

FUELLING SOLUTIONS

BY LIQUIP

SPARE PARTS CATALOGUE

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METERS & PUMPS

SAMPI METERS

exceptional accuracy

The SAMPI positive displacement (PD) meters are ideal for tank truck or depot applications. For metering aviation gasoline and jet fuels the Class 2 meter has a nonferrous construction and SAMPI is approved for use by NSC (Australia) and other major international weights and measures regulatory bodies.

Superior Accuracy at constant flow:

With all other conditions being constant, the SAMPI meter does not vary more than 0.05% in repeatability over the entire range.

Accuracy over the widest range of flow:

The SAMPI meter has an ideal combination of minimum seal or slippage area with lowest pressure differential across the seal. This results in better accuracy over a wide range of flow than available in other type of commercially produced positive displacement meters.

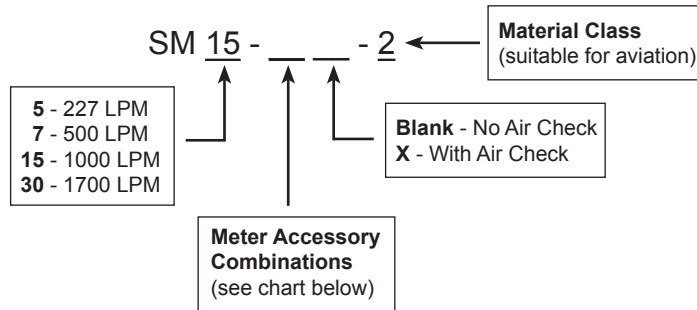
Accuracy regardless of pressure fluctuations:

With the SAMPI meter's unique dual-case design, the bearing surfaces of the meter element are internally and externally subjected to the same system pressure. Therefore, the meter element cannot be stretched or distorted to cause changes in seal area that would adversely affect accuracy.


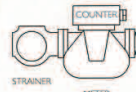
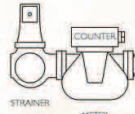
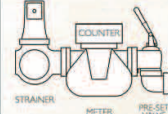

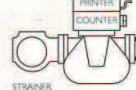
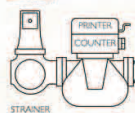
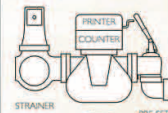
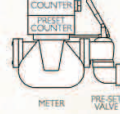
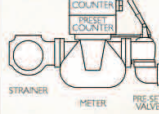
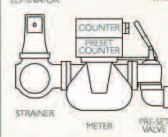
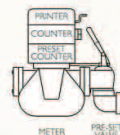
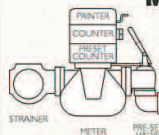
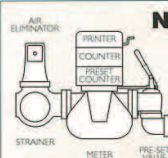


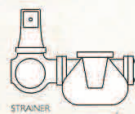
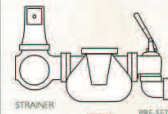


SAMPI METERS

Ordering Information:

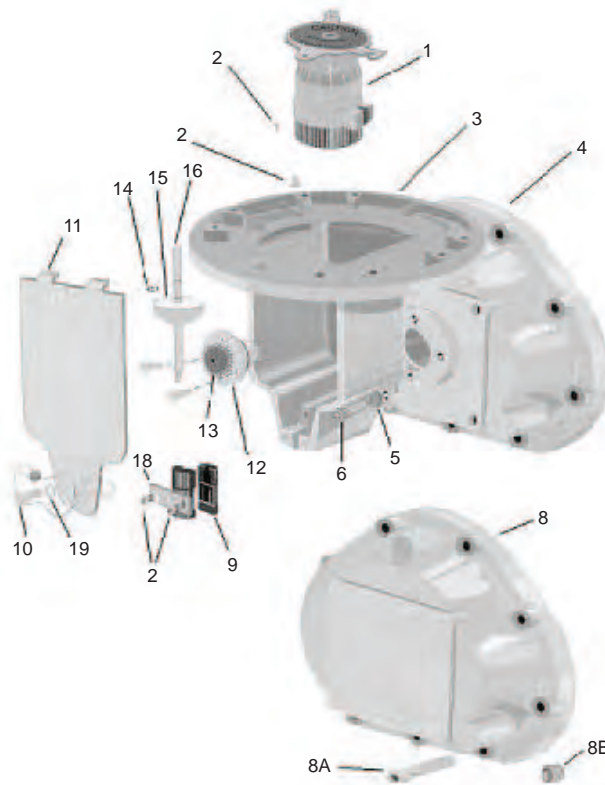


Meter Accessory Combinations

	NO STRAINER NO AIR ELIMINATOR NO VALVE	STRAINER NO AIR ELIMINATOR NO VALVE	STRAINER AIR ELIMINATOR NO VALVE	NO STRAINER NO AIR ELIMINATOR VALVE	STRAINER NO AIR ELIMINATOR VALVE	STRAINER AIR ELIMINATOR VALVE
COUNTER NO PRINTER NO PRE-SET	A 	B 	C 			D 
COUNTER PRINTER NO PRE-SET	E 	F 	G 			H 
COUNTER NO PRINTER PRE-SET				I 	J 	K 
COUNTER PRINTER PRE-SET				L 	M 	N 
NO COUNTER NO PRINTER NO PRE-SET	P 	R 	S 			T 

SAMPI METERS - SM 5 / 7 / 15

Ordering Information:



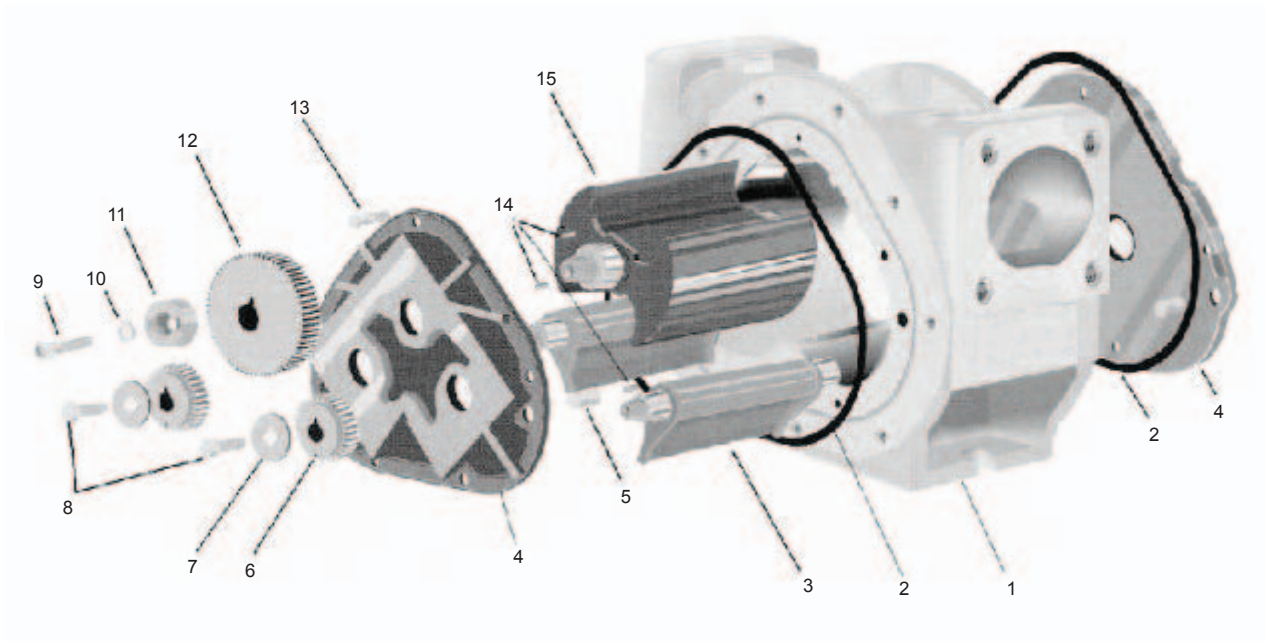
Cover Assembly

Item No	Part No (Class 2)	Description	Qty
1	2030040101	Adjuster Assembly	1
2	N320005010A	Screw 5 Pgx10 8,8 Z Iso 1217	4
3	I0000-25170	Bracket Counter Adapter	1
4	I0123-501148	Cover Front	1
5	*I0705-06743	Flat Washer (.265 ID)	4
6	*I0673-09084	Screw, Counter Bracket (1/4-20 X 1)	4
8	I0124-48273	Cover Rear	1
8A	*I0627-09080	Screw 5/16-18 X 1 3/8"	18
8B	NPT I0566-06790	Plug 1/4-18 NPT	2
9	2061041786	Driveshaft Bushing	1
10	N321006060Z	Screw 6 Pgx60 8,8 Z Iso 1217	1
11	2061048274	Plate Dust Cover	1
12	*I0250-48601	Packing Gland Assy	1
13	*I0165-48284	Gear packing gland (12 teeth)	1
14	2071002188	Retaining Ring	1
15	2061040818	Pinion Gear (2:1)	1
16	2061041787	Shaft	1
18	2061048208	Blocks Bearing	1
19	N3300064Z	Flat Washer D.6	1

* Can be supplied only in KIT

SAMPI METERS - SM 5 / 7 / 15

Ordering Information:

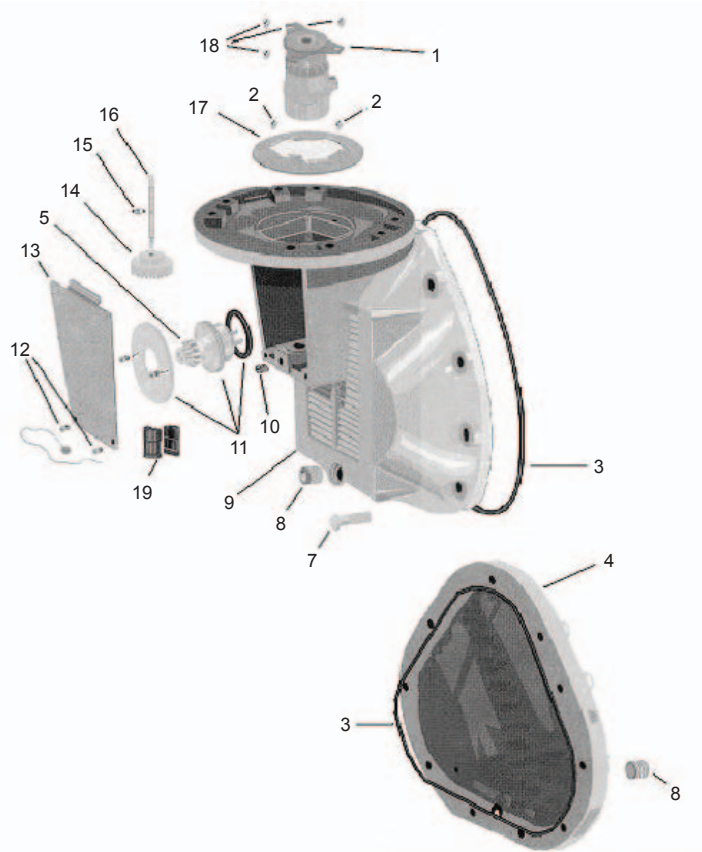


Meter Element			
Item No	Part No (Class 2)	Description	Qty
1	I0110-501149	Housing	1
2	*I0430-09120	O-ring, viton	2
3	I0155-48976	Displacement Rotor Assy	2
4	I0144-44286	Plate Bearing	2
5	I0318-40665	Pin Dowel	4
6	I0163-49469	Gear displacement pinion	2
7	I0771-48319	Washer Rotor Gear	2
8	I0673-09110	Screw 1/4-20 x 3/4"	2
9	I0675-09336	Screw 1/4-20 x 1"	1
10	I0765-09337	Washer, lock	1
11	I0326-501140	Driver Packing Gland	1
12	I0161-49468	Gear Blocking Rotor	1
13	*I0611-09079	Screw 10-24 x 5/8"	8
14	I0528-48345	Key Stainless Steel	3
15	I0153-48079	Blocking Rotor Assy	1

* Can be supplied only in KIT

SAMPI METERS - SM 30

Ordering Information:



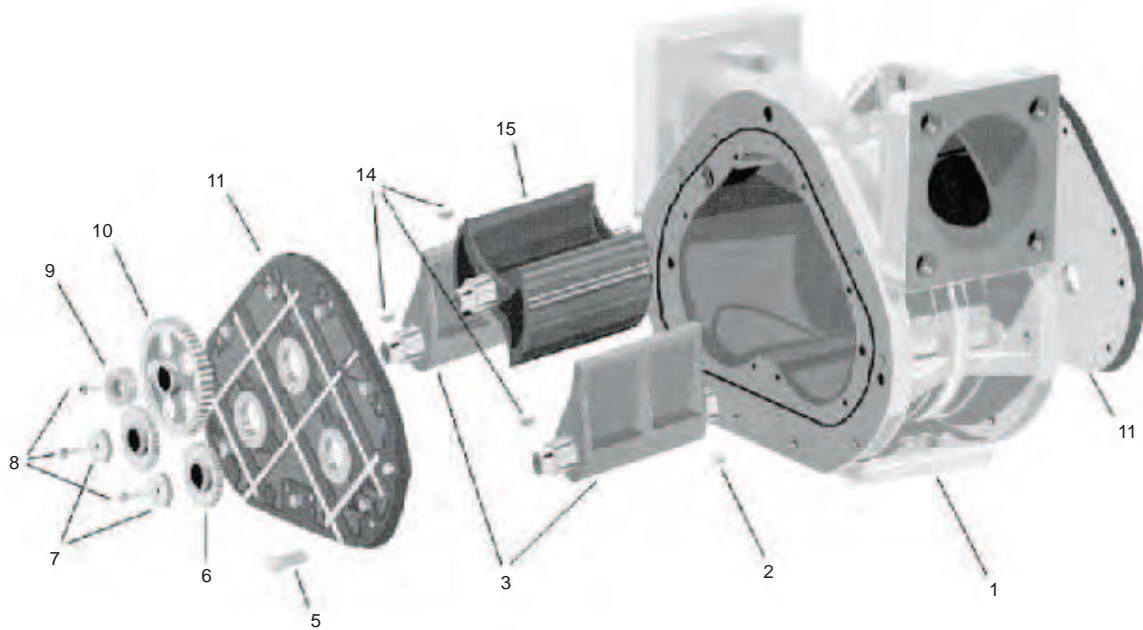
Cover Assembly

Item No	Part No (Class 2)	Description	Qty
1	2030045660	Adjuster Assembly	1
2	I0000-00362	Screw	2
3	*I0430-09325	O-Ring	2
4	I0125-44104	Cover Rear	1
5	*I0165-48283	Pinion gear (1:1)	1
7	*I0627-09085	Screw .312-18 x 1,375	22
8	I0566-04759	Pipe Plug	2
9	I0123-44103	Cover Front	1
10	I0603-06703	Screw. 250-20x.250	1
11	*I0250-48601	Packing gland	1
12	*I0630-04494	Screw. 250-20x.250	2
13	I0362-46169	Dust Cover	1
14	2061040122	Pinion Gear 24 teeth	1
15	2071002188	Retaining Ring	1
16	2061041790	Shaft	1
17	I0364-43044	Plate adjuster mounting	1
18	N3280048065Z	Screw	3
19	2061041786	Driveshaft bushing	1

* Can be supplied only in KIT

SAMPI METERS - SM 30

Ordering Information:



Meter Element			
Item No	Part No (Class 2)	Description	Qty
1	I0110-44101	Housing	1
2	I0318-40099	Pin Dowel	4
3	*I0155-47575	Displacement Rotor Assy	2
5	*I0611-09098	Screw 1/4-20 unc	16
6	*I0163-47388	Gear Pinion	2
7	*I0771-48348	Washer Rotor Gear	2
8	*I0673-07483	Screw 25-20 x 1.00	3
8°	*I0773-06174	Lock, washer, .250	3
9	*I0326-48844	Driver Packing Gland	1
10	*I0161-47387	Gear Blocking Rotor	1
11	I0144-44102	Plate Bearing	2
14	*I0528-07229	Key Stainless Steel	3
15	*I0153-47574	Blocking Rotor Assy	1

* Can be supplied only in KIT

ISOIL METER - SBM Series

compact and lightweight

Operation:

While rotating, the vanes are driven by the internal surface of the single body. This means that the self-lubricating vanes are always in contact with the internal surface of measuring chamber, therefore product leakage is avoided and though high accuracy is granted.

