

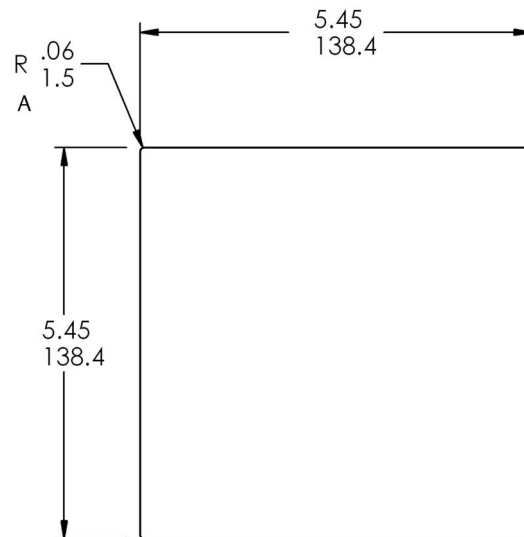
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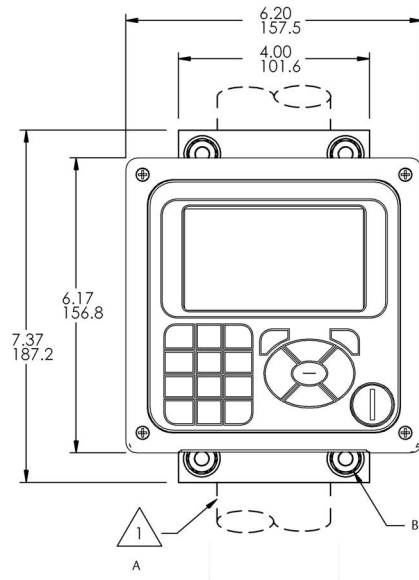
5.18
131.4

Figure 2-4: Panel cut-out



A. Maximum

Figure 2-5: Wall/surface mount front view



- A. 2-inch pipe supplied by customer
- B. Four cover screws

Figure 2-6: Wall/surface mount side view

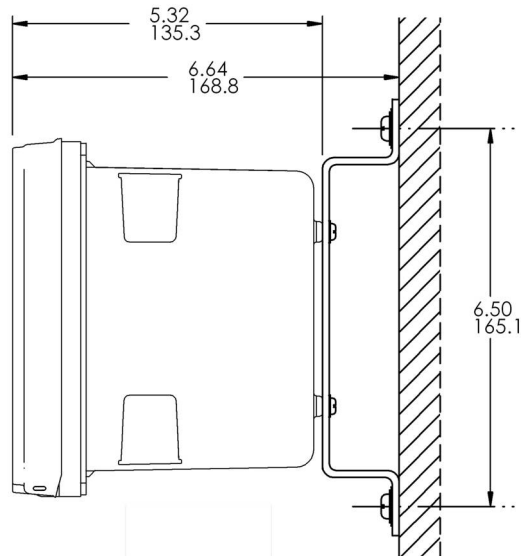
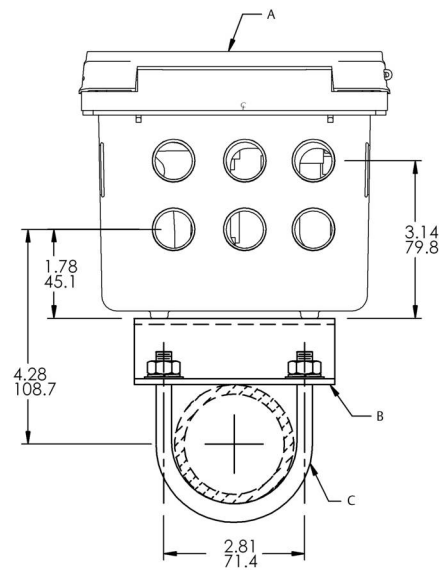
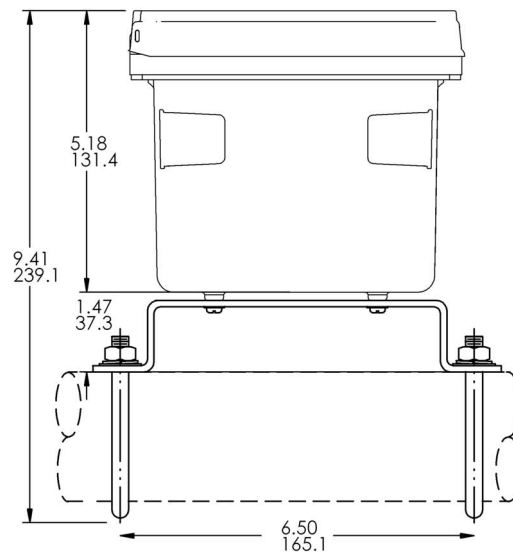


