

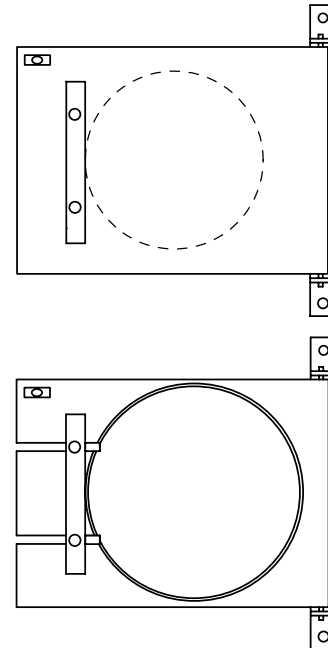
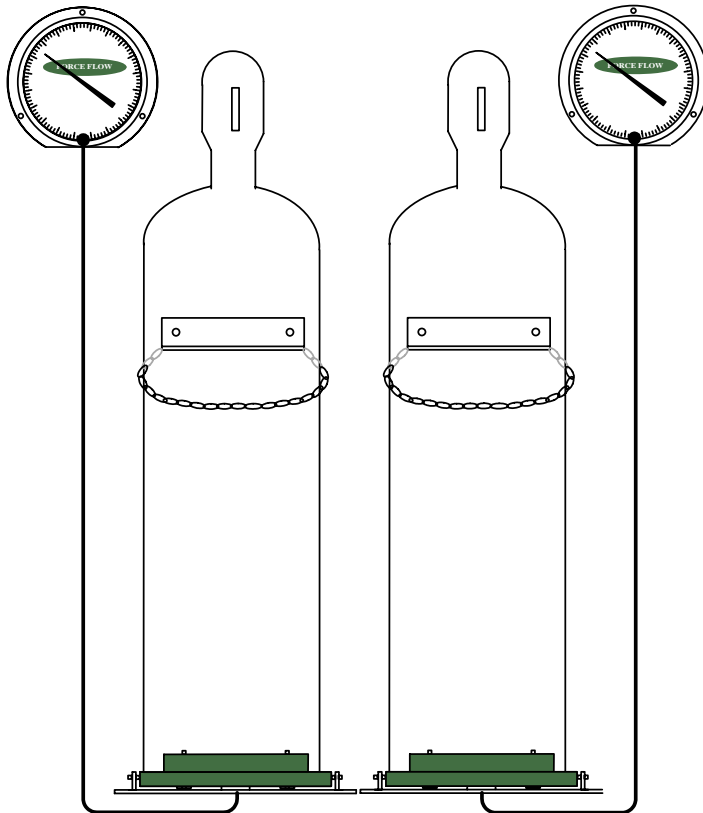
# CENTURY CYLINDER SCALES

CITY/ST: \_\_\_\_\_  
EQUIP: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

FACTORY CALIBRATED  
S/N \_\_\_\_\_

CHLOR-SCALE 150,  
AMMONIA-SCALE  
LIQUEFIED GAS &  
GAS CABINET SCALES

## INSTALLATION & OPERATION HYDRAULIC CYLINDER SCALE



SLOTTED  
Platform



## INCLUDES MODELS:

### HYDRAULIC CHLOR-SCALE 150, AMMONIA-SCALE, LIQUEFIED GAS & GAS CABINET SCALES with CENTURY DIAL INDICATOR

#### CYLINDER DIAMETERS:

CHLORINE & SULFUR DIOXIDE Cylinders:  
USA & CANADA: 10-1/4" (260mm) to 10-1/2" (267mm)  
INTERNATIONAL: OVERSIZED

AMMONIA Cylinders:  
to 15" (381mm) in Diameter

LIQUEFIED GAS Cylinders:  
to 16" (406mm) in Diameter

GAS CABINET Cylinder Scales:  
to 11" (279mm) in Diameter

#### MODEL NUMBERS:

<u>Scale Types:</u>	<u>Model No:</u>	<u>Metric Model No:</u>
Cl <sub>2</sub> & SO <sub>2</sub> Cylinders: (USA & Canada)	4D150-1 (150 lbs)	Metric: 4D68K-1 (68 kg.)
	4D150-2 (150 lbs)	Metric: 4D68K-2 (68 kg.)
Cl <sub>2</sub> & SO <sub>2</sub> Cylinders: (International)		Metric: 4D100K-1 (100 kg.)
		Metric: 4D100K-2 (100 kg.)
Ammonia Cylinders:	4D400-1AS (400 lbs)	Metric: 4D200K-1AS (200 kg.)
	4D400-2AS (400 lbs)	Metric: 4D200K-2AS (200 kg.)
Liquefied Gas Cylinder	4D200-1CYL (100 lbs)	
Gas Cabinet Cylinders:		
	1-Cyl Unit	4D200-1GC (200 lbs)
2-Cyl Unit	4D200-2GC (200 lbs)	4D100K-2GC (100 kg.)

1150-D BURNETT AVE, CONCORD, CA 94520 USA  
1-800-893-6723 US & CANADA, FAX: 925-686-6713

WWW.FORCEFLOW.COM / INFO@FORCEFLOW.COM



**FORCE FLOW**

REF: T4\O&M\CYLHYD\MODELS.tcw (Q0A.pdf)  
03/07/03



## CENTURY DIAL with ALL CYLINDER SCALES

### SECTION

#### C.1.000

**YOU  
ARE  
HERE !**

#### INSTALLATION & OPERATION:

- C.1.101-1 Dimensional Drawing (Chlorine/Sulfur Dioxide/Ammonia)
- C.1.101-2 Dimensional Drawing (Liquefied Gas Cylinders)
- C.1.101-3 Dimensional Drawing (Gas Cabinet Scale)
- C.1.102 Installation Instructions
- C.1.103 Installation Drawing
- C.1.104 Installation Steps 1 - 4
- C.1.105 Installation Steps 5 - 8

#### INSTALLATION CHECK LIST

- C.1.151 Installation Check List

#### OPERATION:

- C.1.201 Operation Instructions

#### C.2.000

#### 4-20mA TRANSMITTER OPTION:

- C.2.101 Model MA150 4-20mA Transmitter Wiring Diagram
- C.2.102 Model MA150 Transmitter Bulletin
- C.2.103 Model MA150 4-20mA Transmitter Data & Spec
- C.2.104 Model MA150 4-20mA Transmitter Dimensional Drawing
- C.2.105 Computer Set-Up for 4-20mA Output

#### POWER SUPPLY OPTION:

- C.2.111 Power Supply (24 Volt)

#### RS-5 REED SWITCH OPTION:

- C.2.121 RS-5 Adjustable Reed Switch Wiring Diagram
- C.2.122 RS-5 Installation Instructions

#### PS-10 PRESSURE SWITCH OPTION:

- C.2.131 PS-10 Fixed Pressure Switch Wiring Diagram

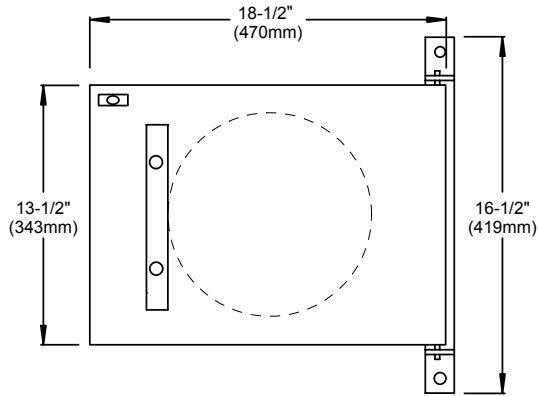
#### C.3.000

#### MAINTENANCE & TROUBLESHOOTING

- C.3.105 Calibration of "Slotted" Platform Scales
- C.3.301 Trouble Shooting & Service Tips
- C.3.303 Maintenance of Load Cell
- C.3.304 Dial Data Sheet
- C.3.401 Parts List

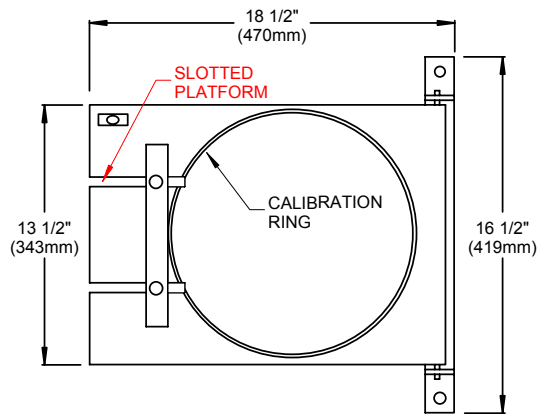
**"STANDARD" PLATFORM for 10-1/4" to 10-1/2" cylinders**

Models:  
 4D150-1 (Single Cyl)  
 4D150-2 (Dual Cyl)  
 4D68K-1 (Single Metric)  
 4D68K-2 (Dual Metric)



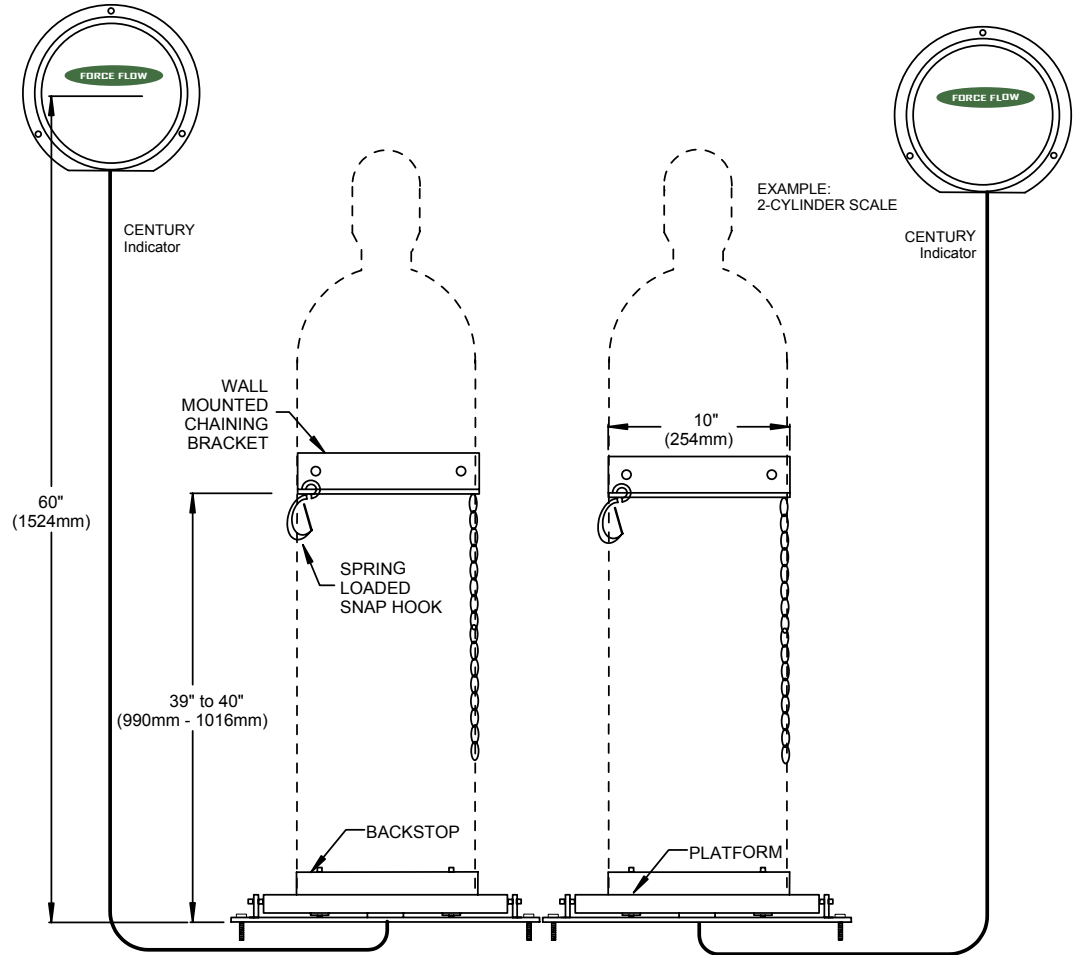
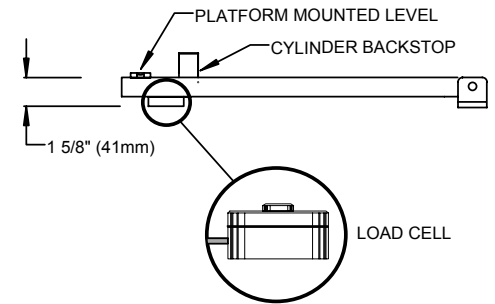
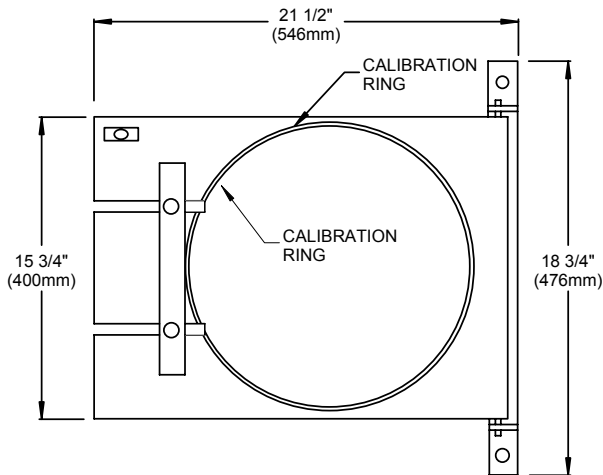
**"SLOTTED" PLATFORM for Oversized International Cylinders**

