Fliteway Technologies, Inc.

Soil Vapor Extraction System

2129 East Birchwood Ave. Cudahy, WI 53110

(414) 483-5600 1-800-236-3580 FAX (414) 483-1957

The New York Blower Company

Fan-to-Size
Fan Selection Data

Project:	
Location:	
Contact:	

Fan Design

Product:	Pressure Blower	Arrangement:	4
Size/Model:	2608A	Drive type:	Direct
Wheel Type:	Aluminum		
Wheel Material:	Aluminum		
Wheel Width:	100.0 %	Wheel Diameter:	100.0 %

Operating Conditions

Volume Flow Rate:	1,000 CFM	Fan Speed:	3500 rpm
Fan Static Pressure:	49.9 in wg	Fan Input Power:	12.5 bhp
Outlet Velocity:	2865 ft/min	VP/SP ratio:	0.0094
Altitude (above mean sea level):	2,390 ft	Operating Temperature:	70 Deg F
Operating Inlet Airstream Density:	0.0689 lb/ft3		
Static Efficiency:	62.53%	Mechanical Efficiency:	63.12%
Maximum Operating Temperature:	70 Deg F	Maximum Safe Operating Speed:	3800 rpm

Conditions at 70 Deg F and 2,390 ft

Volume Flow Rate:	1,000 CFM	Fan Speed:	3500 rpm
Fan Static Pressure:	49.9 in wg	Fan Input Power:	12.5 bhp
Density at Altitude (2,390 ft) :	0.0689 lb/ft3	Max. Safe Speed at 70 Deg F:	3800 rpm

Sound Power Level Ratings Levels expressed in dB (power levels reference 10^(-12) watts)

Center Frequency (Hz):	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
Octave Bands:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Overall**
Total Fan Power Levels*:	88.	95.	98.	99.	97.	93.	89.	83.	104.2
Inlet Power Levels**:	85.	92.	95.	96.	94.	90.	86.	80.	101.2
Outlet Power Levels**:	85.	92.	95.	96.	94.	90.	86.	80.	101.2

*As corrected for point of operation (location on fan curve)
**Unsilenced Inlet and Outlet power ratings are 3 dB lower than total fan power levels under the assumption that "half" of the sound power can be attributed to each opening. Silenced power ratings include this 3 dB reduction as well as the silencer attenuation.

Estimated Sound Pressure Levels Expressed in dB (pressure levels reference $2x10^{-7}$ microbar)

Directivity/Reflection Factor (Q) is 2, hemispherical radiation; Distance is 3 ft.; A-weighting is in use.

The estimated sound pressure level outside the fan due to an open inlet OR outlet is 91.3 dBA at 3.0 feet. The estimated sound pressure level outside the fan when BOTH inlet and outlet are ducted is 79.5 dBA at 3.0 feet (Housing Radiated Noise).

Your Representative:
Air Systems Engineers, LLC
305 Wilmont
Waukesha, WI 53189
Phone: 262-544-4768
Fax: 262-544-9422
E-Mail: kcumming@airsystemsengineers.com

The New York Blower Company certifies that the Pressure Blower fan is licensed to bear the AMCA Air Performance Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings program.

AMCA Licensed for Air Performance without Appurtenances (Accessories). Power (bhp) excludes drives.

Performance certified is for installation type: B - free inlet, ducted outlet.

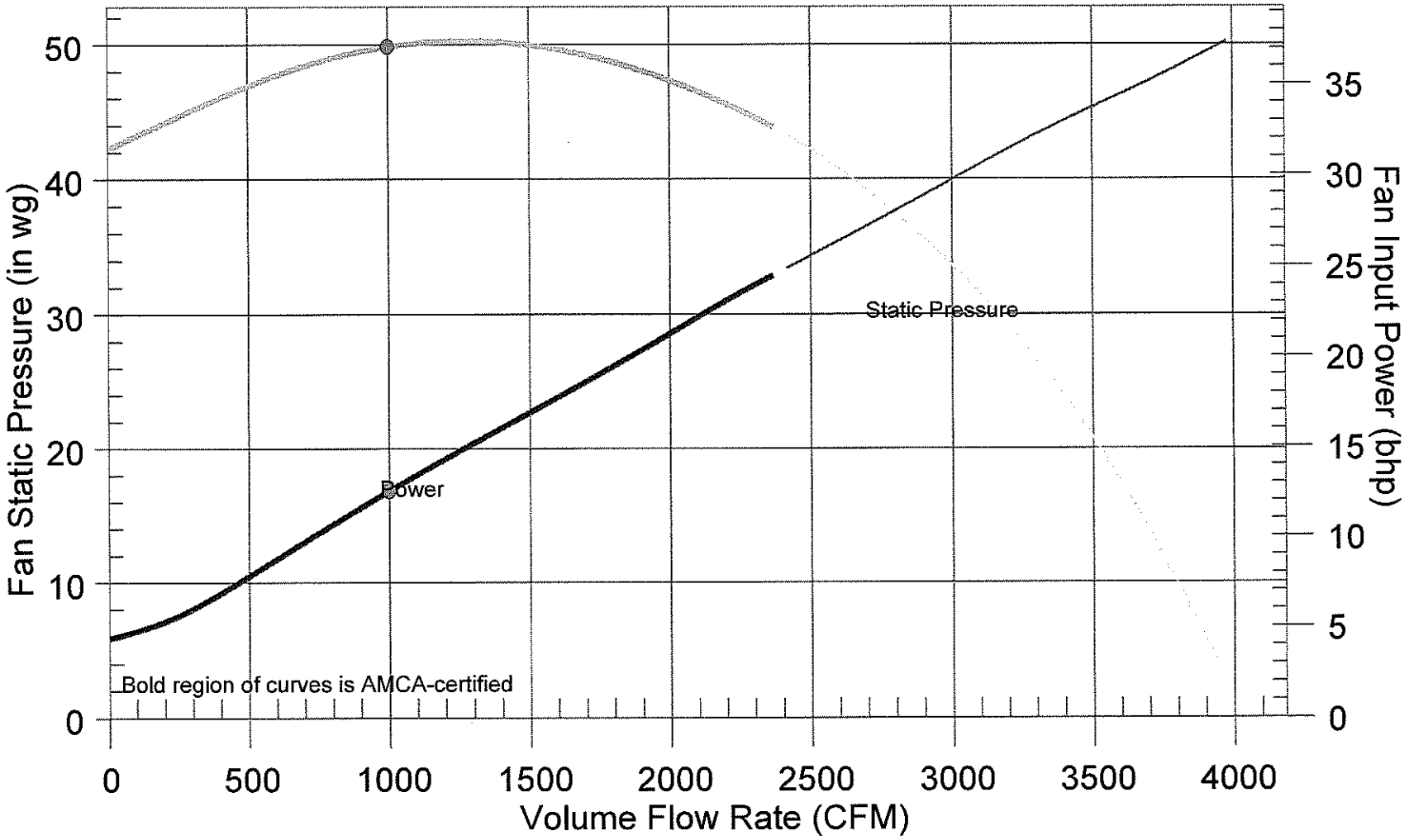
The New York Blower Company

Fan-to-Size

Pressure Blower
2608 Aluminum
Arr.: 4

Volume Flow Rate: 1,000 CFM
Fan Static Press.: 49.9 in wg
Speed: 3500 rpm
Power: 12.5 bhp

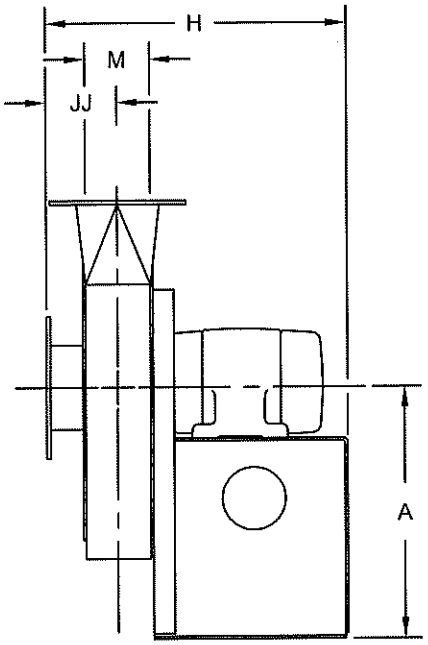
Temp.: 70 Deg F
Altitude: 2,390 ft
Density: 0.0689 lb/ft3
Outlet Velocity: 2865 ft/min

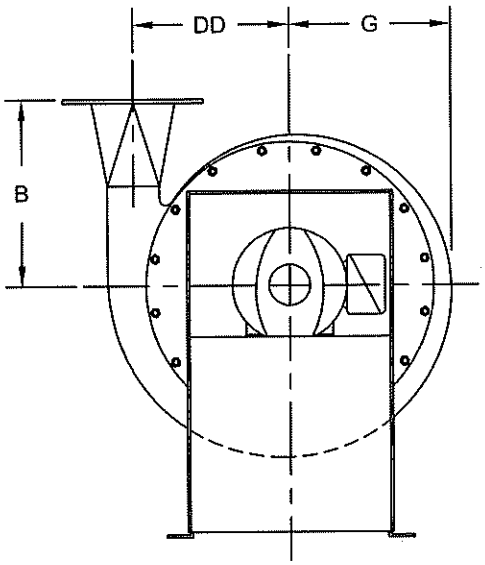


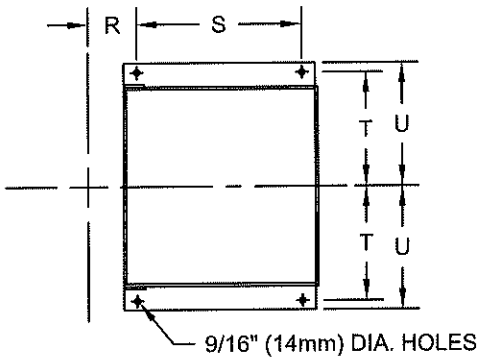
AMCA Licensed for Air Performance without Appurtenances (Accessories). Power (bhp) excludes drives.
Performance certified is for installation type: B - free inlet, ducted outlet.

[v1.80.40-R -- July 2010] Date Printed: 3/13/2012

Your Sales Representative:
Air Systems Engineers, LLC
Phone: 262-544-4768







INLET AND OUTLET FLANGES ARE 3/8" THICK MATERIAL.

PRESSURE BLOWERS ARE ROTATABLE IN THE FIELD BY 22 1/2° INCREMENTS.

MAXIMUM TEMPERATURE: 180°F (82°C)

FURNISHED WITH FLANGED INLET AND OUTLET WHICH FITS ANSI 150 PIPE FLANGES.

ITEM	DIMENSIONS	
	in	mm
A	26	660
B	19	483
DD	17 5/8	448
G	18 1/4	464
H	31 7/8	810
JJ	7	178
M	5	127
R	3 7/8	98
S	19 1/2	495
T	10 7/8	276
U	11 3/4	298

FLANGED OUTLET	DIMENSIONS	
	in	mm
I.D.	8	203
B.C.	11 3/4	298
O.D.	13 1/2	343
NO. HOLES	8	-
DIA. HOLES	7/8	22

FLANGED INLET	DIMENSIONS	
	in	mm
I.D.	8	203
B.C.	11 3/4	298
O.D.	13 1/2	343
NO. HOLES	8	-
DIA. HOLES	7/8	22

TOLERANCE: ±1/8" (±3mm)

nyb The New York Blower Company

7660 Quincy Street, Willowbrook, IL 60521

Pressure Blower A4

SIZE: 23to2608 CW UB

Date: 05-02-06 Drawn By: NYB

DWG: PB-23to2608-4-CW-UB-256-F

B8V

The New York Blower Company

Date:	4/20/2012		
File:	G08905	Control:	100
Sequence:	1	Chg Order:	
Revision:		Processor:	FTD

Customer: **FLITEWAY TECHNOLOGIES**
2129 E Birchwood Ave

Purchase Order: 515946 **Office Reference:** 250419
Tagging: Q14190

FAN INFORMATION

Quantity:	1		
Product Line:	Pressure Blower		
Size:	2608A	Bearing Mfg. & Model:	
Class/Wheel Type:	NA / Aluminum		
Rotation:	CW		
Arrangement:	4		
Discharge:	UB		
Motor Position:			
Motor By:	Customer	Total fan wt. With accessories:	618 lbs
Mounting By:	Customer		

DRIVE INFORMATION

QTY	DESCRIPTION	PART NUMBER
	Motor Sheave	
	Motor Bushing	
	Fan Sheave	
	Fan Bushing	
	Belt	
	Belt Centers: in	

SF:
Belt Tens:

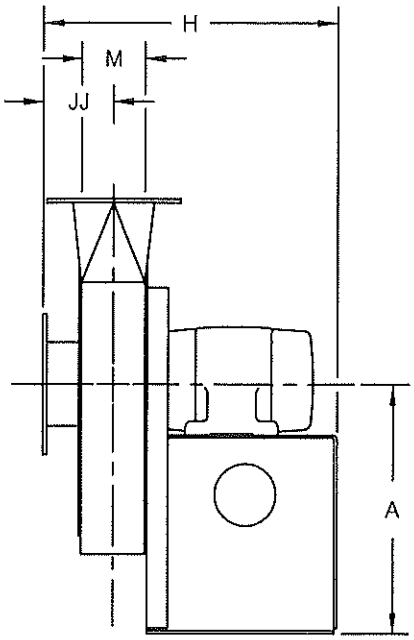
FAN PERFORMANCE DATA

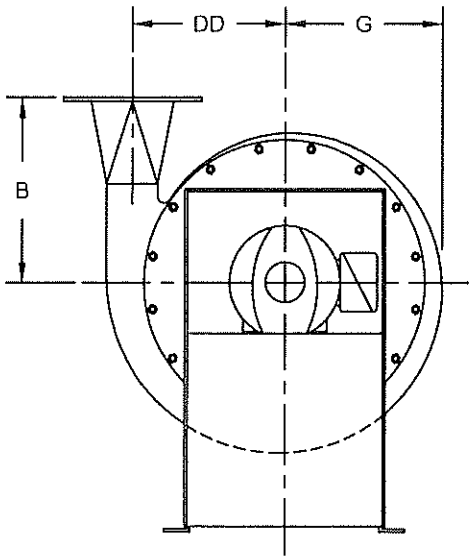
Capacity	CFM	SP	RPM	BHP	TEMP	DENS	ALT	MAX SS
STANDARD	1000	54.3	3500	13.6	70	0.075	0	3800
OPERATING	1000	49.9	3500	12.5	70	0.0689	2390	3800
FUTURE								
TEST								

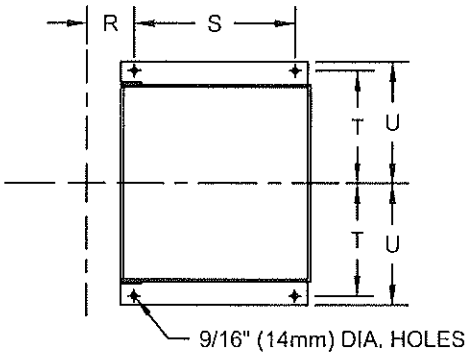
SALES MEMO INFORMATION

QTY	DESCRIPTION	Drawing#
1	CW UB, SIZE 2608A15 PB, ALUM-WHEEL, ARR-4 FLANGED INLET 08" FLANGED OUTLET 08"	G08905-100-02
1	15 HP, 3600 RPM, 254T FRAME MOTOR AND MOUNTING BY CUSTOMER	
1	CLEANOUT DOOR, BOLTED FLUSH 3:00	
1	DRAIN	
1	CERT DOCS: NON-COMPOSITE DWGS, PDF	
1	FAN INSTALLATION AND MAINTENANCE MANUAL REFERENCE NUMBER.	IM140.PDF

FLITEWAY TECHNOLOGIES 2129 E Birchwood Ave	
PURCHASE ORDER: 515946	
Q14190	







INLET AND OUTLET FLANGES ARE 3/8" THICK MATERIAL.

PRESSURE BLOWERS ARE ROTATABLE IN THE FIELD BY 22 1/2° INCREMENTS.

MAXIMUM TEMPERATURE: 180°F (82°C)

FURNISHED WITH FLANGED INLET AND OUTLET WHICH FITS ANSI 150 PIPE FLANGES.

ITEM	DIMENSIONS	
	in	mm
A	26	660
B	19	483
DD	17 5/8	448
G	18 1/4	464
H	31 7/8	810
JJ	7	178
M	5	127
R	3 7/8	98
S	19 1/2	495
T	10 7/8	276
U	11 3/4	298

FLANGED OUTLET	DIMENSIONS	
	in	mm
I.D.	8	203
B.C.	11 3/4	298
O.D.	13 1/2	343
NO. HOLES	8	-
DIA. HOLES	7/8	22

FLANGED INLET	DIMENSIONS	
	in	mm
I.D.	8	203
B.C.	11 3/4	298
O.D.	13 1/2	343
NO. HOLES	8	-
DIA. HOLES	7/8	22

TOLERANCE: ±1/8" (±3mm)

THE NEW YORK BLOWER COMPANY
7660 Quincy Street
Willowbrook, IL 60527-5530

Visit us on the Web:
http://www.nyb.com
Phone: (800) 208-7918
Email: nyb@nyb.com

Pressure Blower A4

SIZE: 2608A CW UB

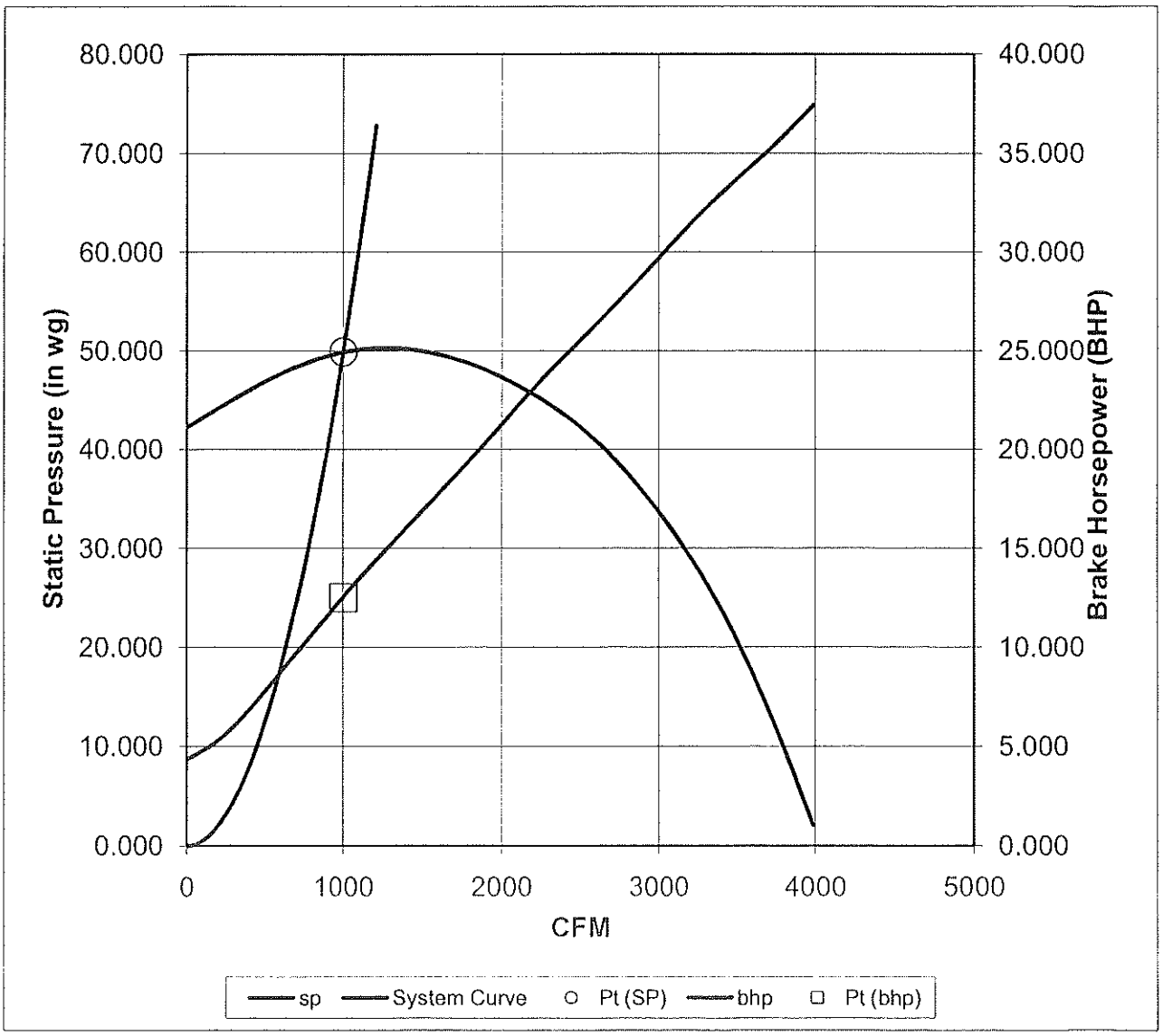
Date 04-20-12 Certified FTD

Drawing No. G08905-100-2 Rev. ____

B8V

Performance Curve

Date:	20-Apr-12	File:	G08905-100	FTD
Performance		Cust. No.:	515946	
Options:		Customer:	FLITEWAY TECHNOLOGIES	
			2129 E Birchwood Ave	
		Product Line:	Pressure Blower	
		Size:	2608A	
		Capacity:	Operating	
		CFM:	1,000	
		SP:	49.9	
		RPM:	3500	
Temperature:	*70*	BHP:	12.5	
Altitude:	*2390*	Density:	0.069	
		Max Safe Speed:	3800	
Tag:	Q14190			

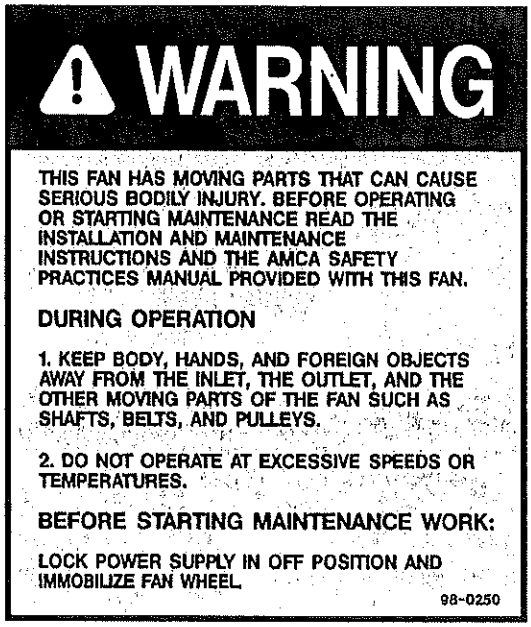


THE NEW YORK BLOWER COMPANY
7660 Quincy Street
Willowbrook, IL 60527-5530
Visit us on the Web: http://www.nyb.com
Phone: (800) 208-7918 Email: nyb@nyb.com

INSTALLATION MAINTENANCE OPERATING INSTRUCTIONS

IM-140

PRESSURE BLOWERS
TYPE HP PRESSURE BLOWERS



A WORD ABOUT SAFETY

The above **WARNING** decal appears on all **nyb** fans. Air moving equipment involves electrical wiring, moving parts, sound, and air velocity or pressure which can create safety hazards if the equipment is not properly installed, operated and maintained. To minimize this danger, follow these instructions as well as the additional instructions and warnings on the equipment itself.

All installers, operators and maintenance personnel should study AMCA Publication 410, "Recommended Safety Practices for Air Moving Devices", which is included as part of every shipment. Additional copies can be obtained by writing to New York Blower Company, 7660 Quincy St., Willowbrook, IL 60527.

ELECTRICAL DISCONNECTS

Every motor driven fan should have an independent disconnect switch to isolate the unit from the electrical supply. It should be near the fan and must be capable of being locked by maintenance personnel while servicing the unit, in accordance with OSHA procedures.

MOVING PARTS

All moving parts must have guards to protect personnel. Safety requirements vary, so the number and type of guards needed to meet company, local and OSHA standards must be determined and specified by the user. Never start a fan without having all safety guards installed. Check regularly for damaged or missing guards and do not operate any fan with guards removed. Fans can also become dangerous because of potential "windmilling", even though all electrical power is disconnected. Always block the rotating assembly before working on any moving parts.

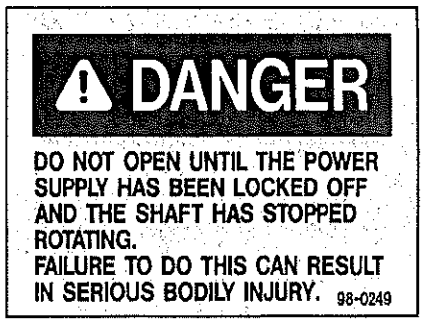
SOUND

Some fans can generate sound that could be hazardous to exposed personnel. It is the responsibility of the system designer and user to determine sound levels of the system, the degree of personnel exposure, and to comply with applicable safety requirements to protect personnel from excessive noise. Consult **nyb** for fan sound power level ratings.

AIR PRESSURE AND SUCTION

In addition to the normal dangers of rotating machinery, fans present another hazard from the suction created at the fan inlet. This suction can draw materials into the fan where they become high velocity projectiles at the outlet. It can also be extremely dangerous to persons in close proximity to the inlet, as the forces involved can overcome the strength of most individuals. Inlets and outlets that are not ducted should be screened to prevent entry and discharge of solid objects.

ACCESS DOORS



The above DANGER decal is placed on all **nyb** cleanout doors. These doors, as well as access doors to the duct system, should never be opened while the fan is in operation. Serious injury could result from the effects of air pressure or suction.

Bolted doors must have the door nuts or fasteners securely tightened to prevent accidental or unauthorized opening.

RECEIVING AND INSPECTION

The fan and accessories should be inspected on receipt for any shipping damage. Turn the wheel by hand to see that it rotates freely and does not bind. If dampers or shutters are provided, check these accessories for free operation of all moving parts.

F.O.B. factory shipping terms require that the receiver be responsible for inspecting the equipment upon arrival. Note damage or shortages on the Bill of Lading and file any claims for damage or loss in transit. **nyb** will assist the customer as much as possible; however, claims must be originated at the point of delivery.

3. Belts tend to stretch somewhat after installation. Recheck tension after several days of operation. Check sheave alignment as well as setscrew and/or bushing bolt tightness.

COUPLING

Coupling alignment should be checked after installation and prior to start up. Alignment is set at the factory, but shipping, handling, and installation can cause misalignment. Also check for proper coupling lubrication. For details on lubrication and for alignment tolerances on the particular coupling supplied, see the manufacturer's installation and maintenance supplement in the shipping envelope.

Installation

Most **nyb** fans are shipped with the coupling installed. In cases where the drive is assembled after shipping, install the coupling as follows:

1. Remove all foreign material from fan and motor shafts and coat with machine oil for easy mounting of coupling halves.
2. Mount the coupling halves on each shaft, setting the gap between the faces specified by the manufacturer. Avoid using force. If mounting difficulty is encountered, lightly polish the shaft with emery cloth until the halves slide on freely.

Alignment

1. Align the coupling to within the manufacturer's limits for parallel and angular misalignment (see Figure 2). A dial indicator or laser can also be used for alignment where greater precision is desired. Adjustments should be made by moving the motor to change shaft angle, and by the use of foot shims to change motor shaft height. Do not move the fan shaft or bearing.
2. When correctly aligned, install the flexible element and tighten all fasteners in the coupling and motor base. Lubricate the coupling if necessary.
3. Recheck alignment and gap after a short period of operation, and recheck the tightness of all fasteners in the coupling assembly.

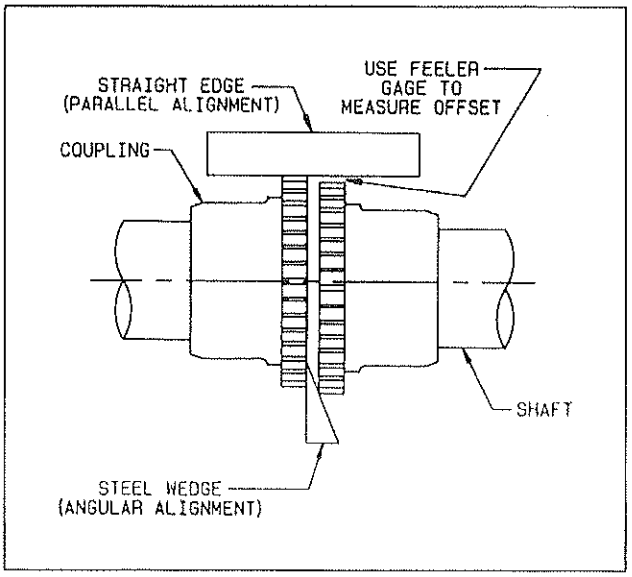


Figure 2

START-UP

Safe operation and maintenance includes the selection and use of appropriate safety accessories for the specific installation. This is the responsibility of the system designer and requires consideration of equipment location and accessibility as well as adjacent components. All safety accessories must be installed properly prior to start-up.

Safe operating speed is a function of system temperature and wheel design. Do not under any circumstances exceed the maximum safe fan speed published in the **nyb** engineering supplement, which is available from your **nyb** field sales representative.

Procedure

1. If the drive components are not supplied by **nyb,** verify with the manufacturer that the starting torque is adequate for the speed and inertia of the fan.
2. Inspect the installation prior to starting the fan. Check for any loose items or debris that could be drawn into the fan or dislodged by the fan discharge. Check the interior of the fan as well. Turn the wheel by hand to check for binding.
3. Check drive installation and belt tension.
4. Check the tightness of all setscrews, nuts and bolts. When furnished, tighten hub setscrews with the wheel oriented so that the setscrew is positioned underneath the shaft.
5. Install all remaining safety devices and guards. Verify that the supply voltage is correct and wire the motor. "Bump" the starter to check for proper wheel rotation.
6. Use extreme caution when testing the fan with ducting disconnected. Apply power and check for unusual sounds or excessive vibration. If either exists, see the section on Common Fan Problems. To avoid motor overload, do not run the fan for more than a few seconds if ductwork is not fully installed. On larger fans, normal operating speed may not be obtained without motor overload unless ductwork is attached. Check for correct fan speed and complete installation. Ductwork and guards must be fully installed for safety.
7. Setscrews should be rechecked after a few minutes, eight hours and two weeks of operation (see Tables 1 & 2 for correct tightening torques).

NOTE: Shut the fan down immediately if there is any sudden increase in fan vibration.

Lubrication

Use the table for relubrication scheduling according to operating speed and shaft diameter. Bearings should be lubricated with a premium quality lithium-based grease conforming to NLGI Grade 2. Examples are:

Mobil	-	Mobilgrease XHP	Chevron	-	Amolith #2
Texaco	-	Premium RB	Shell	-	Alvania #2

These greases are for bearing surface temperatures of 40°F. to 180°F. For surface temperatures of 181°F. to 230°F. use Mobilith SHC220.

Do not use "high temperature" greases, as many are not formulated to be compatible with fan bearings.

Add grease to the bearing while running the fan or rotating the shaft by hand. Be sure all guards are in place if lubrication is performed while the fan is operating. Add just enough grease to cause a slight purging at the seals. Except on split pillowblocks. Completely filled bearings will run hotter until a sufficient amount of grease is purged out of the seals.

Split pillowblock bearings (Link-Belt P-LB6800 & P-LB6900, SKF SAF 22500, Dodge SAF-XT) should be cleaned and repacked at approximately every eighth lubrication interval. This requires removal of the bearing cap. Clean out old grease and repack the bearing with fresh grease. Pack the bearing fully and fill the housing reservoir to the bottom of the shaft on both sides of the bearing. Replace the bearing cap, being careful not to mix caps as they are not interchangeable from one bearing to another. **Do not over lubricate.**

BEARING LUBRICATION INTERVAL [months]

RPM / Shaft	1 - 500	501- 1000	1001- 1500	1501- 2000	2001- 2500	2501- 3000	3001- 3500	3501- 4000
1 7/16	6 / 6	6 / 4	5-6 / 4	4-6 / 2	4-6 / 2	3-5 / 1	2-4 / 1	2-4 / 1
1 11/16	6 / 6	6 / 4	4-6 / 2	4-6 / 1	2-4 / 1	2-4 / 1	2 / 1/2	1/2 / 1/2
1 15/16			6	4-6	4	2-4	2	--
2 7/16	6	4-6	6	4-6	4	2-4	2	1-2
2 15/16	5-6	4-6	4-6	4-6	2-4	2	1/2	1
3 7/16	4-6	3-5	3-4	2-4	2-4	1-2	1	1

Ball Bearings → ◢ ← Non- Split Pillowblock Spherical Roller Bearings

NOTE:

1. **These are general recommendations only; specific manufacturer's recommendations may vary slightly.**
2. **Assumes clean environment, -20°F. to 120°F.**
   a. **Consult The New York Blower Company for operation below -20°F. ambient.**
   b. **Ambient temperatures greater than 120°F. will shorten bearing life.**
   c. **Under extremely dirty conditions, lubricate more frequently.**
3. **Assumes horizontal mounting configuration. For vertically mounted applications, lubricate twice as frequently.**

COMMON FAN PROBLEMS

Excessive Vibration

A common complaint regarding industrial fans is "excessive vibration". **nyb** is careful to ensure that each unit is precisely balanced prior to shipment; however, there are many other causes of vibration including:

1. Loose mounting bolts, setscrews, bearings or couplings.
2. Misalignment or excessive wear of couplings or bearings.
3. Misaligned or unbalanced motor.
4. Bent shaft due to mishandling or material impact.
5. Accumulation of foreign material on the wheel.
6. Excessive wear or erosion of the wheel.
7. Excessive system pressure or restriction of airflow due to closed dampers.
8. Inadequate structural support, mounting procedures or materials.
9. Externally transmitted vibration.

Inadequate Performance

1. Incorrect testing procedures or calculations.
2. Fan running too slowly.
3. Fan wheel rotating in wrong direction or installed back-wards on shaft.
4. Wheel not properly centered relative to inlet cone.
5. Damaged or incorrectly installed cut off sheet or diverter.
6. Poor system design, closed dampers, air leaks, clogged filters, or coils.
7. Obstructions or sharp elbows near inlets.
8. Sharp deflection of airstream at fan outlet.

Excessive Noise

1. Fan operating near "stall" due to incorrect system design or installation.
2. Vibration originating elsewhere in the system.
3. System resonance or pulsation.
4. Improper location orientation of fan intake and discharge
5. Inadequate or faulty design of supporting structures.
6. Nearby sound reflecting surfaces.
7. Loose accessories or components.
8. Loose drive belts.
9. Worn bearings.

Premature Component Failure

1. Prolonged or major vibration.
2. Inadequate or improper maintenance.
3. Abrasive or corrosive elements in the airstream or surrounding environment.
4. Misalignment or physical damage to rotating components or bearings.
5. Bearing failure from incorrect or contaminated lubricant or grounding through the bearings while arc welding.
6. Excessive fan speed.
7. Extreme ambient or airstream temperatures.
8. Improper belt tension.
9. Improper tightening of wheel setscrews.

REPLACEMENT PARTS

It is recommended that only factory-supplied replacement parts be used. **nyb** fan parts are built to be fully compatible with the original fan, using specific alloys and tolerances. These parts carry a standard **nyb** warranty.

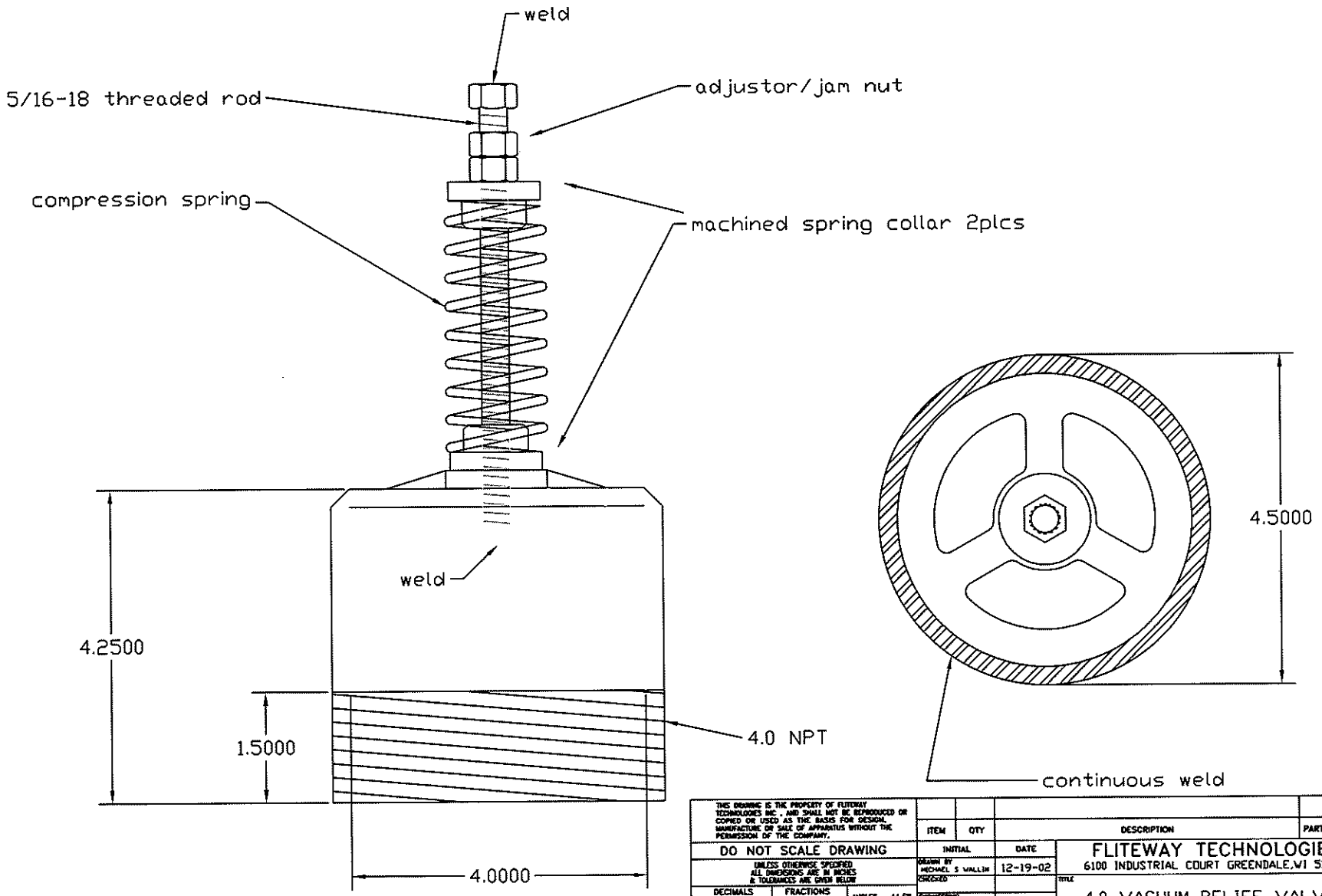
When ordering replacement parts, specify the part name, **nyb** shop and control number, fan size, type, rotation (viewed from drive end), arrangement and bearing size or bore. Most of this information is on the metal nameplate attached to the fan base.

For assistance in selecting replacement parts, contact your local **nyb** representative or visit: http://www.nyb.com.

Example: Part required: Wheel/shaft assembly
Shop/control number: B-10106-100
Fan description: Size 2206A10 Pressure Blower Rotation: Clockwise
Arrangement: 4
Suggested replacement parts include:

Wheel	Component parts: Damper
Shaft ₁	Motor
Bearings*	Coupling*
Shaft Seal*	Sheaves*
	V-Belts*

₁ For Arrangement 1/8 fan only.



DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES & TOLERANCES ARE GIVEN BELOW

DECIMALS	FRACTIONS
0.X ±.030	FRACTIONS ±1/16
0.XX ±.015	
0.XXX ±.005	

ANGLES ±1/2°

FILLETS .038 TO .062R

SURFACE FINISH 125

REMOVE ALL BURRS & BREAK EDGES

ITEM	QTY	DESCRIPTION	PART/MAT'L NO.

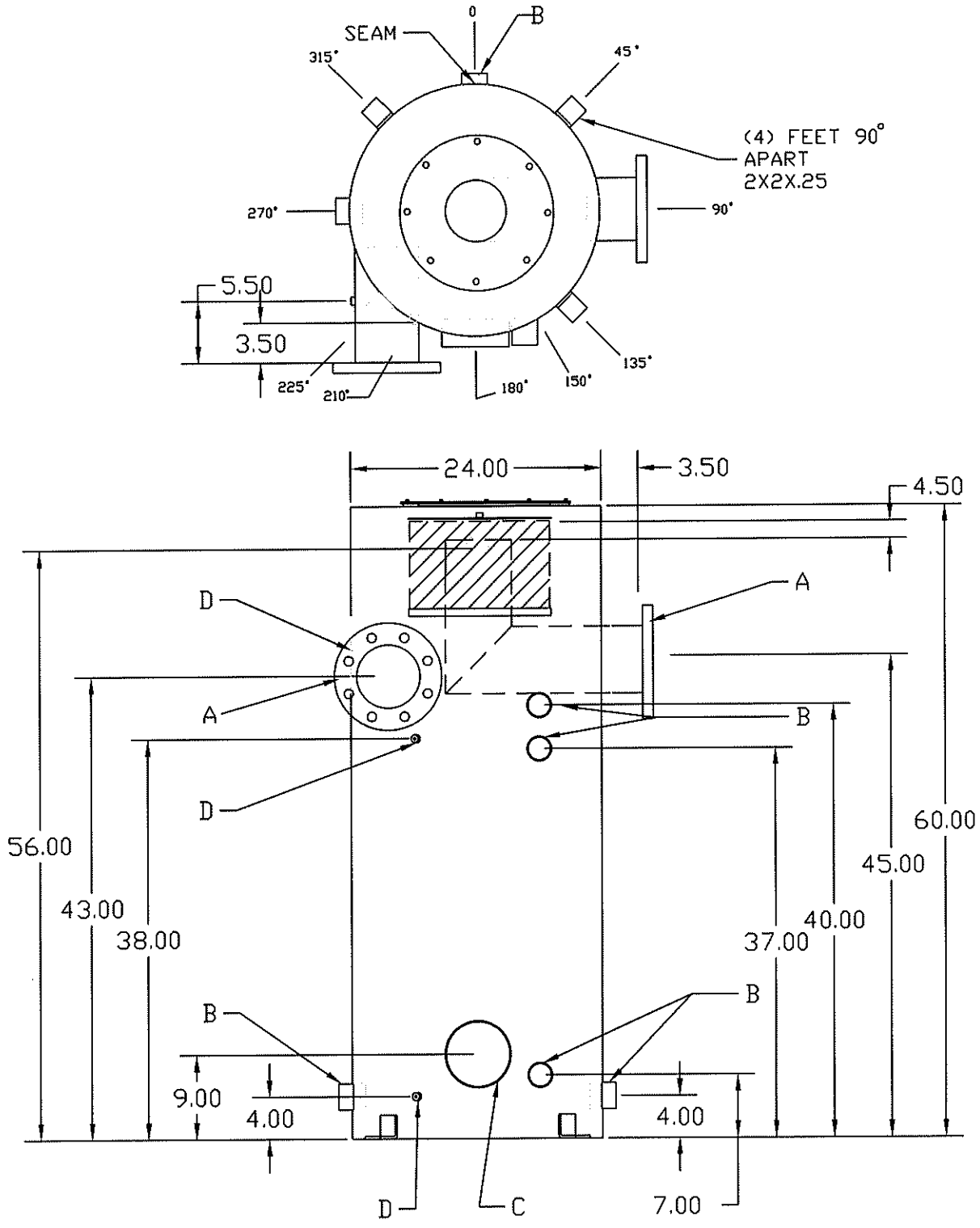
	INITIAL	DATE
DRAWN BY	MICHAEL S WALLIN	12-19-02
CHECKED		
ENGINEERING		
QUA APPROVAL		
ECN NO.		
SIMILAR TO		

FLITEWAY TECHNOLOGIES
6100 INDUSTRIAL COURT GREENDALE,WI 53129

TITLE: 4.0 VACUUM RELIEF VALVE

SCALE	SIZE	DWG. NO.	REV
NONE	A	FW00002	

WEIGHT	UNIT TYPE	CAD FILE NO.	SHEET OF



	PART NAME	QTY
A	6" NPT FLANGE WELDMENT	2
B	2" NPT FEMALE WELDMENT	6
C	6" CLEANOUT PORT	1
D	.25" FEMALE WELDMENT	3

Part #: TK-V117-6F-W/D

Quote #:

Rev: 1

Fliteway Technologies Inc.
6901 Industrial Loop
P.O. Box 108
Greendale, WI 53129

6" 117 GALLON CYCLONIC KNOCKOUT TANK

Date: 4/19/00

Drawn By: Ted Schneeberg

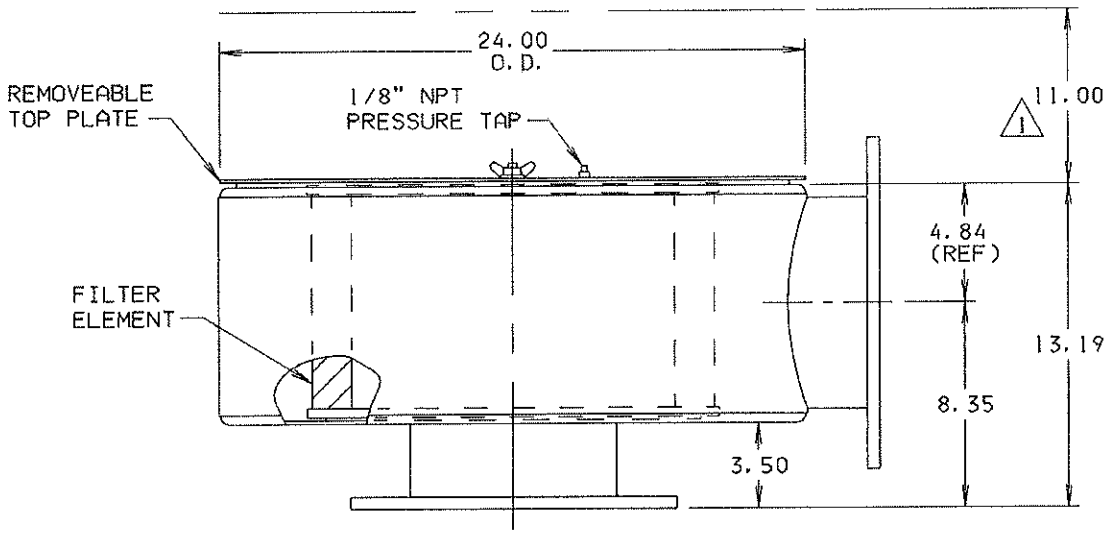
Approval

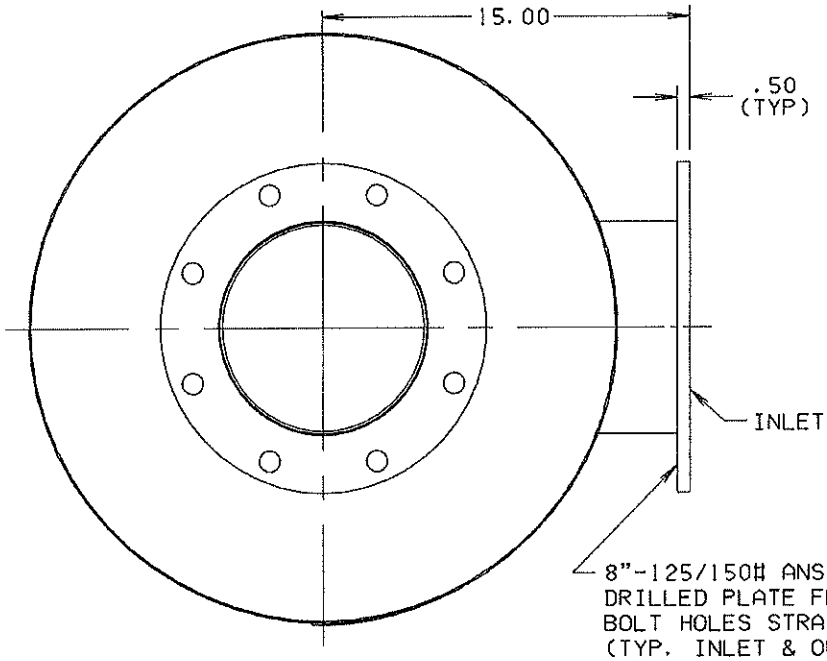
UNIVERSAL SILENCER
A FLEETGUARD/NELSON COMPANY
P.O. Box 411, Stoughton, Wisconsin 53589
608-873-4272 Fax 608-873-4298

STANDARD ILFV-8 INLINE AIR FILTER

DATE 04-16-98
SHEET OF
SCALE NTS

NO.	REVISION	DRAWN	APP'D
2	REDRAWN. UPDATED NOTE 4. WT WAS 90 LBS &ADDED DIMENSION.	4-16-98	DY





NOTES:

1. CLEARANCE REQUIRED FOR FILTER ACCESS.
2. NOMINAL CAPACITY: 2200 CFM AT FLOW VELOCITY OF APPROX. 5,500 FT/MIN.
3. CLEAN OR REPLACE FILTER WHEN ΔP INCREASES 4" H_2O OVER CLEAN ELEMENT.
4. WEIGHT SHOWN DOES INCLUDE WEIGHT OF 2 FILTER ELEMENTS.

FILTER ELEMENTS INCLUDED (APPLIED ONLY TO ORDER FOR WHICH DRAWING IS CERTIFIED)				DIMENSIONS CERTIFIED FOR:
FILTER TYPE AND PART NUMBER	SINGLE STAGE	DUAL STAGE		
		PRE-FILTER	FINAL FILTER	
				P.O. NO:
				U.S. S.O. NO:
				BY
				DATE

DIMENSIONAL DRAWING NO. 34-D08-AP

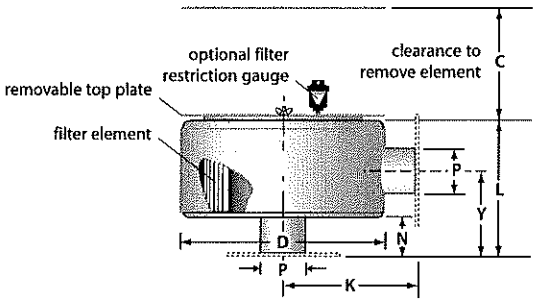
REV. 2

APPROX WT 100 (4) (2) | MATERIAL STEEL | DRAWN DY
FINISH 88-1085 BLUE ENAMEL | CHECK DO 4-16-98

DIMENSIONAL DRAWING NO. 34-D08-AP | REV. 2

SPECIFICATIONS

ILFV Series Vacuum Service Inline Air Filters



DIMENSIONS, WEIGHTS, AND REPLACEMENT ELEMENTS

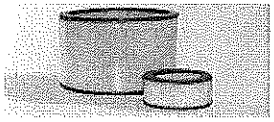
Model	P (nom.)	D	L	N	Y	C	K	Weight (est.)	Rated Cap. (CFM)	Element Part No. Paper	Element Part No. Felt
ILFV-2	2	14	9.38	3.5	6.44	7	10	18	120	81-1063	81-1205
ILFV-2 1/2	2 1/2	14	9.38	3.5	6.44	7	10	19	190	81-1063	81-1205
ILFV-3	3	14	9.38	3.5	6.44	7	10	20	275	81-1063	81-1205
ILFV-4	4	14	9.38	3.5	6.44	7	10	21	500	81-1063	81-1205
ILFV-5	5	18	12.00	3.5	7.75	10	12	50	750	81-0475	81-1207
ILFV-6	6	18	20.56	3.5	12.00	10	12	65	1100	(2) 81-0475	(2) 81-1207
ILFV-8	8	24	13.19	3.5	8.35	11	15	90	2200	81-1163	81-1209
ILFV-10	10	24	22.69	3.5	13.00	11	15	125	3000	(2) 81-1163	(2) 81-1209
ILFV-12	12	30	17.19	3.5	10.35	15	18	160	4300	81-1164	81-1210
ILFV-14	14	30	30.69	3.5	17.00	15	18	205	5900	(2) 81-1164	(2) 81-1210

- All models have a 1/8 in. FNPT tap for installation of a gauge or manometer to monitor pressure drop.
- The C dimension is clearance required to remove elements.
- Non-ASME code construction is suitable for 15" Hg vacuum. Not applicable for pressure applications.
- Rated capacity is based upon flow velocity of approximately 5500 ft/min. If pressure drop allowance permits, capacity may be increased by as much as 50%.
- Flange connections are drilled per ANSI standard for each size.
- Sizes 2" through 4" are standard with male pipe threaded inlet and outlet fitting (MNPT).
- Sizes 5" through 14" are standard with plate flanges drilled to ANSI standards (dashed lines on sketch).
- Weight does not include filter elements.

FILTER ELEMENTS

Two types of filter elements are available for Universal Silencer's vacuum service inline air filters. The pleated paper elements provide the highest efficiency and are considered standard. Pleated felt elements are available for less demanding service, with respect to efficiency. Both types of elements are completely interchangeable and will fit the ILFV filter housings.

SERVICE INTERVALS: Paper and felt elements are typically cleaned or replaced when the air flow resistance has increased 4 inches of water over the initial clean resistance. The maximum restriction recommended across the filter elements is 20 inches of water, but this value may be greater than the equipment can tolerate for best efficiency.



Pleated Paper Element

SPECIFICATIONS:

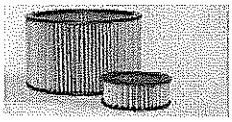
- High-quality industrial-grade filter paper—pleated and oven-cured during production.
- Oven-cured plastisol end caps with molded sealing beads (larger elements for pipe sizes (P) 8 in. through 14 in. have metal end caps with closed-cell rubber gaskets).
- Media efficiency: 99.5% on 2 microns; 97% on 1 micron.
- Maximum operating temperature: 200° F for units with 2 in. through 14 in. pipe sizes.

SERVICE INSTRUCTIONS:

Because of the low cost of the paper element, it is generally treated as a consumable and replaced when dirty. However, depending upon customer preference, the paper element may be cleaned with compressed air and reused.

Compressed Air Cleaning:

Carefully direct compressed air (100 PSI maximum) through the dry element, opposite the normal direction of flow. After cleaning, inspect carefully for holes or cracks. If the element is damaged, replace it.



Pleated Felt Element

SPECIFICATIONS:

- Durable polyester felt media — pleated.
- Oven-cured plastisol end caps with molded sealing beads (larger elements for pipe sizes (P) 8 in. through 14 in. have metal end caps with closed-cell rubber gaskets).
- Media efficiency: 99% on 10 microns.
- Maximum operating temperature: 200° F for units with 2 in. through 8 in. pipe sizes.

  250° F for units with 10 in. through 14 in. pipe sizes using elements with metal end caps.

SERVICE INSTRUCTIONS:

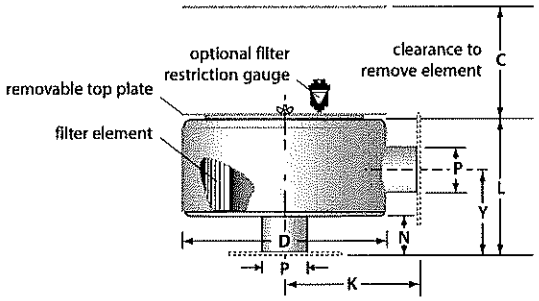
Pleated felt elements may be cleaned with compressed air or water and reused.

Water Cleaning:

Rap the element gently to dislodge accumulated dirt, and soak it thoroughly approximately 15 minutes in warm water and mild detergent. Rinse thoroughly under low-pressure water. Air dry—do not dry with compressed air. After cleaning, inspect carefully for holes or cracks. If the element is damaged, replace it.

SPECIFICATIONS

ILFV Series Vacuum Service Inline Air Filters



DIMENSIONS, WEIGHTS, AND REPLACEMENT ELEMENTS

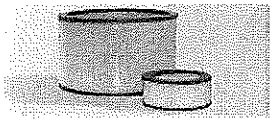
Model	P (nom.)	D	L	N	Y	C	K	Weight (est.)	Rated Cap. (CFM)	Element Part No. Paper	Element Part No. Felt
ILFV-2	2	14	9.38	3.5	6.44	7	10	18	120	81-1063	81-1205
ILFV-2 1/2	2 1/2	14	9.38	3.5	6.44	7	10	19	190	81-1063	81-1205
ILFV-3	3	14	9.38	3.5	6.44	7	10	20	275	81-1063	81-1205
ILFV-4	4	14	9.38	3.5	6.44	7	10	21	500	81-1063	81-1205
ILFV-5	5	18	12.00	3.5	7.75	10	12	50	750	81-0475	81-1207
ILFV-6	6	18	20.56	3.5	12.00	10	12	65	1100	(2) 81-0475	(2) 81-1207
ILFV-8	8	24	13.19	3.5	8.35	11	15	90	2200	81-1163	81-1209
ILFV-10	10	24	22.69	3.5	13.00	11	15	125	3000	(2) 81-1163	(2) 81-1209
ILFV-12	12	30	17.19	3.5	10.35	15	18	160	4300	81-1164	81-1210
ILFV-14	14	30	30.69	3.5	17.00	15	18	205	5900	(2) 81-1164	(2) 81-1210

- All models have a 1/8 in. FNPT tap for installation of a gauge or manometer to monitor pressure drop.
- The C dimension is clearance required to remove elements.
- Non-ASME code construction is suitable for 15" Hg vacuum. Not applicable for pressure applications.
- Rated capacity is based upon flow velocity of approximately 5500 ft/min. If pressure drop allowance permits, capacity may be increased by as much as 50%.
- Flange connections are drilled per ANSI standard for each size.
- Sizes 2" through 4" are standard with male pipe threaded inlet and outlet fitting (MNPT).
- Sizes 5" through 14" are standard with plate flanges drilled to ANSI standards (dashed lines on sketch).
- Weight does not include filter elements.

FILTER ELEMENTS

Two types of filter elements are available for Universal Silencer's vacuum service inline air filters. The pleated paper elements provide the highest efficiency and are considered standard. Pleated felt elements are available for less demanding service, with respect to efficiency. Both types of elements are completely interchangeable and will fit the ILFV filter housings.

SERVICE INTERVALS: Paper and felt elements are typically cleaned or replaced when the air flow resistance has increased 4 inches of water over the initial clean resistance. The maximum restriction recommended across the filter elements is 20 inches of water, but this value may be greater than the equipment can tolerate for best efficiency.



Pleated Paper Element

SPECIFICATIONS:

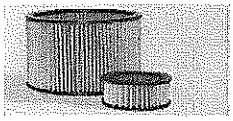
- High-quality industrial-grade filter paper—pleated and oven-cured during production.
- Oven-cured plastisol end caps with molded sealing beads (larger elements for pipe sizes (P) 8 in. through 14 in. have metal end caps with closed-cell rubber gaskets).
- Media efficiency: 99.5% on 2 microns; 97% on 1 micron.
- Maximum operating temperature: 200° F for units with 2 in. through 14 in. pipe sizes.

SERVICE INSTRUCTIONS:

Because of the low cost of the paper element, it is generally treated as a consumable and replaced when dirty. However, depending upon customer preference, the paper element may be cleaned with compressed air and reused.

Compressed Air Cleaning:

Carefully direct compressed air (100 PSI maximum) through the dry element, opposite the normal direction of flow. After cleaning, inspect carefully for holes or cracks. If the element is damaged, replace it.



Pleated Felt Element

SPECIFICATIONS:

- Durable polyester felt media — pleated.
- Oven-cured plastisol end caps with molded sealing beads (larger elements for pipe sizes (P) 8 in. through 14 in. have metal end caps with closed-cell rubber gaskets).
- Media efficiency: 99% on 10 microns.
- Maximum operating temperature: 200° F for units with 2 in. through 8 in. pipe sizes.

  250° F for units with 10 in. through 14 in. pipe sizes using elements with metal end caps.

SERVICE INSTRUCTIONS:

Pleated felt elements may be cleaned with compressed air or water and reused.

Water Cleaning:

Rap the element gently to dislodge accumulated dirt, and soak it thoroughly approximately 15 minutes in warm water and mild detergent. Rinse thoroughly under low-pressure water. Air dry—do not dry with compressed air. After cleaning, inspect carefully for holes or cracks. If the element is damaged, replace it.

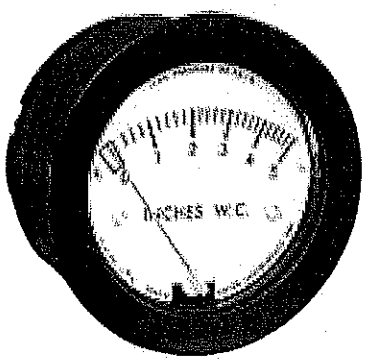
608.873.4272 ■ 608.873.4298 fax ■ US@universal-silencer.com ■ www.universal-silencer.com

Dwyer®

Series 2-5000

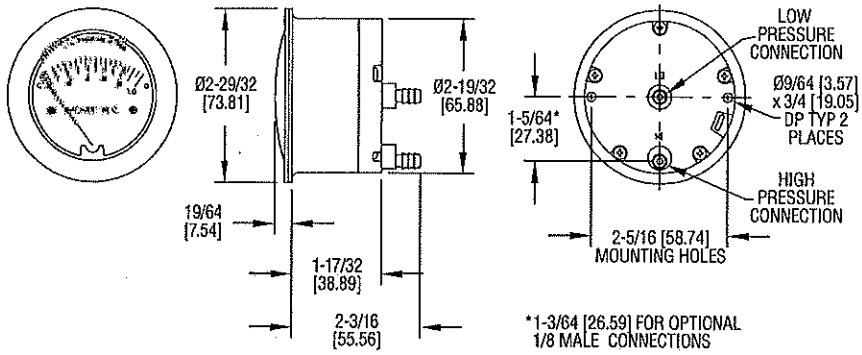
Minihelic® II Differential Pressure Gages

Combining High Accuracy, Compactness, Dependability, and Low Cost



Patent No. 4,347,744

The Series 2-5000 Minihelic® II low differential pressure gage provides excellent readability in a compact size.



Dimensions, Series 2-5000 Minihelic® II Gage.

Combining clean design, small size and low cost with enough accuracy for all but the most demanding applications our Minihelic® II gage offers the latest in design features for a dial type differential pressure gage. It is our most compact gage but is easy to read and can safely operate at total pressures up to 30 psig. The Minihelic® II is designed for panel mounting in a single 2⅝" diameter hole. Standard pressure connections are barbed fittings for ⅜" I.D. tubing; optional ⅛" male NPT connections are also available. Over-pressure protection is built into the Minihelic II® gage by means of a blow-out membrane molded in conjunction with the diaphragm. Accidental over-ranging up to the rated total pressure will not damage the gage. With removable lens and rear housing, the gage may be easily serviced at minimum cost.

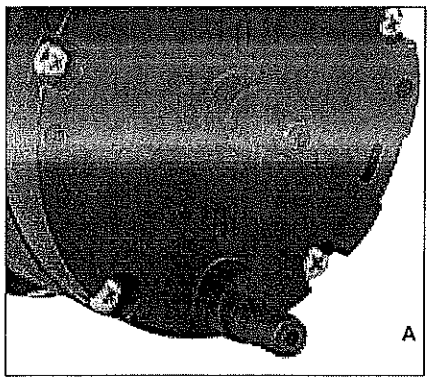
With the housing molded from mineral and glass filled nylon and the lens molded from polycarbonate, the gage will withstand rough use and exposure as well as high total pressure. The 5% accuracy and low cost of the Minihelic® II gage make it well-suited for a wide variety of OEM and user applications. OEM applications include cabinet air purging, medical respiratory therapy equipment, air samplers, laminar flow hoods, and electronic air cooling systems. As an air filter gage, the Minihelic® II finds many end use applications on large stationary engines, compressors, ventilators, and air handling units. The Minihelic® II gage is suitable for many of the same applications as the Magnehelic® gage where the greater accuracy, sensitivity, and higher and lower differential pressure ranges of the Magnehelic® gage are not required.

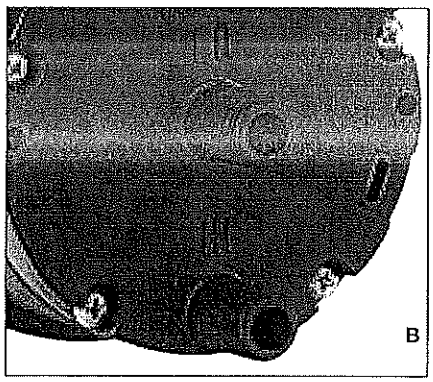
SPECIFICATIONS

Service: Air and compatible gases.
Wetted Materials: Consult factory.
Housing: Glass filled nylon; polycarbonate lens.
Accuracy: ±5% of full scale at 70°F (21.1°C).
Pressure Limits: 30 psig (2.067 bar) continuous to either pressure connection.
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Size: 2-1/16" (52.39 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: Barbed, for 3/16" I.D. tubing (standard); 1/8" male NPT (optional).
Weight: 6 oz (170.1g).

CAUTION: FOR USE ONLY WITH AIR OR COMPATIBLE GASES.

PRESSURE CONNECTIONS





A The standard Minihelic® II gage is supplied with two barbed pressure taps molded into the rear housing of the gage. These connections allow easy, fast connection to the gage using ⅜" I.D. rubber or plastic tubing.

B For applications in systems having higher total operating pressures, optional male ¼" NPT pressure connections can be supplied.

Note the oblong over-pressure vent hole on the back of the gage at the right of the connections. This vent is sealed by a membrane molded in conjunction with the diaphragm and will blow out at approximately 75 psi.

Simplicity of Design Ensures Reliable Operation

Housing is molded from strong mineral and glass filled nylon.

Pointer stops of molded rubber prevent pointer over-travel without damage.

Full view lens is removable and molded of tough polycarbonate.

Aluminum scale litho-printed black on white, enhances readability.

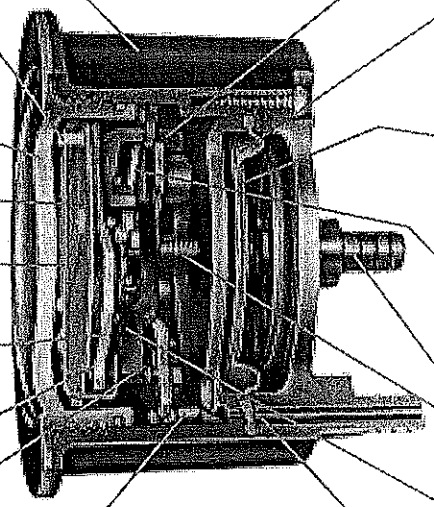
Red tipped aluminum pointer, rigidly mounted to helix is easy to see.

Wishbone assembly provides mounting for helix, helix bearings, and pointer shaft.

Jewel bearings provide virtually friction-free helix motion.

Helix is free to rotate in jewel bearings. It aligns with magnetic field of magnet to transmit pressure indications to pointer.

Zero adjustment screw, located behind the removable lens, eliminates tampering.



Range spring calibration clamp fixes live length of spring for proper gage calibration and is factory set and sealed.

Silicone rubber diaphragm allows accurate response to a broad range of temperatures and at extremely low pressure. Incorporates blow out area for overpressure protection.

Diaphragm support plates of lightweight aluminum on each side of the diaphragm minimize position or attitude sensitivity and help define pressure area.

Flat leaf range spring reacts to pressure on the diaphragm. Live length is adjustable for calibration. Small amplitude of motion minimizes inaccuracies and assures long life.

Low pressure tap connects to rear chamber.

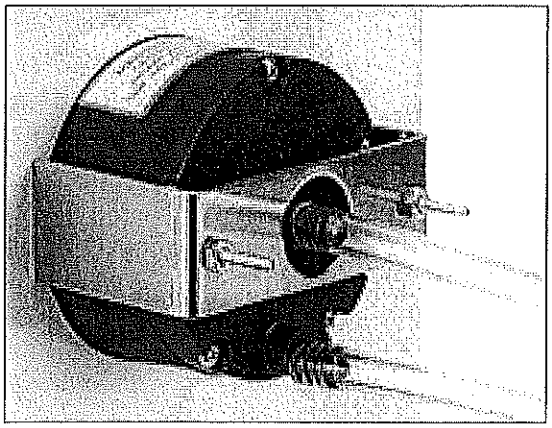
Coil spring link provides a resilient connection between the diaphragm and the range spring.

Ceramic magnet mounted on a molded bracket at the end of the range spring rotates the helix without direct mechanical linkage.

High pressure tap connects with the front chamber through passageway in the plastic case and a sealing ring molded into the edge of the diaphragm.

Patent No. 4,347,744

PANEL MOUNTING



Mounting hardware is supplied with the Minihelic® II gage for panel mounting through a single hole, 2-5/8″ (67 mm) in diameter. Panel thickness up to 1/2″ (13 mm) can be accommodated with the hardware supplied. If necessary, surface mounting of the gage can be accomplished by means of two 4-40 screws into the tapped mounting bracket stud holes in the rear of the gage. Surface mounting requires clearance holes in the panel for the two pressure taps.

STOCKED MODELS

Model Number	Range, Inches of Water
2-5000-0	0-0.5
2-5001	0-1.0
2-5002	0-2.0
2-5003	0-3.0
2-5005	0-5.0
2-5010	0-10
2-5020	0-20
2-5040	0-40
2-5060	0-60
2-5100	0-100

Accessories
A-434 Portable Kit .....
A-497 Surface Mtg. Brkt. ..
A-609 Air Filter Kit .....

Model Number	Range, PSI
2-5205	0-5
2-5210	0-10
2-5215	0-15
*2-5230	0-30

Model Number	Range, MM of Water
2-5000-25MM	0-25
2-5000-50MM	0-50
2-5000-100MM	0-100

Model Number	Range, Pascals
2-5000-125Pa	0-125
2-5000-250Pa	0-250
2-5000-500Pa	0-500

Model Number	Range, kPa
2-5000-1 kPa	0-1
2-5000-3 kPa	0-3

*THIS RANGE EMPLOYS SPIRALLY WOUND BERYLLIUM COPPER BOURDON TUBE POINTER DRIVE MECHANISM.
NOTE: CONSULT FACTORY REGARDING AVAILABILITY OF ADDITIONAL RANGES.

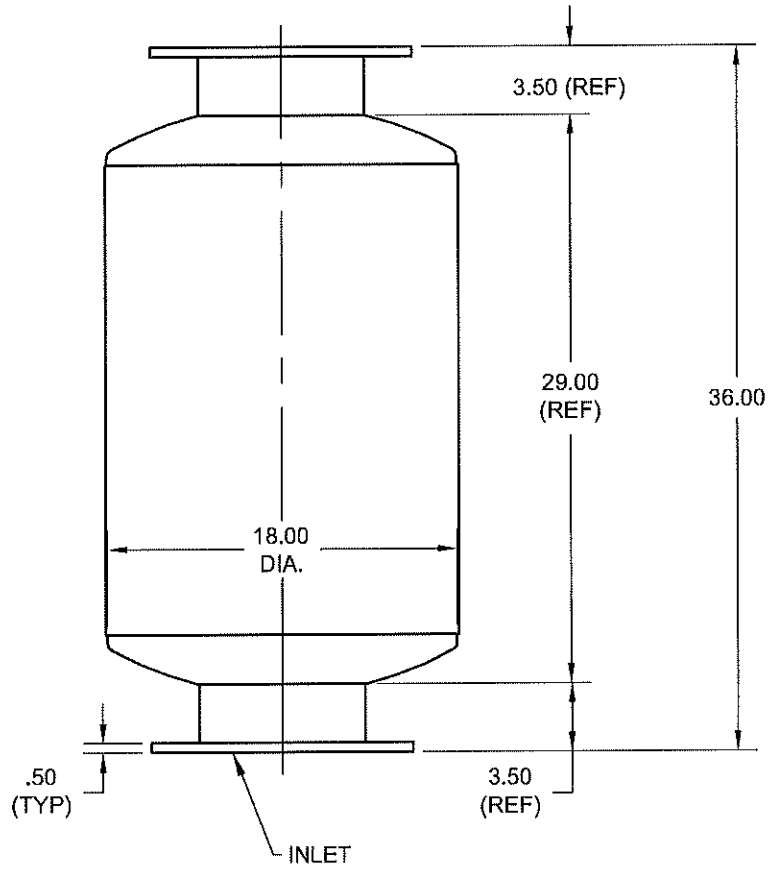
For optional ⅛" male NPT connections, add suffix -NPT to model numbers listed above.
Example: 2-5001-NPT. No extra charge.

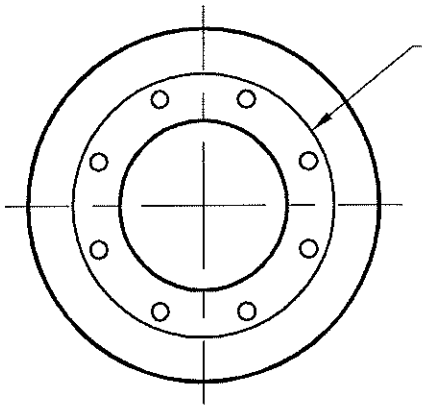
UNIVERSAL SILENCER
P.O. Box 411, Stoughton, Wisconsin 53589
608-873-4272 Fax 608-873-4298

STANDARD SU5-8
ABSORPTIVE TYPE SILENCER

DATE	07-31-06
SHEET	1 OF 1
SCALE	1":10"

REV.	REVISION	DRAWN	APP'D
9	REDRAWN IN AUTOCAD.	ADE 07-31-06	JSM 08-02-06





DIMENSIONAL DRAWING NO. 14-108-AA

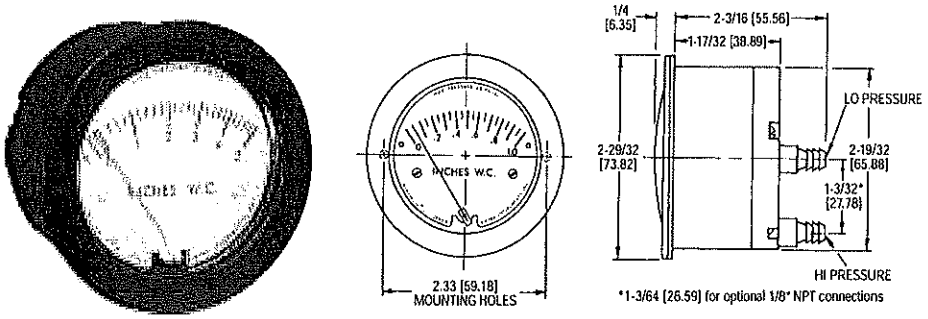
DIMENSIONS CERTIFIED FOR:	
P.O. NO:	
U.S. S.O. NO:	
BY	

REV.	APPROX WT	MATERIAL	DRAWN	DIMENSIONAL DRAWING NO.	REV.
9	120 LBS	STEEL	ADE	14-108-AA	9
	FINISH: 80-0102 SHOP COAT PRIMER		CHECK: JSM 08-02-06		

Bulletin A-36

Series 2-5000 Minihelic II® Differential Pressure Gage

Specifications: Installation & Operating Instructions



Dimensions, Series 2-5000 Minihelic II® Gage.

Series 2-5000 Minihelic II® Differential Pressure Gages have clean design, small size, low cost and sufficient accuracy for all but the most demanding applications. With housing molded from mineral- and glass-filled nylon and a lens molded from polycarbonate, this gage will withstand rough use and exposure, as well as high total pressure up to 30 psig [2.067 bar]. Over-pressure is accommodated by a blow-out membrane molded in conjunction with the diaphragm.

INSTALLATION

1. Select a location free from excessive vibration and where ambient temperature will be between 20° to 120°F (-6.7°C to 49°C). Sensing lines may be any length necessary without affecting accuracy. However, long runs of tubing will dampen readings slightly and cause a minor increase in response time. If pulsing pressure or vibration cause excessive pointer oscillation, please contact factory for ways to provide additional damping.

2. This gage is calibrated and zeroed in the vertical position at the factory. If the gage is used in any other position, it must be re-zeroed each time the position is changed. Gages with ranges under 5 inches w.c.(1.24 kPa), or the equivalent, should be used only in the vertical position unless special calibration was specified when ordering.

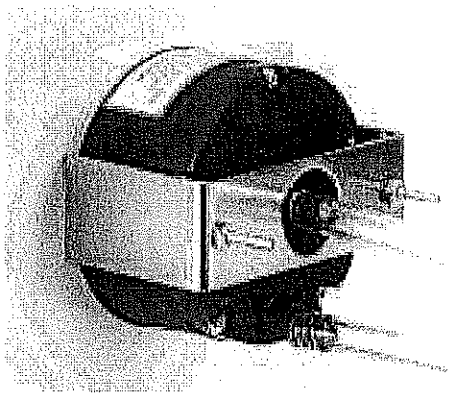
PHYSICAL DATA

Dimensions: 2-29/32" (73.82 mm) x 2- 7/16" (61.93 mm).
Weight: 6 oz. [170 gr].
Rated Total Pressure: 50 psig (3.445 bar) surge; 30 psig (2.067 bar) continuous to either pressure connection.
Ambient Temperature Range: 20°F to 120°F (- 6.7°C to 49°C).
Accuracy: ± 5% of full scale at 70°F (21.1°C).
Connections: standard, barbed for 3/16" I.D. tubing; optional,1/8" NPT(M).
Housing: glass-filled nylon, polycarbonate lens.
Finish: black
Standard Accessories: (2) 4-40 x 1-5/8" mounting studs, (2) 4-40 hex nuts, (1) .050" hex allen wrench, (1) panel mounting bracket.

CAUTION:

Use only with air or compatible non-corrosive gases.

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, IN 46361, U.S.A.
Phone: 219/879-8000 www.dwyer-inst.com
Fax: 219/872-9057
e-mail: info@dwyer-inst.com
Lit-By Fax: 888/891-4963



PANEL MOUNTED INSTALLATION

3. To surface-mount the gage, drill two 5/32" holes on a horizontal line, 2-1/3" apart for mounting screws. Next, drill two 7/16" holes 1-1/32" apart on a vertical line for pressure connections. Install mounting studs in back of the gage, insert through holes in the panel, and secure with hex nuts provided. Be careful not to block the slotted hole near the right-hand mounting hole. This provides a path for pressure relief in the event of over-pressurization.

4. To panel-mount gage, cut a 2-5/8" diameter hole. Install the mounting studs in the back of gage, position gage in the panel, and place bracket over the studs. Thread hex nuts over studs and tighten.

5. After installation, the gage may need to be zeroed before placing in operation. If re-zeroing is required, firmly hold the case of gage with one hand and unscrew the front cover with the palm of the other hand in a counterclockwise direction. If difficult to loosen, place a small sheet of rubber between the cover and the palm of the hand. Zero-adjust screw is located behind the scale at the pair marked "zero." Use the hex allen wrench supplied and adjust until pointer is on zero. This must be done with both pressure connections vented to atmosphere and the gage oriented in the final mounting position. Replace cover.

6. To measure positive pressure, connect tubing to port marked "HI" and vent "LO" port to atmosphere. For negative pressure (vacuum), connect to port marked "LO" and vent "HI" port to atmosphere. For differential pressure, connect higher pressure to port marked "HI" and lower to "LO" port. If gage is supplied with 1/8" NPT connections, be careful not to over-tighten fittings to avoid damage to the gage.

CALIBRATION CHECK

Select a second gage or manometer of known accuracy and in an appropriate range. Use short lengths of rubber or vinyl tubing to connect the high-pressure side of the Minihelic gage and the test gage to two legs of a tee. Very slowly, apply pressure through the third leg. Allow enough time for pressure to equalize throughout the system and for fluid to drain, if a manometer is being used. Compare readings. If the gage being tested exceeds rated accuracy, it should be returned to the factory for recalibration.

MAINTENANCE

No lubrication or periodic servicing is required. Keep case exterior and cover clean. Occasionally, disconnect pressure lines to vent both sides of the gage to atmosphere and re-zero per paragraph 5.

 Printed in U.S.A. 4/01 FR# 14-440434-00 Rev. 1

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, IN 46361, U.S.A.
Phone: 219/879-8000 www.dwyer-inst.com
Fax: 219/872-9057
e-mail: info@dwyer-inst.com
Lit-By Fax: 888/891-4963

GRAINGER

Horizontal Liquid Level Switch, PBT Float

Switch, Magnetically Actuated Dry Reed, -, - Connection, Max. Amps Running -, HP @ 1 Phase - 115V -, HP @ 1 Phase - 230V -, Voltage -, Wire Gauge 22, Pumping Range Min./Max. -, Length -, Width -, Height -, Fitting 1/2 x 1/2 in. NPT, VA Rating 30, Min. Water Level Adjustment -, Max. Water Level Adjustment -, Operation NO/NC, Stem Material PBT, Float Material PBT, Horizontal, For Use With -, Specific Gravity -, Body Material -, Control Range -, Max. Voltage -, Max. Wattage -

Grainger Item #	4YM36
Brand	MADISON
Mfr. Model #	M7700
Ship Qty.	1
Sell Qty. (Will-Call)	1
Ship Weight (lbs.)	0.01
Usually Ships	Today
Catalog Page No.	3892

Price shown may not reflect your price. Log in or register.

Additional Info

Liquid Level Switches and Sensors

Encapsulated, dependable dry reed switch delivers more than 5 million switching cycles at rated electrical load. Visual NO/NC operation indication. Used for alarm circuits that control motor starters, contactors, solenoids, and relays.

Tech Specs

Item: Switch
Type: Magnetically Actuated Dry Reed
Wire Gauge: 22
Overall Length (In.): 2.75
Fitting: 1/2 x 1/2" NPT
VA Rating: 30
Max. Temp. (C): 130
Max. Pressure (PSI): 100
Operation: NO/NC
Stem Length (In.): 2.75
Stem Material: PBT
Float Material: PBT
Mounts: Horizontal
Wire Lead: 24

Notes & Restrictions

There are currently no notes or restrictions for this item.

MSDS

This item does not require a Material Safety Data Sheet (MSDS).

Required Accessories

There are currently no required accessories for this item.

Optional Accessories

There are currently no optional accessories for this item.

Alternate Products

There are currently no alternate products for this item.

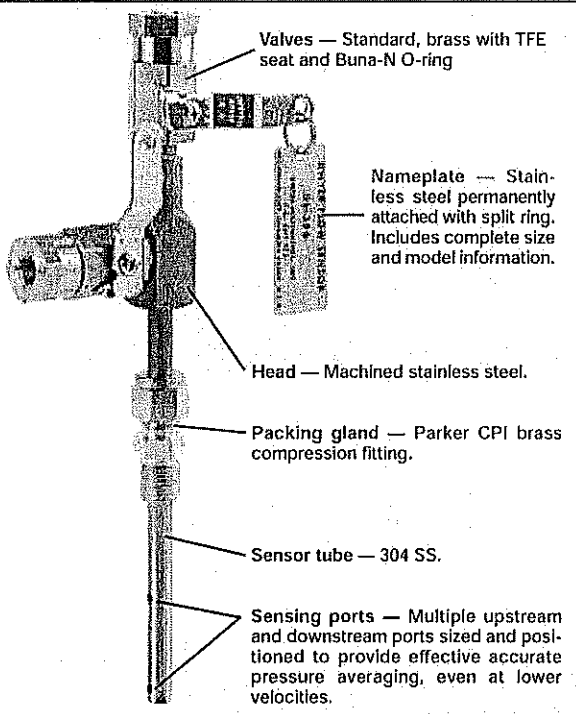
Repair Parts

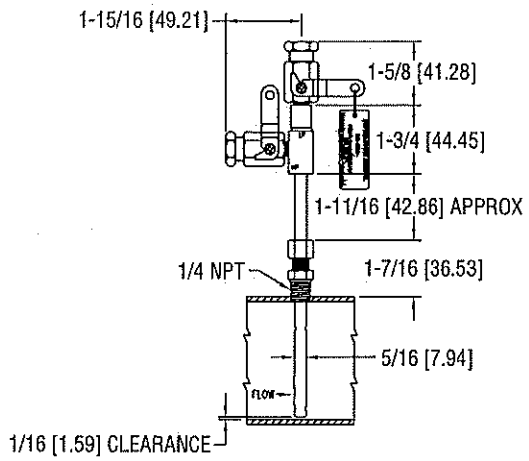
A Repair Part may be available for this item. Visit our Repair Parts Center or contact your local branch for more information.

Series DS

In-Line Flow Sensors

Use with the Dwyer® Differential Pressure Gages or Transmitters





In-Line Flow Sensors are averaging Pitot tubes that provide accurate and convenient flow rate sensing for schedule 40 pipe. When purchased with a Dwyer® Capsuhelic® differential pressure gage of appropriate range, the result is a flow indicating system delivered off the shelf at an economical price.

Pitot tubes have been used in flow measurement for years. Conventional pitot tubes sense velocity pressure at only one point in the flowing stream. Therefore, a series of measurements must be taken across the stream to obtain a meaningful average flow rate. The Dwyer® flow sensor eliminates the need for "traversing" the flowing stream because of its multiple sensing points and built-in averaging capability.

The Series DS-300 flow sensors are designed to be inserted in the pipeline through a compression fitting. They are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with ⅛" female NPT connections. Accessories include adapters with ¼" SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® gage kit. Standard valves are rated at 200 psig (13.7 bar) and 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 flow sensors are available for pipe sizes from 1" to 10".

DS-400 Averaging Flow Sensors are quality constructed from extra strong ¾" dia. stainless steel to resist increased forces encountered at higher flow rates with both air and water. This extra strength also allows them to be made in longer insertion lengths up to 24 inches (61 cm). All models include convenient and quick-acting quarter-turn ball valves to isolate the sensor for zeroing. Process connections to the valve assembly are ⅛" female NPT. A pair of ⅛" NPT × ¼" SAE 45° flared adapters are included, compatible with hoses used in the Model A-471 Portable Capsuhelic® Gage Kit. Supplied solid brass mounting adapter has a ¾" dia. compression fitting to lock in required insertion length and a ¾" male NPT thread for mounting in a Threaded Branch Connection.

Select model with suffix which matches pipe size

DS-300-1"
DS-300-1¼"
DS-300-1½"
DS-300-2"
DS-300-2½"
DS-300-3"
DS-300-4"
DS-300-6"
DS-300-8"
DS-300-10"

DS-400-6"
DS-400-8"
DS-400-10"
DS-400-12"
DS-400-14"
DS-400-16"
DS-400-18"
DS-400-20"
DS-400-24"

Options and Accessories

A-160 Thredolet, ⅜" NPT, forged steel, 3000 psi

A-161 Brass Bushing, ¼" x ⅜"

(DS-300) To order, add suffix -LVdeduct

Ⓑ Items subject to Schedule B discounts

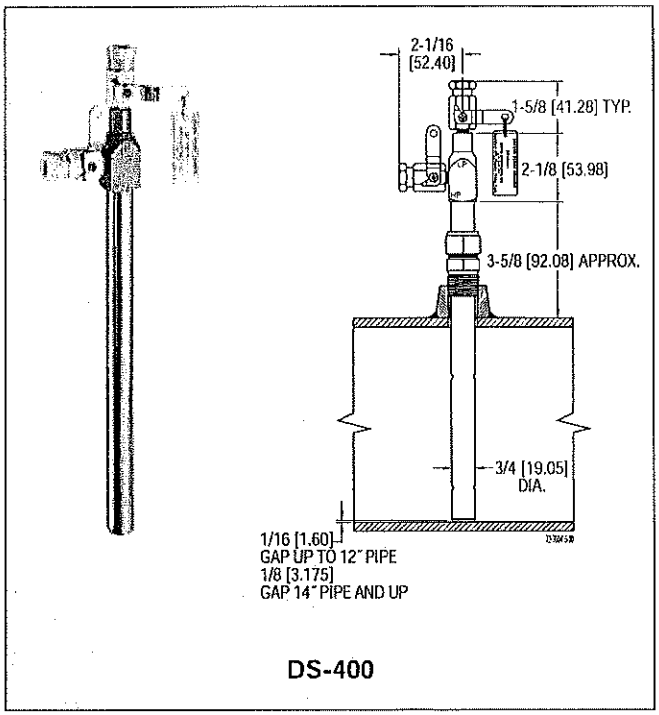
How To Order

Merely determine the pipe size into which the flow sensor will be mounted and designate the size as a suffix to Model DS-300. For example, a flow sensor to be mounted in a 2" pipe would be a Model No. DS-300-2".

For non-critical water and air flow monitoring applications, the chart below can be utilized for ordering a stock Capsuhelic® differential pressure gage for use with the DS-300 flow sensor. Simply locate the maximum flow rate for the media being measured under the appropriate pipe size and read the Capsuhelic® gage range in inches of water column to the left. The DS-300 sensor is supplied with installation and operating instructions, Bulletin F-50. It also includes complete flow conversion information for the three media conditions shown in the chart below. This information enables the user to create a complete differential pressure to flow rate conversion table for the sensor and differential pressure gage employed. Both the Dwyer® Capsuhelic® gage and flow sensor feature excellent repeatability so, once the desired flow rate is determined, deviation from that flow in quantitative measure can be easily determined. You may wish to order the adjustable signal flag option for the Capsuhelic® gage to provide an easily identified reference point for the proper flow.

Capsuhelic® gages with special ranges and/or direct reading scales in appropriate flow units are available on special order for more critical applications. Customer supplied data for the full scale flow (quantity and units) is required along with the differential pressure reading at that full flow figure. Prior to ordering a special Capsuhelic® differential pressure gage for flow read-out, we recommend you request Bulletin F-50 to obtain complete data on converting flow rates of various media to the sensor differential pressure output. With this bulletin and after making a few simple calculations, the exact range gage required can easily be determined.

Large 3/4 Inch Diameter for Extra Strength in Lengths to 24 Inches



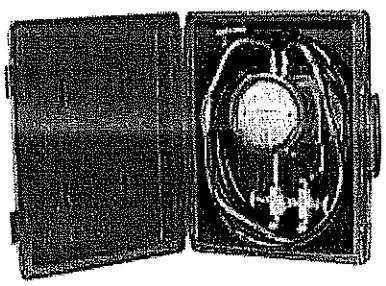
DS-400

GAGE RANGE (IN. W.C.)	MEDIA @ 70°F	FULL RANGE FLOWS BY PIPE SIZE (APPROXIMATE)									
		1"	1¼"	1½"	2"	2½"	3"	4"	6"	8"	10"
2	Water (GPM)	4.8	8.3	11.5	20.5	30	49	86	205	350	560
	Air @ 14.7 PSIA (SCFM)	19.0	33.0	42.0	65.0	113	183	330	760	1340	2130
	Air @ 100 PSIG (SCFM)	50.0	90.5	120.0	210.0	325	510	920	2050	3600	6000
5	Water (GPM)	7.7	14.0	18.0	34.0	47	78	138	320	560	890
	Air @ 14.7 PSIA (SCFM)	30.0	51.0	66.0	118.0	178	289	510	1200	2150	3400
	Air @ 100 PSIG (SCFM)	83.0	142.0	190.0	340.0	610	820	1600	3300	5700	10000
10	Water (GPM)	11.0	19.0	25.5	45.5	67	110	195	450	800	1260
	Air @ 14.7 PSIA (SCFM)	41.0	72.0	93.0	163.0	250	410	725	1690	3040	4860
	Air @ 100 PSIG (SCFM)	120.0	205.0	275.0	470.0	740	1100	2000	4600	8100	15000
25	Water (GPM)	18.0	32.0	40.5	72.0	108	173	310	720	1250	2000
	Air @ 14.7 PSIA (SCFM)	63.0	112.0	155.0	255.0	390	640	1130	2630	4860	7700
	Air @ 100 PSIG (SCFM)	185.0	325.0	430.0	760.0	1200	1800	3300	7200	13000	22000
50	Water (GPM)	25.0	44.0	57.5	100.0	152	247	435	1000	1800	
	Air @ 14.7 PSIA (SCFM)	90.0	161.0	205.0	360.0	560	900	1600	3700	6400	
	Air @ 100 PSIG (SCFM)	260.0	460.0	620.0	1050.0	1700	2600	4600	10000	18500	
100	Water (GPM)	36.5	62.0	82.0	142.0	220	350	620	1500		
	Air @ 14.7 PSIA (SCFM)	135.0	230.0	300.0	505.0	800	1290	2290	5000		
	Air @ 100 PSIG (SCFM)	370.0	660.0	870.0	1500.0	2300	3600	6500	15000		

Model A-471 Portable Kit

The Dwyer® Series 4000 Capsuhelic® differential pressure gage is ideally suited for use as a read-out device with the DS-300 Flow Sensors. The gage may be used on system pressures of up to 500 psig even when the flow sensor differential pressure to be read is less than 0.5" w.c. With accuracy of ±3% of full scale, the Capsuhelic® gage can be used in ambient temperatures from 32 to 200°F (0 to 93.3°C). Zero and range adjustments are made from outside the gage. The standard gage with a die cast aluminum housing can be used with the flow sensor for air or oil applications. For water flow measurements, the optional forged brass housing should be specified. The Capsuhelic® gage may be panel or surface mounted and permanently plumbed to the flow sensor if desired. The optional A-610 pipe mounting bracket allows the gage to be easily attached to any 1¼" - 2" horizontal or vertical pipe.

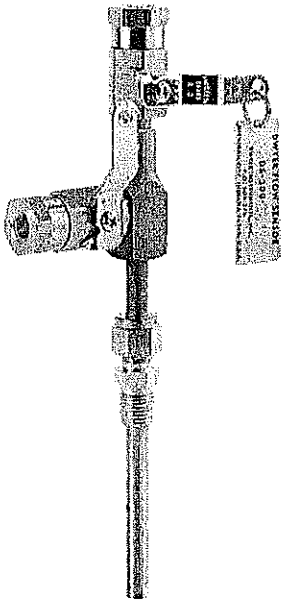
For portable operation, the A-471 Capsuhelic® Portable Gage Kit is available complete with tough polypropylene carrying case, mounting bracket, 3-way manifold valve, two 10' high pressure hoses, and all necessary fittings. See pages 8 and 9 for complete information on the Capsuhelic® gage.

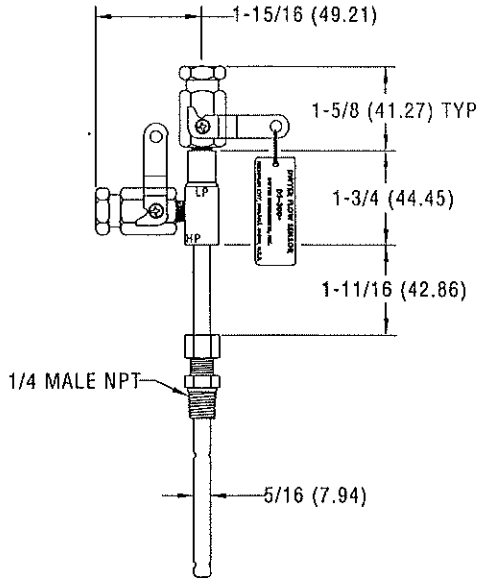


CAPSUHELIC® GAGE SHOWN INSTALLED IN A-471 PORTABLE KIT

Series DS-300 Flow Sensors

Installation and Operating Instructions Flow Calculations





Series DS-300 Flow Sensors are averaging pitot tubes that provide accurate, convenient flow rate sensing. When purchased with a Dwyer Capsuhelic® for liquid flow or Magnehelic® for air flow, differential pressure gage of appropriate range, the result is a flow-indicating system delivered off the shelf at an economical price. Series DS-300 Flow Sensors are designed to be inserted in the pipeline through a compression fitting and are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8" female NPT connections. Accessories include adapters with 1/4" SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® kit. Standard valves are rated at 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 Flow Sensors are available for pipe sizes from 1" to 10".

INSPECTION

Inspect sensor upon receipt of shipment to be certain it is as ordered and not damaged. If damaged, contact carrier.

INSTALLATION

General - The sensing ports of the flow sensor must be correctly positioned for measurement accuracy. The instrument connections on the sensor indicate correct positioning. The side connection is for total or high pressure and should be pointed upstream. The top connection is for static or low pressure.

Location - The sensor should be installed in the flowing line with as much straight run of pipe upstream as possible. A rule of thumb is to allow 10 - 15 pipe diameters upstream and 5 downstream. The table below lists recommended up and down piping.

PRESSURE AND TEMPERATURE

Maximum: 200 psig (13.78 bar) at 200°F (93.3°C).

Upstream and Downstream Dimensions in Terms of Internal Diameter of Pipe*

Upstream Condition	Minimum Diameter of Straight Pipe		
	Upstream		Downstream
	In-Plane	Out of Plane	
One Elbow or Tee	7	9	5
Two 90° Bends in Same Plane	8	12	5
Two 90° Bends in Different Plane	18	24	5
Reducers or Expanders	8	8	5
All Valves**	24	24	5

* Values shown are recommended spacing, in terms of internal diameter for normal industrial metering requirements. For laboratory or high accuracy work, add 25% to values.

** Includes gate, globe, plug and other throttling valves that are only partially opened. If valve is to be fully open, use values for pipe size change. **CONTROL VALVES SHOULD BE LOCATED AFTER THE FLOW SENSOR.**

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.
Phone: 219/879-8000 www.dwyer-inst.com
Fax: 219/872-9057 e-mail: info@dwyer-inst.com

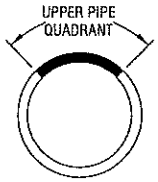
POSITION

Be certain there is sufficient clearance between the mounting position and other pipes, walls, structures, etc, so that the sensor can be inserted through the mounting unit once the mounting unit has been installed onto the pipe.

Flow sensors should be positioned to keep air out of the instrument connecting lines on liquid flows and condensate out of the lines on gas flows. The easiest way to assure this is to install the sensor into the pipe so that air will bleed into, or condensate will drain back to, the pipe.

For Air or Gas Flow

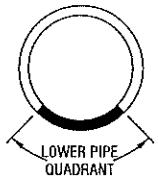
Install in upper quadrant of pipe



Condensate drains back to pipe

For Liquid or Steam Flow

Install in lower quadrant of pipe



Air bleeds back to pipe

INSTALLATION

1. When using an A-160 thred-o-let, weld it to the pipe wall. If replacing a DS-200 unit, an A-161 bushing (1/4" x 3/8') will be needed.

2. Drill through center of the thred-o-let into the pipe with a drill that is slightly larger than the flow sensor diameter.

3. Install the packing gland using proper pipe sealant. If the packing gland is disassembled, note that the tapered end of the ferrule goes into the fitting body.

4. Insert sensor until it bottoms against opposite wall of the pipe, then withdraw 1/16" to allow for thermal expansion.

5. Tighten packing gland nut finger tight. Then tighten nut with a wrench an additional 1-1/4 turns. Be sure to hold the sensor body with a second wrench to prevent the sensor from turning.

INSTRUMENT CONNECTION

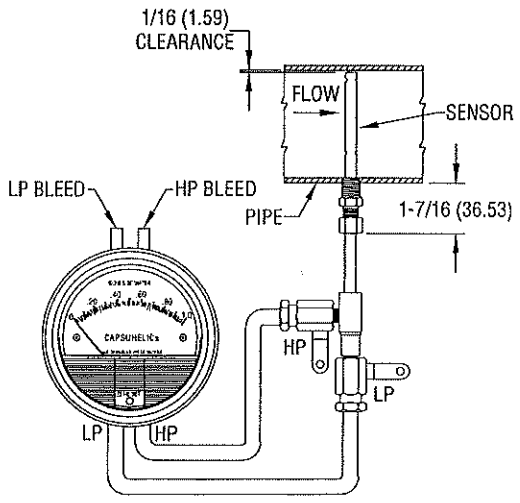
Connect the slide pressure tap to the high pressure port of the Magnehelic® (air only) or Capsuhelic® gage or transmitting instrument and the top connection to the low pressure port.

See the connection schematics below.

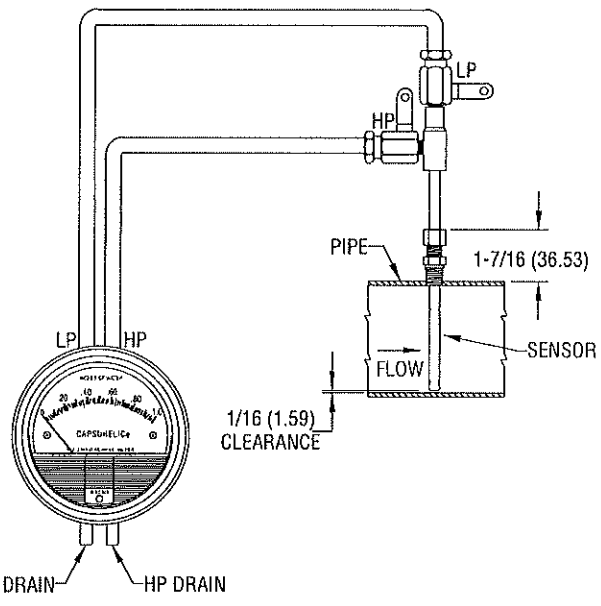
Bleed air from instrument piping on liquid flows. Drain any condensate from the instrument piping on air and gas flows.

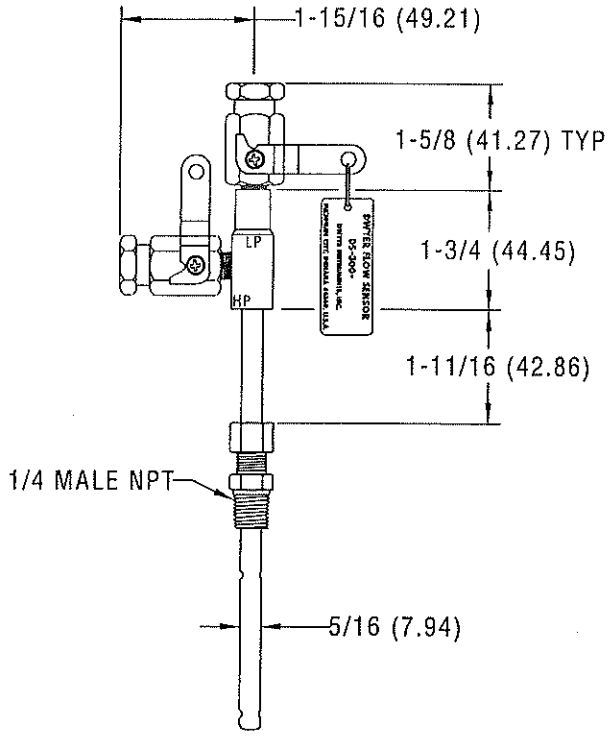
Open valves to instrument to place flow meter into service. For permanent installations, a 3-valve manifold is recommended to allow the gage to be zero checked without interrupting the flow. The Dwyer A-471 Portable Test Kit includes such a device.

Water Flow



Air or Gas Flow





Flow Calculations and Charts

The following information contains tables and equations for determining the differential pressure developed by the DS-300 Flow Sensor for various flow rates of water, steam, air or other gases in different pipe sizes.

This information can be used to prepare conversion charts to translate the differential pressure readings being sensed into the equivalent flow rate. When direct readout of flow is required, use this information to calculate the full flow differential pressure in order to specify the exact range of Dwyer Magnehelic® or Capsuhelic® gage required. Special ranges and calculations are available for these gages at minimal extra cost. See bulletins A-30 and F-41 for additional information on Magnehelic® and Capsuhelic® gages and DS-300 flow sensors.

For additional useful information on making flow calculations, the following service is recommended: Crane Valve Co. Technical Paper No. 410 "Flow of Fluids Through Valves, Fittings and Pipe." It is available from Crane Valve Company, www.cranevalve.com.

Using the appropriate differential pressure equation from Page 4 of this bulletin,calculate the differential pressure generated by the sensor under normal operating conditions of the system. Check the chart below to determine if this value is within the recommended operating range for the sensor. Note that the data in this chart is limited to standard conditions of air at 60°F (15.6°C) and 14.7 psia static line pressure or water at 70°F (21.1°C). To determine recommended operating ranges of other gases, liquids an/or operating conditions, consult factory.

Note: the column on the right side of the chart which defines velocity ranges to avoid. Continuous operation within these ranges can result in damage to the flow sensor caused by excess vibration.

Pipe Size (Schedule 40)	Flow Coefficient "K"	Operating Ranges Air @ 60°F & 14.7 psia (D/P in. W.C.)	Operating Ranges Water @ 70°F (D/P in. W.C.)	Velocity Ranges Not Recommended (Feet per Second)
1	0.52	1.10 to 186	4.00 to 675	146 to 220
1-1/4	0.58	1.15 to 157	4.18 to 568	113 to 170
1-1/2	0.58	0.38 to 115	1.36 to 417	96 to 144
2	0.64	0.75 to 75	2.72 to 271	71 to 108
2-1/2	0.62	1.72 to 53	6.22 to 193	56 to 85
3	0.67	0.39 to 35	1.43 to 127	42 to 64
4	0.67	0.28 to 34	1.02 to 123	28 to 43
6	0.71	0.64 to 11	2.31 to 40	15 to 23
8	0.67	0.10 to 10	0.37 to 37	9.5 to 15
10	0.70	0.17 to 22	0.60 to 79	6.4 to 10

FLOW EQUATIONS

1. Any Liquid

$$Q\ (GPM) = 5.668 \times K \times D^2 \times \sqrt{\Delta P / S_f}$$

2. Steam or Any Gas

$$Q\ (lb/Hr) = 359.1 \times K \times D^2 \times \sqrt{p \times \Delta P}$$

3. Any Gas

$$Q\ (SCFM) = 128.8 \times K \times D^2 \times \sqrt{\frac{P \times \Delta P}{(T + 460) \times S_s}}$$

DIFFERENTIAL PRESSURE EQUATIONS

1. Any Liquid

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_f}{K^2 \times D^4 \times 32.14}$$

2. Steam or Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2}{K^2 \times D^4 \times p \times 128{,}900}$$

3. Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_s \times (T + 460)}{K^2 \times D^4 \times P \times 16{,}590}$$

Technical Notations

The following notations apply:

ΔP = Differential pressure expressed in inches of water column
Q = Flow expressed in GPM, SCFM, or PPH as shown in equation
K = Flow coefficient— See values tabulated on Pg. 3.
D = Inside diameter of line size expressed in inches.

For square or rectangular ducts, use: $D = \sqrt{\frac{4 \times \text{Height} \times \text{Width}}{\pi}}$

P = Static Line pressure (psia)
T = Temperature in degrees Fahrenheit (plus 460 = °Rankine)
p = Density of medium in pounds per square foot
S_f = Sp Gr at flowing conditions
S_s = Sp Gr at 60°F (15.6°C)

SCFM TO ACFM EQUATION

$$SCFM = ACFM \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

$$ACFM = SCFM \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520}\right)$$

$$\text{POUNDS PER CUBIC FOOT STD.} = \text{POUNDS PER CUBIC FOOT ACT.} \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520^*}\right)$$

$$\text{POUNDS PER CUBIC FOOT ACT.} = \text{POUNDS PER CUBIC FOOT STD.} \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

1 Cubic foot of air = 0.076 pounds per cubic foot at 60° F (15.6°C) and 14.7 psia.
* (520°= 460 + 60°) Std. Temp. Rankine

Printed in U.S.A. 7/04 FR# 72-440451-01 Rev. 2

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.
Phone: 219/879-8000 www.dwyer-inst.com
Fax: 219/872-9057 e-mail: info@dwyer-inst.com

Quality design and construction features

Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

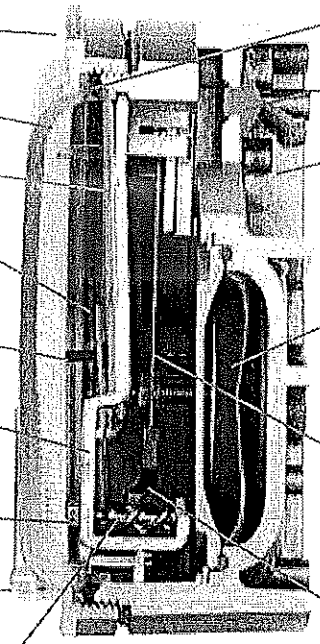
Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.



O-ring seal for cover assures pressure integrity of case.

Blowout plug of silicone rubber protects against overpressure on 15 psig rated models. Opens at approximately 25 psig.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

SERIES 2000 MAGNEHELIC® GAGE — MODELS AND RANGES

The models below will fulfill most requirements. Page V also shows examples of special models built for OEM customers. For special scales furnished in ounces per square inch, inches of mercury, metric units, etc., contact the factory.

Dual Scale English/Metric Models		
Model Number	Range, In. W.C.	Range, Pa or kPa
2000-0D	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa

Model Number	Range Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2150	0-150

Model Number	Range Zero Center Inches of Water
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model Number	Range PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30

*MP option standard
**HP option standard

Dual Scale Air Velocity Units

Model Number	Range in W.C. Velocity, F.P.M.
2000-00AV†••	0-.25/300-2000
2000-0AV†•	0-.50/500-2800
2001AV	0-1.0/500-4000
2002AV	0-2.0/1000-5600
2010AV	0-10/2000-12500

For use with pitot tube.

Model Number	Range MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-25MM	0-25
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100

Zero Center Ranges	
2300-20MM†	10-0-10

Model Number	Range, CM of Water
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300

Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

Model Number	Range, Pascals
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750

Model Number	Range, Pascals
Zero Center Ranges	
2300-60PA	30-0-30
2300-100PA	50-0-50
2300-120PA	60-0-60
2300-250PA	125-0-125
2300-500PA	250-0-250

Model Number	Range, Kilopascals
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-3KPA	1.5-0-1.5

Accessories

A-299, Surface Mounting Bracket
A-300, Flat Flush Mounting Bracket
A-310A, 3-Way Vent Valve
A-321, Safety Relief Valve
A-432, Portable Kit
A-605, Air Filter Kit
A-610, Pipe Mount Kit

Options — To order, add suffix: I.E. 2001-ASF
ASF (Adjustable Signal Flag)
HP (High Pressure Option)
LT (Low Temperatures to -20°F)
MP (Med. Pressure Option)
SP (Setpoint Indicator)

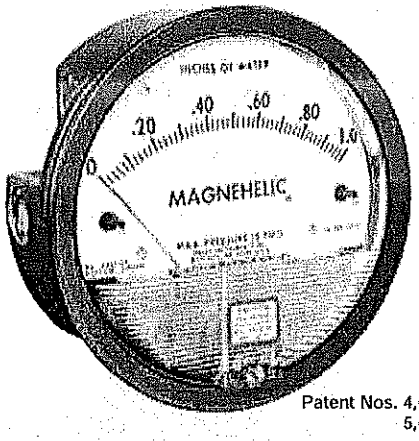
Scale Overlays — Red, Green, Mirrored or Combination, Specify Locations

†These ranges calibrated for vertical scale position.
• Accuracy +/-3%. •• Accuracy +/-4%

1011R01-0299P

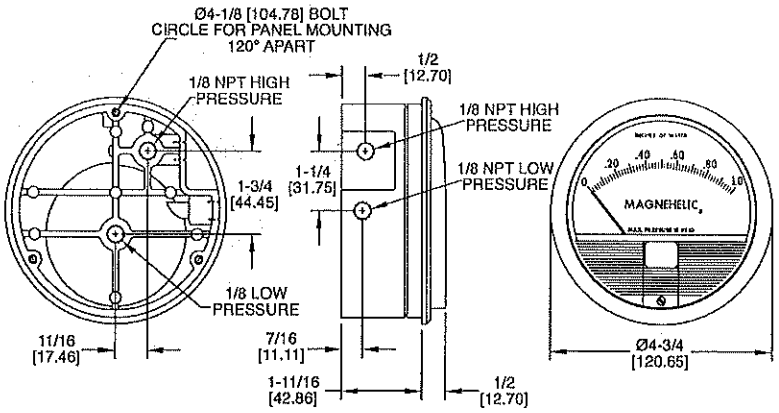
Series 2000 Magnehelic® Differential Pressure Gages

Indicate Positive, Negative or Differential, Accurate within 2%



Patent Nos. 4,030,365
5,012,678

Standard Magnehelic® Pressure Gage has a large, easy-to-read 4" dial.



Dimensions, Standard Series 2000 Magnehelic® Pressure Gages. (Slightly different on medium and high pressure models)

Select the Dwyer® Magnehelic® gage for high accuracy – guaranteed within 2% of full scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

Note: May be used with Hydrogen. When ordering a Buna-N diaphragm pressures must be less than 35 psi.

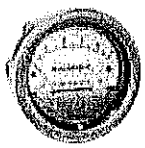
MOUNTING. A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. With the optional A-610 Pipe Mounting Kit they may be conveniently installed on horizontal or vertical 1¼" - 2" pipe. Although calibrated for vertical position, many ranges above 1" may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4⅜" hole is required for flush panel mounting. Complete mounting and connection fittings plus instructions are furnished with each instrument.

Flush ...Surface...or Pipe Mounted

VENT VALVES

In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

HIGH AND MEDIUM PRESSURE MODELS



Installation is similar to standard gages except that a 4⅜" hole is needed for flush mounting. The medium pressure construction is rated for internal pressures up to 35 psig and the high pressure up to 80 psig. Available for all models. Because of larger case, the medium pressure and high pressure models will not fit in a portable case size. Installation of the A-321 safety relief valve on standard Magnehelic® gages often provides adequate protection against infrequent overpressure.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases. (Natural Gas option available.)
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% of full scale (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on - 00, -50 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20" Hg. to 15 psig.† (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.
Temperature Limits: 20 to 140°F.* (-6.67 to 60°C).
Size: 4" (101.6 mm) Diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8" female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g). MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8" NPT plugs for duplicate pressure taps, two 1/8" pipe thread to rubber tubing adapter and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for 3 adapters in MP & HP gage accessories.)
*Low temperature models available as special option.
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

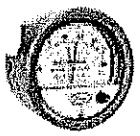
OPTIONS AND ACCESSORIES

Transparent Overlays

Furnished in red and green to highlight and emphasize critical pressures.

Adjustable Signal Flag

Integral with plastic gage cover. Available for most models except those with medium or high pressure construction. Can be ordered with gage or separate.



LED Setpoint Indicator

Bright red LED on right of scale shows when setpoint is reached. Field adjustable from gage face, unit operates on 12-24 VDC. Requires MP or HP style cover and bezel.

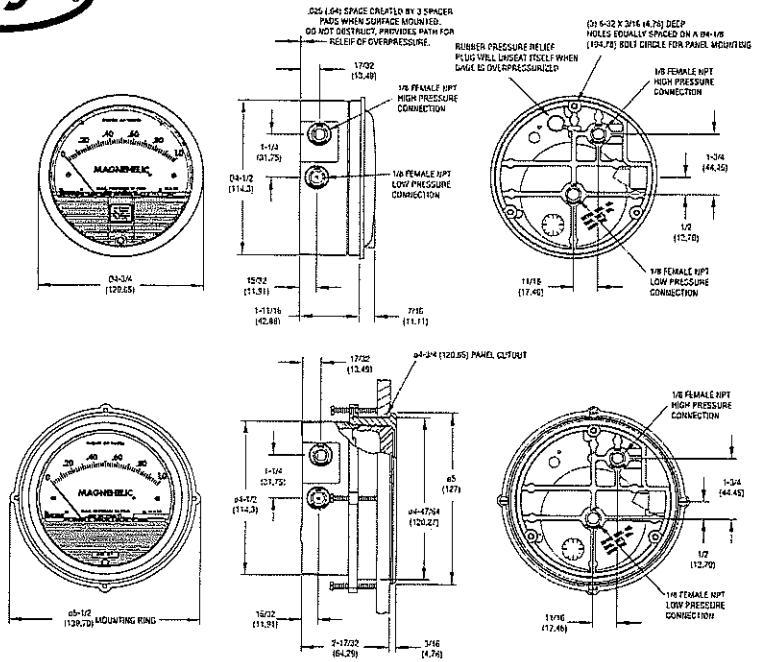
Portable Units

Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft. (2.7 m) of ¼" I.D. rubber tubing, standhang bracket and terminal tube with holder.

Air Filter Gage Accessory Package

Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft. (1.5 m) lengths of ¼" aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves.

Magnehelic® Differential Pressure Gage



**The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.*

STANDARD GAGE ACCESSORIES: Two 1/8" NPT plugs for duplicate pressure taps, two 1/8" pipe thread to rubber tubing adapters and three flush mounting adapters with screws.

MP AND HP GAGE ACCESSORIES: Mounting ring and snap ring retainer substituted for 3 adaptors, 1/4" compression fittings replace 1/8" pipe thread to rubber tubing adaptors.

OVERPRESSURE PROTECTION: Standard Magnehelic® Differential Pressure Gages are rated for a maximum pressure of 15 psig and should not be used where that limit could be exceeded. Models employ a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (excludes MP and HP models). To provide a free path for pressure relief, there are four spacer pads which maintain .023" clearance when gage is surface mounted. Do not obstruct the gap created by these pads.

SPECIFICATIONS

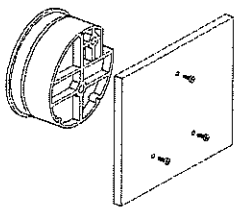
Service: Air and non-combustible, compatible gases. (Natural Gas option available.)
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. (MP model has polycarbonate cover).
Accuracy: ±2% of full scale (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on -00, - 00N, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20" Hg to 15 psig.† (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
Temperature Limits: 20 to 140°F (-6.67 to 60°C). *Low temperature models available as special option.
Size: 4" (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8" female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).

†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.
Note: May be used with hydrogen when ordering Buna-N diaphragm. Pressure must be less than 35 psi.

INSTALLATION

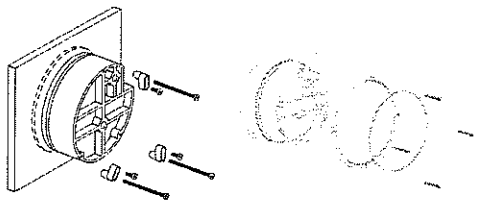
Select a location free from excessive vibration and where the ambient temperature will not exceed 140°F (60°C). Also, avoid direct sunlight which accelerates discoloration of the clear plastic cover. Sensing lines may be run any necessary distance. Long tubing lengths will not affect accuracy but will increase response time slightly. Do not restrict lines. If pulsating pressures or vibration cause excessive pointer oscillation, consult the factory for ways to provide additional damping.
All standard Magnehelic® Differential Pressure Gages are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If gages are to be used in other than vertical position, this should be specified on the order. Many higher range gages will perform within tolerance in other positions with only rezeroing. Low range models of 0.5" w.c. plus 0.25" w.c. and metric equivalents must be used in the vertical position only.

SURFACE MOUNTING



Locate mounting holes, 120° apart on a 4-1/8" dia. circle. Use No. 6-32 machine screws of appropriate length.

FLUSH MOUNTING



Provide a 4-9/16" dia. (116 mm) opening in panel. Provide a 4-3/4" dia. (120 mm) opening for MP and HP models. Insert gage and secure in place with No. 6-32 machine screws of appropriate length, with adapters, firmly secured in place.

PIPE MOUNTING

To mount gage on 1-1/4" - 2" pipe, order optional A-610 pipe mounting kit.

TO ZERO GAGE AFTER INSTALLATION

Set the indicating pointer exactly on the zero mark, using the external zero adjust screw on the cover at the bottom. Note that the zero check or adjustment can only be made with the high and low pressure taps both open to atmosphere.

OPERATION

Positive Pressure: Connect tubing from source of pressure to either of the two high pressure ports. Plug the port not used. Vent one or both low pressure ports to atmosphere.
Negative Pressure: Connect tubing from source of vacuum or negative pressure to either of the two low pressure ports. Plug the port not used. Vent one or both high pressure ports to atmosphere.
Differential Pressure: Connect tubing from the greater of two pressure sources to either high pressure port and the lower to either low pressure port. Plug both unused ports.
When one side of the gage is vented in dirty, dusty atmosphere, we suggest an A-331 Filter Vent Plug be installed in the open port to keep inside of gage clean.

A. For portable use of temporary installation use 1/8" pipe thread to rubber tubing adapter and connect to source of pressure with flexible rubber or vinyl tubing.
B. For permanent installation, 1/4" O.D., or larger, copper or aluminum tubing is recommended.

MAINTENANCE

No lubrication or periodic servicing is required. Keep case exterior and cover clean. Occasionally disconnect pressure lines to vent both sides of gage to atmosphere and re-zero. Optional vent valves should be used in permanent installations. The Series 2000 is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

WARNING

Attempted field repair may void your warranty. Recalibration or repair by the user is not recommended.

TROUBLE SHOOTING TIPS

Gage won't indicate or is sluggish.

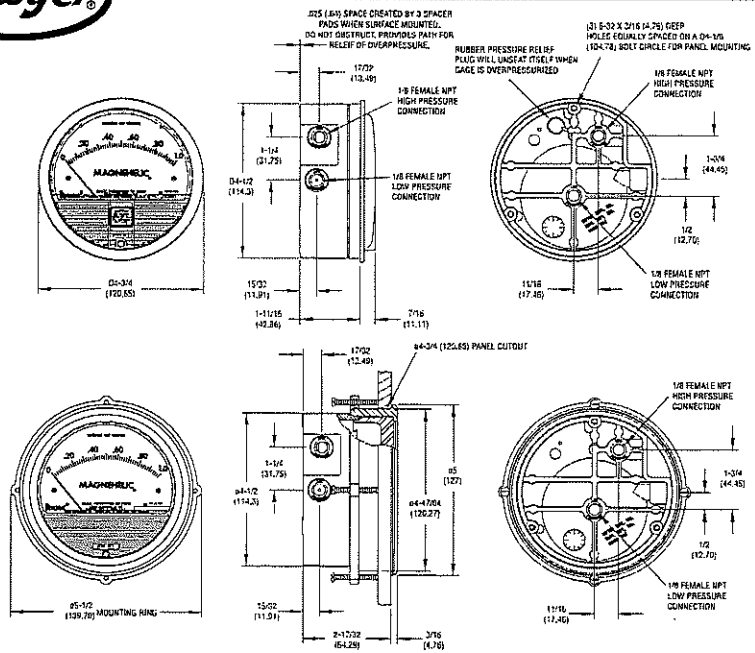
1. Duplicate pressure port not plugged.
2. Diaphragm ruptured due to overpressure.
3. Fittings or sensing lines blocked, pinched, or leaking.
4. Cover loose or "O"ring damaged, missing.
5. Pressure sensor, (static tips, Pitot tube, etc.) improperly located.
6. Ambient temperature too low. For operation below 20°F (-7°C), order gage with low temperature, (LT) option.

DWYER INSTRUMENTS, INC. | Phone: 219/879-8000 www.dwyer-inst.com Fax: 219/872-9057 e-mail: info@dwyer-inst.com

Bulletin A-2

Magnehelic® Differential Pressure Gage

INSTRUCCIONES Y LISTA DE PARTES



(El tapón de goma no es usado en los modelos sobre 180 pulgadas de presión de agua, modelos de presión media o alta, o en instrumentos que requieren un elastizado en cualquier otro material que no sea silicona para el diafragma.)

Accesorios: Tapones 1/8" NPT para las conexiones duplicadas, dos adaptadores de rosca 1/8" NPT a tubo de goma; y tres adaptadores para montaje al ras y tornillos.

Accesorios para Los Modelos MP y HP: El anillo de montaje y el retensor del anillo de presión son substituidos por 3 adaptadores, accesorios de compresión de 1/4" remplazan a los adaptadores de rosca 1/8" a tubo de goma.

Protección Para Sobrepresión: Los Manómetros Diferenciales Magnehelic Estándar están clasificados para una presión máxima de 15 psi y no se deberían de usar donde el límite puede excederse. Los modelos emplean un tapón de goma en el trasero que funciona como una válvula de alivio desmontándose y ventilando el interior del instrumento cuando la sobrepresión alcanza aproximadamente 25 psig. (Los modelos MP y HP son excluidos) Para proveer un camino libre para el alivio de presión, el instrumento viene con rodilleras que mantienen un espacio de .023" cuando el instrumento es montado en superficie. No bloque el espacio creado por estas rodilleras.

ESPECIFICACIONES

Servicio: aire y gases no combustibles, gases compatibles. (opcion disponible para uso con gas natural).
Materiales Mojados: Consulte con la fábrica.
Carcasa: Caja y anillo de retención de aluminio fundido a presión con tapadera de acrílico. (El modelo MP tiene la tapadera de policarbonato.)
Exactitud: ±2% de fondo de escala a 21 °C
Mod. 2000-0 ±3%; Mod. 2000-00 ±4%
Límite de Presión: -20 Hg. a 15 psig. † (-0.677 bar a 1,034 bar); opción MP: 35 psig (2.41 bar), opción HP: 80 psig (5.52 bar).
Sobrepresión: El tapón de alivio se abre aproximadamente a los 25 psig, modelos estandard únicamente. El tapón de goma no es usado en los modelos sobre 180 pulgadas de presión de agua, modelos de presión media o alta, o en instrumentos que requieren un elastizado en cualquier otro material que no sea silicio para el diafragma.
Límite de Temperatura: -6.67 a 60°C. * Modelos de baja temperatura disponibles como opción especial.
Dimensiones: diám. 120,65 mm x 55,6 prof.
Orientación de Montaje: El diafragma debe ser usado solo en posición vertical. Consulte con la fábrica para otras orientaciones de posición.
Conexiones: 1/8" NPT para alta y baja presión, duplicadas (atrás, a los lados).
Peso: 510 g, MP y HP 963 g.

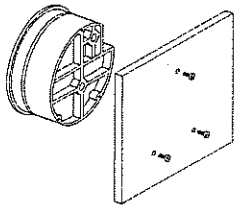
† Para aplicaciones con alto ciclo de velocidad dentro de la clasificación de presión total del instrumento, la próxima clasificación mas alta es recomendada. Vea las opciones de media y alta presión.

El instrumento puede ser usado con hidrogeno cuando se ordena con diafragma de Buna-N. La presion tiene que ser menos de 35 psi.

Instalacion

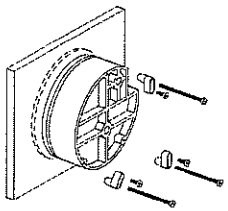
Seleccione un lugar libe de exceso de vibraciones, y donde la temperatura ambiente no supere los 60°C. Evite luz solar directa, para evitar decoloración de la cubierta plástica. Las conexiones de proceso pueden tener cualquier longitud sin afectar la exactitud, pero pueden extender el tiempo de respuesta del instrumento. Si hay pulsación de presión o vibración, consulte a fábrica sobre medios de amortiguación.
Los MAGNEHELIC han sido calibrados con el diafragma vertical, y deben ser usados en esas condiciones. Para otras posiciones, se debe especificar en la orden de provisión. Los de rango elevado pueden ser usados en diversas posiciones, pero se debe reajustar el cero. Los modelos de la serie 2000-00 y equivalentes métricos deben ser usados solo verticalmente.

Montaje en Superficie



Perfore tres orificios separados 120° sobre una circunferencia de 105 mm de diám. y sostenga el instrumento con tres tornillos 6-32 de long. apropiada.

Montaje alineado



Perfore un circulo de 115 mm de diám. en el panel, y sostenga el instrumento mediante los.

Montaje Sobre Pipa

Para montar el instrumento sobre pipas de 32 a 50 mm de diám., ordene el adaptador opcional A-610.

Puesta a Cero Después de Instalar

Deje las conexiones de presión abiertas a atmósfera y ajuste a cero desde tornillo del panel frontal.

Operacion

Presión Positiva: Conecte la tubería desde la fuente de presión a cualquiera de las dos conexiones de alta presión (HIGH), bloqueando la no usada; Las conexiones de baja (LOW) presión pueden dejarse uno o los dos abiertos a la atmósfera.
Presión Negativa: Repita el procedimiento anterior, conectado en este caso las conexiones de baja presión (LOW). Deje las otras conexiones abiertas.
Presión diferencial: Conecte el tubo correspondiente a la presión más positiva al cualquiera de los conectores de alta presión (HIGH) bloqueando el no usado, y la más baja presión o presión negativa (vacío) al conector de baja presión (LOW). Puede usarse cualquier conector de cada par, dejando siempre uno bloqueado. Si se deja una conexión abierta a la atmósfera, se recomienda el uso de un filtro tipo A-331 en el lugar correspondiente para mantener limpio el interior del instrumento. Para uso portable, o instalación temporaria, uso adapta dores para rosca de tubo de 1/89 a tubo flexible, y conecte a proceso mediante una tubería de goma, o equivalente. Para instalación permanente, se recomienda el uso de tubo de cobre o aluminio de por lo menos 1/4" de diám. exterior.

No se requiere mantenimiento específico alguno, ni lubricación. Periódicamente, desconecte el instrumento, ventee la presión acumulada, y reajuste el cero. Para instalaciones permanentes, se debe usar un juego de válvulas de montaje permanente para el venteo.
El instrumento de Serie 2000 no puede ser re parado en el campo y debería de ser regresado si reparos son necesarios (Reparos en el campo no deben de ser intentados y pueden cancelar la garantía.). Asegurarse de incluir una descripción breve del problema más cualquier notas pertinentes a la aplicación para devolución de productos antes de enviar el instrumento.

Cuidado! : La recalibración en campo puede invalidar la garantía. No se recomienda la recalibracion por parte del usuario. En caso necesario envie el instrumento con transporte pago a:

Localización De Fallas

• El instrumento no indica, o es lento en reacción.
1. Conexión duplicada abierta.
2. Diafragma roto por sobrepresión.
3. Tubería de conexión perforada, con pérdidas o pinchazos.
4. Anillo de retención flojo, u "O " ring dañado.
5. Conexión a proceso indebida o inadecuada.
6. Temperatura muy baja. Para este caso ordene tipos LT (baja temperatura).

Printed in U.S.A. 2/08 FR# 12-440212-10 Rev.1

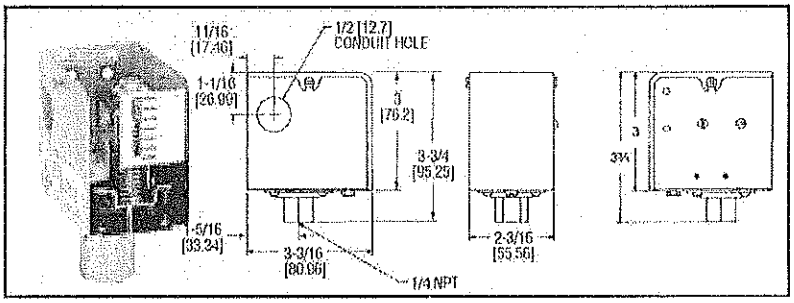
DWYER INSTRUMENTS, INC. Phone: 219/879-8000 www.dwyer-inst.com Fax: 219/872-9057 e-mail: info@dwyer-inst.com
DWYER INSTRUMENTS, INC. Phone: 219/879-8000 www.dwyer-inst.com Fax: 219/872-9057 e-mail: info@dwyer-inst.com

Mercoid®

Series
CS, CD

Low Cost Diaphragm Pressure Switches

Visible Set Points, Fixed or Adjustable Deadband



Series CS, CD combines advanced design and precision construction with small size and low price. Unit is ideal for instrument panels, small compressors and general industrial applications. Visible set point and easy to wire SPDT snap switch reduce installation time. Operates in any position and is vibration resistant.

STOCKED MODELS in bold

Model No.	Adjustable Operating Range	Deadband	Deadband Value
CS-1	1-30" Hg. Vac. (25.4-762 mm Hg)	Fixed	1.5" Hg. (38 mm Hg)
CS-3	1-100" w.c. (.25-24.9 kPa)	Fixed	7" w.c. (1.74 kPa)
CS-10	1-10 psig (.07-.69 bar)	Fixed	0.4 psig (0.03 bar)
CS-30	1-30 psig (.07-2.1 bar)	Fixed	1.0 psig (0.07 bar)
CS-150	10-150 psig (.69-10.3 bar)	Fixed	5 psig (0.35 bar)
CD-10	1-10 psig (.07-.69 bar)	Adjustable	Min: 1.5 psig (.1 bar), Max: 11.5 psig (.79 bar)
CD-30	1-30 psig (.07-2.1 bar)	Adjustable	Min: 2 psig (.14 bar), Max: 12 psig (.83 bar)
CD-150	10-150 psig (.69-10.3 bar)	Adjustable	Min: 14 psig (.97 bar), Max: 24 psig (1.7 bar)

SPECIFICATIONS

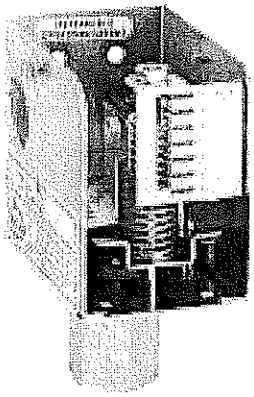
Wetted Materials: Nylon reinforced Buna-N and steel.
Temperature Limits: -30 to 150°F (-35 to 66°C).
Pressure Limit: 30 psig (2.1 bar) for ranges 1, 3, and 10. 50 psig (3.5 bar) for range 30. 175 psig (12.1 bar) for range 150.
Enclosure Rating: General purpose.
Switch Type: SPDT snap switch.
Electrical Rating: 15A @ 120 VAC, 8A @ 240 VAC.
Electrical Connections: Screw terminal.
Conduit Connection: 1/2" hole for conduit hub.
Process Connection: 1/4" female NPT.
Mounting Orientation: Any position.
Set Point Adjustment: Internal screw.
Weight: .5 lb (0.23 kg).
Deadband: See model chart.
Agency Approvals: CE, UL.

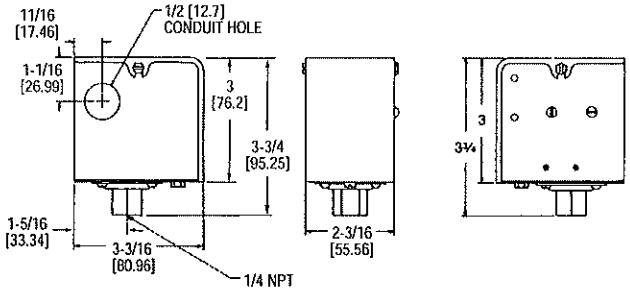
Dwyer Instruments, Inc./P.O. Box 373/Michigan City, IN 46361/Phone 219 879-8000/Fax 219 872-9057 • U.K. Phone (+44) (0)1494-461707 • Australia Phone 61 2 4272-2055

Mercoid®

Series CS Low Cost Diaphragm Pressure Switches

Specifications – Installation and Operating Instructions





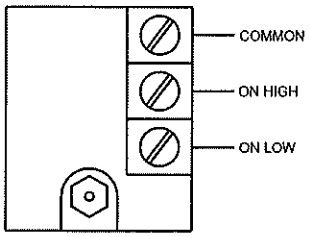
The Series CS Low Cost Diaphragm Pressure Switch is ideal for instrument panels, small compressors and general industrial applications. Visible set point and easy-to-wire SPDT snap switch reduce installation time. This switch operates in any position and is vibration resistant.

INSTALLATION/MOUNTING

The control can be pipe mounted. Do not twist the case when installing. Use wrench on the pressure connection flats.

WIRING

All wiring must conform to the National Electrical code and local regulations. Do not install control to handle loads in excess of electrical rating shown in specifications or as indicated on instructions inside control cover. Connect wiring to screw terminals depending on the action required. Common and High contacts will close and Common and Low contacts will open when increasing pressure (or vacuum) reaches set point. The reverse will occur when pressure (or vacuum) drops below the set point less the deadband.



WIRING DIAGRAM
TOP VIEW

CAUTIONS: Do not oil any parts. Mount control securely. Never exceed electrical rating for switch. Use only with compatible.

WARNING

A failure resulting in injury or damage can be caused by over-pressure, excessive vibration or pressure pulsation, excessive temperature, corrosion of pressure containing parts and movement assembly, electrical overload or other misuse.

PHYSICAL DATA

Temperature Limits: -30 to 150°F (-34.4 to 65.6°C)
Pressure Connections: ¼" NPT(F)
Electrical Ratings: 12 A @ 120 VAC; 8 A @ 240 VAC; 7A @ 277 VAC; ⅛ HP @ 120 VAC; ¼ HP @ 240 VAC
Switch Type: SPDT snap acting
Conduit Opening: ½"
Wiring Connections: Three screw type, common, N.O., N.C.
Set Point Adjustment: Screw type, inside cover
Housing: Galvanized steel, NEMA 1
Diaphragm: Buna-N/Nylon
Calibration Spring: Plated steel
Installation: Any position
Weight: ½ lb. (0.23 kg)

Model No.	Adjustable Operating Range	Fixed Deadband		Max. Pressure
		Maximum	Minimum	
CS-1	1-30" Hg. Vac. 2.5-75 cm Hg.Vac	1.5" Hg. 3.8 cm Hg. Vac	1" Hg. VAC 2.5 cm Hg. Vac	30 psig
CS-3	10-100" w.c. 2.5-250 cm w.c.	7" w.c. 17.8 cm w.c.	5" w.c. 12.7 cm w.c.	30 psig
CS-10	1-10 psig 0.07-0.7 kg/cm²	0.4 psig 0.03 kg/cm²	0.25 psig 0.02 kg/cm²	30 psig
CS-30	1-30 psig 0.07-2.1 kg/cm²	1.0 psig 0.07 kg/cm²	0.5 psig 0.035 kg/cm²	50 psig
CS-150	10-150 psig 0.07-10.5 kg/cm²	5 psig 0.35 kg/cm²	1.5 psig 0.1 kg/cm²	175 psig

Printed in U.S.A. 4/01 FR#90-442119-00 Rev. 2

MERCOID DIVISION
DWYER INSTRUMENTS, INC.
P.O. BOX 258 • MICHIGAN CITY, INDIANA 46361 U.S.A.
Phone: 219/879-8000
Fax: 219/872-9057
Lit-by-Fax: 888/891-4963
www.dwyer-inst.com
e-mail: info@dwyer-inst.com

Fliteway Technologies, Inc.

2129 East Birchwood Ave.• Cudahy, WI 53110
(414) 483-5600 • 1-800-236-3580 • FAX (414) 483-1957

HPP-100

GENERAL DESCRIPTION

The HPP-100 filter is a media filter vessel designed to treat liquid streams. While the typical design application is a activated carbon adsorbtion unit, the filter can easily accommodate many medias. Some applications include:

- Dissolved Organic Removal (Activated Carbon)
- Suspended Solids Removal (Sand Filter)
- Dissolved Minerals (Softener Resin)
- Oil and Grease Removal (Organo-Clays)
- Dissolved and Precipitated Metals Removal
- Special Organics (Resin/Carbon Blends)
- Catalytic Reactor (Chlorine and Peroxide Removal)
- Bio-Remediation Contacter Unit

HPP-100 STANDARD SPECIFICATIONS

Specification	Specification Value	Options
Materials (Vessel)	Polyetheylene	FRP
Materials (Internal Piping)	SCH 80 PVC	Polypropylene, CPVC, 304SS, 316SS
Materials (Collector Nozzles)	Polypropylene	304SS, 316SS
Internal Coating	-NA-	-NA-
External Coating	Epoxy Mastic (Carbon Steel Surfaces)	Any available coating
Maximum Pressure	125 PSIG	Up to 250 PSIG
Maximum Temperature	120° F	Up to 150° F
Cross Sectional Bed Area	0.7 FT^2	Custom sizes available
Bed Depth	4.7 FT (Using 100 Lbs. 8*30 GAC)	Dependent upon supplied media
Bed Volume	3.3 FT^3 (Using 100 Lbs. 8*30 GAC)	NA

CONTACT TIME VS. FLOW RATE

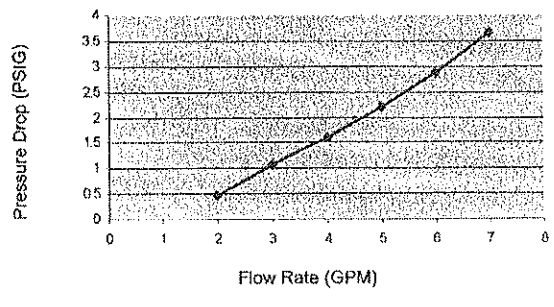
*(8*30 GAC)*

Flow Rate	Single Bed	Dual Bed
2 GPM	12 Minutes	24 Minutes
3 GPM	8 Minutes	16 Minutes
4 GPM	6 Minutes	12 Minutes
5 GPM	5 Minutes	10 Minutes

Related Bulletins:
B99-M111A - O&M Manual - HPP-100 Filter
B99-04A - Contact Time in Filters
B99-05A - About Backwashing
B99-06A - About Pressure Drop
B99-07A - Usage Rates

PRESSURE DROP GRAPH

*(As Filled - 8*30 GAC)*

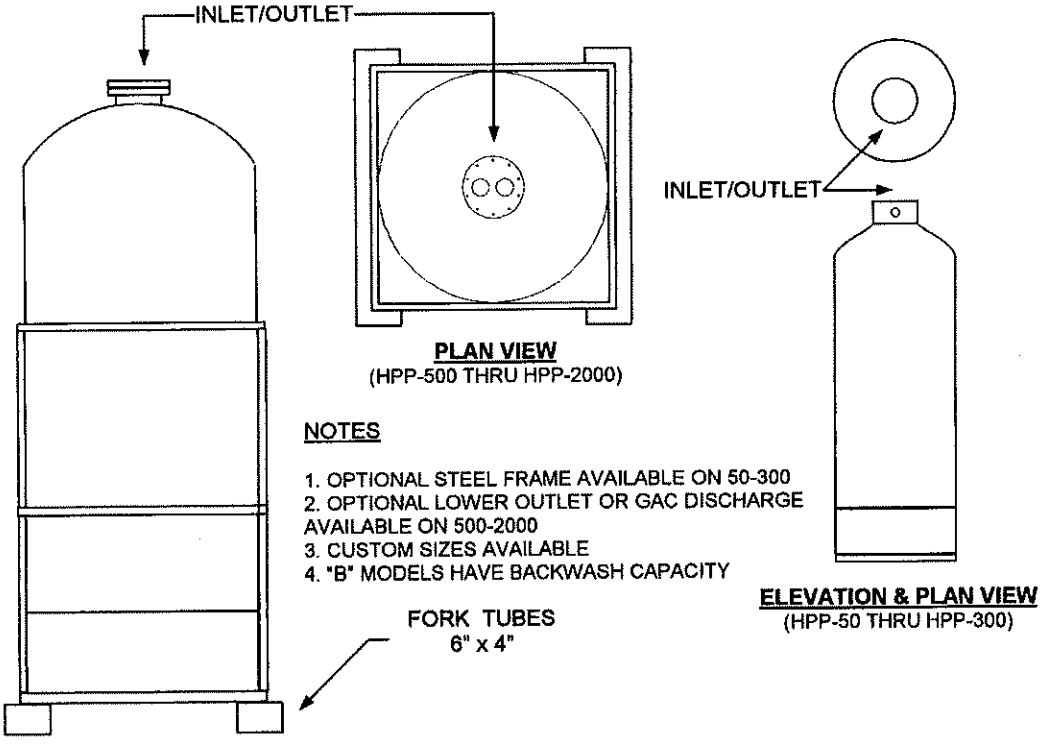


Fliteway is the Rightway!

Fliteway Technologies, Inc.

2129 East Birchwood Ave.• Cudahy, WI 53110
(414) 483-5600 • 1-800-236-3580 • FAX (414) 483-1957

HPP-Series Dimensions



DETAILED DRAWINGS AVAILABLE FOR INDIVIDUAL PRODUCTS

HPP SERIES STANDARD DIMENSIONS

Model # (HPP-) ⇨	50	100/100B	200/200B	300	500	1000	2000
Overall Height	3' 11"	4' 7" / 5' 9"	5' 9" / 6'	6'	7' 2"	7' 5"	8' 1"
Footprint	2' 6" x 2' 6"	1' 2" x 1' 2"	1' 6" x 1' 6"	2' x 2'	2' 6" x 2' 6"	3' x 3'	4' x 4'
Diameter	30"	12"/14"	16"/18"	21"	30"	36"	48"
Inlet/Outlet (FNPT)	¾"	¾"	1"	1"	1 ½"	2"	2"
Drain / Vent (FNPT)	NA	NA	NA	OPT	OPT	OPT	OPT
GAC Fill (Lbs)	50	100	200	300	500	1,000	2,000
Shipping Weight (Lbs)	60	120/130	235/270	380	845	1,475	2,680
Operational Weight (Lbs)	155	245/405	520/695	905	2,065	3,020	5,330

Fliteway is the Rightway!

ITT

Commercial Water

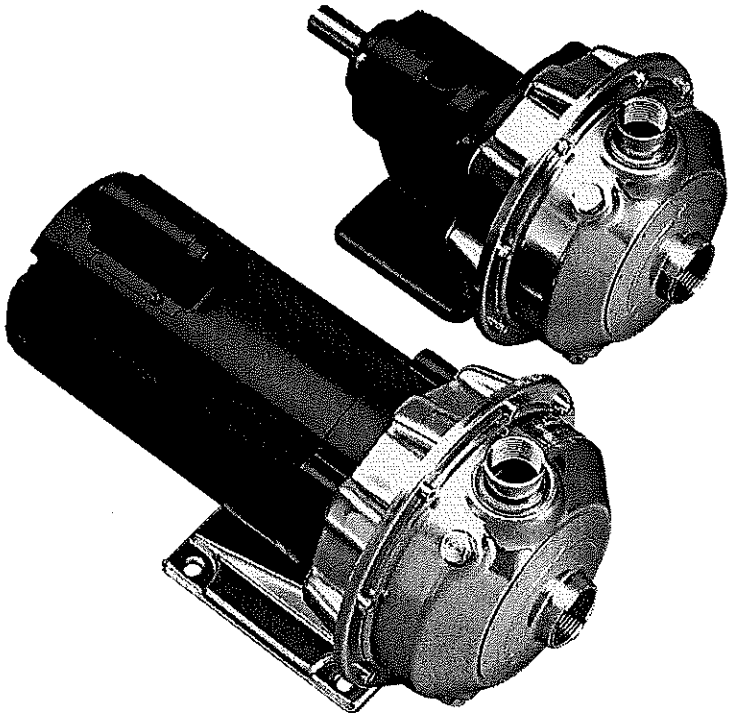
Goulds Pumps

G&L Series NPE

316L SS

NPE Series End Suction Centrifugal Pumps

Bombas Centrífugas de Succión Final Serie NPE



GOULDS PUMPS

Goulds Pumps is a brand of ITT Residential and Commercial Water.

Goulds Pumps es una marca de fábrica de ITT Agua Residencial y Comercial.

www.goulds.com

Engineered for life

A Full Range of Product Features
Una Gama Total de Características del Producto

Superior Materials of Construction: Complete AISI 316L stainless steel liquid handling components and mounting bracket for corrosion resistance, quality appearance, and improved strength and ductility.

High Efficiency Impeller: Enclosed impeller with unique floating seal ring design maintains maximum efficiencies over the life of the pump without adjustment.

Casing and Adapter Features: Stainless steel construction with NPT threaded, centerline connections, easily accessible vent, prime and drain connections with stainless steel plugs. Optional seal face vent/flush available.

Mechanical Seal: Standard John Crane Type 21 with carbon versus silicon-carbide faces, Viton elastomers, and 316 stainless metal parts. Optional high temperature and chemical duty seals available.

Motors: NEMA standard open drip-proof, totally enclosed fan cooled or explosion proof enclosures. Rugged ball bearing design for continuous duty under all operating conditions.

Materiales Superiores de Construcción: *Componentes completos para manejo de líquidos en acero inoxidable AISI 316L. y consola para el montaje para resistencia a la corrosión, apariencia de calidad, y fuerza y ductilidad mejoradas.*

Impulsor de Eficiencia Superior: *El impulsor encerrado con un diseño único de anillo del sello flotante, mantiene sin ajustes, la eficiencia máxima sobre la vida de la bomba.*

Características de la Carcasa y del Adaptador: *Construcción en acero inoxidable con NPT roscado, conexiones centrales, válvulas de fácil acceso, conexiones de cebado y drenaje con enchufes de acero inoxidable. Cara del sello válvula/chorro opcional disponible.*

Sello Mecánico: *Estándar John Crane Tipo 21 con carbón en contraste con caras de silicón-carbide, elastómeros de Viton, y partes metálicas de acero inoxidable 316. Sellos de alta temperatura y productos químicos están disponibles.*

Motores: *Estándar NEMA a prueba de goteo, ventilador totalmente encerrado o recintos a prueba de explosión. Diseño robusto de balineras de bolas para trabajo continuo en todas las condiciones de funcionamiento.*

The various versions of the NPE are identified by a product code number on the pump label. This number is also the catalog number for the pump. The meaning of each digit in the product code number is shown at left.

Las diferentes versiones de la NPE se identifican con un número de código del producto en la etiqueta de la bomba. Este número es también el número del catálogo para la bomba. El significado de cada dígito en el número de código del producto se muestra a la izquierda.

NPE Product Line Numbering System
Línea de Producto NPE Sistema de Numeración

Example Product Code,
Ejemplo Código del Producto

1 ST 2 C 1 A 4 F

Seal Vent/Flush Option,
Opción de Sello Válvula/ChorroSeal Ven

Mechanical Seal and O-ring
4 = Pre-engineered standard
For optional mechanical seal modify catalog order no. with seal code listed below.

Sello Mecánico y Anillo 'O'
4 = Estándar aprobado
Para sello mecánico opcional modificar el número de orden del catálogo con el código del sello anotado abajo.

John Crane Type 21 Mechanical Seal (¾" seal), *Sello Mecánico John Crane Tipo 21 (sello de ⅝")*					
Seal Code, *Código del Sello*	Rotary, *Rotativo*	Stationary, *Estacionario*	Elastomers, *Elastómeros*	Metal Parts, *Partes Metálicas*	Part No., *Pieza Número*
2	Carbon	Silicon Carbide	EPR	316 SS	10K18
4			Viton		10K55
5	Silicon Carbide		EPR		10K81
6			Viton		10K62

Impeller Option . . . No Adder Required
For optional impeller diameters modify catalog order no. with impeller code listed. Select optional impeller diameter from pump performance curve.

Código del Impulsor Opcional
Para impulsores con diámetros opcionales modificar el número de orden del catálogo con el código del impulsor anotado. Escoger el impul con diámetro opcional de la curva de funcionamiento de la bomba.

Impeller Code, *Código del Impulsor*	Pump Size, *Tamaño de la Bomba*		
	1 x 1¼ – 6	1¼ x 1½ – 6	1½ x 2 – 6
	Diameter	Diameter	Diameter
K	–	6⅛	–
G	–	5 15/16	5⅜
H	–	5½	5
A	6⅛	5¼	4¾
B	5¾	5 5/16	4⅝
C	5 5/16	4⅞	4⅜
D	4¾	4⅝	4 1/16
E	4 7/16	4¼	3⅝
F	4 1/16	3⅜	–

Driver, *Conductor*
1 = 1 PH, ODP
2 = 3 PH, ODP
3 = 575 V, ODP
4 = 1 PH, TEFC
5 = 3 PH, TEFC
6 = 575 V, TEFC
7 = 3 PH, XP
8 = 575 V, XP
9 = 3 PH, TEFC Premium Eff.
0 = 1 PH, XP

HP Rating, *HP Potencia*
C = ½ HP E = 1 HP G = 2 HP J = 5 HP
D = ¾ HP F = 1½ HP H = 3 HP

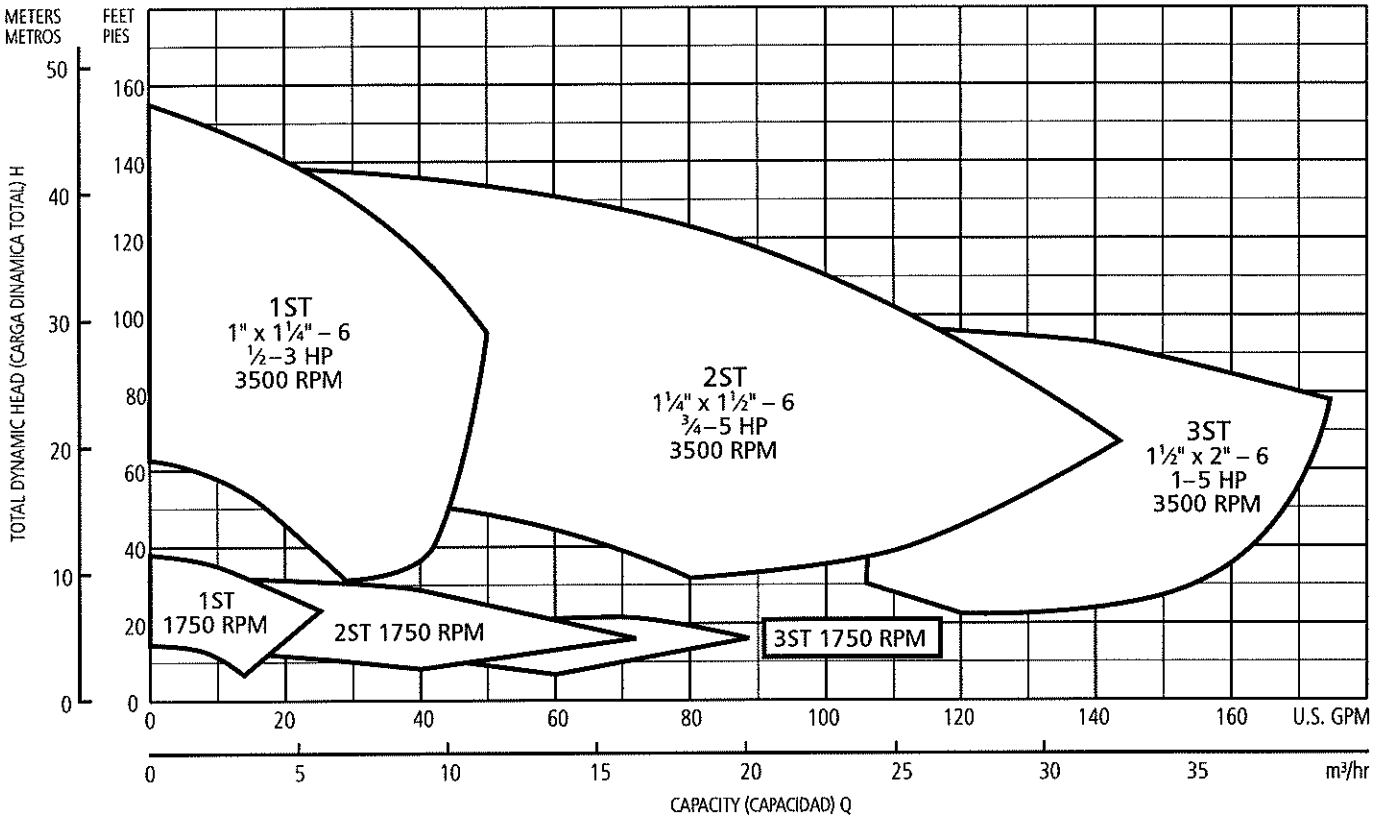
Driver: Hertz/Pole/RPM, *Conductor: Hercios/Polo/RPM*
1 = 60 Hz, 2 pole, 3500 RPM
2 = 60 Hz, 4 pole, 1750 RPM
3 = 60 Hz, 6 pole, 1150 RPM
4 = 50 Hz, 2 pole, 2900 RPM
5 = 50 Hz, 4 pole, 1450 RPM

For frame mounted version, substitute the letters "FRM" in these positions.
Para la versión con el armazón montado, sustituya las letras "FRM" en estas posiciones.

Material
ST = Stainless steel, *Acero inoxidable*

Pump Size, *Tamaño de la Bomba*
1 = 1 x 1¼ – 6 2 = 1¼ x 1½ – 6 3 = 1½ x 2 – 6

Performance Coverage (60 Hz)
Alcance de Funcionamiento (60 Hz)



NOTES:

Not recommended for operation beyond printed H-Q curve.

For critical application conditions consult factory.

Not all combinations of motor, impeller and seal options are available for every pump model. Please check with G&L on non-cataloged numbers.

All standard 3500 RPM ODP and TEFC motors supplied by Goulds Pumps, have minimum of 1.15 service factor. Standard catalog units may utilize available service factor. Any motors supplied other than Goulds Pumps check available service factor.

NOTAS:

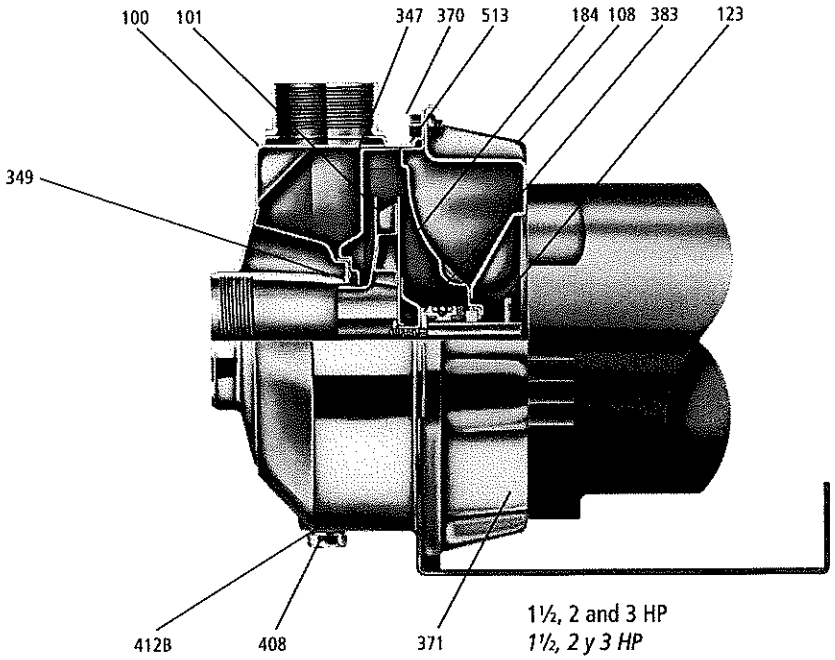
No se recomienda para funcionamiento superior al impreso en la curva H-Q.

Para condiciones de aplicaciones críticas consultar con la fábrica.

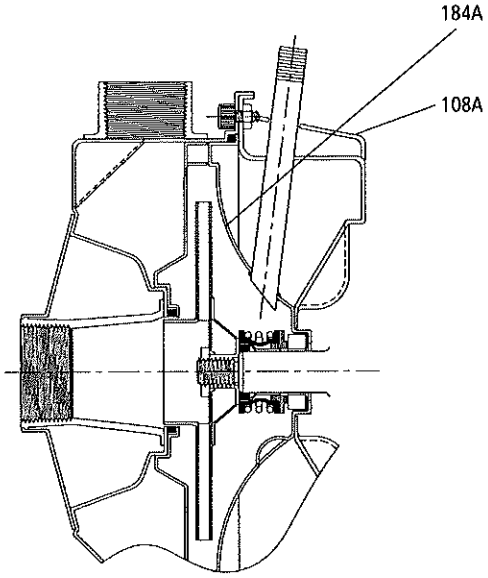
No todas las combinaciones de las opciones de motor, impulsor y sello están disponibles para cada modelo de bombas. Por favor verifique con G&L en los números no catalogados.

Todos los motores estándar de 3500 RPM, ODP (abiertos resguardados) y TEFC (totalmente encerrados con enfriamiento forzado) provistos por Goulds Pumps tienen un factor mínimo de servicio de 1,15. Las unidades estándar de catálogo pueden utilizar el factor de servicio disponible. Verificar el factor de servicio disponible de todo motor no provisto por Goulds Pumps.

NPE Close Coupled Pump Major Components: Materials of Construction
Bomba Cerrada Acoplada NPE Componentes Principales: Materiales de Construcción

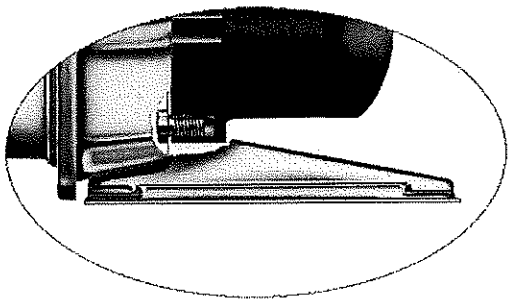


1½, 2 and 3 HP
1½, 2 y 3 HP



Seal Face Vent/Flush Option,
Opción Cara del Sello Válvula/Chorro

Item No., *Parte No.*	Description, *Descripción*	Materials, *Materiales*
100	Casing, *Carcasa*	AISI 316L SS, *AISI 316L Acero inoxidable*
101	Impeller, *Impulsor*	
108	Motor adapter, *Adaptador del motor*	
108A	Motor adapter seal vent/flush, *Sello válvula/chorro del adaptador del motor*	
123	Deflector, *Deflector*	BUNA-N
184	Seal housing, *Alojamiento del sello*	AISI 316L SS, *AISI 316L Acero inoxidable*
184 A	Seal housing seal vent/flush, *Sello válvula/chorro del alojamiento del sello*	
347	Guidevane, *Difusor*	
349	Seal ring, guidevane; *Anillo del sello, difusor*	Viton
370	Socket head screws, casing; *Encajes cabezas de tornillos, carcasa*	AISI 410 SS, *AISI 410 Acero inoxidable*
371	Bolts, motor; *Tornillos, motor*	Plated steel, Acero chapeado
383	Mechanical seal, *Sello mecánico*	**see chart, *ver tabla*
408	Drain and vent plug, casing; *Enchufes de drenaje y válvula, carcasa*	AISI 316L SS, *AISI 316L Acero inoxidable*
412B	O-ring, drain and vent plug; *Anillo 'O', enchufe de drenaje y válvula*	Viton (Standard, *estándar*) EPR (Optional, *Opcional*)
513	O-ring, casing; *Anillo 'O', carcasa*	
Motor *Motor*	NEMA standard, 56J flange; *NEMA estándar, brida 56J*	

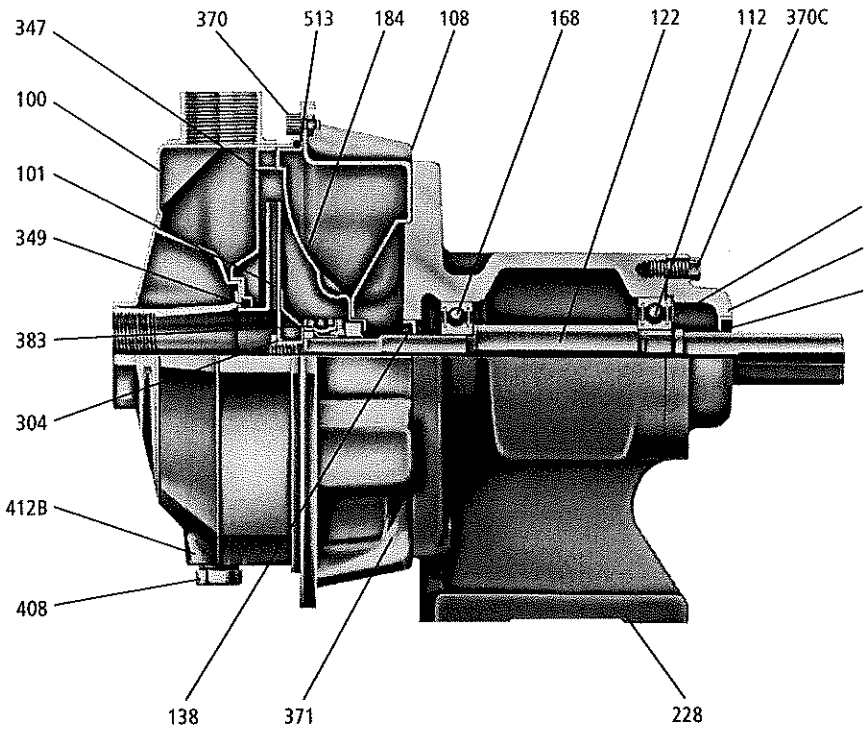


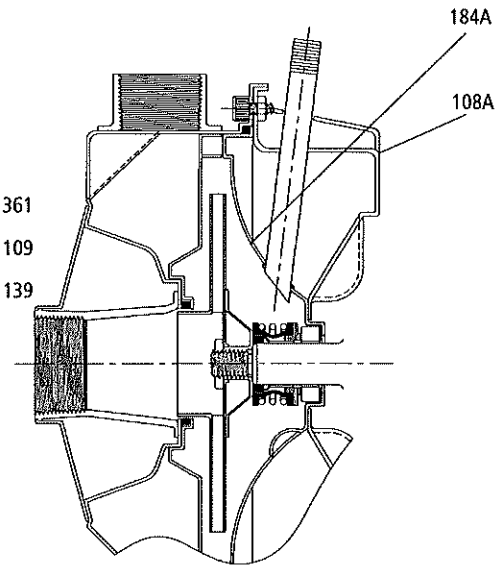
½, ¾ and 1 HP
½, ¾ y 1 HP

Footed motor for 5 HP ODP and TEFC, all explosion proof motors, see page 13.

Motor con pie para 5 HP ODP y TEFC, a prueba de explosiones motores, en la página 13.

NPE Frame Mounted Pump Major Components: Materials of Construction
Bomba NPE de Armazón Montado Componentes Principales: Materiales de Construcción



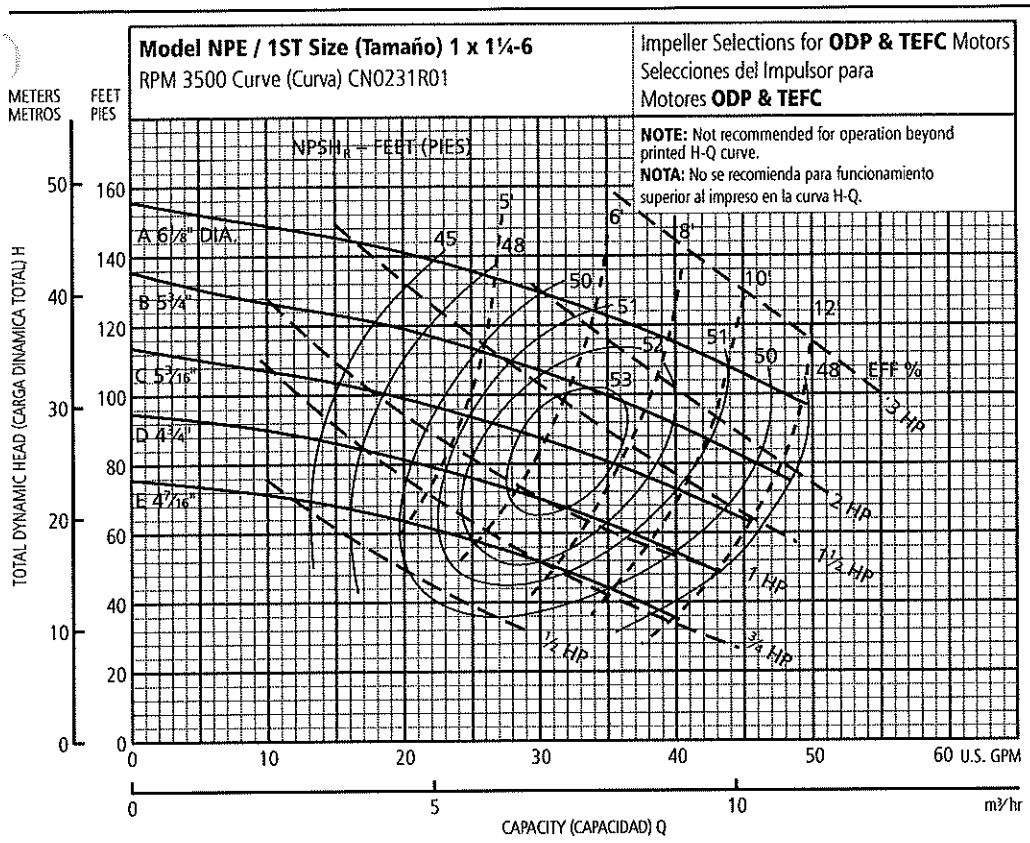


Seal Face Vent/Flush Option,
Opción Cara del Sello Válvula/Chorro

Item No., *Parte No.*	Description, *Descripción*	Materials, *Materiales*
100	Casing, *Carcasa*	AISI 316L SS, *AISI 316L Acero inoxidable*
101	Impeller, *Impulsor*	
108	Adapter, *Adaptador*	
108A	Motor adapter seal vent/flush, *Sello válvula/chorro del adaptador del motor*	
109	Bearing cover, *Cubierta de balineras*	Cast iron, *Hierro fundido*
112	Ball bearing (outboard), *Balineras de bolas (exterior)*	Steel, *Acero*
122	Shaft, *Eje*	AISI 316 SS, *AISI 316 Acero inoxidable*
138	Lip-seal (inboard), *Sello cubierto (interior)*	BUNA/steel, *BUNA/acero*
139	Lip-seal (outboard), *Sello cubierto (exterior)*	BUNA/steel, *BUNA/acero*
168	Ball bearing (inboard), *Balineras de bolas (interior)*	Steel, *Acero*
184	Seal housing, *Alojamiento del sello*	AISI 316L SS, *AISI 316L Acero inoxidable*
184 A	Seal housing seal vent/flush, *Sello válvula/chorro del alojamiento del sello*	
228	Bearing frame, *Armazón de balineras*	Cast iron, *Hierro fundido*

Item No., *Parte No.*	Description, *Descripción*	Materials, *Materiales*
304	Impeller locknut, *Contratuerca del impulsor*	AISI 316 SS, *AISI 316 Acero inoxidable*
347	Guidevane, *Difusor*	
349	Seal ring, guidevane; *Anillo del sello, difusor*	Viton
361	Retaining ring, *Anillo de retención*	Steel, Acero
370	Socket head screws, casing; *Encaje cabeza del tornillo, carcasa*	AISI 410 SS, *AISI 410 Acero inoxidable*
370C	Hex head screw, bearing cover; *Tornillo de cabeza hexagonal, cubierta de balineras*	Plated steel, *Acero chapeado*
371	Hex head screw, bearing frame; *Tornillo de cabeza hexagonal, armazón de balineras*	Plated steel, *Acero chapeado*
383	Mechanical seal, *Sello mecánico*	**see chart, ver tabla
400	Shaft key, *Llave del eje*	Steel, Acero
408	Drain and vent plug, casing; *Enchufes de drenaje y válvula, carcasa*	AISI 316 SS, *AISI 316 Acero inoxidable*
412B	O-ring, drain and vent plug; *Anillo 'O', enchufe de drenaje y válvula*	Viton (Standard, *estándar*) EPR (Optional, *Opcional*)
513	O-ring, casing; *Anillo 'O', carcasa*	

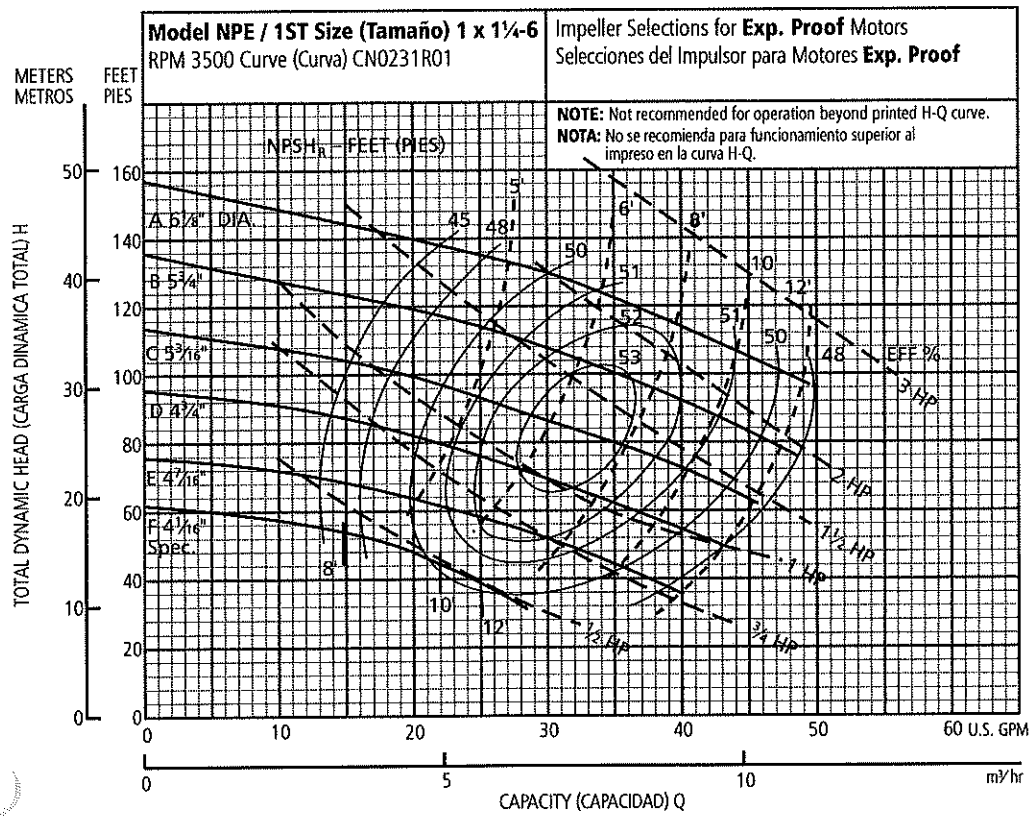
Performance Curves – 60 Hz, 3500 RPM
Curvas de Funcionamiento – 60 Hz, 3500 RPM



Ordering Code, *Código de Pedido*	Standard HP Rating, *Estándar HP Potencia*	Imp. Dia.
E	½	4⁷⁄₁₆"
D	¾	4¾
C	1	5³⁄₁₆
B	1½	5¾
A	2	6⅛

NOTE: Although not recommended, the pump may pass a 1⁄16" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de 1⁄16".*

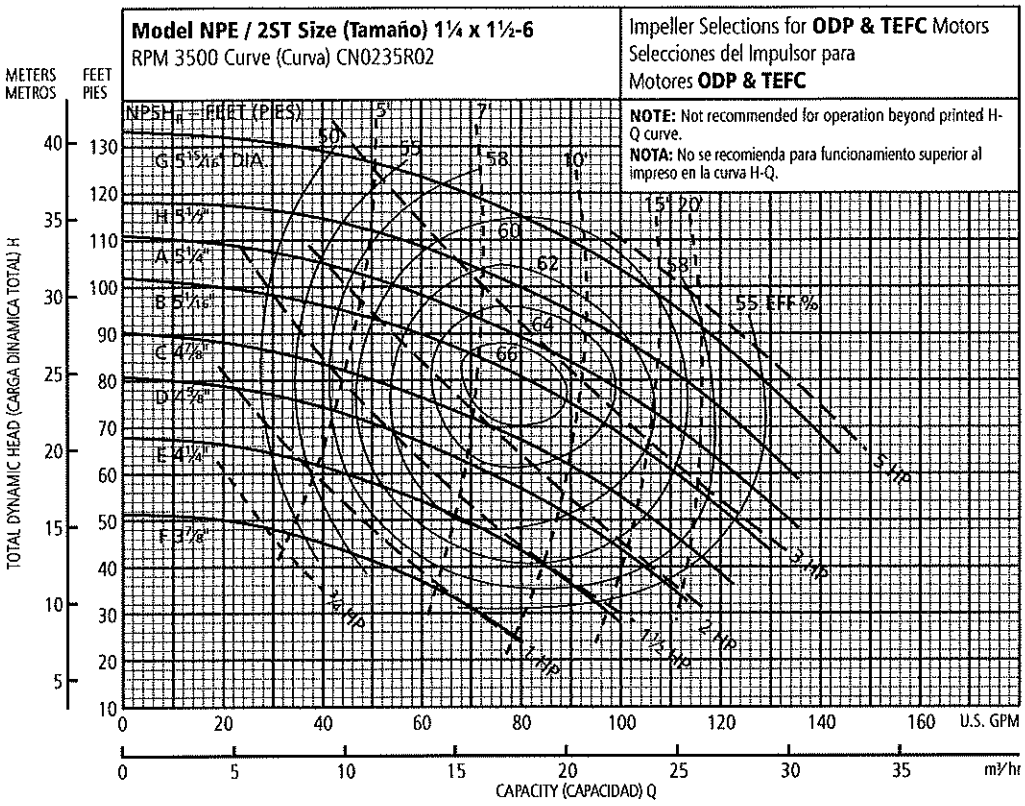


Ordering Code, *Código de Pedido*	Standard HP Rating, *Estándar HP Potencia*	Imp. Dia.
F	½	4⁷⁄₁₆" spec.
E	¾	4⁷⁄₁₆
D	1	4¾
C	1½	5³⁄₁₆
B	2	5¾
A	3	6⅛

NOTE: Although not recommended, the pump may pass a 1⁄16" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de 1⁄16".*

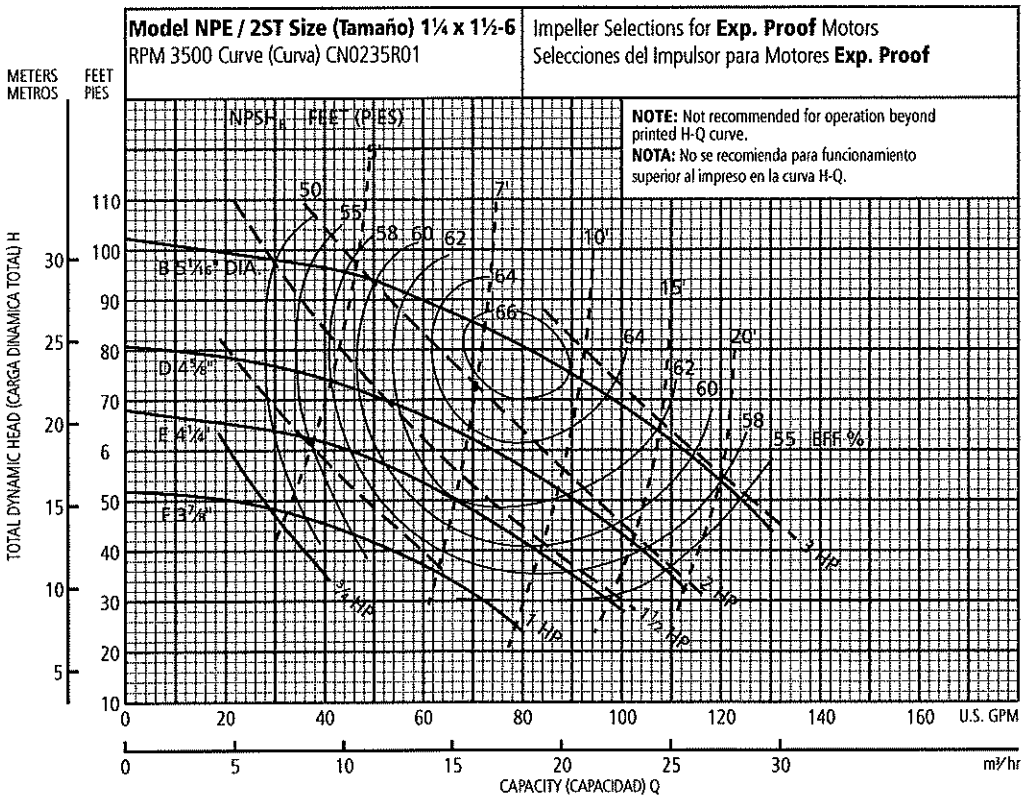
Performance Curves – 60 Hz, 3500 RPM
Curvas de Funcionamiento – 60 Hz, 3500 RPM



Ordering Code, *Código de Pedido*	Standard HP Rating, *Estándar HP Potencia*	Imp. Dia.
F	¾	3⅞"
E	1	4¼
D	1½	4⅝
C	2	4⅞
B	3	5 1/16
A	3	5¼
H	5	5½
G	5	5 15/16

NOTE: Although not recommended, the pump may pass a 3/16" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de 3/16".*

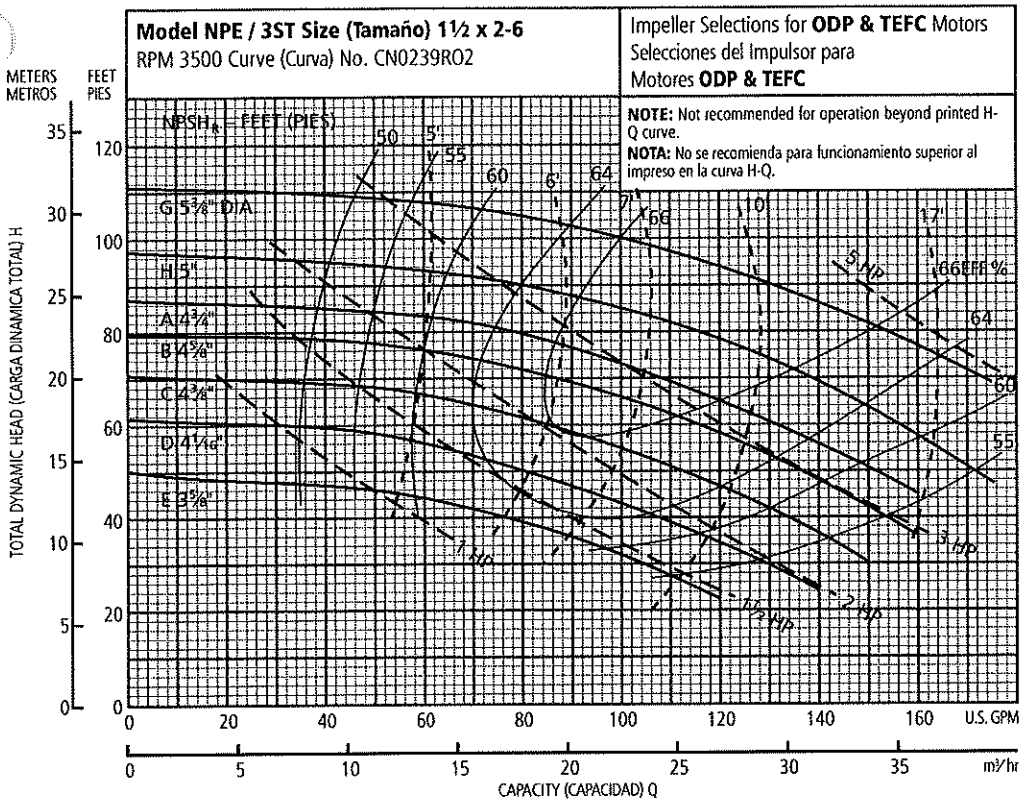


Ordering Code, *Código de Pedido*	Standard HP Rating, *Estándar HP Potencia*	Imp. Dia.
F	1	3⅞"
E	1½	4¼
D	2	4⅝
B	3	5 1/16

NOTE: Although not recommended, the pump may pass a 3/16" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de 3/16".*

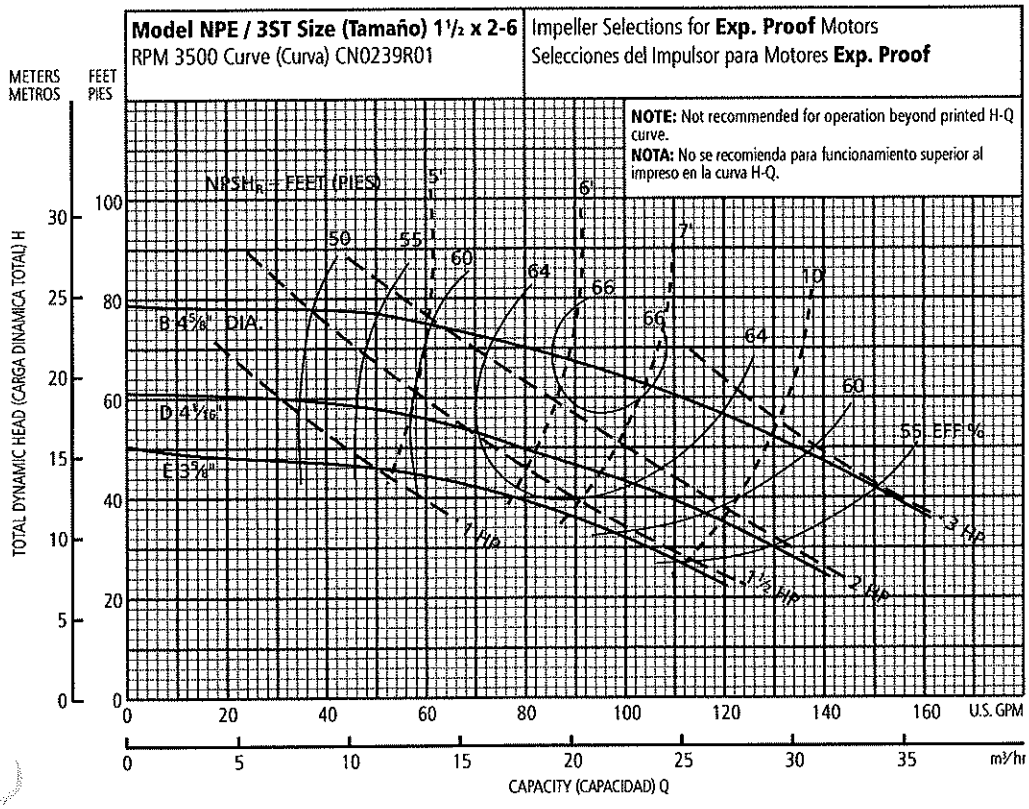
Performance Curves – 60 Hz, 3500 RPM
Curvas de Funcionamiento – 60 Hz, 3500 RPM



Ordering Code, *Código de Pedido*	Standard HP Rating, *Estándar HP Potencia*	Imp. Dia.
E	1	3⅝"
D	1½	4¹⁄₁₆
C	2	4⅜
B	3	4⅝
A	3	4¾
H	5	5
G	5	5⅜

NOTE: Although not recommended, the pump may pass a 11/32" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de 11/32".*

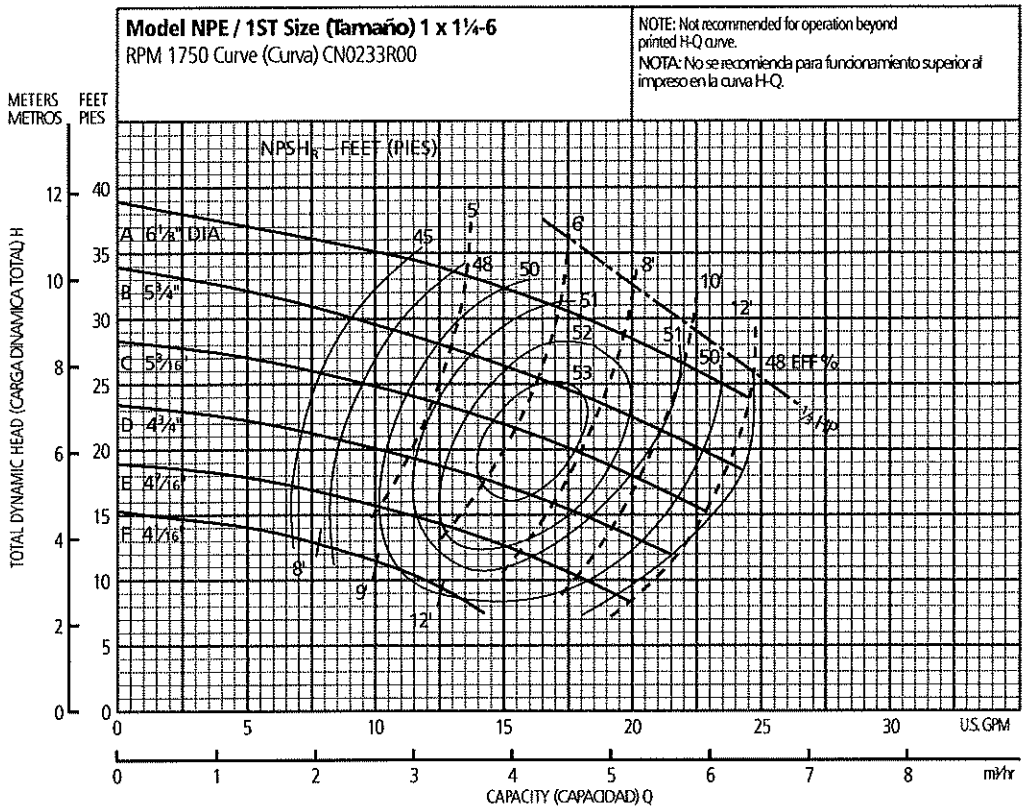


Ordering Code, *Código de Pedido*	Standard HP Rating, *Estándar HP Potencia*	Imp. Dia.
E	1½	3⅝"
D	2	4¹⁄₁₆
B	3	4⅝

NOTE: Although not recommended, the pump may pass a 11/32" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de 11/32".*

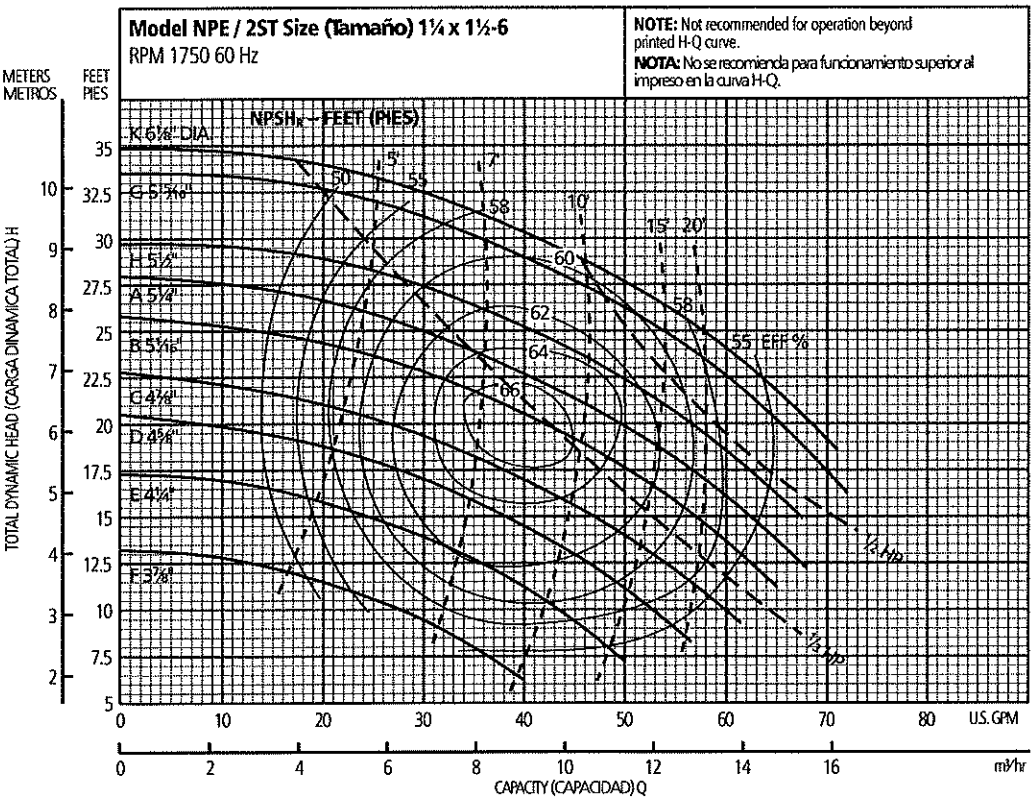
Performance Curves – 60 Hz, 1750 RPM
Curvas de Funcionamiento – 60 Hz, 1750 RPM



Optional Impeller, *Impulsor Opcional*	
Ordering Code, *Código de Pedido*	**Dia.**
A	6⅛"
B	5¾
C	5⁹⁄₁₆
D	4¾
E	4⅞
F	4¹⁄₁₆

NOTE: Although not recommended, the pump may pass a ⅛" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de ⅛".*

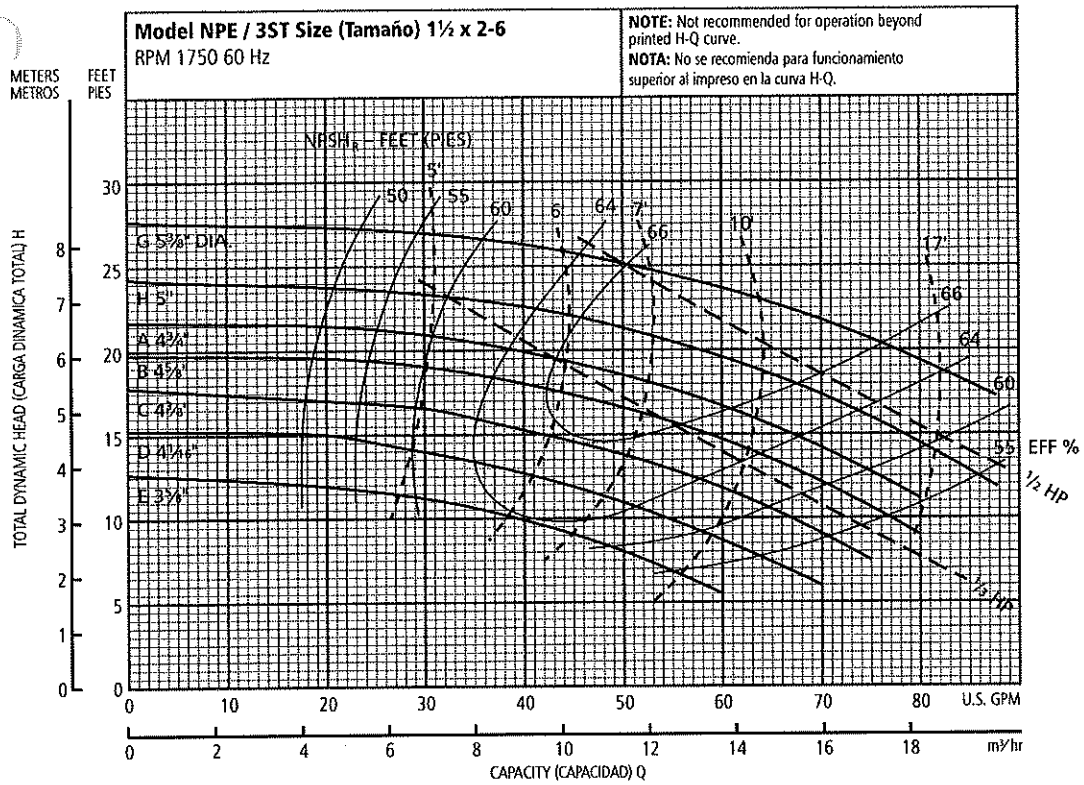


Optional Impeller, *Impulsor Opcional*	
Ordering Code, *Código de Pedido*	**Dia.**
K	6⅛"
G	5¹⁵⁄₁₆"
H	5½
A	5¼
B	5¹⁄₁₆
C	4⅞
D	4⅝
E	4¼
F	3⅞

NOTE: Although not recommended, the pump may pass a ³⁄₁₆" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de ³⁄₁₆".*

Performance Curves – 60 Hz, 1750 RPM
Curvas de Funcionamiento – 60 Hz, 1750 RPM

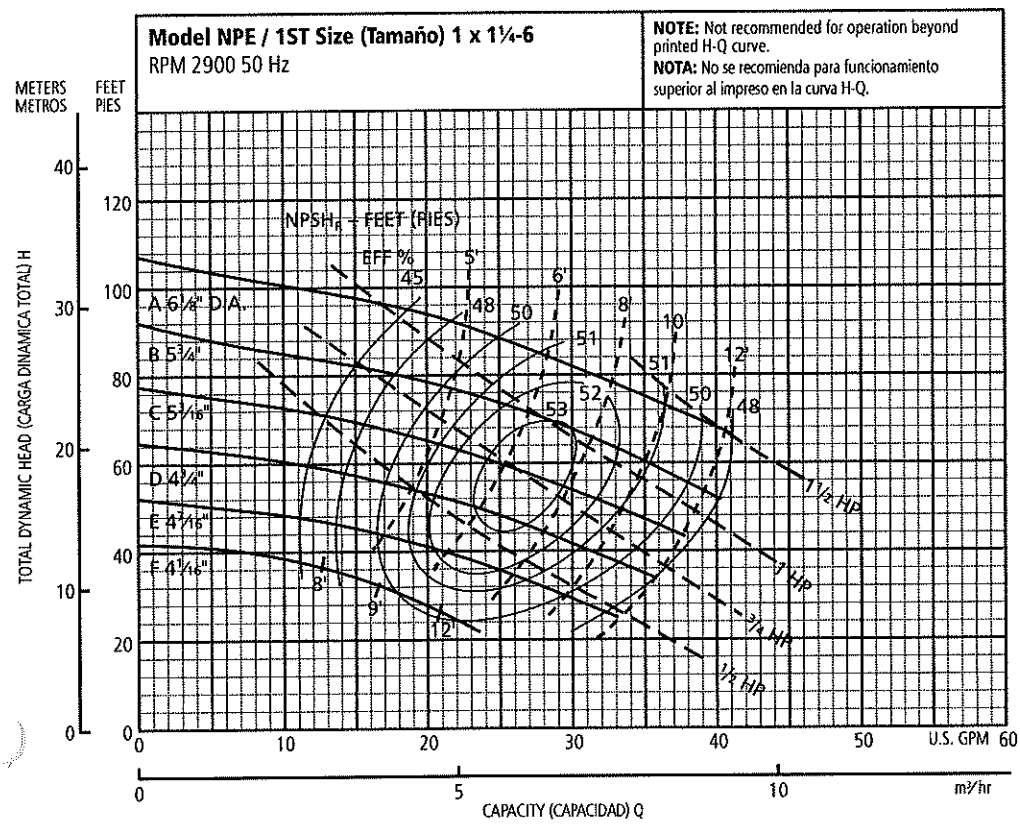


Optional Impeller, *Impulsor Opcional*	
Ordering Code, *Código de Pedido*	**Dia.**
G	5⅜"
H	5
A	4¾
B	4⅝
C	4⅜
D	4 1/16
E	3⅞

NOTE: Although not recommended, the pump may pass a 11/32" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de 11/32".*

