



4511 MODBUS RTU Configuration Manual

4 1 3 1

Universal trip amplifier

No. 4131MCM100(1402)



4 1 3 1

CONTENTS

| | |
|--|---|
| Introduction | 3 |
| Modbus basics | 3 |
| Modbus RTU | 3 |
| Supported Function Codes | 3 |
| Modbus Parameters and factory default settings | 3 |
| Modbus RTU segment line termination | 3 |
| | |
| 4131 Modbus Configuration Parameter List | 4 |
| General | 4 |
| Input | 4 |
| Display | 4 |
| Relay | 5 |
| Display, ADV | 6 |
| Input, ADV | 6 |
| Relay, ADV | 6 |
| | |
| Display units, table 1 and 2 | 7 |
| | |
| 4131 Input types and ranges | 7 |
| | |
| 4131 Modbus Process Parameter List | 8 |
| | |
| 4511 Modbus Configuration Parameter List | 9 |
| | |
| 4511 Modbus Status Parameter List | 9 |
| | |
| 4511 Modbus Front Programming Parameter List | 9 |

INTRODUCTION

This configuration manual

contains the necessary information for configuring a PR 4131 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.

4131 Modbus Configuration Parameter List

| Category | Parameter Name | No. | Register 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 | 4131 = 16689 (0x4131) | | | | | | | | | | | | |
| 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 | 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 | | | | | | | | | | | | |
| RELAY | RELAY UNIT | 18 | 18 | 1 | R/W | UNSIGNED INTEGER | Units for relay setpoint of non-temperature input types | Percent = 0 | Display units = 1 | | | | | | | | | | | |

| Category | Parameter Name | No. | Register Address | Register Size | Read/Write | Type | Description | Values | | | |
|----------|------------------------------|-----|------------------|---------------|------------|------------------|--|--|-------|------------|-------|
| | | | | | | | | Ver 0 | Ver 1 | Ver 2 | Ver 3 |
| 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 | | | | |
| DISPLAY | DISPLAY CONTRAST | 45 | 53 | 1 | R/W | UNSIGNED INTEGER | Contrast in the LCD display | Range: 0..9 | | | |
| DISPLAY | DISPLAY BACKLIGHT | 46 | 54 | 1 | R/W | UNSIGNED INTEGER | Backlight intensity in 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 | Configured tag information shown in line 3 of display in monitor mode (normal mode). | 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 | 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 | | | |

| Category | Parameter Name | No. | Register Address | Register Size | Read/Write | Type | Description | Values | | | |
|----------|-----------------------|-----|------------------|---------------|------------|------------------|---|--|-------|---|-------|
| | | | | | | | | Ver 0 | Ver 1 | Ver 2 | Ver 3 |
| 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 | | | |
| GENERAL | HELPTXT 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..65536 | | | |
| GENERAL | Configuration 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..65536 | | | |

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

4131 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 |

4131 Modbus 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 to 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 CAN NOT RELEASE bit 8 = 1 RELAY 2 CAN NOT 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 |
| 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 bit 2 = 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, decrements every 0.075 second. When reaching 0 (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) |

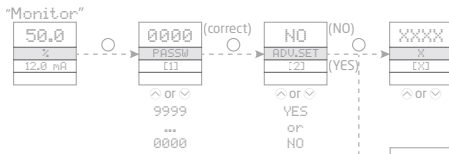
4511 Modbus Configuration Parameter List

| 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 = 0 YES = 1 |
| BAUDRATE | 2 | 3001 | 1 | R/W | INTEGER | The baud value used for Modbus communication | 2400 BAUD = 0 4800 BAUD = 1 9600 BAUD = 2 19200 BAUD = 3 38400 BAUD = 4 57600 BAUD = 5 115200 BAUD = 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 = 0 YES = 1 |
| PARITY | 4 | 3003 | 1 | R/W | INTEGER | Configures parity check on Modbus frames | NONE = 0 EVEN PARITY = 1 ODD PARITY = 2 |
| STOPBITS | 5 | 3004 | 1 | R/W | INTEGER | Configures the number of stopbits in Modbus frames | ONE STOPBIT = 1 TWO STOPBITS = 2 |
| 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 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 = 0 4800 BAUD = 1 9600 BAUD = 2 19200 BAUD = 3 38400 BAUD = 4 57600 BAUD = 5 115200 BAUD = 6 SEARCHING = 7 ERROR = 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 = 0 YES = 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



Please note:

If no keys are activated for 1 minute, the 4511 display will return to the "Monitor" view without saving. The display will also 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.

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
 - Reset Modbus to default
 - Select Modbus slave address
- [5] Select parity for Modbus
- [6] Select number of stop bits
- [7] Select response delay in ms
- [8] Enable automatic baudrate detection
- [9] Searching for Modbus baudrate
- [10] Modbus baudrate detected
- [11] Modbus baudrate not detected
- [12] Select baudrate in bps

