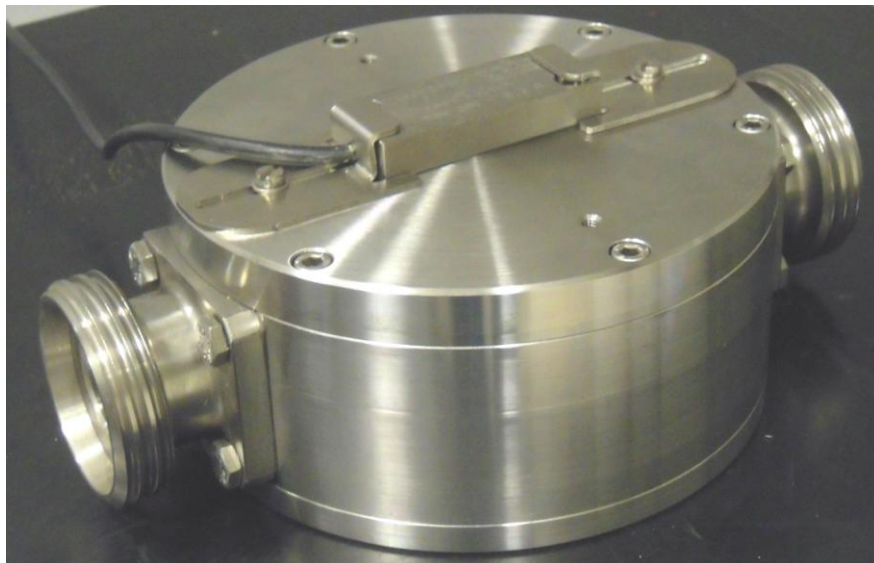


K
D
N

*INSTALLATION, OPERATION
AND MAINTENANCE MANUAL
OF METERS.*

KDN



CRAIND
I M P I A N T I

® **CRAIND IMPIANTI s.r.l.**
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INTRODUCTION

A semi positive displacement nutantic disc flow transducer type KDN is situated in the liquid line, which detects the transfer of very small volumes of liquid. A magnetically operated switch converts the disc movement into pulses which are transferred along twin screened wire to remote electronic counting/control devices.

INSTALLATION

Location of Meter.

It is recommended that the meter be fitted into a horizontal section of the pipe run wherever possible. With the meter fitted into vertical pipe, errors in registration can be possibly caused by the settling of the disc due to gravity within the measuring chamber after shut of the movement of the disc after metering has ceased can trigger the reed switch and create an extra pulse. The meter should be fitted upstream of any flow control device, thus preventing free discharge from the meter and reducing the risk of draining and vapour locking causing erroneous reading on start up.

Preparation of Pipework

Before Petting the meter into position, the following points should be checked:

- That unions or flanges of correct size and spacification have been fitted to the pipeline in the required position. Joints requiring the application of heat must never be made with the meter in position.
- That the distance between unions or flanges is correct for the meter to be fitted.
- That the two unions or flanges are in line, and all local pipework is unstrained and correctly supported. This is particulary significant when using meters constructed in PVC.
- The pipeline must be purged of a!! rust, swarf welding slag jointing compound by flushing or similar means before putting the meter into service.



Installation.

- As the meter **are not bi-directional** respected direction arrows and the meter may be fitted directly in to the system.
- Excessive tightening of the reed switch securing screws should be guarded against at all times.
- Meters should not be fitted into systems which are subjected to any form of excessive hydraulic shock, or damage to the meter internals may result.

Electrical Connections.

Electrical connections between the meter and the indicating of control instrument shall be made using screened cable. The reed switch is protected in a inox case. The switch withstand temperature up 100°C and is completely waterproofed. The maximum recommended lenght of cable is 100 metres.

contatt type	N.O.
VA max.	10
A max.	0,2
V max.	30
T max.	100 °C

The fife expectancy of a reed switch is dipendent on the application specific loading and can be as hight as 107 to 108 operations.



MAINTENANCE

Dismantling.

The meter has been designed to require the minimum of maintenance. However, general planned maintenance is recommended and the following procedures may be adopted for maintenance purposes:

- Isolate the meter from its source of supply and if possible drain it.
- Remove the meter from the pipeline by undoing the union nuts and springing the pipework slightly to disconnect the connections or with flanged version of the meter by undoing flanged bolts and sliding the meter from between the system flanges.
- Empty liquid from the meter.
- Under the socked head cap screws from one end of the meter and remove the end and the top plates. Some resistance will be felt when removing the plate as an "O" ring seal is located on the end plate spigot.
- Remove the disc chamber.
- Remove disc by gently lifting from the chamber.
- Remove barrier plate.

Having completely dismantled meter all component may be thoroughly washed in warm soapy water. On no account should abrasive materials be used to clean the meter parts as meter accuracy relies upon the maintenance of controlled clearances.

