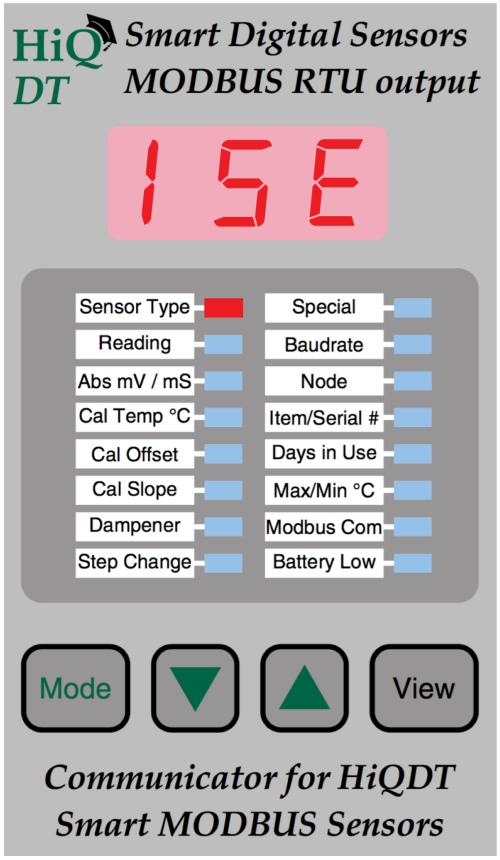
Communicator for HiQDT Smart Digital Ion Selective Sensors

- Lightweight portable 9V battery powered handheld communicator (HHC) calibrates & configures **HiQDT smart digital RS485 MODBUS RTU sensors** at any location. All values stored in non-volatile sensor EEPROM for hot-swap portability when installed back into field service
- The following values are stored in non-volatile EEPROM memory inside the sensor board for complete installation portability & hot-swap use:
  - Offset calibration for temperature
  - Offset calibration for process value (adjusts to grab sample)
  - Slope calibration for process value for sensitivity to changes
  - Time in use since calibration last performed for all cal types
  - Factory set Sensor Serial & Item Number for traceability
  - The max & min °C in service & total time in use (energized)
- Node scanning feature for ease of finding address on connected sensor
- Node changing feature allows for any sensor to be used for any channel
- The calibration values themselves and time since that 'Cal' was last performed are displayed using 'View' key in the various Cal LED modes
- Intelligent software auto-detects sensor type on selected node meaning one HHC can interface all HiQDT smart digital MODBUS sensor types
- **MODBUS RTU** read/write for all information shown on handheld communicator for acquisition of measured process parameter (ISE), temperature, calibrations & analytics for connected HiQDT smart digital sensor for intelligent remote management & troubleshooting
- Quick disconnect cables to 1,000 meters (3,280 feet); NEMA 6P & IP67 rated waterproof HiQ4M & HiQ4F snap connectors for rugged field use
- Input Data Ranges & Max Resolution for Ion Selective Measurements:
  - pION range of -2.000 to +16.000 with 0.001 pION resolution
  - ppm ranges are 0-10, 0-100 or 0-999
  - kilo-ppm ranges are 0-10,000, 0-100,000 or 0-999,000 ppm
  - Temperature range of -40 to +210 °C; 0.1°C resolution
- Perform offset calibration anywhere in range (usually in-situ adjustment)
- Perform slope calibration anywhere in range. The factory slope is typically used unless specifically recommended by factory to be changed
- Automatic Temperature Compensation (ATC) with optimal isopotential and temperature coefficient factory programmed for each ISE sensor



Programming

Handheld communicator (HHC) has 3-digit display & 16 LEDs to show readings & analytic data as well as to calibrate and configure sensor. Programming done by 4 key front panel. 'Mode' key used to toggle and navigate to each LED. 'Up' or 'Down' buttons scroll available options & adjust values. 'Mode' key is used to make selections and save entries. 'View' key provides additional information for the given LED mode (see table for details on use of 'View'). Once baudrate and node of connected sensor are entered all parameters are automatically loaded for zero configuration plug & play use in the field.

