



4" - 20"

VERTICAL UPFLOW METERS

MODELS

VF27, VF28, VF29, VF30

**OPERATION AND MAINTENANCE MANUAL
PARTS LIST**

FEATURING:

*STANDARD TOTALIZER ASSEMBLY

*MODEL CN06-2 INDICATOR-TOTALIZER

*CERAMIC BEARING CARTRIDGE PROPELLER

*ONE PIECE SEPARATOR/SPINDLE AND THREADED REVERSE THRUST BEARING CARTRIDGE



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WARRANTY

This Warranty shall apply to and be limited to the original purchaser consumer of any McCrometer product. Meters or instruments defective because of faulty material or workmanship will be repaired or replaced, at the option of McCrometer, free of charge, FOB the factory in Hemet, California, within a period of one (1) year from the date of delivery.

Repairs or modifications by others than McCrometer or their authorized representatives shall render this Warranty null and void in the event that factory examination reveals that such repair or modification was detrimental to the meter or instrument. Any deviations from the factory calibration require notification in writing to McCrometer of such recalibrations or this Warranty shall be voided.

In case of a claim under this Warranty, the claimant is instructed to contact McCrometer, 3255 W. Stetson Ave., Hemet, California 92545, and to provide an identification or description of the meter or instrument, the date of delivery, and the nature of the problem.

The Warranty provided above is the only Warranty made by McCrometer with respect to its products or any parts thereof and is made expressly in lieu of any other warranties, by course of dealing, usages of trade or otherwise, expressed or implied, including but not limited to any implied warranties of fitness for any particular purpose or of merchantability under the uniform commercial code. It is agreed this Warranty is in lieu of and buyer hereby waives all other warranties, guarantees or liabilities arising by law or otherwise. Seller shall not incur any other obligations or liabilities or be liable to buyer, or any customer of buyer for any anticipated or lost profits, incidental or consequential damages, or any other losses or expenses incurred by reason of the purchase, installation, repair, use or misuse by buyer or third parties of its products (including any parts repaired or replaced); and seller does not authorize any person to assume for seller any other liability in connection with the products or parts thereof. This Warranty cannot be extended, altered or varied except by a written instrument signed by seller and buyer.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

McCrometer reserves the right to make improvements and repairs on product components which are beyond the Warranty period at the manufacturer's option and expense, without obligation to renew the expired Warranty on the components or on the entire unit. Due to the rapid advancement of meter design technology, McCrometer reserves the right to make improvements in design and material without prior notice to the trade.

All sales and all agreements in relation to sales shall be deemed made at the manufacturer's place of business in Hemet, California and any dispute arising from any sale or agreement shall be interpreted under the laws of the State of California.

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*For Indicator-Totalizer Models Only

VERTICAL UPFLOW METER INSTALLATION

I. UNCRATING. When uncrating the meter, any damage due to rough or improper handling should be reported to the transportation firm and McCrometer. If for any reason it is determined that the unit or parts of the unit should be returned to the factory, please contact McCrometer for clearance prior to shipment. Each unit must be properly crated to prevent any further damage. The factory assumes no responsibility for equipment damage in return shipment due to improper packaging. The shipping crate contains the following items:

Vertical Upflow Meter with Standard Totalizer (VF27 or VF29)	1
Vertical Upflow Meter with CN06-2 (VF28 or VF30)	1
Mounting Equipment as required	-
Operation and Maintenance Manual	1
Tool T-2402-1	1

II. INSTALLATION of McCrometer Vertical Upflow Meters varies depending upon the type and model of meter selected for each application. The meter must have a full flow of liquid for proper accuracy. The meter installations fall into two basic categories:

- 1. MODEL VF27 and VF28** are designed to allow installation to an appropriate cast iron or fabricated steel tee. These tees usually replace an elbow in existing systems. Fully opened gate valves, fittings, or other obstructions that tend to set up flow disturbances should be a minimum of five pipe diameters upstream from meter location.
- 2. MODEL VF29 and VF30 TEE** can be installed similar to placing a flanged elbow or tee in the line. Installation can be made to any vertical discharge concrete turnouts with proper anchor bolts. The meter must be installed upright for a full flow of liquid through the pipe to assure proper accuracy. Fully opened gate valves, fittings, or other obstructions that tend to set up flow disturbances should be a minimum of five pipe diameters upstream from the meter location.

VERTICAL UPFLOW METERS OPERATION AND MAINTENANCE MANUAL

III. MCCROMETER products have been carefully designed to be as maintenance free as possible. Periodic preventive maintenance, however, is highly recommended and should be practiced according to schedule to assure continuous accuracy and trouble-free performance of your propeller meters. The maintenance and inspection procedure can also be used as a guide to locating a problem in the unit that may be the cause of abnormal meter operation.

Routine preventative maintenance should be performed on

all meters, which includes cleaning and an inspection of the propeller and its bearing. The intervals between inspections depend on the water quality and the usage of the meter. The initial inspection should be performed after one to two years of service, to determine the period between future inspections. After five to ten years, the complete meter should be inspected to ensure years of dependable service.

IV. METER HEAD ASSEMBLY should be removed from the tee or meter tee tube by removing the meter head bolts (#45) and lifting the entire head assembly upward, taking care not to damage the propeller assembly as it is pulled clear of the tee flanged end. Inspect the meter head o-ring (#44) or flat gasket for any signs of damage and replace if necessary. Replace the meter head assembly with a dummy cover plate if the service line is to remain in operation.

V. WORKING AREA chosen for disassembly and reassembly of the internal meter components should be clean to reduce the chance of dust or dirt particles being introduced into the meter mechanism.

VI. TOTALIZER ASSEMBLY (#4) service procedure should include cleaning and inspection of the unit noting any excessive wear on the change gears (#7 & #8) that may lead to operational problems in the unit.

