Configuration manual
4116 / 4511
Modbus RTU configuration of
4116 Universal transmitter

No. 4116MCM102-UK
For 4511 devices from ser. no. 141590001

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.
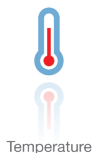
Temperature

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.

(1938)

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Introduction

This configuration manual

contains the necessary information for configuring a PR 4116 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

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.

4116 Configuration parameter list

Category	Parameter Name	No.	Modbus Address	Register Size	Read/Write	Type	Description	Values			
								Ver 0	Ver 1	Ver 2	Ver 3
GENERAL	DEVICE NUMBER	0	0	1	RO	UNSIGNED INTEGER	Defines the actual device type	4116 = 16662 (0x4116)			
GENERAL	DEVICE VERSION	1	1	1	RO	UNSIGNED INTEGER	Product version	0	1	2	3
GENERAL	PASSWORD	2	2	1	R/W	UNSIGNED INTEGER	Password for entering configuration menu	Range: 0...9999			
INPUT	INPUT TYPE	3	3	1	R/W	UNSIGNED INTEGER	Selected input type (Voltage, Current, Resistance, Potentiometer, Temperature)	TEMP = 0 POTM = 1 LINR = 2 CURR = 3 VOLT = 4			
INPUT	INPUT VOLTAGE RANGE	4	4	1	R/W	UNSIGNED 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	INPUT CURRENT RANGE	5	5	1	R/W	UNSIGNED INTEGER	Fixed input range for current measurements	0...20 mA = 0 4...20 mA = 1			
INPUT	CONNECTION TYPE	6	6	1	R/W	UNSIGNED INTEGER	Sensor connection type for RTD / resistance measurements	2-wire = 0 3-wire = 1 4-wire = 2			
INPUT	LIN RES LOW	7	7	1	R/W	UNSIGNED INTEGER	Input range low for Linear resistance measurements	Range: 0...9998			
INPUT	LIN RES HIGH	8	8	1	R/W	UNSIGNED INTEGER	Input range high for Linear resistance measurements.	Range: 1...9999			
INPUT	TEMP UNIT	9	9	1	R/W	UNSIGNED INTEGER	Temperature units	°C = 0 °F = 1			
INPUT	TEMP SENSOR TYPE	10	10	1	R/W	UNSIGNED INTEGER	Temperature sensor type	TC = 0 Ni = 1 Pt = 2			TC = 0 Ni = 1 Pt = 2 Cu = 3
INPUT	PT TYPE	11	11	1	R/W	UNSIGNED INTEGER	Pt value (Pt10, Pt20, Pt50...)	Pt10 = 0 Pt20 = 1 Pt50 = 2 Pt100 = 3 Pt200 = 4 Pt400 = 5 Pt500 = 6 Pt1000 = 7	Pt10 = 0 Pt20 = 1 Pt50 = 2 Pt100 = 3 Pt200 = 4 Pt250 = 5 Pt300 = 6 Pt400 = 7 Pt500 = 8 Pt1000 = 9		
INPUT	NI TYPE	12	12	1	R/W	UNSIGNED INTEGER	Ni value (Ni50, Ni100...)		Ni50 = 0 Ni100 = 1 Ni120 = 2 Ni1000 = 3		
INPUT	TC TYPE	13	13	1	R/W	UNSIGNED INTEGER	Thermocouple type (TCB, TCK...)		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		
DISPLAY	DISPLAY UNIT	14	14	1	R/W	UNSIGNED INTEGER	Units shown as display units for non-temperature input types	table 1	table 2 (except [blank])	table 2	
DISPLAY	DECIMAL POINT	15	15	1	R/W	UNSIGNED 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	16	1	R/W	INTEGER	Low display range for display reading of non-temperature input types	Range: -1999...9999			
DISPLAY	DISPLAY HIGH	17	17	1	R/W	INTEGER	High display range for display reading of non-temperature input types	Range: -1999...9999			

