LCA Software Modification

Here are the modifications on LCA communication.

I-) Continuous communication data format is changed.
II-) Filter Tolerance modified (Coversion Rate changed)
III-) New Modbus Registers added.
IV-) Writing E²PROM in Modbus communication is changed.
V-) Modbus Reset option is selectable in parameter 42.
VI-) "m³" unit added.
VII-) RTU data stream bug (uninterrupted more than 128bytes) fixed.
VIII-) Relay Set Points can work positive, negative or both values.
IX-) Calibration requires at least %1 percent loading.

- **Continuous Communication Data**

The Serial Data Transfer is in Continuous Mode when Modbus ID Nr is set as 0, 254 or 255. Modbus ID Nr 0, 254 and 255 are specific numbers that used for continuous mode selection. Otherwise, Modbus protocol will be in use.

Continuos data can be **LossWeight**, **Display** or **LossWeight & Display** value.

- When "P34:Modbus ID Nr" is set as **000**, **Display** value is transmitted throught the serial port
- When "P34:Modbus ID Nr" is set as **254**, **LossWeight** and **Display** values are transmitted throught the serial port
- When "P34:Modbus ID Nr" is set as **255**, **LossWeight** value is transmitted throught the serial port

The Serial Data format is;

P34:Modbus ID Nr
000

If ID Number is set as 0, then signed (**+**,**-**) measured **Display** value is transfered via the serial port continuously. Transmitting format is Ascii. Data sequence starts with 9 bytes of data and finally "**CR**" (character 13) character is sent.

Example:

1-) Transmitting the measured value as " -0.444kg" is transmitted like as:
' '(32), ' '(32), ' '(32), '**-**'(45), '**0**'(48), '**.**'(46), '**4**'(52), '**4**'(52), '**4**'(52), chr(13)

2-) Transmitting the measured value as " 0.476kg" is transmitted like as:
' '(32), ' '(32), ' '(32), ' '(32), '**0**'(48), '**.**'(46), '**4**'(52), '**7**'(55), '**6**'(54), chr(13)

P34:Modbus ID Nr

255

If ID Number is set as 255, then signed (**+**,**-**) **LossWeight** value is transfered via the serial port continuously. Data format is same as stated above

P34:Modbus ID Nr
254

If ID Number is set as 254, then signed **LossWeight** and **Display** values are transfered via the serial port continuously. Transmitting data length is 8 bytes and finally "**CR**" (character 13) character is sent. Data format will be as below;

LossWeight_High (*), LossWeight_Low (*), Display_High (*)Display_Low, CR (Display and LossWeight values are 32bits long).
*Word value
Example:

1-) When Display is " -0.476kg" and LossWeight data is " 0.212kg", the transfer data will be as:

-476 = 0xFFFFFE24 (hexadecimal) --> 0xFFFF(high), 0xFE24 (Low)
212 = 0x000000D4 (hexadecimal) --> 0x0000(high), 0x00D4 (Low)

0xFF(255), 0xFF(255), 0xFE(254), 0x24(36), 0x00(0), 0x00(0), 0x00(0), 0xD4(212), 0x0D (13)

2-) When Display is " -12.105kg" and LossWeight data is " 0.000kg", the transfer data will be as:

12105 = 0x00002F49 (hexadecimal) --> 0x0000(high), 0x2F49 (Low)
0 = 0x00000000 (hexadecimal) --> 0x0000(high), 0x0000 (Low)

0x00(0), 0x00(0), 0x2F(47), 0x49(73), 0x00(0), 0x00(0), 0x00(0), 0x00(0), 0x0D (13)

Note: Data transfer will stop when Local Adjusment by using the Function button is in operation. In normal measurement screen, LCA device will keep on to transfer data even there is no '**S**' symbol on the screen.

- **Filter Tolerance modified** **(12.06.2007)**

  - ✓ "P31:Convers.Rate" parameter is added. This parameter sets the speed of the each Analog to Digital Conversion. The selectable rates are 6Hz, 12Hz, 25Hz and 50Hz. Please decrease the speed to slow down the system.

    Note: The address of the parameter on the non-volatile memory area is 95.

    0→6 Hz
    1→12Hz
    2→25Hz

3→50Hz

- ✓ "P17:Filter Size" parameter is modified. Number of ADC samples that to be used for average calculation. The selectable ranges are;

  0→4 measurements
  1→8 measurements
  2→16 measurements
  3→32 measurements
  4→64 measurements

  When this parameter set as 4 then last 64 measurements are used for average calculation. Please increase this parameter up to 64 (selected on the parameters screen as 4) for vibrated and slow systems.

- ✓ "P18:Filt.Toleranc" parameter is modified. When this parameter set as 0 (zero), maximum tolerance is used. Set this parameter to zero for hard, continuous-motion systems.

- **Writing E²PROM in Modbus communication is changed**

  - ✓ Writing to E²PROM area via Modbus also updates the related RAM data.

  - ✓ Security unlock process is removed. (Command=1, RegA=1357h, RegB=2192h)

Normally, writing to E²PROM changes the E²PROM data only. There are two ways to update the RAM values from E²PROM;

1-) There must be a power down and up to get new values be updated.
2-) Command 10 (0x0A: Update parameters from E²PROM) must be executed via Modbus.