1. BONNET MOUNTING SCREWS (#3) should be removed and the entire bonnet (#1) lifted off the meter.

2. TOTALIZER is contained within the totalizer bonnet (#1) and held in place by a base cup (#5). It should not be necessary to remove the totalizer (#4) during inspection; however, removal of the base cup (#5) is necessary for inspection of the totalizer change gears (#7 & #8). Removal of the base cup (#5) can be accomplished by inserting a small screwdriver into the two cutouts and prying upward under the edge.

3. TOTALIZER CHANGE GEARS (#7 & #8) should be inspected for any sign of wear. Both the A-(drive) gear and B-(driven) gear are attached to the lower portion of the totalizer assembly (#4). Spin the floating totalizer driven magnet in the center of the totalizer bottom (#4) to make certain it spins freely without bind or drag. The bottom of the totalizer has the letter "A" molded next to the A-drive gear shaft, and the letter "B" next to the B-driven gear shaft.

4. TOTALIZER DRIVE MAGNET ASSEMBLY (#12) located in the meter head (#13) at the top of the vertical shaft assembly (#23) should be checked and adjusted, if necessary, to position it 1/16" below the top surface of the meter head (#13). Adjustments can be made by loosening the socket head set screw in the side of the totalizer drive magnet assembly (#12) and sliding it up or down the vertical shaft (#23) as desired. Always be sure the set screw is tightened into the flat area on the vertical shaft (#23).

***VII. INDICATOR-TOTALIZER** service procedure includes removal, cleaning and inspection of the unit noting any excessive wear on the gears and other wear points that may lead to

operational problems in the unit.

***1. BONNET MOUNTING SCREWS (#3)**, located beneath the indicator-totalizer bonnet lid, should be removed and the entire bonnet (#1) lifted off the meter. Replace the o-ring seals around each of the four screws (#3) and at the bottom of the bonnet (#4) and cover each of the new o-rings with a thin coat of silicone grease.

***2. INDICATOR MOUNTING SCREWS (#6)** and shake-proof washers (#7) holding the indicator-totalizer unit (#5) to the meter head (#13) should be removed and the unit lifted off, exposing the A-drive gear (#11) attached to the top of the vertical shaft (#23).

***3. METER CHANGE GEARS** should be inspected for any sign of wear. The A-(drive) gear (#11) is attached to the top of the vertical shaft (#23), and the B-(driven) gear (#12) is attached to the bottom of the indicator (#5). The position of the A-drive gear should be checked and adjusted, if necessary, to position the top face of the gear 1/8" below the top surface of the meter head (#13). The position of the B-driven gear top face should be 1/8" below the bottom of the indicator-totalizer.

***4. INDICATOR-TOTALIZER** unit (#5) should be cleaned thoroughly using a mild soap and a soft brush. Under no circumstances should the entire unit be immersed in the soap or should any metal object be used when cleaning and inspecting the internal parts of the indicator-totalizer unit.

***5. GEARS** within the indicator-totalizer unit (#5) should be inspected carefully. If any excessive wear is visible on the gear teeth and other wear points, the unit must be returned to McCrometer for repair.

VIII. VERTICAL SHAFT ASSEMBLY (#23) is pulled directly out the top of the meter after removing two screws (#29) inside the meter head (#13) holding the vertical shaft support plate (#28) and bearing assembly (#26) to the meter head (#13). Spin both the upper bearing assembly (#26) and the lower bearing assembly (#24) gently, checking for any sign of wear. Inspect the vertical shaft assembly (#23) to be sure it is not bent or damaged.

IX. PROPELLER ASSEMBLY (#31) inspection should include cleaning the ceramic sleeve bearing (#33), separator assembly (#18), drive magnet (#35), and the propeller assembly (#31).

1. PROPELLER REMOVAL can be accomplished by first removing the thrust bearing cartridge assembly (#42). Loosen the set screw (#41) in the side of the nose of the propeller. Remove the thrust bearing cartridge (#42) by turning it counterclockwise while holding the propeller in place.

2. REVERSE THRUST BEARING CARTRIDGE (#38) must now be removed. Turn the propeller (#32) so that the Allen wrench clearance hole is lined up with the set screw in the side of

***For Indicator-Totalizer Models**

the reverse thrust bearing cartridge (#38). The location of the set screw is marked by a small hole drilled in the face of the reverse thrust bearing cartridge. With a 5/64" Allen wrench, loosen the set screw (#39) in the reverse thrust bearing cartridge (#38) two to three turns, which will allow the cartridge to be unscrewed without damaging the spindle thread. **Note:** If the bearing area appears to be clogged with dirt or sediment, making it difficult to locate the set screw (#39) or to allow the Allen wrench to fit into the set screw socket, then the bearing area should be flushed out with water. Insert Tool T-2402X-1 into the propeller through the threaded nose. The tabs in the tool should engage in the screwdriver slot in the end of the reverse thrust bearing cartridge (#38). Remove the propeller assembly (#31) and reverse thrust bearing cartridge (#38) by turning Tool T-2402X-1 counterclockwise, unscrewing the reverse thrust bearing cartridge (#38) from the spindle (#19). The propeller assembly with reverse flow cartridge will now slide off the spindle. **WARNING:** If the reverse thrust cartridge does not unscrew easily, it may be because the set screw was not unscrewed enough. If unscrewing the reverse flow cartridge is continued with the set screw binding on spindle thread, damage to thread could occur.

3. WATER LUBRICATION of the ceramic sleeve bearing (#33) is achieved by means of two openings in the end of the thrust bearing cartridge (#42) which allow air to be purged from the bearing area. These should be cleared of any foreign material by running a small wire through the holes on either side of the screwdriver slot.

