# Operating Manual



## touchMATRIX® Indicator PN350
### PROFINET display device with touch screen and graphic display

## Product features:

- Multi-function display with PROFINET interface
- Operating modes for displaying two process values and links of the two values (1+2, 1-2, 1x2, 1:2)
- PROFINET IO Device Conformance Class B
- Dual Port Ethernet with integrated switch
- Bright and high-contrast display with event dependent color variations
- Emulation of a 7-segment display inclusively icons and units
- Intuitive and easy parameterization by plain text and touch screen
- 3.78 x 1.89 inch (96 x 48 mm) norm panel housing and IP65 protection
- Optional switching outputs

## Available options:

PN350:      Basic unit with PROFINET-interface

- Option **AC:**     Power supply 115 … 230 VAC
- Option **AO:**     16 bit analog output, 4 control outputs, serial RS232 interface
- Option **AR:**     16 bit analog output, 4 control outputs, serial RS485 interface
- Option **CO:**     4 control outputs, serial RS232 interface
- Option **CR:**     4 control outputs, serial RS485 interface
- Option **RL:**     2 relay outputs

Options can be combined

Die deutsche Beschreibung ist verfügbar unter:
https://www.motrona.com/fileadmin/files/bedienungsanleitungen/Pn350_d.pdf

The English description is available at:
https://www.motrona.com/fileadmin/files/bedienungsanleitungen/Pn350_e.pdf

La description en français est disponible sur:
https://www.motrona.com/fileadmin/files/bedienungsanleitungen/Pn350_f.pdf

The operator software OS (freeware) is available at:
https://www.motrona.com/en/support/software.html
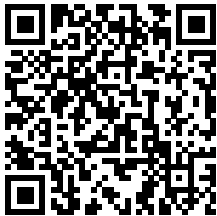
| Version: | Description: |
|---|---|
| PN350_01a_oi/TJ/mbo/May 23 | First Version |
| | |
| | |

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# 1. Safety Instructions and Responsibility

## 1.1.    General Safety Instructions

This operation manual is a significant component of the unit and includes important rules and hints about the installation, function and usage. Non-observance can result in damage and/or impairment of the functions to the unit or the machine or even in injury to persons using the equipment!

Please read the following instructions carefully before operating the device and <u>observe all safety and warning instructions!</u> Keep the manual for later use.

A pertinent qualification of the respective staff is a fundamental requirement in order to use this manual. The unit must be installed, connected and put into operation by a qualified electrician.

**Liability exclusion:** The manufacturer is not liable for personal injury and/or damage to property and for consequential damage, due to incorrect handling, installation and operation. Further claims, due to errors in the operation manual as well as misinterpretations are excluded from liability.

In addition the manufacturer reserves the right to modify the hardware, software or operation manual at any time and without prior notice. Therefore, there might be minor differences between the unit and the descriptions in operation manual.

The raiser respectively positioner is exclusively responsible for the safety of the system and equipment where the unit will be integrated.

During installation or maintenance all general and also all country- and application-specific safety rules and standards must be observed.

If the device is used in processes, where a failure or faulty operation could damage the system or injure persons, appropriate precautions to avoid such consequences must be taken.

## 1.2.    Use According to the Intended Purpose

The unit is intended exclusively for use in industrial machines, constructions and systems. Non-conforming usage does not correspond to the provisions and lies within the sole responsibility of the user. The manufacturer is not liable for damages which have arisen through unsuitable and improper use.

Please note that device may only be installed in proper form and used in a technically perfect condition (in accordance to the Technical Specifications). The device is not suitable for operation in explosion-proof areas or areas which are excluded by the EN 61010-1 standard.

# 1.3. Installation

The device is only allowed to be installed and operated within the permissible temperature range. Please ensure an adequate ventilation and avoid all direct contact between the device and hot or aggressive gases and liquids.

Before installation or maintenance, the unit must be disconnected from all voltage-sources. Further it must be ensured that no danger can arise by touching the disconnected voltage-sources.

Devices which are supplied by AC-voltages must be connected exclusively by switches, respectively circuit-breakers with the low voltage network. The switch or circuit-breaker must be placed as near as possible to the device and further indicated as separator.

Incoming as well as outgoing wires and wires for extra low voltages (ELV) must be separated from dangerous electrical cables (SELV circuits) by using a double resp. increased isolation.

All selected wires and isolations must be conformed to the provided voltage- and temperature-ranges. Further all country- and application-specific standards, which are relevant for structure, form and quality of the wires, must be ensured. Indications about the permissible wire cross-sections for wiring are described in the Technical Specifications.

Before first start-up it must be ensured that all connections and wires are firmly seated and secured in the screw terminals. All (inclusively unused) terminals must be fastened by turning the relevant screws clockwise up to the stop.

Overvoltages at the connections must be limited to values in accordance to the overvoltage category II.

## 1.4. EMC Guidelines

All motrona devices are designed to provide high protection against electromagnetic interference. Nevertheless you must minimize the influence of electromagnetic noise to the device and all connected cables.

Therefore the following measures are mandatory for a successful installation and operation:
- **Use shielded cables for all signal and control input and output lines.**
- **Cables for digital controls (digital I/O, relay outputs) must not exceed a length of 30 m and are allowed for in building operation only**
- Use shield connection clamps to connect the cable shields properly to earth
- The wiring of the common ground lines must be star-shaped and common ground must be connected to earth at only one single point
- The device should be mounted in a metal enclosure with sufficient distance to sources of electromagnetic noise.
- Run signal and control cables apart from power lines and other cables emitting electromagnetic noise.

Please also refer to motrona manual "General Rules for Cabling, Grounding, Cabinet Assembly". You can download that manual by the link
https://www.motrona.com/en/support/general-certificates.html


## 1.5. Cleaning, Maintenance and Service Notes

To clean the front of the unit please use only a slightly damp (not wet!), soft cloth. For the rear no cleaning is necessary. For an unscheduled, individual cleaning of the rear the maintenance staff or assembler is self-responsible.

During normal operation no maintenance is necessary. In case of unexpected problems, failures or malfunctions the device must be shipped for back to the manufacturer for checking, adjustment and reparation (if necessary). Unauthorized opening and repairing can have negative effects or failures to the protection-measures of the unit.

# 2. Introduction

This series of display unit is suitable for PROFINET and panel mounting.
Two process data values transmitted by the PROFINET controller can be scaled, linked and displayed.
Due to the intuitive operation, the extensive functions and options, it can be used universally.

**Basic knowledge of the function of PROFINET IO is required to commission the PROFINET display device and to understand these operating instructions.**

## 2.1.　Operation Mode

All functions are can be configured in the parameter menu.
Optionally the two process data values or the linked value can be displayed.
The type of link is set via the operating mode.
The following operating modes can be set:

- VALUE1 + VALUE2:
  The linked value is the sum of the two process data values.
- VALUE1 – VALUE2:
  The linked value is the difference of the two process data values.
- VALUE1 x VALUE2:
  The linked value is the product of the two process data values.
- VALUE1 / VALUE2:
  The linked value is the quotient of the two process data values.

## 2.2. Function Diagram
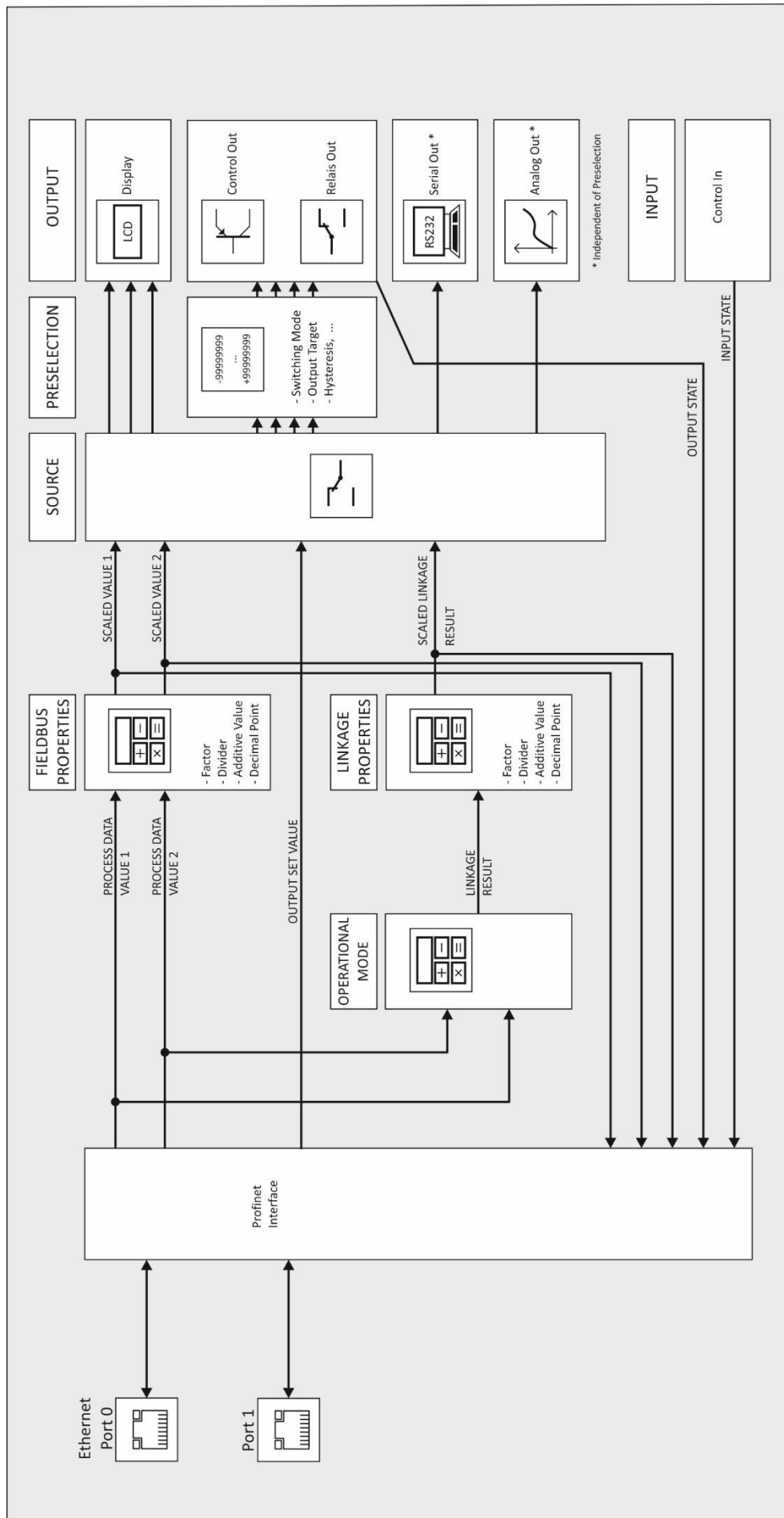
# 3. Electrical Connections

The terminal screws should be tightened with a slotted screwdriver (blade width 2mm).
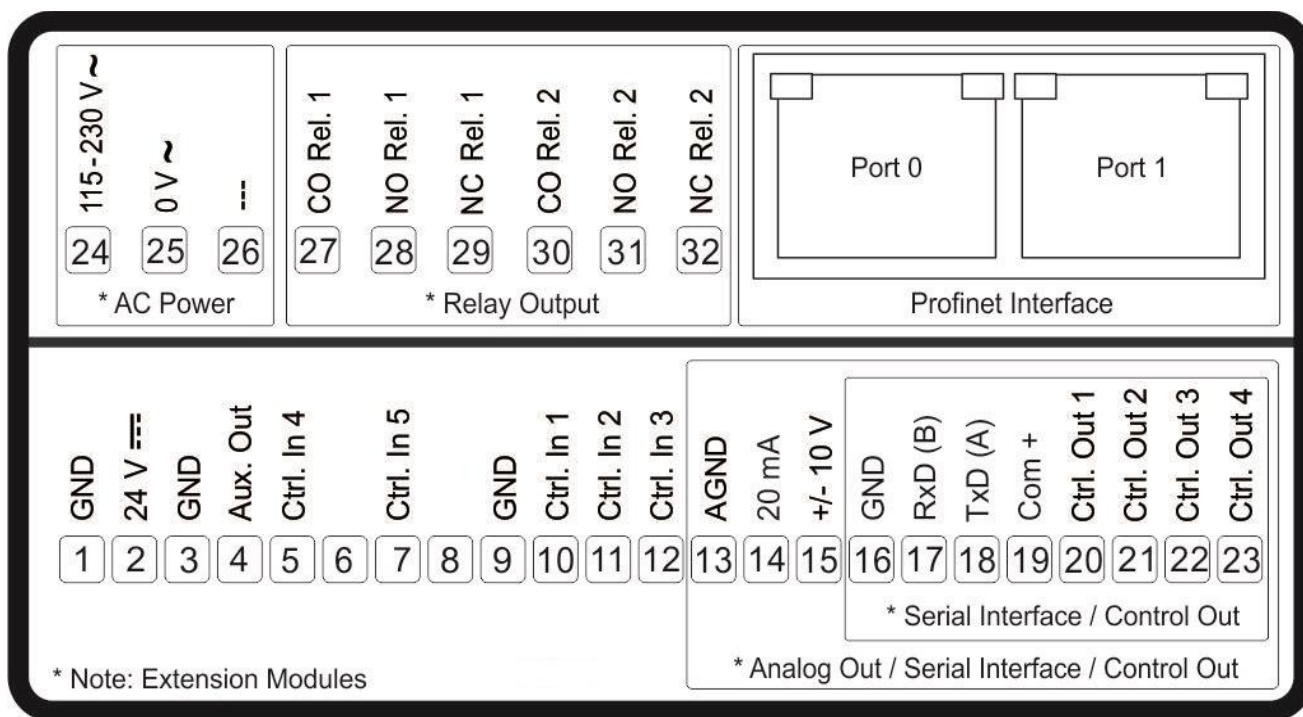


## 3.1. DC Power Supply

The unit accepts DC supply from 18 to 30 V at the terminals 1 and 2. The power consumption depends on the level of the supply voltage with approx. 100 mA and the additional current required at the Auxiliary Voltage Output.