Figure 2-7: Pipe mount bottom view



- A. Front panel
- B. 2-inch pipe mount bracket

Figure 2-8: Pipe mount side view



Shown with mounting kit, PN 23820-00

3 Wiring

3.1 General wiring information

The transmitter is designed for simple installation, featuring detachable connectors, slide-out input boards, and a hinged front panel that swings down for convenient wiring access.

The transmitter is easy to wire. It includes removable connectors and slide-out signal input boards. The front panel is hinged at the bottom. The panel swings down for easy access to the wiring locations.

3.1.1 Removable connectors and signal input boards

The transmitter facilitates wiring and installation with its three slots for easily removable signal input and communication boards, allowing partial or full board removal from the enclosure.

The transmitter uses removable signal input boards and communication boards to facilitate wiring and installation. You can remove each of the signal boards either partially or completely from the enclosure for wiring. The transmitter has three slots for placement of up to two signal input boards and one communication board.

Slot 1 - left	Slot 2 - center	Slot 3 - right
Profibus® board	Signal board 1	Signal board 2

3.1.2 Wire the signal input boards

For wiring the transmitter's signal input measurement boards, connect sensor leads according to marked positions on the board, slide the board into an enclosure slot, manage excess cable through the gland, and secure it, noting that Emerson is the exclusive supplier for replacement boards.

Slots 2 and 3 are for signal input measurement boards.

Procedure

1. Wire the sensor leads to the measurement board following the lead locations marked on the board.
2. Carefully slide the wired board fully into the enclosure slot and take up the excess sensor cable through the cable gland.
3. Tighten the cable gland nut to secure the cable and ensure a sealed enclosure.

Note

For the purpose of replacing factory-installed signal input boards, Emerson is the sole supplier.

3.1.3 Digital communications

The Rosemount 56 features standard HART® digital communications with selectable versions 5 and 7 via the local keypad and offers optional PROFIBUS® DP communication for integration with a host system.

The Rosemount 56 Transmitter has HART communications as a standard feature and PROFIBUS DP as an option.

HART versions 5 and 7 are standard on the transmitter. You can switch between HART versions using the local keypad. A PROFIBUS DP communication board is available as an option for transmitter communication with a host. HART communication supports Bell 202 digital communication over an analog 4-20 mA current output. PROFIBUS DP is an open communication protocol which operates over a dedicated digital line to the host.

For more information, refer to the [Rosemount 56 HART manual](#) or Profibus DP Addendum manual.

3.1.4 Alarm relays

The transmitter's alarm system includes four relays with customizable functions for process measurements, temperature, fault alarms, interval timers, user-programmable logic, deadband, and failsafe operations with USP alarming available for conductivity when using the appropriate measurement board.

Emerson supplies four alarm relays with the switching power supply (85 to 264 Vac, 03 order code) and the 24 Vdc power supply (20 - 30 Vdc, 02 order code). You can use all relays for process measurement(s) or temperature. You can also configure any relay as a fault alarm instead of a process alarm. In addition, you may configure any relay independently and program it as an interval timer (typically used to activate pumps or control valves).