Models:  
 4D100K-1 (Single Metric Cylinder)  
 4D100K-2 (Dual Metric Cylinder)



**AMMONIA CYLINDER PLATFORM**

Models:  
 4D400-1AS (Single Ammonia)  
 4D400-2AS (Dual Ammonia)  
 4D200K-1AS (Single Metric)  
 4D200K-2AS (Dual Metric)



C.1.101-1



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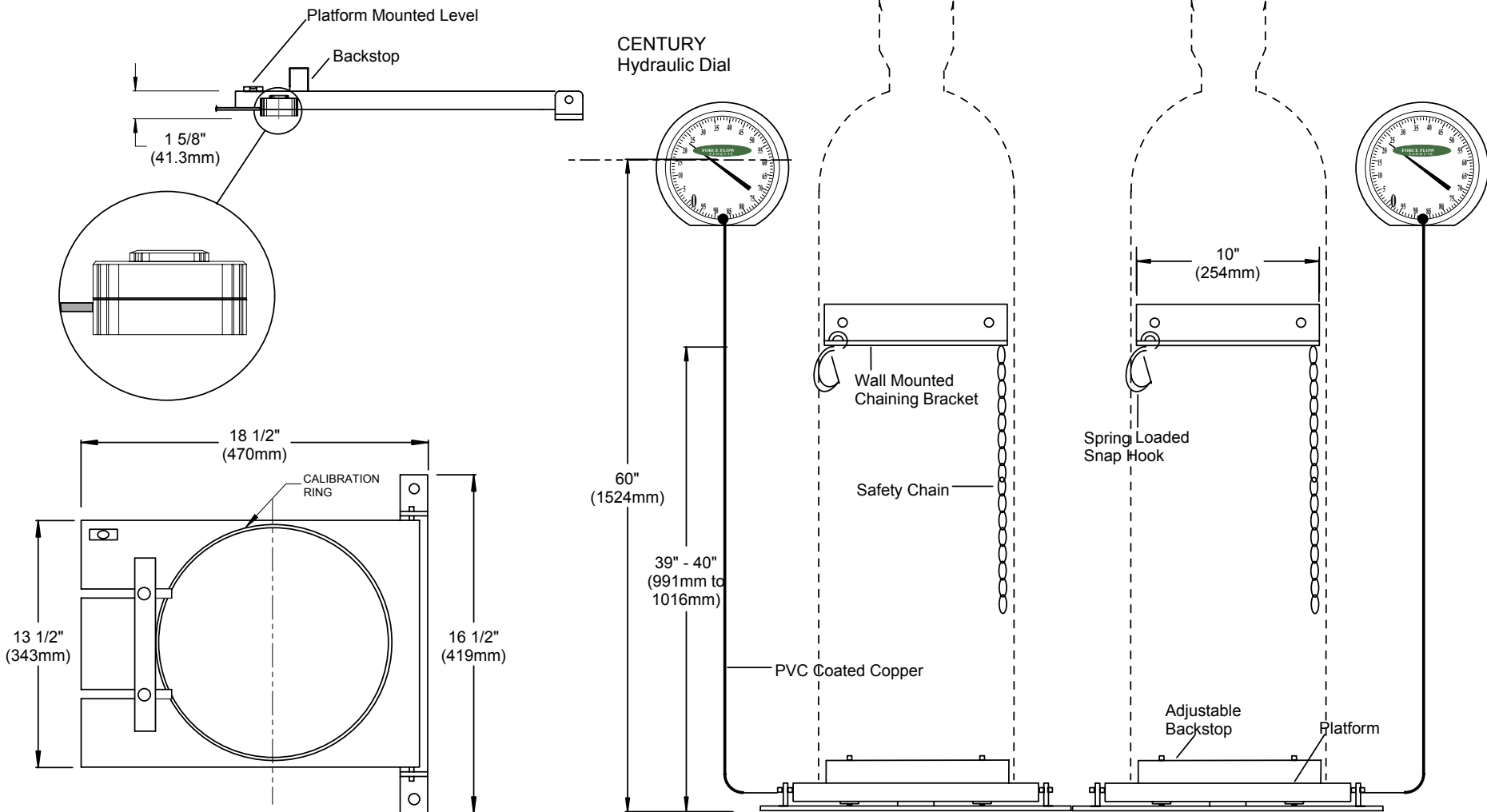
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**HYDRAULIC CYLINDER SCALES for Single or Dual Cylinders (Cl2, S02 and Ammonia)**

Drawn by: SLP Drawing Number  
 Date: 01/02/94  
 Revised: 11/07/02  
 Scale: NONE

30472

<u>Model Numbers</u>	<u>No. of Cylinders</u>
4D200-1CYL (200 lbs)	1-Cylinder Scale
4D200-2CYL (200 lbs)	2-Cylinder Scale



**C.1.101-2**



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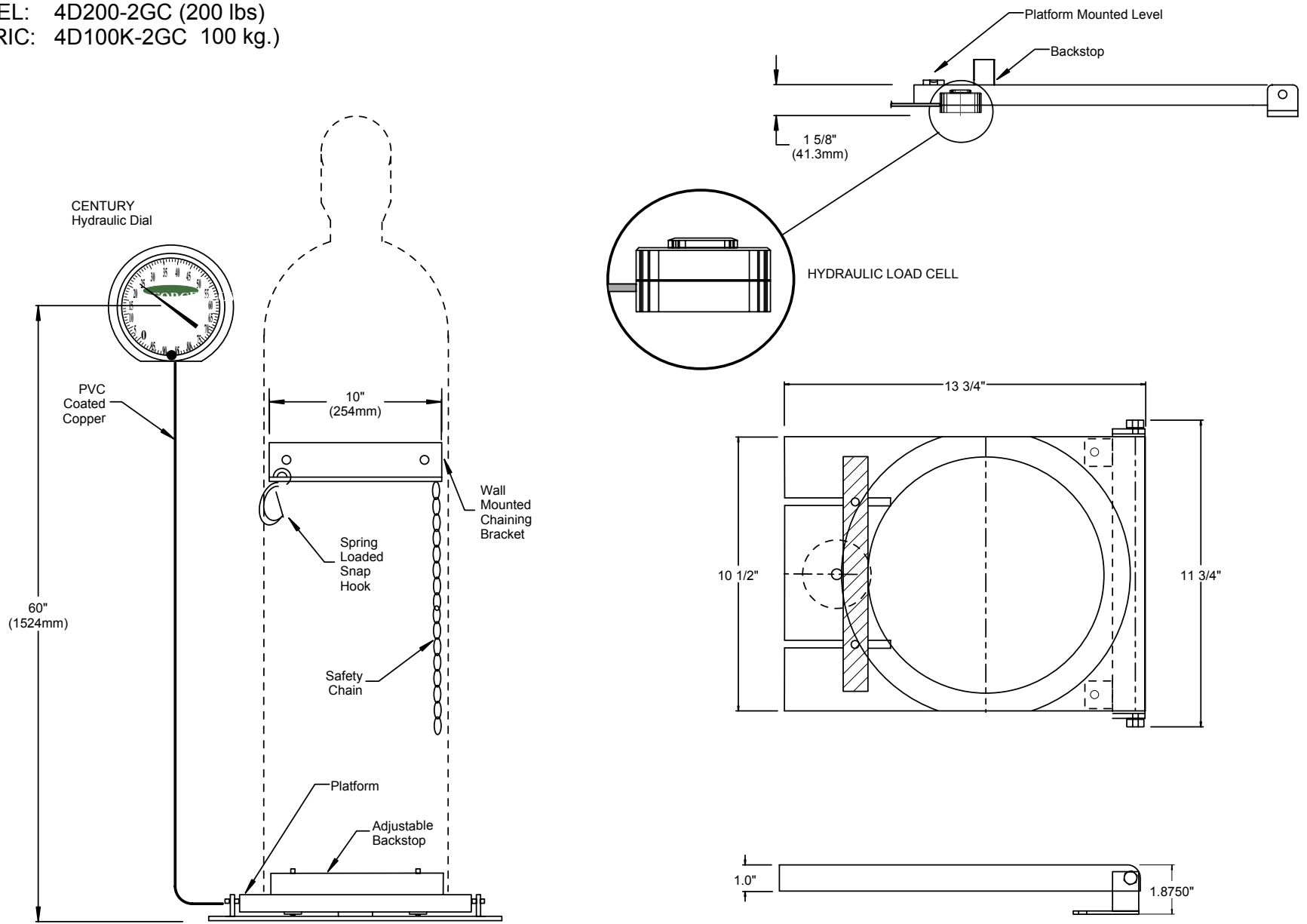
**HYDRAULIC CYLINDER-SCALE**  
 with CENTURY Dial Indicator  
 for 8" (203mm) to 16" (406mm) Cylinders  
 200 lbs. or 100 kg. Dial

Drawn by: SLP  
 Date: 01/05/94  
 Revised: 12/09/97  
 Scale: NONE

Drawing Number

**29875**

MODEL: 4D200-2GC (200 lbs)  
 METRIC: 4D100K-2GC 100 kg.)



C.1.101-3



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 www.forceflow.com / info@forceflow.com

REF: T4\O&M\CYLHYD\GASCAB.tcw (Q01-3.pdf)

GAS CABINET SCALE

Drawn by: SLJ/MT	Drawing Number
Date: 08/18/97	30487
Revised: 01/13/03	
Scale: NONE	

# HYDRAULIC CHLOR-SCALE 150 & AMMONIA-SCALE

## INSTALLATION

If you have any questions regarding the installation, operation or maintenance on your scale, please do not hesitate to call our .... HELP HOTLINE 1-800-893-6723

**WARNING:** To prevent possible personal injury or damage to the equipment through misuse, this equipment should be installed, operated and serviced only by trained, qualified personnel who are thoroughly familiar with the entire contents of this Instruction Manual, which should be thoroughly reviewed and understood prior to installing and operating the equipment.

### ITEMS REQUIRED FOR INSTALLATION

- Hammer drill and masonry Bit (5/16" or 8mm)
- Two (2) 1/4" or 7mm diameter anchors (for platform)
- Three (3) properly chosen anchors (for dial)
- Two (2) properly chosen anchors (for chaining bracket)
- Adjustable wrench
- Tape measure
- Hammer (for pounding in anchor bolts)
- Cylinder (for platform placement)

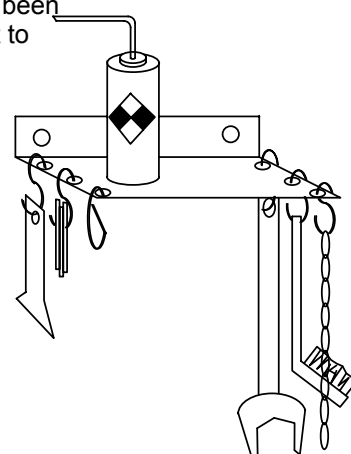
### COMMENTS

Your CYLINDER Scale consists 3 basic assemblies:

1. Load Cell System (Dial, PVC Coated Copper Tubing and Load Cell).
2. PVC Platform (Backstop, Slotted Platform with Hinge, and Leveling Shims).
3. Chaining Device (Bracket with Equipment Hooks, Chain and Spring Loaded Bolt Snap)

### CYLINDER CHANGE-OUT TOOL HOOKS

Change-Out Tool Hooks have been added to the Chaining Bracket to keep frequently used tools need to change cylinders.



### INSTALLATION

**CAUTION:** For proper operation and to avoid possible damage to the scale or injury to yourself, you **MUST** install these items in the following Step-by-Step manner. The standard scale is meant to be installed in close proximity to a wall or other upright structure. If this is not possible, please consult factory for proper installation. The scale should be used with compressed gas cylinders with outside diameters of 8" (203mm) to 16" (406mm), and gross weights of up to 400 lbs (181 kg).

Remove all items from box. For dual cylinder units, two of each of the above assemblies should be found. The load cell systems is filled and calibrated at the factory. Be careful when handling the load cell system so as NOT TO TWIST, KINK or BREAK TUBING or FITTINGS !

