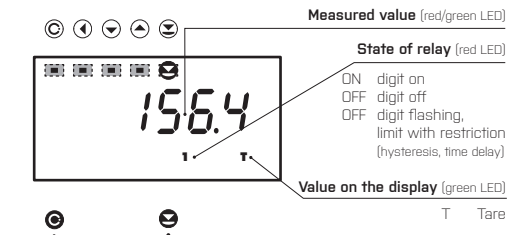
Programming diagram of the LIGHT MENU



Password to access the menu
range: 0...9999

Selection of transmission rate of the data output
Range: 300/600/1200/2400/4800/9600/19200/38400/57600/115200/230400 Baud

Setting instrument address
range: 1...247

Selection of data protocol

Selection of data protocol
SLAVE Instrument projects received data
- entered by commands 0x06 or 0x10

MASTER Instrument solicits data from subordinate system
- instrument controls data tansmission from subordinate system
- "COMMAN" may be used for selection of received data (for commands see data protocol)
- instrument asks 10 questions/s, if no response arrives within 2s the display shows " - - - - "

Selection of registers
- this item is available only for setting of "MASTER" in option "PROT."

COM. 03 Reading setup (holding) registers at address 4xxxx
COM. 04 Reading input (input) registers at address 3xxxx

Setting register address
- this item is available only for setting of "MASTER" in option "PROT."
- defines the address of the register to be read
- allows to enter the range 0...65535, the address usually set is in range 0...9999 (without highest digits)

Selection of the format of input data

Selection of the format of input data
U.INT.16 16-bit unsing integer
- range: 0...65 535

S.INT.16 16-bit sign integer
- range: -32 768...32 768

U.INT.32 32-bit unsing integer
- range: 0...4 294 967 296

S.INT.32 32-bit sign integer
- range: -2 147 483 648...2 147 483 647

FLOAT IEEE format
- range: -2 147 483 648...2 147 483 647

Selection of order of the 32 bit parts
- this item is available only for setting of "U.INT.32", "S.INT.32" or "FLOAT" in option "FORMAT"

LO-HI Lower 16 bit is transmitted first
HI-LO Higher 16 bit is transmitted second

Setting minimum value of input data
- this item is available only for setting of "U.INT.16" or "S.INT.16" in option "FORMAT"
- range: 0...65 535

DEF MIN.LO
Format U.INT.16 = 0
Format S.INT.16 = 32 768

Setting maximum value of input data
- this item is available only for setting of "U.INT.16" or "S.INT.16" in option "FORMAT"
- range: 0...65 535

DEF MAX.LO
Format U.INT.16 = 65 535
Format S.INT.16 = 32 767

Setting minimum value of input data
- this item is available only for setting of "U.INT.32" or "S.INT.32" in option "FORMAT"
- range: -99 999...999 999
- setting the range of input values "Long integer" number in two values (words) "MIN. LO" and "MIN. HI"
- to set maximum divide the values by 65536, split the outcome to two parts and enter to "MIN. LO" and "MIN.HI"

Setting minimum value of input data
- this item is available only for setting of "U.INT.32" or "S.INT.32" in option "FORMAT""
- range: -99 999...999 999
- preset value in HEX format equals 0x800 0000

DEF MIM.LO
Format U.INT.16 = 0
Format S.INT.16 = 0

DEF MIM.Hi
Format U.INT.16 = 0
Format S.INT.16 = 32 768

Setting maximum value of input data
- this item is available only for setting of "U.INT.32" or "S.INT.32" in option "FORMAT"
- range: -99 999...999 999
- setting the range of input values "Long integer" number in two values (words) "MAX. LO" and "MAX. HI"
- to set maximum divide the values by 65536, split the outcome to two parts and enter to "MAX. LO" and "MAX.HI"

Setting maximum value of input data
- this item is available only for setting of "U.INT.32" or "S.INT.32" in option "FORMAT"
- range: 0...65 535
- preset value in HEX format equals 0x800 0000