All process alarms, alarm logic (high or low activation or USP*), and deadband are user-programmable. Customer-defined failsafe operation is supported as a programmable menu function to allow all relays to be energized or not energized as a default condition upon powering the transmitter. You may program the USP* alarm to activate when the conductivity is within a user-selectable percentage of the limit. USP* alarming is available only when a contacting conductivity measurement board is installed.

3.2 Preparing conduit openings

The transmitters features six conduit openings for wiring, with four sealed by plugs for shipment, designed to accommodate ½-inch conduit fittings or PG13.5 cable glands, requiring watertight fittings to maintain a watertight case.

There are six conduit openings in all configurations of the transmitter.

Note

Four of the openings are fitted with plugs for shipment.

Conduit openings accept ½-inch conduit fittings or PG13.5 cable glands. To keep the cases watertight, block unused openings with Type 4X or IP66 conduit plugs.

NOTICE

Use watertight fittings and hubs that comply with your requirements. Connect the conduit hub to the conduit before attaching the fitting to the transmitter.

3.3 Preparing sensor cable

The Rosemount 56 is intended for use with all Rosemount sensors. Refer to the sensor Quick Start Guide for details on preparing sensor cables.

3.4 Power, output, and sensor connections

3.4.1 Power wiring

The transmitter offers two power supply options: a 24 Vdc supply with an order code of -02 and an 85-265 Vac switching power supply with an order code of -03, both connectable via clearly marked leads on a vertically-mounted board in the main enclosure, with the grounding plate of the -03 supply also providing connections for certain sensors to reduce radio frequency interference.

Emerson offers two power supplies for the transmitter:

- 24 Vdc (20 - 30 V) Power Supply (-02 order code)
- 85 - 265 Vac Switching Power Supply (-03 order code)

AC main leads and 24 Vdc leads are wired to the power supply board, which is mounted vertically on the left side of the main enclosure cavity. Each lead location is clearly marked on the power supply board. Wire the power leads to the power supply board using the lead markings on the board.

The grounding plate is connected to the earth terminal of the -03 order code (85 - 265 Vac) power supply. The green screws on the grounding plate are intended for connection to some sensors to minimize radio frequency interference. The green screws are not intended for safety purposes.

3.4.2 Current output wiring

Emerson ships all transmitters with four 4-20 mA current outputs. Wiring locations for the outputs are on the main board, which is mounted on the hinged door of the transmitter.

Wire the output leads to the correct position on the main board using the lead markings (+/positive, -/negative) on the board. Emerson provides male mating connectors with each transmitter.

NOTICE

Twisted pairs are required to minimize noise pickup in the 4-20 mA current outputs. For high Electromagnetic Interference (EMI)/Radio Frequency Interference (RFI) environments, shielded sensor wire is required. Emerson recommends shielded sensor wire in all other installations.

3.4.3 Alarm relay wiring

Emerson supplies four alarm relays with the switching power supply (85 to 265 Vac, 03 order code) and the 24 Vdc power supply (20-30 Vdc, 02 order code).

Wire the relay leads on each of the independent relays to the correct position on the power supply board using the printed lead markings (NO/Normally open, NC/Normally closed, or COM/Common) on the board. See [Figure 3-1](#)

Figure 3-1: Alarm relay wiring for Rosemount 1056 switching power supply (03 ordering code)

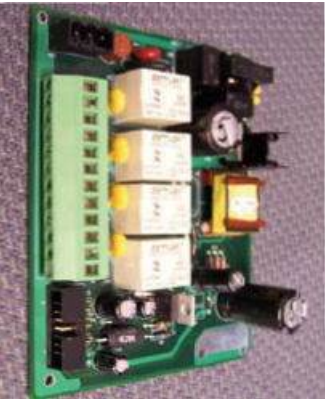


Table 3-1: Relays

NO1	Relay 1
COM1	
NC1	
NO2	Relay 2
COM2	
NC2	
NO3	Relay 3
COM3	
NC3	
NO4	Relay 4
COM4	
NC4	

4 Display and operation

4.1 User interface

The transmitter has a large display which shows two live measurement readouts in large digits and up to six additional process variables or diagnostic parameters concurrently.

