Maintenance Manual

Console

Nuovo Pignone RLO 3097/98

Job No. 1003004/5/6

Manzel®

Lubriquip,Inc. by

SLICO

SLICO S.R.L. Sistemi di Lubrificazione Centralizzata
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February 15, 2008

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Manzel®

Maintenance Procedures

1. Wipe off external surfaces of lubricator and divider valves as required.

2. Do not allow Lubricator to run empty. Damage to the internal lubricator components will result.

3. Do not allow 10 Gallon SS Reservoir to run empty. Damage to Pumps and/or Air will be pumped into the distribution systems.

4. Use only clean filtered oil of the type and viscosity recommended by the compressor manufacturer and which corresponds to an ISO 4406 cleanliness rating of 18/14 minimum.

5. Once each month, check all lines and connections for leaks. Tighten, or replace, any leaking components as needed.

6. Every 6 months, replace filter elements in pressure filters. Note, change intervals may be longer or shorter depending on the cleanliness and the actual service conditions encountered.

7. If oil flow needs to be increased, or decreased to a given stage, refer to Bulletin 51020, page 7 for pump output adjustment procedures.

8. If oil flow to a given lube point needs to be increased, or decreased, it will be necessary to change the divider valve working section feeding that point to a higher, or lower, output working section. Refer to Bulletin 10103, page 3 for available outputs. Consult Graco Representative for assistance in resizing divider valves.

9. Purging air from the system and filling the lines is covered in bulletins 30103 and 30107.

10. Locating a blockage in the distribution network and divider valve disassembly / assembly procedures are covered in Bulletin 30101.

11. Replacement parts:

    a. Lubricator replacements parts are listed in Bulletin 51020 and on drawings:
        i. SL.07036.30-01T4
    b. Divider valve replacement parts are listed in Bulletin 10103,10161 and on drawings:
        i. SL.07036.32-01/02/03/04/05/06/07
    c. Accessory replacement parts are listed on drawings:
        i. SL.07036.30/31/32/33, IT-M01/03/07/11/12/13/22/23

Drawing List For RLO 3097/98

Description	Part Number / Drawing Number
MBL76Lubricator	SL.07036.30-01T1/T2-SOP5693812/0
Hydraulic schematic	SL.07036.30-01T3-SOP5693812/0
List of material	SL.07036.30-01T4-SOP5693812/0
Motor Atex	IT-M11-0003
Cicle Counter	Proflo-PF1-CCT MANUAL
Coupling	IT-M01-0005
Pressurized pump assy	376-000-120
Lubricator assy	SL.07036.33-02
Pressure gage	IT-M12-0005
Balancing Valve	BULLETIN 15812
In-line filter 10 Micron	527-100-581
Check valve	509-350-030
MHP-3 master divider valve	SL.07036.32-01
MHP-3 secondary divider valve	SL.07036.32-02/03/04/05/06/07
Termometer	IT-M23-0001
Guard coupling	IT-M101-09
Heater Atex	IT-M07-0005
Level transmitter Emerson	IT-M13-0002
Suction filter 125 micron	473-020-274
Manual reset indicator	509-932-840
Temperature switch	IT-M22-0001
Relief Valve	SL.07036.33-03
Accessories	SL.07036.31-01/02/03/04

TSHH 3167

TSHL 3167

TG 3175

VIEW BULKHEAD

A

N°6 x TUBING 1/4"

40 = = = = 130

555

PG 3144

PG 3141

PROFLO DISPLAY

ZT 3114

PSV 3142

206V–105D/E/F

206PH–105D/E/F

LT 3106

PDI 1000

206VG–105D/E/F

206VM–105D/E/F

N°6 HOLE ø18

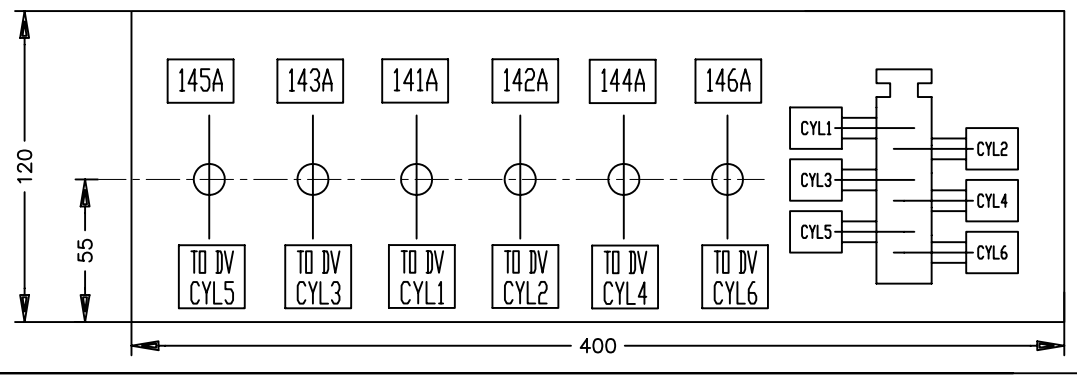
1150

200

700

700

1800

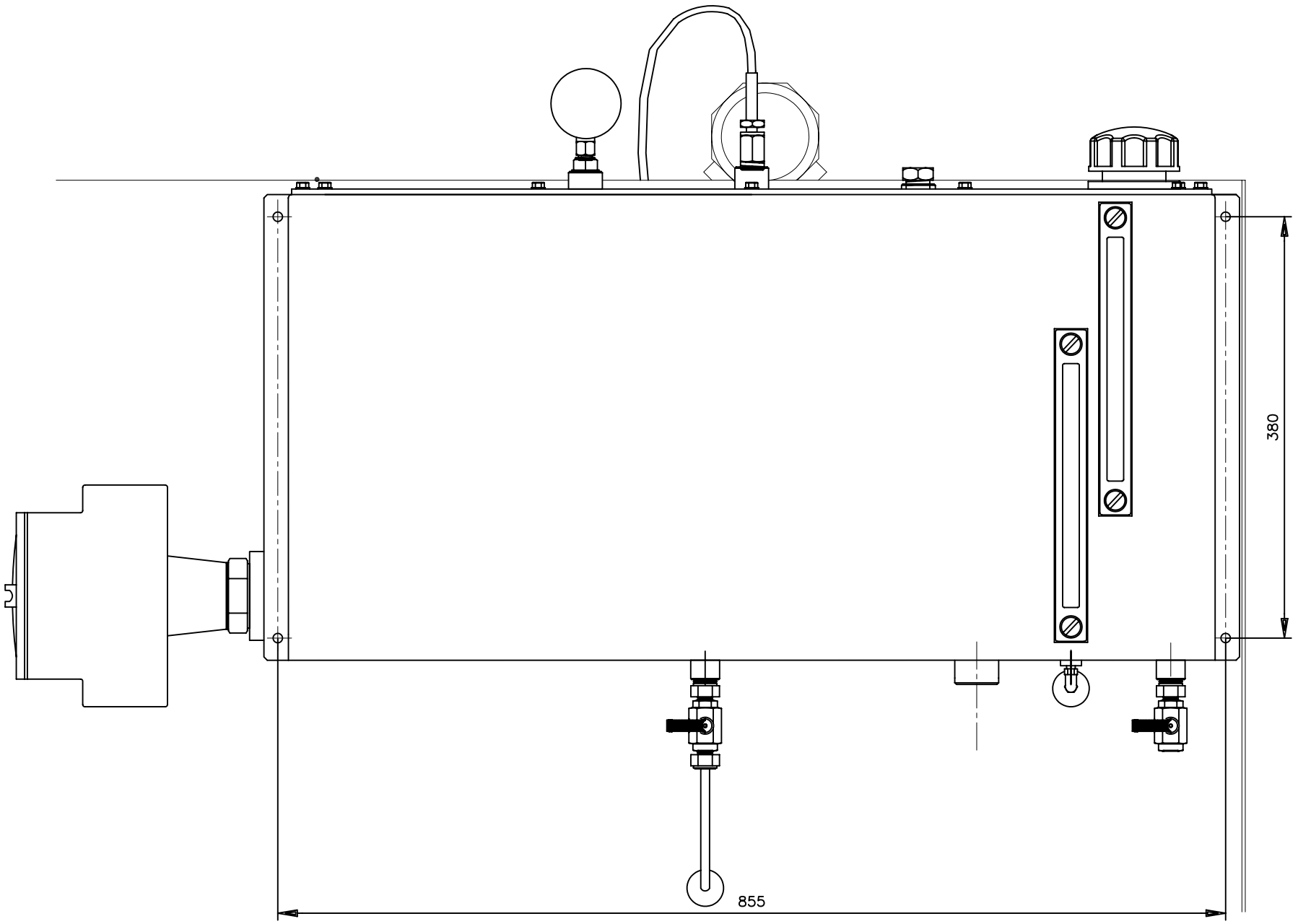


VIEW BULKHEAD FROM "A"

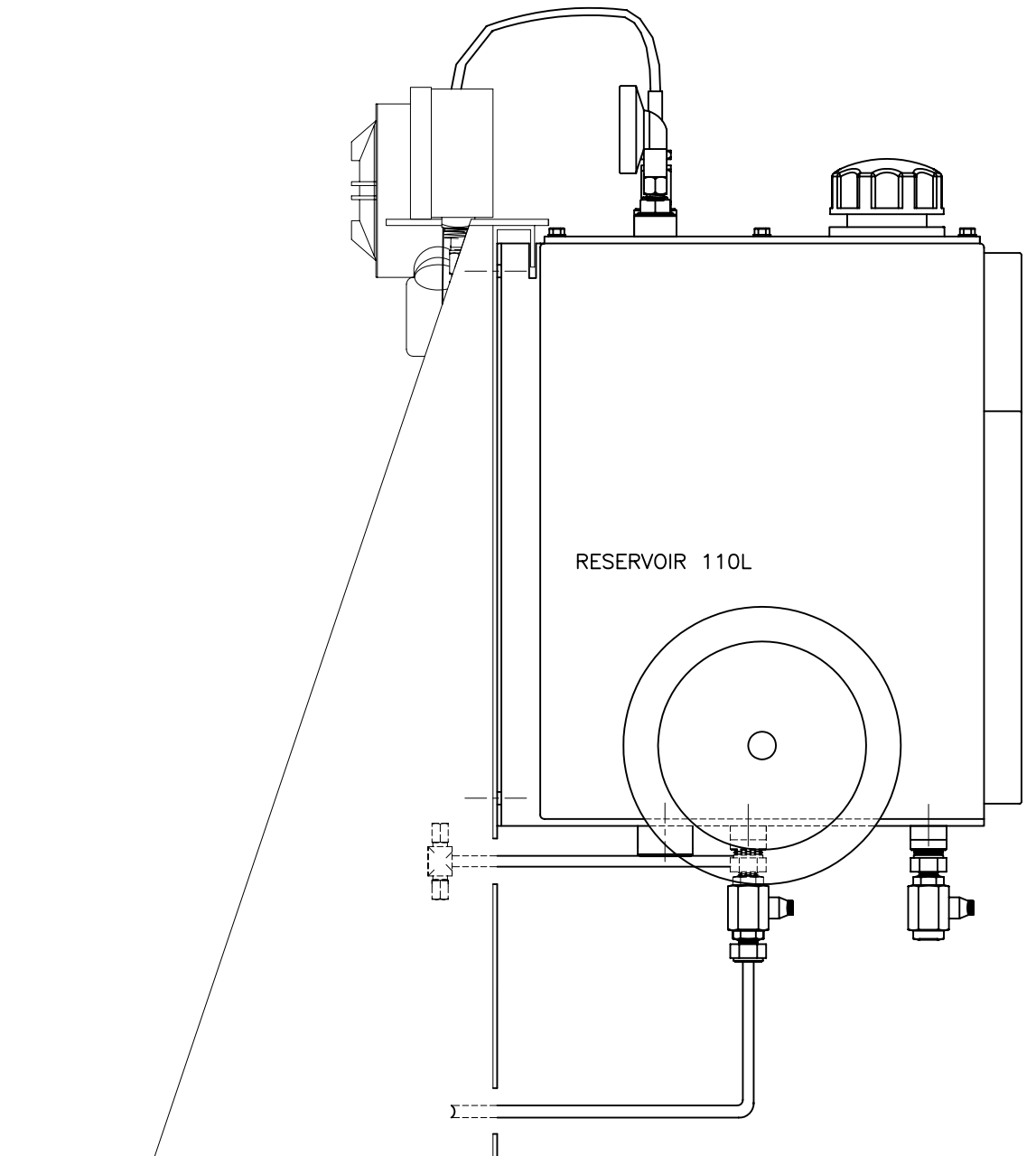
REV.1 – 03/2009

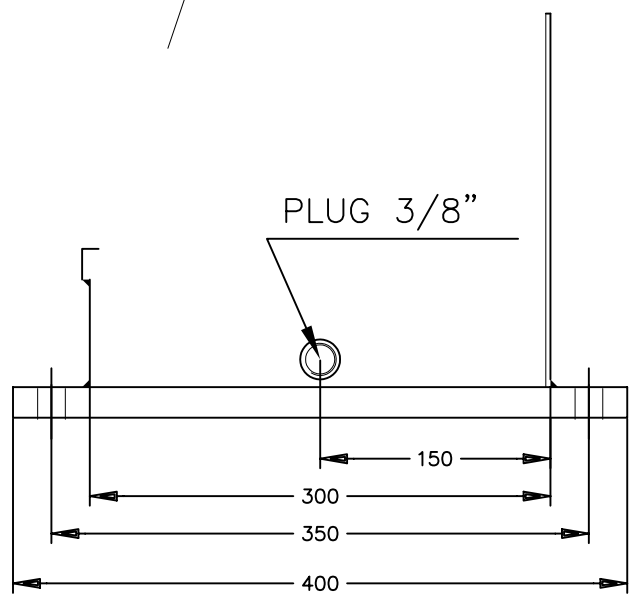
NG modello	Materiale S.STEEL			Commessa RLO 03097
SLICO TRABON–MANZEL KLS–OPCO *Moncalieri (TO)*	Tratt.	Prof.tratt.	Dur.HRC	Dis. Ng SL.07036.30–01
	Denominazione MBL76 CONSOLE LUBRICATOR ASSEMBLY			Codice
	Gruppo ALBERTA H2 NUOVO PIGNONE			Q.ta' 1 of 4 Scala 1 : 4 Diseg. M.M. Data 10/2008

BACK VIEW



SIDE VIEW

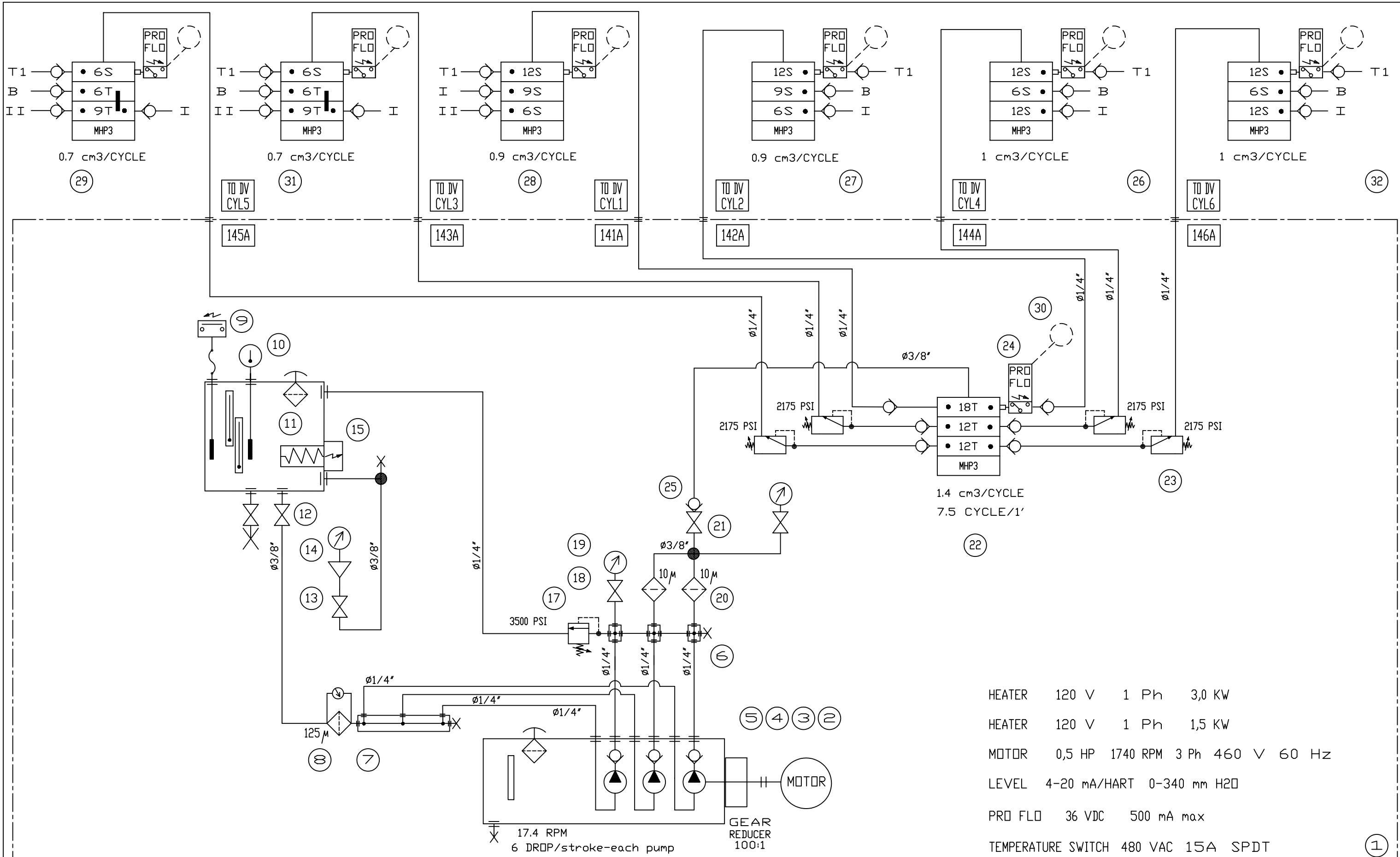




REV.1 – 03/2009

ORIGIN: SL.07036.33–10

NG modello	Materiale INOX 304			Commessa RLO 03097
SLICO TRABON–MANZEL KLS–OPCO *Moncalieri (TO)*	Tratt.	Prof.tratt.	Dur.HRC	Dis. Ng SL.07036.30–01
	Denominazione SUPPLEMENTARY RESERVOIR 110LT.			Codice
	Gruppo ALBERTA H2 NUOVO PIGNONE			Q.ta' 2 di 4 Scala 1 : 4 Diseg. M.M. Data 10/2008



HEATER 120 V 1 Ph 3,0 KW

HEATER 120 V 1 Ph 1,5 KW

MOTOR 0,5 HP 1740 RPM 3 Ph 460 V 60 Hz

LEVEL 4-20 mA/HART 0-340 mm H2O

PRO FLO 36 VDC 500 mA max

TEMPERATURE SWITCH 480 VAC 15A SPDT

1

PUMP:

PUMP TYPE	PISTON SIZE (INCHES)	MAXIMUM PRESSURE (PSI)	*DROPS PER STROKE		CUBIC INCHES PER STROKE		CUBIC CENTIMETERS PER STROKE		STROKES PER MINUTE	
			MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
76F	1/4	6000 PSI	12	2	.024	.004	.393	.066	50	3

REV.1 – 03/2009

NG modello	Materiale		Commessa RLO 03097
SLICO TRABON–MANZEL KLS–OPCO *Moncalieri (TO)*	Tratt.	Prof.tratt.	Dur.HRC
	Denominazione HYDRAULIC SCHEMATIC		Dis. Ng SL.07036.30–01
	Gruppo ALBERTA NUOVO PIGNONE		Codice Q.ta' 3 of 4 Scala 1:4 Diseg. A.M. Data 10/2008

ITEM	QTY	DESCRIPTION	PART NUMBER	
1	1	CONSOLE	SL.07036.00-00	
2	1	MOTOR	IT-M11-0003	
3	1	COUPLING	IT-M01-0005	
4	1	GUARD COUPLING	ITM101-09	IT-M03-0007
5	1	MBL LUBRICATOR	SL.07036.33-02	
6	3	CROSS ANCHOR	IT-M19-0001	
7	1	ANCHOR-4 INLET-EXTRA	6047-3/8"1/4"-3	
8	1	SUCTION FILTER-125 MICRON	473-020-274	
9	1	TEMPERATURE SWITCH	IT-M22-0001	
10	1	THERMOMETER	IT-M23-0001	
11	1	RESERVOIR ASSY 110 LITER	SL.07036.33-10	
12	2	BALL TAP	24702-004	
13	1	BALL TAP 3/8" INOX	SS-43GS-6A	
14	1	EMERSON TRANSMIT.LEVEL	IT-M13-0002	
15	1	HEATER	IT-M07-0008	
16				
17	1	PRESS.RELIEF VALVE 3500 PSI	SL.07036.33-03	
18	2	BALL TAP FOR GAGE	SS-43GS-4	
19	2	GAGE4000 PSI DN100 1/2"G	IT-M12-0005	
20	2	IN-LINE FILTER 10MICRON	527-100-581	
21	1	HIGH PRESS.BALL TAP 1/4"	GE2-1/4-MINI	
22	1	MHP3-MASTER FEEDER ASSEMBLY	SL.07036.32-01	
23	4	BALANCING VALVE	509-510-000	GRACO BULLETIN NUMBER 15812
24	1	CYCLES COUNTER PRO/FLO	PF1-CCT-T-0907	PROFLO PF1-CCT MANUAL
25	1	CHECK VALVE	509-360-010	
26	1	MHP3-SECONDARY FEEDER ASSEMBLY	SL.07036.32-02	SUPPLIED IN RL03098
27	1	MHP3-SECONDARY FEEDER ASSEMBLY	SL.07036.32-03	SUPPLIED IN RL03098
28	1	MHP3-SECONDARY FEEDER ASSEMBLY	SL.07036.32-04	SUPPLIED IN RL03098
29	1	MHP3-SECONDARY FEEDER ASSEMBLY	SL.07036.32-05	SUPPLIED IN RL03098
30	1	EX.PROOF WIRING FITTING	SL.07036.33-06	
31	1	MHP3-SECONDARY FEEDER ASSEMBLY	SL.07036.32-06	SUPPLIED IN RL03098
32	1	MHP3-SECONDARY FEEDER ASSEMBLY	SL.07036.32-07	SUPPLIED IN RL03098
33	1	ID TAG	SL.07036.31	
34				
35	2	COD-3/8-1/4M	SS-6TA-1-4	
36	1	PLUG-3/8	SS-600-P	
37	3	90°-1/4-1/4M	SS-400-2-4	
38	1	DIR-3/8-1/2MGAS	SS-600-1-8RT	
39	2	RID.FOR FILTER	3/4M-3/8F	
40	8	DIR-1/4-1/4M	SS-400-1-4	
41	17	DIR-1/4-1/8M	SS-400-1-2	
42	3	DIR-3/8-1/4M	SS-600-1-4	
43	3	90°-1/4-1/8M	SS-400-2-2	
44	2	FITT.GAGE-1/2T-1/2FGAS	IT-M12-0006A	
45				
46				
47	1	DIR-3/8-1/2MGAS	SS-600-1-8RT	
48	1	DIR-3/8-3/8MGAS	SS-600-1-6RT	
49	6	PASSAPARETE 1/4	SS-400-6-1	
50	2	COD-1/4-1/4M	SS-4TA-1-4	
51	1	RID.FOR FILTER	1/8M-1/8F	
52	2	90°-1/4M-1/4F_TRIPLELOK	1/4CDS	
53	6	90°-1/4-1/4M	SS-400-2-4	SUPPLIED IN RL03098
54	20	DIR-1/4-1/8M	SS-400-1-2	SUPPLIED IN RL03098
55	3	NIPPLI-1/4"NPT_TRIPLELOK	1/4FFS	
56	2	NIPPLI	1/2"-NPT	
57	2	NIPPLI	1/2"-GAS	
58	1	ACCESSORIES	SL.07036.33-09	
59	MT8	INOX TUBE 1/4"	SS-T4-S035-6ME	
60	MT4	INOX TUBE 3/8"	SS-T6-S049-6M	
61	1	UNION CROSS 3/8"	SS-600-4	
62	1	REDUCING PORT CONNECTOR	SS-601-PC4	
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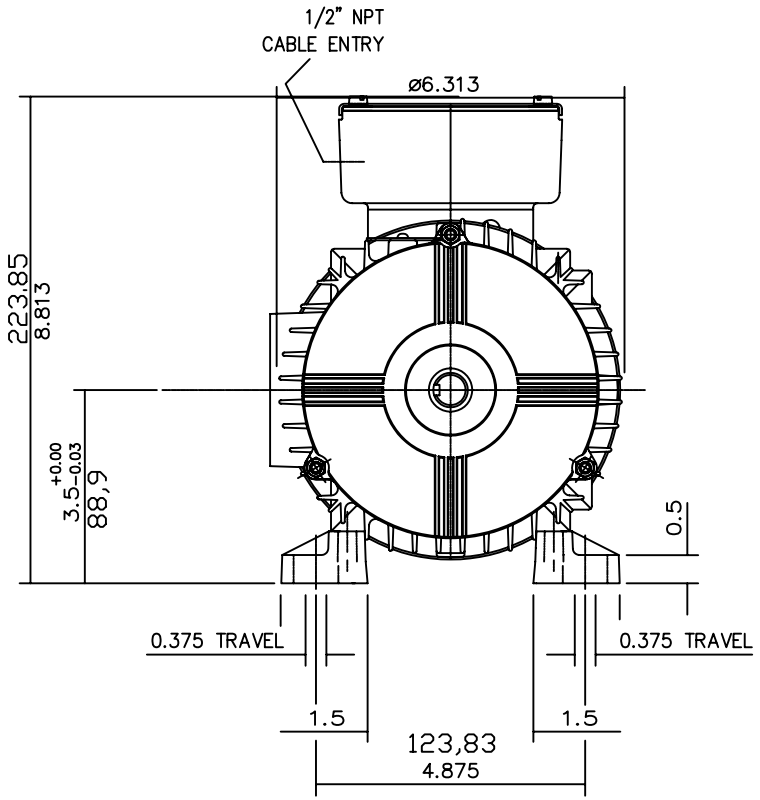
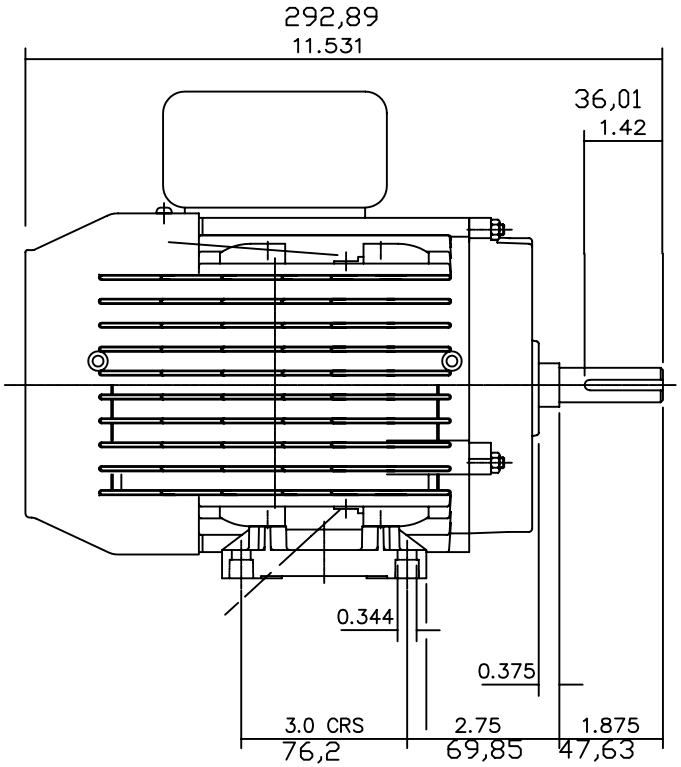
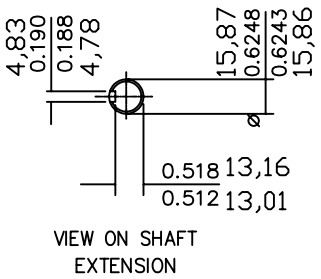
REV.2 – 10/2010

NG modello	Materiale		Commessa RLO 03097
SLICO TRABON–MANZEL KLS–OPCO *Moncalieri (TO)*	Tratt. / Prof.tratt. / Dur.HRC	Dis. Ng SL.07036.30–01	Codice
	Denominazione LIST OF COMPONENT		Q.ta' 4 of 4
	Gruppo ALBERTA–H2 NUOVO PIGNONE		Scala . Diseg. A.M. Data 10/2008







VIEW ON SHAFT EXTENSION

TYPE:	2/W-DA56-B
HORSE POWER:	0,37 KW
RPM:	1710
VOLTAGE:	460 V
HERTZ:	60 Hz
PHASE:	3
ENCLOSURE:	460 3 360 TEFC - IP55
BEARING:	6204ZZCM - 6003ZZCM
DUTY:	NEMA
MOUNTING:	FEET-B3
EXPLOSION PROOF:	DIVISION 2-CL.1-GROUPS A,B,C,D-TEMP.T3
MODEL:	5422203WA-77
SER. NUMBER:	EE185157-EE185162-EE185184

NG modello	Materiale			Commessa	
SLICO TRABON-MANZEL KLS-OPCO *Moncalieri (TO)*	Tratt.	Prof.tratt.	Dur.HRC	Dis. Ng	IT-M11-0003
	Denominazione MOTORE TRIFASE BROOK CROMPTON			Codice	RLO 03097
	Gruppo NUOVO PIGNONE			Q.ta'	1
				Scala	
				Diseg.	A.M.
				Data	01/2008

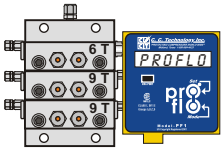
CC Technology pro-flo
LUBRICATION DIVISION

3201 West Wall St. Midland, Texas 79701
Office: (432) 520-6700 fax: (432) 520-6707
Toll free: 1-800-664-4033
Visit Us on the Web: www.cct.nu

Bulletin PFIB
3-24-05

proflo®
Fluid Flow Monitor
U.S. Patents 6,823,270 - 6,850,849 B1

Proflo®
Divider Block Monitor and Compressor Shutdown Protection

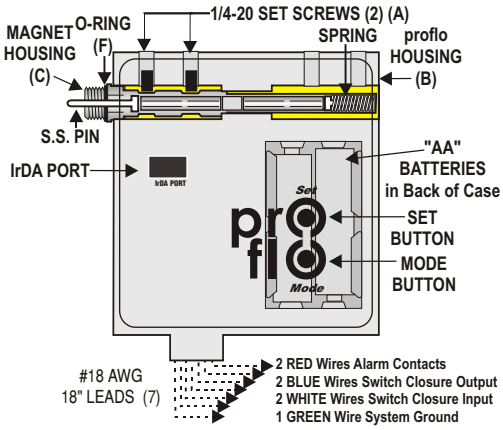


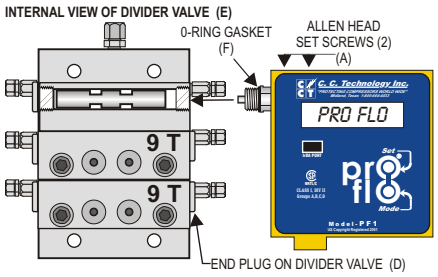
PDA
Fluid Flow
+ Trending Software
Trends
Oil Consumption

TOTAL = COMPRESSOR PROTECTION

Monitors Operation of ALEMITE - LINCOLN,- TRABON - - LUBRIQUIP - SB - DROPSA Divider Block Systems

WARNING: WELDING ON THE COMPRESSOR SKID OR PIPING WITH THE PROFLO WIRING CONNECTED TO ANYTHING WILL DESTROY THE PROFLO ALARM CIRCUIT OR CAUSE THE UNIT TO FAIL PREMATURELY. THIS WILL VOID THE PROFLO WARRANTY!

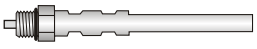




INSTALLATION PROCEDURE FOR proflo MODEL PF1

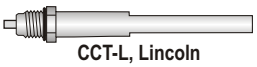
1. Loosen all Allen head set screws (2) (A) on top of proflo case and remove magnet housing (C).
2. Remove end plug (D) from end of divider valve where proflo will be installed. The proflo may be installed on any convenient divider valve, top to bottom or on either side.
3. Be sure 0-ring (F) is in place on proflo magnet housing (C).Screw magnet housing (C) into end of divider valve (E).Torque to 15 foot pounds max.
4. Slide proflo the way on magnet housing (C). **Do Not** Over tighten set screws. 15 inch pounds max.
5. The LCD on the proflo indicates cycle time. Correct operation of the proflo can be verified by the compressor running or by manually pumping oil through the divider valve assembly with a hand purge gun. The LCD enables the operator to adjust the lubricator pump for correct cycle time. Recommended cycle time can be found on a tag on top of the lubricator box or by contacting the compressor manufacturer or the engineer who designed the lube system. If cycle time cannot be identified contact ARIEL RESPONSE CENTER at C C Technology at 1-800-664-4033
6. **NOTE:** All conduit and connections should be appropriate for area classification.
7. After installing the proflo or performing any maintenance on the lube system, compressor cylinders or packing, it is necessary to pre-lube the complete system with a purge gun to purge air from the divider blocks and all components--------" BEFORE COMPRESSOR START-UP".

The proflo must be installed with the correct magnet assembly for each divider block manufacturer

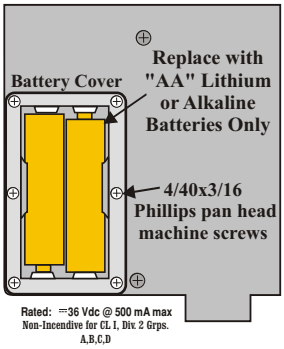


CCT-T, Alemite, SB & Trabon
Part #0-PF-TMA w/ O-ring

Dropsa
Part #0-PF-DMA - ¼" BSP



CCT-L, Lincoln
Part #0-PF-LMA- w/ O-ring



To Replace "AA" Lithium Batteries

Remove Phillips screws (6) located on battery cover on back of the proflo case. Remove cover to expose batteries. ***NOTE: Remove plastic sleeve covering old batteries and slide plastic sleeves on new batteries before installation. After Inserting new batteries press the mode button until LCD displays "BATTERY". This tells the proflo to check battery power and reset to actual remaining battery power.*** Replace battery cover, screws and gasket. Do Not over tighten screws. NOTE: If screws on battery cover are lost, replace with 4/40 x 3/16 phillips pan head machine screws.

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT OR CHANGE BATTERIES WHILE CIRCUIT IS LIVE. BATTERIES MUST ONLY BE CHANGED IN A NON-HAZARDOUS AREA.

Control Your Oil Consumption and Find Possible Cause of Premature Wear From Over or Under Lubricating
with the proflo "Fluid Flow Trending" Software for the Palm operating System

Having Packing, Rod or Cylinder Wear Problems?
Order the proflo ***"Single Point Test Kit"*** to Test the Reliability of the Divider Block or Lube Pump at Each Injection Point. Instantly displays the quantity of oil injected into a single lube point!

1. Displays Oil consumption for Each 30 Minutes of Compressor Operation.
2. Displays Every Day the Compressor Was Over & Under Lubricated.
3. Displays Total Oil Consumption of the Compressor Lube System.
4. Displays Daily and Total Lost Dollars for over Lubricating the Compressor.
5. Displays Total Cycles of the Divider Block System .
6. Displays Total Run Time of the Compressor.

Converts All Information to an Excel format for hard copy trending, graphing and presentation to management.

proflo Feat

Home
FFT Software
proflo Features
Button Operation

On Board Display:
- **Run Time of Compressor - • Cycle Time of Lube System**
- **Remaining Battery Life - • Total Divider Block Cycles**
- **Overload Circuit Protection - • Adjustable Alarm Time**
- **Alarm Mode - Normally Open / Normally Closed**
- **Cycle Time: "LAST" - "AVERAGE" - "NOW"**

Click Here for proflo PF1 Installation, Operation & Wiring Instructic

FEATURES	SPECIFICATIONS
• Monitors and Trends Oil Usage of the Divider Block Lube System Every 30 Minutes • Operates on Field Replaceable "AA" Alkaline Batteries With "LOW BATTERY" Warning or (24 VDC Model # PF1 24V) • Adjustable Alarm Time for "Slow Flow" Shutdown Protection • Wireless Download of Divider Block Information to Palm Device (Up to 50 Compressors) • Instant Conversion of Palm Files to Excel Spreadsheet with Automatic Line Graph Plotting with "FFT" Software • On Board Diagnostic Data	• Temp Range: –40 +185 F • Switch Capable: 170 VDC @ .5 Amp • Environment Rating: Class I Div. II Groups A,B,C,D -Zone 2 • Power: "AA" Alkaline Batteries or 24 VDC • Device Inputs: Remote Switch Closure • Device Outputs: Pulse Output with Each Divider Block Cycle for PLC Monitor • Alarm Wiring: N/O (Normally Open) - N/C (Normally Closed)

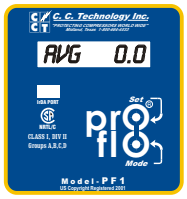
[Home] [About CCT] [Our Direction] [Lube Design] [Contact Us] [CCT Site Map]
[CCT Products] [Check Valves] [Divider Blocks] [System Filters] [Lube No-Flow]
[Find Your Pump] [Lubricators] [NeoMag] [Pressure Ind.] [proflo PF1] [proflo Jr.] [Prox Switch]
[Purge Gun] [SPTD] [Satellite Monitors] [Technical Info] [Tech Schools]

Bulletin PFIB
3-24-05

proflo®
Fluid Flow Monitor
U.S. Patents 6,823,270 - 6,850,849 B1

Button Operation & Wiring Instructions

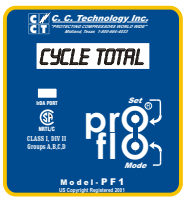
First Push Set Button to Clear Alarm: Display Will Indicate **"LAST"** & **"AVG".** "Last" is the Last Divider Block Cycle Time. "AVG" is the Average Time in Seconds of the Last Six Divider Block Cycles.



1. Push Mode Button: LCD will Display **"NOW".** This is a built in Stop Watch to Enable the Operator to Easily Set Cycle Time of the Lube System by Adjusting the Lubricator Pump

2. Push Mode Button:
LCD will display
"RUN TIME"
Indicates Total Run Time Hours of Lube System

3. Push Mode Button:
LCD will display
"CYCLE TOTAL"
This Mode Displays Total Divider Block Cycles



4. Push Mode Button:
LCD will display
"BATTERY 100 PCNT"
This Mode Displays the Remaining Battery Life
"AA" Lithium or Alkaline Batteries

5.Push Mode Button:
LCD will display
"SEND DATA?"

This Mode is Used to Send Divider Block System Information to Palm Device: Push **"Set"** Button, LCD Will Display **"SENDING".** If the Palm Device is Not Available to Receive the Data the LCD Will Display **"FAILURE"** and Return to Last and AVG Default Display.

Contact C C Technology for Information on "FFT" Software for Wireless Download of Lube System Oil Consumption & Trend Data From the proflo to Handheld Devices with Palm Operating Systems

6. Push Mode Button:
LCD will display
"SETUP?"
In this Mode You can Set the Alarm Shutdown Time & Change the Wiring Mode to N/O or N/C

To Change Alarm Time & N/O-N/C Wiring Operation

1. Push mode button until display reads **"SETUP?**
2. Push **"Set"** Button, LCD Will Scroll **"1. SET ALARM TIME"**
3. Push and release **"Set"** Button to Change Alarm Time From 30 Secs. to 240 Secs.
4. Push **"Mode"** Button 2 more times and LCD Will Scroll **"2. SET ALARM MODE?"**
5. Push **"Set"** Button to Toggle from **N/O and N/C** Wiring Mode.

How to Setup proflo for Normally Open -N/O or Normally Closed -N/C Wiring

1. Push and release **"MODE"** button until "SETUP" is displayed.
2. Push the **"SET"** button and the LCD will scroll **"1. SET ALARM TIME".**
3. Push the **"Mode"** button again and the LCD will scroll **"2. SET ALARM MODE"**
4. Push the **"SET"** button to show current Alarm Wiring Mode setting.
5. Push **"SET"** button again to change display to read:

"N/O" for Normally Open Alarm Mode or **"N/C" for Normally Closed Alarm Wiring Mode.**
After desired wiring mode is set, the **proflo** will automatically return to the Last and AVG display In 30 seconds.

WIRING INSTRUCTIONS

Blue Wires: Transistor Pulse Output with Each Divider Block Cycle: 36 Vdc @ 500mA max.
The two (2) blue wires are used to send a transistor pulse output with each divider block cycle to a PLC or Digital Counter. DO NOT use both Alarm Wires (RED)and Switch closure Wires (BLUE) at the same time.

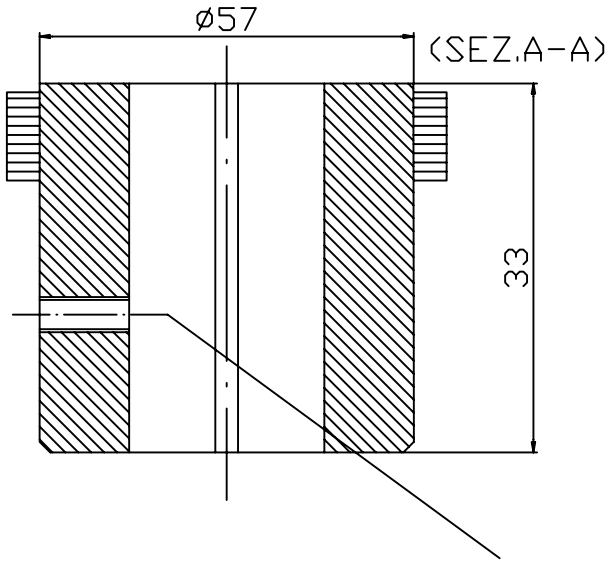
Caution: Insulate blue wires from contact with each other or anything when not in use.

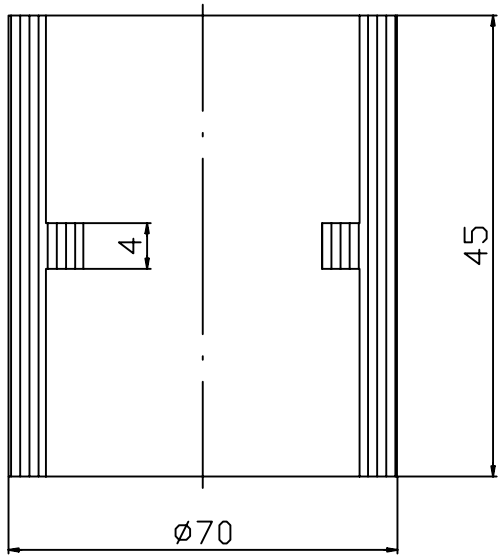
White Wires: To be Connected to a Proximity Switch with a Dry Contact Switch Closure. This Enables the Operator to Mount the proflo in the Control Panel. Install a **proflo** proximity switch on the divider block. Mount the **proflo** in a convenient location on the compressor frame or in the control panel. Connect the two (2) white wires from the proximity switch to the white wires on the **proflo**. ***To mount the proflo in the control panel order Part # PFPMT-1 for one proflo & PFPMT-2 for two proflos.***

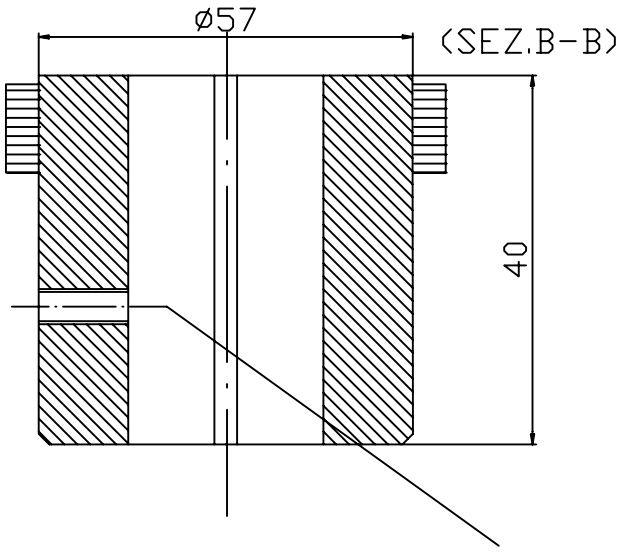
Caution: Insulate white wires from contact with each other or anything when not in use.

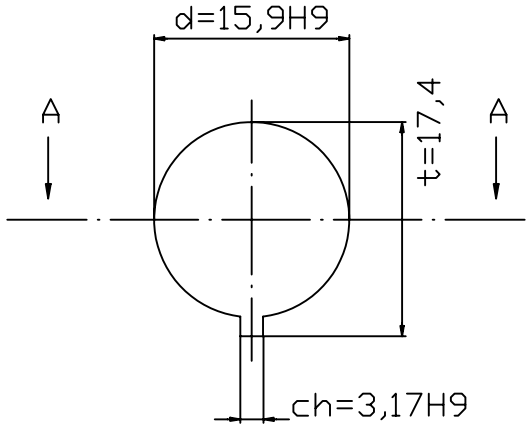
Red Wires: Alarm Shutdown to Control Panel for No-Flow Shutdown. Switching Capacity: 36 Vdc @ 500 mA max.
Normally Open Wiring: Connect 1 Red Wire to the Control Panel Terminal & 1 Red Wire to the Earth Ground in Control Panel.
Normally Closed Wiring: Connect 1 Red Wire to the Positive Terminal in Control Panel & 1 Red Wire to the Common in Control Panel.

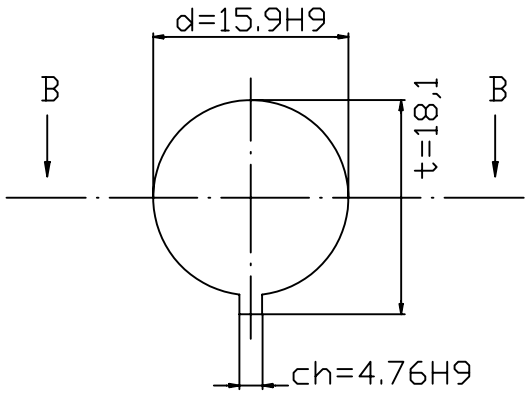
GREEN WIRE: Must be Securely Grounded in the Control Panel. "DO NOT" Ground the Green Wire to the Electrical Conduit. Improper Grounding May Result in Unreliable Operation of the proflo.*DO NOT WELD ON SKID WITH PROFLO WIRES CONNECTED TO ANYTHING.*











CODIFICA LATO CONDOTTO

N°1 SEMIGIUNTO OMT3033C

IN ACCIAIO = OMT

TAGLIA = 3

QUOTA E (LUNGH.SEMIGIUNTO)= 033

CON FORO GRANO = C

LAVORAZIONE PER ALBERO CONDOTTO d = 15,9H9

ch = 3,17H9

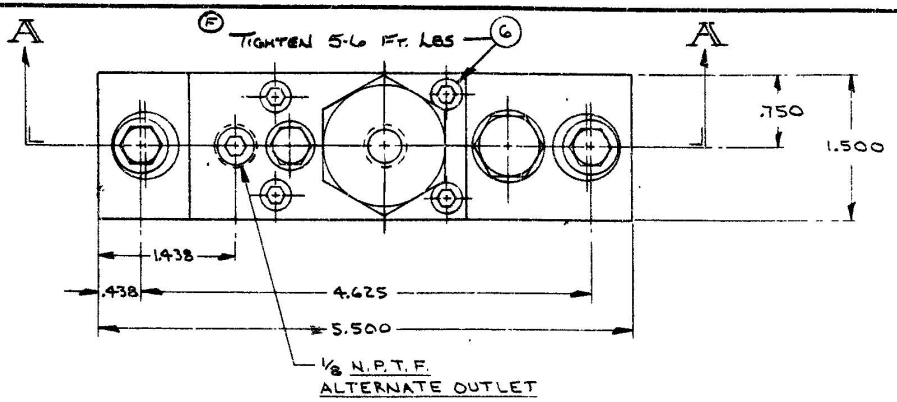
t = 17,4

CODIFICA LATO MOTORE

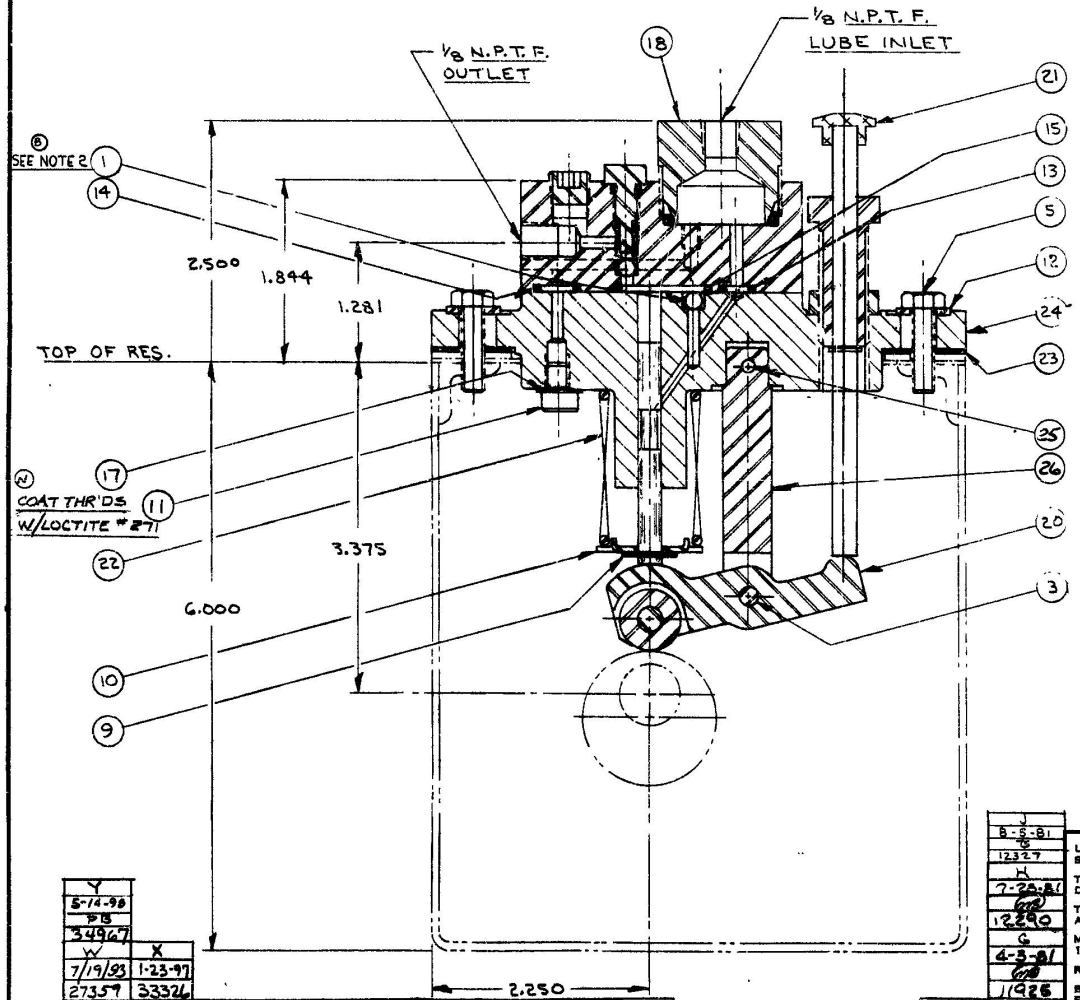
N°1 SEMIGIUNTO OMT3040C11

NG modello	Materiale			Commessa RLO 03097
SLICO TRABON-MANZEL KLS-OPCO *Moncalieri (TO)*	Tratt.	Prof.tratt.	Dur.HRC	Dis. Ng IT-M01-0005
	Denominazione GIUNTO OMT			Codice
	Gruppo ALBERTA-CANADA			Q.ta' 1 Scala Diseg. A.M. Data 05/2007

DWG. NO. C-376-000-120



ITEM	QTY.	DESCRIPTION	PART NO.
(B) 1	1	BALL - 3/16 DIA.	401-010-030
2	1	NUT - 1/4-28 HEX	410-430-090
3	1	PIN - ROCKER ARM	411-700-757 (K)(P)
(D) 4			
5	2	SCREW - 1/4-20 x 1" HEX. HD.	415-640-060 (L)
6	4	SCREW - #10-24 x 1 1/4 SOC. HD.	419-110-070
7			(E)(K)
(A) 8			
(T) 9	SEE CHART	RING - RETAINING	418-150-040
10	1	RETAINER - SPRING	SEE CHART
11	1	SCREW - 1/4-28 x 3/8 SOC. HD.	419-140-010
12	2	WASHER	421-700-894
13	1	O-RING (-010)	422-040-100
14	1	O RING (-012)	422-040-120
15	1	O-RING (-018)	422-040-180
(A) 16			
17	1	GASKET	500-252-100
(Y) 18	1	PRESS. SUPPLY HOUSING ASSY.	438-027-020
(A) 19			
(D) 20	1	ARM - ROCKER ASSY.	453-004-543
(X)(H) 21	1	HAND PLUNGER ASSY.	453-012-198
(T) 22	1	SPRING - RETURN	SEE CHART
23	1	GASKET - PUMP	439-075-433
24	1	PUMP BODY & PISTON ASSY.	SEE CHART
(G)(C) 25	1	PIN-GROOVE	411-101-680
(C) 26	1	POST-ROCKER ARM	480-000-590



ASS'Y. NO.	PISTON SIZE	(M) QTY ITEM 9	PART NO. ITEM 10	PART NO. ITEM 24	PART NO ITEM 22
376-000-120	3/16	1	418-700-347	477-010-661	458-200-010
(W) 376-000-130	1/4	0	060251	477-010-662	458-200-010
ADD (S)(R) 376-000-140	5/16	0	060251	477-010-663	458-200-010
(W) 376-000-150	3/8	0	060251	477-010-664	458-200-010

NOTE:

1.) MAX. INLET PRESSURE 100 P.S.I. (V)

(B) 2.) BALL SEAT ITEM 1 PER ES-219

(C) 3.) ASSEMBLE ITEM 25 & 26 TO ITEM 24 PER ES-224.

