

PERFORMANCE
MADE
SMARTER

Product Manual 4512

Bluetooth communication enabler



TEMPERATURE | I.S. INTERFACES | COMMUNICATION INTERFACES | MULTIFUNCTIONAL | ISOLATION | DISPLAY

No. 4512V100-UK
From serial no.: 191003001



6 Product Pillars

to meet your every need

Individually outstanding, unrivalled in combination

With our innovative, patented technologies, we make signal conditioning smarter and simpler. Our portfolio is composed of six product areas, where we offer a wide range of analog and digital devices covering over a thousand applications in industrial and factory automation. All our products comply with or surpass the highest industry standards, ensuring reliability in even the harshest of environments and have a 5-year warranty for greater peace of mind.



Our range of temperature transmitters and sensors provides the highest level of signal integrity from the measurement point to your control system. You can convert industrial process temperature signals to analog, bus or digital communications using a highly reliable point-to-point solution with a fast response time, automatic self-calibration, sensor error detection, low drift, and top EMC performance in any environment.



We deliver the safest signals by validating our products against the toughest safety standards. Through our commitment to innovation, we have made pioneering achievements in developing I.S. interfaces with SIL 2 Full Assessment that are both efficient and cost-effective. Our comprehensive range of analog and digital intrinsically safe isolation barriers offers multifunctional inputs and outputs, making PR an easy-to-implement site standard. Our backplanes further simplify large installations and provide seamless integration to standard DCS systems.



We provide inexpensive, easy-to-use, future-ready communication interfaces that can access your PR installed base of products. All the interfaces are detachable, have a built-in display for readout of process values and diagnostics, and can be configured via push-buttons. Product specific functionality includes communication via Modbus and Bluetooth and remote access using our PR Process Supervisor (PPS) application, available for iOS and Android.



Our unique range of single devices covering multiple applications is easily deployable as your site standard. Having one variant that applies to a broad range of applications can reduce your installation time and training, and greatly simplify spare parts management at your facilities. Our devices are designed for long-term signal accuracy, low power consumption, immunity to electrical noise and simple programming.



Our compact, fast, high-quality 6 mm isolators are based on microprocessor technology to provide exceptional performance and EMC-immunity for dedicated applications at a very low total cost of ownership. They can be stacked both vertically and horizontally with no air gap separation between units required.



Our display range is characterized by its flexibility and stability. The devices meet nearly every demand for display readout of process signals, and have universal input and power supply capabilities. They provide a real-time measurement of your process value no matter the industry, and are engineered to provide a user-friendly and reliable relay of information, even in demanding environments.

Bluetooth communication enabler 4512

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Warning



To avoid the risk of electric shock and fire, the safety instructions of this guide must be observed and the guidelines followed. The specifications must not be exceeded, and the device must only be applied as described in the following.

Prior to the commissioning of the device, this installation guide must be examined carefully.

Only qualified personnel (technicians) should install this device.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Repair of the device must be done by PR electronics A/S only.

Symbol identification



Triangle with an exclamation mark: Read the manual before installation and commissioning of the device in order to avoid incidents that could lead to personal injury or mechanical damage.



The CE mark proves the compliance of the device with the essential requirements of the directives.



Ex devices have been approved according to the ATEX directive for use in connection with installations in explosive areas.



The product meets the requirements of the standards:

Factory Mutual Approval Standard Class Number 3611 and CSA C22.2 No. 213-16.

FM/CSA Hazardous (Classified) Location Electrical Equipment:

Non Incendive / Class I / Division 2 / Groups A,B,C,D.



The device has an internal, non-removable, rechargeable coin cell battery.

Do not attempt to open the back cover or remove the battery, as you may damage the device.

Safety instructions

Receipt and unpacking

Unpack the device without damaging it and check whether the device type corresponds to the one ordered.

Environment

The device is manufactured for indoor use. Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation.

The device may be used in Overvoltage Category II, Pollution Degree 2 at an altitude up to 2000 m.

If the equipment is installed within an ultimate enclosure, the inner service temperature of the enclosure corresponds to the ambient temperature of the device.

If the device is operated in an ambient temperature between +55°C and +60°C, the temperature of the device housing may be higher than +60°C. The device must therefore be installed so that it is only accessible to service personnel or users that are aware of the reason for restricted access and the required safety measures at an ambient temperature of +55°C to +60°C.

Mounting

Only qualified technicians who are familiar with the technical terms, warnings, and instructions in this installation guide and who are able to follow these should connect the device. Only devices which are undamaged and free of moist and dust may be installed. The device may be installed on and supplied by PR electronics 4000 and 9000 series only.

Should there be any doubt as to the correct handling of the device, please contact your local distributor or, alternatively,
PR electronics A/S
www.prelectronics.com

IECEX and ATEX installation in Zone 2

DEKRA 13ATEX0098 X..... II 3 G Ex nA IIC T5 Gc
IECEX DEK 13.0026 X Ex nA IIC T5 Gc

For safe Ex installation the following must be observed:

The device must be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

Year of manufacture can be taken from the first two digits in the serial number.

The devices must be installed in a suitable enclosure providing a degree of protection of at least IP54 according to EN60529, taking into account the environmental conditions under which the equipment will be used.

