Operation and Service Manual

for HERMetic UTImeter Rtex

Connectors Q1 and Q2

Portable Electronic Restricted Gauging Device
Ullage - **T**emperature - **I**nterface detector

Note : before using the instrument please read this book.

EN ISO 9001:2000
DNV
Certified Company

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2. General information

2.1 Shipment note

The following parts should be included in the shipment:

- 1 instrument fitted out with one battery in the display;
- 1 set of 4 Allen keys: 1.5, 2, 2.5 and 3 mm;
- 1 Operation and Service Manual.

2.2 Initial inspection

Check the contents of the shipment for completeness and note whether any damage has occurred during transport. Carry out the “Initial test before installing the instrument” to verify the good functioning. If the contents are incomplete, or if there is a damage, not use the device. A claim should be filled with the carrier immediately, and Enraf Tanksystem SA Sales or Service organization should be notified in order to facilitate the repair or replacement of the instrument.

2.3 Documentation discrepancies

The design of the instrument is subject to continuous development and improvement. Consequently, the instrument may incorporate minor changes in detail from the information contained in the manual.

2.4 Warranty

Two (2) years after installation but max. 30 months after delivery ex works except batteries.

The Vendor undertakes to remedy any defect resulting from faulty design materials or workmanship. The Vendor's obligation is limited to the repair or replacement of such defective parts by his own plant or one of his authorized service stations. The Purchaser shall bear the cost and risk of transportation of defective parts and repaired parts supplied in replacement of such defective parts.

When returned to Enraf Tanksystem SA or any of its agreed Service Stations equipment must be contamination-free. If it is determined that the Purchasers equipment is contaminated, it will be returned to the Purchaser at the Purchasers expense. Contaminated equipment will not be repaired, replaced, or covered under any warranty until such time that the said equipment is decontaminated by the Purchaser.

The Purchaser shall notify by fax, telex or in writing of any defect immediately upon discovery, specifying the nature of the defect and/or the extend of the damage caused thereby.

Where no other conditions have been negotiated between the Vendor and the Purchaser "General Conditions 188" of United Nations shall apply.

This instrument has been certified as Intrinsically Safe Instrumentation for only those classes or categories of hazardous areas stated on the instrument label, bearing the mark of the applicable approval authority. No other usage is authorized.

Unauthorized repair or component replacement by the Purchaser will void this guarantee and may impair the intrinsic safety of the instrument. In particular it is not allowed to repair electronic circuits.

In no event shall Enraf Tanksystem SA be liable for indirect, incidental or consequential loss or damage or failure of any kind connected with the use if its products or failure of its products to function or operate properly.

Enraf Tanksystem SA do not assume the indemnification for any accident or damage caused by the operation of its product and the warranty is limited to the replacement of parts or complete goods.

2.5 Certification

Enraf Tanksystem SA is an ISO 9001 certified company by Det Norske Veritas Certification GmbH.

The equipment has been approved for the electrical intrinsic safety by the following authorities :

ATEX
II 1 G EEx ia IIB T4 / Tamb. 50 °C

Factory Mutual (FM Approvals)
CL I, DIV 1, GP C&D, T4 Tamb. 50 °C and
CL I, ZN 0, AEx ia IIB T4 Tamb. 50 °C

The equipment has been approved as oil/water interface detector according to MARPOL Resolution MEPC.5(XIII) of 13 June 1980 by National Maritime Authorities and/or Classification Societies.

If you need a copy of any of these certificates please contact:

Enraf Tanksystem SA
Rue de l'industrie 2
1630 Bulle, SWITZERLAND

Telephone : +41-26-91 91 500
Telefax : +41-26-91 91 505
Web site : www.tanksystem.com
E-mail : info@tanksystem.com

2.6 Spare parts

When ordering spares identify the spare part by TS number and description. Refer to section “Drawings”.

Some spares might be repairable; in this case send the part(s) to any authorised service center or to the factory.

In case of urgency, complete replacement units can be made available. Contact the factory or nearest Service Station for details.

2.7 Service and Repair

The customer is responsible for any freight and customs clearance charges. If units are sent on a "freight collect" the charges will be invoiced to the customer.

When returning units or parts for repair to the factory please fill out a service request form (see next page). The serial number (letter "R" followed by 5 digits) is printed on the identification plate as shown on the Figure 6-1.

When returned to Enraf Tanksystem SA equipment must be contamination-free. If it is determined that the customers equipment is contaminated, it will be returned to the customer at the customers expense. Contaminated equipment will not be repaired until such time that the customer decontaminates the said equipment.

Service Request

Customer's address: .....
.....
.....
.....
.....

Telephone: .....

E-mail: .....

Fax: .....

Type of unit or part: .....
.....

Serial number: .....

Short description of trouble: .....
.....
.....
.....

Do you want a quotation before repair is started:.....yes / no.....

Repaired unit has to be returned to the following address:
.....
.....
.....
.....
.....

3. Worldwide Service Stations network

The updated list can be found on our website www.enraftanksystem.com

COUNTRY	ADDRESS	TELEPHONE/FAX/E-MAIL
SWITZERLAND	ENRAF TANKSYSTEM SA 2, rue de l'Industrie CH-1630 BULLE	Tel : +41-26-91 91 500 Fax : +41-26-91 91 505 info@tanksystem.com
CANADA	PYLON ATLANTIC A Div. Of Pylon Electronics Inc. 31 Trider Crescent., DARTMOUTH, N.S. B3B 1V6	Tel : +1-902-4683344 Fax : +1-902-4681203 halifax_csr@pylonelectronics.com
CHINA	HUA HAI EQUIPMENT & ENGINEERING CO LTD Factory 7, Lane 1365, East Kang Qiao Road Kang Qiao Industrial Zone, Pu Dong SHANGHAI, P.C. 201315	Tel : +86-21-68183183 Fax : +86-21-68183115 huahaish@huahaiee.com
GREECE	SPANMARIN 86, Filonos Street GR-185 36 PIRAEUS	Tel : +30-210-4294498 Fax : +30-210-4294495 spanmarin@ath.forthnet.gr
JAPAN	DAIWA HANBAI CORPORATION LTD 10-31, Mitejima 2-Chome, Nishiyodogawa-ku OSAKA 555-0012	Tel : +81-6-64714701 Fax : +81-6-64729008 daiwa471@silver.ocn.ne.jp
KOREA	World Ocean CO., LTD Hang-Woon Building 1168-11, Cho Ryang 3 Dong Dong-Ku PUSAN	Tel : +82-51-462-2554/5 Fax : +82-51-462-0468 marine@worldocean.co.kr
MEXICO	URBAN S.A. DE C.V. Ave. Ejército Mexicano 1902 Col. Loma del Gallo 89460 CD. MADERO, TAMPS. MEXICO	Tel : +52-833-2170190 Fax : +52-833-2170190 E-mail : urbansa@prodigy.net.mx
NETHERLANDS	B.V. TECHNISCH BUREAU UITTENBOGAART Brugwachter 13 NL-3034 KD ROTTERDAM	Tel : +31-10-4114614 Fax : +31-10-4141004 info@tbu.nl

The updated list can be found on our website www.enraftanksystem.com

COUNTRY	ADDRESS	TELEPHONE/FAX/E-MAIL
PORTUGAL	CONTROLIS Soc. Com. Equipamentos de Controlo, Lda. Rua Conceiçao Sameiro Antunes, 26E P-2800 COVA DA PIEDADE	Tel : +351-21-2740606 Fax : +351-21-2740897 controlis@netc.pt
RUSSIA	NPP "GERDA" Vilisa Latsisa str. 17 Building 1 125480 MOSCOW	Tel : +7-495-7558845 Fax : +7-495-7558846 info@gerda.ru
SINGAPORE	HUBBELL INT'L (1976) PTE LTD 322 Thomson Road SINGAPORE 307665	Tel : +65-6-2557281 Tel : +65-6-2550464 Fax : +65-6-2532098 hubbell@mbox2.singnet.com.sg
SPAIN	E.N.I. Electronica y Neumatica Industrial, S.A. C/Jon Arrospide, 20 (Int.) 48014 BILBAO	Tel : +34-94-4746263 Fax : +34-94-4745868 eni.tecnica@eni.es
SWEDEN	INSTRUMENTKONTROLL Lars Petersson AB Varholmsgatan 1 414 74 GÖTEBORG	Tel : +46-31-240510 Tel : +46-31-240525 Fax : +46-31-243710 Info@instrumentkontroll.se
UNITED ARAB EMIRATES	MARITRONICS TRADING L.L.C. P.O. Box 6488 Shed # 72, Jadaf Ship Docking Yard DUBAI	Tel : +971-4-3247500 Fax :+971-4-3242500 maritron@emirates.net.ae
UNITED KINGDOM	ENERGY MARINE (INTERNATIONAL) LTD. 12 Clipstone Brook Industrial Estate Cherrycourt Way LEIGHTON BUZZARD, BEDS LU7 8TX	Tel : +44-1525-851234 Fax :+44-1525-852345 info@engmar.com
U.S.A/ TEXAS	HERMETIC, INC. 4522 Center Street DEER PARK, TX 77536	Tel: +1-281-930 1777 Fax: +1-281-930 1222 Toll free call in the USA: 1-800-900 1778 info@hermeticinc.com

4. Recommendation for safe use

1. This Operation and Service Manual is a guide in order to help the user to operate the instrument to our best knowledge.

2. Nevertheless the maker disclaims all responsibility and liability for damage resulting from the use of the equipment regardless of the cause of the damage.

3. **Attention is drawn to the possible hazard due to electrostatic charges which may be present in the tank.** This may happen in particular with static accumulator liquids, i.e. liquids which have low conductivity of 50 picoSiemens/metre (pS/m) or less.

4. **It is very important that the instrument is grounded to the tank before the probe is introduced into the tank and remains grounded until after complete withdrawal from the tank.**

   4.1. If the instrument is installed with the quick connect coupler, grounding is effected through the quick connect coupler and the mating nipple of the valve provided that these parts are kept clean and free from corrosion in order to guarantee electrical conductivity. If a grease is used for this purpose, it must be one which contains graphite.

   4.2. If the instrument is not connected to the mating deck valve, the instrument has to be also earthed by means of the grounding cable and clamp.

5. **It is anticipated that the user will have specific operating methods laid down to ensure safety when using this type of apparatus. In this case the user's instructions shall be strictly observed.**

6. **In the absence of such instructions the following should be noted:**

   6.1. If a metal sounding pipe is fitted beneath the deck valve or tank is inerted, then ullaging, etc. is permissible at any time with no restriction.

   6.2. If there is no sounding tube or tank is not inerted, the following precautions shall be taken:

      6.2.1. If the cargo is not a static accumulator liquid, i.e. its conductivity is more than 50 pS/m, then ullaging is permitted provided that the instrument is properly grounded and earthed before the probe is inserted into the tank and remains earthed until the probe has been removed from the tank.

      6.2.2. If the cargo is a static accumulator liquid, i.e. its conductivity is less than 50 pS/m, then ullaging is permitted provided that:

         6.2.2.1. The instrument is properly grounded and earthed before the probe is inserted into the tank and remains earthed until the probe has been removed from the tank.
         6.2.2.2. The apparatus is not introduced into a tank until at least 30 minutes have elapsed after completion of any loading operation or stopping the injection of inert gas.

   6.3. For further guidance refer to International Safety Guide for Oil Tankers and Terminals (ISGOTT), ISBN 1 85609 081 7, Fith Edition 2006, or consult the appropriate Legislative Authority for the installation.

7. **Warning: change of battery must be carried out in safe area only (non flammable atmosphere).**

5. Functions - Key Features

This HERMetic instrument is a portable multiple functions gauging system that is designed to perform under restricted conditions in a single operation 3 measurements:

a) **U**llage (outage). Optionally innage is available[1].

b) Oil/water **I**nterface level.

Tape resolution: 1 mm (*1/16* ")
Tape accuracy: ±3.2 mm for 30 m
(±*1/8* " approx. for 100 feet)
Ullage/interface detection accuracy:
±2 mm (±*0.08* " approx.)
Minimum detectable tank bottom interface or liquid level: 4 mm (0.16" approx.).

c) **T**emperature by continuous reading at any level.

