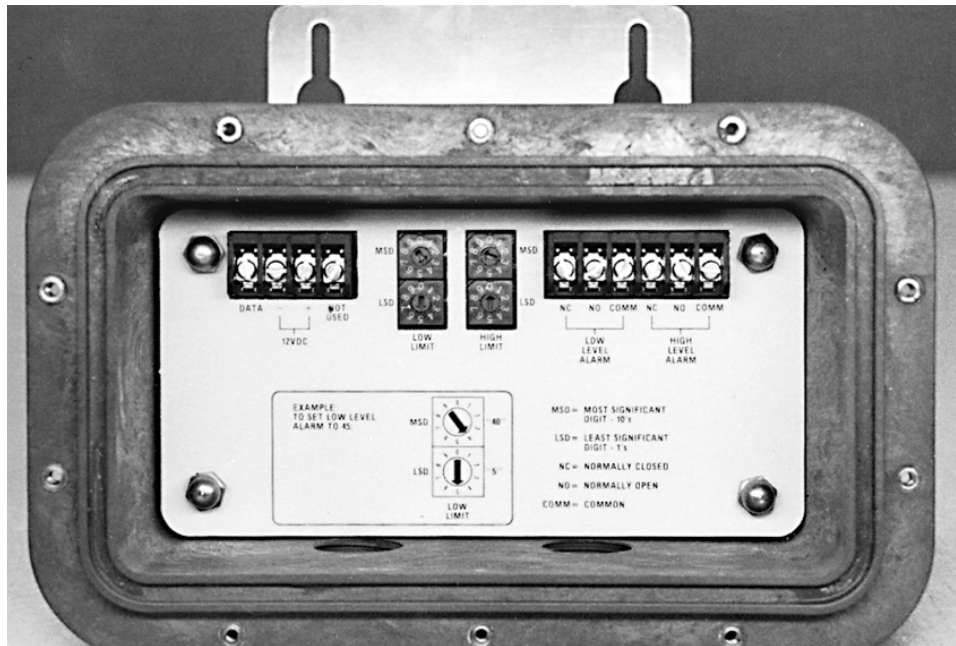


High-Low Alarm Relay BOX

Instruction Manual



Part #60-3403-071
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Revision C, August, 2002



Foreword

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

Although 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 the problem persists, call or email the Isco Customer Service Department for assistance. Contact information is provided below. Simple difficulties can often be diagnosed over the phone. If it is necessary to return the equipment to the factory for service, please follow the shipping instructions provided by the Customer Service Department, including the use of the **Return Authorization Number** specified. **Be sure to include a note describing the malfunction.** This will aid in the prompt repair and return of the equipment.

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

Contact Information

Phone:	(800) 228-4373	(USA, Canada, Mexico)
	(402) 464-0231	(Outside North America)
Repair Service:	(800) 775-2965	(Analytical and Process Monitoring Instruments)
	(800) 228-4373	(Samplers and Flow Meters)
Fax:	(402) 465-3022	
Email address:	info@isco.com	
Website:	www.isco.com	
Return equipment to:	4700 Superior Street, Lincoln, NE 68504-1398	
Other correspondence:	P.O. Box 82531, Lincoln, NE 68501-2531	

Isco High-Low Alarm Relay Box

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Isco High-Low Alarm Relay Box

1.1 Introduction

The Isco High-Low Alarm Relay Box monitors flow rate data from 3000 Series Flow Transmitters and 4200 Series Flow Meters. Alarm relays trip when the flow rate falls below or exceeds programmed limits. High and low set points are user-selected and range from 0% to 99% in 1% increments. Output from the High-Low Alarm Relay Box is the switching of form C (SPDT) relay contacts. Two relays are provided; one for a high alarm and the other for a low alarm. The availability of form C contacts (both NO [normally open] and NC [normally closed] contacts) means that loads may be turned on or off. Relay contacts are rated at 3 Amperes, 24 volts AC or DC. The Alarm Box operates on 12 VDC supplied by the transmitter or flow meter. Current consumption in standby condition is approximately 10 mA. In alarm condition, the current increases to 190 mA. Up to four Alarm Boxes can be used with a single transmitter or flow meter.

CAUTION

Use the Alarm Box with care in battery-powered flow meter installations. The Alarm Box draws its operating power from the flow meter, causing a significant reduction in battery life. Each Alarm Box will consume about one ampere-hour of battery capacity in four days, reducing capacity approximately 25%. In Alarm condition, one Alarm Box will discharge a fresh (4 Ah) battery in about 21 hours.

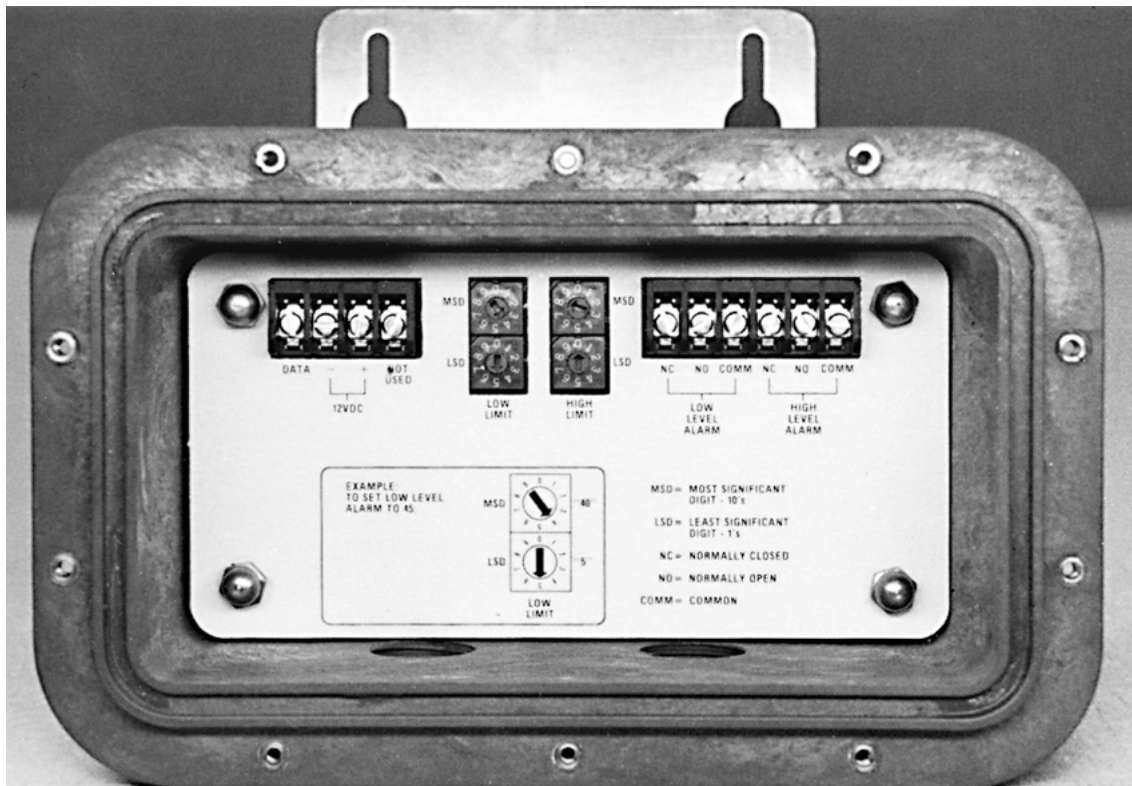


Figure 1-1 High-Low Alarm Box (Cover Removed)

1.2 Setting the Limit Switches

The High-Low Alarm Relay Box contains a microprocessor that interprets serial data from the transmitter or flow meter and compares it with values entered by the user as trip-points for the relays. Rotary switches inside the Alarm Box set the high and low trip points. There are two rotary switches for each limit. The switches labeled MSD (most significant digit) determine the first digit of the percentage entered as a set point. For example, if you want to enter a low level alarm of 18%, you would set the LOW LIMIT MSD switch to 1, and the LOW LIMIT LSD switch to 8.

Use the same method to program the HIGH LIMIT switch. For example, if you want to set the high limit to 79%, you would set the HIGH LIMIT MSD switch to 7 and the HIGH LIMIT LSD switch to 9.

1.3 Installation

A stainless steel mounting plate is attached to the back of the plastic case with two slotted holes punched into the plate. The slots will accommodate up to $\frac{3}{16}$ " hardware. Drill two mounting holes on 3" centers. Two threaded holes in the box allow the use of either $\frac{1}{2}$ " conduit fittings or Stahlin fittings (watertight compression bushings). While suitable for use in damp locations, the High-Low Alarm Relay Box should not be installed submersion is a possibility. Where subfreezing temperatures are expected, Isco recommends installation of the Alarm Box indoors or in a heated location, as the microprocessor is not specified to operate below 32° F (0° C).

1.4 Wiring to Model 3010 and 3020 Flow Transmitters

Connecting the Alarm Box to a flow transmitter requires three wires. A three wire cable typically has the following wires in it: black, white, and another color, such as red or green. Connect the wires as follows:


Terminals in 3000 Series Flow Transmitter	Terminal Strip#	Wire Colors	Terminals in Alarm Box
2312 INTERFACE +	TS2	BLACK	+12VDC
2312 INTERFACE -	TS2	WHITE	-12VDC
2312 INTERFACE OUT	TS2	(OTHER)	DATA

Wire additional Alarm Boxes together *in parallel* as described in the table above. Use no more than **four** Alarm Boxes per flow transmitter. See Figure 1-2. The maximum recommended distance between the Flow Meter and the High-Low Alarm Box is 250 feet (76 m). The minimum wire gauge is #18 AWG. In electrically noisy environments, shielded cable is recommended. The wire colors shown are for example only; use any color of wire and cable available, but make sure the connections end up the same as shown.

To connect external devices to the high level or low level, alarm relay:

Use NO and COMM for devices to turn ON when the alarm trips. Use NC and COMM for devices to turn OFF when the alarm trips.

Wire gauge and the length of the cable run depend on the device being controlled. Recommended limits for wiring to the **relay contacts only** are 1000 feet maximum cable run and #18 AWG wire size.

 WARNING
<p>To prevent hazard of electric shock, use the relay contacts for low voltage pilot duty only. Do not wire 120 VAC or higher voltages directly to the relay contacts.</p>

1.5 Wiring to 4200 Series Flow Meters



Rain Gauge Connector Icon

Connecting the High-Low Alarm Box to a 4200 Series Flow Meter requires a connect cable with an M/S connector (available from Isco) that attaches to the Rain Gauge connector on the side of the flow meter case. See Figure 1-2.

On one end of the cable there is a 4-pin male M/S connector which attaches to the Rain Gauge connector on the flow meter. The other end of the cable terminates in three stripped wires that attach as follows to the terminal block on the left side of the High-Low Alarm Relay Box:

- BLACK +12VDC
- GREEN -12VDC
- WHITE DATA

Up to four Alarm Boxes may be wired together in parallel as described in the table above. Due to increased current draw, Isco recommends use of no more than one Alarm Box with any battery-powered flow meter.

1.5.1 Distances Greater Than 25 Feet

If the Alarm Box and 4200 Series Flow Meter are more than 25 feet apart, user-supplied cable spliced to the Isco cable can extend the maximum distance to 200 feet. For greater distances than this, consult the factory. Then connect as described for the Models 3010 and 3020 in the previous section. Cable used should meet the following specification:

Three wire 18 AWG, sheathed (for protection of the conductors.)

If the cable is installed in conduit, do not use conduits already containing AC wiring or other data or control cables. Running data cable in conduits with AC wiring is unsafe and generally violates codes. Splice the cables together in a junction box (Figure 1-2). Insulate the connections with tape or wire nuts. In electrically noisy environments, **shielded cable** may be necessary for proper operation. Connect the shield to the negative wire from the flow meter connect cable.

In non-conduit installations, use watertight Stahlin fittings (available from Isco) to seal cable entry into the Alarm Box.

1.5.2 Connection With a Tipping Bucket Rain Gauge

If the installation includes a tipping bucket rain gauge, the Rain Gauge connector on the flow meter is already used. It will be necessary to modify the cable to allow attachment of the Alarm Box. Consult the factory for details on this modification.

1.6 Circuit Description

Refer to Figure 1-3 Component Layout for details on the High-Low Alarm Box. 12 VDC power enters the board on terminals 03 (+) and 02 (-) of terminal strip P1 and is distributed to the two relay coils K1 and K2 and the 78L05 voltage regulator, which provides 5 VDC to the rest of the circuitry. The use of serial data and Microprocessor U1 provide temperature stability. Serial data from the Model 3010 Flow Transmitter enters the board on terminal 01 of terminal strip P1 and is fed to the microprocessor by transistor Q1. An internal UART in the microprocessor reads the percent of flow rate transmitted from the flow meter/transmitter. It compares this reading with the high and low set points entered in BCD from rotary switches SW1-4. Transistors Q2 and Q3 provide drive for the alarm relay coils. Note that the contacts of both relays, brought out on strip P2, are electrically isolated from the rest of the circuitry.

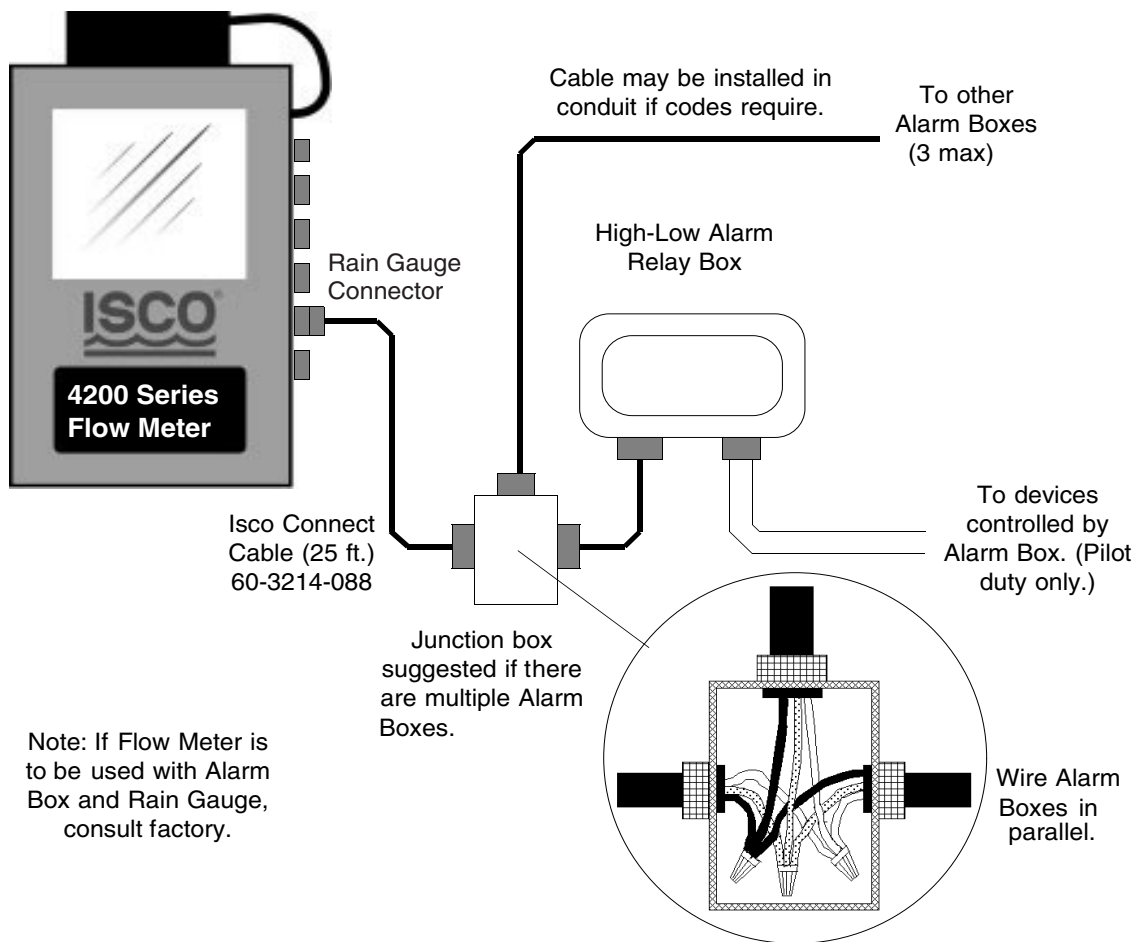
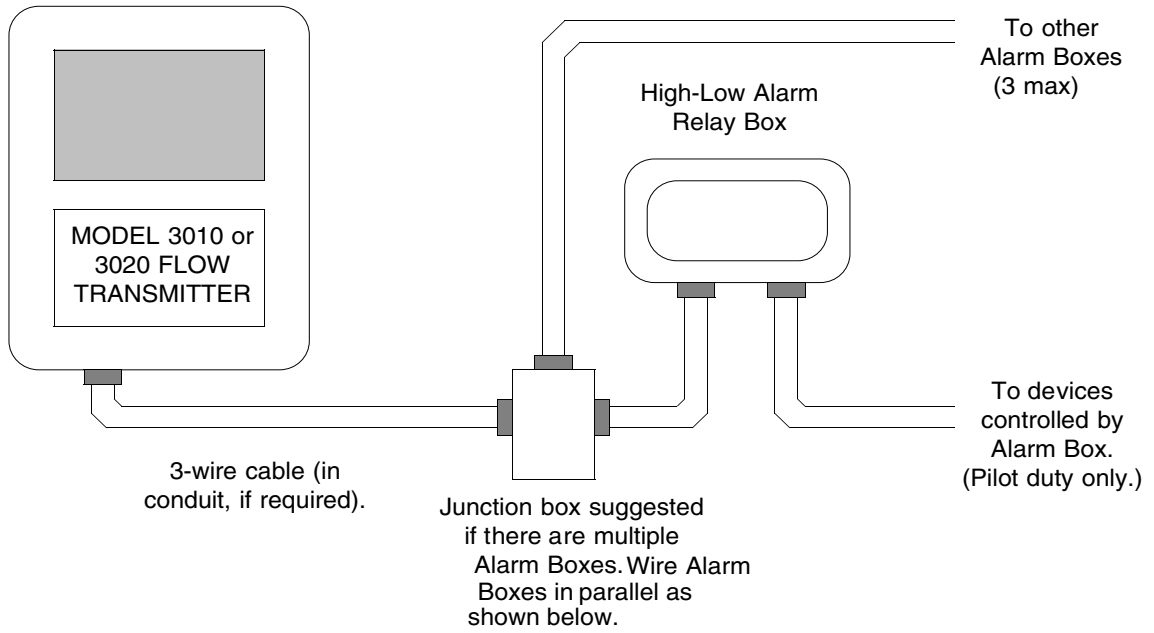


Figure 1-2 Interconnection Between Flow Meters and Alarm Boxes

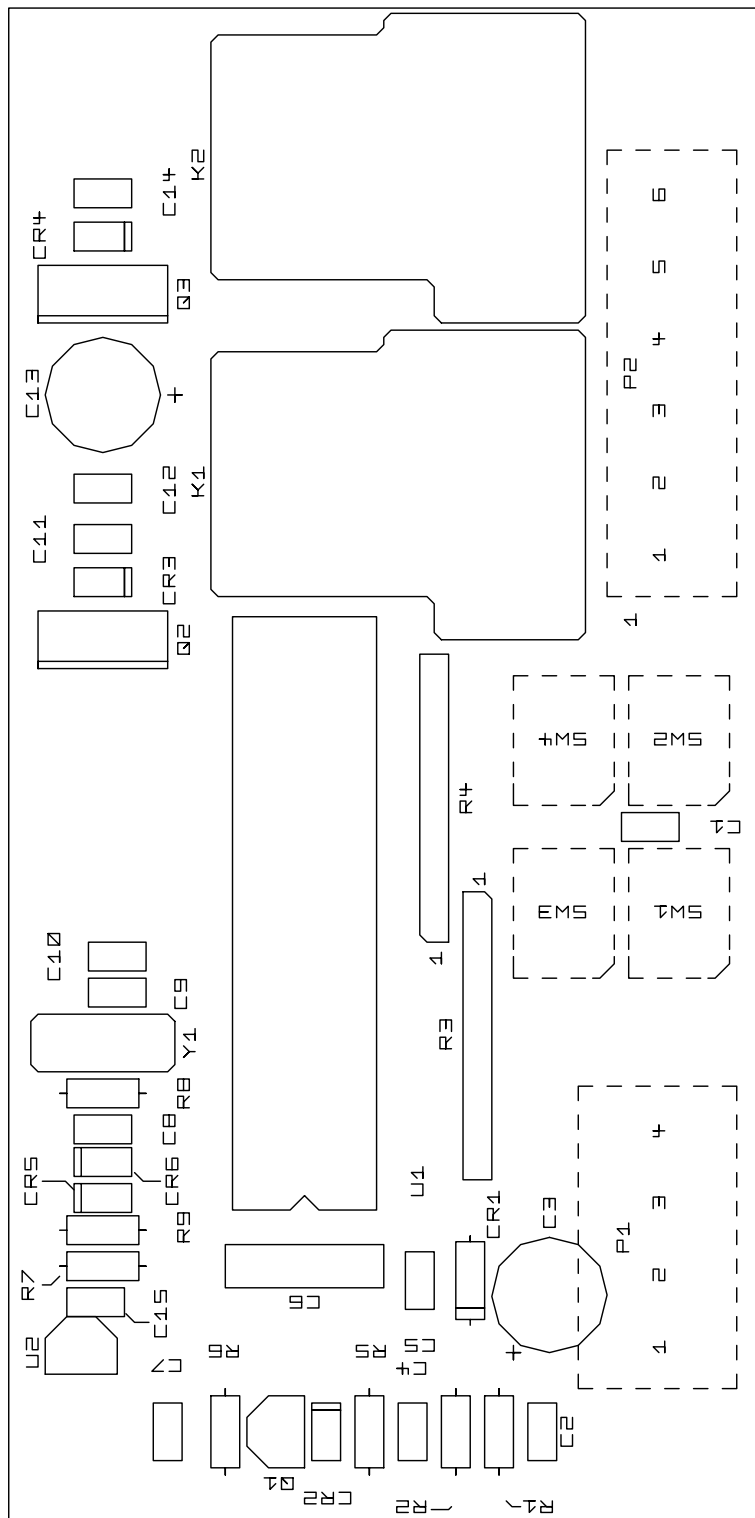


Figure 1-3 Component Layout for the High-Low Alarm Box

1.7 Replacement Parts List

The following table lists replacement part descriptions and part numbers applicable to the Isco High-Low Relay Alarm Box. Refer to Figure 1-4 for corresponding item numbers

Table 1-2 High-Low Alarm Box Replacement Parts			
Item	Complete Assembly	Individual Parts	Description
1	60-3404-031		Alarm Box CPU Board Assembly
2	60-3404-028		High-Low Alarm Box, Complete
3		60-2443-095	Amplifier Box Lid
4		60-3403-048	Alarm Box Label
5*		60-3403-070	Lid Gasket
6		109-0309-06	1/2" Tapered Caplugs #WW-9X
7*	60-3214-088		Flow Meter Connect Cable

*Not Shown

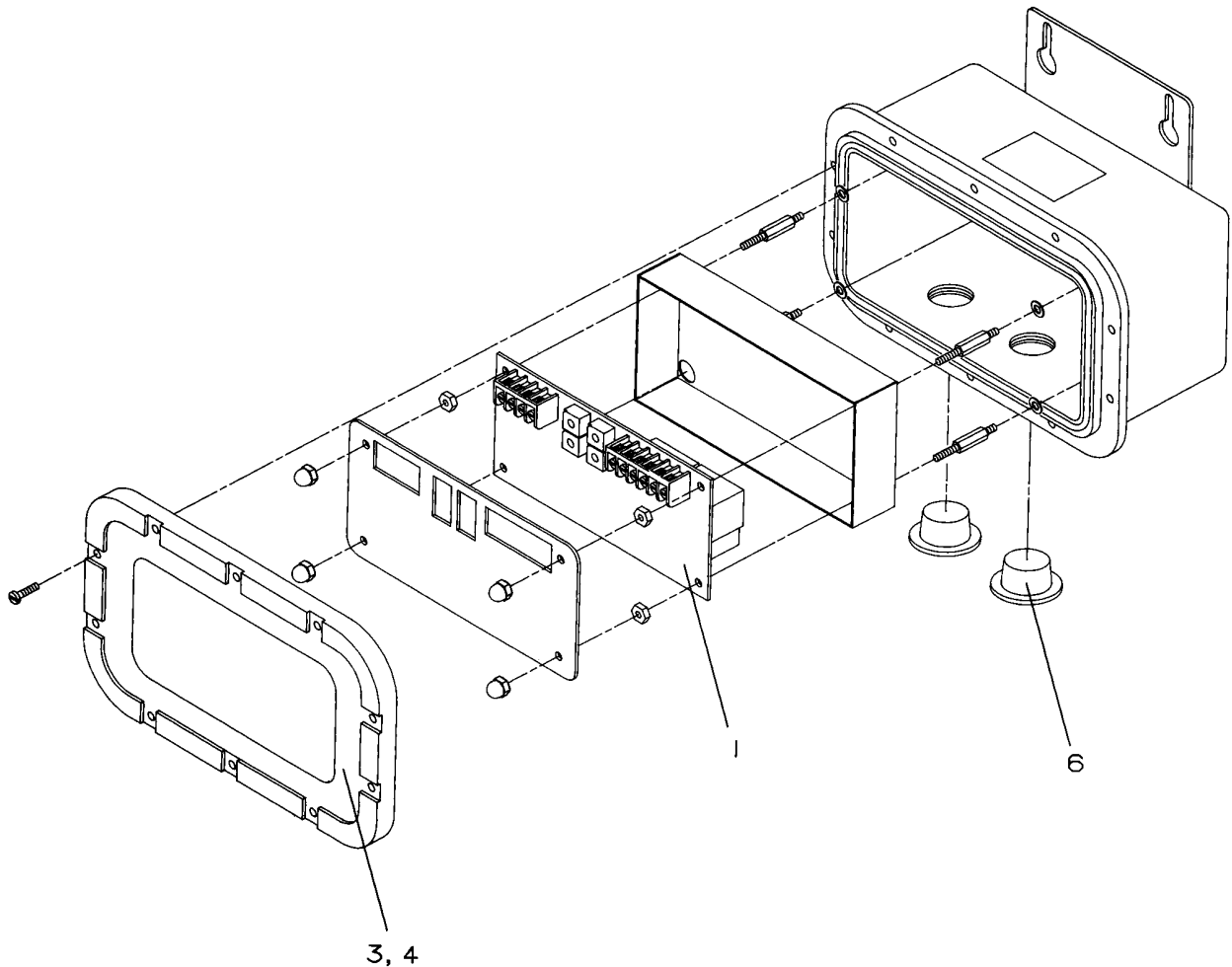


Figure 1-4 Illustration for Replacement Parts List

Isco One Year Limited Factory Service Warranty *

Isco warrants covered products against failure due to faulty parts or workmanship for a period of one year (365 days) from their shipping date, or from the date of installation by an authorized Isco Service Engineer, as may be appropriate.

During the warranty period, repairs, replacements, and labor shall be provided at no charge. Isco's liability is strictly limited to repair and/or replacement, at Isco's sole discretion.

Failure of expendable items (e.g., charts, ribbon, tubing, glassware, seals and filters), or from normal wear, accident, misuse, corrosion, or lack of proper maintenance, is not covered. Isco assumes no liability for any consequential damages.

Isco specifically disclaims any warranty of merchantability or fitness for a particular purpose.

This warranty applies only to products sold under the Isco trademark and is made in lieu of any other warranty, written or expressed.

No items may be returned for warranty service without a return authorization number issued from Isco.

This warranty does not apply to the following products: Process Analyzers, SFX 3560 SFE Extractor, 6100 VOC Sampler.

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

** This warranty applies to USA customers. Customers in other countries should contact their Isco dealer for warranty service.*

In the event of instrument problems, always contact the Isco Service Department, as problems can often be diagnosed and corrected without requiring an on-site visit. In the U.S.A., contact Isco Service at the numbers listed below. International customers should contact their local Isco agent or Isco International Customer Service.

Return Authorization

A return authorization number must be issued prior to shipping. Following authorization, Isco will pay for surface transportation (excluding packing/crating) both ways for 30 days from the beginning of the warranty period. After 30 days, expense for warranty shipments will be the responsibility of the customer.

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

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

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

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