Inspection and Assembly

- Inspect the barrier plate for wear, which if present will manifest itself in the form of "waisting" or hollowing of the barrier surface. Any reduction in barrier thickness will permit the passage of un measuring liquid. if in doubt a new barrier should be obtained and fitted.
- Examine the disc chamber plates for wear and scouring, the latter will only occur in extreme cases when large abrasive



particles have passed through the measuring chamber. Any mild signs of scouring may be polished out with meta! polish and soft cloth. Chamber displaying heavy signs of wear should be replaced and the cause of scouring ascertained and a suitable strainer fitted up-stream of the meter before re-installation of the meter in the pipework system.

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Examine the meter end plates and in particular the "O" ring seal. It is recommended that new "O" rings be fitted on assembly as used rings tend to take a permanent set and leakage could occur due to the "rings" inability to reseal (This is particularly with PTFE "O" rings). If an "O" ring has been damaged during dismantling it must be replaced.

- Inspect the disc for signs of wear and ensure that no particles are embedded in the disc wall.
- Replace the piston into chamber, feeding the can slot over the barrier plate and check that for all positions of the piston within the chamber, the amount of "side play" or free movement is not excessive and that the piston rotates within the chamber.

To check that small meters are operating correctly after assembly, place meter to lips and blow into the connection. The rotation of the disc within the chamber should be immediately apparent.

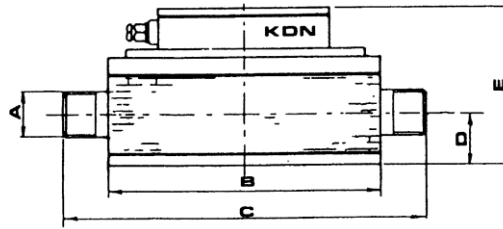
Commissioning

Immediately after installation or after long periods of shut down the meter must be slowly purged of air. This is most effectively achieved by allowing the liquid to be metered to flow through the meter at a slowly increasing rate until the maximum throughput is achieved.

The meter is now ready to be put into service and will accurately measure all liquid passing through it, provided it is not operate outside the limits.

METER DIMENSIONS





CONTATORE METER	DIMENSIONI DIMENSIONS (mm)				PESO WEIGHT (Kg)
MODELLO/TYPE A	B	C	D	E	AISI
KDN Ø ½" - ¾"	118	175	20	82	5,5
KDN Ø 1"	148	197	34	103	9,5
KDN Ø 1 ½"	176	248	37	125	14
KDN Ø 2"	242	320	40	130	23
KDN Ø 3"	300	375	62	162	52

Pag.4

METER	DIMENSIONS (mm)				WEIGHT (Kg)
MODELLO/ME A	B	C	D	E	MSI
KDN Ø ½" - W'	118	175	20	82	5,5
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MODEL	FLOW RATE	PULSES	MSI 316	
			T ma: °C	P ma: bar
	Min Mai Uh	cc x imp		
KDN 1"	200 6.000	135	80	10
KDN 1'/"	900 12.000	220	80	10
KDN 2"	2.000 22.000	500	80	10



KDN 3"	3.500 35.000	780	80	10
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The number of omitted pulses is the and it refers to water.