All GND terminals are internally interconnected.

## 3.2. Auxiliary Voltage Output

Terminal 3 and 4 provide an auxiliary output for supply of sensors and encoders.
The output voltage depends on the power supply.

| DC version | AC version |
|---|---|
| The encoder voltage is approx. 1 V lower than the power supply voltage at terminal 1 and 2 and should be loaded with max. 250 mA | The encoder voltage is 24 VDC (± 15%) and should be loaded with max. 150 mA up to 45 degrees Celsius. At higher temperature the maximum output current is reduced to 80 mA. |

## 3.3. PROFINET Interface

The PROFINET interface provides 2 RJ45 Ethernet connectors (Port 0 and 1) with an integrated switch for full duplex communication up to 100 Mbit/s.

### 3.3.1. LEDs

Both ports have a yellow and a green status LED:
Green ("LINK") is on when an Ethernet connection has been established via the port.
Yellow ("ACTIVITY") flickers when data is being sent or received through the port.

Two red PROFINET status LEDs are located on the left side of the device behind the ventilation slots:



LED 0         LED 1
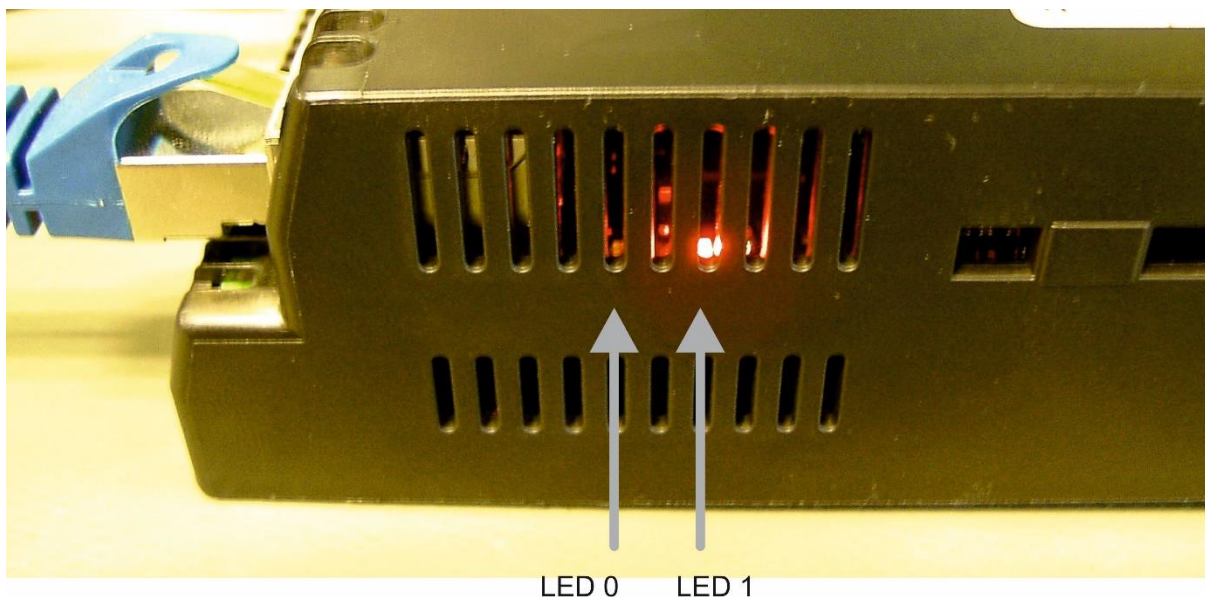
LED 0:   off:        Normal operation
         flashing:   Device identification by PROFINET service"DCP Signal"
         on:         Alarm pending (see error message on display)

LED 1:   off:        PROFINET communication running
         flashing:   Device has finished initialization, Ethernet link established,
                     Profinet communication not yet running.
         on:         Temporarily after power on (for some seconds): Initialization
                     Permanently: No Ethernet connection or device faulty.

These LEDs are not necessary for normal operation but may be helpful during commissioning.

### 3.3.2. PROFINET-Configuration

The PROFINET interface is described in the corresponding GSDML file "GSDML-V2.43-MOTRONA-PN350-REPNS-xxxxxxxx".
The device has one single slot, to which the "PN350" module is dedicated. The module has a single subslot with a fixed submodule.

### 3.3.3. Process Data

With the cyclic PROFINET communication, the PROFINET IO controller sends 9 bytes of **process output data** to the PN350:

- Process Data Value 1, 4 bytes
- Process Data Value 2, 4 bytes
- Output Set Value, 1 byte

Process Data Value 1 and Process Data Value 2 can be scaled and provided with units using the parameters in the "Fieldbus Properties" menu (chapter 5.2).

In addition, a so-called "Linkage value" is calculated from the two process data values. The linkage value can be scaled separately and also provided with units. The type of link (+, -, x or /) is set with the "Operational Mode" parameter in the General menu (chapter 5.1), while the scaling is set by the parameters in the "Linkage Properties" menu (chapter 5.3).

The three scaled values can then optionally be displayed on the display, see sections "Display during operation" (chapter 4.2) and "Display menu" (chapter 5.12). The digital control outputs and the analog output can also be controlled by the three scaled values.

With the Output Set Value, you can switch directly those outputs that are not assigned to any preselection switching condition (see parameter "Output Target ..." in chapter 5.5 ff). Bits 0…3 of Output Set Value represent the Ctrl outputs Out 1…4 while bits 4 and 5 represent the relays Rel. 1 and Rel. 2.

The PN350 sends 17 bytes of **process input data** to the PROFINET IO controller:

- The scaled display value 1, 4 byte
- The scaled display value 2, 4 byte
- The scaled linkage value, 4 byte
- The actual value of the control inputs (Digital Input value), 4 Byte:
  In this status value, bits 0…4 represent the inputs Ctrl. In 1…4.
  (Bits 5…31 are not used and are fixed at 0)
- The actual value of the control outputs (Digital Output Value), 1 byte:
  In this status byte, bits 0…3 represent the outputs Ctrl. Out 1…4 and bits 4 and 5 the relays Rel. 1 and Rel. 2.

### 3.3.4. Acyclic Data Exchange

With the acyclic PROFINET communication (Record Data Services), all device parameters of the PN350 can be accessed via slot 1 / subslot 1. All parameter values are signed 32-bit values (4 bytes). The index of each individual register you can find in the parameter tables in Chapter 6.2.

## 3.4. Control Inputs

Five control inputs with HTL-PNP characteristics are available at terminals 5, 7, 10, 11 and 12
Three of these inputs (Ctrl.In 1…3) are configurable in the COMMAND MENU and can be used for externally triggered functions such as switching the display, locking the touch screen or enabling the latching of control and relay outputs.

Wiring of the control inputs:
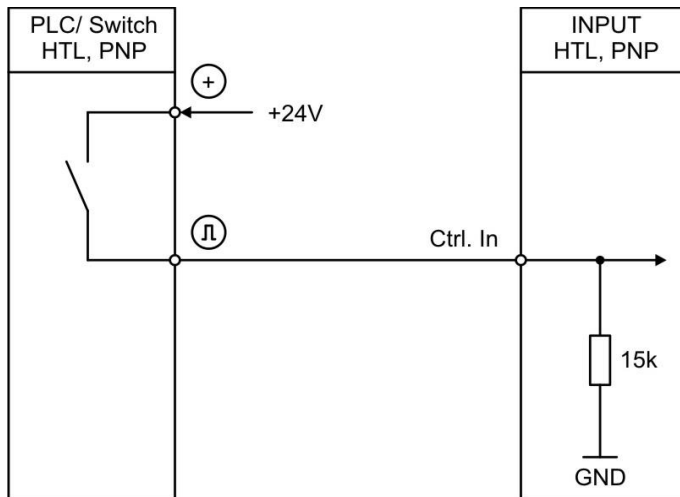


Open control inputs are always "LOW".
The input stages are designed for electronic control signals.

## 3.5. Analog Output (Option AO/AR)

A 16 bit analog output is available at terminal 13 and 14 / 15
This output can be configured and scaled in the ANALOG MENU.

The following configuration is possible:

- Voltage output:        -10 … +10 V
- Current output:          0 … 20 mA
- Current output:          4 … 20 mA

The analog output is proportional to the reference source and is referenced to potential AGND.
AGND and GND are internally interconnected.

> **Important:**
> A parallel operation with voltage and current output at the analog output is not allowed!

## 3.6. Serial Interface (Option AO/AR/CO/CR)

A serial interface (RS232 or RS485) is available at terminal 16, 17 und 18.
This interface can be configured in the SERIAL MENU.

The serial interface RS232 or RS485 can be used:

- for easy setup and commissioning of the units
- to modify settings and parameters during operation
- to read out internal states and actual measuring values by PC or PLC

The following drawing shows the connection to a PC by using a standard Sub-D-9 connector:

Connection of the RS232 interface:
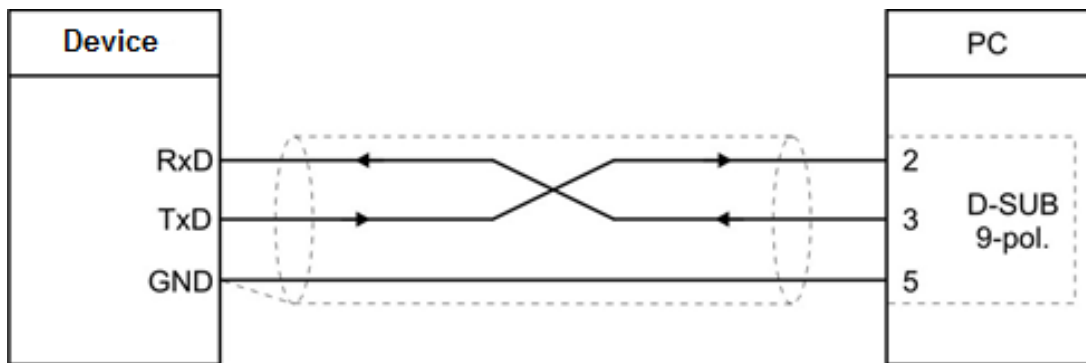


Connection of the RS485 interface:
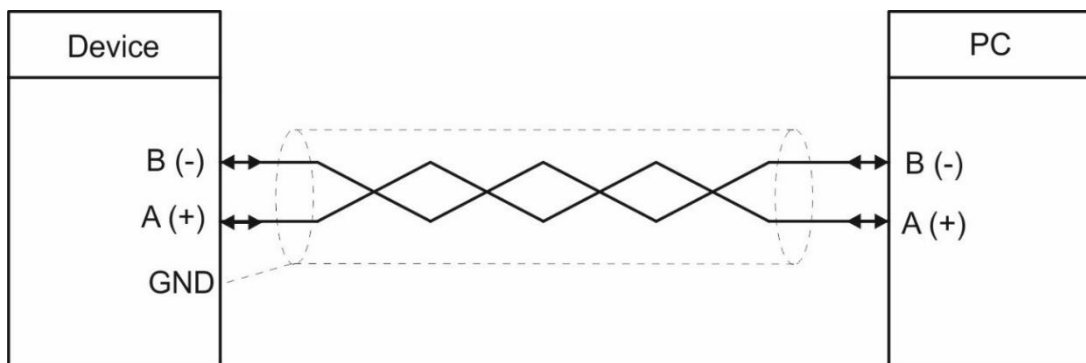


## 3.7. Control Outputs (Option AO/AR/CO/CR)

Four control outputs are available at terminal 20, 21, 22 and 23.
Switching conditions can be set in the PRESELECTION MENU. The output Ctrl. Out1 – 4 are fast PNP outputs with a switching capability of 5 – 30 Volt / 200 mA per channel. The switching states is displayed (display with unit and status bar) as C1 … C4.