Category	Parameter Name	No.	Modbus Address	Register Size	Read/Write	Type	Description	Values Ver 0	Ver 1	Ver 2	Ver 3
RELAY	RELAY UNIT	18	18	1	R/W	UNSIGNED INTEGER	Units for relay setpoint of non-temperature input types	Percent = 0 Display units = 1			
RELAY	RELAY 1 FUNCTION	19	19	1	R/W	UNSIGNED INTEGER	Relay function (setpoint, window, error etc.)	OFF = 0 POWER = 1 ERROR = 2 WINDOW = 3 SETPOINT = 4			
RELAY	RELAY 1 CONTACT	20	20	1	R/W	UNSIGNED INTEGER	Contact function, (NO/NC or "open inside window"/"closed inside window")	NC / Open inside window = 0 NO / Closed inside window = 1			
RELAY	RELAY 1 SETPOINT	21	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 input types:** DISPLAY LOW...DISPLAY HIGH 0...1000 (0.0...100.0%) **Range for temperature input types:** equals the measurement range for the selected sensor type			
RELAY	RELAY 1 ACTION DIRECTION	22	23	1	R/W	UNSIGNED INTEGER	Activation direction	DECREASING = 0 INCREASING = 1			
RELAY	RELAY 1 HYSTERESIS	23	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 input types:** 1...(display range/4) 1...250 (0.1...25%) / 0...100.0% **Range for temperature input types:** 0.1...(temperature sensor range/4) / 0...100.0%			
RELAY	RELAY 1 ERROR ACTION	24	25	1	R/W	UNSIGNED INTEGER	Action on error	NONE = 0 OPEN = 1 CLOSE = 2 HOLD = 3			
RELAY	RELAY 1 ON DELAY	25	26	1	R/W	UNSIGNED INTEGER	Relay ON time delay	Range: 0..3600s			
RELAY	RELAY 1 OFF DELAY	26	27	1	R/W	UNSIGNED INTEGER	Relay OFF time delay	Range: 0..3600s			
RELAY	RELAY 1 SETPOINT LOW WINDOW	27	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			
RELAY	RELAY 1 SETPOINT HIGH WINDOW	28	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			
RELAY	RELAY 2 FUNCTION	29	32	1	R/W	UNSIGNED INTEGER		As RELAY 1 FUNCTION			
RELAY	RELAY 2 CONTACT	30	33	1	R/W	UNSIGNED INTEGER		As RELAY 1 CONTACT			
RELAY	RELAY 2 SETPOINT	31	34	2	R/W	INTEGER		As RELAY 1 SETPOINT			
RELAY	RELAY 2 ACTION DIRECTION	32	36	1	R/W	UNSIGNED INTEGER		As RELAY 1 ACTION DIRECTION			
RELAY	RELAY 2 HYSTERESIS	33	37	1	R/W	UNSIGNED INTEGER		As RELAY 1 HYSTERESIS			
RELAY	RELAY 2 ERROR ACTION	34	38	1	R/W	UNSIGNED INTEGER		As RELAY 1 ERROR ACTION			
RELAY	RELAY 2 ON DELAY	35	39	1	R/W	UNSIGNED INTEGER		As RELAY 1 ON DELAY			
RELAY	RELAY 2 OFF DELAY	36	40	1	R/W	UNSIGNED INTEGER		As RELAY 1 OFF DELAY			
RELAY	RELAY 2 SETPOINT LOW	37	41	2	R/W	INTEGER		As RELAY 1 SETPOINT LOW			
RELAY	RELAY 2 SETPOINT HIGH	38	43	2	R/W	INTEGER		As RELAY 1 SETPOINT HIGH			

