



ONLINE ORP TRANSMITTER & CONTROLLER

Model : ORT 601 - 1

INSTRUCTION MANUAL



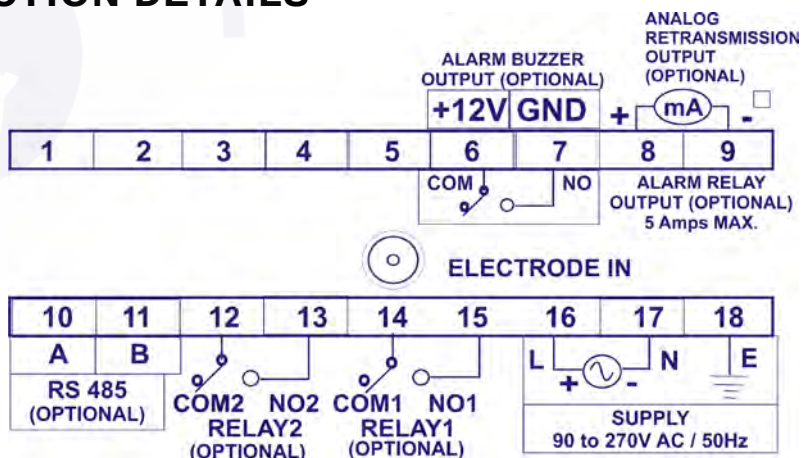
1. SPECIFICATION

Model	ORT 601 - 1
Display	4 + 4 Digit 0.5" & 0.39" 7 Seg RED LED Display
Input Impedance	>1012 Ohms
Range	-1999 to 1999 ORP
Resolution	1 ORP
Electrode Input	Platinum Electrode with BNC Attachment
Accuracy	1 ORP 1 digit
Set Point - 1 & 2	Two Set Point with 6 Relay Status Selectable
Relay Output	Relay - 1 for Setpoint - 1, Relay - 2 for Setpoint - 2 (5A Rating)
Relay Hysteresis	0 to 5 pH (user adjustable)(only for High & Low control modes)
Relay Cyclic delay	0 to 100 seconds(user adjustable)(only for High & Low modes)
Alarm Output(optional)	inbuilt audible buzzer with front key reset
Optional Re.Tx. output	Galvanically Isolated 4 - 20 mA
Optional Com. output	Isolated RS 485
Comm. Protocol	MODBUS RTU
Operating Environment	-10 to 50°C / 10 to 95 % RH Non Condensing
Power Supply	90 to 270V AC / DC 50Hz
Dimension	96 x 96 x 85 mm
Cutout Dimension	92 x 92 mm
Weight	500 grams (Approx.)

Note:

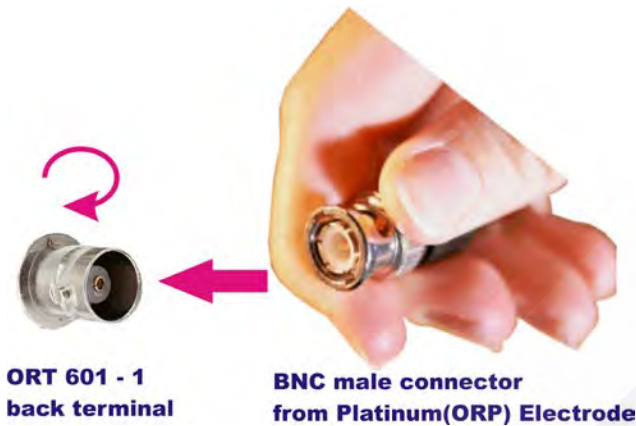
1. Online ORP sensor or electrode is Optional. It depends on application, working temperature, type of fitting and cable length
2. Due to continuous product improvements, Published specifications may change with out notice

2. CONNECTION DETAILS

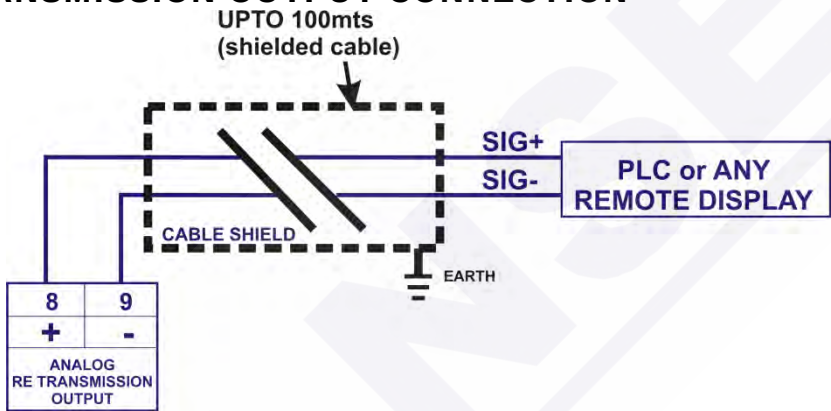


3. WIRING DETAILS

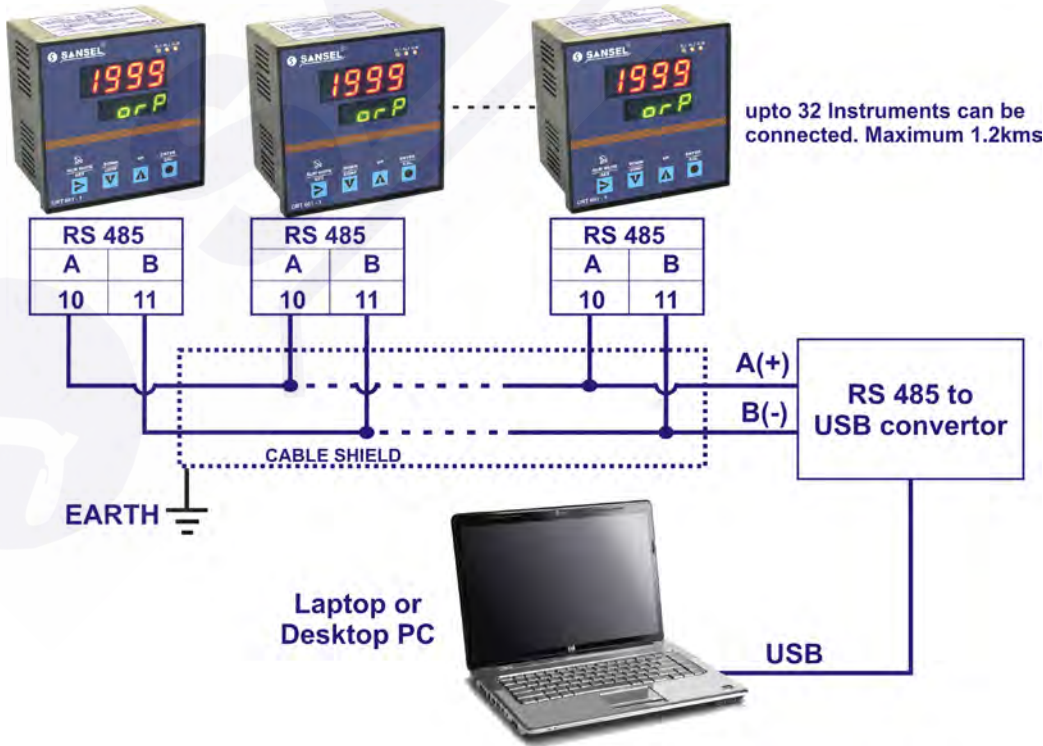
3.1. PLATINUM(ORP) ELECTRODE CONNECTION



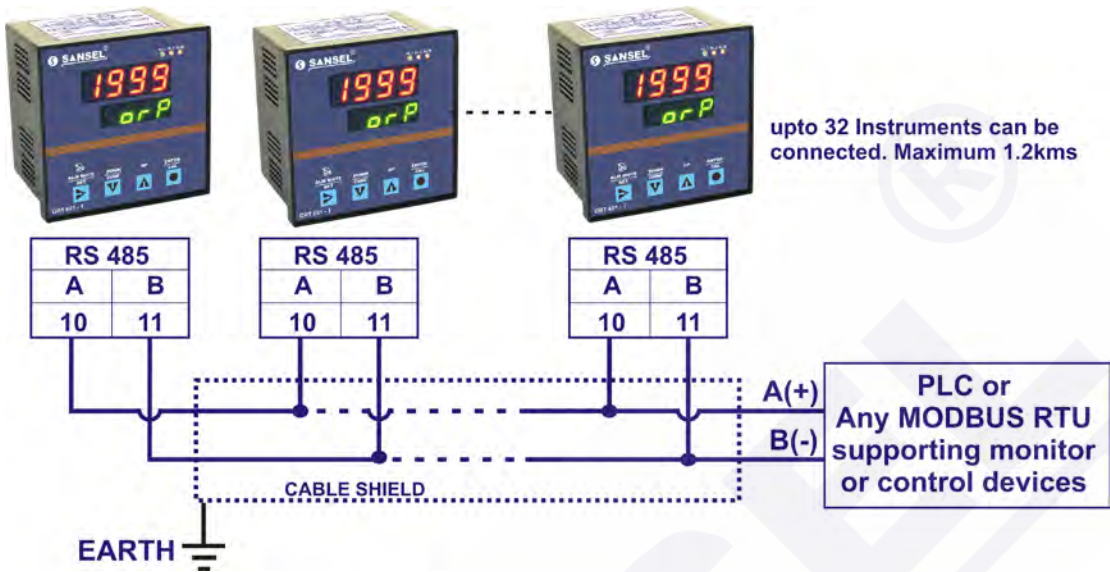
3.2. RE TRANSMISSION OUTPUT CONNECTION



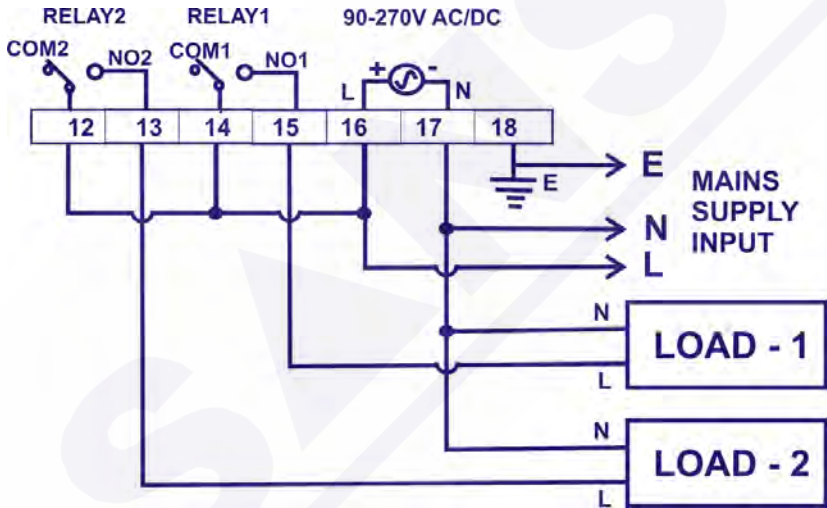
3.3. PC COMMUNICATION THROUGH RS 485



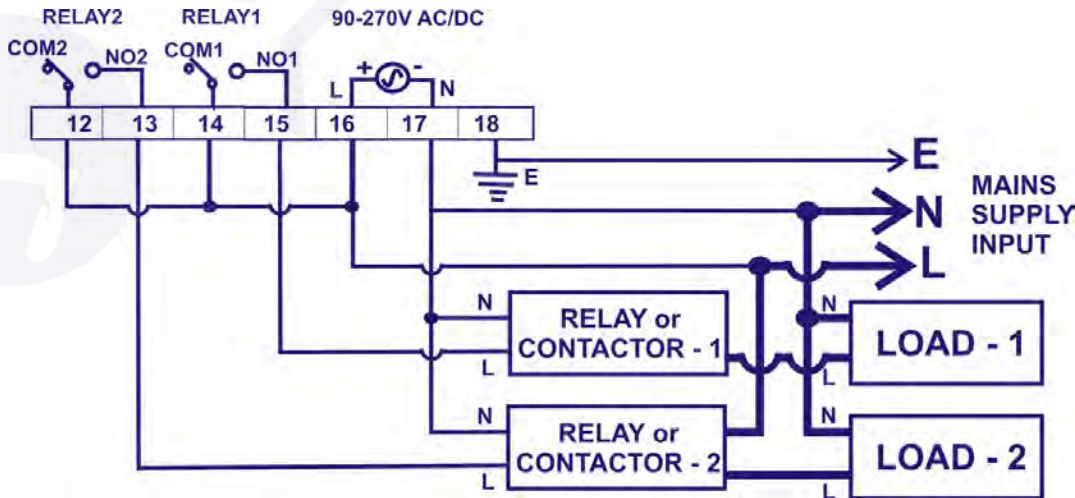
3.4. PLC or OTHER RS 485 MODBUS RTU supporting Device connection



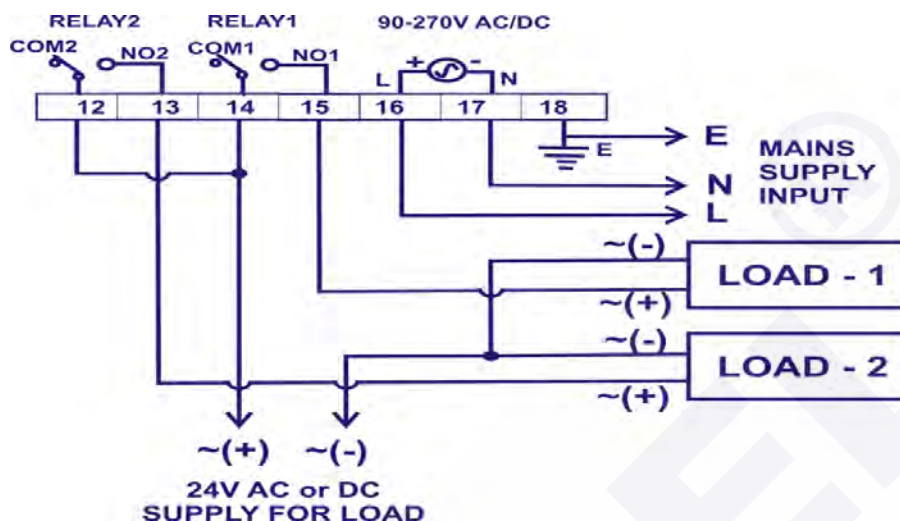
3.5. WIRING OF RELAY OUTPUT TO LOAD (SUPPLY 230V AC / BELOW 1kW LOAD)



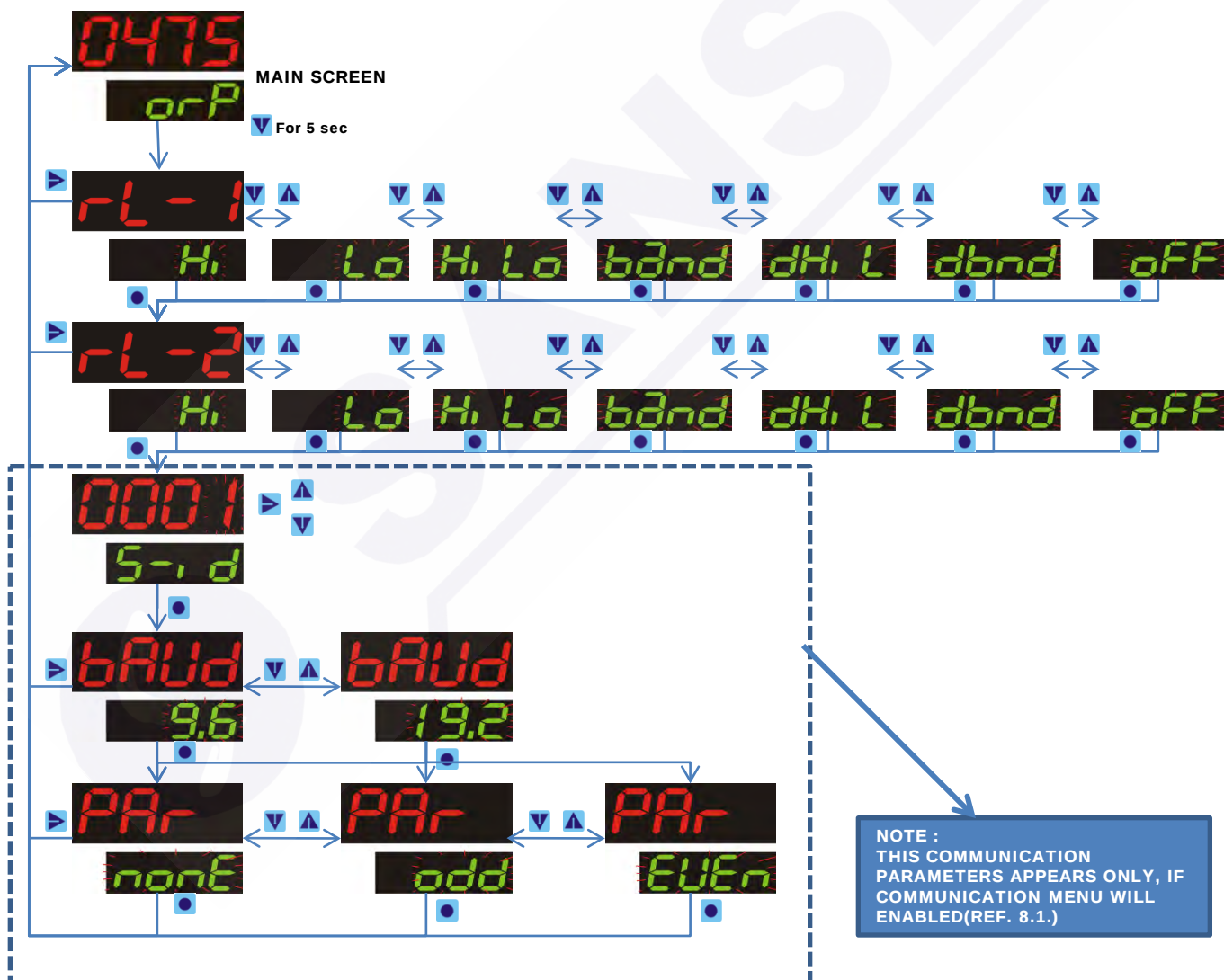
3.6. WIRING OF RELAY OUTPUT TO LOAD (SUPPLY 230V AC / ABOVE 1kW LOAD)



3.7. WIRING OF RELAY OUTPUT TO LOAD (SUPPLY 24V AC / DC)



4. PROGRAMMING AND CONFIGURATION



SYMBOL	NAME	DESCRIPTION
	RELAY – 1 CONTROL MODE	Used to change the Relay – 1 control mode from the choice of “High”, “Low”, “High & Low”, “Band”, “Differential High & low”, “Differential band”, “OFF”
	RELAY – 2 CONTROL MODE	Used to change the Relay – 2 control mode from the choice of “High”, “Low”, “High & Low”, “Band”, “Differential High & low”, “Differential band”, “OFF”
	HIGH	OUTPUT gives, if PV goes below the HIGH SETVALUE
	LOW	OUTPUT gives, if PV goes above the LOW SETVALUE
	HIGH & LOW	OUTPUT gives, if PV goes above the HIGH SETVALUE & below the LOW SETVALUE
	BAND	OUTPUT gives, if PV goes above the LOW SETVALUE & below the HIGH SETVALUE
	DIFFERENTIAL HIGH & LOW	if PV goes above the HIGH SETVALUE the OUTPUT will ON till the PV goes below the LOW SETVALUE, then OUTPUT will OFF till the HIGH SETVALUE Reach.
	DIFFERENTIAL BAND	if PV goes above the LOW SETVALUE the OUTPUT will ON till the PV goes below the HIGH SETVALUE, then OUTPUT will OFF till the LOW SETVALUE reach.
	OFF	OUTPUT OFF
	SLAVE ID	Digital Communication Slave Address(ID)(1 to 32), On a network of Instruments the Address is used to specify or identify a particular instrument.
	BAUD RATE(kbps)	Digital Communication Baud Rate(9.6 & 19.2 kbps)
	PARITY	Digital Communication Parity (NONE, ODD, EVEN)

5. CALIBRATION PROCEDURE FOR ORT 601 – 1

For better accuracy, Calibration of the ORT 601 – 1 is recommended. In addition, the ORT 601 – 1 must be recalibrated whenever:

- The ORP Electrode is replaced.
- After testing long term in high temperature.
- Where high accuracy is required.
- At least once a month.

Before start calibrating the ORT 601 - 1, take the freshly prepared (or) purchased standard solution(range depends on application used) with 100ml quantity in a beaker and start calibration as following simple steps.

NOTE : For Best results, calibrate with certified accurate standard Solutions.

5.1.Span calibration

STEP 1 : Rinse the Electrode with Distilled Water. Immerse the Electrode into the Standard solution and wait for stabilization of Reading, Press CAL Key till the Display Shows

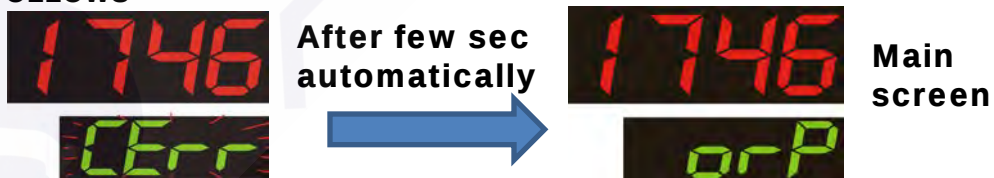


STEP 2 : Then use UP & DOWN keys to roll over the blinking digit(0 – 9) and move by SET key to adjust the Standard value and Press CAL key to Confirm the Calibration value. The display shows



NOTE :

AT CALIBRATION MODE, THE DISPLAY SHOWS “CERR” (CALIBRATION ERROR) AS FOLLOWS



The following table may be useful to find and correcting, if above “CALIBRATION ERROR” will appear.

CAUSES	REMEDY
1. Wrong calibration method	1. Retry with proper settings & procedure given above
2. The solution is more deviation (not within $\pm 50\%$) from the standard value.	2. Check the standard solution value
3. Expired standard solution used	3. Calibrate with newly purchased standard solution
4. ORP Electrode damage	4. Replace new ORP Electrode & calibrate with ORT 601 - 1
5. ORP Electrode fails	5. Replace new ORP Electrode & calibrate with ORT 601 - 1

Note : If still the “CALIBRATION ERROR” exists please follow the “FAULT FINDING GUIDE”(Ref. 9)

6. ANALOG RE TRANSMISSION OUTPUT SETTING

NOTE : It will works only, if the “ ANALOG RE TRANSMISSION OUTPUT” will enable on Hardware on factory.

STEP 1 : To View and Modify the Analog Re Transmission Output LOW & HIGH Limits, Switch OFF the ORT 601 - 1 and ON by Pressing SET key the display shows



STEP 2 : To Modify the “Analog Output LOW” Limits(-1999 to 1999 ORP), use UP & DOWN keys to roll over (0 – 9), move blinking digit by SET key and save and Enter to “Analog Output HIGH” Limits by pressing ENTER key the display shows



STEP 3 : To Modify the “Analog Output HIGH” Limits (-1999 to 1999 ORP), use UP & DOWN keys to roll over (0 – 9), move blinking digit by SET key and save and Exit to main screen by pressing ENTER key as above.

7. ALARM or RELAY SETTINGS

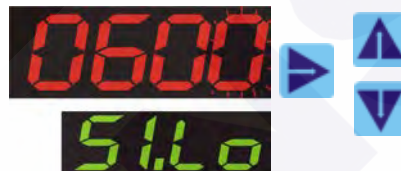
7.1. SETVALUE

This Alarm setvalues used to alert the local operator by glowing audible buzzer attached inbuilt(optional) in ORT 601 – 1 & also used to control any process using relay contact(5A rated). To view & Configure the “ALARM or RELAY SETVALUES” follow the steps below.

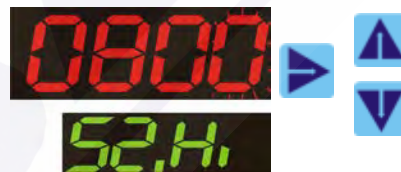
STEP 1 : In Main Screen, Press SET Key till the Display Shows



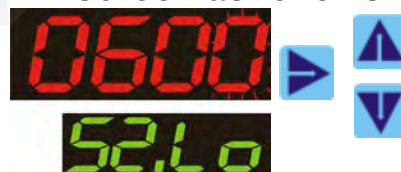
STEP 2 : In “OUT1 HIGH SET” screen, use UP & DOWN keys to scroll the blinking digit(between 0 – 9) & move by SET key and set the desire “OUT1 HIGH SET”. Then press ENTER key to save & enter into to “OUT1 LOW SET” screen as follows.



STEP 3 : In “OUT1 LOW SET” screen, use UP & DOWN keys to scroll the blinking digit(between 0 – 9) & move by SET key and set the desire “OUT1 LOW SET”. Then press ENTER key to save & enter into to “OUT2 HIGH SET” screen as follows.



STEP 4 : In “OUT2 HIGH SET” screen, use UP & DOWN keys to scroll the blinking digit(between 0 – 9) & move using SET key and set the desire “OUT2 HIGH SET”. Then press ENTER key to save & enter into to “OUT2 LOW SET” screen as follows.



STEP 5 : In “OUT2 LOW SET” screen, use UP & DOWN keys to scroll the blinking digit(between 0 – 9) & move using SET key and set the desire “ALARM2 HIGH SET”. Then press ENTER key to save & exit to Main screen as follows.



NOTE :

1. IN ABOVE "ALARM or RELAY SETVALUES" RESPECTED SETVALUES ONLY APPEAR AS PER SELECTED "ALARM MODES"(REF. 4).
2. DURING SETTING THE ABOVE "ALARM or RELAY SETVALUES", IF THE "SERR"(SETVALUE ERROR) WILL APPEAR AS FOLLOWS.



After few sec
automatically



OUT1 high
Setvalue

The above "SETVALUE ERROR" will appear, during setting any setvalue "LOW" value lesser than "HIGH" value of same OUTPUT.

7.2. HYSTERISIS & CYCLIC DELAY

This Alarm CYCLIC DELAY used to glowing audible buzzer or RELAY in ORT 601 – 1 & also used to control any process using relay contact(5A rated). To view & Configure the "ALARM or RELAY CYCLIC DELAY" follow the steps below.

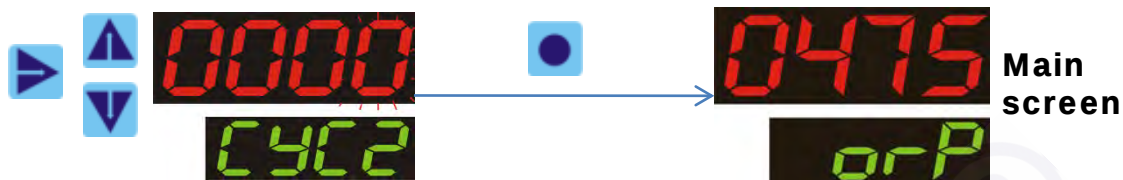
STEP 1 : In Main Screen, Press SET & DOWN Key simultaneously till the Display Shows



STEP 2 : To Modify the "OUTPUT – 1 HYSTERISIS" (0 to 500 ORP), use UP & DOWN keys to roll over (0 – 9), move blinking digit by SET key and save by Enter to "OUTPUT – 1 CYCLIC DELAY" by pressing ENTER key the display shows



STEP 3 : To Modify the "OUTPUT – 1 CYCLIC DELAY" (0 to 100sec), use UP & DOWN keys to roll over (0 – 9), move blinking digit by SET key and save by Enter to "OUTPUT – 2 HYSTERISIS" by pressing ENTER key the display shows as above. To Modify the "OUTPUT – 2 HYSTERISIS" (0 to 500 ORP), use UP & DOWN keys to roll over (0 – 9), move blinking digit by SET key and save by Enter to "OUTPUT – 2 CYCLIC DELAY" by pressing ENTER key the display shows



STEP 4 : To Modify the “OUTPUT – 2 CYCLIC DELAY” (0 to 100sec), use UP & DOWN keys to roll over (0 – 9), move blinking digit by SET key and save and Exit to main screen by pressing ENTER key the display shows as above.

8. DIGITAL COMMUNICATION

NOTE : It will works only, if the “ DIGITAL COMMUNICATION OUTPUT” will enable on Hardware on factory.

8.1. COMMUNICATION SETTING PARAMETER (ENABLE / DISABLE)

This “COMMUNICATION SETTINGS PARAMETER” is used to hide the communication parameter settings like SLAVE ID, BAUD RATE & PARITY from Configuration menu for unauthorized person operation protection.

STEP 1 : To modify the “COMMUNICATION SETTINGS PARAMETER”, Switch OFF the ORT 601 – 1 & ON by pressing UP& DOWN Key simultaneously till the Display Shows



STEP 2 : Use UP & DOWN keys to scroll between ENABLE & DISABLE the communication settings and select the desire mode and press ENTER key to save the mode return back to main screen.

8.2. PARAMETER MODBUS ADDRESSES

This is a complete list of parameters MODBUS Addresses available in the ORT 601 – 1.

Parameter Name	Address(Dec)	Function	Actual read(A)	Factor*	DESCRIPTION
ORP value	40001	Read	-1999 to 1999	=A/1	Actual ORP value reading
OUTPUT - 1 Control mode	40002	Read/Write	0 to 6	=A/1	0 - High,1 - Low,2 - High Low, 3 - Band,4 - Diff. High Low, 5 - Diff. Band,6 - Off
Set value high1	40003	Read/Write	-1999 to 1999	=A/1	-
Set value low1	40004	Read/Write	-1999 to 1999	=A/1	-
Slave ID	40005	Read	1 to 32	=A/1	Communication Address
Baud rate	40006	Read	0 or 1	=A/1	0 - 9600, 1 - 19200
Parity	40007	Read	0 to 2	=A/1	0 - None, 1 - Odd, 2 - Even
OUTPUT - 1 status	40008	Read	0 or 1	=A/1	0 - Relay1 ON,1 - Relay1 OFF
Alarm Status	40009	Read	0 or 1	=A/1	0 - Alarm OFF,1 - Alarm ON
Alarm Condition	40010	Read	0 or 1	=A/1	0 - OFF Condition, 1 - ON Condition
OUTPUT - 2 Control mode	40011	Read/Write	0 to 6	=A/1	0 - High,1 - Low,2 - High Low, 3 - Band,4 - Diff. High Low, 5 - Diff. Band,6 - Off
Set value high2	40012	Read/Write	-1999 to 1999	=A/1	-
Set value low2	40013	Read/Write	-1999 to 1999	=A/1	-
Analog low limit	40014	Read/Write	-1999 to 1999	=A/1	for 4-20mA Retransmission
Analog high limit	40015	Read/Write	-1999 to 1999	=A/1	for 4-20mA Retransmission
Hysteresis relay1	40016	Read/Write	0 to 500	=A/1	Applicable only for High and Low Relay Modes
Cyclic delay relay1	40017	Read/Write	0 to 100	=A/1	-
Hysteresis relay2	40018	Read/Write	0 to 500	=A/1	Applicable only for High and Low Relay Modes
Cyclic delay relay2	40019	Read/Write	0 to 100	=A/1	-
OUTPUT - 2 status	40020	Read	0 or 1	=A/1	0 - Relay2 ON,1 - Relay2 OFF

Note : *Read Final value of any above parameter, after applying the “Actual read” to “Factor” given.

8.3. MODBUS MASTER QUERY AND RESPONSE FEEDBACKS FROM ORT 601 - 1

ORT 601 – 1 supports the RTU Mode in MODBUS communications. This device acts like a slave device in the MODBUS network. The slave address with which the unit is Configurable(Ref. 4) between 1 to 32(decimal). ORT 601 – 1 supports functions 03 of the MODBUS protocol.

8.3.1.COMMUNICATION PARAMETERS:

Baud Rate : 9600(Configurable Ref. 4)
Flow Control : NONE
No of data bits : 8
Parity : NONE(Configurable Ref. 4)
No of Stop Bits : 1(Configurable Ref. 4)

8.3.2. SUPPORTED FUNCTIONS AND SCOPE:

Function 03 – Read Holding registers

8.3.3. QUERY FROM MASTER DEVICE

Field Name	Example (Hex)
Slave Address	01
Function	03
Start Address Hi (Refer 8.3.5)	00
Start Address Lo (Refer 8.3.5)	00
No of Registers to read Hi	00
No of Registers to read Lo	01
Error Check	CRC

The above example is a typical example of supported format for function # 03.

8.3.4. RESPONSE FROM ORT 601 – 1

Field Name	Example (Hex)
Slave Address	01
Function	03
Byte Count	02
Data Hi	xx
Data Lo	xx
Error Check	CRC

8.3.5. MODBUS QUERY LIST IN HEX DECIMAL(hex)

Parameter Name	Function	Start Address Hi	Start Address Lo	No. of Registers to read Hi	No. of Registers to read Lo
ORP value	03	00	00	00	01
OUTPUT - 1 Control mode	03	00	01	00	01
Set value high1	03	00	02	00	01
Set value low1	03	00	03	00	01
Slave ID	03	00	04	00	01
Baud rate	03	00	05	00	01
Parity	03	00	06	00	01
OUTPUT - 1 status	03	00	07	00	01
Alarm Status	03	00	08	00	01
Alarm Condition	03	00	09	00	01
OUTPUT - 2 Control mode	03	00	0A	00	01
Set value high2	03	00	0B	00	01
Set value low2	03	00	0C	00	01
Analog low limit	03	00	0D	00	01
Analog high limit	03	00	0E	00	01
Hysteresis relay1	03	00	0F	00	01
Cyclic delay relay1	03	00	10	00	01
Hysteresis relay2	03	00	11	00	01
Cyclic delay relay2	03	00	12	00	01
OUTPUT - 2 status	03	00	13	00	01

8.3.6. MORE ON UNSUPPORTED FUNCTIONS:

Unsupported functions will not return a response from ORT 601 - 1 . However continuing development will ensure that more Functions will be added to this model in future releases. For specific Functional requirements please contact SANSEL INSTRUMENTS AND CONTROLS.

9. FAULT FINDING GUIDE

The following table may be useful in correcting malfunctions and avoiding simple pitfalls.

CAUSE	REMEDY
Display not glow	Check A.C supply (If it is ok, ORT 601 – 1 need to service at factory.)
Reading fluctuating	Poor earthing (1. If poor, Connect on efficient earth 2. If it is ok, ORT 601 – 1 need to service at factory.)
Relay or Alarm Output not coming	1. Check the “RELAY CONTROL MODE”(Ref. 4) & “RELAY or ALARM SETTINGS”(Ref. 9) 2. Check the represented wiring is correctly connected(Ref. 3) (If it is ok, ORT 601 – 1 need to service at factory.)
Analog Retransmission Output not coming	1. Check the “ANALOG RETRANSMISSION OUTPUT SETTINGS”(Ref. 8) 2. Check the represented wiring is correctly connected(Ref. 3) (If it is ok, ORT 601 – 1 need to service at factory.)
Communication Output not coming	1. Check the “DIGITAL COMMUNICATION OUTPUT SETTINGS”(Ref. 4) 2. Check the represented wiring is correctly connected(Ref. 3) (If it is ok, ORT 601 – 1 need to service at factory.)

10. CONTACT US

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