DEF MAX.LO
Format U.INT.16 = 65 535
Format S.INT.16 = 65 535

DEF MAX.Hi
Format U.INT.16 = 65 535
Format S.INT.16 = 32 767

Setting of float input range - Min.
- input data format is float according to standard IEEE -754, 32 bits
- range: $0.3\times10^{-38} <= |x| <= 1.7\times10^{38}$

Setting of float input range - Max.
- input data format is float according to standard IEEE -754, 32 bits
- range: $0.3\times10^{-38} <= |x| <= 1.7\times10^{38}$

Setting display projection for minimum input value
- range: -99 999...999 999

Setting display projection for maximum input value
- range: -99 999...999 999

Setting of limit 1
range: -99999...999999

Option - Comparator

Selecting the menu type LIGHT/PROFI
LIGHT - simplifield menu (minimal choice of settings)
PROFI - entire menu (for advanced user)

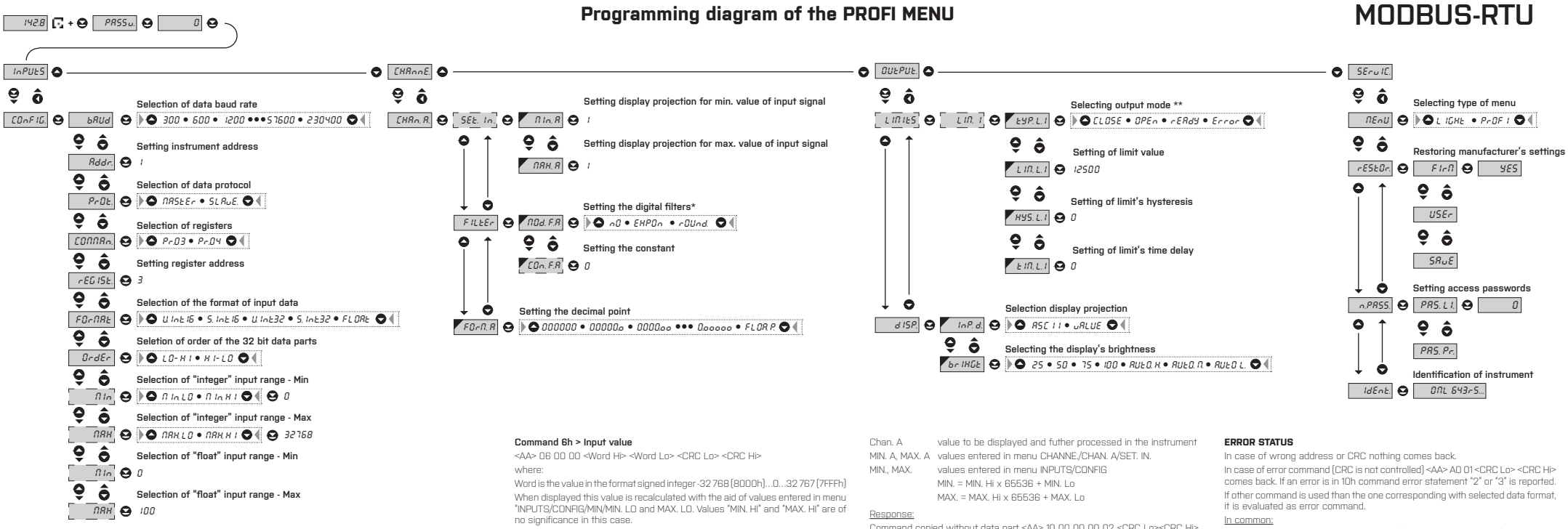
Return to the manufacturer's settings
Restores manufacturer's califrations and default setting of menu items (DEF)

Return to the user's settings
Restores user's setting, which means setting which was saved in the menu item SERVIC./RESTOR./SAVE

Setting a new user password for the LIGHT menu
range: 0...9999
- universal passwords in the event of loss „8177"

Displaying the instrument's SW version
Type of instrument, SW version and currectly selected input (Mode) are projected on the display

Programming diagram of the PROFI MENU



!