Category	Parameter Name	No.	Modbus Address	Register Size	Read/Write	Type	Description	Values Ver 0	Ver 1	Ver 2	Ver 3
OUTPUT	OUTPUT TYPE	39	45	1	R/W	UNSIGNED INTEGER	Output type		CURR = 0 VOLT = 1		
OUTPUT	VOLTAGE OUTPUT RANGE	40	46	1	R/W	UNSIGNED INTEGER	Fixed output range for voltage output		0...1 V = 0 0.2...1 V = 1 0...5 V = 2 1...5 V = 3 0...10 V = 4 0.2...10 V = 5 1...0 V = 6 1...0.2 V = 7 5...0 V = 8 5...1 V = 9 10...0 V = 10 10...2 V = 11		
OUTPUT	CURRENT OUTPUT RANGE	41	47	1	R/W	UNSIGNED INTEGER	Fixed output range for current output	0...20 mA = 0 4...20 mA = 1 20...0 mA = 2 20...4 mA = 3	0...20 mA = 0 4...20 mA = 1 (SIL) 20...0 mA = 2 20...4 mA = 3 (SIL)	0...20 mA = 0 4...20 mA = 1 4...20 mA (SIL) = 2 20...0 mA = 3 20...4 mA = 4 20...4 mA (SIL) = 5	
OUTPUT	OUTPUT ERROR	42	48	1	R/W	UNSIGNED 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	43	49	2	R/W	INTEGER	Temperature for output low value for temperature input types in 1/10°		Range equals the measurement range for the selected sensor type and must be lower than OUTPUT HIGH		
OUTPUT	OUTPUT HIGH	44	51	2	R/W	INTEGER	Temperature for output high value for temperature input types in 1/10°		Range equals the measurement range for the selected sensor type and must be higher than OUTPUT LOW		
DISPLAY	DISPLAY CONTRAST	45	53	1	R/W	UNSIGNED INTEGER	Contrast on the LCD display		Range: 0...9		
DISPLAY	DISPLAY BACKLIGHT	46	54	1	R/W	UNSIGNED INTEGER	Backlight intensity on LCD		Range: 0...9		
DISPLAY	TAG TEXT	47	55	3	R/W	ASCII CHAR	Tag of the device (6 characters)		Range: ASCII values from 32 to 90 (' ' to 'Z').		
DISPLAY	LINE 3 FUNCTION	48	58	1	R/W	UNSIGNED INTEGER	Information shown in line 3 of display in monitor mode (normal mode). Choose between the analog output value or the configured tag.		Output value = 0 TAG = 1		
INPUT	USE CALIB	49	59	1	R/W	UNSIGNED INTEGER	Use the applied calibration values		NO = 0 YES = 1		
GENERAL	ENABLE PASSWORD	50	60	1	R/W	UNSIGNED INTEGER	Password protect entry to configuration menu via display		NO = 0 YES = 1		
RELAY	ENABLE FAST SET	51	61	1	R/W	UNSIGNED INTEGER	Enable fast set of relay setpoints from monitor menu		NO = 0 YES = 1		
INPUT	CALIB RANGE LOW	52	62	2	R/W	FLOAT	Actual process value for low calibration point in either display values or 1/10°C		**For non-temperature input types:** 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	53	64	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	54	66	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	55	68	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	No.	Modbus Address	Register Size	Read/Write	Type	Description	Values			
								Ver 0	Ver 1	Ver 2	Ver 3
GENERAL	HELPTEXT LANGUAGE	57	72	1	R/W	UNSIGNED INTEGER	Language for the help texts shown in display	UK = 0 DK = 1 DE = 2 FR = 3 SE = 4 IT = 5 ES = 6			
INPUT	CJC TYPE	58	73	1	R/W	UNSIGNED INTEGER	CJC compensation type for TC temperature types (internal/connector)	None - Fixed internal		INTERNAL = 0 CONNECTOR = 1	
RELAY	RELAY 1 LATCH ENABLE	59	74	1	R/W	UNSIGNED INTEGER	Activate latch function	None (Latch function not implemented)		NO = 0 YES = 1	
RELAY	RELAY 2 LATCH ENABLE	60	75	1	R/W	UNSIGNED INTEGER	Activate latch function	None (Latch function not implemented)		NO = 0 YES = 1	
INPUT	CU TYPE	61	76	1	R/W	UNSIGNED INTEGER	Cu value (Cu10, Cu20, Cu50...)	None (Cu temperature type not implemented)			Cu10 = 0 Cu20 = 1 Cu50 = 2 Cu100 = 3
GENERAL	SERIAL NUMBER	62	77	2	RO	UNSIGNED INTEGER	Device serial number	None (Serial Number not part of CONFIGURATION DATA)			Range: 0... 999999999
GENERAL	CHECKSUM	100	100	1	RO	UNSIGNED INTEGER	CRC16 checksum of the configuration	Range 0...65535			
GENERAL	Configu- ration counter	101	101	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...65535			

Table 1: Display units, ver. 0

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

Table 2: Display units, ver. 1-3

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]*

[blank]* - not available in ver. 1.