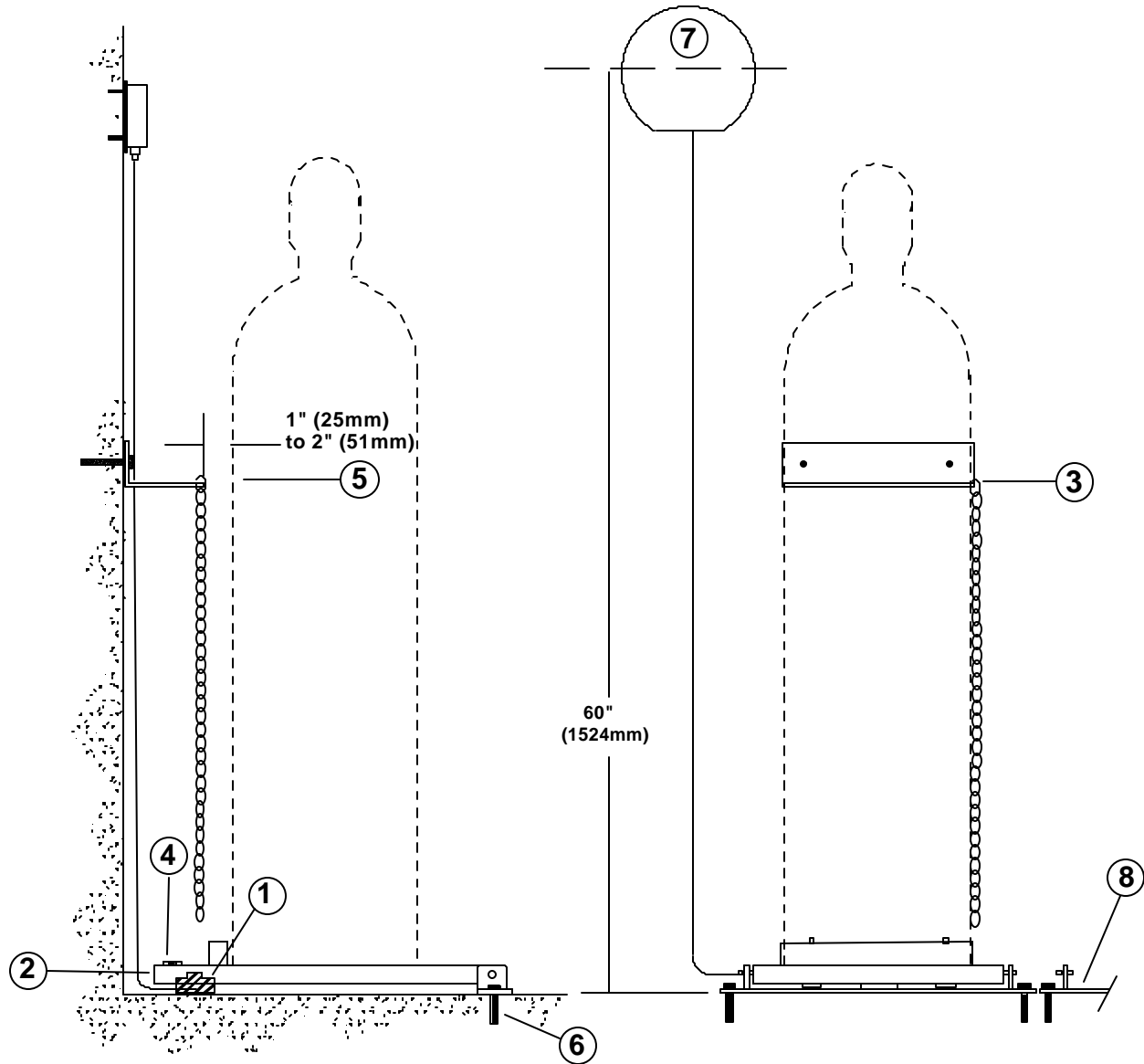
**NOTE:** If installing multiple scales, be sure floor area is sufficient to accommodate platform feet (and diameter of tank if overhang).



**AVOID "KINKING" TUBING**

**IMPORTANT:** "Unroll" PVC Coated Copper Tubing, rather than "pulling" it straight.

**IMPORTANT:** Read Installation Instructions thoroughly before installing.



C.1.103  
X.1.103



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**CHLOR-SCALE CYLINDER SCALES**  
for Chlorine, Sulfur Dioxide,  
Ammonia & Liquefied Gas Cylinders

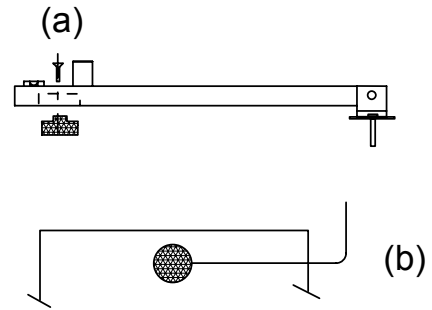
Drawn by: SLP  
Date: 01/05/94  
Revised: 10/01/98  
Scale: NONE

Drawing Number

**29809**

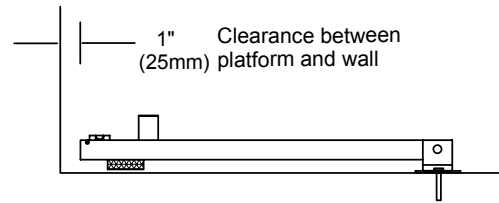
## STEP 1: MOUNTING THE LOAD CELL

- Remove the Flathead Screw from the load cell and attach the load cell under the back of the platform with this screw.
- Be sure the tubing is running out of the SIDE (NOT the end) of the platform and does not obstruct platform movement.



## STEP 2: PLACE PLATFORM ON FLOOR

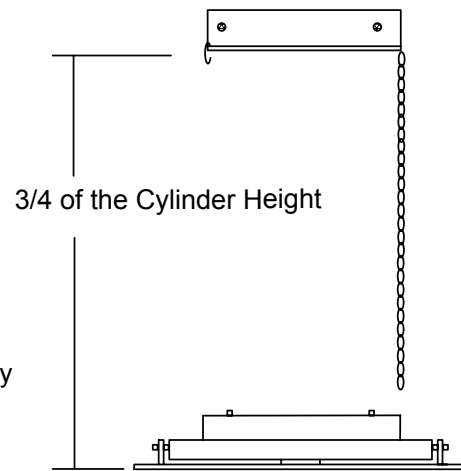
Place the platform on the floor with the backstop side of the platform at the wall. (NOTE: Allow at least 1" (25mm) clearance between wall and platform.)



## STEP 3: ALIGNING AND MOUNTING THE CHAINING BRACKET

- For 150 lb. cylinders, the chaining bracket should be at approximately 39" (991mm) to 41" (1041mm) above the floor. For oversized cylinders, the chaining bracket should be at approximately 3/4 of the height of the cylinder.
- To align the chaining bracket with the platform, adjust bracket until the hanging chain aligns with the right-hand side of the backstop. Be sure the bracket is level, mark holes and anchor the bracket to the wall. Make sure your anchor bolts are properly sized and are compatible with your wall material !!

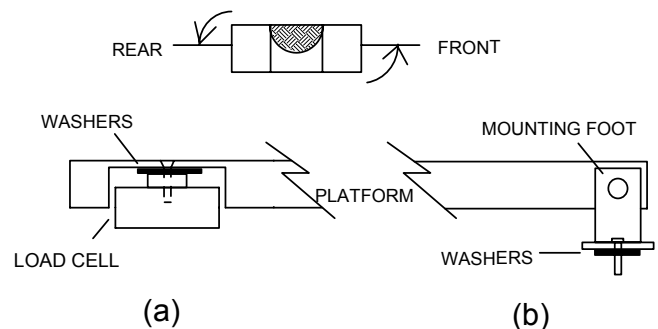
NOTE: If the foot of your wall protrudes, it may be necessary to opt a spacer between the wall and the chaining bracket to assure no more than 1" to 2" space (see Installation Drawing).



## STEP 4: LEVEL PLATFORM

Check the platform-mounting level to assure that the scale is level from FRONT to REAR. If the platform is NOT level, either:

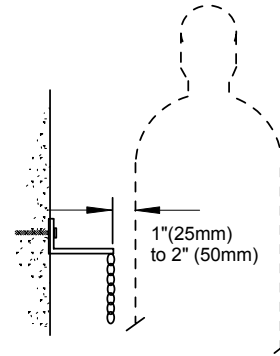
- RAISE REAR of platform by placing shims on TOP of LOAD CELL PISTON, or
- RAISE FRONT by placing shims UNDERNEATH the HINGE on the ANCHOR BOLTS (shims provided with scale).



**STEP 5: ADJUSTING CYLINDER DISTANCE FROM CHAINING BRACKET**

Adjust the platform distance so that with a cylinder against the platform backstop, the cylinder is approximately 1" (25mm) to 2" (50mm) from the front edge of the chaining bracket.

Cylinder must not touch chaining bracket or scale will not operate properly.



**STEP 6: ANCHORING THE PLATFORM**

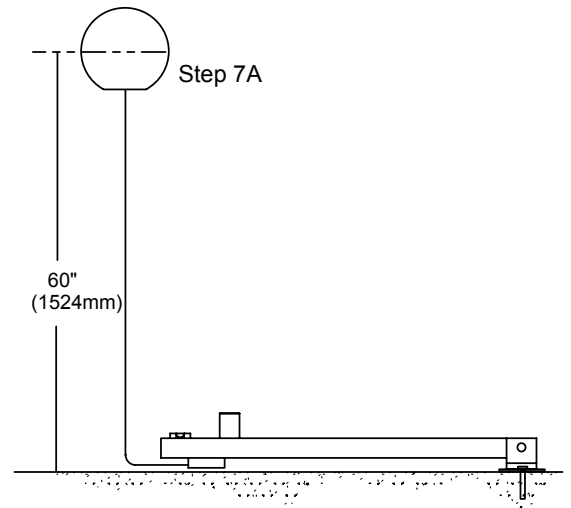
Platform must not touch wall, or scale will not function properly. Mark mounting holes on the floor, remove cylinder from the scale. Drill holes with proper sized bit and bolt scale to the floor using two (2) 1/4" (7mm) diameter anchor bolts. Make sure your anchor bolts are properly sized and compatible with your floor material !

**DANGER !**

To avoid injury caused by tipping cylinder, **DO NOT USE SCALE UNTIL PLATFORM IS BOLTED TO FLOOR !**

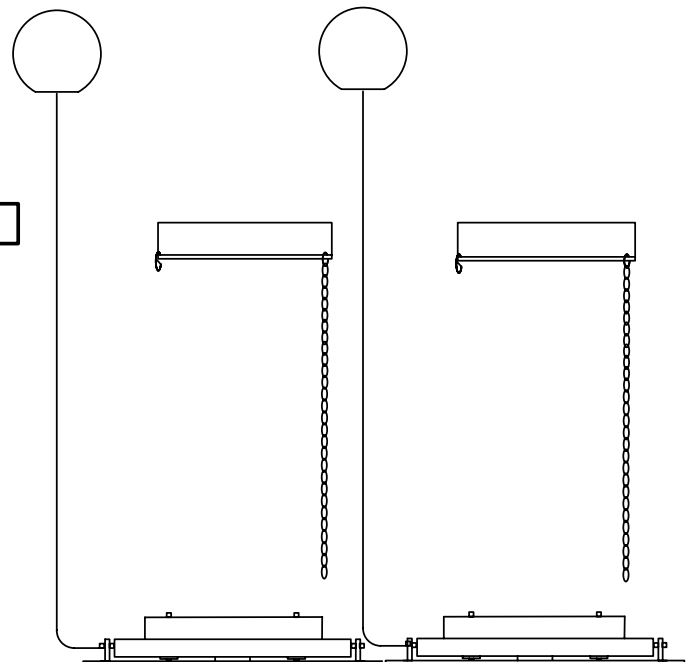
**STEP 7: MOUNTING THE INDICATOR**

- a) Carefully "UNROLL" tubing (avoid pulling like a spring) and mount dial at a convenient height (approx. 60" or 1524mm) above floor using three (3) properly chosen bolts. Make sure your bolts are properly sized and compatible with your wall material !!
- b) Be sure not to restrain the platform with the tubing when mounting the dial.



**STEP 8: MOUNTING ADDITIONAL SCALES**

To mount additional scales side-by-side, be sure to allow for the frame feet and/or cylinder diameter when determining the distance between platforms (if minimizing floor area) and repeat Step 1 - 7.