Upon delay exceeding 60 s the programming mode is automatically discontinued and the instrument itself restores the measuring mode

***Setting the digital filters**

OFF	filters are off
EXPON.	exponential filter
ROUND	rouding
COn. F.A	setting of the calibration constant

***Selecting output mode**

CLOSE	closing relay (normally open)
OPEN	opening relay (normally closed)
ERROR	error indication
READY	all OK

ERROR STATEMENTS

ERROR	CAUSE	ELIMINATION
E.d._	number is too small (large negative) to be displayed	change DP setting, channel constant
E.d.‾	number is too large to be displayed	change DP setting, channel constant
E. r._	Input quantity is smaller than permitted input quantity range	change input signal value or input (range) setting
E. r.‾	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
E.HW.	a part of the instrument does not work properly	send the instrument for repair
E.EE.	data in EEPROM corrupted	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.SE.	data in EEPROM outside the range	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.CL.	memory was empty (presetting carried out)	upon repeated error statement send instrument for repair, possible failure in calibration
E. in.	disconnected input circuit	check wiring

Command 6h > Input value

<AA> 06 00 00 <Word Hi> <Word Lo> <CRC Lo> <CRC Hi>

where:

Word is the value in the format signed integer -32 768 (8000h)...0...32 767 (7FFFh)

When displayed this value is recalculated with the aid of values entered in menu "INPUTS/CONFIG/MIN/MIN. LO and MAX. LO. Values "MIN. HI" and "MAX. HI" are of no significance in this case.

Response:

<AA> 06 00 00 <Word Hi><Word Lo><CRC Lo><CRC Hi>

Command 10h > Input value

<AA> 10 00 00 00 02 04 <Lo Word Hi> <Lo Word Lo> <Hi Word Hi> <Hi Word Lo> <CRC Lo> <CRC Hi>

where:

<Hi Word><Lo Word> together they create the value LONG INT.

Input values are calculated through the following values:

$$\text{CHAN. A} = \text{MIN. A} + \frac{(\text{MAX. A} - \text{MIN. A})}{(\text{MAX.} - \text{MIN.})} \times (\text{input data} - \text{MIN.})$$

Chan. A	value to be displayed and futher processed in the instrument
MIN. A, MAX. A	values entered in menu CHANNE./CHAN. A/SET. IN.
MIN., MAX.	values entered in menu INPUTS/CONFIG MIN. = MIN. Hi x 65536 + MIN. Lo MAX. = MAX. Hi x 65536 + MAX. Lo

Response:

Command copied without data part <AA> 10 00 00 00 02 <CRC Lo><CRC Hi>.

Command 20h > NON-STANDARD COMMAND for MODBUS

making instrument control accessible through standard commands of the OM ASCII protocol

<AA> 20 <number of symbols in standard message> standard message <CRC Lo> <CRC Hi>

Response:

provided no error occurs in MODBUS frame:

<AA> 20 <number of characters in standard message> standard message <CRC Lo> <CRC Hi> In this format is also the response ?00, reporting error in processing standard OM command.

Address field of standard message will always be 00 - here without any significance.

ERROR STATUS

In case of wrong address or CRC nothing comes back.

In case of error command (CRC is not controlled) <AA> A0 01<CRC Lo> <CRC Hi> comes back. If an error is in 10h command error statement "2" or "3" is reported.

If other command is used than the one corresponding with selected data format, it is evaluated as error command.

In common:

<AA> instrument address - binary 1 - 247 (set in instrument menu)

<CRC Lo> <CRC Hi> is a control word according to definitions in Appendix C of MODBUS protocol description.