4. CERAMIC BEARING CARTRIDGE (#33) and drive magnet (#35) should be cleaned of any foreign material and inspected for damage. Using a bottle brush, thoroughly clean the ceramic bearing surface (#33) and the magnet inside diameter (#35). After cleaning the propeller, flush the inside out with water. The outside surfaces of the propeller should also be cleaned to assure a smooth, unrestricted flow across the surface of the propeller. Do not use an oil based solvent in cleaning, as damage to the assembly could occur.

5. SPINDLE CERAMIC SLEEVE (#20) and the O.D. or surface of the separator (#18) should be cleaned and inspected for any substantial amount of wear. The thrust bearing (#4.3) should be checked for any damage. If it is determined that the spindle ceramic sleeve (#20) or separator (#19) are worn sufficiently, the separator/support spindle assembly (#18) should be replaced.

6. SEPARATOR/SUPPORT SPINDLE ASSEMBLY (#18) can be removed for replacement by removing the four mounting screws (#21) which thread into the gearbox. Separator o-ring (#22) should be replaced and the new o-ring (#22) covered with a thin coat of silicone grease. The separator/support spindle assembly (#18) can then be replaced in the front of the drop pipe (#14) with a firm push, gently rotating the assembly at the same time. Replace and tighten the four mounting screws (#21).

7. PROPELLER INSTALLATION is accomplished by following these steps: **a)** The reverse thrust cartridge set screw (#39) should be protruding out of the reverse thrust bearing cartridge so it will not bind up on the spindle thread. **Note:** Look through the end of the propeller and hole in the reverse thrust cartridge to be sure the set screw is not showing. **b)** Slide the propeller assembly onto the support spindle (#18) until the reverse thrust bearing cartridge (#38) contacts the threads on the end of the spindle (#19). Using Tool T-2402X-1, thread the reverse thrust bearing cartridge onto the spindle. If you feel any resistance when threading the reverse thrust cartridge on, stop at once and check to be sure the set screw is not binding on the thread. Be careful not to cross-thread the reverse thrust bearing cartridge. Thread the reverse thrust bearing cartridge (#32) onto the spindle (#18) until the trailing edge of the propeller contacts the drop pipe (#14). Set the proper end play by inserting a 5/64" Allen wrench into the reverse thrust bearing set screw (through the side of the propeller) and loosen the reverse thrust bearing cartridge (#38) 1/2 turn counterclockwise. Tighten the set screw in reverse thrust bearing cartridge. There should be approximately .020" clearance between the gearbox (#14) and trailing edge of the propeller when the propeller is pulled forward (away from the drop pipe). The propeller must not contact the drop pipe.

8. THRUST BEARING CARTRIDGE ASSEMBLY (#42) should be inspected for damage and replaced in the nose of the propeller. The thrust bearing cartridge (#42) is used to adjust the amount of longitudinal end play of the propeller assembly on its spindle (#19), which should be about 1/64". End play can be adjusted by turning the thrust bearing cartridge assembly (#42) clockwise until it tightens against the end of the support spindle (#19), then turning thrust bearing cartridge (#42) counterclockwise 1/8 of a turn. Tighten set screw (#41). Check the longitudinal end play of the propeller to ensure it's not excessive and does not allow the propeller (#31) to contact the drop pipe (#14). Check the clearance between the propeller (#31) and drop pipe (#14). The clearance should be approximately .010" between the drop pipe (#14) and trailing edge of the propeller when the propeller is pushed back (toward the drop pipe). The propeller assembly (#31) must spin freely.

9. PROPELLER BEARING (#33) can be checked for excessive radial play by rocking the propeller (#32) gently from side to side on the spindle (#19). Some play is required for proper operation of the water lubricated ceramic sleeve bearing.

X. INSPECTION of all internal meter parts that may be replaced in the field has been accomplished at this point. Should any of the meter parts, upon inspection, appear to be damaged or excessively worn, they must be replaced to assure proper meter operation and prevent further damage.

XI. REASSEMBLY is necessary at this point. Before reassembling any parts, make certain that each is cleaned of any dust or dirt and properly lubricated. Costs for replacement parts not covered by warranty are available from current parts and price

list. If it is determined that the meter should be returned for repair, please notify McCrometer prior to shipment. Each meter must be properly packaged to prevent damage to the meter in shipment.

1. **VERTICAL SHAFT ASSEMBLY (#23)** should be inserted gently into the separator (#18) through the opening in the top of the meter head (#13). Take care not to chip the ceramic magnet when replacing the shaft. Replace and secure two screws and shakeproof washers (#29 & #30) that hold the vertical shaft upper bearing support plate (#28) in place. Turn the top of the vertical shaft (#23) to check for any bind or drag. Should any bind or drag be apparent, it can usually be corrected by adjusting the vertical shaft collar and bearing assembly (#26). Loosen the set screw (#41) in the side of the assembly (#26) and slide the shaft (#23) downward until it rests against the bottom of the separator (#18), then lift up about 1/64". Tighten set screw (#41).
2. **TOTALIZER DRIVE MAGNET ASSEMBLY (#12)** should be checked again to make certain it is properly set to drive the totalizer (#4). (See step VI, 4.)
3. **TOTALIZER BASE CUP (#5)** can be placed back in the totalizer bonnet (#1) on the totalizer assembly (#4) after the desiccant capsule and the base cup o-ring (#6) are replaced. Be sure o-ring (#6) is on base cup (#5) properly.
4. **TOTALIZER BONNET ASSEMBLY (#1)** should be cleaned and replaced on the meter head (#13). Bonnet o-ring (#2) should be replaced and the new o-ring (#2) covered with a thin coat of silicone grease. Secure four screws (#3).
- *5. **CHANGE GEARS (#11 & #12)** should be checked again to make certain they are in proper alignment (see step VII-3.)
- *6. **INDICATOR-TOTALIZER mechanism (#5)** should be placed on the meter head (#13) with the mounting screws and shakeproof washers (#6 & #7). The B-driven gear (#12) should be set in the cutout in the meter head (#13). Do not tighten mounting screws (#6) until the gear mesh has been properly adjusted. To adjust gear mesh slide the indicator-totalizer mechanism (#5) towards the A-drive gear (#11) until the unit stops because of full gear mesh. Now back off the indicator-totalizer mechanism 1/64" and tighten mounting screws (#6).
- *7. **INDICATOR BONNET ASSEMBLY (#1)** should be cleaned and replaced over the indicator-totalizer unit (#5) after the desiccant bag is replaced. Secure four screws (#2) beneath the bonnet lid. Do not overtighten the mounting screws (#2) as this will result in damage to the screw o-rings (#3).
8. **PROPELLER ASSEMBLY (#31)** should be dipped in water to lubricate the propeller ceramic sleeve bearing (#33). Spin the propeller (#32) gently to make certain the meter operates smoothly and no bind or drag is apparent.