Ambient temperature range: -20°C to 50°C
(-4°F to 122°F)

Sensor measurement range:-40°C to 90°C
(-40°F to 194°F)

Resolution: 0.01° or 0.1°, selectable

Accuracy over calibration range: ±0.1°C (0°C to 70°C); ±0.2°F (32°F to 158 °F)

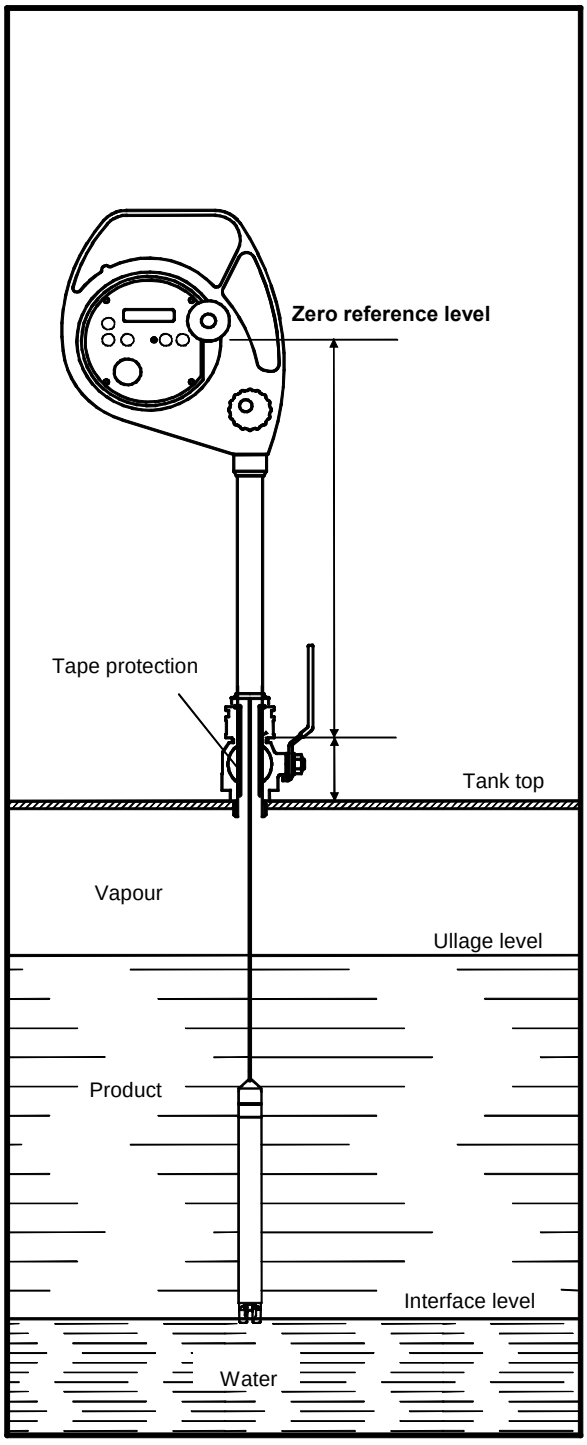
Temperature reading: °C or °F, selectable.

This HERMetic device meets the requirements of API MPMS Chapter 7 2001, table 3, ISO 4268 and IP PMM Part IV.

Thanks to the small diameter of the sensing probe this instrument can be used with valves of diameters down to 25 mm (1") only.

A tape protection tube prevents closing the valve on the tape through inadvertence.

[1] An additional device, usable with 2" valves only, can be provided that allows **Reference Height** and **Innage** measurement. Available on "Visc" models.



6. Description

6.1 General

Each HERMetic instrument is **individually identified** with a 6 digits serial number starting with the letter R, example R10058. This serial number is printed on the identification plate as shown on Figure 6-1.

The HERMetic instrument is fitted with an **ULTRA** sensing probe.

The unit emits control beep, continuous beep and intermittent beep.

When the sensing probe is surrounded by air, a control beep occurs every 2 sec.

When the sensing probe is in contact with any petroleum product, the beep is continuous.

When the sensing probe is in contact with water the beep is intermittent.

Control beep	• •
Continuous beep	• • • • • • • • • •
Intermittent beep	• • • • • •

A light signal (LED) can also be activated that blinks at the same frequency as the buzzer tones. This can be useful in noisy environments or at night.

A backlight can be used at night to light up the display.

The HERMetic instrument is powered by a 9 Volt battery stored in the electronic terminal named instrument unit. Current consumption is very low, ensuring long operation without battery replacement. **A continuous tone means that the battery needs replacement**. If the battery power is too low, it is no more possible to read the temperature.

Maintenance is easy because design is modular and allows quick exchange of parts.

See also Figure 6-2 to get to know the equipment.

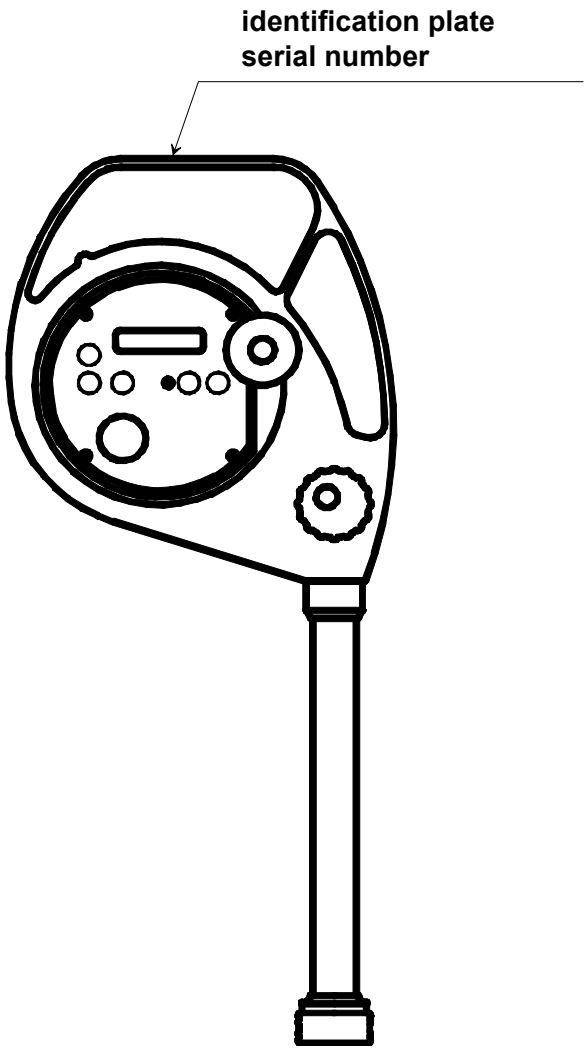


Figure 6-1

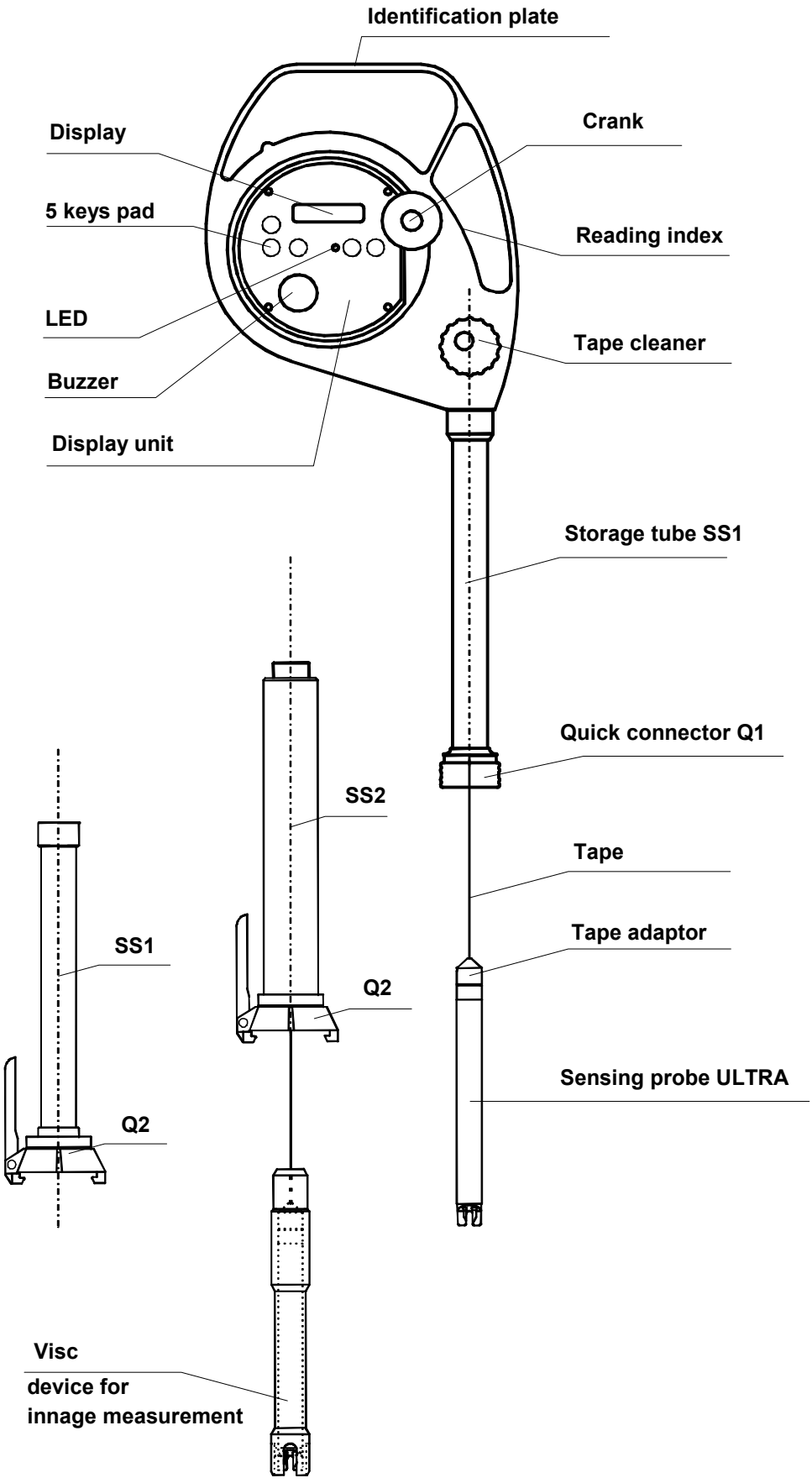

Identification plate
Display
Crank
5 keys pad
Reading index
LED
Tape cleaner
Buzzer
Display unit
Storage tube SS1
Quick connector Q1
SS2
Tape
Tape adaptor
SS1
Q2
Q2
Sensing probe ULTRA
Visc
device for
innage measurement

Figure 6-2

6.2 ULTRA sensing probe

6.2.1 Introduction

The ULTRA sensing probe consists of a stainless steel tube terminated by a high-tech plastic head which cannot be removed from the tube. The sensing probe includes an ultrasonic liquid level sensor, a temperature sensor and a conductivity electrode. The sensitivity for ullage and interface measurement is not adjustable. The temperature measurement is calibrated at the factory and does not require subsequent adjustment.

6.2.2 Ullage detection

The ullage detector consists of two piezoceramic plates and electronic circuits. When the sensor head is immersed in a non-conductive liquid (oil or petroleum), the emitted ultrasonic signal is detected by the receiver, coded and sent to the instrument unit which activates the buzzer with the continuous beep.

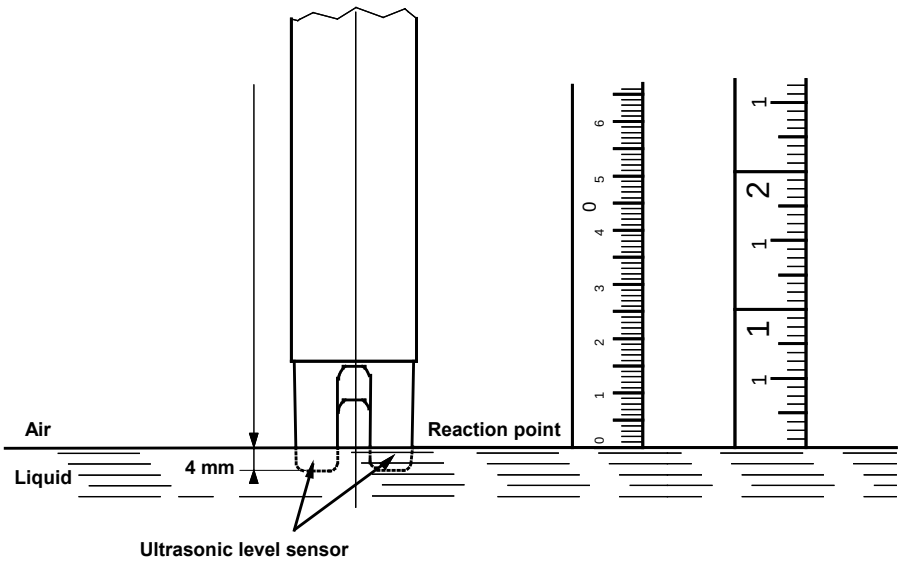


Figure 6-3

The reaction point is located 4 mm (5/32") from the sensor bottom and identical with the zero-point of the tape graduation.

6.2.3 Interface detection

The principle consists of a conductivity measurement between an active electrode and a grounded electrode. When the liquid is conductive (as water), the ullage sensor detects the presence of the liquid as well and the conductivity electrodes and associated electronic circuits modulate the coded signal to generate the intermittent beep.

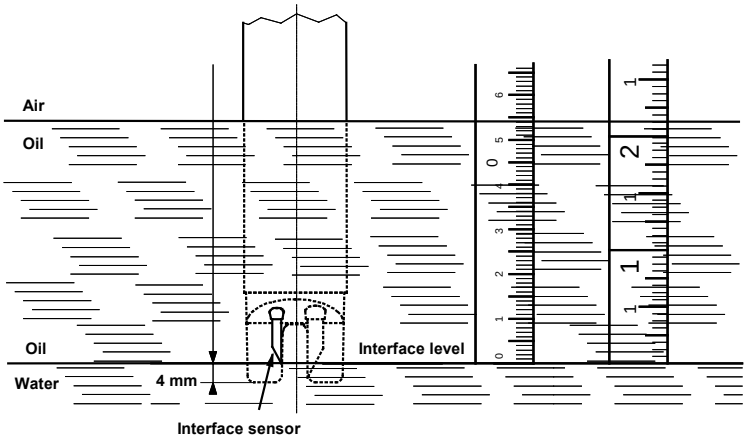


Figure 6-4

The reaction point is located 4 mm (5/32") from the sensor bottom and identical with the zero-point of the tape graduation.

6.2.4 Temperature measurement

The sensing element is a Platinum Resistance Temperature Detector (RTD) element. The element is located in the temperature electrode, which is filled in with a heat transfer compound paste to reduce the response time.
The RTD element signal is digitized, and then all errors (offset, non-linearity and drift) are corrected and compensated by the micro-controller located in the sensor probe. The RTD element characteristics are stored in the sensor memory and are dedicated to one sensor. For this reason, changing a sensor does not require a new calibration.
All data are serialised and sent by the micro-controller to the Display Unit.
Temperature settings (resolution, scale) are easy to select by pressing the 5-key control panel.