The calibration mechanism allows micrometric adjustment. It is not necessary to change gears. When an electronic counter is used, the calibration mechanism is substituted with a 90° driving gear, if the electronic counter is mounted directly on the meter. If the electronic counter is remote, the meter mounts a pulses emitter or encoder.

Applications:

- tank trucks loading and unloading
- biofuel Blending
- aircraft refuelling
- petrochemical products transfer in refineries, loading terminals and pipelines
- calibration of other meters or tanks (Master Meters)

Filtering and air elimination:

To assure a measuring accuracy and preserve the meter from damage, the fluid under measurement must be properly filtered and air or gas must be eliminated. Isoil produces a wide range of strainers and strainer-air separators.

Accessories:

- pulses emitters: Encoder 6422 Eex-d. Pulses emitter EM 345 Eex-i incorporated in Veeder Root 7887 register
- mechanical temperature compensation: setting "alfa" coefficient (only with Veeder Root 7887 register)
- with VEGA II, compensation is achieved by an algorithm based on "alfa" coefficient or density
- unit drum (for Master Meter): allows the reading of the tens of litre
- instant flow rate indicator: Mechanical needle indicator
- ticket printer: Veeder Root 7889, with one or two pneumatic micro switches or electric micro switches Eex-d ATEX
- extension for electronic or mechanical counter: L=250mm e 500mm
- preset valve: 2" and 3"
- air check valve: 2" and 3"



ISOIL METER - SBM Series

Technical Specifications

	STANDARD		UPON REQUEST
	SBM 75	SBM 150	SBM 75 / SBM 150
EU Directives compliance			
PED (dir. 97/23/CE)	Compliant directive 97/23/CE, with risk category depending on the measured liquid		
ATEX (dir. 94/9/CE)	Non-electrical equipment, compliant directive 94/9/CE, suitable for installation in hazardous area II 2G, marking Ex II 2 G c T1 ... T6		
Working conditions			
Flow rate	[50 ; 500] l/min @ 10 cSt	[100 ; 1300] l/min @ 10 cSt	
	600 l/min max with jet fuel (*)	1400 l/min max with jet fuel (*)	
Working pressure	1000 kPa max	1000 kPa max	Higher available upon request
Test pressure	1700 kPa	1700kPa	Higher available upon request
Working temperature	[-30; +100]°C	[-30; +100]°C	Higher and lower available upon request
Construction			
Manifold and flanges	Aluminium	Aluminium	
Body	Aluminium	Aluminium	
Covers	Carbon steel	Carbon steel	
Rotor	Aluminium	Aluminium	
Vanes	Rilsan	Graphite	PTFE or graphite (SBM75)
Gaskets	NBR (Nitrile)	NBR (Nitrile)	FKM (viton) or PTFE
Ball bearings	Stainless steel	Stainless steel	Graphite bushes
Coupling	Viton lip seal	Viton lip seal	Mechanical or magnetic drive
Flanged	Square 90 x 90mm	3" ANSI 150 FF	2" ANSI150RF (SBM75) Square 120 x 120 mm (SBM150)
Readout (with mechanical register)	litres	litres	Others upon request
Volume per revolution	0.625 litres	2.2797 litres	
Flow direction	Left (IN) to right (OUT)	Left (IN) to right (OUT)	Right (IN) to left (OUT)
Performances			
Accuracy	± 0.15%	± 0.1%	
Repeatability	± 0.02%	± 0.01%	

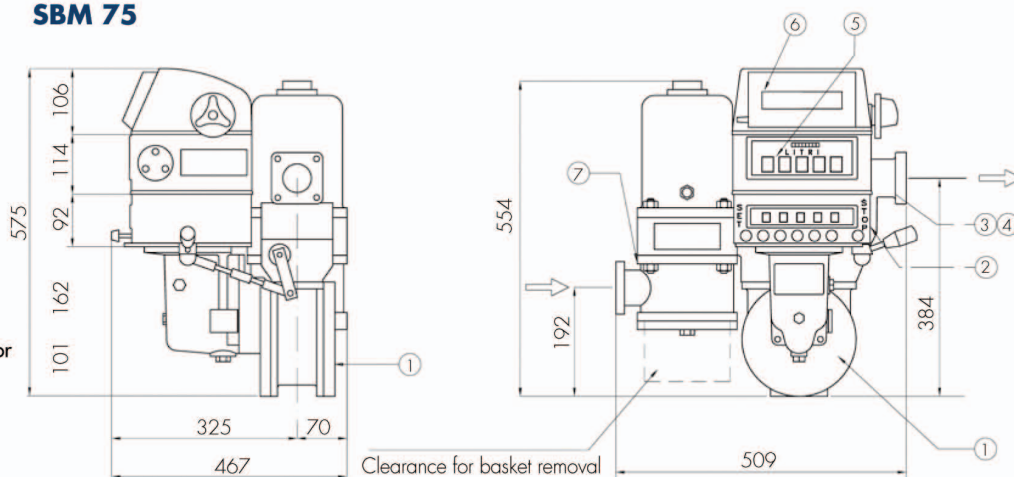
(*) version with "aviation trim" (no copper or copper alloys in the wetted parts)

ISOIL METER - SBM Series

Ordering Information:

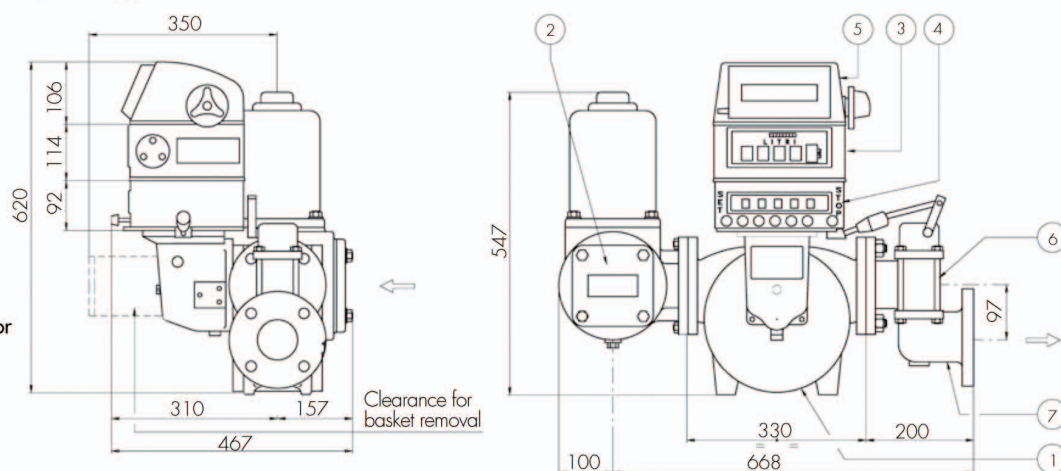
SBM 75

- 1) P.D. Meter
- 2) Strainer-air separator
- 3) Counter
- 4) Preset
- 5) Preset valve
- 6) Check valve
- 7) Printer



SBM 150

- 1) P.D. Meter
- 2) Strainer-air separator
- 3) Counter
- 4) Preset
- 5) Preset valve
- 6) Check valve
- 7) Printer



Weight water with accessories

Type	CF	CFVp	CFS	CFVpS
SBM 75	38 kg	44 kg	43 kg	49 kg
SBM 150	62 kg	75 kg	67 kg	80 kg

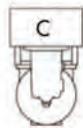
ISOIL METER - SBM Series

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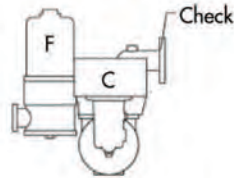
Terminal Version

C = "Counter" V/R 7887
 F = Trainer-airseparator
 P = Preset
 Vp = Preset valve
 Vm = Manual valve
 S = Ticket printer V/R
 Check = Check valve

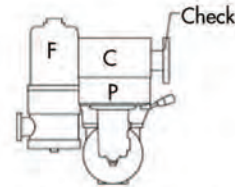
SBM 75



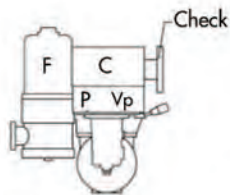
0) MOD: C



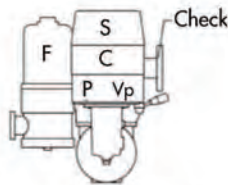
1) MOD: CF + check



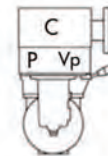
2) MOD: CFP + check



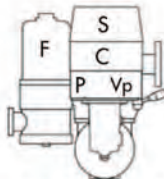
3) MOD: CFPV + check



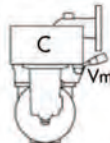
4) MOD: CFPvS + check



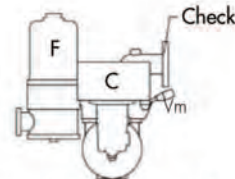
5) MOD: CPVp



6) MOD: CPvS

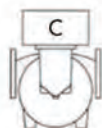


7) MOD: CVm

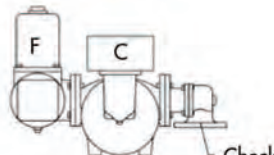


8) MOD: CFVm + check

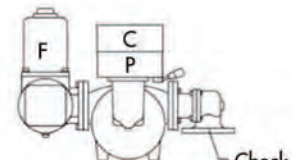
SBM 150



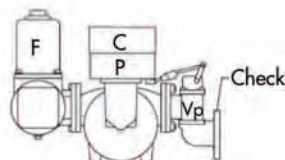
0) MOD: C



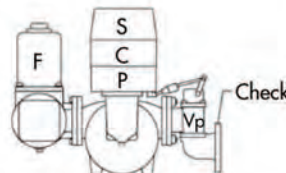
1) MOD: CF + check



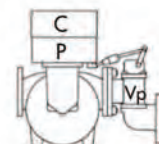
2) MOD: CFP + check



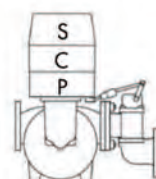
3) MOD: CFPVp + check



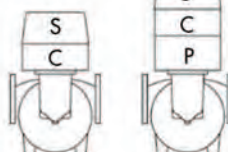
4) MOD: CFPvS + check



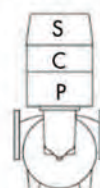
5) MOD: CPVp



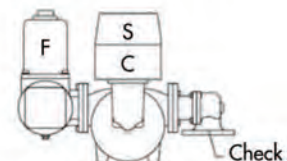
6) MOD: CPvS



7) MOD: CS



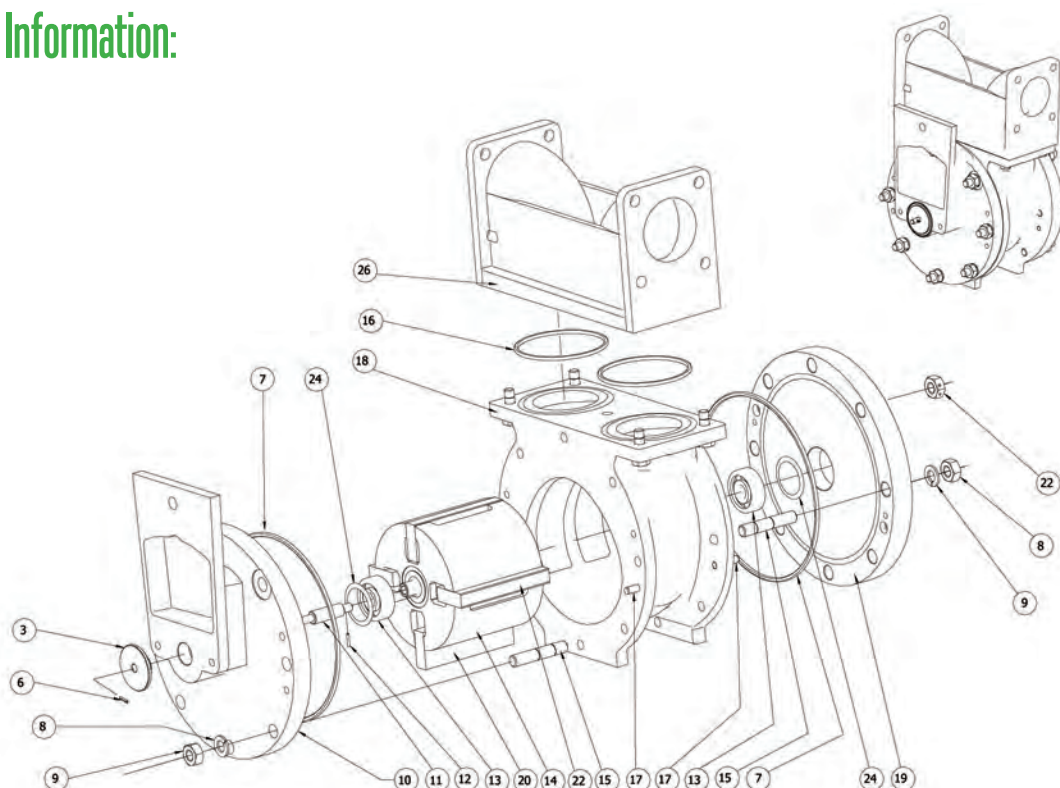
8) MOD: CPS



9) MOD: CFS + check

ISOIL METER - SBM 75

Ordering Information:

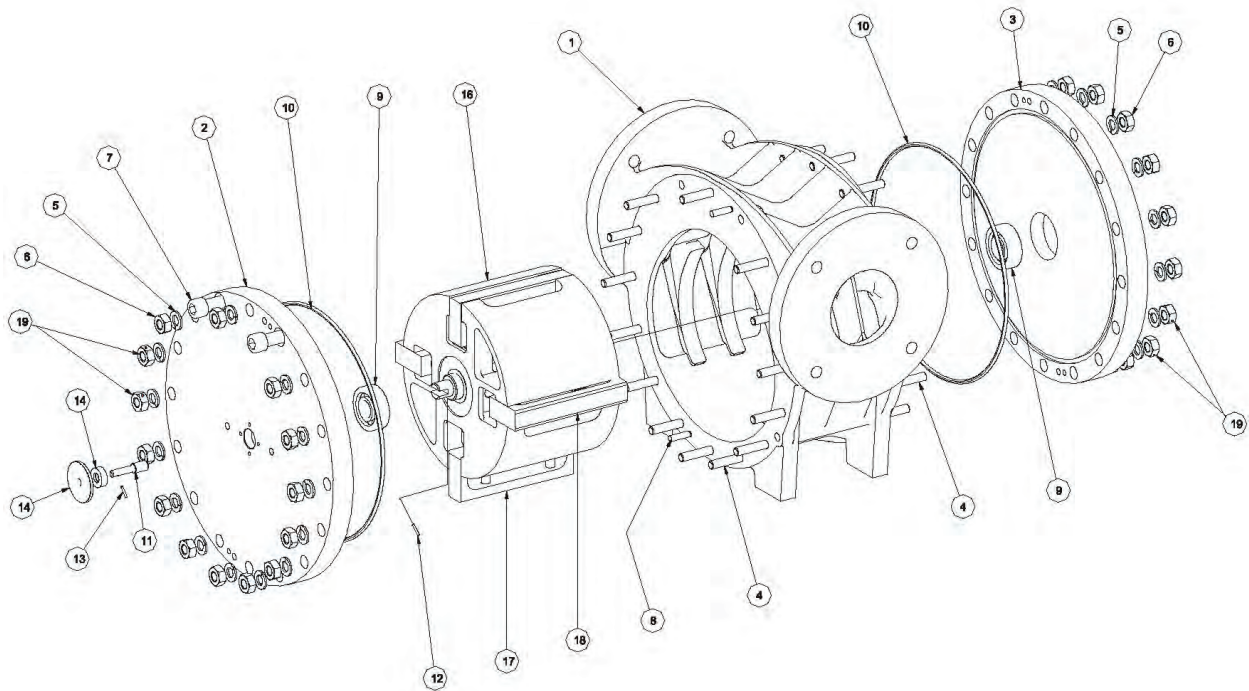


Item	Code	Description	Qty	Material
3	-	BM 36/1	-	
6	80SP5009	Spirol pin	1	Carbon steel
7*	80GU1582	O-Ring	2	Nitrile
7*	80GU1579	O-Ring	2	FKM
8	80RO1180	Spring washer	16	Carbon steel
9	80DA1018	Nut	12	Carbon steel
10	80COB123	Front cover	1	Aluminium
11	80AL0323	Shaft	1	Carbon steel
12	80SP5006	Spirol pin	1	Carbon steel
13*	80CU1102	Bearing	2	Stainless steel
14	80RO2060	Rotor	1	Aluminium
15	80PR3018	Stud	16	Carbon steel
16*	80GU1135	O-Ring	2	FKM
16*	80GU1138	O-Ring	2	Nitrile
17	80SP6018	Pin	4	Carbon steel
18	80COG045	Body	1	Aluminium
19	80COB363	Back cover	1	Carbon steel
20*	80COC040	RH vanes pair	1	- Rilsan
22*	80COC070	LH vanes pair	1	- Rilsan
24	-	Shim	1	-
26	80CO0123	Manifold	1	Aluminium
27	80VI2129	Screw	4	Carbon steel

* Suggested spare parts

ISOIL METER - SBM 150

Ordering Information:



Item	Code	Description	Qty	Material
1	80COG063	Body	1	Aluminium
2	80COB072	Front cover	1	Carbon steel
3	80COB339	Rear cover	1	Carbon steel
4	80PR3075	Stud	30	Carbon steel
5	80RO1180	Washer	30	Carbon steel
6	80DA1018	Nut	25	Carbon steel
7	80VI4267	Screw	2	Carbon steel
8	80SP6021	Dowel pin	4	Stainless steel
9*	80CU1100	Bearing	2	Carbon steel
10*	80GU1630	OR seal	2	Nitrile
10*	80GU1627	OR seal	2	Viton
11	80AL0293	Rotor spindle	1	Stainless steel
12	80SP5033	Spirol pin	1	Carbon steel
13	80SP5009	Spirol pin	1	Carbon steel
14*	80KI0135	Kit BM 36/1	1	Viton
16	80RO2078	Rotor	1	Aluminium
17*	80COC075	Left vanes couple	1	Graphite
18*	80COC045	Right vanes couple	1	Graphite
19	80DA1006	Nut	4	Carbon steel

* Suggested spare parts

ISOIL METER - BM Series

exceptionally efficient for bulk loading and unloading aviation product

The BM range of Isoil meters, by virtue of excellent design and development over a number of years, is noted for exceptional accuracy over a very wide range and in service this accuracy is maintained over long periods of use. Simplicity is a key feature with the only moving parts, the rotor and rotor blades, constantly immersed in liquid.

Operation:

While rotating, the vanes are driven by the internal surface of the single body. This means that the self-lubricating vanes are always in contact with the internal surface of measuring chamber, therefore product leakage is avoided and though high accuracy is granted.

The calibration mechanism allows micrometric adjustment. It is not necessary to change gears. When an electronic counter is used, the calibration mechanism is substituted with a 90° driving gear, if the electronic counter is mounted directly on the meter. If the electronic counter is remote, the meter mounts a pulses emitter or encoder.

Applications:

- loading and unloading of tank trucks, tank wagons and barges
- aircraft refuelling
- transfer of petrochemical products from refineries to depots in pipelines
- calibration of other meters or tanks

Filtering and air elimination:

To assure a measuring accuracy and preserve the meter from damage, the fluid under measurement must be properly filtered and air or gas must be eliminated. Isoil produces a wide range of strainers and strainer-air separators.



ISOIL METER - BM Series

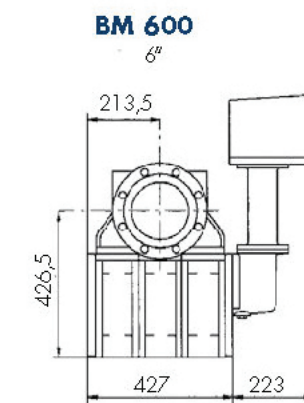
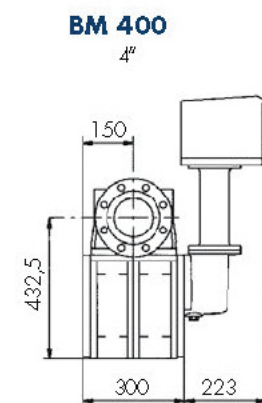
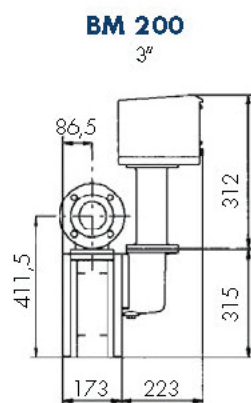
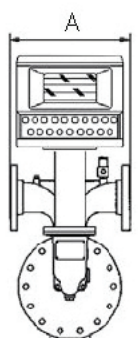
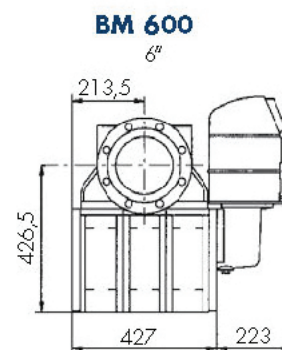
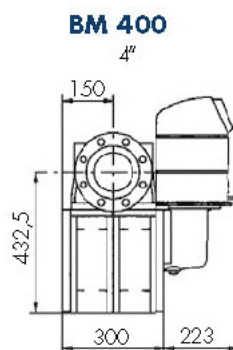
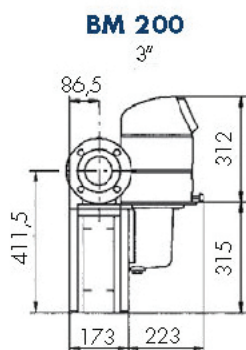
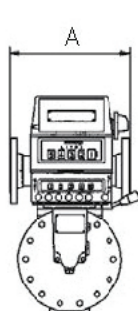
Technical Specifications

	STANDARD			UPON REQUEST
	BM 200	BM 400	BM 600	
EU Directives compliance				
PED (dir. 97/23/CE)	Compliant directive 97/23/CE, with risk category depending on the measured liquid			
ATEX (dir. 94/9/CE)	Non-electrical equipment, compliant directive 94/9/CE, suitable for installation in hazardous area II 2G, marking Ex II 2 G c T1 ... T6			
Working conditions				
Flow rate	[100 ; 1300] l/min @ 10 cSt	[200 ; 2400] l/min @ 10 cSt	[300 ; 3400] l/min @ 10 cSt	
Maximum flow rate avio	1400 l/min	2600 l/min	4000 l/min	
Working pressure	1000 kPa max	1000 kPa max	1000 kPa max	Higher value
Test pressure	1700 kPa	1700kPa	1700kPa	
Working temperature	[-30; +100]°C	[-30; +100]°C	[-30; +100]°C	Higher and lower values
Construction				
Manifold and flanges	Carbon steel	Carbon steel	Carbon steel or Aluminium (avio)	
Body	Carbon steel with corrosion prevention treatment	Carbon steel with corrosion prevention treatment	Carbon steel with corrosion prevention treatment	
Covers	Carbon steel with corrosion prevention treatment	Carbon steel with corrosion prevention treatment	Carbon steel with corrosion prevention treatment	
Rotor	Aluminium	Aluminium	Aluminium	Stainless steel SS316
Vanes	Graphite	Graphite	Graphite	PTFE
Gaskets	NBR (Nitrile)	NBR (Nitrile)	NBR (Nitrile)	FKM (viton) or PTFE
Ball bearings	Stainless steel	Stainless steel	Stainless steel	Graphite bushes
Seal	Viton lip seal	Viton lip seal	Viton lip seal	Mechanical or magnetic drive
Flanged	3" ANSI150 RF	4" ANSI 150 RF or FF (avio)	6" ANSI150 RF	Other sizes and standards
Readout (with mechanical register)	litres	litres or m ³	m ³	Others
Volume per revolution	2.275 litres	4.55 litres	6.825 litres	
Flow direction	Left (IN) to right (OUT)	Left (IN) to right (OUT)	Left (IN) to right (OUT)	Right (IN) to left (OUT)
Performances				
Accuracy	± 0.1%	± 0.1%	± 0.1%	
Repeatability	± 0.01%	± 0.01%	± 0.01%	

ISOIL METER - BM Series

Ordering Information (Accessories):

Pulses emitter Encoder 6422 Eex-d. Pulses emitter EM 345 Eex-i incorporated in Veeder Root 7887 register
Mechanical temperature compensation Setting "alfa" coefficient (only with Veeder Root 7887 register)
With VEGA II compensation Is achieved by an algorithm based on "alfa" coefficient or density
Unit drum (for Master Meter) Allows the reading of 1/10 of the last digit
Instant flow rate Mechanical needle indicator
Ticket printer Veeder Root. Zero start or cumulative
Preset Veeder Root 7889, with one or two pneumatic micro switches or electric micro switches Eex-d ATEX
Extension for electronic or mechanical counter L = 250mm, 500mm, 1000mm and 3000mm
ISE/N automatic valve 3" or 4". 2 stages or multistep closure. Flow limiting. No return

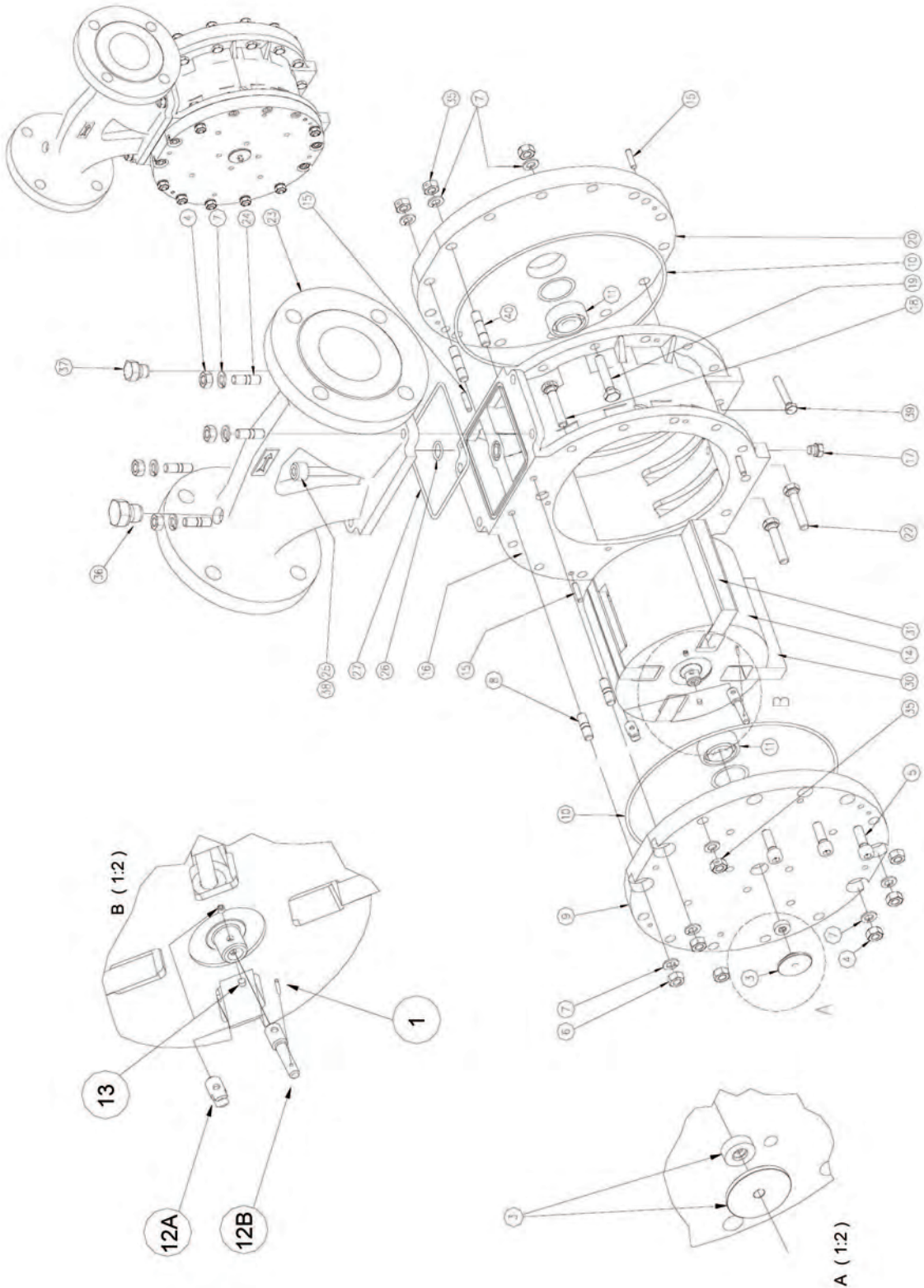


Type	Dimension A	Weight
BM 200	356 mm	54 kg
BM 400	430 mm	102 kg
BM 600	733mm	155 kg

Accessories	Weight
VR Counter	6 kg
Preset	5 kg
Printer	5 kg
VEGA II Counter	20 kg

ISOIL METER - BM 200

Ordering Information:



ISOIL METER - BM 200

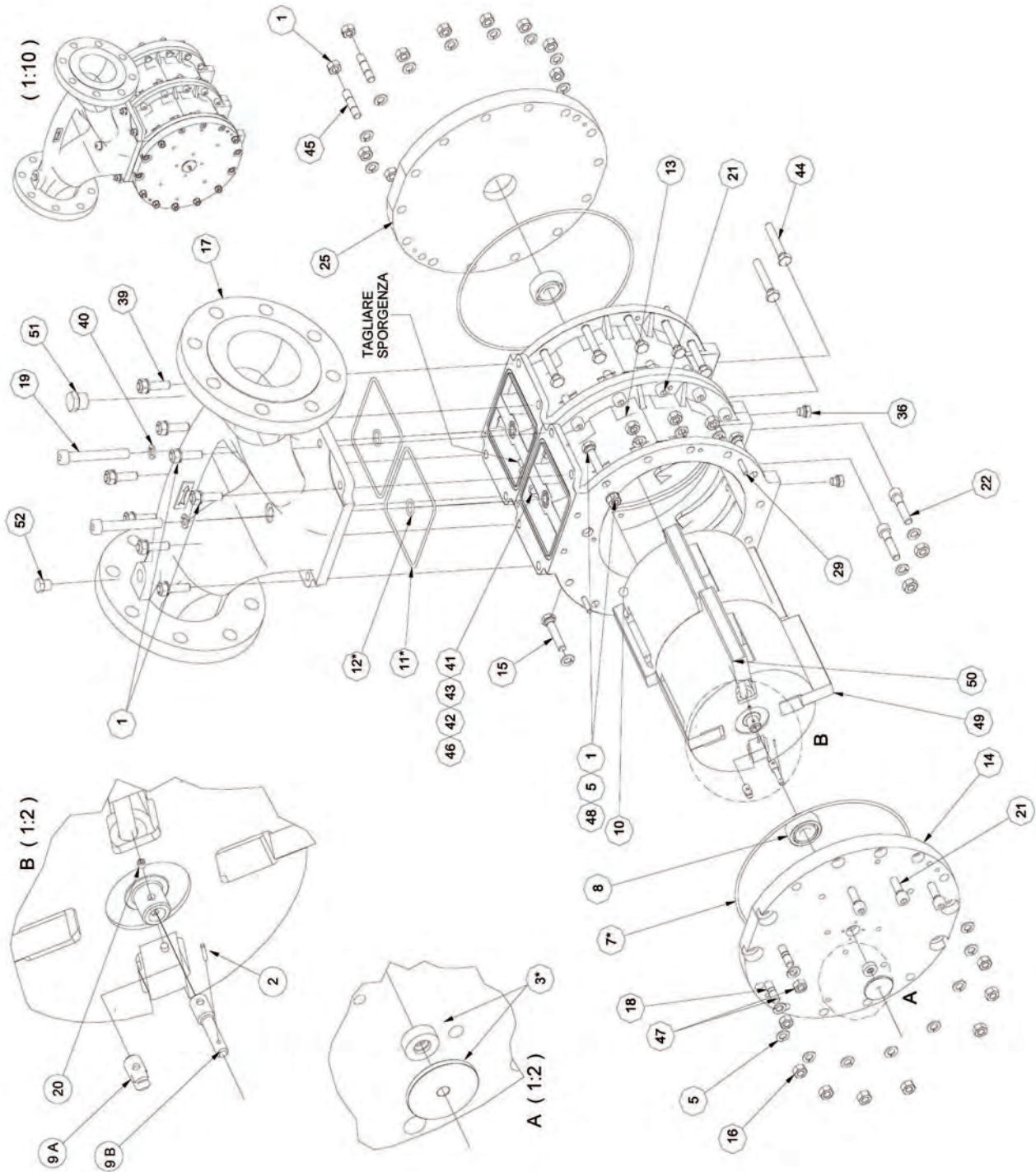
Ordering Information:

Item	Code	Description	Qty	Material
1	80SP5009	Spirol pin	1	Carbon steel
3*	80KI0135	BM36/1 Kit	1	FKM
3*	80KI0131	BM36/1 Kit	1	Nitrile
4	80DA1018	Nut	26	Carbon steel
5	80VI4285	Screw	3	Carbon steel
6	80DA1063	Nut	2	Carbon steel
7	80RO1180	Spring washer	32	Carbon steel
8	80PR3060	Stud	2	Carbon steel
9	80COB501	Front cover	1	Carbon steel
10*	80GU1630	O-Ring	2	Nitrile
10*	80GU1627	O-Ring	2	FKM
11*	80CU1100	Ball bearing	2	Stainless steel
12-A	80BU0046	Bush	1	Carbon steel
12-B	80AL0291	Shaft	1	Carbon steel
13	80GR1034	Grain	2	Carbon steel
14	80RO2081	Rotor assembly	1	Aluminium
15	80SP6021	Pin	4	Carbon steel
16	80COG503	Body	1	Carbon steel
17	80TA1120	Plug	1	Stainless steel
18	80VI2178	Screw	2	Carbon steel
19	80VI2171	Screw	17	Carbon steel
20	80COB509	Front cover	1	Carbon steel
22	80VI4309	Screw	2	Carbon steel
23	80CO0368	Manifold	1	Carbon steel
24	80PR3066	Stud	4	Carbon steel
25	80VI4331	Screw	1	Carbon steel
26*	80GU1288	O-Ring	1	Nitrile
26*	80GU1285	O-Ring	1	FKM
27*	80GU1549	O-Ring	1	Nitrile
27*	80GU1546	O-Ring	1	FKM
30	80COC045	RH vanes pair	1	-
31	80COC075	LH vanes pair	1	-
35	80DA1006	Nut	6	Carbon steel
36	80TA1090	Plug	1	Stainless steel
37	80TA1099	Plug	1	Stainless steel
38	80RO1183	Spring washer	1	Carbon steel
39	80VI2173	Screw	2	Carbon steel
40	80PR3075	Stud	2	Carbon steel

* Suggested spare parts

ISOIL METER - BM 400

Ordering Information:



ISOIL METER - BM 400

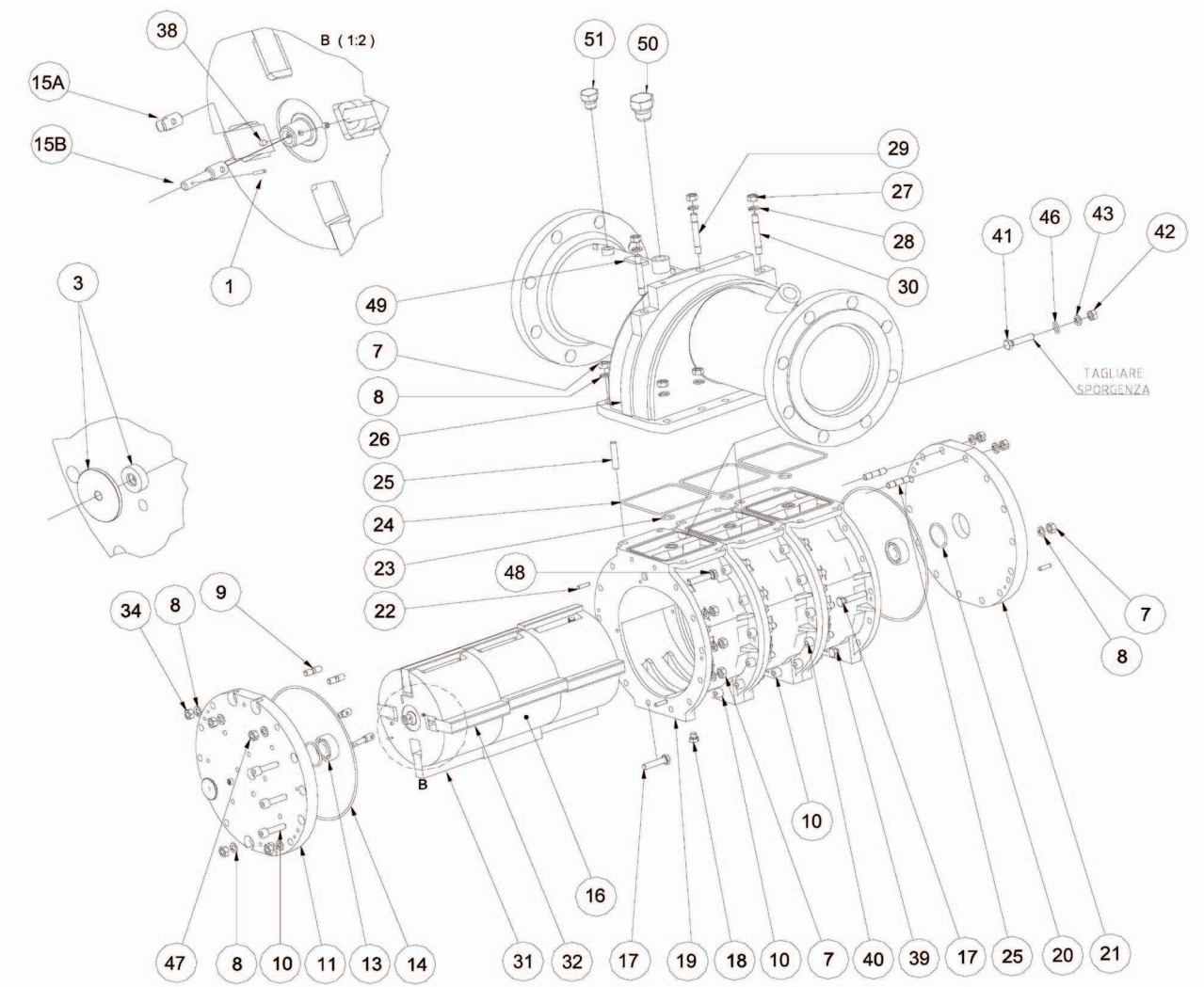
Ordering Information:

Item	Code	Description	Qty	Material
1	80DA1006	Nut	6	Carbon steel
2	80SP5009	Spirol pin	2	Carbon steel
3*	80KI0131	BM36/1 Kit	1	Nitrile
3*	80KI0135	BM36/1 Kit	1	FKM
5	80RO1180	Spring washer	50	Carbon steel
7*	80GU1630	O-Ring	3	Nitrile
7*	80GU1627	O-Ring	3	FKM
8*	80CU1100	Ball bearing	2	Stainless steel
9-A	80AL0291	Shaft	1	Stainless steel
9-B	80BU0046	Bush	1	Stainless steel
10	80RO2090	Rotor assembly	1	Aluminium
11*	80GU1549	O-Ring	2	Nitrile
11*	80GU1546	O-Ring	2	FKM
12*	80GU1288	O-Ring	2	Nitrile
12*	80GU1285	O-Ring	2	FKM
13	80COG503	Body	2	Carbon steel
14	80COB501	Front cover	1	Carbon steel
15	80VI2171	Screw	19	Carbon steel
16	80DA1018	Nut	40	Carbon steel
17	80CO0365	Manifold	1	Carbon steel
18	80PR3060	Stud	2	Carbon steel
19	80VI4345	Screw	2	Carbon steel
20	80GR1034	Grain	2	Stainless steel
21	80VI4285	Screw	13	Carbon steel
22	80VI4309	Screw	2	Carbon steel
25	80COB509	Back cover	1	Carbon steel
29	80SP6021	Pin	6	Carbon steel
36	80TA1120	Plug	2	Stainless steel
39	80PR3066	Stud	8	Carbon steel
40	80RO1183	Rondella	2	Carbon steel
41	80VI4237	Screw	2	Stainless steel
42	80DA1000	Nut	2	Stainless steel
43	80RO1207	Washer	2	Carbon steel
44	80VI2173	Screw	2	Carbon steel
45	80PR307	Stud	2	Carbon steel
46	80GU1205	O-Ring	2	Nitrile
46	80GU1204	O-Ring	2	FKM
47	80DA1063	Nut	2	Carbon steel
48	80VI2178	Screw	2	Carbon steel
49*	80COC075	LH vanes pair	2	-
50*	80COC045	RH vanes pair	2	-
51	80TA1090	Plug	1	Stainless steel
52	80TA1099	Plug	1	Stainless steel

* Suggested spare parts

ISOIL METER - BM 600

Ordering Information:



Item	Code	Description	Qty	Material
1	80SP5009	Spirol pin	2	Carbon steel
3*	80KI0131	BM36/1 Kit	1	Nitrile
3*	80KI0135	BM36/1 Kit	1	FKM
7	80DA1018	Nut	56	Carbon steel
8	80RO1180	Spring washer	64	Carbon steel
9	80PR3060	Stud	2	Carbon steel
10	80VI4309	Screw	4	Carbon steel
11	80COB147	Front cover	1	Carbon steel
13*	80CU1101	Ball bearing	2	Stainless steel
14*	80GU1630	O-Ring	4	Nitrile
14*	80GU1627	O-Ring	4	FKM

* Suggested spare parts

ISOIL METER - BM 600

Ordering Information:

Item	Code	Description	Qty	Material
15-A	80BU0046	Bush	1	Stainless steel
15-B	80AL0291	Shaft	1	Carbon steel
16	80RO2099	Rotor	1	Aluminium
17	80VI2171	Screw	17	Carbon steel
18	80TA1120	Plug	3	Stainless steel
19	80COG503	Body	1	Carbon steel
20	80SP0168	Shim	1	Stainless steel
21	80COB579	Back cover	1	Carbon steel
22	80SP6021	Pin	8	Carbon steel
23*	80GU1288	O-Ring	3	Nitrile
23*	80GU1285	O-Ring	3	FKM
24*	80GU1549	O-Ring	3	Nitrile
24*	80GU1546	O-Ring	3	FKM
25	80PR3075	Stud	14	Carbon steel
26	80CO0087	Manifold	1	Carbon steel
27	80DA1072	Nut	3	Carbon steel
28	80RO183	Spring washer	3	Carbon steel
29	80PR3112	Stud	1	Carbon steel
30	80PR3110	Stud	2	Carbon steel
31*	80COC045	RH vanes pair	3	-
32*	80COC075	LH vanes pair	3	-
34	80DA1063	Nut	4	Carbon steel
38	80GR1034	Grob screw	1	Carbon steel
39	80VI2173	Screw	4	Carbon steel
40	80VI4285	Screw	23	Carbon steel
41	80VI4237	Screw	4	Stainless steel
42	80DA1000	Nut	4	Stainless steel
43	80RO1207	Spring washer	4	Carbon steel
46	80GU1205	O-Ring	4	Nitrile
46	80GU1204	O-Ring	4	FKM
47	80DA1008	Nut	6	Stainless steel
48	80VI2178	Screw	2	Carbon steel
49	80TA3060	Plate	1	Aluminium
50	80TA1090	Plug	1	Stainless steel
51	80TA1090	Plug	1	Stainless steel

* Suggested spare parts

PULSER - ERP200

The ERP200 Series Electronic Remote Pulser is designed to convert signals from a rotating shaft into an electrical signal. The apparatus comprises a printed circuit board (PCB), a metallic mounting bracket and a plastic slotted disk (shaft) all housed in a plastic enclosure. Access to the internal block is via a plastic lid fitted with a rubber O-Ring and mounted with screws.

There are several situations where a remote pulser may be preferred or even required:

- (i) When buying a meter capsule only, with no register or drive and no calibration gears. A remote pulser is much cheaper to buy and much less to maintain.
- (ii) When there is no room to have a mechanical or electronic register mounted on the meter. The remote pulser is much smaller than any register.
- (iii) Using a remote pulser also allows the register to be mounted in a better viewing position.

A solid-state pulse transmitter provides accurate readings at high revolutions for remote applications.

A quality sealed plastic housing is able to operate in a broad temperature range with excellent impact and chemical resistance.

The electronic pulse transmitter has three opto sensors each sensor producing 25 Pulses per revolution, thus producing 150 combinations of pulses per revolution. The pulses signals are used by Registers for measuring purpose.

With three opto sensors, the pulse transmitter can detect:

- (i) Flow direction
- (ii) Faulty opto sensors
- (iii) Loss of power.