The switching voltage of the outputs must be applied to input terminal 19 (COM+).
In case of switching inductive loads, it is advisable to use external filtering of the coils.

Wiring of the control outputs:
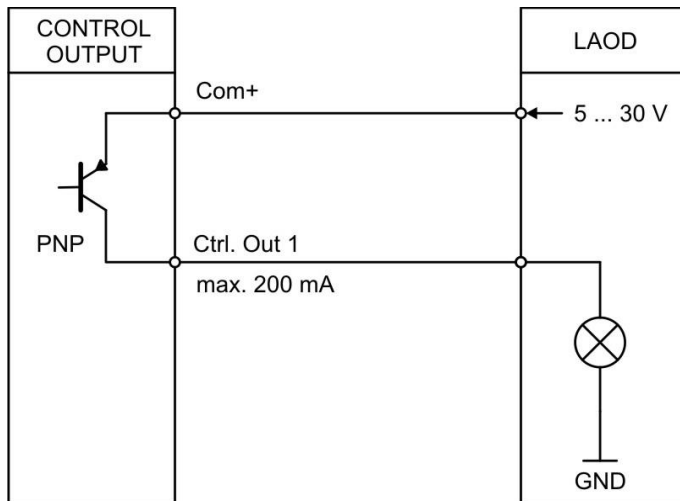


## 3.8.    AC Power Supply (Option AC)

The unit accepts AC supply from 115 to 230 V at the terminals 24 and 25. The power consumption depends on the level of the supply voltage with approx. 3VA and the additional current required at the auxiliary voltage output.

Devices with option AC can also be supplied with a DC voltage between 18 and 30 VDC at terminals 1 and 2.

## 3.9.    Relay Outputs (Option RL)

Two relay outputs with potential-free changeover contacts are available at terminal 27, 28, 28, 30, 31, 32. Switching conditions can be set in the PRESELECTION MENU. The switching state is displayed (display with unit and status bar) as K1 and K4.

AC-switching capacity max. 250 VAC/ max. 3 A / 750 VA
DC-switching capacity max. 150 VAC/ max. 2 A / 50 W

Wiring of the relay outputs:
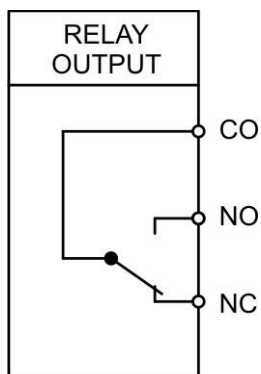
# 4. Display and Touch Screen

## 4.1. Screen Structure for Parameterization

The parameter menus and the parameters are described in chapter 5.
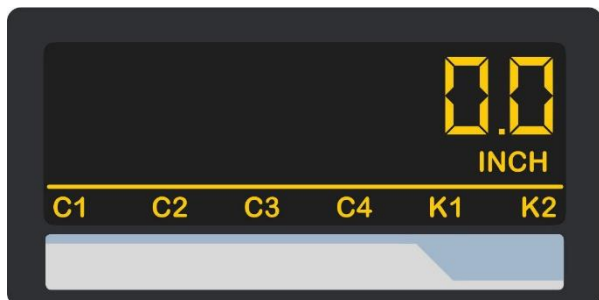
**Start setup procedure:**

To edit the parameters,
press the touch screen for 3 seconds.

**Menu selection:**

Select the parameter menu via arrow buttons and confirm with "OK".

The menu selection can be terminated with „C".

**Parameter selection:**

Select the parameter via arrow buttons and confirm with „OK".

The parameter selection can be terminated with „C".

**Parameter editing:**

Edit the parameter via arrow button up and down, shift cursor via left and right and save with „OK".

The parameter editing can be terminated with „C".

Parameter changes becomes active only after closing the menu selection.

## 4.2. Screen Structure in Operation

During operation, either the two process data values and/or the linked value can be displayed.
The values to be displayed are selected in the display menu.
The following displays are available:
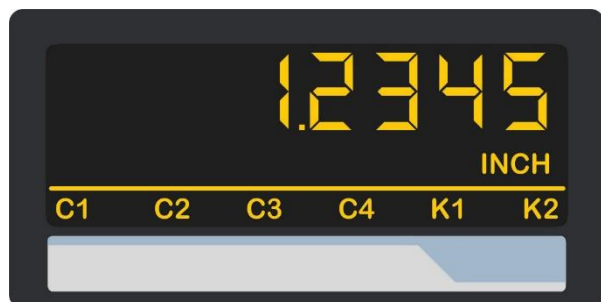


### Display of a value with unit and status bar

To switch to the next display,
press the touch screen.

Control or Relay status are only displayed with
Option CO, CR, AO, AR or RL.
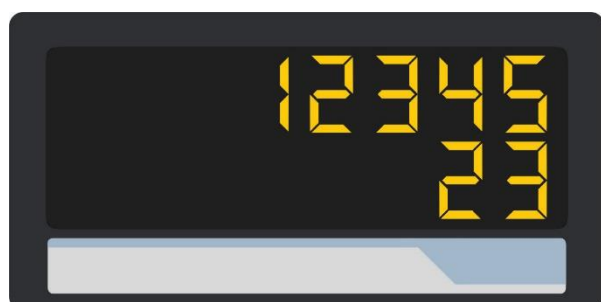


### Two-line display of two values without units

To switch to the next display, press the top of
the screen.
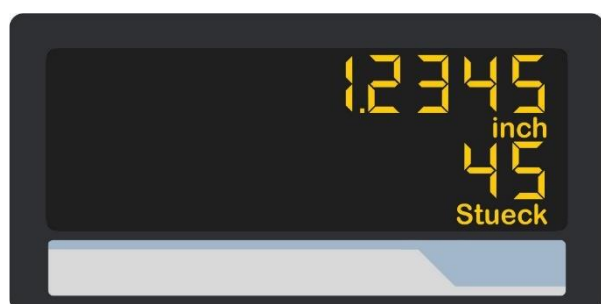


### Two-line display of two values with units

To switch to the next display, press the top of
the screen.



### Large display (4-digits)

To switch to the next display, press the top of
the screen.
This is only possible with activated parameter
„LARGE DISPLAY".



### Display with command keys

To switch to the next display, press the top of
the screen or "SKIP".

Continuation "**Screen Structure in Operation**":



Display for quick start for enter preselection values (PRESELECTION VALUES)

To switch to the next display, press the top of the screen or "SKIP".

This is only possible with option CO, CR, AO, AR or RL.



Display with minimum and maximum values

To switch to the next display, press the top of the screen or "SKIP".

If there is no valid display value because the cyclic PROFINET data exchange has not yet started, dashes ("--------") are displayed instead of the respective display value.

# 4.3.    Error Messages
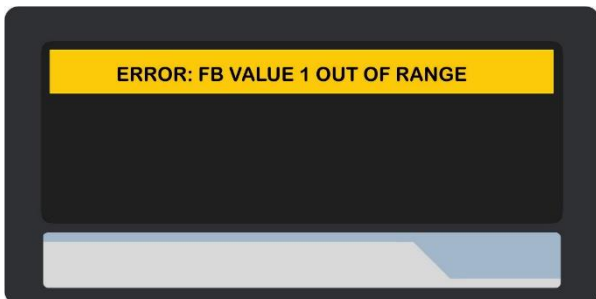


ERROR: FB VALUE 1 OUT OF RANGE

The value range of process data value 1 has been exceeded.
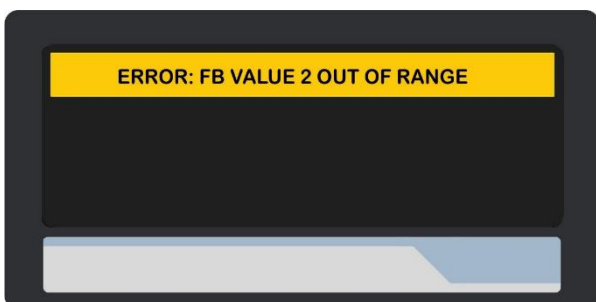


ERROR: FB VALUE 2 OUT OF RANGE

The value range of process data value 2 has been exceeded.
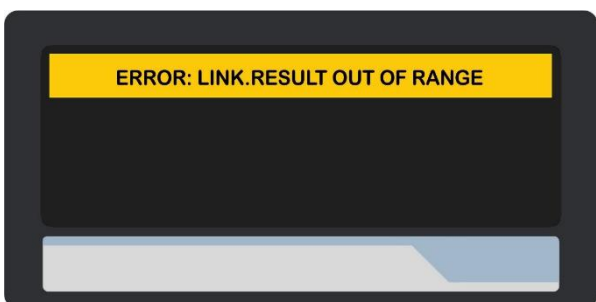


ERROR: LINK.RESULT OUT OF RANGE

The value range of the linked display value has been exceeded

Continuation "**Error Messages**":
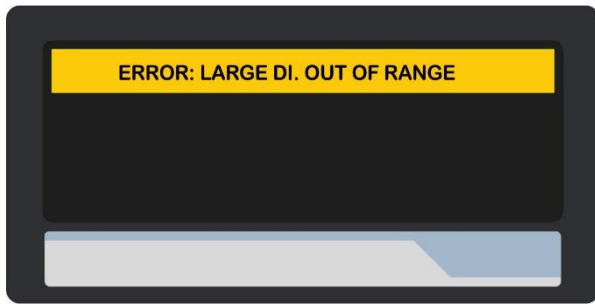
ERROR: LARGE DI. OUT OF RANGE

The value range of the large display has been exceeded

All error messages are displayed flashing.
A corresponding diagnostic alarm is sent via PROFINET for each error message

| | The error messages described are <u>automatically</u> reset as soon as the corresponding display value is back in the displayable range. |
|---|---|

# 5. Parameter / Overview – Menu Structure

The parameterization of the device is realized via the serial interface with a PC and the operating software OS. The link to the free download can be found on page 2.

This section provides an overview of the menus and their parameters. The menu names are printed bold and the associated parameters are listed under the menu name.

| Menu / Parameter |
| --- |
| **GENERAL MENU** |
| OPERATIONAL MODE |
| ENCODER SUPPLY |
| PIN PRESELECTION |
| PIN PARAMETER |
| FACTORY SETTINGS |
| **FIELDBUS PROPERTIES** |
| IN1 FACTOR |
| IN1 DIVIDER |
| IN1 ADDITIVE VALUE |
| IN1 DECIMAL POINT |
| IN1 SCALE UNIT |
| IN2 FACTOR |
| IN2 DIVIDER |
| IN2 ADDITIVE VALUE |
| IN2 DECIMAL POINT |
| IN2 SCALE UNIT |
| (FB VALUE IN 0)* |
| (FB VALUE IN 1)* |
| (FB VALUE IN 2)* |
| (FB VALUE IN 3)* |
| (FB VALUE OUT 0)* |
| (FB VALUE OUT 1)* |
| (FB VALUE OUT 2)* |
| (FB VALUE OUT 3)* |
| **LINKAGE PROPERTIES** |
| FACTOR |
| DIVIDER |
| ADDITIVE VALUE |
| DECIMAL POINT |
| SCALE UNIT |

*) Not visible in the menu

| Menu / Parameter |
| --- |
| **PRESELECTION VALUES** |
| PRESELECTION 1 |
| PRESELECTION 2 |
| PRESELECTION 3 |
| PRESELECTION 4 |
| **PRESELECTION 1 MENU** |
| SOURCE 1 |
| MODE 1 |
| HYSTERESIS 1 |
| PULSE TIME 1 |
| OUTPUT TARGET 1 |
| OUTPUT POLARITY 1 |
| OUTPUT LOCK 1 |
| START UP DELAY 1 |
| EVENT COLOR 1 |
| **PRESELECTION 2 MENU** |
| SOURCE 2 |
| MODE 2 |
| HYSTERESIS 2 |
| PULSE TIME 2 |
| OUTPUT TARGET 2 |
| OUTPUT POLARITY 2 |
| OUTPUT LOCK 2 |
| START UP DELAY 2 |
| EVENT COLOR 2 |
| **PRESELECTION 3 MENU** |
| SOURCE 3 |
| MODE 3 |
| HYSTERESIS 3 |
| PULSE TIME 3 |
| OUTPUT TARGET 3 |
| OUTPUT POLARITY 3 |
| OUTPUT LOCK 3 |
| START UP DELAY 3 |
| EVENT COLOR 3 |

| Menu / Parameter |
| --- |
| PRESELECTION 4 MENU |
| SOURCE 4 |
| MODE 4 |
| HYSTERESIS 4 |
| PULSE TIME 4 |
| OUTPUT TARGET 4 |
| OUTPUT POLARITY 4 |
| OUTPUT LOCK 4 |
| START UP DELAY 4 |
| EVENT COLOR 4 |
| SERIAL MENU |
| UNIT NUMBER |
| SERIAL BAUD RATE |
| SERIAL FORMAT |
| SERIAL PROTOCOL |
| SERIAL TIMER |
| SERIAL VALUE |
| MODBUS |
| ANALOG MENU |
| ANALOG SOURCE |
| ANALOG FORMAT |
| ANALOG START |
| ANALOG END |
| ANALOG GAIN |
| ANALOG OFFSET |
| COMMAND MENU |
| INPUT 1 ACTION |
| INPUT 1 CONFIG |
| INPUT 2 ACTION |
| INPUT 2 CONFIG |
| INPUT 3 ACTION |
| INPUT 3 CONFIG |

| Menu / Parameter |
| --- |
| DISPLAY MENU |
| START DISPLAY |
| SOURCE SINGLE |
| SOURCE DUAL TOP |
| SOURCE DUAL DOWN |
| LARGE DISPLAY |
| COLOR |
| BRIGHTNESS |
| CONTRAST |
| SCREEN SAVER |
| UP-DATE-TIME |
| FONT |
| QUICKSTART BUTTON |

