FLXA21 Quick Start-up Manual

This Tech Note is designed to assist with the installation of the FLXA21. This document should be used in conjunction with the User's Manual of the FLXA21.

1. Wiring and Installation

Open the cover and remove the plastic inserts covering the modules. They will be reinstalled after the wiring is completed.

1.1. Installation site

The FLXA21 is weatherproof and can be installed both inside and outside. It should, however, be installed as close as possible to the sensor to avoid long cable runs between the instrument and sensor. When a pH sensor is used, the cable length including the sensor cable should not exceed 20 meters (65.6 feet); 60 meters (197 feet) when using BA10 extension box and WF10 cable. For a conductivity sensor the cable run should not exceed 60 meters (197 feet). For dissolved oxygen the sensor cable run should not exceed 30 meters (100 feet).

Select an installation site that meets the following conditions.

- Mechanical vibrations and shocks are negligible
- No relay switch and power switch are installed close to the converter
- There is space for cable connection beneath the cable glands
- Not exposed to direct sunlight or severe weather conditions
- Maintenance is possible
- No corrosive atmosphere

Select an installation site where the ambient temperature and humidity are within the limits of the instrument specifications (see chapter 2). If the instrument is installed outside and exposed to direct sunlight, a sun shade hood should be used.

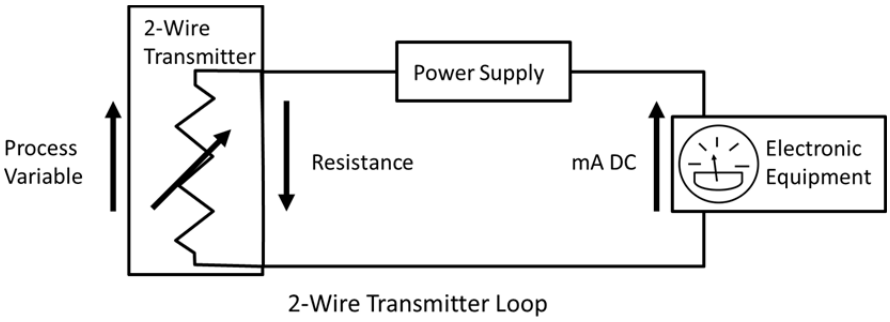
The Flexa can be mounted on a wall, pipe or panel when the /PM option is ordered ***this is how we will keep the unit in stock***. For dimensional information please refer to section 3.5 Mounting Methods in the instruction manual.

1.2. Wiring the power supply

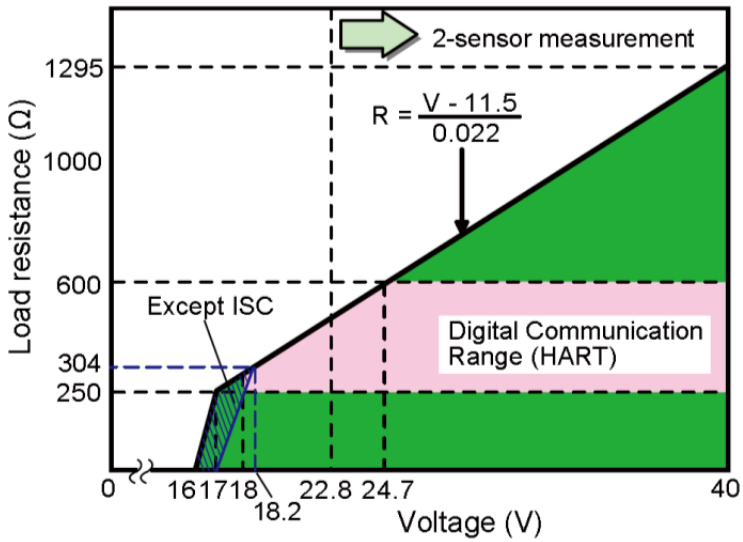
FLXA21 is a 2-wire transmitter and can be powered by a DC power supply of max. 40 VDC. The Power Supply voltage depends on:

- The load resistance: impedance of electronic equipment: typically 250 Ohm
- Number of input modules: 1-sensor measurement or 2-sensor measurement.