(J) 4.) STAMP PISTON SIZE & DATE PER ES-268

(U) 5) TEST PER TP-406

SECTION A-A

Y									
5-14-98									
PB									
34967									
W	X								
7/19/93	1-23-97								
27359	33326								
V	U	T	S	R	P	N	M	L	
9-16-93	6-5-92	7-16-91	4-20-90	2-9-90	8-30-88	3-29-86	8-1-84	6-28-84	
MG	MG	GP	LH	GP	K.N.	K.N/A	JS	JS	
26128	25735	24653	23151	22906	20879	17584	15636	16557	

J					
8-5-81					
PB					
12327					
H					
7-28-81					
GP					
12290					
G					
4-3-81					
GP					
11926					

K					
1-16-84					
JS					
14663					

F					
2-22-81					
GP					
11775					

UNLESS OTHERWISE SPECIFIED:
TOLERANCES ON ALL DIMENSIONS ± .010
TOLERANCE ON ALL ANGLES ± 1/2°
MACHINED SURFACES 125 MICROINCH MAX.
REMOVE ALL BURRS
BREAK ALL SHARP EDGES .010 RADIUS

SIMILAR DWG:

MAT'L. AND SIZE: SEE ABOVE
HEAT TREAT:
PLATING OR PAINTING:
REMARKS:

LET.	A	B	C	D	E
DATE	5/21/79	6-20-79	7-16-79	1-22-81	
BY	TS	WZ	WZ	JS	
ECN No.	6656-M	6656-N	6656-P	6656-Q	11631

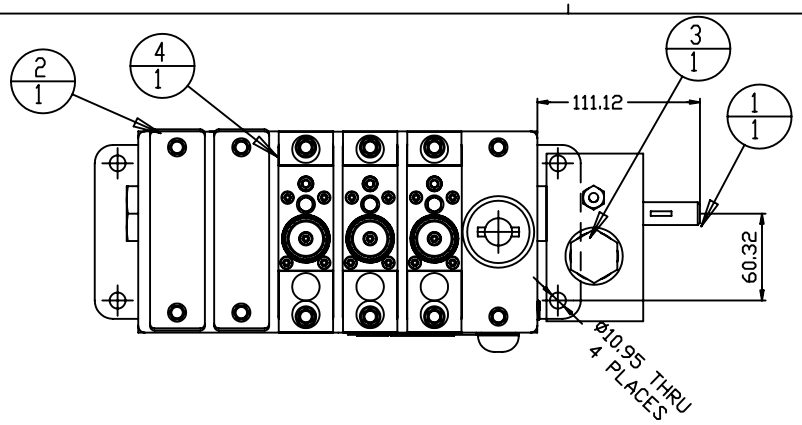
LUBRIQUIP HOUDAILLE™
Tuthill® and Mangel® Centralized Lubrication Systems
LUBRIQUIP DIVISION OF HOUDAILLE INDUSTRIES, INC.
16901 CRANWOOD PARKWAY, CLEVELAND, OHIO 44128

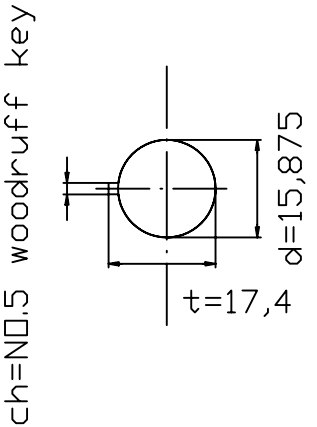
NAME: PRESSURIZED MODEL 76 PUMP ASS'Y.

DRAWN BY:	DATE:	CHECKED BY:	APPROVED BY:
POWELL	10-31-78		

SCALE	RELEASE No	DWG. NO.
1:1	6656-R	C-376-000-120

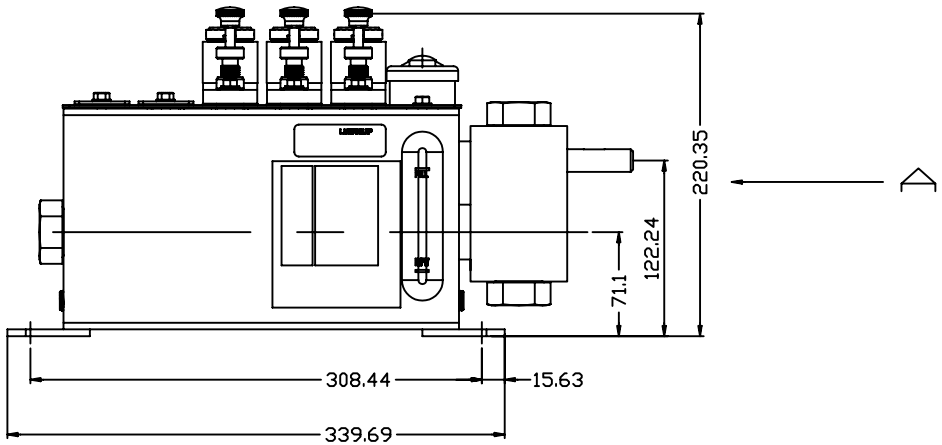
COMPOSITE

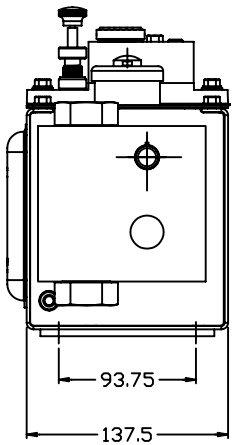




ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	CAMSHAFT 8PT	466-820-100
2	2	COVER-BLANK ASSY 8PT	276-100-002
3	1	DOUBLE REDUCTION END ROT.	481-760-010
4	3	MODEL 76 PUMP ASSY 1/4	376-000-130

VIEW FROM "A"





LUBRICATOR: MANZEL 76
RESERVOIR SIZE: 8 PT

DRIVE TYPE:
RIGHT HAND, END, ROTARY, INTEGRAL GEAR REDUCER 100:1

ALL DIMENSIONS ARE FOR REFERENCE

NG modello	Materiale	Commessa RLO 03097

SLICO
TRABON-MANZEL
KLS-OPCO
Moncalieri (TO)

Tratt.	Prof.tratt.	Dur.HRC	Dis. Ng SL.07036.33-02

Denominazione MBL LUBRICATOR
PRESSURIZED PUMP

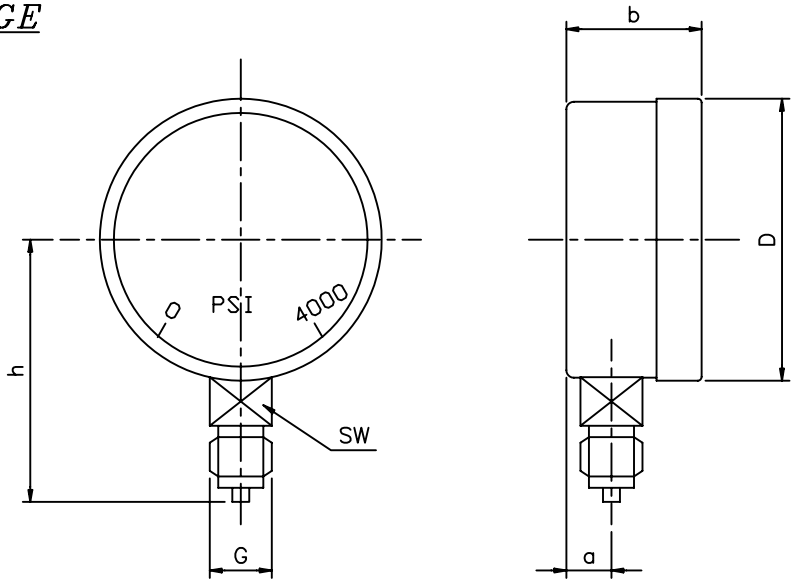
Codice

Gruppo ALBERTA-H2
NUOVO PIGNONE

Q.ta' 1 of 1
Scala 1:2.5
Diseg. A.M.
Data 01/2008

MANOMETRI ATTACCO RADIALE

RADIAL GAGE



WIKA

Codice/Code
233. 30. 100. PSI4000

EN837-1, RIEMPIMENTO SILICONICO M50, ACCURATEZZA 1.0
SCALA 0-4000 PSI, COMPONENTI IN ACCIAIO INOSSIDABILE
TEMPERATURA D'UTILIZZO -40°C/60°C, VETRO LAMINATO DI SICUREZZA

PSI	D	G	a	b	h	SW
0÷4000	100	1/2" B	25	59,5	87	14

EN837-1, SILICON FILLING M50, ACCURACY 1.0
SCALE 0-4000 PSI, STAINLESS STEEL COMPONENTS
TEMPERATURE RANGE -40°C/60°C, LAMINATED SAFETY GLASS

LUBRIQUIP®
Lubrication & Dispensing Solutions

Trabon® and Manzel® Balancing Valve Product Specs and Ordering

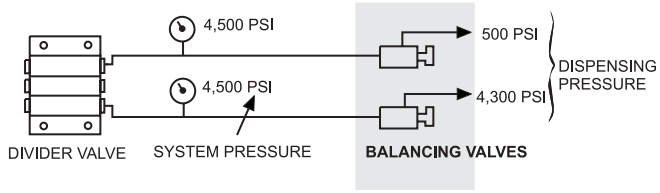
Bulletin 15812

DESCRIPTION

The Lubriquip® Balancing Valve assists divider valves to accurately proportion lubricant at high differential pressures. It is recommended for use when a pressure difference greater than 1,000 PSI exists between two or more of the points in a Lubriquip divider valve system.

The balancing valve is not affected by downstream pressure variations. The preset pressure setting will maintain a uniform pressure throughout the system that assures accurate and efficient system operation.

Figure 1
Balancing valve set at 4,500 PSI



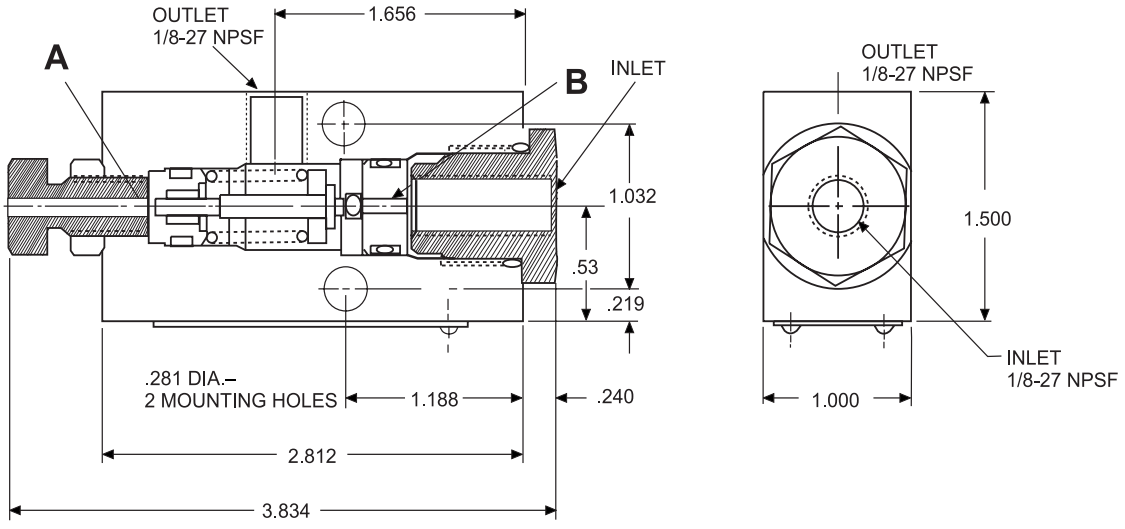
FEATURES

- Balancing valve is not affected by downstream pressure, assures accurate flow to all lubrication points.
- Balancing valve is field adjustable. Reduces on-site inventory costs as one model meets all your system needs.
- Balancing valve is in-line mounted, so it lowers installation costs.
- Balancing valve uses a wear-resistant tungsten-carbide ball to reduce maintenance costs.

OPERATION (Figure 2)

The area (A) behind the check ball piston is sealed from downstream pressure. Because this area and the seat area (B) of the check ball are equal, the valve is balanced and is not affected by downstream pressure. As pressure upstream of the valve rises above the spring setting, the check ball unseats, allowing fluid to pass through the valve. As pressure drops, the spring closes the check ball until pressure again exceeds the spring setting.

Figure 2



SPECIFICATIONS

Material ..... Steel
Maximum Operating Pressure ..... 6,500 PSI
Adjustable ..... (Factory set at 2,000 PSI)
from 1,000 to 6,500 PSI

Operating Temperature . . . . –10 to + 250°F
(– 23 to +121°C)

Lubricant ..... Oil

Seals ..... Viton

Net Weight ..... 1.19 lb. (.54 kg.)

TYPICAL APPLICATION

Figure 3

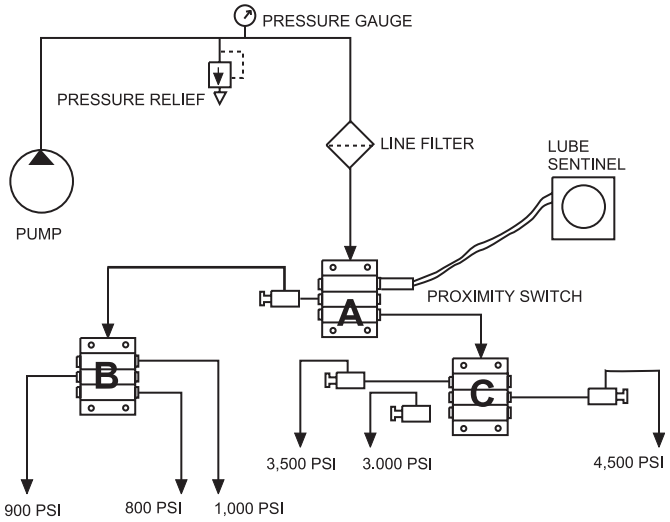
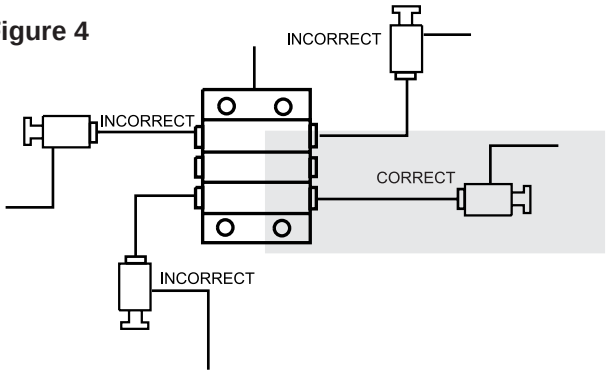


Figure 3 shows a typical compressor lubrication system using MH divider valves and balancing valves. In the system, a 3,700 PSI dispensing pressure difference exists. One balancing valve is installed in the line between the master divider (A) and the secondary divider valve (B). Also two balancing valves are installed downstream from the secondary divider valve (C), where a pressure difference of 1,500 PSI exists. Each valve is set to equal the highest pressure point in the system which, in this case, is 4,500 PSI. A fourth balancing valve is installed to serve the lubrication point at 4,500 PSI, downstream from the divider valve (C). It balances the divider valve system at startup, should the compressor begin operating at low pressure.

INSTALLATION

A balancing valve must be mounted with the outlet up to permit removal of trapped air and improve the operation of the valve. See Figure 4.

Figure 4



The Lubriquip balancing valve is factory set at 2,000 PSI. When changing pressure setting, it is recommended that a pressure gauge be installed at the inlet of the balancing valve to determine the pressure required to open the valve. To change the pressure setting, loosen the locknut on the adjustment screw and turn the screw clockwise to increase the pressure setting or counterclockwise to reduce the pressure setting. When the desired setting is attained, retighten the locknut.

After installation and pressure adjustment, check the system pressure upstream of the balancing valve. The pressure setting of the balancing valve must be equal to the highest pressure in the system.

ORDERING INFORMATION

Balancing Valve 509-510-000

Valve Seal kit 560-001-470

Look to LUBRIQUIP, Inc.
for all of your Centralized Lubrication System needs.

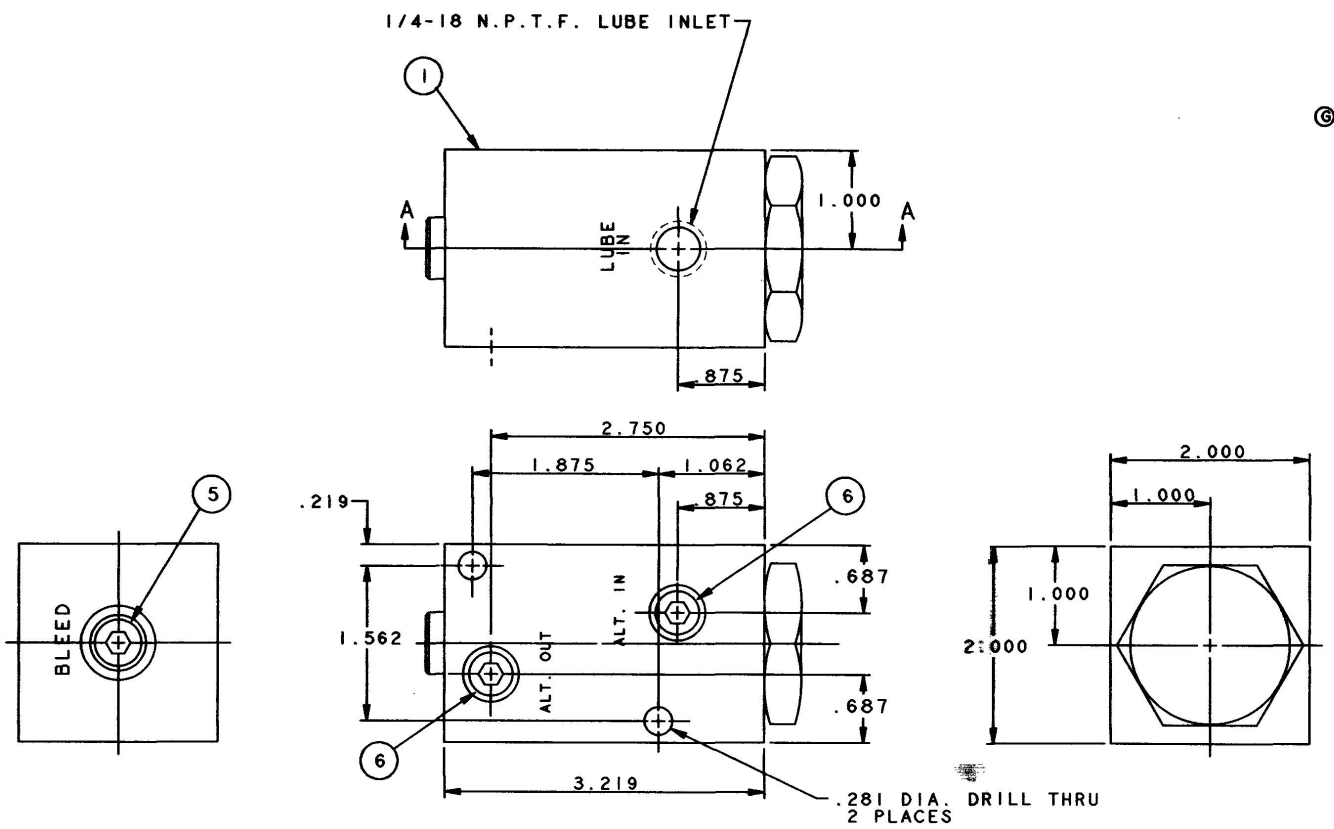
Products include:

DIVIDER VALVES: for oil and grease...to 7,500 psi... 1 to 24 points from a single valve assembly...up to 256 points from a Master/Secondaries circuit...or systems that handle an entire plant.
PUMPS: fixed and variable displacement...manual and air, hydraulic, electric motor or mechanically driven.
TIMERS/AUTOMATIC CONTROLS: from simple on/off to complete flow and pressure monitoring, either time- or machine-actuated.
ACCESSORY VALVES: balancing, check and flow.
INDICATORS: performance and broken line.
ACCESSORIES: fittings, brackets, clamps, filters and strainers.

LUBRIQUIP®
Lubrication & Dispensing Solutions

ISO 9000:2000 REGISTERED FIRM
ISO 14000 REGISTERED FIRM

ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	FILTER BODY	527-100-620
2	1	FILTER ELEMENT ASSM	SEE CHART
3	1	NAMETAG	527-100-270
4	2	DRIVE SCREW	411-050-080
BA 5	1	7/16-20 SAE PLUG	412-700-541
GEDCA 6	2	1/4 PTF SHORT PLUG	412-160-030



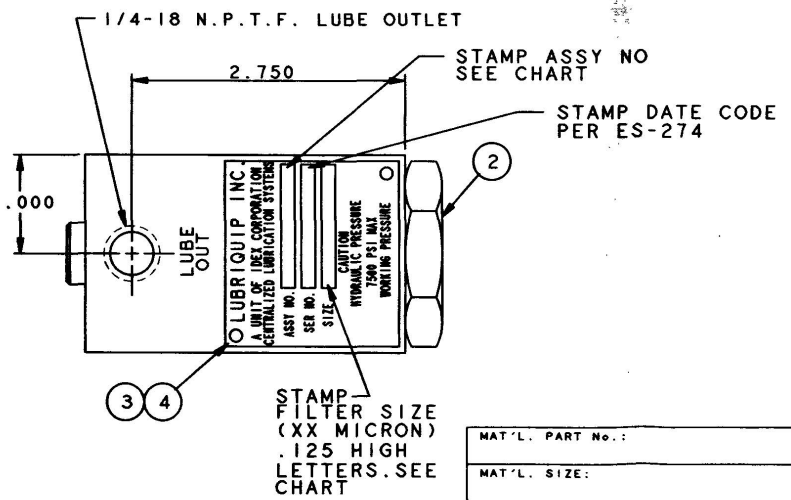
ASSEMBLY No	P/N ITEM 2	FILTER SIZE
GE 527-100-581	527-100-540	10 MICRON
GE 527-100-591	527-100-550	25 MICRON
527-100-601	527-100-560	40 MICRON
527-100-611	527-100-570	90 MICRON

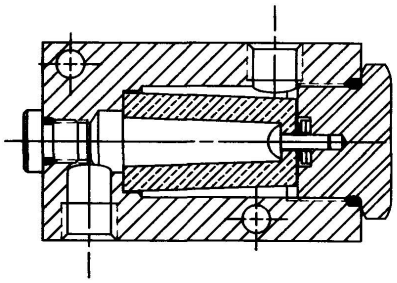
Ⓕ

MULTIPASS TEST, AVERAGE BETA RATIO

MICRON	10 uM	25 uM	50uM
	7	390.4	
527-100-581	(86%)	(+99%)	
		4	138
527-100-591		(75%)	(+99%)

Ⓖ NOTE: TORQUE PLUGS TO 20-30 FT./LBS.





SECTION A-A

MAT'L. PART No.:

MAT'L. SIZE:

HEAT TREAT:

PLATING OR PAINTING:

UNLESS OTHERWISE SPECIFIED:
TOLERANCES:
MACHINING ±.010
FABRICATION ±.020
SAND CAST ±.030
DIE CAST ±.010
INVESTMENT CAST ±.010
INJECTION MOLD ±.010
ANGLES ± 1/2 DEG.
MACHINED SURFACES .125 MICROINCH MAXIMUM
REMOVE ALL BURRS
BREAK SHARP EDGES .010 RAD/45 CHMF.

J	H	G	F	E	RELEASE	LETTER
		1-16-97	10-28-96	10-8-96	1-10-96	DATE
		P.B.	CFO	P.B.	M.B.	BY
		33293	33092	33035	31919	ER/ECN

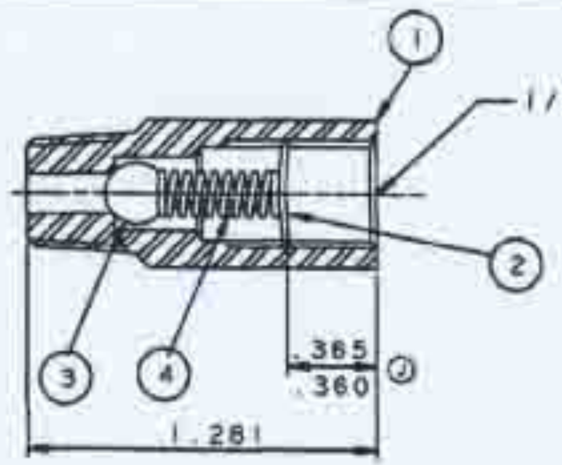
LUBRIQUIP®
Centralized Lubrication Systems
LUBRIQUIP, INC. A Unit of IDEX Corporation
18901 CRANWOOD PARKWAY, CLEVELAND, OHIO 44128

NAME: w/ BLEED PORT
IN-LINE FILTER ASSM

DRAWN BY:	DATE:	CHECKED BY:
M. BOSLEY	10-27-93	

SCALE:	DWG. SIZE:	DWG. No.
1:1	C	527-100-581

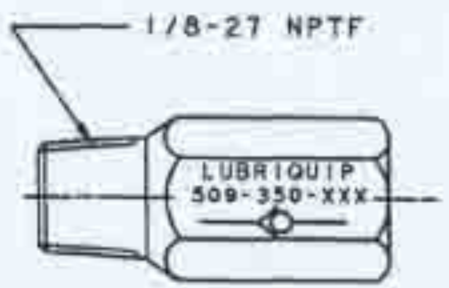
ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	BODY-CHECK VALVE	509-251-003
2	1	KEEPER	509-256-002
3	1	BALL-3/16 DIA.	401-030-030
4	1	SPRING	SEE CHART



NOTES:

1) BALL SEAT PER ES-219
2) STAMP PER ES-140
Ⓗ 3) TEST CRACKING PRESSURE PER TP-510 PER CHARTED PSI MIN/MAX RATINGS.

ASSEMBLY No.	ITEM #4	RATING	CRACKING PRESS. Ⓗ
509-350-010	458-006-115	10 PSI	8-12 PSI
509-350-030	509-253-001	35 PSI	25-45 PSI
509-350-100	458-005-836	100PSI	100-120 PSI
509-350-120	458-005-836	125PSI	125-135 PSI
509-350-250	509-268-020	250PSI	240-260 PSI



MAT'L. PART No.:

MAT'L. SIZE:

HEAT TREAT:

PLATING OR PAINTING:

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UNLESS OTHERWISE SPECIFIED:
TOLERANCES:
MACHINING ±.010
FABRICATION ±.020
SAND CAST ±.030
DIE CAST ±.010
INVESTMENT CAST ±.010
INJECTION MOLD ±.010
ANGLES ± 1/2 DEG.
MACHINED SURFACES 125 MICROINCH MAXIMUM
REMOVE ALL BURRS
BREAK SHARP EDGES .010 RAD/45 CHMF.

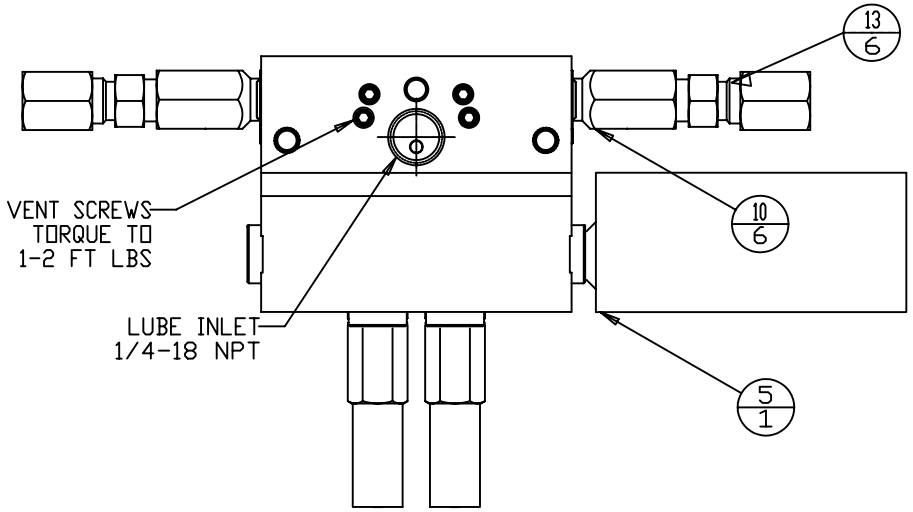
LUBRIQUIP®
Centralized Lubrication Systems
LUBRIQUIP, INC. A Unit of IDEX Corporation
18901 CRANWOOD PARKWAY, CLEVELAND, OHIO 44128

NAME: (SINGLE BALL) CHECK VALVE-1/8 P

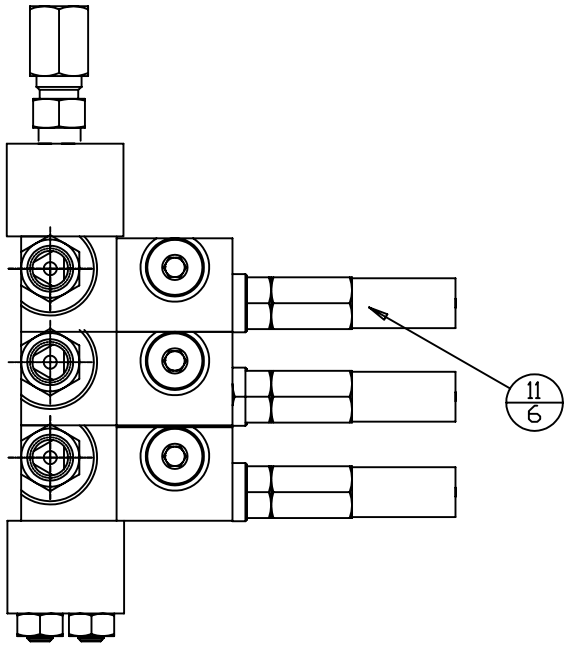
DRAWN BY:	DATE:	CHECKED BY:
K.NISHIZAKI	12-11-89	JRKL

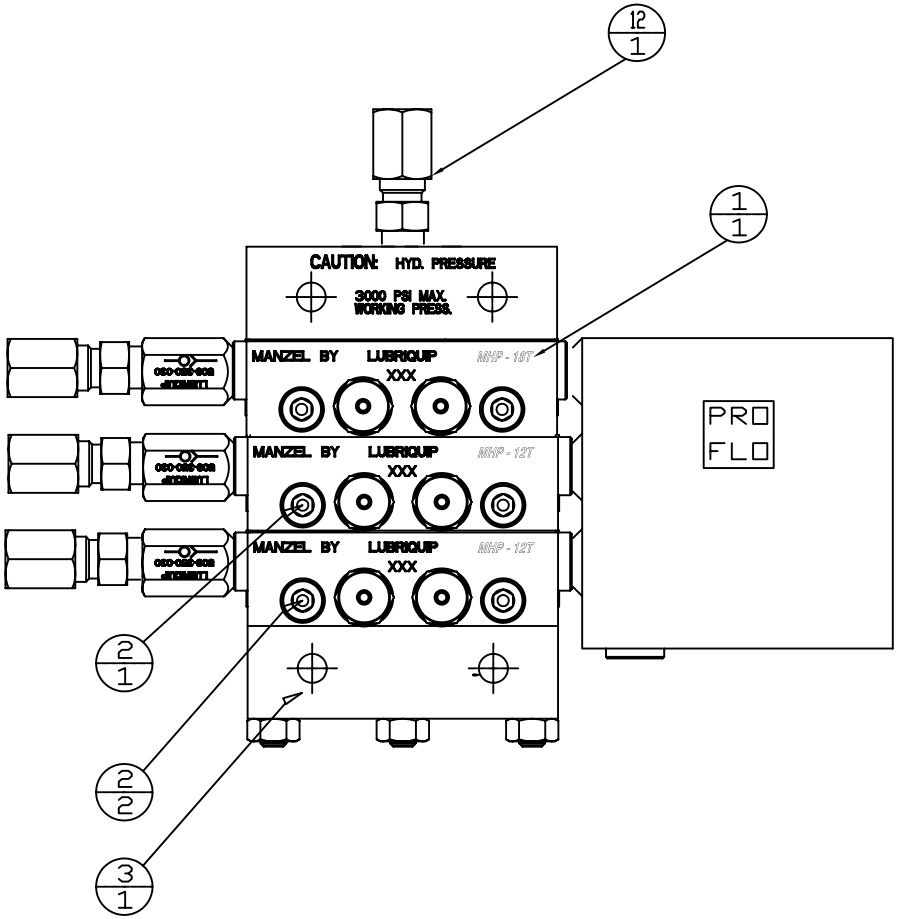
SCALE: | DWG. SIZE: | DWG. No.:

K	J	H	G	F	E	RELEASE	LETTER
7/11/06	12-15-98	5-22-97	2-15-94	11-28-90	12-12-89		DATE
							BY



ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 18T	106-000-115
2	2	MHV VALVE BLOCK ASSY 12T	106-000-105
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG	Z52 RLO 3097
5	1	CICLE COUNTER-PROFLO	PF1-CCT
9	4	BALANCING VALVE	509-510-000
10	6	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
11	6	MANUAL RESET IND. (3500 PSI)	509-932-840
13	6	raccordo diritto 1/8"-KMZ	400-1-2
12	1	raccordo diritto 1/4"-KMZ	400-1-4

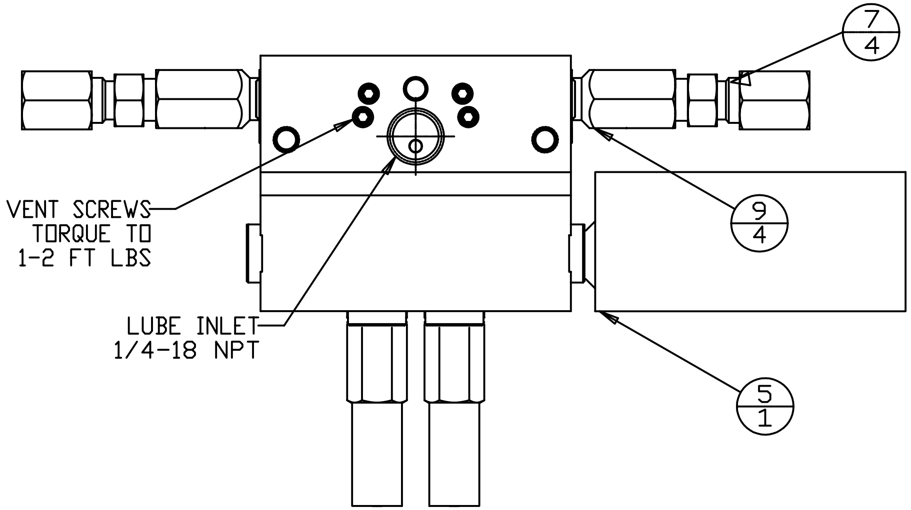




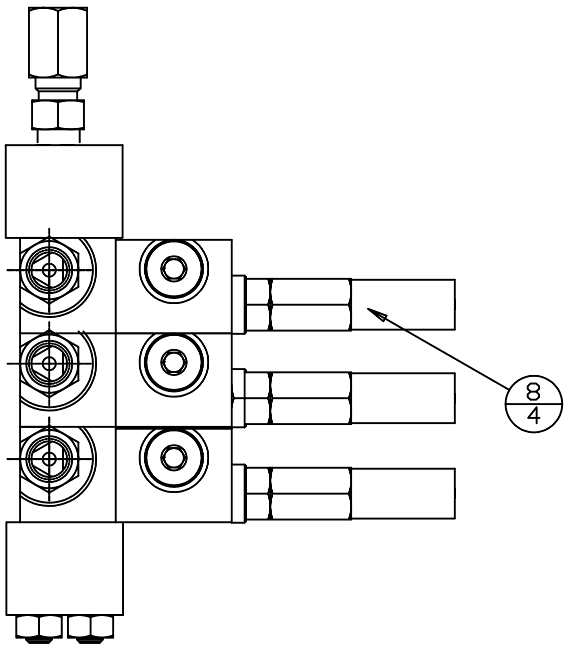
MHP3-18T-12T-12T

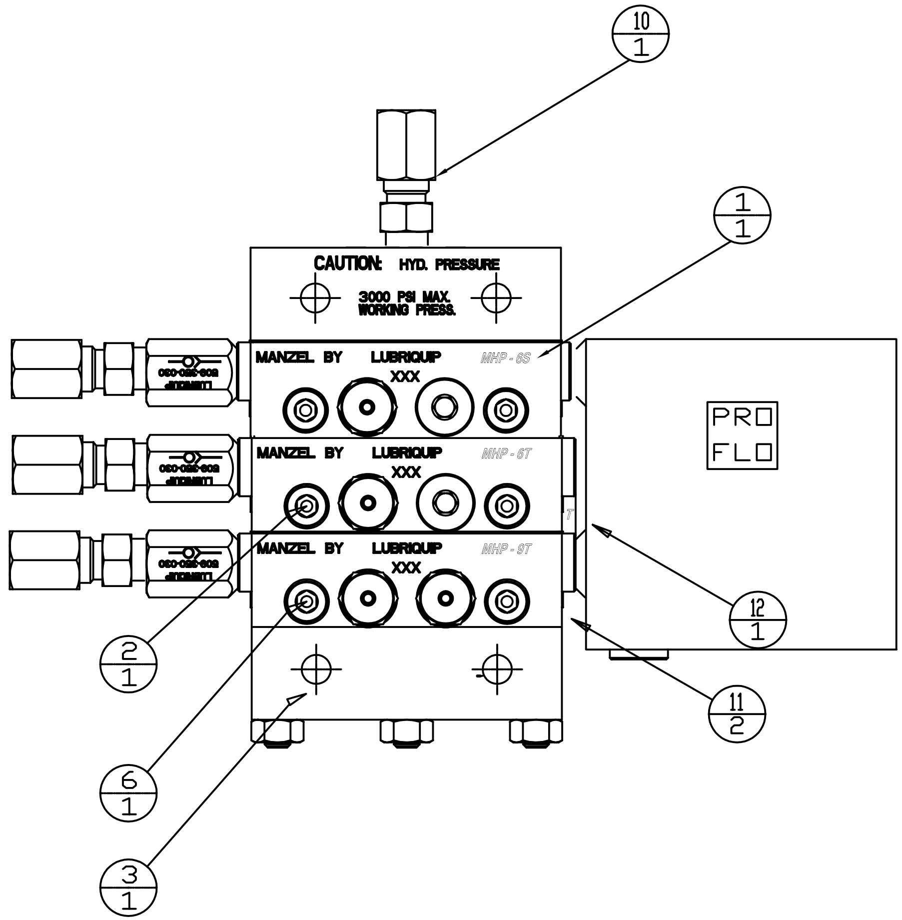
						DENOMINAZIONE
nome	A.M.	visto	Piano			SCHEMA DIVIDER VALVE
data	06/2007	tav.	01/07			
COMM.	RL03097					
STD.	SL.07036.32					DIS. SL.07036.32-01
DIVIDER VALVE						
NUOVO PIGNONE						
e						MODIFICHE
d						NOME
c						DATA
b						
a						

SLICO
TRABON-MANZEL
KLS-OPCO
MONCALIERI - TO



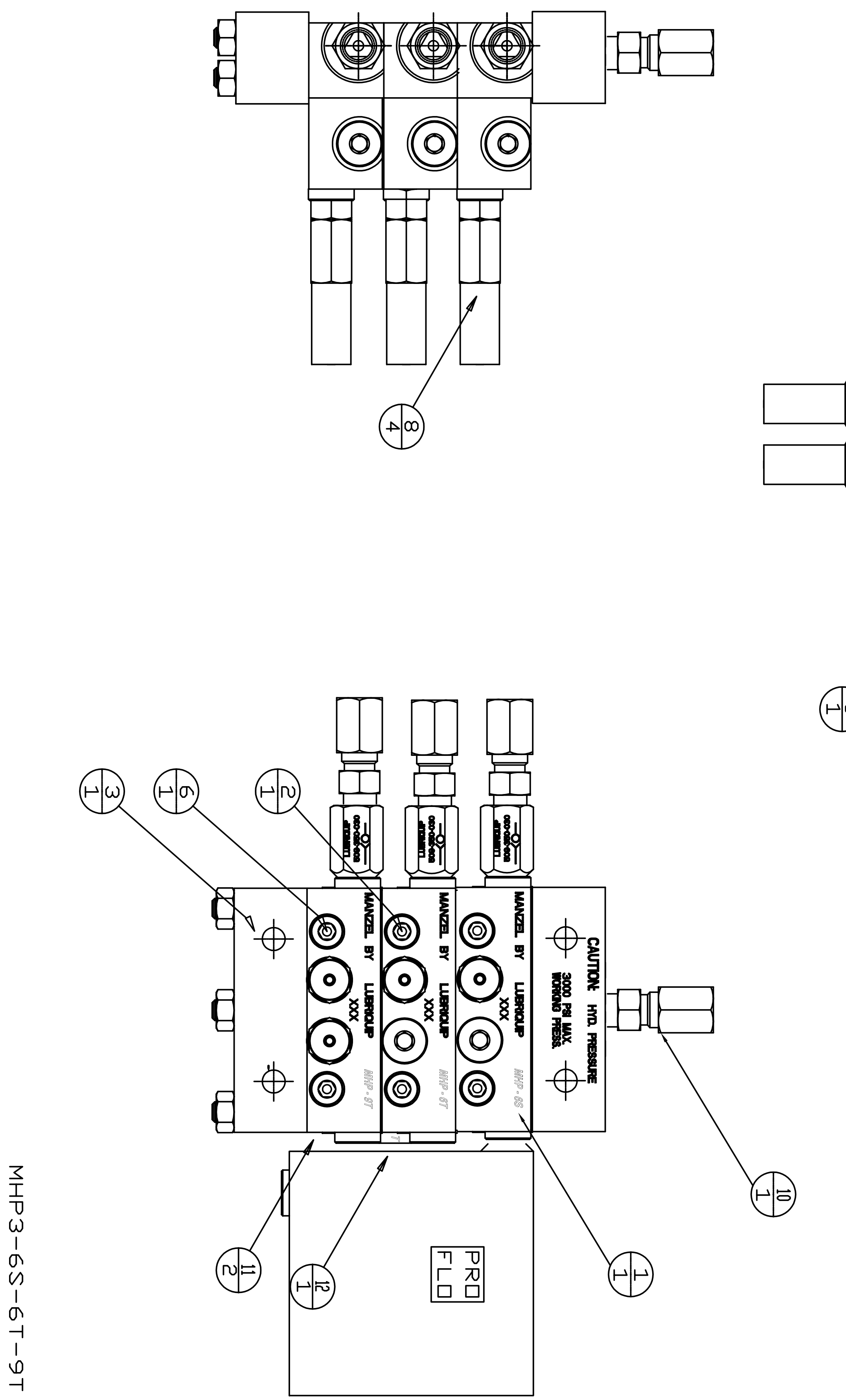
ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 6S	106-000-025
2	1	MHV VALVE BLOCK ASSY 6T	106-000-085
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-29	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 9T	106-000-095
7	4	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	4	MANUAL RESET IND. (1500 PSI)	509-932-630
9	4	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	2	PLUG-1/8 PIPE	TPN2
12	1	CROSSPORT RIGHT 6T/9T	527-005-320

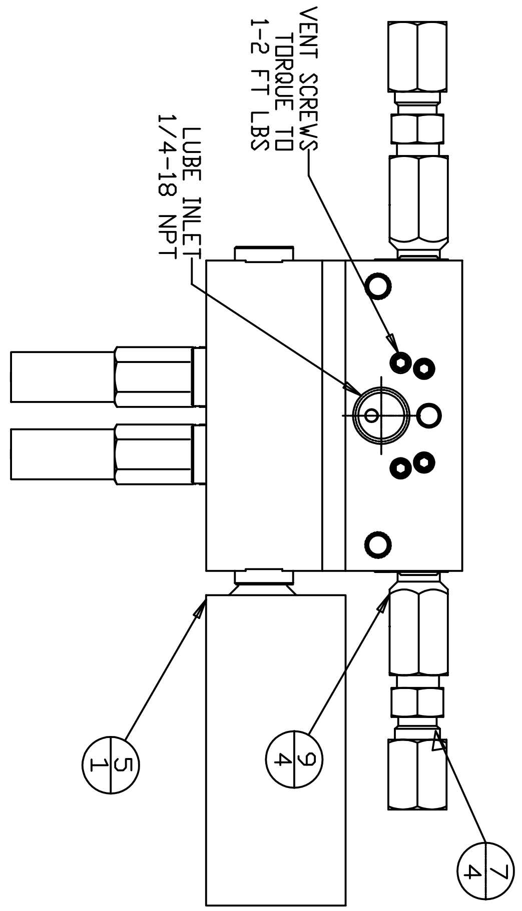




MHP3-6S-6T-9T

SLICO TRABON-MANZEL KLS-OPCO MONCALIERI - TO	e				nome A.M. / visto Plano	DENOMINAZIONE
	d				data 06/2007 / tav. 02/07	SCHEMA DIVIDER VALVE
	c				COMM. RLO3098	
	b			DIVIDER VALVE-ITEM 29		
	a				STD. SL.07036.32	DIS. SL.07036.32-02
		MODIFICHE	NOME	DATA	NUOVO PIGNONE	

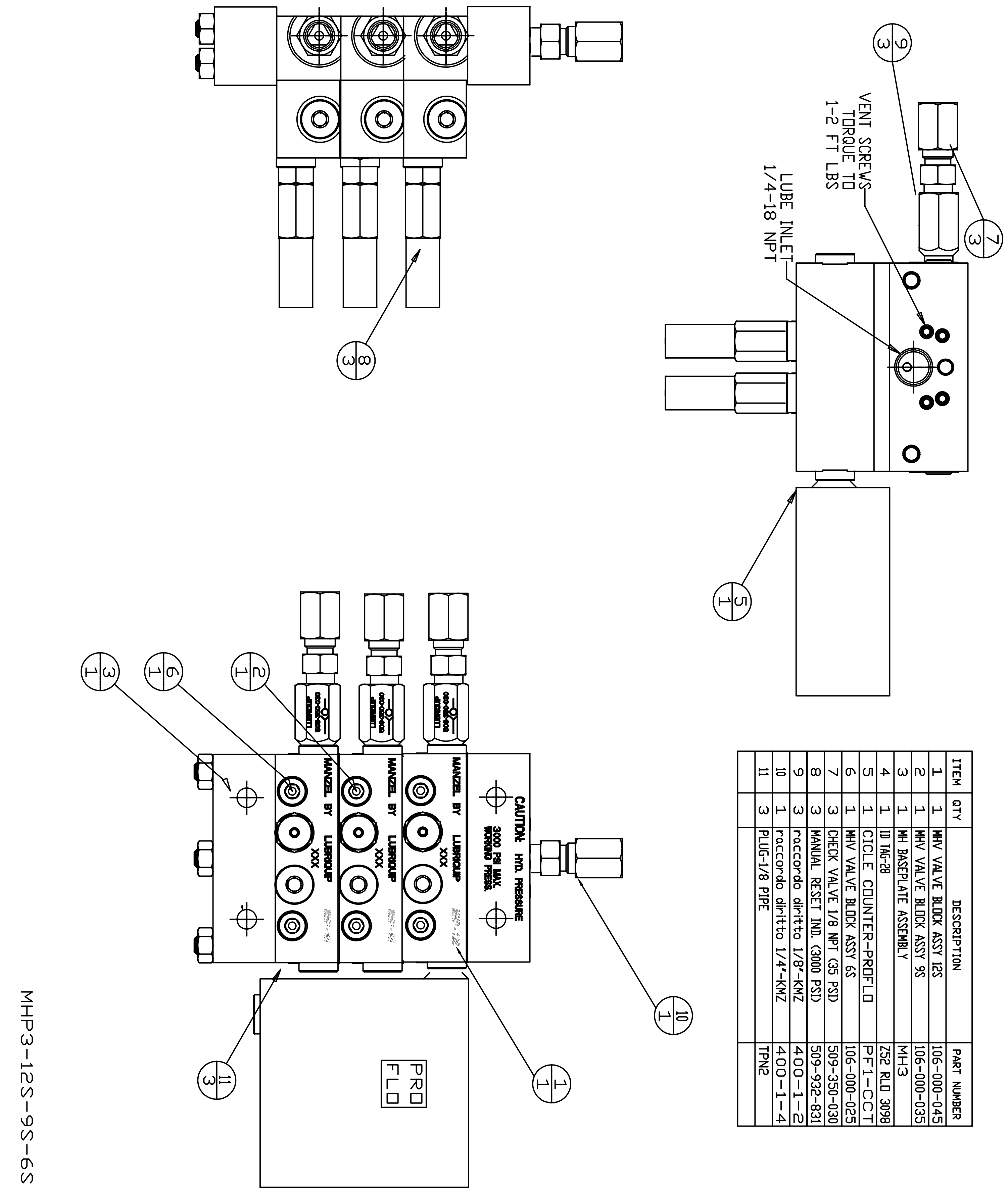




ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 6S	106-000-025
2	1	MHV VALVE BLOCK ASSY 6T	106-000-085
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-31	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 9T	106-000-095
7	4	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	4	MANUAL RESET IND. (2000 PSI)	509-932-640
9	4	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	2	PLUG-1/8 PIPE	TPN2
12	1	CROSSPORT RIGHT 6T/9T	527-005-320

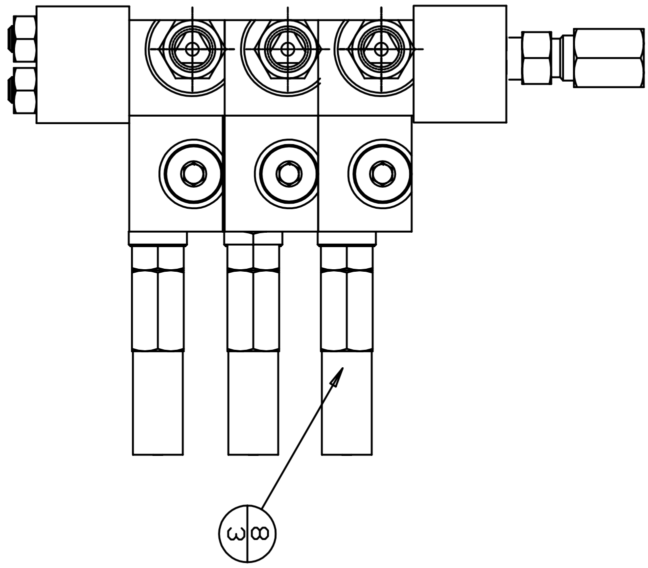
SLICO
TRABON–MANZEL
KLS–OPCO
MONCALIERI – TO

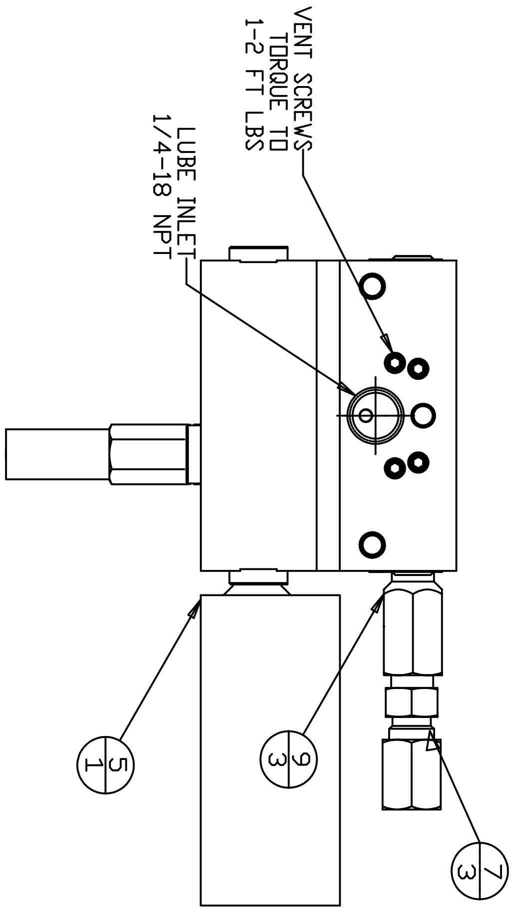
e					nome A.M.	visto Plano	DENOMINAZIONE
d					data 06/2007	tav. 03/07	SCHEMA DIVIDER VALVE
c					COMM.		
b				DIVIDER VALVE–ITEM 31	RLO3098		
a					STD.		DIS.
	MODIFICHE	NOME	DATA	NUOVO PIGNONE	SL.07036.32		SL.07036.32–03

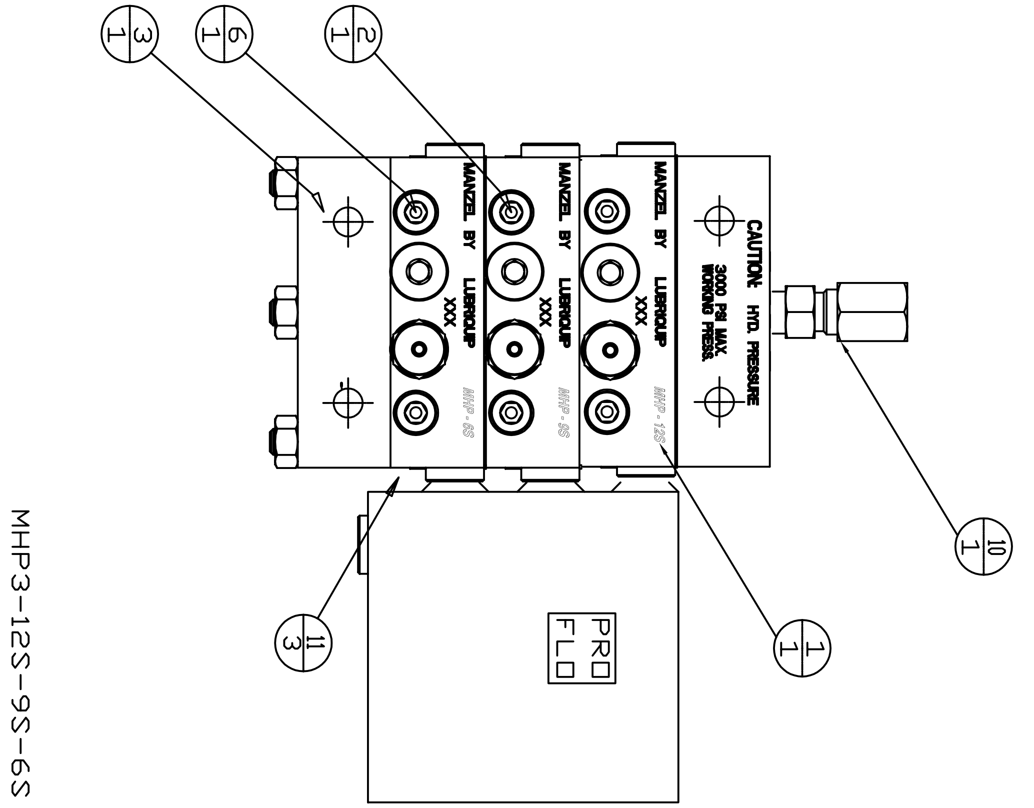


ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 12S	106-000-045
2	1	MHV VALVE BLOCK ASSY 9S	106-000-035
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-28	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 6S	106-000-025
7	3	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	3	MANUAL RESET IND. (3000 PSI)	509-932-831
9	3	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	3	PLUG-1/8 PIPE	TPN2

SLICO TRABON–MANZEL KLS–OPCO	e					nome A.M.	visto Plano	DENOMINAZIONE
	d					data 06/2007	tav. 04/07	SCHEMA DIVIDER VALVE
	c					COMM.		
	b				DIVIDER VALVE–ITEM 28	RLO3098		
	a					STD.		DIS.
MONCALIERI – TO		MODIFICHE	NOME	DATA	NUOVO PIGNONE	SL.07036.32		SL.07036.32–04

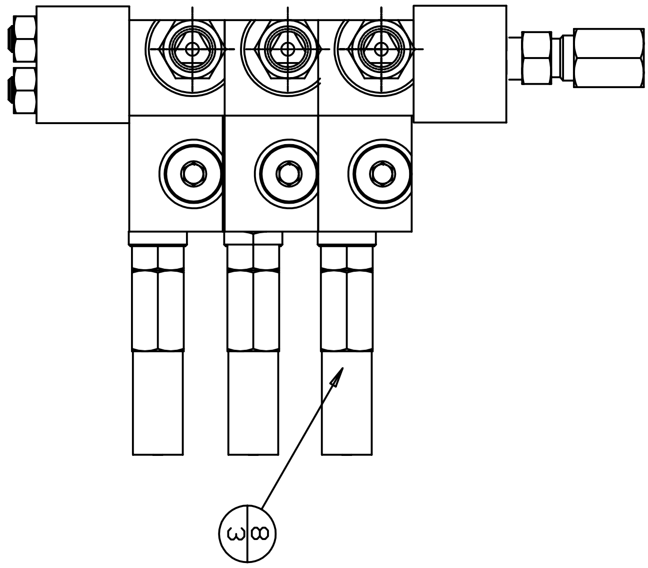


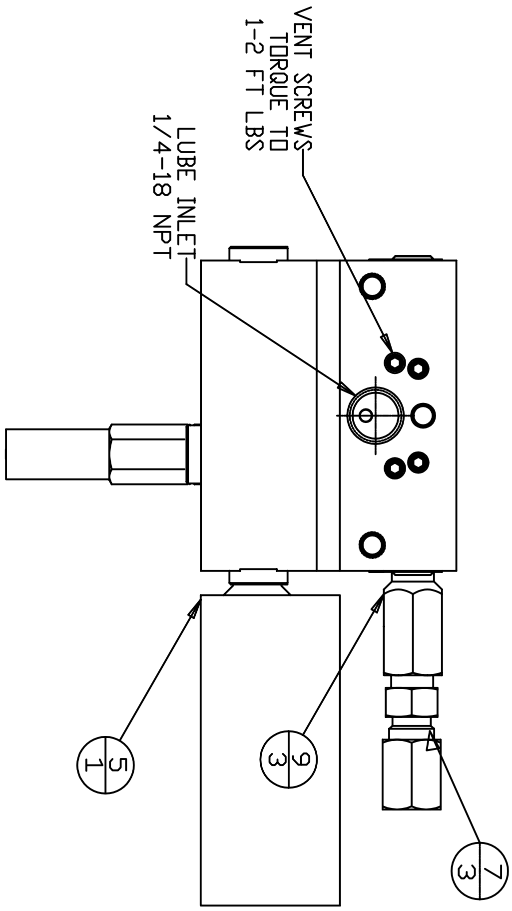


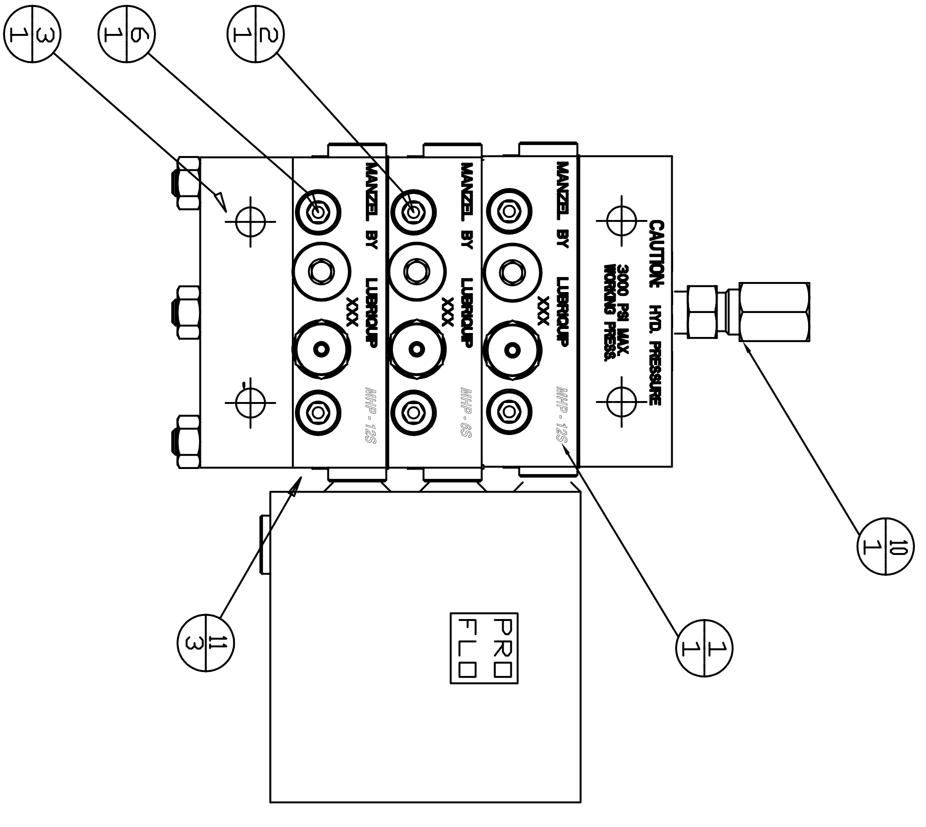


ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 12S	106-000-045
2	1	MHV VALVE BLOCK ASSY 9S	106-000-035
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-27	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 6S	106-000-025
7	3	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	3	MANUAL RESET IND. (3000 PSI)	509-932-831
9	3	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	3	PLUG-1/8 PIPE	TPN2

SLICO TRABON-MANZEL KLS-OPCO	e					nome A.M.	visto Plano	DENOMINAZIONE
	d					data 06/2007	tav. 05/07	SCHEMA DIVIDER VALVE
	c					COMM.		
	b				DIVIDER VALVE-ITEM 27	RLO3098		
	a					STD.		DIS.
MONCALIERI – TO		MODIFICHE	NOME	DATA	NUOVO PIGNONE	SL.07036.32		SL.07036.32-05



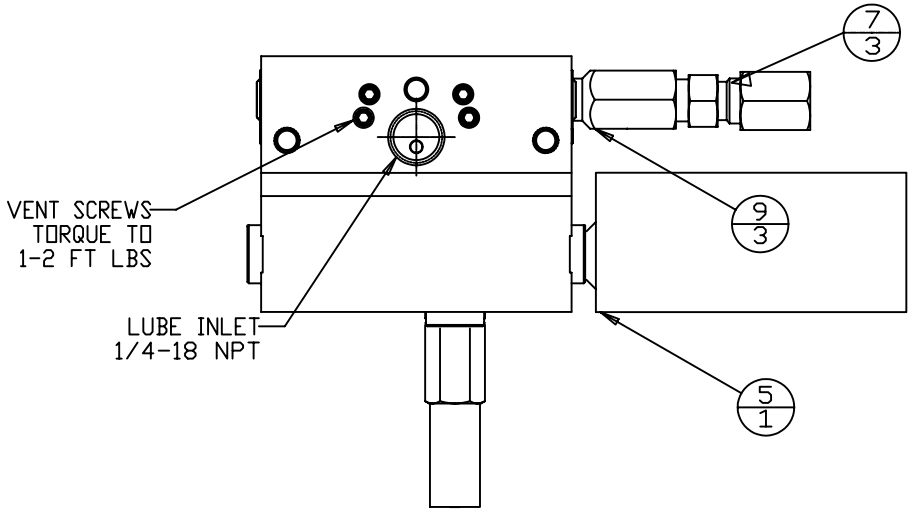




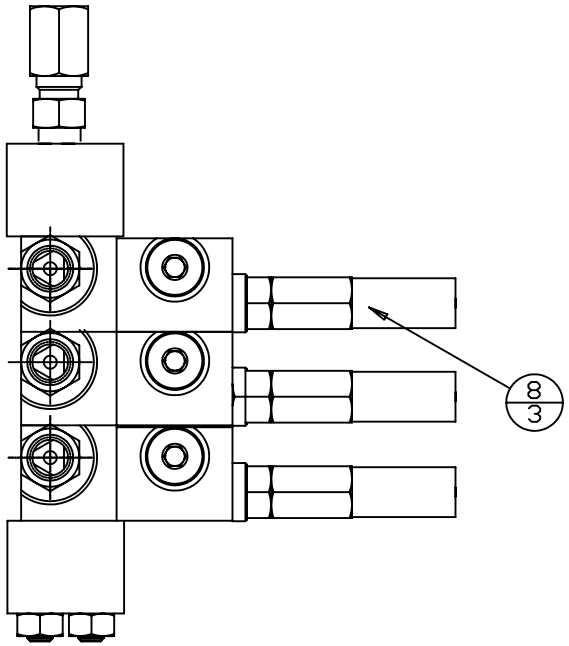
MHP3-12S-6S-12S

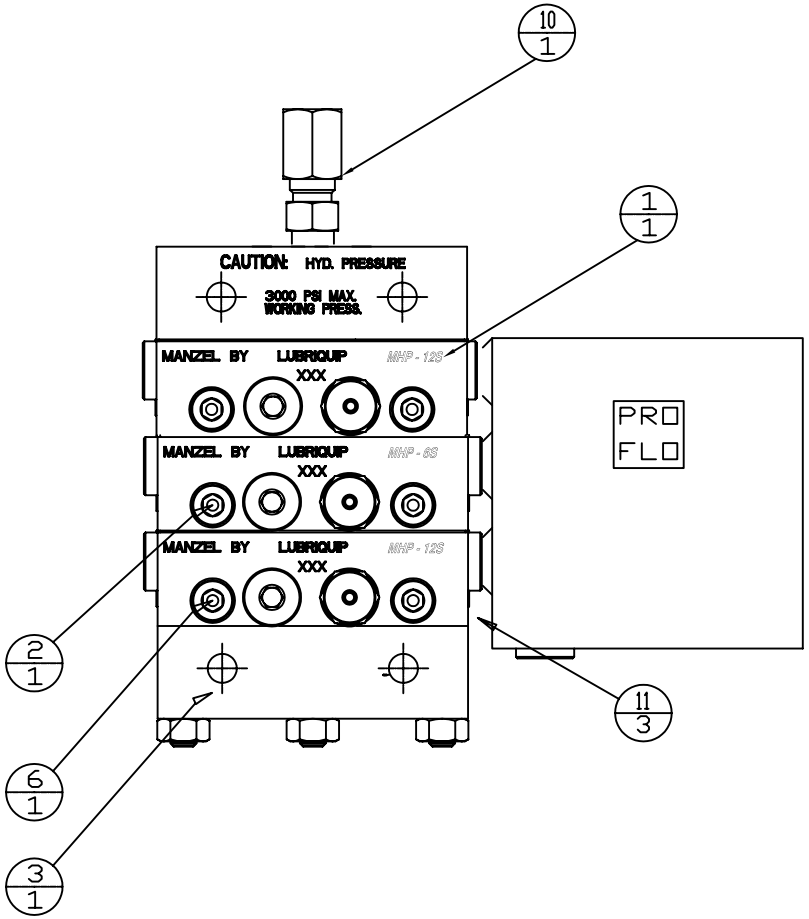
ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 12S	106-000-045
2	1	MHV VALVE BLOCK ASSY 6S	106-000-025
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-26	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 12S	106-000-045
7	3	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	3	MANUAL RESET IND. (2000 PSI)	509-932-640
9	3	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	3	PLUG-1/8 PIPE	TPN2

SLICO TRABON-MANZEL KLS-OPCO MONCALIERI - TO						
e				nome A.M.	visto Plano	DENOMINAZIONE
d				data 06/2007	tav. 06/07	SCHEMA DIVIDER VALVE
c				COMM. RLO3098		
b				DIVIDER VALVE-ITEM 26		
a				STD. SL.07036.32		DIS. SL.07036.32-06
	MODIFICHE	NOME	DATA	NUOVO PIGNONE		



ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 12S	106-000-045
2	1	MHV VALVE BLOCK ASSY 6S	106-000-025
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-32	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 12S	106-000-045
7	3	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	3	MANUAL RESET IND. (1500 PSI)	509-932-630
9	3	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	3	PLUG-1/8 PIPE	TPN2





MHP3-12S-6S-12S

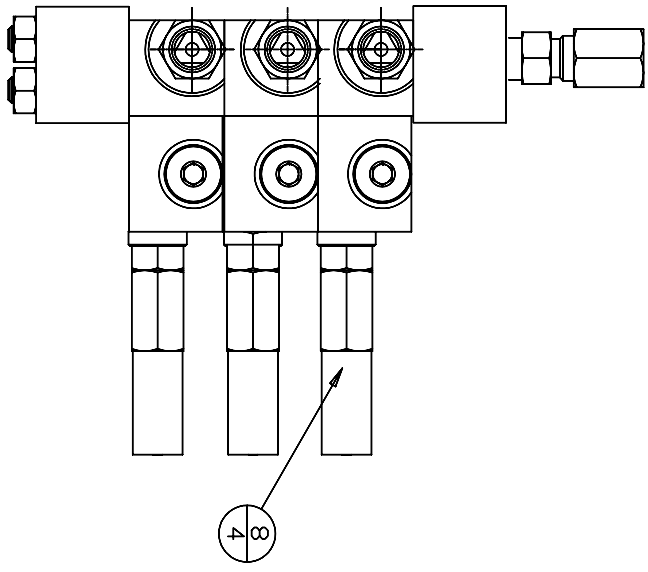
e	d	c	b	a	MODIFICHE	NOME	DATA

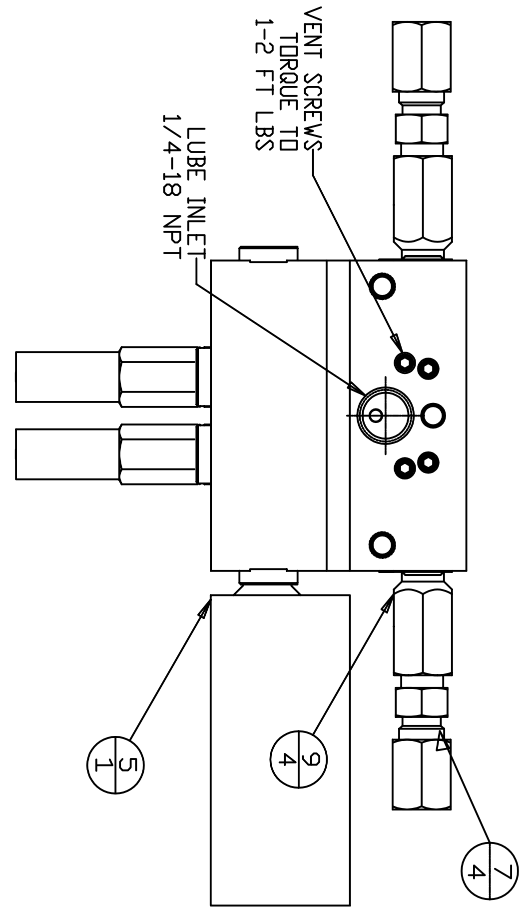
DENOMINAZIONE				
SCHEMA DIVIDER VALVE				
visto Piano				
tav. 07/07				
data 06/2007	nome A.M.			
COMM. RL03098				
STD. SL.07036.32				
DIS. SL.07036.32-07				

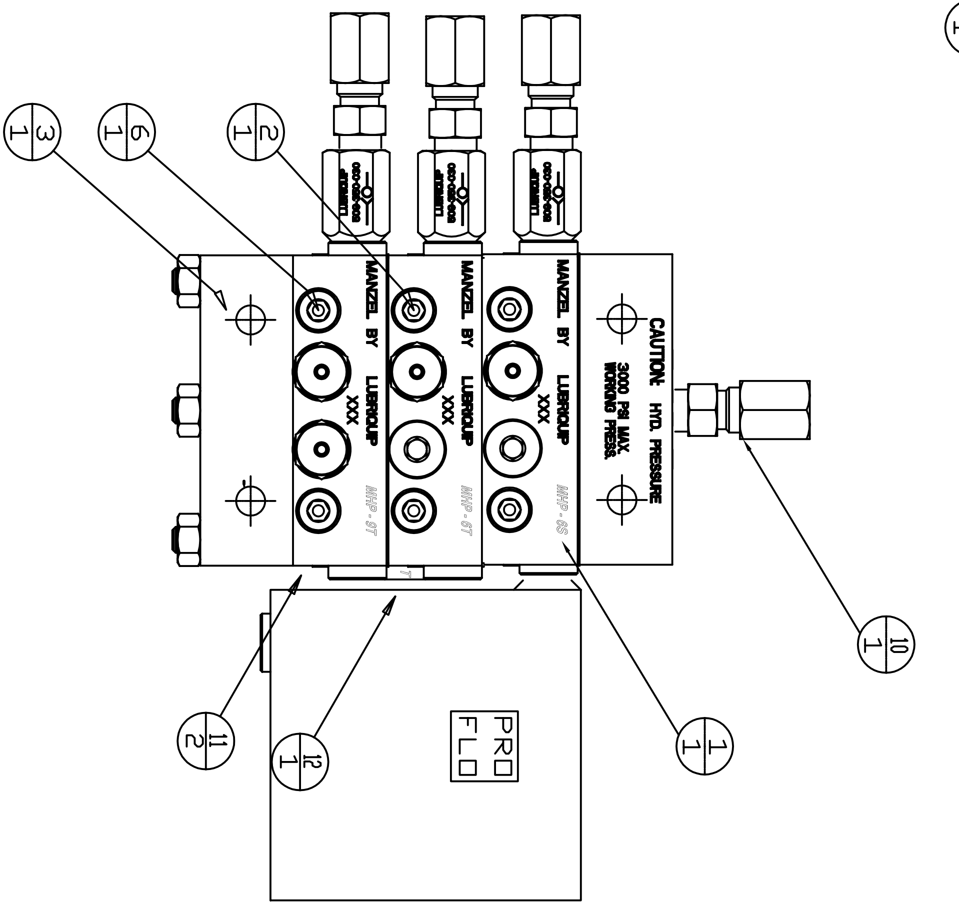
DIVIDER VALVE-ITEM 32

NUOVO PIGNONE

SLICO
TRABON-MANZEL
KLS-OPCO
MONCALIERI - TO



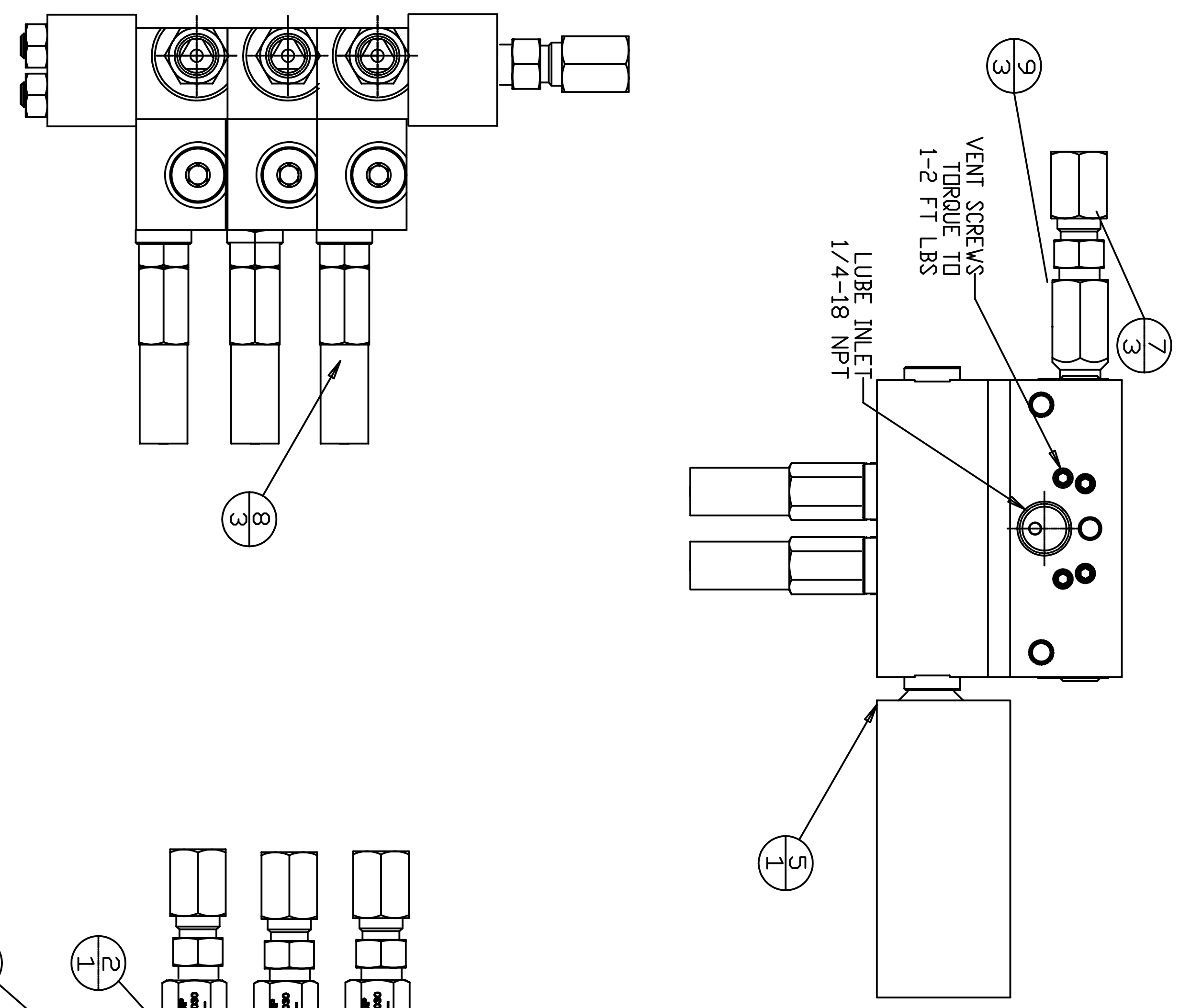


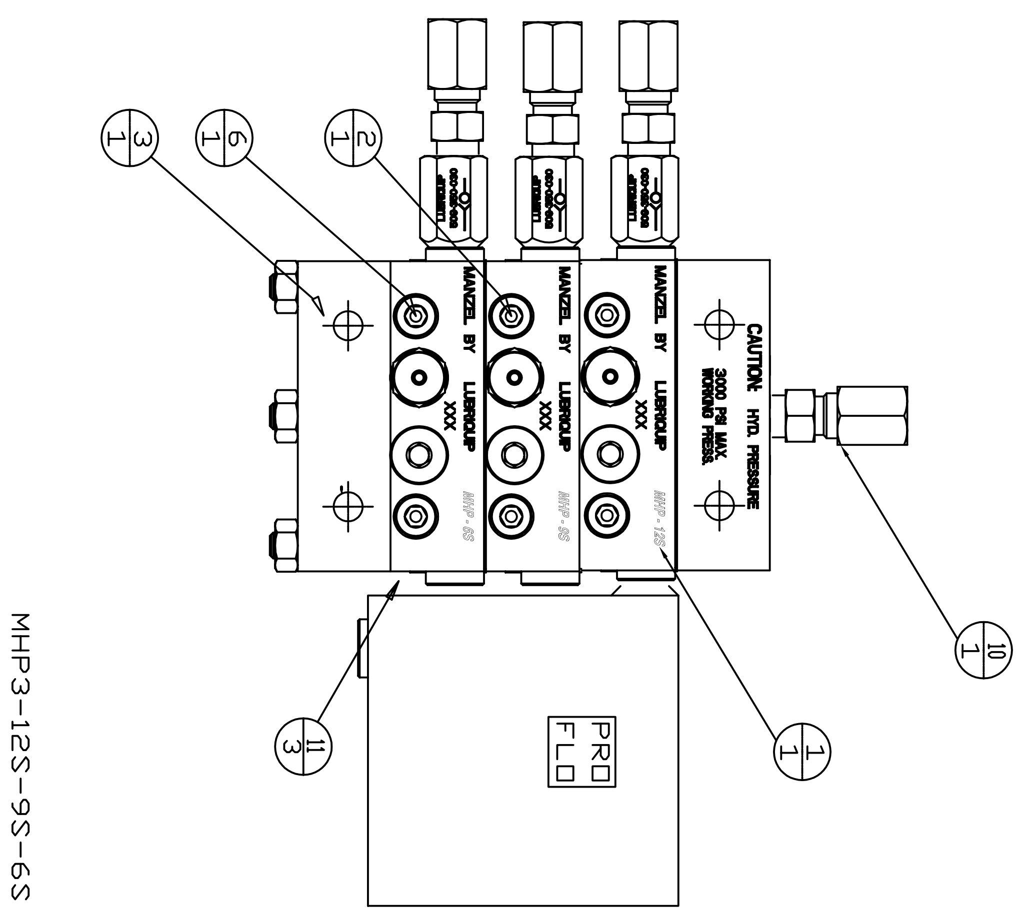


MHP3-6S-6T-9T

ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 6S	106-000-025
2	1	MHV VALVE BLOCK ASSY 6T	106-000-085
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-31	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 9T	106-000-095
7	4	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	4	MANUAL RESET IND. (2000 PSI)	509-932-640
9	4	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	2	PLUG-1/8 PIPE	TPN2
12	1	CROSSPORT RIGHT 6T/9T	527-005-320

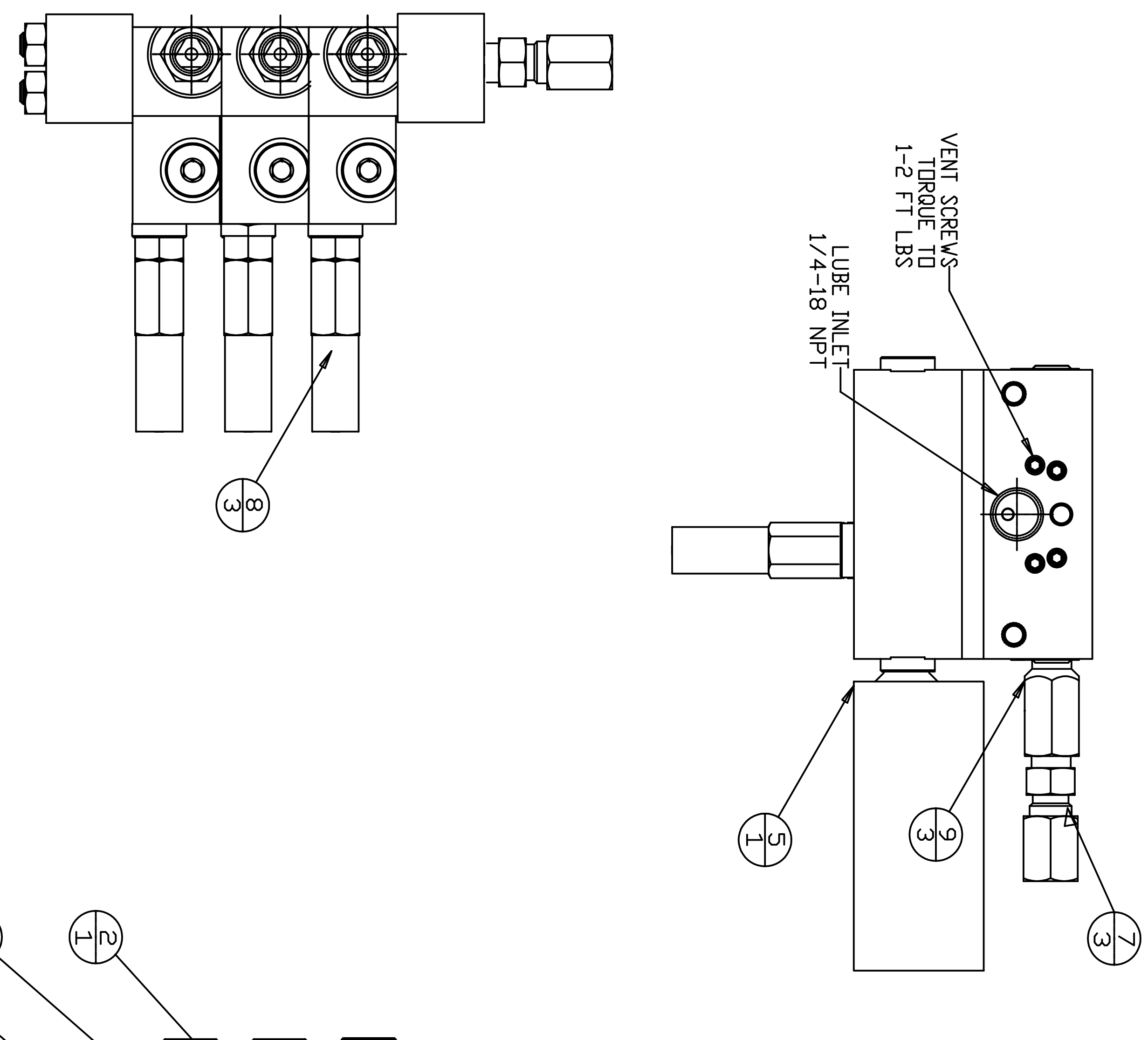
SLICO TRABON-MANZEL KLS-OPCO MONCALIERI – TO					nome A.M.	visto Plano	DENOMINAZIONE
	e				data 06/2007	tav. 03/07	SCHEMA DIVIDER VALVE
	d				COMM.		
	c			DIVIDER VALVE-ITEM 31	RLO3098		
	b				STD.		DIS.
	a			NUOVO PIGNONE	SL.07036.32		SL.07036.32-03
	MODIFICHE	NOME	DATA				

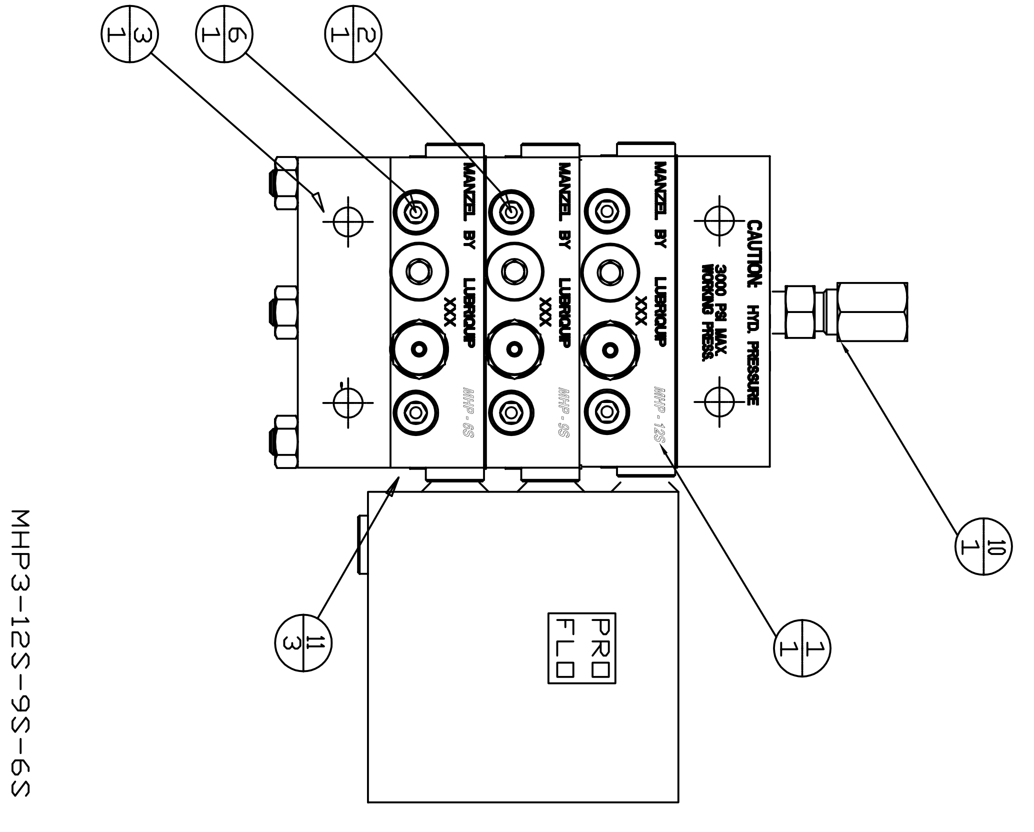




ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 12S	106-000-045
2	1	MHV VALVE BLOCK ASSY 9S	106-000-035
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-28	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 6S	106-000-025
7	3	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	3	MANUAL RESET IND. (3000 PSI)	509-932-831
9	3	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	3	PLUG-1/8 PIPE	TPN2

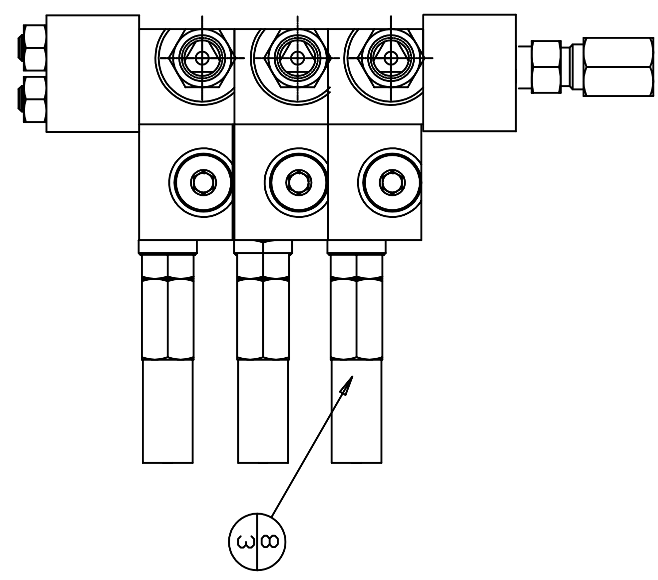
SLICO	e					nome A.M.	visto Plano	DENOMINAZIONE
TRABON-MANZEL	d					data 06/2007	tav. 04/07	SCHEMA DIVIDER VALVE
KLS-OPCO	c					COMM. RLO3098		
	b				DIVIDER VALVE-ITEM 28			
	a					STD.		DIS.
MONCALIERI - TO		MODIFICHE	NOME	DATA	NUOVO PIGNONE	SL.07036.32		SL.07036.32-04

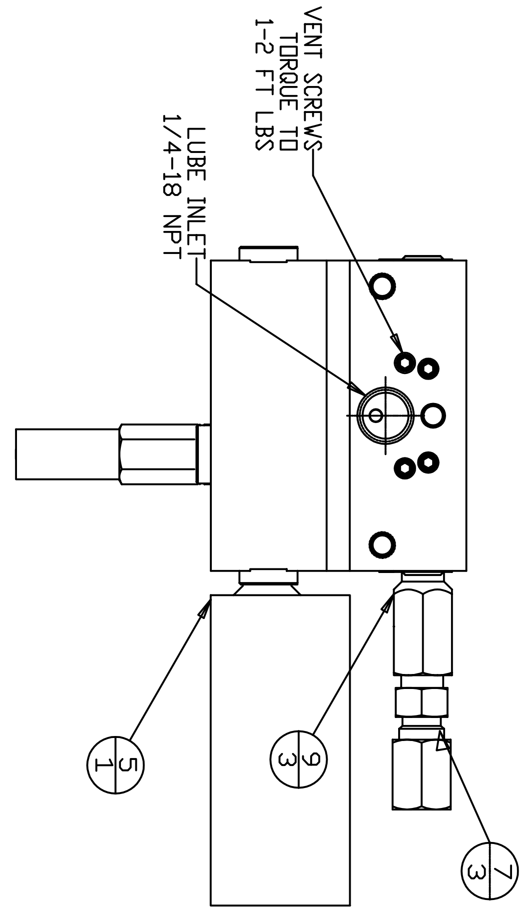


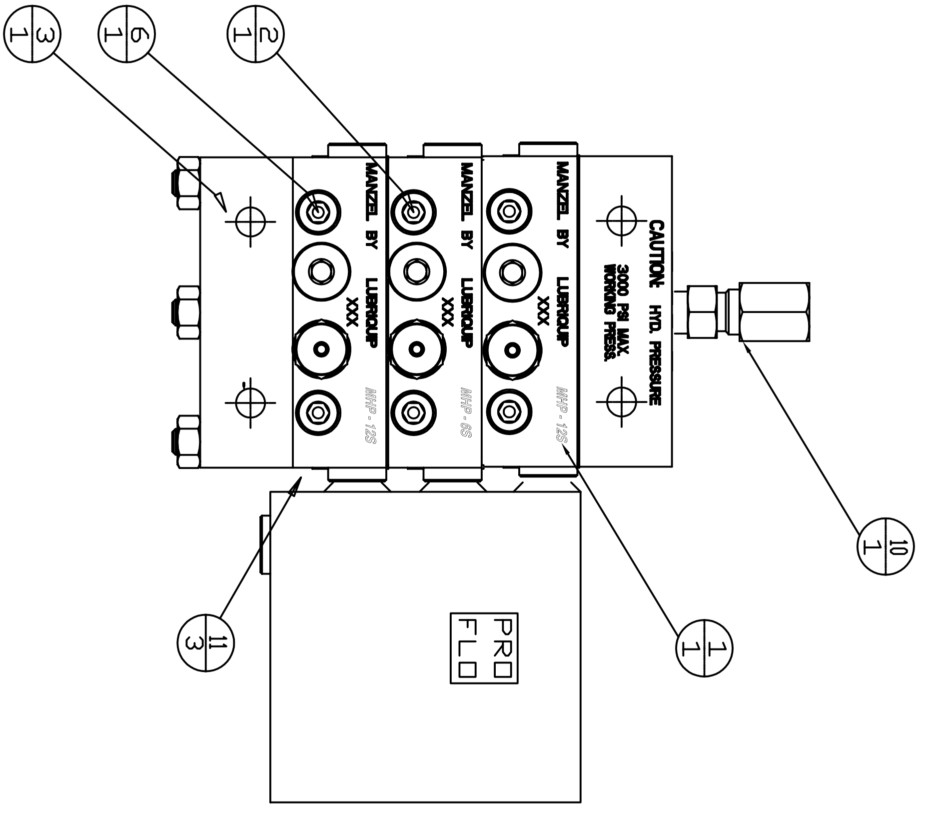


ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 12S	106-000-045
2	1	MHV VALVE BLOCK ASSY 9S	106-000-035
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-27	Z52 RLD 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 6S	106-000-025
7	3	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	3	MANUAL RESET IND. (3000 PSI)	509-932-831
9	3	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	3	PLUG-1/8 PIPE	TPN2

SLICO TRABON-MANZEL KLS-OPCO MONCALIERI - TO	e					nome A.M. / visto Plano / DENOMINAZIONE
	d					data 06/2007 / tav. 05/07 / SCHEMA DIVIDER VALVE
	c					COMM. RLO3098
	b				DIVIDER VALVE-ITEM 27	
	a					STD. SL.07036.32 / DIS. SL.07036.32-05
		MODIFICHE	NOME	DATA	NUOVO PIGNONE	







MHP3-12S-6S-12S

ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 12S	106-000-045
2	1	MHV VALVE BLOCK ASSY 6S	106-000-025
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-26	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 12S	106-000-045
7	3	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	3	MANUAL RESET IND. (2000 PSI)	509-932-640
9	3	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	3	PLUG-1/8 PIPE	TPN2

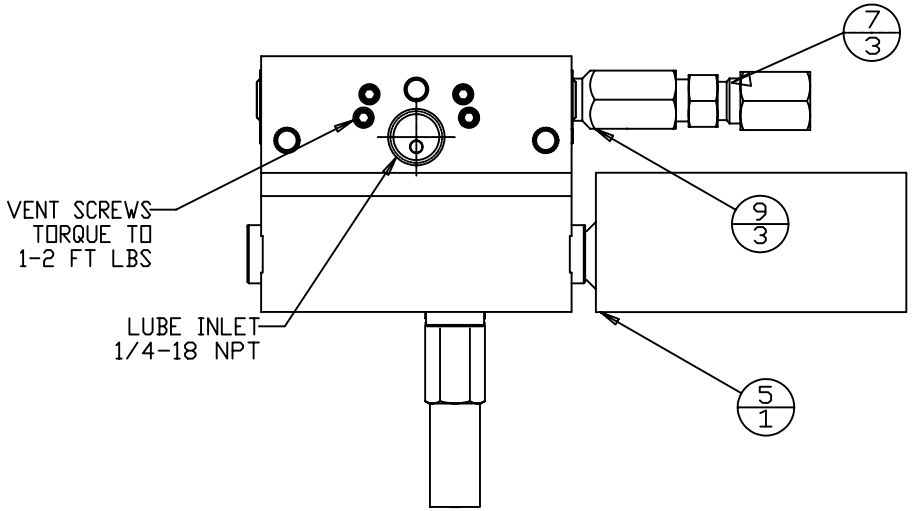
SLICO
TRABON–MANZEL
KLS–OPCO
MONCALIERI – TO

	MODIFICHE	NOME	DATA
e			
d			
c			
b			
a			

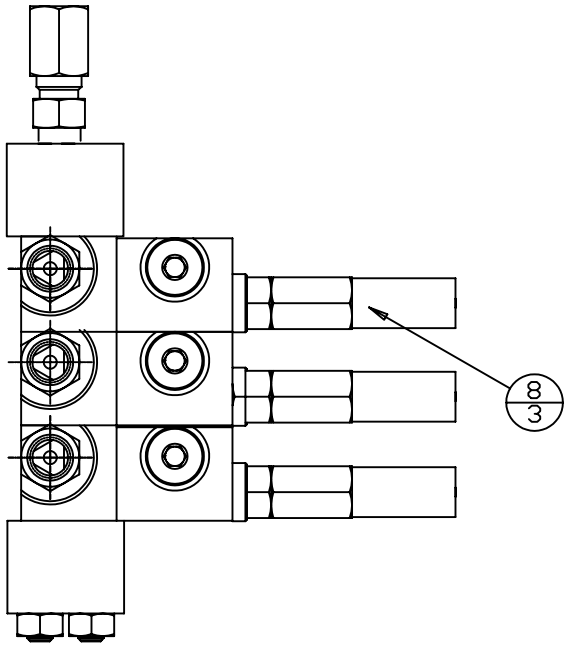
DIVIDER VALVE–ITEM 26

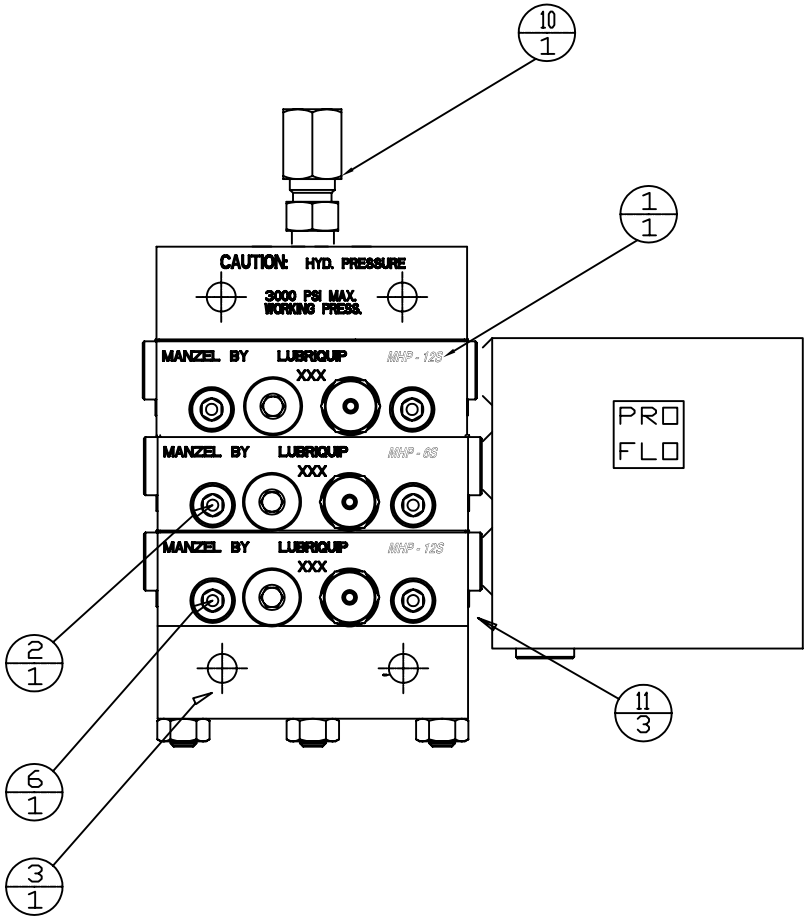
NUOVO PIGNONE

nome A.M.	visto Plano	DENOMINAZIONE
data 06/2007	tav. 06/07	SCHEMA DIVIDER VALVE
COMM. RLO3098		
STD. SL.07036.32		DIS. SL.07036.32–06



ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	MHV VALVE BLOCK ASSY 12S	106-000-045
2	1	MHV VALVE BLOCK ASSY 6S	106-000-025
3	1	MH BASEPLATE ASSEMBLY	MH3
4	1	ID TAG-32	Z52 RLO 3098
5	1	CICLE COUNTER-PROFLO	PF1-CCT
6	1	MHV VALVE BLOCK ASSY 12S	106-000-045
7	3	CHECK VALVE 1/8 NPT (35 PSI)	509-350-030
8	3	MANUAL RESET IND. (1500 PSI)	509-932-630
9	3	raccordo diritto 1/8"-KMZ	400-1-2
10	1	raccordo diritto 1/4"-KMZ	400-1-4
11	3	PLUG-1/8 PIPE	TPN2





MHP3-12S-6S-12S

e	d	c	b	a	MODIFICHE	NOME	DATA

DENOMINAZIONE				
SCHEMA DIVIDER VALVE				
visto Piano				
tav. 07/07				
data 06/2007	nome A.M.			
COMM. RL03098				
STD. SL.07036.32				
DIS. SL.07036.32-07				

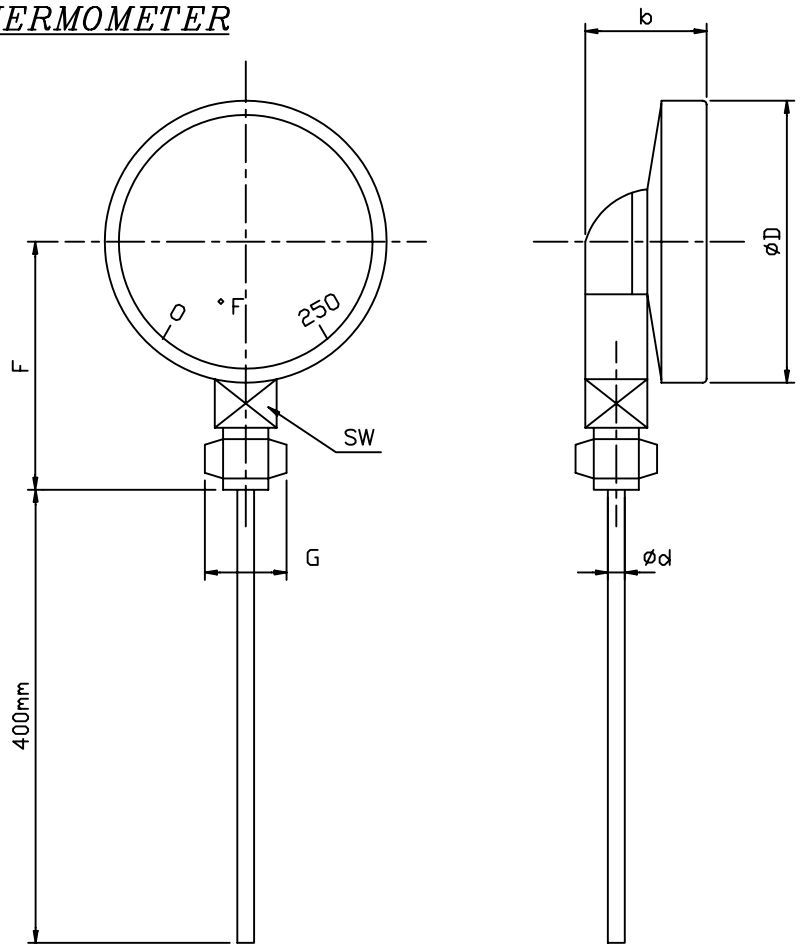
DIVIDER VALVE-ITEM 32

NUOVO PIGNONE

SLICO
TRABON-MANZEL
KLS-OPCO
MONCALIERI - TO

TERMOMETRI ATTACCO RADIALE

RADIAL THERMOMETER



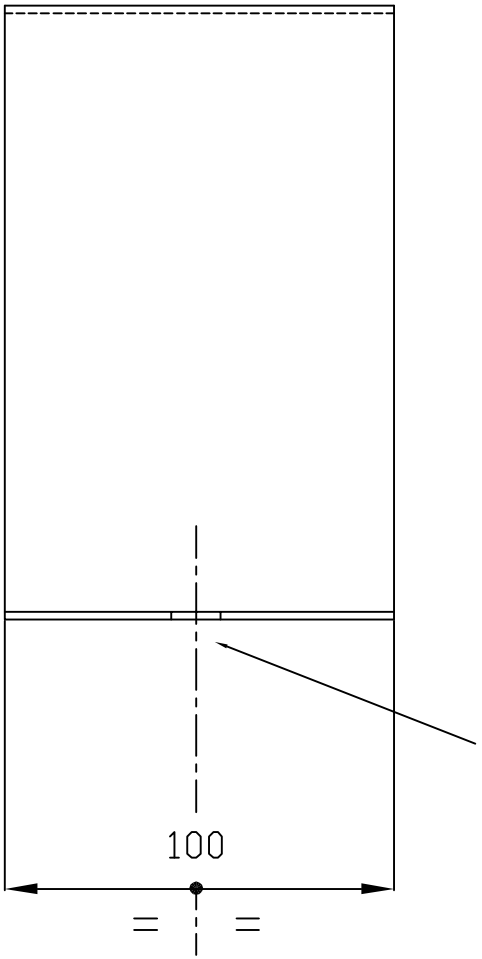
WIKA

Codice/Code
R52.063.0/250°F

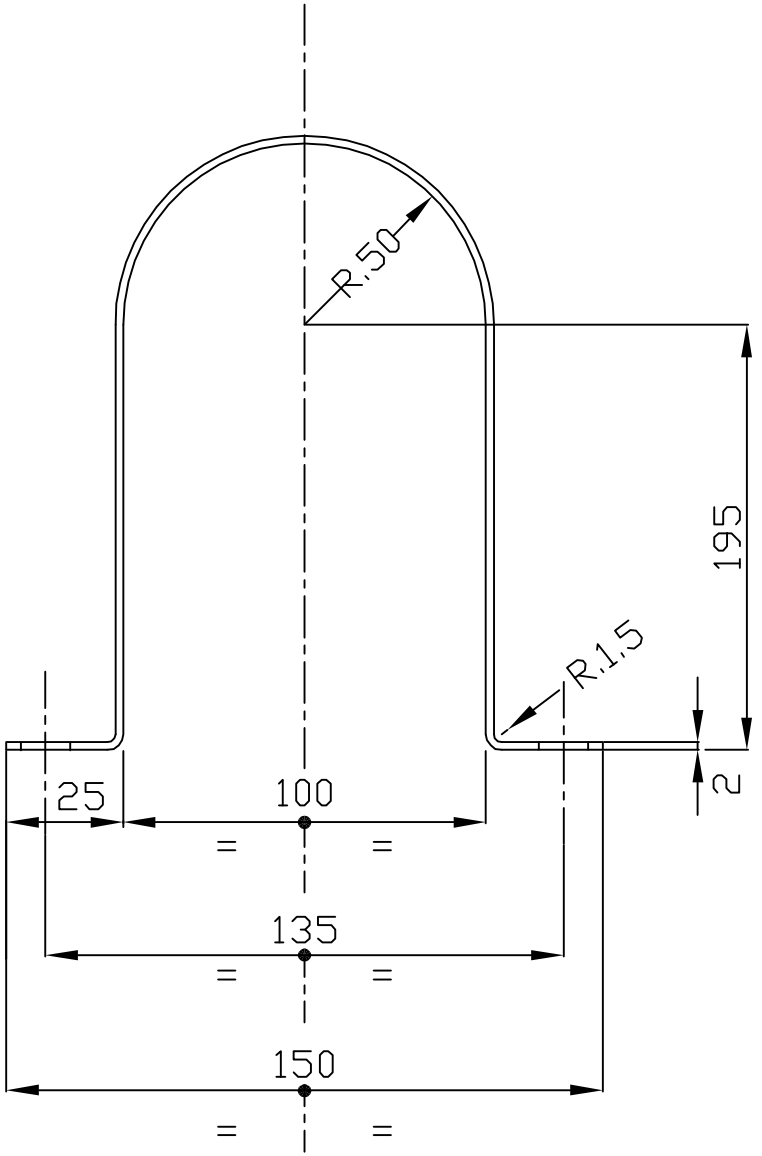
DIN EN 13 190, PRESSIONE MAX=25 bar, ACCURATEZZA 1.0
SCALA 0-250°F, COMPONENTI IN ACCIAIO INOSSIDABILE
TEMPERATURA D'UTILIZZO 0°C/100°C-0°F/250°F, IP 43

°F	D	G	d	b	F	SW
0÷250	63	1/2" B	6;8	34	47	27

DIN EN 13 190, MAX PRESS=25 bar, ACCURACY 1.0
SCALE 0-250°F, STAINLESS STEEL COMPONENTS
TEMPERATURE RANGE 0°C/100°C-0°F/250°F, IP 43



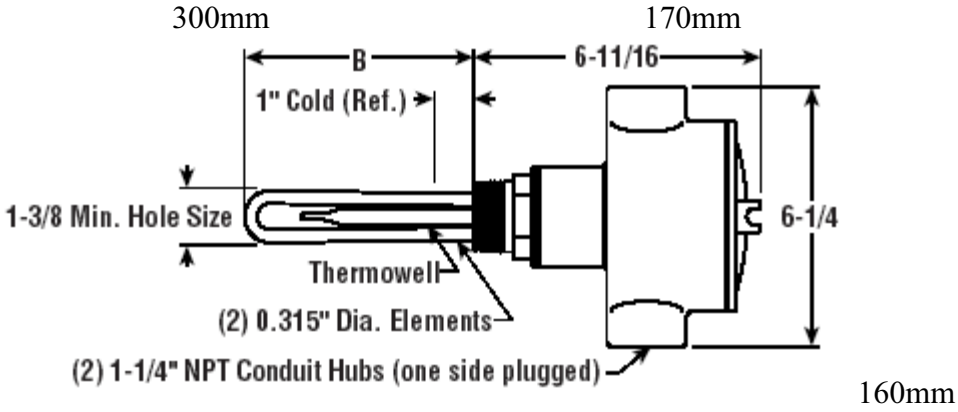
SPESSORE ALLUMINIO = 2 mm



NG modello	Materiale ALLUMINIO			Commessa	
SLICO TRABON–MANZEL KLS–OPCO *Moncalieri (TO)*	Tratt.	Prof.tratt.	Dur.HRC	Dis. Ng ITM101–09	
	Denominazione RIPARO GIUNTO			Codice RLO 03097	
	Gruppo NUOVO PIGNONE			Q.ta' 1 Scala Diseg. A.M. Data 02/2008	

Trabon – **OPCO** – **HY-POWER** – *Manzel*

HEATER



Model N°ARTMO-2155E2T2 / PCN 275055

B = 11-3/4” (300mm); 2” NPT Steel Screw Plug

Integral Thermostat DPST to break heater: 60°F-250°F

N°2 element armoured INOX AISI 316

1500 W, 120 V, 1 Ph, 24W/in^2

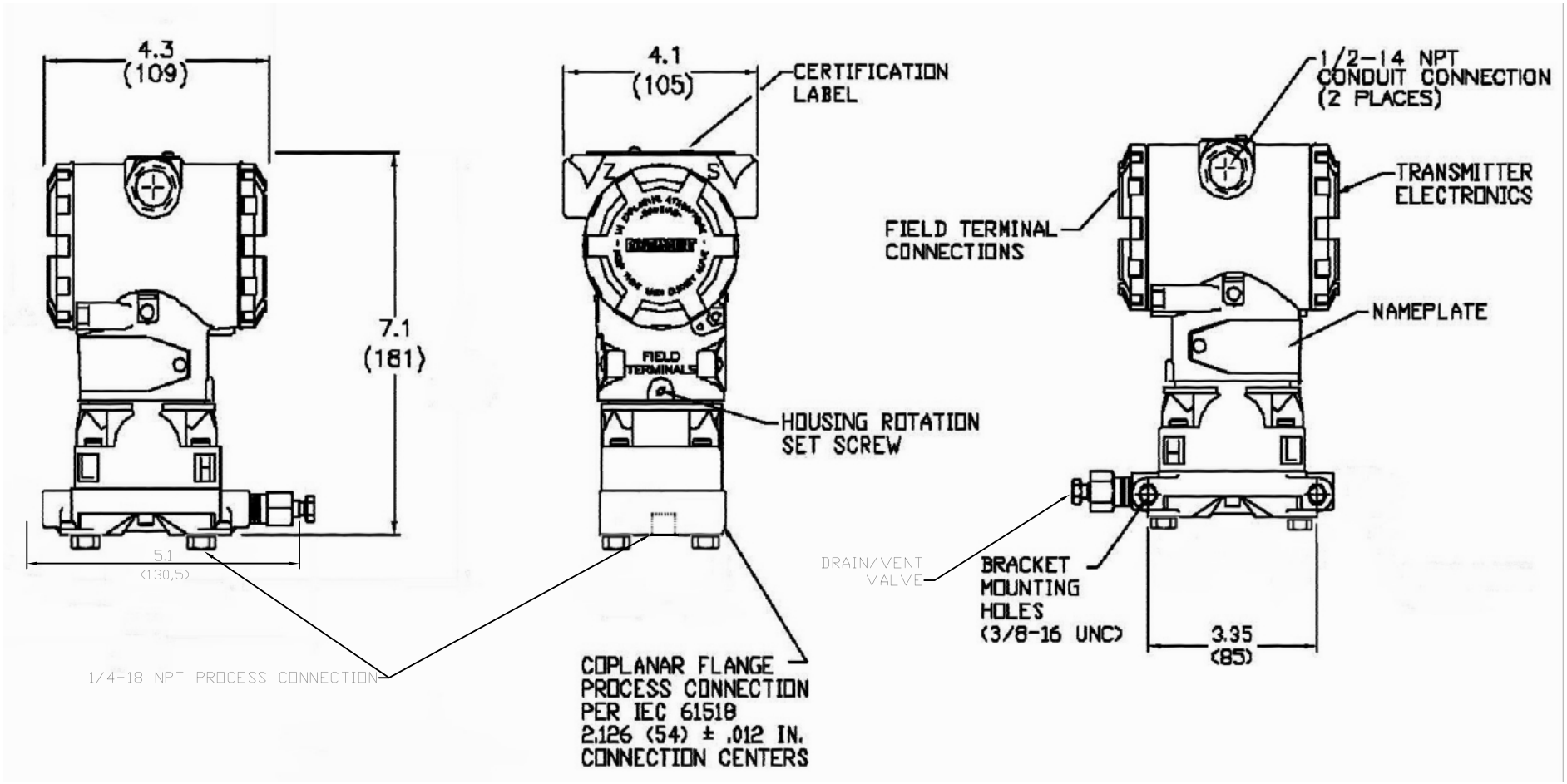
3 Lbs

Mineral Oil, Certificate: UL&CSA Class 1, Group BCD, Division 2, 4xAexd

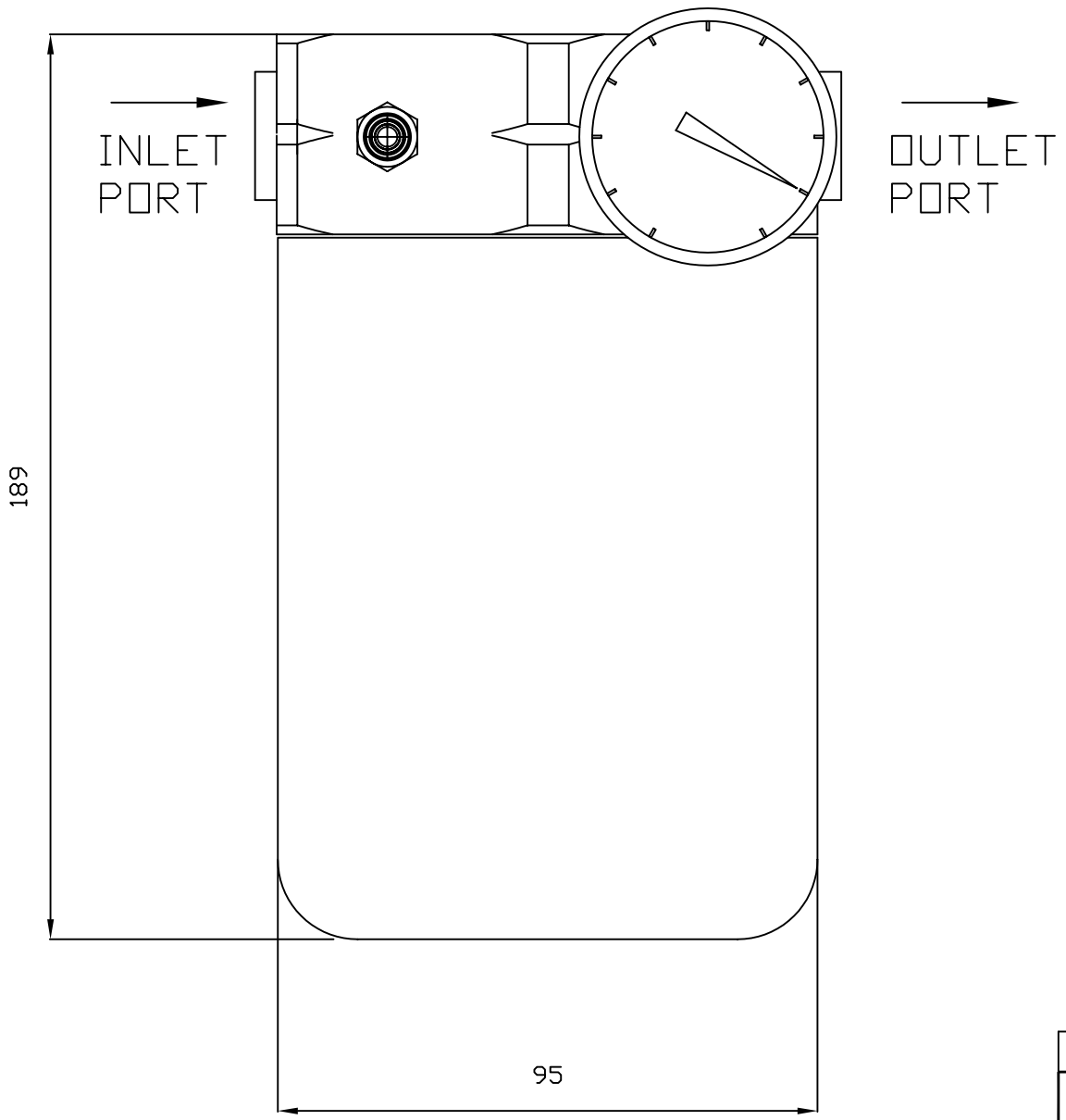
Explosion Proof Certificate N°1773852 (LR39591)

TRABON – MANZEL
S.da CARPICE, 28 – MONCALIERI - TO

	Drawn by	TITLE	IT.M07-0005	
Date:	15/01/2008			
Name:	SLICO	Approved by:	Scale	Sheet N°.:1/1



NS modello	Materiale: ALLUMINIO				Commessa
SLICO TRABON - MANZEL KLS - OPCO Moncalieri (TO)	Tratt.	Prof.tratt.	Dur.HRC	Dis. Ng: IT-M13-0002	Codice
	Denominazione: TRASDUTTORE DI PRESSIONE EMERSON 3051S1CG (0÷62mbar)			Q.ta': 1	
	Gruppo: NUOVO PIGNONE			Scala	
				Diseg.: M.M.	
				Data: 09/2007	



SUCTION FILTER WITH CLOGGING INDICATOR

PORT $\frac{3}{4}''$

MAX OPERATING PRESSURE
12 BAR CONTINUOUS DUTY

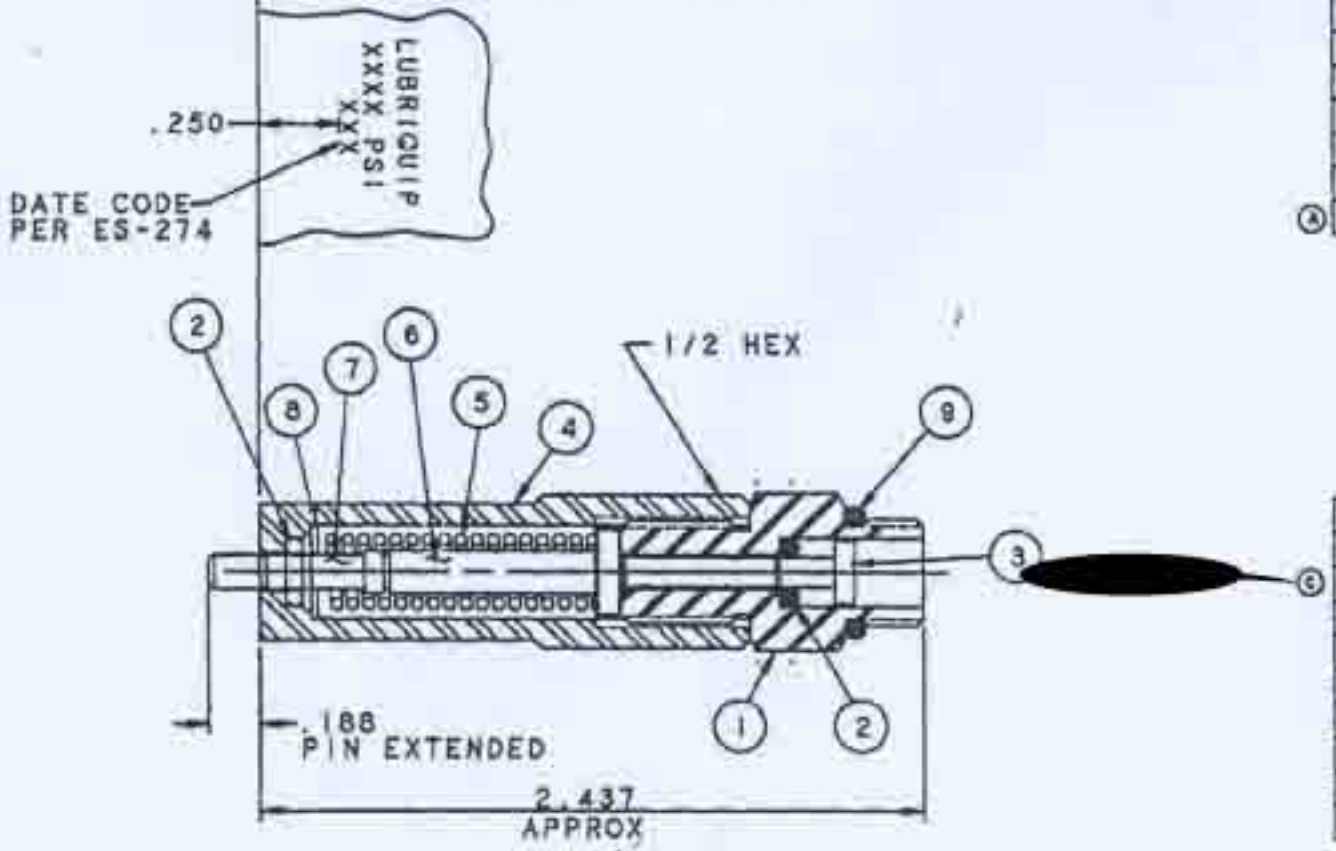
125 MICRON FILTER ELEMENT

STANDARD SEALS BUNA-N

BY-PASS VALVE HEAD THL
ON INTAKE LINE OPENING
STARTS AT 0.25 BAR +/-10%

NG modello NUOVO PIGNONE	Materiale ACC. INOX			Commessa RLO 03097
SLICO TRABON-MANZEL KLS-OPCO *Moncalieri (TO)*	Tratt.	Prof.tratt.	Dur.HRC	Dis. Ng 473-020-274
	Denominazione SUCTION FILTER 125 MICRON			Codice
	Gruppo ALBERTA			Q.ta' 1 Scala 1:4 Diseg. A.M. Data 05/2007

PARTIAL DEVELOPED VIEW SHOWING STAMPING
NOTE: STAMP PSI PER CHART
ALL CHARACTERS TO BE 3/32" HIGH



ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	BODY	509-397-030
2	2	O-RING-006	422-040-060
3	1	PISTON	509-385-000
4	1	CAP	509-928-000
5	1	SPRING	SEE CHART
6	1	PISTON	509-929-000
7	1	INDICATOR PIN	509-930-000
8	1	WASHER	509-932-100
(A) 9	1	O-RING	422-210-030

NOTE:
TEST PER TP-516

STAMPING SPEC.			
ASS'Y NO.	PRESSURE	P/N ITEM #5	SPRING COLOR
509-932-840	3500	458-006-048	BLACK
509-932-650	2500	509-394-000	PURPLE
509-932-640	2000	509-393-000	ORANGE
509-932-630	1500	509-392-000	RED
509-932-620	1000	509-391-000	YELLOW
509-932-610	750	509-388-000	ALUMINUM
509-932-600	500	509-390-000	BLUE
509-932-590	250	509-389-000	GREEN

MAT'L. PART No.:
MAT'L. SIZE:
HEAT TREAT:
PLATING OR PAINTING:

UNLESS OTHERWISE SPECIFIED:
TOLERANCES:
MACHINING ±.010
FABRICATION ±.020
SAND CAST ±.030
DIE CAST ±.010
INVESTMENT CAST ±.010
INJECTION MOLD ±.010
ANGLES ± 1/2 DEG.
MACHINED SURFACES 125 MICROINCH MAXIMUM
REMOVE ALL BURRS
BREAK SHARP EDGES .010 RAD/45 CHMF.

E	D	C	B	A	RELEASE	LETTER
		5-25-89	12-18-84	3-17-94	3-14-84	DATE
		CDG	RH	DH	H.B.	BY
		36054	30108	28718	28689	EA/ECN

LUBRIQUIP®
Centralized Lubrication Systems
LUBRIQUIP, INC. A Unit of IDEX Corporation
(8900) CRANWOOD PARKWAY, CLEVELAND, OHIO 44128

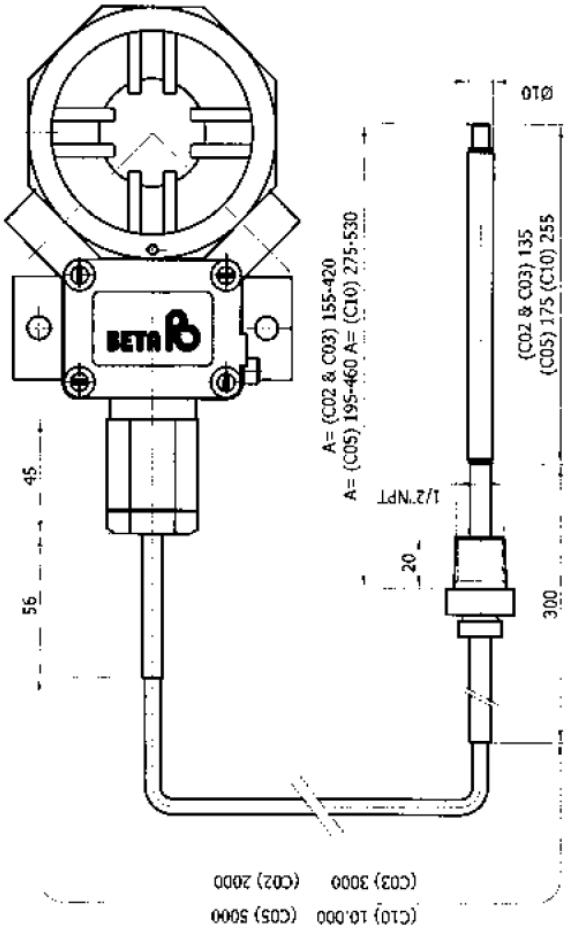
NAME: O-RING SEAL PORT
MANUAL RESET INDICATOR

DRAWN BY:	DATE:	CHECKED BY:
M. BOSLEY	3-10-94	JR VH

SCALE:	DWG. SIZE:	DWG. No.
-N-	B	509-932-590

Trabon – **OPCO** – **HY-POWER** – *Manzel*

TEMPERATURE SWITCH



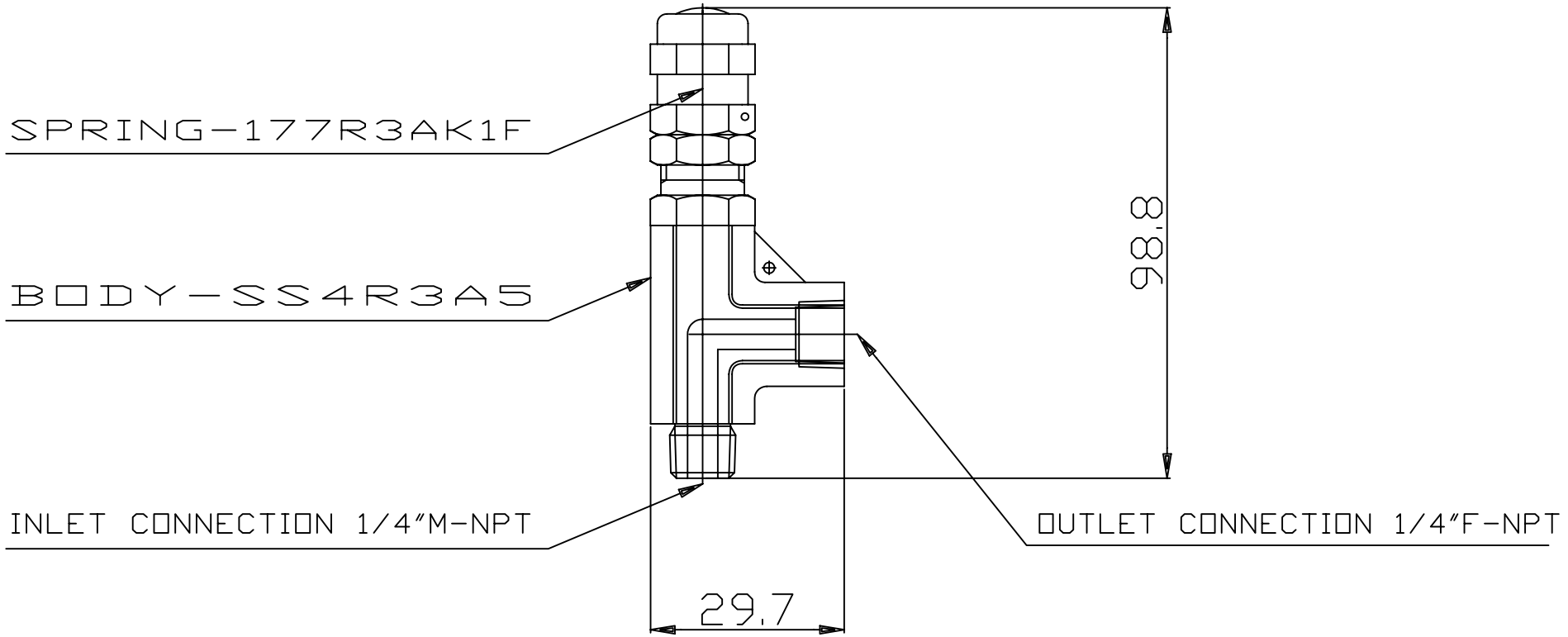
TYPE	A (±1,5)	B (±3,)	C (±5,0)
W3-T548H-C02-S0-K1	135	155-240	2000

SLICO
TRABON – MANZEL
S.da CARPICE, 28 – MONCALIERI - TO

	Drawn by	TITLE	IT-M22-0001	
Date:	14/01/2008			
Name:	SLICO	Approved by:	Scale	Sheet N°.:1/1

OPERATIONAL RANGE 3000-4000 PSI

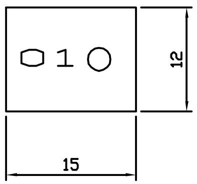
SET TO 3500 PSI



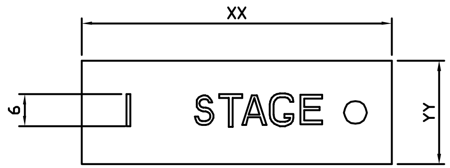
SET 3500 PSI

NG modello	Materiale 316 STAINLESS STEEL	Commessa RLO 03097
SLICO TRABON-MANZEL KLS-OPCO *Moncalieri (TO)*	Tratt. / Prof.tratt. / Dur.HRC	Dis. Ng SL.07036.33-03
	Denominazione LUBRICATOR CONSOLE RELIEF VALVE	Codice
	Gruppo ALBERTA-H2 NUOVO PIGNONE	Q.ta' 1 of 1 Scala 1:2.5 Diseg. A.M. Data 01/2008

DIMENSIONI
TARGHETTA



EX
ALTEZZA LETTERE = 6
COME DA ESEMPIO



MATERIALE INOX AISI 304
SPESSORE 5-8/10
INCISIONE CHIMICA

OGGETTO DA SCRIVERE DENTRO	QUANTITA'
01	03
02	03
03	03
04	03
05	03
07	03
08	03
09	03
10	03
11	03
12	06
13	03
14	03
15	03
16	03
17	03
18	03
19	03
20	06
21	03
22	03
23	12
24	03
25	03
26	06
27	03
28	03
29	06
30	21

SLICO
TRABON-MANZEL
KLS-OPCO
MONCALIERI - TO

	MODIFICHE	NOME	DATA
e			
d			
c			
b			
a			

ID TAG

ALBERTA - H2

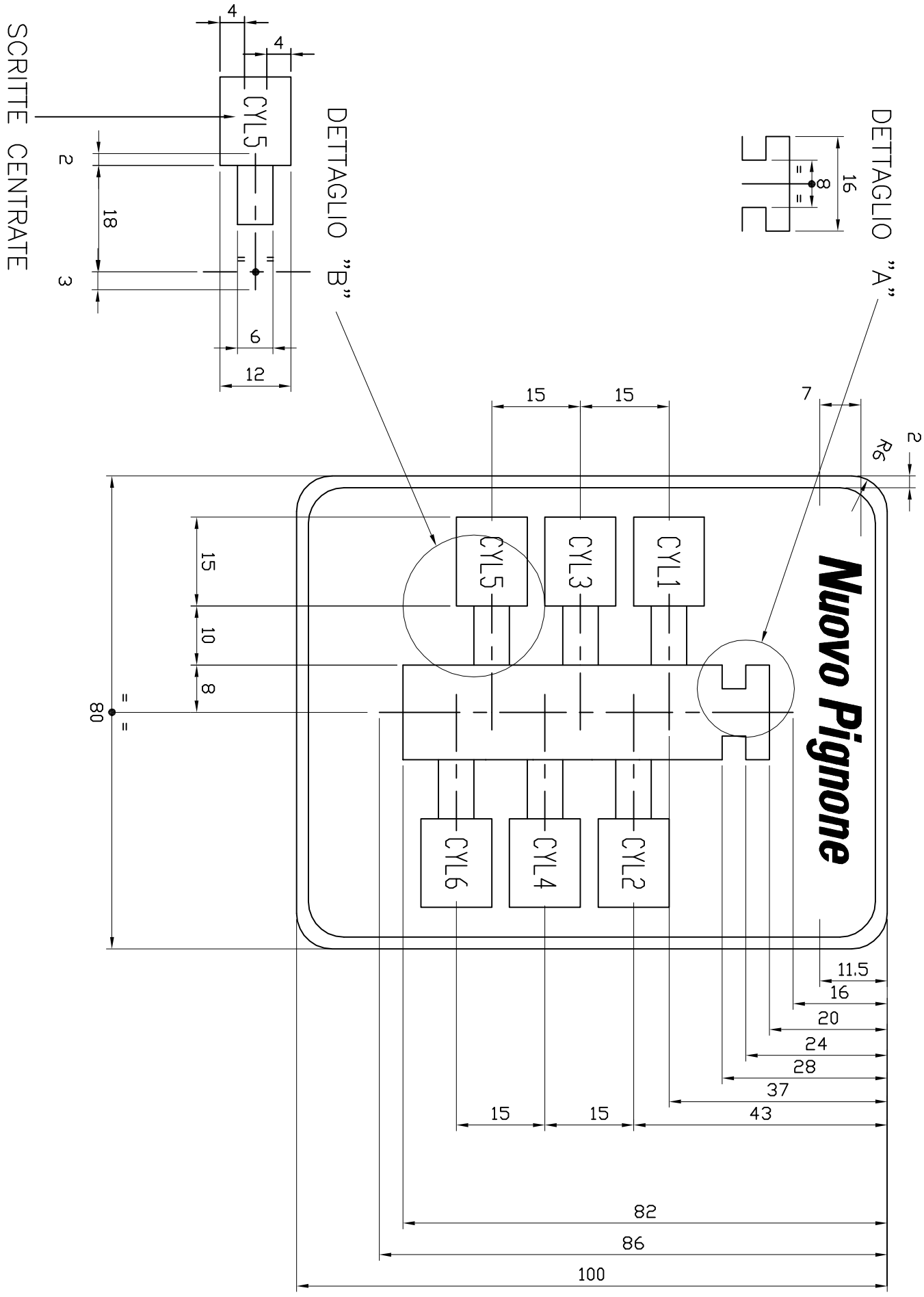
nome A.M. | visto Plano
data 01/2008 | tav. 01/03

COMM. RLO3097

STD. SL.07036.31

DENOMINAZIONE ID-TAG

DIS. SL.07036.31-01

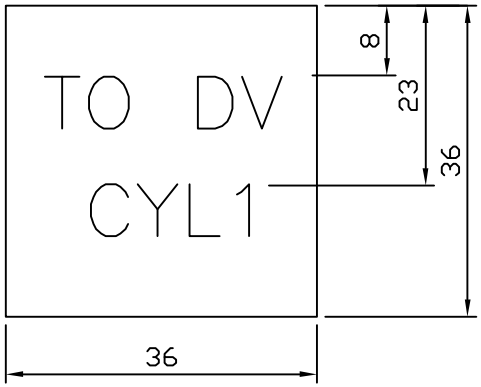


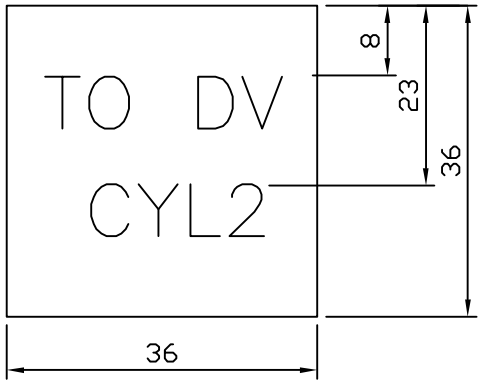
ARALDITE AUTOADESIVA BIANCO–SCRITTA NERA

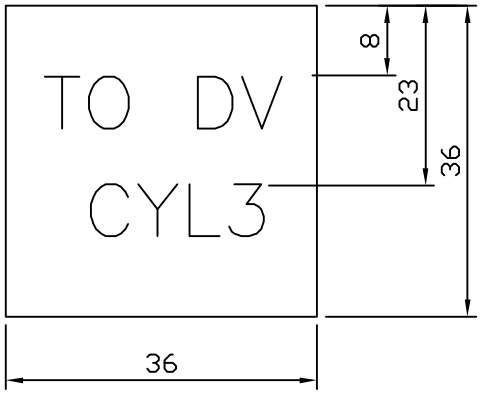
ALTEZZA CARATTERI = 4 mm

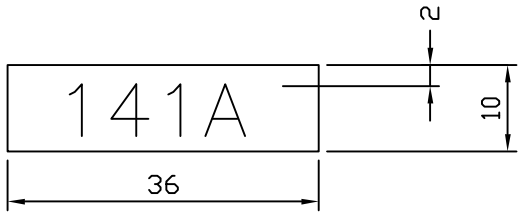
SLICO TRABON–MANZEL KLS–OPCO MONCALIERI – TO	e					nome A.M.	visto Plano	DENOMINAZIONE
	d					data 05/2007	tav. 02/03	SCHEMA DIVIDER VALVE
	c					COMM.		
	b				DIVIDER VALVE NAME PLATE	ID–TAG		
	a					STD.		DIS.
		MODIFICHE	NOME	DATA	NUOVO PIGNONE	SL.07036.31		SL.07036.31–02

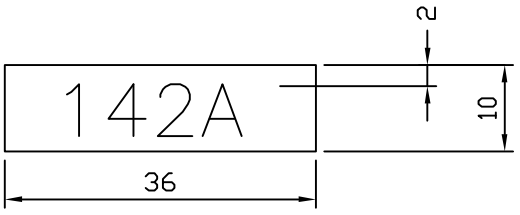
ARALDITE AUTOADESIVA BIANCO–SCRITTA NERA
ALTEZZA CARATTERI = 6 mm
SCRITTE CENTRATE & SIMMETRICHE

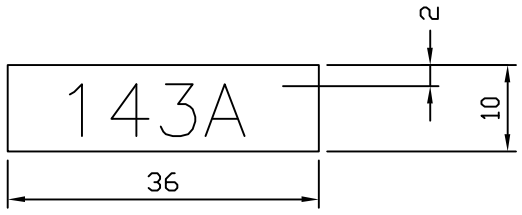


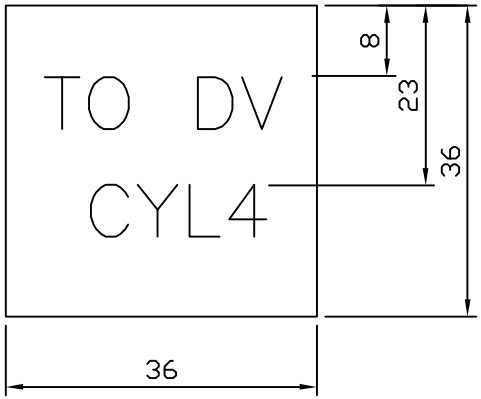


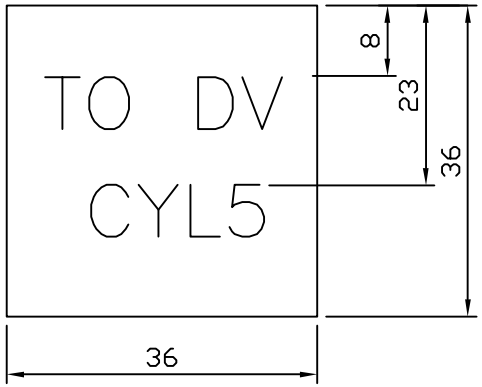


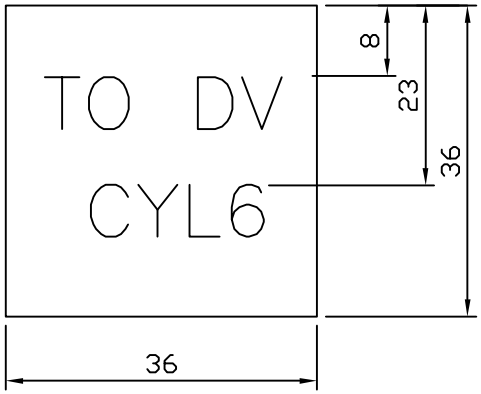


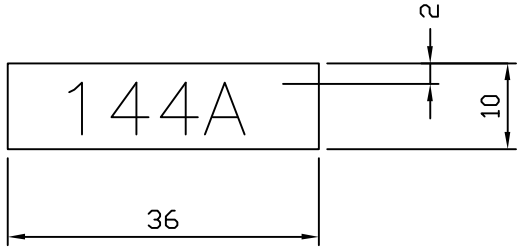


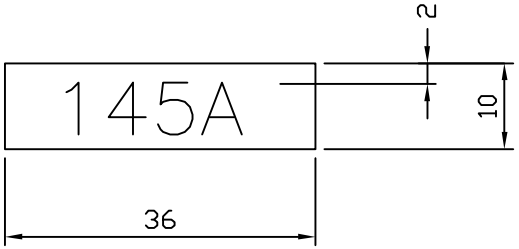


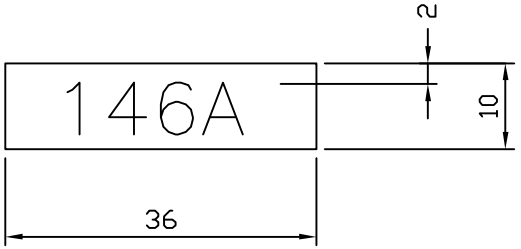












DENOMINAZIONE						
visto Plano						
tav. 03/03	SCHEMA DIVIDER VALVE					
nome A.M.						
data 05/2007	COMM. ID–TAG					
STD. SL.07036.31	DIVIDER VALVE NAME PLATE					
DIS. SL.07036.31–03	NUOVO PIGNONE					
		e				
		d				
		c				
		b				
		a				
			MODIFICHE	NOME	DATA	

SLICO
TRABON–MANZEL
KLS–OPCO
MONCALIERI – TO

ARALDITE AUTOADESIVA BIANCO-SCRITTA NERA
ALTEZZA CARATTERI = 6 mm
SCRITTE CENTRATE & SIMMETRICHE

OGGETTO DA
SCRIVERE DENTRO

QUANTITA'

RLO 3097
JOB 1003004/5/6 01
DIS. SL.07036.30

SLICO	e					nome A.M.	visto Plano
	d					data 05/2007	tav. 04/04
TRABON-MANZEL	c					**COMM.**	
KLS-OPCO	b				DIVIDER VALVE NAME PLATE	ID-TAG	
	a					**STD.**	
MONCALIERI - TO		MODIFICHE	NOME	DATA	NUOVO PIGNONE	SL.07036.31	

DENOMINAZIONE	
SCHEMA DIVIDER VALVE	
DIS.	SL.07036.31-04

Literature List

Description	Manual/Graco Bulletin Number
Manzel Force feed box	51020/51021
MHV Modular Divider Valve	10103
Divider Valve Accessories & Part	10161
Product Service/Maintenance	30101
Product Service/Maintenance	30103
Product Service/Maintenance	30107
Indicator	15401
Checkvalve	15825
Ex Proof. Fitting	Crouse-Hinds manual
Gauge & Thermometer	Wika manual
Motor	Brook manual
Balancing Valve	15812
Temperature switch	Beta manual
Heater	Chromalox manual
Electric level	Emerson manual

Certificate List

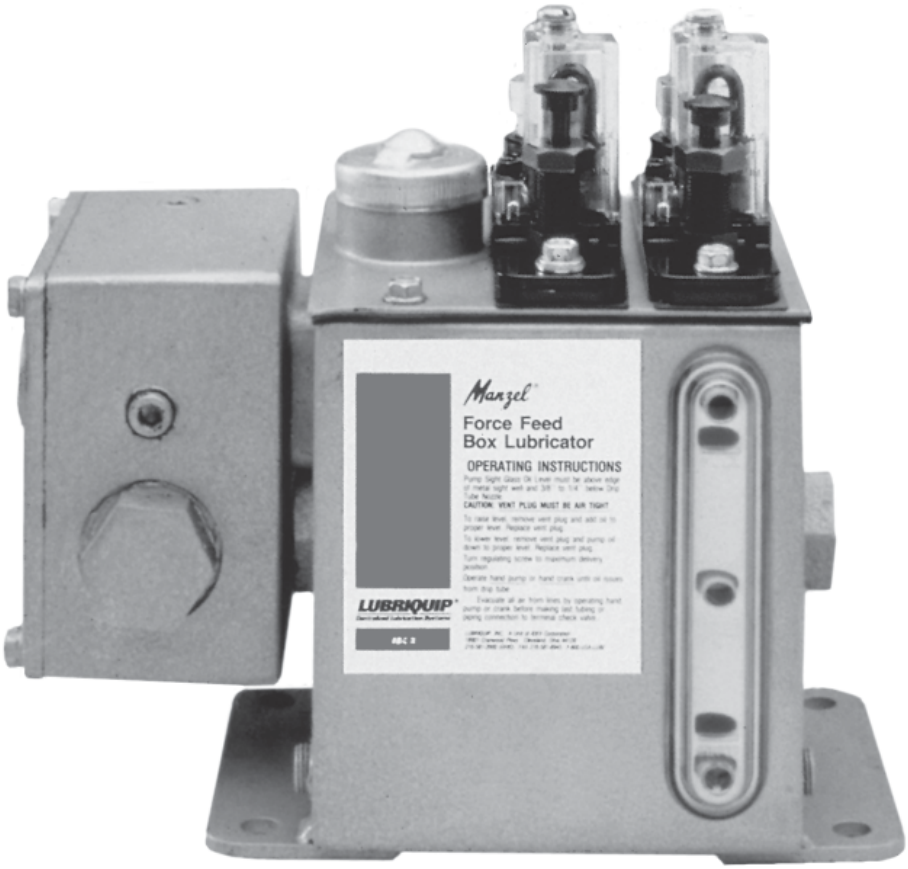
Description	Certification
Motor	Brook certification
Console	Functional test
Electric level	Emerson ExProof certification
Heater	Nema certification
Electric level	Emerson calibration certification
Ex Proof Fittings	Crouse-Hinds certification
MBL76 console lubricator	Declaration by the manufacturer
Gauge	Wika certification
Thermometer	Wika certification (to be continued)
Temperature switch	Beta certification

Manzel® BY LUBRIQUIP®

Force Feed Box Lubricators

Product Specs and Ordering

Bulletin 51020



Manzel®

Pumping Packages

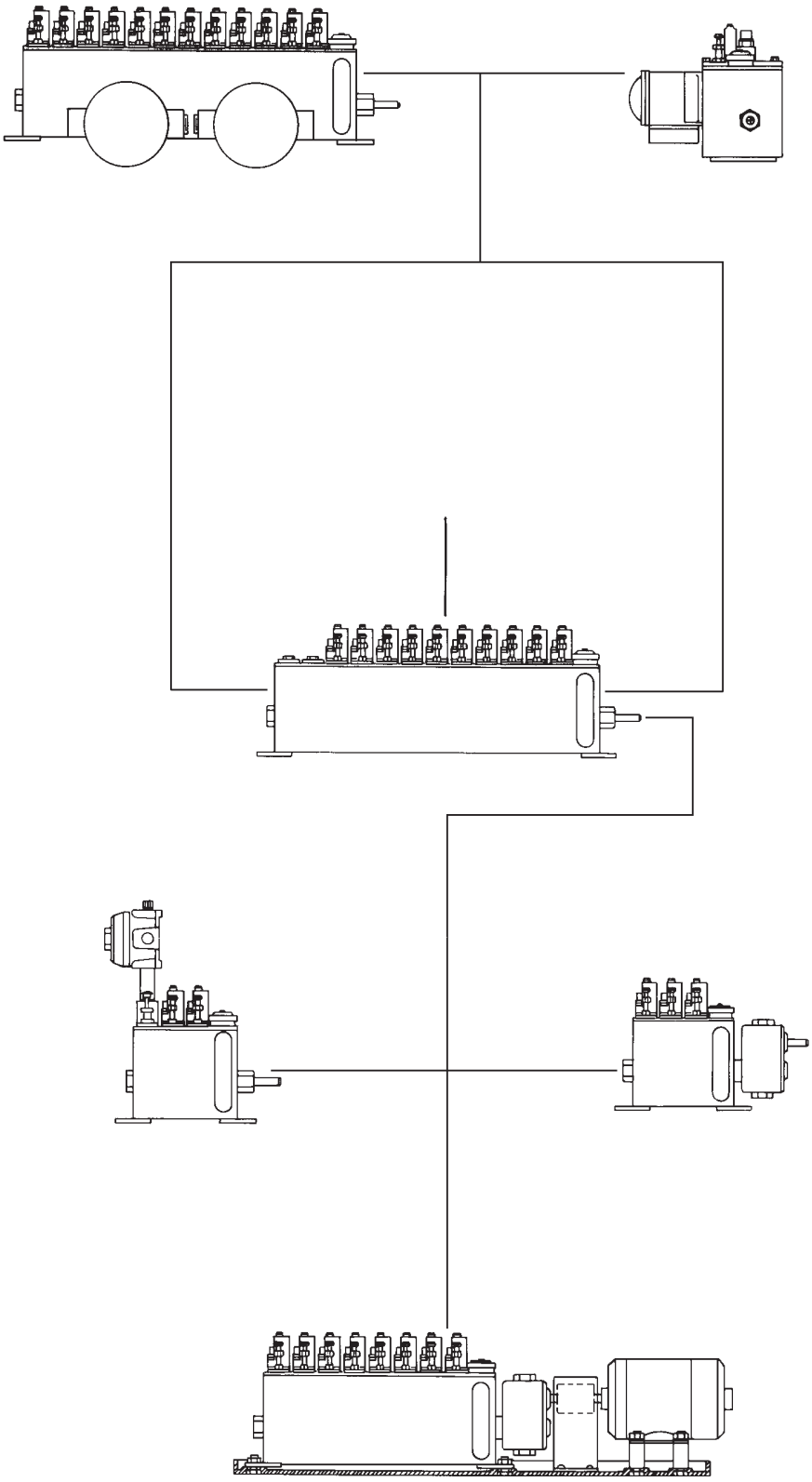
LUBRIQUIP®
Lubrication & Dispensing Solutions

IDEX CORPORATION

Revised November 2004

FORCE FEED BOX LUBRICATOR = true modularity

Wide choice of standard modular components helps you meet application requirements more exactly without the added costs of a custom system.



RESERVOIR ACCESSORIES:

Automatic fill, low level, and electric and steam heater options. For details see page 12 thru 15.

PUMPS:

Two pump styles are available for use in the Manzel Model MBL Box Lubricator. The first is the Model 88 Pump (reference literature 51025), which is ideal for light - medium duty applications. The model 88 pump is interchangeable with pumps from competitive lubricators. The second offering is the Model 76 Pump (reference literature 51021), which is ideal for heavy-duty applications. Both styles of pump provide pressures up to 7,500 PSI for mineral or synthetic oils. See complete details in reference literature.

RESERVOIRS:

Eight reservoir capacities are available to hold from 4 to 40 pints and accommodate from 1 to 24 pumps. Blank cover assemblies are available for unused pump stations. For details see pages 4 and 5.

SHAFT ROTATION ALARMS:

Three shaft rotation alarm options are available. These options use one pump station on the reservoir and are available with SPDT or DPDT switches or without a switch. For details see page 14

DRIVE OPTIONS:

Eighteen drive options are available from direct drive to a reduction ratio of 400:1. Options provide left- or right-hand end of reservoir mounting, end or rear rotary drives, end ratchet drives and gear reducers. For details see pages 8, 9, and 10.

MOTOR AND MOTOR MOUNTING BASE OPTIONS:

Single- and three-phase motors are available at ratings of 1/3,1/4 and 1/2 hp, for 115/230 volt or 230/460 volt, an explosion-proof, TEFC or TENV configuration. Some motor configurations are available foot-mounted and/or face-mounted.

Eight sizes of motor mounting bases are available to accommodate the various reservoir sizes. For details see page 11.

INTRODUCTION

MODULARITY

Force Feed Box Lubricators provide true modularity that permits customizing a pump-to-point lubrication system from off-shelf components. The modular variables are shown on page 2 and consist of the following categories of components:

- Pumps
- Reservoir
- Reservoir Heaters
- Reservoir Oil Level Controls
- Drives
- Shaft Rotation Alarm
- Motor and Motor Mounting Bases

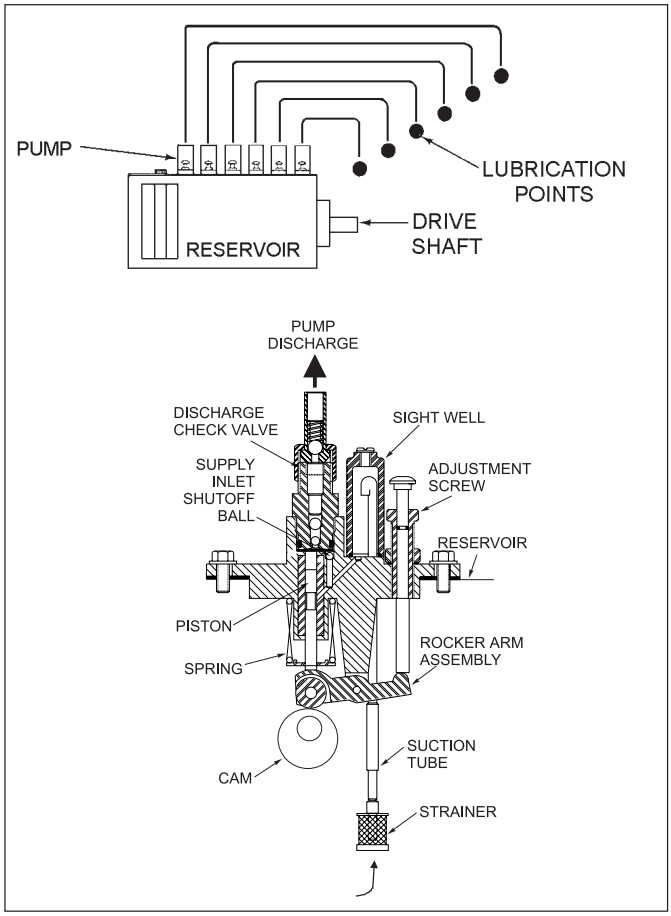
In addition to these Force Feed Box Lubricator components, Lubriquip offers a complete line of auxiliary equipment. Also, Manzel pumping packages can be used with divider valves in a series progressive installation. Lubriquip's performance-proven products that may be used with Modular Box Lubricators are listed below along with the respective literature number.

- Lube Line Alert 54000
- Lube Sentry 15831
- Lube Sentinel II Monitor 14701
- Lube Meter Panel 44630
- Check Valves 15825
- In-Line Filters 15200
- MH Modular Divider Valves 10103

DESCRIPTION

A basic pump-to-point system is shown in the illustration which depicts six pumps mounted on a common reservoir from which each pump is dispensing oil to a single lubrication point. These pumps are operated by individual cams on the drive shaft.

PUMP-TO-POINT SYSTEM



FEATURES/BENEFITS

- Force Feed Box Lubricators provide a proven, cost-effective way to assemble customized oil systems that meet specific requirements by using standard modular components.
- Force Feed Box Lubricators increase opportunities to standardize lube system components and reduce lube maintenance and service costs.
- Force Feed Box Lubricators save you system design dollars and lead time.
- Force Feed Box Lubricators are dependable and backed by the industry's most comprehensive international distributor network — with application expertise, parts stocks and factory-trained service nearby, wherever you are located.

INTERCHANGEABILITY, CONVERSION AND RETROFITS

Lubriquip Model 88 Pumps have been designed to be easily interchangeable with other manufacturers' pumps. For details contact your local Lubriquip representative or call on us for system design and application assistance. At the factory and in the field through our network of distributors, we have unmatched experience in the design and effective application of lubrication systems. We also have in-depth know-how in the application of these systems in your specific industry.

APPLICATIONS AND INDUSTRIES

All working parts of the Force Feed Systems are totally enclosed away from dirt, water and impurities. And, each moving part is self-lubricated at all times by the fluid in the reservoir. This and the wide range of options, high discharge pressure and rugged construction plus the many other features and benefits make Force Feed Systems ideally suited for these applications and industries:

APPLICATION	INDUSTRY	USE
Compressors	Petrochemical Refineries, Gas Transmission, Injection and Storage Cold Storage General Manufacturing Air Systems	Lubricate cylinder walls and piston shaft packing.
Edgers, Planers Band Saws	Lumber	Lubricate slides and ways. Blade coolant (see note).
	NOTE Using lubricant as a coolant permits burning saw dust without drying.	
Mixers	Rubber	Used in the blending process and to lubricate dust stop seals.
Can Lid Presses	Food Processing	Lubricate high-speed bearings.
Band Saws	Lumber	Saw guides.

RESERVOIRS

DESCRIPTION

Eight reservoir styles are available for the Model 76/88 Pump. Each is ruggedly built to reduce deflection and provide longer life. The end plates supporting the shaft main bearings are heavy gage steel welded to the main body.

Camshaft intermediate support bearings are bottom mounted to an inside channel to provide maximum rigidity without adding length.

Each reservoir is equipped to handle the maximum number of pumps. Unused pump stations are covered with a gasket, blank cover assembly that can easily be removed to convert to an active pump station.

Additional pump stations are required for the following options:

- Automatic Fill Options FI and F2
- Low Level Option L1
- Shaft Rotation and Low Level Alarm Options (S1, S2 and S3)

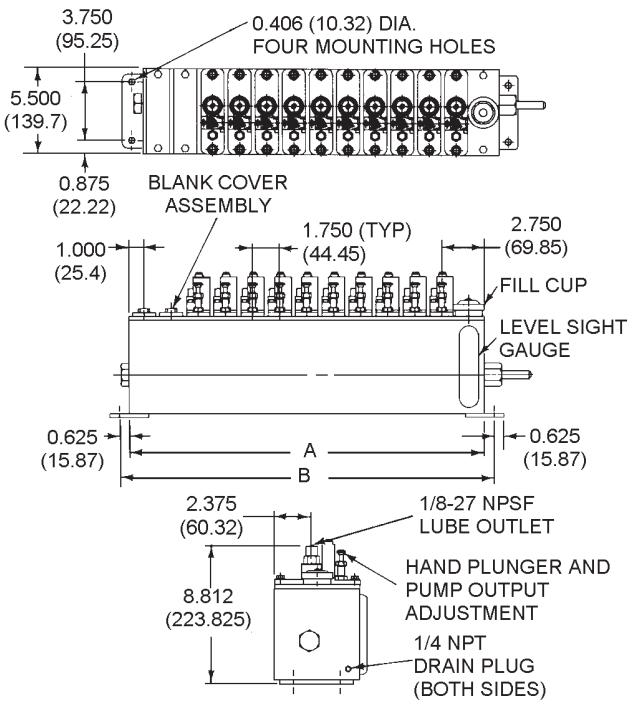
FEATURES/BENEFITS

- Rugged construction for durability
- Complete assembly - includes level sight gauge, fill cup and drain plug
- Versatile - permits mounting drive motor on right or left end
- Precise camshaft alignment insures proper lubrication by all pumps

SPECIFICATIONS

ORDERING CODE	TANK CAPACITY PINTS	MAXIMUM PUMP STATIONS
T1	4	2
T2	6	3
T3	8	5
T4	12	8
T5	16	12
T6	24	16
T7	32	20
T8	40	24

DIMENSIONS



OPTION	SIZE PINTS	SIZE LITERS	DIMENSIONS - INCHES (MILLIMETERS) A		B	
T1	4	1.89	5.500	(139.70)	6.750	(171.45)
T2	6	2.84	7.250	(184.15)	8.500	(215.90)
T3	8	3.79	10.750	(273.05)	12.000	(304.80)
T4	12	5.68	16.000	(406.40)	17.250	(438.15)
T5	16	7.57	23.000	(584.20)	24.250	(615.95)
T6	24	11.36	30.000	(762.00)	31.250	(793.75)
T7	32	15.14	37.000	(939.80)	38.250	(971.55)
T8	40	18.93	44.000	(1,117.60)	45.250	(1,149.35)

NOTE

A blank cover assembly will be provided for all unused pump stations.

ORDERING INFORMATION

Replacement reservoirs are available only with drives. Order reservoir and drive option from menu. Omit all other options when ordering.

PUMPS

DESCRIPTION

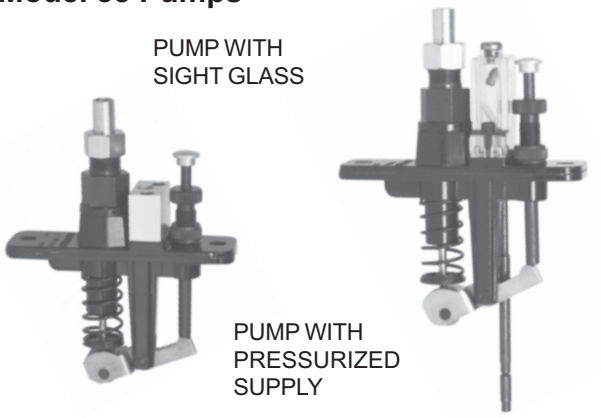
Force Feed Box Lubricators are heavy-duty precision metering pumps capable of accurately pumping small flows of either mineral or synthetic oil to machinery injection points. The single-piston pump is mechanically driven from a common camshaft in the reservoir and are adjustable from 1 to 27 drops per stroke. The drive options, shown on page 8 thru 10, provide many more variations to suit the application. Model 76/88 Pumps are interchangeable with competitive models. The pump's maximum pressure is variable up to 7,500 psi depending on the piston size. All working parts are totally enclosed away from dirt, water, and impurities and self-lubricated at all times by the fluid in the reservoir.

Model 76/88 Pumps are rugged, heavy duty units. The pump cylinder housing is a precision machined casting fitted with an alloy steel piston.

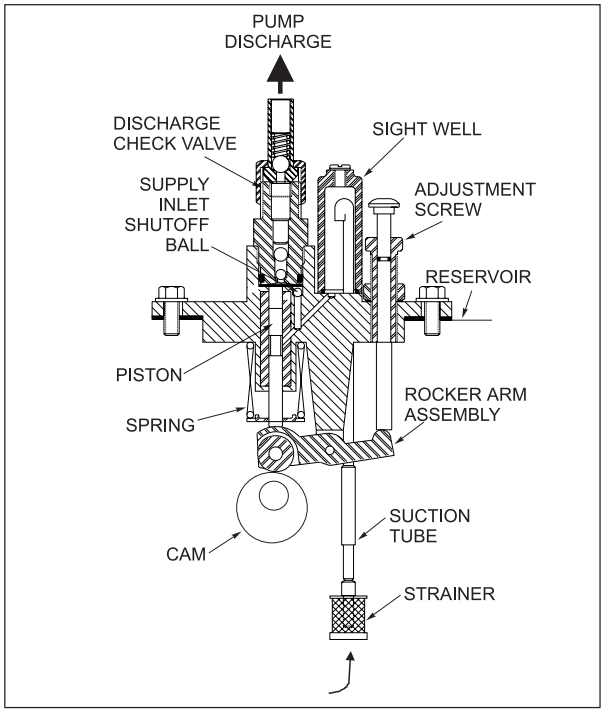
The pump is actuated by a hardened steel roller following a cam for low torque and longer life. The visual sight is one-piece injection molded material that is impervious to ultra-violet rays, and mineral and synthetic oils.

Three piston sizes are available to produce outputs up to 27 drops per stroke.

Model 88 Pumps



Model 76 Pumps



Pumps With Sight Glass

FEATURES/BENEFITS

- Rugged construction for high performance and durability
- Easy serviceability - pumps can be added or replaced quickly
- Pump output is easily adjustable

OPERATION

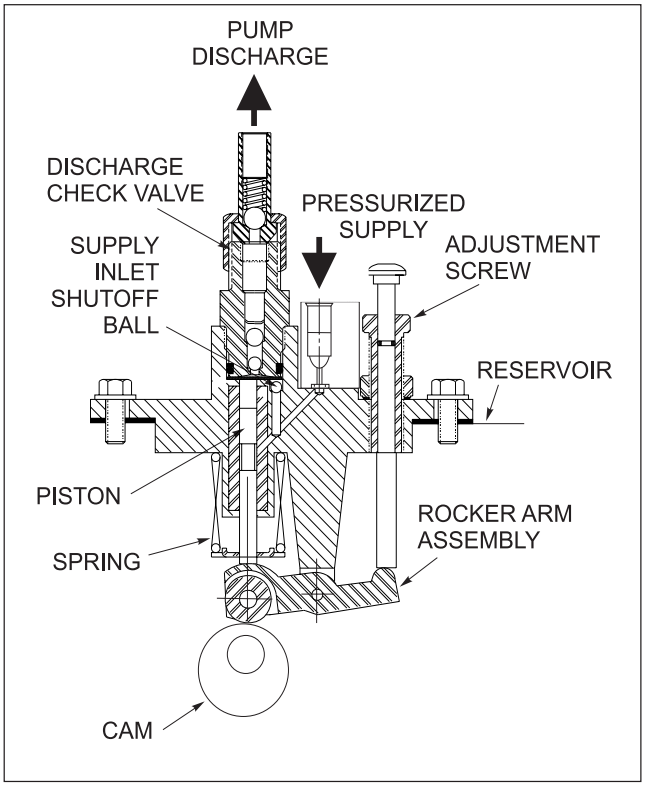
Pumps With Sight Glass

Rotation of the lubricator cam actuates the pump rocker arm assembly to operate the pump piston. On the piston down-stroke, spring pressure is exerted on the piston causing it to follow the cam. As it moves down, a pressure reduction is created between the piston and the check valve and the valve closes. The supply inlet shut-off ball is then unseated and lubricant is drawn into the piston cylinder from the sight well. This creates a pressure reduction (vacuum) in the air-tight sight well that causes lubricant from the reservoir to be drawn into the well until pressure is equalized. On the piston up-stroke, the oil in the cylinder is injected out through the discharge check valve to the machine injection point.

The number of drops seen falling in the sight well is the amount of oil discharged by the pump. Each pump can be adjusted by means of an external screw. This changes the length of the pump stroke which changes the pump discharge volume.

Pumps With Pressurized Supplies

Rotation of the lubricator cam actuates the pump rocker arm assembly to operate the pump piston. On the piston down-stroke, spring pressure is exerted on the piston causing it to follow the cam. As it moves down, a pressure reduction (vacuum) is created between the piston and the discharge check valve and the valve closes. This allows the pressurized supply to unseat the supply inlet shut-off ball and pressurize the piston bore with lubricant. On the piston up-stroke, the piston forces the supply inlet shut-off ball to seat and shut off the pressurized supply. Lubricant in the piston cylinder is forced out through the discharge check valve to the machine injection point. Each pump can be adjusted by means of an external screw. This changes the length of the pump stroke which changes the pump discharge volume.



Pumps With Pressurized Supplies

ADJUSTMENT

Pump discharge (output flow) can be adjusted within the min.\max. ranges as shown in the illustration. The adjustment is linear. Therefore, positioning the screw midway will produce one-half of the pump capacity. To adjust the flow, proceed as follows:

1. Loosen adjusting screw locknut.
2. Turn the adjusting screw to the desired position and, with the pump operating, count the drops falling in the sight well for a one-minute interval.
3. Tighten adjusting screw locknut.

Calculate Pints Per Day As Follows:

Number of Drops/Min. X 1440 (Minutes in a Day) = Pints/Day
14115 (Number of drops in a Pint)

Calculate Minimum or Maximum Pump Output Capacity

$$\frac{\text{Input Speed} \times \text{Gear Ration} \quad \text{Pump Output (Min. or Max. drops/stroke)} \quad \times \quad 1440 \text{ (Min./day)}}{14115 \text{ (Number of Drops in a Pint)}} = \text{Min. or Max. Pump Output (Pints Per Day)}$$

* Minimum and Maximum Drops Per Stroke Listed in Specifications on the next page.

NOTE: For proper sizing select the appropriate Lubricator brand. Brand as well as piston size will effect minimum and maximum pump capacity.

The following example is a Manzel lubricator, electric motor driven, 300:1 internal ratio, 1/4" pump model 76/88. Solve for maximum flow:

$$\frac{\text{1725 Motor Speed} \; \boldsymbol{X} \; \text{Max. 12 drops per stroke} \quad \times \quad 1440 \text{ Min.}}{\text{300:1 Gear Radio} \qquad 14115 \text{ (Number of Drops in a Pint)}} = \text{Max. 7.04 Pints/day}$$

To Calculate Minimum: Replace the maximum 12 drops per stroke with the minimum 2 drops per stroke:
(1.17 minimum pints per day)

ORDERING INFORMATION

Use the following part numbers if you are ordering only a pump assembly and a Modular Box Lubricator. Blank cover assemblies may be ordered by specifying part number **471-690-054**.

PUMP SPECIFICATIONS										
ORDERING CODE	PISTON SIZE (INCHES)	MAXIMUM PRESSURE (PSI)	*DROPS PER STROKE		CUBIC INCHES PER STROKE		CUBIC CENTIMETERS PER STROKE		STROKES PER MINUTE	
			MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
76/88B	3/16	7500 PSI	6	1	0.013	0.002	0.213	0.033	50	3
76/88C	1/4	6000 PSI	12	2	0.024	0.004	0.393	0.066	50	3
76/88E	3/8	2500 PSI	27	4	0.055	0.008	0.901	0.131	50	3
*when approaching maximum outputs some oils will stream rather than form drops in sight glass.										

1 Based on 500 SUS oil at 70ºF ambient. Heavier oil will produce fewer but larger drops.
2 When approaching maximum outputs, some oils will stream rather than form drops in sight glass.
3 For operating pressures over 50% of the rated maximum, consult the factory.

MODEL NUMBER	PUMP SIZE	PART NUMBERS	
		STANDARD PUMP	PRESSURIZED PUMP
76B	3/16 - inch	376-000-000	376-000-120
76C	1/4 - inch	376-000-010	376-000-130
76E	3/8 - inch	376-000-030	376-000-150
88B	3/16 - inch	376-000-001	376-000-121
88C	1/4 - inch	376-000-011	376-000-131
88E	3/8 - inch	376-000-031	376-000-151

PUMP SIGHT GLASS REPAIR KITS

Sight Glass Repair Kits are available for both the Manzel Model 76 & 88 Pumps. Sight Glass Kits are independent of pump sizes

PUMP	SIGHT GLASS KIT
Model 76	562-000-200
Model 88	560-001-860

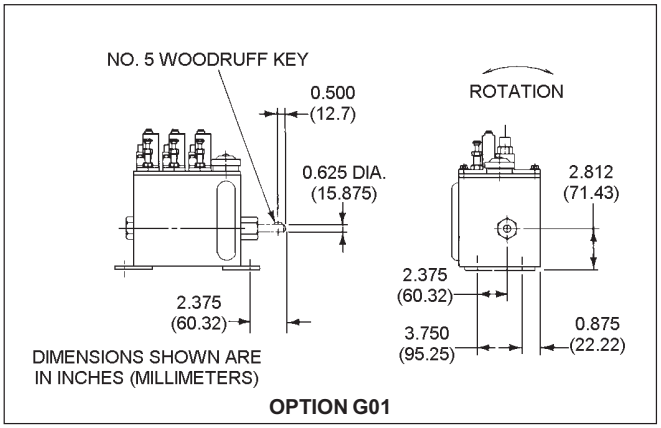
DRIVES/MOTORS

DESCRIPTION

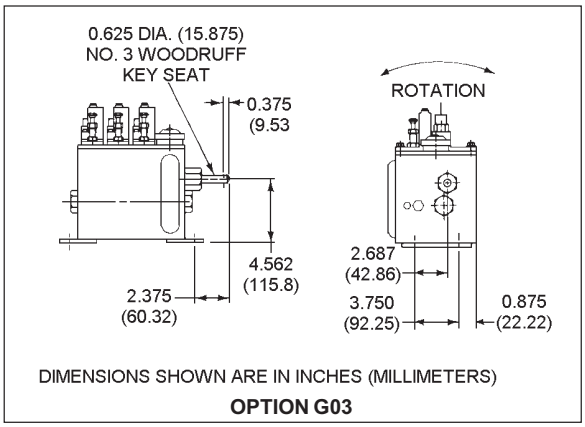
Six drive configurations, some with several variations, provide a total of 18 options. These configurations are listed below in conjunction with pertinent technical data and a detailed dimensional drawing. All options are available as left- or right-hand.

DIRECT END ROTARY — OPTION G01

This option is shown in the right-hand location. It is not available with the motor option.



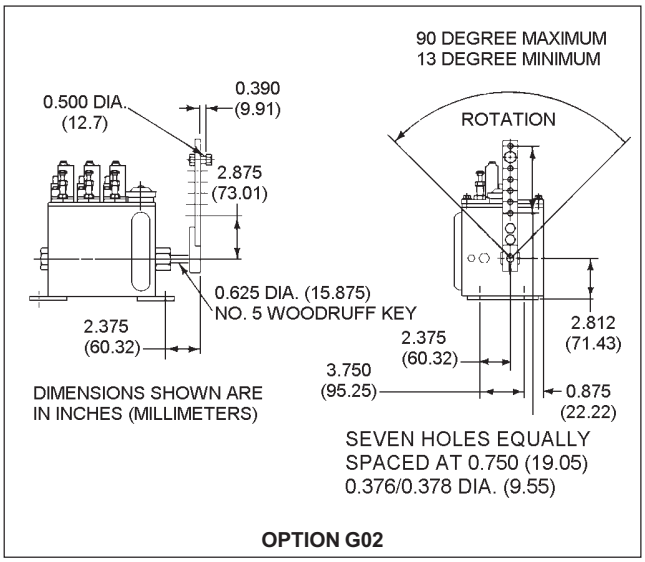
OPTION G01



OPTION G03

END RATCHET — OPTION G02

Option G02 is shown in the right-hand location. It is not available with the motor option. The drive arm is not included with this option. If desired, specify part number **453-004-603**.



OPTION G02

END ROTARY RATCHET — OPTIONS G03 AND G04

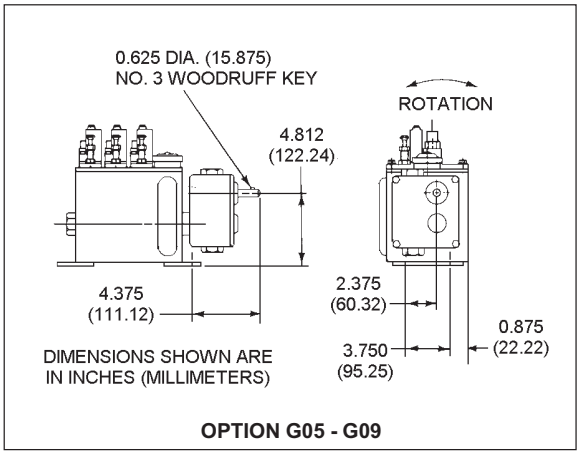
Option G03 as a right-hand drive is shown. It is not available with the motor option. Specifications are as follows:

OPTION	RATIO	MAXIMUM INPUT SPEED
G03	37-1/2:1	800 rpm
G04	75:1	800 rpm

DOUBLE REDUCTION END ROTARY — OPTIONS G05 THROUGH G09

These drive options are available in either left- or right-hand configurations: the right-hand is shown. When the motor option is selected, it is available only for a right-hand drive. It is available in five ratios as follows:

OPTION	RATIO	PART NUMBER
G05	25:1	481-760-012
G06	50:1	481-760-009
G07	100:1	481-760-010
G08	200:1	481-760-011
G09	400:1	481-760-004



OPTION G05 - G09

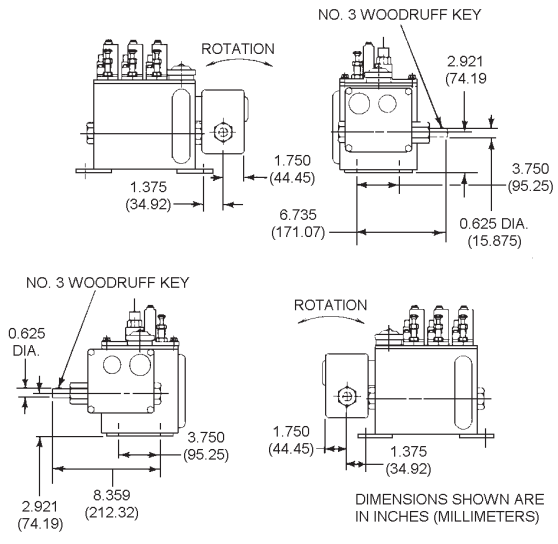
RIGHT ANGLE ROTARY DRIVE — OPTIONS G1O THROUGH G13

These drive options are available for right-hand and left hand drives only. This option is not available with the motor option. Ratios for each drive option are listed below:

NOTE

Top, bottom and front drive locations are available on request as special orders.

OPTION	RATIO
G10	25:1
G11	50:1
G12	188:1
G13	375:1

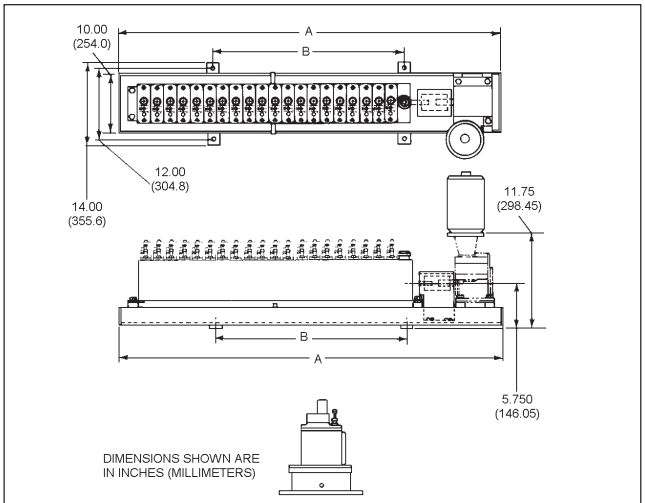


OPTION G10 - G13

GEAR REDUCER — OPTIONS G14 THROUGH G18

These options are shown below and the ratios and part numbers for each option are as follows:

OPTION	RATIO
G14	100:1
G15	150:1
G16	200:1
G17	300:1
G18	400:1



OPTION G14 - G18

DRIVE LOCATIONS

All drives may be ordered for either right- or left-hand locations, except for Options G05 through G09, when ordered with one of the motor options. When other drive locations are needed, contact Lubriquip or one of its Manzel distributor locations.

MOTORS

Ten motor options are available to meet the following requirements: Other motors may be supplied as specials to meet duty conditions not listed (contact factory).

OPTION	POWER	HORSE VOLTAGE	PHASE	DUTY TYPE	PART NUMBER
M2	1/4	115/230	1	See A	492-440-190
M3	1/4	115/230	1	See B	492-600-090
M5	1/4	230/460	3	See A	492-440-360
M6	1/3	230/460	3	See B	492-600-020
M7	1/2	115/230	1	See C	492-620-060
M8	1/2	230/460	3	See C	492-620-070
M9	1/4	115/230	1	See B	492-600-090
M10	1/2	230/460	3	See B	492-540-310
M11	1/2	115/230	1	See D	492-380-040
M12	1/2	230/460	3	See D	492-380-030

NOTE

- All motors operate at 1725 rpm
- M2, M3, MS, and M6 are foot-mounted (56F). M7 and M8 are foot-mounted (56F) for T1 through T5 and face-mounted (56C) for T6, T7, and T8. M9 through M12 are face-mounted (56C)

Duty Type:

A - Totally-enclosed, non-ventilated (TENV)
B - Hazardous Area, Class 1, Group D
C - Hazardous Area, severe duty, Class 1, Group C, tropical insulation
D - Totally-enclosed, fan-cooled (TEFC)

MOTOR MOUNTING BASES — OPTIONS P1 THROUGH P5

A motor mounting base option is available for all standard size reservoirs (Options T1 through T5). These options may be used only with drive options G06 through G09. Dimensional data for the bases is provided below:

MOTOR MOUNTING BASES — OPTIONS P6, P7, AND P8

A motor mounting base option is available for all standard size reservoirs (Options T6, T7, and T8). These options may be used only with drive options G14 through G18. Dimensional data for the bases is shown below:

DIMENSIONS

OPTION	RESERVOIR CAPACITY	DIMENSIONS (INCHES) A	B	C	NUMBER OF MOUNTING HOLES
P1	4 pints - T1 (1.89 liters)	24.500 (622.30)	20.500 (520.70)	—	4
P2	6 pints - T2 (2.84 liters)	26.250 (666.75)	22.250 (565.15)	—	4
P3	8 pints - T3 (3.79 liters)	29.750 (755.65)	25.760 (654.05)	—	4
P4	2 pints - T4 (5.68 liters)	35.000 (889.00)	15.500 (393.70)	15.500 (393.70)	6
P5	6 pints - T5 (7.51 liters)	42.000 (1066.80)	19.000 (482.60)	19.000 (482.60)	6

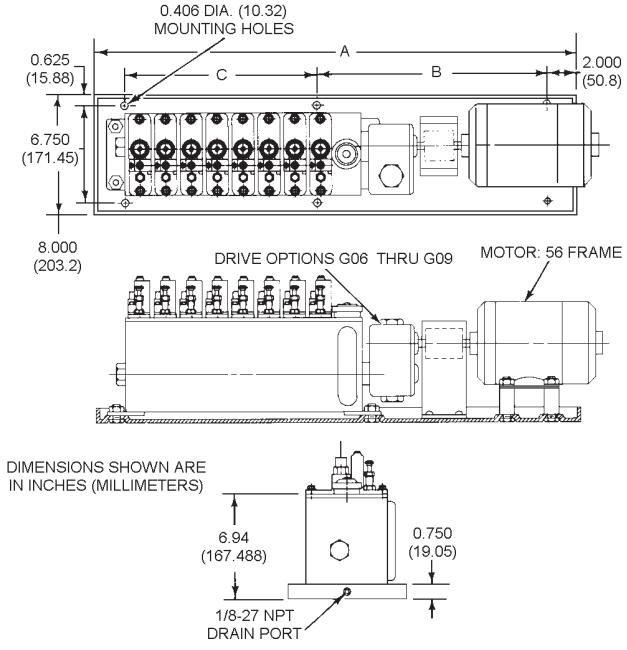
NOTE

Millimeter dimensions appear in parentheses below the dimensions given in inches.

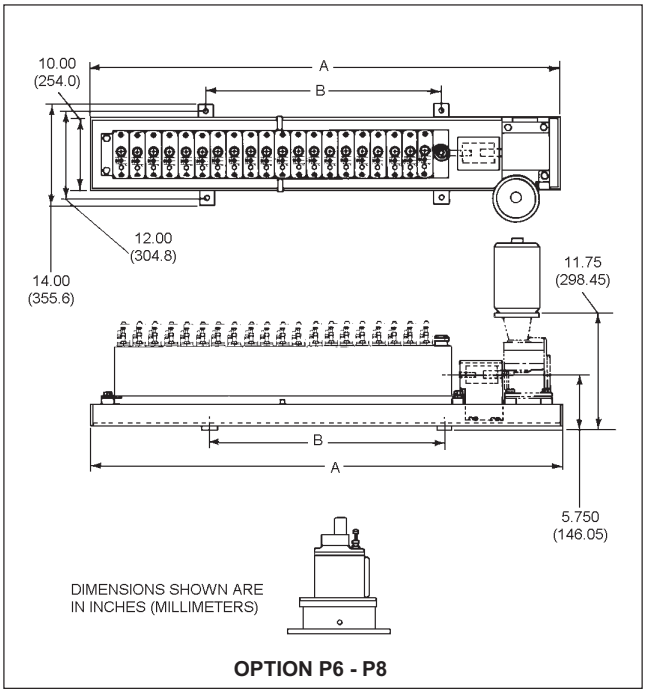
OPTION	RESERVOIR CAPACITY	DIMENSIONS (INCHES) A	B	NUMBER OF MOUNTING HOLES
P6	24 pints - T6 (11.36 liters)	46.000 (1168.40)	16.000 (406.40)	4
P7	32 pints - T7 (15.14 liters)	53.000 (1346.20)	23.000 (584.20)	4
P8	40 pints - T8 (18.93 liters)	60.000 (1524.00)	30.000 (762.00)	4

NOTE

Millimeter dimensions appear in parentheses below the dimensions given in inches.



OPTION P1 - P5



OPTION P6 - P8

ACCESSORIES

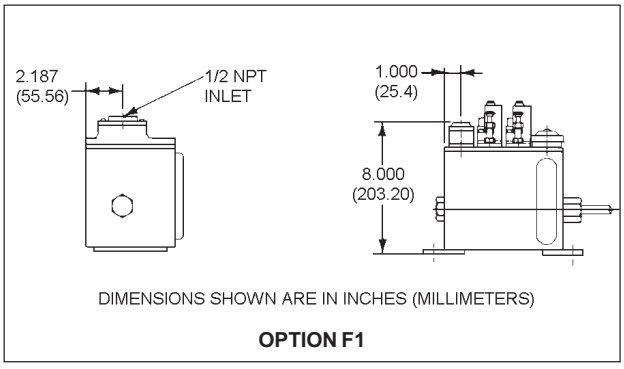
AUTOMATIC FILL — OPTIONS F1, F2, F3, AND F4

OPTION FI — Gravity Supply

This option is mounted in the last pump station at the end opposite the drive. The only exception is when either a shaft rotation alarm or one of the low level options is specified. Then this option is mounted in the second to the last pump station. Pertinent dimensional data is provided in the following illustration. Specify part number **456-030-031** when ordering this option separately.

NOTE

An inlet oil pressure head of 2 to 5 feet is required for the gravity supply.

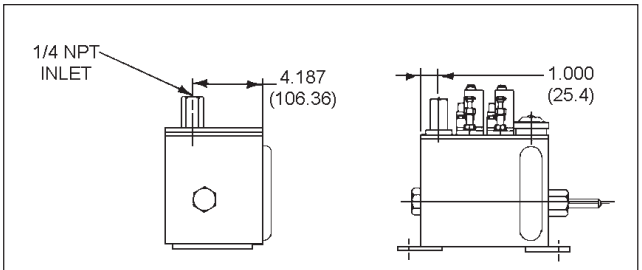


DIMENSIONS SHOWN ARE IN INCHES (MILLIMETERS)

OPTION F1

OPTION F2 — Pressurized Supply

This option is mounted in the last pump station at the end opposite the drive. The only exception is when either a shaft rotation alarm or one of the low level options is specified. Then this option is mounted in the second to the last pump station. Pertinent dimensional data is provided in the following illustration. The inlet pressure should be between 15 and 70 psig. Specify part number **456-030-035** when ordering this option separately.



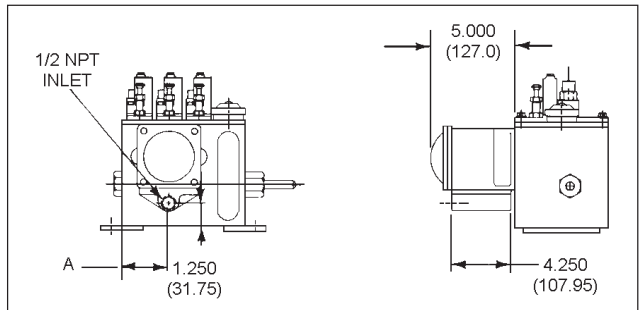
DIMENSIONS SHOWN ARE IN INCHES (MILLIMETERS)

OPTION F2

OPTION F3 — Oil Level Controller

This automatic fill option does not require a pump station for mounting. It is mounted only on the front of the reservoir and requires a maximum inlet pressure of 5 psi. Specify part number **456-030-032** when ordering this option separately.

	RESERVOIR		DIMENSION A	
OPTION	PINTS	LITERS	INCHES	MILLIMETERS
T1	4	1.89	1.00	25.40
T2	6	2.84	2.75	69.85
T3	8	3.79	3.63	92.08
T4	12	5.68	3.63	92.08
T5	16	7.57	11.50	292.10
T6	24	11.36	15.00	381.00
T7	32	15.14	12.38	314.33
T8	40	18.93	14.13	358.78



DIMENSIONS SHOWN ARE IN INCHES (MILLIMETERS)

OPTION F3

OPTION F4 — Pressurized Supply With Level Control

This automatic fill option mounts on the front of the reservoir and requires a 0 to 70 psi inlet supply. The switch actuates when a 1/2 to 3/4 loss of oil level occurs in the controller.

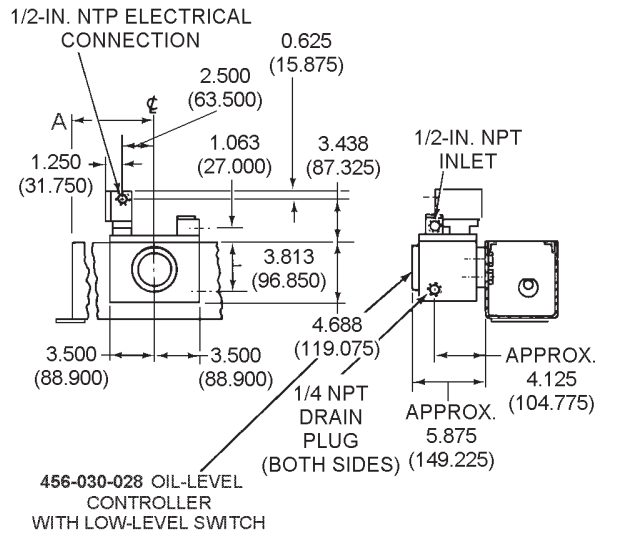
ELECTRICAL DATA:

Contacts: Single-Pole, Double-Throw

Contact Rating: 15 amps at 115/230 or 480 VAC
0.5 amps at 125 VDC
0.25 amps at 250 VDC

Switch Rating: Class 1, Groups C and D, Division I

	RESERVOIR		DIMENSION A	
OPTION	PINTS	LITERS	INCHES	MILLIMETERS
T1	4	1.89	1.00	25.40
T2	6	2.84	2.75	69.85
T3	8	3.79	3.63	92.08
T4	12	5.68	3.63	92.08
T5	16	7.57	11.50	292.10
T6	24	11.36	15.00	381.00
T7	32	15.14	12.38	314.33
T8	40	18.93	14.13	358.78



DIMENSIONS SHOWN ARE IN INCHES (MILLIMETERS)

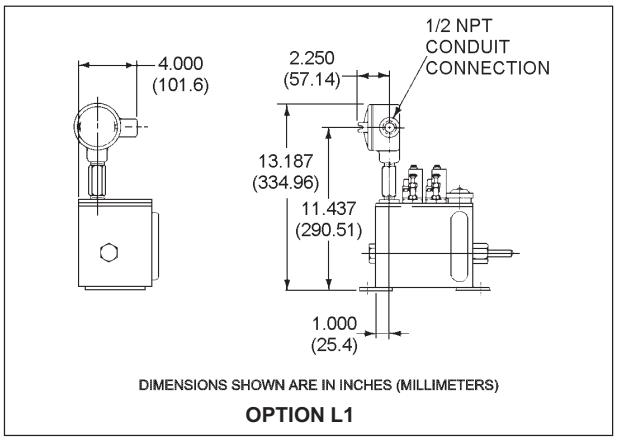
OPTION F4

LOW LEVEL SWITCH — OPTION 5

L1, & L2 Option L1 - Class 1, Group C&D

The low level switch is single-pole, double-throw and meets the explosion-proof requirements of Class 1, Groups C and D, as well as Class 2, Groups E, F, and G. This option is mounted in the last pump station opposite the drive end. The only exception is when a shaft rotation alarm option is specified, then it is mounted in the third to the last pump station. Dimensional data and electrical ratings are shown on the following illustration.

Specify part number **456-010-164** when ordering this option separately.



DIMENSIONS SHOWN ARE IN INCHES (MILLIMETERS)

OPTION L1

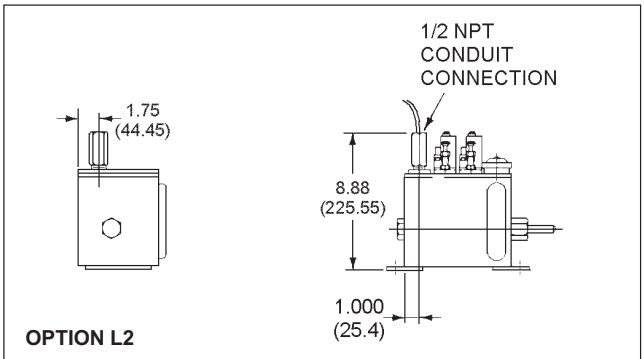
ELECTRICAL RATINGS:

15 amps at 115/230 or 480 VAC
1/2 amp at 125 VDC
1/4 amp at 250 VDC

OPTION L2

The low level switch is single pole-single throw, N.C. Electrical rating is 10 watts @120 VAC (Minimum). This option is mounted in the last pump station opposite the drive end. The only exception is when a shaft rotation alarm option is specified, then it is mounted in the third to the last pump station. Dimensional data and electrical ratings are shown on the following illustration.

Specify part number **456-010-190** when ordering this option separately.



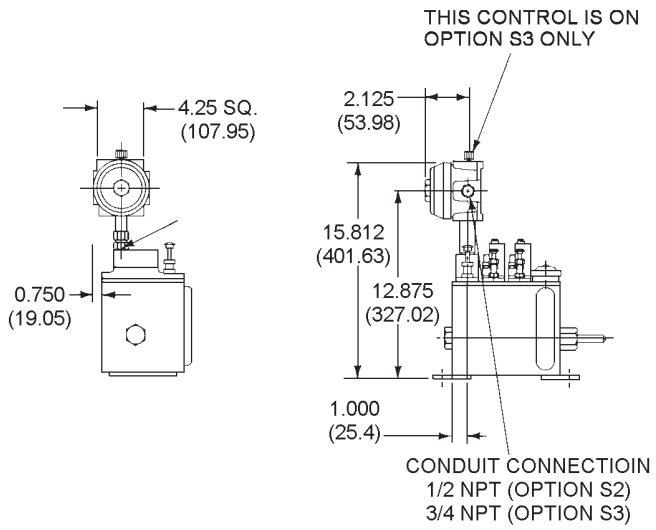
OPTION L2

DIMENSIONS SHOWN ARE IN INCHES (MILLIMETERS)

SHAFT ROTATION ALARM — OPTIONS SI, S2, AND S3

The shaft rotation alarm meets the explosion-proof requirements of Class 1, Groups B, C, and D, as well as Class 2, Groups E, F and G. It is always mounted in the last pump station at the end of the reservoir opposite the drive. Option S1 is an alarm without a switch. Options S2 and S3, are single-pole, double-throw and double-pole, double-throw, switches respectively. These switches are factory set to signal when the pressure falls below 50 psig (3.515 kg/cm^2). Pressure switch operation is dependent on shaft rotation and adequate oil level to maintain switch setting. Dimensional data and electrical ratings are provided in the illustration shown below.

OPTION	PART NUMBER
S1	301-300-039
S2	456-020-459
S3	456-020-460



OPTION S1 Shown

ELECTRICAL RATINGS:

15 amps at 125/250 VAC
1/2 amp at 125 VDC
1/4 amp at 250 VDC

ELECTRIC HEATER — OPTIONS H1 THROUGH H6

Electric heater options are not available for the four-pint reservoir (Option T1). Heater options H2 and H4 require two heaters. Heater options H5 and H6 require three heaters. Specifications for these heaters are provided in the following tables and the dimensional data is shown in the illustrations.

CAUTION

Heater elements must be completely submerged in oil at all times.

Heater Options H1, H2 and H5:

Voltage	115 volts
Wattage	150 watts
Thermostat Voltage	115/230 volts
Temperature Range	–100°F - 500°F (38°C - 260°C)
Watt Density	20 w/sq. in.
Hazardous Area Rating	Class 1, Group D
Part Number	492-041-721

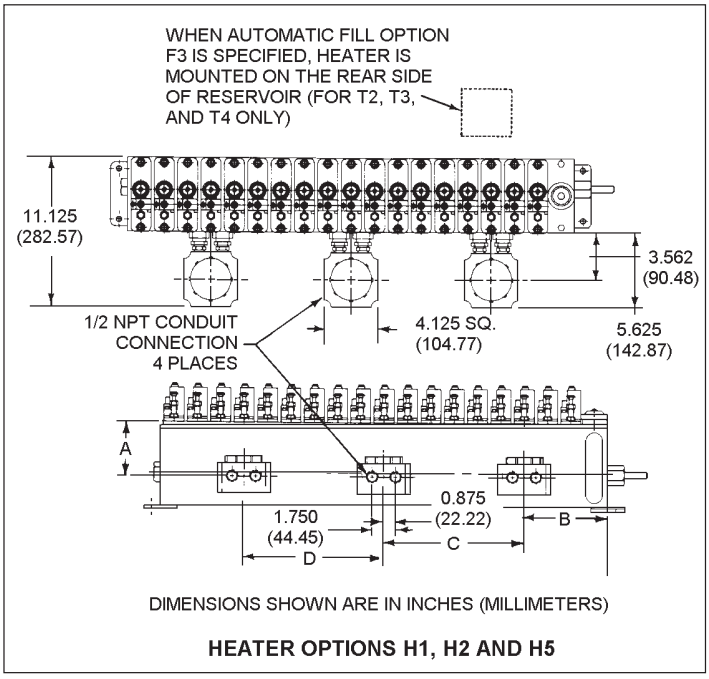
Heater Options H3, H4 and H6:

Voltage	120 volts
Wattage	200 watts
Thermostat Voltage	120 volts
Temperature Range	60° to 240°F (15.6 to 116°C)
Watt Density	22 w/sq.in.
Hazardous Area Rating	Class 1, Group B
Part Number	492-041-734

DIMENSIONS - INCHES (MILLIMETERS)*

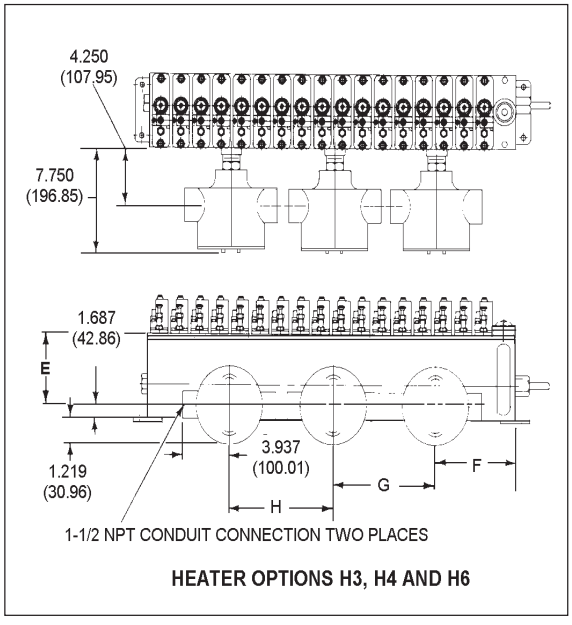
RESERVOIR CAPACITY	OPTIONS H1, H2 AND H5				OPTIONS H3, H4 AND H6				
	A	B	C	D	E	F	G	H	OPTION
6 pints - T2 (2.84 liters)	4.750 (120.65)	3.625 (92.08)	N/A	N/A	4.5 (114.30)	1.875 (47.625)	N/A	N/A	H1 or H3
8 pints - T3 (3.79 liters)	4.125 (104.78)	4.500** (114.30)	N/A	N/A	4.5 (114.30)	5.375 (136.53)	N/A	N/A	H1 or H3
12 pints - T4 (5.68 liters)	4.125 (104.78)	9.750 (247.65)	N/A	N/A	4.5 (114.30)	5.375 (136.53)	N/A	N/A	H1 or H3
16 pints - T5 (7.57 liters)	4.125 (104.78)	6.250 (158.75)	10.50	N/A	4.5 (114.30)	7.125 (180.98)	8.750 (222.25)	N/A	H2 or H4
24 pints - T6 (11.36 liters)	4.125 (104.78)	8.000 (203.20)	14.00	N/A	4.5 (114.30)	8.875 (225.43)	12.25 (311.15)	N/A	H2 or H4
32 pints - T7 (15.14 liters)	4.125 (104.78)	6.250 (158.75)	12.25 (311.15)	12.25 (311.15)	4.5 (114.30)	7.125 (180.98)	10.50 (266.70)	12.25 (311.15)	H5 or H6
40 pints - T8 (18.93 liters)	4.125 (104.78)	6.250 (158.75)	15.75 (400.05)	15.75 (400.05)	4.5 (114.30)	7.125 (180.98)	15.75 (400.05)	14.00 (355.60)	H5 or H6

*All dimensions are for right- or left-hand drive unless otherwise noted.
**4.500 (114.30) is for right-hand drive. For left-hand drive, Dimension B = 6.250 (158.75).

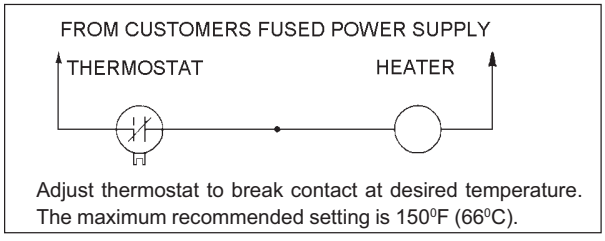


DIMENSIONS SHOWN ARE IN INCHES (MILLIMETERS)

HEATER OPTIONS H1, H2 AND H5



HEATER OPTIONS H3, H4 AND H6



Adjust thermostat to break contact at desired temperature.
The maximum recommended setting is 150°F (66°C).

WIRING SCHEMATIC FOR HEATER OPTIONS

PACKAGE ORDERING INFORMATION (MENU)

MBL-XX-XXX XX-XXX X-XX-XX-XX-XX-XX-XX

RESERVOIR SIZE:
- T1 - 4 PINTS, 2 PUMP STATIONS MAX.
- T2 - 6 PINTS, 3 PUMP STATIONS MAX.
- T3 - 8 PINTS, 5 PUMP STATIONS MAX.
- T4 - 12 PINTS. 8 PUMP STATIONS MAX.
- T5 - 16 PINTS, 12 PUMP STATIONS MAX.
- T6 - 24 PINTS. 16 PUMP STATIONS MAX.
- T7 - 32 PINTS. 20 PUMP STATIONS MAX.
- T8 - 40 PINTS. 24 PUMP STATIONS MAX.

***PUMP SIZE:**
- 76 / 88B - 3/16 IN. DIA. MODEL 76 & 88 PUMP
- 76 / 88C - 1/4 IN. DIA. MODEL 76 & 88 PUMP
- 76 / 88E - 3/8 IN. DIA. MODEL 76 & 88 PUMP

SEE LITERATURE 51025 FOR 88 PUMP OPTIONS
SEE LITERATURE 51021 FOR 76 PUMP OPTIONS

***PUMP QUANTITY:**
- 01 - 1 PUMP
- THRU
- 24 - 24 PUMPS

SEE NOTES 1 AND 2

DRIVE OPTIONS:
- G01 - DIRECT END ROTARY
- G02 - END RATCHET
- G03 - END ROTARY RATCHET 37-1/2:1 RATIO
- G04 - END ROTARY RATCHET 75:1 RATIO

ALL RESERVOIRS

- G05 - DOUBLE REDUCTION END ROTARY 25:1 RATIO
- G06 - DOUBLE REDUCTION END ROTARY 50:1 RATIO
- G07 - DOUBLE REDUCTION END ROTARY 100:1 RATIO
- G08 - DOUBLE REDUCTION END ROTARY 200:1 RATIO
- G09 - DOUBLE REDUCTION END ROTARY 400:1 RATIO
- G10 - RIGHT ANGLE ROTARY 25:1 RATIO
- G11 - RIGHT ANGLE ROTARY 50:1 RATIO
- G12 - RIGHT ANGLE ROTARY 188:1 RATIO
- G13 - RIGHT ANGLE ROTARY 375:1 RATIO

T1 THROUGH T5 RESERVOIRS

- G14 - 100:1 RATIO GEAR REDUCER
- G15 - 150:1 RATIO GEAR REDUCER
- G16 - 200:1 RATIO GEAR REDUCER
- G17 - 300:1 RATIO GEAR REDUCER
- G18 - 400:1 RATIO GEAR REDUCER

T6, T7, AND T8 RESERVOIRS (SEE NOTE 3)

DRIVE LOCATION:
- R - RIGHT-HAND END OF RESERVOIR
- L - LEFT-HAND END OF RESERVOIR

***MOTOR MOUNTING BASE:**
- P1 - FOR 4 PINT RESERVOIR
- P2 - FOR 6 PINT RESERVOIR
- P3 - FOR 8 PINT RESERVOIR
- P4 - FOR 12 PINT RESERVOIR
- P5 - FOR 16 PINT RESERVOIR
- P6 - FOR 24 PINT RESERVOIR
- P7 - FOR 32 PINT RESERVOIR
- P8 - FOR 40 PINT RESERVOIR

SEE NOTE 4

SEE NOTE 6

***MOTOR OPTION:**
- M2 1/4 HP 1725 RPM, 115/230 V,1 PH., TENV MOTOR, FOOT-MOUNTED (56F)
- M3 1/4 HP 1725 RPM, 115/230 V,1 PH., HAZARDOUS AREA , CLASS 1, GROUP D, FOOT-MOUNTED (56F)
- M5 1/4 HP 1725 RPM, 230/460 V,3 PH., TENV MOTOR, FOOT-MOUNTED (56F)
- M6 1/4 HP 1725 RPM, 230/460 V,3 PH., HAZARDOUS AREA , CLASS 1, GROUP D, FOOT-MOUNTED (56F)
- M7 1/2 HP 1725 RPM, 115/230 V,1 PH., HAZARDOUS AREA , CLASS 1, GROUP C, SEVERE DUTY, TROPICAL INSULATION
- M8 1/2 HP 1725 RPM, 230/460 V,3 PH., HAZARDOUS AREA , CLASS 1, GROUP C. SEVERE DUTY. TROPICAL INSULATION
- M9 1/4 HP 1725 RPM, 115/230 V,1 PH., 60HZ, CLASS 1, GROUP D, FACE-MOUNTED (56C)
- M10 1/2 HP 1725 RPM, 230/460 V,3 PH., 60HZ, CLASS 1, GROUP D, FACE-MOUNTED (56C)
- M11 1/2 HP 1725 RPM, 115/230 V,1 PH., 60HZ, TEFC, FACE-MOUNTED (56C)
- M12 1/2 HP 1725 RPM, 230/460 V,3 PH., 60HZ, TEFC, FACE-MOUNTED (56C)

SEE NOTE 5

***AUTOMATIC FILL OPTION:**
- F1- GRAVITY SUPPLY
- F2 - PRESSURIZED SUPPLY
- F3 - OIL LEVEL CONTROL
- F4 - PRESSURIZED SUPPLY WITH LEVEL CONTROL

MOUNTS IN A PUMP STATION (SEE NOTE 2)

***LOW LEVEL OPTION:**
- L1 - LOW LEVEL SWITCH HAZARDOUS AREA . CL1, GROUP C&D, CL2 GROUP E,F,G (MOUNTS IN A PUMP STATION, SEE NOTE 2)
- L2 - LOW LEVEL, 10 WATTS AT 120 VAC, SPST REED SWITCH, NC

***SHAFT ROTATION AND LOW LEVEL ALARM OPTION:**
- S1 - ALARM WITH NO ELECTRICAL SWITCH
- S2 - ALARM WITH SPDT SWITCH, HAZARDOUS AREA . CL1, GROUP B,C,D, CL2 GROUP E, F, G
- S3 - ALARM WITH DPDT SWITCH, HAZARDOUS AREA . CL1, GROUP B,C,D, CL2 GROUP E, F, G

MOUNTS IN A PUMP STATION (SEE NOTE 2)

***HEATER OPTION:**
- H1 - ELECTRIC HEATER. HAZARDOUS AREA , CLASS 1, GROUP D (4,6,8 AND 12 PINT RESERVOIRS, I HEATER)
- H2 - ELECTRIC HEATER, HAZARDOUS AREA . CLASS 1, GROUP D (16 AND 24 PINT RESERVOIR, 2 HEATERS)
- H3 - ELECTRIC HEATER, HAZARDOUS AREA , CLASS 1, GROUP B (4,6, 8 AND 12 PINT RESERVOIRS, 1 HEATER)
- H4 - ELECTRIC HEATER, HAZARDOUS AREA , CLASS 1, GROUP B (16 AND 24 PINT RESERVOIRS, 2 HEATERS)
- H5 - ELECTRIC HEATER, HAZARDOUS AREA , CLASS 1, GROUP D (32 and 40 PINT RESERVOIRS, 3 HEATERS)
- H6 - ELECTRIC HEATER, HAZARDOUS AREA , CLASS 1, GROUP B (32 and 40 PINT RESERVOIRS, 3 HEATERS)

***OMIT IF NOT REQUIRED**

NOTES:
1. When pump quantity Is less than maximum pump stations of specified reservoir, blank cover assembly (Part No. 471-609-054) Is placed In the unused pump stations.
2. When shaft rotation alarm, low level or automatic fill (F1 or F2) options are specified, deduct one pump station for each option.
3. Require mounting base options P6, P7, and P8.
4. May be used only with options G06 through G09 when drive option Is specified.
5. M7 and M8 are foot-mounted (56F) for T1 through T5 and face-mounted (56C) for T6, T7, and T8.
6. Used only for drive options G14 through G18.

ISO 9000:2000 REGISTERED FIRM

ISO 14001 REGISTERED FIRM

LUBRIQUIP, INC., A Unit of IDEX Corporation ❑ 18901 Cranwood Pkwy. ❑ Cleveland, Ohio 44128
Phone: 216-581-2000 or 800-USA-LUBE ❑ FAX : 216-581-8945 ❑ Internet: http://www.lubriquip.com

IDEX CORPORATION

Model 76 Pumps

Product Specs and Ordering

Bulletin 51021

DESCRIPTION

The Manzel® Model 76 pump is a rugged single-piston pump capable of accurately delivering precise volumes of oil to machinery lubrication points at pressures up to 7500 psi (517 bar).

The Model 76 Pump is designed for use in the Manzel® Model MBL Box Lubricator with half-inch rise cams. The pump is driven from a common camshaft in the MBL reservoir and is adjustable from 1 to 27 drops per stroke. Three (3) pump piston sizes are available from 3/16”, 1/4" and 3/8” diameters.

A hardened steel roller following a cam actuates the pump and reduces the torque. The round sight glass well is made of a one-piece injection molded nylon material that is impervious to ultra-violet rays, and is comparable with mineral and synthetic oils.

All working parts are totally enclosed to protect them from dirt, water, and other contaminants and is self-lubricated at all times by the fluid in the MBL Reservoir.

Manzel Model 76 Pump

FEATURES

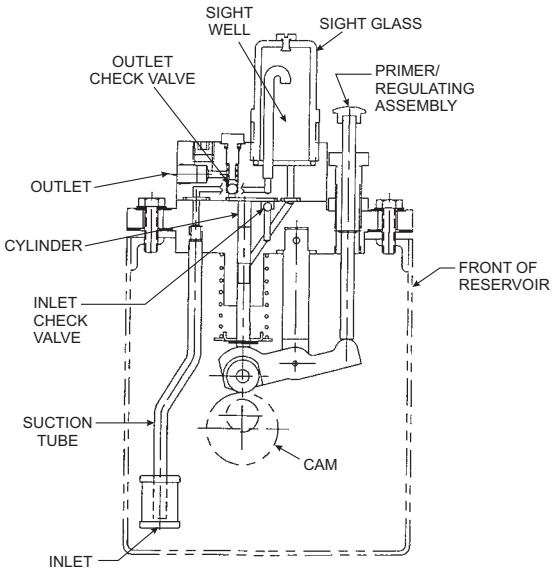
- Heavy-duty 2 piece steel body construction for high performance and durability
- Hardened steel cam roller, adds to pump and cam life
- Easy serviceability – pumps can be added or removed quickly
- Pump output is easily adjustable
- One piece, injection molded, sight glass for mineral and synthetic oils

OPERATION

Pumps with Sight Glass - Suction Type

(Refer to Figure 1)

Rotation of the lubricator cam operates the piston pump units in the reservoir. On the pump piston downstroke, lubricant is drawn into the cylinder from the sight well. This creates a pressure reduction (vacuum) in the airtight sight well that causes lubricant from the reservoir to be drawn into the well until the pressure is equalized. On the piston upstroke, the oil in the cylinder is ejected through the discharge check valve to a machine lubrication point. The number of drops seen falling into the sight well is the amount of oil discharged by the pump. Pump output can be adjusted by means of an external screw. This changes the length of the pump stroke, which changes the pump discharge volume.



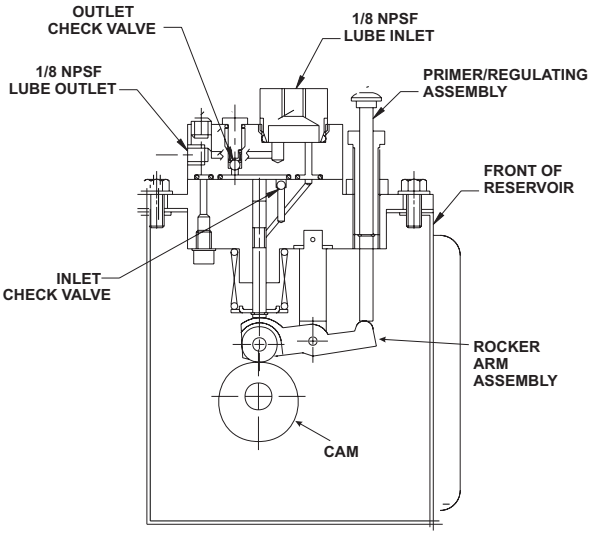
Suction - Type Pump with Sight Glass

Figure 1

Pressurized Suction & Gravity Feed-Pumps

(Refer to Figure 2)

Rotation of the lubricator cam actuates the pump rocker arm assembly to operate the pump piston. On the downstroke, spring pressure is exerted on the piston causing it to follow the cam. As it moves down, a pressure reduction (vacuum) is created between the piston and the discharge check valve causing the check valve to close. This allows the pressurized supply of oil to unseat the supply inlet shut-off ball and pressurize the piston bore with lubricant. On the piston upstroke, the piston forces the supply inlet to seat and shut off the pressurized supply. Lubricant in the piston cylinder is forced out through the discharge check valve to the machine lubrication point. Pump output can be adjusted by means of an external screw. This changes the length of the pump stroke, which changes the pump discharge volume.



Gravity - Feed Pump

Figure 2

SPECIFICATIONS

Model 76 Vacuum Pump with Sight Glass and Suction Tube

Part Number	Piston Size inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-000	3/16 (4.8)	7500 (517)	1	6	0.002	0.013	0.033	0.213	3	50
376-000-010	1/4 (6.4)	6000 (414)	2	12	0.004	0.024	0.066	0.393	3	50
376-000-030	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

Model 76 Vacuum Pump with 7/8" Short Suction Tube & 1/8" NPTF Vertical Outlet Adapter

Part Number	Piston Size inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-040	3/16 (4.8)	7500 (517)	1	6	0.002	0.013	0.033	0.213	3	50
376-000-050	1/4 (6.4)	6000 (414)	2	12	0.004	0.024	0.066	0.393	3	50
376-000-070	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

Model 76 Pressurized Supply Pump (without Sight Glass)

Part Number	Piston Size Inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-120	3/16 (4.8)	7500 (517)	1	6	0.002	0.013	0.033	0.213	3	50
376-000-130	1/4 (6.4)	6000 (414)	2	12	0.004	0.024	0.066	0.393	3	50
376-000-150	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

Model 76 Vacuum Pumps - For Alarm with 1/2" Short Suction

Part Number	Piston Size Inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-160	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

Model 76 Vacuum Pumps - For Alarm with 7/8" Short Suction

Part Number	Piston Size Inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-170	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

NOTE:

1. Pump output specifications are based on 500 SUS oil at 70^{0}F ambient. Heavier oil will produce fewer but larger drops.
2. When approaching maximum outputs, some oils will stream rather than form drops in sight glass.
3. For operating pressures over 50% of the rated maximum, consult the factory.
4. A lowable viscosity range independent of temperature: 80-5000 SUS.
5. Maximum allowable inlet pressure: Pressurized pump, 100 PSI; Pressurized pump with sight glass, 10 PSI.

NOTE:

Any static positive pressure applied to the pump inlet has the potential to cause leakage flow through a pump at rest or adjusted for zero stroke unless offset by a check valve of comparable pressure rating located at the pump outlet.

Sight Glass Kits

Part Number	Description
560-000-200	Nylon – Sight Glass, O-Ring, & Vent Screw

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Model 76 Pumps

Product Specs and Ordering

Bulletin 51021

DESCRIPTION

The Manzel® Model 76 pump is a rugged single-piston pump capable of accurately delivering precise volumes of oil to machinery lubrication points at pressures up to 7500 psi (517 bar).

The Model 76 Pump is designed for use in the Manzel® Model MBL Box Lubricator with half-inch rise cams. The pump is driven from a common camshaft in the MBL reservoir and is adjustable from 1 to 27 drops per stroke. Three (3) pump piston sizes are available from 3/16”, 1/4" and 3/8” diameters.

A hardened steel roller following a cam actuates the pump and reduces the torque. The round sight glass well is made of a one-piece injection molded nylon material that is impervious to ultra-violet rays, and is comparable with mineral and synthetic oils.

All working parts are totally enclosed to protect them from dirt, water, and other contaminants and is self-lubricated at all times by the fluid in the MBL Reservoir.

Manzel Model 76 Pump

FEATURES

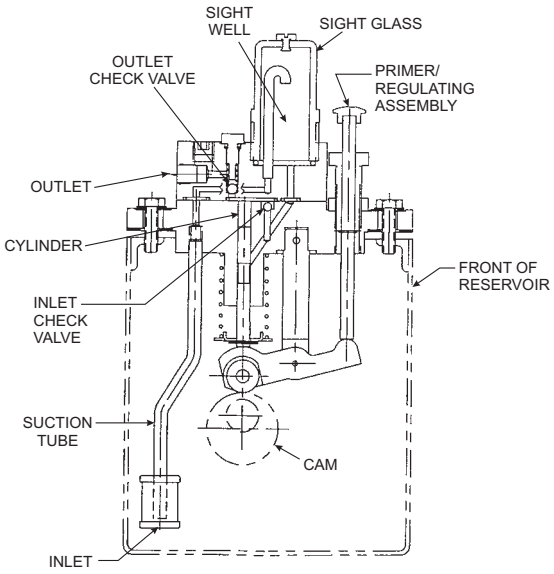
- Heavy-duty 2 piece steel body construction for high performance and durability
- Hardened steel cam roller, adds to pump and cam life
- Easy serviceability – pumps can be added or removed quickly
- Pump output is easily adjustable
- One piece, injection molded, sight glass for mineral and synthetic oils

OPERATION

Pumps with Sight Glass - Suction Type

(Refer to Figure 1)

Rotation of the lubricator cam operates the piston pump units in the reservoir. On the pump piston downstroke, lubricant is drawn into the cylinder from the sight well. This creates a pressure reduction (vacuum) in the airtight sight well that causes lubricant from the reservoir to be drawn into the well until the pressure is equalized. On the piston upstroke, the oil in the cylinder is ejected through the discharge check valve to a machine lubrication point. The number of drops seen falling into the sight well is the amount of oil discharged by the pump. Pump output can be adjusted by means of an external screw. This changes the length of the pump stroke, which changes the pump discharge volume.



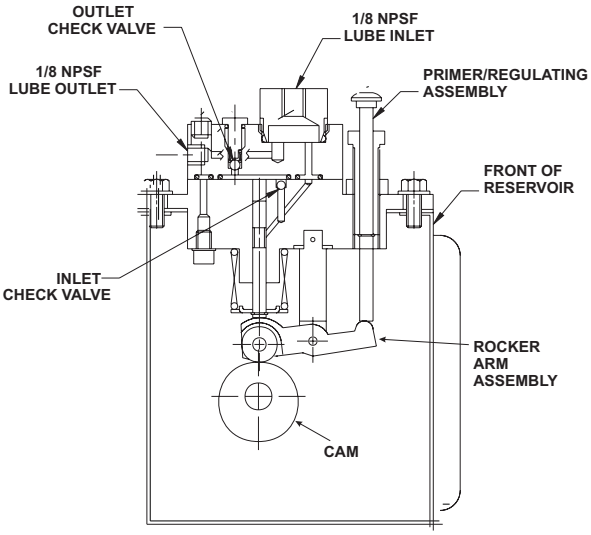
Suction - Type Pump with Sight Glass

Figure 1

Pressurized Suction & Gravity Feed-Pumps

(Refer to Figure 2)

Rotation of the lubricator cam actuates the pump rocker arm assembly to operate the pump piston. On the downstroke, spring pressure is exerted on the piston causing it to follow the cam. As it moves down, a pressure reduction (vacuum) is created between the piston and the discharge check valve causing the check valve to close. This allows the pressurized supply of oil to unseat the supply inlet shut-off ball and pressurize the piston bore with lubricant. On the piston upstroke, the piston forces the supply inlet to seat and shut off the pressurized supply. Lubricant in the piston cylinder is forced out through the discharge check valve to the machine lubrication point. Pump output can be adjusted by means of an external screw. This changes the length of the pump stroke, which changes the pump discharge volume.



Gravity - Feed Pump

Figure 2

SPECIFICATIONS

Model 76 Vacuum Pump with Sight Glass and Suction Tube

Part Number	Piston Size inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-000	3/16 (4.8)	7500 (517)	1	6	0.002	0.013	0.033	0.213	3	50
376-000-010	1/4 (6.4)	6000 (414)	2	12	0.004	0.024	0.066	0.393	3	50
376-000-030	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

Model 76 Vacuum Pump with 7/8" Short Suction Tube & 1/8" NPTF Vertical Outlet Adapter

Part Number	Piston Size inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-040	3/16 (4.8)	7500 (517)	1	6	0.002	0.013	0.033	0.213	3	50
376-000-050	1/4 (6.4)	6000 (414)	2	12	0.004	0.024	0.066	0.393	3	50
376-000-070	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

Model 76 Pressurized Supply Pump (without Sight Glass)

Part Number	Piston Size Inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-120	3/16 (4.8)	7500 (517)	1	6	0.002	0.013	0.033	0.213	3	50
376-000-130	1/4 (6.4)	6000 (414)	2	12	0.004	0.024	0.066	0.393	3	50
376-000-150	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

Model 76 Vacuum Pumps - For Alarm with 1/2" Short Suction

Part Number	Piston Size Inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-160	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

Model 76 Vacuum Pumps - For Alarm with 7/8" Short Suction

Part Number	Piston Size Inches (mm)	Maximum Pressure psi (bar)	Drops Per Stroke		Cubic Inches Per Stroke		Cubic Centimeters Per Stroke		Strokes Per Minute	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
376-000-170	3/8 (9.5)	2500 (172)	4	27	0.008	0.055	0.131	0.901	3	50

NOTE:

1. Pump output specifications are based on 500 SUS oil at 70^{0}F ambient. Heavier oil will produce fewer but larger drops.
2. When approaching maximum outputs, some oils will stream rather than form drops in sight glass.
3. For operating pressures over 50% of the rated maximum, consult the factory.
4. A lowable viscosity range independent of temperature: 80-5000 SUS.
5. Maximum allowable inlet pressure: Pressurized pump, 100 PSI; Pressurized pump with sight glass, 10 PSI.

NOTE:

Any static positive pressure applied to the pump inlet has the potential to cause leakage flow through a pump at rest or adjusted for zero stroke unless offset by a check valve of comparable pressure rating located at the pump outlet.

Sight Glass Kits

Part Number	Description
560-000-200	Nylon – Sight Glass, O-Ring, & Vent Screw

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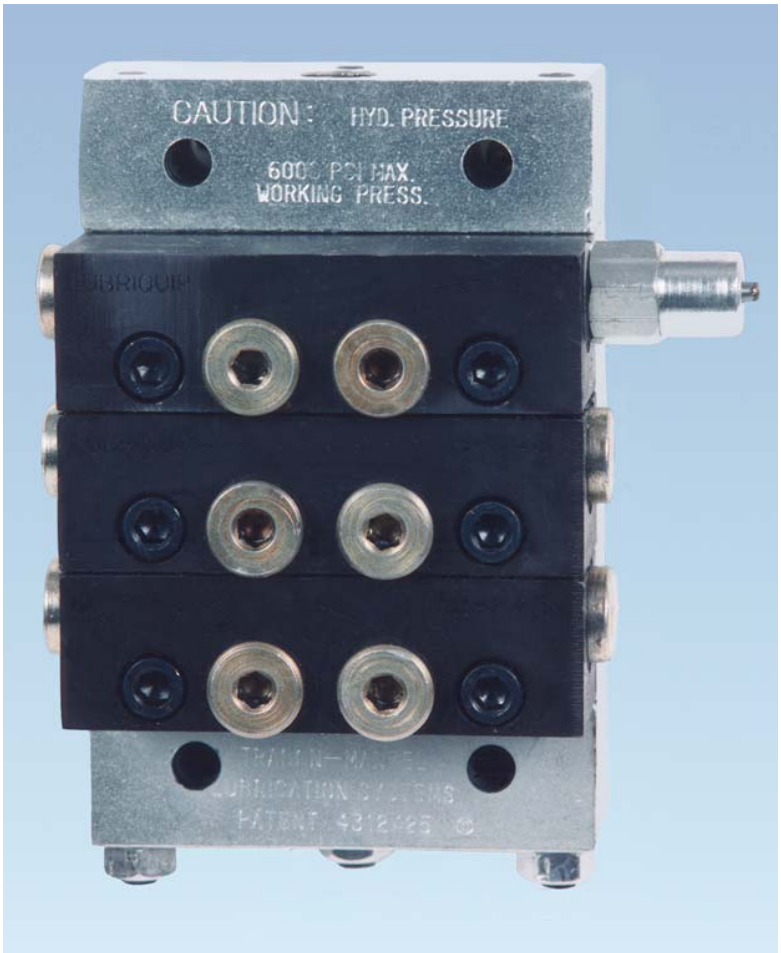
Trabon® and Manzel®
BY LUBRIQUIP®

MH Modular Divider Valves

Product Specs and Ordering

Bulletin 10103

Modular, Series-Progressive, Divider Valve Delivers Positive Oil Lubrication for Gas Engines, Compressors and Similar Equipment at Pressures up to 6000 PSI and 7500 PSI



IDEX CORPORATION

Revised November 2004

MH divider valves precisely proportion a volume of oil to satisfy the different requirements of every point in a lube system. They operate in sequential fashion to ensure that no point is missed. Series-Progressive design provides ready monitoring capability.

MH divider valves are available for use with petroleum or synthetic oils and at pressures up to 7500 PSI. The modular, stackable subplate design provides maximum application flexibility. Accessory components are available for visual diagnostics and electrical monitoring.

FEATURES/BENEFITS

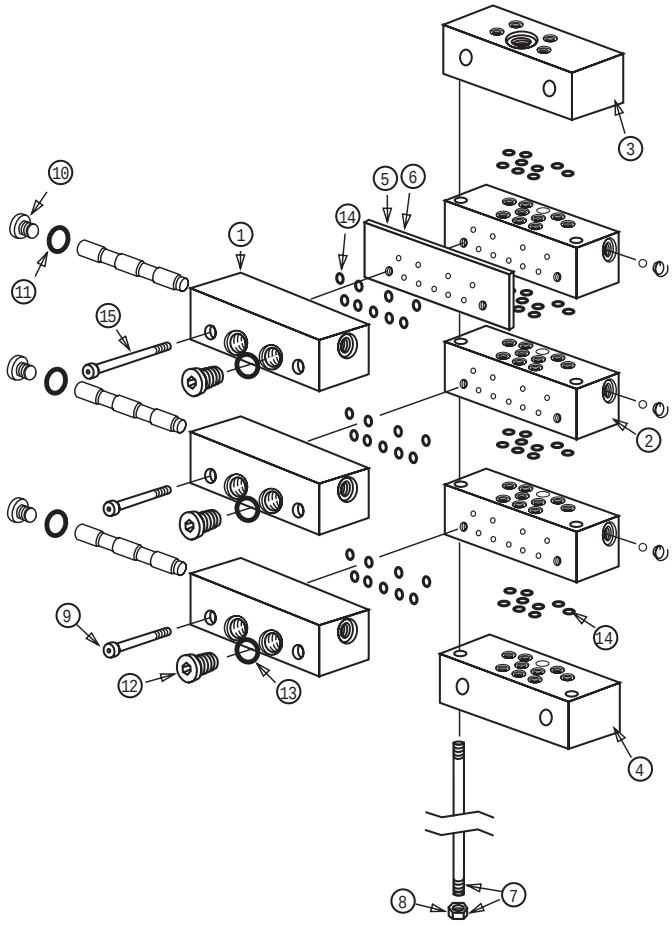
- Use in terminating oil systems at pressures up to 7500 PSI (517 bar)
- Lubricate up to 16 points from one divider valve assembly.
- Soft-seal O-ring construction and indicator ports minimize leakage and reduce maintenance.
- Built-in check valves prevent lube back flow and help keep lube lines full.
- Stackable subplate design simplifies build-up, installation and maintenance.
- Ample clearance between outlet connections for elbows and 3/8" lube lines.
- Performance indicators, cycle indicators and proximity switches monitor divider valve action to simplify troubleshooting and repair.
- Choice of SAE or NPSF inlet and outlet connections.
- Choice of 70 Durometer Buna-N or 90 Durometer Viton O-rings.

DESCRIPTION

Each MH divider valve assembly incorporates from three to eight working piston sections (1), associated subplate sections which include the outlet distribution ports (2), an inlet section (3), and an end section (4).

“Twin” sections are ported to provide separate outputs from each end of a working piston and direct them to two lube points. “Single” sections are ported to combine the outputs from each end of a working piston and direct it to one lube point.

Crossport plates (5) may be installed between working piston sections and subplate sections to combine the outputs of successive working piston sections. (Crossport plates must not be installed beneath bottom working sections.) Singling plates (6) may be installed to combine the outputs from both ends of a working piston in any "Twin" section. Bypass sections (not shown) may be used in place of working piston sections to eliminate inactive lube lines without disturbing active lube lines, or to provide for future system expansion. (Divider assembly must contain at least three working sections in addition to bypass section.)



Components

Key	Size	Description	Output Volume		MHP (Standard Buna-N 70 Durometer O-Rings) *+	MHH (High Pressure Viton 90 Durometer O-Rings)	With/Cycle Pin *+ Right-Hand Side
			in^3	cm^3			
1	6T	.006 Twin	0.006	0.098	106-000-085	106-000-595	N.A.
	6S	.006 Single	0.012	0.197	106-000-025	106-000-465	N.A.
	9T	.009 Twin	0.009	0.148	106-000-095	106-000-605	N.A.
	9S	.009 Single	0.018	0.295	106-000-035	106-000-475	N.A.
	12T	.012 Twin	0.012	0.197	106-000-105	106-000-615	N.A.
	12S	.012 Single	0.024	0.393	106-000-045	106-000-485	N.A.
	18T	.018 Twin	0.018	0.295	106-000-115	106-000-625	106-000-235
	18S	.018 Single	0.036	0.590	106-000-055	106-000-495	106-000-205
	24T	.024 Twin	0.024	0.393	106-000-125	106-000-635	106-000-245
	24S	.024 Single	0.048	0.787	106-000-065	106-000-505	106-000-215
	30T	.030 Twin	0.030	0.492	106-000-135	106-000-645	106-000-255
	30S	.030 Single	0.060	0.983	106-000-075	106-000-515	106-000-225
-	-	Bypass	-	-	106-000-010		-

Key	Description	1/8-27 NPSF	7/16-20 SAE
2	Intermediate Subplate*	527-000-311	527-003-550
3	Inlet (w/Bleed)	1/4-18 NPSF 527-000-321	7/16-20 SAE 527-000-325
4	End Section*	527-001-900	
5	Crossport Plate-Right+#	527-005-320	
	Crossport Plate-Left+#	527-005-330	
	Crossport Plate-Both+#	527-005-340	
6	Singling Plate+#	527-005-350	

* Part numbers include standard Buna-N 70 Durometer seals for 6000 PSI maximum system pressure. Consult Lubriquip for Viton 90 Durometer (7500 PSI) seals.

Working piston sections are also available with cycle indicators and field sensitive mechanical proximity switches mounted on the left-hand side.

When requested, crossporting and singling can be accomplished by using appropriate plates.

+ Part numbers include appropriate mounting screws.

Part numbers include 90 Durometer Viton seals for 7500 PSI maximum system pressure.

Parts List Key	Description	Part Number
7	Tie Rod & Nut Assembly (3 Req'd)	
	3 Section	527-001-930
	4 Section	527-001-940
	5 Section	527-001-950
	6 Section	527-001-960
	7 Section	527-001-970
	8 Section	527-001-980
8	Tie Rod Nut Only	410-440-010
9	Valve Block Mounting Screw	419-140-070
10	Piston Enclosure Plug	527-000-232
11	Piston Enclosure "O" Ring (70 Buna)	422-210-040
	Piston Enclosure "O" Ring (90 Viton)	422-240-040
12	Indicator Port Plug	527-300-840
13	Indicator Port "O" Ring (70 Buna)	422-210-030
	Indicator Port "O" Ring (90 Viton)	422-240-030
14	(70 Duro) Buna-N "O" Ring	422-010-060
	(90 Duro) Viton "O" Ring	527-000-840
15	Valve Block Mounting Screw for use with Crossport and Singling Plates	419-140-080

CYCLE INDICATORS

By sensing divider valve piston movement, lube volume can be accurately monitored and controlled. A variety of mechanical and electrical cycle indicators are available for this purpose.

TYPE	RATING	PART NO
S.P.D.T.	20A @ 125, 250 VAC .50A @ 125 VDC .25A @ 250 VDC	510-599-000
D.P.D.T.	10A @ 125, 250 VAC .30A @ 125 VDC .15A @ 250 VDC	510-577-000

DIVIDER VALVE SECTIONS WITH ATTACHED CYCLE INDICATOR PIN

18 through 30 size MH divider valve sections are available with a factory-installed cycle indicator pin attached to either end of the piston. The pin moves in and out one time for each complete cycle of the divider valve assembly. Application pressure is limited to 3500 PSI.

See Page 3 for part numbers. Consult Lubriquip for part numbers of sections with pin on left-hand side and for part numbers of secitons with viton seals.

MAGNETIC VISUAL CYCLE INDICATOR

A No-Weep Magnetic Visual Cycle Indicator can be installed in place of a piston enclosure plug on any size divider valve section. Six steel balls in a transparent sleeve follow a magnet which moves with the cycling piston. Unlike a cycle indicator pin, working section displacement is not reduced. Suitable for application at pressures up to 7500 PSI. Part number 509-932-522.

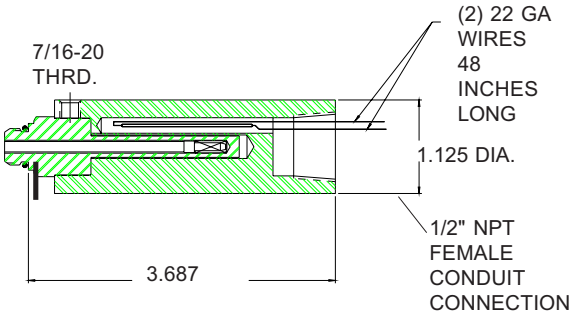
CYCLE INDICATOR SWITCH - FOR USE WITH DIVIDER VALVE SECTION HAVING ATTACHED CYCLE INDICATOR PIN

Switch bracket clamps to a cycle indicator pin housing. Cycle indicator pin movement repeatedly trips an electrical (limit) switch. Switch pulses provide input to a system controller which counts them to control and verify completion of the lube cycle.

UNIVERSAL CYCLE COUNTER - FOR USE WITH DIVIDER VALVE SECTION HAVING ATTACHED CYCLE INDICATOR PIN

Counter housing clamps to a cycle indicator pin housing. A 6-digit mechanical counter, advanced by the movement of a divider valve cycle indicator pin, provides visual assurance that the system is functioning. Every “count” indicates one complete cycle of the divider valve assembly. Suitable for application at pressures up to 3500 PSI. Part number 527-002-410

REED-TYPE PROXIMITY SWITCH (OPTIONAL)



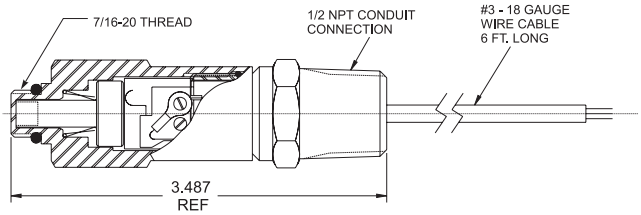
This magnetically operated SPST switch is installed in place of a piston enclosure plug. This "unattached pin" type switch can be used with any size MH working section

An indicator type magnet follows the divider valve piston, opening and closing the switch as it moves back and forth.

SPECIFICATIONS

Material ..... Stainless Steel, Aluminum
Switch Rating ..... 1.2 Volt-Amperes; up to 115 VAC, 50 VDC
Contacts ..... Single Pole, Single Throw
Ambient Temperture Range ..... 0^{O}F to + 130^{O}F (-18^{O}C to + 55^{O}C)
Max Operating Pressure ..... 7500 psi
Max Cycle Rate ..... 60 cpm
Cycle Life Expectancy ..... 10,000,000+ cycles
Part Number 527-001-231

FIELD-SENSITIVE-MECHANICAL (FSmech) PROXIMITY SWITCH FOR HAZARDOUS ENVIRONMENTS (SUPPLIED AS STANDARD WITH MENU CODE OPTIONS E,F,G,M,N,P)



This mechanical switch is installed in place of a piston enclosure plug and is actuated by the movement of the piston.
It can be used with any size MH working section and is suitable for use in systems operating in hazardous environments.

SPECIFICATIONS

Current Rating ..... 1.2 volt-amps at 28VDC
..... 5 A Resistive, at 115/230 VAC
Temperature Range ..... -58^{0}F to $+167^{0}$F (-50^{0}C to $+75^{0}$C
Normally Open Contacts
Maximum Cycle Rate ..... 150 CPM
Cycle Life Expectancy ..... 10,000,000 +cycles
Maximum Operating Pressure ..... 7500 PSI
CSA Certified for CL1. Groups A,B,C and D. Div. 1.
Part Number 527-006-060

PERFORMANCE INDICATORS

Performance indicators respond to the increase in pressure which occurs when lube lines or lube points become blocked. When installed in indicator ports of working piston sections, they pinpoint blockage location. Some models relieve the excessive pressure, allowing the divider valve to continue to cycle. Some models do not relieve the excessive pressure, causing the divider valve to lock up.

Automatic Reset Relief Indicator

A spring-loaded piston unseats when lube line blockage occurs and lubricant escapes through a vent to the atmosphere. This allows the system to continue lubricating the other unaffected points. When the blockage is cleared, the piston automatically reseats.

Part Number	Relief Pressure
508-310-415	750 PSI (52 bar)
508-310-425	1000 PSI (69 bar)
508-310-435	1250 PSI (86 bar)
508-310-445	1500 PSI (104 bar)
508-310-455	2000 PSI (138 bar)
508-310-465	2500 PSI (173 bar)
508-310-475	3000 PSI (207 bar)

Disc-Type Pressure Indicator

A blow-out disc ruptures when lube line blockage occurs and lubricant forces a pin to protrude from the body of the indicator. There is no provision for relief and the pressure escalates until relieved elsewhere in the system. The disc must be replaced and the pin reset manually after the blockage is eliminated.

Part Number	Relief Pressure
509-499-625	2800 PSI (193 bar)
509-499-105	3700 PSI (255 bar)
509-499-125	4600 PSI (317 bar)
509-499-145	5500 PSI (380 bar)
509-499-165	6400 PSI (441 bar)

Spring-Type Pressure Indicator with Memory

When blockage occurs, a spring-loaded piston unseats and forces a separate indicator pin to protrude from the body of the indicator. There is no provision for relief, and the pressure escalates until relieved elsewhere in the system. The spring automatically reseats the piston but the indicator pin must be reset manually after the blockage is eliminated.

Part Number	Pressure
509-932-590	250 PSI (17 bar)
509-932-600	500 PSI (35 bar)
509-932-610	750 PSI (52 bar)
509-932-620	1000 PSI (69 bar)
509-932-630	1500 PSI (103 bar)
509-932-640	2000 PSI (138 bar)
509-932-650	2500 PSI (173 bar)
509-932-831	3000 PSI (207 bar)
509-932-832	5000 PSI (345 bar)

OUTLET CHECK VALVES

NPT Divider Valve Outlet Check Valves

Max. Operating Pressure	Cracking Pressure	Description	Part Number
5000 PSI	10 PSI	1/8-27 M X 1/8-27 F NPFT NPSF Carbon Steel Hard Seat	509-350-010
	35 PSI	"	509-350-030
	100 PSI	"	509-350-100
	250 PSI	"	509-350-250
	360 PSI	"	463-001-582
7500 PSI	35-60 PSI	1/8-27 M X 1/4-18 F NPFT NPSF Stainless Steel Soft Seat	463-001-580

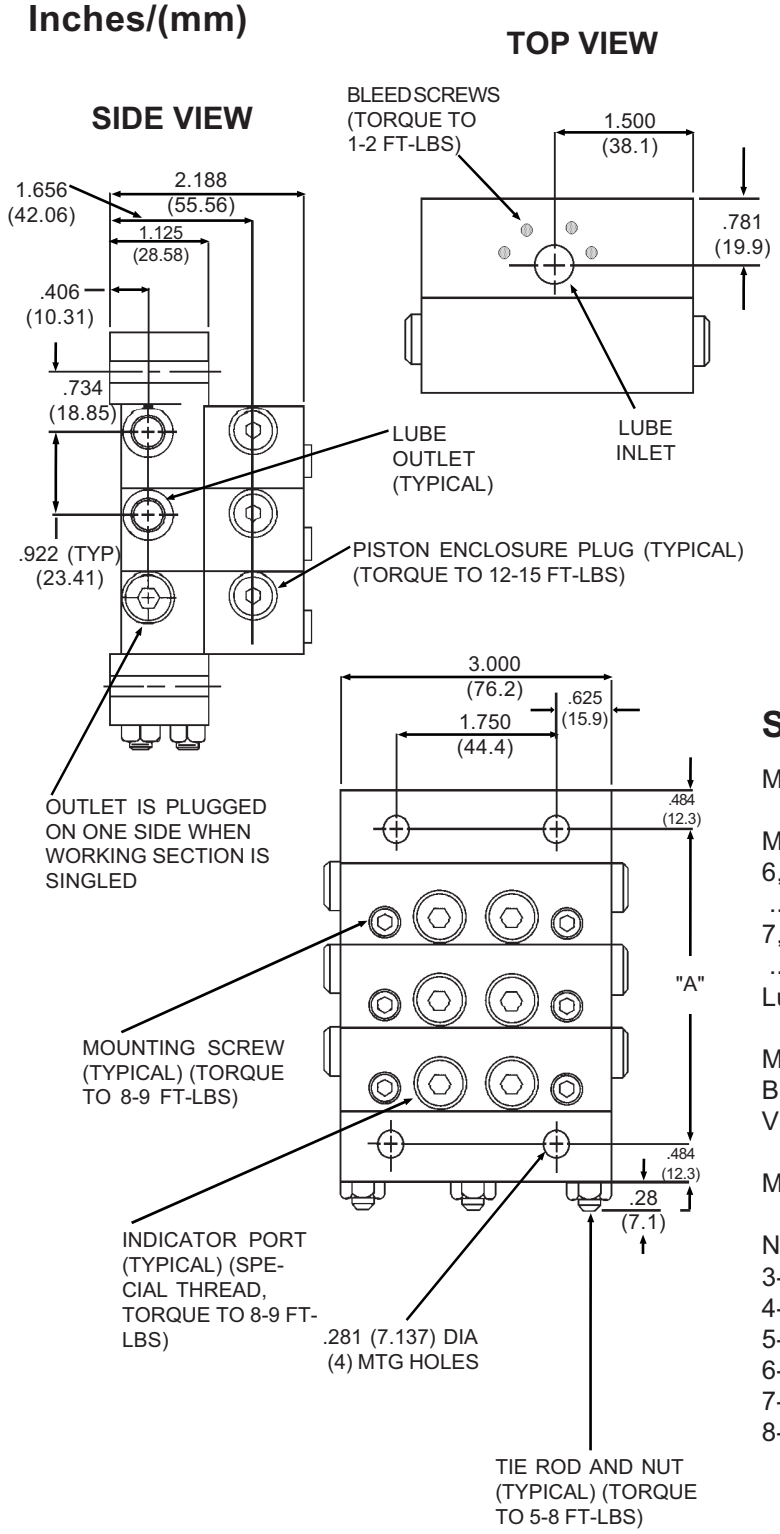
SAE Divider Valve Outlet Check Valves

Max. Operating Pressure	Cracking Pressure	Description	Part Number
3500 PSI	20 -50 PSI	7/16-20 M X 7/16-20 F Stainless Steel Hard Seat	463-001-589
7500 PSI	20 -50 PSI	7/16 - 20 M x 7/16 - 20 F Stainless Steel Soft Seat	463-001-585

Outlet check valves enhance system integrity by ensuring that contaminants, air or gases do not back up into the lubricaton system.

DIMENSIONS

Inches/(mm)



PORT SIZES:	
Inlet	**Outlet**
1/4-18 (F) NPSF	1/8-27 (F) NPSF
7/16-20 (F) SAE	7/16-20 (F) SAE

Qty of Sections	"A"
3	3.578 (90.88)
4	4.500 (114.30)
5	5.422 (137.71)
6	6.344 (161.13)
7	7.266 (184.55)
8	8.188 (207.97)

SPECIFICATIONS

Material.....Steel Body (Corrosion Protected)
Steel Piston (Honed Fit)
Maximum Pressure
6,000 psi for Petroleum Oil only
..... Buna O-Rings (422-010-060)
7,500 psi for Petroleum or Synthetic Oil
..... Viton O-Rings (527-000-840)
Lubricant.....Petroleum or Synthetic Oil only

Maximum Operating Temperature
Buna-N O-Rings.....200°F (93°C)
Viton O-Rings.....350°F (163°C)

Maximum Cycle Rate ..... 200 CPM

Net Weight
3-section divider valve assembly 5.9 lbs (2.7 kg)
4-section divider valve assembly 7.3 lbs (3.3 kg)
5-section divider valve assembly 8.7 lbs (4.0 kg)
6-section divider valve assembly 10.2 lbs (4.6 kg)
7-section divider valve assembly 11.6 lbs (5.6 kg)
8-section divider valve assembly 13.0 lbs (5.9 kg)

ORDERING INFORMATION

MH DIVIDER VALVE ASSEMBLY ORDERING CODE

XXX-XXX- X X-XX X XX

SERIES OF DIVIDER

MHP - STANDARD COMPRESSOR TO 6,000 PSI (BUNA SEALS)
MHH - HIGH PRESSURE COMPRESSOR TO 7,500 PSI (VITON SEALS)

INLET - OUTLET THREADS

NPT - INLET 1/4 -18, OUTLET 1/8 - 27
SAE - INLET 7/16 - 20, OUTLET 7/16 - 20

DIVIDER VALVE ACCESSORY OPTIONS (OMIT WHEN NOT REQUIRED)

P - ASSEMBLY OF PERFORMANCE INDICATORS
IN ALL WORKING OUTLETS **
C - ASSEMBLY OF EXTERNAL CHECK VALVES
IN ALL WORKING OUTLETS **
B - ASSEMBLY OF PERFORMANCE INDICATORS & CHECK VALVES
IN ALL WORKING OUTLETS **

NUMBER OF SECTIONS

3 - THREE
4 - FOUR
5 - FIVE
6 - SIX
7 - SEVEN
8 - EIGHT

WORKING SECTION CAPACITY

06 - .006 CU. IN.
09 - .009 CU. IN.
12 - .012 CU. IN.
18 - .018 CU. IN.
24 - .024 CU. IN.
30 - .030 CU. IN.
BP - BYPASS

TYPE OF VALVE SECTION

T - TWIN VALVE
S - SINGLE VALVE-RH OUTLET
L - SINGLE VALVE-LH OUTLET
B - TWIN VALVE W/CYCLE PIN RIGHT
C - SINGLE VALVE W/CYCLE PIN RIGHT - RH OUTLET
D - SINGLE VALVE W/CYCLE PIN RIGHT - LH OUTLET
• E - TWIN VALVE W/PROXIMITY SWITCH RIGHT
• F - SINGLE VALVE W/PROXIMITY SWITCH RIGHT - RH OUTLET
• G - SINGLE VALVE W/PROXIMITY SWITCH RIGHT -LH OUTLET
H - TWIN W/CYCLE PIN LEFT
J - SINGLE W/CYCLE PIN LEFT - RH OUTLET
K - SINGLE W/CYCLE PIN LEFT - LH OUTLET
• M - TWIN W/PROX. SW. LEFT
• N - SINGLE W/PROX. SW. LEFT - RH OUTLET
• P - SINGLE W/PROX. SW. LEFT - LH OUTLET

CROSSPORTING OPTION (OMIT WHEN NOT REQUIRED)

CR - RIGHT HAND SIDE
CL - LEFT HAND SIDE
CB - BOTH SIDES

** PERFORMANCE INDICATOR/CHECK VALVE PART NUMBER MUST BE SPECIFIED ON ORDER.

• SPECIFYING E,F, G, M, N, OR P WILL INCLUDE THE STANDARD FSmech 527-006-060 PROXIMITY SWITCH. CONSULT THE FACTORY IF OTHER PROXIMITY SWITCH OPTIONS ARE RQUIRED.

NOTES:

1) RIGHT / LEFT HAND IS DETERMINED WHEN VIEWING FRONT OF DIVIDER VALVE ASSEMBLY WITH INLET AT TOP.

2) WORKING SECTIONS ARE SPECIFIED STARTING FROM INLET SECTION DOWN.

3) WHEN VALVE IS CROSSPORTED, ITS OUTLET IS PLUGGED AND OUTPUT IS DIVERTED TO NEXT VALVE FARTHEST FROM INLET.

4) LAST VALVE IN DIVIDER ASSEMBLY, FARTHEST FROM INLET, CANNOT BE CROSSPORTED.

5) WHEN VALVE IS A TWIN, BOTH OUTLETS IN ITS SUBPLATE MUST BE USED. WHEN VALVE IS A SINGLE, ONLY ONE OUTLET IN ITS SUBPLATE CAN BE USED AND THE OTHER OUTLET MUST BE PLUGGED.

6) SINGLE VALVE CAN BE CROSSPORTED ON ONE SIDE ONLY.

7) CYCLE PINS ARE LIMITED TO APPLICATIONS OF 3,500 PSI MAX.

8) CYCLE PINS ARE AVAILABLE ON MH 18,24 & 30 SIZE VALVES ONLY.

9) FSmech PROXIMITY SWITCHES CAN BE USED ON ALL SIZES OF MH WORKING SECTIONS.

10) ALL DIVIDER VALVE ASSEMBLIES MUST HAVE A MINIMUM OF 3 WORKING SECTIONS AND A MAXIMUM OF 8 WORKING SECTIONS..

Lubriquip endorses the SAE recommendation of ISO 18/14 (ISO 4406) oil cleanliness for most bearing applications. Some high speed bearings may require cleaner oil. Consult the bearing manufacturer for recommendation.

LUBRIQUIP®
Lubrication & Dispensing Solutions

ISO 9000:2000 REGISTERED FIRM

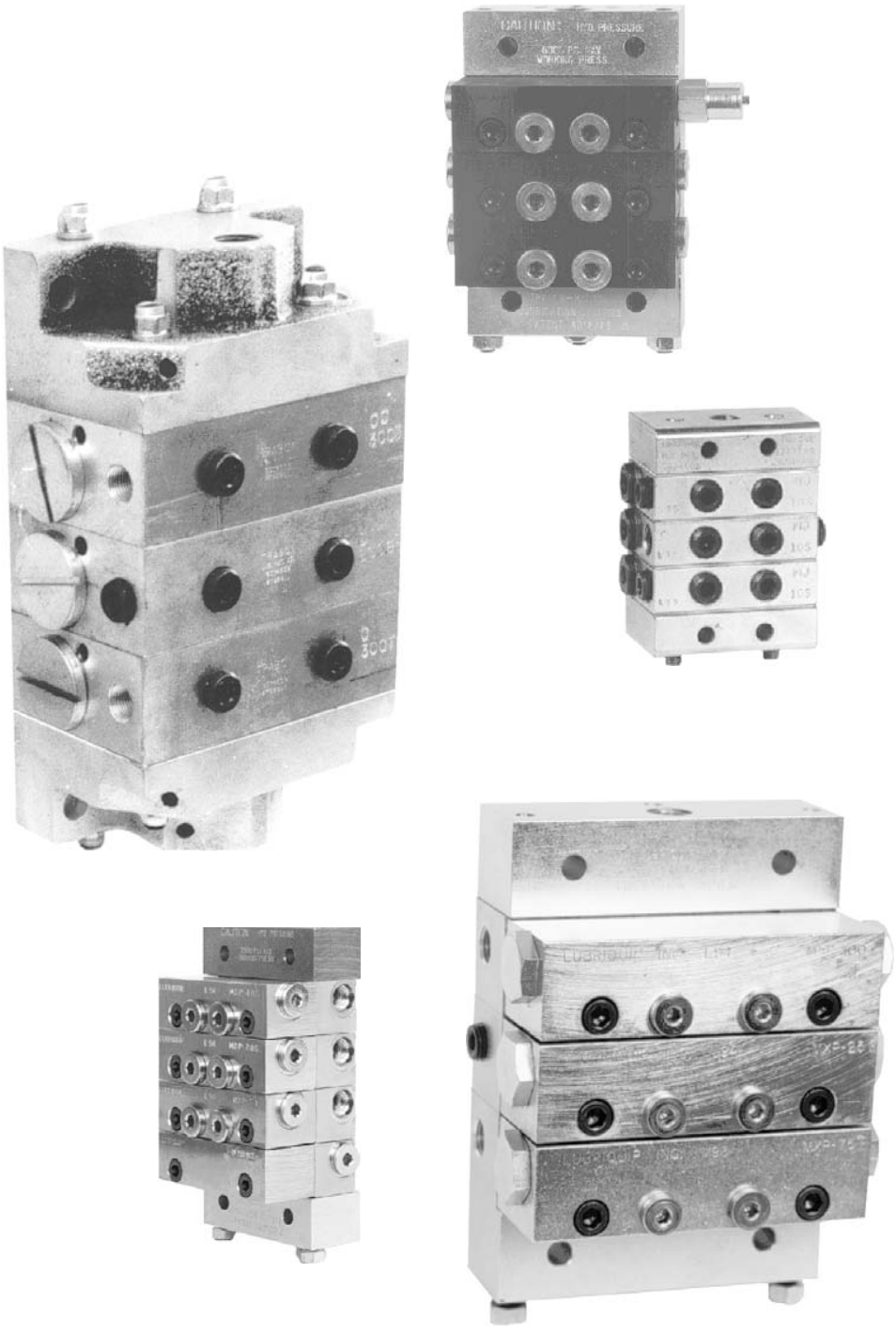
ISO 14000 REGISTERED FIRM

Trabon® BY LUBRIQUIP®

Series-Flo® Divider Valve Accessories & Parts

Product Specs and Ordering

Bulletin 10161



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Revised September 2004

Series-Flo Divider Valve Parts

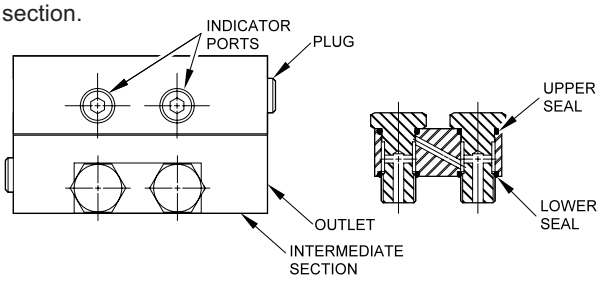
Part Numbers							
Divider Valve	MJ	MJ-SS	MS/MH	MS (Nickel)	MX/MXO	MXP	MGO
Intermediate Gasket 1 - Per Section	510-998-002	510-998-002	- -	- -	510-933-001	- -	- -
Enclosure †			O-Ring (Buna) 422-210-040	O-Ring (Buna) 422-210-040	O-Ring (Viton) 422-240-080	O-Ring (Viton) 422-240-080	
Plug Seals 2-Per Section	Gasket 510-681-000	Gasket 439-077-235	Gasket 527-000-240	Gasket 527-000-240	Gasket 500-776-000	Gasket 500-776-000	O-Ring 422-012-170
O-Rings (9) Per Section Except "MGO"	- - - -	- - - -	Std (Buna-N) 422-010-060 (90 Duro Viton) MH Only 527-000-840	Buna-N 422-010-060	- - - -	Std (Viton) 527-300-510 (90 Duro)	Viton & Buna-N O-Rings 422-040-110 (4) 422-040-120 (2) 422-040-130 (2) 422-040-150 (1) 423-700-086 (1) Repair Kit 560-001-950 Contains All of Above O-Rings for One Valve Section
Tie Rods Qty Per Divider Valve Ass'y	(2)	(2)	(3)	(3)	(4)	(3)	(2)
Number of Sections in Divider Valve							Upper Rods
3	510-999-030	510-999-130	527-001-930	527-003-290	510-505-030	527-300-270	510-665-030
4	510-999-040	510-999-140	527-001-940	527-003-300	510-505-040	527-300-280	thru
5	510-999-050	510-999-150	527-001-950	527-003-310	510-505-050	527-300-290	510-665-100
6	510-999-060	510-999-160	527-001-960	527-003-320	510-505-060	527-300-300	Lower Rods
7	510-999-070	510-999-170	527-001-970	527-003-330	510-505-070	527-300-310	510-666-030
8	510-999-080	510-999-180	527-001-980	527-003-340	510-505 080	527-300-320	thru
9	- -	- -	- -	- -	510-505-090	527-300-330	510-666-100
10	- -	- -	- -	- -	510-505-100	527-300-340	
Tie Rod nuts Qty Per Divider Valve Ass'y	410-440-010 (2)	410-702-002 (2)	410-440-010 (3)	410-702-002 (3)	510-506-001 (8)	410-440-020 (3)	510-506-001 (8)
Mounting Screws 2 Per Valve Section	- -	- -	419-140-070	419-700-020	- -	419-160-080	- -
Mounting Bars and Plates	See 15126	- -	See 15126	- -	See 15126	- -	- -
Cycle Ind. Pin Repair Kit †	- - Gasket 560-002-987	--	O-Ring (Buna-N) 560-002-055 Gasket 560-002-050	--	O-Ring (Viton) 560-001-720* Gasket 560-001-710	O-Ring (Viton) 560-001-720 (Ind. Body) 527-300-830	- - 510-612-001 (Ind. Body)

* 1985 and Later

† MS/MH dated L94 and later use o-ring seal; K94 and earlier use metal gasket.
MXP dated K94 and later use o-ring seal; J94 and earlier use metal gasket.

Singling And Crossporting Bar Assemblies Used with MJ & MX Type Dividers

Singling Kits externally convert a "T" (Twin Outlet) section to an "S" (Single Outlet) section.



Crossporting Kits externally combine the output of two (2) adjacent sections.

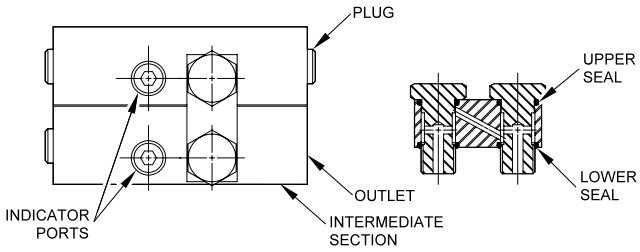
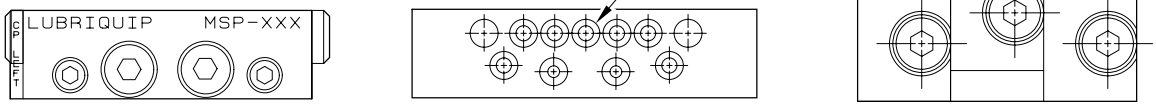


Plate Type Single and Crossport Kit Used with MSP & MXP Type Dividers



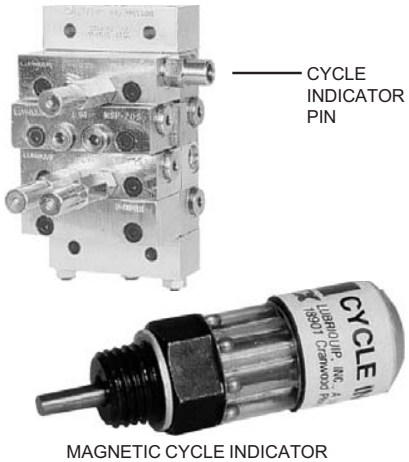
ORDERING INFORMATION

Part Numbers								
Divider	Single Kit	Crossport Kits			Upper Seal (Bar Type)	Lower Seal (Bar Type)	O-Ring (Plate Type)	Valve Block Mounting Screw-Long
		Right Side	Left Side	Both Sides				
MJ	189-000-050	189-000-040	189-000-040	- -	503-816-010	510-657-000	- -	- -
MJ-SS	- -	- -	- -	- -	- -	- -	- -	- -
MSP	527-005-350	527-005-320	527-005-330	527-005-340	- -	- -	422-010-060	419-140-080
MS (Nickel)	- -	- -	- -	- -	- -	- -	- -	- -
MX/MXO	189-000-060	189-000-090	189-000-090	- -	510-966-000	510-968-000	- -	- -
MXP	527-301-000	527-300-980	527-300-970	527-300-990	- -	- -	527-300-510	419-160-090
MXP (Nickel)	- -	- -	- -	- -	- -	- -	- -	- -
MGO	- -	- -	- -	- -	- -	- -	- -	- -

Cycle Indicators

Cycle Indicators provide a means of visually monitoring lube flow thru the system. The pin type cycles in and out when lubricant is flowing. Movement of the pin is caused by the piston (the two are attached) so that when the piston moves the indicator pin in and out once, the entire divider valve has cycled. This accessory must be ordered as part of a divider section. Refer to individual divider valve product sheet for ordering code. The magnetic type has six steel balls, within a transparent housing, that move back and forth during normal cycling of the valve. This accessory replaces the piston enclosure plug and can be used on any size valve section.

Valve Series	Part Numbers (Magnetic Type)
	O-Ring Sealed
MS/MH	509-932-522
MX/MXP	509-932-720
MGO	509-932-836



MAGNETIC CYCLE INDICATOR

Cycle Counters - Ordering Information

The function of a **Cycle Counter** is to give assurance that the lubricant is flowing thru the system. Every "count" indicates one complete cycle of the divider valve. Visual inspection and/or recording of counts provides a constant check on the performance of your lubricant system and the pump. (Universal Counter - **Part Number 527-002- 410)** Can be used on MJ, MS, MH, MX and MXP divider valve assemblies.

Important - the cycle counter must be attached to a section which is equipped with a cycle indicator pin. If you are adding the counter to an existing system that does not have such a section, you must order it to replace an existing section somewhere in the system. Refer to individual divider valve product sheets for ordering information.

Cycle Switches - Ordering Information

The function of a **Cycle Switch** is to electrically give assurance that the lubricant is flowing thru the system. Actuated by a cycle pin, switch can be wired to various controls.

Important - cycle switch must be attached to a section which is equipped with a cycle indicator pin. When adding the cycle switch to an existing system that does not have a section with a cycle indicator pin, you must order such a section to replace an existing section somewhere in the system. Refer to individual divider valve sheets for ordering information.

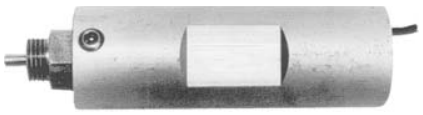
Part Numbers						
Series-Flo Divider Valves	**MJ**	**MS/MH**	**MS (Nickel)**	**MX/MXO**	**MXP**	**MGO**
Cycle Switch and Bracket Ass'y **SPDT**	510-599-000	510-599-000	510-599-000	510-599-000	510-599-000	510-250-000
	Electrical ratings: 15 amps at 125, 250 and 480 VAC 1/2 amp at 125 VDC, 1/4 amp at 250 VDC, 6.0 amps at 24 VDC Non-Inductive					
Replacement Switch	529-726-001	529-726-001	529-726-001	529-726-001	529-726-001	529-726-001
Cycle Switch and Bracket Ass'y **DPDT**	510-577-000	510-577-000	510-577-000	510-577-000	510-577-000	510-269-001
	Electrical ratings: 10 amps at 125 or 250 VAC .3 amp at 125 VDC or .15 amp at 250 VDC					
Replacement Switch	507-741-000	507-741-000	507-741-000	507-741-000	507-741-000	507-741-000
Replacement **Bracket** for either **SPDT** or **DPDT** Switch Assemblies	511-968-002	511-968-002	511-968-002	511-968-002	511-968-002	510-246-002
Moisture Resistant Cycle Switch with 6 Ft Cable and Bracket Ass'y **SPDT**	510-599-200	510-599-200	510-599-200	510-599-200	510-599-200	- -
	Electrical ratings: 5 amps at 125 or 250 VAC Wire Code for Moisture Resistent Switch: BK (Com), Red (N.C.), WH (N.O.)., GN (Ground)					
Replacement Switch w/6 Ft Cable	529-726-200	529-726-200	529-726-200	529-726-200	529-726-200	- -

Proximity Cycle Switches - Ordering Information

The **Proximity Cycle Switches** are magnetically operated single throw switches that sense the movement of the divider valve piston when it is cycling. Each proximity cycle switch provides a signal that is used to monitor the system. It is available in three basic types with specifications and features as listed on page 5.

Proximity Switches Con't

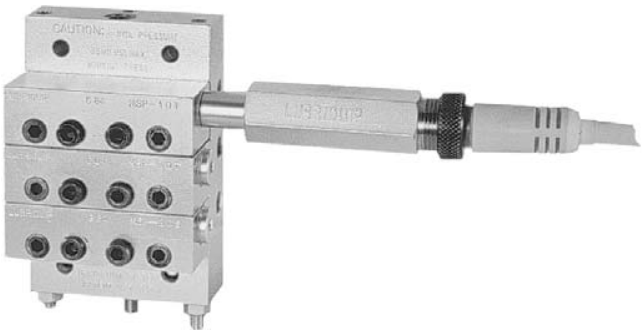
The **Reed Type Proximity Switch** is available in an unattached version for oil only applications for MS, MH, and MGO at pressures up to 7500 psi and with cycle rates under 60 cycles per minute.



REED TYPE PROXIMITY SWITCH

The **Field Sensitive Magnetic Proximity Switch** is a dry contact, ceramic magnet operated switch. It can be used in either grease or oil applications, at cycle rates up to 200 cpm and at pressures that do not exceed 3500 psi. The switch is available in three sizes for MS/MH, MX/MXP and MGO and is not limited to valve section size. Mating plugs in 6 ft and 12 ft lengths are available. It is also available in an explosion-proof version (with 6 foot wire) for MS/MH divider valves.

The **Magnetic Operated Proximity Switch** is not limited to valve size and contains a miniature snap-action switch that is tripped by attraction of the internal magnet to the moving divider piston. A 24 VDC only version has built-in light emitting diodes (LEDs) for local verification of cycling and is available with 3-pin, 4-pin, or 5-pin connectors. Similar units without LEDs are suitable for DC or AC operation and also include an explosion-proof version with a 6 ft. pigtail lead. These switches may be used at pressures up to 7500 psi and at cycle rates not exceeding 150 cpm.



FEEDER WITH FIELD SENSITIVE PROXIMITY SWITCH ATTACHED

Description	No. of Pins	Type Seal	Part Numbers MS	MH	MX	MXP	MGO
Unattached Reed Type (oil only) 10 mA @ 120 VAC 24 mA @ 24 VDC 10,000,000 Cycle Life	1/2 NPT w/Leads (Exp. Proof)	O-Ring	527-001-231	527-001-231	- -	- -	570-155-001
		Gasket*	- -	- -	- -	- -	- -
Field Sensitive Magnetic Type 3-pin and 5-pin (AC only) 2A @ 120/240 VAC 4-pin (DC only) 0.1A @ 28 VDC 150,000,000 Cycle Life	3	O-Ring	527-003-251	527-003-251*	527-005-520	527-005-520	570-999-060
		Gasket*	- -	- -	570-999-050	570-999-050	- -
	5	O-Ring	527-004-111	527-004-111*	527-005-190	527-005-190	570-999-220
		Gasket*	- -	- -	570-999-210	570-999-210	- -
	4	O-Ring	527-004-112	527-004-112*	527-007-140	527-007-140	527-007-120
	Pigtail Lead (Exp. Proof)	O-Ring	527-003-431	527-003-431*	527-006-150	527-006-150	- -
		Gasket*	- -	- -	- -	- -	- -
Magnetic Type with LEDs 5A @ 24 VDC 10,000,000 Cycle Life	3	O-Ring	527-005-690	527-005-690	- -	- -	- -
		Gasket*	- -	- -	- -	- -	- -
	5	O-Ring	527-005-670	527-005-670	- -	- -	- -
		Gasket*	- -	- -	- -	- -	- -
Magnetic Type 5A @ 24 VDC	3	Gasket*	- -	- -	527-006-130	527-006-130	- -
5A @ 120/240 VAC	5	O-Ring	527-006-050	527-006-050	527-006-140	527-006-140	- -
10,000,000 Cycle Life	Pigtail Lead (Exp. Proof)	O-Ring	527-006-060	527-006-060	- -	- -	- -
Field Sensitive MagneticmType 25 ma @ 24 VDC M12 X 1, 4-pin (DC only) 10,000,000 Cycle Life	4	O-Ring	527-007-263	527-007-263	- -	- -	- -

* Consult your distributor for availability.

Notes: * Pressure must be limited to 3500 psi maximum.

Request bulletin 15600 for additional information on Proximity Cycle Switches.

Proximity Switches Con't

Connecting Cables for:					
3-Pin Proximity Switch			5-Pin Proximity Switch		
Connector	Length (ft)	Part Number	Connector	Length (ft)	Part Number
Straight	3	570-999-070	Straight	3	570-999-180
Straight	6	570-999-080	Straight	6	570-999-160
Straight	12	570-999-090	Straight	12	570-999-170
			90°	6	570-999-390
4-Pin (M12 X 1)					
Straight	6.6	570-999-590	90°	6.6	570-999-600
Connecting Cables w/Indicator Light for 115 VAC					
Straight	12	492-240-171			

Trabon Performance Indicators are pressure sensitive devices which pinpoint excessive pressure by causing an indicator pin to protrude or by releasing lubricant to atmosphere. If the lube system operation must stop when a lubrication blockage occurs, then a seal-tight type of indicator should be used. If the lube system must continue to operate in spite of the blockage, the vent-to-atmosphere type of performance indicator should be used.

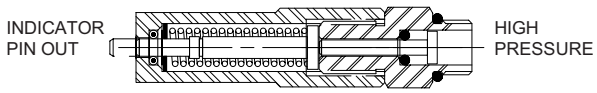
FEATURES

- Precise location of lube line blockage / high pressure.
- Allows lube system to shut down or continue operation when lube line blockage occurs.
- Option of manual or automatic resetting performance indicators.

OPERATION

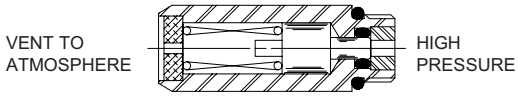
Reset Indicator:

Reset indicators may be used in master and/or secondary divider valves. A high pressure condition will cause the piston inside the indicator to move up, compressing a spring and forcing the pin to protrude. As high pressure is relieved the spring will force the piston down, while the indicator pin is held in place by an o-ring until it is reset manually.



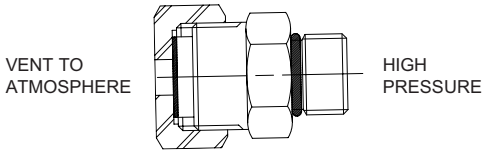
Automatic Relief Indicator:

These indicators can be used in master and secondary divider valves. By venting lubricant-to-atmosphere, automatic relief indicators can “pinpoint” lube line blockage, while allowing the rest of the lube system to operate. Inside the indicator is a piston which covers the lube vent in the indicator, a lube line blockage creates excessive pressure and forces this piston up, uncovering the outlet, and allowing lubricant to escape through the vent. When the blockage is corrected, a spring forces the piston back down covering the outlet and causing the indicator to automatically reset itself. This indicator allows the rest of the lube system to operate if a lube line is blocked.



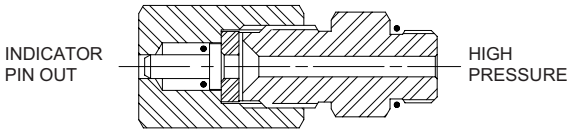
Blowout-To-Atmosphere Indicator:

The blowout-to-atmosphere indicator can be used in master and secondary divider valves. Excessive pressure due to a lube line blockage will cause an internal disc to rupture. Lubricant will escape through the ruptured disc to atmosphere. This pinpoints the blocked line and allows the rest of the system to continue to operate. When the blockage is corrected, the ruptured disc must be replaced.



Rupture Indicator:

Rupture indicators are used on MH divider valves where lube system pressures exceed 2500 psi. The high pressure from lube line blockage causes a disc to rupture. The lubricant than forces an indicator pin to protrude, locating the blockage. The high pressure backs up through the system and trips a pressure switch to shut the system off. When fault is corrected, the disc must be replaced and pin reset manually.



ORDERING INFORMATION

Order performance indicator by part number and description. Disc are color coded for burst pressure and can be ordered by part number and description. Refer to the following tables.

Automatic Relief Indicator

PSI	1/8 NPTF (OLD STYLE) For MJ, MH, MS, MXP	1/8 NPSF w/O-RING SEAL (*NEW STYLE) MH, MS, MXP	1/4 NPTF For MX+
750	508-310-075	508-310-415	508-210-075
1000	508-310-100	508-310-425	508-210-100
1250	508-310-125	508-310-435	—
1500	508-310-150	508-310-445	508-210-150
2000	508-310-200	508-310-455	508-210-200
2500	508-310-250	508-310-465	508-210-250
3000	508-310-300	508-310-475	508-210-300

Reset Indicator with Memory

PSI	1/8 NPTF (OLD STYLE) For MJ, MH, MS, MXP	1/8 NPSF w/O-RING (*NEW STYLE) MH, MS, MXP	1/4 NPTF For MX+	7/8-14 w/O-RING (*NEW STYLE) MGO
250	509-931-010	509-932-590	509-932-010	509-932-018
500	509-931-020	509-932-600	509-932-020	509-932-028
750	509-931-030	509-932-610	509-932-030	509-932-038
1000	509-931-040	509-932-620	509-932-040	509-932-048
1500	509-931-050	509-932-630	509-932-050	509-932-058
2000	509-931-060	509-932-640	509-932-060	509-932-068
2500	509-931-070	509-932-650	509-932-070	509-932-078

Blowout Indicator

MH 1/8 NPT	MX 1/4 NPT	Replacement Disc (11/16" dia.)	Color	PSI
- -	509-206-100	509-292-000	Yellow	1450
- -	509-206-120	509-293-000	Red	1750
- -	509-206-160	509-295-000	Aluminum	2350
- -	509-206-200	509-297-000	Blue	2950

Rupture Indicator

MH 1/8 NPTF (OLD STYLE)	1/8 NPSF w/O-RING (*NEW STYLE) MH	MX 1/4 NPTF	Replacement Disc (3/8" dia.)	Color	PSI
509-499-620	509-499-625	- -	509-277-000	Green	2800
509-499-100	509-499-105	- -	509-478-000	Half Yellow	3700
509-499-120	509-499-125	- -	509-479-000	Half Red	4600
509-499-140	509-499-145	- -	509-480-000	Half Orange	5500
509-449-160	509-499-165	- -	509-481-000	Half Aluminum	6400

Indicator port adapter 527-300-850 1/8 NPSF with o-ring to 7/16-20 SAE o-ring seal port.

+ For old-style MGO Dividers, use with 3/8x1/4 bushing (Trabon 412-170-030).

* Applies to product with date code L-94 (November 1994) or later.

Request Bulletin 15401 for further information on Performance Indicators.

LUBRIQUIP®
Lubrication & Dispensing Solutions

ISO 9000:2000 Registered Firm

ISO 14001 Registered Firm

DESCRIPTION

In a Trabon Series-Flo System®, free flow of lubricant from the pump through the transmission system and the bearings is necessary. If any portion of this transmission system (a divider valve, line fitting or any bearing) does not freely accept and pass its portion of the lubricant a blockage has occurred. This blockage will cause a higher than normal pumping pressure to be developed by the pump. Depending on the application or system design, this blockage with its resultant high pump pressure will usually cause a complete loss of lubricant flow into the total system and no bearing will be receiving lubricant.

The loss of flow due to a blockage is first indicated with the higher than normal system pressure that is developed by the pump as it attempts to overcome this blockage. This abnormally higher pressure that is a result of a blockage is limited, isolated, and signalled through the use of various performance indicators, reset and relief, incorporated into the system design.

Figure A. Components of the MSP Divider Valve

Divider Valve —

A Series-Flo® type divider valve is a manifolded proportioning device consisting of an inlet and end section plus a minimum of three intermediate sections. The divider valve is manifolded together with tie rods and nuts. A master divider valve is the first divider valve downstream from the lube pump. A secondary divider valve is any divider valve receiving lubricant from the master divider valve.

Intermediate Sections —

Intermediate sections (three or more required per manifold) contain a piston specially fitted to that section, built in outlet check valves and various passageways that, working with the piston, meters and valves the flow of lubricant. See Figure B. Intermediate sections may be manufactured to require one (1) or two (2) lube outlets. Stamping located on the face of each section will indicate (1) the style of divider valve section (MSP, MX, etc.), (2) the discharge per piston stroke expressed in thousandths of cubic inches (35 = .035 in^3) and (3) the number of lube outlets required (S = single, one outlet only; T = twin, two lube outlets required). See Figure A.

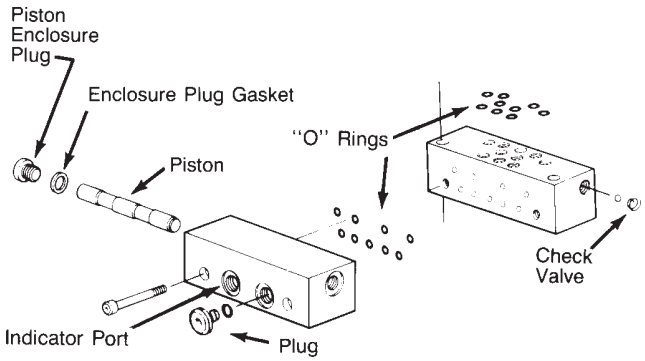


Figure B. Intermediate Valve & Subplate Section

Warning —

Never block a lube outlet that is designed to discharge lubricant.

PERFORMANCE INDICATORS

Trabon® Performance Indicators are pressure-sensitive devices that pinpoint excessive pressure in Trabon series progressive lubricating systems. These devices, which are installed in the indicator ports of divider valves, signal a fault either by causing an indicator pin to protrude or by releasing lubricant to the atmosphere.

All Performance Indicators respond quickly to protect the lube system and locate lube line blockage. Two of these devices - the Reset Indicator with Memory and the Rupture Indicator - will stop lube system operation when a fault occurs. If, however, lube system operation must continue in spite of a single line being blocked, the Automatic Relief Indicator should be used. Rupture-to-Atmosphere Indicators for Trabon pumps are also included.

It is recommended that some type of Performance Indicator be used to monitor every working outlet of a Trabon Centralized Lubrication System.

Reset Indicator with Memory —
Reset Indicators stop lube system operation when a fault occurs. These devices can be used in either master or secondary divider valves. When a lube line becomes blocked, the resultant high pressure pushes the indicator pin through the opening in the cap. The high pressure prevents the affected divider valve piston from completing its cycle, causing a pressure backup through the divider valve which trips a pressure switch upstream from the valve and shuts off the pump. The indicator pin remains extended until it is reset manually. This helps locate the lube line that is blocked.

Rupture Indicator —
Rupture Indicators are used on MSH divider valve applications where lube system pressures exceed 2500 psi. The high pressure from lube line blockage causes a disc to rupture. The lubricant then forces an indicator pin to protrude, locating the blockage. The high pressure backs up through the system and trips a switch to shut the system off. When the fault is corrected, the disc must be replaced and the pin reset manually.

Automatic Relief Indicator —
These Performance Indicators pinpoint lube line blockage but allow the lube system to continue to supply lubrication to points that are not blocked. They are used primarily in secondary divider valves. The excessive pressure created by line blockage moves a piston, enabling the lubricant to escape through a vent. When the pressure is relieved, the spring resets the piston. Because these devices permit the lube system to keep operating when a lube point is blocked, a separate pressure switch connected to an audible or visual alarm should be used to warn of high pressure.

Rupture-to-Atmosphere Indicator —
These indicators, which are standard on all Lubriquip pumps, provide pump protection and give visual indication of excessive system pressure. The pressure disc ruptures at a predetermined pressure setting, venting lubricant to the atmosphere and relieving the high pressure. A spud assembly is available to return vented lubricant to the reservoir by way of a tube. A high pressure switch is recommended to provide an audible or visual warning alarm that high system pressure has occurred.

LOCATING BLOCKAGE

If a blockage exists in a Trabon Series-Flo system it is caused by one of the following reasons:

(1) Crushed transmission line in the System.
(2) Blocked bearing in the system.
(3) Improperly drilled fitting in the system.
(4) Blocked divider valve in the system.

All servicing and disassembling should be carried out under the cleanest conditions possible. A blockage in a Trabon Series-Flo system will be centrally signalled by a pressure gauge, pressure switch, controller or by the pump relief indicator, exhausting lubricant. Before proceeding as outlined, make a visual inspection of the system and check for crushed lines or improper divider valve installation. Verify that each divider valve outlet required to discharge lubricant can do so and that no pipe plugs have been installed in an outlet designed to serve a bearing or another divider valve.

Use Filtered Lubricant Only.

Note: Dirt and foreign material are the worst enemies of any lubricating system.

Procedure —

Step No. 1 —
Use a manual pump with a gauge. Fill the pump with clean, filtered lubricant common to the system. Connect the manual pump into the inlet of the master divider valve and slowly operate pump. If system will not cycle freely below 1,500 PSI, see Step 2.

Step No. 2 —
2-1. Master Divider Valve Equipped With Performance Indicator:
With manual pump connected to the master divider valve as outlined in Step 1, raise pressure to 2,000 PSI, the indicators in the indicator ports will signal the location of the blockage. An indicator in the up position indicates pressure is in that outgoing line and signals the blockage is in the area being served from this outlet, as shown in Figure C. See Step 3.

If no indicator pins are protruding, the blockage is in the master divider valve.

2-2. Master Divider Valve Without Performance Indicators:
With pressure on the master as outlined in step 2-1, remove one at a time each indicator port plug and attempt to operate manual pump after each plug is removed. Do not exceed 2,000 PSI. If pressure drops and master cycles freely after an indicator port plug is removed then blockage is downstream in the area that is being served from that outlet. See Step 3.

If all indicator port plugs are removed and master will not cycle, blockage is in this divider valve.

Note: When indicator port plug of a blocked area is removed a small shot of trapped lubricant will usually surge out of this outlet as the inlet pressure on the divider valve drops.

If testing in Step 2 (1 or 2) indicates a blockage in the master divider valve, this divider valve must be disassembled and cleaned. See Step 5 for instructions on correct procedure.

Step No. 3 —

Testing accomplished in Step 2 has indicated the blockage is downstream of the master divider valve. Install the manual pump in the indicator Port of the master divider valve that is common to this blocked area. See Figure D. Proceed to downstream secondary divider valve and remove all indicator port plugs. Slowly operate manual pump. If lubricant can be discharged freely through each of the indicator ports of this divider valve the blockage is not in the supply line or the divider valve, see Step 4. If lubricant is not freely discharged through the open indicator ports of the secondary divider valve the blockage is in this divider valve or its supply line. Disconnect supply line at secondary inlet fitting and slowly operate manual pump to verify location. If blockage is in divider valve see Step 5.

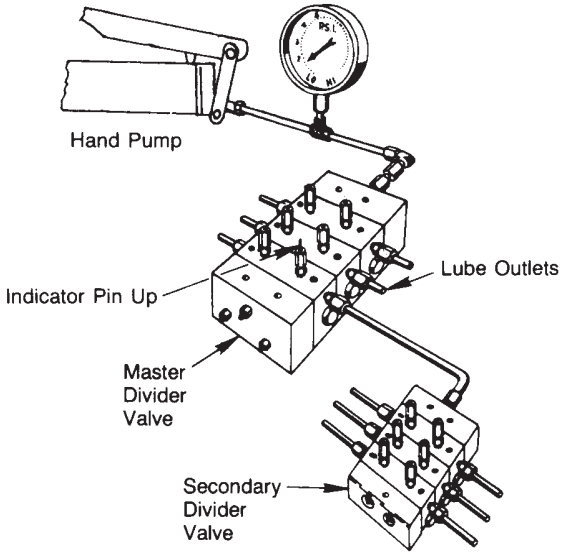


Figure C

Step No. 4 —

Install manual pump into each indicator port of secondary divider valve in turn, and slowly operate pump. See Figure E. If high pressure exists blockage has been located. Look for **crushed line, tight bearing, improperly drilled fittings and/or lube inlet port.** Correct as necessary.

Step No. 5 —

When testing indicates a blockage has occurred in any divider valve, that divider valve must be disassembled and cleaned.

Note: Dirt and foreign material are the worst enemies of any lubricating equipment. All servicing and disassembling should be carried out under the cleanest possible conditions.

Before disassembling any divider valve make a sketch and note as to the arrangement of the intermediate sections. For example: INLET 10T-20S-10T-30S END. See Figure F. Also remove end plugs only and try to move each piston back and forth without removing the piston from the intermediate section.

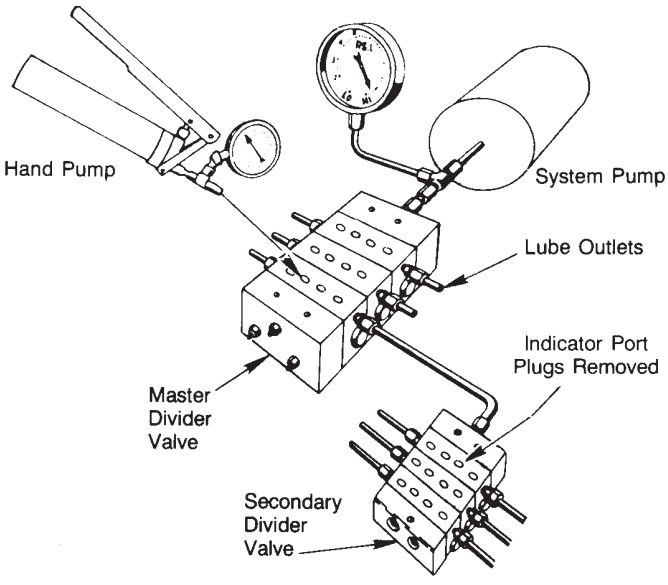


Figure D

Caution —

Do not insert hard metal objects into piston bore (i.e., punches, screwdrivers, etc.) use a brass rod and hand pressure only.

If all pistons are movable and there is no indication of a more serious problem, replace end plugs and using a new gasket apply the correct torque, see Torque Table. Retest this divider valve using the manual pump. If a piston is jammed, or a hard wax-like substance, or dirt is noted at the end of the piston chamber, proceed with disassembly. The divider valve can be dismantled by removing the tie rod nuts. With the individual sections on the bench remove the end plug from both ends of the section. Taking one section at a time remove the piston, if it appears to be jammed, try removing it from the other direction. With badly jammed pistons it may be necessary to use a brass rod and lightly tap piston out.

Clean sections and pistons in a suitable **clean** solvent until all lubricant has been removed. Use compressed air to dry and blow out all ports thoroughly. A small wire probe should be used to make sure all passages are clean and open. Inspect the cylinder bore and piston carefully for scratches, score marks or other damage.

Note: If either piston or cylinder bore is damaged a **new** section must be installed. All pistons are selectively fitted to the bore for proper clearance. Care must be taken to install piston only into the intermediate section from which it was removed.

If divider valve section and piston both appear in good condition, reassemble section making certain that piston slides smoothly but snugly in cylinder bore. Repeat cleaning and inspection of each section. After all sections have been cleaned, blown out, inspected and found to be in good condition, reassemble divider valve as indicated by the notes and sketches.

Caution —

Use all new gaskets, and correct torque ratings listed below. Test operation of divider valve using manual pump.

Assembly Torque (Ft. Lbs)								
	MJ	M	MV	MVH	MSP/ MH	MX	MXP	MG
Tie Rod Nuts	12	20	20	24	8	23	9	12
Indicator Plugs	7	15	15	15	10	18	15	18
End Plugs	15	15	15	15	11	35	35	15
Valve Section Mounting Screw	□	□	□	□	9	□	13	□

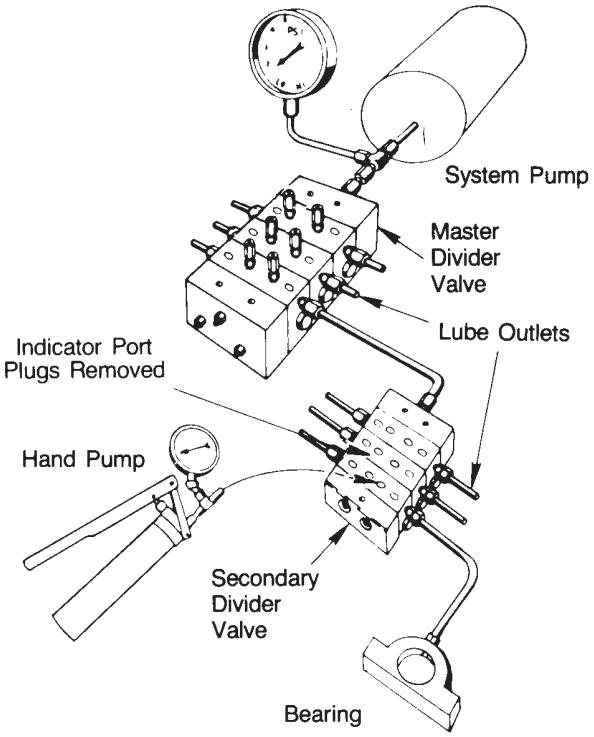


Figure E

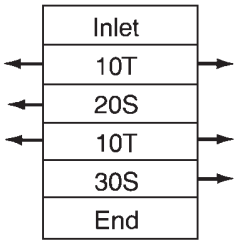


Figure F

CONTAMINATION BLOCKAGE

If dirt, foreign material or any other form of contamination is found in a divider valve, cleaning that divider valve will only temporarily solve contamination blockage problems. The **source of the contamination must be eliminated for satisfactory service.** The system filtering method must be investigated, filter elements should be inspected or changed as required. The reservoir must be inspected and cleaned if necessary. The reservoir filling method should be reviewed to eliminate any chance of foreign material entering the reservoir during filling. All lubricating systems require filtered lubricant.

SEPARATION BLOCKAGE

If a hard wax or soap like material is found in the intermediate section grease separation is occurring. This means that the oil is being squeezed from the grease at normal system operating pressure and the grease thickener is being deposited in the divider valve. Cleaning the divider valve will usually result in only temporarily solving the problem. Consult your lubricant supplier for recommendations on alternate lubricants and your local Trabon Distributor to verify compatibility with centralized lubricating Systems.

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PURGING AIR FROM THE SYSTEM

All lubrication Systems attain optimum operational efficiency when any ingested air has been purged from all of the lines and components. Manual air-bleeding procedures are necessary in the event any system components are loosened, disconnected, or removed after their initial installation. Although most lubricating systems are eventually self-purging, the relatively small volume of lubricant dispensed by the metering devices results in a slower rate of lubricant flow, compared to the amounts available from a manual hand pump, and delays the completion of the total system air-purging process. Therefore, manual system air purging becomes a necessity on repaired equipment before machine operation is resumed. The procedures in sections 1, 2 and 3 should be followed in sequences in order to ensure that any air ingested into the lube system during a maintenance procedure is entirely removed.

There are several air purging procedures available for selection and use, the choice of which depends upon the particular maintenance or repair procedure that has preceded it:

- Air purging after replacing a line between a secondary divider valve and a lube point - see Section 1.
- Air purging after replacing a line between the master divider valve and a secondary divider valve - see Section 2.
- Air purging after replacing a line between the pump and a master divider valve - see Section 3.

CAUTION

Use only clean oil filtered to at least the SAE - recommended cleanliness level of ISO 18/14 (ISO Standard 4406) when prefilling a system. The manufacturers' of the machine tool and its component bearings should be consulted to ensure that the ISO 18/14 cleanliness level is adequate for their parts.

- Air purging after adding or replacing any component module in a master divider valve assembly - see Section 4.
- Air purging after adding or replacing any component module in a secondary divider valve assembly - see Section 5.

Section 1

PURGING AIR FROM SECONDARY DIVIDER VALVE-TO-LUBE POINT LINES

Refer to Figure 1 when performing this procedure:

Step 1 - Install the line from the secondary divider valve to the lube point, but do not completely tighten the connection at the lube point.

Step 2 - Remove the performance indicator port plug or the piston enclosure plug in the working valve section
on the secondary divider valve assembly corresponding to the outlet port and line connected to the lube point.

Step 3 - Attach a hand pump filled with clean, filtered lubricant to the port on the secondary divider valve that was opened in Step 2.

Step 4 - Operate the hand pump until air-free lubricant is observed flowing from the line at the lubrication point.

Step 5 - Tighten the fitting at the lubrication point while lubricant is still flowing.

Step 6 - Remove the hand pump and reinstall the performance indicator or piston enclosure plug removed in Step 2 into the secondary divider valve's open port.

The system is now ready for operation.

NOTE

If check valves were not installed at the lubrication point, lubricant may continually drain out of the line when the secondary port is open. Therefore, when check valves are not used, the only method for bleeding this line is to tighten the line at both ends and repeatedly cycle the secondary divider valve via hand pump operation until lubricant, free of air, flows from the lubrication point.

Figure 4. Typical Installation with Pneumatic Indicating Relay

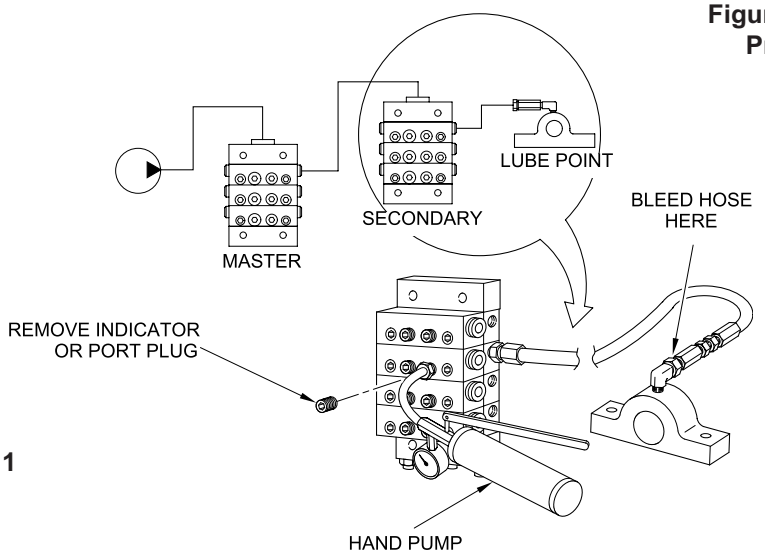

Figure 1

Section 2

PURGING AIR FROM MASTER-TO SECONDARY DIVIDER VALVE LUBE LINES

Refer to Figure 2 when performing this procedure:

Step 1 -Install the line from the master divider valve to the secondary divider valve, but do not completely tighten the connection at the secondary divider valve's inlet.

Step 2 - Remove the performance indicator port plug or the piston enclosure plug from the working valve section on the master divider valve assembly corresponding to the outlet port and line connected to the secondary valve.

Step 3 - Attach a hand pump to the port on the master divider valve that was opened in Step 2.

Step 4 - Operate the hand pump until air-free lubricant is observed flowing freely from the secondary valve's lube inlet connector.

Step 5 - Tighten the fitting at the secondary valve's inlet while lubricant is still flowing

Step 6 - Remove all of the indicator port plugs from the secondary divider valve's working sections.

Step 7 - Operate the hand pump again until air-free lubricant is observed flowing out all of the secondary divider valve's indicator ports.

Step 8 - Reinstall all of the performance indicators or port plugs in the secondary divider valve while lubricant is still flowing from the ports.

Step 9 -Remove the hand pump and reinstall the performance indicator or piston enclosure plug removed in Step 2 into the master divider working valve's open port.

The system is now ready for operation.

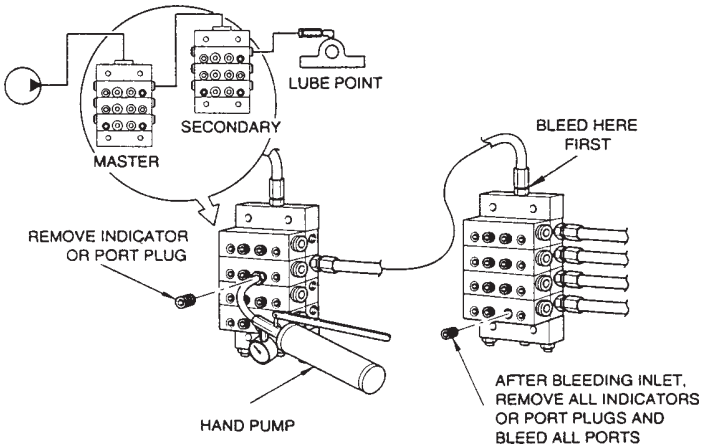

Figure 2

Section 3

PURGING AIR FROM PUMP-TO-MASTER DIVIDER VALVE LINES

Refer to Figure 3 when performing this procedure:

Step 1 - Install the line from the system pump to the master divider valve, but do not completely tighten the connection at the master valve's lube inlet.

Step 2 - Cycle the system pump until air-free lubricant is observed flowing from the line at the master divider valve's lube inlet.

Step 3 - Tighten the fitting at the lube inlet port while lubricant is still flowing.

The system is now ready for operation.

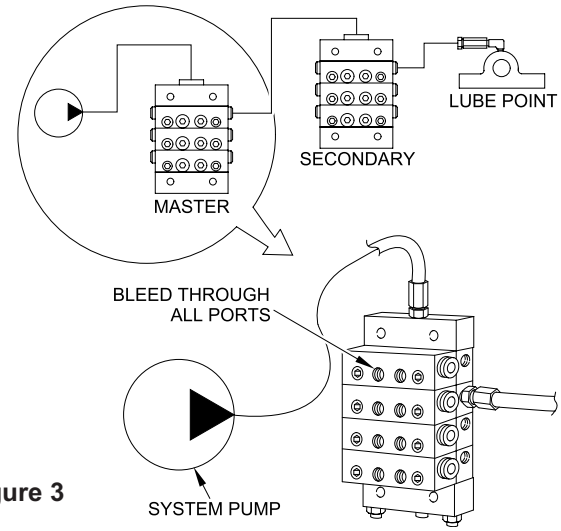

Figure 3

Section 4

PURGING AIR AFTER ADDING OR REPLACING A MASTER DIVIDER VALVE MODULE

This procedure should be followed whenever any of the individual modules in a master divider valve assembly are added or replaced or when any of its port enclosure plugs have been loosened or removed. Refer to Figure 4 when performing this procedure:

Step 1 - Install the new or replacement module into the master divider valve assembly; also connect the tubing or hoses to the appropriate secondary divider valve(s) or lubrication point(s) if the new/replacement module is a base section. However, do not completely tighten the connection(s) at the secondary divider valve's inlet or at the lubrication point(s).

Step 2 - Disconnect and remove the line from the pump at the inlet of the master divider valve.

Step 3 - Attach a hand pump filled with clean, filtered lubricant to the pump inlet port on the master divider valve.

Step 4 - Operate the hand pump until air-free lubricant is observed flowing from each secondary valve's lube inlet connector and/or each lubrication point's connector.

Step 5 - Tighten the fitting at the secondary valve inlet or at the lubrication point while lubricant is still flowing.

Step 6 - Remove the hand pump and reconnect the system pump to the inlet of the master divider valve.

The system is now ready for operation.

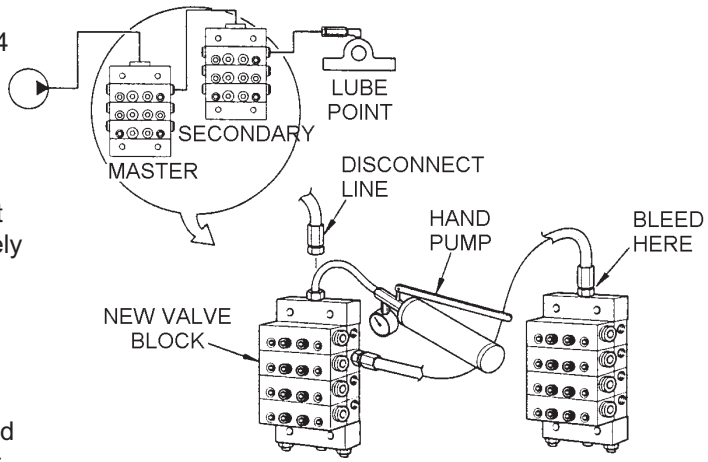

Figure 4

Section 5

PURGING AIR AFTER ADDING OR REPLACING A SECONDARY DIVIDER VALVE MODULE

This procedure should be followed whenever any of the individual modules in a secondary divider valve assembly are added or replaced or when any of its port enclosure plugs have been loosened or removed~ Refer to Figure 5 when performing this procedure:

Step 1 - Install the new or replacement module into the secondary divider valve assembly; also, connect the tubing or hoses to the appropriate lubrication point if the new/replacement module is a base section. However, do not completely tighten the connection at the lubrication point.

Step 2 - Remove the performance indicator port plug or piston enclosure plug from the working valve section on the secondary divider valve assembly corresponding to the outlet port and line connected to a particular lube point~

Step 3 - Attach a hand pump filled with clean, filtered lubricant to the port on the secondary divider valve that was opened in Step 2.

Step 4 - Operate the hand pump until air-free lubricant is observed flowing from the loosened connector at the lube point.

Step 5 - Tighten the fitting at the lube point while lubricant is still flowing.

Step 6 - Repeat Steps 2, 3, 4, and 5 for any additional lubrication points connected to the new module.

Step 7 - Remove the hand pump and reinstall the performance indicator or port plug removed in Step 2 into the secondary divider valve's open port.

The system is now ready for operation.

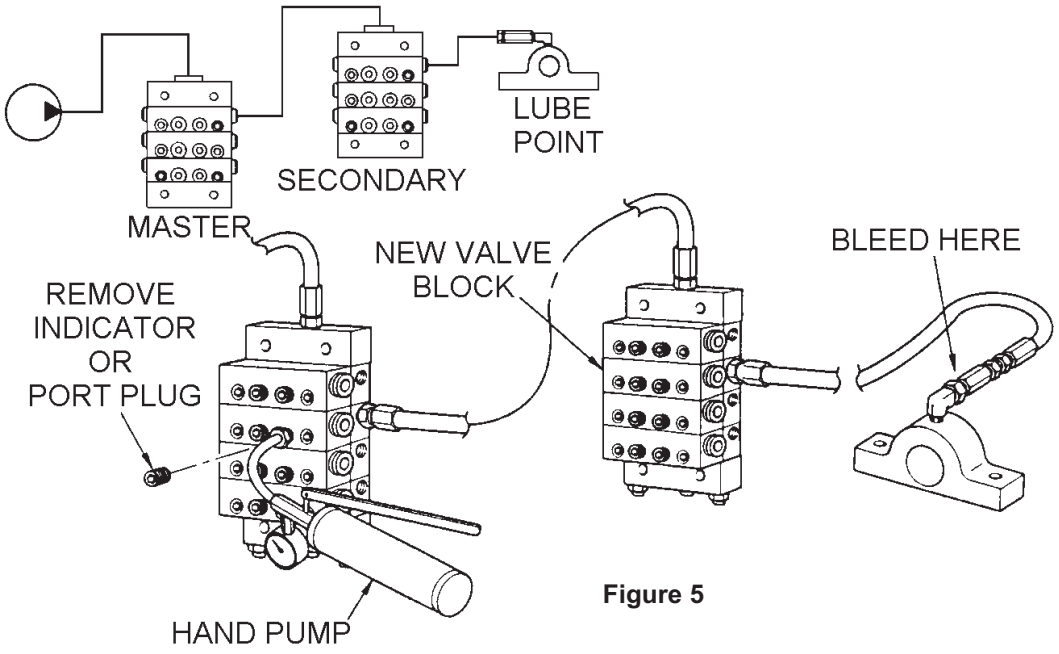

Figure 5

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PREFILLING THE SYSTEM WITH LUBRICANT

Once the lubrication system installation has been completed, it is necessary to prefill all of the lines (tubing/pipes/hoses) and all of the divider valves before operation of the lubrication system can be started. Proper adherence to the following procedures will help to reduce and alleviate machine start-up problems caused by residual air in the lubrication system lines and components during their installation process. Leaving entrapped air in the lube lines could prevent lubricant from gaining access to the lube points during the critical initial start-up period. Proper prefilling of the lubrication system will insure that lubricant is immediately available to every lube point upon machine start-up, protecting them from any potential damage. In order to simplify prefilling, it is divided into three separate procedures:

- Filling the lines connecting the secondary divider valves to the lube points (Section 1.0).
- Filling the lines connecting the master divider valve to the secondary divider valves (Section 1.1).
- Filling the master divider valve (Section 1.2).

These three procedures should always be performed as a complete group in the sequence listed in order to ensure that every component in the system is completely filled with lubricant prior to machine start-up.

CAUTION

Use only clean oil filtered to the SAE-recommended cleanliness level of ISO 18/14 (ISO Standard 4406) when prefilling a system. The manufacturers of the machine tool and its component bearings should be consulted to ensure that the ISO 18/14 cleanliness level is adequate.

1.0 Filling Secondary-to-Lube Point Lines

Refer to Figure 1 when performing this procedure:

1. Remove the port plugs or performance indicators from all of the indicator ports on the front of the secondary divider valves.
2. Connect a hand pump filled with clean, filtered lubricant to the indicator port closest to the first line to be filled that corresponds to the output port that is feeding the line to be filled.
3. In order to verify when the lubricant is flowing and has reached the end of the lube line, loosen the connector at the lube point of the line that is to be filled.
4. Stroke the hand pump until air-free lubricant is observed flowing from the end of the lube line.
5. Tighten the lube line connector at the lube point, but do not replace the port plugs or performance indicators into the ports on the front of the working section.
6. Repeat Steps 1 through 5 for each of the other lube lines connected to the other outlet ports in the secondary divider valve assembly and for any other secondary divider assemblies in the system.

NOTE

Do not replace any of the performance indicators or port plugs removed in Step 1 until the line-filling procedure described in Section 1.1 (Filling Master-to-Secondary Lube Lines) has also been completed.

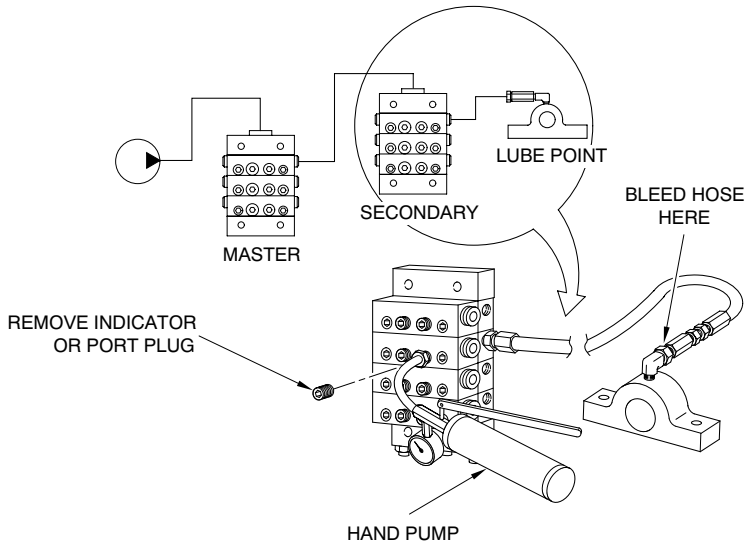


Figure 1

1.1 Filling Master-To-Secondary Lubelines

Refer to Figure 2 when performing this procedure:

1. Remove the port plugs or performance indicators from all of the indicator ports on the front of the master divider valve.
2. Connect a hand pump filled with clean, filtered lubricant to the indicator port closest to the lube output port that is feeding the line to the secondary divider valve.
3. Stroke the hand pump to fill the line between the master divider valve and secondary divider valve.
4. Continue to stroke the pump until the lubricant purges all of the air out of the internal passages of the secondary divider valve and lubricant flows freely from all indicator ports with no evidence of included air.
5. Reinstall the port plugs or performance indicators in their respective positions in the secondary divider valve. Do not replace the port plugs or performance indicators in the master divider valve yet.
6. Repeat Steps 1 through 5 for each of the other lube lines between the master divider valve and all other secondary divider valves.
7. Do not replace any of the performance indicators and port plugs removed in Step 1 from the master divider valve assembly until the air-purging procedure described in Section 1.2 (Filling the Master Divider Valve) has also been completed.

