

# SINEAX A20

Panel Mounting Indicator with OLED data Display.

### 1. GENERAL SPECIFICATIONS

The A20 module is a panel mounting indicator with OLED datadisplay. The module has two RS485 serial ports, both supporting MODBUS-RTU protocol: -Master MODBUS-RTU Port: through it the data exchange with the connected slave I/O modules is performed. -Slave MODBUS-RTU Port: through it the data acquired from the slave I/O modules and their elaborations are exchanged with a master device. Through this port it is besides possible the indicator software configuration.

**New Possibility** by a self-reading to visualize and read the data written from an modbus-rtu master module connected to the Modbus-rtu slave port(when A20 is in modbus-rtu MASTER modality)

Besides the module has the following features:

- Complete parameters configurable both by the programming Menu and via software through the Slave RS485.
- Easy navigation on the programming Menu by three buttons on the frontal panel.
- Possibility to read and at choice to display up to 20 quantities.
- New Autoscroll** for visualized values
- Possibility to define and display up to 10 elaborated quantities, obtained by the application of mathematical or logical functions on the acquired/elaborated quantities.
- Optional calculation of the moving average for the acquired analog quantities.
- Optional scaling of the acquired/elaborated analog quantities.
- Possibility to force the continuous or trigger writing of 10 quantities relative to the connected slave modules.
- Possibility to define, for each elaborated quantity, an alarm with two individually activable thresholds.
- Alarm signaling by warning message or by trigger writing.
- The quantities acquired through the Master MODBUS-RTU port and their elaborations are made available to a master device through the Slave MODBUS RTU port.

- Selectable menu language: Italian, English, French.
- Settable display contrast.
- Number of quantities to view on the same display screen: 1, 2 or 3 measurements.
- Settable number of decimal figures: automatic, 1, 2 or 3.

### 2. TECHNICAL SPECIFICATIONS

Power Supply:	10..40 Vdc, 19..28 Vac
Consumption:	Max: 1 W, mean: 0,5 W
Master RS485 Specifications:	
Type:	Half-duplex RS485.
Capacity:	32 Standard nodes.
Protocol:	Master MODBUS-RTU.
Protection:	Max 12 Vdc, Max 350 V (8 X 20 us)

CAMILLE BAUER SINEAX A20 ENGLISH - 1/21

Slave RS485 Specifications	
Type:	Half-duplex RS485.
Capacity:	32 Standard nodes.
Protocol:	Slave MODBUS-RTU.
Protection:	Max 12 Vdc, Max 350 V (8 X 20 us)

### 2.3 General Technical Features

Environmental Conditions:	Temperature: -10..60°C. Humidity min: 30%, max 90% at 40°C non-condensing
Storage Temperature:	-20..85 °C.
Isolation:	1500 V among each pair of ports.
Connections:	-Removable screw terminals, 5,08 mm pitch. -Three buttons for menu navigation.

Protection Degree: IP65 (on the frontal panel with the provided seal).

Dimensions (L x H x W): 96x 48 x 40 mm.

Standards: EN61000-6-4/2002-10 (electromagnetic emission, industrial environment).

EN61000-6-2/2005-10 (electromagnetic immunity, industrial environment).

EN61010-1/2001 (safety).

All circuits must be isolated from the other circuits under dangerous voltage with double isolation. The power supply transformer must comply with EN60742: "Isolated transformers and safety transformers".

### 3. FUNCTIONING DESCRIPTION

The A20 module is a front-panel display and it is configurable in ModBUS RTU "master" or "slave" modality. The A20 module can display and process the data acquired from the modbus-rtu slave modules in MASTER modality. In the same modality it can make a self-reading (at address #248 of the internal register from 41000 at 41099) for the written data by Modbus-rtu master module connected to the A20 slave port.

The data exchange with the measurement modules is performed through the Master RS485 port, according to MODBUS-RTU Master protocol; so the acquired data may be viewed by the OLED display.

In Master modality the A20 can read the written data from an master module connected to the A20 slave port.

The three buttons on the frontal panel allow to scroll the acquired data list and to accede to the programming menu.

### 3.1 Setting Modalities

All the module parameters may be set both by the programming menu and through the Slave RS485 port by the apposite configuration tool.

### 3.2 Data Acquisition through the Master MODBUS-RTU Port

The table containing the admitted characters is on Appendix A.

### 4.1.4 Exit from menu

The exit from the programming menu is performed by selecting Exit from the Main Menu or from the Setup Menu. If the buttons are not used for approximately 40 sec, the instrument automatically exits from the menu and returns to view mode.