## CENTURY DIAL with ALL CYLINDER SCALES

### SECTION

#### C.1.000

##### INSTALLATION & OPERATION:

- C.1.101-1 Dimensional Drawing (Chlorine/Sulfur Dioxide/Ammonia)
- C.1.101-2 Dimensional Drawing (Liquefied Gas Cylinders)
- C.1.101-3 Dimensional Drawing (Gas Cabinet Scale)
- C.1.102 Installation Instructions
- C.1.103 Installation Drawing
- C.1.104 Installation Steps 1 - 4
- C.1.105 Installation Steps 5 - 8

**YOU  
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##### INSTALLATION CHECK LIST

- C.1.151 Installation Check List

##### OPERATION:

- C.1.201 Operation Instructions

#### C.2.000

##### 4-20mA TRANSMITTER OPTION:

- C.2.101 Model MA150 4-20mA Transmitter Wiring Diagram
- C.2.102 Model MA150 Transmitter Bulletin
- C.2.103 Model MA150 4-20mA Transmitter Data & Spec
- C.2.104 Model MA150 4-20mA Transmitter Dimensional Drawing
- C.2.105 Computer Set-Up for 4-20mA Output

##### POWER SUPPLY OPTION:

- C.2.111 Power Supply (24 Volt)

##### RS-5 REED SWITCH OPTION:

- C.2.121 RS-5 Adjustable Reed Switch Wiring Diagram
- C.2.122 RS-5 Installation Instructions

##### PS-10 PRESSURE SWITCH OPTION:

- C.2.131 PS-10 Fixed Pressure Switch Wiring Diagram

#### C.3.000

##### MAINTENANCE & TROUBLESHOOTING

- C.3.105 Calibration of "Slotted" Platform Scales
- C.3.301 Trouble Shooting & Service Tips
- C.3.303 Maintenance of Load Cell
- C.3.304 Dial Data Sheet
- C.3.401 Parts List

# INSTALLATION CHECK-OFF LIST

## CHLORINE, SULFUR DIOXIDE & AMMONIA CYLINDER SCALES

- PLATFORM DOES NOT TOUCH THE WALL AT THE BASE.
  
- LOAD CELL IS ATTACHED TO BACK OF PLATFORM WITH TUBING RUNNING OUT THE SIDE PERPENDICULAR TO THE PLATFORM.
  
- CHAINING BRACKET IS APPROXIMATELY 39" (991mm) TO 41" (1041mm) FROM THE FLOOR.
  
- PLATFORM IS LEVEL FROM FRONT TO REAR.
  
- CYLINDER IS 1" (25mm) TO 2" (50mm) FROM BRACKET WHEN AGAINST PLATFORM BACKSTOP.
  
- PLATFORM IS BOLTED TO FLOOR WITH TWO (2) 1/4" (7mm) ANCHOR BOLTS.

**CAUTION: DO NOT USE SCALE UNTIL PLATFORM IS BOLTED TO FLOOR !**

- DIAL IS MOUNTED APPROXIMATELY 60" (1524mm) ABOVE THE FLOOR AND TUBING DOES NOT RESTRAIN PLATFORM.

**NOTE: FEET OF ADDITIONAL SCALES MAY BE BUTTED AGAINST EACH OTHER.**

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**C.1.151**

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## CENTURY DIAL with ALL CYLINDER SCALES

### SECTION

#### C.1.000

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##### OPERATION:

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#### C.2.000

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##### PS-10 PRESSURE SWITCH OPTION:

- C.2.131 PS-10 Fixed Pressure Switch Wiring Diagram

#### C.3.000

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- C.3.301 Trouble Shooting & Service Tips
- C.3.303 Maintenance of Load Cell
- C.3.304 Dial Data Sheet
- C.3.401 Parts List

# CENTURY SCALE OPERATION

If you have any questions regarding the installation, operation or maintenance of your scale, please  
**DO NOT HESITATE TO CALL OUR HELP HOTLINE 1-800-893-6723;**  
email us at [info@forceflow.com](mailto:info@forceflow.com),  
or Fax us 1-925-686-6713

## "PORTABLE" TANK APPLICATIONS

"PORTABLE" means: Empty tank is REPLACED.

### LOAD CONTAINER

Load a FULL container on scale platform.

#### NOTE:

To calibrate a DRUMM-SCALE, CYLINDER-SCALE, TOTE BIN SCALE or CARBOY-SCALE: Make sure the tank is resting against the backstop.

If scale weighs HEAVY...move backstop forward.  
If scale weighs LIGHT ...move backstop back.

### PROCESS CONNECTIONS

Make all necessary process connections to container or tank. Assure that all connections are FLEXIBLE, so as not to restrain the vessel from freely resting on the scale and platform movement is not restrained.

### DETERMINE TARE

To determine tare weight:

- 1) Check container to see if the tare weight is marked on it (ie stamped on chine or top of cylinder).
- 2) On containers and tanks that are not marked, begin by zeroing the scale. Place an empty container and any applicable process connections. The value displayed is the tare weight. Record this weight in a visible location for future reference.

### TARE ADJUSTMENT

Rotate the tare adjustment knob until the display indicates the net contents of the container (the tare adjustment is located on face of the CENTURY).

EXCEPTION SOLO XT: Use "Up" or "Down" arrow keys.

#### NOTE:

When loading a PARTIALLY full container, start by zeroing the scale with the tare adjust knob. Then place the container on the scale and make process connections. Use the tare adjustment to subtract the tare weight amount from the displayed amount.

## "FIXED" TANK APPLICATIONS

"FIXED" means: Empty tank is REFILLED.

...PRIOR TO FILLING TANK:

### CENTER TANK

Load container on scale platform.

CHEM-SCALE or BULK TANK (permanent tank) applications only:

CHEM-SCALE: Make certain that the tank is centered on platform.

BULK TANKS: Make certain saddles are equal distance from tank centerline.

### PROCESS CONNECTIONS

Make all necessary process connections to container or tank. Assure that all connections are FLEXIBLE, so as not to restrain the vessel from freely resting on the scale and platform movement is not restrained.

### TARE ADJUSTMENT

WITH NO CHEMICAL IN TANK.... Rotate the tare adjustment knob until it reads ZERO.

EXCEPTION SOLO XT: Use "Up" or "Down" arrow keys.

### FILL TANK

Fill tank. Indicator should now read only weight of chemical.

## CENTURY DIAL with ALL CYLINDER SCALES

### SECTION

#### C.1.000

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- C.1.101-3 Dimensional Drawing (Gas Cabinet Scale)
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- C.2.131 PS-10 Fixed Pressure Switch Wiring Diagram

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# CENTURY INDICATOR or SATELLITE

## WIRING PROCEDURE

1. The ZERO and SPAN of the Transmitter have been factory set. No field adjustment is possible.

NOTE: A flexible conduit is recommended for ease of installation and to incorporate a moisture trap prior to hook-up (see Figure 2)

2. Transmitter is not field repairable. Return to factory if transmitter does not function properly.
3. Transmitter is protected for reverse polarity, but care should be exercised to connect positive excitation to RED lead. Otherwise, transmitter will not work. (see Figure 1)
4. Do not use more than 30 volt DC power supply.
5. This transmitter has a FIVE (5) YEAR WARRANTY from date of shipment (when correctly installed)

**C.2.101**  
**SAT.2.101**

Figure 1

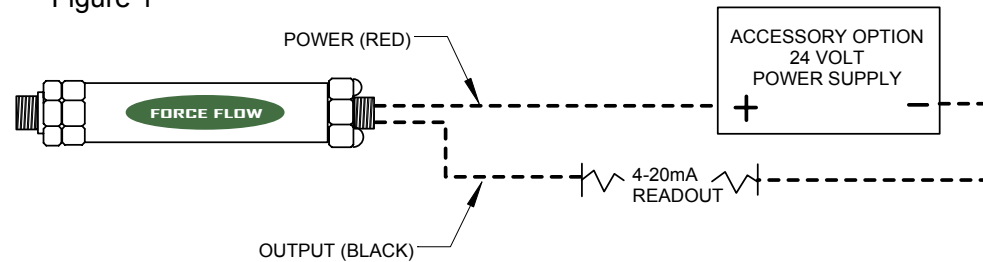
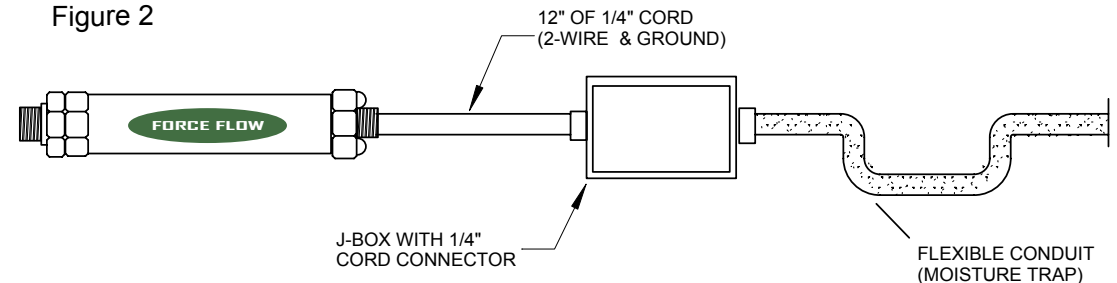


Figure 2



### TRANSMITTER WIRING DIAGRAM MODELS MA150 and MA400

Drawn by: SLP  
Date: 04/01/93  
Revised: 04/01/01  
Scale: NONE

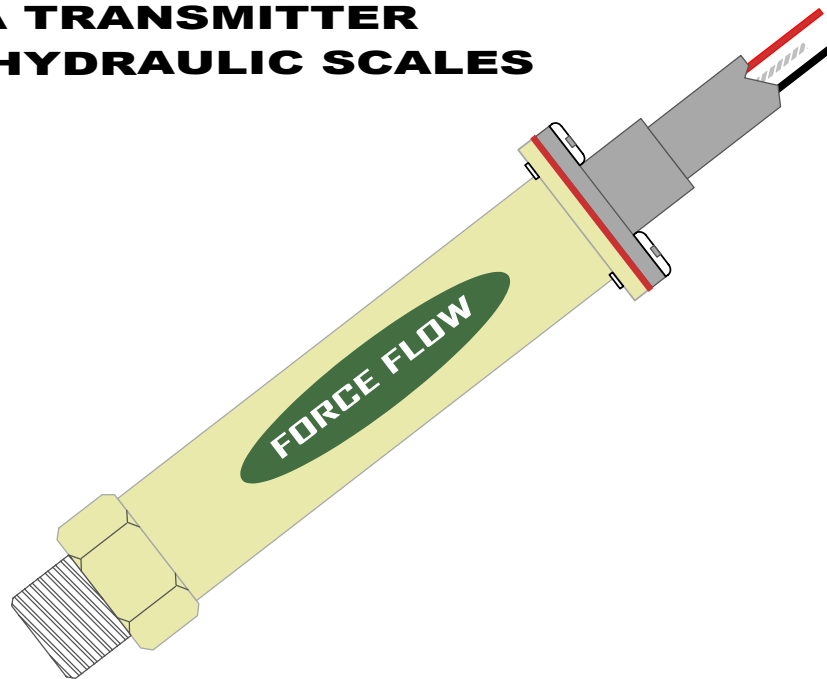
Drawing Number  
**29840**

**FORCE FLOW**

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www.forceflow.com / info@forceflow.com

# SATELLITE MA-150

## 4-20mA TRANSMITTER FOR HYDRAULIC SCALES



Force Flow's transmitter Model MA-150 measures the pressure of the hydraulic load cell system and converts the pressure to a standard 2-wire, 4-20mA analog signal that is proportional to the weight on the scale. This transmitter provides accurate, repeatable and highly reliable performance.

- 1% Accuracy
- Compact, Rugged Construction
- Sealed, NIST Traceable Calibration
- NEMA 4X Enclosure
- Reverse Polarity Protection
- Use with CHLOR-SCALE 150, CARBOY-SCALE, AMMONIA 150 and CYLINDER-200 Scales

# SATELLITE 4-20mA TRANSMITTER

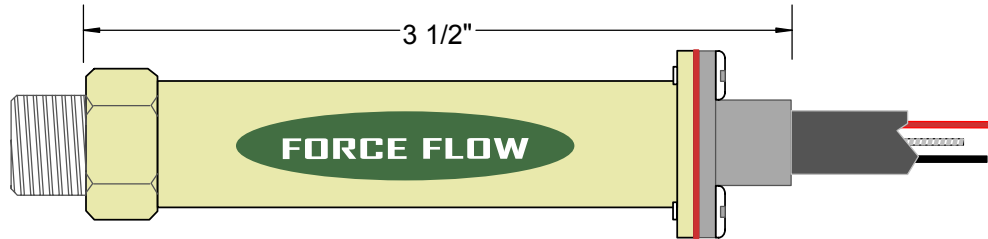
## Model MA150

### PERFORMANCE SPECIFICATIONS

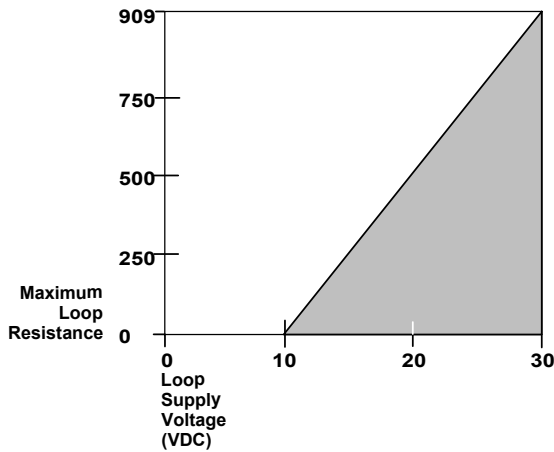
Accuracy	+/- 1.0% (linearity/hysteresis/repeatability)	Hysteresis	+/- 0.2%
Linearity	+/- 0.7%	Response Time	less than 1ms
Repeatability	+/- 0.07%		