The display is back-lit, and you can customize the format to meet your requirements. Use the **ENTER/MENU** key to access **Calibration**, **Hold** (of current outputs), **Programming**, **Display**, **Data**, and **HART** functions. In addition, you can use a dedicated **INFO** key to access useful diagnostic and instrument information regarding installed sensor(s) and any problematic conditions. The display flashes a red banner to indicate a **Fault** condition and a yellow banner for a **Warning** condition. The transmitter displays **Help** screens for fault and warning conditions to guide you in troubleshooting. During calibration and programming, press keys step-by-step through procedures. An alpha-numeric keypad, similar to a cell phone keypad, is available to allow you to enter data during programming and calibration or lengthy tags to describe process points, sensors, or instrumentation.



4.2 Instrument keypad

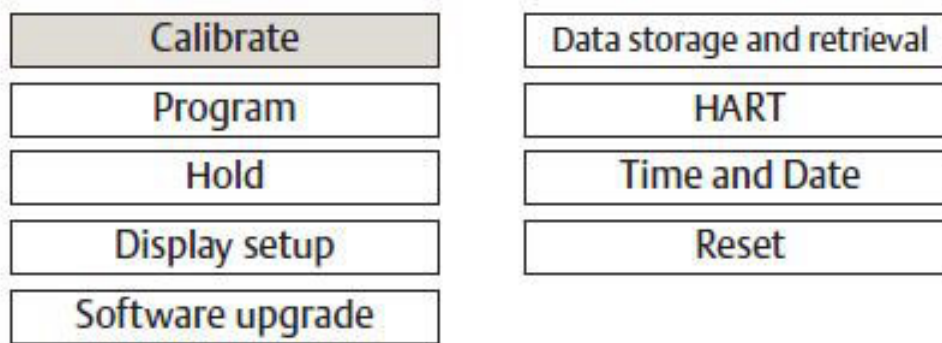
There are three Function keys, four Navigation keys and an alpha-numeric keypad on the instrument keypad.

Function keys

The **ENTER/MENU** key is used to access menus for programming and calibrating the instrument as well as retrieving stored data. Eight top-level menu items appear when pressing the **ENTER/MENU** key from the main display of live readings:

- **Calibrate:** Calibrate attached sensors and analog outputs.
- **Program:** Program outputs, relays, measurement, temperature, and security codes.
- **Hold:** Suspend current outputs.

- **Display Setup:** Program graphic trend display, brightness, main display format, tags, language, and warnings.
- **Data storage and retrieval:** Enable data and event storage, download data, and view events.
- **HART or Profibus:** Program HART® and Profibus communication parameters.
- **Time and Date:** Set and view real-time clock settings.
- **Reset:** Reset all instrument settings, calibration settings or current outputs to factory defaults.



The **ENTER/MENU** key is also used to enter selections or enable programming and calibration steps.

The **EXIT** key returns to the previous menu level.

The **INFO** key provides detailed instructions and explanations during programming and calibrating procedures. It also provides troubleshooting tips for all faults and warnings that may occur during calibration or continuous operation in process.

Navigation keys

The four Navigation keys arranged around the **ENTER/MENU** key operate in an intuitive manner similar to the navigation keys on a computer keyboard. During menu operation, these keys are used to move the highlighted screen selection to another adjacent screen item. During tag entry, the left key is used to delete entries during active alpha-numeric character entry.

Alpha-numeric keypad

The alpha-numeric keypad has 12 keys as outlined below:

- Nine keys are alpha-numeric
- One key is a dedicated "1" key
- One key is a dedicated "0" key
- One key is a dedicated "." (decimal point) key

The alpha-numeric keypad operates the same as entries on a mobile phone. The nine alpha-numeric keys have multiple characters that can be entered for tag entries or during programming and calibration steps. Character selections are made by pressing the key multiple times to toggle to characters that are available on each key.