4116 Input types and ranges

Input type	Min. value	Max. value	Standard
mA	0 mA	20 mA	-
V	0 V	10 V	-
Pt10...Pt1000	-200°C	+850°C	IEC 60751
Ni50...Ni1000	-60°C	+250°C	DIN 43760
Cu10...Cu100	-200°C	+260°C	α = 0,00427
Lin. R	0 Ω	10000 Ω	-
Potentiometer	10 Ω	100 kΩ	-
TC B	0°C	+1820°C	IEC 60584-1
TC E	-100°C	+1000°C	IEC 60584-1
TC J	-100°C	+1200°C	IEC 60584-1
TC K	-180°C	+1372°C	IEC 60584-1
TC L	-200°C	+900°C	DIN 43710
TC N	-180°C	+1300°C	IEC 60584-1
TC R	-50°C	+1760°C	IEC 60584-1
TC S	-50°C	+1760°C	IEC 60584-1
TC T	-200°C	+400°C	IEC 60584-1
TC U	-200°C	+600°C	DIN 43710
TC W3	0°C	+2300°C	ASTM E988-90
TC W5	0°C	+2300°C	ASTM E988-90
TC LR	-200°C	+800°C	GOST 3044-84

4116MCM102

4116 Process parameter list

Parameter Name	No.	Register Address	Register Size	Read/Write	Type	Description	Values
DISPLAY VALUE	1	1000	2	RO	INTEGER	The measured value in 1/10 of °C/°F for temperature Input types, or the scaled display value for non-temperature input types (INTEGER version of PRIMARY VALUE)	**Range for non-temperature input types:** DISPLAY LOW...DISPLAY HIGH **Range for temperature input types:** equals the measurement range for the selected sensor type
PERCENT PV	2	1002	1	RO	INTEGER	The relative input value as 1/100 of % calculated from PRIMARY VALUE. For temperature input types 0..100% corresponds to the selected temperature range (OUTPUT LOW...OUTPUT HIGH) For non-temperature input types 0..100% corresponds the selected fixed range (e.g. 4...20 mA)	Range: 0...9999 (e.g. 7898 = 78.98%)
MEASURE STATUS	3	1003	1	RO	INTEGER	The actual measurement status	OUTPUT UNDERRANGE bit 0 = 1 OUTPUT OVERRANGE bit 1 = 1 OUTPUT LOW LIMITED bit 2 = 1 OUTPUT HIGH LIMITED bit 3 = 1 INPUT UNDERRANGE bit 4 = 1 INPUT OVERRANGE bit 5 = 1 SENSOR SHORTED bit 6 = 1 SENSOR BROKEN bit 7 = 1
ERROR STATUS	4	1004	1	RO	INTEGER	The actual error status (Device errors)	AD COMM. ERROR bit 0 = 1 CJC ERROR bit 1 = 1 RAM ERROR bit 2 = 1 EEP ERROR bit 3 = 1 FLASH ERROR bit 4 = 1 NOT CALIBRATED bit 5 = 1 BAD OUTPUT bit 6 = 1 NO OUTPUT bit 7 = 1 OUTPUT SUPPLY ERROR bit 8 = 1 INPUT SUPPLY ERROR bit 9 = 1 EXT. FLASH ERROR bit 10 = 1
RELAY STATUS	5	1005	1	R/W	INTEGER	The actual relay status calculated from PRIMARY VALUE	**ALL VERSIONS:** RELAY 1 INVERTED bit 0 = 1 RELAY 2 INVERTED bit 1 = 1 RELAY 1 IS ON bit 2 = 1 RELAY 2 IS ON bit 3 = 1 RELAY 1 WILL GO ON AFTER DELAY bit 4 = 1 RELAY 2 WILL GO ON AFTER DELAY bit 5 = 1 **ONLY VERSION 2-3:** RELAY 1 IS LATCHED bit 6 = 1 RELAY 2 IS LATCHED bit 7 = 1 RELAY 1 CANNOT RELEASE bit 8 = 1 RELAY 2 CANNOT RELEASE bit 9 = 1
PRIMARY RAW VALUE	6	1006	2	RO	FLOAT	The measured value in 1/10 of °C/°F for temperature Input types, or the scaled display value for non-temperature input types, NOT PROCESS CALIBRATED.	**Range for non-temperature input types:** DISPLAY LOW...DISPLAY HIGH Range for temperature input types equals the measurement range for the selected sensor type
PRIMARY VALUE	7	1008	2	R/W	FLOAT	The measured value in 1/10 of °C/°F for temperature Input types, or the scaled display value for non-temperature input types	**Range for non-temperature input types:** DISPLAY LOW...DISPLAY HIGH Range for temperature input types equals the measurement range for the selected sensor type
RELATIVE PV	8	1010	2	RO	FLOAT	The relative input value calculated from PRIMARY VALUE. For temperature input types relative to selected temperature range (OUTPUT LOW...OUTPUT HIGH) For non-temperature input types relative to selected fixed range (e.g. 4...20 mA)	Range: 0.0...1.0
OUTPUT VALUE	9	1012	2	R/W	FLOAT	Calculated output value in µA or µV	**Range:** CURRENT: 0.0...23000.0 (23 mA) VOLTAGE: 0.0...1150000.0 (11.5 V)
MEASURE CONTROL	10	1014	1	R/W	INTEGER	Measurement control. By disabling update of certain READ/WRITE parameters PRIMARY VALUE, OUTPUT VALUE or RELAY STATUS, these can be simulated by writing values. All bits are cleared when TIMEOUT COUNTER reaches 0	DISABLE PRIMARY VALUE UPDATE (INCL. MEASURE STATUS) bit 2 = 1 DISABLE OUTPUT VALUE UPDATE bit 3 = 1 DISABLE RELAY STATUS UPDATE bit 4 = 1 DISABLE CONFIGURATION CHECK bit 5 = 1 REMAINING BITS SHALL BE SET TO 0
TIMEOUT COUNTER	11	1015	1	R/W	INTEGER	Time out counter, increments every 0.075 second. When reaching 256 (if not refreshed) all bits in MEASURE CONTROL will be cleared.	Range: 0...255
INTERNAL TEMPERATURE	12	1016	1	RO	INTEGER	Internal measured or connector temperature in 1/10 of °C/°F	**Range:** -200...800 (-20.0...80.0 °C) or -40...1760 (-4.0...176.0 °F)