To prevent ignition of the explosive atmospheres do not separate connectors when energized and an explosive gas mixture is present.

To avoid the risk of explosion due to electrostatic charging of the enclosure, do not handle the units unless the area is known to be safe, or appropriate safety measures are taken to avoid electrostatic discharge. For safe installation the following must be observed

FM installation in Zone 2 / Div. 2

FM, US CL I, Div 2, Gp A, B, C, D T5
CL I, Zn 2, Gp IIC T5
FM, CA CL I, Div 2, Gp A, B, C, D T5

For safe Ex installation the following must be observed:

The device must be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

CAUTION: To prevent injury, read the manual before use.

WARNING - Explosion hazard. Substitution of components may impair suitability for Class I, Division 2.

WARNING - Explosion hazard. Do not disconnect while circuit is live unless area is known to be non-hazardous.

WARNING - Explosion hazard. Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Year of manufacture can be taken from the first two digits in the serial number.

The equipment is intended to be mounted in a vent-free, tool-secured enclosure, meeting the equipment enclosure requirements in accordance with ANSI/ISA-61010-1 and C22.2 No. 1010.1, where applicable.

Cleaning

When disconnected, the device may be cleaned with a cloth moistened with distilled water.

Warranty

PR electronics A/S offers a 5-year warranty on this product.

Liability

To the extent the instructions in this manual are not strictly observed, the customer cannot advance a demand against PR electronics A/S that would otherwise exist according to the concluded sales agreement.

Bluetooth communication enabler 4512

- Bluetooth communication between the PR 4000/9000 devices and iOS/Android devices
- Live monitoring of process values and diagnostics on compatible smart devices or directly on the PR 4512
- Advanced data logging and event logging using the built-in real-time clock

Applications

- Program devices via Bluetooth using an iOS/Android device running the free PPS app (PR Process Supervisor).
- Use PPS data for preventive maintenance.
- All logged data can be exported in .csv format, for advanced data analysis off-site.
- On-site analysis of real-time process data on an iOS/Android compatible device.
- Off-site analysis of historic process data on a PC using PReset.

Technical characteristics

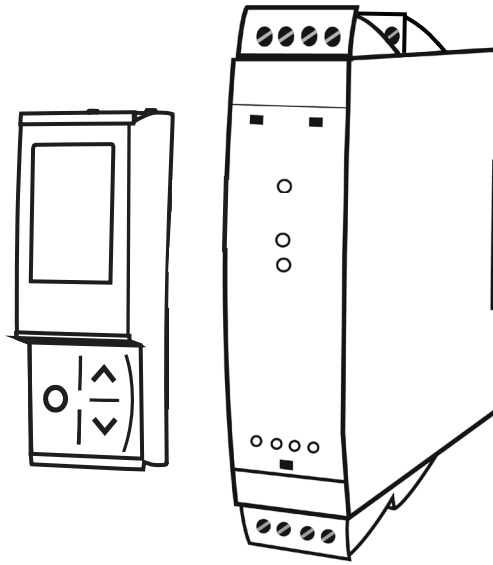
- PR 4512 runs Bluetooth 4.2, and requires a smart device with 4.0 or newer.
- PPS is compatible with iOS and Android devices.
- The PR 4512 automatically detects the device settings on the connected PR 4000 and 9000 device.
- An internal battery energizes the 4512 real-time clock for at least 2 years, should the 4512 remain de-energized.
- Typical data logging capacity is more than 30 days at 1 second intervals.
- Easy to read dot matrix LCD display.
- Fast pairing or safe pairing via two-factor authentication.

Mounting / installation / programming

- Mounting in Zone 2 / Div 2.
- The 4512 can be moved from one device to another. The individual system 4000/9000 device configuration of a transmitter can be saved and downloaded to subsequent transmitters.
- Programmed parameters can be protected by a user-defined password.
- When mounted on devices that are installed upside down, a menu selection rotates the 4512 display 180 degrees and reverses the up/down button functions.
- All data, including configuration, data log and event log from a PR 4000 / 9000 device can be transferred to a PC using the PR 4590.

Mounting on a 4000 / 9000 device





PR 4512 is a detachable display that can be mounted on all system 4000/9000 fronts for programming and signal monitoring.

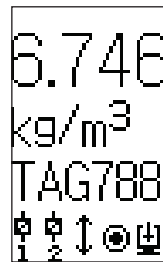


PR 4512 contains a dot matrix LCD display

Line 1 can e.g. show the scaled process value.
Line 2 can e.g. show the selected engineering unit.
Line 3 can e.g. show the analog output or TAG no.
Line 4 shows status for communication and e.g. signal trending.

Icons illustrate - left to right:

-  Relay/-s status
-  Input signal trend up/down
-  Display communication to host
-  Logdata present (steady) or logging in progress (blinking)



Order

Type	Description
4512	Bluetooth communication enabler
4590	ConfigMate interface

Electrical specifications

Environmental conditions:

Operating temperature	-20°C to +60°C
Storage temperature	-20°C to +85°C
Humidity.	< 95% RH (non-cond.)
Protection degree	IP20 when installed

Installation in pollution degree 2 / overvoltage category II.