### PHYSICAL SPECIFICATION

Electronic Housing	NEMA 4X
Weight	2 oz. (approx. without cable)
Electrical Connection	No. 24 AWG, 36" PVC, shielded, vented, UL approved



### Power Supply & Load Limitations Electrical Characteristics



### OPERATING CONDITIONS

<b>INFLUENCE</b>	<b>OPERATING LIMITS</b>
Ambient Temp.	-20 deg. to +180 deg. F
Supply Voltage	10 to 30 VDC Unregulated
Output Load	0 to 909 OHMS

### TYPICAL SPECIFICATIONS

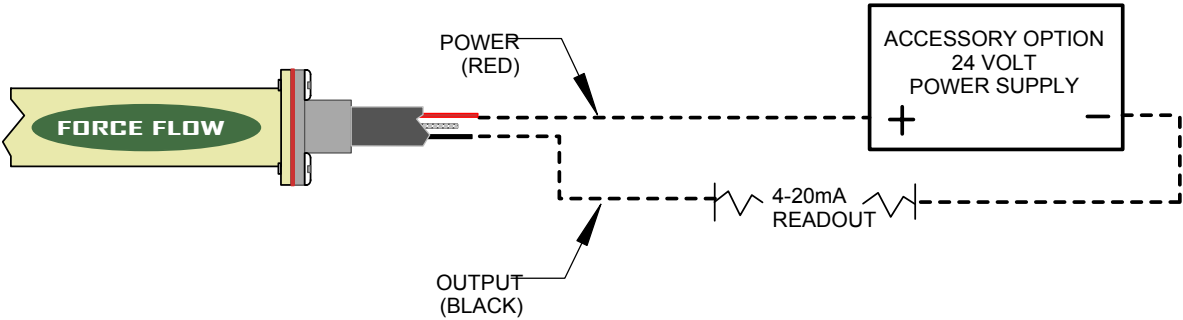
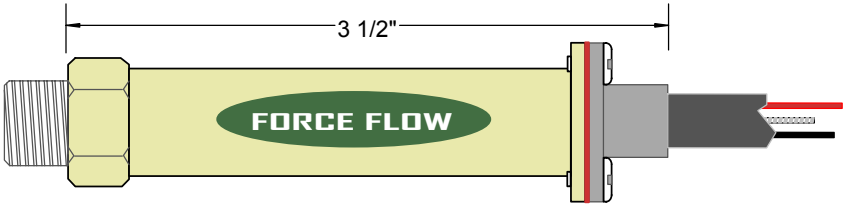
Scale(s) shall be equipped with a transmitter that outputs a 4-20 mA signal which is proportional to the gross weight on the scale.

Transmitter shall be loop-powered by an external source ranging from 10 to 30 VDC. Transmitter shall include internal RFI protection. Transmitter shall utilize a polysilicon strain gage bridge.

Transmitter shall have an accuracy better than +/- 1.0% full scale. Unit shall be factory spanned and calibrated making field adjustment unnecessary. Transmitter shall carry a minimum of a Five (5) Year Factory Warranty. "Limited" Warranties shall be considered unacceptable.

Transmitter shall be model MA-150 as manufactured by floquip, 1150-D Burnett Avenue, Concord, CA 94520 USA.

# SATELLITE 4-20mA TRANSMITTER Model MA150



C.2.104  
SAT.2.104

## COMPUTER SET-UP FOR CYLINDERS & CARBOYS

### 1. WIRE TRANSMITTER TO COMPUTER OR OTHER INTERFACE.

Before proceeding to operational steps, be sure transmitter is wired properly per wiring instructions.

### 2. SET SPAN VALUES ON COMPUTER OR OTHER INTERFACE.

When setting parameters on your computer interface, you must first set the span mode. The following values are used for the different capacity scales as follows:

#### PORTABLE TANK APPLICATIONS:

	Dial Readout	@ 4 mA	@ 20 mA
Carboy/Cylinder 100 lbs.	0 lbs.	300 lbs.	
Carboy/Cylinder 200 lbs.	0 lbs.	300 lbs.	
Ammonia/Carboy/Drum 400 lbs.	0 lbs.	400 lbs.	
Carboy/Drum 600 lbs.	0 lbs.	600 lbs.	

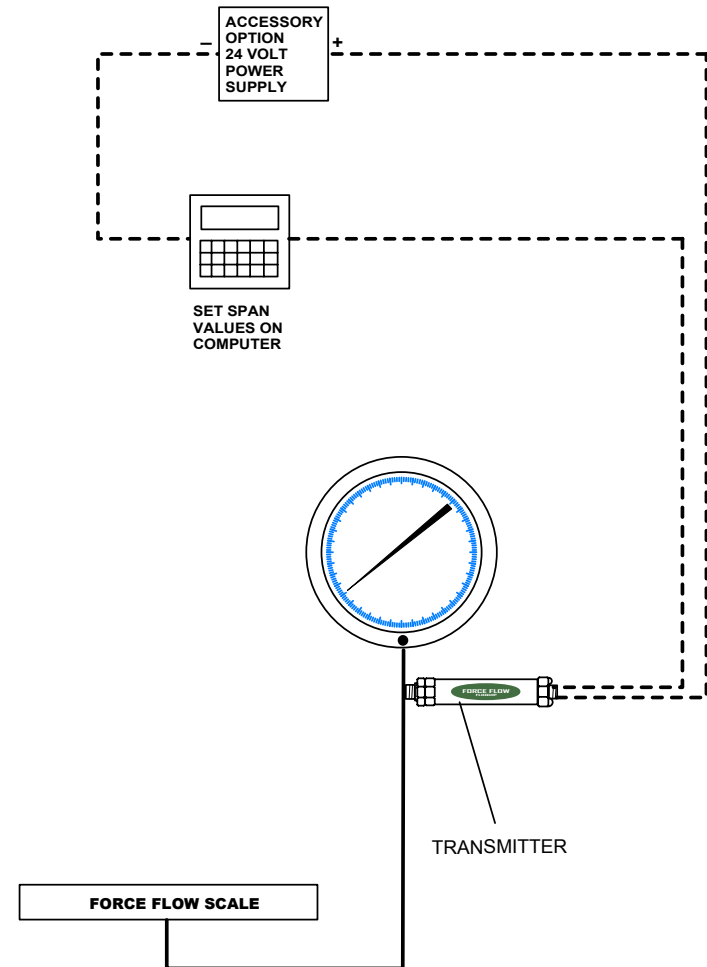
### 3. PLACE FULL TANK ON SCALE

A full tank should give you a readout of tank tare weight plus chemical contents.

### 4. SUBTRACT TARE WEIGHT FROM GROSS READING:

To read weight of chemical only (net wt), place empty vessel on scale before setting zero on computer. If tank or cylinder tare weights vary, there must be provided on the computer a method to adjust or "shift" zero after a new tank/cylinder is loaded.

GROSS WEIGHT, less TANK TARE WEIGHT = NET CONTENT WEIGHT



**C.2.105**



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File: T4\O&M\ACENMSTR\TRANCYL.tcw (Q07.pdf)

**COMPUTER SET-UP FOR  
 4-20mA TRANSMITTER  
 CYLINDER & CARBOY Applications**

Drawn by: SLP  
 Date: 10/22/02  
 Revised: 11/19/02  
 Scale: NONE

Drawing Number  
30471

## CENTURY DIAL with ALL CYLINDER SCALES

### SECTION

#### C.1.000

##### INSTALLATION & OPERATION:

- C.1.101-1 Dimensional Drawing (Chlorine/Sulfur Dioxide/Ammonia)
- C.1.101-2 Dimensional Drawing (Liquefied Gas Cylinders)
- C.1.101-3 Dimensional Drawing (Gas Cabinet Scale)
- C.1.102 Installation Instructions
- C.1.103 Installation Drawing
- C.1.104 Installation Steps 1 - 4
- C.1.105 Installation Steps 5 - 8

##### INSTALLATION CHECK LIST

- C.1.151 Installation Check List

##### OPERATION:

- C.1.201 Operation Instructions

#### C.2.000

##### 4-20mA TRANSMITTER OPTION:

- C.2.101 Model MA150 4-20mA Transmitter Wiring Diagram
- C.2.102 Model MA150 Transmitter Bulletin
- C.2.103 Model MA150 4-20mA Transmitter Data & Spec
- C.2.104 Model MA150 4-20mA Transmitter Dimensional Drawing
- C.2.105 Computer Set-Up for 4-20mA Output

**YOU  
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##### POWER SUPPLY OPTION:

- C.2.111 Power Supply (24 Volt)

##### RS-5 REED SWITCH OPTION:

- C.2.121 RS-5 Adjustable Reed Switch Wiring Diagram
- C.2.122 RS-5 Installation Instructions

##### PS-10 PRESSURE SWITCH OPTION:

- C.2.131 PS-10 Fixed Pressure Switch Wiring Diagram

#### C.3.000

##### MAINTENANCE & TROUBLESHOOTING

- C.3.105 Calibration of "Slotted" Platform Scales
- C.3.301 Trouble Shooting & Service Tips
- C.3.303 Maintenance of Load Cell
- C.3.304 Dial Data Sheet
- C.3.401 Parts List

# ACOPIAN Series U

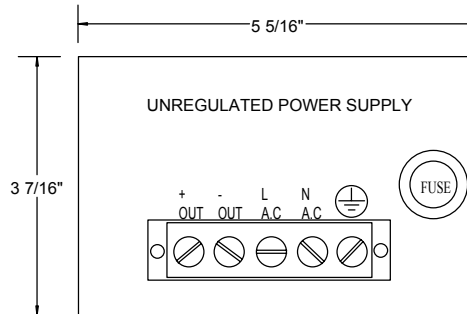
## Optional Accessory

Unregulated Power Supply  
U.L. Recognized

Low-cost DC power suitable for driving loads such as lamps, relays and small motors is provided by Series U Unregulated power supplies. All components are generously derated, insuring a long and trouble free life; built in fusing prevents damage due to prolonged overload or short circuits. They are housed in extruded aluminum cases which can be mounted in any position.

### STANDARD FEATURES:

- Silicon rectifiers
- Capacitive filtering
- Fused input
- May be used in series or parallel
- No derating or heat sinking required
- Completely serviceable.



### SPECIFICATIONS:

Input Voltage: 0-125 VAC, 50-400 Hz, Single Phase

Nominal Output Voltage: 24

Output AMPS: 1.0

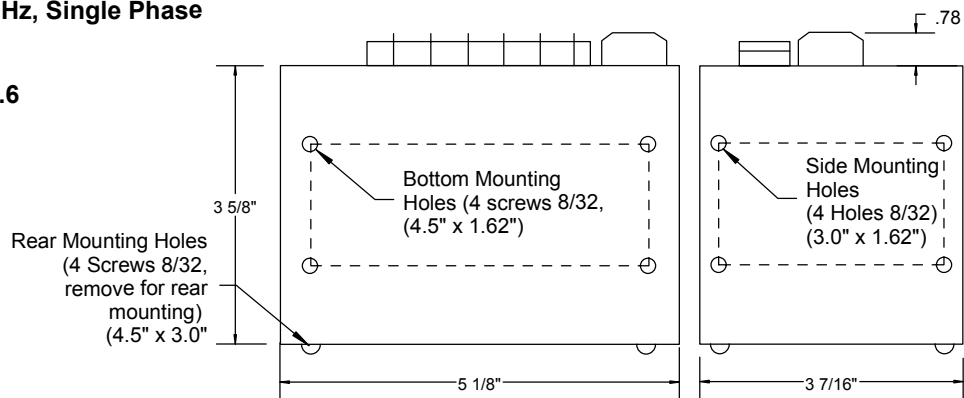
Output Voltage N/L F/L: 26.4 to 21.6

Ripple Volts: 1.7

Model: U24Y100

Size: Y3

Weight: 2 lbs. 8 oz.



**LOAD REGULATION:** Nominal output voltage is based on 115 VAC input, with approximately 50% of rated output current being drawn.

**LINE REGULATION:** With fixed load, output voltage change is proportional to input voltage change.

**OUTPUT VOLTAGE ADJUSTMENT:** An adjustable auto-transformer (not included) may be used to adjust output voltage by varying the AC input voltage to the supply.

**POLARITY:** Output is floating; either positive or negative terminal may be grounded or floated up to 300 V above ground.