TECHNICAL SPECIFICATIONS FOR HiQDT CALIBRATOR & CONFIGURATOR

Mechanical

Housing:	ABS
Mounting:	Handheld
IP Class:	Housing IP40
Connector:	HiQ4M female for HiQ4M sensor male snap
Temp.:	Usage -15 to +50 °C (Storage -35 to +75 °C)
Weight:	130 grams with battery (4.6 ounces) 100 grams without battery (3.5 ounces)
Dimensions:	D 26 x W 60 x H 120 mm (1.0" X 2.4" X 4.7")

** Number of seconds until auto shutdown starts from when sensor is disconnected from HHC*

Electrical

Supply:	9V battery (Alkaline or Lithium)
Consumption:	~30 mA with HiQDT sensor "On"
Battery Life:	~15 hrs Alkaline or ~30 hrs Lithium
	Auto shutdown after 25 seconds * without communication
Interface:	Smart IOTRON™ Ion Selective (ISE) HiQDT MODBUS RTU Sensors
Baud rate:	9600 or 19,200 kbps (selectable)
CE mark:	EN61326A

RoHS COMPLIANT

BENEFITS OF IOTRON™ SMART DIGITAL HiQDT MODBUS RTU ISE SENSORS

- **Integral RS-485 MODBUS RTU interfaces all-modern PLC controllers & data acquisition systems.**
- **Communicator provides easy management of field installations** without the cost of a mating transmitter. This is ideal for locations where a local display is not necessary or possible due to installation limitations.
- **Intelligent management of sensor calibrations and service life-cycle** for efficient commissioning & maintenance. All aspects of installation are completely portable from the shop to the field site location.
- **Days in use** value is stamped for calibrations that are performed. This allows for predictive scheduling of maintenance in the PLC to ensure the accurate measurement in the field based upon user defined criteria.
- **All digital sensors ensure** reliable operation even in noisy process environments unlike analog sensors.
- **No degradation in digital output** even with very long cable runs **up to max of 1,000 meters (3,280 feet)**
- Bridging connections & modifying installations easily without loss of signal quality with **NEMA 6P & IP67 rated quick disconnect waterproof and corrosion-resistant dual snap connector**. Simple plug and play operation for intelligent maintenance planning & smart management of sensor installations and stocking.
- **Low-cost snap digital extension cables** facilitate consolidation of very many HiQDT sensors outputs into one panel enclosure where very many remote field installations can all be conveniently all viewed at once.
- **Intelligent HiQDT handheld communicator software identifies type of sensor connected** & autoloads correct features. There exists no possibility of accidentally using the wrong set of options or settings.
- **All Extension cables for HiQDT sensors are inter-compatible**. Uniform extension cables minimize stocking. Separate field installation guide details available options to commission & exchange sensors.

SENSORS FOR USE WITH SMART DIGITAL HiQDT WITH RS-485 MODBUS RTU OUTPUT

- **Entire line of proven Iotron™** inline, immersion, submersible, twist lock, sanitary, HOT-TAP retractable **ion selective (ISE) sensors** made by ASTI are **ALL available** in the smart digital HiQDT type configuration
- **Waterproofing Option "A", "B", "C", "G", "H" or "IT" is recommended for any** HiQDT smart digital sensor with integral RS-485 MODBUS RTU digital output for immersion or fully submersible installations.

TECHNICAL SPECIFICATIONS FOR HiQDT DIGITAL SENSORS WITH RS-485

Mechanical & Thermal

Housing:	RADEL
Junction:	HDPE, PP or PVDF (KYNAR)
Mounting:	Inline, Immersion, Submersible, Sanitary & HOT-TAP as per sensor specifications
Rating:	Fully submersible and waterproof without the use of immersion tube with WPB/WPH seal
Connector:	NEMA 6P rated HiQ4M male snap connectors for HiQDT snap extension cables; Extension cables for 3TX-HiQ platform can be used for HiQDT type smart digital sensors as well
Max Cable:	Up to 3,280 feet (1,000 meters) using 22 AWG leads and 12VDC power supply
Temp.:	Max 40 to 70°C depending upon sensor type
Pressure:	Max 10 to 20 psig depending upon sensor type
Weight:	Per Sensor, Typically 0.5 to 2 kilograms
Dimensions:	Per Sensor, Minimum size is ¾" MNPT for inline installations, Min length is 8.0 inches with max of about 12 inches with WPB/WPH