PULSER - ERP200

Electrical:

When the application of the ERP200 Series is in areas subject to safety requirements such as oil company operations, it is essential that all legislative, industry and company requirements be thoroughly researched and understood. Not only do these vary from country to country but also there are some 'grey' areas with the operation of vehicles in zoned places such as loading gantries.

All ERP200 Series equipment is certified for Zone 0 installation. Installation shall be carried out in accordance with the applicable code of practice by suitably trained personnel.

Following instructions contain details on wiring and how to avoid interference from extraneous sources. In all cases, use the Liqip power filter as that contains power-filtering equipment to ensure a clean, stable power supply to the electronics.

Electronic boards are a hybrid of surface-mount and through-hole components each being selected according to past experience of reliability and mechanical strength.

Safety Certification:

1. IEC Ex

Certificate: IECEx TSA 08.0043X

Marking: Ex ia IIA T4 IP66
Ta = -20°C to +60°C

2. ATEX

Certificate: TRAC09ATEX11220X

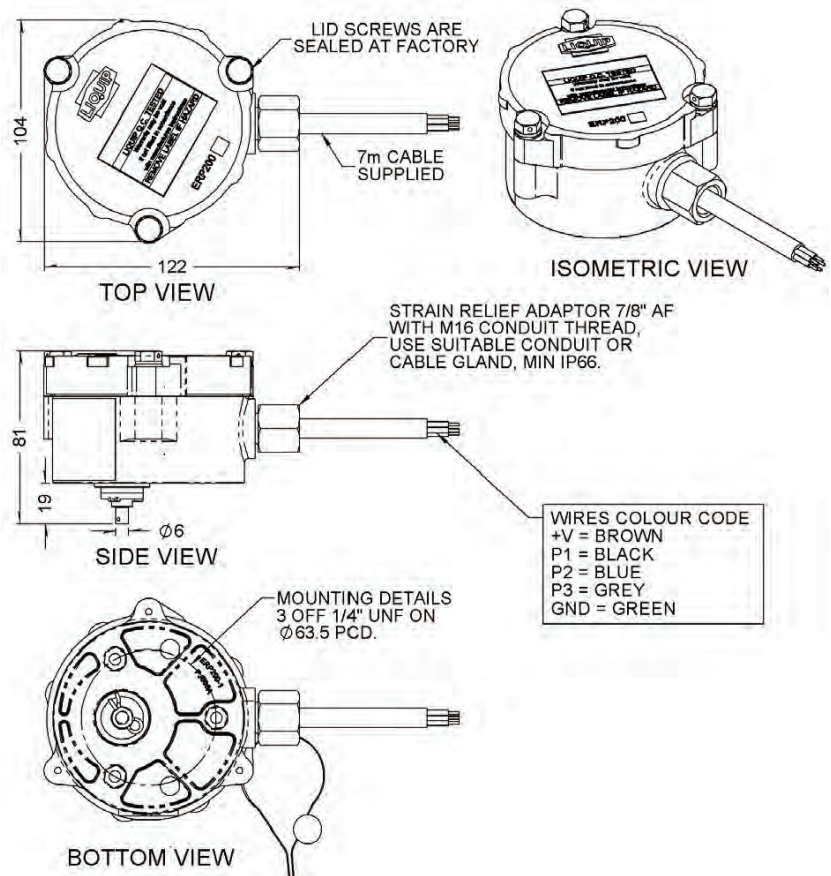
Marking: **CE** 0518 **II 1 G**
Ex ia IIA T4 IP66
Ta = -20°C to +60°C

Conditions of Safe Use:

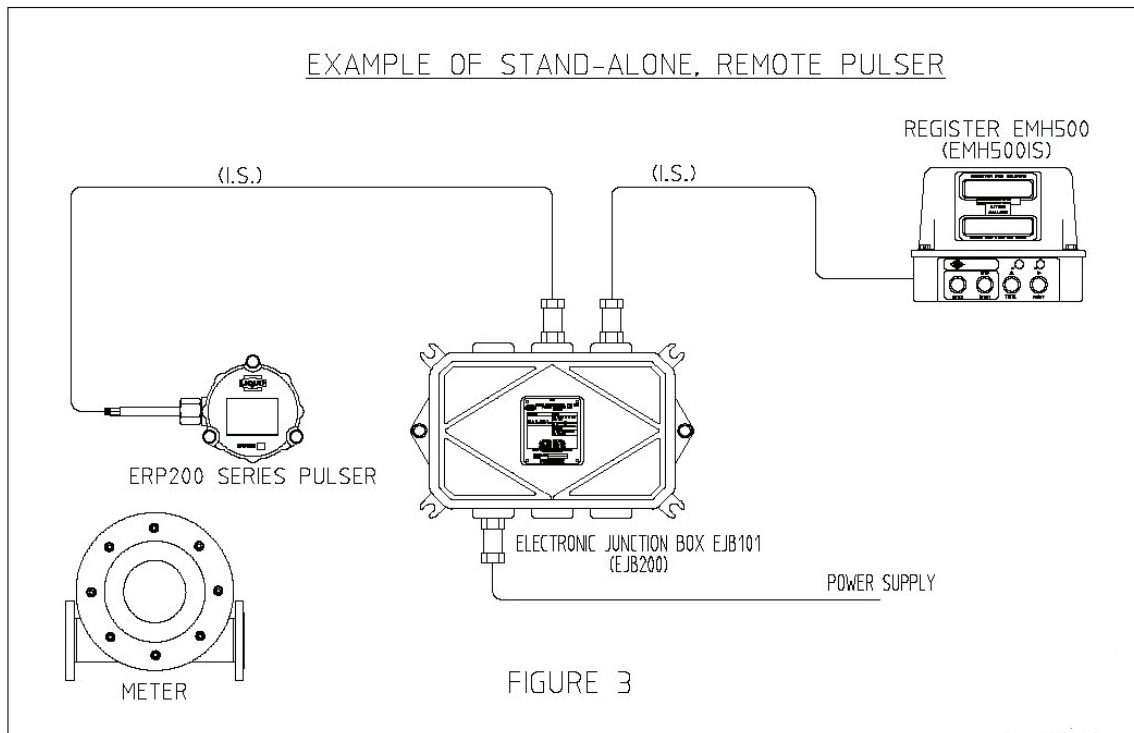
1. Input Parameters: $U_i = 26.6V$, $I_i = 660mA$, $P_i = 1.2W$, $C_i = 1.14\mu F$, $L_i = 0mH$.
2. **Warning:** In Zone 0 only: Electrostatic Hazard. Do not rub. Clean with a damp cloth. Do not use solvents.
3. Port entry: Use suitable conduit or cable gland, min IP66.
4. Any length of connecting cable may be supplied subject to satisfying the L and C parameters of the equipment.

Weights and Measures Approval:

1. AUSTRALIA: NMI S351A, S407



PULSER - ERP200



Ordering Information (Kits):

Kits for mounting Remote Pulser (Top Mount)	
Part No	Description
EPM200-3Z	Meter kit for electronic remote pulser to top mount to Neptune meter
EPM200-4Z	Meter kit for electronic remote pulser to top mount to Sampi & Lc meters WITH calibrator
EPM200-7Z	Meter kit for electronic remote pulser to top mount to Lc meters NO calibrator (to suit Lc meter with old style drive)
EPM200-9Z	Meter kit for electronic remote pulser to top mount to Lc meters NO calibrator (to suit Lc meter with hexagon drive)
EPM200-5Z	Meter kit for electronic remote pulser to top mount to SBM meters
EPM200-6Z	Meter kit for electronic remote pulser to top mount to Smith meters

Kits for mounting Remote Pulser (Direct Mount)	
Part No	Description
EPM100-3Z	Meter kit for electronic remote pulser to direct mount to Lc meters
EPM100-4Z	Meter kit for electronic remote pulser to direct mount to SBM meters
EPM100-7Z	Meter kit for electronic remote pulser to direct mount to Sampi meters
EPM100-8Z	Meter kit for electronic remote pulser to direct mount to Avery-Hardoll meters

ELECTRONIC METER REGISTER - EMH600

EMH600 series is the latest in Liquip's range of electronic registers. Most of the EMH500 and EMH400 functions have been retained;

- 1 Connection to electronic ticket printer
- 2 Electronic Calibration
- 3 Non-linearity correction
- 4 Temperature compensation
- 5 Non volatile memory for storing set parameters.

Mechanically, the EMH600 mounts directly onto the meter to replace the EMH500. The EMH600 still operates on 12 volts or 24 volts installations. However wiring differs to the EMH500, as no EJB101 is required.

- EMH600 is the standard version for moderate climates (-25°C to +55°C), software ver.11.01.XX,
- EMH600H is the version for cold climates (-40°C to +55°C), software ver.11.01.XX,
- EMH600H-MP is the version for cold climates (-40°C to +55°C), multi-product, software ver.11.05.XX,



Mechanical Description:

The register has one display as standard and has the pulser built-in. In its simplest form it bolts on to any meter in place of the existing mechanical counter. Accessories available include remote pulser, ticket printer and temperature probe.

1. Register housing

A register mounted on a tanker may be exposed to severe environmental conditions including exposure to water and vibration. Water entry has been addressed primarily by eliminating the normal viewing window. Construction is a shallow nylon body that contains all buttons and the main connection plug. A clear high impact, polycarbonate top hat then forms the viewing windows. This means the entire cover of the register has no potential leak points of any sort or any connections. In the case of impact damage replacement is cheap and simple.

All control buttons are of the sealed type with no through-spindle to allow leakage and the 26-pin connecting plug and socket are a military specification waterproof type. The latter is also vibration resistant and all connectors employed in the electronics are of the locking type to prevent loosening. All screw fasteners are fitted with locking washers.

Pulser vibration can cause false readings if not controlled. Mechanically the pulse-wheel is dampened by an internal wave spring, however, the primary control is electronic, employing three precisely spaced sensors with software analysing and rejecting any spurious counts.

All control buttons and sealed access ports for calibration purposes are mounted on the front face for ease of use by the operator. Buttons are click-type to provide feedback to the user.

ELECTRONIC METER REGISTER - EMH600

A 24-pin connector is rear-mounted and clearance is maximised by recessing the male into the nylon housing and supplying a 90° female for the truck wiring connector.

As previously mentioned the register bolts directly onto the mounting of a Veeder Root mechanical counter. Fit the drive fork to suit the correct meter.

In the case of a Neptune meter, Liquip supplies an adaptor EMH200-5 for equally simple bolt-on conversion.

2. Remote Pulser, ERP200

It may be preferred to have the register mounted away from the meter. In this case the register internal opto connection to the main board must be disconnected and securely cable tied out of harms way. The ERP200 is wired into the EMH600 via a junction box and main harness without further modification (refer to EMH600 wiring diagram X400302).

ERP200 is a self-contained pulser that can operate with the intrinsically safe power supply or directly from the vehicle power at 9v to 30v.

Body mounting is the same pattern as Veeder Root pulsers for interchangeability. It can therefore be driven off a Veeder-Root mechanical register (off the existing post-calibration gear drive train by mounting on an adaptor plate or by driving directly off the meter chamber main shaft).

Construction of body, cover and toothed wheel and shaft is in acetal, supported by a sealed-for life ball bearing. Friction damping is by an internal wave spring. The cover is screw-on for ease of access with calibration-seal lug provided and O-Ring water sealing. A maximum speed of 1,000 rpm is sufficient for all current applications when driving directly off the meter main shaft. There is no minimum speed each tooth is counted.

NOTE:

EMH600 can also work with third party remote pulsers as long as they produce output signal of amplitude from 0V to at least +4V square or sine. Such a pulser must be connected to the input no. 'E' on the EMH600 mil. spec. connector (WHITE/RED cable on the supplied harness) and the register must have enabled reading of the single pulse input (in the management calibration menu "SInput=Y").

ELECTRONIC METER REGISTER - EMH600

Appendix

A1 - EMH600 ELECTRONIC REGISTER SPECIFICATIONS

Microprocessor:	32 bit μ P at 16.7MHz
Program Memory:	256K x 16 bits of EPROM
Operating Temperature:	-25°C to +55°C, or -40°C to +55°C
Size:	210 x 210 x 135mm
Weight:	1.6kg
Displays:	1 x 8 digits, 15mm high
Power Input:	9 to 30Vdc @ 600mA polarity protected. In-line fuse (rated 2A, antisurge) is strongly recommended.
Temperature Compensation:	-10 to +50°C for all petroleum products listed below Extended ranges available according to local regulations
Temperature Probe:	PT100 100 Ω @0°C
Product Density:	0.500 - 0.600kg/L for LPG, 0.653 - 1.075kg/L for other products
Communication:	Two RS232C ports to be used to communicate with a PC or other serial device such as a modem or printer.
PC:	Software is written for Touch-PC on-line communication. Commands that can be interrogated include resetting the meter and requesting the current delivery quantity.
Printer:	Epson CTM-290 or TM-295, Liquip Blaster.
Pulse Input:	Will accept 3-channel pulses of 60° phase shifted, from ERP200 pulser or single pulse from third-party pulser.
Pulse Output:	This is an Open Drain, active-low output, signal calibrated to 10 pulses/litre, where the pulse width can be set up to either 2 ms or 0.2 ms duration, (either 166Hz or 1.66kHz max. frequency).
External Reset:	This is an input/output signal.
Relay Output:	Current source, 1A max, unregulated voltage - internally taken from the power input. Solenoid to be connected between this output and the Ground. Additional in-line fuse (1A, antisurge) is strongly recommended.

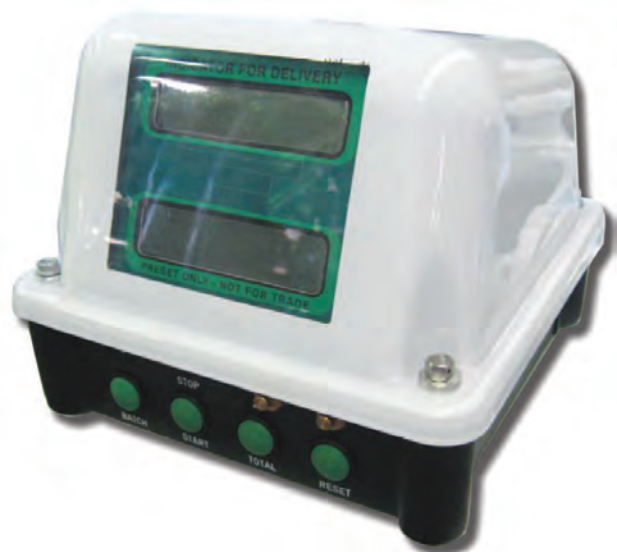
ELECTRONIC METER REGISTER - EMH500

The EMH500 series is the latest in LIQUIP's range of electronic registers. It features many more functions and a greater processing power than its predecessor, the EMH400.

1. All of the EMH400 functions have been retained;
 - Connection to electronic ticket printer
 - Electronic Calibration
 - Non-linearity correction
 - Temperature compensation
 - Non volatile memory for storing set parameters.

2. The EMH500H has added functions such as:
 - A preset delivery/batch function, which includes user selectable ramping and flow rate functions.
 - The addition of a second RS-232C port , with built-in software to communicate with a range of devices such as a range of printers, an in-cab Touch PC, remote displays, operational commands from the truck cab, and other ports to accept information from temperature transmitters and 'foreign' pulsers.
 - A self-test option that in conjunction with the Electronic Test Jig, allows the user to perform a self test of the major components of the register. These include the Temperature reading, the Opto board, both Communication Ports, both Relays, and the Output Pulse.
 - A separate pulse output that can be used to drive an auxiliary display.
 - A single pulse input mode which allows the EMH500 to be used with third party single wire pulsers.
 - A programmable automatic reset and print time-out.
 - Units selectable as either Litres or Gallons.
 - Selectable display resolution.
 - An accumulative total of Power Interrupts since the last management ticket.