TERMINATING COMMUNICATION

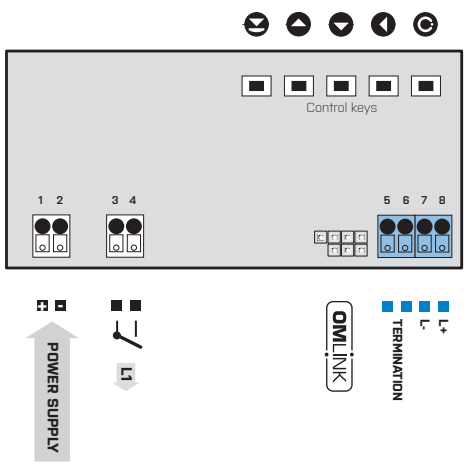
Communication is terminated provided no data arrives during 3 1/2 characters. This period is determined with uncertainty of ±250 µs. MODBUS has standard rates up to 19 200. For higher rate it is necessary to count with this uncertainty e.g. 115 200 Baud -> 500 ±250 µs, 230 400 Baud -> 250 ±250 µs.

FORMAT	ORDER	COMM.	DATA
U. INT. 16	n/a	0x06	<AA> 06 00 00 <Word Hi> <Word Lo> <CRC Lo> <CRC Hi>
S. INT. 16	n/a	0x06	<AA> 06 00 00 <Word Hi> <Word Lo> <CRC Lo> <CRC Hi>
U. INT. 32	LO - HI	0x10	<AA> 10 00 00 00 02 04 <Lo Word Hi> <Lo Word Lo> <Hi Word Hi> <Hi Word Lo> <CRC Lo> <CRC Hi>
S. INT. 32	LO - HI	0x10	<AA> 10 00 00 00 02 04 <Lo Word Hi> <Lo Word Lo> <Hi Word Hi> <Hi Word Lo> <CRC Lo> <CRC Hi>
FLOAT	LO - HI	0x10	<AA> 10 00 00 00 02 04 <Lo Word Hi> <Lo Word Lo> <Hi Word Hi> <Hi Word Lo> <CRC Lo> <CRC Hi>
U. INT. 32	HI - LO	0x10	<AA> 10 00 00 00 02 04 <Hi Word Hi> <Hi Word Lo> <Lo Word Hi> <Lo Word Lo> <CRC Lo> <CRC Hi>
S. INT. 32	HI - LO	0x10	<AA> 10 00 00 00 02 04 <Hi Word Hi> <Hi Word Lo> <Lo Word Hi> <Lo Word Lo> <CRC Lo> <CRC Hi>
FLOAT	HI - LO	0x10	<AA> 10 00 00 00 02 04 <Hi Word Hi> <Hi Word Lo> <Lo Word Hi> <Lo Word Lo> <CRC Lo> <CRC Hi>

LEGENDA

#	Command beginning
<AA>	Instrument address (1...247)
<Word xx>	16-bit data
<Lo Word xx>	32-bit data (lower part)
<Hi Word xx>	32-bit data (higher part)
U.INT.16	unsingned integer 0 (0x0000)...65 535 (0xFFFF)
S.INT.16	singned integer -32 768 (0x8000)...65 535 (0x7FFF)
U.INT.32	unsingned integer 0 (0x0000 0000)...4 294 967 295 (0xFFFF FFFF)
S.INT.32	singned integer -2147483648 (0x8000 0000)...65 535 (0x7FFF FFFF)
FLOAT	IEEE floating point ±6,80564693277058E+38 <Hi Word Hi> = ZEEE EEE; <Hi Word Lo> = EMMM MMMM <Lo Word Hi> = MMMM MMMM; <Lo Worg Lo> = MMMM MMMM Z...sign (1[0]/-1[1]); E...Exponent (-127[0x00]...0[0x7F]...128[0xFF]) M...Mantisa (1.0...2.0), highest mantisa bit is always 1 and it is covered by the lowest exponent bit e.g.: 0x3F80 0000 = Z*2^E*M = 1*2^[0]*1 = 1

CONNECTING AND CONTROLING OF INSTRUMENT



Power supply cord should not be near low voltage input signal leads.