4511 Modbus configuration parameter list

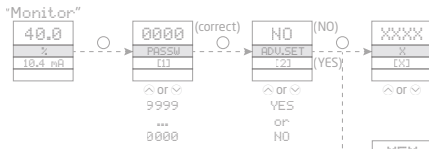| Parameter Name	No.	Register Address	Register Size	Read/Write	Type	Description	Values	
ENABLE MODBUS	1	3000	1	R/W	INTEGER	Enable Modbus communication. If disabled, 4511 ignores all frames sent from the Modbus master and the only way to re-enable Modbus communication is by using the 4511 menu.	NO YES	= 0 = 1
BAUDRATE	2	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	3	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	4	3003	1	R/W	INTEGER	Configures parity check on Modbus frames	NONE EVEN PARITY ODD PARITY	= 0 = 1 = 2
STOPBITS	5	3004	1	R/W	INTEGER	Configures the number of stopbits in Modbus frames	ONE STOPBIT TWO STOPBITS	= 0 = 1
ADDRESS	6	3005	1	R/W	INTEGER	Configures the Modbus address of the 4511 (Address 0 is broadcast address)	Range: 1...247	
RESPONSE DELAY	7	3006	1	R/W	INTEGER	Configures minimum delay for Modbus response in ms	Range: 0...1000	

4511 Additional parameter list

Parameter Name	No.	Register Address	Register Size	Read/Write	Type	Description	Values	
ROTATE DEVICE	1	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