4.3 Main display

The 56 displays one or two primary measurement values, up to six secondary measurement values, fault and warning banner, alarm relay flags, and a digital communications icon.

Process measurements

Two process variables are displayed if two signal boards are installed. One process variable and process temperature are displayed if one signal board is installed with one sensor. The Upper display area shows the Sensor 1 process reading. The Center display area shows the Sensor 2 process reading. For dual conductivity, refer to the Quick Start Guide.

For single input configurations, the Upper display area shows the live process variable and the Center display area can be assigned to Temperature or blank.

Secondary values

Up to six secondary values are shown in six display quadrants at the bottom half of the screen. All six secondary value positions can be programmed by the user to any display parameter available.

4.4 Menu system

For information about the menu system, refer to the [Rosemount 56 Quick Start Guide](#).

4.5 USB data port

⚠ CAUTION

Not all USB memory devices will physically fit into the Rosemount 56 data port. After removing the USB cover and seal, make sure that the USB memory device can be easily and fully inserted into the USB data port without any mechanical conflict with the USB data port flange. The USB communications port is protected by a Type 4-rated seal and cover. Do not remove the cover during cleaning of the analyzer housing. Never remove the USB port cover when the instrument is operated in a hazardous rated area.

The Rosemount 56 menu system is similar to a computer. A USB 2.0 data port is accessible on the front panel of the Rosemount 56 instrument. The USB data port can be used for download of measurement data and events using a USB memory device. It can also be used to download and upload complete analyzer configurations to copy all programmed settings to another Rosemount 56 analyzer.

Note

Only Rosemount 56 units which display the **Transfer Configurations** tab under the **Data Storage and Retrieval** menu are capable of downloading and uploading analyzer configurations.

The USB data port is easily accessed by inserting a coin in the vertical slot of the cover and rotating counterclockwise one quarter turn to remove the cover and Type 4 seal.

Note

The data logger and event logger are disabled by default setting upon initial startup from the factory. Always enable the data logger and event logger under the **Data Storage and Retrieval** menu to initiate internal recording of process data and event data.

4.6 Rosemount 56 data logger and event logger download procedures

4.6.1 Description

The Rosemount 56 supports download of stored data logger and event logger data at the device. The download process is performed using a USB 2.0 flash drive memory device inserted into the USB data port on the front panel of the Rosemount 56 analyzer. The data can be uploaded to a PC for viewing in preformatted Excel tables.

4.6.2 Rosemount 56 data logger download procedure

Procedure

1. From the main menu, select **Data storage and retrieval**.
2. Select the **Download** tab.
3. Select **Download measurement** data.
4. With the Rosemount 56 analyzer powered, remove the **NEMA** cap from the front display by inserting a coin into the cap's vertical slot and rotating counterclockwise. Remove the USB cap to access the data port.
5. Carefully insert a USB 2.0 flash drive into the USB port on the Rosemount 56. Note that the USB insertion connector is keyed.
6. The **Download** screen will report **Earliest data available** and **Latest data available** that can be downloaded from the internal data logger file.
7. With a USB 2.0 flash drive properly inserted, choice **Selected Range (default)** or **All Data**.
8. If **Selected Range** is chosen, define the **Start Date** and **End Date** in the screen fields. Note that the **Start Date** and **End Date** reported will default to the current data that is recognized by the analyzer.
9. If **All Data** is selected, all stored date (up to 30 days) will be downloaded.
10. Select **START** and press **ENTER**.
11. A **Data download information and instruction** screen is displayed while data logger files are being downloaded. The download process will be completed in a few minutes.
12. When the data logger download is complete, a confirmation screen is display with the reported range of dates that were downloaded to the USB flash drive.
13. Carefully remove the USB 2.0 flash drive from the USB port.
14. Insert the **NEMA** cap into the Rosemount 56 USB front display opening.
15. You may exit the **Download completed** screen by selecting **BACK**.
16. To view data logger files, insert the USB flash drive into a computer. On the designated drive associated with the USB flash drive, individual data logger files for each day can be opened as Excel formatted files in the root directory of the USB drive. Note that the data codes are assigned file names based on the analyzer's recognized dates.