## 5.1.    General Menu

In all parameter tables, the values with a gray background are the default values (factory settings) of the respective parameter.

| OPERATIONAL MODE | | |
|---|---|---|
| This parameter defines how the linked display value is calculated. | | |
| 0 | VALUE1 + VALUE2 | The linked value is the sum of the two process data values |
| 1 | VALUE1 – VALUE2 | The linked value is the difference of the two process data values |
| 2 | VALUE1 x VALUE2 | The linked value is the product of the two process data values |
| 3 | VALUE1 / VALUE2 | The linked value is the quotient of the two process data values |

| ENCODER SUPPLY | | |
|---|---|---|
| This parameter defines the voltage of the auxiliary supply output (Aux-Out). | | |
| 0 | 24VDC SUPPLY | 24 VDC encoder supply |
| 1 | 5VDC SUPPLY | 5 VDC encoder supply |

| PIN PRESELECTION | |
|---|---|
| This parameter defines the PIN-code to lock the quick start of the menu PRESELECTION VALUE for entering the preselection values. (Master PIN 6079). <br> This Lock function is only useful in conjunction with active lock function in PIN PARAMETER. | |
| 0000 | No lock |
| … | |
| 9999 | Access after entering PIN code 9999 |

| PIN PARAMETER | |
|---|---|
| This parameter defines the PIN code for lock function of all parameters (master PIN 6079). | |
| 0000 | No lock |
| … | |
| 9999 | Parameterization of the unit after entering PIN code 9999 |

| FACTORY SETTINGS | | |
|---|---|---|
| 0 | NO | No default values are loaded |
| 1 | YES | Load default values of all parameters (grey marked default values) |

## 5.2.    Fieldbus Properties

The parameters for displaying the process data values are set in this menu.

---

**IN1 FACTOR** (Multiplication factor for process data value 1)
This parameter defines the factor by which the process data value 1 is multiplied.

| | |
|---|---|
| -99999999 | Smallest value |
| 1 | Default value |
| 99999999 | Highest value |

---

**IN1 DIVIDER** (Division factor for process data value 1)
This parameter defines the divisor by which the process data value 1 is divided.

| | |
|---|---|
| -99999999 | Smallest value |
| 1 | Default value |
| 99999999 | Highest value |

---

**IN1 ADDITIVE VALUE** (Additive constant for process data value 1)
This parameter defines an additive constant that is added to the process data value 1.

| | |
|---|---|
| -99999999 | Smallest value |
| 0 | Default value |
| 99999999 | Highest value |

---

**IN1 DECIMAL POINT** (Decimal point for process data value 1)
This setting defines the position of the decimal point for the process data value 1.

| | | |
|---|---|---|
| 0 | NO | No decimal point |
| 1 | 0000000.0 | Decimal point at the specified position |
| 2 | 000000.00 | Decimal point at the specified position |
| 3 | 00000.000 | Decimal point at the specified position |
| 4 | 0000.0000 | Decimal point at the specified position |
| 5 | 000.00000 | Decimal point at the specified position |
| 6 | 00.000000 | Decimal point at the specified position |
| 7 | 0.0000000 | Decimal point at the specified position |

Continuation "**Fieldbus Properties**":

| IN 1 SCALE UNIT (Unit of measure for process data value 1) | |
|---|---|
| This parameter defines which unit is shown for the process data value 1 in the display. | |
| The setting of the SCALE UNITS does not affect the displayed value. | |

| | | |
|---|---|---|
| 0 | Hz | Default |
| 1 | kHz | |
| 2 | m/s | |
| 3 | m/min | |
| 4 | km/h | |
| 5 | mph | |
| 6 | 1/min | |
| 7 | RPM | |
| 8 | 1/sec | |
| 9 | RPS | |
| 10 | Stk/h | |
| 11 | pcs/h | |
| 12 | mm | |
| 13 | m | |
| 14 | inch | |
| 15 | feet | |
| 16 | Stueck | |
| 17 | pcs | |
| 18 | sec | |
| 19 | min | |
| 20 | Min:Sec | |
| 21 | H:M:S | |
| 22 | Min:Sec:00 | |
| 23 | l/min | |
| 24 | gal/min | |
| 25 | ml/min | |
| 26 | gr/min | |
| 27 | inch/min | |
| 28 | H:M | |
| 29 | Edit Unit | A customized unit with up to 16 digits can be edited using this parameter. Pressing the "OK" button opens the Edit Unit Menu. A unit can be created using the arrow keys. (by pressing and holding the arrow keys the characters scroll fast). The "OK" butten saves the Edit Unit Menu. The "C" button closes the Edit Unit Menu. |

|   | ! | " | # | $ | % | & | ' | ( | ) | * | + | , | - | . | / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | : | ; | < | = | > | ? |
| @ | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
| P | Q | R | S | T | U | V | W | X | Y | Z | [ | \ | ] | ^ | _ |
| ` | a | b | c | d | e | f | g | h | i | j | k | l | m | n | o |
| p | q | r | s | t | u | v | w | x | y | z | { | \| | } | ~ | |

Continuation "**Fieldbus Properties**":

| IN2 FACTOR (Multiplication factor for process data value 2) This parameter defines the factor by which the process data value 2 is multiplied. | | |
| --- | --- | --- |
| | -99999999 | Smallest value |
| | 1 | Default value |
| | 99999999 | Highest value |

| IN2 DIVIDER (Division factor for process data value 2) This parameter defines the divisor by which the process data value 2 is divided. | | |
| --- | --- | --- |
| | -99999999 | Smallest value |
| | 1 | Default value |
| | 99999999 | Highest value |

| IN2 ADDITIVE VALUE (Additive constant for process data value 2) This parameter defines an additive constant that is added to the process data value 2. | | |
| --- | --- | --- |
| | -99999999 | Smallest value |
| | 0 | Default value |
| | 99999999 | Highest value |

| IN2 DECIMAL POINT (Decimal point for process data value 2) This setting defines the position of the decimal point for the process data value 2. | | |
| --- | --- | --- |
| 0 | NO | No decimal point |
| 1 | 0000000.0 | Decimal point at the specified position |
| 2 | 000000.00 | Decimal point at the specified position |
| 3 | 00000.000 | Decimal point at the specified position |
| 4 | 0000.0000 | Decimal point at the specified position |
| 5 | 000.00000 | Decimal point at the specified position |
| 6 | 00.000000 | Decimal point at the specified position |
| 7 | 0.0000000 | Decimal point at the specified position |

| IN 2 SCALE UNIT (Unit of measure for process data value 2) This parameter defines which unit is shown for the process data value 2 in the display. The setting of the SCALE UNITS does not affect the displayed value. |
| --- |
| Settings see parameter IN 1 SCALE UNIT |

| FB VALUE IN 0 * Reserved for future use, must remain set to the default value. | | |
| --- | --- | --- |
| | 00 | Smallest value |
| | 00 | Default value |
| | 00 | Highest value |

Continuation "**Fieldbus Properties**":

| FB VALUE IN 1 * | | |
|---|---|---|
| Reserved for future use, must remain set to the default value. | | |
| | 01 | Smallest value |
| | 01 | Default value |
| | 01 | Highest value |

| FB VALUE IN 2 * | | |
|---|---|---|
| Reserved for future use, must remain set to the default value. | | |
| | 02 | Smallest value |
| | 02 | Default value |
| | 02 | Highest value |

| FB VALUE IN 3 * | | |
|---|---|---|
| Reserved for future use, must remain set to the default value. | | |
| | 27 | Smallest value |
| | 27 | Default value |
| | 27 | Highest value |

| FB VALUE OUT 0 * | | |
|---|---|---|
| Reserved for future use, must remain set to the default value. | | |
| | 00 | Smallest value |
| | 00 | Default value |
| | 00 | Highest value |

| FB VALUE OUT 1 * | | |
|---|---|---|
| Reserved for future use, must remain set to the default value. | | |
| | 01 | Smallest value |
| | 01 | Default value |
| | 01 | Highest value |

| FB VALUE OUT 2 * | | |
|---|---|---|
| Reserved for future use, must remain set to the default value. | | |
| | 02 | Smallest value |
| | 02 | Default value |
| | 02 | Highest value |

| FB VALUE OUT 3 * | | |
|---|---|---|
| Reserved for future use, must remain set to the default value. | | |
| | 03 | Smallest value |
| | 03 | Default value |
| | 03 | Highest value |

*) Not visible in the menu

## 5.3. Linkage Properties

The parameters for displaying the linked display value are set in this menu

| FACTOR (Multiplication factor) |||
|---|---|---|
| This parameter defines the factor by which the result of the link is multiplied. |||
| | -99999999 | Smallest value |
| | 1 | Default value |
| | 99999999 | Highest value |

| DIVIDER (Division factor) |||
|---|---|---|
| This parameter defines the divisor by which the result of the link is divided. |||
| | -99999999 | Smallest value |
| | 1 | Default value |
| | 99999999 | Highest value |

| ADDITIVE VALUE (Additive value) |||
|---|---|---|
| This parameter defines an additive constant that is added to the result of the link. |||
| | -99999999 | Smallest value |
| | 0 | Default value |
| | 99999999 | Highest value |

| DECIMAL POINT (Decimal point) |||
|---|---|---|
| This setting defines the position of the decimal point for the link. |||
| 0 | NO | No decimal point |
| 1 | 0000000.0 | Decimal point at the specified position |
| 2 | 000000.00 | Decimal point at the specified position |
| 3 | 00000.000 | Decimal point at the specified position |
| 4 | 0000.0000 | Decimal point at the specified position |
| 5 | 000.00000 | Decimal point at the specified position |
| 6 | 00.000000 | Decimal point at the specified position |
| 7 | 0.0000000 | Decimal point at the specified position |

| SCALE UNITS (Unit of measurement display) |
|---|
| This parameter defines which unit is shown for the linked value in the display. |
| A setting of the SCALE UNITS does not affect the displayed value. |

| |
|---|
| **Settings see parameter IN 1 SCALE UNIT** |

## 5.4. Preselection Values

This menu is used to set the preselection values or the switching points.
The preselection values are always referred to the selected SOURCE of the PRESELECTION MENU.
This menu is only available for devices with option CO, CR, AO, AR or RL.

**PRESELECTION 1**
Preselection / switching point 1

|  | -99999999 | Smallest preselection value |
|---|---|---|
|  | 1000 | Default value |
|  | +99999999 | Highest preselection value |

**PRESELECTION 2**
Preselection / switching point 2

|  | -99999999 | Smallest preselection value |
|---|---|---|
|  | 2000 | Default value |
|  | +99999999 | Highest preselection value |

**PRESELECTION 3**
Preselection / switching point 3

|  | -99999999 | Smallest preselection value |
|---|---|---|
|  | 3000 | Default value |
|  | +99999999 | Highest preselection value |

**PRESELECTION 4**
Preselection / switching point 4

|  | -99999999 | Smallest preselection value |
|---|---|---|
|  | 4000 | Default value |
|  | +99999999 | Highest preselection value |

## 5.5. Preselection 1 Menu

In this menu, the parameters of the reference source, the switching conditions and further definitions for preset value / switching point 1 are defined.