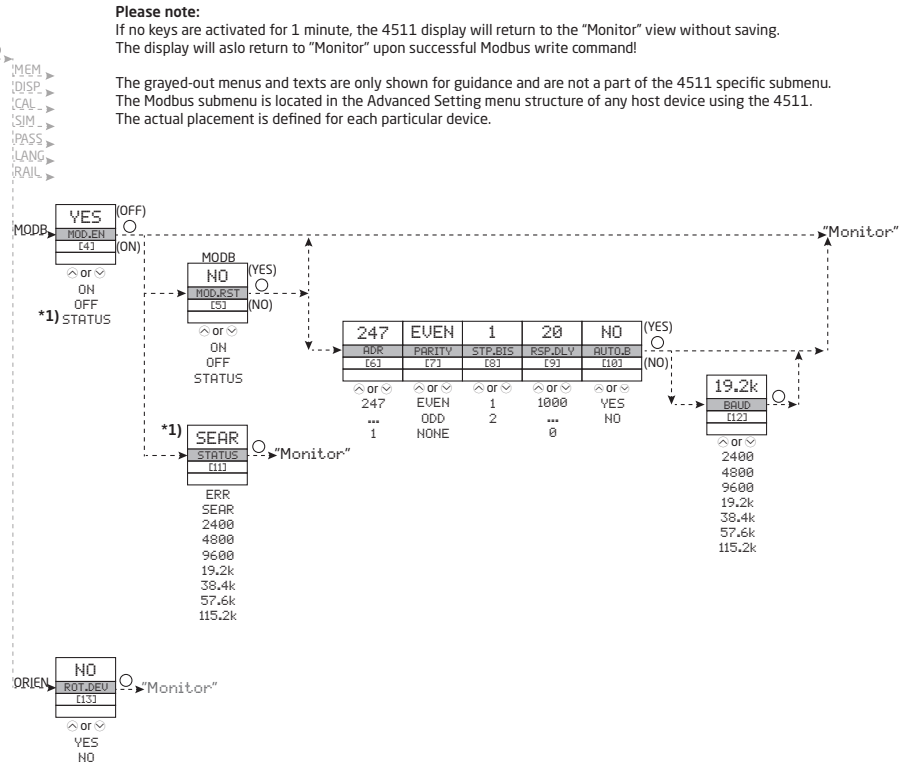| Parameter Name	No.	Register Address	Register Size	Read/Write	Type	Description	Values	
AUTOBAUD STATUS	1	4000	1	RO	INTEGER	Actual state of automatic baudrate detection	2400 BAUD 4800 BAUD 9600 BAUD 19200 BAUD 38400 BAUD 57600 BAUD 115200 BAUD SEARCHING ERROR	= 0 = 1 = 2 = 3 = 4 = 5 = 6 = 7 = 8
IDENTIFY DEVICE	2	4001	1	R/W	INTEGER	Enables the device to flash the LCD background with appr. 4 Hz. **Value will automatically return to NO if not written within 10 seconds!**	NO YES	= 0 = 1
MAXIMUM READ REGISTERS	3	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

"Monitor"

```
40.0
%
10.4 mA
```
○ →
```
0000
PASSW
[1]
```
(correct) ○ →
```
NO
ADV.SET
[2]
```
(NO) ○ →
```
XXXX
X
[X]
```

∧ or ∨
9999
...
0000

∧ or ∨
YES
or
NO

∧ or ∨

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.

(YES)

```
MEM
SETUP
[3]
```
○

MEM →
DISP. →
CAL →
SIM →
PASS →
LANG →
RAIL →

∧ or ∨
MEM
DISP
CAL
SIM
PASS
LANG
RAIL
MODB
ORIEN

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

MODB →
```
YES
MOD.EN
[4]
```
(OFF)
○
(ON)

∧ or ∨
ON
OFF
*1) STATUS

```
MODB
NO
MOD.RST
[5]
```
(YES) ○
(NO)

∧ or ∨
ON
OFF
STATUS

*1)
```
SEAR
STATUS
[11]
```
○ → "Monitor"

ERR
SEAR
2400
4800
9600
19.2k
38.4k
57.6k
115.2k

247	EVEN	1	20	NO	(YES)
ADR	PARITY	STP.BIS	RSP.DLY	AUTO.B	
[6]	[7]	[8]	[9]	[10]	(NO)

∧ or ∨   ∧ or ∨   ∧ or ∨   ∧ or ∨   ∧ or ∨
247   EVEN   1   1000   YES
...   ODD   2   ...   NO
1   NONE   0

→ "Monitor"

```
19.2k
BAUD
[12]
```
○

∧ or ∨
2400
4800
9600
19.2k
38.4k
57.6k
115.2k

ORIEN →
```
NO
ROT.DEV
[13]
```
○ → "Monitor"

∧ or ∨
YES
NO

Document history

The following list provides notes concerning revisions of this document.

Rev. ID	Date	Notes
102	1938	Changes to Process parameter list, no 10 & 11

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