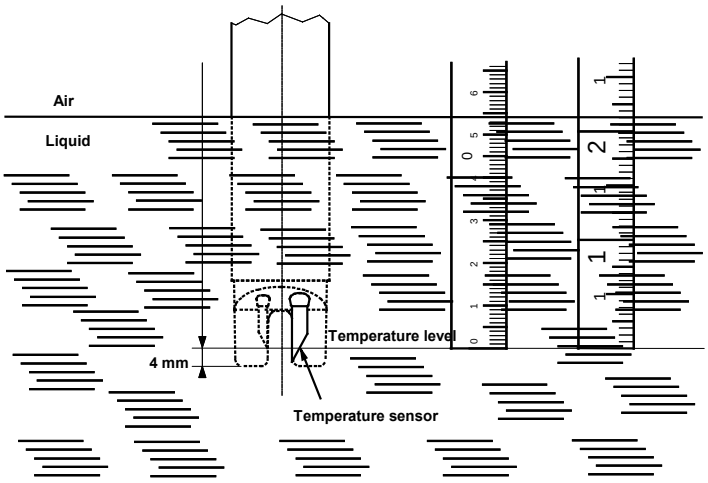


Figure 6-5

The reaction point is located 4 mm (5/32") from the sensor bottom and identical with the zero-point of the tape graduation.

6.3 Tape

The ETFE (TEFZEL) coated tape provides 3 main functions :

- It holds the sensing probe.
- It is graduated and therefore makes it possible to determine the distance between the reaction point and the reading index. If the reading index is set up at the zero ullage level, the reading of the tape is identical to the ullage.
- It contains 2 wires for transmitting the signal and the power between the display unit and the probe. The steel tape itself is used as a grounding wire between the sensing probe tube and the display unit.

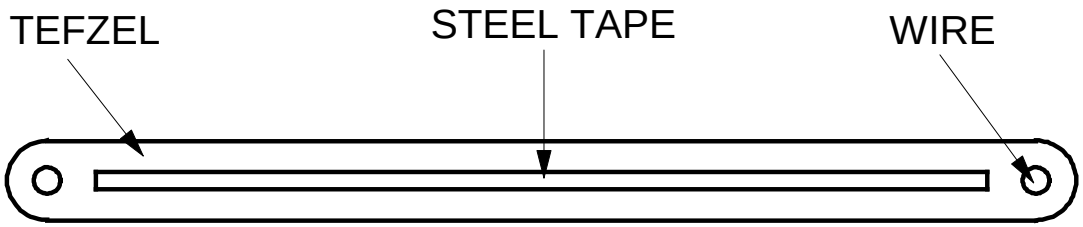


Figure 6-6

The standard graduation is a double side type that shows the metric graduation on one side and the inch one on the other side. The tape is mounted on the equipment according to the need.

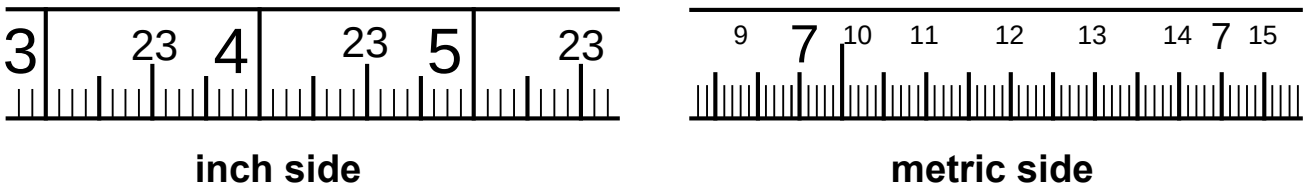


Figure 6-7

6.4 Tape protection

The tape protection tube is a mechanical safety device which prevents the valve from being closed as long as the sensing probe is inside the tank. When the sensing probe is lowered the protection tube will follow the sensing probe by gravity until the tube is retained by a ring located inside the coupler. In that position the protection tube prevents closing the valve. When the tape is wound up the protection tube will stay in position until it is pushed up by the sensing probe. Before instrument is used check that the protection tube is moving freely. For cleaning purposes the protection tube is slotted.

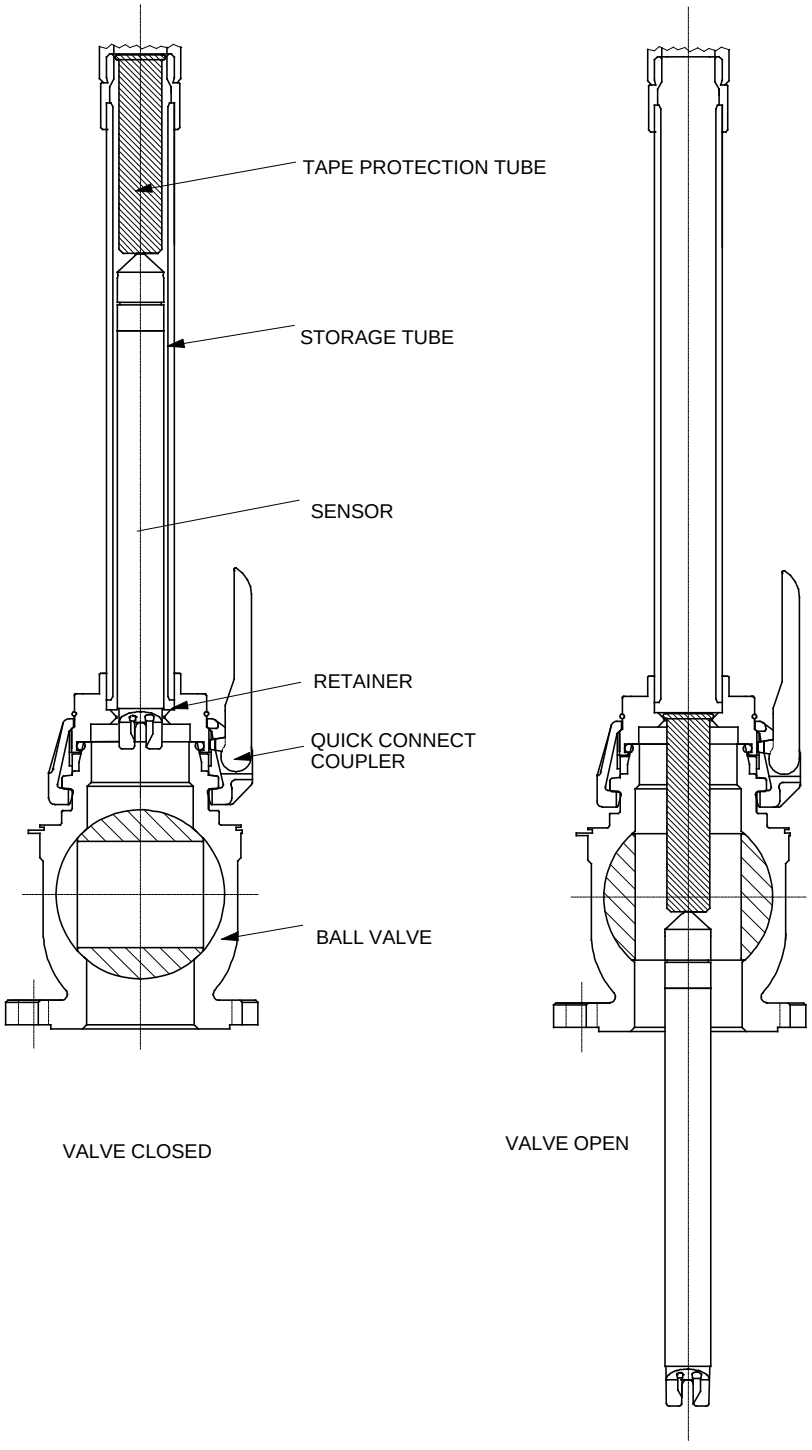


Figure 6-8

6.5 Reading index

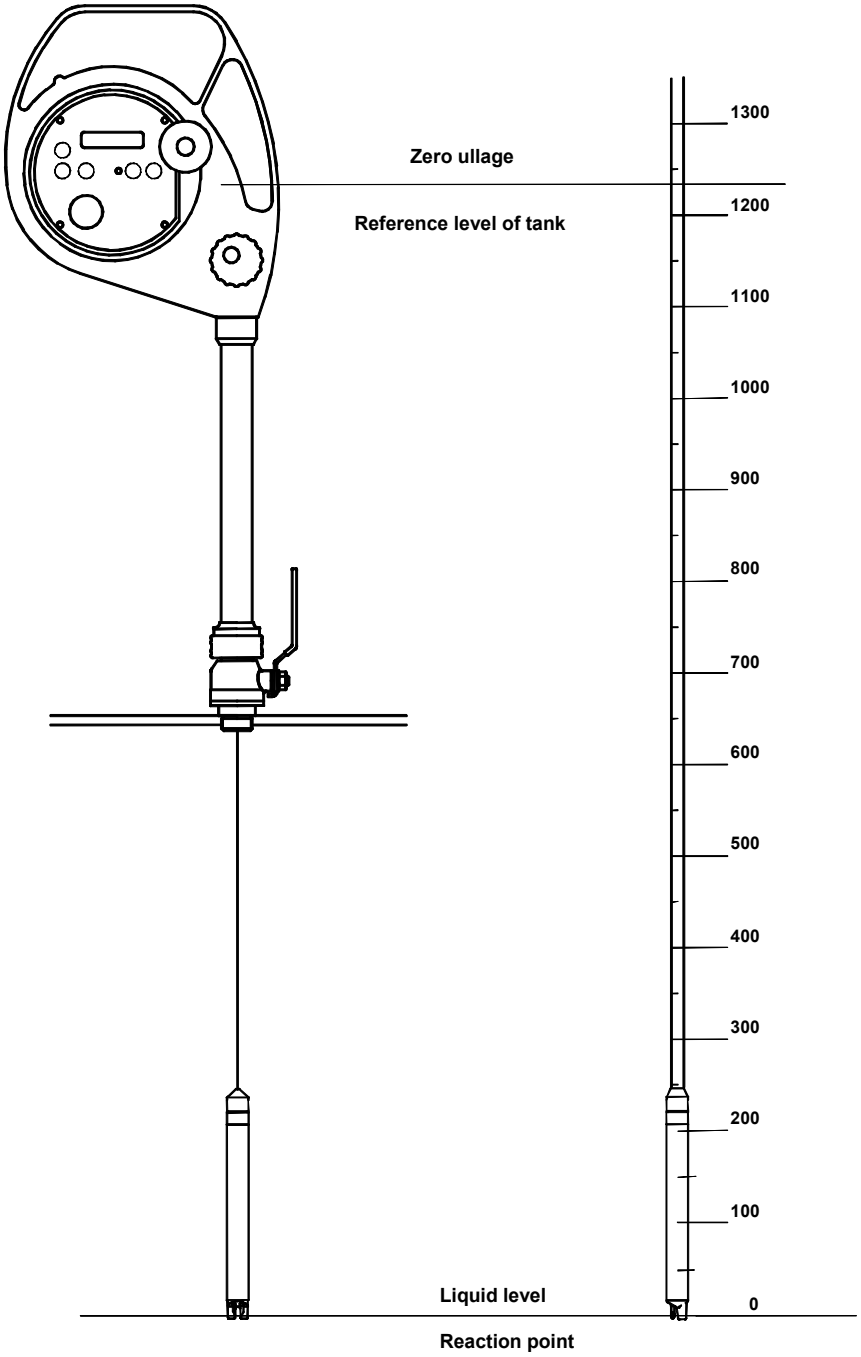


Figure 6-9

The tape reading at the height of the reading index of the instrument is indicating the distance between the reaction point and the reading index.
If the instrument is installed in such a way that the reading index is at the same level as the zero-ullage reference level the reading of the tape corresponds to the ullage providing the reaction point of the sensing probe is positioned at the liquid level.

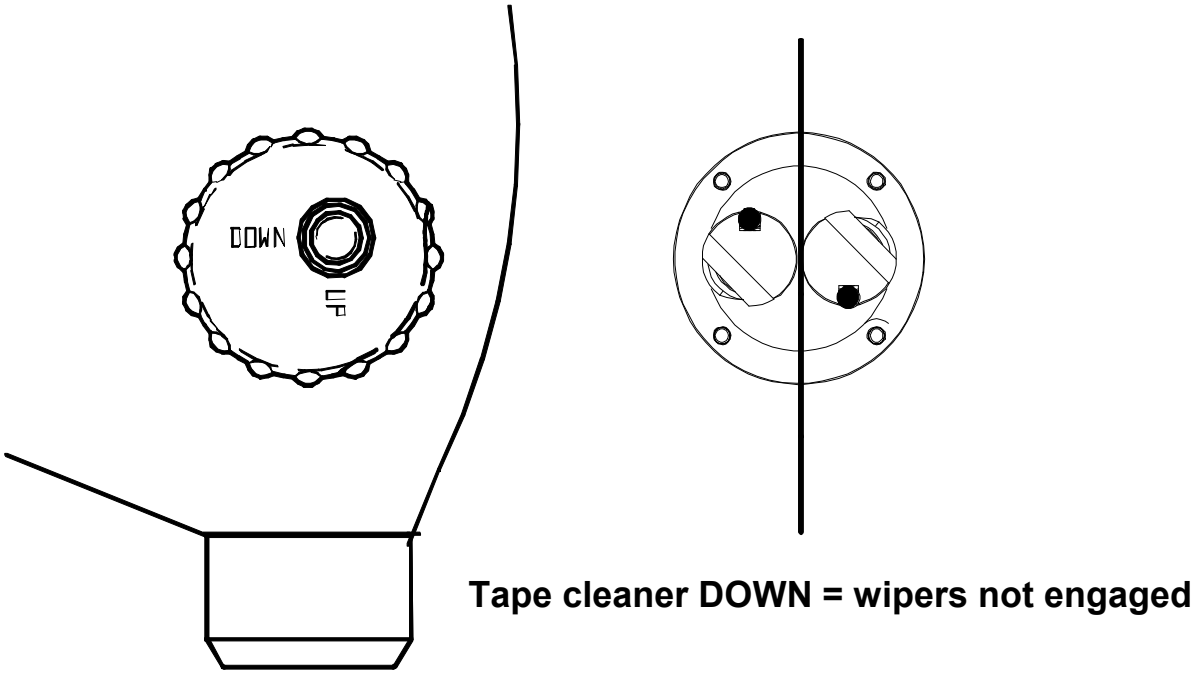
If the reading index is positioned below or above the reference level a positive or negative correction of the tape reading is necessary.
See also chapter 7 “Examples of installation of the gauging system”.