This function is only available for devices with option CO, CR, AO, AR or RL.

| SOURCE 1 | | |
|---|---|---|
| This parameter defines the reference source for preselection 1 | | |
| 0 | FIELDBUS VALUE 1 | Reference source is the process data value 1 |
| 1 | FIELDBUS VALUE 2 | Reference source is the process data value 2 |
| 2 | LINKAGE RESULT | Reference source is the linked display value |

| MODE 1 | | |
|---|---|---|
| Switching condition for preselection 1. Output/ relay switches under the following conditions: | | |
| 0 | \|RESULT\|>=\|PRES\| | Absolute value of the display value is greater or equal absolute value of PRESELECTION 1<br><br>With HYSTERESIS 1 not equal 0 the following switching condition is applied:<br>\|Display value\| >= PRESELECTION 1 → ON,<br>\|Display value\| < PRESELECTION 1 – HYSTERESIS 1 →OFF |
| 1 | \|RESULT\|<=\|PRES\| | Absolute value of the display value is less or equal absolute value of PRESELECTION 1<br><br>With HYSTERESIS 1 not equal 0 the following switching condition is applied:<br>\|Display value\| <= PRESELECTION 1 → ON,<br>\|Display value\| > PRESELECTION 1 + HYSTERESIS 1 →OFF |
| 2 | \|RESULT\|=\|PRES\| | Absolute value of the display value is equal absolute value of PRESELECTION 1. A range (Preselection +/- ½ Hysteresis) can be defined and monitored in conjunction with HYSTERESIS 1<br>With HYSTERESIS 1 not equal 0 the following switching condition is applied:<br>\|Display value\| > PRESELECTION 1 + ½ HYSTERESIS 1 → OFF,<br>\|Display value\| < PRESELECTION 1 - ½ HYSTERESIS 1 → OFF |
| 3 | RESULT>=PRES | Display value is greater or equal PRESELECTION 1<br><br>With HYSTERESIS 1 not equal 0 the following switching condition is applied:<br>Display value >= PRESELECTION 1 → ON,<br>Display value < PRESELECTION 1 – HYSTERESIS 1 →OFF |
| 4 | RESULT<=PRES | Display value is less or equal PRESELECTION 1<br><br>With HYSTERESIS 1 not equal 0 the following switching condition is applied:<br>Display value <= PRESELECTION 1 → ON,<br>Display value > PRESELECTION 1 + HYSTERESIS 1 →OFF |
| 5 | RESULT=PRES | Display value is equal PRESELECTION 1.<br>A range (Preselection +/- ½ Hysteresis) can be defined and monitored in conjunction with HYSTERESIS 1.<br><br>With HYSTERESIS 1 not equal 0 the following switching condition is applied:<br>Display value > PRESELECTION 1 + ½ HYSTERESIS 1 → OFF,<br>Display value < PRESELECTION 1 - ½ HYSTERESIS 1 → OFF |
| 6 | RES>=PRES-TRAIL | Trailing PRESELECTION 1:<br>Display value is greater or equal PRESELECTION 2 – PRESELECTION 1<br>PRESELECTION 1 is the trailing value from PRESELECTION 2 |
| 7 | ERROR SET | Error message for device errors |

Continuation "**Preselection 1 Menu**":

---

**HYSTERESIS 1**
This parameter defines the switching hysteresis of the switch-off point for preselection 1

| | | |
|---|---|---|
| **0** | No switching hysteresis | |
| ... | | |
| **9999** | Switching hysteresis of 99999 | |

---

**PULSE TIME 1 (S)**
Duration of output pulse for the switching condition of preselection 1.

| | | |
|---|---|---|
| **0.000** | No output pulse (static signal) | |
| ... | | |
| **60.000** | Pulse duration of 60 seconds | |

---

**OUTPUT TARGET 1**
Assignment of an output or relay for the switching condition of preselection 1.
If more than one switching condition is assigned to one output / relay, the output is set when at least one switching condition is true.
**If an output is not assigned a switching condition in any of the Output Target 1…4 parameters, the output can be controlled directly via PROFINET with the process output data byte "Output Set Value".**

| 0 | NO | No assignment |
|---|---|---|
| 1 | CTRL OUT 1 | Switching condition assigned to "Ctrl. Out 1" |
| 2 | CTRL OUT 2 | Switching condition assigned to "Ctrl. Out 2" |
| 3 | CTRL OUT 3 | Switching condition assigned to "Ctrl. Out 3" |
| 4 | CTRL OUT 4 | Switching condition assigned to "Ctrl. Out 4" |
| 5 | RELAY 1 | Switching condition assigned to "Rel. 1" |
| 6 | RELAY 2 | Switching condition assigned to "Rel. 2" |

---

**OUTPUT POLARITY 1**
Polarity for the switching condition of preselection 1.

| 0 | ACTIVE HIGH | Switching condition is true → Output is „HIGH" |
|---|---|---|
| 1 | ACTIVE LOW | Switching condition is true → Output is „LOW" |

---

**OUTPUT LOCK 1**
Latch for the switching condition of preselection 1

| 0 | NO | No latch for preselection |
|---|---|---|
| 1 | YES | Latch for preselection (command LOCK RELEASE will clear latch) |

Continuation "**Preselection 1 Menu**":

| | EVENT COLOR 1 | |
|---|---|---|
| Event-depending change of the display color for the switching condition of preselection 1.<br>EVENT COLOR 1 has the lowest priority. EVENT COLOR 2 … 4 are allowed to overwrite this color change. | |
| 0 | NO CHANGE | No color change |
| 1 | CHANGE TO RED | Color change to red |
| 2 | CHANGE TO GREEN | Color change to green |
| 3 | CHANGE TO YELLOW | Color change to yellow |

# 5.6.　Preselection 2 Menu

**SOURCE 2**
The reference source for preselection 2, see PRESELECTION 1 MENU.

**MODE 2**
Switching conditions for preselection 2, see PRESELECTION 1 MENU (except trailing preselection).

| | | | |
|---|---|---|---|
| | | | See PRESELECTION 1 MENU |
| | 6 | RES>=PRES-TRAIL | Trailing preselection 2:<br>Display value is greater or equal to PRESELECTION 1 – PRESELECTION 2<br>PRESELECTION 2 is the trailing preselection of PRESELECTION 1. |

**HYSTERESIS 2**
This parameter defines the switching hysteresis of the switch-off point for preselection 2.
See PRESELECTION 1 MENU.

**PULSE TIME 2 (S)**
Duration of output pulse for the switching condition of preselection 2.
See PRESELECTION 1 MENU.

**OUTPUT TARGET 2**
Assignment of an output or relay for the switching condition of preselection 2.
See PRESELECTION 1 MENU.

**OUTPUT POLARITY 2**
Polarity for the switching condition of preselection 2.
See PRESELECTION 1 MENU.

**OUTPUT LOCK 2**
Latch for the switching condition of preselection 2.
See PRESELECTION 1 MENU.

**EVENT COLOR 2**
Event-depending change of the display color for the switching condition of preselection 2.
See PRESELECTION 1 MENU.

## 5.7.    Preselection 3 Menu

---

**SOURCE 3**

The reference source for preselection 3, see PRESELECTION 1 MENU.

---

**MODE 3**

Switching conditions for preselection 3, see PRESELECTION 1 MENU (except trailing preselection)

| | | | |
|---|---|---|---|
| | | | see PRESELECTION 1 MENU |
| | 6 | RES>=PRES-TRAIL | Trailing preselection 3:<br>Display value is greater or equal to PRESELECTION 4 – PRESELECTION 3<br>PRESELECTION 3 is the trailing preselection of PRESELECTION 4. |

---

**HYSTERESIS 3**

This parameter defines the switching hysteresis of the switch-off point for preselection 3.
See PRESELECTION 1 MENU.

---

**PULSE TIME 3 (S)**

Duration of output pulse for the switching condition of preselection 3.
See PRESELECTION 1 MENU.

---

**OUTPUT TARGET 3**

Assignment of an output or relay for the switching condition of preselection 3.
See PRESELECTION 1 MENU.

---

**OUTPUT POLARITY 3**

Polarity for the switching condition of preselection 3.
See PRESELECTION 1 MENU.

---

**OUTPUT LOCK 3**

Latch for the switching condition of preselection 3.
See PRESELECTION 1 MENU.

---

**EVENT COLOR 3**

Event-depending change of the display color for the switching condition of preselection 3.
See PRESELECTION 1 MENU.

---

# 5.8. Preselection 4 Menu

---

**SOURCE 4**

The reference source for preselection 4, see PRESELECTION 1 MENU.

---

**MODE 4**

Switching conditions for preselection 4, see PRESELECTION 1 MENU (except trailing preselection)

| | | | see PRESELECTION 1 MENU. |
|---|---|---|---|
| | 9 | RES>=PRES-TRAIL | Trailing preselection 4:<br>Display value is greater or equal to PRESELECTION 3 – PRESELECTION4<br>PRESELECTION 4 is the trailing preselection of PRESELECTION 3. |

---

**HYSTERESIS 4**

This parameter defines the switching hysteresis of the switch-off point for preselection 4.
See PRESELECTION 1 MENU

---

**PULSE TIME 4 (S)**

Duration of output pulse for the switching condition of preselection 4.
See PRESELECTION 1 MENU.

---

**OUTPUT TARGET 4**

Assignment of an output or relay for the switching condition of preselection 4.
See PRESELECTION 1 MENU.

---

**OUTPUT POLARITY 4**

Polarity for the switching condition of preselection 4.
See PRESELECTION 1 MENU.

---

**OUTPUT LOCK 4**

Latch for the switching condition of preselection 4.
See PRESELECTION 1 MENU.

---

**EVENT COLOR 4**

Event-depending change of the display color for the switching condition of preselection 4.
See PRESELECTION 1 MENU.

## 5.9. Serial Menu

This menu defines the basic settings of serial interface.
This function is only available for devices with option CO, CR, AO or AR

| UNIT NUMBER | | |
|---|---|---|
| This parameter defines the serial device address. The addresses between 11 and 99 can be assigned to the device. Addresses with zero are not allowed, because these are used as broadcast addresses. | | |
| | 11 | Smallest address without zero |
| | … | |
| | 99 | Highest address without zero |

| SERIAL BAUD RATE | | |
|---|---|---|
| This parameter defines the serial baud rate. | | |
| 0 | 9600 | 9600 baud |
| 1 | 19200 | 19200 baud |
| 2 | 38400 | 38400 baud |
| 3 | 115200 | 115200 baud |

| SERIAL FORMAT | | | | |
|---|---|---|---|---|
| This parameter defines the bit data format. | | | | |
| 0 | 8-EVEN-1 | 8 data | Parity even | 1 Stopp |
| 1 | 8-ODD-1 | 8 data | Parity odd | 1 Stopp |
| 2 | 8-NONE-1 | 8 data | no Parity | 1 Stopp |
| 3 | 8-NONE-2 | 8 data | no Parity | 2 Stopps |

**SERIAL PROTOCOL**

Determines the sequence of characters send, when using the serial output for cyclic data transmission under time control (xxxxxxx = value SERIAL VALUE).
Setting „1" removes the unit address from the string which allows a slight faster transmission cycle.

| | 0 | Transmission report = unit no., +/-, data, LF, CR |
|---|---|---|
| | | 1 \| 1 \| +/- \| X \| X \| X \| X \| X \| X \| X \| LF \| CR |
| | 1 | Transmission report = +/-, data, LF, CR |
| | | +/- \| X \| X \| X \| X \| X \| X \| X \| LF \| CR |

Continuation "**Serial Menu**":

| SERIAL TIMER (S) | | |
|---|---|---|
| This register determines the cycle time in seconds for cycling transmission of SERIAL VALUE when using the serial output. (On a serial request, the cycling transmission is stopped for 20 s) | | |
| | 0.000 | All cyclic transmission is switched off. The unit will send data upon a serial request or with command SERIAL PRINT. |
| | … | |
| | 60.000 | Cycle time in seconds. |

| SERIAL VALUE | | |
|---|---|---|
| This parameter defines the value to be transmitted. | | |

| | Setting | Code | Register |
|---|---|---|---|
| | 0 | :0 | Scaled Result Fieldbus Value 1 |
| | 1 | :1 | Scaled Result Fieldbus Value 2 |
| | 2 | :2 | Scaled Result Linkage Result |
| | 3 | :3 | Fieldbus Value 1 |
| | 4 | :4 | Fieldbus Value 2 |
| | 5 | :5 | |
| | 6 | :6 | |
| | 7 | :7 | |
| | 8 | :8 | Minimum Value |
| | 9 | :9 | Maximum Value |

| MODBUS | | |
|---|---|---|
| This parameter enables the Modbus protocol and determines the Modbus address. (For details of the Modbus communication please refer to the additional manual Modbus_RTU) | | |
| | 0 | Modbus disabled: Serial interface is using Lecom protocol (Motrona default protocol) |
| | 1 … 247 | Modbus enabled: Serial interface is using Modbus RTU protocol The set value is the Modbus address of the device. |

## 5.10.  Analog Menu

This menu defines the basic settings of the analog output.
This function is only available for devices with option AO or AR.

