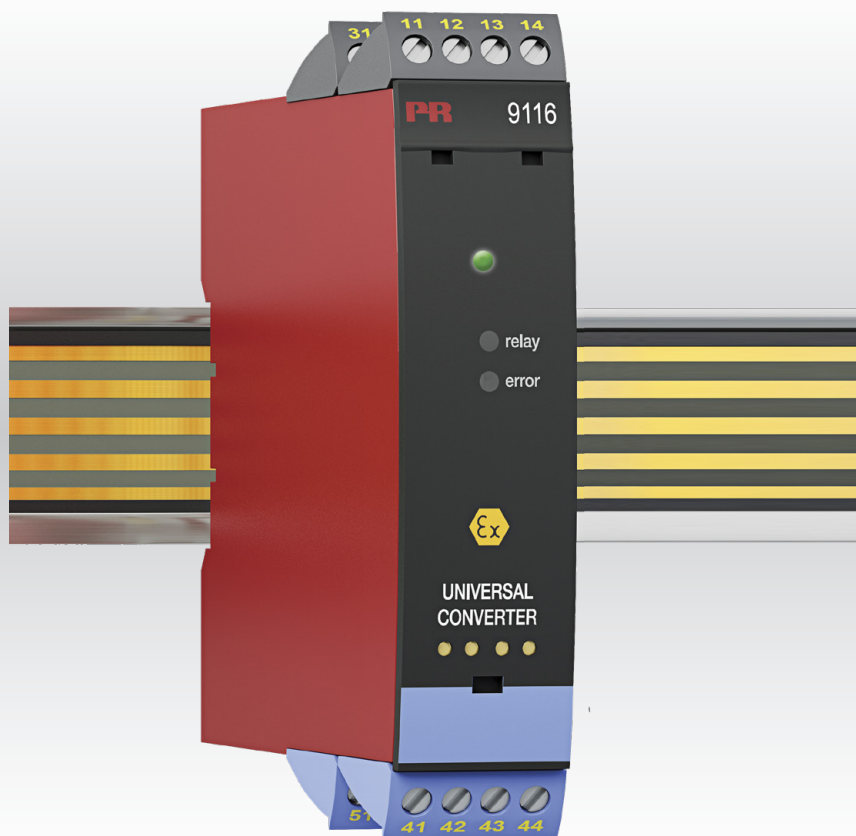# Configuration Manual
9116 / 4511
Modbus RTU configuration of
9116 Universal converter

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

No. 9116MCM101-UK
For 4511 devices from ser. no. 141590001

PR electronics

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.

Temperature

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.

I.S. Interface

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.

Communication

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.

Multifunction

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.

Isolation

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.

Display

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.

Contents

Introduction

This configuration manual

contains the necessary information for configuring a PR 9116 device which is connected to a PR 4511 Modbus RTU enabler.

Modbus is a "master-slave" system,

where the "master" communicates with one or multiple "slaves".

The master typically is a PLC (Programmable Logic Controller), DCS (Distributed Control System), HMI (Human Machine Interface), RTU (Remote Terminal Unit) or PC.

The three most common Modbus versions used are: MODBUS ASCII, MODBUS RTU and MODBUS/TCP.

In Modbus RTU, data is coded in binary, and requires only one communication byte per data byte. This is ideal for use over multi-drop RS485 networks, at speeds up to 115,200 bps.
The most common speeds are 9,600 bps and 19,200 bps.

Modbus RTU is the most widely used industrial protocol and is supported by the 4511.

Modbus RTU

To communicate with a slave device, the master sends a message containing:

> **Device Address - Function Code - Data - Error Check**

The Device Address is a number from 0 to 247.

Messages sent to address 0 (broadcast messages) will be accepted by all slaves, but numbers 1-247 are addresses of specific devices. With the exception of broadcast messages, a slave device always responds to a Modbus message so the master knows the message was received.

4511 Supported Modbus Function Codes

Command	Function code
Read Holding Registers*	03
Read Input Registers*	04
Write Single Register	06
Diagnostics	08
Write Multiple Registers	16

*Holding Registers and Input Registers contain identical data in PR 4511.

The Function Code defines the command that the slave device is to execute, such as read data, accept data, report status. Some function codes have sub-function codes.