*For Indicator-Totalizer Models Only

9. **METER HEAD O-RING OR FLAT GASKET (#44)** should be inspected for any sign of damage. O-ring should be covered with a thin coat of silicone grease. The meter can now be installed in the service line. When replacing the meter on the line, make certain that the top of the meter tube or tee is smooth and free of any foreign material. Make certain that no foreign materials are attached to the inside of the service line pipe, as any flow disturbance or obstruction may affect the accuracy of the meter.

NOTES

4"-20" VERTICAL UPFLOW METERS MODELS VF27, VF29 PARTS LIST

NO.	QTY.	PART NUMBER	DESCRIPTION
A	1	7-VF27-*	VERTICAL UPFLOW METER HEAD ASSEMBLY
B	1	7-VF29-*	VERTICAL UPFLOW METER HEAD ASSEMBLY
	1	6-4260	TOTALIZER & BONNET COMPLETE (ITEMS 1 THRU 6)
	1	7-4260	TOTALIZER & BONNET COMPLETE (ITEMS 1 THRU 8)
1	1	5-4316	TOTALIZER BONNET ASSEMBLY
	1	1-4317-2	TOTALIZER BONNET LID (W/PIN)
2	1	1-1551-38	O-RING, TOTALIZER BONNET
3	4	1-1115-10-10	SCREW, BONNET MOUNTING (ea.)
4	1	5-4260	TOTALIZER ASSEMBLY (SPECIFY DIAL)
	1	2-2310-‡	DIAL (AS SPECIFIED)
	2	1-1118-3-3	SCREW, DIAL MOUNTING (ea.)
	1	1-4276	SWEEP HAND
5	1	1-4318	BASE CUP, TOTALIZER
6	1	1-1551-17	O-RING, BASE CUP
7	1	3-4045	A-GEAR ASSEMBLY (SPECIFY # OF TEETH)
8	1	3-4045	B-GEAR ASSEMBLY (SPECIFY # OF TEETH)
12	1	3-2324	DRIVE MAGNET ASSEMBLY, TOTALIZER
13A	1	3-2401-*	METER HEAD (VF27 VERTICAL UPFLOW METER)
13A	1	2-2401-04	METER HEAD (VF27, 4" ONLY) VERTICAL UPFLOW METER
13B	1	2-2103	METER HEAD (VF29 VERTICAL TEE METER)
13C	1	2-2105	METER HEAD (VF29, 4" ONLY) VERTICAL TEE METER
14	1	3-2390-*	DROP PIPE ASSEMBLY
15	8	1-1251-6-16	BOLT, DROP PIPE TOP FLANGE (ea.)
16	-	1-1806	VIBRA-TITE, DROP PIPE BOLT
17	1	1-1551-25	O-RING, DROP PIPE TOP FLANGE
18	1	4-2455-2	SEPARATOR/ SUPPORT SPINDLE ASSEMBLY
20	1	1-1508-20	CERAMIC SLEEVE FOR SUPPORT SPINDLE
21	4	1-1103-8-7	SCREW, SEPARATOR/SPINDLE MOUNTING (ea.)
22	1	1-1551-24	O-RING, SEPARATOR
23A	1	3-2392-*	VERTICAL SHAFT & DRIVEN MAGNET ASSEMBLY FOR VF27-*
23B	1	3-4114-*	VERTICAL SHAFT & DRIVEN MAGNET ASSEMBLY VF29 4" ONLY
24	1	3-2306	SHAFT GUIDE & LOWER BEARING ASSEMBLY
25	1	3-2175	SET COLLAR ASSEMBLY
26	1	3-2352	VERTICAL SHAFT COLLAR & BEARING ASSEMBLY
27	2	1-1113-6-4	SCREW, VERTICAL SHAFT COLLAR & BEARING MTG. (ea.)
28	1	2-2305	VERTICAL SHAFT UPPER SUPPORT PLATE
29	2	1-1113-10-6	SCREW, SUPPORT PLATE MOUNTING (ea.)
30	2	1-1302-10	SHAKEPROOF WASHER, SUPPORT PLT. MTG. SCREW (ea.)
31	1	5-2425-‡-PT	PROPELLER ASSEMBLY (ITEMS 32 THRU 42)
32	1	3-2425-‡-P	PROPELLER
33	1	2-2426-P-1	CERAMIC BEARING CARTRIDGE
34	1	1-1116-8-6	SCREW, CERAMIC BEARING CARTRIDGE MTG.
35	1	2-1601-2	DRIVE MAGNET
36	1	1-2428-‡	DRIVE MAGNET RETAINING PLATE
37	2	1-1115-3-18	SCREW, DRIVE MAGNET RETAINING PLATE (ea.)
38	1	3-2402-2	REV. THRUST BEARING CART. ASSEM. (ITEMS 39 & 40)
39	1	1-1101-8-5	SET SCREW, THRUST BEARING
40	2	1-1509-1	CERAMIC THRUST BEARING, 3/16" DIA. (ea.)
41	1	1-1125-6	SET SCREW, NYLON POINT (ea.)
42	1	3-2356	THRUST BEARING CARTRIDGE ASSEMBLY
43	2	1-1510-1	CERAMIC THRUST BEARING, 1/4" DIA. (ea.)
44A	1	1-1557-*	GASKET, METER HEAD (VF27 VERTICAL UPFLOW METER)
44B	1	1-1552-‡	O-RING, METER HEAD (VF29 VERTICAL TEE METER)
45A	set	1-1253-‡	BOLTS, METER HEAD (VF27 VERTICAL UPFLOW METER)
45B	8	1-1251-8-24	BOLTS, METER HEAD (ea.) (VF29 VERTICAL TEE METER)
46A	set	1-1301-‡	WASHERS, METER HEAD BOLTS (VF27 METER)
46B	8	1-1301-14	WASHERS, METER HEAD BOLTS (ea.) (VF29 METER)
-	1	1-1607-5	DESICCANT CAPSULE