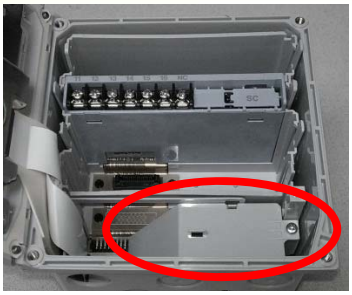
One (1) Sensor module (1 input):
16 to 40 V DC (for pH/ORP, SC and DO)
17 to 40 V DC (for ISC)
Two (2) Sensor modules (2 inputs):
22.8 to 40 V DC (for pH/ORP, SC and DO)



2-Wire Transmitter Loop



The power supply is connected to the terminals marked with + and – which corresponds with the polarity of the DC power supply. The shield/ ground is connected to the terminal marked ⏚, then replace ground wiring cover.

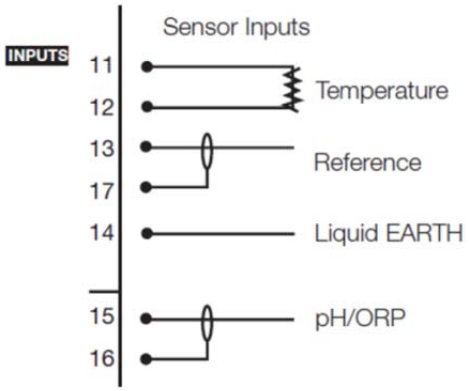


1.3. Wiring the sensor

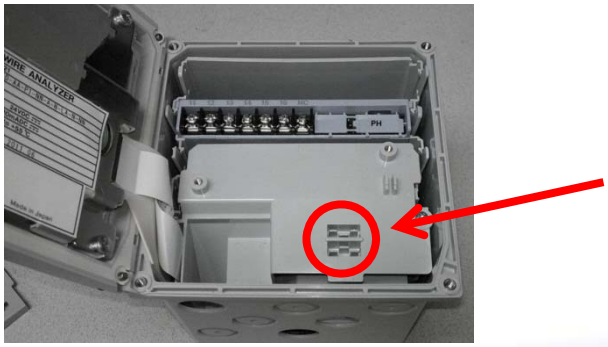
The FLXA21 can be used with a wide range of commercially available sensor types, both from Yokogawa and other manufacturers. For more detailed information, refer to the respective instruction manual of the sensor. The sensor systems from Yokogawa fall into two categories; the ones that use a fixed cable and the ones with separate cables. To connect sensors with fixed cables, simply match the terminal numbers in the instrument with the identification numbers on the cable ends. The separate sensors and cables are not numbered, but instead use a color-coding system.

1.3.1. pH Measurement

Conventional pH sensors are connected to the module as follows:

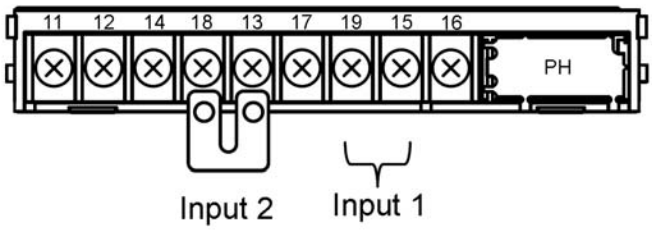


In addition to the wiring of the sensor, insure that a jumper for **low-impedance sensor inputs** is installed. The jumpers can be found on the plastic sensor module cover and can be stored in the lower level module wiring cover.



- pH Glass Electrode is a **high impedance sensor input**
- Standard reference electrodes and an ORP/REDOX electrode are **low impedance sensor inputs**
- Special electrodes using 2 glass sensor (example: **Pfaudler, SC24V**) do not need jumpers.

