TIENet™ 305
Rain & SDI-12 Input
Installation and Operation Guide

305

ISCO®

Rain & SDI-12 Input

TIENet™

TELEDYNE ISCO
Everywhere**you**look™

Foreword - Water and Wastewater Products

This instruction manual is designed to help you gain a thorough understanding of the operation of the equipment. Teledyne ISCO recommends that you read this manual completely before placing the equipment in service.

Although Teledyne ISCO designs reliability into all equipment, there is always the possibility of a malfunction. This manual may help in diagnosing and repairing the malfunction.

If a problem persists, call or e-mail Teledyne ISCO technical support for assistance. Simple difficulties can often be diagnosed over the phone. For faster service, please have your serial number ready.

If it is necessary to return the equipment to the factory for service, please follow the shipping instructions provided by technical support, including the use of the Return Merchandise Authorization (RMA) specified. Be sure to include a note describing the malfunction. This will aid in the prompt repair and return of the equipment. **No item may be returned for service without a Return Merchandise Authorization (RMA) number issued by Teledyne.**

Teledyne ISCO welcomes suggestions that would improve the information presented in this manual or enhance the operation of the equipment itself.

Teledyne ISCO is continually improving its products and reserves the right to change product specifications, replacement parts, schematics, and instructions without notice.

Contact Information

Customer Service

Phone:	(800) 228-4373	(USA, Canada, Mexico)
	(402) 464-0231	(Outside North America)
Fax:	(402) 465-3022	
Email:	isco.orders@teledyne.com	

Technical Support

Phone:	Toll Free (866) 298-6174 (Samplers and flowmeters)
Email:	iscowatersupport@Teledyne.com
Return equipment to:	4700 Superior Street, Lincoln, NE 68504-1398

Other Correspondence

Mail to:	P.O. Box 82531, Lincoln, NE 68501-2531

Warranty and Operation Manuals can be found on our website at:

www.teledyneisco.com

General Warnings

Before installing, operating, or maintaining this equipment, it is imperative that all hazards and preventive measures are fully understood. While specific hazards may vary according to location and application, heed the following general warnings:

⚠ **WARNING**

Avoid hazardous practices! If you use this instrument in any way not specified in this manual, the protection provided by the instrument may be impaired.

⚠ **AVERTISSEMENT**

Éviter les usages périlleux! Si vous utilisez cet instrument d'une manière autre que celles qui sont specifiées dans ce manuel, la protection fournie de l'instrument peut être affaiblie; cela augmentera votre risque de blessure.

Hazard Severity Levels

This manual applies *Hazard Severity Levels* to the safety alerts, These three levels are described in the sample alerts below.

⚠ **CAUTION**

Cautions identify a potential hazard, which if not avoided, may result in minor or moderate injury. This category can also warn you of unsafe practices, or conditions that may cause property damage.

⚠ **WARNING**

Warnings identify a potentially hazardous condition, which if not avoided, could result in death or serious injury.

⚠ **DANGER**

DANGER – limited to the most extreme situations to identify an imminent hazard, which if not avoided, will result in death or serious injury.

Hazard Symbols   The equipment and this manual use symbols used to warn of hazards. The symbols are explained below.

Hazard Symbols
Warnings and Cautions
The exclamation point within the triangle is a warning sign alerting you of important instructions in the instrument's technical reference manual.
The lightning flash and arrowhead within the triangle is a warning sign alerting you of "dangerous voltage" inside the product.
Symboles de sécurité
Ce symbole signale l'existence d'instructions importantes relatives au produit dans ce manuel.
Ce symbole signale la présence d'un danger d'électocution.
Warnungen und Vorsichtshinweise
Das Ausrufezeichen in Dreieck ist ein Warnzeichen, das Sie darauf aufmerksam macht, daß wichtige Anleitungen zu diesem Handbuch gehören.
Der gepfeilte Blitz im Dreieck ist ein Warnzeichen, das Sei vor "gefährlichen Spannungen" im Inneren des Produkts warnt.
Advertencias y Precauciones
Esta señal le advierte sobre la importancia de las instrucciones del manual que acompañan a este producto.
Esta señal alerta sobre la presencia de alto voltaje en el interior del producto.

TIENet™ 305 Rain & SDI-12 Input

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TIENet™ 305 Rain & SDI-12 Input

Section 1 Introduction

The TIENet Model 305 Rain & SDI-12 Input device transmits rain tips and information from an SDI-12 device to the DuraTracker flow logger using Teledyne ISCO's TIENet connectivity.

The 305 device consists of a wall-mountable isolated interface with a 1 meter cable that attaches to the DuraTracker. An ISCO 674 rain gauge can be connected to the connector on the 305 to send rain tips to the DuraTracker. An SDI-12 device can also be attached to the connector. If more than one device needs to be connected at the same time, the Universal Junction Box can be used in conjunction with ISCO cables to connect multiple devices.
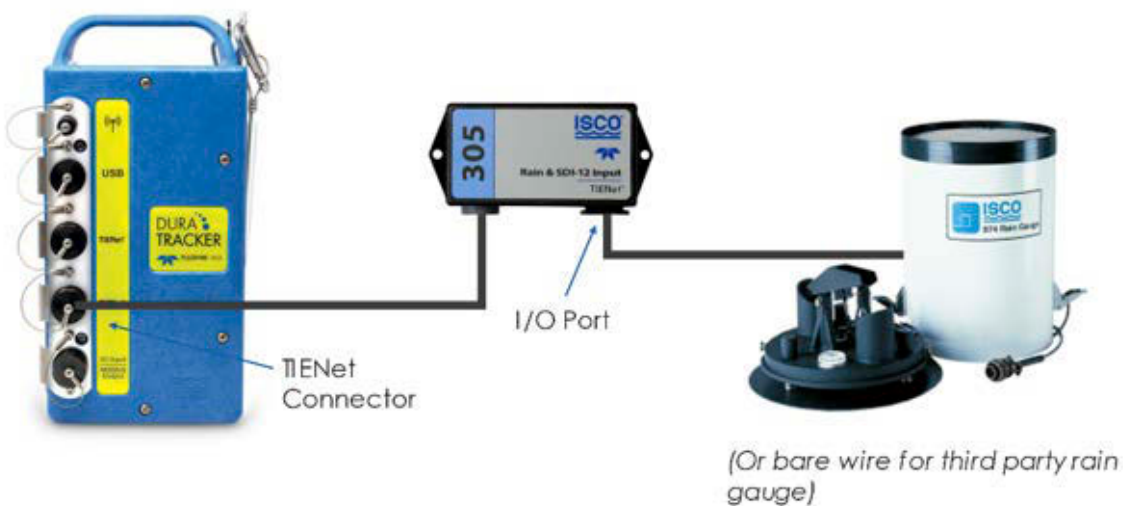
Figure 1-1 TIENet connection to Rain Gauge via the 305 Rain & SDI-12 Input

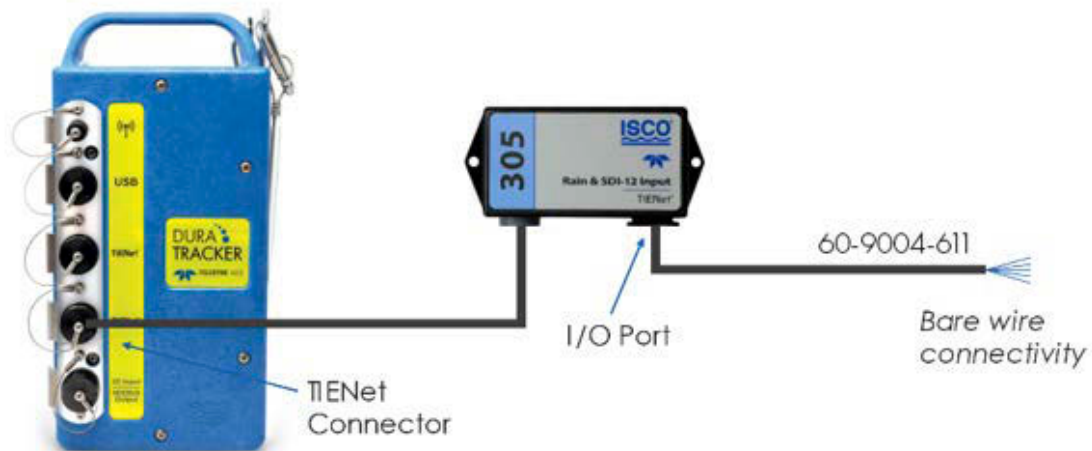*Figure 1-2   TIENet connection via the 305 Rain & SDI-12 Input*

Figure 1-3   TIENet connection to Rain Gauge and SDI-12 Sonde via the 305 Rain & SDI-12 Input

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☑ **Note**

Old 6712 cables have a different pinout and will not work with the 305.

1.1 Operation

See the *674 Rain Gauge Installation and Operation Guide* or the SDI-12 device manual for operation of connected sensors.

1.2 Technical Specifications

Table 1-1 Table 1-1 Technical Specifications[a]	
TIENet 305 Rain & SDI-12 Input	
305 Weight	0.54 kg (1.2 lbs.)
Ambient Operating Temperature	-40°C to +60°C (-40°F to +140°F)
Connection Cable Length	1 meter
Max rated drive current	530mA

   a.   All specifications are subject to change without notice.

1.3 Replacement Parts and Accessories

Parts and accessories can be purchased by contacting Teledyne ISCO's Customer Service Department.

> **Teledyne ISCO**
> Customer Service Dept.
> P.O. Box 82531
> Lincoln, NE 68501 USA
> Phone: 800 228-4373
>   402 464-0231
> FAX: 402 465-3022
> E-mail: isco.orders@teledyne.com

1.3.1 TIENet 305 Rain & SDI-12 Input

305 Rain & SDI-12 Input w/ 1 m cable ending in TIENet plug 60-4804-018

Universal Junction Box w/ reference Air.. 60-4804-121

674 Rain Gauge Standard (0.01" per tip) 60-3284-001

674 Rain Gauge Metric (0.1 mm per tip).. 60-3284-006

SDI-12/Rain cable (305 connector on one end and pigtails on other).................. 60-9004-611

Rain Gauge cable (for connecting Rain Gauge to Universal Junction Box) 60-4304-055

☑ ***Note***

Teledyne ISCO uses FreeRTOS version 5.4.2 in its TIENet devices. In accordance with the FreeRTOS license, FreeRTOS source code is available on request. For more information, visit www.FreeRTOS.org.

EAR99 Technology Subject to Restrictions Contained on the Cover Page

TIENet™ 305 Rain & SDI-12 Input

Section 2 Installation and Setup for DuraTracker®

2.1 Installation

TIENet devices like the 305 are connected to the DuraTracker by plugging the connector into the front panel.

2.1.1 Connecting the Cable to DuraTracker

The DuraTracker has two TIENet receptacles located on the front of the unit. Sensor cables are attached to these receptacles.

To connect the sensor:

1. Remove the protective caps.

    a. Push down on the sensor release while pulling the protective cap from the TIENet receptacle.

    b. Pull the cap from the end of the sensor cable plug.

2. Prepare the TIENet plug.

    a. Inspect the plug. It should be clean and dry. Damaged O-rings must be replaced. Spare O-rings are supplied in the maintenance kit.

    b. Coat the O-ring's sealing surface with a silicone lubricant.

⚠ CAUTION
Do not use petroleum-based lubricants. Petroleum-based lubricants will cause the O-ring to swell and prematurely deteriorate. Aerosol silicone lubricant sprays often use petroleum-based propellants. If using an aerosol spray, allow the propellant to evaporate for several minutes before proceeding.

⚠ CAUTION
Only plug sensors into the DuraTracker when power has been removed. Failure to do so could result in damage to the DuraTracker.

3. Insert the TIENet plug into the receptacle. The sensor release will click when the sensor cable is properly connected.

4. Connect the two caps.

Figure 2-1   Connecting a TIENet sensor cable

2.1.2   Connecting Rain gauge or SDI-12 device

The ISCO 674 Rain Gauge will connect directly to the TIENet 305's connector port. See the *674 Rain Gauge Installation and Operation Guide* for more information. All other non-ISCO rain gauges and SDI-12 devices need to match the manufacturer's pinout to the Teledyne ISCO 60-9004-611 cable color code chart (Table 2-1).

Table 2-1 Color Codes	
60-9004-611 Cable Insulation Color	**305 Function**
Red	+3.3v
Black	GND
Blue	NC
Purple	Rain
White	Switched +12v
Orange	Data
Yellow	NC
Brown	NC
Green	NC

The TIENet 305 device can connect to one rain gauge and two SDI-12 devices with the use of the Teledyne ISCO Universal Junction Box. The Rain Gauge uses +3.3v, GND, and Rain functions. SDI-12 uses Switched +12v, GND, and Data functions

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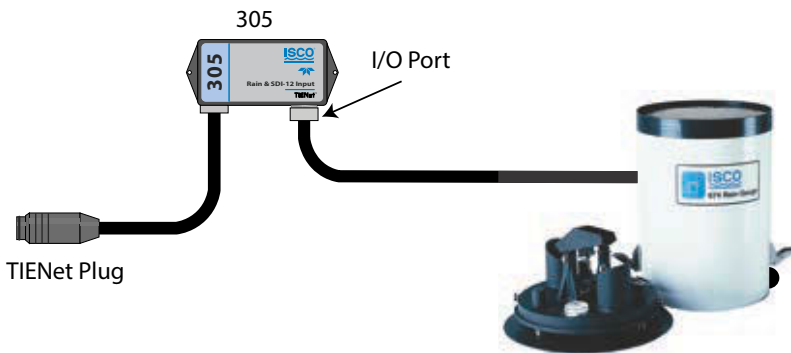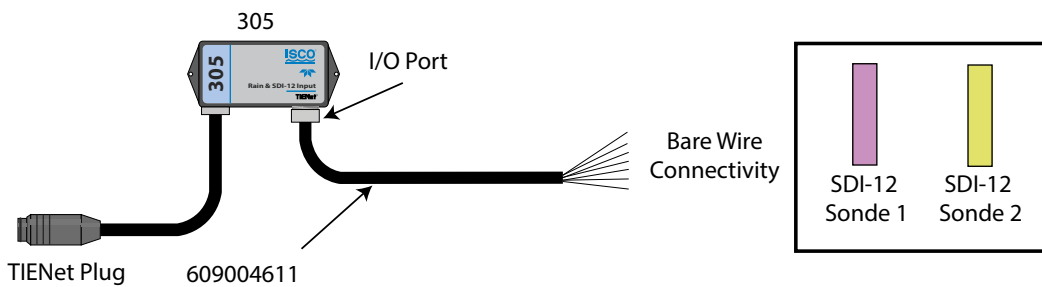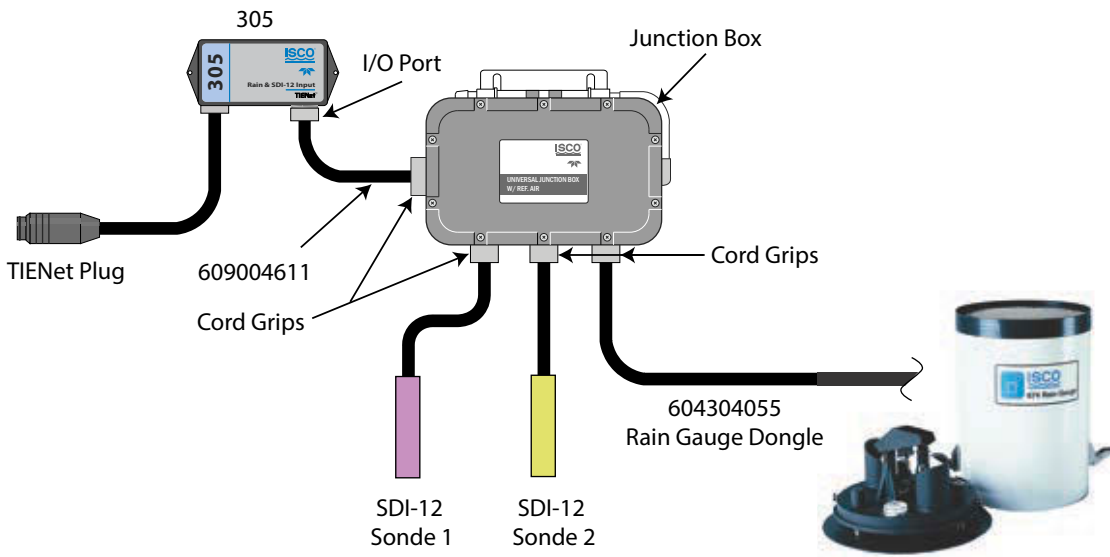☑ *Note*

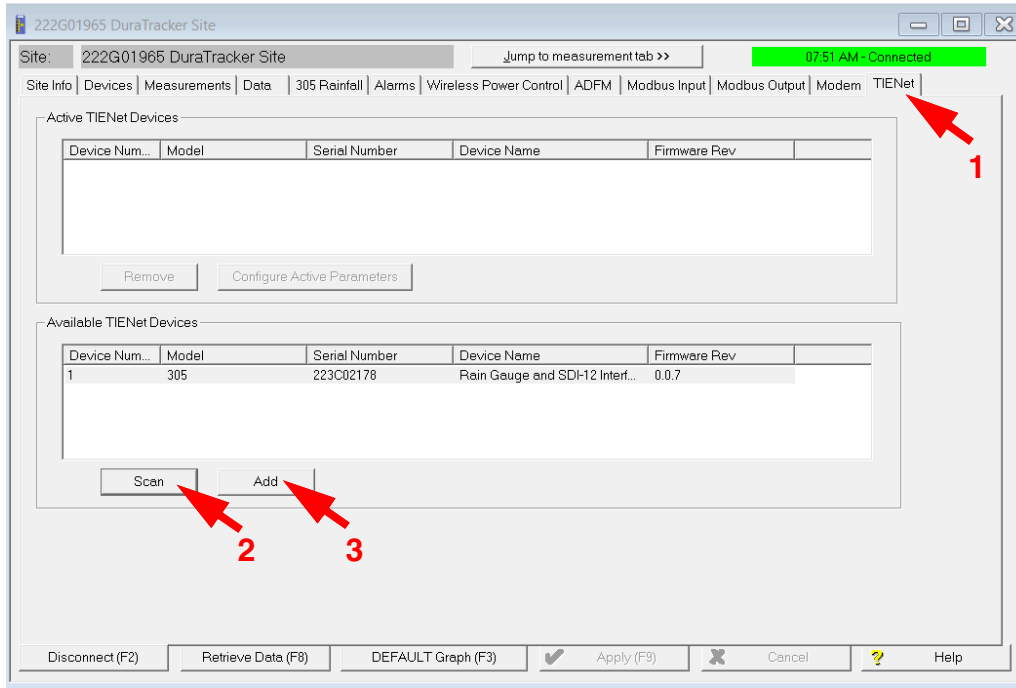530mA is the maximum rated current that the 305 can drive.

Figure 2-2   305 Rain & SDI-12 Input connections

☑ *Note*

Old 6712 cables may have a different pinout that will not work with the 305.

2.2 Configuring the 305

To set up the 305 Rain & SDI-12 Input, it must first be scanned. Go to the TIENET tab in Flowlink (1) and click on SCAN (2).

TIENet Tab Scan

Once the 305 shows up in the AVAILABLE TIENET DEVICES, click on ADD (3) to move it to the ACTIVE TIENET DEVICES (4). It is now ready to set up for Rain or SDI-12 measurements.
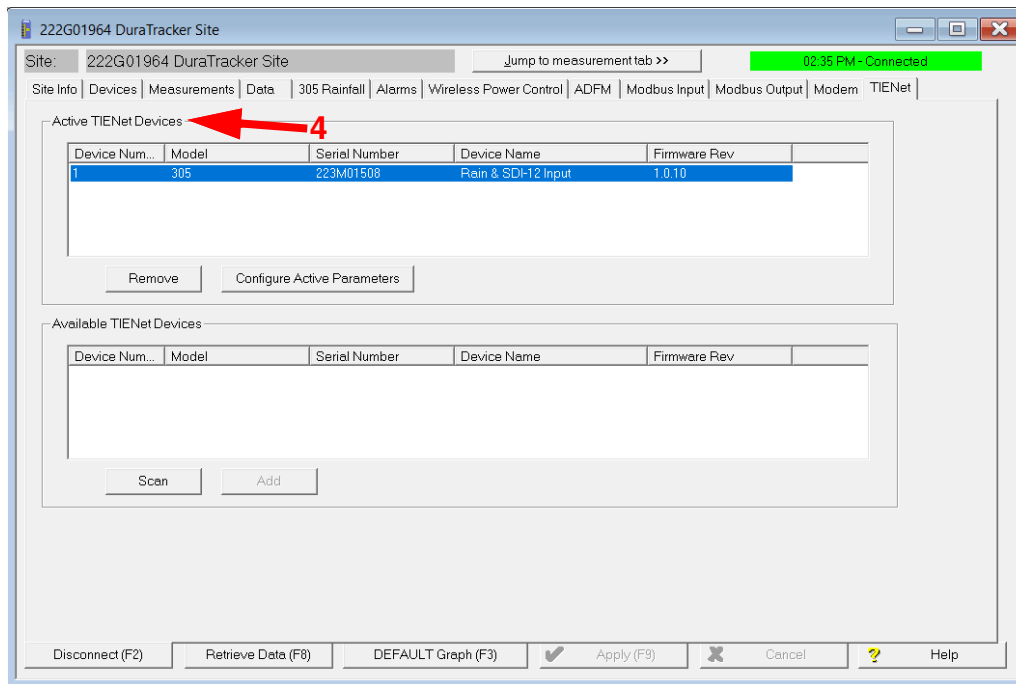

Figure 2-3   TIENet tab Add

2.2.1   Rain Gauge

Once an ISCO 674 Rain Gauge is connected to the 305 Rain & SDI-12 Input, it will need to be set up. By clicking the 305 RAINFALL tab (1) you can change the unit of measure for RAIN SINCE MIDNIGHT between inches, feet, millimeters, or meters (2) The default AMOUNT PER TIP is 0.01 inches (3), so if you have a metric calibrated rain gauge, you will need to change the amount per tip to 0.1 mm. You can also set a USER DEFINED measurement in inches or millimeters (4).
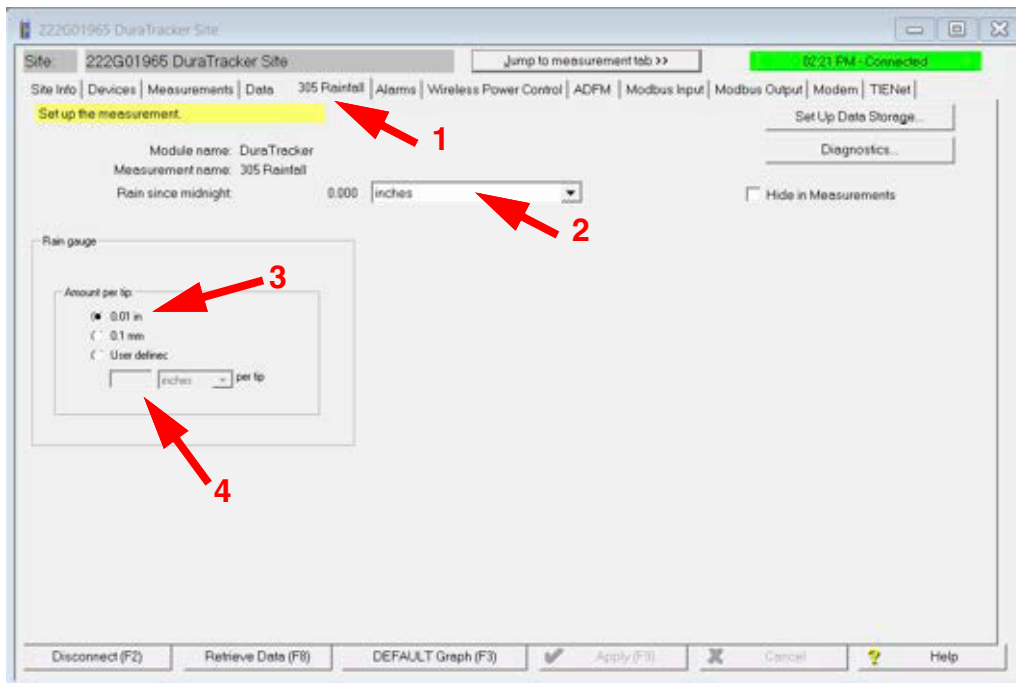

Figure 2-4   305 Rainfall tab

2.2.2 SDI-12 Device

When setting up a Sonde, go to JUMP TO MEASUREMENTS TAB >>, then DURATRACKER, then the SONDE tab.
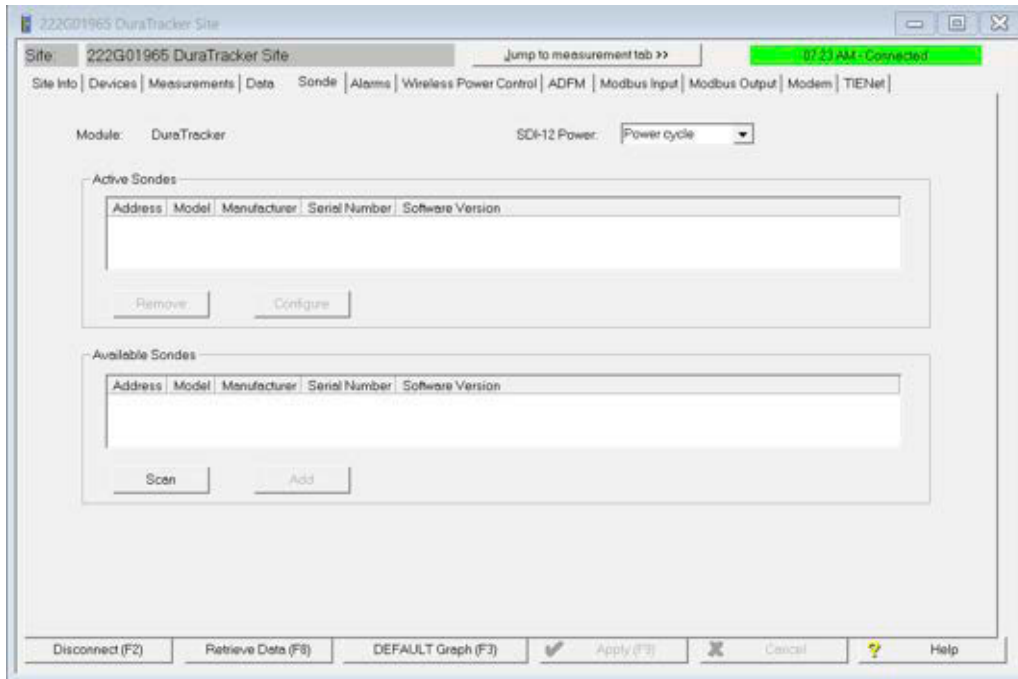

Figure 2-5   Sonde tab

Click SCAN (1) to see the attached devices. Up to two SDI-12 devices can be added to the 305 Rain & SDI-12 Input device. Select the SDI-12 device you want to use from the AVAILABLE SONDES list (2) and click ADD to move it to the ACTIVE SONDES list (3).
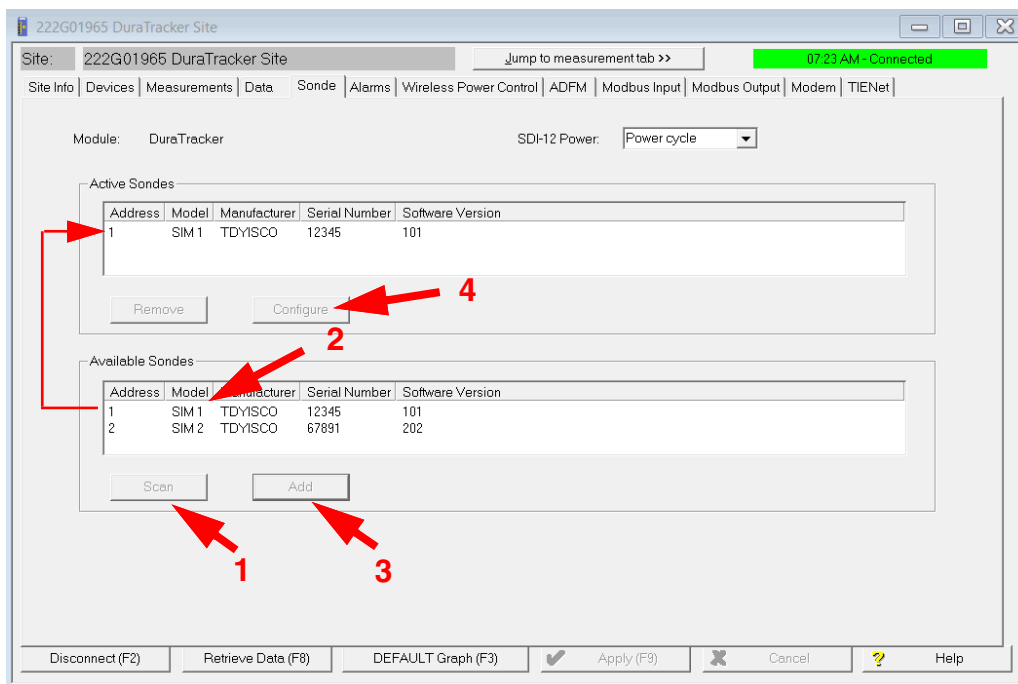

Figure 2-6   Sonde tab Scan

Select the Sonde that you want to use from the list of active sondes and click CONFIGURE (Figure 2-6, step 4). The SONDE DATA window opens (Figure 2-7).

Figure 2-7   Sonde Data window

You will now be able to set up the Sonde using the manufacturer's manual.

BANK is used for measurement bank.

- For example, Address "a" Bank 2 sends measurement command "aM2", where "a" is the address.
- If you are unsure, use Address "a" Bank 0 (sends "0M!"), where "a" is the address.
- Use 'C' Bank for concurrent measurement ("0C!").
- Reading is the measurement Index for the "Send Data" response.

2.3 Firmware Updates

The sensor firmware can be updated using the Update Software tool included with Flowlink software. Refer to the software help windows for step-by-step instructions.

2.4 Maintenance

Sensor cleaning is recommended every 12 months. The cable and outer surfaces of the 305 sensor can be cleaned with mild detergent and warm water.

> ⚠ **CAUTION**
> Never allow water in enter the connector on the 305 or the connector on the cable end.

2.5 Contact Teledyne ISCO

If you have further questions about the installation, operation, and maintenance of your TIENet device, please contact our service department at:

Teledyne ISCO
4700 Superior St.
Lincoln, NE 68504

Phone: 866 298-6174 or 402 464-0231
Fax: 402 465-3022
E-mail: iscowatersupport@teledyne.com

TIENet™ 305 Rain & SDI-12 Input

Appendix A Replacement Parts

A.1 Replacement Parts

Replacement parts are called out in the following illustrations.

Replacement parts can be purchased by contacting Teledyne ISCO's Customer Service Department.

Teledyne ISCO
Customer Service Department
P.O. Box 82531
Lincoln, NE 68501 USA

Phone: (800) 228-4373
(402) 464-0231
FAX:(402) 465-3022

E-mail: isco.orders@teledyne.com

A.1.1 305 Rain & SDI-12 Input

Replacement Plug Sensor Cap Kit for 2100 Series and TIENet Devices 60-9004-469