4.6.3 Rosemount 56 event logger download procedure

Procedure

1. From the main menu, select **Data storage and retrieval**.
2. Select the **Download** tab.
3. Select **Download events**.
4. With the Rosemount 56 analyzer powered, remove the **NEMA** cap from the front display by inserting a coin into the cap's vertical slot and rotating counterclockwise. Remove the USB cap to access the data port.
5. Carefully insert a USB 2.0 flash drive into the USB port on the Rosemount 56. Note that the USB insertion connector is keyed.
6. A **Download events information** screen is briefly displayed while events files are being downloaded. The download process may require a few minutes to complete.
7. When the events download is complete, a confirmation screen appears.
8. Carefully remove the USB 2.0 flash drive from the USB port.
9. Insert the Type 4 cap into the Rosemount 56 USB front display opening.
10. You may exit the **Download completed** screen by selecting **BACK**.
11. To view event logger files, insert the USB flash drive into a computer. On the designated drive associated with the USB device, the single event logger file can be opened as an Excel formatted file in the root directory of the USB drive. Note that the data codes are assigned file names based on the analyzer's recognized dates.

4.7 Software upgrade

4.7.1 Description

All Rosemount 56 advanced analyzers with serial number J12- or later (October 2012) allow software upgrades using the device's USB data port. To download and install software upgrades, refer to [Rosemount 56 Dual Channel Transmitter](#).

4.7.2 Software upgrade checklist

Before upgrading, confirm:

- Serial Number date codes of the 56 analyzer is J12 (October 2012) or later.
- Confirm that Safe Area requirements are met before installing software.
- USB 2.0 flash drive memory device is available.

4.7.3 Software upgrade procedure

Procedure

1. Download the Rosemount 56 software upgrade file to a computer. Access software **HERE**. Save the file to the main root directory of a USB flash drive memory stick. Only one Rosemount 56 software upgrade file should be present at the root directory.
2. Save all user settings before upgrading the software by copying the analyzer's configuration to a flash drive. Access this procedure at the local Rosemount 56 device menu location: **MENU/Data storage and retrieval/Transfer Configuration**.

3. Download the Data Logger measurement data and the Events before upgrading the software. Access these procedures at Rosemount 56 menu location: **MENU/Data storage and re-trieval/Download/Download measurement data and at /Download/Download Events**.
4. With the Rosemount 56 analyzer powered up and the front enclosure panel completely closed, remove the Type 4 cap from the front display by inserting a coin into the cap's vertical slot and rotating counterclockwise. Remove the USB cap and seal to access the data port.
5. Carefully insert a USB 2.0 flash drive into the USB port on the Rosemount 56. The USB insertion connector is keyed. Note that some USB devices will not fit into the USB port due to mechanical restrictions.
6. Press the **ENTER/MENU** key. Select **Software upgrade** in the main menu.
7. Select **NEXT**. Press **ENTER/MENU** to start software upgrade. The current software version and the new software version are reported on the screen.
8. Select **NEXT**. Press **ENTER/MENU**. **Software upgrade in process** and a progress bar will appear. The process may require up to 5 minutes to complete.
9. The **Time and Date** screen will appear. Enter local real time clock and date information. Press **ENTER/MENU**.
10. The main screen will appear reporting live process values. Programming of settings and calibration may be required.

4.8 Configuration transfer

4.8.1 Description

All Rosemount 56 unit with serial number J12- or later (October 2012) will support the function of Configuration Transfer from one Rosemount 56 analyzer to another, or multiple Rosemount 56 analyzers. The transfer is done by using a version 2.0 USB flash drive (USB memory stick) for downloading the existing configuration and uploading to another instrument.