* INSERT METER SIZE TO COMPLETE PART NUMBER
(USE -04 FOR 4"; -06 FOR 6"; -08 FOR 8"; ETC.)

‡ CONSULT FACTORY

CONSULT FACTORY FOR PRICING.

When ordering replacement parts, please specify:

• Meter Size • Meter Model • Meter Serial Number

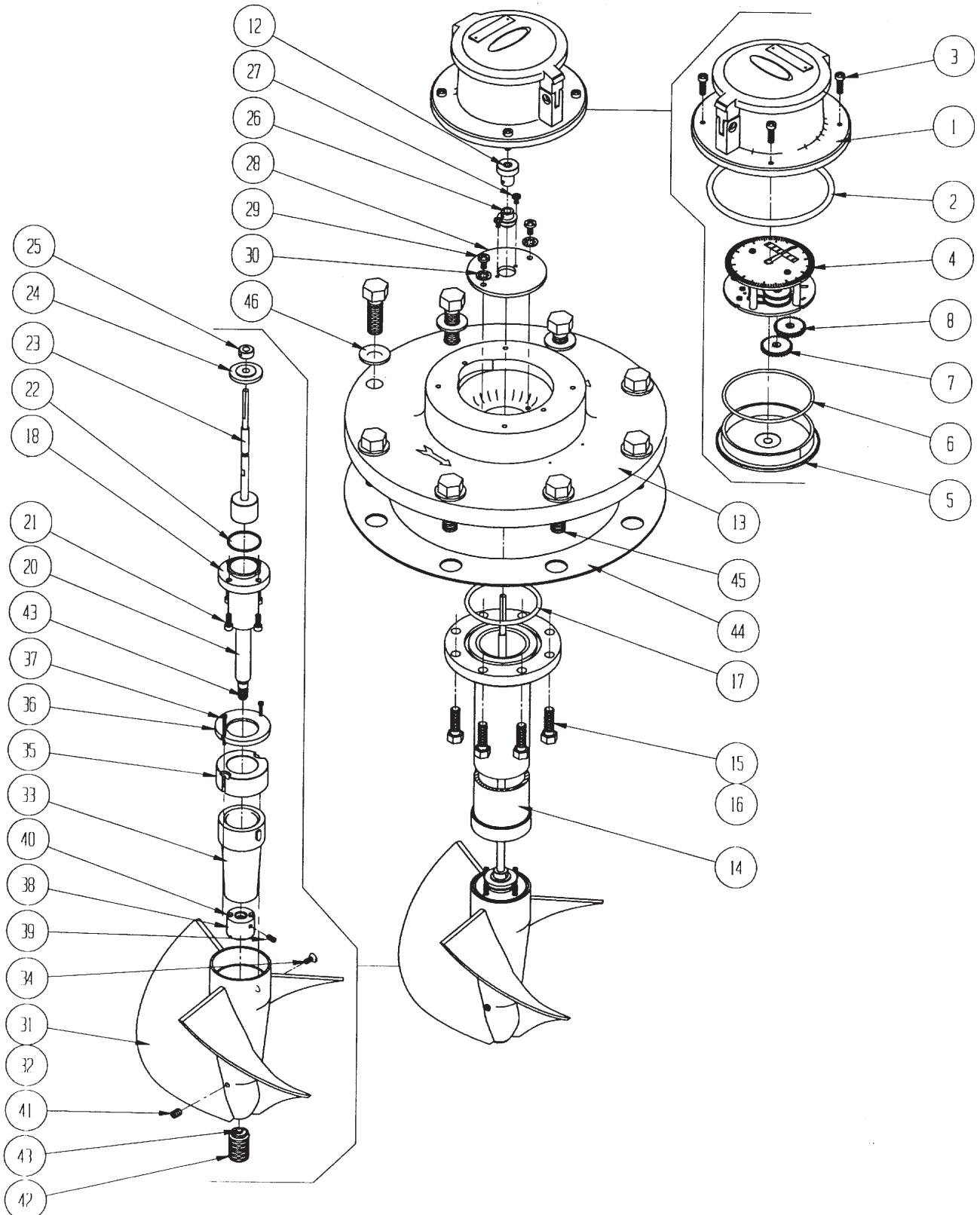
4"-20" VERTICAL UPFLOW METERS

MODELS VF27, VF29

*STANDARD TOTALIZER ASSEMBLY

*CERAMIC BEARING CARTRIDGE PROPELLER

*ONE PIECE SEPARATOR/SPINDLE AND THREADED REVERSE THRUST BEARING CARTRIDGE



4"-20" VERTICAL UPFLOW METERS MODELS VF28, VF30 PARTS LIST

NO.	QTY.	PART NUMBER	DESCRIPTION
A	1	7-VF28-*	VERTICAL UPFLOW METER HEAD ASSEMBLY
B	1	7-VF30-*	VERTICAL UPFLOW METER HEAD ASSEMBLY
1	1	5-4337	INDICATOR-TOTALIZER BONNET ASSEM. (ITEMS 2 THRU 5)
	1	1-4338	INDICATOR-TOTALIZER BONNET LID (W/PIN)
2	4	1-1115-10-56H	SCREW, BONNET MOUNTING (ea.)
3	4	1-1551-6	O-RING, BONNET MOUNTING SCREW (ea.)
4	1	1-1551-49	O-RING, BONNET
5	1	5-CN06-2	INDICATOR-TOTALIZER MECHANISM (SPECIFY DIAL)
	1	1-4013-‡	DIAL (AS SPECIFIED)
	2	1-1118-3-3	SCREW, DIAL MOUNTING (ea.)
	1	1-4321	INDICATOR HAND
	1	1-4326	TEST HAND
6	2	1-1113-10-6	SCREW, INDICATOR-TOTALIZER MOUNTING (ea.)
7	2	1-1302-10	SHAKEPROOF WASHER, IND.-TOT. MOUNTING SCREW (ea.)
11A	1	3-2176	A-GEAR ASSEMBLY (5-15 TEETH) (SPECIFY # OF TEETH)
11B	1	3-2157	A-GEAR ASSEMBLY (16-54 TEETH) (SPECIFY # OF TEETH)
12	1	3-2163	B-GEAR ASSEMBLY (SPECIFY # OF TEETH)
13A	1	3-2401-*	METER HEAD (VF28 VERTICAL UPFLOW METER)
13B	1	2-2401-04	METER HEAD (VF28, 4" ONLY) VERTICAL UPFLOW METER
13C	1	2-2103	METER HEAD (VF30 VERTICAL TEE METER)
13D	1	2-2105	METER HEAD (VF30, 4" ONLY) VERTICAL TEE METER
14	1	3-2390-*	DROP PIPE ASSEMBLY
15	8	1-1251-5-16	BOLT, DROP PIPE TOP FLANGE (ea.)
16	-	1-1806	VIBRA-TITE, DROP PIPE BOLT
17	1	1-1551-25	O-RING, DROP PIPE TOP FLANGE