Terminals 15-16 are identified as **input 1** (High Impedance) and terminals 13-17 are defined as **input 2** (Low Impedance). For conventional pH sensors, the jumper is placed as illustrated:

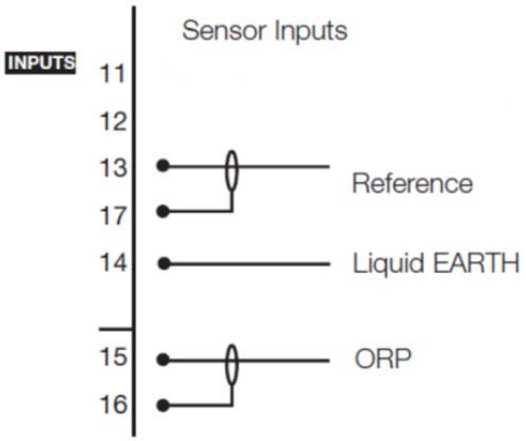


Glass sensor on Input 1.
Reference sensor on Input 2.

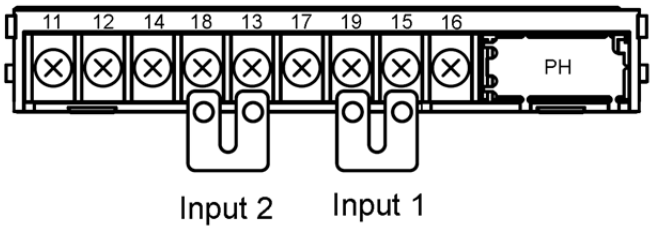
1.3.2. ORP Measurement

The ORP measurement uses the same sensor input module as the pH measurement. It is not uncommon to measure ORP as process variable and a pH Glass electrode as reference. This is the case with **rH** measurement and with pH compensated ORP measurement.

Conventional ORP sensors are connected to the module as follows:

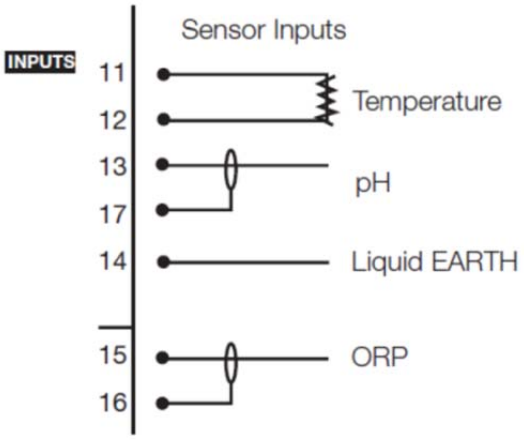


For conventional ORP sensors, the jumpers are placed as illustrated:

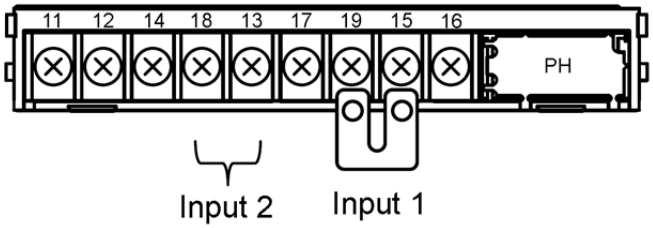


Metal sensor on Input 1.
Reference sensor on Input 2.

pH Compensated ORP sensors are connected to the module as follows:



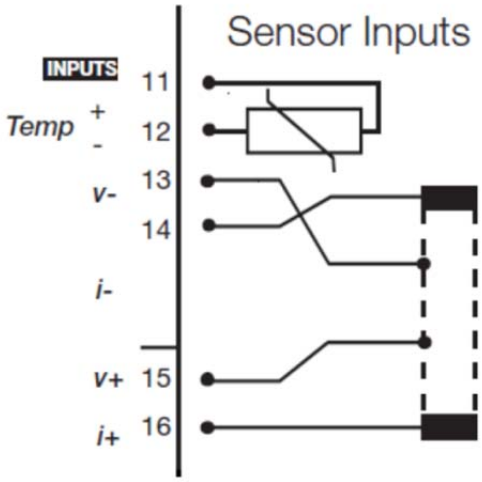
For pH Compensated ORP sensors, the jumper is placed as illustrated:



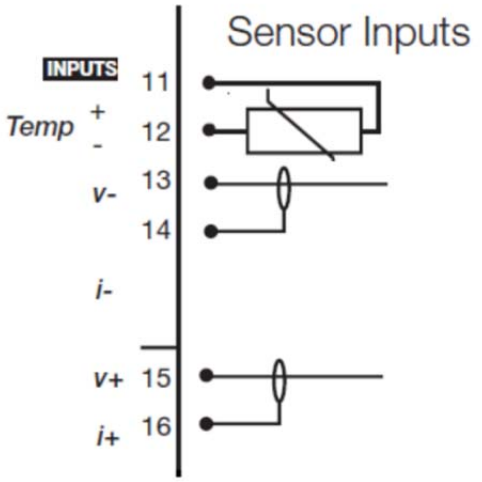
Metal sensor on Input 1.
pH glass (as reference) on Input 2.

1.3.3. SC Measurement

Contacting Conductivity, SC, sensors are connected to the module as follows:

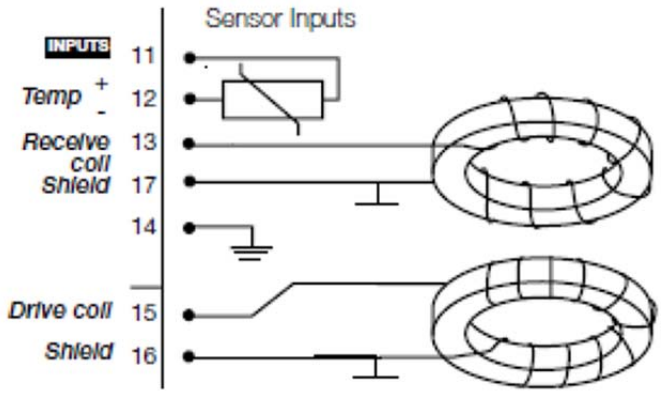


The above diagram shows wiring for 4-electrode conductivity sensors, such as SC42-SP34 large bore series. For 2-electrode conductivity sensors, such as SC42-Sp36 small bore series, jumpers must be installed between terminals 13-14 and between terminals 15-16, as shown in the diagram below.



1.3.4. ISC Measurement

ISC40 sensors are connected to the module as follows:



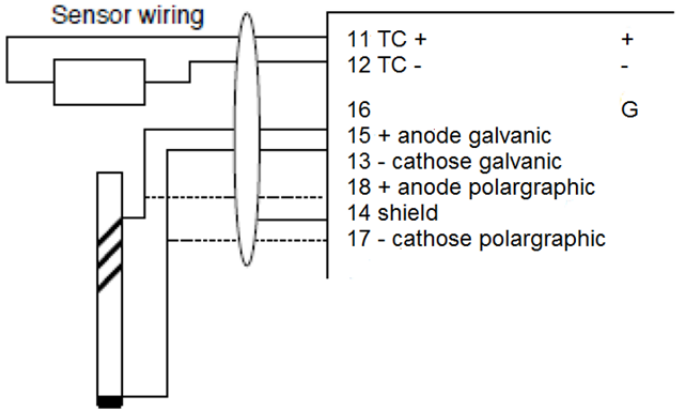
The sensors are supplied with integral cables and each individual wire is marked with the corresponding terminal numbers.