Mechanical specifications:

Dimensions (HxWxD)	73.2 x 23.3 x 26.5 mm
Dimensions (HxWxD) w/ 4000/9000 unit	109 x 23.5 x 131 mm
Weight approx.	30 g

Common specifications:

Supply voltage	6.5...20 V supplied from host 4000 / 9000 device
Max. required power	0.15 W

Extended EMC immunity: NAMUR NE 21, A criterion, burst	No loss of communication
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Internal battery back-up (for real-time clock)	2 years (@ 25°C)
Calibrated real-time clock accuracy	<±60 s/year @ 25°C
Bluetooth communication	BLE 4.2
Bluetooth radio.	Class 2

Data logging:

Memory	100 MB
Capacity	> 2.75 million data points ¹
Data retention, without power.	~ 10 years

Observed authority requirements:

Directives:

EMC.	2014/30/EU
RED.	2014/53/EU
ATEX	2014/34/EU
RoHS	2011/65/EU

Standards:

UL, Standard for Safety	UL 61010-1
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Bluetooth:

Europe, CE.	117-37823-1
US, FCC.	ID QoQBGM111
Canada, IC.	5123A-BGM111
Japan, MIC.	Ⓡ209-J00192
Korea, KC.	MSIP-CRM-BGT, BGM111
China, SRRC, CMIIT-ID	2018DJ6574
Brazil, Anatel	06541-18-11723
Peru, MTC	T-251621-2018
Australia, RCM	42 004 182 772

Please find an updated list of countries who have approved the use of 4512 at:

www.preelectronics.com/4512-bluetooth-approvals/

¹ Consult www.preelectronics.com/logpointcalculator for device specific capacity.

Approvals:

Ex/ I.S.:

ATEX	DEKRA 13ATEX0098 X II 3 G Ex nA IIC T5 Gc
IECEX	DEK 13.0026 X Ex nA IIC T5 Gc
c FM us.	FM18US0268X / FM18CA0129X
FM, US	CL I, Div 2, Gp A, B, C, D T5 CL I, Zn 2, Grp IIC T5
FM, CA	CL I, Div 2, Gp A, B, C, D T5

4512 - configuration / operating the function keys

Documentation for routing diagram.

In general

When using the PR 4512 for configuration of a PR 4000 or PR 9000 device, you will be guided through all parameters and can choose the settings which fit the application. For each menu there is a scrolling help text which is automatically shown in line 3 on the display.

Configuration is carried out by use of the 3 function keys:

- ⏪ will increase the numerical value or choose the next parameter
- ⏩ will decrease the numerical value or choose the previous parameter
- ⏹ will save the chosen value and proceed to the next menu

When configuration is completed, the display will return to the default state 1.0. Pressing and holding ⏹ will return to the previous menu or return to the default state (1.0) without saving the changed values or parameters.

If no key is activated for 1 minute, the display will return to the default state (1.0) without saving the changed values or parameters.

For device-specific programming menus, please refer to the user manual for each device, e.g. PR 4116.

4512 functions

The PR 4512 gives access to a number of functions which can be reached by answering "Yes" to the menu point "ADV.SET" (see "4512 settings - routing diagram" on page 10).

Two factor authentication

When pairing the PPS device with PR 4512, a physical acknowledgement on the 4512 unit is required to complete pairing (activation of the ⏹ button). Two factor authentication is enabled by default.

Log functionality

By selecting the "LOG.INT" menu item, it is possible to set the log interval in seconds. Valid selections are 1...9999 s. You can also choose to reset the stored log in the menu item "LOG. DEL".

The logging function exits automatically, if the PR 4512 is detached. If the PR 4512 is placed back on the same device, the logging will continue. In the event of a power outage, logging will resume when power is restored.

Error Scenarios and help texts

Conditions	Scrolling help text	Solution
4512 has been without power until the battery is fully discharged. The RTC now needs to be synchronized.	RTC synchronization required.	Connect a smart device to the 4512 and synchronize. The error message will disappear when the synchronization is OK.
4512 has a log in progress and is moved to a new host.	New host detected, move 4512 back to previous host or press OK to stop log.	Move the 4512 back to the previous host or press OK. Both actions will remove the error message. The log will still be available in the memory of the 4512, but the device will not continue logging. Use PR 4590 or the PPS app to read out the log, before moving 4512 to a new host.
4512 has a log in progress and the user changes the host configuration.	Configuration change detected, log has been stopped.	If the configuration is changed while logging, the log is stopped immediately. Press OK to acknowledge that the log has been stopped in order to remove the error message. The log will still be available in the memory of the 4512, until a new log is started. Use PR 4590 or the PPS app to read out the log, before starting a new log.

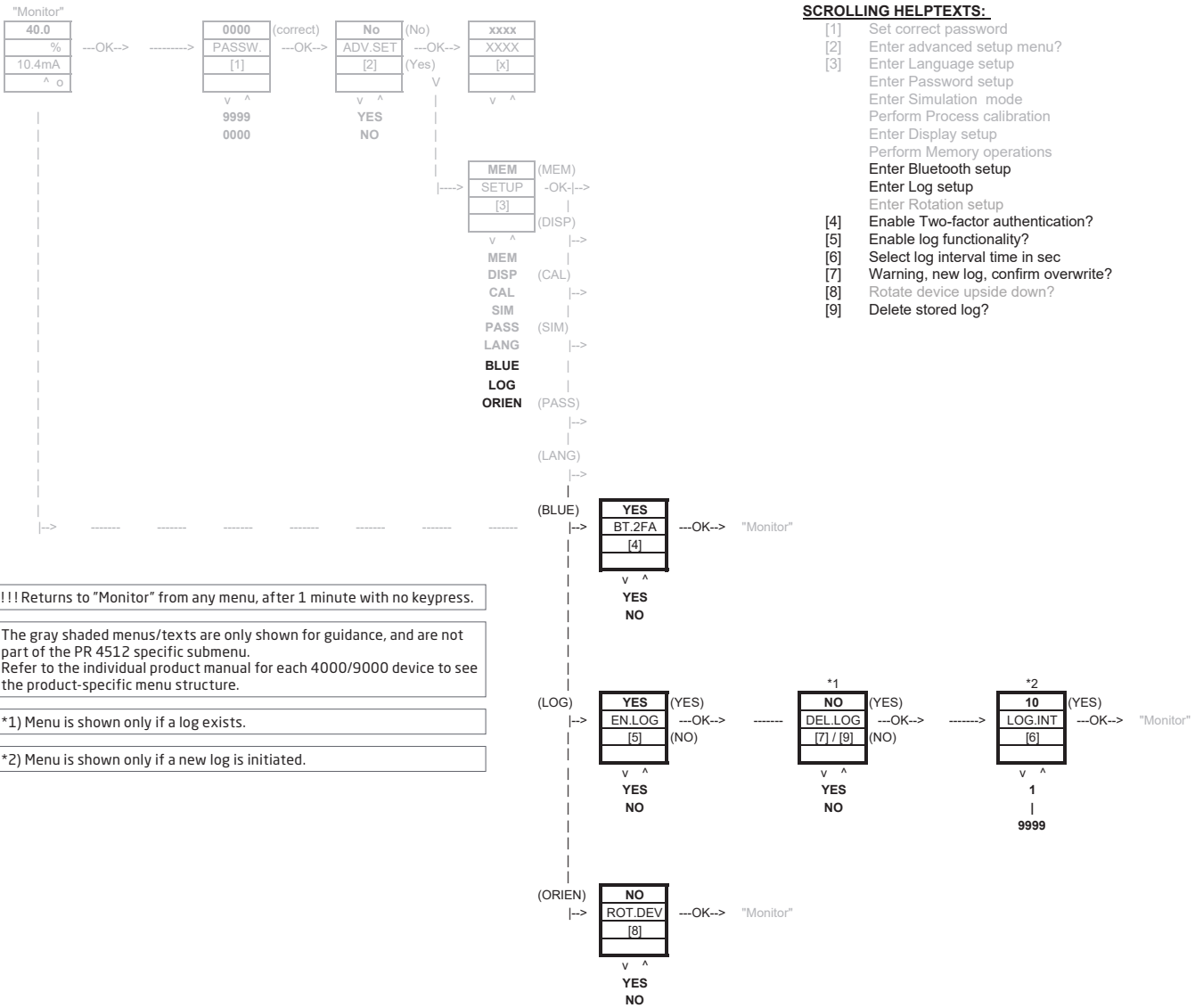
Memory

The memory available for data logging is 100 MB. When the memory is full, the oldest data will be overwritten.

Backup of device configuration

If you want to back-up the 4000/9000 product configuration, remember to save the configuration in the PR 4512 under the menu point "MEM" in the "ADV.SET" menu. The saved configuration can later be imported into PReset (see "Import of saved device configuration" on page 18).

4512 settings - routing diagram



SCROLLING HELPTXTS:

- [1] Set correct password
- [2] Enter advanced setup menu?
- [3] Enter Language setup
- Enter Password setup
- Enter Simulation mode
- Perform Process calibration
- Enter Display setup
- Perform Memory operations
- Enter Bluetooth setup**
- Enter Log setup**
- Enter Rotation setup
- [4] **Enable Two-factor authentication?**
- [5] **Enable log functionality?**
- [6] **Select log interval time in sec**
- [7] **Warning, new log, confirm overwrite?**
- [8] **Rotate device upside down?**
- [9] **Delete stored log?**

PR Process Supervisor - PPS app

The PR electronics 'PR Process Supervisor' - PPS - app enables remote data logging, programming and error diagnostics of PR 4000/9000 devices mounted with the 4512 Bluetooth communication enabler.

The app shows live data directly from a smart device. It is designed for technical and maintenance staff as well as plant operators. All that is required to get started is to download the free app, and you have a user friendly interface for monitoring and programming of installed PR devices.

App download

If you have already downloaded the PR electronics PPS app from either the Apple App store (IOS) or Google Play (Android), check for updates that will add the Bluetooth communication options.²

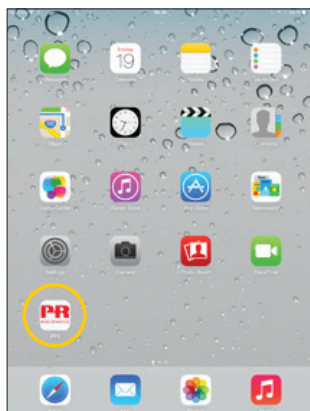
If you will be downloading the PR electronics PPS app for the first time, follow the instructions for IOS below. The Android download process will be similar.