Mechanically, the EMH500 can directly replace the EMH400 or the EMH300. Slight modifications need to be made electrically as the EMH500 can support several remote devices, but it still runs on 12 volts or 24 volts.



ELECTRONIC METER REGISTER - EMH500

Mechanical Description:

Two 'foundation' components are required to start to build the system. A power box provides power supply to the counting components and also, in the case of preset systems, translates the signals to power supplies out to relays or solenoid valves. The second component of the system is the register, which has two displays as standard and can have the pulser built-in. In its simplest form it bolts on to any meter in place of the existing mechanical counter.

1. Junction Power Box, EJB101, EJB102, EJB200

The housing is cast aluminium with weatherproof seal. Six ports are provided. One for the supply from the vehicle battery (11v to 30v), one output to supply power and communication to the Register, and the remaining ports are for the auxiliary devices such as, the communication ports, temperature probe, remote pulser and solenoids. These ports may require approved glands and conduit to comply with regulations.

The single electronic board provides circuit protection and power conditioning for protection against ripples and surges.

Mounting is by four externally accessible M10 or 3/8 inch screws to any suitable bracket or to the chassis etc.

For more detailed information, housing diagrams and specifications, refer to Appendix A2.

(Note: EJB102 is UK version of box with additional switch for bulk hose blow-down, EJB200 has the circuitry fully encapsulated in epoxy resin & is approved for Class 1 Zone 1).

2. Register housing

The greatest mechanical enemies of a register mounted on a tanker (and probably out in the weather) are water entry and vibration.

Water entry has been addressed primarily by eliminating the normal viewing window. Construction is a shallow nylon body that contains all buttons and the main connection plug. A clear high impact, polycarbonate top hat then forms the viewing windows. Therefore the whole cover of the register has no potential leak points of any sort, nor any connections, so in the case of impact damage replacement is cheap and simple.

All control buttons are of the sealed type with no through-spindle to allow leakage and the 24-pin connecting plug and socket are a military specification waterproof type. The latter is also vibration resistant and all connectors employed in the electronics are of the locking type to prevent loosening. All screw fasteners are fitted with locking washers.

Pulser vibration can cause false readings if not controlled. Mechanically the pulse-wheel is dampened by an internal wave spring but the primary control is electronic, employing three precisely spaced sensors and the software then analyses and rejects any spurious counts.

All control buttons and sealed access ports for calibration purposes are mounted on the front face for ease of use by the operator. Buttons are click-type to provide feedback to the user.

A 24-pin connector is rear-mounted and clearance is maximised by recessing the male into the nylon housing and supplying a 90° female for the truck wiring connector.

ELECTRONIC METER REGISTER - EMH500

As previously mentioned the register bolts directly onto the mounting of a Veeder Root mechanical counter - simply fit the drive fork to suit the particular meter.

In the case of a Neptune meter, LIQUIP supply an adaptor EMH200-5 for equally simple bolt-on conversion.

EMH500H is standard register

EMH500IS is approved for Class 1 Zone 1

EMH501 is for Canada

3. Remote Pulser, ERP200

It is sometimes preferred to have the register mounted away from the meter. In this case the register internal opto connection to the main board must be disconnected and securely cable tied out of harms way. The ERP100 is wired into the power box then via the standard main harness without further modification.

ERP200 is a self-contained pulser that can operate with the intrinsically safe power supply or directly from the vehicle power at 9v to 30v.

Body mounting is the same pattern as Veeder Root pulsers for interchangeability. It can therefore be driven off a Veeder-Root mechanical register: off the existing post-calibration gear drive train by mounting on an adaptor plate: or by driving directly off the meter chamber main shaft.

Construction of body, cover and toothed wheel and shaft is in Delrin, supported by a sealed-for-life ball bearing. Friction damping is by an internal wave spring. The cover is screw-on for ease of access with calibration-seal lug provided and O-Ring water sealing. A maximum speed of 1,000 rpm is sufficient for all current applications when driving directly off the meter main shaft. There is no minimum speed each tooth is counted.

For housing diagrams and specifications, refer to Appendices A3 and A4.

NOTE:

EMH500 can also work with third party remote pulsers as long as they produce output signal of amplitude from 0V to at least +4V square or sine. Such a pulser must be connected to the input terminal marked "P1" on "REMOTE PULSER" inside the EJB101 and the register must have enabled reading of the single pulse input (in the management calibration menu "SInput=Y").

JUNCTION BOX - EJB101

Liquip electronic system requires complete integrity of power supply to guarantee data communication is not corrupted. The EJB101 has been produced to provide the complete power interface.

The cast aluminium housing has a weather-proof seal and is Ex 'e' rated. Five ports are provided - one for the supply from the vehicle battery (9v to 30v), one output to supply power and communication to the register and the remaining ports are for the auxiliary devices (such a communication ports, temperature probe, remote pulser and solenoids). These ports may require approved glands and conduit to comply with regulations. The single electronic board is manufactured to Cenelec standard for the intrinsically safe barrier and also provides circuit protection and power conditioning for surge and ripple protection.

The EJB200 is built for intrinsically safe barriers and also provides circuit protection and power conditioning for protection against ripples and surge.



ISOIL DIGITAL DISPLAY - LFD-6

ISOIL's new LFD-6 remote display unit has been designed mainly for use on hydrant dispensers and aviation refuellers working at airports. This application requires the volume measured by the PD meter be repeated and easily read from a reasonable distance within the working area.

The LFD-6 nevertheless can be used in any application where the operator is working at a distance from the meter counter and an easily readable display is required. Such typical applications include top loading of tank trucks and rail cars, also loading of barges, ships, etc.

From a metrology standpoint, it is the main meter (and counter) that is the only official metering reference. Therefore, the LFD-6 has to be considered as a simple repeater of the main instrument. The value displayed is received by factorised pulses representing the minimum value to be read (e.g. if the display is required in litres, then 1 pulse=litre). If the LFD-6 is used in conjunction with ISOIL's VegaII or VegaT electronic counter it can be linked via serial line. The LFD-6 has a maximum of 6 digits plus a decimal point that can be programmed in a fixed position. At the end of the delivery the unit can be reset to zero remotely by means of a dedicated input.

The display brightness is achieved by automatic, self adjusting LED which provides very high readability in all lighting conditions. The LFD-6 is suitable for use in explosive areas and harsh environments. ATEX conformity and IP66 protection rating.

Ordering Information:

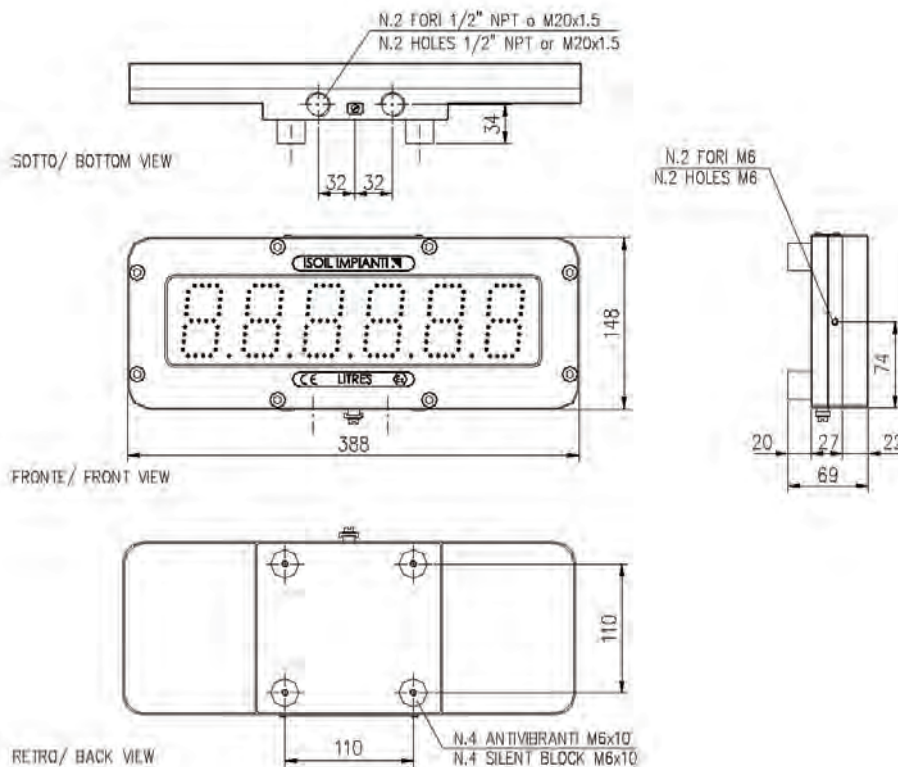
Part No	Description
LFD-6	Remote Digital Display



ISOIL DIGITAL DISPLAY - LFD-6

Technical Specifications

Reading:	N° 6 digit 63(H)x30(L) mm– Red L.E.D. high efficiency type+decimal point
Brightness:	Self adjusting according to the environmental conditions
Unit of measure:	At custom choice by means of labels with the main units of measure
Counting input:	From npn/ pnp open collector transistor or square wave 5-15VDC – 5KHz max
Reset input:	From npn/ pnp open collector transistor or square wave 5-15VDC – 5KHz max
Serial communication:	N° 1 line settable as RS232 or RS485 (communication protocol compatible with ISOIL VEGAI e VEGA T electronic registers)
Mains:	10-30VDC
Power:	10 W max
Working temperature:	-25÷55°C
Stock temperature:	-40÷65°C
Relative humidity:	0÷95% without condensation
Housing's material:	Anodised aluminium alloy
Environmental protection:	IP66
ATEX conformity:	For category II 2 G protection mode Ex IIB T6- EC type examination certificate: INERIS 08ATEX0028
Cable entries (standard):	From the bottom, 2 holes 1/2" NPT
Cable clamps:	In the bottom side, spring terminals for wires 1,5mmq max
Mounting facilities:	N° 6 screwed holes M6x10 on the back and lateral sides for wall or bracket mounting Equipped with silent block supports
Dimensions /Weight:	388x148x49mm / 5 Kg



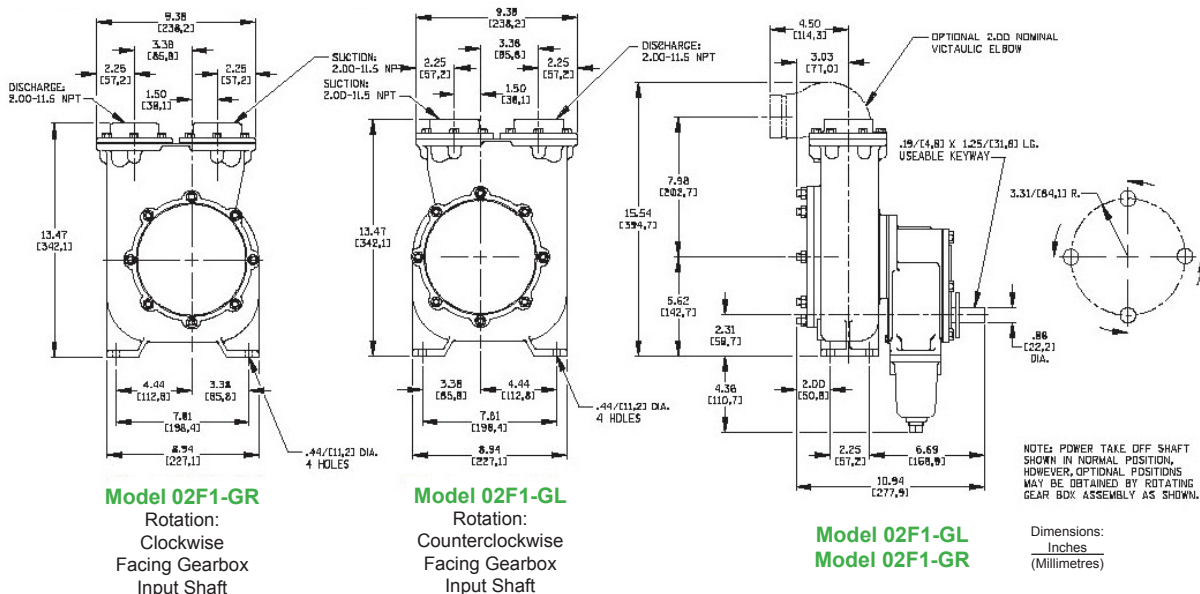
GORMAN RUPP PUMP 2"

most economical and best quality pump

Gorman Rupp pumps are proven performers in reliability. Self-priming centrifugal PTO pumps are ideal for handling aircraft fuels. Designed for truck mounting.

Technical Specifications

Size:	2" x 2" (51 mm x 51 mm) NPT - Female
Casing:	Aluminium Alloy 356-T6 Maximum Operating Pressure 234 psi (1613 kPa)*
Enclosed Type, Six Vane Impeller:	Aluminium Alloy 356-T6 w/Gray Iron 30 Hub Insert
Pinion Shaft:	Alloy Steel 4320
Replaceable Wear Ring:	Copper Alloy C93200
Removable Cover Plate:	Gray Iron 30, 6 lbs. (3 kg)
Seal:	Type 21, Mechanical, Self-Lubricated. Carbon Rotating Face. Ni-Resist Stationary Face. Fluorocarbon Elastomers (DuPont Viton® or Equivalent). Stainless Steel No. 18-8 Cage & Spring. Maximum Temperature of Liquid Pumped, 160°F (71°C)*
Seal Guard:	Brass Tubing ASTM B-135
Gearbox Housing:	Gray Iron 30
Gearbox Lubrication:	SAE 90 Gear Oil
Gear:	Alloy Steel 4620
Gear Ratio:	5.69:1 Increase
Bearings:	Open Single Row Ball
Flanges:	Gray Iron 30
Gaskets:	Buna-N w/Cork and Vegetable Fiber
Hardware:	Standard Plated Steel
Optional Equipment:	Victaulic™ Elbow Victaulic is a Registered Trademark of Victaulic Company of America



GORMAN RUPP PUMP 2"

Ordering Information:

Part No	Description
8425	Pump Gorman Rupp 2" model 02F1-GR (right-hand rotation)