**AMBIENT OPERATING TEMPERATURE:** -10 to + 65 degrees C. No derating required.

**STORAGE TEMPERATURE:** -55 to +85 degrees C.

**OPTIONAL 230 VOLT INPUT AVAILABLE:** Consult factory for model number and price.

C.2.111  
X.2.111  
SAT.2.111

REF: T4\O&MACENMSTR\ACOPIAN.tcw (A11.pdf) (WEB: ACOPIAN)  
11/26/02

## CENTURY DIAL with ALL CYLINDER SCALES

### SECTION

#### C.1.000

##### INSTALLATION & OPERATION:

- C.1.101-1 Dimensional Drawing (Chlorine/Sulfur Dioxide/Ammonia)
- C.1.101-2 Dimensional Drawing (Liquefied Gas Cylinders)
- C.1.101-3 Dimensional Drawing (Gas Cabinet Scale)
- C.1.102 Installation Instructions
- C.1.103 Installation Drawing
- C.1.104 Installation Steps 1 - 4
- C.1.105 Installation Steps 5 - 8

##### INSTALLATION CHECK LIST

- C.1.151 Installation Check List

##### OPERATION:

- C.1.201 Operation Instructions

#### C.2.000

##### 4-20mA TRANSMITTER OPTION:

- C.2.101 Model MA150 4-20mA Transmitter Wiring Diagram
- C.2.102 Model MA150 Transmitter Bulletin
- C.2.103 Model MA150 4-20mA Transmitter Data & Spec
- C.2.104 Model MA150 4-20mA Transmitter Dimensional Drawing
- C.2.105 Computer Set-Up for 4-20mA Output

##### POWER SUPPLY OPTION:

- C.2.111 Power Supply (24 Volt)

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##### RS-5 REED SWITCH OPTION:

- C.2.121 RS-5 Adjustable Reed Switch Wiring Diagram
- C.2.122 RS-5 Installation Instructions

##### PS-10 PRESSURE SWITCH OPTION:

- C.2.131 PS-10 Fixed Pressure Switch Wiring Diagram

#### C.3.000

##### MAINTENANCE & TROUBLESHOOTING

- C.3.105 Calibration of "Slotted" Platform Scales
- C.3.301 Trouble Shooting & Service Tips
- C.3.303 Maintenance of Load Cell
- C.3.304 Dial Data Sheet
- C.3.401 Parts List



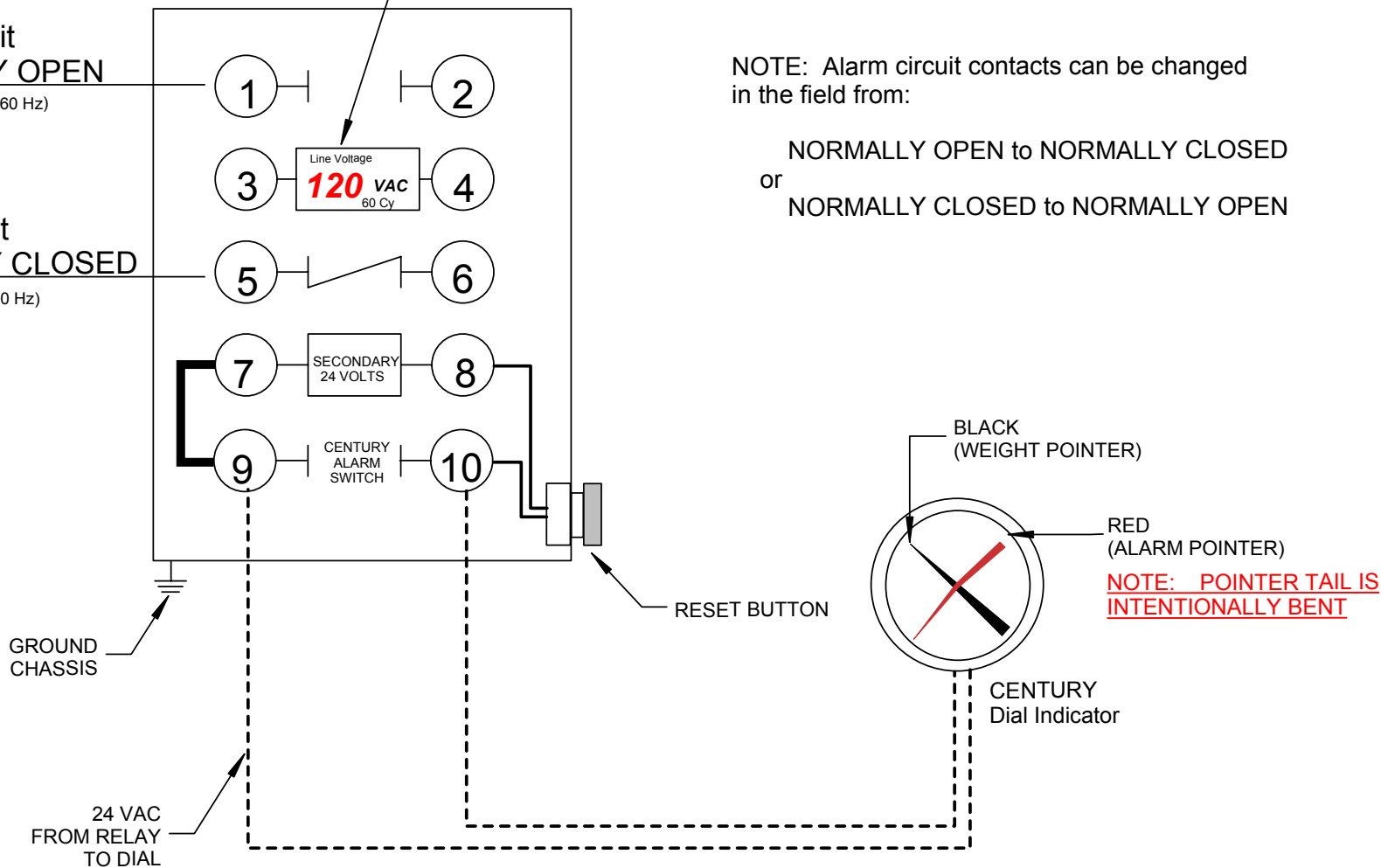
**NOTE: Actual LINE VOLTAGE provided is noted between Terminals #3 and #4 in the relay box, i.e. "120 VAC" or "240 VAC".**

Alarm Circuit  
NORMALLY OPEN

120 Volt (240 Volt/50-60 Hz)  
25 AMP Maximum

Alarm Circuit  
NORMALLY CLOSED

120 Volt (240 Volt/50-60 Hz)  
25 AMP Maximum



NOTE: Alarm circuit contacts can be changed in the field from:

NORMALLY OPEN to NORMALLY CLOSED  
or  
NORMALLY CLOSED to NORMALLY OPEN

**C.2.121**

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File: T4\O&M\ACCESSRY\RS5\_RS150.tcw (A12.pdf) (WEB: RS5&150.pdf)  
08/11/03 MD

**120 or 240 VAC WIRING DIAGRAM**  
**Model RS-5 and RS-150**  
**Adjustable Alarm Reed Switch**

Drawn by: SLP/MD  
Date: 03/15/92  
Revised: 08/11/03  
Scale: NONE

Drawing Number  
**29483**

# MODEL RS-5 & RS-150

## ADJUSTABLE ALARM REED SWITCH with MANUAL RESET RELAY

### I INSTALLATION

Mount the relay box on a convenient surface near the dial. This box is not designed for mounting on the pedestal. Ground the chassis box.

**NOTE:**

**Actual LINE VOLTAGE on terminals #3 and #4 in the relay box.,  
i.e. is "120 VOLT AC" or "240 VOLT AC".**

Attach the appropriate line voltage (SEE ABOVE NOTE) to terminals #3 and #4. Attach alarm circuit to terminals #1 and #2 for NORMALLY OPEN (or #5 and #6 for NORMALLY CLOSED). Make sure this alarm circuit does not draw more than 25 amps at the appropriate line voltage (see above "NOTE") or it will burn out the points.

**Make sure this alarm circuit does not draw more than 25 amps at the  
appropriate line voltage (see above note) or it will burn out the points.**

### II OPERATION

The assembly consists of a magnet mounted on the black scale pointer, a 1/2 amp NORMALLY OPEN reed switch mounted on the adjustable pointer inside the scale dial glass, and a 24 Volt line junctioned from the dial to an electrical box. The box contains a relay, and a manual reset relay button.

Position the adjustable pointer (RED) containing the reed switch near the low chemical level on the scale dial. When the scale pointer (BLACK) coincides with the adjustable pointer (RED), the reed switch closes, completing the 24 Volt relay circuit which in turn closes the dry SPDT relay to trip an alarm or light (furnished by others). The relay is held in and the circuit is kept closed by a normally closed reset button wired in series. The alarm circuit can be shut off by momentarily depressing the reset button when the pointers are NOT coinciding.

### III MAINTNANCE

Maintenance is very minimal. The reed switch and relay are rated at approximately a million cycles. The circuit is dormant until the magnet activates the reed switch. Normal electrical practices should be used to trace any malfunction.



## CENTURY DIAL with ALL CYLINDER SCALES

### SECTION

#### C.1.000

##### INSTALLATION & OPERATION:

- C.1.101-1 Dimensional Drawing (Chlorine/Sulfur Dioxide/Ammonia)
- C.1.101-2 Dimensional Drawing (Liquefied Gas Cylinders)
- C.1.101-3 Dimensional Drawing (Gas Cabinet Scale)
- C.1.102 Installation Instructions
- C.1.103 Installation Drawing
- C.1.104 Installation Steps 1 - 4
- C.1.105 Installation Steps 5 - 8

##### INSTALLATION CHECK LIST

- C.1.151 Installation Check List

##### OPERATION:

- C.1.201 Operation Instructions

#### C.2.000

##### 4-20mA TRANSMITTER OPTION:

- C.2.101 Model MA150 4-20mA Transmitter Wiring Diagram
- C.2.102 Model MA150 Transmitter Bulletin
- C.2.103 Model MA150 4-20mA Transmitter Data & Spec
- C.2.104 Model MA150 4-20mA Transmitter Dimensional Drawing
- C.2.105 Computer Set-Up for 4-20mA Output

##### POWER SUPPLY OPTION:

- C.2.111 Power Supply (24 Volt)

##### RS-5 REED SWITCH OPTION:

- C.2.121 RS-5 Adjustable Reed Switch Wiring Diagram
- C.2.122 RS-5 Installation Instructions

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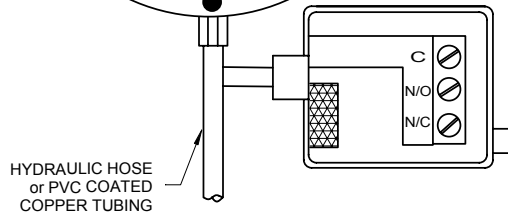
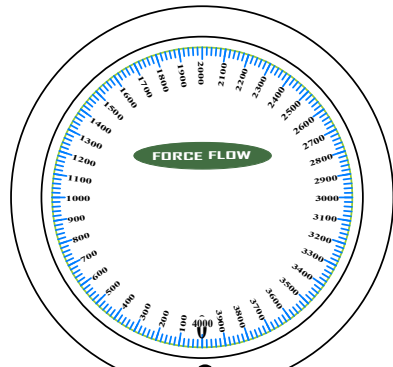
##### PS-10 PRESSURE SWITCH OPTION:

- C.2.131 PS-10 Fixed Pressure Switch Wiring Diagram

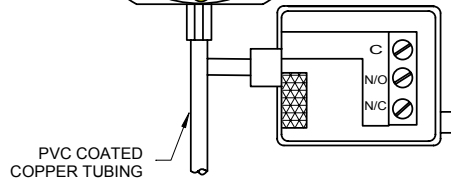
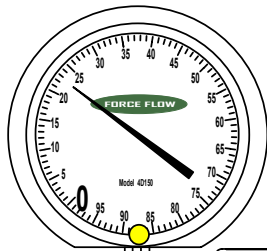
#### C.3.000

##### MAINTENANCE & TROUBLESHOOTING

- C.3.105 Calibration of "Slotted" Platform Scales
- C.3.301 Trouble Shooting & Service Tips
- C.3.303 Maintenance of Load Cell
- C.3.304 Dial Data Sheet
- C.3.401 Parts List

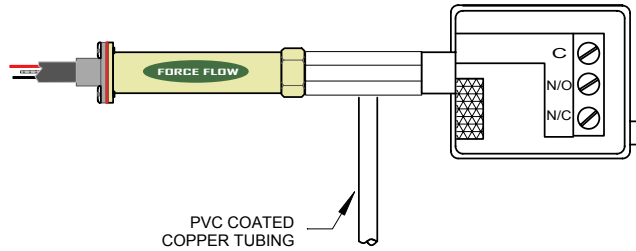


**CENTURY  
Dial Indicator**



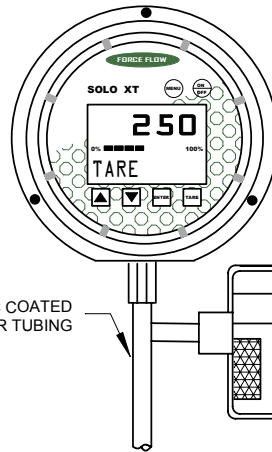
**CENTURY 150  
Dial Indicator**

**C.2.131  
X.2.131  
SAT.2.131**



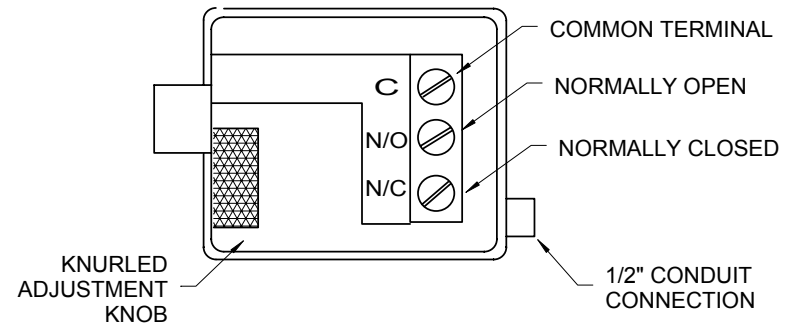
PVC COATED  
COPPER TUBING

**SATELLITE  
4-20mA Transmitter**



PVC COATED  
COPPER TUBING

**SOLO XT  
Cross Technology Indicator**



**NOTE:**

Pressure setting adjustments are made by removing pressure switch face plate and turning the knurled knob:  
COUNTERCLOCKWISE to LOWER  
CLOCKWISE to RAISE

**WIRING CONFIGURATION OF SWITCH:**

To wire switch as LOW LEVEL alarm:

- 1) Switch closes on FALLING level = N/C
- 2) Switch opens on FALLING level = N/O

To wire switch as HIGH LEVEL alarm:

- 1) Switch closes on RISING level = N/O
- 2) Switch opens on RISING level = N/C

**TO TEST THE SETTING:**

Remove weight from scale (for descending setting) or apply weight to scale (for ascending setting). Listen for an audible "Click", or use a continuity tester to determine change in switch status.