Go to the App store or scan the QR code (the code works for both IOS and Android).



Search for "PR electronics PPS", and install the free application.

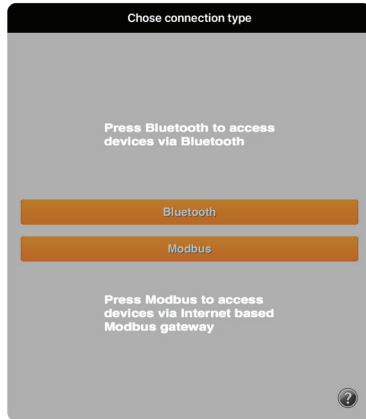


Tap the newly created PPS icon.

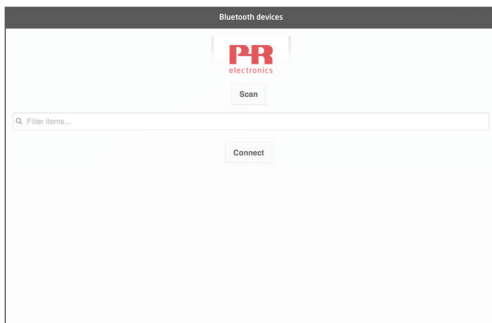
² Please consult app release notes for latest status of supported devices.

Connection and configuration

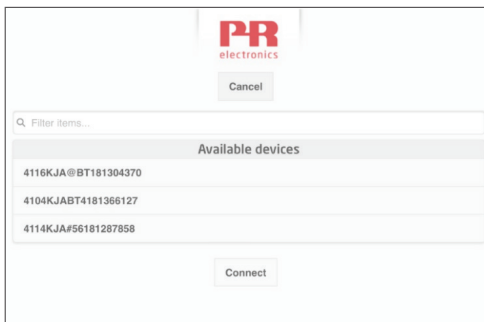
1. Start the PPS app and choose Bluetooth. Remember to activate Bluetooth communication on the smart device.



2. Perform "Scan" and discover products in the Bluetooth range with PR 4512 installed.




3. In order to identify a specific product in the app, each product may be configured with an individual TAG number. If needed, perform "filter items" to select specific product types, e.g. all "PR 4116".
4. Select the desired device and click 'Connect'.

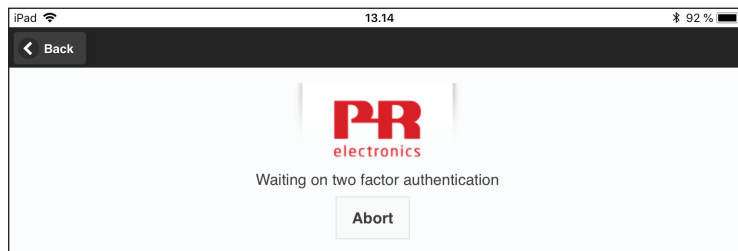


5. When a specific product is selected in the PPS, the display on the corresponding PR 4512 device will flash, indicating that connection has been established.

Pairing options

- a) Two-factor authentication - BT.2FA (enabled as default):
1. The display on the corresponding PR 4512 device will flash.
 2. Confirm that the right device has been selected by pushing the  button on the 4512.

Note: When password is enabled on PR 4512, the PPS will prompt the user to type in password when pairing.



- b) Fast pairing:
1. Deactivate two factor authentication through the PR 4512 menu (see page 10).
 2. Bluetooth devices in the vicinity of the smart device are automatically discovered.
 3. Select the desired device.
 4. The display on the corresponding PR 4512 device will flash.

Note: As long as a Bluetooth connection is running, the active 4512 device will be flashing.

Time adjustment

The internal clock in the PR 4512 uses Coordinated Universal Time (UTC). When connecting to a smart device, the clock will automatically show local time.

If the internal clock has drifted by > 2 minutes, a warning will appear on the smart device prompting you to adjust the time.

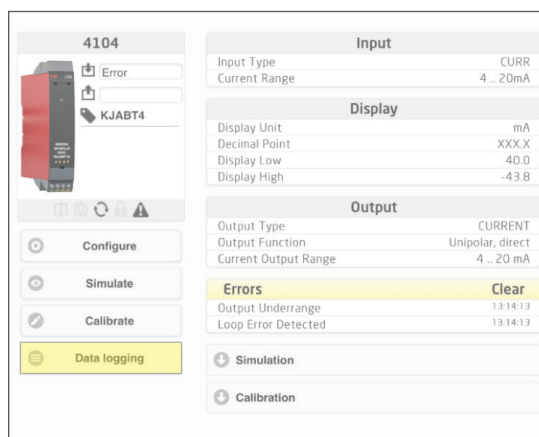
Process simulation

If a process simulation is performed using the PPS app, the device will return to normal operation state when the connection between the PPS app and the 4512 is terminated.