18	1	4-2455-2	SEPARATOR/SUPPORT SPINDLE ASSEM. (ITEMS 19 & 20)
20	1	1-1508-20	CERAMIC SLEEVE FOR SUPPORT SPINDLE
21	4	1-1103-8-7	SCREW, SEPARATOR/SPINDLE MOUNTING (ea.)
22	1	1-1551-24	O-RING, SEPARATOR & SPINDLE
23A	1	3-2392-*	VERTICAL SHAFT & DRIVEN MAGNET ASSEMBLY VF28-*
23B	1	3-4114-*	VERTICAL SHAFT & DRIVEN MAGNET ASSEMBLY VF30 4" ONLY
24	1	3-2306	SHAFT GUIDE & LOWER BEARING ASSEMBLY
25	1	3-2175	SET COLLAR ASSEMBLY
26	1	3-2352	VERTICAL SHAFT COLLAR & BEARING ASSEMBLY (ea.)
27	2	1-1113-6-4	SCREW, VERTICAL SHAFT COLLAR & BEARING MTG. (ea.)
28	1	2-2305	VERTICAL SHAFT UPPER SUPPORT PLATE
29	2	1-1113-10-6	SCREW, SUPPORT PLATE MOUNTING (ea.)
30	2	1-1302-10	SHAKEPROOF WASHER, SUPPORT PLT. MTG. SCREW (ea.)
31	1	5-2425-‡-PT	PROPELLER ASSEMBLY (ITEMS 32 THRU 42)
32	1	2-2425-‡-P	PROPELLER
33	1	2-2426-P-1	CERAMIC BEARING CARTRIDGE
34	1	1-1116-8-6	SCREW, CERAMIC BEARING CARTRIDGE MTG.
35	1	2-1601-2	DRIVE MAGNET
36	1	1-2428-P	DRIVE MAGNET RETAINING PLATE
37	2	1-1115-3-18	SCREW, DRIVE MAGNET RETAINING PLATE (ea.)
38	1	3-2402-2	REV. THRUST BEARING CART. ASSEM. (ITEMS 39 & 40)
39	1	1-1101-8-5	SET SCREW, THRUST BEARING
40	2	1-1509-1	CERAMIC THRUST BEARING, 3/16" DIA. (ea.)
41	1	1-1125-6	SET SCREW, NYLON POINT (ea.)
42	1	3-2356	THRUST BEARING CARTRIDGE ASSEMBLY (ITEM 43)
43	2	1-1510-1	CERAMIC THRUST BEARING, 1/4" DIA. (ea.)
44A	1	1-1557-*	GASKET, METER HEAD (VF28 VERTICAL UPFLOW METER)
44B	1	1-1552-2	O-RING, METER HEAD (VF30 VERTICAL TEE METER)
45A	set	1-1253-‡	BOLTS, METER HEAD (VF28 VERTICAL UPFLOW METER)
45B	8	1-1251-8-24	BOLTS, METER HEAD (ea.) (VF30 VERTICAL TEE METER)
46A	set	1-1301-‡	WASHERS, METER HEAD BOLTS (VF28 METER)
46B	8	1-1301-14	WASHERS, METER HEAD BOLTS (ea.) (VF30 METER)
-	1	10015-00	DESICCANT BAG

* INSERT METER SIZE TO COMPLETE PART NUMBER
(USE -04 FOR 4"; -06 FOR 6"; -08 FOR 8"; ETC.)