1.3.5. DO Measurement

The input module for DO measurement is suitable for different types of DO sensors:

i. Galvanic sensors like model DO30G
ii. Polarographic sensors like HAMILTON'S Oxyferm and Oxygold

The connection is as follows:



The DO30G sensor comes with integral cable and the wires are labeled with the corresponding terminal numbers.

1.3.6. Wiring of YOKOGAWA sensors

Sensor	Measurement	Board Terminals							Input 2	Input 1	Jumper	Remark
		11	12	13	14	15	16	17	18/13	19/15		
DO30G	DO	11	12	13	14	15	16					Fixed Cable
FU20/PH20 /FU24	pH, pH& ORP, rH	11	12	13	14	15	16	17	Yes	No		Fixed Cable
FU20/PH20 /FU24	ORP	11	12	13		14			Yes	Yes	13/14	Fixed Cable
FU20/PH20 /FU24	pH Comp. ORP	11	12	15		14		16	No	Yes	13/14	Fixed Cable
FU20-VP/ FU24-VP	pH, pH& ORP, rH	E	F	B	D	A			Yes	No		VP6-SC
FU20-VP/ FU24-VP	ORP	E	F	B		D			Yes	Yes	13/14	VP6-SC
FU20-VP/ FU24-VP	pH Comp. ORP	E	F	A		D			No	Yes	13/14	VP6-SC
ISC40	ISC	11	12	13	14	15	16					Fixed Cable
PR20/PR10	pH	11	12	13	14	15	16		Yes	No		Fixed Cable
SC21	pH			Blue	Liquid Earth	Red		(White)	No	No		WU20 Triax
SC24V	pH	E	F	C	H	A	B	D				VP8-DC
SC25V	pH	E	F	B	D	A			Yes	No		VP6-SC
SC29-PTG	pH Comp. ORP			Red	Liquid Earth	Blue		(White)				WU20 Triax
SC29-PTP	ORP			Blue	Liquid Earth	Red		(White)	Yes	Yes		WU20 Triax
SC42	SC	11	12	13	14	15	16					WU40 cable
SC4A	SC	11	12	13	14	15	16					Fixed Cable
SM21/SR20 /SM60	pH	Green: Red	Green: Blue	Yellow: Red	Black	Red: Red	Red: Blue	Yellow: Blue	Yes	No		WU20 Color Coded Coax
SM29/SR20	ORP			Yellow: Red	Black	Red: Red	Red: Blue	Yellow: Blue	Yes	Yes		WU20 Color Coded Coax
SX42	SC	Brown	Brown	Yellow Green		Red					13/14 and 15/16	Sensor Wiring

1.3.7. Wiring of HAMILTON sensors

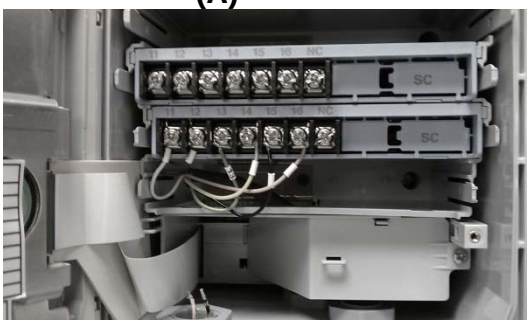
Sensor	Measurement	11	12	13	14	15	16	17	18	18/13	19/15	jumper	remark
CHEMOTRODE	pH			blue		red		(white)		yes		13/14	WU20D cable
CHEMOTRODE-ORP	ORP									yes	yes	13/14	
CHEMOTRODE-VP	pH	E	F	B		A				yes		13/14	VP6-SC
CLARITRODE	pH			blue		red		(white)		yes		13/14	WU20D cable
CLARITRODE-VP	pH	E	F	B		A				yes			VP6-SC
CONDUCELL -4	SC	E	F	C	D	A	B						
EASYFERM	pH			blue		red		(white)		yes		13/14	WU20D cable
EASYFERM-VP	pH	E	F	B		A				yes		13/14	VP6-SC
INCHTRODE	pH	E	F	B	D	A				yes			VP6-SC
MECOTRODE	pH			blue		red		(white)		yes		13/14	WU20D cable
MECOTRODE-VP	pH	E	F	B		A				yes			VP6-SC
OXYFERM	DO	E	F										
OXYFERM-VP	DO	E	F		D			A	B				
OXYGOLD	DO	E	F		D			A	B				
pHeasy	pH	E	F	B	D	A	B			yes			
POLILYTE	pH			blue		red		(white)		yes		13/14	WU20D cable
POLILYTE-VP	pH									yes		13/14	
VISIFERM	DO	E	F		D			A	B				VP8-DC;
													C/D to 24VDC +/-

1.3.8. Color coding of Variopin cables

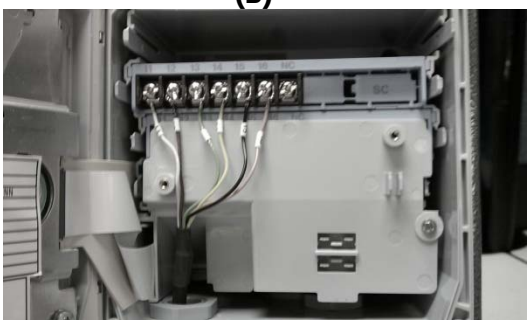
pin		A	B	C	D	E	F	G	H
Hamilton	VP6-SC	black/clear	red	grey	blue	white	green		
Hamilton	VP8-DC	black/clear	black shield	red/ clear	red shield	white	green	yellow	brown
WU10-V-S	VP6-SC	clear	brown	black	yellow	red	blue		
WU10-V-D	VP8-DC	brown core	brown shield	white core	white shield	red	blue	yellow	

NOTE: When two sensor modules are used, the upper-level module is for input 1 and the lower-level module is for input 2. For ease of installation, first wire input 2 sensor on the lower-level module **(A),** and attach the wiring cover; then wire input 1 sensor on the upper-level module **(B)** and replace the module wiring cover **(C)**.

(A)



(B)

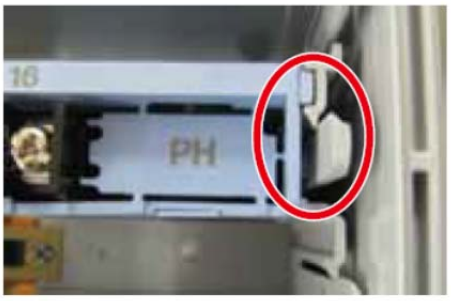


(C)

(D)

When all wiring is completed and all covers have been installed, the front cover can be closed **(D)** and the power can be switched on.

WARNING: When one of the modules has been removed and replaced, make sure you lock the module securely in place. Confirm that all locking-tabs (including for BLANK slots) are in "Locked" position before you close the front panel. If the locking-tabs are in "Unlock" position, the front panel may be interfered with locking-tabs.



Unlock

Lock

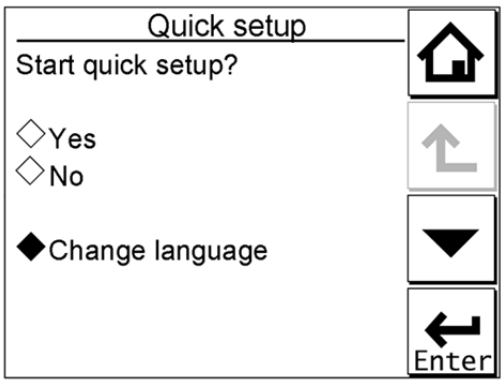
2. Operation

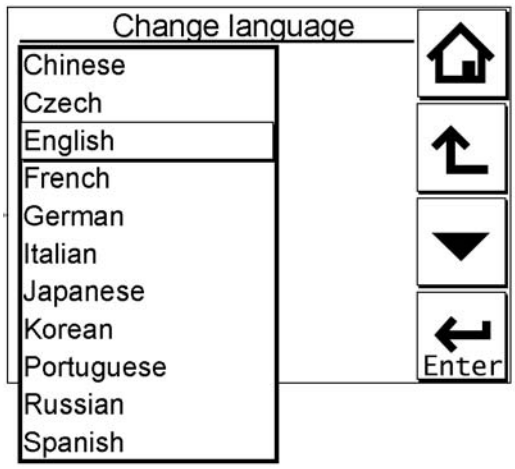
When all wiring is completed, turn on the power to the instrument. Make sure that the LCD screen turns on, and then wait for the Quick Setup menu to be displayed. Follow the on-screen instructions for set-up and calibration. If the instrument is not configured correctly an error indicator may be displayed, or the measurement values displayed may be incorrect. Consult the Instruction Manual supplied on CD with the analyzer, and check the initial settings and change them to suit your purpose.

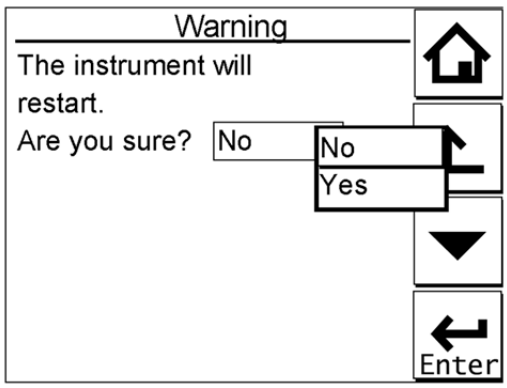
Basic operation of the software is similar the EXAxt 450 series. For more detailed information please refer to the instruction manual.

2.1. Change language

The default language setting for the FLEXA is English. To select a different language other than English, follow the steps below.

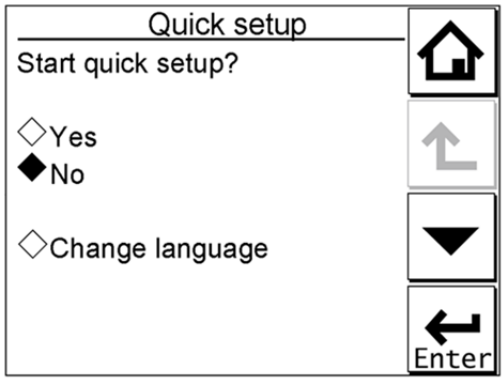


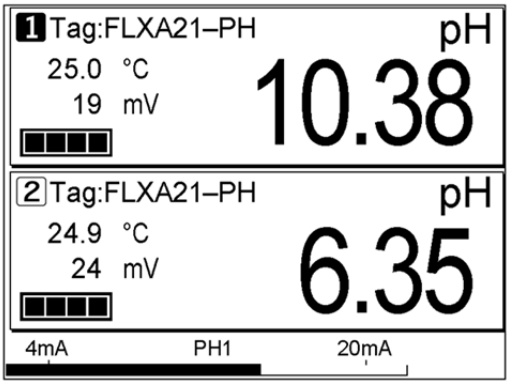




2.2. Quick setup

The Quick setup menu is used to program the basic items necessary to make the transmitter operational, such as the date/time and sensor settings. The detailed settings are described in chapter 5, Commissioning in the instruction manual. Each time the FLXA21 is started up, this menu is displayed. If it is not necessary to change the setup you may bypass the Quick setup, by selecting **No** or  . When no operation is performed for 10 minutes, the screen changes to the main display (or home display) automatically.