6.6 Tape cleaner

This HERMetic equipment is fitted with a tape cleaner that helps draining the liquid back to the tank when rewinding the tape. It is very easy to operate:

- position "DOWN": the wipers are not working, the tape is free;
- position "UP": the wipers are cleaning the tape.

Refer to Figure 6-10.



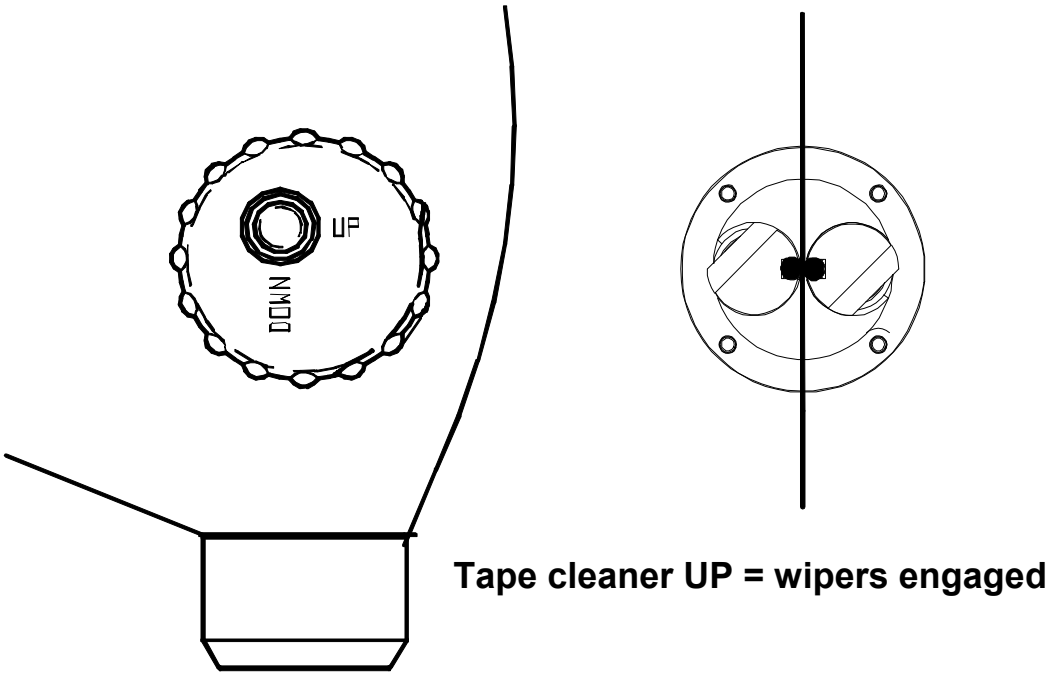


Figure 6-10

6.7 Additional Load (option)

An additional load (see Figure 6-2) on the sensing probe can be provided for one of the following reasons. This option is available on UTImeter Rtex Visc equipped with the storage tube Q2 (2") and needs valves of at least 2" size.

6.7.1 Viscous liquids (> 800 Cst)

For gauging viscous liquids the load can help the sensing probe in penetrating the liquid and in keeping the tape straight.

6.7.2 Reference height and innage

For measuring the reference height of a tank and innages the load allows the sensing probe to touch the dip/datum plate.

6.8 Others

The tape is coiled on a reel which holds also the electronic box and the display unit.

The reel is assembled to the electronic box and can be locked at discrete positions by means of a stopping mechanism in the crank. Pull the crank to free the stopping mechanism.

The external reel flange and the frame are made in aluminium coated with polyamid PA 11 (RILSAN).

The storage tube is threaded to the frame.

The storage tube is equipped with a quick-connector which fits on the HERMetic valves.

7. Examples of installation of the gauging system

7.1 General

The gauging system consists of the HERMetic instrument and the associated HERMetic valve. Two types of connector can be provided as shown on Figure 7-1.

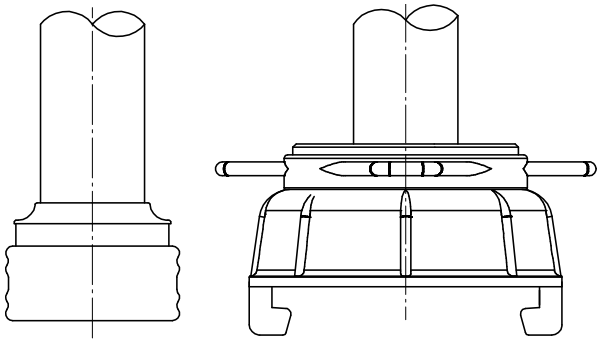


Figure 7-1

The following sections, respectively 7.2, 7.3 for connector Q2 and 7.4, 7.5 for connector Q1, describe 2 examples for installing the valves and adjusting the height of the gauging system.

The valves should be installed in such a way that the zero-ullage level coincides with the reading index level, so that no correction would be necessary. For achieving this it may be necessary to install an adjusting pipe between the deck and the valve.

If the valves are installed directly on deck or if for any reason the level of the reading index is below or above the zero-ullage level, then a correction table should be used.

There should be no internal tank structure between the valve outlet and the tank bottom such that will impede the path of the equipment into the tank.

All valves shall be installed at the same level.

Small systematic level error can be corrected by adjusting the reading index accordingly.

When designing the gauging port and to avoid damaging the tape during rewinding it is advised to chamfer or to grind all sharp edges (on pipes, flanges, etc.) that could damage the tape when operating the gauge.

7.2 Example of installation on a pipe, connector Q2

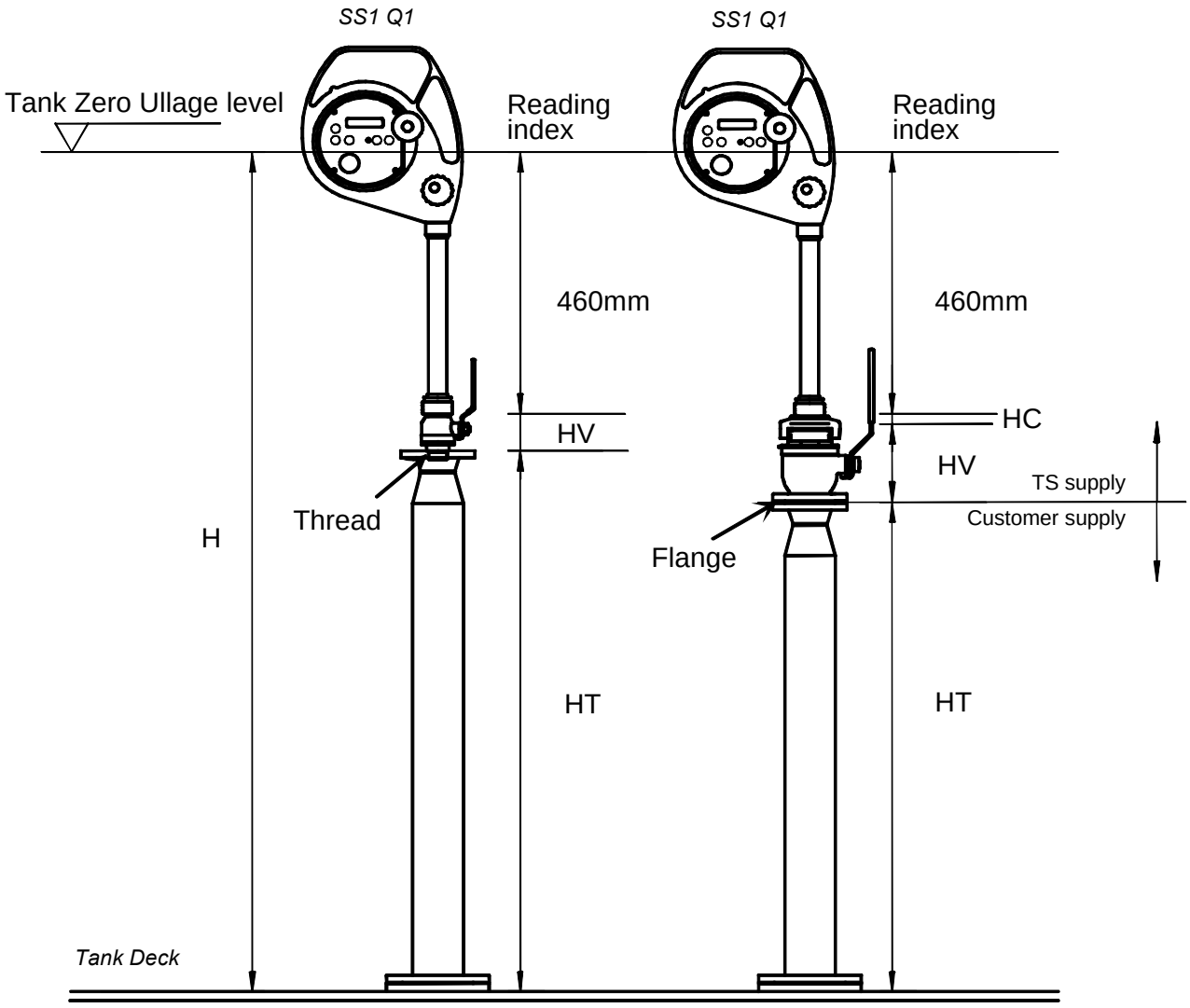


Figure 7-2

Valve designation	C.2-SS; C.2-SS-W; C.2-SS-BL; C.2-SS-SEC
Bottom connection	thread or flange
Boring	2”
*) HV (mm)	141
*) HT (mm)	H-615

*) Dimension HV is without gasket. If gaskets are used dimension HT is reduced by thickness of gasket.

7.3 Example of installation on the deck, connector Q2

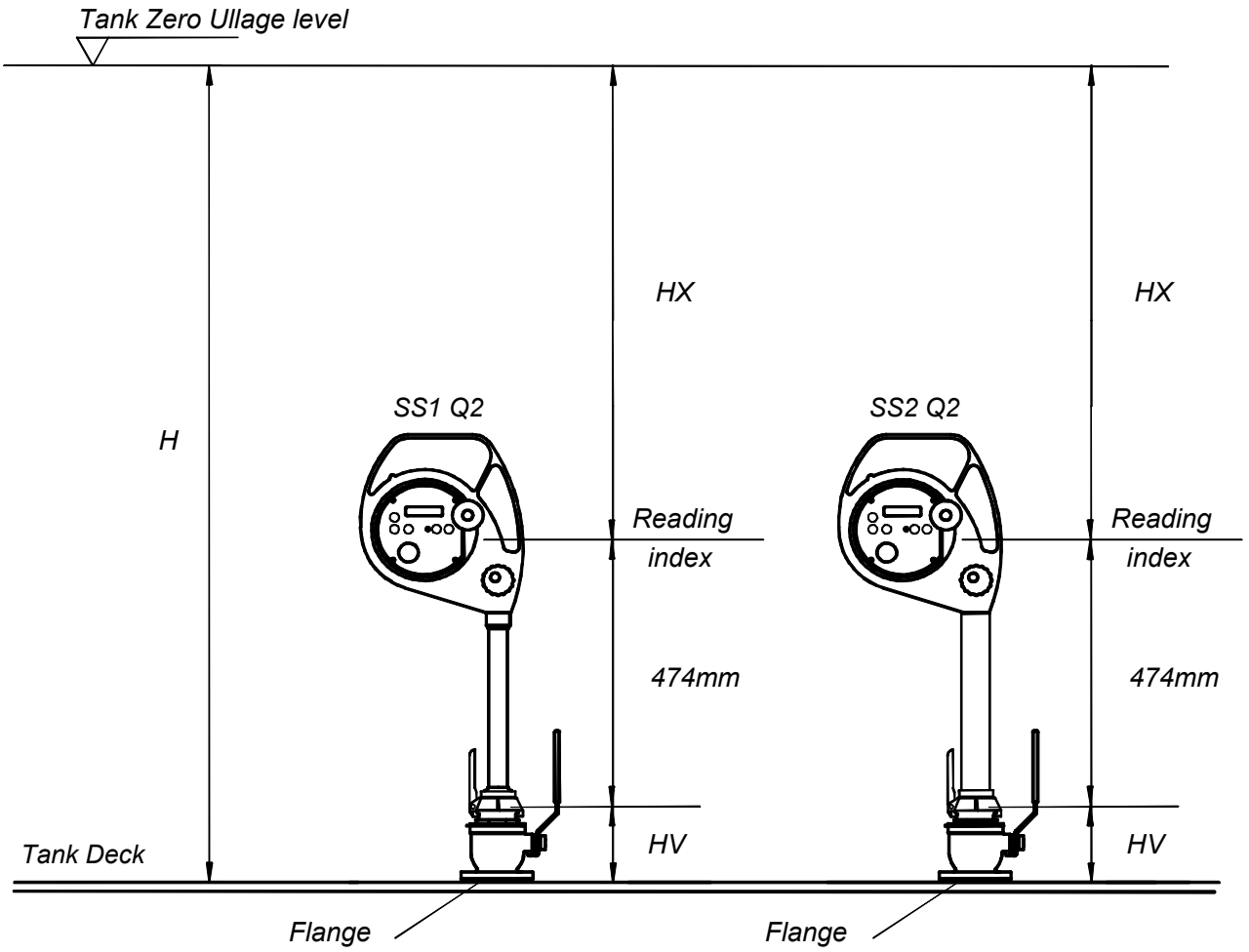


Figure 7-3

Valve designation	C.2-SS; C.2-SS-W; C.2-SS-BL; C.2-SS-SEC
Bottom connection	thread or flange
Boring	2”
*) HV (mm)	141
*) HX (mm)	H-615

*) Dimension HV is without gasket. If gaskets are used dimension HX is reduced by thickness of gasket.