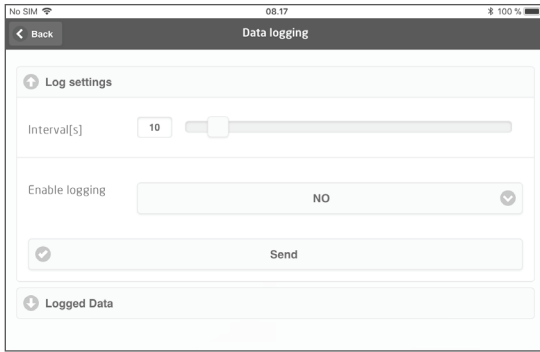
Data logging set-up

Opening screen for start-up of data logging:

1. Select "Data logging" in the left-hand side.



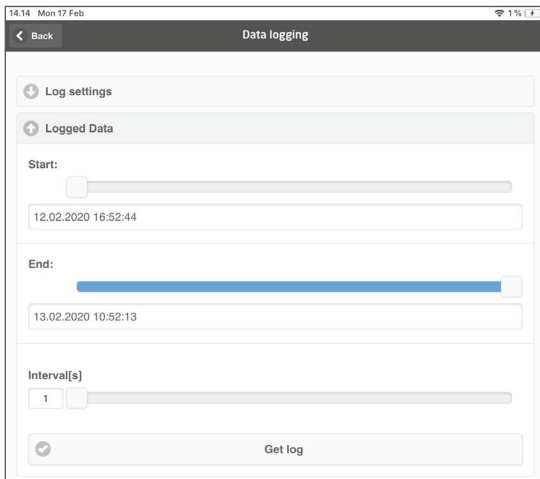
2. Select the data logging interval.
Valid selections are 1...9999 sec.



3. Use the down-arrow to change 'NO' to 'YES' and enable logging.
4. Click Send.

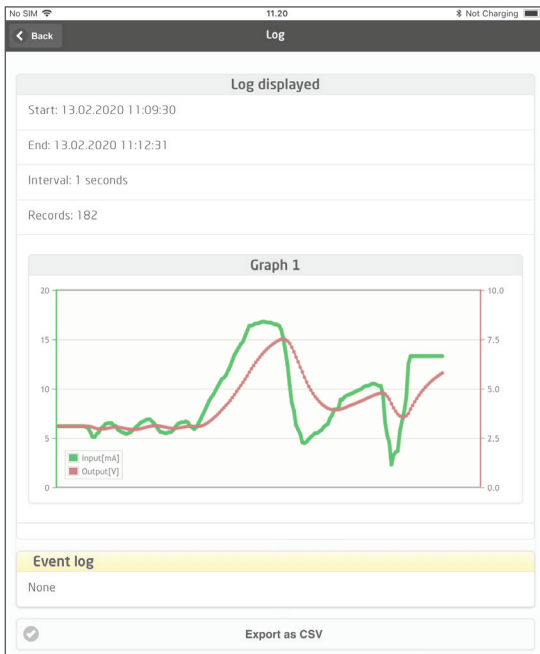
Analysis of logged data, event logging and export

1. Select the period and interval to transfer to the smart device and click the "Get log" button.



Note: Export intervals must be a multiple of the logged interval. If datalogging is done with 5 sec. intervals, valid export intervals are 5, 10, 15,...9995.

2. The available log information is shown.



3. The event log indicates the error code, date and time of each event and when it was cleared.

Event log	
Input Overrange	18.02.2020 10:10:15
Sensor Broken	18.02.2020 10:10:15
Sensor Broken Cleared	18.02.2020 10:10:24
Sensor Broken	18.02.2020 10:10:25
Input Overrange Cleared	18.02.2020 10:10:26
Input Overrange	18.02.2020 10:10:27
Input Overrange Cleared	18.02.2020 10:10:33
Sensor Broken Cleared	18.02.2020 10:10:34

4. If the logged data needs to be transferred to a PC, click the "Export as CSV" button.

For a detailed description of the error codes, see the section "Error indications" in the individual 4000/9000 series product manual.

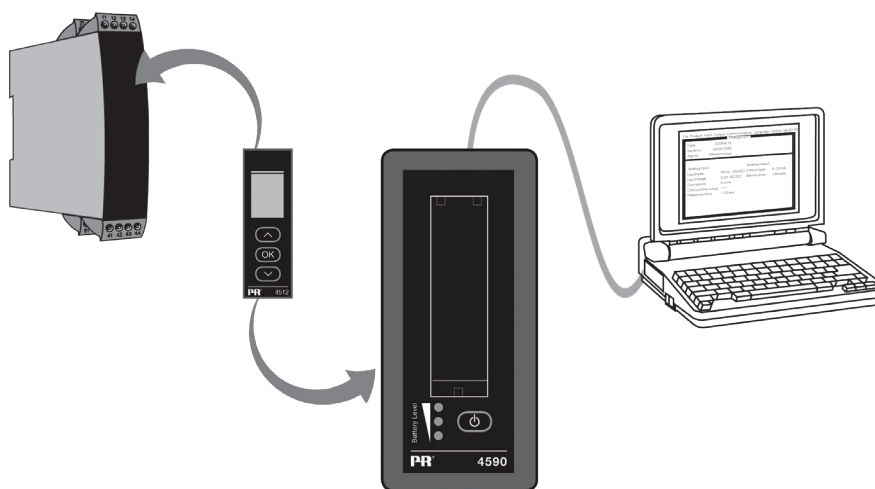
PReset software

Time adjustment

The internal clock in the PR 4512 uses Coordinated Universal Time (UTC). When connecting to PReset, the clock will automatically show local time.