### 4.2 Menu Description

The programming menu is structured into four basic submenus:

- 1) Readings Menu
- 2) Functions Menu
- 3) Writings Menu
- 4) Setup Menu

The submenus structure is described on the schemes on pages 19, 20 and 21. This section instead illustrates all the parameters which may be set for each submenu.

### 4.2.1 READINGS MENU

It allows to define the data to read from the I/O modules connected through the Master RS485 port and the data came from an modbus master module through the RS485 slave port.

This menu allows to:

- 1) Insert a new reading.
- 2) Delete a previously defined reading.
- 3) Modify a previously defined reading.
- 4) Decide if the read data will be viewed or not and in the first case to select the data position on the display list.

Readings Setting Modalities

For each defined reading, it is possible to set the following parameters:

Description

Identification name for the reading.

Slave Address

The A20 in master modality uses the addresses from #1 to #247 for communicate with slaves module; it is also possible to execute the auto-reading function at the address #248 for the modbus registers written previously from a master module connected to the A20 RS485 slave port.

Modbus address of the data to read on the correspondent slave I/O module.

The register for the self-reading are from 41000 to 41099 at address #248.

Use the following addressing modality depending on the utilized Modbus function and on the data type to read:

ADDRESSES	DATA TYPE	FUNCTION
1..10000	Boolean	01
10001..20000	Boolean	02
30001..40000	Float/Long Int/Short Int	04
40001..50000	Float/Long Int/Short Int	03

For example if we want to read an holding register with address 40002 then the Register Address has to be set at 40002.

The Functions Menu is illustrated on the schemes on pages 19 and 20.

### 4.2.2 FUNCTIONS MENU

It allows to define some Functions, obtained by the elaboration of one or more read or/and elaborated quantities.

This menu allows to:

- 1) Insert a new function.
- 2) Delete a previously defined function.
- 3) Modify a previously defined function and quickly modify only the alarm thresholds.
- 4) Decide if the elaborated data will be viewed or not and in the first case to select the data position on the display list.

Functions Setting Modalities

For each function the following settings are possible:

Description

Identification Name for the function.

Operation

Operation to execute. The selectable operations and the supported data types are listed on the below table:

Operation Code	Operation	Operands Number	Operands and Resulting Quantity Format
0	Identity	1	Integer (Long/Word) and Float
1	Sum of 2	2	Integer (Long/Word) and Float
2	Sum of 3	3	Integer (Long/Word) and Float
3	Subtraction	2	Integer (Long/Word) and Float
4	Multiplication	2	Integer (Long/Word) and Float
5	Division	2	Integer (Long/Word) and Float
6	Square	1	Integer (Long/Word) and Float
7	Cube	1	Integer (Long/Word) and Float
8	Square Root	1	Integer (Long/Word) and Float
9	Math. Average of 2	2	Integer (Long/Word) and Float
10	Math. Average of 3	3	Integer (Long/Word) and Float
11	Logical AND of 2	2	Boolean
12	Logical AND of 3	3	Boolean
13	Logical OR of 2	2	Boolean
14	Logical OR of 3	3	Boolean
15	Bit extraction 0..15 from register	1	Integer (Word)

Scale Factor (only for Float, Long and Short format s)

It represents with the Scale Factor one of the two parameters defining the data scaling. The Scale Factor value may be both long and float. The resulting scaled quantity depends on the Scale Factor according to the following formula:

Scaled Quantity = Scale Factor \* Elaborated not scaled quantity + Data Offset

Boolean Logic (only for Boolean format)

Interpretation logic of boolean Data:

-Positive: the displayed logic value is the operation result.

-Negative: the displayed logic value is the negation of the operation result.

Display Data

By selecting Yes the data will be displayed. Also the position on the display list may be chosen.

Contrast

It sets the display contrast. Values from 1 to 15.

Language

It allows to select the module language: Italian, English, French.

Data View

It allows to choose how many data (rows) to display on the same screen: 3 rows, 2 rows, 1 row.

Write

It sets the data type to write. The following formats may be selected:

- Float: 32-bit floating point format
- Long Integer: 32-bit integer format
- Short Integer: 16-bit integer format

Boolean

It sets the data type to read. The following formats may be selected:

- Float: 32-bit floating point format
- Long Integer: 32-bit integer format
- Short Integer: 16-bit integer format
- Boolean: boolean format

Reading Order (only for Float or Long Integer formats)

Order of the two words which constitute Float or Long Integer data. The following items may be selected:

- MSW first: The most significant word is read before, then the least significant one.
- LSW first: The least significant word is read before, then the most significant one.

Data Display Format (Decimal Figures) only for Float or Long/Short Integer formats

Number of decimal figures to view after the decimal point:

- Automatic: Maximum Displayable Number of decimal figures.
- Max 1 Figure: 1 decimal figure after the decimal point.
- Max 2 Figure: 2 decimal figures after the decimal point.
- Max 3 Figure: 3 decimal figures after the decimal point.