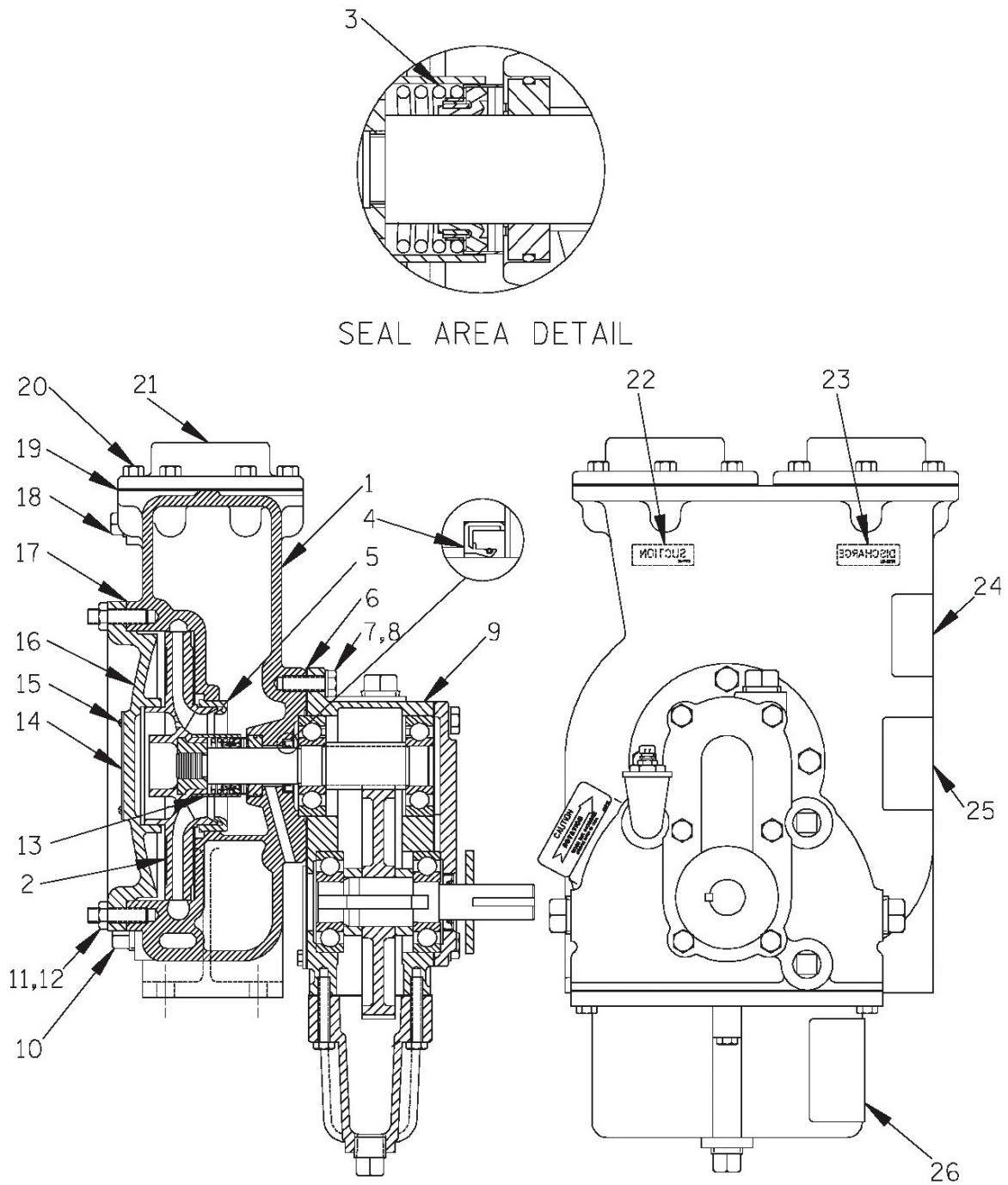


Figure 1. Pump Model 02F1-GR

GORMAN RUPP PUMP 2"

Ordering Information:

If your pump serial number is followed by an "N", your pump is NOT a standard production model. Contact the Liquip part sales team to verify part numbers.

Parts List Pump Model 02F1-GR				
Item		Part No	Description	Qty
1		8751B	Pump Casing	1
2		8101	Impeller	1
3	*	25271-851	Seal Assembly	1
4	*	25217-165	Oil Seal	1
5	*	8099	Wear Ring	1
6	*	8102G	Gasket	1
7		B0604	Hex Head Capscrew	3
8		J06	Lock Washer	3
9		44161-020	Gear Box Assembly	1
10		P06	Pipe Plug	1
11		C0606	Stud	8
12		D06	Hex Nut	8
13		31143-056	Seal Guard	1
14		38818-020	Name Plate	1
15		BM#04-03	Drive Screw	4
16		11156	Cover Plate	1
17	*	8098G	Cover Plate Gasket	1
18		P04	Pipe Plug	2
19	*	9288A	Flange Gasket	2
20		B0603	Hex Head Capscrew	12
21		9586A	Flange	2
22		6588AG	Suction Sticker	1
23		6588BJ	Discharge Sticker	1
24		GR-02	G-R Decal	1
25		38816-077	Gear Lube Decal	2
26		8382B	Lubrication Decal	REF
NOT SHOWN		38817-039	Instruction Tag	1
NOT SHOWN		6588U	Instruction Tag	1

* Indicates parts recommended for stock

GORMAN RUPP PUMP 2"

Ordering Information:

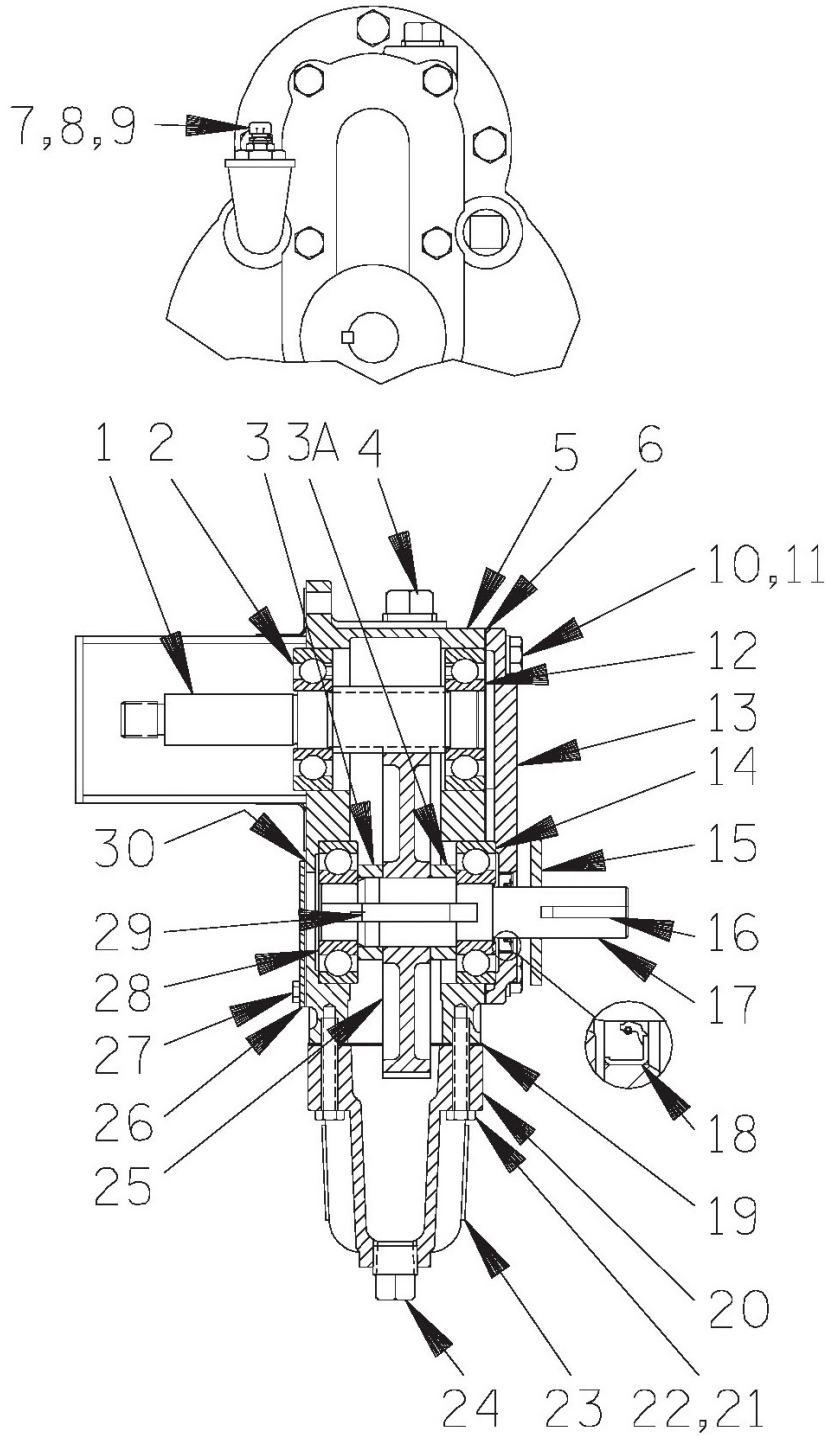


Figure 2. 44161-020 Gear Box Assembly

GORMAN RUPP PUMP 2"

Ordering Information:

If your pump serial number is followed by an N", your pump is NOT a standard production model. Contact the Liquip part sales team to verify part numbers.

Parts List 44161-020 Gearbox Assembly				
Item		Part No	Description	Qty
1		38521-016	Pinion Shaft	1
2	*	23275-206	Ball Bearing	1
3		8104	Spacer Sleeve	2
4		P08	Pipe Plug	1
5		8103B	Gear Box	1
6	*	8097G	Gasket	1
7		S1530	Air Vent	1
8		AP0802	Reducing Pipe Bushing	1
9		RS08	Street Below	1
10		B0503	Hex Head Capscrew	6
11		J05	Lock Washer	6
12	*	23275-206	Ball Bearing	1
13		8097	Bearing Cover	1
14	*	S1120	Ball Bearing	1
15		31131-063	Slinger Ring	1
16	*	N0305	Key	1
17		8095	Drive Shaft	1
18	*	S1617	Oil Seal	1
19	*	10332G	Gasket	1
20		38354-032	Oil Sump	1
21		B0406	Hex Head Capscrew	2
22		B0403	Hex Head Capscrew	4
23		8382B	Decal	2
24		P08	Pipe Plug	5
25		8022	Drive Gear	1
26		8120	Cover Plate	1
27		BW#10-01-1/4S	Hex Head Capscrew	3
28	*	S1120	Ball Bearing	1
29	*	N0506	Key	1
30	*	8120G	Cover Gasket	1

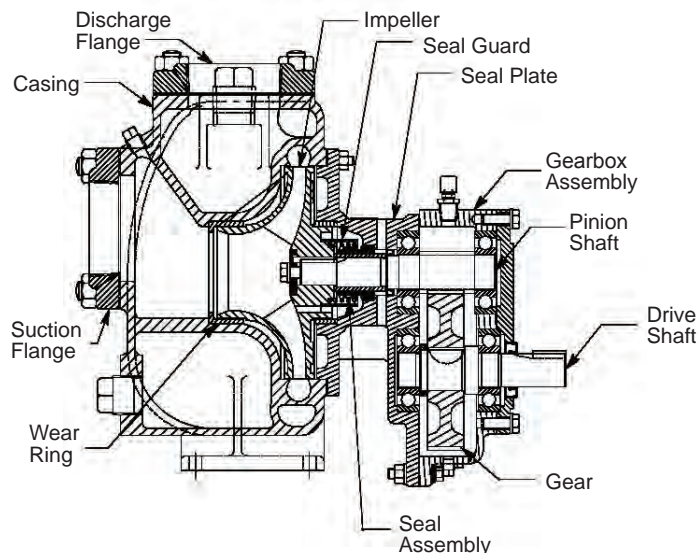
* Indicates parts recommended for stock

GORMAN RUPP PUMP 3"

These 3" pumps are used as the product pump on most larger capacity Liquip JET-A aviation refuellers. These Gorman Rupp self-priming product (aviation fuel) pumps are driven by an hydraulic motor on the fuelling module. They pull the product (JET fuel) from the cargo tank and pump into aircraft at around 1,000+ litres / min.

Technical Specifications

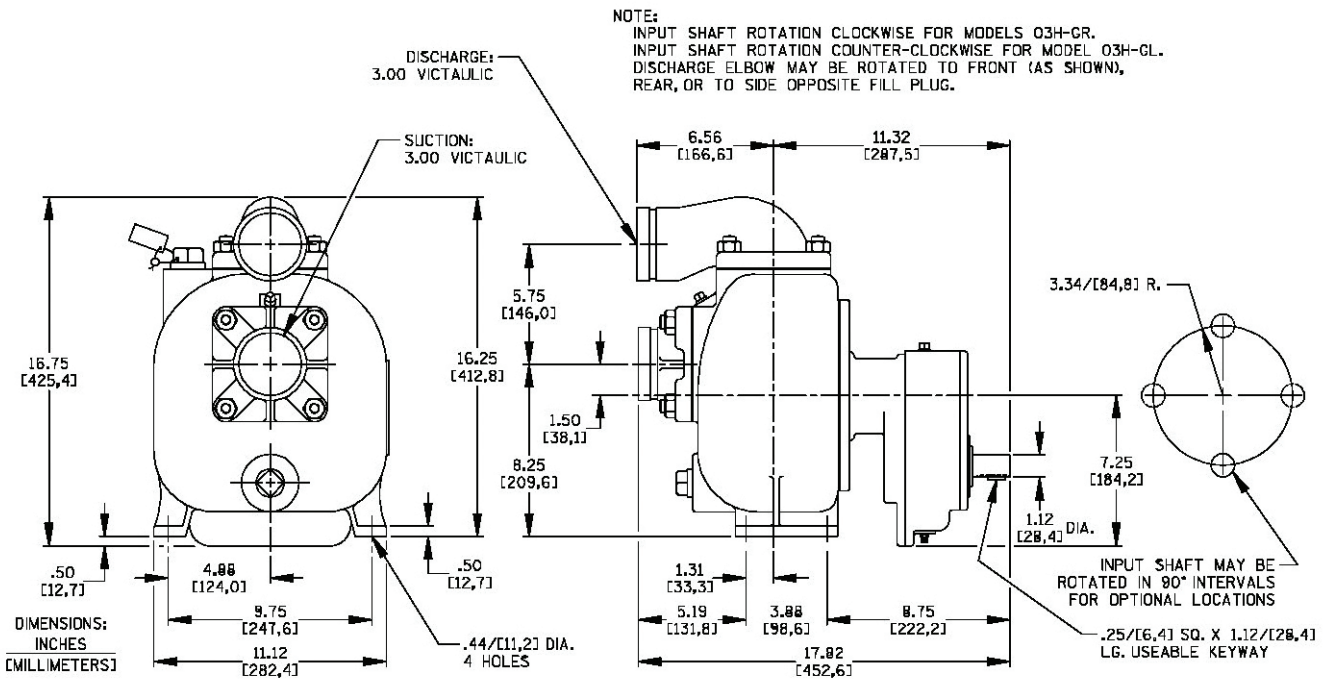
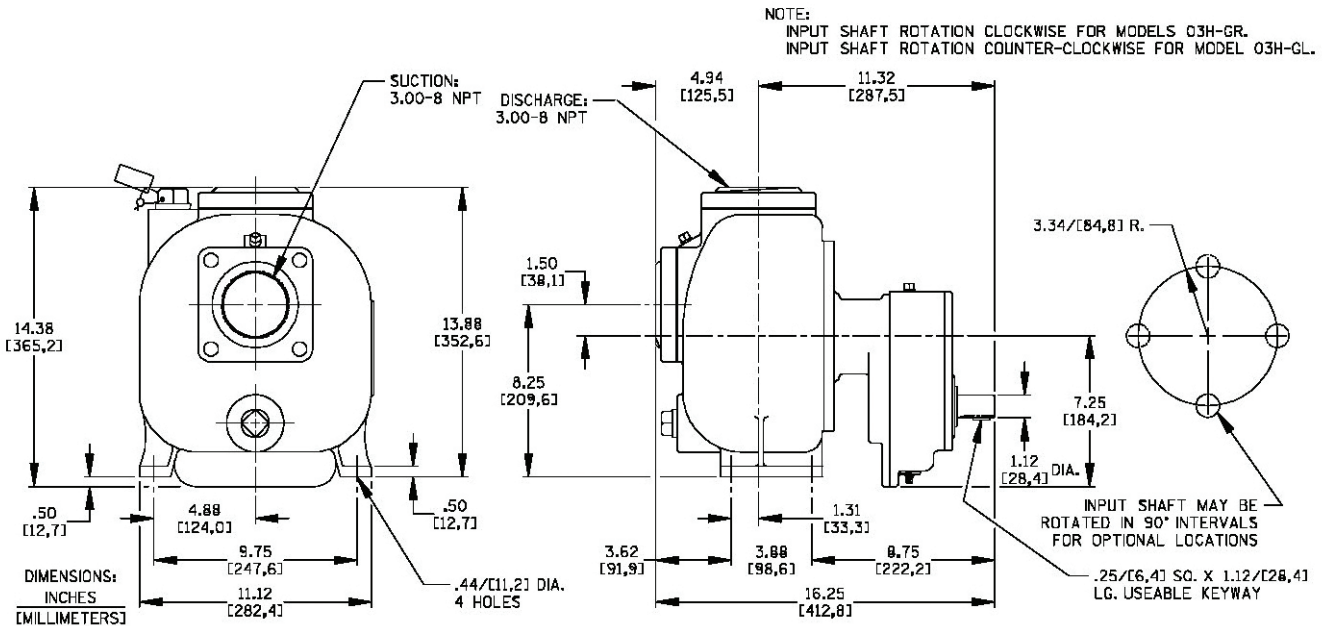
Size:	3" x 3" (76 mm x 76 mm) NPT - Female
Casing:	(03H1) Aluminium Alloy 356-T6 (03H3) Ductile Iron 60-40-18 Maximum Operating Pressure 176 psi (1214 kPa)*
Enclosed Type: Five Vane Impeller:	Almag 35. Handles 7/16" (11,1 mm) Diameter Spherical Solids
Pinion Shaft:	Alloy Steel 4320
Shaft Sleeve:	Alloy Steel 4130
Replaceable Wear Ring:	Copper Alloy C93200
Seal Plate:	Gray Iron 30, 6 lbs. (3 kg)
Seal Guard:	Copper Alloy C26000
Gearbox Housing:	Gray Iron 30
Gearbox Lubrication:	SAE 90 Gear Oil
Gear:	Alloy Steel 4620
Gear Ratio:	4.09:1 Increase
Bearings:	Open Single Row Ball
Flanges:	(03H1) Aluminium Alloy 356-T6 (03H3) Ductile Iron 60-40-18
Gaskets:	Buna-N w/Cork and Vegetable Fiber
O-Rings:	Buna-N
Hardware:	Standard Plated Steel
Optional Equipment:	Victaulic™ Elbow Victaulic is a Registered Trademark of Victaulic Company of America



**Contact Liquip staff for applications exceeding maximum pressure and/or temperature indicated.*

GORMAN RUPP PUMP 3"

Specification Data



GORMAN RUPP PUMP 3"

Ordering Information:

Part No	Description
8426	Pump Gorman Rupp 3" model 03H1-GR

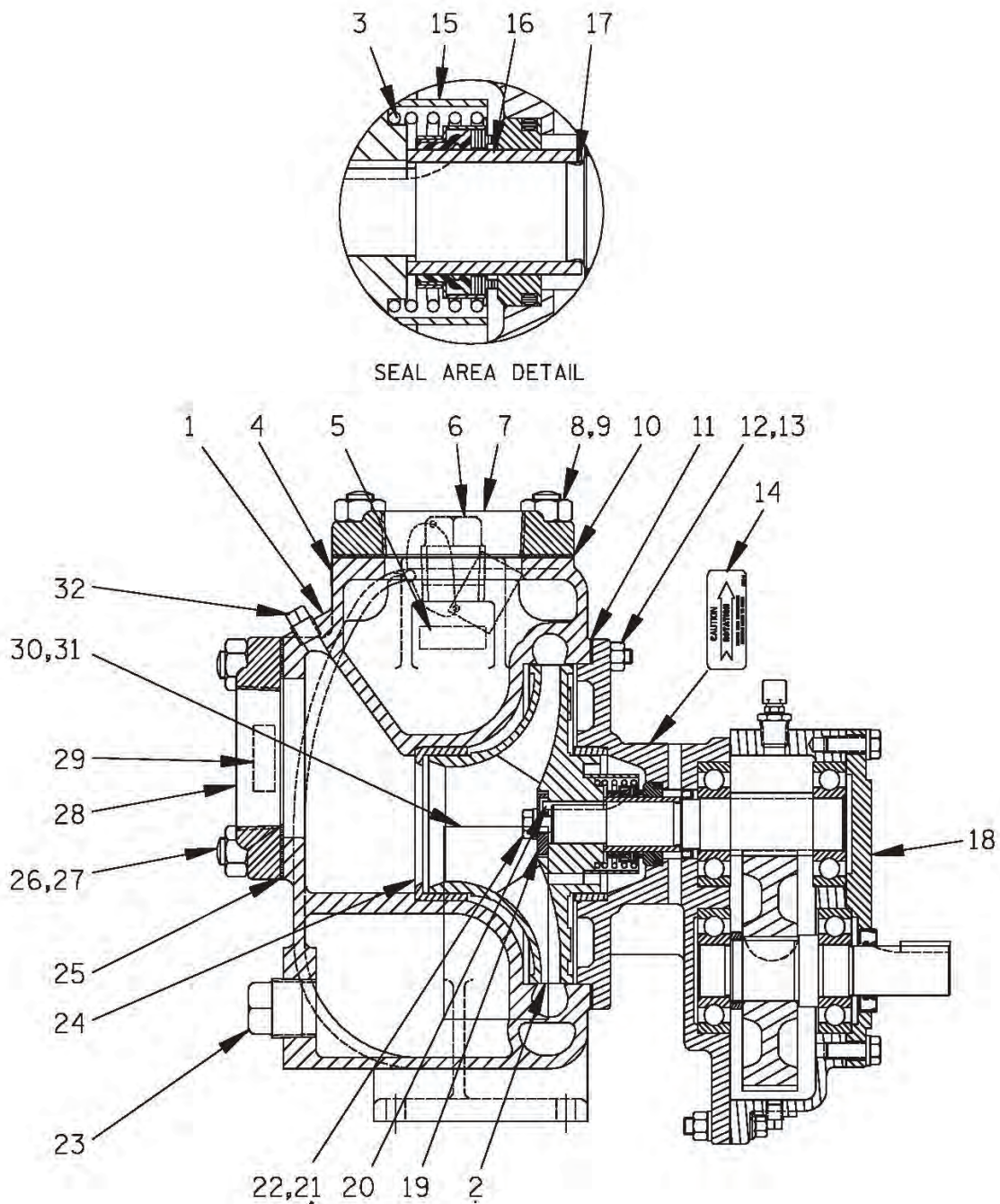


Figure 1. Pump Model 03H1-GR

GORMAN RUPP PUMP 3"

Ordering Information:

If your pump serial number is followed by an "N", your pump is NOT a standard production model. Contact the Liquip part sales team to verify part numbers.

Parts List Pump Model 03H1-GR				
Item		Part No	Description	Qty
1		8274A	Pump Casing	1
2	*	8251A	Impeller	1
3	*	25271-192	Seal Assembly	1
4		6588BJ	Discharge Sticker	1
5		6588AH	FL Here to PRM Stk	1
6		48271-064	Fill Plug Assy	1
7		1390	Discharge Flange	1
8		C1009	Stud	4
9		D10	Hex Nut	4
10	*	1318GB	Discharge Gasket	1
11	*	3GC	Pump Casing Gasket Set	1
12		C0605 1/2	Stud	8
13		D06	Hex Nut	8
14		2613M	Rotation Decal	1
15		9834	Seal Guard	1
16	*	9140	Shaft Sleeve	1
17	*	S1461	Shaft Sleeve O-Ring	1
18		44161-014	Gearbox Assembly	1
19	*	6750	Impeller Washer	1
20	*	N0305-1/2	Impeller Key	1
21		BT0604	Nylock Capscrew	1
22		J06	Lockwasher	1
23		P20	Casing Drain Plug	1
24	*	62ZL5	Wear Ring	1
25	*	1318GB	Suction Flange Gasket	1
26		C1009	Stud	4
27		D10	Hex Nut	4
28		1390	Suction Flange	1
29		6588AG	Suction Sticker	1
30		38818-018	Name Plate	1
31		BM#04-03	Drive Screw	4
32		P04	Pipe Plug	1

* Indicates parts recommended for stock

GORMAN RUPP PUMP 3"

Ordering Information:

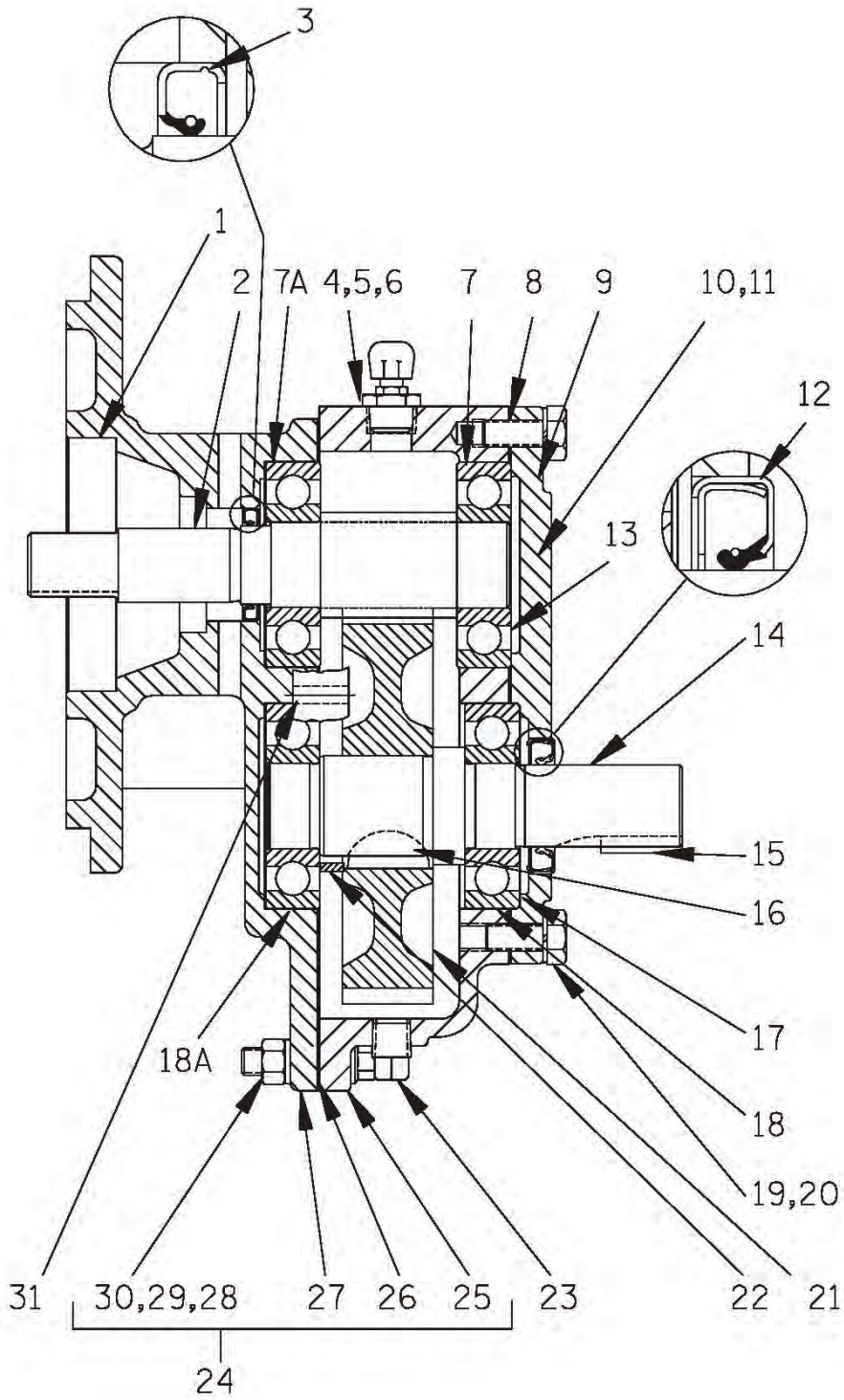


Figure 2. 44161-014 Gearbox Assembly

GORMAN RUPP PUMP 3"

Ordering Information:

If your pump serial number is followed by an "N", your pump is NOT a standard production model. Contact the Liquip part sales team to verify part numbers.

Parts List 44161-014 Gearbox Assembly				
Item		Part No	Description	Qty
1		62ZL6	Wear Ring	1
2		8896	Pinion Shaft	1
3	*	S1764	Oil Seal	1
4		S1530	Air Vent	1
5		AP0602	Reducing Pipe Bushing	1
6		11495A	Shipping Plug	1
7	*	S390	Ball Bearing	1
7A	*	S390	Ball Bearing	1
8	*	8871G	Gasket	1
9		8871	Cover Plate	1
10		38816-239	Lubrication Decal	1
11		2613CQ	PTO Lubrication Decal	1
12	*	S389	Oil Seal	1
13	*	S464	Adjusting Shim Set	1
14		8837	Drive Shaft	1
15	*	N0404-1/2	Key	1
16	*	AV1210	WDF Key	1
17	*	S464	Adjusting Shim Set	1
18	*	S390	Ball Bearing	1
18A	*	S390	Ball Bearing	1
19		J06	Lock Washer	6
20		B0604	Hex Head Capscrew	6
21		8895	Helical Gear	1
22		9142	Spacer Sleeve	1
23		P06	Pipe Plug	5
24		8914	Gear Housing Assembly	1
25	†	NOT AVAILABLE	- Gear Housing	1
26		8870G	- Gasket	1
27	†	NOT AVAILABLE	- Seal Plate	1
28		31871-065	- Flanged Capscrew	8
29		J06	- Lock Washer	8
30		D06	- Hex Nut	8
31		AA0403 -1/2	Dowel Pin	2

* Indicates parts recommended for stock

† Indicates the mating surfaces of items 25 and 27 are machines at the factory for a flush fit. These items are available only by ordering the complete gearbox housing assembly (Item 24).

PORTABLE AVIATION DRUM PUMP

Liquip Portable Aviation Drum Pump refuelling assembly is a complete frame-mounted package, consisting of:

- A hand pump capable of 1 litre per turn
- Velcon VF31 mini-filter and cartridge
- Static reel with cable and clamp
- Hose - 25mm (1") aviation hose (length to suit customer requirements)
- Nozzle - ZVF25.41 manual 25mm (1") bowser-style nozzle with built-in swivel,
- Strainer, dust cap and earth clamp/pin
- Drum Spear suitable for 200 litre drums
- Ground / earth spike

The unit is mounted in a lightweight aluminium frame designed to be free-standing on top of the fuel drum. Filter monitors are last line in defence against fuel contamination by water and dirt. The monitor vessel contains a 6 inch diameter monitor cartridge designed to indicate (by a rise in pressure differential between the inlet and outlet) a problem with water or dirt contamination. The product is pumped under pressure to flow through the housing inlet chamber and "outside-in" through the monitor cartridge. This specially developed multimedia cartridge configuration traps and holds minute solid particles (to less than one micron) whilst absorbing any water contamination, culminating in shutting down the flow if water is present in any volume.

OPTION:

Electric pump in place of hand pump

Ordering Information:

Contact the Liquip Sales Department for assistance in determining which of the numerous models and options available will best suit your application.



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