Electrical

Operating VDC:	7.0 to 13.0 VDC at sensor board
Power Supply:	Isolated & Regulated 9V or 12V DC
Current draw:	Max 20mA Absolute (Typical 15mA)
ISE Ranges:	0.01-9.99, 10.0-99.9, 100-999 ppm Kilo-ppm ranges when reading > 999 1.00-9.99 kiloppm (1,000-9,990 ppm) 10.0-99.9 kiloppm (10,000-99,900 ppm) 100-999 kiloppm (100,000-999,000ppm)
Temp Sensor:	Integral Platinum 1000Ω TC Element
Temp Range:	-40 to +210°C ±0.3°C *(limited by actual sensor specs, Max 125°C Submersible)*
Temp. Comp.:	Automatic for all measurements
Digital Output:	Non-Isolated RS-485 MODBUS RTU
Compatibility:	For use with HiQDT Handheld Communicator or else any customer PLC with isolated RS-485 input that accepts MODBUS RTU slaves
CE mark:	EN61326A

RoHS COMPLIANT

INTELLIGENT HANDHELD COMMUNICATOR (HHC) FOR FIELD CALIBRATION, CONFIGURATION, SPOT MEASUREMENT & TROUBLESHOOTING OF HiQDT SMART DIGITAL RS485 MODBUS RTU SENSORS

LED LABEL	Parameter	Description & Method to Access	Range	Default
Sensor Type	Measurement type	Load options for connected sensor **'View' key shows software revision, Hold 'View' key for formula weight**	pH or ORP or DO or ISE or CON (autodetected)	Per Type
Reading*****	Process Parameter ****	Display current calibrated value *See Display Features for more detailed explanation of how to use this LED mode*	0.01-9.99, 10.0-99.9, 100-999 ppm 1.00-9.99 kiloppm (1,000-9,990 ppm) 10.0-99.9 kiloppm (10,000-99,900 ppm) 100-999 kiloppm (100,000-999,000 ppm) ***'View' key show values in pION units****	Per Measured Solution
Absolute mV	Process Parameter	Display the absolute mV value from connector ISE sensor	-1,000 to +1,000 for all Ion Selective (ISE) sensor types	Per Sensor & Media
Cal Temp.	**Offset calibration of temperature in °C ****	**Adjust temp reading up & down 'View' key shows current temp cal.**	**±25.0 °C * from raw value**	**0.0**
Cal Offset	**mV Offset Calibration ISE Calibration ****	**Defines the mV@ the Isopotential Concentration for ISE sensor 'View' shows current mV offset**	**±320 mV * from factory default voltage programmed for the isoconcentration**	**Per Sensor**
Cal Slope	**Defines span for ISE measurements ** Cal Slope is only for pH & ISE sensors**	**Defines mV per pION for all ranges 'View' shows current slope in mV per pION (decade) units**	**Limits are 10.0 to 99.9 mV per pION *Sign of slope will be as follows: Positive (+) for cation ISE sensor Negative (-) for anion ISE sensor***	**Per Sensor**
Dampener	Smoothing dampener & output delay ***	Sets number of seconds to be used for dampener for process value(s)	1, 2, 3, 4, 5, 8, 10, 15, 20 or 30 Seconds	10 - Dampen 1 - Delay
Step Change	Sensitivity for 'Up' & 'Down' buttons	mV increment for each time the 'Up' or 'Down' button is depressed	Choices: 0.05, 0.10, 0.20, 0.5, 1.0 or 2.0	0.05
Special	Special Setup Features	Set temp compensation coefficient	Units are µV per °C (000-999), Defaults 198 for monovalent & 99 for divalent	Per Sensor
Baudrate	Baudrate for Com	Toggle between 9600 or 19,200 kbps	9600 or 19,200 kbps	Per Network
Node	Address for Com	Chose a valid address on network	From 001 to 247	Per Sensor
Item/Serial Number (#)	Sensor Item Number & Sensor Serial Number	Item Number defines sensor model; 'View' shows Serial Number which is the unique traceable identifier	Item # from 0-65,535 with >999 shown in sequence; Serial # per HiQDT Serial Number Scheme	Per Sensor
Days in Use	Total time HiQDT sensor is energized	Increments time in use after dispatch from factory to track sensor lifetime & predictive maintenance purposes	0-65,535 in units of days (>999 displayed flashing) Within ±2% accuracy	Per Sensor Field Use
Max/Min °C	Displays max & Min Temp in field use	The max temp in field use is shown; Push 'View' button for min temp	-40 to +210 °C * Actual temperature range is limited by ISE sensor specs	Per Sensor Field Use