7.4 Example of installation on a pipe, connector Q1

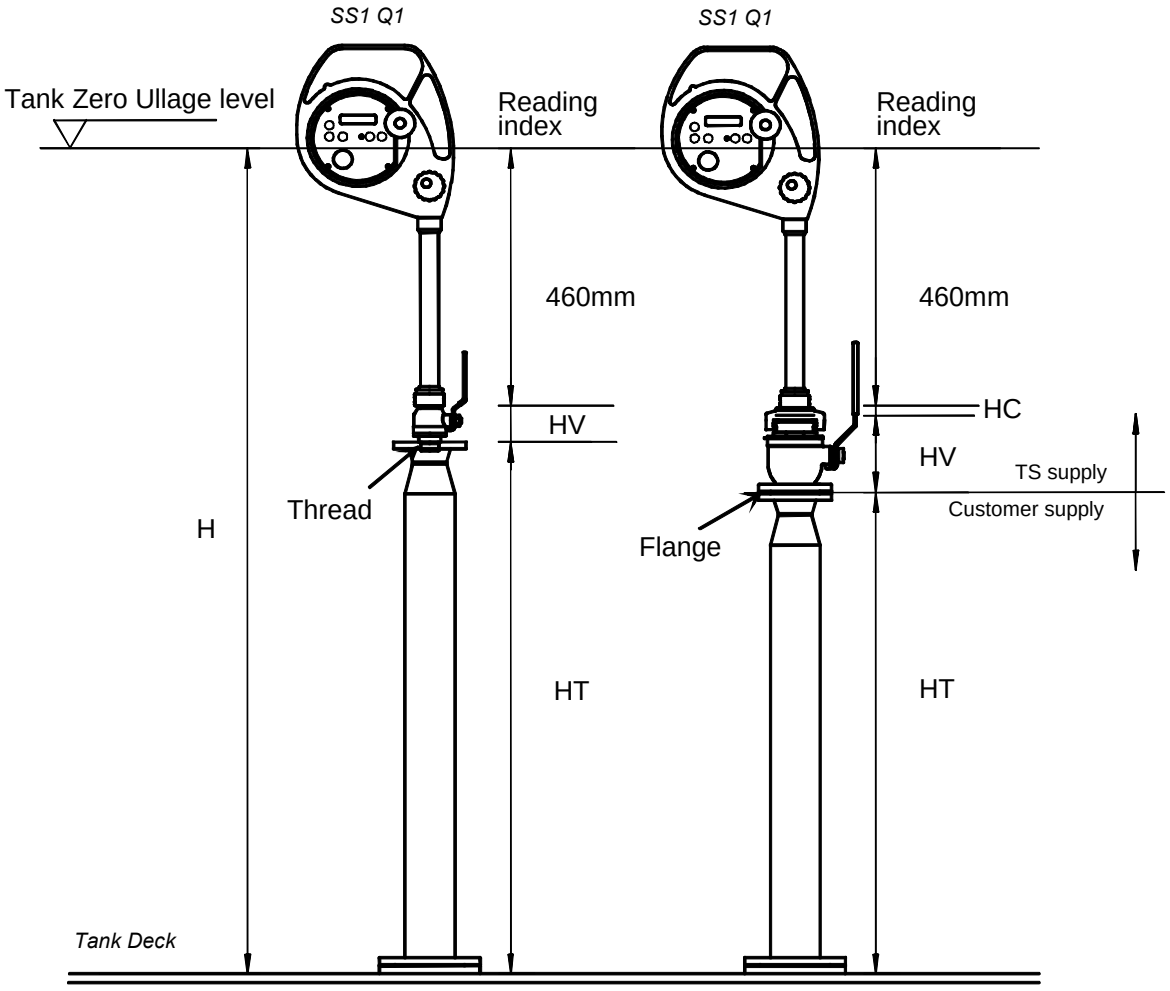


Figure 7-4

Valve designation	**A.1-SS**	**C.1-SS**	**C.1-SS**	**C.1-SS**	**C.2-SS C.2-SS-W**	**C.2-SS C.2-SS-W**	**A.2-SS**	**A.2,5-SS**	**A.4-SS**
Boring	1"	1"	1"	1"	2"	2"	2"	2,5"	4"
Bottom connection	thread	thread	flange JIS 5K25	flange JIS 5K50	thread	flange	flange	flange	flange
*) HV (mm)	120	65	79	79	141	141	172	99	140
HC (mm)	na	na	na	na	14	14	41	53	58
*) HT (mm)	H-580	H-525	H-539	H-539	H-615	H-615	H-673	H-612	H-658

*) Dimension HV is without gasket. If gaskets are used dimension HT is reduced by thickness of gasket.

7.5 Example of installation on the deck, connector Q1

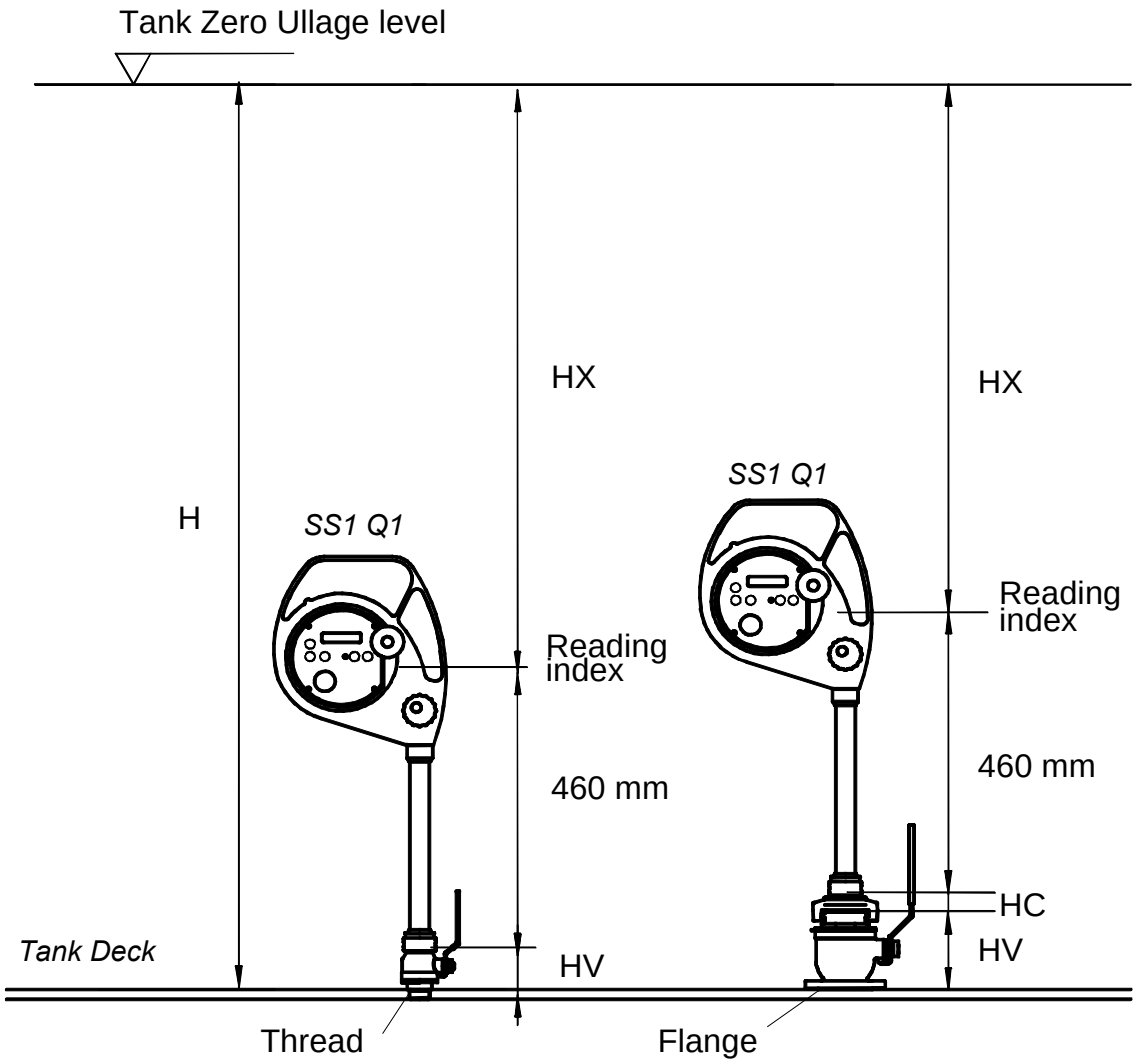


Figure 7-5

Valve designation	A.1-SS	C.1-SS	C.1-SS	C.1-SS	C.2-SS C.2-SS-W	C.2-SS C.2-SS-W	A.2-SS	A.2,5-SS	A.4-SS
Boring	1"	1"	1"	1"	2"	2"	2"	2,5"	4"
Bottom connection	thread	thread	flange JIS 5K25	flange JIS 5K50	thread	flange	flange	flange	flange
*) HV (mm)	120	65	79	79	141	141	172	99	140
HC (mm)	na	na	na	na	14	14	41	53	58
*) HX (mm)	H-580	H-525	H-539	H-539	H-615	H-615	H-673	H-612	H-658

*) Dimension HV is without gasket. If gaskets are used dimension HX is reduced by thickness of gasket.

8. Operation

8.1 Basic rules concerning the 5-key control pad

Apart from the "ON" / "OFF" keys that are self-explanatory, there are 3 other keys that help in customising the unit:

- pressing "+" allows to scroll down the menus, a pointer show the actual menu you have selected,
- pressing "-" allows to exit a menu,
- pressing "enter" (later on named "E") allows to enter a specific menu.

The small pointer displayed on the left is showing the active setting.

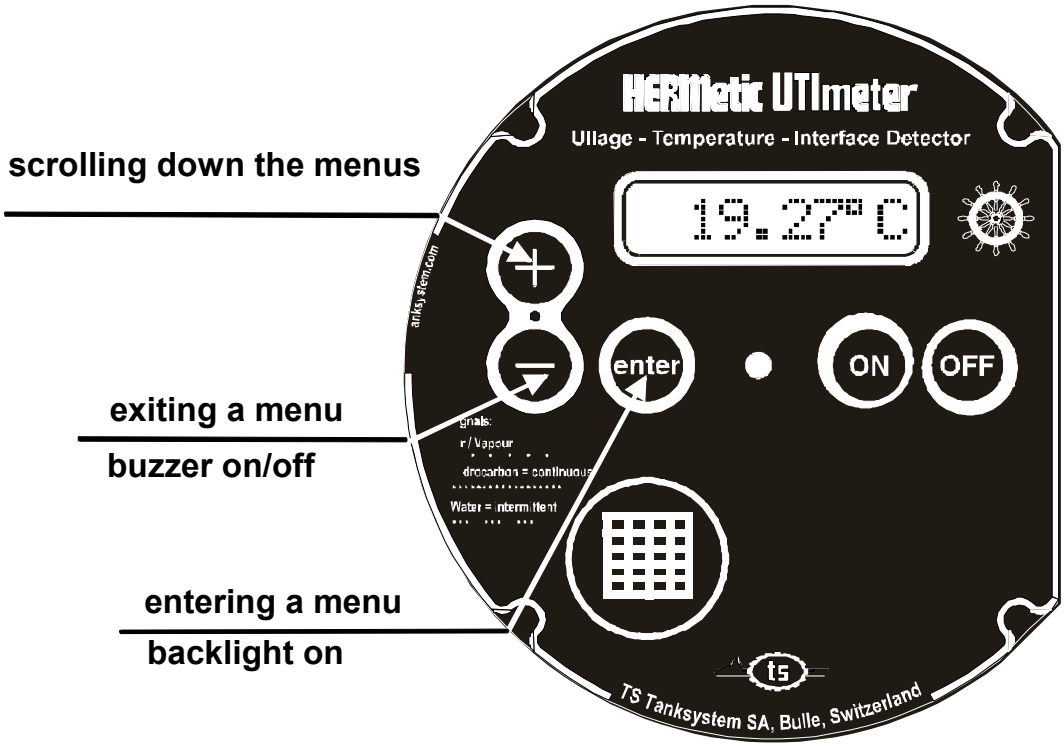


Figure 8-1

8.2 Selecting the language

English, German or French languages can be selected by following the sequences described in Figure 8-2.