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www.forceflow.com / info@forceflow.com

File: T4\O&M\ACCESSORY\PS10&150.tcw (A14.pdf) (WEB: PS10&150.pdf)  
11/21/02

**PS-10 and PS-150 PRESSURE SWITCH  
10 AMP @ 120 or 240 VOLT AC  
NEMA 4 ENCLOSURE**

Drawn by: SLP  
Date: 01/15/71  
Revised: 11/21/02  
Scale: NONE

Drawing Number  
**29450-  
PS-10**

## CENTURY DIAL with ALL CYLINDER SCALES

### SECTION

#### C.1.000

##### INSTALLATION & OPERATION:

- C.1.101-1 Dimensional Drawing (Chlorine/Sulfur Dioxide/Ammonia)
- C.1.101-2 Dimensional Drawing (Liquefied Gas Cylinders)
- C.1.101-3 Dimensional Drawing (Gas Cabinet Scale)
- C.1.102 Installation Instructions
- C.1.103 Installation Drawing
- C.1.104 Installation Steps 1 - 4
- C.1.105 Installation Steps 5 - 8

##### INSTALLATION CHECK LIST

- C.1.151 Installation Check List

##### OPERATION:

- C.1.201 Operation Instructions

#### C.2.000

##### 4-20mA TRANSMITTER OPTION:

- C.2.101 Model MA150 4-20mA Transmitter Wiring Diagram
- C.2.102 Model MA150 Transmitter Bulletin
- C.2.103 Model MA150 4-20mA Transmitter Data & Spec
- C.2.104 Model MA150 4-20mA Transmitter Dimensional Drawing
- C.2.105 Computer Set-Up for 4-20mA Output

##### POWER SUPPLY OPTION:

- C.2.111 Power Supply (24 Volt)

##### RS-5 REED SWITCH OPTION:

- C.2.121 RS-5 Adjustable Reed Switch Wiring Diagram
- C.2.122 RS-5 Installation Instructions

##### PS-10 PRESSURE SWITCH OPTION:

- C.2.131 PS-10 Fixed Pressure Switch Wiring Diagram

#### C.3.000

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##### MAINTENANCE & TROUBLESHOOTING

- C.3.105 Calibration of "Slotted" Platform Scales
- C.3.301 Trouble Shooting & Service Tips
- C.3.303 Maintenance of Load Cell
- C.3.304 Dial Data Sheet
- C.3.401 Parts List

# FOR SCALES WITH SLOTTED PLATFORM(S) ONLY !

## CALIBRATING THE SCALE

### IMPORTANT !

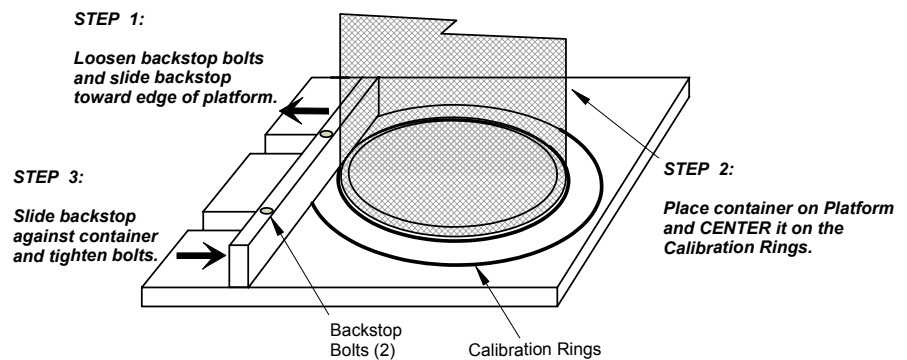
*To insure accurate weight readings, it is critical that the load is properly centered within the "CALIBRATION RING".*

### SCALE CALIBRATION

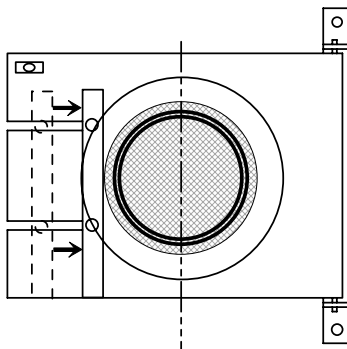
- 1) Loosen the backstop hold-down nuts and slide the backstop toward the edge of the platform.
- 2) Place the container that is to be weighed (or an empty container that is the same diameter of the container to be weighed) on the platform.

Using the CALIBRATION RINGS on the platform as the "target", center the container within the calibration rings.

- 3) Slide the backstop against the container and tighten the backstop hold-down bolts.

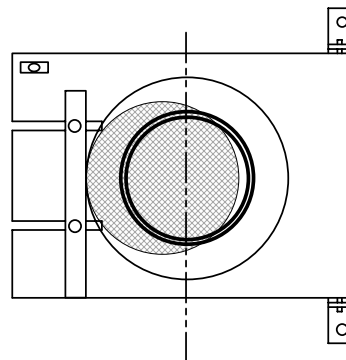


### CORRECT



Container CENTERED in Calibrating Rings

### INCORRECT



Container OFF CENTER of Calibrating Rings

### DAILY OPERATION

When using containers with the same diameter there is no need to readjust the backstop. Simply slide the new container against the backstop making sure the container is centered in the Calibration Rings.

**FORCE FLOW**

**C.3.105**  
**X.3.105**  
**S.3.105**  
**W.3.105**  
**WA.3.105**  
**SAT.3.105**

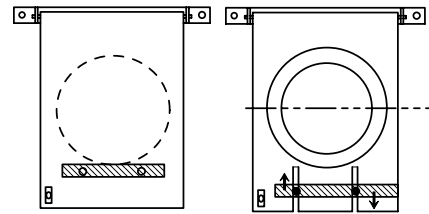
1150-D BURNETT AVE, CONCORD, CA 94520 USA  
1-800-893-6723 US & CANADA, FAX: 925-686-6713  
WWW.FORCEFLOW.COM / INFO@FORCEFLOW.COM

REF: T4IO&MICYLHYDICALIBSLOT.tcw (L09.pdf)  
02/2003

# TROUBLE SHOOTING & SERVICE TIPS WHEN WEIGHING CYLINDERS

## CYLINDER CONSIDERATIONS

- CHAINING BRACKET: Cylinder should not touch the chaining bracket.
- RESTRAINT CHAIN: The chain should not be tight against the cylinder. This could pull the cylinder weight "off center".
- TILTING CYLINDER: If the cylinder is tilting, position it on the platform in a left to right, or right to left direction (rather than leaning toward load cell or hinge).
- BACKSTOP: For accurate measurement, the cylinder must be against backstop.



"STANDARD" Platform

Provided when cylinder is 10 1/4" to 10 1/2" in diameter.

"SLOTTED" Platform

Provided when cylinder is OTHER THAN 10 1/4" to 10 1/2" in diameter.

## TARE WEIGHT REMOVED

- TARE WEIGHT: After placing new cylinder on scale, tare weight of cylinder must be removed. Rotate "tare adjust knob" on dial face to read NET contents of cylinder.
- VALVE WRENCH: If cylinder valve wrench is to remain in place when in service, adjust "tare adjust knob" AFTER wrench is on cylinder.

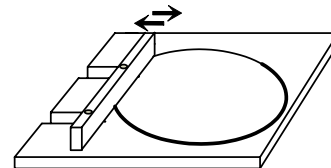
## CALIBRATION CHECK

### ON "STANDARD" 150 LB CYLINDER PLATFORMS ONLY:

- Cylinder must be standard 10 1/4 to 10 1/2" in diameter.
- Must be level front to rear. Check platform mounted level.

### ON "SLOTTED" PLATFORMS ONLY: (Provided when Cylinder is NOT 10 1/4" to 10 1/2" diameter)

- SCALE WEIGHS LIGHT:  
Loosen nut on backstop and move backstop TOWARD load cell. Put cylinder against backstop.
- SCALE WEIGHS HEAVY:  
Remove cylinder. Loosen nut on backstop and move backstop AWAY from load cell. Put cylinder against backstop.



NOTE: The scale accuracy is plus or minus 1% of the actual gross weight (or approximately 2.5 lbs/1.13 kg plus or minus for a 150 lb cylinder).

## TUBING RESTRAINING PLATFORM

- The dial should not be mounted so that it pulls the tubing tight up against platform. This will restrict platform movement.

## "FLUCTUATING" READINGS

- If the platform-mounted LEVEL is out-of-level, this may indicate a loss of hydraulic fluid. The top of the piston should sit approximately 1/4" (7mm) above the cylinder of the load cell. If this distance is less than 1/4" (7mm), or if you experience inaccurate or fluctuating readings, see REFILLING INSTRUCTIONS Section C.3.311.

NOTE: A loss of hydraulic oil does not necessarily indicate a serious leak. Some scales do NOT require refilling for many years.

## UNEVEN FLOOR

- If floor is very uneven, the piston of the load cell may be tilted so far over that it is creating a bind in the load cell. If so, use some washers to shim underneath the load cell so the piston is STRAIGHT in relation to the load cell cylinder. See Section C.3.303.

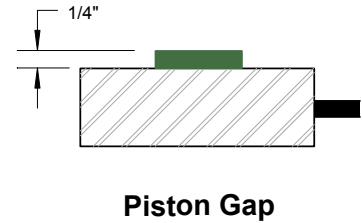


# CHLOR-SCALE 150, AMMONIA-SCALE & CARBOY-SCALE TROUBLESHOOTING

## MAINTENANCE:

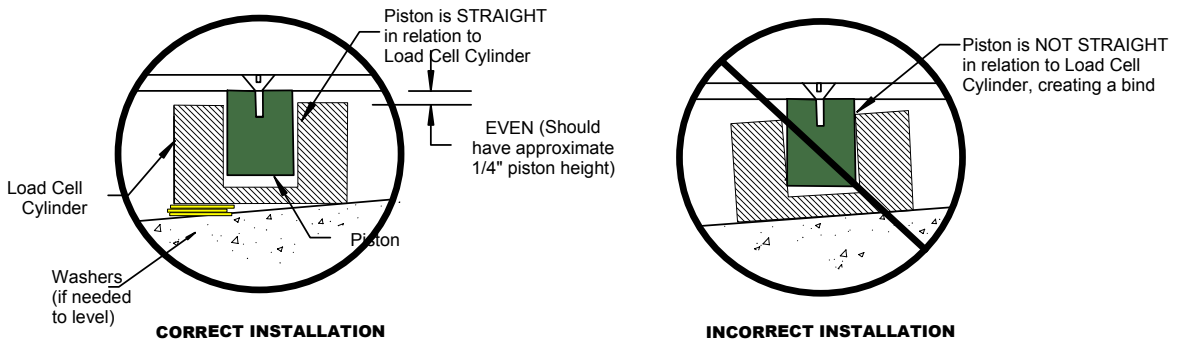
Your Scale requires minimal maintenance. If the platform mounted level is "out of level", this may indicate a loss of hydraulic fluid. Occasionally the load cell should be removed from the platform and checked to assure a full charge of oil.

The top of the piston should sit approximately 1/4" above the cylinder of the load cell. If this distance is less than 1/4", or if you experience inaccurate or fluctuating readings, consult factory 1-800-893-6723 or [info@forceflow.com](mailto:info@forceflow.com).