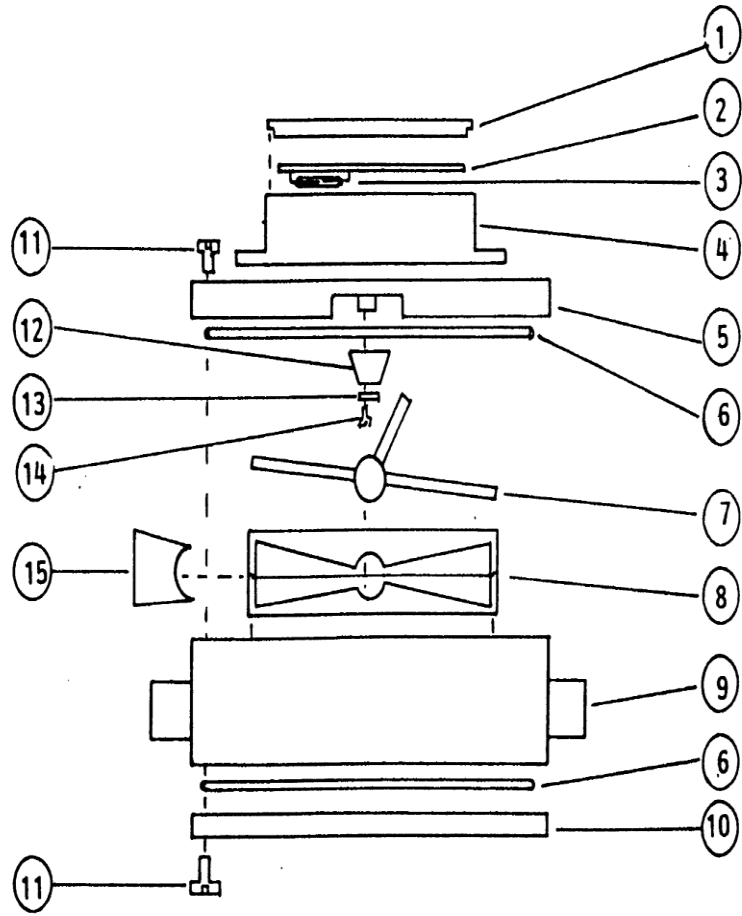
DISCS MATERIALS : PTFE- MSI 316 O.R MATERIALS
VITON - FIFE - EPDM – NTIRILE

EXPLODED VIEW OF METER PARTS



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- | | |
|------------------------------|-------------------|
| 1) Cover | 9) Body |
| 2) Head | 10) Bottom Flange |
| 3) REED | 11) Bodyscrew |
| 4) Printed circuit with Reed | 12) Roller |
| 5) Top flange | 13) Gasket |
| 6) 'O' Ring | 14) Roller screw |
| 7) Disc complete | 15) Barrier |
| 8) Measuring | |

N . 1 disc complete , N . 1 Reed switchN , N . 1 roller,
N.1 barrier plate, N.2 O”rings seals

ASSOCIATED EQUIPMENT

Filters

In order to guard against seizure of the meter working parts, due to the ingress of oversized particles too large to be swept through the meter, it is recommended that filter be fitted upstream of the meter to filter out particles in excess of 0,1 mm in diameter. For further information do not hesitate to contact our Technical Department in CRAIND IMPIANTI

Valves

Remotely controlled valves, when fitted, should be of the fast closing type to minimize the effect of over-run at the end of a batch delivery. Generally, pneumatically operated valves are recommended. Our Technical Department in CRAIND IMPIANTI will be pleased to offer a suitably specified valve to suit your requirements.



Pumps

Use pumps free from pulsation (volumetric types). Positive displacement pumps inherently produce pulsations which can cause measurement errors.

Air Separation

If there is danger of entrained air being present in the liquid then a suitable de-aeration device must be installed upstream of the meter otherwise air will be measured as liquid.

CLEANING IN SITE

When a system is to be cleaned in place, sterilized or purged without removal of the meter from the line, it is advisable to provide the meter with a by-pass to prevent damage occurring to the internal working parts unless the following recommendations can be adhered to:

- Liquid detergent temperatures in excess of the maximum stated in the meter specification should not be used for cleaning purposes or distortion and expansion of the disc will result, causing the piston to "bind" within the chamber.
- Check that cleaning fluid will not attack or corrode the material of the meter.
- Sterilization with steam is not admitted. If it is necessary the pressure of the in-coming steam to the meter must be carefully controlled so that the velocity of the disc within the chamber is kept below 75% of its maximum velocity when metering with liquids. the same must be done when purging the system with air.
- After steam sterilization or air purging during re-charging of the pipe with fluid, care must be taken to avoid impact of high speed fluid re-entering the empty measuring chamber.



ATTENTION: • It is **very dangerous to empty the meter** by using air, nitrogen or steam. If it is necessary be very **careful during the operation. emptying will inevitably damage the meter.**

FAULT FINDING

If the metering system is not functioning correctly:

- First check the operation of the indicator or control instrument correctly:
 - Disconnect the signal input connections to the instrument and simulate the pulsations of the reed switch at the meter by intermittently short circuiting the input signal terminals at the rear of the instrument. If the appropriate pulses are not received on the indicating or control equipment, then these units must be checked as described in the appropriate instruction manual. If pulses are received and indicated then re-connect a signal input cable.
- Check that the interconnection cable is satisfactory by:
 - Disconnecting the other end of the cable from the reed switch connection. Short circuit the conductors and see whether or not pulses are received on the control equipment at the other end of signal cable. If pulses are not received then there is a break somewhere in the interconnection cable and it should be replaced. If pulses are received re-connect the cable.
- Check the operation of the reed switch by:
 - Remove the head assembly from the meter and connect a battery ohm meter. Pass a normal magnet across the bottom of the reed switch and if the resistance changes from at test I mega ohm to less than I ohm due to the movement of the magnet, the reed switch is operative.
- To check that the disc is rotating whilst liquid is flowing:
 - 1) Hold an ordinary magnetic compass near the reed switch recess in the meter body. If the needle oscillates wildly the disc is moving.
 - 2) A visual check can be made on the quantity of liquid flowing through the system with the control device fully open. If the flow rate is drastically below that normally delivered the disc could be stationary and helping to produce a prohibitive head loss across the meter.
 - 3) Adjust the system flow rate to its maximum and check for a slight vibration of the meter



4) caused by a rotating disc.