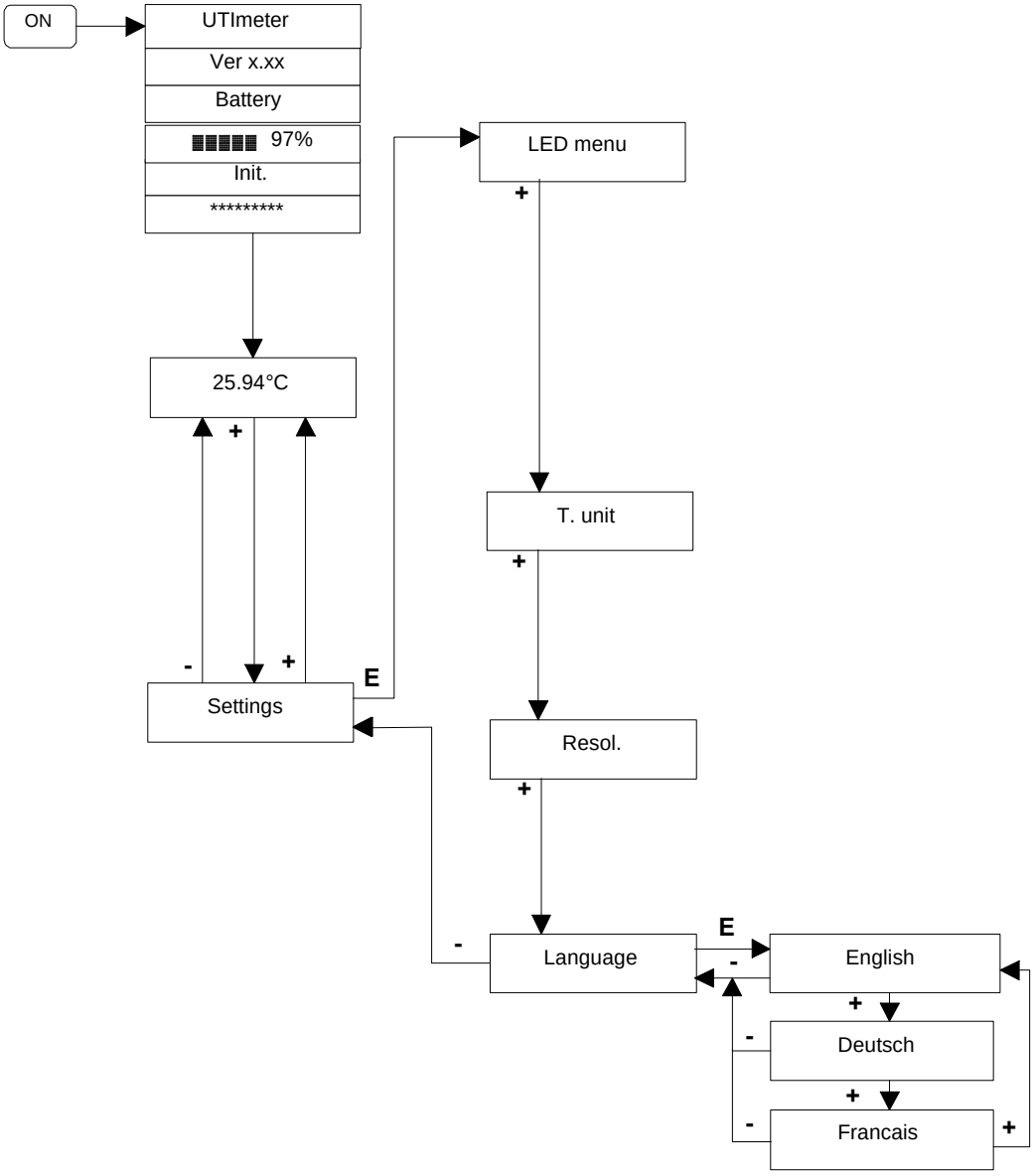


Figure 8-2

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter", "LED menu" is displayed,
- Press on "+"; "T. unit" is displayed,
- Press on "+", "Resol." is displayed,
- Press on "+", "Language." is displayed,
- Press on "enter",
- Select the language by pressing on "+" one or more times, the display shows the language selected,
- Press "-" two times to come back in measurement mode.

The new setting is stored in the permanent memory.

8.3 Selecting the temperature scale

The temperature can be displayed either in Celsius or Farenheit degrees. Refer to Figure 8-3.

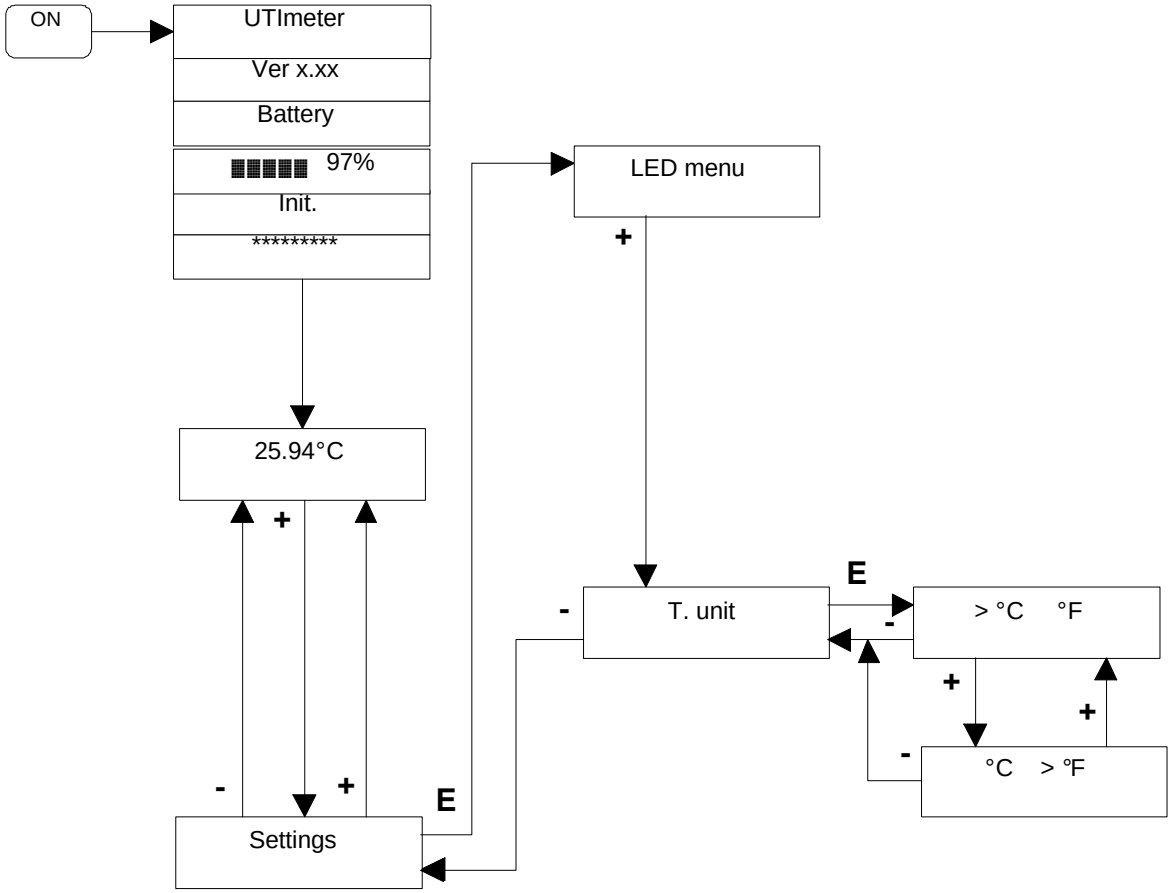


Figure 8-3

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter", "LED menu" is displayed,
- Press on "+"; "T. unit" is displayed,
- Press on "enter",
- Select the scale by pressing on "+" one or more times, the pointer shows the scale selected,
- Press "-" two times to come back in measurement mode.

The new setting is stored in the permanent memory.

8.4 Selecting the temperature resolution

The temperature reading can be given with 1 or 2 digits after the dot. Select the appropriate resolution as shown on Figure 8-4.

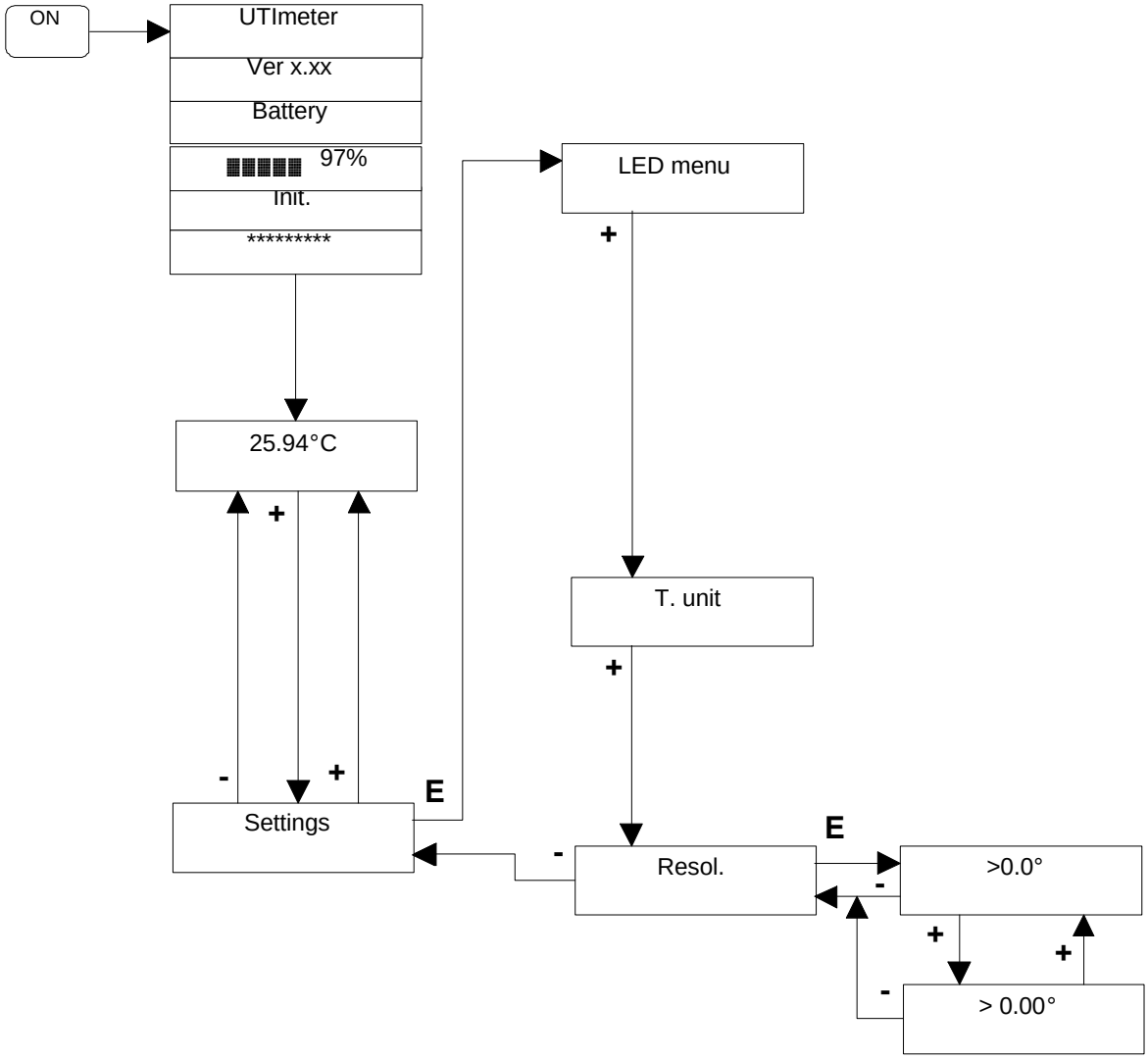


Figure 8-4

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter", "LED menu" is displayed,
- Press on "+"; "T. unit" is displayed,
- Press on "+", "Resol." is displayed,
- Press on "enter",
- Select the resolution by pressing on "+" one or more times, the pointer shows the resolution selected,
- Press "-" two times to come back in measurement mode.

The new setting is stored in the permanent memory.

8.5 Activating the LED

Refer to Figure 8-5.
The LED can be activated on 2 modes:
- one is temporary, it is automatically erased when the unit is switched off, in order to save the battery life;
- the other is permanent, it will stay even is the unit is switched off.