Performance Curves – 50 Hz, 2900 RPM
Curvas de Funcionamiento – 50 Hz, 2900 RPM

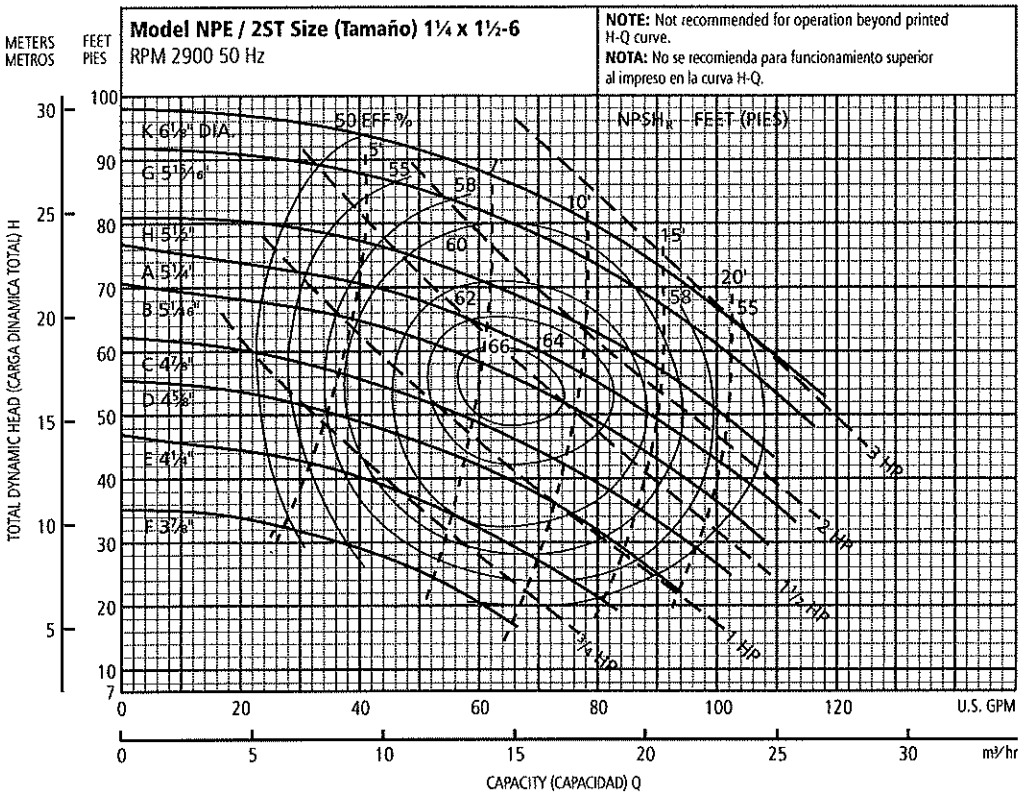


Optional Impeller, *Impulsor Opcional*	
Ordering Code, *Código de Pedido*	**Dia.**
A	6⅛"
B	5¾
C	5 3/16
D	4¾
E	4 7/16
F	4 1/16

NOTE: Although not recommended, the pump may pass a 1/16" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de 1/16".*

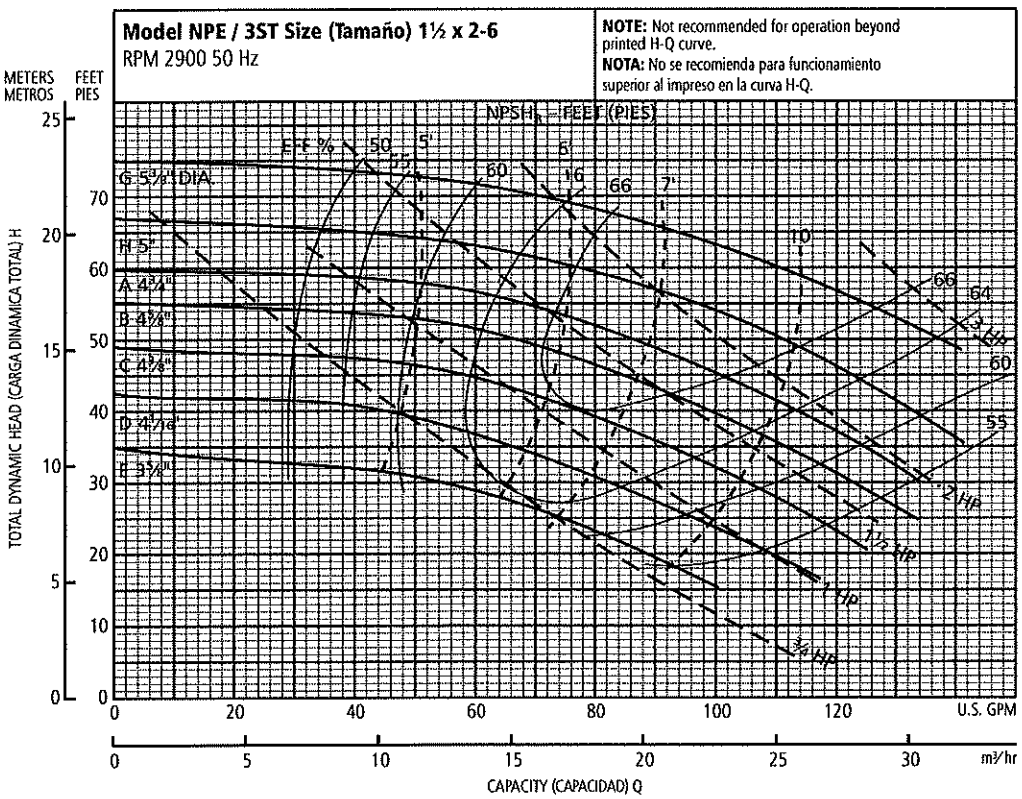
Performance Curves – 50 Hz, 2900 RPM
Curvas de Funcionamiento – 50 Hz, 2900 RPM



Optional Impeller, *Impulsor Opcional*	
Ordering Code, *Código de Pedido*	**Dia.**
K	6⅛"
G	5¹⁵⁄₁₆"
H	5½
A	5¼
B	5¹⁄₁₆
C	4⅞
D	4⅝
E	4¼
F	3⅞

NOTE: Although not recommended, the pump may pass a ⅜" sphere.

NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de ⅜".*



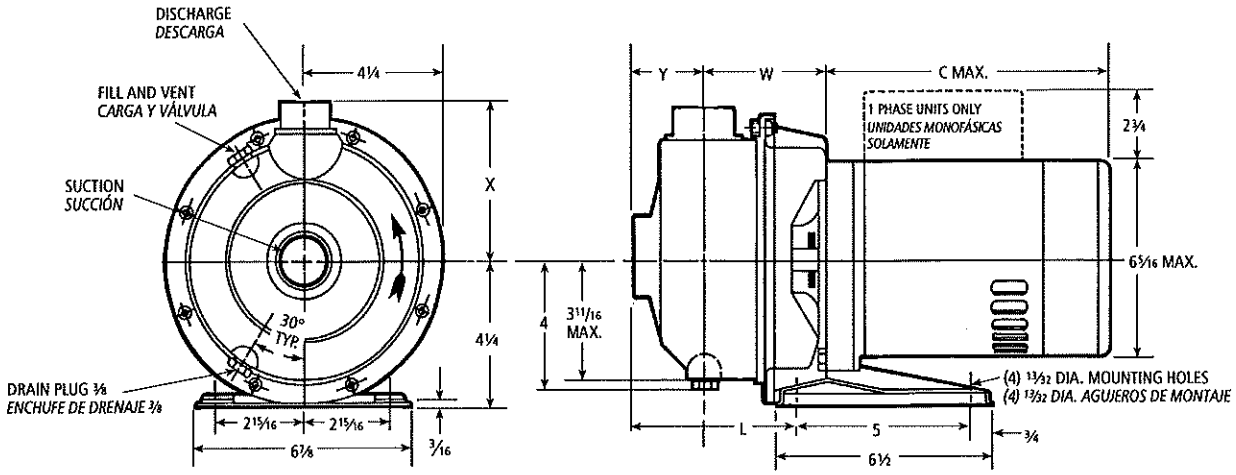
Optional Impeller, *Impulsor Opcional*	
Ordering Code, *Código de Pedido*	**Dia.**
G	5⅜"
H	5
A	4¾
B	4⅝
C	4⅜
D	4¹⁄₁₆
E	3⅝

NOTE: Although not recommended, the pump may pass a ¹¹⁄₃₂" sphere.

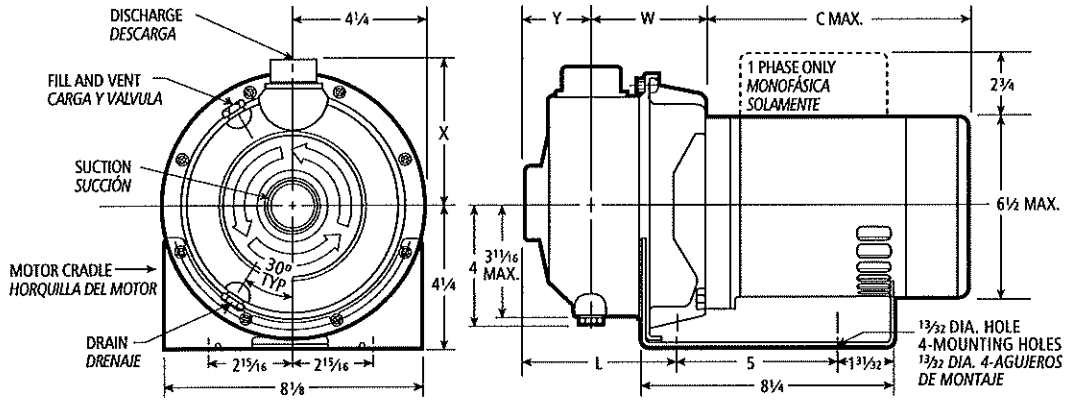
NOTA: *Si bien no se recomienda, la bomba puede pasar una esfera de ¹¹⁄₃₂".*

NPE Close Coupled – Dimensions, Weights and Specifications
NPE Acople Cerrado – Dimensiones, Pesos y Especificaciones

Clockwise Rotation Viewed from Drive End
Rotación en Dirección de las Agujas del Reloj Visto desde el Extremo del Motor



ODP and TEFC ½, ¾ and 1 HP (standard), *ODP y TEFC ½, ¾ y 1 HP (estándar)*



ODP and TEFC 1½, 2 and 3 HP (standard), *ODP y TEFC 1½, 2 y 3 HP (estándar)*

Specifications
Especificaciones

Capacities to:
85 GPM (322L/min) at 1750 RPM
170 GPM (643L/min) at 3500 RPM

Heads to:
39 feet (12 m) at 1750 RPM
150 feet (46 m) at 3500 RPM

Working pressures to:
125 PSIG (9 bars)

Maximum temperatures to:
250° F (121° C)

Direction of rotation:
Clockwise when viewed from motor end.

Motor specifications:
NEMA 56J frame, 1750 RPM, ½ HP. 3500 RPM ½ through 5 HP. Open drip-proof, totally enclosed fan-cooled or explosion proof enclosures. Stainless steel shaft with ball bearings.

Single phase: Voltage 115/230 ODP and TEFC. (3 and 5 HP model – 230 V only) Built-in overload with auto-reset provided.

Three phase: Voltage 208-230/460 ODP, TEFC and EX PROOF.

NOTE: For three phase motors, overload protection must be provided in starter unit. Starter and heaters must be ordered separately.

Capacidades:
85 GPM (322L/min) a 1750 RPM
170 GPM (643L/min) a 3500 RPM

Cargas:
39 pies (12 m) a 1750 RPM
150 pies (46 m) a 3500 RPM

Presión de trabajo:
125 PSIG (9 baras)

Temperatura máxima:
250° F (121° C)

Dirección de rotación:
En dirección de las agujas del reloj visto desde el extremo final del motor.

Motores:
Armazón 56J NEMA, 1750 RPM ½ HP. 3500 RPM ½ a 5 HP. Cubiertas abiertas resguardadas, totalmente encerradas enfriadas por ventilador o a prueba de explosiones. Eje de acero inoxidable con balineras de bolas.

Monofásicos: *Voltaje 115/230 ODP y TEFC. (modelo 3 y 5 HP – 230 voltios solamente) Se proporciona protección térmica contra sobrecarga construida con reseteo automático.*

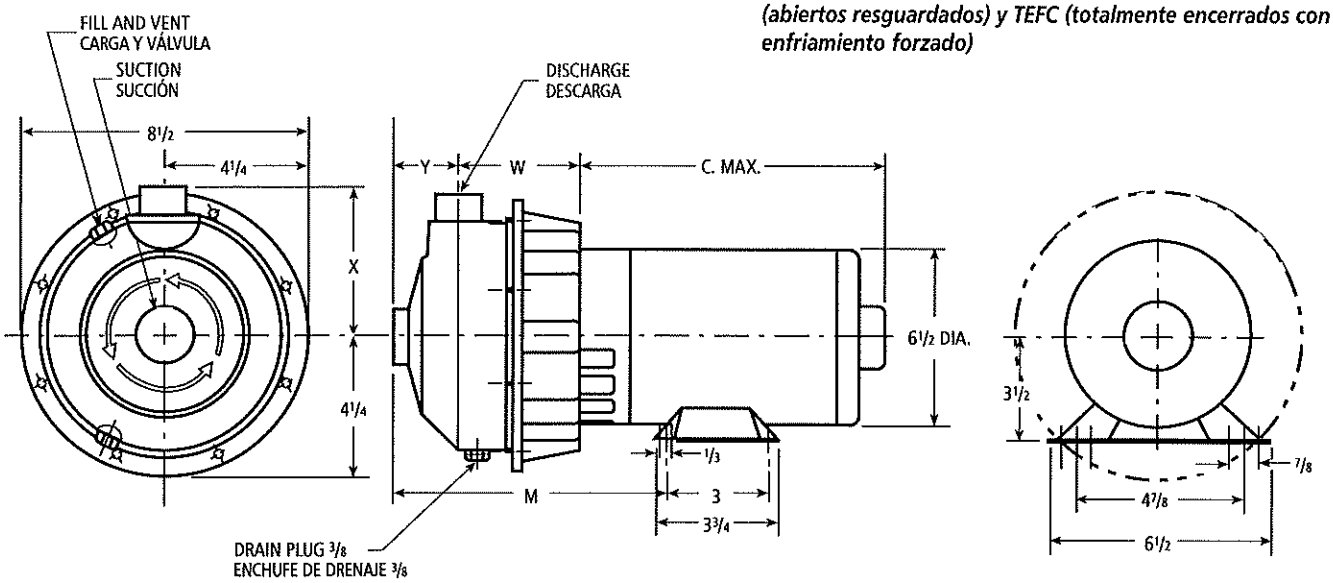
Trifásicos: *Voltaje 208-230/460 ODP, TEFC y EX PROOF.*

NOTA: *Para motores trifásicos se debe de proporcionar la protección térmica contra sobrecarga en la unidad de arranque. El arrancador y los calentadores se deben pedir por separado.*

NPE Close Coupled with Footed Motor, Explosion-proof and 5 HP Motors
NPE Acople Cerrado con Motor con Patas, Motores a Prueba de Explosión Y 5 HP

All Explosion Proof Motors and 5 HP ODP and TEFC

Todos los motores son a prueba de explosiones, 5 HP, ODP (abiertos resguardados) y TEFC (totalmente encerrados con enfriamiento forzado)



Dimensions – Determined by Pump, *Dimensiones – Determinadas por la Bomba*

Pump, *Bomba*	Suction, *Succión*	Discharge, *Descarga*	HP	W	X	Y	L	M
1ST	1¼	1	½ – 3	3 5/16	4⅜	2	4 9/16	7 5/16
2ST	1½	1¼	¾ – 5	3¾	4½	2⅛	5⅛	7⅞
3ST	2	1½	1 – 5	3¾	4⅝	2⅛	5⅛	7⅞

Available Motor Weights and Dimensions, *Pesos y Dimensiones Disponibles del Motor*

HP	Motor Weights, *Pesos del Motor*						C Max. Length, *(Longitud)*
	1 Phase, *Monofásicos*			3 Phase, *Trifásicos*			
	ODP	TEFC	EXP	ODP	TEFC	EXP	
½	16	21	47	19	18	27	9 15/16
¾	19	24	41	21	21	30	10¼
1	22	26	49	23	21	30	11
1½	28	35	56	27	27	37	11 5/16
2	33	39	60	32	33	44	12 1/16
3	40	43	—	41	37	—	12 7/16
5	42	—	—	42	45	—	14¼

Dimensions in inches, weights in pounds.
Dimensiones en pulgadas, pesos en libras.

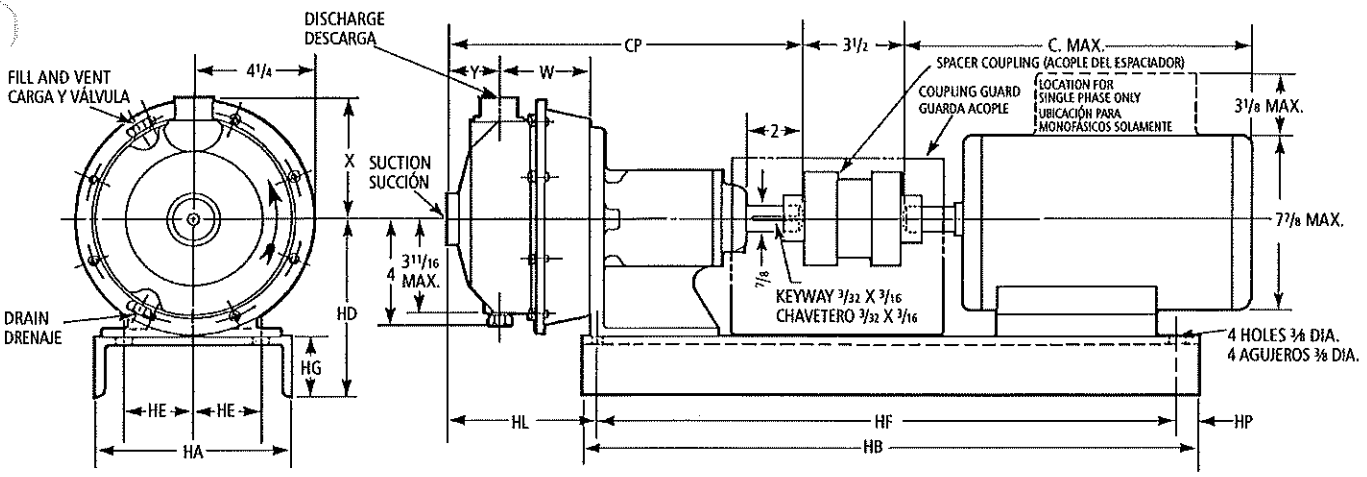
NOTES:

1. Pump will be shipped with top vertical discharge position as standard. For other orientations, remove casing bolts, rotate discharge to desired position, replace and tighten 6mm bolts to 5 – 6 lbs.-ft.
2. Motor dimensions may vary with motor manufacturers.
3. Dimensions in inches, weights in pounds.
4. For explosion proof motor dimensions consult factory for information.
5. Not to be used for construction purposes unless certified.

NOTAS:

1. *Las bombas se transportarán con la descarga vertical superior como estándar. Para otras orientaciones, retirar los tornillos de la carcasa, rotar la descarga a la posición deseada, y reemplazar y apretar los tornillos de 6mm a 5 – 6 libras-pies.*
2. *Las dimensiones del motor puede que varíen con los fabricantes.*
3. *Dimensiones en pulgadas, pesos en libras.*
4. *Para las dimensiones de los motores a prueba de explosión consultar con la fábrica para información.*
5. *No usar para propósitos de construcción sin certificar.*

NPE Frame Mounted – Dimensions, Weights and Specifications
NPE Armazón Montado – Dimensiones, Pesos y Especificaciones



Specifications
Especificaciones

Capacities to:
85 GPM (322L/min) at 1750 RPM
170 GPM (643L/min) at 3500 RPM

Heads to:
39 feet (12 m) at 1750 RPM
150 feet (47 m) at 3500 RPM

Working pressures to:
125 PSIG (9 bars)

Maximum temperatures to:
212°F (100°C) with standard seal or 250°F (121°C) with optional high temperature seal.

Direction of rotation:
Clockwise when viewed from motor end.

Motor specifications:
T-frame single and three phase. Open drip-proof, TEFC or explosion proof enclosures are available for 60 Hz, 3500 and 1750 RPM operation.

For three phase motors, overload protection must be provided in starter unit. Starter and heaters must be ordered separately.

Capacidades:
85 GPM (322L/min) a 1750 RPM
170 GPM (643L/min) a 3500 RPM

Cargas:
39 pies (12 m) a 1750 RPM
150 pies (47 m) a 3500 RPM

Presión de trabajo:
125 PSIG (9 baras)

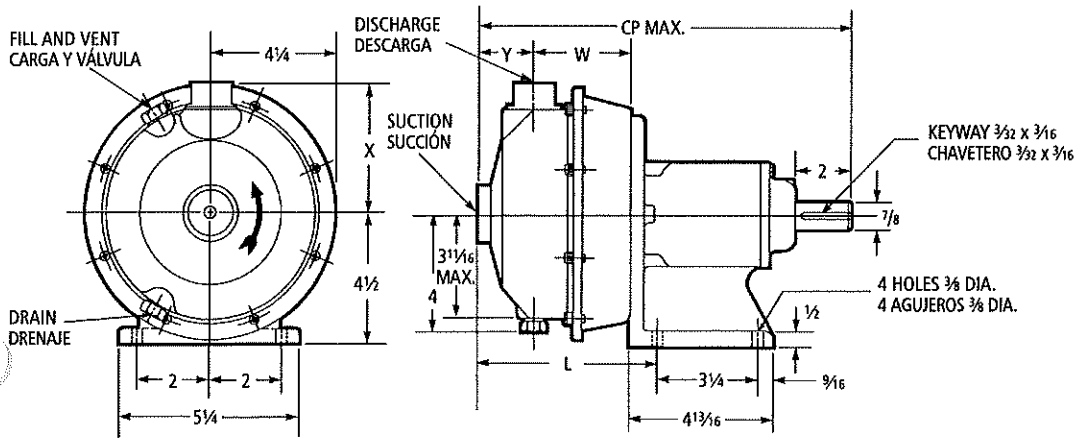
Temperatura máxima:
212°F (100°C) con sello estándar o 250°F (121°C) con sello opcional para alta temperatura.

Dirección de rotación:
En dirección de las agujas del reloj visto desde el extremo final del motor.

Motores:
Armazón T- monofásico y trifásico. A prueba de goteo, TEFC o recintos a prueba de explosión están disponibles para funcionamiento de 60 Hz, 3500 y 1750 RPM.

Para motores trifásicos se debe de proporcionar la protección térmica contra sobrecarga en la unidad de arranque. El arrancador y los calentadores se deben pedir por separado.

NPE-F



Dimensions and Weights
Dimensiones y Pesos

Dimensions and Weights – Determined by Pump,
Dimensiones y Pesos – Determinados por la Bomba

Pump, *Bomba*	Suct. NPT, *Succión NPT*	Disch. NPT, *Descarga NPT*	CP	L	W	X	Y	Wt., *Peso*	Dim. "HL" Determined by Pump and Motor, *Dim. "HL" Determinadas por la Bomba y el Motor* Frame, *Armazón*		
									56	140	180
1ST	1¼	1	12 15/16	6 7/16	3 5/16	4⅛	2	22½	4 9/16		6 7/16
2ST	1½	1¼	13½	7	3¾	4½	2⅛	23	5⅛		7
3ST	2	1½				4⅝					

Available Motor and Bedplate Dimensions and Weights,
Pesos y Dimensiones Disponibles de la Fundación y del Motor

Motor Frame, *Armazón del Motor*	HA	HB	HD	HE	HF	HG	HP	Wt. Max., *Peso Máx*	Shims, *Deflector*
56 143T 145T	8	26	6⅞	3⅛	22⅜	2⅜	1	30	1"
182T 184T	10	26	7¼	3¾	24	2¾	⅞	43	—

NOTES:

1. Pump will be shipped with top vertical discharge position as standard. For other orientations, remove casing bolts, rotate discharge to desired position, replace and tighten 6mm bolts to 5 – 6 lbs.-ft.
2. Motor dimensions may vary with motor manufacturers.
3. Dimensions in inches, weights in pounds.
4. For explosion proof motor dimensions consult factory for information.
5. Not to be used for construction purposes unless certified.

NOTAS:

1. *Las bombas se transportarán con la descarga vertical superior como estándar. Para otras orientaciones, retirar los tornillos de la carcasa, rotar la descarga a la posición deseada, y reemplazar y apretar los tornillos de 6mm a 5 – 6 libras-pies.*
2. *Las dimensiones del motor puede que varíen con los fabricantes.*
3. *Dimensiones en pulgadas, pesos en libras.*
4. *Para las dimensiones de los motores a prueba de explosión consultar con la fábrica para información.*
5. *No usar para propósitos de construcción sin certificar.*

Frame Size, *Tamaño del Armazón*	Horsepower, *Fuerza* 3500 RPM				C Max.	Wt. Max., *Peso Máx.*
	Single Phase, *Monofásicos*		Three Phase, *Trifásicos*			
	ODP	TEFC	ODP	TEFC		
56	½ – 1½	½ – 1½	½ – 1	½ – 1	13	45
143T	—	—	1½	1½	13⅜	45
145T	2	2	1½ – 3	1½ – 2	14¼	52
182T	3	3	5	3	16⅝	63
184T	5	5	—	5	18⅛	112

ITT

Commercial Water

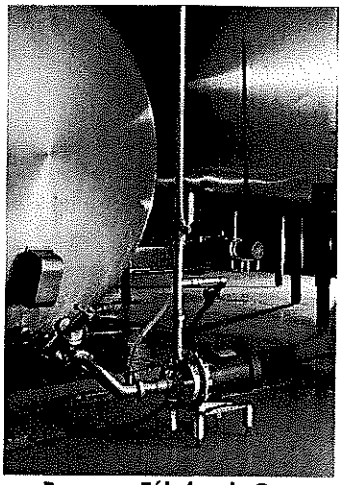
Typical Applications, *Aplicaciones Típicas*

Specifically designed for a broad range of general applications traditionally requiring various materials such as all iron, bronze fitted or all bronze construction.

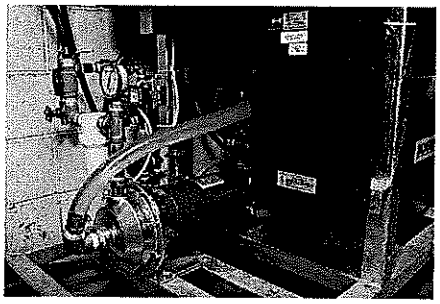
- Water circulation
- Booster service
- Liquid transfer
- Spray system
- Chillers
- Washing/cleaning systems
- Injection molding cooling
- Reverse osmosis
- Air scrubbers
- Heat exchangers
- Filtration systems
- Jockey pumps
- OEM applications
- General water services

Diseñadas específicamente para una amplia variedad de aplicaciones generales, requiriendo tradicionalmente varios materiales, tales como hierro, bronce empotrado o todas las construcciones de bronce.

- *Circulación de agua*
- *Aumento de presión*
- *Transferencia de líquidos*
- *Sistemas de aspersión*
- *Enfriadores*
- *Sistemas de lavado/limpieza*
- *Enfriamiento con molde por inyección*
- *Osmosis reversa*
- *Depuradores de aire*
- *Termopermutadores*
- *Sistemas de filtración*
- *Bombas auxiliares*
- *Aplicaciones OEM*
- *Servicios generales de agua*

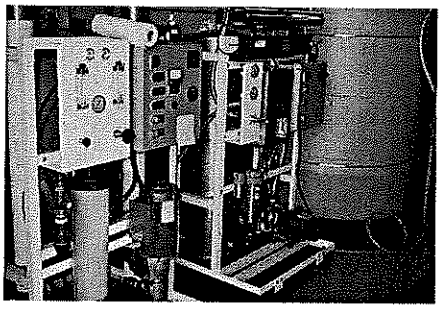


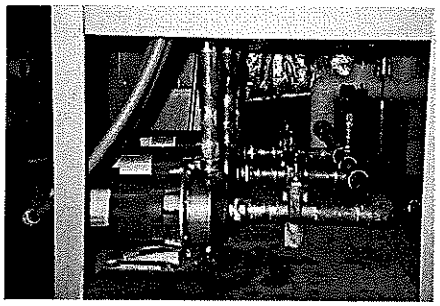
Brewery, *Fábrica de Cerveza*



Car Wash, *Lavadero de Autos*

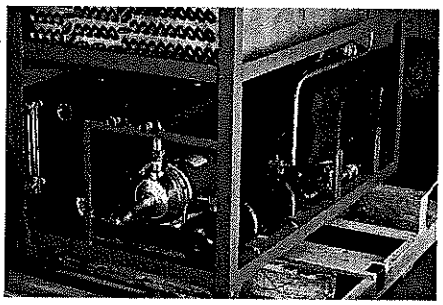
Pure Water/ OEM, *Agua Pural OEM*





Pressure Booster System, *Sistema de Aumento de Presión*

Chiller, *Enfriador*



GOULDS PUMPS

GLNPE2 June, 2006

Goulds Pumps, G&L y el símbolo ITT Engineered Blocks son marcas registradas y marcas comerciales de ITT Corporation.

LAS ESPECIFICACIONES ESTÁN SUJETAS A CAMBIO SIN PREVIO AVISO.

Junio, 2006

Engineered for life