‡ CONSULT FACTORY

CONSULT FACTORY FOR PRICING.

When ordering replacement parts, please specify:

• Meter Size • Meter Model • Meter Serial Number

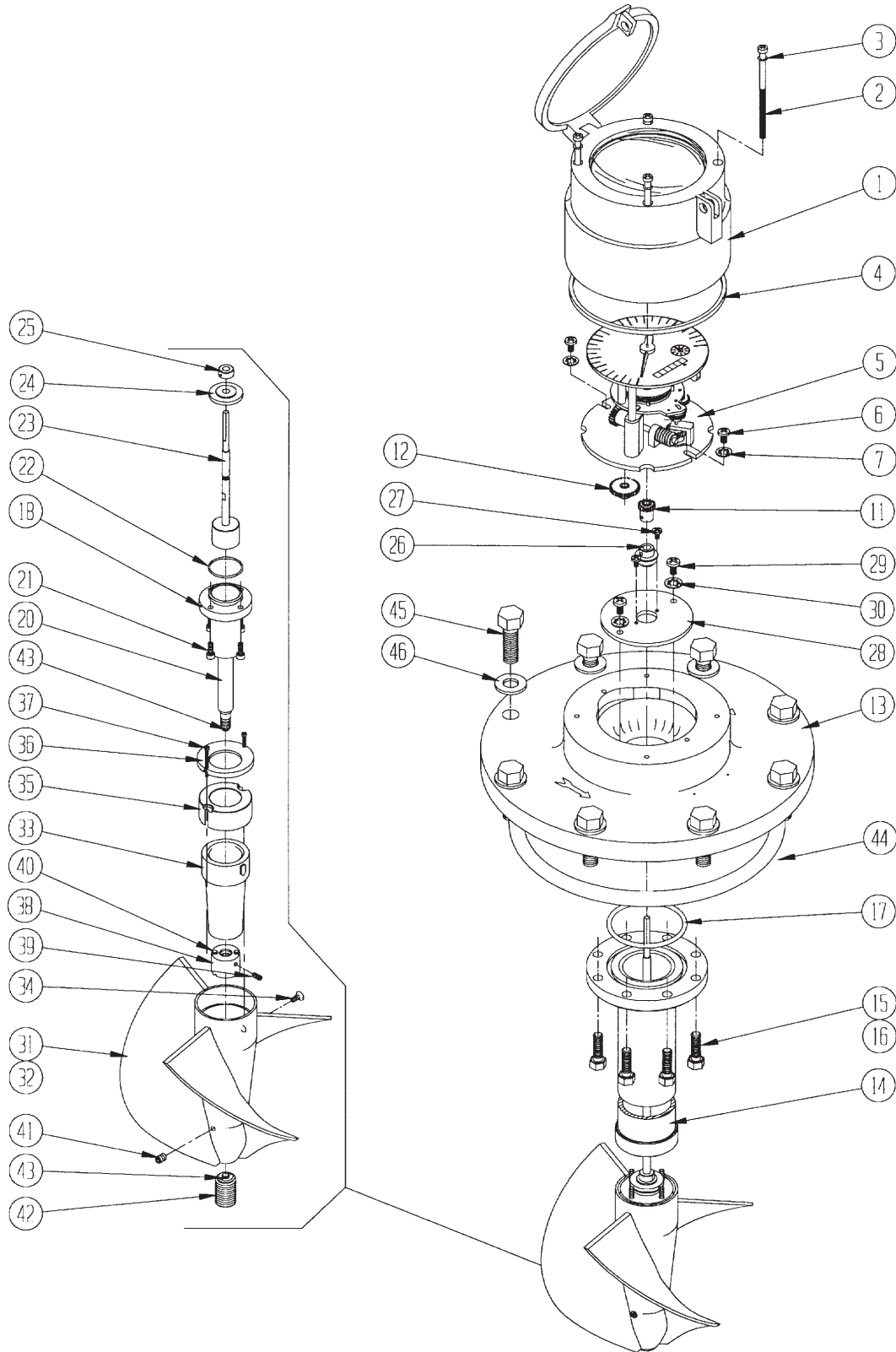
4"-20" VERTICAL UPFLOW METERS

MODELS VF28, VF30

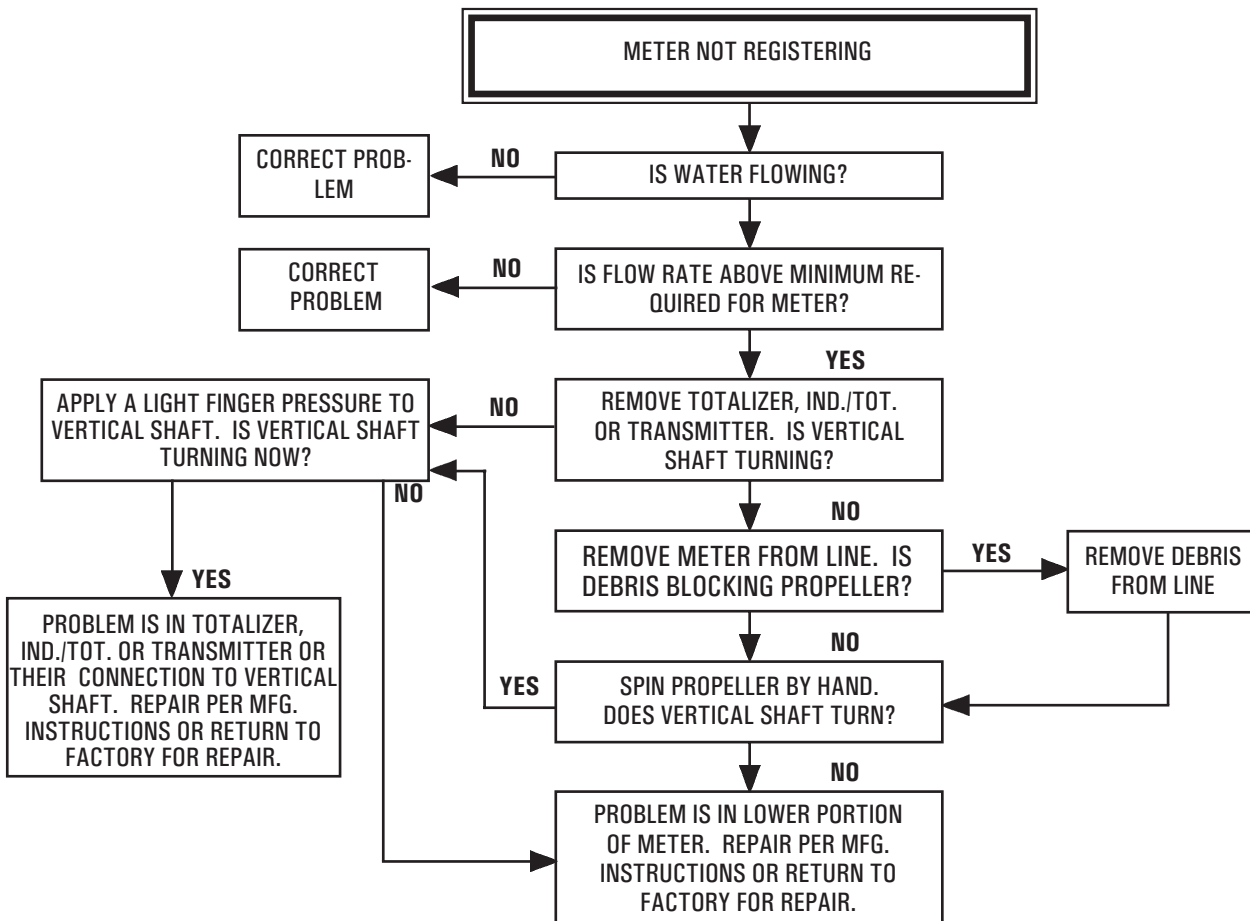
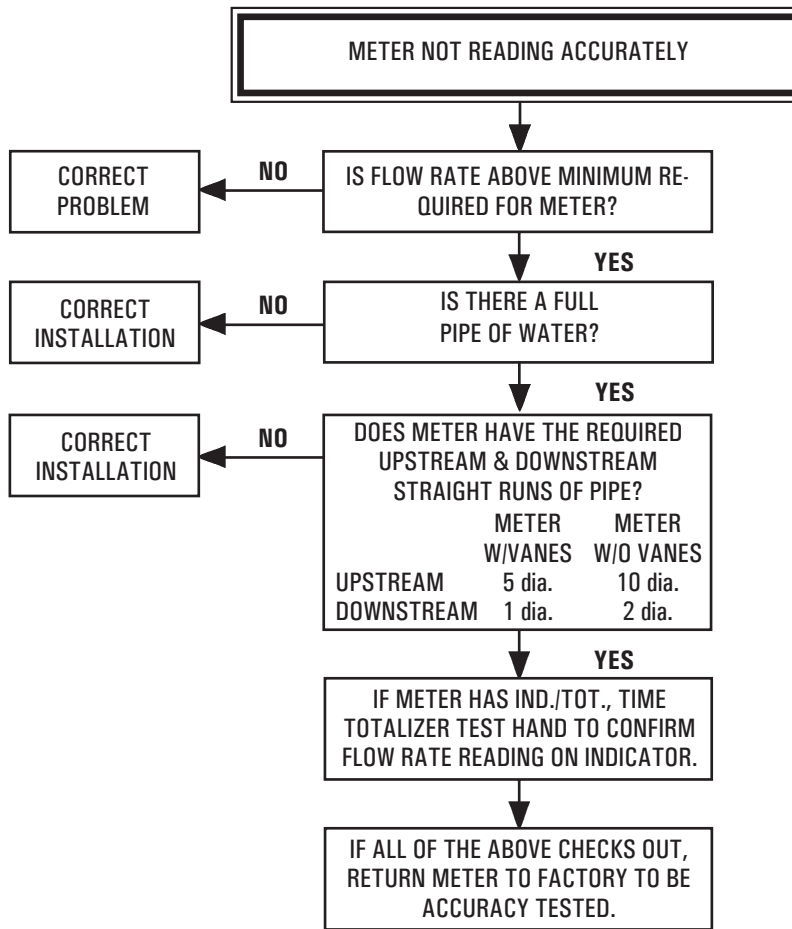
*MODEL CN06-2 INDICATOR-TOTALIZER ASSEMBLY

*CERAMIC BEARING CARTRIDGE PROPELLER

*ONE PIECE SEPARATOR/SPINDLE AND THREADED REVERSE THRUST BEARING CARTRIDGE



PROPELLER METER TROUBLESHOOTING FLOW CHART



WARNING:

BEFORE REMOVING THE METER HEAD FROM THE PIPELINE THE WATER MUST BE TURNED OFF AND PRESSURE MUST BE RELIEVED FROM THE LINE. SERIOUS INJURY CAN RESULT FROM REMOVING A METER HEAD UNDER PRESSURE.