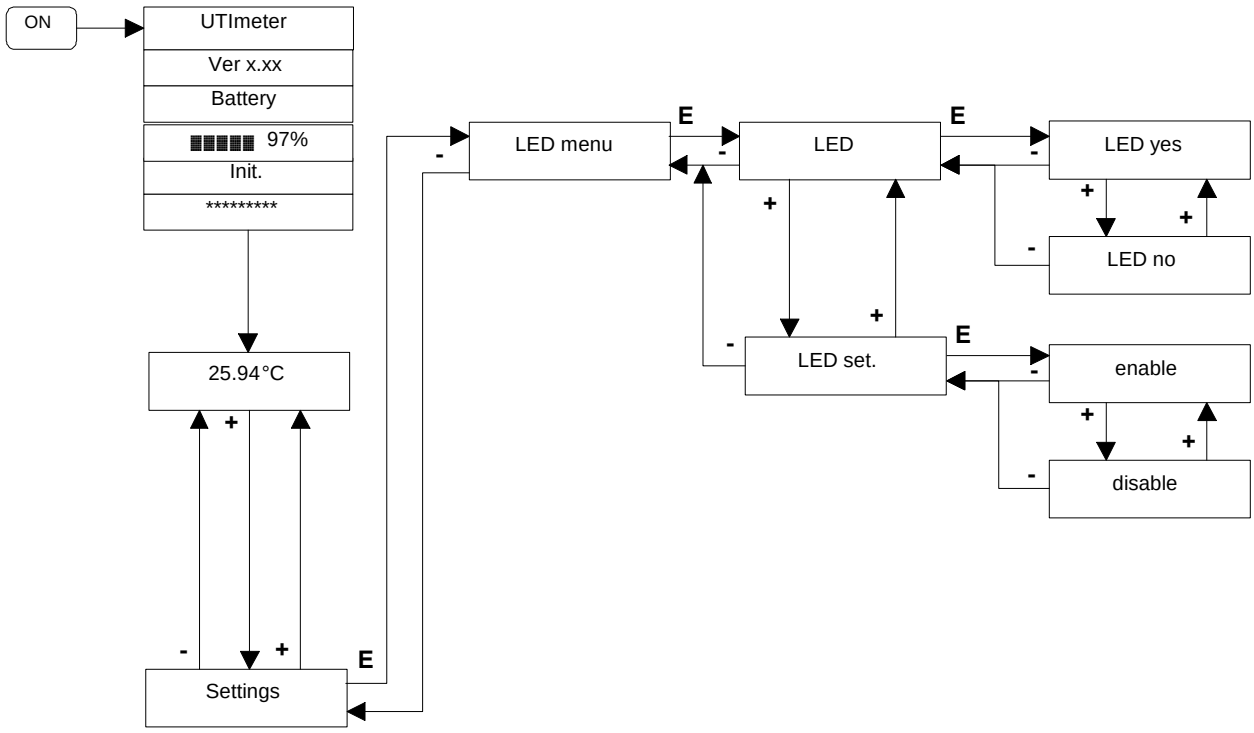


Figure 8-5

8.5.1 Temporary setting of the LED

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter"; "LED menu" is displayed,
- Press on "enter"; "LED" is displayed,
- Press on "enter", then select by pressing "+" the mode: "LED yes" or "LED no".
- Press "-" two times to come back in measurement mode.

It is always possible to change the status of the LED during gauging, by using the same menu again. If not done before, switching off the unit will automatically light off the LED.

8.5.2 Permanent setting of the LED

- Switch on the equipment,
- Wait until the temperature is displayed,
- Press on "+" to enter the settings menu,
- Press on "enter"; "LED menu" is displayed,
- Press on "enter"; "LED " is displayed,
- Press on "+", "LED Set." is displayed,
- Press on "enter",
- "Enable" or "disable" the LED by pressing on "+" one or more times,
- Press "-" two times to come back in measurement mode.

The new setting is stored in the permanent memory.
Remember that the LED needs an extra power and reduces the battery life accordingly.

8.6 Muting the buzzer

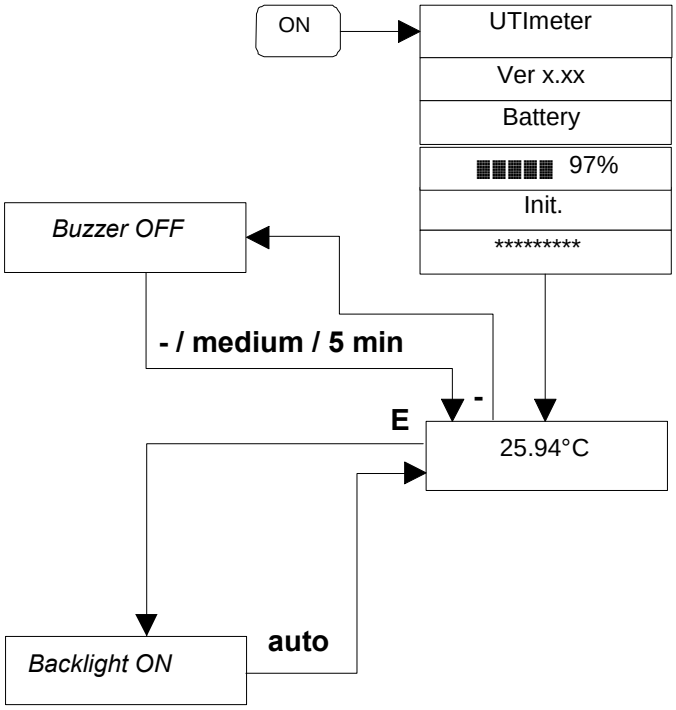


Figure 8-6

When in measurement mode it is possible to mute the buzzer.
- Press on "-",
- Press on "-" again to reset the buzzer.

IMPORTANT NOTE: in order to prevent any misuse of the equipment, there is an automatic reactivation of the buzzer each time the medium changes (air to liquid, liquid to water, etc.) or after 5 minutes muting. To keep the buzzer muting, press again on "-".

8.7 Backlight

Refer to Figure 8-6.
When in measurement mode press "enter": this switches on the backlight. After around 10 seconds, the light switches off automatically to save the battery life.

8.8 Checking the functions before using the instrument

Before installing the HERMetic instrument as described in section 8.9, the following tests are recommended to ensure that the instrument is ready to work.

8.8.1 Battery

Refer to section 9.2 "Checking the battery".

8.8.2 Temperature

Switch on the unit.
The buzzer shall beep every 2 sec.
When the temperature is displayed, check that it shows the surrounding temperature.

8.8.3 Ullage

Switch on the unit.
The buzzer shall beep every 2 sec.
Check the ullage in a glass of water.
Check the ullage by immersing the ultrasonic gap sensor but not the electrodes (position A); The buzzer shall beep continuously.

8.8.4 Interface

Switch on the unit.
The buzzer shall beep every 2 sec.
Check the interface in a glass of water.
Check the interface by immersing the interface electrodes also (position B). The buzzer shall beep intermittently.

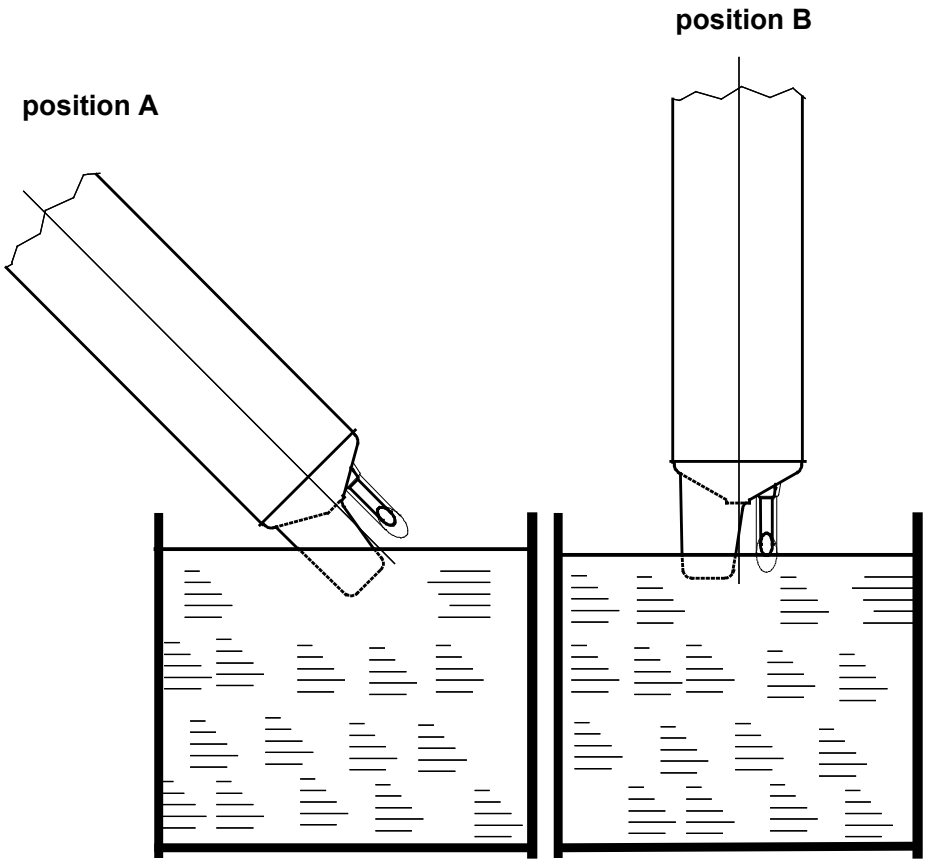


Figure 8-7

8.9 Installation of the instrument

- This HERMetic equipment must be coupled to a certified HERMetic valve.
- Before starting please read carefully the chapter “Recommendation for safe use” and follow your company's safety instructions.
- Check that the HERMetic valve is closed.
- Remove the end cap (weather cap / blind cover / security cover) of the HERMetic valve.
- Clean the seal surfaces of the nipple of the valve and of the coupler of the instrument from dust or grease.

Note: **Cleaning** of the mating surfaces is very important for **earth grounding** purpose and for good accuracy on **zero reference level**.

- Check whether the tape protection tube is moving freely.
- Install the HERMetic instrument on top of the valve by means of the quick coupler. Ensure that the equipment is properly earthed. If not, ground it with the (optional) grounding cable before operating.

8.10 Ullage / interface measurement

- Install the HERMetic equipment as per 8.9 "Installation of the instrument”.
- Open the valve by turning the handle.
- Switch on the equipment: a control beep is audible every 2 seconds.
- Put the tape cleaner on the "DOWN" position. Disengage the knob of the crank handle and lower the sensing probe into the tank by turning the reel. Make sure that the tape does not rub on any sharp edge when lowering as its insulation could be damaged.
- As soon as the sensor comes in contact with the petroleum product the control beep will change for a continuous beep. Raise the sensing probe again until the continuous beep stops and lower the sensing probe again slowly until the continuous beep is heard again. Now the ullage level can be read against the ullage reference. If the zero-ullage reference does not correspond to the reading index of the instrument, a correction has to be made accordingly.
- Lower the sensing probe further until the sensor touches the oil-water interface. As soon as the sensor comes in contact with water the continuous beep will change for an intermittent beep. The difference between the ullage reading and the interface reading represents the thickness of the product layer.
- When the measurements are completed, switch off the unit, turn the tape cleaner on "UP" position and wind up the tape until the sensing probe is in the storage tube. The reading on the tape shall be less than 420 mm or 1 ft 5 inch.
- Close the valve and disconnect the instrument from the nipple.
- Put the end cap back on the valve.

8.11 Reference height / innage measurement

If the unit is fitted with the additional load (model SS2 Q2, see Figure 8-8) then reference height / innage measurement are possible.

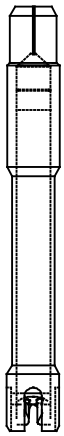


Figure 8-8

- Install the HERMetic equipment as per 8.9 "Installation of the instrument".

- Open the valve by turning the handle.

- Put the tape cleaner on the "DOWN" position. Disengage the knob of the crank handle and lower the sensing probe into the tank by turning the reel. Make sure that the tape does not rub on any sharp edge when lowering as its insulation could be damaged.

- When the sensing probe comes in contact with the dip/datum plate record the distance shown on the reading index. See Figure 8-9. The exact distance from the plate to the reading index is (reading + 4 mm / + 5/32") which is the reference height providing the reading index level has been adjusted to the zero ullage level of the tank. If the tank zero ullage is levelled above or below the reading index, an additional correction shall apply. For more details refer to section "Installation of the gauging system".

- Turn the tape cleaner on "UP" position.

- Switch on the unit and raise up the sensing probe until checking the oil/water interface if any (see details in section 8.10 "Ullage / interface measurement"). To get a better accuracy of the interface level, release the tape cleaner on the "DOWN" position during the final checking. Calculate the free water height by subtracting the index reading to the reference height.

- Reengage the tape cleaner on the "UP" position and raise up the sensing probe until checking the ullage (see details in section 8.10 "Ullage / interface measurement"). Release the tape cleaner for final checking of the ullage. Calculate the innage by subtracting the index reading and the free water height to the reference height determined before.

- When the measurements are completed, switch off the unit, engage the tape cleaner on the "UP" position and wind up the tape until the sensing probe is in the storage tube. The reading on the tape shall be less than 420 mm or 1 ft 5 inch.

- Close the valve and disconnect the instrument from the nipple.

- Put the end cap back on the valve.

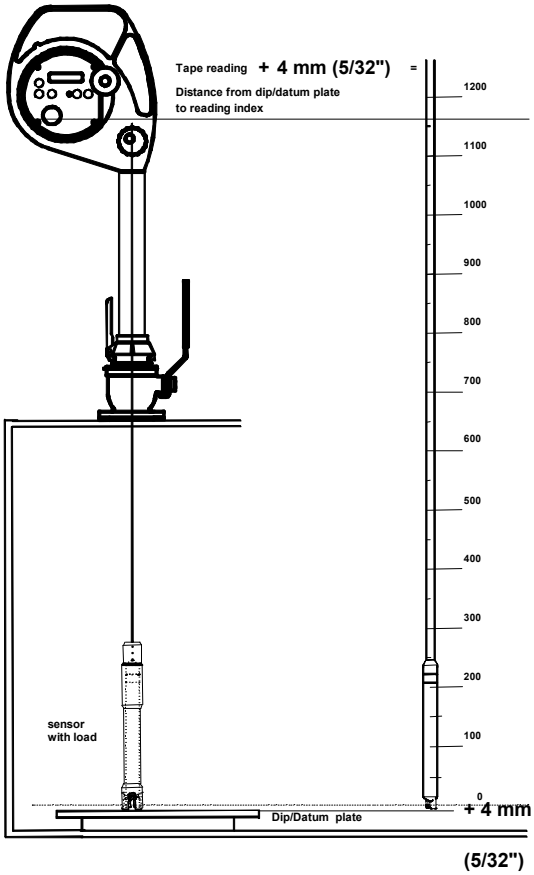


Figure 8-9

8.12 Temperature measurement

- Install the HERMetic equipment as per 8.9 "Installation of the instrument".

- Open the valve by turning the handle.

- Switch on the unit: a control beep is audible every 2 seconds.