---

**ANALOG SOURCE**

This parameter defines the reference source for analog output.

| | | |
|---|---|---|
| 0 | FIELDBUS VALUE 1 | Reference source is the process data value 1 |
| 1 | FIELDBUS VALUE 2 | Reference source is the process data value 2 |
| 2 | LINKAGE RESULT | Reference source is the linked display value |

---

**ANALOG FORMAT**

This parameter defines the output characteristics. The analogue output is proportional to the display value.
With setting ANALOG FORMAT (-10 … +10 V) in MODE COUNTER the polarity of the analog output depends on the polarity of the display value.

| | | |
|---|---|---|
| 0 | -10…10V | -10 … +10 V |
| 1 | 0…20MA | 0 … 20 mA |
| 2 | 4…20MA | 4 … 20 mA |

---

**ANALOG START**

This parameter defines the start value of the analog conversion. This start value is corresponding to the display value for an analog output of 0 V or 0/4 mA.

| | |
|---|---|
| -99999999 | Smallest start value |
| 0 | Default value |
| +99999999 | Highest start value |

---

**ANALOG END**

This parameter defines the end value of the analog conversion. This end value is corresponding to the display value for an analog output of (+/-) 10 V or 20mA.

| | |
|---|---|
| -99999999 | Smallest end value |
| 10000 | Default Wert |
| +99999999 | Highest end value |

---

**ANALOG GAIN (%)**

This parameter specifies the maximum conversion of the analog output in %.

e. g. 102,00 corresponds to a conversion of 10,2 V or 20,4 mA, when the ANALOG END value is reached.
e. g. 95,00 corresponds to a conversion of 9,5 V or 18 mA, when the ANALOG END value is reached.

| | |
|---|---|
| 0.00 | Smallest gain |
| 100.00 | Default value |
| 110.00 | Highest gain |

---

**ANALOG OFFSET (%)**

This parameter defines the zero offset of the analog output.
e.g.  0.20 result in an offset of 0.02 V or 0.04 mA at ANALOG START value

| | |
|---|---|
| -99.99 | Smallest offset |
| 0 | Default value |
| +99.00 | Highest offset |

# 5.11.    Command Menu

**INPUT 1 ACTION** (function Input 1)
This parameter defines the function of the input "Ctrl. In 1".

| | | | |
|---|---|---|---|
| 0 | NO | No function | |
| 1 | FREEZE | Freeze actual display value | (s) |
| 2 | KEY LOCK | Disable touch screen | (s) |
| 3 | LOCK RELEASE | Release latching of all outputs/relays | (d) |
| 4 | RESET MIN/MAX | Reset of the min. / max. values | (d) (s) |
| 5 | SERIAL PRINT | Sending of serial data, see parameter SERIAL VALUE | (d) |
| 6 | TEACH PRESEL. 1 | Current display value is stored as PRESELECTION 1 | (d) |
| 7 | TEACH PRESEL. 2 | Current display value is stored as PRESELECTION 2 | (d) |
| 8 | TEACH PRESEL. 3 | Current display value is stored as PRESELECTION 3 | (d) |
| 9 | TEACH PRESEL. 4 | Current display value is stored as PRESELECTION 4 | (d) |
| 10 | SCROLL DISPLAY | Display switching (see display in operation mode) | (d) |
| 11 | CLEAR LOOP TIME | Release all latched switching conditions | |
| 12 | (Command 11) | N.A. | |
| 13 | START PRESELECT | N.A. | |
| 14 | ACTIVATE | N.A. | |
| 15 | STORE DATA | N.A. | |
| 16 | TESTPROGRAM | N.A. | |
| 17 | SET RED COLOR | The display lights up red. The color can be changed by the event-dependent color switching in the PRESELECTION 1… 4 | (d) |
| 18 | SET GREEN COLOR | The display lights up green. The color can be changed by the event-dependent color switching in the PRESELECTION 1… 4 | (d) |
| 19 | SET YELLOW COLOR | The display lights up yellow The color can be changed by the event-dependent color switching in the PRESELECTION 1… 4 | (d) |
| 20 | INC. BRIGHTNESS | Display brightness is increased | (d) (s) |
| 21 | DEC. BRIGHTNESS | Display brightness is reduced | (d) (s) |
| | | | |

(s) =    static switching (level evaluation)
　　　　INPUT CONFIG must be set to active LOW / HIGH

(d) =    dynamic switching (edge evaluation)
　　　　INPUT CONFIG must be set to RISING/FALLING EDGE

Continuation "**Command Menu**":

| INPUT 1 CONFIG | | |
|---|---|---|
| This parameter defines the switching characteristics of the input "Ctrl. In 1". | | |

| | 0 | ACTIVE LOW | Active at „LOW" (static) |
|---|---|---|---|
| | 1 | ACTIVE HIGH | Active at „HIGH" (static) |
| | 2 | RISING EDGE | Activate at rising edge |
| | 3 | FALLING EDGE | Activate at falling edge |

---

**INPUT 2 ACTION**
This parameter defines the function of the input "Ctrl. In 2".
See parameter INPUT 1 ACTION.

---

**INPUT 2 CONFIG**
This parameter defines the switching characteristics of the input "Ctrl. In 2".
See parameter INPUT 1 CONFIG.

---

**INPUT 3 ACTION**
This parameter defines the function of the input "Ctrl. In 3".
See parameter INPUT 1 ACTION.

---

**INPUT 3 CONFIG**
This parameter defines the switching characteristics of the input "Ctrl. In 3".
See parameter INPUT 1 CONFIG.

## 5.12.    Display Menu

Parameter changes become active only after closing the menu selection.

| START DISPLAY | | |
|---|---|---|
| This parameter defines the start display after switching on device. | | |
| 0 | STANDARD | Display of a value with unit and status bar |
| 1 | LARGE | Large display (only the parameter „LARGE DISPLAY" is active) |
| 2 | DOUBLE | Two-line display without units |
| 3 | DOUBLE WITH UNIT | Two-line display with units |
| 4 | COMMAND | Display with command keys |
| 5 | QUICKSTART | Display with quick start function to enter / display preselection values (only for option CO/CR/AO/AR/RL) |
| 6 | MINIMUM/MAXIMUM | Display with minimum and maximum value |

| SOURCE SINGLE | | |
|---|---|---|
| Reference source of supply for single-line display and large display | | |
| 0 | FIELDBUS VALUE 1 | The process data value 1 is shown in the one-line display |
| 1 | FIELDBUS VALUE 2 | The process data value 2 is shown in the one-line display |
| 2 | LINKAGE RESULT | The linked display value is shown in the single-line display |

| SOURCE DUAL TOP | | |
|---|---|---|
| Reference source for two-line display, first line | | |
| 0 | FIELDBUS VALUE 1 | The process data value 1 is displayed in the upper line |
| 1 | FIELDBUS VALUE 2 | The process data value 2 is displayed in the upper line |
| 2 | LINKAGE RESULT | The linked display value is shown in the upper line |

| SOURCE DUAL DOWN | | |
|---|---|---|
| Reference source for two-line display, bottom line | | |
| 0 | FIELDBUS VALUE 1 | The process data value 1 is displayed in the bottom line |
| 1 | FIELDBUS VALUE 2 | The process data value 2 is displayed in the bottom line |
| 2 | LINKAGE RESULT | The linked display value is shown in the bottom line |

| LARGE DISPLAY | | |
|---|---|---|
| This parameter defines to switch on / off the large display. By splitting ratio the display value for the large display can be divided. (The reference source for the large display is the process value set in the "SOURCE SINGLE" parameter.) | | |
| 0 | NO | Large display off |
| 1 | 1:1 | Large display with splitting ratio 1:1 |
| 2 | 1:10 | Large display with splitting ratio 1:10 |
| 3 | 1:100 | Large display with splitting ratio 1:100 |
| 4 | 1:1000 | Large display with splitting ratio 1:1000 |
| 5 | 1:10000 | Large display with splitting ratio 1:10000 |

Continuation "**Display Menu**":

| COLOR | | |
|---|---|---|
| This parameter defines the display color. Event-depending change of the display color by a switching condition is possible (see PRESELECTION 1…4 MENU). Event-depending changes are only available for devices with option CO, AO or RL. | | |
| 0 | RED | Red display |
| 1 | GREEN | Green display |
| 2 | YELLOW | Yellow display |

| BRIGHTNESS (%) | |
|---|---|
| This parameter defines the brightness of the display in percent. | |
| 10 | Min. brightness |
| 90 | Default value |
| 100 | Max. brightness |

| CONTRAST | |
|---|---|
| This parameter defines the viewing angle. | |
| 0 | Viewing angle from top |
| 1 | Viewing angle from center |
| 2 | Viewing angle from bottom |

| SCREEN SAVER (S) | |
|---|---|
| This parameter defines the time in seconds until the display is switched off, after the last touch action. A new touch action will activate the display again | |
| 0 | No switch off |
| … | |
| 9999 | Longest time to switch off |

| UP-DATE-TIME (S) | |
|---|---|
| This parameter defines the update time of the display in seconds. | |
| 0.005 | Shortest update time |
| 0.1 | Default value |
| 9.999 | Longest update time |

| FONT | |
|---|---|
| This parameter defines the setting of the font style. | |
| 0 | Standard |
| 1 | Font 1 |

Continuation **"Display Menu"**:

| QUICKSTART BUTTON | | | |
|---|---|---|---|
| This parameter determines which command key should be displayed when the display contains "QUICKSTART function" (parameter only visible with option CO/CR/AO/AR/RL). | | | |
| | 0 | EDIT PRESEL. | Edit menu is opened after pressing the left command key and "Preselection Values" can be changed.<br>Attention: monitoring of the switching outputs, correction of the analog output, etc. are deactivated as long as the editing menu is open! |
| | 1 | SHOW PRESEL. | Set "Preselection Values" are displayed on the screen after pressing the left command button. The editing menu is not opened. The monitoring of the switching outputs, the correction of the analog output, etc. are still activated. |

# 6. Appendix

## 6.1.　Data Readout via Serial Interface

The free operator software OS is available at: https://www.motrona.com/en/support/software.html
All codes shown in the parameter SERIAL VALUE are available for serial readout by PC or PLC. The communication of Motrona devices is based on the Drivecom protocol according to ISO 1745 or the Modbus RTU protocol.
All protocol details can be found in our manual SERPRO (Drivecom) and Modbus_RTU_oi_e (Modbus RTU) for motrona devives which you can find on our homepage www.motrona.com.

To request for a data transmission you must send the following request string to the converter:

| EOT | AD1 | AD2 | C1 | C2 | ENQ |
|---|---|---|---|---|---|

EOT = control character (Hex 04)
AD1 = unit address, High Byte
AD2 = unit address, Low Byte
C1　= register code, High Byte
C2　= register code, Low Byte
ENQ = control character (Hex 05)

The following example shows the request string for readout of the actual input frequency of a monitor (Code=1) from a unit with unit address 11:

| ASCII-Code: | EOT | 1 | 1 | : | 1 | ENQ |
|---|---|---|---|---|---|---|
| Hex-Code: | 04 | 31 | 31 | 3A | 31 | 05 |
| Binary-Code: | 0000 0100 | 0011 0001 | 0011 0001 | 0011 1010 | 0011 0001 | 0000 0101 |

After a correct request, the unit will respond:

| STX | C1 | C2 | xxxxx | ETX | BCC |
|---|---|---|---|---|---|

STX = control character (Hex 02)
C1　= register code, High Byte
C2　= register code, Low Byte
xxxxx = readout data
ETX = control character (Hex 03)
BCC = block check character