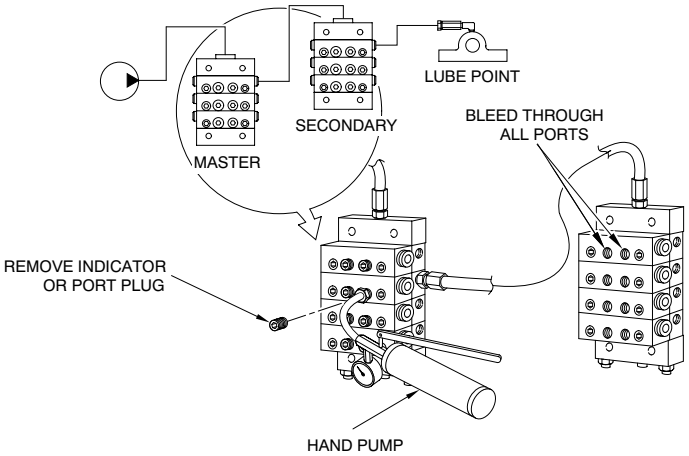


Figure 2

1.2 Filling The Master Divider Valve

Refer to Figure 3 when performing this procedure:

1. Verify that all port plugs or performance indicators have been removed from all indicator ports in the master divider valve.
2. Verify that the system pump is properly connected to the inlet port of the master divider valve.
3. Cycle the system pump sufficiently to fill the main feeder line between the pump and the master divider valve, and lubricant is observed being discharged from all of the indicator ports on the front of the master divider valve with no evidence of included air.
4. Reinstall the master divider valve port plugs or performance indicators into their respective positions.

NOTE

If any maintenance procedures requiring loosening or disconnecting of any connectors or fittings are performed subsequent to completion of the prefilling procedures described above, but prior to machine start-up, the prefilling procedures should be repeated to assure that the lubrication system is completely filled with lubricant and is air-free. Since the most critical operating period for a newly installed machine, in terms of potential for being damaged by unremoved/unfiltered lubricant contaminants and lack of adequate lubrication, is the initial start-up and operation, compliance with the recommended prefilling procedures is crucial for attaining a problem-free start-up of the machine tool and continued reliable long term operating capability.

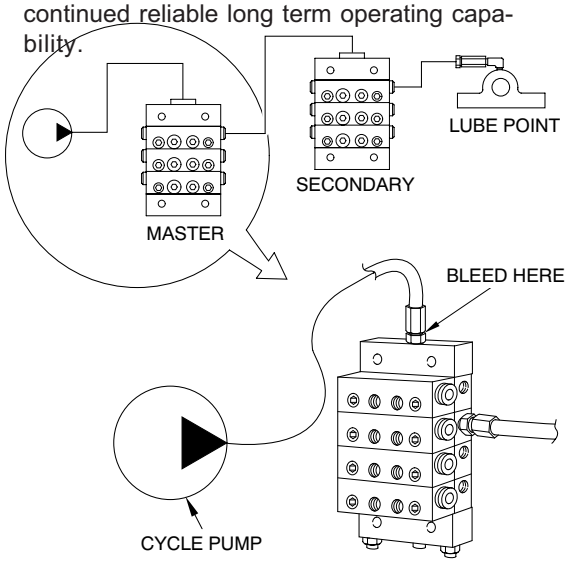


Figure 3

DESCRIPTION

Trabon Performance Indicators are pressure-sensitive devices that pinpoint excessive pressure in Trabon series progressive lubricating systems. These devices, which are installed in the alternate outlet ports of divider valves, signal a fault either by causing an indicator pin to protrude or by releasing lubricant to the atmosphere.

All Performance Indicators respond quickly to protect the lube system and locate lube line blockage. Two of these devices–the Reset Indicator with Memory and the Rupture Indicator–will stop lube system operation when a fault occurs. If, however, lube system operation must continue in spite of a single line being blocked, the Automatic Relief Indicator should be used. Rupture-to-Atmosphere Indicators for Trabon pumps are also included.

It is recommended that some type of Performance Indicator be used to monitor every working outlet of a Trabon Centralized Lubrication System.

Reset Indicator with Memory

Reset Indicators stop lube system operation when a fault occurs. These devices can be used in either master or secondary divider valves. When a lube line becomes blocked, the resultant high pressure moves pistons (A) and (B) (see Figure 1). This movement compresses the spring and pushes indicator pin (C) through the opening in the cap. The high pressure prevents the affected divider valve piston from completing its cycle, causing a pressure backup through the divider valve which trips a pressure switch upstream from the valve and shuts off the pump. As high pressure is relieved, the spring expands, resetting the pistons. Indicator pin (C) is held in place by o-ring (D) until it is reset manually. This helps locate the lube line that is blocked.

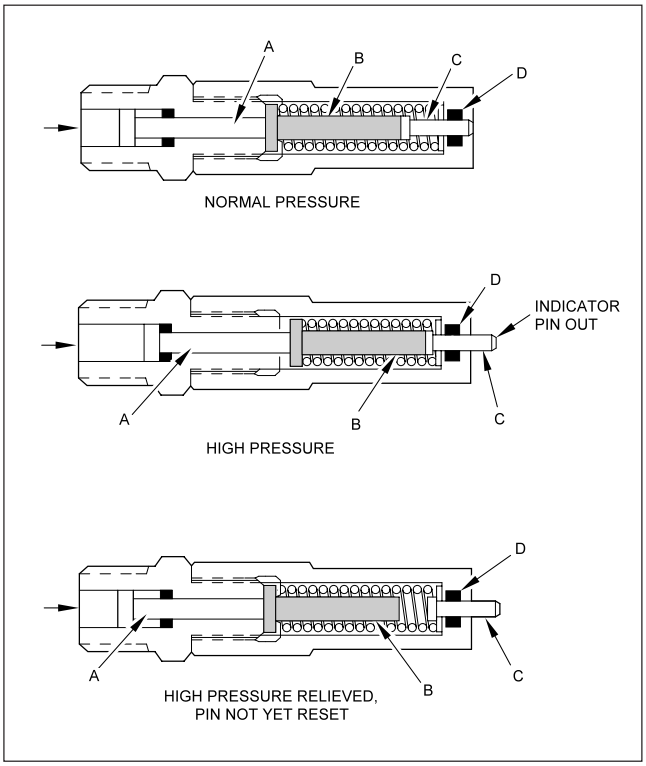


Figure 1. Reset Indicator Operation

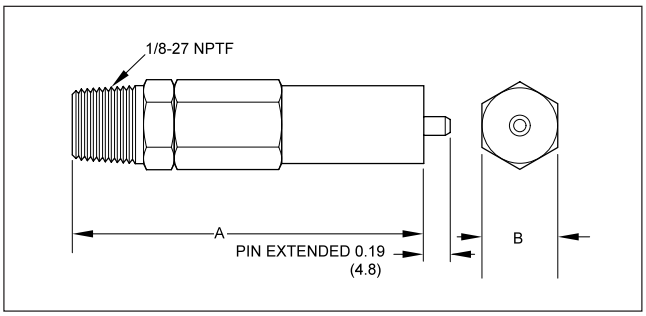


Figure 2. Reset Indicator Dimensions

Pressure (PSI)	1/8" NPTF MJ, MH, MS, MXP	1/8" NPSF w/O-Ring MH, MS, MXP	Nickel Plated 1/8" NPTF MJ, MH, MS, MXP	1/4" NPTF MX only	7/8"-14 SAE w/O-Ring MGO
250	509-931-010	509-932-590	509-932-210	509-932-010	509-932-018
500	509-931-020	509-932-600	509-932-220	509-932-020	509-932-028
750	509-931-030	509-932-610	509-932-230	509-932-030	509-932-038
1000	509-931-040	509-932-620	509-932-240	509-932-040	509-932-048
1500	509-931-050	509-932-630	509-932-250	509-932-050	509-932-058
2000	509-931-060	509-932-640	509-932-260	509-932-060	509-932-068
2500	509-931-070	509-932-650	509-932-270	509-932-070	509-932-078
Dimensions (See Figure 2)					
A	2.34 (59.5)	2.44 (62.0)	2.34 (59.5)	2.47 (62.7)	2.63 (66.8)
B	0.50 (12.7)	0.56 (14.3)	0.50 (12.7)	0.56 (14.3)	1.00 (25.4)
O-Ring	NO	YES	NO	NO	YES

Table 1. Reset Indicator with Memory Ordering Data/Dimensions

Automatic Relief Indicator

These Performance Indicators pinpoint lube line blockage but allow the lube system to continue to supply lubrication to points that are not blocked. They are used primarily in secondary divider valves. The excessive pressure created by line blockage moves a piston, enabling the lubricant to escape through a vent. (See Figure 3.) When the pressure is relieved, the spring resets the piston. Because these devices permit the lube system to keep operating when a lube point is blocked, a separate pressure switch connected to an audible or visual alarm should be used to warn of high pressure.

Pressure (PSI)	1/8" NPTF MJ, MH, MS, MXP	1/8" NPSF w/O-Ring MH, MS, MXP	1/4" NPTF MX only
750 ±20%	508-310-075	508-310-415	508-210-075
1000 ±20%	508-310-100	508-310-425	508-210-100
1250 ±20%	508-310-125	508-310-435	Not Available
1500 ±20%	508-310-150	508-310-445	508-210-150
2000 ±20%	508-310-200	508-310-455	508-210-200
2500 ±20%	508-310-250	508-310-465	508-210-250
3000 ±24%	508-310-300	508-310-475	508-210-300

Table 2. Automatic Relief Indicators

Automatic Relief Indicators used to be identified by the color of the spring retainer in the end of the indicator. Pressure ratings are now stamped on the body of the indicator. Table 3 is shown for reference and to aid in the selection of replacement indicators.

Retainer Color	Pressure Rating
Blue	750
Green	1000
Yellow	1400
Red	1800
Orange	2200
Aluminum	2500
Purple	Consult the Factory

Table 3. Reference Table

Note: If you are replacing indicators that have a pressure rating that is no longer available, it is recommended that you select available indicators with the next higher pressure rating.

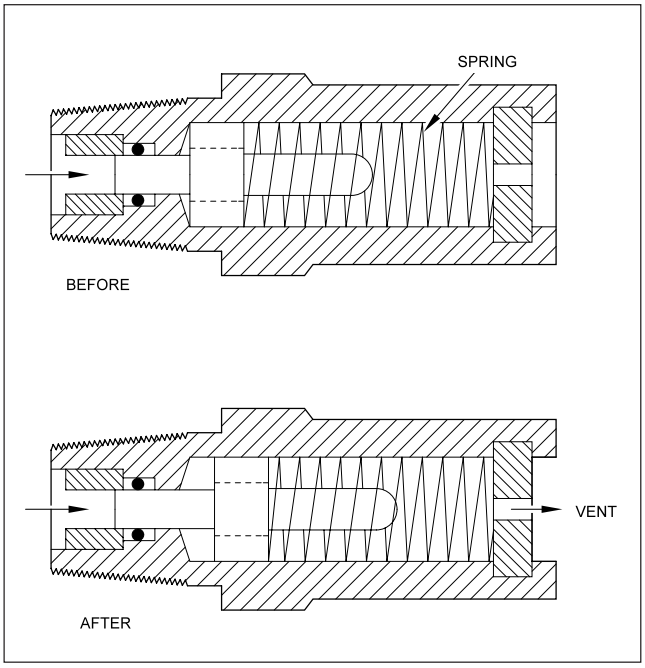


Figure 3. Automatic Relief Indicator Operation

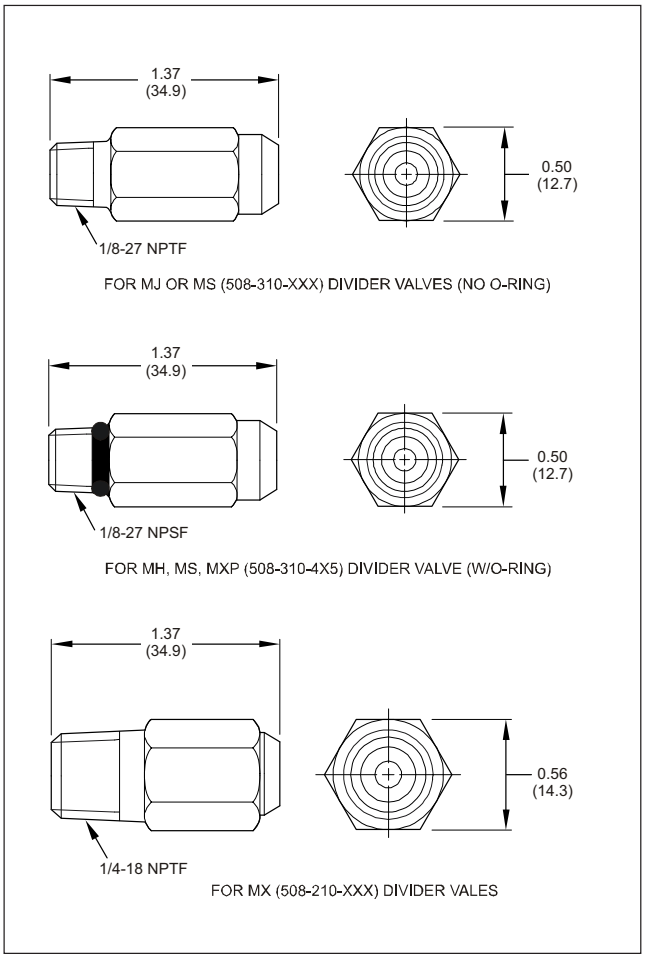


Figure 4. Automatic Relief Indicator Dimensions

Rupture Indicator

Rupture indicators are used on MH divider valve applications where lube system pressures exceed 2,500 psi. The high pressure from lube line blockage causes a disc to rupture. The lubricant then forces an indicator pin to protrude, locating the blockage. (See Figure 5.) The high pressure backs up through the system and trips a switch to shut the system off. When the fault is corrected, the disc must be replaced and the pin reset manually. See Table 4 for ordering data and Figure 6 for dimensions.

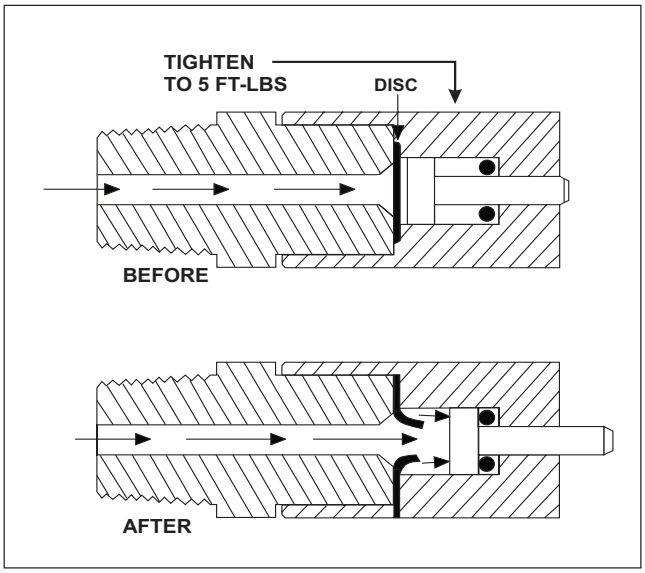


Figure 5. Rupture Indicator Operation

PSI	1/8-27 NPTF	Complete Assembly 1/8-27 NPSF with o-ring	Replacement Disc (3/8" Dia.)	Disc Color
2800 ±20%	509-499-620	509-499-625	509-277-000	Green
3700 ±20%	509-499-100	509-499-105	509-278-000	Yellow
4600 ±20%	509-499-120	509-499-125	509-279-000	Red
5500 ±20%	509-499-140	509-499-145	509-280-000	Orange
6400 ±20%	509-499-160	509-499-165	509-282-000	Pink
7300 ±20%	509-499-200	509-499-205	509-283-000	Blue
8200 ±20%	509-499-220	N/A	509-284-000	Purple

Table 4. Rupture Indicator Ordering Data

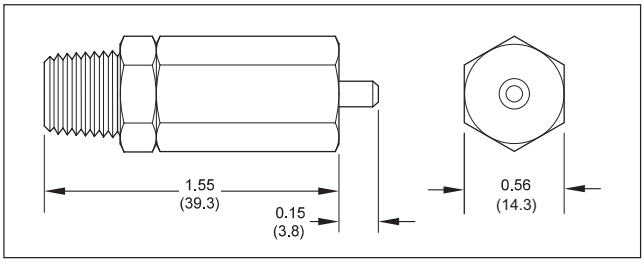


Figure 6. Rupture Indicator Dimensions

Rupture-to-Atmosphere Indicator

These indicators, which are standard on all Lubriquip pumps, provide pump protection and give visual indication of excessive system pressure. The pressure disc ruptures at a predetermined pressure setting, venting lubricant to the atmosphere and relieving the high pressure. (See Figure 7.) See Table 5 for ordering data.

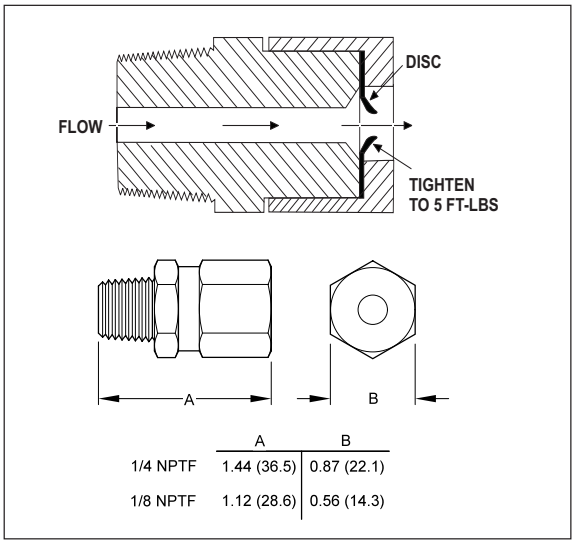


Figure 7. Rupture-to-Atmosphere Operation/Dimensions

PSI*	Complete Assembly	Replacement	Disc Color	Blowout Disc
For 1/4" NPTF Fittings		11/16" Dia.		(Qty = 6)
900	509-206-060	509-290-000	Black	560-900-250
1450	509-206-100	509-292-000	Yellow	560-900-270
1750	509-206-120	509-293-000	Red	560-900-280
2050	509-206-140	509-294-000	Orange	560-900-290
2350	509-206-160	509-295-000	Aluminum	560-900-300
2650	509-206-180	509-296-000	Pink	560-900-310
2950	509-206-200	509-297-000	Blue	560-900-320
3250	509-206-220	509-298-000	Purple	560-900-330
For 1/8" NPTF Fittings		3/8" Dia.		(Qty = 25)
900	509-230-060	509-276-000	Black	560-900-050
1450	509-230-100	509-278-000	Yellow	560-900-070
1750	509-230-120	509-279-000	Red	560-900-080
2050	509-230-140	509-280-000	Orange	560-900-090
2350	509-230-160	509-281-000	Aluminum	560-900-100
2650	509-230-180	509-282-000	Pink	560-900-110
2950	509-230-200	509-283-000	Blue	560-900-120
3250	509-230-220	509-284-000	Purple	560-900-130
5000	509-230-350	509-285-200	Brown	560-900-140
For Hi Press 1/8" NPTF Fittings		3/8" Dia.		(Qty = 25)
3700	509-494-100	509-278-000	Yellow	560-900-070
4600	509-494-120	509-279-000	Red	560-900-080
5500	509-494-140	509-280-000	Orange	560-900-090
6400	509-494-160	509-282-000	Pink	560-900-110
7300	509-494-200	509-283-000	Blue	560-900-120
8200	509-494-220	509-284-000	Purple	560-900-130
9500	509-230-500	509-285-000	Gray	N/A

* Discs up to 2350 psi have a tolerance of ±500 psi. Discs greater than 2350 psi have a tolerance of ±20%.

Table 5. Rupture-to-Atmosphere Ordering Data

Rupture-to-Atmosphere Indicator with Spud Assembly

A spud assembly (see Figure 8) is available to return vented lubricant to the reservoir by way of a tube. See Table 6 for ordering data. A high pressure switch is recommended to provide an audible or visual warning alarm that high system pressure has occurred.

PSI*	Complete Assembly	Replacement Disc (11/16" Dia.)	Color
1450	509-220-101	509-292-000	Yellow
1750	509-220-121	509-293-000	Red
2350	509-220-161	509-295-000	Aluminum

* All pressures have a tolerance of ±500 psi.

Table 6. Rupture-to-Atmosphere w/Spud Ordering Data

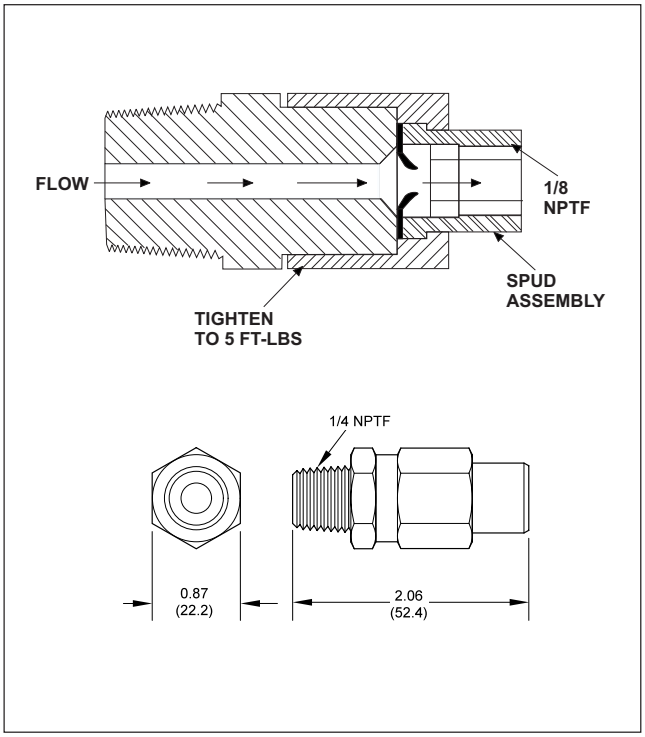


Figure 8. Rupture-to-Atmosphere w/Spud Assembly

Rupture Discs (11/16" Dia.)

The following discs (Table 7) are available (shipped loose) or in packaged quantity. They can be used in either type of Rupture-to-Atmosphere Indicator (509-206-xxx or 509-220-xxx).

PSI*	Disc Part No.	Color	Qty=6
900	509-290-000	Black	560-900-250
1175	509-291-000	Green	N/A
1450	509-292-000	Yellow	560-900-270
1450	509-293-000	Red	560-900-280
2050	509-294-000	Orange	560-900-290
2350	509-295-000	Aluminum	560-900-300
2650	509-296-000	Pink	560-900-310
2950	509-297-000	Blue	560-900-320
3250	509-298-000	Purple	560-900-330

* Discs up to 2350 psi have a tolerance of ±500 psi. Discs greater than 2350 psi have a tolernace of ±20%.

Table 7. Rupture Discs

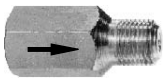
LUBRIQUIP®
Lubrication & Dispensing Solutions

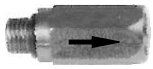
ISO 9000:2000 REGISTERED FIRM

ISO 14001 REGISTERED FIRM

SINGLE BALL STEEL CHECK VALVES

Single Ball Steel Check Valves are designed for use in hydraulic or lubrication systems with pressures up to 5,000 PSI. Available in two models for use as inlet or outlet check valves. An arrow stamped on the body indicates flow direction. The standard type ball and spring principle is used.





Features

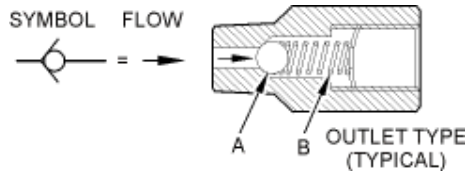
- Positive seal prevents leakage and backflow
- Compact and easy to install

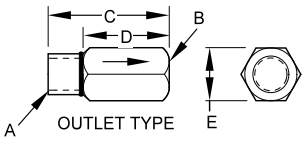
Specifications

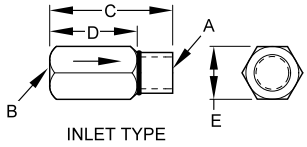
Lubricant (Mineral Based and Synthetic) ..... Oil and Grease
Net Weight (approx.) ..... 1 oz. (28g)
See table below for dimensions specifications and materials.

Operation

The check valve is installed with the arrow on the body facing in the direction of flow. Incoming flow pushes ball (A) from the valve seat, compressing spring (B), permitting lubricant to flow through the check valve to the lube points. When flow stops, spring (B) expands, reseating ball (A) creating a positive seal.







NOTE: STRAIGHT THREAD CHECK VALVES
INCLUDED O-RING AT BASE OF MALE THREADS

Single Ball Check Valve Dimensions and Ordering Information

Pipe Size		C	D	E HEX	Pressure		Material			
Inlet "A"	Outlet "B"				Nom. Cracking PSI (bar)	Max. Operating PSI (bar)	Body	Spring	Ball	Part Number
1/8 NPTF (M)	1/8 NPSF (F)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	10 (0.7)	5000 (345)	Steel	Steel	Steel	509-350-010
1/8 NPTF (F)	1/8 NPSF (M)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	15 (1)	5000 (345)	Steel	Steel	Steel	509-355-010
1/8 NPTF (M)	1/8 NPSF (F)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	35 (2)	5000 (345)	Steel	Steel	Steel	509-350-030
1/8 NPTF (F)	1/8 NPSF (M)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	35 (2)	5000 (345)	Steel	Steel	Steel	509-355-030
1/8 NPTF (F)	1/8 NPSF (M)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	60 (4)	5000 (345)	Steel	Steel	Steel	509-355-060
1/8 NPTF (M)	1/8 NPSF (F)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	100 (7)	5000 (345)	Steel	Steel	Steel	509-350-100
1/8 NPTF (M)	1/8 NPSF (F)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	125 (9)	5000 (345)	Steel	Steel	Steel	509-350-120
1/8 NPTF (M)	1/8 NPSF (F)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	250 (17)	5000 (345)	Steel	Steel	Steel	509-350-250
1/8 NPTF (F)	1/8 NPSF (M)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	250 (17)	5000 (345)	Steel	Steel	Steel	509-355-250
1/8 NPTF (M)	1/8 NPSF (F)	1.28 (32.5)	0.56 (14.2)	0.56 (14.2)	360 (25)	5000 (345)	Steel	Steel	Steel	463-001-582
1/4 NPTF (M)	1/4 NPSF (F)	1.62 (41.2)	0.68 (17.4)	0.68 (17.4)	10 (0.7)	5000 (345)	Steel	Steel	Steel	509-360-010
1/4 NPTF (F)	1/4 NPSF (M)	1.75 (44.5)	0.68 (17.4)	0.68 (17.4)	10 (0.7)	5000 (345)	Steel	Steel	Steel	509-365-010
1/4 NPTF (M)	1/4 NPSF (F)	1.62 (41.2)	0.68 (17.4)	0.68 (17.4)	35 (2)	5000 (345)	Steel	Steel	Steel	509-360-030
1/4 NPTF (F)	1/4 NPSF (M)	1.75 (44.5)	0.68 (17.4)	0.68 (17.4)	35 (2)	5000 (345)	Steel	Steel	Steel	509-365-030
1/4 NPTF (M)	1/4 NPSF (F)	1.62 (41.2)	0.68 (17.4)	0.68 (17.4)	35 (2)	5000 (345)	Steel *	Steel	Steel	509-360-035
1/4 NPTF (M)	1/4 NPSF (F)	1.62 (41.2)	0.68 (17.4)	0.68 (17.4)	100 (7)	5000 (345)	Steel	Steel	Steel	509-360-100
1/4 NPTF (M)	1/4 NPSF (F)	1.62 (41.2)	0.68 (17.4)	0.68 (17.4)	250 (17)	5000 (345)	Steel	Steel	Steel	509-360-250

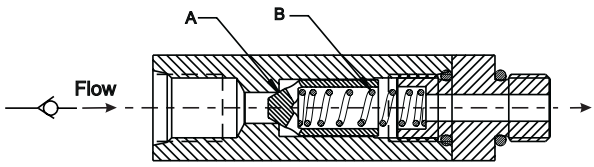
* Nickel Plated

Single Ball Check Valve Dimensions and Ordering Information con'd

Straight Thread Check Valves, SAE										
Tube Size		C	D	E HEX	Pressure		Material			Part Number
Inlet "A"	Outlet "B"				Nom. Cracking PSI (bar)	Max. Operating PSI (bar)	Body	Spring	Ball	
7/16-20 SAE (M)	7/16-20 SAE (F)	1.56 (39.6)	1.20 (30.5)	0.62 (15.7)	35 (2)	3500 (242)	S.S.	Steel	Steel	463-001-589
9/16-18 SAE (M)	9/16-18 SAE (F)	1.68 (42.7)	1.30 (33.0)	0.75 (19.0)	35 (2)	3500 (242)	S.S.	Steel	Steel	463-001-590
9/16-18 SAE (F)	9/16-18 SAE (M)	1.75 (44.5)	1.36 (34.5)	0.81 (20.6)	35 (2)	5000 (345)	S.S.	Steel	Steel	463-001-600
7/16-20 SAE (F)	7/16-20 SAE (M)	1.44 (36.6)	1.08 (27.4)	0.69 (17.4)	60 (4)	5000 (345)	S.S.	Steel	Steel	463-001-601
Straight Thread Check Valves - BSPP, "G"										
1/8 BSPP (M)	1/8 BSPP (F)	1.27 (32.3)	1.03 (26.1)	0.62 (15.9)	35 (2)	5000 (345)	Steel	Steel	Steel	463-001-573
1/4 BSPP (F)	1/4 BSPP (M)	1.79 (45.4)	1.41 (35.7)	0.88 (22.3)	35 (2)	5000 (345)	Steel	Steel	Steel	463-001-621
1/8 BSPP (F)	1/8 BSPP (M)	1.27 (32.1)	1.03 (26.1)	0.62 (15.9)	35 (2)	3000 (207)	Steel	Steel	Steel	463-001-622
Straight Thread Check Valves - Metric (ISO 6149)										
M12x1.5 (F)	M12x1.5 (M)	1.84 (46.8)	1.41 (35.8)	0.78 (20.0)	35 (2)	5000 (345)	Steel	Steel	Steel	463-001-630
M10x1 (M)	M10x1 (F)	1.56 (39.6)	1.22 (31.1)	0.78 (20.0)	35 (2)	5000 (345)	Steel	Steel	Steel	463-001-632

HI SHOCK STEEL CHECK VALVES

Hi Shock Steel Check Valves are a poppet type designed specifically for the harsh operating conditions encountered in the circulating oil systems found on modern high speed metal forming presses.



Features

- Hardened poppet provides long life
- Available with SAE straight, or pipe threads

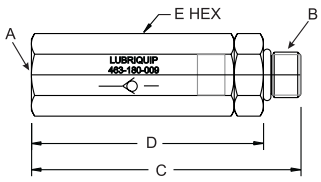
Specifications

Material ..... Steel body, hardened steel poppet
Maximum Operating Pressure ..... 3500 PSI (241 bar)
Maximum Operating Temperature ..... 250°F (121°C)
Cracking Pressure ..... 200 PSI (14 bar)
Lubricant (Mineral base and Synthetic) ..... Oil

Operation

The check valve is installed with the arrow on the body facing in the direction of flow. Incoming flow pushes poppet (A) from the valve seat, compressing spring (B), permitting lubricant to flow through the check valve. When flow stops, spring (B) expands, reseating poppet (A) thus preventing back flow.

High Shock Check Valve Dimensions and Ordering Information

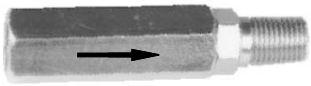


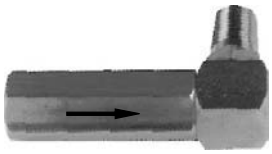
Inlet	Outlet	Thread Size/Type		Dimensions			
		A	B	C	D	E	Part Number
Female	Male	7/16-20 SAE	7/16-20 SAE	2.59 (65.8)	2.23 (56.6)	0.69 (17.5)	463-180-009*
Female	Male	1/4-18 NPSF	1/8-27 NPTF	2.15 (54.6)	1.77 (45.0)	1.00 (25.4)	463-180-010
Male	Female	9/16-18 SAE	9/16-18 SAE	2.39 (60.7)	1.99 (50.5)	0.75 (19.0)	463-180-011

* Supplied less O-ring on male thread

DOUBLE BALL CHECK VALVES

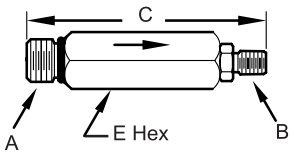
Double Ball Check Valves are designed for high pressure applications where reverse leakage must be kept to a minimum. Typical applications include engine and compressor cylinder lubrication, and hydraulic systems. Check valves can be used to isolate parts of circuits and to prevent fluid drainage due to gravity. A relatively stiff bias spring in these valves serves to increase the reliability of circuits designed to detect a blockage or reduction in lubricant flow. This bias spring also can provide a controlled pressure in hydraulic circuits. The right angle configuration allows convenient installation in a wide variety of plumbing configurations. Application is similar to straight body double ball check valves.

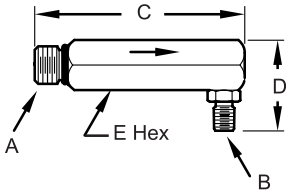




Features

- Various inlet and outlet sizes and configurations
- Positive sealing check valve





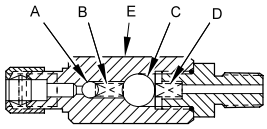
Specifications

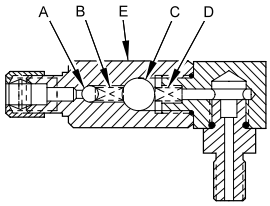
Lubricant (Mineral Based and Synthetic) ..... Oil and Grease
See tale below for dimensions, specifications and materials.

Maximum Operating Temperature ..... 400 °F (204.5 °C)

Operation

Fluid flow entering the check valve creates a pressure on the smaller ball (A). If the pressure created is higher than the opposing force of the bias spring (B), the smaller ball is moved off its seat inside the valve body (E). This allows flow to create a similar pressure and action on the larger ball (C) and spring (D). Flow then continues on to the outlet of the check valve. If flow is reversed in the circuit, flow force and spring (D) cause ball (C) to be reseated. Any leakage around ball (C) is blocked by ball (A) that is firmly seated by bias spring (B).





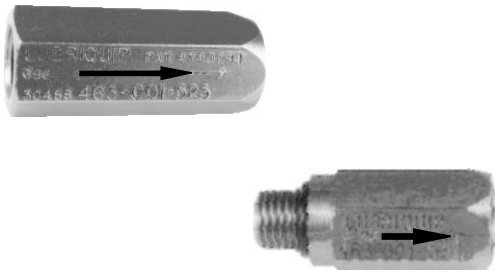
Double Ball Check Valve Dimensions and Ordering Information

Inlet "A"	Outlet "B"	C	D	E HEX	Pressure		Material			Part Number
					Nom. Cracking PSI (bar)	Max. Operating PSI (bar)	Body	Spring	Ball	
Straight										
1/4" OD Tube	1/8-27 NPTF (M)	3.00 (76.2)	N/A	.75 (19.1)	90 (6)	6000 (414)	Carbon Steel	Stainless Steel	Stainless Steel	070200
1/4" OD Tube	1/4-18 NPTF (M)	3.19 (81.0)	N/A	.75 (19.1)	90 (6)	6000 (414)	Carbon Steel	Stainless Steel	Stainless Steel	070201
1/4-18 NPTF (F)	1/4-18 NPTF (M)	3.21 (81.5)	N/A	.75 (19.1)	90 (6)	8000 (552)	Carbon Steel	Stainless Steel	Stainless Steel	070205
1/8-27 NPTF (F)	1/8-27 NPTF (M)	3.19 (81.0)	N/A	.75 (19.1)	90 (6)	8000 (552)	Carbon Steel	Stainless Steel	Stainless Steel	070206
1/8-27 NPTF (F)	1/4-18 NPTF (M)	3.19 (81.0)	N/A	.75 (19.1)	110 (7)	8000 (552)	Carbon Steel	Stainless Steel	Stainless Steel	070207
1/4-18 NPTF (F)	1/4-18 NPTF (M)	3.19 (81.0)	N/A	.75 (19.1)	110 (7)	8000 (552)	Stainless Steel	Stainless Steel	Stainless Steel	070252
1/8-27 NPTF (F)	1/8-27 NPTF (M)	3.19 (81.0)	N/A	.75 (19.1)	110 (7)	8000 (552)	Stainless Steel	Stainless Steel	Stainless Steel	070253
1/8-27 NPTF (F)	1/4-18 NPTF (M)	3.19 (81.0)	N/A	.75 (19.1)	110 (7)	8000 (552)	Stainless Steel	Stainless Steel	Stainless Steel	070254
1/4-18 NPTF (F)	1/8-27 NPTF (M)	2.75 (69.9)	N/A	.75 (19.1)	110 (7)	8000 (552)	Stainless Steel	Stainless Steel	Stainless Steel	070255
Angle										
1/4" OD Tube	1/4-18 NPTF (M)	2.50 (63.5)	1.53 (38.9)	.94 (23.9)	90 (6)	8000 (552)	Carbon Steel	Stainless Steel	Stainless Steel	040233
1/4" OD Tube	1/4 NPTF (M)	3.00 (76.2)	1.60 (40.6)	.75 (19.1)	90 (6)	8000 (552)	Carbon Steel	Stainless Steel	Stainless Steel	070202
1/8-27 NPTF (F)	1/4-18 NPTF (M)	3.00 (76.2)	1.78 (45.2)	.75 (19.1)	110 (7)	8000 (552)	Carbon Steel	Stainless Steel	Stainless Steel	070211
1/8-27 NPTF (F)	1/4-18 NPTF (M)	2.75 (69.9)	1.78 (45.2)	.75 (19.1)	110 (7)	8000 (552)	Stainless Steel	Stainless Steel	Stainless Steel	070274

SOFT SEAT CHECK VALVES

Soft Seat Check Valves are designed for use in hydraulic or lubrication systems with pressures up to 7,500 PSI. A poppet and soft ball check design improves check valve reliability. This check valve is available in single and “double ball” versions. The “double ball” check valve contains a poppet and soft ball check, as well as a conventional steel ball back-up for added protection. An arrow stamped on the body indicates flow direction.

Available in a wide range of pipe thread and tube size inlet/outlet fitting combinations, this unit can be used in a variety of applications.



Features

- Provides optimum sealing against reverse flow
- Tapered at outlet end to help identify flow direction

Specifications

Material
Poppet (except 463-001-616) ..... Steel
Ball (Large, soft seat) ..... See Table
Ball (Small) ..... Steel
See table below for dimensions, pressure ratings and materials

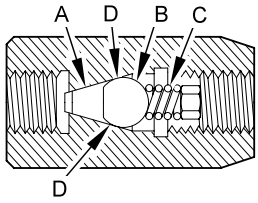
Maximum Operating
Temperature ..... Viton Ball 400 °F (204.5 °C)
Buna N Ball 250 °F (121 °C)

Lubricant (Mineral Based and Synthetic) ..... Oil and Grease
Compatible with Viton or Buna N Material

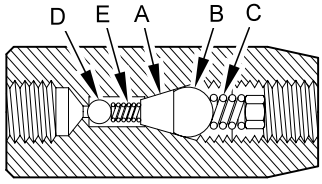
Net Weight ..... Single Ball 4 oz. (113g)
Double Ball 5 oz. (142g)

Operation

Single Ball Soft Seat Check Valve. Lubricant flow entering the check valve moves poppet (A), and Viton ball (B) forward, allowing lubricant to move around the poppet and ball, through the check valve, and out to the lube point. During flow through the check valve, the poppet and Viton ball remain nested together. When flow stops, spring (C) returns poppet (A) and ball (B) to the check position. The poppet functions only as an alignment and anti-extrusion mechanism for the Viton ball. The Viton ball provides the seal when seated against the check valve body at point (D).



Double Ball Soft Seat Check Valve. In the “double ball” version, the function is basically the same. In a flow condition, steel ball (D) moves off its seat compressing spring (E), causing poppet (A) and ball (B) to move forward allowing lube to flow around ball (D), poppet (A), and ball (B), through the check valve and out to the lube point.



Soft Seat Check Valve Dimensions and Ordering Information

Soft Seat Single Ball Check Valve

Inlet "A"	Outlet "B"	Figure	C	D	E HEX	Pressure		Material			Part Number
						Nom. Cracking PSI (bar)	Max. Operating PSI (bar)	Body	Spring	Ball	
1/4-18 NPSF (F)	1/4-18 NPSF (F)	A	1.94 (49.2)	—	0.75 (19.1)	48 (3)	7,500 (518)	Stainless	Steel	Viton	463-001-524
1/4-18 NPSF (F)	1/4-18 NPSF (F)	A	1.94 (49.2)	—	0.75 (19.1)	42 (3)	7,500 (518)	Stainless	Steel	Buna N	463-001-525
1/8-27 NPSF (F)	1/8-27 NPTF (M)	D	1.31 (33.3)	.94 (23.8)	0.58 (14.3)	35 (2)	100 (7)	Steel	Steel	Viton	463-001-535 *
1/8-27 NPTF (M)	1/8-27 NPSF (F)	D	1.28 (32.5)	.79 (20.1)	0.58 (14.3)	35 (2)	100 (7)	Steel	Steel	Viton	463-001-536 *
1/8-27 NPTF (M)	1/4-18 NPSF (F)	D	1.56 (39.7)	1.08 (27.3)	0.69 (17.4)	48 (3)	7,500 (518)	Stainless	Steel	Viton	463-001-580
7/16-20 SAE (F)	7/16-20 SAE (F)	A	1.94 (49.2)	—	0.63 (15.9)	35 (2)	7,500 (518)	Stainless	Steel	Viton	463-001-584
7/16-20 SAE (M)	7/16-20 SAE (F)	B	1.56 (39.7)	1.20 (30.5)	0.63 (15.9)	35 (2)	7,500 (518)	Stainless	Steel	Viton	463-001-585
9/16-18 SAE (M)	9/16-18 SAE (F)	B	1.69 (42.9)	2.42 (61.5)	0.75 (19.1)	48 (3)	7,500 (518)	Stainless	Steel	Viton	463-001-587
7/16-20 SAE (F)	7/16-20 SAE (M)	C	2.78 (70.6)	2.42 (61.5)	0.63 (15.9)	25 (2)	7,500 (518)	Stainless	Steel	Viton	463-001-593

Soft Seat Double Ball Check Valve

1/4-18 NPSF (F)	1/4-18 NPSF (F)	A	2.41 (61.1)	—	0.75 (19.1)	48 (3)	7,500 (518)	Stainless	Steel	Buna N/Steel	463-024-166
1/4-18 NPSF (F)	1/4-18 NPSF (F)	A	2.41 (61.1)	—	0.75 (19.1)	48 (3)	7,500 (518)	Stainless	Steel	Viton/Steel	463-024-173
1/8-27 NPSF (F)	1/8-27 NPSF (F)	A	2.41 (61.1)	—	0.56 (14.3)	48 (3)	7,500 (518)	Stainless	S.S./Steel	Viton/Steel	463-024-174

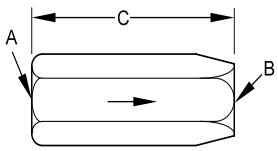
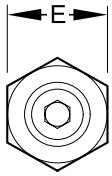


Fig. A



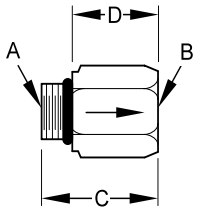


Fig. B

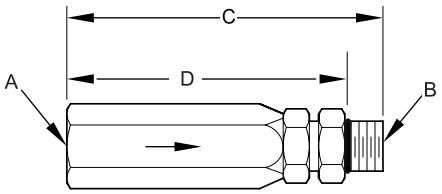


Fig. C

* No Poppet

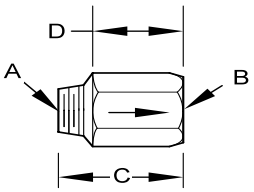
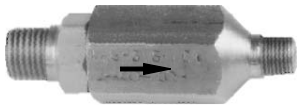


Fig. D

TWIN TANDEM CHECK VALVE

Twin Tandem Check Valves are designed for hydraulic or lubrication systems with pressures up to 10,000 PSI. The Twin Tandem Check Valve incorporates both a garter type check valve and a standard ball and spring type check valve. The garter check valve has a soft seat elastic garter band that permits uninterrupted flow and seals unwanted back flow.



Features

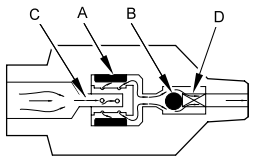
- Positive seal prevents leakage and back flow
- Compact and easy to install

Specifications

Material ..... All Stainless Steel
Viton Elastic Band ..... Suitable for most fluids
Maximum Operating Pressure ..... 10,000 PSI (690 bar)
Maximum Operating Temperature ..... 400 °F (204.5 °C)
Cracking Pressure ..... 45 ±10 PSI (3 ± 0.7 bar)
Lubricant (Mineral Based and Synthetic) ..... Oil and Grease Compatible with Viton
Net Weight (approx.) ..... 5 oz. (142g)

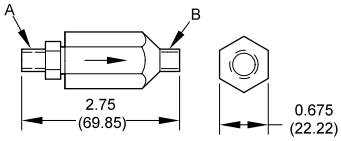
Operation

The Twin Tandem Check Valve is installed in a system with the arrow on the check valve towards the direction of flow. Under normal flow conditions, the soft seat Viton elastic garter band (A) is raised off the valve stem uncovering the flow holes and allowing flow through the valve stem (C). The lubricant flow pushes ball (B) from the valve seat compressing spring (D), and travels into the system. In case of back flow, the ball check (B) is blocking the flow, any leakage compresses the garter band (A) over the flow holes in the valve stem and forms a positive seal.



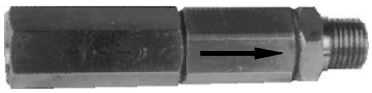
Twin Tandem Check Valve Dimensions and Ordering Information

Pipe Size		Part
A Inlet	B Outlet	Number
1/4 NPTF (M)	1/8 NPTF (M)	509-356-060
1/4 NPTF (M)	1/4 NPTF (M)	509-356-100



BRASS DOUBLE BALL CHECK VALVES

Brass Double Ball Check Valves are for use in hydraulic or lubrication systems with pressures up to 3,000 PSI. These check valves are typically used as inlet check valves. Two of the conventional spring & ball type checks are combined to provide maximum protection against system back flow/ leakage. Flow direction is indicated by an arrow stamped on the check valve body.



Features

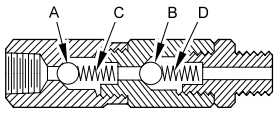
- Positive seal prevents leakage and back flow
- Compact and easy to install

Specifications

Material ..... All Brass with Stainless Steel Spring
Maximum Operating Pressure ..... 3,000 PSI (207 bar)
Maximum Operating Temperature ..... 500 °F (260 °C)
Cracking Pressure ..... 35 ±10 PSI (2 ± 0.7 bar)
Lubricant (Mineral Based and Synthetic) ..... Oil and Grease
Net Weight (approx.) ..... 6 oz. (171g)

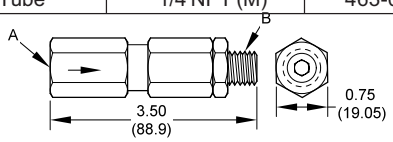
Operation

The check valve is installed with the arrow on the check valve towards the direction of flow. Incoming flow of lubricant moves check balls (A) and then (B), compressing springs (C) & (D). This allows lubricant to flow through the check valve and out to the lube points. When flow ceases, springs (C) & (D) reseat the check balls, preventing back flow to the system.



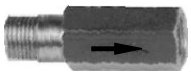
Brass Double Ball Check Valve Dimensions and Ordering Information

A (Inlet)	B (Outlet)	Part Number
1/4 NPT (FM)	1/4 NPT (M)	463-021-571
1/8 NPT (FM)	1/8 NPT (M)	463-021-611
1/4" O.D. Tube	1/4 NPT (M)	463-021-701



BI-FLOW OUTLET CHECK VALVE

The Bi-Flow Outlet Check Valve is a conventional metal ball, hard seat type check valve. It is capable of using a special fitting in the outlet to accept either 3/16" or 1/4" tube.

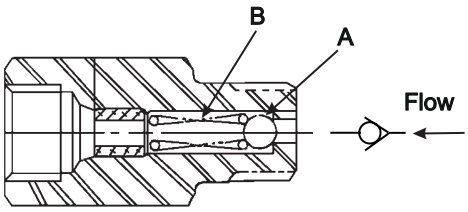


Specifications

Material ..... Steel
Maximum Pressure ..... 5,000 PSI (345 bar)
Cracking Pressure ..... 35 ±10 PSI (2 ± 0.7 bar)
Lubricant (Mineral Based and Synthetic) ..... Oil and Grease
Net Weight ..... 4 oz. (113g)

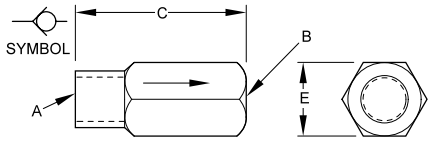
Operation

The check valve is installed with the arrow on the check valve in the direction of flow. Incoming flow pushes ball (A) from the valve seat, compressing spring (B), permitting lubricant to flow through the check valve to the lube points. When flow stops, spring (B) expands, reseating ball (A), creating a positive seal.



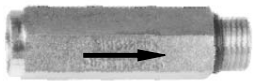
Bi-Flow Outlet Check Valve Dimensions and Ordering Information

Pipe Size		C	E	Part Number
Inlet "A"	Outlet "B"			
1/8-27 (M)	1/8-27 (FM)	1.500 (38.1)	0.500 (12.7)	463-001-546
1/4-18 (M)	1/4-18 (FM)	1.593 (40.5)	0.687 (17.4)	463-001-550



CHECK VALVE WITH 90 MICRON FILTER

This check valve is a conventional metal ball, hard seat type with an integral 90 micron filter. It is designed to be used before a "zero-leak" solenoid inlet base. However, it can be used anywhere that a check valve and a filter would be used in series.



Features

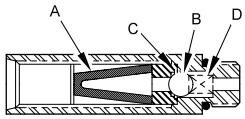
- One check/filter combination valve replaces two separate devices resulting in fewer leak paths.
- Protects downstream components from contamination.
- Compact and easy to install.

Specifications

Body Material ..... Steel
Filter Material ..... (90 Micron) Sintered Bronze
Maximum Pressure ..... 7,500 PSI (518 bar)
Cracking Pressure ..... 35 ±10 PSI (2 ± 0.7 bar)
Lubricant (Mineral Based and Synthetic) ..... Oil only
Net Weight (Approx.) ..... 3 oz. (85g)

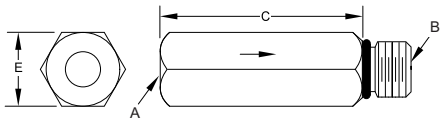
Operation

The check valve is installed with the arrow on the check valve in the direction of flow. The oil first passes through the filter element (A). Then flow pushes the ball (B) from the valve seat (C), compressing the spring (D) and permitting oil to flow through the check valve. When flow stops, the spring (D) expands, reseating the ball (B) and creating a positive seal.



Check Valve with Filter Dimensions and Ordering Information

SAE Thread Size		C	E	Part Number
Inlet "A"	Outlet "B"			
9/16-18 (FM)	9/16-18 (M)	2.50	0.687	463-001-604
7/16-20 (FM)	7/16-20 (M)	1.89	0.562	463-001-605



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