The Data defines addresses in the device's memory map for read functions, contains data values to be written into the device's memory, or contains other information needed to carry out the function requested.

The Error Check is a 16-bit numeric value representing the Cyclic Redundancy Check (CRC).

Maximum number of registers which can be read or written at once

For a read command, the limit is 8 registers at a baud rate up to 38,400 bps,
16 registers @ 57,800 bps and 32 registers @ 115,200 bps.

For a write command, the limit is 123 registers at baud rates up to 115,200 bps.

4511 Modbus parameter settings

Automatic Baudrate Detection:	Can be configured YES or **NO**
Supported baudrates:	2400, 4800, 9600, **19.2k**, 38.4k, 57.6k, 115.2k bps
Parity Mode:	**Even**, Odd or None parity
Stop Bits:	**1** or 2 stop bits
Response delay:	0…1000 ms **(0 ms = default)**
Modbus slave addressing range:	1 - 247 **(247 = default address)**
Modbus Parameter Storage:	Saved in non-volatile memory in the 4511 device
(Factory Default Values are marked in **bold**)	

Modbus RTU segment line termination

A 120 Ohm resistor should be installed on both ends of a RS485 Modbus RTU segment loop to prevent signal echoes from corrupting data on the line.

9116 Parameter Lists

9116 Configuration Parameter List

Category	Parameter Name	Modbus Address	Register Size	Read/ Write	Type	Description	Values
GENERAL	DEVICE TYPE	0	1	RO	UNSIGNED INTEGER	Defines the actual device type	9116 = 4458 (0x9116A)
GENERAL	DEVICE VERSION	1	1	RO	UNSIGNED INTEGER	Product version	0
INPUT	INPUT TYPE	2	1	R/W	INTEGER	Selected input type (Voltage, Current, Resistance, Potentiometer, Temperature)	TEMP = 0 CURR = 1 POTM = 2 LINR = 3 VOLT = 4
INPUT	INPUT CURRENT RANGE	3	1	R/W	INTEGER	Fixed input range for current measurements	0...20 mA = 0 4...20 mA = 1
INPUT	CONNECTION TYPE	4	1	R/W	INTEGER	Sensor connection type for RTD / resistance measurements	2-wire = 0 3-wire = 1 4-wire = 2
INPUT	TEMP UNIT	5	1	R/W	INTEGER	Temperature units	°C = 0 °F = 1
INPUT	TEMP SENSOR TYPE	6	1	R/W	INTEGER	Temperature sensor type	TC = 0 Ni = 1 Pt = 2
INPUT	PT TYPE	7	1	R/W	INTEGER	Pt value (Pt10, Pt20, Pt50...)	Pt10 = 0 Pt20 = 1 Pt50 = 2 Pt100 = 3 Pt200 = 4 Pt250 = 5 Pt300 = 6 Pt400 = 7 Pt500 = 8 Pt1000 = 9
INPUT	NI TYPE	8	1	R/W	INTEGER	Ni value (Ni50, Ni100, Ni120...)	Ni50 = 0 Ni100 = 1 Ni120 = 2 Ni1000 = 3
INPUT	TC TYPE	9	1	R/W	INTEGER	Thermocouple type (TCB, TCK etc.)	TC type B = 0 TC type E = 1 TC type J = 2 TC type K = 3 TC type L = 4 TC type N = 5 TC type R = 6 TC type S = 7 TC type T = 8 TC type U = 9 TC type W3 = 10 TC type W5 = 11 TC type Lr = 12
INPUT	CJC TYPE	10	1	R/W	INTEGER	CJC compensation type for TC temperature types (internal or connector)	INTERNAL = 0 CONNECTOR = 1
INPUT	INPUT VOLTAGE RANGE	11	1	R/W	INTEGER	Fixed input range for voltage measurements	0...1 V = 0 0.2..1 V = 1 0...5 V = 2 1...5 V = 3 0...10 V = 4 2...10 V = 5
INPUT	LIN RES LOW	12	1	R/W	UNSIGNED INTEGER	Input range low for Linear resistance measurements	Range: 0...9998
INPUT	LIN RES HIGH	13	1	R/W	UNSIGNED INTEGER	Input range high for Linear resistance measurements	Range: 1...9999
DISPLAY	DISPLAY UNIT	14	1	R/W	INTEGER	Units shown as display units for non-temperature input types	Acc. to table 1
DISPLAY	DECIMAL POINT	15	1	R/W	INTEGER	Decimal point place for display reading of non-temperature input types	XXXX = 0 X.XXX = 1 XX.XX = 2 XXX.X = 3
DISPLAY	DISPLAY LOW	16	1	R/W	INTEGER	Low display range for display reading of non-temperature input types	Range: -1999...9999
DISPLAY	DISPLAY HIGH	17	1	R/W	INTEGER	High display range for display reading of non-temperature input types	Range: -1999...9999