4.8.2 Transfer configuration process user notes

Procedure

1. Configuration Transfer can only be performed between instruments of identical configuration. The analyzers must have the same signal boards installed.
2. Several text files downloaded to the flash drive can be saved to a PC and used later.
3. Only one set of configuration files will be stored on the flash drive. The files that are downloaded will over-write any existing files stored in the root directory of the flash drive.

4.8.3 Transfer configuration procedure user notes

Procedure

1. Confirm all user settings before transferring configuration.
2. From the main menu, select **Data storage and retrieval**.
3. Select the **Transfer Configuration** tab.
4. Select **Copy analyzer configuration to the flash drive**.

5. With the Rosemount 56 analyzer powered, remove the **NEMA** cap from the front display by inserting a coin into the cap's vertical slot and rotating counterclockwise. Remove the USB cap to access the data port.
6. Carefully insert a USB 2.0 flash drive into the USB port on the Rosemount 56. Note that the USB in-section connector is keyed.
7. Select **Copy data**. Press **ENTER**.
8. An **information** screen appears warning users that any configuration files that exist in the root directly of the flash drive will be overwritten upon configuration transfer. If **No** is selected (default setting), existing configuration files will not be overwritten. Select **Yes** to transfer the configuration file to the flash drive.
9. The configuration file will be transferred (downloaded) in about 20 seconds. A screen will report that the configuration file has been transfused.
10. Carefully remove the USB 2.0 flash drive from the USB port.
11. Insert the **NEMA** cap into the Rosemount 56 USB front display opening.
12. Follow Steps 2-3 above on the instrument that will receive the copied configuration.
13. On the Rosemount 56 analyzer instrument that will receive the copied configuration, remove the Type 4 cap from the front display.
14. Carefully insert the USB 2.0 flash drive containing the configuration file into the USB port.
15. Select **Copy configuration from the flash drive to the analyzer**. Press **ENTER**.
16. There are two options for configuration transfer. Select one of the following and press **ENTER**:
 - Copy configuration data only to the analyzer.
 - Copy configuration and calibration data to the analyzer.
17. Select **Copy data**. Press **ENTER**.
18. The configuration file will be transferred (uploaded) in about 20 seconds. A screen will report that the configuration file has been transfused.
19. Carefully remove the USB 2.0 flash drive from the USB port.
20. Insert the **NEMA** cap into the Rosemount 56 USB front display opening.

5 Programming the analyzer - Basics

5.1 General

Typical programming steps include the following listed procedures. Each of these programming functions are easily and quickly accomplished using the intuitive menu systems:

- Changing the measurement type, measurement units and temperature units
- Choose temperature units and manual or automatic temperature compensation mode
- Configure and assign values to the current outputs
- Set a security code for two levels of security access
- Accessing menu functions using a security code
- Enabling and disabling Hold mode for current outputs
- Choosing the frequency of the AC power (needed for optimum noise rejection)
- Resetting all factory defaults, calibration data only, or current output settings only

5.2 Changing startup settings

Procedure

1. To change the measurement type, measurement units, or temperature units that were initially entered in Quick Start Guide, choose the **Reset** function or access the Program menus for Sensor 1 or Sensor 2.

The following choices for specific measurement type, measurement units are available for each sensor measurement board:

Signal board	Available measurements	Measurements units
pH/ORP (-22, -32)	pH, ORP, Redox, Ammonia, Fluoride, Custom ISE	pH, mV (ORP) %, ppm, mg/L, ppb, µg/L, (ISE)
Contacting conductivity (-20, -30)	Conductivity, Resistivity, TDS, Salinity, NaOH (0-12%), HCl (0-15%), Low H ₂ SO ₄ , High H ₂ SO ₄ , NaCl (0-20%), Custom Curve	µS/cm, mS/cm, S/cm% (concentration)
Toroidal conductivity (-21, -31)	Conductivity, Resistivity, TDS, Salinity, NaOH (0-12%), HCl (0-15%), Low H ₂ SO ₄ , High H ₂ SO ₄ , NaCl (0-20%), Custom Curve	µS/cm, mS/cm, S/cm% (concentration)
Chlorine (-24, -34)	Free Chlorine, pH Independ. Free Cl, Total Chlorine, Monochloramine	ppm, mg/L
Oxygen (-25, -35)	Oxygen (ppm), Trace Oxygen (ppb), Percent Oxygen in gas, Salinity	ppm, mg/L, ppb, µg/L % Sat, Partial Pressure, % Oxygen In Gas, ppm Oxygen In Gas
Ozone (-26, -36)	Ozone	ppm, mg/L, ppb, µg/L

Signal board	Available measurements	Measurements units
Temperature (all)	Temperature	°C / °F

2. To change the measurement type, measurement units, or temperature units, access the **Reset** screens by pressing **ENTER/MENU** from the main screen.

S1: 7.00pH 25.2 °C S2: 0.056 µS/cm 52.1 °C

Reset what?

☒ All user settings (Returns to Quick Start)

☐ Sensor 1 calibration only

☐ Sensor 2 calibration only

☐ Output 1 calibration only

☐ Output 2 calibration only

☐ Output 3 calibration only

☐ Output 4 calibration only

APPLY BACK

3. To change the measurement type, measurement units, or temperature units, access the **Program** screens by pressing **ENTER/MENU** from the main screen.

S1: 7.00pH 25.2 °C S2: 0.056 µS/cm 52.1 °C

Outputs Relays Measure Temperature pH diagnostic setup Security

Measurement pH

Pre-amplifier location Analyzer

Filter 4 sec

Reference Impedance Low

Wiring Normal

Resolution 0.01 pH

NEXT BACK

5.3 Programming temperature

Most liquid analytical measurements (except ORP) require temperature compensation. The Rosemount 56 performs temperature compensation automatically by applying internal temperature correction algorithms. Temperature correction can also be turned off. If temperature correction is off, the Rosemount 56 uses the temperature entered by the user in all temperature correction calculations.

Procedure

To select automatic or manual temp compensation, set the manual reference temperature, and to program temperature units as °C or °F, access the **Temperature** screens by pressing **ENTER/MENU** from the main screen.

S1: -71.29pH 999.9°C				S2: 0.0000GPM	
Outputs	Relays	Measure	Temperature	pH diagnostic setup	Security
Enter security codes (three digits maximum). 000 means no security. For more information press INFO.					
Calibration/Hold		0			
All		0			
BACK					
Warning					

5.4 Configuring and ranging the current outputs

The Rosemount 56 accepts inputs from two sensors and has four analog current outputs. Ranging the outputs means assigning values to the low (0 or 4 mA) and high (20 mA) outputs. This section provides a guide for configuring and ranging the outputs. ALWAYS CONFIGURE THE OUTPUTS FIRST.

Procedure

To configure the outputs, access the **Outputs** screen by pressing **ENTER/MENU** from the main screen.

S1: 7.00pH 25.2 °C		S2: 0.056 µS/cm 52.1 °C	
Outputs	Relays	Measure	Temperature
pH diagnostic setup			
Security			
Output	1		
Analog/PID/Simulate	PID		
Assign	S1 Measurement		
Range	4-20mA		
Setpoint	14.00 pH		
NEXT BACK			

5.5 Setting a security code

The security codes prevent accidental or unwanted changes to program settings, displays, and calibration. The Rosemount 56 has two levels of security code to control access and use of the instrument to different types of users.

The two levels of security are:

- **All:** This is the Supervisory security level. It allows access to all menu functions, including Programming, Calibration, Hold and Display.
- **Calibration/Hold:** This is the operator or technician level menu. It allows access to only calibration and Hold of the current outputs.

Procedure

To set security codes, access the **Security** screen by pressing **ENTER/MENU** from the main screen. Upon entry of the proper code, the following security screen will appear: