



Weaver

CONSTRUCTION MANAGEMENT

3679 S Huron Street, Suite 404 Englewood, Colorado 80110
Phone: (303) 789-4111 FAX: (303) 789-4310

SUBMITTAL TRANSMITTAL

June 6, 2012

Submittal No: 13320-001

PROJECT: **Harold Thompson Regional WRF**
Birdsall Rd.
Fountain, CO 80817
Job No. 2908

ENGINEER: **GMS, Inc.**
611 No. Weber St., #300
Colorado Springs, CO 80903
719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan
Sewage Disposal District**
901 S. Santa Fe Ave.
Fountain, CO 80817
719-382-5303 James Heckman

CONTRACTOR: **Teledyne ISCO, Inc.**
4700 Superior Street
Lincoln, NE 68504
402-464-0231 Shauna Olsen

SUBJECT: ISCO 4700 Refrigerated Sampler

SPEC SECTION: 13320 - Wastewater Composite Sampler

PREVIOUS SUBMISSION DATES:

DEVIATIONS FROM SPEC: ___ YES X NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver Construction Management and, unless indicated otherwise, has been found to be in conformance with the intent of the contract documents.

Contractor's Stamp:

Date: 6/6/12

Reviewed by: Leslie Brown

(x) Reviewed Without Comments

() Reviewed With Comments

Engineer's Stamp:

ENGINEER'S

COMMENTS: _____

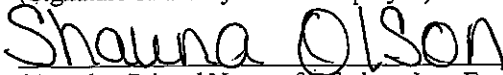
TELEDYNE ISCO SUBMITTAL FORM

Customer	Weaver General Construction	Order Number	6233171
	3679 South Huron Street Suite 404	Purchase Order	83087
	Englewood, CO 80110		
Ref:	Fountain Colorado Project		
		<input checked="" type="checkbox"/>	Hold for Customer Approval
		<input type="checkbox"/>	Revised & Resubmitted
Quantity	Part #	Description	
2	68-4700-064	4700 Refrigerated Sampler (120 VAC, 60 Hz) with battery backed power. Includes control panel, refrigeration unit, distributor arm, battery backed connector adapter, 6.5 AH lead-acid battery, battery bracket, two pump tubes, instruction manual and pocket guide.	
2	Extwaren	1 year extended warranty.	
2	68-4700-020	4700 refrigerated sampler multipurpose cable with 16 unterminated leads, 10 ft. (3m). Includes instruction sheet.	
2	68-4700-009	1-bottle Configuration. Includes one polyethylene 9.5-liter (2.5 gallon) round bottle, locating base, one cap and two discharge tubes.	
6	68-2740-009	2.5-gallon (10-liter) polyethylene round bottle with 2 caps.	
2	68-4700-004	24-bottle Configuration. Includes 24 glass 350-ml round bottles with PTFE line caps, retaining ring, bottle rack and two discharge tubes.	
2	68-2100-001	350-ml glass round bottles with PTFE lines caps-quantity 24.	
2	68-1680-058	3/8 inch vinyl suction line-100 ft. Includes tubing coupler.	
2	60-9004-367	3/8 inch standard weighted polypropylene strainer.	
2	60-5304-584	SPA 584. Modification to 4700 refrigerator for addition of Anchor lugs.	
2	60-3703-278	Pump Housing bushing.	
2	60-6700-062	Pump tubing for 4700 sampler-quantity 5.	
2	60-4704-024	4700 pump paddle assy.	

Note: One complete operation and maintenance manual in a standard binder is included with each model. Standard manuals include specifications, start-up, operating procedures, schematics, spare parts lists, and all available options. Teledyne Isco does not customize manuals. No start-up and installation is included unless specifically



(Signature of Teledyne Isco Employee)



(Typed or Printed Name of Teledyne Isco Employee)

Teledyne Isco, Inc.
4700 Superior Street
Lincoln, NE 68504
Phone: (402) 464-0231
USA & Canada: (800) 228-4373
FAX: (402) 465-3022

Teledyne Isco One Year Limited Warranty*

Factory Service for Teledyne Isco Flow Meters, Waste Water Samplers, and Syringe Pumps

This warranty exclusively covers Teledyne Isco instruments, providing a one-year limited warranty covering parts and labor.

Any instrument that fails during the warranty period due to faulty parts or workmanship will be repaired at the factory at no charge to the customer. Teledyne Isco's exclusive liability is limited to repair or replacement of defective instruments. Teledyne Isco is not liable for consequential damages.

Teledyne Isco will pay surface transportation charges both ways within the 48 contiguous United States if the instrument proves to be defective within 30 days of shipment. Throughout the remainder of the warranty period, the customer will pay to return the instrument to Teledyne Isco, and Teledyne Isco will pay surface transportation to return the repaired instrument to the customer. Teledyne Isco will not pay air freight or customer's packing and crating charges. This warranty does not cover loss, damage, or defects resulting from transportation between the customer's facility and the repair facility.

The warranty for any instrument is the one in effect on date of shipment. The warranty period begins on the shipping date, unless Teledyne Isco agrees in writing to a different date.

Excluded from this warranty are normal wear; expendable items such as charts, ribbon, lamps, tubing, and glassware; fittings and wetted parts of valves; and damage due to corrosion, misuse, accident, or lack of proper maintenance. This warranty does not cover products not sold under the Teledyne Isco trademark or for which any other warranty is specifically stated.

No item may be returned for warranty service without a return authorization number issued by Teledyne Isco.

This warranty is expressly in lieu of all other warranties and obligations and Teledyne Isco specifically disclaims any warranty of merchantability or fitness for a particular purpose.

The warrantor is Teledyne Isco, Inc. 4700 Superior, Lincoln, NE 68504, U.S.A.

*** This warranty applies to the USA and countries where Teledyne Isco Inc. does not have an authorized dealer. Customers in countries outside the USA, where Teledyne Isco has an authorized dealer, should contact their Teledyne Isco dealer for warranty service.**

Before returning any instrument for repair, please call, fax, or e-mail the Teledyne Isco Service Department for instructions. Many problems can often be diagnosed and corrected over the phone, or by e-mail, without returning the instrument to the factory.

Instruments needing factory repair should be packed carefully, and shipped to the attention of the service department. Small, non-fragile items can be sent by insured parcel post. **PLEASE BE SURE TO ENCLOSE A NOTE EXPLAINING THE PROBLEM.**

Shipping Address: Teledyne Isco, Inc. - Attention Repair Service
4700 Superior Street
Lincoln, NE 68504 USA

Mailing Address: Teledyne Isco, Inc.
PO Box 82531
Lincoln, NE 68501 USA

Phone: Repair service: (800) 775-2965 (lab instruments)
(866) 298-6174 (samplers & flow meters)
Sales & General Information: (800) 228-4373 (USA & Canada)

Fax: (402) 465-3001

Email: IscoService@teledyne.com



March 8, 2011 P/N 60-1002-040 Rev E

 **TELEDYNE ISCO**
A Teledyne Technologies Company

Charles V. Fulmer
Vice President & General Manager



TELEDYNE ISCO
A Teledyne Technologies Company

4700 Superior Street
P.O. Box 82531
Lincoln, NE 68501-2531
Ph: 402-465-3031
Fax: 402-465-3905
Email: cfulmer@teledyne.com
www.isco.com

January 4, 2010

Subject: Certification of ARRA Buy American Provision

Dear Valued Customer:

Section 1605 of P.L.111-5 – the American Recovery and Reinvestment Act (ARRA) – contains a “Buy American” provision which prohibits the use of ARRA funds for a project “unless all of the iron, steel and manufactured goods used in the project are manufactured in the United States.” Subsequently, on April 28, 2009, the United States Environmental Protection Agency issued a Memorandum clarifying the Buy American provisions contained in the ARRA.

Based upon the wording of the P.L.111-5 and upon the USEPA clarification, I hereby certify that the manufactured goods that Teledyne Isco supplies to the clean water industry for use in ARRA-funded projects are in full compliance with the Buy American provision, Section 1605 of the Act. All Teledyne Isco products are manufactured, assembled or otherwise configured at our factory in Lincoln, Nebraska, and therefore qualify as goods manufactured in the United States of America.

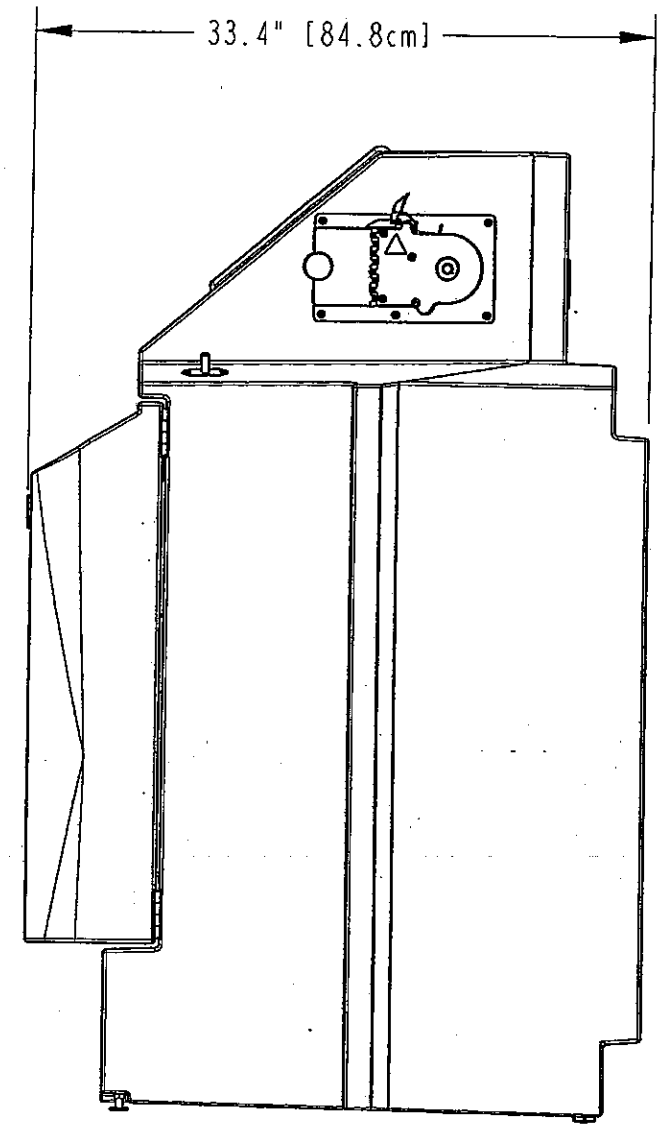
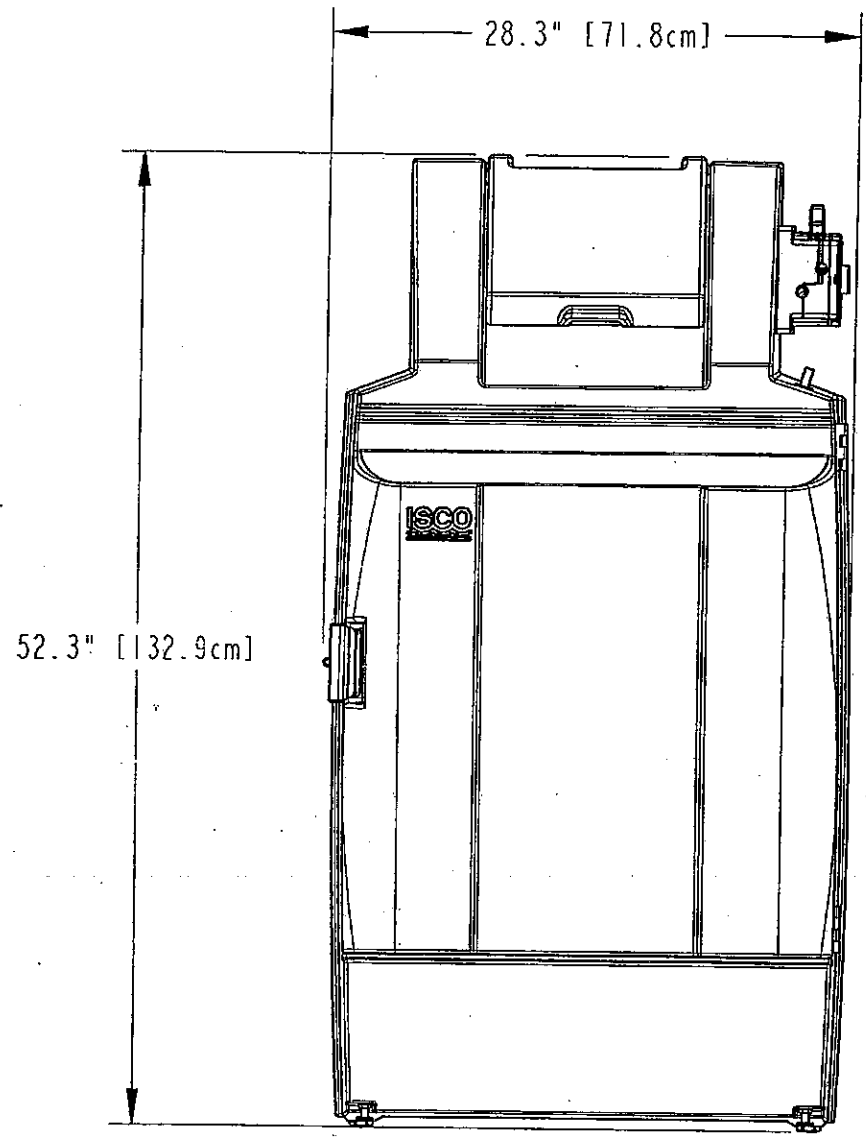
Please feel free to contact me if you have any questions in this matter or if we can be of further assistance.

Sincerely yours,

Charles V. Fulmer
Vice President and General Manager
Teledyne Isco, Inc.
Lincoln, Nebraska, USA

604702027

REVISIONS					
CHG.	AUTHORITY	DESCRIPTION	BY	CHKD	DATE



UNCONTROLLED

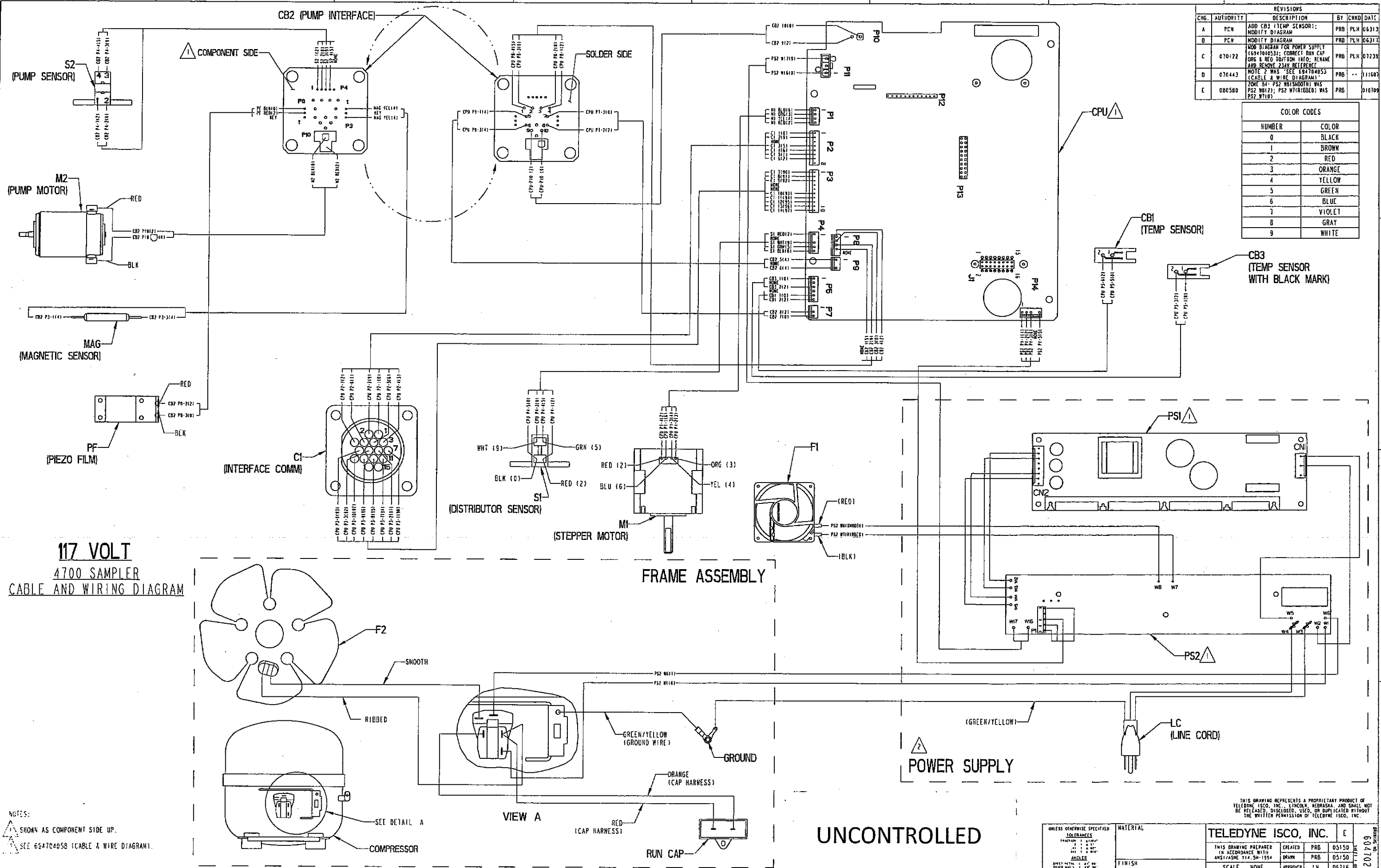
4700 REFRIGERATED SAMPLER TECHNICAL INFORMATION	
WEIGHT(DRY)	159lbs. [72.1kg]
POWER REQUIREMENTS	120V 60Hz, OR 230V 50Hz
ELECTRICAL CONNECTIONS	FLOW METERS/ALARMS - 16 CONDUCTOR PLUG PROVIDES CONNECTION TO FLOW METER OR ALARM OUTPUTS

THIS DRAWING REPRESENTS A PROPRIETARY PRODUCT OF TELEDYNE ISCO, INC., LINCOLN, NEBRASKA, AND SHALL NOT BE RELEASED, DISCLOSED, USED, OR DUPLICATED WITHOUT THE WRITTEN PERMISSION OF TELEDYNE ISCO, INC.

TOLERANCES FRACTION = ±1/64" .X = ±.1" .XX = ±.02" .XXX = ±.010" ANGLES SHEET METAL = ±1° 00' OTHER MAT'L = ±0° 30' SURFACE ROUGHNESS 125 MICROINCHES MAXIMUM	MATERIAL	TELEDYNE ISCO, INC.			DRAWING NO. 604702027
	FINISH	THIS DRAWING PREPARED IN ACCORDANCE WITH ANSI/ASME Y14.5M-1994	CREATED	PRB	
		SCALE 0.100	DRAWN	PRB	06198
			APPROVED	LF	06198
SPECIFICATION DRAWING FOR 4700 REFRIGERATED SAMPLER					

SHEET 1 OF 2

8 7 6 5 4 3 2 1



REVISIONS			
CHG.	AUTHORITY	DESCRIPTION	BY [CHKD DATE]
A	PCW	ADD CB3 (TEMP SENSOR); MODIFY DIAGRAM	PRB PLH 06313
B	PCW	MODIFY DIAGRAM	PRB PLH 06317
C	070122	MOD DIAGRAM FOR POWER SUPPLY (69+704853); CORRECT RUN CAP ORG & REG 10/7/50M INFO; RE-NAME AND REMOVE 234V REFERENCE	PRB PLH 07238
D	070443	NOTE 2 WAS "SEE 69704053 (CABLE & WIRE DIAGRAM)"	PRB --- 111607
E	080580	ZONE 84 - PS2 W/1500TH; WAS PS2 W/121; PS2 W/1100TH; WAS PS2 W/110	PRB 010709

COLOR CODES	
NUMBER	COLOR
0	BLACK
1	BROWN
2	RED
3	ORANGE
4	YELLOW
5	GREEN
6	BLUE
7	VIOLET
8	GRAY
9	WHITE

117 VOLT
4700 SAMPLER
CABLE AND WIRING DIAGRAM

NOTES:
1. SHOWN AS COMPONENT SIDE UP.
2. SEE 69704058 (CABLE & WIRE DIAGRAM).

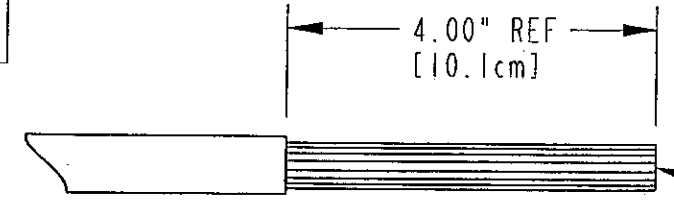
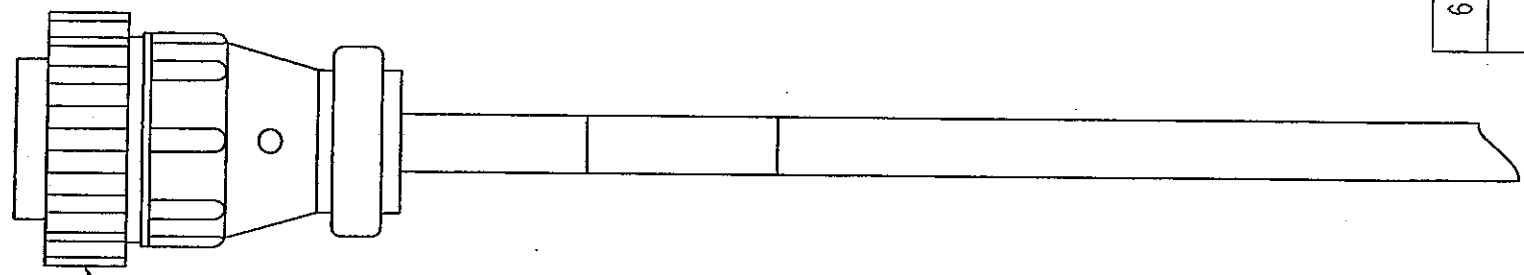
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UNLESS OTHERWISE SPECIFIED		TELEDYNE ISCO, INC.		E	
TOLERANCES	MATERIAL	THIS DRAWING PREPARED	DATE	BY	DATE
FRACTION: 1/16"		IN ACCORDANCE WITH	05150	PRB	05150
DECIMAL: 0.001"		ANSI/ASME Y14.5M-1994		PRB	05150
ANGLE		SCALE	NONE	APPROVED	LN 06216
SHEET METAL: 1/8" BY OTHER METAL: 1/16" BY		WIRING DIAGRAM, 117 VOLT, 4700 REFRIGERATED SAMPLER			
SURFACE FINISH:		DRAWING NO. 601702020			
FINISH					

UNCONTROLLED

604702027

REVISIONS				
CHG.	AUTHORITY	DESCRIPTION	BY	CHKD DATE



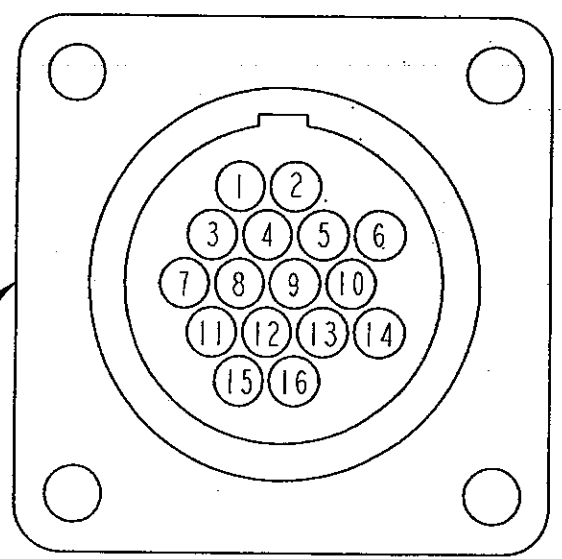
SEE TABLE BELOW FOR COLOR CODES

4700 SAMPLER CABLE
 LENGTH: 10.0' [3.0m]
 PART NUMBER: 694704041

STANDARD CABLES ALSO AVAILABLE:

- 1) 4700 SAMPLER TO ISCO FLOW METER (6 PIN)
 LENGTH: 25.0' [7.6m]
 PART NUMBER: 694704043
- 2) 4700 SAMPLER TO SERIAL COMPUTER (9 PIN)
 LENGTH: 12.5' [3.8m]
 PART NUMBER: 694704042

PIN #	FUNCTION	UNIVERSAL CABLE COLOR CODE
1	12V TO FLOW METER	BLACK
2	GROUND TO FLOW METER	WHITE
3	FLOW PULSE INPUT FROM FLOW METER	GREEN
4	SERIAL (INTERROGATOR) OUTPUT	BLUE
5	EVENT MART OUTPUT TO FLOW METER	ORANGE
6	INHIBIT IN FROM FLOW METER/ SERIAL (INTERROGATOR) INPUT	RED
7	12V OUTPUT	WHITE/BLACK
8	GENERAL OUTPUT 1 - 0 to 5V DC 100 mA MAX	RED/BLACK
9	GENERAL OUTPUT 2 - 0 to 5V DC 100 mA MAX	RED/WHITE
10	GENERAL OUTPUT 3 - 0 to 5V DC 100 mA MAX	ORANGE/BLACK
11	GENERAL OUTPUT 4 - 0 to 5V DC 100 mA MAX	GREEN/BLACK
12	+ 4-20mA INPUT	GREEN/WHITE
13	- 4-20mA INPUT	BLUE/WHITE
14	GROUND	BLUE/BLACK
15	NO CONNECT	BLACK/WHITE
16	NO CONNECT	BARE



16 PIN CONNECTOR
 ON 4700 SAMPLER
 BACK SIDE

CUP SIDE VIEW

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		THIS DRAWING PREPARED IN ACCORDANCE WITH ANSI/ASME Y14.5M-1994	CREATED PRB 06198	DRAWN PRB 06198	APPROVED LF 06198	
SCALE 0.100		SPECIFICATION DRAWING FOR 4700 REFRIGERATED SAMPLER				

SECTION []
Teledyne Isco 4700 Refrigerated Sampler
Engineering Specifications
Revised: October 27, 2010

PART [] PRODUCTS

1.1 Manufacturer

- A. Wastewater sampling equipment supplied by Teledyne Isco, Inc. 4700 Superior Street, Lincoln, NE, 68504-1398. Phone (402) 464-0231, fax (402) 465-3064, email IscoInfo@teledyne.com, web site www.isco.com.

2.1 Design

The automatic refrigerated wastewater sampler shall be furnished for sequential and composite sampling applications, and shall be suitable for indoor or outdoor installation without the requirements for additional enclosures for weather protection. The sampler shall be capable of collecting samples from a variety of liquid sources including open channels, sewers, and stormwater conduits. The sampler will route samples to storage containers for collection and off-site analysis. The sample stream will be a direct path from sample source to sample bottle. Samples will not pass through metering chambers or other diversions. The sampler shall be suited to collect priority pollutant or general purpose samples in multiple bottles or a single bottle. The sampler will be line (AC) powered (110 volt 60Hz or 220 volt 50Hz).

A. Refrigerator

1. The refrigerator shall have a target cooling range of 34-48°F (1-9°C), with a setpoint accuracy of ± 1 degree C at 4°C in 75°F (24°C) ambient conditions.
2. The refrigerator shall have a 5 minute typical recovery time to return to 39°F (4°C) after the door has been opened for 1 minute in 75°F (24°C) ambient conditions.
3. The collected samples shall be stored in an enclosure capable of operating in ambient temperatures from -20°F to 120°F (-29° to 49°C).
4. Built-in heaters shall prevent collected samples from freezing if the ambient air temperature drops below freezing.
5. The compressor shall disengage if a temperature of 221°F (105°C) is reached.
6. The refrigerator shall, upon program initiation, drop the temperature within the sample compartment by 2.5° C below the set temperature for the first 24 hours of operation before resuming normal operation.

B. Controller

1. The sampler's memory shall maintain the program settings, stored programs, and the results of the last sampling sequence when the sampler is turned off or an external power interruption occurs.
2. A user-initiated diagnostics routine shall determine the operational status of the sampler. The controller will display any error conditions detected by the diagnostic routines.
3. The current refrigeration temperature shall appear on the sampler's display, and temperature readings shall be stored in a report.
4. The controller shall be able to automatically switch input power to a connected Isco power supply in the event of a loss of AC power.
5. Sample volumes shall be selectable from 10 to 9,990 ml in 1-ml increments.

6. The sampler shall be capable of being programmed to rinse the suction line with the source liquid up to three times.
7. The sampler shall typically deliver sample volumes with an accuracy of ± 10 ml or $\pm 10\%$, whichever is greater, of the programmed value. The sample volume repeatability shall be ± 5 ml or $\pm 5\%$, whichever is greater, of the average of the maximum and minimum sample volume in the sample set.
8. The sampler shall collect sequential or composite samples at user-definable intervals and volumes. A delay to first sample collection shall be programmable by the real-time clock.
 - i. Time Pacing
The sampler will use an internal real-time clock to provide time and date information. Uniform time-paced samples shall be collected at regular time intervals from 1 minute to 99 hours 59 minutes. Sample volumes may be equal or variable in proportion to flow.
 - ii. Flow Pacing, DC Pulse
The sampler shall accept a 5 to 15 VDC flow proportional pulse or isolated dry contact closure, at least 25 ms in duration, from an external flow meter for flow pacing. Samples shall be equal in volume and shall be taken at variable times proportional to flow. The number of flow pulses shall be selectable, from 1 to 9,999 pulses, as the flow interval for each sample collection.
 - iii. Flow Pacing, Analog Input
The sampler shall have a standard 4-20mA flow proportional input compatible with most flow meters without additional interfacing. Samples shall be equal in volume and shall be taken at variable times proportional to flow.
 - iv. Flow-Weighted Volumes, DC Pulse
The sampler shall accept a 5 to 15 VDC flow proportional pulse or isolated dry contact closure, at least 25 ms in duration, from an external flow meter. Samples shall be taken at equal time intervals, and variable sample volumes shall be proportional to cumulative flow.
 - v. Flow-Weighted Volumes, Analog Input
The sampler shall have a standard 4-20 mA flow proportional input compatible with most flow meters without additional interfacing. Samples shall be taken at equal time intervals, and variable sample volumes shall be proportional to cumulative flow.
9. The sampler shall have 3 selectable modes of sample distribution.
 - i. Samples per bottle mode: The sampler shall be capable of depositing a minimum of 15 samples in each sample container.
 - ii. Bottles per sample mode: The sampler shall be capable of filling all sample bottles with a single initiation.
 - iii. Multiple bottle composite mode: The sampler shall be able to simultaneously create a user-selected pair or set of bottles for depositing of multiple samples, switching bottles after a programmed period of time has elapsed, or a programmed number of samples has been collected.
10. Sampler Outputs
 - i. The sampler shall have four standard digital alarm outputs capable of direct wiring to a Programmable Logic Controller (PLC) or data logger (5 volt, 100 mA).

- ii. Output alarms shall include: Program started, Program completed, Pump error, Distributor jammed, 3-way valve control¹, Taking sample, Pumping forward, Powered up, Pumping reverse, Bottle full, and Delay before sample.
- iii. The sampler shall output an event mark of 12VDC for the duration of the sample fill, from the flow meter connector.
- iv. The sampler shall store a one-minute temperature data report retrievable by an IBM-compatible computer using a program such as Hyper Terminal. The program shall include failsafe loading with site ID codes to prevent field errors due to multiple files.

11. Pump

Samples will be collected via a peristaltic pump. This pump shall produce typical line velocities of 3.0 feet per second in a 3/8 inch (0.95 cm) ID suction line at 3 feet (1 m) of head. At 25 feet (7.6 m) of head, the pump shall typically produce a line velocity of 2.2 feet (0.67 m) per second. The pump shall be capable of lifting a sample a maximum of 28 feet (8 m).

- i. Before and after each sample is collected, the pump shall air-purge the suction line. Pre-purges and post-purges will be automatically controlled, and no pre-calibration adjustments are required.
- ii. With the opening of the pump's latch and band, all power will be removed from the sampler's pump motor, to eliminate the possibility of a pump activation injuring personnel.
- iii. The liquid detection system shall minimize the effects of changing head, intermittent flow in the suction line, or variable battery conditions on sample volume. After initial detection of liquid, the sensor shall monitor for the presence of liquid during the sample collection sequence, allowing for full bottle detection in composite mode. The liquid detector also monitors for anomalies in the sample collection process. If no liquid is detected, the sampler shall be capable of retrying the sampling sequence up to three times.
- iv. After liquid detection, the pump revolution counter shall count actual pump revolutions to determine sample volume delivery to the storage containers. If liquid flow is interrupted during the sample collection sequence, the detector shall inhibit the pump revolution counter from incrementing until liquid flow is restored. Automatic compensations for air slugs in the sample shall be made by the delivery system. Additionally, the pump revolution counter shall monitor the total number of pump revolutions and alert the user when a pre-selected number of counts has been reached to alert the user of the need for pump tubing replacement. One pump revolution is equivalent to 12 pump counts. This indicator shall appear on the controller display screen.

3.1 Description

A. Sampler

- 1. The top section housing the control panel, pump, distributor electronics, and power supply box shall be rated NEMA 4X, 6, and IP 67.
- 2. The sampler shall include long-life electronic temperature sensing devices that measure the refrigeration compartment and evaporator plate temperatures. A microprocessor will utilize this sensor to control operation of the compressor, built-in heaters, and the self-defrosting cycle of the evaporator plate.

B. Refrigerator

The shell of the refrigerator shall be constructed of rotationally molded UV-resistant polyethylene with molded-in-place thermal insulation, providing exceptional resistance to corrosion and weathering. The top of the refrigerator door shall be recessed for ease of access from above. For 24 bottle configurations, the bottle rack shall slide out for ease of sample recovery. The copper refrigeration lines, condenser coil, and evaporator plate will be powder-coated with heat-treated polyester, then painted with a rust converter paint overcoat, for additional corrosion resistance.

1. The refrigerator's door shall have hasps capable of accepting a padlock to prevent unauthorized tampering with the sample compartment contents. A compression gasket will be used to seal the refrigerator door. The refrigerator power supply and solid-state thermostat shall be contained in an epoxy-potted enclosure housed in a discrete compartment of the sampler's molded frame. All exposed metal components used in the construction of the refrigeration system shall be either plated aluminum or stainless steel.
2. The refrigerator will use a condensing coil with forced-air cooling.
3. The compressor is rated at (1/5 Hp for 110V)(1/4 Hp for 220V). The compressor will be equipped with a temperature safety cutout that will disengage the compressor if a temperature of 221°F (105°C) is reached.
4. The refrigeration system will contain HFC-134a refrigerant, a non-CFC refrigerant with an ozone depletion potential of zero.

C. Controller

1. The controller shall be housed in a discrete compartment of the sampler's molded frame beneath a flip cover.
2. The controller will show sampler status and program information via a 2-row, 20-column, 40 total character display. This display shall be angled for easy viewing, and backlit for easy use in all light conditions. All programming and manual control of the sampler will be entered via an 18 position keypad.
3. The controller shall not require a separate heater.

4. Pump

- i. The modular peristaltic pump shall be housed in a discrete compartment of the sampler's molded frame, beneath a latched cover. The pump casing shall be constructed of high strength Noryl plastic and designed for corrosion resistance.
- ii. The pump shall include a latched housing cover and thumbscrew opening for the replacement of pump tubing. The pump shall include a built-in magnetic safety interlock.
- iii. The pump shall include an optional heater², housed beneath the pump cover, for the prevention of liquid freezing inside the pump under extremely cold conditions. A heater shall be available for both 115VAC and 230VAC samplers.
- iv. Liquid Detector
The sampler will sense the presence of the liquid via a non-wetted, non-conductive detector. The sensor shall not be dependent on, or affected by, any chemical or physical property of the liquid or its contents. The sensor shall not require routine maintenance or cleaning.
- v. The pump tubing used shall be specially treated to minimize water extractable pollutants. Specially designed bands shall indicate the correct placement of the

tubing inside the pump. The tubing shall typically last for a minimum of 1,000,000 pump counts.

D. Distributor

The modular distributor shall be housed in a discrete compartment of the refrigerator's molded frame. Sample distribution will be belt-driven by a stepper motor. Positive location of the distributor arm will be achieved using an optical sensor. A single adjustable distributor arm will be used for all bottle configurations and sampler mounting possibilities. The distributor arm may be moved by hand for ease of sample recovery, and shall relocate itself before the next sample is taken.

E. Suction Lines and Strainers

The sampler will utilize a suction line and strainer for taking samples. The suction line shall be made of {[3/8 inch (.95 cm) ID vinyl] [3/8 inch (.95 cm) ID PTFE lined polyethylene] with a length of _____ feet}.³ [The suction line shall have a factory-installed standard 3/8" weighted polypropylene strainer, or an optional (all stainless steel strainer for 3/8" (0.95cm) line) (all CPVC weighted strainer for 3/8" (0.95cm) line)].⁴

F. Sample Collection Containers

The sampler shall be supplied with sample collection container(s). The container(s) shall be [(1 round 10L polyethylene)(1 round 10L glass)(1 round 20L polyethylene)(1 round 20L glass)(2 round 10L polyethylene)(2 round 10L glass)(4 round 10L polyethylene)(4 round 10L glass)(24 wedge 1L polypropylene)(24 round 350ml glass)]⁵.

¹ Specify optional pressurized line capability.

² Specify optional pump heater.

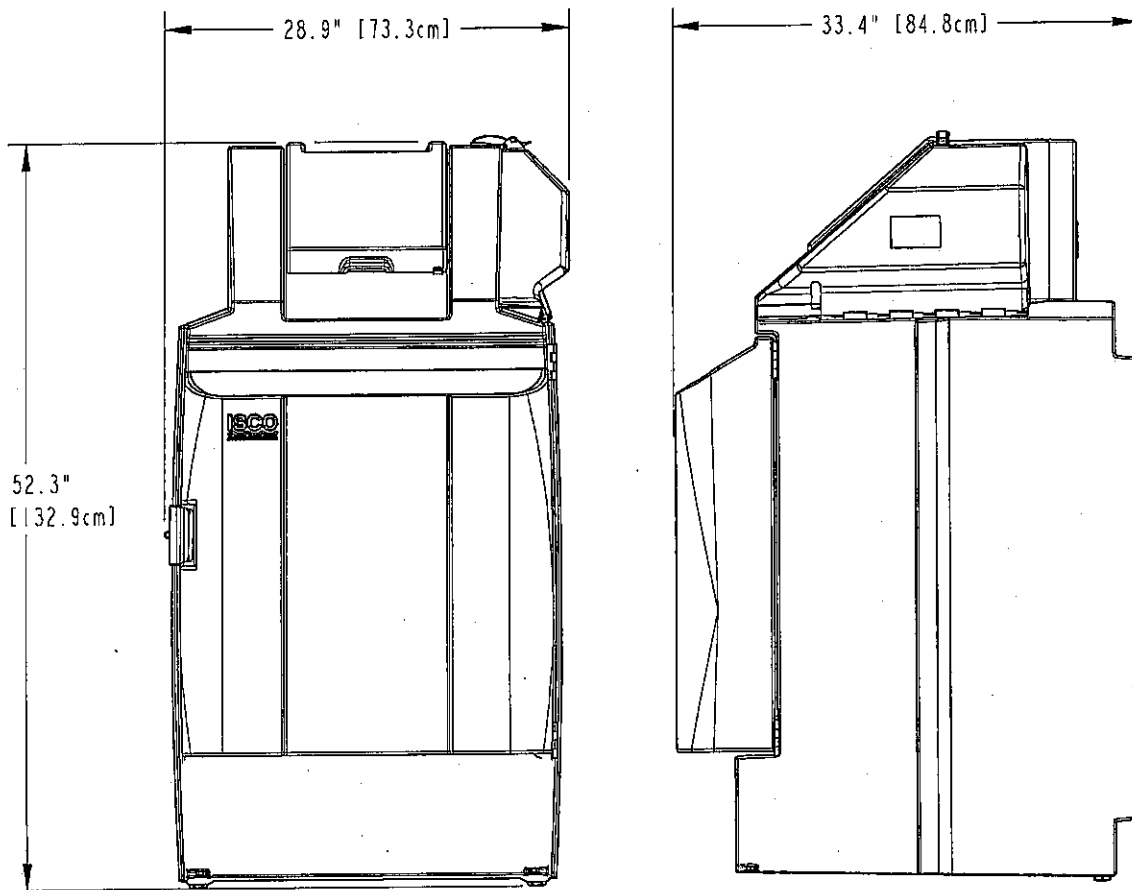
³ Specify length and material for sampler suction line

⁴ Specify type of strainer for sampler suction line

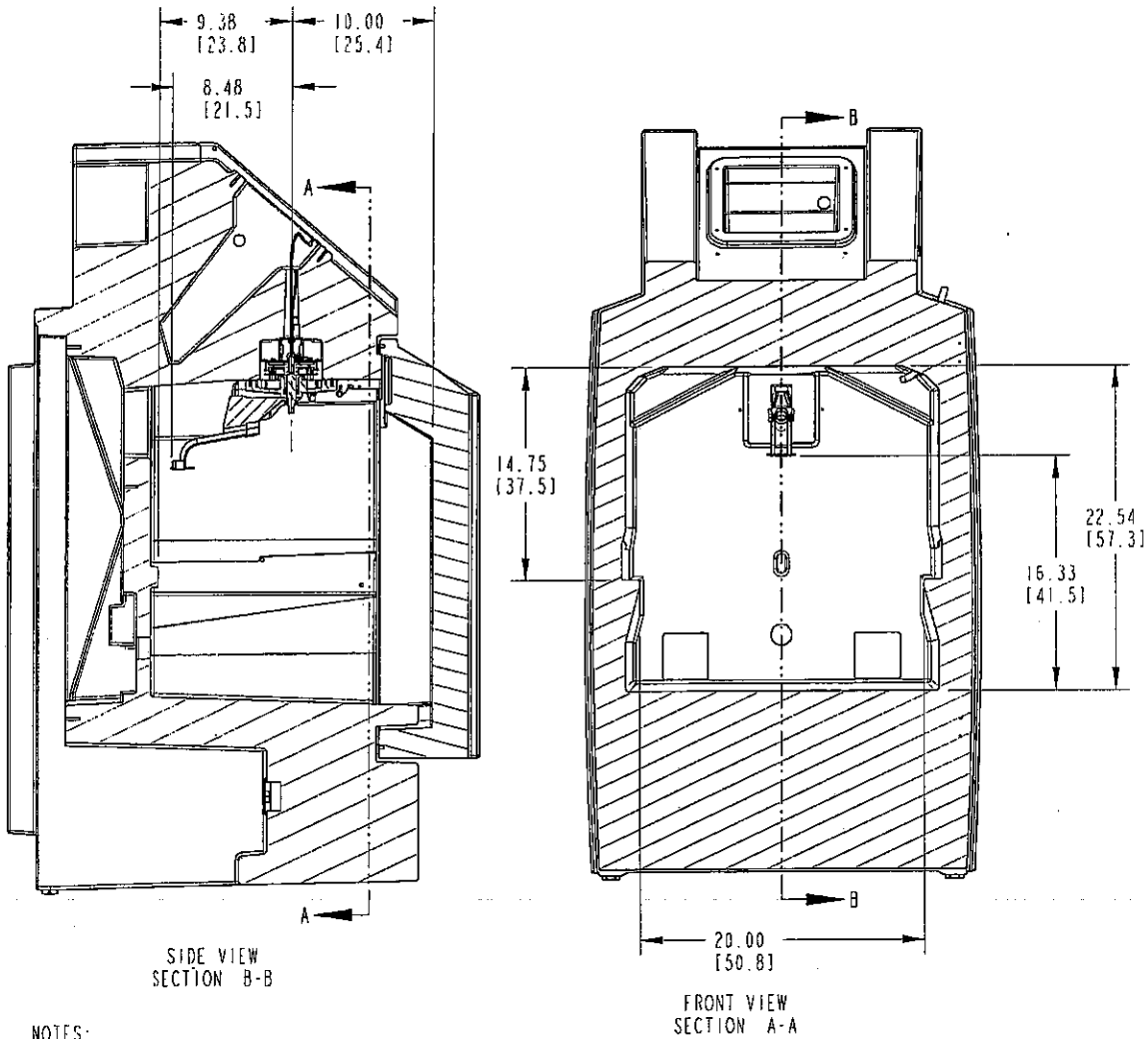
⁵ Specify bottle or bottles required

™- General Elec

4700 Refrigerated Wastewater Sampler



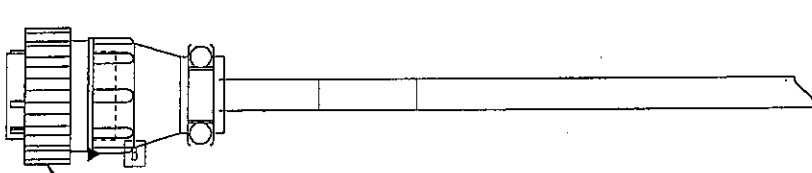
4700 Sampler Bottle Compartment



NOTES:

- I. PRIMARY DIMENSIONS ARE IN INCHES, SECONDARY IN CENTIMETERS.
- I. DISTRIBUTOR ARM IS SHOWN IN PARALLEL POSITION IN SIDE VIEW.

4700 Sampler Cable Connector Pins



4700 SAMPLER CABLE (SOLD SEPARATELY)
 LENGTH: 10.0' [3.0m]
 PART NUMBER: 694704041

NOTE THAT CABLES ARE NOT INCLUDED WITH THE SAMPLER AND MUST BE PURCHASED SEPARATELY.

STANDARD CABLES ALSO AVAILABLE:

1) 4700 SAMPLER TO ISCO FLOW METER (16 PIN)
 LENGTH: 25.0' [7.6m]
 PART NUMBER: 694704043

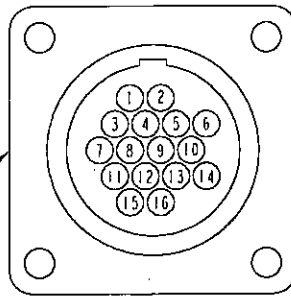
2) 4700 SAMPLER TO SERIAL COMPUTER (9 PIN)
 LENGTH: 12.5' [3.8m]
 PART NUMBER: 694704042

4.00" REF
 [10.1cm]

SEE TABLE BELOW FOR COLOR CODES

604702027
 B

4700 16 PIN FUNCTIONALITY TABLE		
PIN #	FUNCTION	UNIVERSAL CABLE COLOR CODE
1	12V TO FLOW METER	BLACK
2	GROUND TO FLOW METER	WHITE
3	FLOW PULSE INPUT FROM FLOW METER	GREEN
4	SERIAL (INTERROGATOR) OUTPUT	BLUE
5	EVENT MARK OUTPUT TO FLOW METER	ORANGE
6	INHIBIT IN FROM FLOW METER/ SERIAL (INTERROGATOR) INPUT	RED
7	12V OUTPUT	WHITE/BLACK
8	GENERAL OUTPUT 1 - 0 to 5V DC 100 mA MAX	RED/BLACK
9	GENERAL OUTPUT 2 - 0 to 5V DC 100 mA MAX	RED/WHITE
10	GENERAL OUTPUT 3 - 0 to 5V DC 100 mA MAX	ORANGE/BLACK
11	GENERAL OUTPUT 4 - 0 to 5V DC 100 mA MAX	GREEN/BLACK
12	+ 4-20mA INPUT	GREEN/WHITE
13	- 4-20mA INPUT	BLUE/WHITE
14	GROUND	BLUE/BLACK
15	NO CONNECT	BLACK/WHITE
16	NO CONNECT	BARE



16 PIN CONNECTOR
 ON 4700 SAMPLER
 BACK SIDE

CUP SIDE VIEW

[END OF SECTION]

SECTION []
Teledyne Isco Signature Series
Lead Acid Battery Pack Engineering Specifications
October 2011

PART [] PRODUCTS

1.1 Manufacturer

- A. Lead acid gel cell battery pack supplied by Teledyne Isco, Inc. 4700 Superior Street, Lincoln, NE, 68504-1398. Phone (402) 464-0231, fax (402) 465-3064, email IscoInfo@teledyne.com, web site www.isco.com.

2.1 Functional Design

- A. The Model 946 battery pack shall be furnished for powering a Teledyne Isco wastewater sampler and/or flow meter.
- B. The battery pack shall be rechargeable for reuse.

3.1 Description

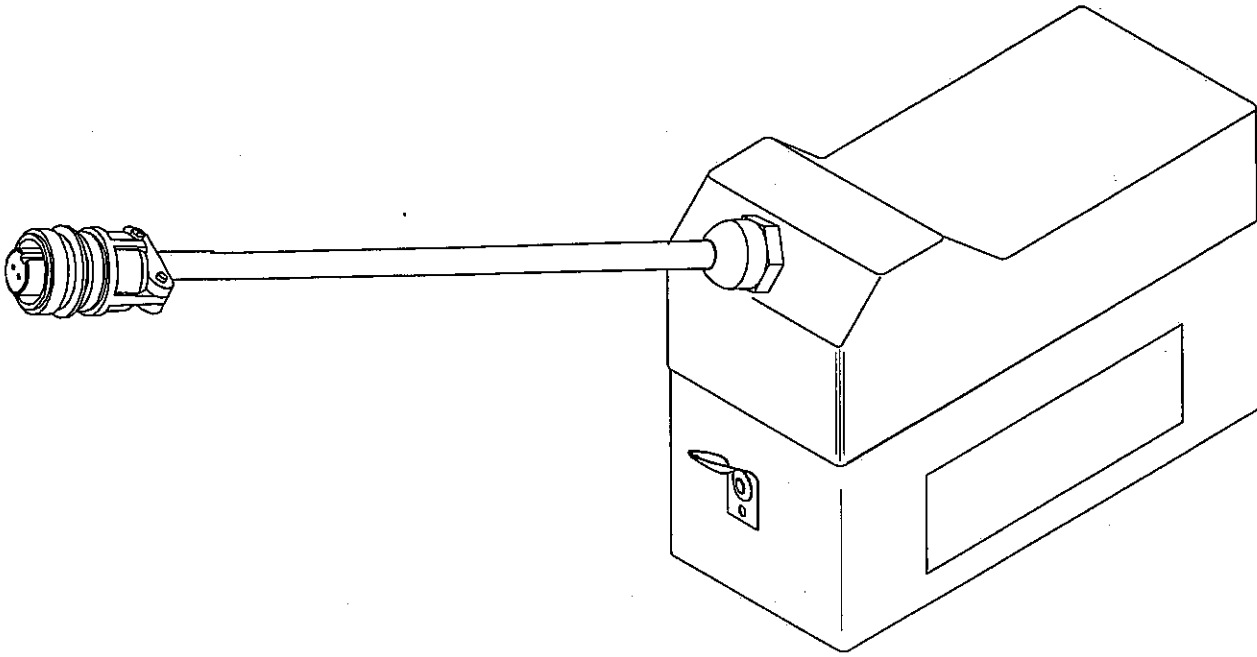
A. Construction

- 1. The 10-inch (25.4cm) connect cable shall terminate in a female 2-pin, 10SL-4S cable mount receptacle shall connect to the power port of the instrument.
- 2. The battery construction shall be sealed gelled electrolyte.
- 3. The battery pack shall weigh 5.2lbs (2.36kg).

B. Operation

- 1. The battery shall supply nominal 12VDC power to the instrument.
- 2. The battery capacity shall be 6.5 Amp Hours.
- 3. The battery shall be rechargeable by optional Teledyne Isco chargers that include solar panel- and line-powered models.¹

Teledyne Isco 946 Lead Acid Battery Pack



Cable length = 12.5in. (31.8cm)

Case (with clips) LxWxH = 7x2.75x5in. (17.8x6.99x12.7cm)

¹ Specify optional Teledyne Isco charger.

Isco 4700 Multipurpose Cable

Preparation and Functions

Instruction Sheet #60-4702-034

Rev B, May 29, 2008

Overview

The terminated end of this multipurpose cable connects to the 16-pin connector on the back side of the 4700 refrigerated sampler. The unterminated end can be wired to compatible circuits for interfacing with the sampler. These instructions explain how to prepare the cable for use, as well as the function of each wire.

CAUTION

Risk of equipment damage. Only experienced electronic technicians should make the connections to an external device using this cable.

Ensure that the connection has protection from the environment, such as running the cable through conduit and making the connections inside a watertight electrical box.

WARNING

Ensure that no wire ends come into contact with each other. Personal injury, power shutdown, or component failure can result.

Wires not in use should be individually sealed at all times.

Standard 10' Length
part #69-4704-041

Custom Length ($\leq 100'$)
part #60-5314-738
(contact factory)

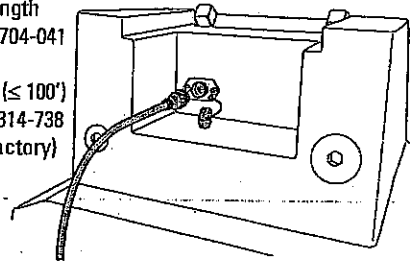


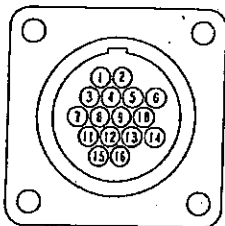
Figure 1: 4700 Refrigerator Rear Connector

Preparation

Referring to Table 1, select the appropriate wires and tin the ends with solder or attach crimped connector ends. Electrically insulate any unused wires.

Table 1: 4700 Rear Connector Pin Functions^a

Pin	Wire Color ^b	Signal	Sampler I/O	Additional Information
1	Black	12VDC	0	+12.5 VDC, 1 ampere maximum
2	White	Ground	n/a	Common ground
3	Green	Flow Pulse	I	25 millisecond (minimum) pulse, +5 to +15 VDC
4	Blue	Serial Data	0	For use with PC connections. Cable 69-4704-042 is recommended.
5	Orange	Event Mark	0	3 second, +12 VDC pulse at beginning of sample collection
6	Red	Enable Pin ^c	I	Ground this input (short to pin 2) to disable sampler operation. Leave this input open (floating) to collect samples.
7	White/Black	12VDC	0	+12.5 VDC, 1 ampere maximum
8	Red/Black	Alarm 1 ^d	0	0 to +5 VDC, 100 mA maximum
9	Red/White	Alarm 2 ^d	0	0 to +5 VDC, 100 mA maximum
10	Orange/Black	Alarm 3 ^d	0	0 to +5 VDC, 100 mA maximum
11	Green/Black	Alarm 4 ^d	0	0 to +5 VDC, 100 mA maximum
12	Green/White	Analog 4-20 mA (+)	I	Linear current loop signal representing minimum flow rate at 4 mA, maximum flow rate at 20 mA. This input is paired with pin 13.
13	Blue/White	Analog 4-20 mA (-)	I	See pin 12.
14	Blue/Black	Ground	n/a	Common ground. Same as pin 2.
15	Black/White	Not Used	n/a	Not used
16	Bare	Not Used	n/a	Not used



- All voltage levels are referenced to common ground on pins 2 and 14.
- For color pairs, the first color named is the predominant color, and the second is the stripe.
- This pin is also used as the Serial Data Input for use with PC connections. Cable 69-4704-042 is recommended instead for a serial data connection.
- See the 4700 Installation and Operation Guide to configure alarm conditions.

Teledyne Isco, Inc.

P.O. Box 82531, Lincoln, Nebraska, 68501 USA

Toll-free: (800) 775-2965 • Phone: (402) 464-0231 • Fax: (402) 465-3001

E-mail: IscoService@teledyne.com



TELEDYNE ISCO

A Teledyne Technologies Company

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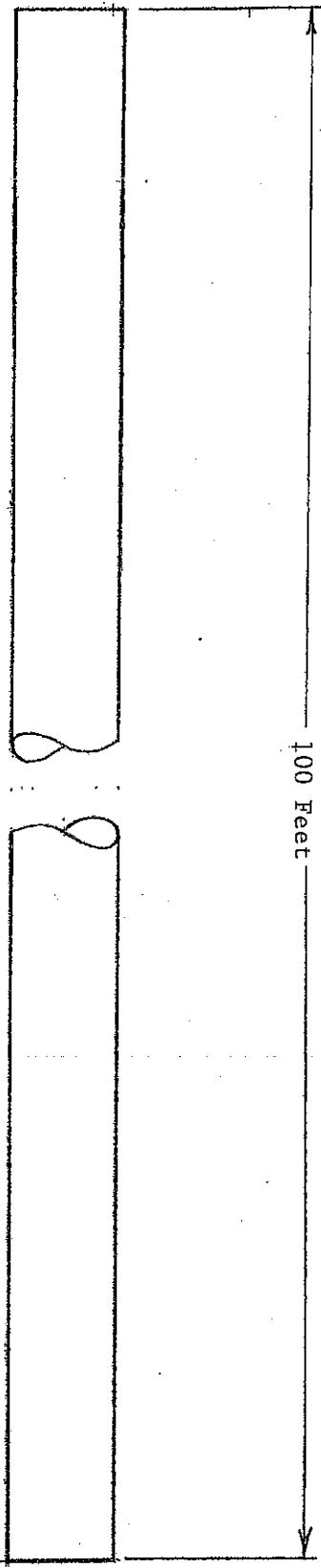
Table 2-3 Unterminated Connect Cable^a

Pin	Wire Color	Signal Name	Sampler Input/Output	Parameters/Comments
1	Black	12 VDC Power	Output	+12.5 VDC, 1 ampere maximum. Power for external devices.
2	White	Ground	N/A	Common ground
3	Green	Flow Pulse	Input	25 millisecond (minimum) pulse, +5 to +15 VDC
4	Blue	Serial Data	Output	For use with PC connections. Cable 69-4704-042 is recommended. See section 4.3.2.
5	Orange	Event Mark	Output	3 second, +12 VDC pulse at beginning of sample collection
6	Red	Enable Pin ^c	Input	Ground this input (short to pin 2) to disable sampler operation. Leave this input open (floating) to collect samples.
7	White/Black	12 VDC	Output	+12.5 VDC, 1 ampere maximum. Power for external devices.
8	Red/Black	Alarm 1 ^d	Output	Alarm Off = 0 VDC, Alarm On = +5 VDC
9	Red/White	Alarm 2 ^d	Output	Alarm Off = 0 VDC, Alarm On = +5 VDC
10	Orange/Black	Alarm 3 ^d	Output	Alarm Off = 0 VDC, Alarm On = +5 VDC
11	Green/Black	Alarm 4 ^d	Output	Alarm Off = 0 VDC, Alarm On = +5 VDC
12	Green/White	Analog 4-20 mA (+)	Input	Linear current loop signal representing minimum flow rate at 4 mA, maximum flow rate at 20 mA. This input is paired with pin 13.
13	Blue/White	Analog 4-20 mA (-)	Input	See pin 12.
14	Blue/Black	Ground	N/A	Common ground. Same as pin 2.
15	Black/White	N/A	N/A	Not used
16	Bare	N/A	N/A	Not used

- a. All voltage measurements are referenced to common ground on pins 2 and 14.
- b. For color pairs, the first named color is the predominant color; the second named color is the spiral stripe around it.
- c. This pin is also used as the Serial Data Input for use with PC connections. Cable 69-4704-042 is recommended instead for a serial data connection. See section 4.3.2.
- d. Output from internal driver is current limited to 100 mA maximum. The output between the alarm pin and ground can drive low-power alarm devices rated for 5 VDC. Control higher-power (>100 mA) devices, or devices with different voltage requirements through a user-supplied relay. See section 3.3.8 to configure alarm conditions.

REVISIONS

REV.	REV. NO.	DESCRIPTION OF CHANGE	BY	CHKD. BY	DATE
Δ	-	ADDED MATL. NOTE	JDD		6/87



NOTES:
 1. MATERIAL - FEP LINER .318" ± .007" ID, .020" ± .005" WALL, PE JACKET .500" OD.

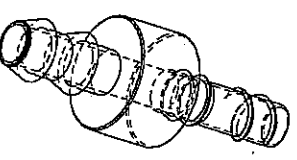
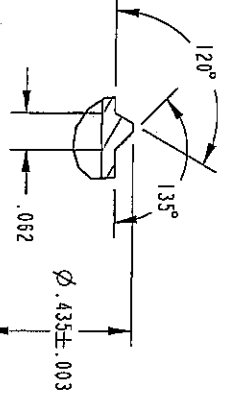
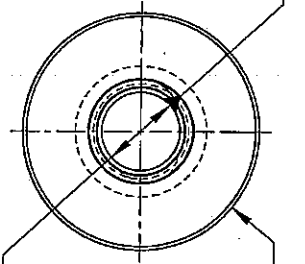
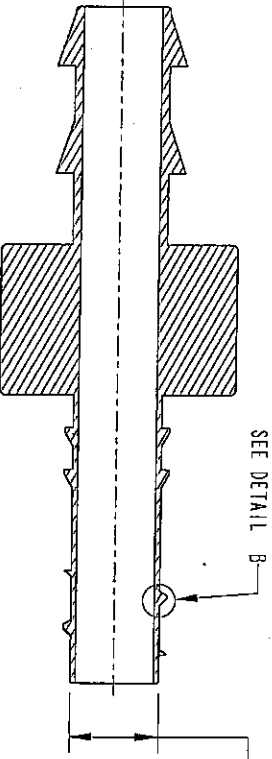
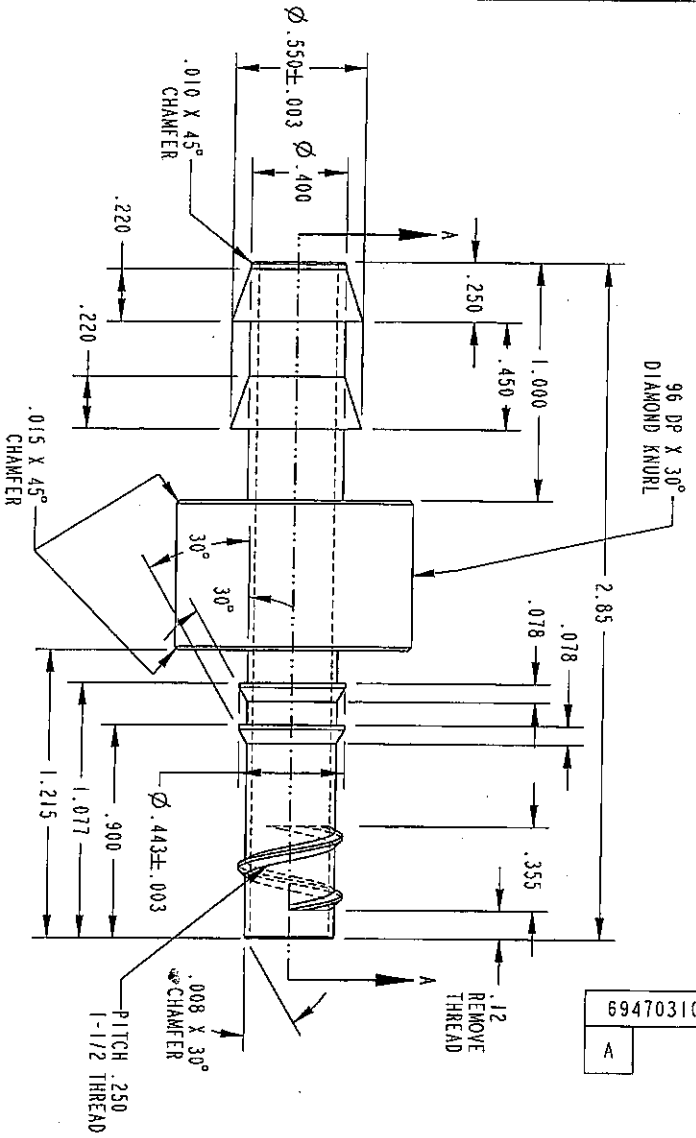
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M=MEGOHMS
 K=KILOHMS
 M=MICROFARADS
 P=PICOFARADS
 VOLTAGE MEASURED TO NEUTRAL
 RETAIN COUPLERS SHOWN RELEASER
 RESISTORS 1/4W, 10%
 CAPACITORS 100V
 DIODES INE14
 UNLESS OTHERWISE NOTED

TOLERANCES
 FRACTION..... ± 1/64"
 XX..... ± .010"
 XXX..... ± .005"
 DO NOT SCALE

MODEL	2700	DATE	BY	DATE
TITLE	3/8" X 100 Ft. Vinyl Suction	CHECKED	BY	DATE
FINISH	NONE	APPROVED	BY	DATE
DRWG NO.	60-2703-14	SHT.	1	1
REV.	A			

SEE NOTE 1



694703106
A

CHG. AUTHORITY		REVISIONS		DESCRIPTION		BY CHNG DATE	
A	0800019	ADD DATE	AND	0101	ADD DATE	AND	011508
HOO NOTE 2 TO REFLECT G10L CHANGE							

- NOTES:
1. PART TO BE CLEAN, DRY, AND BURR FREE.
 2. UNLESS OTHERWISE NOTED ALL CIRCULAR RUNOUT IS $\sqrt{.015}$ C.

UNLESS OTHERWISE SPECIFIED		MATERIAL		TELEDYNE ISCO, INC.		DRAWING NO.	
TOLERANCES		1.000 RND BAR		A		694703106	
FRACTIONS ± .010		SST 303 GND					
DECIMALS ± .003		004221100					
ANGLES ± .100		FINISH					
OTHER MAT'L ± .010		PASSIVATE					
SURFACE ROUGHNESS							
TYP. FINISH							
PART MUST COMPLY WITH FABRICATION STANDARD INDICATED							
THIS DRAWING PREPARED IN ACCORDANCE WITH ANSI/ASME Y14.5M-1994		SCALE N/A		APPROVED		DATE	
DRAWN		RRF		07031			
APPROVED		RRF		07040			
		RRF		07047			

THIS DRAWING REPRESENTS A PROPRIETARY PRODUCT OF TELEDYNE ISCO, INC., LINCOLN, NEBRASKA, AND SHALL NOT BE RELEASED, DISCLOSED, USED, OR REPLICATED WITHOUT THE WRITTEN PERMISSION OF TELEDYNE ISCO, INC.

UNCONTROLLED

SPA# 584
60-5304-584
MOUNTING LUGS FOR REFRIGERATOR
KIT INSTALLATION INSTRUCTIONS

To install (4) stainless steel mounting lugs on an Isco fiberglass refrigerator obtain a drill, 3/16" bit and rivet gun.

The fiberglass refrigerator contains an electronic control box on the back lower left side, this box may need to be moved to allow proper drilling and rivet placement. To access the control box remove the screws that secure the rear plastic plate to the lower back of the refrigerator. See drawing - Loosen, do not remove, the three screws that secure the box to the frame of the refrigerator. Slide the box toward the center of the refrigerator. Re-tighten the three screws that secure the box to the frame. Replace the plastic plate on the lower back of the refrigerator.

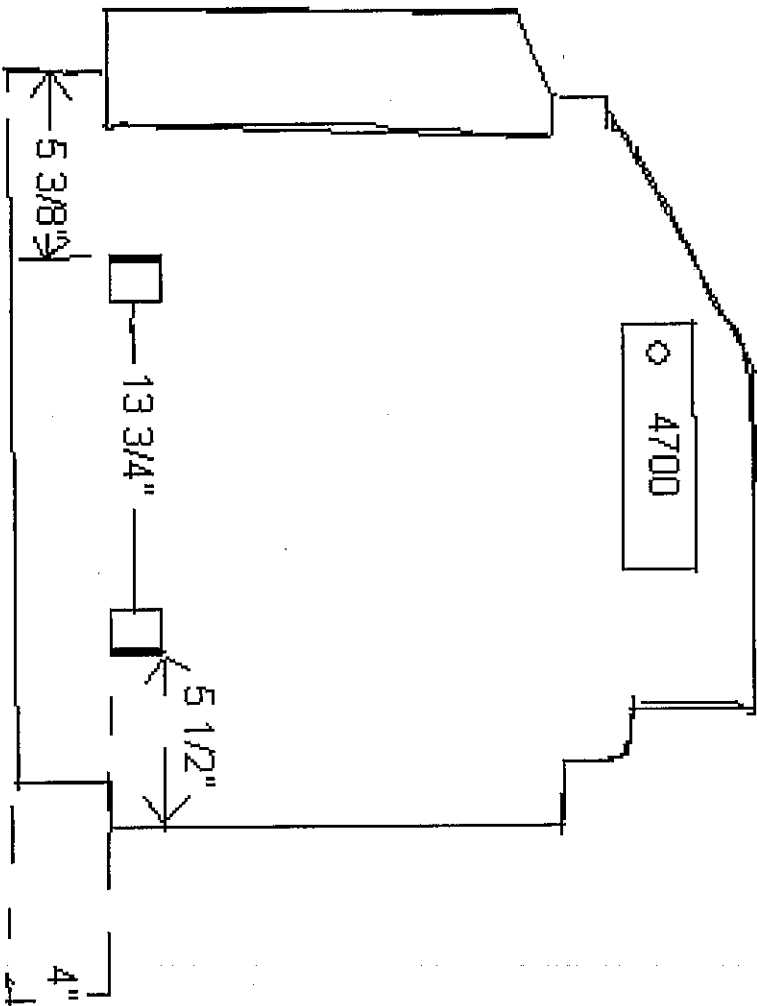
Use 3/16" pilot hole, insure bit does not go more than 1/8" past the inside of the refrigerator compartment.

See drawing, mount lugs on the side of the refrigerator, with flanges vertical, facing outward.

Place bottom of Anchor Lug 1.5" from the bottom edge of the refrigerator.

Mounted vertically, place flanged side of Anchor Lug 3.5" from the side of the refrigerator.

For further assistance, please contact Isco, Inc. at 800-228-4373 or (402) 464-0231.



SPA 584 for 4700
Drawn by Patrick W.
7/26/2007

4700 Refrigerated Sampler Reference Guide



Designed for WWTP Operators

ISCO

Isco 4700 Refrigerated Sampler

Isco's 4700 Refrigerated Sampler set new standards for weather and corrosion resistance. Its rotationally-molded polyethylene construction, user-friendly controls, and workplace-savvy features make it the first choice for stationary sampling in both municipal and industrial wastewater applications.

Use this handy reference guide to explore the design features that make the 4700 Sampler your best choice in refrigerated sampling.

The 4700 gives you:

◆ Ease of Maintenance

Quick & easy pump tube replacement - without tools.

◆ Easy to Service

Modular design uncomplicates servicing. Simply switch out components and put the sampler back into service with minimal downtime.

New modular refrigeration system allows fast, easy removal and replacement.

◆ User Convenience

Protective coatings on refrigeration components
Lockable covers and refrigerator compartment
Automatic variable sample volume control
Single cable for multiple connections
Optional battery-backed power

◆ Superior Cooling Performance

Positive door latch with compression door gasket
Fully insulated
Efficient air circulation fan
Built-in air temperature sensors
Rugged, high-efficiency 1/5 hp compressor

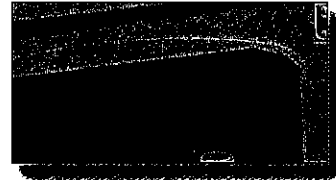
◆ Superior Pump Performance

Non-contacting liquid detection system
Pump revolution counter
Pump tubing bands
Specially formulated pump tubing
= 23 ft. (3.5 m) suction lift
= Line velocity over EPA & ISO recommended
2 ft/sec (0.6 m/sec)

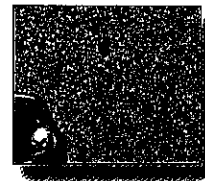
◆ All Weather Operation

Optional pump heater
Corrosion protection on:
= Controller = Refrigeration System
= Distributor = Pump = Cable Connector

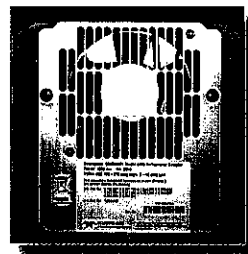
Roto-molded cabinet provides exceptional durability and is fully insulated for maximum refrigeration performance and economical operation.



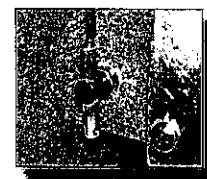
Integrated Drip rail over bottles prevents contamination of open bottles when door is opened.



Textured surfaces cover the enclosure to repel dirt and dust.

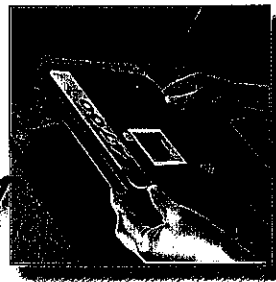


Circulation fan keeps cold air in the refrigeration compartment and moves warmer air to the cooling chamber.

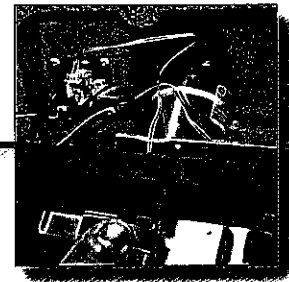


Air temperature sensor is located in the warmest part of the refrigerator for quicker reaction to temperature changes.

Easy to Service Components



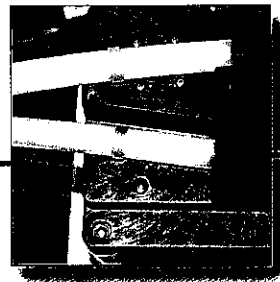
Removing control panel



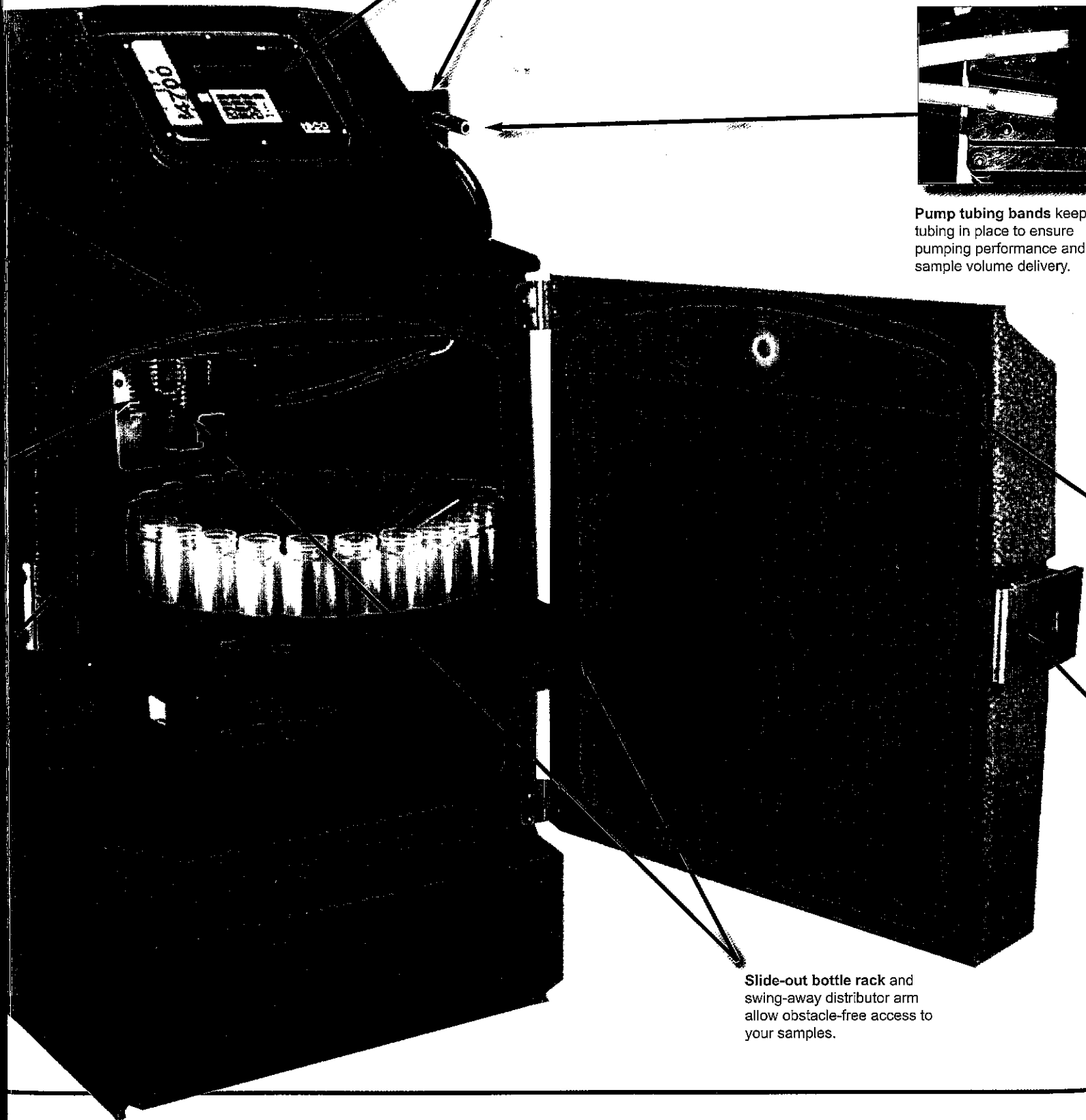
Pump assembly removal



Distributor assembly

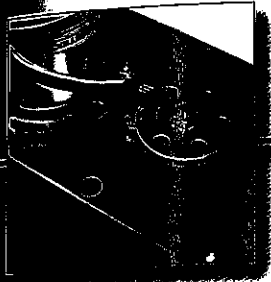


Pump tubing bands keep the tubing in place to ensure pumping performance and sample volume delivery.

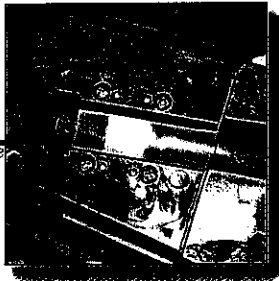


Slide-out bottle rack and swing-away distributor arm allow obstacle-free access to your samples.

removal

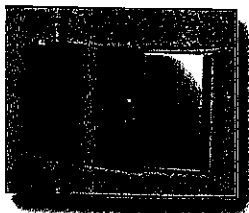


Pump revolution counter guarantees sample volume accuracy.



Liquid detector notifies controller when liquid is present for precise line rinsing and eliminating missed samples.

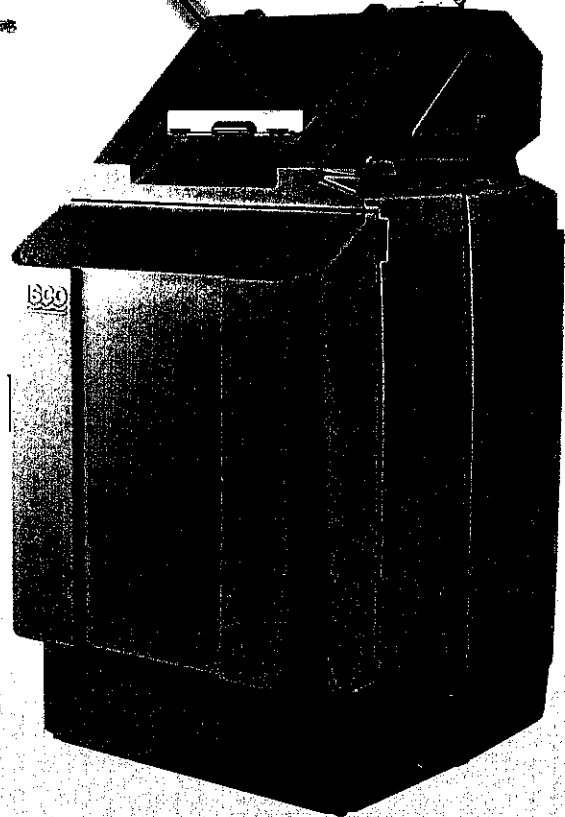
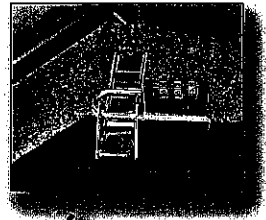
Compression Door Gasket provides a tight seal for efficient cooling & heating.



Positive Door Latch keeps the door from flying open and maintains sample cooling / heating efficiency.

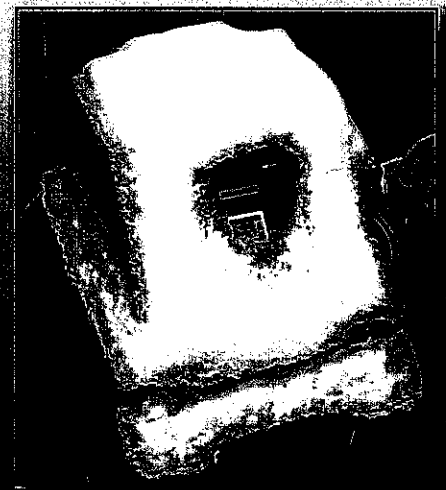


Lockable covers on the front panel, pump cover, and refrigerator door prevent tampering.



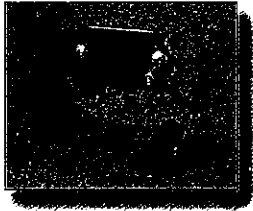
**MCERTS
Compliant**

Rugged, all-weather construction and optional pump heaters allow the 4700 to perform flawlessly, even in the harshest climates.



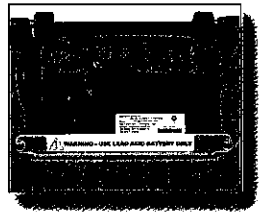
Isco 4700 Sampler

Designed for long term reliability & ease of use.

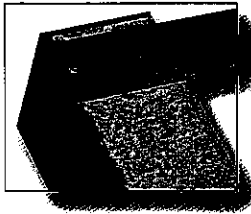


Single connector reduces the number of cables leading to the sampler.

- ◆ 4-20 mA input
- ◆ 4 digital alarm outputs
- ◆ Flow meter pulse input
- ◆ Event mark output
- ◆ Output to PC



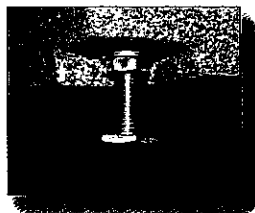
Optional battery-backed power ensures uninterrupted operation during main power outages.



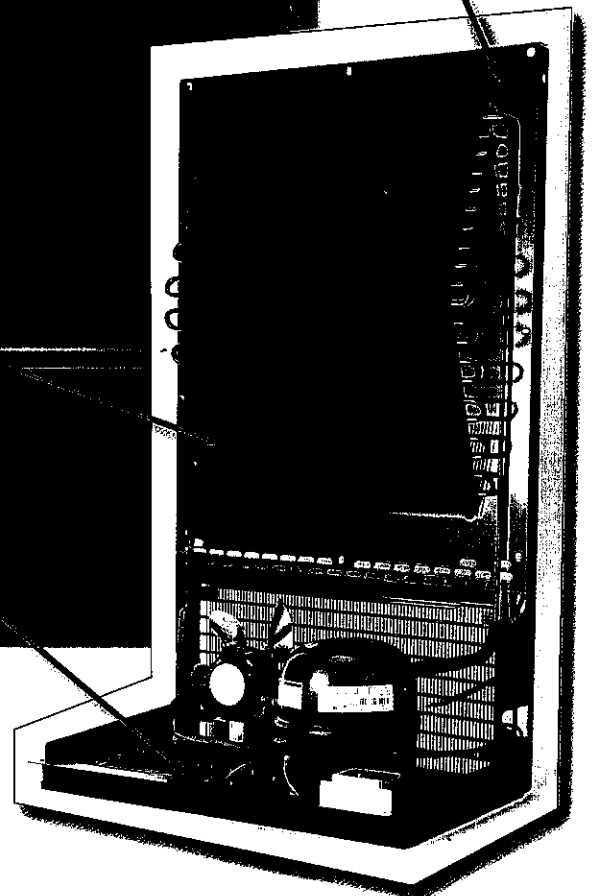
Thick insulation improves cooling/heating efficiency.

Powder coating with heat treated polyester and rust conversion paint provide superior corrosion protection of the refrigeration system.

Modular construction allows quick, easy component removal and replacement.



Adjustable feet allow easy leveling.



Specifications

Isco 4700 Refrigerated Sampler

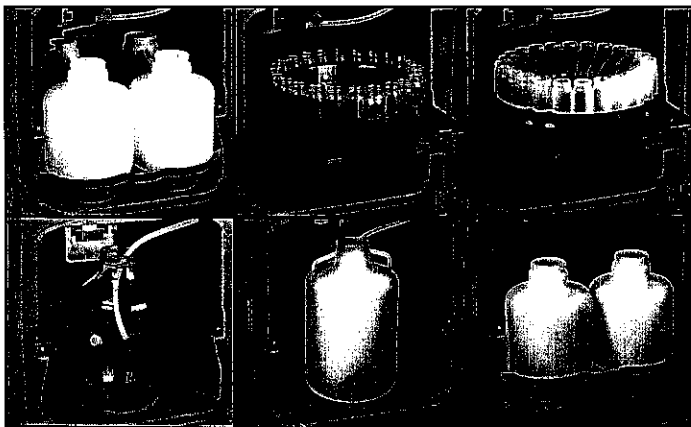
Physical	
Size (HxWxD):	52 x 28 x 33 inches (132 x 72 x 84 cm)
Weight (empty):	159 lbs (72 kg)
Refrigerator body:	Linear low-density polyethylene (LLDPE)
Power requirements:	120 VAC, 60 Hz, or 240 VAC, 50 Hz (specify)
Operational temperature:	-20 to 120° F (-29 to 49° C)
Pump	
Intake suction tubing	
Length:	3 to 99 feet (1 to 30 m)
Material:	Vinyl or FEP-lined PE
Inside diameter:	3/8 inch (9 mm)
Pump tubing Life:	Typically 1,000,000 pump counts
Maximum suction lift:	28 feet (8.5 m)
Typical repeatability:	±5 ml or ±5% of the average volume in a set, whichever is greater, at lifts up to 25 ft.
Typical accuracy:	±10 ml or ±10% of programmed value, whichever is greater
Typical line velocity at head height	
3 ft. (0.9 m):	3.0 ft./s (0.91 m/s)
10 ft. (3.1 m):	2.9 ft./s (0.87 m/s)
15 ft. (4.6 m):	2.7 ft./s (0.83 m/s)
Liquid presence detector:	Non-wetted, non-conductive sensor detects when liquid reaches the pump to automatically compensate for changes in head heights.

Controller	
Enclosure rating:	NEMA 4X, 6 (IP67)
Program memory:	Non-volatile ROM
Flow meter signal inputs:	5 to 15 volt DC pulse or 25 millisecond isolated contact closure for Isco flow meters. 4-20 mA input for non-Isco flow meters.
Digital alarms:	4 programmable outputs; 5V, 100 mA
Number of composite samples:	Programmable from 1 to 999 samples.
Internal clock accuracy:	1 minute per month, typical
Software	
Sample frequency:	1 minute to 99 hours 59 minutes, in 1-minute increments. 1 to 9,999 flow pulses.
Sampling modes:	Constant time - constant volume, Constant time - variable volume, Variable time - constant volume (Flow modes are controlled by external flow meter signal).
Programmable sample volumes:	10 to 9,990 ml in 1 ml increments.
Sample retries:	If no sample is detected, up to 3 attempts; user selectable.
Rinse cycles:	Automatic rinsing of suction line up to 3 rinses for each sample collection.
Controller diagnostics:	Tests for RAM, ROM, pump, display and electrical components.

Ordering Information

Contact the factory or your Isco Representative for complete ordering information.

Description	Part Number
Isco 4700 Refrigerated Sampler. Suction line, strainer, and bottle configuration not included; order separately.	120V/60Hz 68-4700-001
	240V/50Hz 68-4700-002
As above with Pump Heater	120V/60Hz 68-4700-102
	240V/50Hz 68-4700-103
Bottle Configurations	
Twenty-four 1-liter PP bottles	68-4700-003
Twenty-four 350-ml glass bottles	68-4700-004
Four 10-liter round PE bottles	68-4700-005
Four 10-liter round glass bottles	68-4700-006
Two 10-liter round PE bottles	68-4700-007
Two 10-liter round glass bottles	68-4700-008
One 20-liter round PE bottle	68-4700-011
One 20-liter round glass bottle	68-4700-012
One 10-liter round PE bottle	68-4700-009
One 10-liter round glass bottle	68-4700-010
Twenty-four 1-liter ProPak bottles	68-4700-017
One 10-liter ProPak bottle	68-4700-018
Four 20-liter Rectangular PE bottles	60-5314-740



Teledyne Isco, Inc.
 4700 Superior St.
 Lincoln, NE 68504 USA
 Phone: (402) 464-0231
 USA & Canada: (800) 228-4373
 Fax: (402) 465-3022
 e-mail: iscoinfo@teledyne.com

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