Category	Parameter Name	Modbus Address	Register Size	Read/Write	Type	Description	Values
RELAY	RELAY UNIT	18	1	R/W	INTEGER	Units for relay setpoint of non-temperature input types	Percent = 0 Display units = 1
RELAY	RELAY FUNCTION	19	1	R/W	INTEGER	Relay function (setpoint, window, error etc.)	OFF = 0 POWER = 1 ERROR = 2 WINDOW = 3 SETPOINT = 4
RELAY	RELAY CONTACT	20	1	R/W	INTEGER	Contact function, (NO/NC or "open inside window"/"closed inside window")	NC / Open inside window = 0 NO / Closed inside window = 1
RELAY	RELAY SETPOINT	21	2	R/W	INTEGER	Setpoint in either display values or 1/10% (percent) for non-temperature and in 1/10° for temperature input types	**Range for non-temperature measurements:** Min. limit: 1 & max. limit: abs(DISP HIGH – DISP LOW")/4 if relay unit is set to Display units. 1…250 (0.1…25.0%) if relay unit is set to percent **Range for temperature input types:** Range equals the measurement range for the selected sensor type, see table 2
RELAY	RELAY ACTION DIRECTION	23	1	R/W	INTEGER	Activation direction	DECREASING = 0 INCREASING = 1
RELAY	RELAY HYSTERESIS	24	1	R/W	UNSIGNED INTEGER	Hysteresis in either display values or 1/10% (percent) for non-temperature, and in 1/10° for temperature input types	**Range for non-temperature measurements:** 1…Absolute value of (DISP HIGH-DISPL LOW)/4 if relay unit is set to Display units. 1…250 (0.1…25.0%) if relay unit is set to percent **Range for temperature input types:** Min. limit: 0.1 & max. limit equals 25% of the measurement range for the selected sensor type
RELAY	RELAY ERROR ACTION	25	1	R/W	INTEGER	Action on error	NONE = 0 OPEN = 1 CLOSE = 2 HOLD = 3
RELAY	RELAY ON DELAY	26	1	R/W	UNSIGNED INTEGER	Relay ON time delay	Range: 0…3600 s
RELAY	RELAY OFF DELAY	27	1	R/W	UNSIGNED INTEGER	Relay OFF time delay	Range: 0…3600 s
RELAY	RELAY SETPOINT LOW	28	2	R/W	INTEGER	Low window setpoint in either display values or 1/10% (percent) for non-temperature, and in 1/10° for temperature input types	As RELAY SETPOINT with the addition that RELAY SETPOINT HIGH must be higher than RELAY SETPOINT LOW
RELAY	RELAY SETPOINT HIGH	30	2	R/W	INTEGER	High window setpoint in either display values or 1/10% (percent) for non-temperature, and in 1/10° for temperature input types	As RELAY SETPOINT LOW
OUTPUT	CURRENT OUTPUT RANGE	32	1	R/W	INTEGER	Fixed output range for current output	0…20 mA = 0 4…20 mA = 1 20…0 mA = 2 20…4 mA = 3
OUTPUT	OUTPUT ERROR	33	1	R/W	INTEGER	Analog output action on error. This sets the output error signaling value (If set to none sensor error detection is disabled)	NONE = 0 0 mA = 1 3.5 mA = 2 23 mA = 3
OUTPUT	OUTPUT LOW	34	2	R/W	INTEGER	Temperature for output low value for temperature input types in 0.1°	Range equals the measurement range for the selected sensor type, see table 2. Must be 10 (1.0°) lower than OUTPUT HIGH
OUTPUT	OUTPUT HIGH	36	2	R/W	INTEGER	Temperature for output high value for temperature input types in 0.1°	Range equals the measurement range for the selected sensor type, see table 2. Must be 10 (1.0°) higher than OUTPUT LOW
OUTPUT	OUTPUT RESPONSE TIME	38	1	R/W	UNSIGNED INTEGER	Analog output response time in 1/10 seconds	0…600 (0 to 60.0 s)
INPUT	CALIB RANGE LOW	39	2	R/W	FLOAT	Actual process value for low calibration point in either display values or 1/10°C	**For non-temperature input types:** the range is DISPLAY LOW…DISPLAY HIGH **For temperature input types:** the range equals the measurement range for the selected sensor type
INPUT	CALIB RANGE HIGH	41	2	R/W	FLOAT	Actual process value for high calibration point in either display values or 1/10°C	As CALIB RANGE LOW
INPUT	CALIB POINT LOW	43	2	R/W	FLOAT	Measured process value for low calibration point in either display values or 1/10°C (Must be copied from PROCESS DATA)	As CALIB RANGE LOW
INPUT	CALIB POINT HIGH	45	2	R/W	FLOAT	Measured process value for high calibration point in either display values or 1/10°C. (Must be copied from PROCESS DATA)	As CALIB RANGE LOW