**** Negative values are always shown as flashing.***

*COLOR NOTES: Parameters in light **light green** are defined by factory at dispatch time or determined from field use. Parameters in grey can be adjusted as desired. Parameters in **dark green** are obtained from wet calibrations done with HiQDT sensor in the field.*

** **Holding the 'View' key for 3 to 5 seconds in this LED mode shows the 'Days in Use' SINCE this calibration was performed**
** **When ppm is greater than 999, the LED will flash and automatically switch to displaying in kilo-ppm units (see note below)**
** **Holding BOTH the 'View' AND 'Up' keys for 3 to 5 seconds in this LED mode will reset all calibration values back to default**
*** **Holding the 'View' key for 3 to 5 seconds allows for the delay from boot value to be shown as well as adjusted**
**** **Holding both 'Up' & 'Mode' keys shows software rev or both 'Down' & 'Mode' keys shows build date in Reading LED mode**
***** **User Adjustable Timeout Feature: Press 'Down' + 'View' in 'Reading' mode to set minutes before automatic shutoff occurs**

NOTE ON ISE SENSORS WHEN PPM VALUES ARE GREATER THAN 999 ppm:
When the ppm value is over 999 then the LED will switch to displaying in kilo-ppm units. The display operating in kilo-ppm units is indicated by flashing of the Reading, Cal Offset or Cal Slope LED mode. To convert from kilo-ppm to ppm units multiply by 1,000.

'Modbus Com' & 'Battery Low' LED

- The "Modbus Com" LED is illuminated briefly each time that a communication packet is sent or received.
- The "Battery Low" LED will at first flash as warning & then illuminate continuously when the 9V battery should be replaced.
  - **MUST Change 9V battery when LED is illuminated to ensure valid readings and calibrations**

HiQDT SMART DIGITAL ION SELECTIVE SENSOR FEATURES & BASIC USAGE

The smart digital HiQDT ion selective (ISE) sensors with integral MODBUS RTU communications allows for simple & fully portable installation scheme. Sensor may be calibrated anywhere (lab, shop or field) and interfaced with any data acquisition or control system in the field via the RS-485 MODBUS RTU communications. The temperature offset and process value offset calibrations can be done with sensor left in service to agree with a reference value for an external measurement device (please see calibration instructions). Waterproof and corrosion-resistant NEMA 6P HiQ4M snap connector comes standard for easy seamless hot-swap of sensors from service for cleaning, recalibration and other maintenance tasks as may be required as well as eventual replacement of sensor in time.