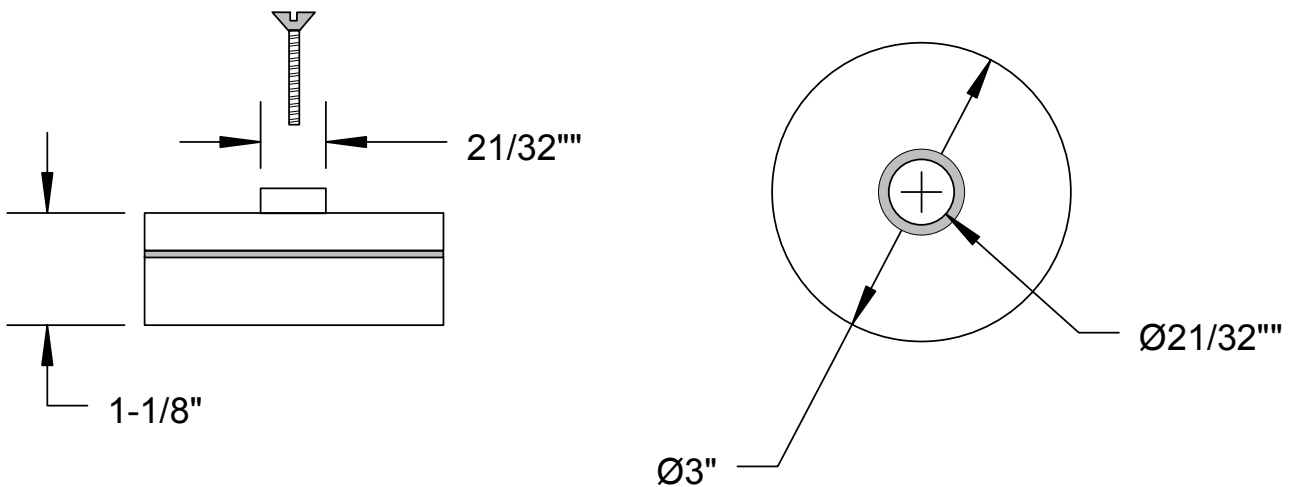
## CHECK THAT LOAD CELL IS LEVEL

If the ground is uneven and the load cell "piston" is not "straight" in relation to the load cell "cylinder", the binding could create inaccurate readings or damage the diaphragm. Shim load cell cylinder, if necessary.



## LOAD CELL DIMENSIONED

Model LC1.25 is used in CHLOR-SCALE 150, AMMONIA-SCALE and CARBOY-SCALE.



1150-D Burnett Ave, Concord, CA 94520 USA  
1-800-893-6723 US & Canada, Fax: 925-686-6713  
[www.forceflow.com](http://www.forceflow.com) / [info@forceflow.com](mailto:info@forceflow.com)



**C.3.303**  
**SAT.3.303**

**DIAL SIZE:**

4.5"

**SPECIFICATIONS:**

- Temperature Stable with damper installed to prevent shock damage.
- Accuracy shall be better than 1/2 of 1%.
- 5 Year Factory Warranty.
- Immune to power failure, lightning strikes & RFI/EMI.

**OPTIONS:**

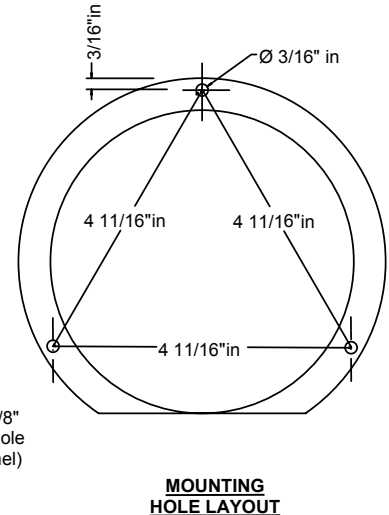
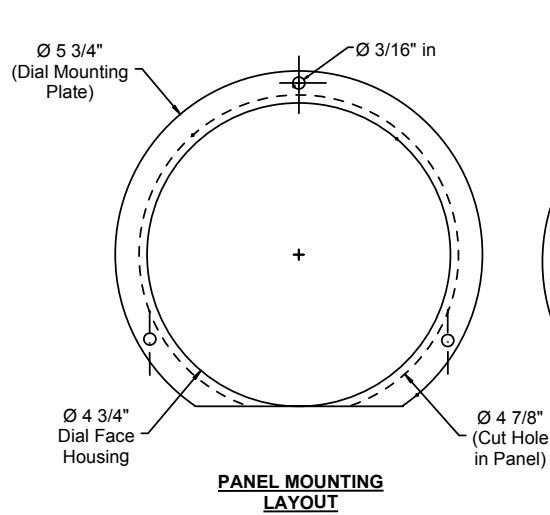
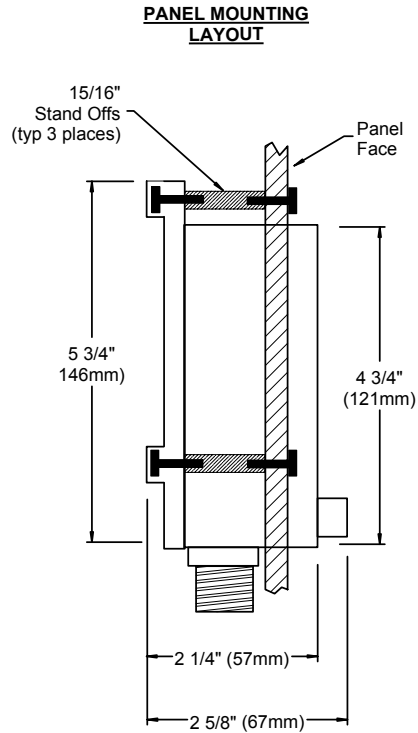
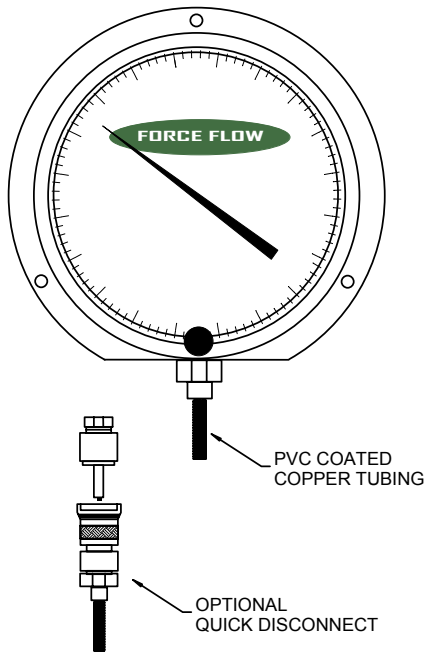
4-20mA Transmitter (Model MA420), loop powered (requires 12-45 Volt DC power)

Adjustable Low Level Alarm (Model RS5) with 10 amp manual reset relay (for Portable Tank Applications)

Fixed Pressure Switch (Model PS10) 10 amp 110 or 220 Volt AC.  
(for Fixed Tank Applications)

Locking Tare Adjust Knob (prevents tampering).

**CENTURY 150**



DIAL SIZE	DIAL MOUNTING PLATE DIAMETER	DIAL FACE HOUSING DIAMETER	MOUNTING HOLE LAYOUT	PANEL MOUNT
				CUTOUT DIAMETER
4 1/2" (114mm)	5 3/4" (146mm)	4 3/4" (121mm)	(See Diagram)	4 7/8" (124mm)

**C.3.304**



1150-D Burnett Ave, Concord, CA 94520 USA  
1-800-893-6723 US & Canada, Fax: 925-686-6713  
www.forceflow.com / info@forceflow.com

**CENTURY 150  
HYDRAULIC INDICATOR**

Drawn by: SLP  
Date: 09/01/95  
Revised: 11/01/99  
Scale: NONE

Drawing Number  
**30196**

**PARTS LIST**

- 1 Cylinder Platforms (for 1 cylinder)
  - 1A: 150# Cylinder Platform (USA/Canada only)
  - 1B: Ammonia Cylinder Platform
  - 1C: Liquefied Gas Cylinder or 150# INTERNATIONAL Cylinders

- 2 Wall Mounted Chaining Bracket:
  - With 32" Chain (8-12" cylinders)
  - With 44" Chain (12-16" cylinders)

- 3 ELECTRONIC: Load Cell (#3a) with Cable (#5a)

HYDRAULIC Load Cell (#3b) with PVC Copper and XT ONLY: Tubing (#5b)

- 4 HYDRAULIC (and XT) SCALES ONLY:
  - 4a: Internal 1.25 Load Cell Diaphragm
  - 4b: Pint of RO-5 Oil

- 5 5a: ELECTRONIC: Electronic Cable only  
5b HYDRAULIC and XT: PVC Copper Tubing only

- 6 CENTURY, 4-1/2" diameter Dial .  
SOLO XT Cross-Technology  
SOLO 1000-1 Single Channel  
SOLO 1000-2 Dual Channel  
WIZARD 4000-1 or -2  
WIZARD 4000-3 or -4

**ACCESSORIES**

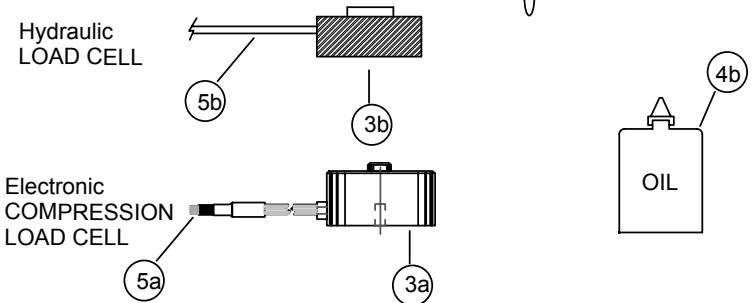
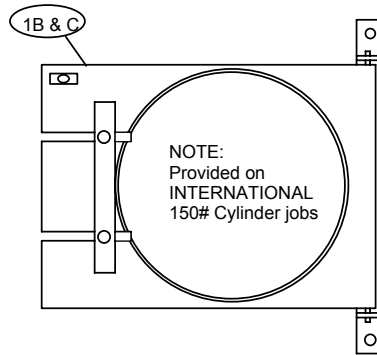
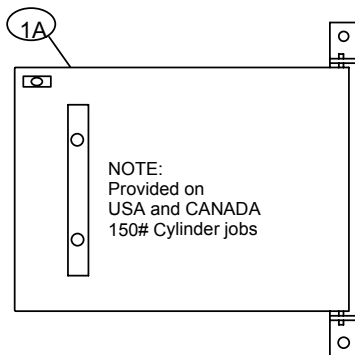
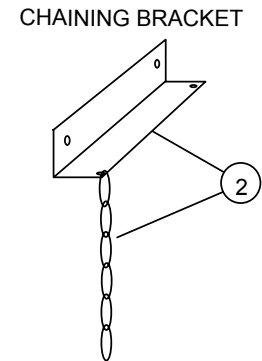
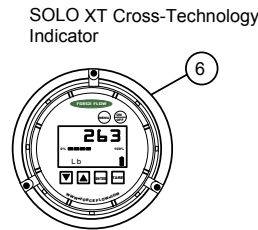
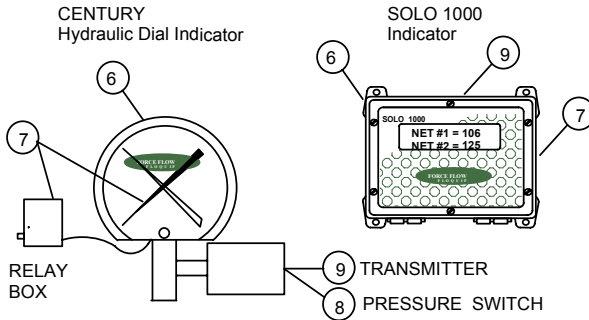
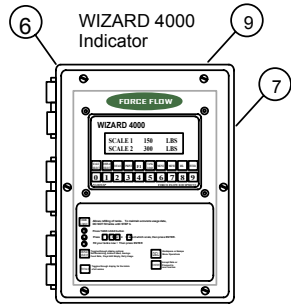
- 7 HYDRAULIC: RS-150 Reed Switch with Reset Relay Box  
ELECTRONIC WIZARD: W5ASP Alarm Switch  
ELECTRONIC SOLO: S5ASP Alarm Switch

- 8 HYDRAULIC and XT ONLY:  
PS-10 Fixed Pressure Switch

- 9 HYDRAULIC: MA-150 Transmitter (24 Volt)  
HYD. or XT: Power Supply  
ELECTRONIC: Consult Factory

**CONSULT FACTORY  
FOR CURRENT PRICING  
& TECHNICAL ASSISTANCE**

1-800-893-6723 Fax: 925-686-6713  
info@forceflow.com www.forceflow.com



**C.3.401  
W.3.401  
S.3.401  
X.3.401**



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www.forceflow.com / info@forceflow.com

PARTS LIST  
150 lb. CL2 & SO2, Ammonia &  
Liquefied Gas Cylinders

Drawn by: SLP  
Date: 01/05/89  
Revised: 12/17/02  
Scale: NONE

Drawing Number  
**29502-  
CYL**