Category	Parameter Name	Modbus Address	Register Size	Read/ Write	Type	Description	Values
INPUT	USE CALIB	47	1	R/W	INTEGER	Use the applied calibration values	NO = 0 YES = 1
GENERAL	PASSWORD	200	1	R/W	UNSIGNED INTEGER	Write this parameter to change password value	0...9999
GENERAL	PASSWORD ATTEMPT	201	1	R/W	UNSIGNED INTEGER	Write the value of PASSWORD to this parameter to open device for configuration if password is set	0...9999
DISPLAY	DISPLAY CONTRAST	202	1	R/W	UNSIGNED INTEGER	Contrast in the LCD display	Range: 0...9
DISPLAY	DISPLAY BACKLIGHT	203	1	R/W	UNSIGNED INTEGER	Backlight intensity in LCD	Range: 0...9
DISPLAY	TAG TEXT	204	3	R/W	ASCII CHAR	Tag of the device (5 characters)	Range: ASCII values from 32 to 90 ('-' to 'Z').
DISPLAY	LINE FUNCTION	210	1	R/W	UNSIGNED INTEGER	Information shown in line 2/3 of display in monitor mode (normal mode).	INPUT VALUE = 0 OUTPUT VALUE = 1 TAG = 2 ALTERNATING = 3
GENERAL	ENABLE PASSWORD	211	1	R/W	UNSIGNED INTEGER	Password protect configuration	NO = 0 YES = 1
RELAY	ENABLE FAST SET	212	1	R/W	UNSIGNED INTEGER	Enable fast set of relay setpoint from monitor menu	NO = 0 YES = 1
GENERAL	HELP TEXT LANGUAGE	213	1	R/W	UNSIGNED INTEGER	Language for the help texts shown on display	UK = 0 DK = 1 DE = 2 FR = 3 SE = 4 IT = 5 ES = 6
GENERAL	ENABLE RAIL ERROR SIGNAL	214	1	R/W	UNSIGNED INTEGER	Rail error relay function	NO = 0 YES = 1
GENERAL	ENABLE SIL MODE	215	1	RO	UNSIGNED INTEGER	Shows if the device is SIL Locked	NO = 0 YES = 1
GENERAL	CHECK SUM	300	1	RO	UNSIGNED INTEGER	CRC16 checksum of the configuration	Range 0...65536
GENERAL	CONFIGURA-TION COUNTER	301	1	RO	UNSIGNED INTEGER	This counter will count the number of times the configuration has been changed. The counter is reset on power-up	Range 0...65536

