically compensates the cold junction.

To activate the desired thermocouple type and measurement range, activate the range code (see 'Table 15' up to 'Table 21') into 'configuration mode' (see section 8.2).

See connection examples at 'Table 14'.

OUTPUT SIGNAL

the output signal is configurable to 4/20 mA (active and passive) and 0/10 Vdc (see section 8.3).

SENSOR BREAK DETECTION

The instrument displays an error message in case of sensor break (see section 11).

TOTAL ERROR

The 'total error' indicated in the tables below, includes the measuring error, the cold junction error and the output signal error.

Table 14 | **Connections for thermocouples**

1 2 3

tc+
tc-
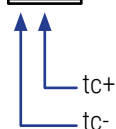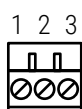
For a correct measure of thermocouple signals, always use compensated cable between the instrument and the thermocouple.

Table 15 | **Temperature ranges for thermocouple J**

Input signal	Code	Measurement range		Total error (cold junction included)
Thermoc. J	19	0/1200 ºC	32/2190 ºF	<3º
	20	0/1000 ºC	32/1832 ºF	
	21	0/800 ºC	32/1472 ºF	
	22	0/600 ºC	32/1112 ºF	
	23	0/450 ºC	32/842 ºF	
	24	0/300 ºC	32/572 ºF	
	25	0/150 ºC	32/302 ºF	

Table 16 | **Temperature ranges for thermocouple K**

Input signal	Code	Measurement range		Total error (cold junction included)
Thermoc. K	26	0/1350 ºC	32/2462 ºF	<3º
	27	0/1000 ºC	32/1832 ºF	
	28	0/800 ºC	32/1472 ºF	
	29	0/600 ºC	32/1112 ºF	
	30	0/450 ºC	32/842 ºF	
	31	0/300 ºC	32/572 ºF	
	32	0/150 ºC	32/302 ºF	

Table 17 | **Temperature ranges for thermocouple N**

Input signal	Code	Measurement range		Total error (cold junction included)
Thermoc. N	33	0/1300 ºC	32/2372 ºF	<3º
	34	0/1000 ºC	32/1832 ºF	
	35	0/800 ºC	32/1472 ºF	
	36	0/600 ºC	32/1112 ºF	
	37	0/450 ºC	32/842 ºF	
	38	0/300 ºC	32/572 ºF	
	39	0/150 ºC	32/302 ºF	

Table 18 | **Temperature ranges for thermocouple E**

Input signal	Code	Measurement range		Total error (cold junction included)
Thermoc. E	41	0/900 ºC	32/1472 ºF	<3º
	42	0/600 ºC	32/1112 ºF	
	43	0/450 ºC	32/842 ºF	
	44	0/300 ºC	32/572 ºF	
	45	0/150 ºC	32/302 ºF	

Table 19 | **Temperature ranges for thermocouple T**

Input signal	Code	Measurement range		Total error (cold junction included)
Thermoc. T	46	0/400 ºC	32/752 ºF	<3º
	47	0/300 ºC	32/572 ºF	
	48	0/200 ºC	32/392 ºF	
	49	0/100 ºC	32/212 ºF	

Table 20 | **Temperature ranges for thermocouple R**

Input signal	Code	Measurement range		Total error (cold junction included)
Thermoc. R	50	0/1750 ºC	32/3182 ºF	<5º
	51	0/1500 ºC	32/2732 ºF	
	52	0/1200 ºC	32/2192 ºF	
	53	0/900 ºC	32/1652 ºF	

Table 21 | **Temperature ranges for thermocouple S**

Input signal	Code	Measurement range		Total error (cold junction included)
Thermoc. S	54	0/1750 ºC	32/3182 ºF	<5º
	55	0/1500 ºC	32/2732 ºF	
	56	0/1200 ºC	32/2192 ºF	
	57	0/900 ºC	32/1652 ºF	

9 Input signals (cont.)

9.6. Pt (Pt100, Pt500, Pt1000) and Ni (Ni100, Ni200, Ni1000) probes
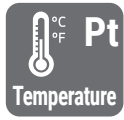
MEASURING RANGES FOR PT AND NI PROBES

The instrument can be configured to measure temperature from Pt probes (Pt100, Pt500 and Pt1000) and Ni probes (Ni100, Ni200 y Ni1000).

To activate the desired probe type and measurement range, activate the range code (see 'Table 23' and 'Table 24') into 'configuration mode' (see section 8.2).

See connection examples at 'Table 22'.

OUTPUT SIGNAL

the output signal is configurable to 4/20 mA (active and passive) and 0/10 Vdc (see section 8.3).

SENSOR BREAK DETECTION

The instrument displays an error message in case of of sensor break (see section 11).

PT100 WITH 2 AND 3 WIRES

The instrument accepts 2 and 3 wire Pt100 probes. Select the connection according to the wires of the probes (see Table 22).

'ALPHA' TEMPERATURE COEFFICIENT

The instrument is configured 'by default' to work with an 'alpha' value of '0.0385' for Pt proves (Pt100, Pt500, Pt1000). To activate an 'alpha' value of '0.0390' see section '8.6'. This parameter is associated to the probe and depends on the probe manufacturer.

CURRENT THROUGH THE PROBE

The instrument generates <900 uA through Pt100, Ni100 and Ni200 probes. The instrument generates <90 uA through Pt500, Pt1000 and Ni1000 probes.

Table 23 | **Temperature ranges for Pt100**

Input signal	Code	Measurement range		Total error
Pt100	59	0/700 °C	32/1292 °F	<2º
	60	0/600 °C	32/1112 °F	
	61	0/500 °C	32/932 °F	
	62	0/400 °C	32/752 °F	
	63	0/300 °C	32/572 °F	
	64	0/200 °C	32/392 °F	
	65	0/100 °C	32/121 °F	
	66	-50/+50 °C	-58/122 °F	
	67	-100/+100 °C	-148/212 °F	
	68	-200/+200 °C	-328/392 °F	

Table 22 | **Connection examples for Pt100 3 wires and Pt, Ni 2 wires**

Connections for Pt100 (3 wires)

Connections for Pt100 (2 wires)

Connections for Pt500, Pt1000, Ni,100, Ni200 and Ni1000 (2 wires)
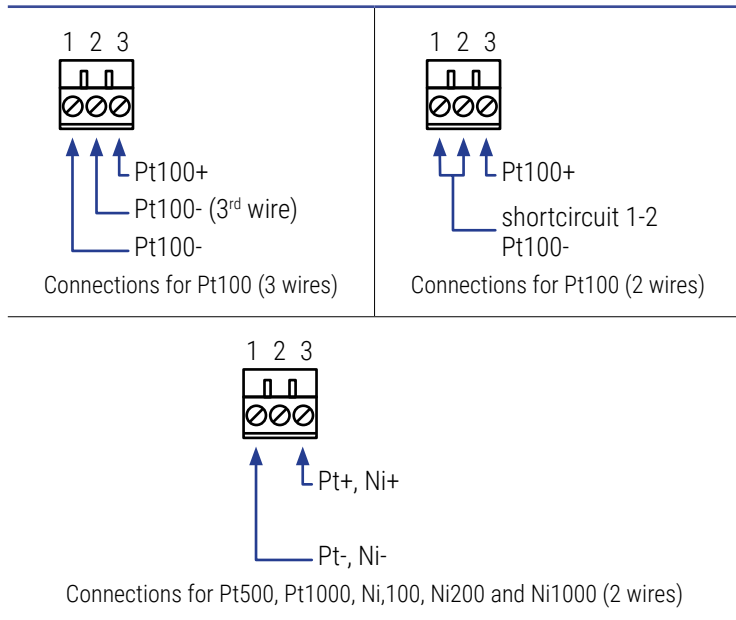
Table 24 | **Temperature ranges for Pt500, Pt1000 and Ni**

Input signal	Code	Measurement range		Total error
Pt500	69	0/630 °C	32/1166 °F	<2º
	70	0/300 °C	32/572 °F	
	71	-150/150 °C	-238/302 °F	
Pt1000	72	0/630 °C	32/1166 °F	<2º
	73	0/300 °C	32/572 °F	
	74	-190/190 °C	-310/374 °F	
Ni100	75	-60/180 °C	-76/356 °F	<2º
Ni200	76	-60/120 °C	-76/248 °F	
Ni1000	77	-60/180 °C	-76/356 °F	

10. Technical specifications

INPUT SIGNAL RANGES

process	4/20 mA, 0/10 Vdc (active and passive) excitation voltage +15 Vdc @30 mA (see section 9.1)
thermocouples	J, K, N, E, T, R and S (see section 9.5)
'Pt' and 'Ni' probes	Pt100 (2 and 3 wires, automatic compensation up to 30 Ohm) Pt500, Pt1000, Ni100, Ni200, Ni1000 (2 wires) (see section 9.6)
'NTC' probes	(see section 9.4)
resistances	ranges for 100 K, 50 K, 25 K, 10 K, 5 K y 2.5 K (see section 9.3)
potentiometers	nominal value form 500 Ohm to 20 KOhm (see section 9.2)

ACCURACY AR 25 ºC	see section for each type of signal
THERMAL DRIFT	150 ppm/º
STEP RESPONSE	300 mSec. (0 % to 99 % signal)

OUTPUT SIGNAL RANGES

mA ranges	4/20 mA active, max. 22 mA, min. 1.5 mA, maximum load < 400 Ohm 4/20 mA passive, max. 30 Vdc on terminals
Vdc ranges	0/10 Vdc, max. 11 Vdc, min.. -1 Vdc, minimum load > 1 KOhm

CONFIGURATION

key pad	2 keys
display	2 digits, 7 segments, 5 mm height, red color

POWER SUPPLY

voltage range	18 to 265 Vac/dc isolated (20 to 240 Vac/dc ±10%)
AC frequency	45 a 65 Hz
consumption	<1.0 W
power wires	1 mm^2 to 2.5 mm^2 (AWG17 to AWG14)
overvoltage category	2

ISOLATION

input - output	2300 Veff (60 seconds)
power - input	2300 Veff (60 seconds)
power - output	2300 Veff (60 seconds)

IP PROTECTION	IP30
IMPACT PROTECTION	IK06

TEMPERATURE

operation	de 0 a +50 ºC
storage	de -20 a +70 ºC
'warm-up' time	15 minutes

MECHANICAL

size	106 x 108 x 22.5 mm
mounting	standard DIN rail (35 x 7.5 mm)
connections	plug-in screw terminal (pitch 5.08 mm)
housing material	polyamide V0
weight	<150 grams
packaging	130 x 80 x 45 mm, cardboard

11. Error codes

In case of error, the error code is shown flashing on the 'configuration digits'. The error code is not visible inside 'configuration mode' or inside the 'tools' menu.

The error code remains active on display until the problem that caused the error is solved. In case of multiple error codes, solve the first problem to see the next active error code.

Table 25 Error codes

E1	'Hardware underrange'. Input signal is below the minimum readable signal. Output signal is the minimum available 0 Vdc, 0 mA. Possible sensor break.
E2	'Hardware overrrange'. Input signal is above the maximum readable signal. Output signal is the maximum available 10.5 Vdc, 20.5 mA. Possible sensor break.
E3	'Password error'. If 'password' function is active, the password code entered is not correct.

12. Precautions on installation

⚡ Risk of electrical shock. Instrument terminals can be connected to dangerous voltage.

▢ Instrument protected with double isolation. No earth connection required.

CE Instrument conforms to CE rules and regulations.

This instrument has been designed and verified conforming to the 61010-1 CE Security Regulation, for industrial applications. Installation of this instrument must be performed by qualified personnel only. This manual contains the appropriate information for the installation. Using the instrument in ways not specified by the manufacturer may lead to a reduction of the specified protection level. Disconnect the instrument from all external circuits before starting any maintenance and / or installation action.

The instrument does not have a general switch and will start operation as soon as power is connected. The instrument does not have protection fuse, the fuse must be added during installation.

The instrument is designed to be panel mounted. An appropriate ventilation of the instrument must be assured. Do not expose the instrument to excess of humidity. Maintain clean by using a humid rag and do NOT use abrasive products such as alcohols, solvents, etc. General recommendations for electrical installations apply, and for proper functionality we recommend : if possible, install the instrument far from electrical noise or magnetic field generators such as power relays, electrical motors, speed variators, ... If possible, do not install along the same conduits power cables (power, motor controllers, electrovalves, ...) together witah signal and/or control cables. Before proceeding to the power connection, verify that the voltage level available matches the power levels indicated in the label on the instrument. In case of fire, disconnect the instrument from the power line, fire alarm according to local rules, disconnect the air conditioning, attack fire with carbonic snow, never with water.

⚠ Conformity with security regulations EN-61010-1 requires that the front cover is closed. The output terminal prevents the front cover from opening.

13. Warranty

This instrument is warranted against all manufacturing defects for a period of 24 months, as requested by the European legislation. This warranty does not apply in case of misuse or accident, and the scope of the warranty is limited to repair of the instrument, not being the manufacturer responsible for additional damages or additional costs. Within the warranty period and after examination by the manufacturer, the unit will be repaired or substituted when found to be defective.

Extended warranty available at (see section 4)

14. Factory default parameters

Input signal	4/20 mA	['10']
Output signal	4/20 mA	['xx.']
Password code	disabled	['00']
Pt100 'alpha'	0.0385	['01']
Display code		['10.']

RESET TO DEFAULT FACTORY PARAMETERS

To recover the instrument to default factory parameters, select code '97' and activate value '01'.

· access the 'configuration mode'

· access code '97' and press key '**SQ**' (■)

· the 'configuration digits' show code '00' flashing

· press key '**UP**' (▲) to change to value '01'

· press key '**SQ**' (■)

· the leds light a round shape while the new configuration is stored, and the instrument returns to 'normal mode' of operation

· the 'configuration digits' show code '10.' and the default factory configuration is now active

FIRMWARE VERSION

The instrument 'firmware' version is an alphanumerical code from '00' to 'FF', accessible through the configuration code '98'.

15. CE declaration of conformity

Manufacturer	PCE INSTRUMENTS
Products	**PCE-SCI-U**

The manufacturer declares that the instruments indicated comply with the directives and rules indicated below.

Electromagnetic compatibility directive 2014/30/EU
Low voltage directive 2014/35/EU
ROHS directive 2011/65/EU
WEEE directive 2012/19/EU

Security rules EN-61010-1

Instrument	Fixed, Permanently connected
Pollution degree	1 and 2 (without condensation)
Isolation	Double
Overvotlage category 2	

Electromagnetic compatibility rules EN-61326-1

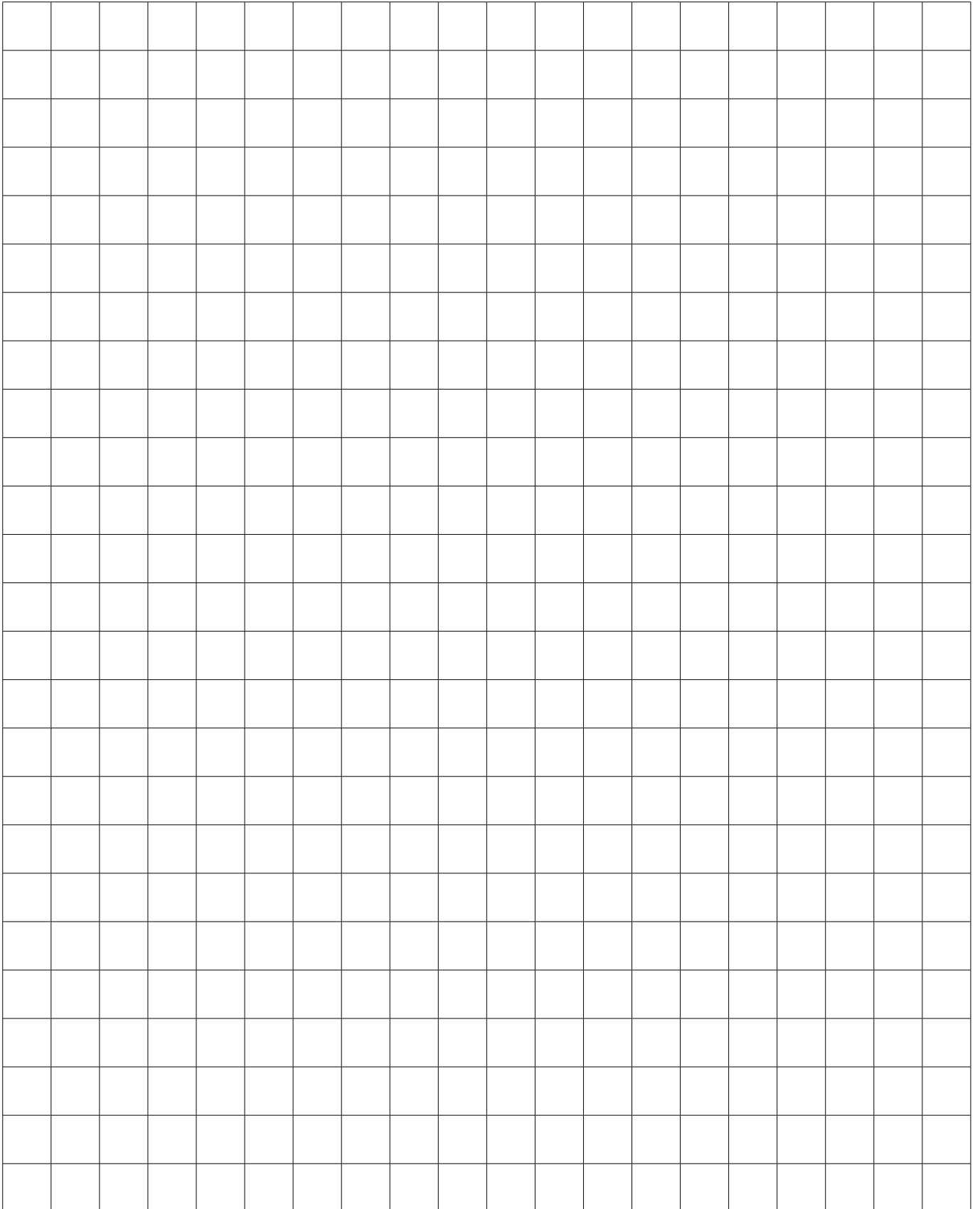| EM environment	Industrial
CISPR 11	Instrument Class A & Class B Group 1

According to directive 2012/19/EU, electronic equipment must be recycled in a selective and controlled way at the end of its useful life.

Notes

Notes

PCE Instruments

www.pce-instruments.com