SETUP OF HIQDT RS-485 MODBUS RTU SENSOR TO HANDHELD COMMUNICATOR (HHC)

1. **Instructions for node scanning and changing node are below in green.**
2. Press the 'Mode' button to turn on HHC. The HHC will attempt to communicate with the last used baudrate and node address. If either no sensor is connected or available at the last used baudrate and node address then three dashes "---" are shown on display. If no buttons are pressed for 25 seconds form this state the HHC will automatically turn itself off to conserve battery life.
    a. If previous baudrate and node address are valid for connected sensor the HHC will automatically load all relevant LED options and addressable parameters for that sensor type.
3. Pressing 'Mode' button navigates to 'Node' LED mode. Use 'Up' & 'Down' keys to scroll to node of the connected sensor. Node information is typically found on label of sensor. If this information is not available, the HiQDT Windows software can be used scan the sensor in question to determine the current node address. The baudrate and node address of the HiQDT sensors can only be changed by the Windows software. When the desired node address is reached press the 'Mode' key enter the value.
    a. Default node for pH sensors is 1, ORP sensors is 2 Wide-Range ORP sensors is 3, DO sensors is 4, ISE sensors is 5, Conductivity is 6. If multiple sensors of same type are used on one MODBUS RTU network the node address for each same type of sensor must differ from default to ensure that node is a unique and valid address.
4. If baudrate needs to be adjusted (9600 or 19,200 kbps) then the HHC automatically navigates to this LED mode next.
5. HHC will return back to the reading mode after selecting node & baudrate. If the selections are valid then process reading is shown otherwise three dashes "---" are shown.
6. Press 'Mode' button after reading LED to toggle to sensor type LED which shows type of sensor that is connected.

*** Initial node of '0' will be shown (press 'Mode' when node address is '0' to exit scan mode). Select starting address for scan with 'Up' or 'Down' keys. Node address scrolled in increments of 10. For example, pressing 'Up' key gives address of 1→10→20→30… and so forth while pressing 'Down' key gives addresses of →240→230→220… and so forth. Press 'Mode' to begin scan. Scanning is always performed in an ascending fashion. Scan will stop when sensor is found. Sensor type for node address found displayed flashing with node address. Press 'Mode' to select this node and you will enter 'Reading' mode. Press 'View' to continue scanning. If no sensors found when address 247 is reached, then 'Err' is displayed. Press 'Mode' to resume scan and repeat these procedures.**

**** Select the current node for the attached sensor. If the current node is not known use the node scanning feature to determine it. When in the 'Baud Rate' LED mode, hold the 'View' key for at least 3 seconds to initiate the node changing mode. The current node of the sensor will be shown and the 'Sensor Type' and 'Node' LED will flash. If the 'Mode' key is pressed immediately after entering this node changing mode, then no change to the address will be made since the address displayed will equal the current node address. Use 'Up' and 'Down' keys to adjust the node to the modified address if desired. Press 'Mode' key to enter the new node address selected with 'Up' & 'Down keys.**

SENSOR SERIAL NUMBER, ITEM NUMBER & TOTAL TIME IN FIELD SERVICE

Systematic tracking achieved with factory stamped sensor serial and item number. The internal clock on the HiQDT sensor board is incremented when energized to monitor the total number of days in active field service. If the sensor is disconnected the incrementing of the time in service will stop. When the sensor is energized the incrementing of time in service will once again resume. The number of days in service is always the actual real-time total usage. The total days in use is shown in days and equally accurate for continuous or intermittent service such that the time in service is accurate even if the sensor is taken in & out of use for cleaning & re-calibration and/or swapped between different installations.

IMPORTANT NOTE BEFORE PERFORMING CALIBRATIONS:

The time averaging dampener is always on even when performing calibrations. ***It can be desirable to adjust dampener to a short value when performing calibrations to make the calibration process quicker and then reset the dampener back to a higher value before reinstalling the sensor back into continuous use in field service (be sure to remember this last step!)***

TEMPERATURE CALIBRATION INSTRUCTIONS

The temperature is calibrated by pushing the 'Up' or 'Down' buttons when in the temperature display (°C) mode. *