9116 Process Parameter List

Parameter Name	Register Address	Register Size	Read/ Write	Type	Description	Values
PROCESS VALUE	1000	2	RO	FLOAT	The measured process value. Temperature is represented as 1/10 of degrees (i.e. with fixed decimal point at 0.1°C or 0.1°F). When measuring other signal types the process value will be the configured display range and decimal point. If the selected temperature unit is different from °C and the selected measurement type is a temperature type, the process value is converted to the selected temperature unit.	**Range for non-temperature input types:** DISPLAY LOW...DISPLAY HIGH **Range for temperature input types:** equals the measurement range for the selected sensor type
OUTPUT VALUE	1002	1	RO	INTEGER	The output value in µA.	Range: 0...23000 (23 mA)
RELAY STATUS	1003	1	READ ONLY	UNSIGNED INTEGER	Status of actual relay state	Not used — bit 0-1 RELAY_ON: — bit 2 relay function 1 = ON; 0 = OFF Not used — bit 3 RELAY_PRE_ON: — bit 4 relay state before on/off counter; 0 = relay will turn off, 1 = relay will turn on Not used — bit 5-7
MEASURE STATUS	1004	1	RO	UNSIGNED INTEGER	The actual measurement status	LEAD_BREAKAGE — bit 0 SHORT_CIRCUIT — bit 1 INPUT_OVERRANGE — bit 2 INPUT_UNDERRANGE — bit 3 Not used — bit 4-7
ERROR STATUS	1005	1	RO	UNSIGNED INTEGER	The actual error status (device errors)	RAM_ERROR — bit 0 FLASH_ERROR — bit 1 SOFTWARE_ERROR — bit 2 ADC_ERROR — bit 3 OUTPUT_SUPPLY_ERROR bit 4 INPUT_SUPPLY_ERROR — bit 5 CJC_ERROR — bit 6 EXT_CJC_ERROR — bit 7 CALIB_ERROR — bit 8 CONFIG_ERROR — bit 9 BAD_OUTPUT_ERROR — bit 10 MAIN_CPU_ERROR — bit 11 RELAY_ERROR — bit 12 INIT_ERROR — bit 13 RESET_ERROR — bit 14 INPUTCOM_ERROR — bit 15
CONFIG-URATION STATUS	1006	2	RO	ASCII CHAR	Status of the last approved configuration	**"FAIL"** No valid configuration has been received **"OPEN"** Actual configuration is NOT locked (non-SIL) **"LOCK"** Actual configuration is locked (SIL) **"INIT"** Initial status after a power-up/reset
ERROR STATUS	1200	1	RO	UNSIGNED INTEGER	Status of common device errors. If any bits in the ERROR STATUS parameter are set, both channels have entered a safe state, where the analog outputs are forced below 3.5 mA and the relay contact is de-energized (only 9116). All other process data values are then unpredictable, and shall not be relied upon nor used for any user information!	MAIN_CH1_COMM_ERROR bit 0 MAIN_CH2_COMM_ERROR bit 1 MAIN_CONFIG_ERROR — bit 2 MAIN_FLASH_ERROR — bit 3 MAIN_RAM_ERROR — bit 4 MAIN_SUPPLY_ERROR — bit 5 MAIN_INIT_ERROR — bit 6 MAIN_PRGFLOW_ERROR — bit 7
OUT STATE	1201	1	RO	UNSIGNED INTEGER	Status of LEDs and error relay / power rail error signal.	Power LED, — bit 0 0 = OFF, 1 = ON. Relay LED, — bit 1 0 = OFF, 1 = ON. Channel 1 Status LED, — bit 2 0 = OFF, 1 = ON. Channel 2 Status LED, — bit 3 0 = OFF, 1 = ON. Power Rail signal, — bit 4 0 = Open, 1 = Closed Status Relay (N.C.), — bit 5 0 = Energized, 1 = De-energized Not used — bit 6-7