Measure Units (only for Float, Long and Short formats s)

It allows to insert a measure unit, settable letter by letter

Data Offset (only for Float, Long and Short formats s)

It represents with the Data Offset one of the two parameters defining the data scaling. The Data Offset value may be both long and float. The resulting scaled quantity depends on the Data Offset according to the following formula:

Scaled Quantity = Scale Factor \* Elaborated not scaled quantity + Data Offset

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Write

It sets the data type to write. The following formats may be selected:

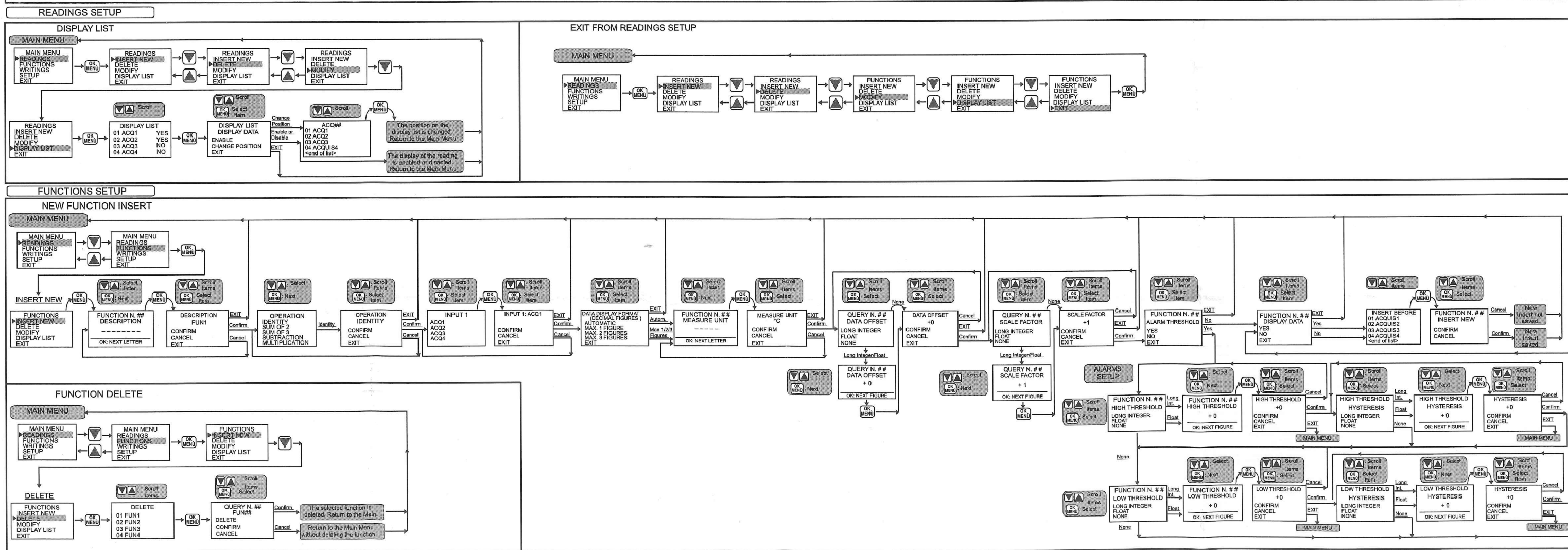
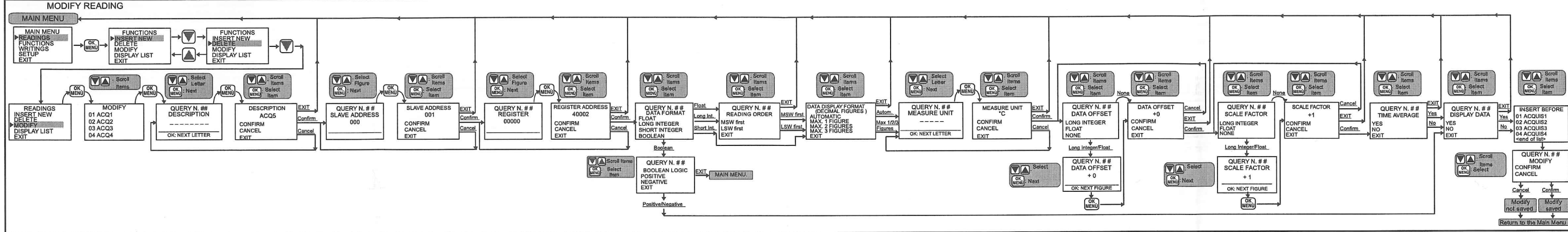
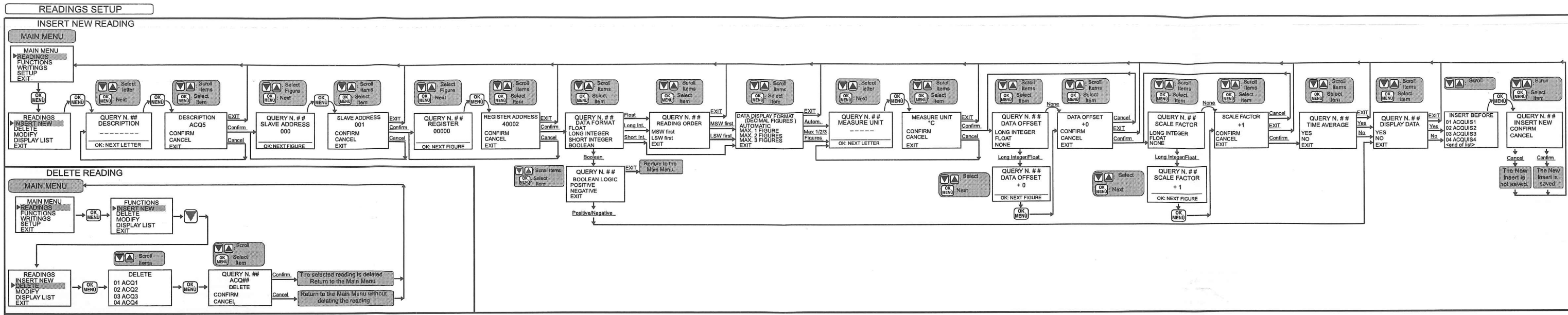
- Float: 32-bit floating point format
- Long Integer: 32-bit integer format
- Short Integer: 16-bit integer format