Contactors, large electrical motors and other power elements should not be operated in the vicinity of the instrument.

Input signal leads (measured value) should be separated from all power devices.

Our instruments are extensively tested and they comply with relevant standrads for use in industrial environment, however, adhering to the above mentioned measures is stronlgy advised.

EXTERNAL INPUT

	DESCRIPTION	CONTROLS
TERMINATION	Termination of commuication line RS 485	upon contact, terminal (No. 5 + 6)

TECHNICAL DATA

INPUT

Type	RS 485
Protocol	MODBUS-RTU, Master, Slave
Data format	8 bit + no parity + 1 stop bit
Rate	300...230 400 Baud
RS 485	isolated, two-way communication, addressing (max. 31 instruments)

INSTRUMENT'S ACCURACY

TC	50 ppm/°C
Data back-up	stores the measured value after the device has been switched off (EEPROM)
Digital filtres	exponencialn filter, rounding
External inputs	1, termination of commuication line RS 485
OM Link	Company communication interface for operating, setting and updating of instruments
Watch-dog	reset after 500 ms
Calibration	at 25°C and 40% r.h.

PROJECTION

Display	999999, red or green 7-segment LED, digit height 14 mm
Projection	-99999...999999
Decimal point	setting - in menu
Brightness	0 %, 25 %, 50 %, 75 %, 100 % (selectable in the menu) or automatically at three steps Auto. H, Auto. M and Auto. L

COMPARATOR

Type	digital, menu selectable
Mode	Hysteresis
Limit	-99999...999999
Hysteresis	0...999999
Delay	0...99,9 s
Output	1x relay with a switch on contact (Form A), (250 VAC/30 VDC, 3 A)* 1x open collector, (30 VDC/100 mA)*
Relay	1/8 HP 277 VAC, 1/10 HP 125 V, Pilot Duty D300

* values given are for resistive load

POWER SUPPLY

	10...30 VDC/24 VAC, ±10 %, 3 VA, isolated

MECHANICAL PROPERTIES

Material	Noryl GFN2 SE1, incombustible UL 94 V-I
Dimensions	96 x 48 x 30 mm
Panel cut out	92 x 44 mm

ENVIROMENTAL

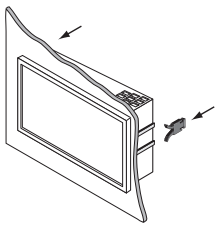
Connection	terminal board, section < 1,5 mm²
Stabilization period	15 minutes after switch on
Working temperature	-20°...60°C
Storage temperature	-20°...85°C
Cover	IP65 (front panel only), rear of the instrument is open!
Construction	security calss I
El. safety	EN 61010-1, A2
Dielectric strength	2,5 kVAC after 1 min between supply and input 4 kVAC after 1 min between supply and relay output
Insulation resistance*	for pollution degree II, measuring cat. III. power supply > 300 V (PI) input, output > 300 V (DI)
EMC	EN 61326-1 (Industrial area)

*PI - Primary insulation, DI - Double insulation

MOUNTING AND DIMENSIONS

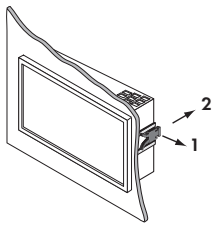
Mounting the instrument

1. insert the instrument into the panel cutout
2. insret the fixating sliders into side groves of the enclosure as shown
3. press the sliders tightly aginst the rear side of the panel



Removal of the instrument

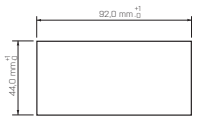
1. pry the rear end of the sliders away from the instrument's enclosure
2. slide the fixating sliders out of side groves of the enclosure as shown
3. remove the instrument from the panel cutout



Front view

Side view

Panel cut



Panel thickness: 0,5...20 mm

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