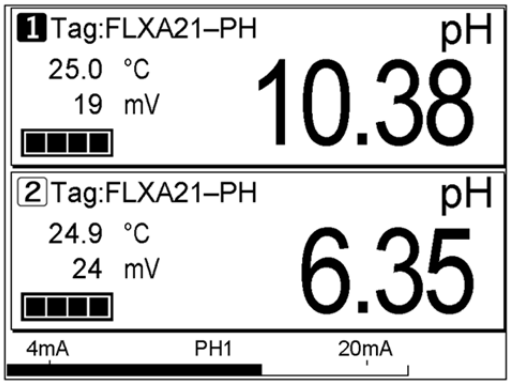




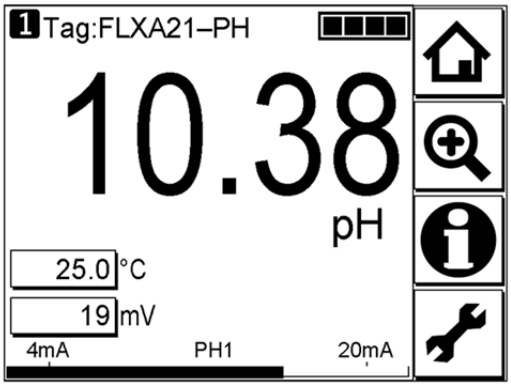
2.3. Basic operation

When 2 sensor modules are installed, the Home display shows both sensor information at one time, while the Main display will show the individual sensor information. If only one sensor module is installed, the  is grayed out and disabled on the Main display. On the Home display, pressing the 1st sensor (top) information or the 2nd sensor (bottom) information causes the Main display of the selected sensor to appear.

Home Display



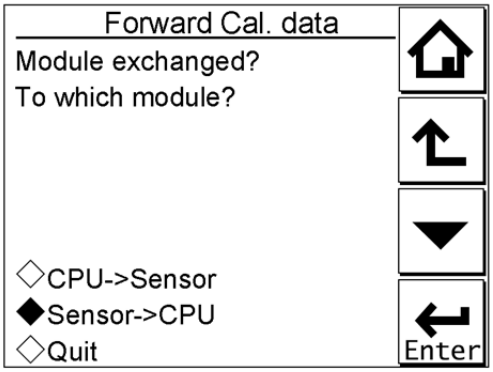
Main Display



3. Commissioning

FLXA21 stores calibration data in the module(s) and in the housing assembly. After replacement of the module(s), the FLXA21 can transfer calibration data from the housing assembly's CPU to the replaced module(s), allowing the new module(s) to be programed with the original sensor module settings. The same is true when the housing assembly has to be replaced. The FLXA21 can transfer calibration data from the module(s) to the new housing assembly's CPU.

After replacement of the module(s) or housing assembly, the unit is powered back on and the display shows the message below.



1.) If the sensor module was replaced **Select [CPU->Sensor],** and then calibration data is sent to the new module.
2.) If the housing was replaced **Select [Sensor->CPU],** and then calibration data is sent to the new housing.
3.) Select [Quit] if transfer of calibration data isn't necessary.

QUICK SET-UP NOTES:

a. pH measurement module
Under "measurement "a selection is made for pH, ORP or pH&ORP. The selected measurement must be in accordance with the sensor wiring. When rH measurement is requested pH&ORP must be chosen on this level. The rH must then be selected in the **commissioning menu**.

b. SC measurement module
Under "measurement" a selection is made between Conductivity, Resistivity, Concentration or Concentration plus Conductivity. On this level only Conductivity or Resistivity can be selected. Settings for Concentration measurement must be done in the **commissioning menu.**

c. DO measurement module
Under “sensor type” a selection is made for Galvanic or Polarographic. The selected sensor type must be in accordance with the sensor wiring. Otherwise the analyzer or sensor can be damaged.

WARNING: When a sensor input module has been changed to another measurement parameter, the FLEXA factory default must be initiated. Otherwise the FLEXA can be damaged. Commissioning>Advanced setup>Settings>Load factory settings>YES.
****See TechNote TNA1201 for more information****