Now, writing E²PROM updates RAM data also (ver 1.7).

Normally, security unlock process must be applied before the write E²PROM command. Now, this feature is removed. Writing to E²PROM can be done without unlocking the security gateway. (Calibration security key is working on. The calibration key is must be applied before writing to the calibration key protected areas)

Example:

To change the decimal point data that located at the address 44 (0x2C) in E²PROM area, (Assume that the value is to be changed from 0 to 4)

"**:<u>02</u>10<u>0000</u>0003<u>06</u>0002<u>002C</u>0004<u>B3</u>**" + '**\r**' (chr(13)) + '**\n**' (chr(10))

- Modbus ID
- Function Code
- Command
- Quantity of Registers
- Number of Bytes
- Command
- Register A
- Register B
- Check Sum

- **New Modbus Registers**

  - ✓ CRC16 value is added.

The CRC16 is calculating from the registers 5 to 13. [Total 9 Registers] and located at the Register 4. CRC16-CCITT standard is used to calculate the CRC16. The registers are stated below:

Register 4: CRC16
Register 5: Status_A
Register 6: Status_B
Register 7: Status_C
Register 8-9: Display value
Register 10-11: Tare value
Register 12-13: Gross value

Example:

Calculation of the CRC16 value from the values below;

Register 5: Status_A	=0x0100
Register 6: Status_B	=0x8101
Register 7: Status_C	=0x0441
Register 8: Display value High	=0x0000
Register 9: Display value Low	=0x0055
Register 10: Tare value High	=0x0000
Register 11: Tare value Low	=0x0000
Register 12: Gross value High	=0x0000
Register 13: Gross value Low	=0x0055

Each data that to be added to the CRC16 calculation arranged as;
00 01 01 81 41 04 00 00 55 00 00 00 00 00 00 00 55 00
And the result is **0xA4B2**

  - ✓ Relay Set Points moved to Modbus Registers area.

There is a modification on Relay Set points location. The registers moved to the Register 32, 33, 34, 35.

Register 32: SetPoint1 Value High
Register 33: SetPoint1 Value Low
Register 34: SetPoint2 Value High
Register 35: SetPoint2 Value Low

So, the registers can be read and written via modbus without setting e²prom. But in this case, the values are volatile. Datas will lose when power down and up state occurred. Initially, the values are read from the E²PROM area when power-up state occurred. Also changing an E²PROM value makes values updated from E²PROM area.

  - ✓ Changing in Display Value per Second value is added.

The value is calculated like as;
Display/Second = Display Old (1 second before) - Display Value (New Value)
Here are the registers;

Register 36: Changing in Disp per Second High
Register 37: Changing in Disp per Second Low

- ✓ User RAM areas added.

New Modbus registers added for user applications. The Registers 38 to 41 are free registers to be used from the user. So, user can use these areas as external RAM. (Volatile memory. Initially starts as zero when power up state occurred.)

Register 38: User Area 1 [R/W]
Register 39: User Area 2 [R/W]
Register 40: User Area 3 [R/W]
Register 41: User Area 4 [R/W]

- **Modbus Reset option is selectable**

When the communication parameters are forgetten, there is no possibilities to communicate with the LCA-X devices again. So, you have to remember the communication parameters on LCA stored or you have to use LCA-D version to change the parameters using keys.

Standart LCA (v1.3) devices has a special function that can reset the communication parameters to the known values (RTU,1200,8b,n,1s) when you apply reverse voltage to the communication lines. For RS485, apply reverse voltage (5V between A/B lines), for RS232 apply positive signal to RS_Rx/A terminal (can be applied by using a 1K resistor between Power+ and RS_Rx/A terminals) at least 3 seconds.

But using Modbus Reset function, sometimes it can be an another problem. For example, if you are using a 'PLC Operator Panel', the 'PLC Operator Panel' can drive the communication lines to the reverse voltage level when it is in start-up situation. To prevent this condition, Modbus Reset option can be disabled by using "P42:Modbus Reset"

- **"m³" Unit Indication**

"P07:Unit Set" parameter option changed. When this parameter set as 9->m³ then the unit on the measurement menu shown as "m³"

- **RTU data stream bug (uninterrupted more than 128bytes) fixed**

Normally, Modbus RTU data requests should include data breaks 2 to 32ms. The LCA device has 128 bytes of internal buffer for serial communication. Uninterrupted data stream (more than internal buffer) makes LCA communication unstable. In this condition all measuring operations of the device are normal. This bug is fixed in v1.7g.

- **Relay Set Points can work positive, negative or both values**

i) P43:SP1 Sign parameter added. According to this parameter Set Point 1 can work for negative or positive or both positive and negative values. Parameter is located in E²prom location 97.

ii) P44:SP2 Sign parameter added. Same as Set Point1. Parameter is located in E^2prom location 98.
iii) "Status_a" Modbus register bits updated.
Bits 0-1 SP1 Sign bits. 0:Positive, 1:Negative, 2:Both
Bits 2-3 SP2 Sign bits. 0:Positive, 1:Negative, 2:Both
The firmware version 1.7h covers all the features above.

- **Calibration requires at least %1 percent loading.**

When calibrating with a load, the load must be more than %1 percent of the full range. The required percentage is equals to 5000 internal counts and can be seen on the LCD while calibration load is loaded.