If all the previously mentioned checks prove satisfactory then the meter must be removed from the line and dismantled and inspected as detailed in maintenance sections.

- Possible causes of imperfect operation are:
 - 1) A fractured disc or balls allowing the passing of unmeasured fluid.
 - 2) Resistance to motion of the disc due to:
 - Particles of foreign matter embedded in the working surfaces of the meter.
 - A "gummed up" meter due to ineffective temperature control or settling out during "shut'off".
 - A distorted disc due to operation at temperatures in excess of the maximum permitted.
 - Worn barrier or roller allowing the disc to "cock" during operation are not in the right position.
 - Bent disc pegs due to excessive pressure drop across the meter



**ATEX: ADDICT
ISTRUZIONI AND
IN FORMATION**

This addict istructions and informations completate the istruction's manual and the standard's service.

1- What operating

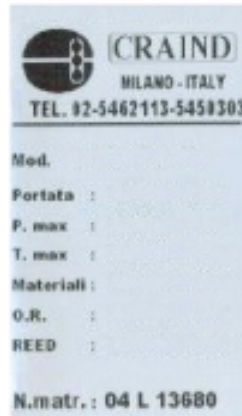
features have

Your equipment?

2- 1.1 - Marking

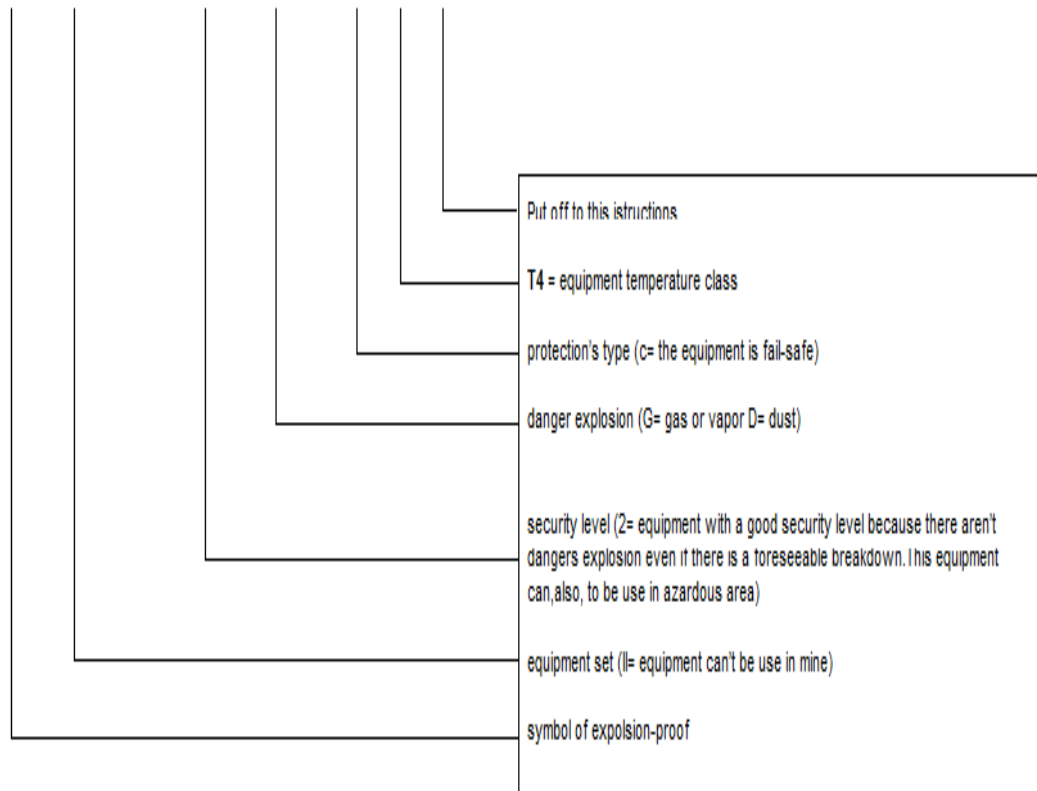
and esplications.

All of Yours equipment have this label







II 2 GD c T4 X



2- THE DATAS THAT YOU MUST CONTROL DURING THE OPERATION DANGER EXPLOSION!

The observance of the instruction contained in this chapter can be produce severe damages to the people, or it can be cause the death! This instructions don't prescind from an appropriate utilization of the equipment and from the istructions on the generic instruction's manual.



	ATEX: ADDICT ISTRUZIONI AND IN FORMATION	
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Note 1: refer to the individual instructions for the other accessory united to the meter.

Note 2: all meters must be assembled with this follow addict precaution



REPLACEMENT REED KDN



OLD SERIES

NEW SERIES