9116 Simulation Parameter List

Parameter Name	Register Address	Register Size	Read/Write	Type	Description	Values
MEASUREMENT CONTROL	2000	1	R/W	UNSIGNED INTEGER	Controls various updates of process values and configuration. All simulation functions are ignored if ENABLE SIL MODE = YES	**Bit 0-2:** Disables updating of various process parameters enabling simulation using SIMULATION VALUE Value 0: NONE- All simulation disabled. Value 1: RELAY_SIM - The updating of the relay (RELAYSTATUS) is disabled. Value 2: OUT_SIM - The updating of the analog output (OUTPUT VALUE) is disabled. Value 3: SETP_SIM - SETPOINT for the relay is overwritten with SIMULATION VALUE enabling temporary fast setting of relay. Value 4: MEAS_SIM -The updating of input value (PROCESS VALUE) is disabled. Value 5: PROCESS_SIM - When set, PROCESS VALUE is updated without user calibrated values, facilitating a new process calibration Value 6-7: Unused **Bit 3:** RELAY_INV 1 = Current relay state is inverted. **Bit 4-7:** Reserved - must be set to 0!
SIMULATION VALUE	2001	2	R/W	INTEGER	Common simulation parameter. Function is dependent on the bits set in MEASUREMENT CONTROL: If single bit values are simulated, a zero will indicate an inactive output. Integer values are always represented from the LSB and up.	The entered simulation values must match the corresponding simulated data type dependent on the value of MEASUREMENT CONTROL CH1 bit 0-2: RELAY_SIM: Simulates RELAY STATUS CH1 OUT_SIM: Simulates OUTPUT VALUE CH1 (in μA) SETP_SIM: Simulates RELAY SETPOINT CH1 MEAS_SIM: Simulates PROCESS VALUE CH1 (display values) PROCESS_SIM: N.A.
OUT STATE	2200	1	R/W	UNSIGNED INTEGER	This parameter is used to simulate the process parameter with the same name.	Power LED, 0 = OFF, 1 = ON. bit 0 Relay LED, 0 = OFF, 1 = ON. bit 1 Channel 1 Status LED, bit 2 0 = OFF, 1 = ON. Channel 2 Status LED, bit 3 0 = OFF, 1 = ON. Power Rail signal, bit 4 0 = Open, 1 = Closed Status Relay (N.C.), bit 5 0 = Energized, 1 = De-energized Not used bit 6-7
MEASUREMENT CONTROL COMMON	2201	1	R/W	UNSIGNED INTEGER	Disables various updates of process values and configuration, enabling simulation using OUT STATE. All simulation functions, except bit 0 and 7, are ignored if ENABLE SIL MODE = YES. All bits, except for bit 0 and bit 7, are cleared when the parameter SIMULATION TIMEOUT reaches zero.	**Bit 0:** If set, all errors are cleared and configuration is reread from external flash. The bit is automatically cleared when executed. **Bit 1-2:** Reserved - must be set to 0! **Bit 3:** If set, the updating of Power Rail status is disabled, enabling simulation and test. **Bit 4:** If set the updating of status relay is disabled, enabling simulation and test. **Bit 5:** If set, the updating of all LEDs is stopped so they can be controlled from OUT STATE. **Bit 6:** Unused. **Bit 7:** If set, all LEDs will be turned off until cleared or 10 scans after the last successful communication.
SIMULATION TIMEOUT	2202	1	R/W	UNSIGNED INTEGER	Timeout counter disabling all simulation, ensuring that normal measure status is re-established. The counter is decremented every 75 ms until it reaches zero (timeout). Can be used to set different timeouts, i.e. setting the value to 133 will make the timeout occur appr. (133 * 0.075 ms) = 10 seconds after it was set.	Minimum timeout value is 0 s (which will also disable all simulation values before they take effect) Maximum timeout value is 255 * 0.075 s = 19.13 s.

Table 1: Display units

0	°C	10	mils	20	in/s	30	t	40	kJ	50	kA	60	m³/h
1	°F	11	yd	21	ips	31	kg	41	Wh	51	mA	61	l/s
2	K	12	m³	22	ft/s	32	g	42	MWh	52	µA	62	l/min
3	%	13	l	23	in/min	33	N	43	kWh	53	V	63	l/h
4	m	14	s	24	ft/min	34	Pa	44	W	54	kV	64	gal/min
5	cm	15	min	25	in/h	35	MPa	45	GW	55	mV	65	gal/h
6	mm	16	m/s	26	ft/h	36	kPa	46	MW	56	Ω	66	t/h
7	µm	17	mm/s	27	m/s²	37	hPa	47	kW	57	S	67	mol
8	ft	18	m/min	28	rpm	38	bar	48	hp	58	µS	68	pH
9	in	19	m/h	29	Hz	39	mbar	49	A	59	m³/min	69	[blank]