## 6.2. Parameter/ Indices and Serial Codes

| # | Menu | Name | Index (hex) | Serial Code | Min | Max | Default |
|---|------|------|-------------|-------------|-----|-----|---------|
| 0 | GENERAL MENU | OPERATIONAL MODE | 0001 | 00 | 0 | 3 | 0 |
| 1 | GENERAL MENU | ENCODER SUPPLY | 0002 | 01 | 0 | 1 | 1 |
| 2 | GENERAL MENU | PIN PRESELECTION | 0003 | 02 | 0 | 9999 | 0 |
| 3 | GENERAL MENU | PIN PARAMETER | 0004 | 03 | 0 | 9999 | 0 |
| 4 | GENERAL MENU | FACTORY SETTINGS | 0005 | 04 | 0 | 1 | 0 |
| 5 | GENERAL MENU | – | 0006 | 05 | 0 | 0 | 0 |
| 6 | GENERAL MENU | – | 0007 | 06 | 0 | 0 | 0 |
| 7 | GENERAL MENU | – | 0008 | 07 | 0 | 0 | 0 |
| 8 | GENERAL MENU | – | 0009 | 08 | 0 | 0 | 0 |
| 9 | FIELDBUS PROPERTIES | IN1 FACTOR | 000B | 09 | -99999999 | 99999999 | 1 |
| 10 | FIELDBUS PROPERTIES | IN1 DIVIDER | 000C | 10 | 1 | 99999999 | 1 |
| 11 | FIELDBUS PROPERTIES | IN1 ADDITIVE VALUE | 000D | 11 | -99999999 | 99999999 | 0 |
| 12 | FIELDBUS PROPERTIES | IN1 DECIMAL POINT | 000E | 12 | 0 | 7 | 0 |
| 13 | FIELDBUS PROPERTIES | IN1 SCALE UNIT | 000F | 13 | 0 | 29 | 0 |
| 14 | FIELDBUS PROPERTIES | IN2 FACTOR | 0010 | 14 | -99999999 | 99999999 | 1 |
| 15 | FIELDBUS PROPERTIES | IN2 DIVIDER | 0011 | 15 | 1 | 99999999 | 1 |
| 16 | FIELDBUS PROPERTIES | IN2 ADDITIVE VALUE | 0012 | 16 | -99999999 | 99999999 | 0 |
| 17 | FIELDBUS PROPERTIES | IN2 DECIMAL POINT | 0013 | 17 | 0 | 7 | 0 |
| 18 | FIELDBUS PROPERTIES | IN2 SCALE UNIT | 0014 | 18 | 0 | 29 | 0 |
| 19 | FIELDBUS PROPERTIES | FB VALUE IN 0 | 0015 | 19 | 0 | 0 | 0 |
| 20 | FIELDBUS PROPERTIES | FB VALUE IN 1 | 0016 | 20 | 1 | 1 | 1 |
| 21 | FIELDBUS PROPERTIES | FB VALUE IN 2 | 0017 | 21 | 2 | 2 | 2 |
| 22 | FIELDBUS PROPERTIES | FB VALUE IN 3 | 0018 | 22 | 27 | 27 | 27 |
| 23 | FIELDBUS PROPERTIES | FB VALUE OUT 0 | 0019 | 23 | 0 | 0 | 0 |
| 24 | FIELDBUS PROPERTIES | FB VALUE OUT 1 | 001A | 24 | 1 | 1 | 1 |
| 25 | FIELDBUS PROPERTIES | FB VALUE OUT 2 | 001B | 25 | 2 | 2 | 2 |
| 26 | FIELDBUS PROPERTIES | FB VALUE OUT 3 | 001C | 26 | 3 | 3 | 3 |
| 27 | FIELDBUS PROPERTIES | – | 001D | 27 | 0 | 0 | 0 |
| 28 | FIELDBUS PROPERTIES | – | 001E | 28 | 0 | 0 | 0 |
| 22 | LINKAGE PROPERTIES | FACTOR | 0020 | 29 | -99999999 | 99999999 | 1 |
| 23 | LINKAGE PROPERTIES | DIVIDER | 0021 | 30 | 1 | 99999999 | 1 |
| 24 | LINKAGE PROPERTIES | ADDITIVE VALUE | 0022 | 31 | -99999999 | 99999999 | 0 |
| 25 | LINKAGE PROPERTIES | DECIMAL POINT | 0023 | 32 | 0 | 7 | 0 |
| 26 | LINKAGE PROPERTIES | SCALE UNIT | 0024 | 33 | 0 | 29 | 0 |
| 29 | LINKAGE PROPERTIES | – | 0025 | 34 | 0 | 0 | 0 |
| 30 | LINKAGE PROPERTIES | – | 0026 | 35 | 0 | 0 | 0 |
| 31 | PRESELECTION VALUES | PRESELECTION 1 | 0028 | B1 | -99999999 | 99999999 | 1000 |
| 32 | PRESELECTION VALUES | PRESELECTION 2 | 0029 | B2 | -99999999 | 99999999 | 2000 |
| 33 | PRESELECTION VALUES | PRESELECTION 3 | 002A | B3 | -99999999 | 99999999 | 3000 |
| 34 | PRESELECTION VALUES | PRESELECTION 4 | 002B | B4 | -99999999 | 99999999 | 4000 |

Continuation "**Parameter / Indices / Serial Codes**":

| # | Menu | Name | Index (hex) | Serial Code | Min | Max | Default |
|---|------|------|-------------|-------------|-----|-----|---------|
| 35 | PRESELECTION 1 MENU | SOURCE 1 | 002D | B5 | 0 | 2 | 0 |
| 36 | PRESELECTION 1 MENU | MODE 1 | 002E | B6 | 0 | 7 | 0 |
| 37 | PRESELECTION 1 MENU | HYSTERESIS 1 | 002F | B7 | 0 | 99999 | 0 |
| 38 | PRESELECTION 1 MENU | PULSE TIME 1 (S) | 0030 | B8 | 0 | 60000 | 0 |
| 39 | PRESELECTION 1 MENU | OUTPUT TARGET 1 | 0031 | B9 | 0 | 6 | 1 |
| 40 | PRESELECTION 1 MENU | OUTPUT POLARITY 1 | 0032 | C0 | 0 | 1 | 0 |
| 41 | PRESELECTION 1 MENU | OUTPUT LOCK 1 | 0033 | C1 | 0 | 1 | 0 |
| 42 | PRESELECTION 1 MENU | EVENT COLOR 1 | 0034 | C2 | 0 | 3 | 0 |
| 43 | PRESELECTION 1 MENU | – | 0035 | C3 | 0 | 0 | 0 |
| 44 | PRESELECTION 1 MENU | – | 0036 | C4 | 0 | 0 | 0 |
| 45 | PRESELECTION 2 MENU | SOURCE 2 | 0038 | C5 | 0 | 2 | 0 |
| 46 | PRESELECTION 2 MENU | MODE 2 | 0039 | C6 | 0 | 7 | 0 |
| 47 | PRESELECTION 2 MENU | HYSTERESIS 2 | 003A | C7 | 0 | 99999 | 0 |
| 48 | PRESELECTION 2 MENU | PULSE TIME 2 (S) | 003B | C8 | 0 | 60000 | 0 |
| 49 | PRESELECTION 2 MENU | OUTPUT TARGET 2 | 003C | C9 | 0 | 6 | 2 |
| 50 | PRESELECTION 2 MENU | OUTPUT POLARITY 2 | 003D | D0 | 0 | 1 | 0 |
| 51 | PRESELECTION 2 MENU | OUTPUT LOCK 2 | 003E | D1 | 0 | 1 | 0 |
| 52 | PRESELECTION 2 MENU | EVENT COLOR 2 | 003F | D2 | 0 | 3 | 0 |
| 53 | PRESELECTION 2 MENU | – | 0040 | D3 | 0 | 0 | 0 |
| 54 | PRESELECTION 2 MENU | – | 0041 | D4 | 0 | 0 | 0 |
| 55 | PRESELECTION 3 MENU | SOURCE 3 | 0043 | D5 | 0 | 2 | 0 |
| 56 | PRESELECTION 3 MENU | MODE 3 | 0044 | D6 | 0 | 7 | 0 |
| 57 | PRESELECTION 3 MENU | HYSTERESIS 3 | 0045 | D7 | 0 | 99999 | 0 |
| 58 | PRESELECTION 3 MENU | PULSE TIME 3 (S) | 0046 | D8 | 0 | 60000 | 0 |
| 59 | PRESELECTION 3 MENU | OUTPUT TARGET 3 | 0047 | D9 | 0 | 6 | 3 |
| 60 | PRESELECTION 3 MENU | OUTPUT POLARITY 3 | 0048 | E0 | 0 | 1 | 0 |
| 61 | PRESELECTION 3 MENU | OUTPUT LOCK 3 | 0049 | E1 | 0 | 1 | 0 |
| 62 | PRESELECTION 3 MENU | EVENT COLOR 3 | 004A | E2 | 0 | 3 | 0 |
| 63 | PRESELECTION 3 MENU | – | 004B | E3 | 0 | 0 | 0 |
| 64 | PRESELECTION 3 MENU | – | 004C | E4 | 0 | 0 | 0 |
| 65 | PRESELECTION 4 MENU | SOURCE 4 | 004E | E5 | 0 | 2 | 0 |
| 66 | PRESELECTION 4 MENU | MODE 4 | 004F | E6 | 0 | 7 | 0 |
| 67 | PRESELECTION 4 MENU | HYSTERESIS 4 | 0050 | E7 | 0 | 99999 | 0 |
| 68 | PRESELECTION 4 MENU | PULSE TIME 4 (S) | 0051 | E8 | 0 | 60000 | 0 |
| 69 | PRESELECTION 4 MENU | OUTPUT TARGET 4 | 0052 | E9 | 0 | 6 | 4 |
| 70 | PRESELECTION 4 MENU | OUTPUT POLARITY 4 | 0053 | F0 | 0 | 1 | 0 |
| 71 | PRESELECTION 4 MENU | OUTPUT LOCK 4 | 0054 | F1 | 0 | 1 | 0 |
| 72 | PRESELECTION 4 MENU | EVENT COLOR 4 | 0055 | F2 | 0 | 3 | 0 |
| 73 | PRESELECTION 4 MENU | – | 0056 | F3 | 0 | 0 | 0 |
| 74 | PRESELECTION 4 MENU | – | 0057 | F4 | 0 | 0 | 0 |

Continuation "Parameter / Indices / Serial Codes":

| # | Menu | Name | Index (hex) | Serial Code | Min | Max | Default |
|---|------|------|-------------|-------------|-----|-----|---------|
| 75 | SERIAL MENU | UNIT NUMBER | 0059 | 90 | 11 | 99 | 11 |
| 76 | SERIAL MENU | SERIAL BAUD RATE | 005A | 91 | 0 | 3 | 3 |
| 77 | SERIAL MENU | SERIAL FORMAT | 005B | 92 | 0 | 3 | 2 |
| 78 | SERIAL MENU | SERIAL PROTOCOL | 005C | F5 | 0 | 1 | 0 |
| 79 | SERIAL MENU | SERIAL TIMER (S) | 005D | F6 | 0 | 60000 | 0 |
| 80 | SERIAL MENU | SERIAL VALUE | 005E | F7 | 0 | 9 | 0 |
| 81 | SERIAL MENU | MODBUS | 005F | F8 | 0 | 247 | 0 |
| 82 | SERIAL MENU | – | 0060 | F9 | 0 | 0 | 0 |
| 83 | SERIAL MENU | – | 0061 | G0 | 0 | 0 | 0 |
| 84 | ANALOG MENU | ANALOG SOURCE | 0063 | G1 | 0 | 2 | 0 |
| 85 | ANALOG MENU | ANALOG FORMAT | 0064 | G2 | 0 | 2 | 0 |
| 86 | ANALOG MENU | ANALOG START | 0065 | G3 | -99999999 | 99999999 | 0 |
| 87 | ANALOG MENU | ANALOG END | 0066 | G4 | -99999999 | 99999999 | 10000 |
| 88 | ANALOG MENU | ANALOG GAIN % | 0067 | G5 | 0 | 11000 | 10000 |
| 89 | ANALOG MENU | ANALOG OFFSET % | 0068 | G6 | -9999 | 9999 | 0 |
| 90 | ANALOG MENU | – | 0069 | G7 | 0 | 0 | 0 |
| 91 | COMMAND MENU | INPUT 1 ACTION | 006B | G8 | 0 | 21 | 0 |
| 92 | COMMAND MENU | INPUT 1 CONFIG. | 006C | G9 | 0 | 3 | 2 |
| 93 | COMMAND MENU | INPUT 2 ACTION | 006D | H0 | 0 | 21 | 0 |
| 94 | COMMAND MENU | INPUT 2 CONFIG. | 006E | H1 | 0 | 3 | 2 |
| 95 | COMMAND MENU | INPUT 3 ACTION | 006F | H2 | 0 | 21 | 0 |
| 96 | COMMAND MENU | INPUT 3 CONFIG. | 0070 | H3 | 0 | 3 | 2 |
| 97 | COMMAND MENU | - | 0071 | H4 | 0 | 0 | 0 |
| 98 | COMMAND MENU | - | 0072 | H5 | 0 | 0 | 0 |
| 99 | COMMAND MENU | - | 0073 | H6 | 0 | 0 | 0 |
| 100 | COMMAND MENU | - | 0074 | H7 | 0 | 0 | 0 |
| 101 | DISPLAY MENU | START DISPLAY | 0076 | H8 | 0 | 6 | 0 |
| 102 | DISPLAY MENU | SOURCE SINGLE | 0077 | H9 | 0 | 2 | 0 |
| 103 | DISPLAY MENU | SOURCE DUAL TOP | 0078 | I0 | 0 | 2 | 0 |
| 104 | DISPLAY MENU | SOURCE DUAL DOWN | 0079 | I1 | 0 | 2 | 1 |
| 105 | DISPLAY MENU | LARGE DISPLAY | 007A | I2 | 0 | 5 | 0 |
| 106 | DISPLAY MENU | COLOR | 007B | I3 | 0 | 2 | 0 |
| 107 | DISPLAY MENU | BRIGHTNESS % | 007C | I4 | 10 | 100 | 90 |
| 108 | DISPLAY MENU | CONTRAST | 007D | I5 | 0 | 2 | 1 |
| 109 | DISPLAY MENU | SCREEN SAVER (S) | 007E | I6 | 0 | 9999 | 0 |
| 110 | DISPLAY MENU | UP-DATE-TIME (S) | 007F | I7 | 5 | 9999 | 100 |
| 111 | DISPLAY MENU | FONT | 0080 | I8 | 0 | 1 | 0 |
| 112 | DISPLAY MENU | QUICKSTART BUTTON | 0081 | I9 | 0 | 1 | 0 |
| 113 | DISPLAY MENU | – | 0082 | J0 | 0 | 0 | 0 |
| 114 | DISPLAY MENU | – | 0083 | J1 | 0 | 0 | 0 |