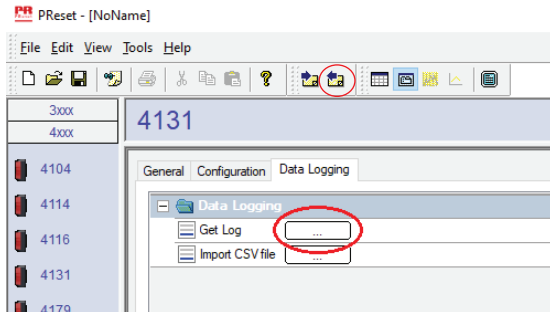
If the internal clock has drifted by > 2 minutes, a warning will appear in PReset prompting you to adjust the time.

Detailed analysis of logged data

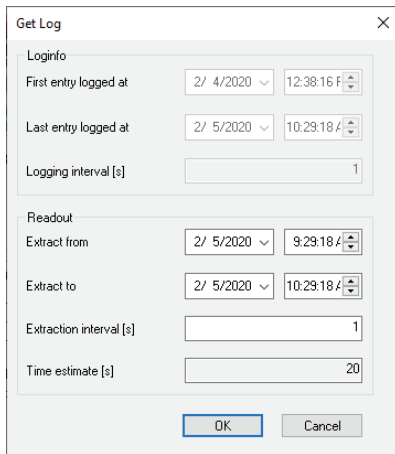


Use the PR 4590 ConfigMate to transfer logged data in the PR 4512 to PReset for analysis.

1. In PReset, click on the "Receive" icon.
2. Select the tab "Data Logging"
3. Click "Get Log".



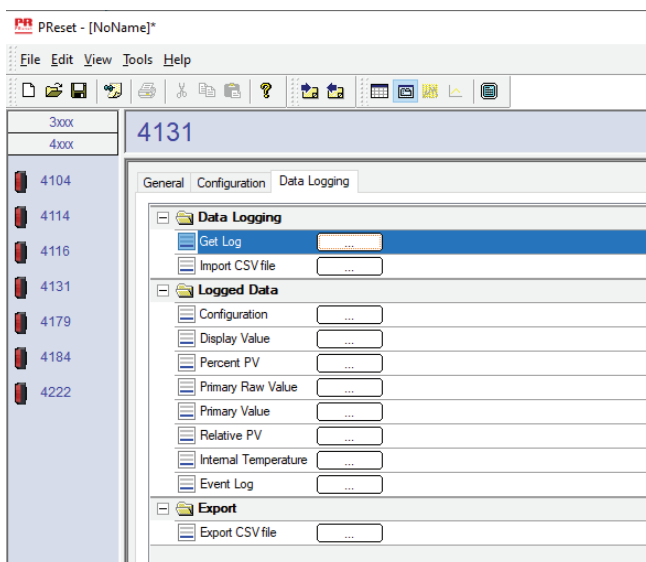
4. In the following window, select the "start time", "end time" and "interval".



Note: Time estimate [s] is automatically calculated and indicates the data transfer time to PReset.

Note: Export intervals must be a multiple of the logged interval. If datalogging is done with 5 sec. intervals, valid export intervals are 5, 10, 15,...9995.

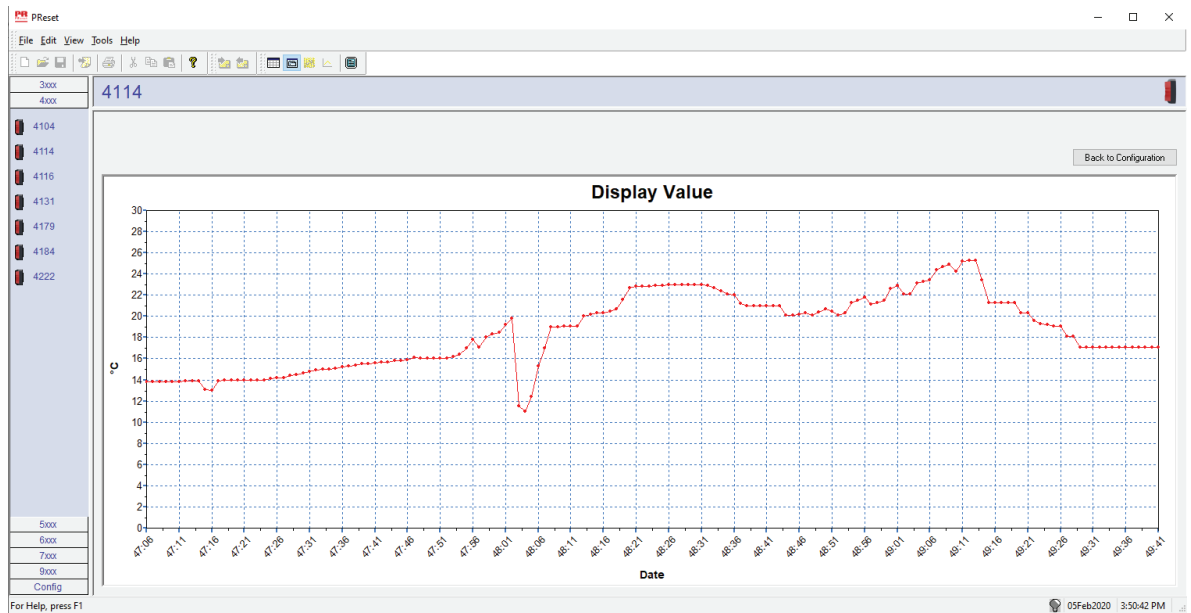
5. Click "OK" to transfer the data into PReset.
6. The following window opens:



7. Click the box next to each log (e.g. Display Value) to view logged data as a graph.
8. By clicking the box next to "Export as CSV", all logged data will be exported as a .csv file.