Boolean

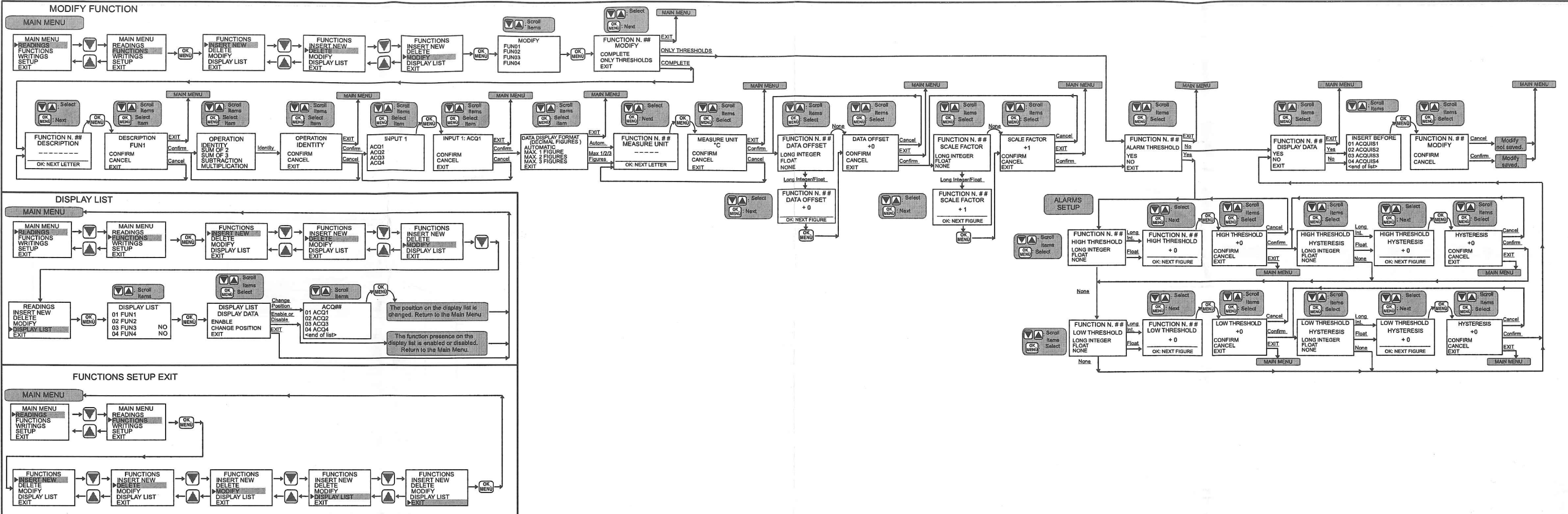
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Reading Order (



**FUNCTIONS SETUP**



**WRITINGS SETUP**