9116 Input Types, Ranges and Limits

Input type	Min. value	Max. value	Standard	Relay hysteresis limits
mA	0 mA	20 mA	-	0.1...25.0% of display scaling
V	0 V	10 V	-	0.1...25.0% of display scaling
Pt10...Pt1000	-200°C	+850°C	IEC 60751	0.1...262.5°C
Ni50...Ni1000	-60°C	+250°C	DIN 43760	0.1...77.5°C
Lin. R	0 Ω	10000 Ω	-	0.1...25.0% of display scaling
Potentiometer	10 Ω	10000 Ω	-	0.1...25.0% of display scaling
TC B	0°C	+1820°C	IEC 60584-1	0.1...455°C
TC E	-100°C	+1000°C	IEC 60584-1	0.1...275°C
TC J	-100°C	+1200°C	IEC 60584-1	0.1...325°C
TC K	-180°C	+1372°C	IEC 60584-1	0.1...388°C
TC L	-200°C	+900°C	DIN 43710	0.1...275°C
TC N	-180°C	+1300°C	IEC 60584-1	0.1...370°C
TC R	-50°C	+1760°C	IEC 60584-1	0.1...452.5°C
TC S	-50°C	+1760°C	IEC 60584-1	0.1...452.5°C
TC T	-200°C	+400°C	IEC 60584-1	0.1...150°C
TC U	-200°C	+600°C	DIN 43710	0.1...200°C
TC W3	0°C	+2300°C	ASTM E988-90	0.1...575°C
TC W5	0°C	+2300°C	ASTM E988-90	0.1...575°C
TC LR	-200°C	+800°C	GOST 3044-84	0.1...250°C

4511 Modbus Parameter Lists

4511 Modbus Configuration Parameter List

| Parameter Name	Register Address	Register Size	Read/ Write	Type	Description	Values	
ENABLE MODBUS	3000	1	R/W	INTEGER	Enable Modbus communication. If disabled, 4511 ignores all frames sent from the Modbus master and the only way to re-enable Modbus communication is by using the 4511 menu.	NO YES	= 0 = 1
BAUDRATE	3001	1	R/W	INTEGER	The baud value used for Modbus communication	2400 BAUD 4800 BAUD 9600 BAUD 19200 BAUD 38400 BAUD 57600 BAUD 115200 BAUD	= 0 = 1 = 2 = 3 = 4 = 5 = 6
ENABLE AUTOBAUD	3002	1	R/W	INTEGER	Enable automatic baudrate detection. If enabled, 4511 determines the baudrate automatically by listening to frames sent on the Modbus line.	NO YES	= 0 = 1
PARITY	3003	1	R/W	INTEGER	Configures parity check on Modbus frames	NONE EVEN PARITY ODD PARITY	= 0 = 1 = 2
STOP BITS	3004	1	R/W	INTEGER	Configures the number of stop bits in Modbus frames	ONE STOP BIT TWO STOP BITS	= 1 = 2
ADDRESS	3005	1	R/W	INTEGER	Configures the Modbus address of the 4511 (Address 0 is broadcast address)	Range:	1...247
RESPONSE DELAY	3006	1	R/W	INTEGER	Configures minimum delay for Modbus response in ms	Range:	0...1000

4511 Additional Parameter List

Parameter Name	Register Address	Register Size	Read/ Write	Type	Description	Values	
ROTATE DEVICE	3100	1	R/W	INTEGER	Enables the display and key buttons to be used normally when the host device is mounted upside down	NO YES	= 0 = 1