Data logging

The below example shows the graph for display value. Other options are Relative PV, Output Value and Primary Raw Values.



Event log

The below example shows an event log in PReset for a PR 4114. The event log indicates date and time for the occurrence of the event and for when it was cleared.

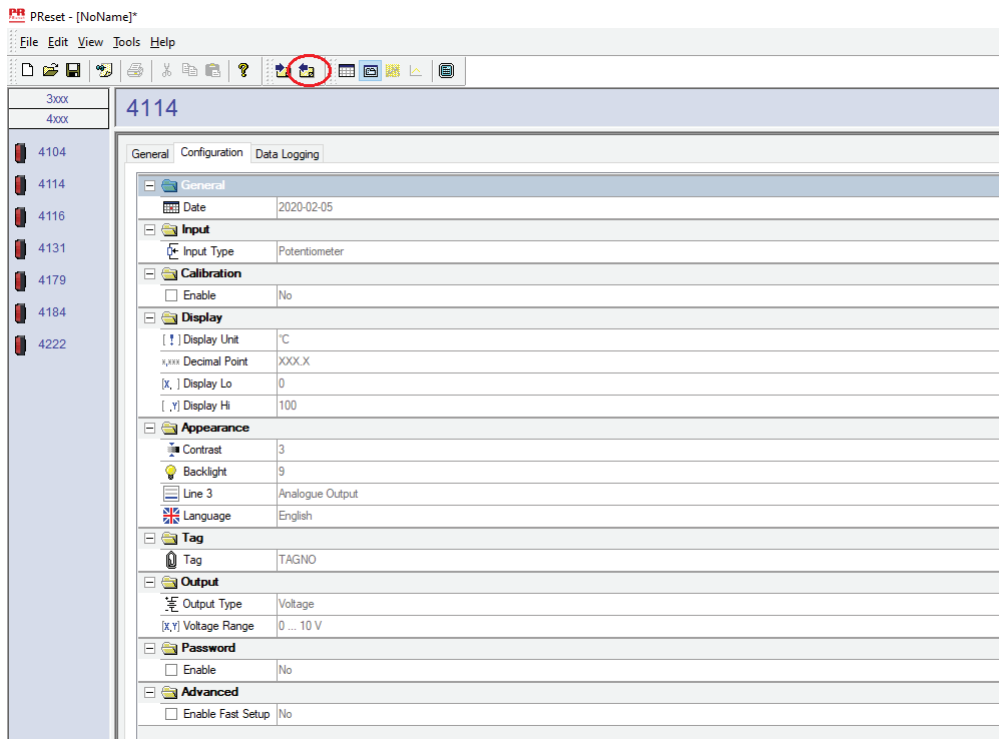
The screenshot shows the PReset software interface with the event log for PR 4114. The log table is as follows:

	Date	Event
1	2020-02-05 15:54:27	INPUT_OVER_RANGE - SET
2	2020-02-05 15:54:35	INPUT_OVER_RANGE - CLEAR
3	2020-02-05 15:54:39	INPUT_OVER_RANGE - SET
4	2020-02-05 15:54:41	INPUT_OVER_RANGE - CLEAR
5	2020-02-05 15:54:55	INPUT_OVER_RANGE - SET
6	2020-02-05 15:54:58	INPUT_OVER_RANGE - CLEAR

For a detailed description of the error codes, see the section "Error indications" in the individual 4000/9000 series product manual.

Import of saved device configuration

1. Click on the "Receive" icon.
2. Select the tab "Configuration".



Document history

The following list provides notes concerning revisions of this document.

Rev. ID	Date	Notes
100	2002	initial release of the product

We are near you, *all over the world*

Our trusted red boxes are supported wherever you are

All our devices are backed by expert service and a 5-year warranty. With each product you purchase, you receive personal technical support and guidance, day-to-day delivery, repair without charge within the warranty period and easily accessible documentation.

We are headquartered in Denmark, and have offices and authorized partners the world over. We are a local business

with a global reach. This means that we are always nearby and know your local markets well.

We are committed to your satisfaction and provide PERFORMANCE MADE SMARTER all around the world.

For more information on our warranty program, or to meet with a sales representative in your region, visit prelectronics.com.

Benefit today from *PERFORMANCE MADE SMARTER*

PR electronics is the leading technology company specialized in making industrial process control safer, more reliable and more efficient. Since 1974, we have been dedicated to perfecting our core competence of innovating high precision technology with low power consumption. This dedication continues to set new standards for products communicating, monitoring and connecting our customers' process measurement points to their process control systems.

Our innovative, patented technologies are derived from our extensive R&D facilities and from having a great understanding of our customers' needs and processes. We are guided by principles of simplicity, focus, courage and excellence, enabling some of the world's greatest companies to achieve PERFORMANCE MADE SMARTER.