** Negative values are always shown as flashing.*

CALIBRATION OF HiQDT SMART DIGITAL ISE SENSORS WITH HANDHELD COMMUNICATOR

1. Use the 'Mode' button to toggle to 'Offset' LED and calibrate to first desired value in ppm or kilo-ppm using 'Up' and 'Down' keys. For this offset calibration the typical scheme is to perform it in-situ adjustment for field reading to an offline determined grab sample analysis. The sensor is disconnected from the data acquisition or control system and connected to the handheld communicator leaving the sensor installed in the process.
    a. It is very important that the sensor reading is very well stabilized before performing 'Offset' adjustment to create agreement between the inline reading and the offline grab sample analyzed value.
    b. ADJUSTMENT TO AGREE WITH GRAB SAMPLE VALUE SHOULD ALWAYS BE IN OFFSET MODE!!
    c. Contact factory for assistance regarding how to perform a timely offline grab sample analysis of the sample at the measurement location if a well-defined method is not already in place with the laboratory at the facility.
2. **The factory programmed slope should be used for most ion selective sensors. If you wish to perform a field slope calibration, please contact the factory for assistance. The instructions below provide the sequence which would be employed for performing a field slope calibration once you are instructed by the factory.**
    a. Use the 'Mode' button to toggle to the 'Slope' LED and use 'Up' and 'Down' keys until the display reads the desired value in ppm or kilo-ppm units.
3. All calibration values are stored inside the HiQDT smart digital ISE sensor in EEPROM such that sensor can be powered down or moved without loss of calibration values resulting in a true plug and play measurement system with seamless hot-swap of sensor in field.
4. Results of calibrations with ISE sensor can be viewed by pressing the 'View' key in each calibration LED mode which always returns the current calibration values used to compute the displayed ppm, kilo-ppm or pION values.

!! IMPORTANT NOTE FOR POWERING HiQDT SMART DIGITAL SENSORS !!

- The RS-485 MODBUS RTU digital output from the HiQDT smart digital sensors is non-isolated.
    - Power source that energizes sensor should be isolated (dedicated & separate from all other devices) or
    - DC/DC converter/isolator can be added to the existing power supply employed to accomplish the same net result as having a dedicated separate 9V to 12V DC power source.
    - RS-485 MODBUS RTU master employed must be isolated to ensure proper operation with sensor

NOTES ON ADJUSTABLE SMOOTHING DAMPENER & OUTPUT DELAY:

- Dampener LED when HiQDT-ISE sensor is connected allows for display and modification of the variable that is used to set the number of seconds used for the smoothing dampener and delay from boot to send the output values
- For intermittent operation, it is recommended to set this dampener & output delay variable to a low number in order to minimize power consumption while from battery power sources and maximize sampling time of process output

DISPLAY FEATURES AVAILABLE USING THE 'VIEW' KEY

- **In 'Node' mode press 'View' key to invoke the node scanning feature (see page 5 for details). ***
- **In 'Baud Rate' mode press 'View' key for 3 to 5 seconds to invoke node changing mode (see page 5 for details). ****
- In 'Sensor Type' LED mode, the software revision for the connected sensor is shown when the 'View' key is pressed.
- In 'Sensor Type' LED mode, when 'View' key is held for 3 to 5 seconds formula weight of measured ion is indicated.
- In 'Reading' LED mode, displayed units are ppm or kilo-ppm units. When LED flashing this indicates kilo-ppm units
  - Pressing 'View' key in 'Reading' LED mode returns the native scientific pION units sent from the sensor.
- In 'Cal Temp.' LED mode, the offset in °C * for current temp calibration is shown when the 'View' key is pressed.
- In 'Cal Offset' LED mode, the offset in mV * is shown for both sensors when the 'View' key is pressed.
  - Offset calibration limit is ± 320mV from the factory programmed default for the given ion selective sensor.
- In 'Cal Slope' LED mode, the current slope for the connected HiQDT ISE sensor is shown in mV per pION units.
  - Days since this calibration performed shown by holding 'View' in the 'Cal' mode for 3 to 5 seconds. **If BOTH 'View' & 'Up' pressed for 3 to 5 seconds in any 'Cal' mode will reset all calibrations back to factory default**

* ***Negative values shown as flashing.***

MODBUS RTU setup of HiQDT sensor is available to enable all functionality detailed below:

READ-ONLY Data	Core Process Value Description	READ-ONLY Data	Analytic Sensor Value Description
Calibrated Process Values for HiQDT-ISE	Calibrated pION value with the range -2.000 to +16.000 sent as 0 to 18,000 Calibrated temp with the range -40.0 to +210.0 °C sent as 0 to 2,5000 ***ISE values sent are always calibrated & are always temperature compensated.***	Connected Sensor Type	1 - HiQDT-pH 2 - HiQDT-ORP Standard Range 3 - HiQDT-ORP Wide Range 4 - HiQDT-DO (Dissolved Oxygen) 5 - HiQDT-ISE (Ion Selective) 6 - HiQDT-CON (EC Standard/High) 7 - HiQDT-CON-L (EC Ultralow)
Raw Process Values	Raw mV sent as 25,000 ± 20,000 corresponds to range of -1,000.0 to +1,000.0 mV. *Minimum 5,000 corresponds to -1,000mV and maximum 45,000 corresponds to +1,000mV.*	Sensor Serial Number Sensor Diagnostics	Unique Serial Number Designation: YY.M-AA.DDD ** Sensor Item Number Software Revision Max Temp in Use Min Temp in Use Days in Field Use
		Calibration Values	Temperature Offset Days since Temp Offset Cal Process mV Offset Days since mV Offset Cal ISE Slope Cal Days since Slope Cal

** *Serial format YY is last digits of year; M is month with A=Oct, B= Nov & C=Dec; AA is letter(s) from A to nY (as permissible); DDD is value from 0 to 255*

READ/WRITE Type	Adjustable Calibration Description	READ/WRITE Type	Adjustable Parameter Description
Offset Adjust Temperature	**Calibrated Temperature Value Limit ±25.0 °C * from raw value** *The temperature to which reading is adjusted is sent as 0 to 2,500 corresponding to -40.0 to +210.0 °C*	Reset Calibrations	Will reset all user adjustable sensor calibrations back to factory default values
Offset Adjust ISE Value To Offline Grab Sample Analyzed Value or Low Standard Solution	**Calibrated ISE Value for Offset Limit ±1,000 mV * from default** *ISE value to which reading is adjusted is sent as 0 to 18,000 corresponding to -2.000 to +16.000 pION units*	Dampener Delay from Boot	Time averaging of process value Time until process values are sent from boot 1, 2, 3, 4, 5, 8, 10, 15, 20 or 30 Seconds
Adjust Sensor Slope	**Calibrated ISE Value for Slope Limit 10.0-99.9 mV per pION unit** *ISE value to which reading is adjusted is sent as 0 to 18,000 corresponding to -2.000 to +16.000 pION units*	Step Change	Increment value for stepwise calibration on the handheld communicator: 0.05, 0.10, 0.20, 0.5, 1.0 or 2.0 mV

* ***Negative values shown as flashing.***

NOTE 1: For communication to be successful all MODBUS devices on the network must use the same baudrate and have a unique node address assigned. The handheld communicator is a MODBUS master whereas all HiQDT sensors are MODBUS slaves. In order for the handheld communicator to be interfaced with the HiQDT sensor, that sensor must either be removed from the network, or else bypassed by means of a suitable bridge box scheme. It is also possible to access any given HiQDT sensor on the MODBUS network if the existing MODBUS master is disconnected or powered down. If the node of the HiQDT sensor to be interfaced is not known, please use the Windows software to determine the current node address and modify if it should be necessary to ensure a valid & unique node address setting on the network. Please see HiQDT installation guide and HiQDT controller manual for additional recommendations & details about commissioning, calibration and troubleshooting.

NOTE 2: Access to **READ** values in *Core Process Value Column* gained through MODBUS function code (04).

NOTE 3: Access to **READ** parameters in the *Analytic Sensor Value Column, Adjustable Calibration Column & Adjustable Parameters Column* gained through MODBUS function code (03).

NOTE 4: Access to **WRITE** parameters in the *Analytic Sensor Value Column, Adjustable Calibration Column & Adjustable Parameters Column* gained through MODBUS function code (16).

Last Modified April 23, 2021 | Revision 3