4511 Modbus Status Parameter List

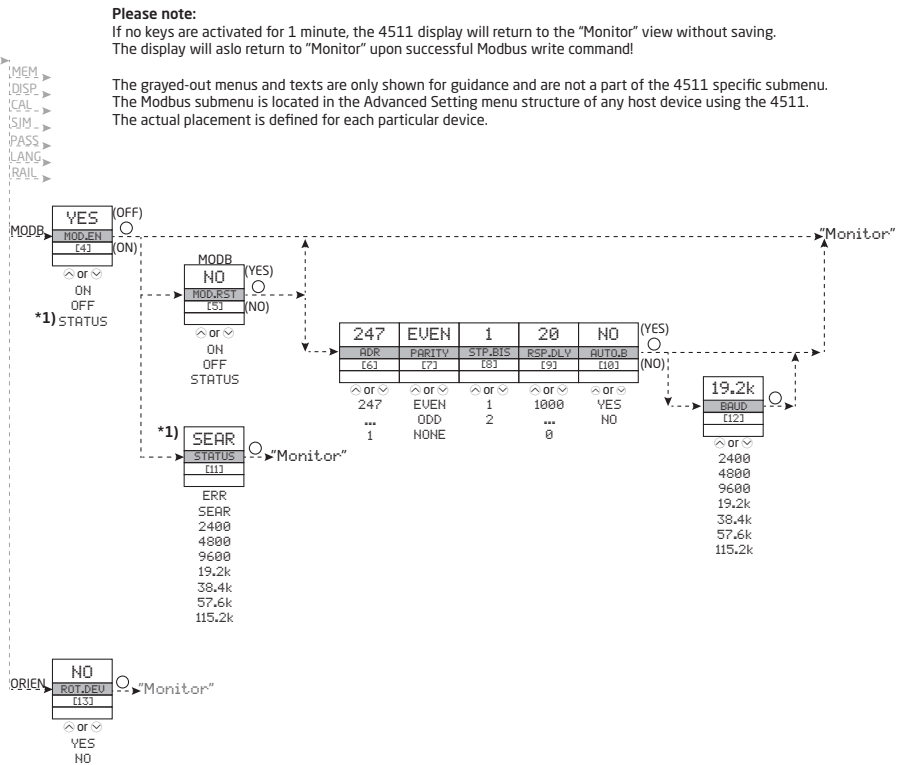| Parameter Name	Register Address	Register Size	Read/ Write	Type	Description	Values	
AUTOBAUD STATUS	4000	1	RO	INTEGER	Actual state of automatic baudrate detection	2400 BAUD 4800 BAUD 9600 BAUD 19200 BAUD 38400 BAUD 57600 BAUD 115200 BAUD SEARCHING ERROR	= 0 = 1 = 2 = 3 = 4 = 5 = 6 = 7 = 8
IDENTIFY DEVICE	4001	1	R/W	INTEGER	Enables the device to flash the LCD background with approx. 4 Hz. **Value will automatically return to NO if not written within 10 seconds!**	NO YES	= 0 = 1
MAXIMUM READ REGISTERS	4002	1	RO	INTEGER	Maximum allowed number of registers that can be read in one command, with the given/detected baudrate	Range:	8...32

4511 Modbus Front Programming Parameter Menu
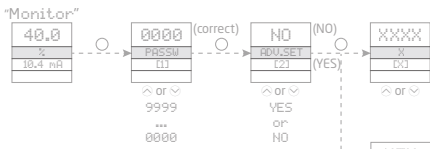
Scrolling HELP TEXTS:

[1]	Set correct password
[2]	Enter advanced setup menu
[3]	Perform memory operations
	Enter display setup
	Perform process calibration
	Enter simulation setup
	Enter password setup
	Enter language setup
	Enter rail setup (System 9000)
	Enter Modbus setup
[4]	Check automatic baudrate detection status
	Enable Modbus communication
	Disable Modbus communication
[5]	Reset Modbus to default
[6]	Select Modbus slave address
[7]	Select parity for Modbus
[8]	Select number of stop bits
[9]	Select response delay in ms
[10]	Enable automatic baudrate detection
[11]	Searching for Modbus baudrate
	Modbus baudrate detected
	Modbus baudrate not detected
[12]	Select baudrate in bps
[13]	Rotate device upside down?

* 1) Only if automatic
baudrate detection
is enabled

Please note:
If no keys are activated for 1 minute, the 4511 display will return to the "Monitor" view without saving.
The display will aslo return to "Monitor" upon successful Modbus write command!

The grayed-out menus and texts are only shown for guidance and are not a part of the 4511 specific submenu.
The Modbus submenu is located in the Advanced Setting menu structure of any host device using the 4511.
The actual placement is defined for each particular device.

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.