## 6.2.1. Commands:

| # | Command | Function | Index (hex) | Serial Code |
|---|---------|----------|-------------|-------------|
| 0 | FREEZE DISPLAY | Freeze actual display value | 1000 | 54 |
| 1 | KEY LOCK (TOUCH DISABLE) | Disable touch screen | 1001 | 55 |
| 2 | LOCK RELEASE | Release latching of all outputs/relays | 1002 | 56 |
| 3 | CLEAR MIN MAX | Reset of the min. / max. values | 1003 | 57 |
| 4 | SERIAL PRINT | Sending serial data (see SERIAL VALUE) | 1004 | 58 |
| 5 | TEACH PRESELECTION 1 | Save current display value as PRESELECTION 1 | 1005 | 59 |
| 6 | TEACH PRESELECTION 2 | Save current display value as PRESELECTION 2 | 1006 | 60 |
| 7 | TEACH PRESELECTION 3 | Save current display value as PRESELECTION 3 | 1007 | 61 |
| 8 | TEACH PRESELECTION 4 | Save current display value as PRESELECTION 4 | 1008 | 62 |
| 9 | SCROLL_DISPLAY | Display switching (see chapter 4.2 / Display representation during operation) | 1009 | 63 |
| 10 | CLEAR LOOP TIME | All set switching conditions are enabled | 100A | 64 |
| 11 | Command 11 (not applicable) | N.A. | 100B | 65 |
| 12 | START PRESELCETION | N.A. | 100C | 66 |
| 13 | ACTIVATE DATA | N.A. | 100D | 67 |
| 14 | STORE EEPROM | Save parameter values in EEPROM | 100E | 68 |
| 15 | TESTPROGRAMM | N.A. | 100F | |
| 16 | SET RED COLOUR | Switch display color to red. (Color can be changed by the event-dependent color switching in the PRESELECTION 1... 4) | 1010 | 5: |
| 17 | SET GREEN COLOUR | Switch display color to green. (Color can be changed by the event-dependent color switching in the PRESELECTION 1... 4) | 1011 | 5; |
| 18 | SET YELLOW COLOUR | Switch display color to yellow. (Color can be changed by the event-dependent color switching in the PRESELECTION 1... 4) | 1012 | 5< |
| 19 | INCR. BRIGHTNESS | Display brightness is increased | 1013 | 5= |
| 20 | DECR. BRIGHTNESS | Display brightness is reduced | 1014 | 5> |
| 21 | Command 21 (not applicable) | N.A. | 1015 | 5? |
| | … | | … | |
| 31 | Command 31 (not applicable) | N.A. | 101F | 5I |

## 6.2.2. Status Words:

| Status | Function | Index (hex) | Serial Code |
|--------|----------|-------------|-------------|
| Bus Commands | Commands via PROFINET as a complete status word (each bit represents a command, bit no. of the respective command see column # in table above) | 3002 | }4 |
| Extern Commands | Commands via the control inputs Ctr. In. 1…3 | 3004 | }2 |
| Output Status | State of the control outputs Ctrl.Out 1…4, Rel. 1 and 2 | 3010 | }6 |
| Error Status | Errorr status | 3014 | }: |

## 6.2.3. Variables (Actual values):

| Actual value | Function | Index (hex) | Serial Code |
|---|---|---|---|
| Scaled_Result_FB_Value_1 | Scaled process data value 1 (display value) | 4800 | :0 |
| Scaled_Result_FB_Value_2 | Scaled process data value 2 (display value) | 4801 | :1 |
| Scaled_Result_Linkage | Scaled linked display value | 4802 | :2 |
| Unscaled_FB_Value_1 | Process data value 1 (as received via PROFINET) | 4000 | :3 |
| Unscaled_FB_Value_2 | Process data value 2 (as received via PROFINET) | 4001 | :4 |
| Minimum_Value | Saved minimum display value | — | :8 |
| Maximum_Value | Saved maximum display value | — | :9 |
| Error_Status | Error status | — | ;0 |
| Analog_Out_Voltage | Analog output voltage (only with option AO) | — | ;3 |
| Analog_Out_Current | Analog output current (only with option AO) | — | ;4 |
| Cmd_State_new | State of the digital control inputs Ctrl.In 1…5 | — | <7 |

## 6.3. Dimensions

**front view**

48 mm [1.89"]

96 mm [3.78"]

**riew view**

24 25 26 27 28 29 30 31 32 33

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

ABS UL94-V0

**side view**

**top view**

114 mm [4.49"]

120 mm [4.72"]
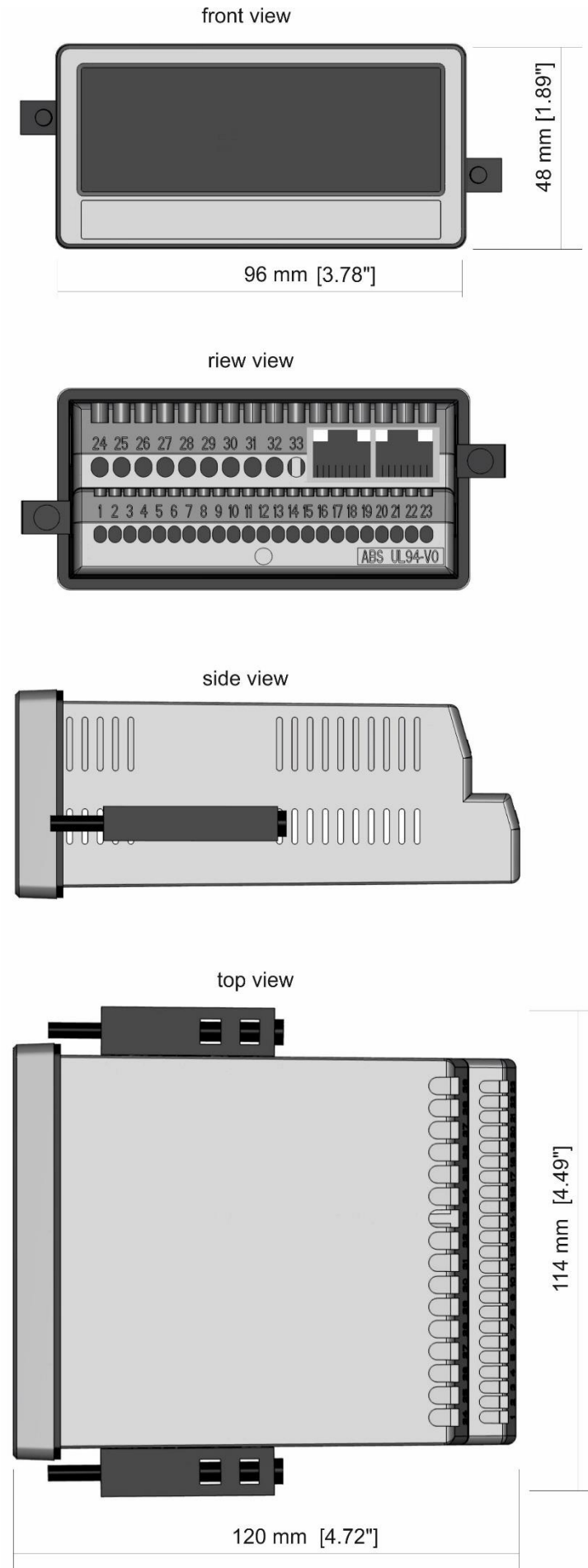
# 6.4. Technical Specifications

| Technical Specification: | | |
|---|---|---|
| Connection: | Connection type: | Screw terminals, 1,5 mm² / AWG 16 |
| Power supply DC: | Input voltage: | 18 … 30 VDC |
| | Protection circuit: | Reverse polarity protection |
| | Consumption: | ca. 100 mA (unloaded) |
| | Fuse protection: | extern: T 0,5 A |
| Power supply AC:<br>(Option AC) | Input voltage: | 115 … 230 VAC ± 10%, 50 … 60 Hz |
| | Power consumption: | ca. 3 VA (unloaded) |
| | Fuse protection: | extern: T 0,1A |
| Auxiliary voltage output: | With DC supply: | 24 VDC (approx.1 V lower than input voltage), max. 250 mA<br>or 5 VDC (± 15%), max. 250 mA |
| | With AC supply: | 24 VDC (± 15%) (max. 150 mA up to 45°C<br>resp. 113°F/ 80 mA from 45°C<br>resp. 113°F) or 5 VDC (± 15%), max. 250 mA |
| PROFINET interface: | Connection: | 2 Ethernet Ports RJ45 with integrated switch and galvanic isolation |
| | Data transfer rate: | 100 Mbit/s full duplex |
| | Communication: | PROFINET IO Device<br>PROFINET RT with cyclic and acyclic data exchange |
| | Conformance-Class: | B |
| | Netload-Class: | III |
| Control inputs: | Number of inputs: | 3 |
| | Format: | HTL, PNP (Low 0 … 3 V, High 9 … 30 V) |
| | Frequency: | max. 1 kHz |
| | Reaction time: | 1 ms |
| | Load: | max. 2 mA at 24VDC |
| Analog output:<br>(Option AO/AR) | Configuration: | Current or voltage operation |
| | Voltage output: | -10…+10 V (max. 2 mA) |
| | Current output: | 0/4 … 20 mA (burden: max. 270 Ohm) |
| | Resolution: | 16 Bit |
| | Accuracy: | ± 0,1 % 0°C … +45°C / ± 0,1 % +32°F … +113°F<br>± 0,15 % -20°C … 0°C and +45°C … +60°C /<br>± 0,15 % -4°F … +32°F and +113°F … +140°F |
| | Reaction time: | approx. 50 ms |
| Control outputs:<br>(Option AO/AR/CO/CR) | Number of outputs: | 4 |
| | Format / level: | 5 … 30 V (depends on the COM+ voltage), PNP |
| | Output current: | max. 200 mA |
| | Reaction time: | approx. 50 ms |
| Relay outputs:<br>(Option RL) | Number of outputs: | 2 |
| | Configuration: | COM, NO, NC (potential free) |
| | AC-Switching capacity: | max. 250 VAC / 3 A / 750 VA |
| | DC-Switching capacity: | max. 150 VDC / 2 A / 50 W |
| | Reaction time: | approx. 50 ms |
| Serial interface:<br>(Option AO/AR/CO/CR) | Format (Option A0/CO): | RS232 |
| | Format (Option AR/CR) | RS485 |
| | Baud rate: | 9600, 19200 or 38400 Baud |
| | Protocol: | Lecom or Modbus RTU |

Continuation **"Technical Specifications"**:

| Display: | Type: | Graphic-LCD with backlight |
|---|---|---|
| | Display range: | 8 digits plus sign (-99999999 … 99999999) |
| | Digit height (single + dual): | 13 mm / 0.51 inch |
| | Digit height (large display | 26 mm / 1,02 inch |
| | Color: | red/ green/ yellow (switchable) |
| | Operation: | touch screen (resistive) |
| Housing: | Material: | ABS, UL 94 V-0 |
| | Mounting: | Panel |
| | Dimensions (w x h x d): | 96 x 48 x 116 mm / 3.78. x 1.89 x 4.56 inch |
| | Cut out (w x h): | 91 x 43 mm / 3.58 x 1.69 inch |
| | Protection class: | IP65 (front), IP20 (rear) |
| | Weight: | approx. 200 g |
| Ambient temperature: | Operating: | -20°C … +60°C resp. -4 … 140°F non condensing |
| | Storage: | -25°C … +70°C resp. -13 … 158°F |
| Ambient conditions: | Altitude: | max. 2000 m (6560 ft) above sea level |
| | Humidity: | max. 80% relative humidity up to 30°C / 86°F |
| | Pollution Degree: | 2 |
| Conformity and standards: | EMC 2014/30/EU: | EN 61326-1: 2013 for industrial location |
| | | EN 55011: 2016 + A1: 2017 + A11: 2020 Class A |
| | LV 2014/35/EU: | EN 61010-1: 2010 + A1:2019 + AC: 2019-04 |
| | (Only for option AC and RL) | EN IEC 61010-2-201: 2018 |
| | RoHS ( II ) 2011/65/EU | |
| | RoHS (III) 2015/863: | EN IEC 63000: 2018 |