- Put the tape cleaner on the "DOWN" position. Disengage the knob of the crank handle and lower the sensing probe to the **deepest** reading desired. Make sure that the tape does not rub on any sharp edge when lowering; its insulation might be damaged.

- The position of temperature sensor coincides with zero of tape, so the tape index reading shows directly level at which temperature is measured

- When the desired temperature ullage level is reached, joggle the sensing probe approximately 300 mm (1 foot) above and below the desired measurement level until the displayed temperature reading settles. For heavy crude oils which have a low thermal conductivity and a viscous nature, the joggling procedure is a necessity to assure an accurate temperature reading in a minimum amount of time.

- When temperature has settled, record it.

- Engage the tape cleaner on "UP" position. Raise the probe to the next ullage level to be measured and repeat the procedure a.m. To joggle the sensing probe the tape cleaner must be on the "DOWN" position.

- When the measurements are completed, switch off the unit, engage the tape cleaner on "UP" position and wind up the tape until the sensing probe is in the storage tube. The reading on the tape shall be less than 420 mm or 1 ft 5 inch.

- Close the valve and disconnect the instrument from the nipple.

- Put the end cap back on the valve.

IMPORTANT NOTE

As mentionned in 8.6 "Muting the buzzer" it is easy to mute the buzzer during the temperature measurement by pressing on "-".

Recall that after 5 minutes have elapsed or each time the probe detects a change of the medium (air, liquid, water), the buzzer will reactivate automatically. To keep it muting, press on "-" again.

9. Care and Maintenance

9.1 Care

Clean the instrument of any excess of liquid after use.

Make sure that the sensing probe is completely stored in the storage tube after use (reading index shall indicate less than 420 mm or 1 ft 5 ").

Check the tightness of the reading index screws and if necessary adjust the level, refer to section 9.9.

Store the instrument in a dry location.
Check periodically (at least every 6 months) the continuity of grounding by measuring the electrical resistance between the tape adaptor (or the sensing probe tube) and the quick connect coupler. Resistance should not exceed 10 Ω.

Periodically clean carefully the sensor probe, the frame and the mechanical parts, as storage tube, tape, with an appropriate solvent.

Note: always reassemble the storage tube to the frame in the vertical position to allow the O-ring to seat properly in the tube.

Check periodically the condition of the tape cleaner.

With such conductive liquids which form salts when drying, wash the sensing probe with water or alcohol and brush it very gently with a soft brush to prevent a water detection error due to a short-circuit between the electrode and the tube.

9.2 Checking the battery

Please note that in case you have to change the battery, it must be done only in a safe area. Refer to section 9.3 "Battery replacement".

9.2.1 Before starting gauging

Switch on the unit. The buzzer tones every 2 seconds if the battery is not too low.

The following sequences are displayed as per Figure 9-1, the 4th sequence shows the remaining power of the battery in percentage and as a bar-graph.

If the power left is less than 50% we recommend to have a spare battery ready for exchange. See also 9.3 "Battery replacement".

If the power left is less than 20% the message is blinking to advise that the power may not be enough to carry out all the work.

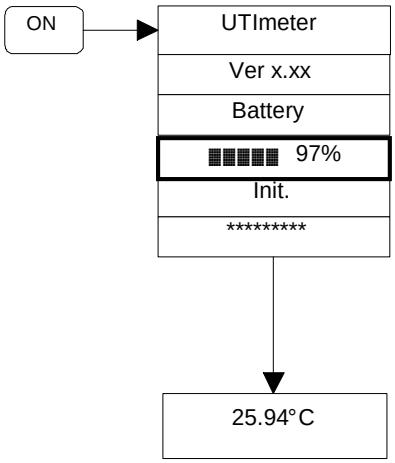


Figure 9-1

If the battery is too low, the unit will stop on the message "battery" as shown on Figure 9-2 and the buzzer tones continuously. Change the battery as per 9.3 "Battery replacement".

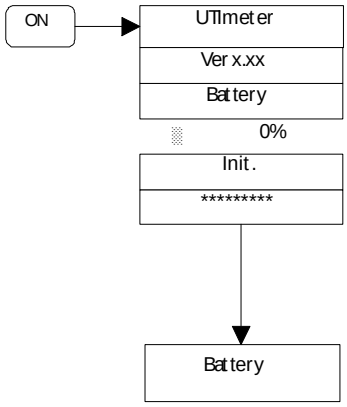


Figure 9-2

If it is not possible to switch on the unit, the battery is out or work. Change the battery first, as per **9.3 "**Battery replacement**".**

9.2.2 During gauging

When the unit is already switched on and working, it is always possible to see what power is left with the battery by entering the settings menu:

- Press on "+" to enter the settings menu,
- Press on "enter", "LED menu" is displayed,
- Press on "+"; "T. unit" is displayed,
- Press on "+", "Resol." is displayed,
- Press on "+", "Language" is displayed,
- Press on "+", "Battery" is displayed,
- Press on "enter",
- The remaining battery power is displayed in percentage and as a bar-graph; pressing "+" again allows to see the tension of the battery (B); the last information (A) is internal.
- Press "-" two times to come back in measurement mode.

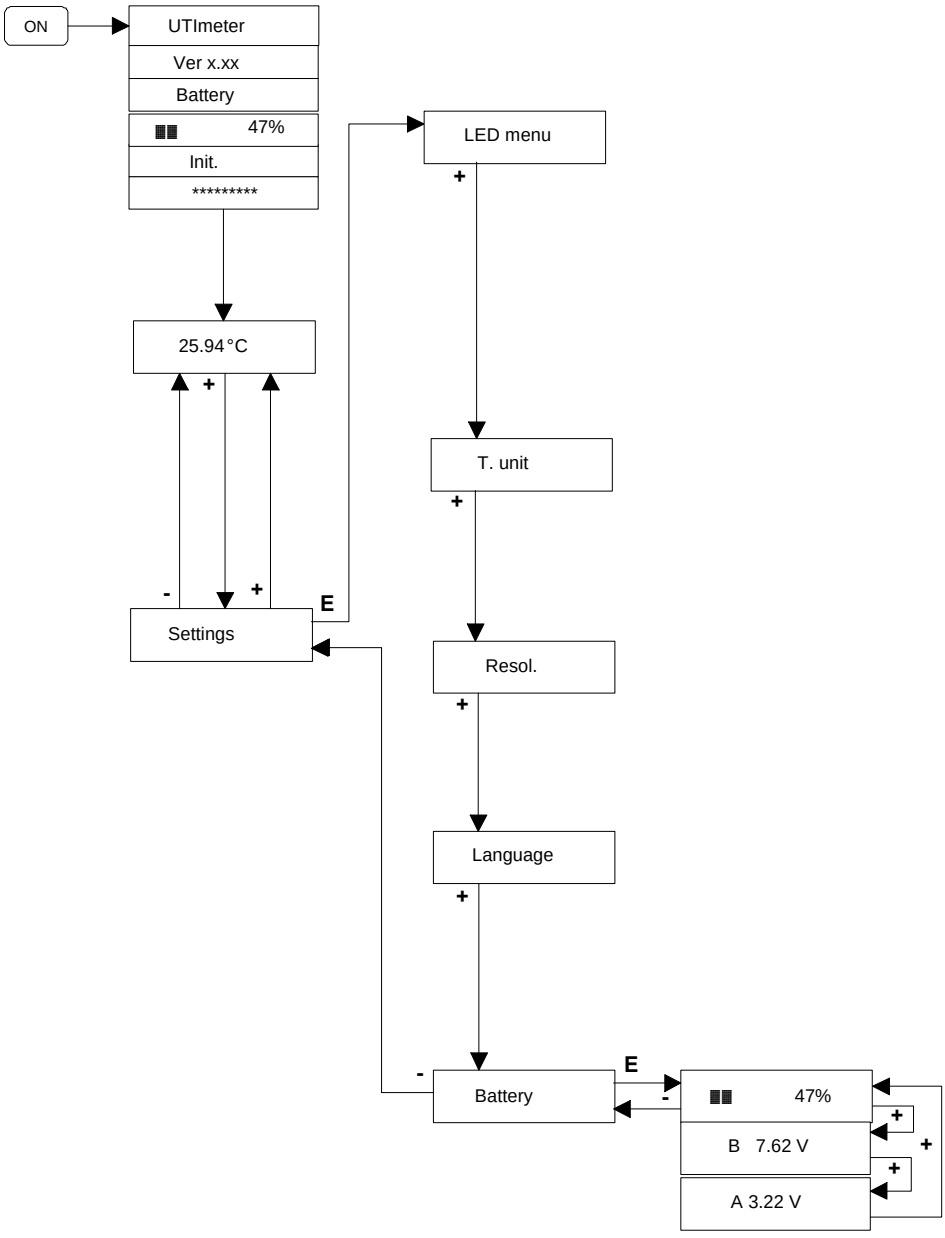


Figure 9-3

9.3 Battery replacement

Warning : change the battery only in a non hazardous area.

- Unscrew the 2 screws of the battery holder using the 2,5 mm Hex Allen key which is located on the carrying case. See Figure 9-4.
- Pull it gently out.
- Change the battery (one-way only device). See Figure 9-4.
- Push the battery holder back in its housing (one-way only).
- Tighten the 2 screws.

Only one battery is approved:

Duracell / Procell MN1604

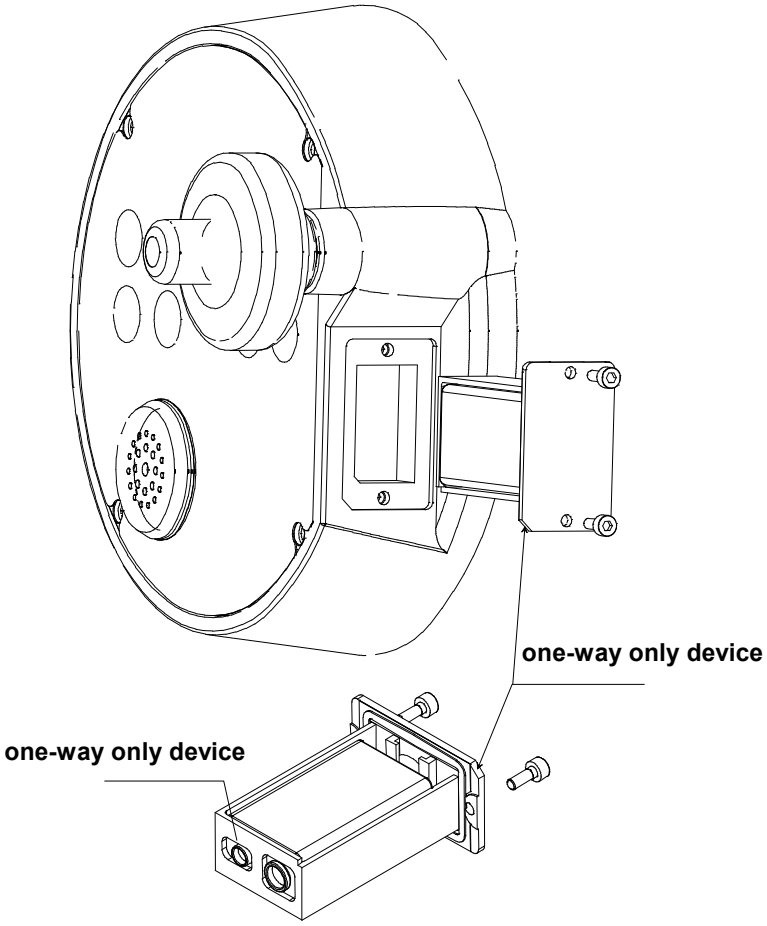


Figure 9-4

9.4 Tape replacement

THE REPLACEMENT OF THE TAPE DOES NOT REQUIRE TO RE-CALIBRATE THE TEMPERATURE.
Follow the different sequences as described below. The Figure 12-1 : general assembly, list of the main spare parts can also help.

9.4.1 Disconnecting the tape from the sensor

Follow the instructions of section 9.5 "Sensing probe replacement".

9.4.2 Disconnecting the tape from the electronic box

- Unscrew with the 2.5 Allen key the 2 screws (A) of the battery holder and pull it out as shown on Figure 9-5.
- Unscrew with the 2.5 Allen key the 4 screws (B) of the display unit and pull it gently out as shown on Figure 9-5.

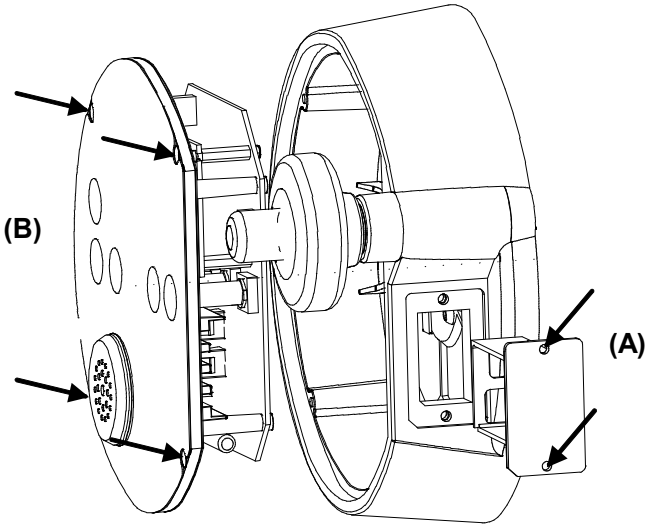


Figure 9-5

- Disconnect the connecting plug (C) as shown on Figure 9-6 and remove the display unit.
- Unscrew with the 2.5 Allen key the tape holder (G) by removing the 2 screws (F) and the grounding cable (D) as shown on Figure 9-6. Do not loose the 2 remaining screws that secure the reel axle.

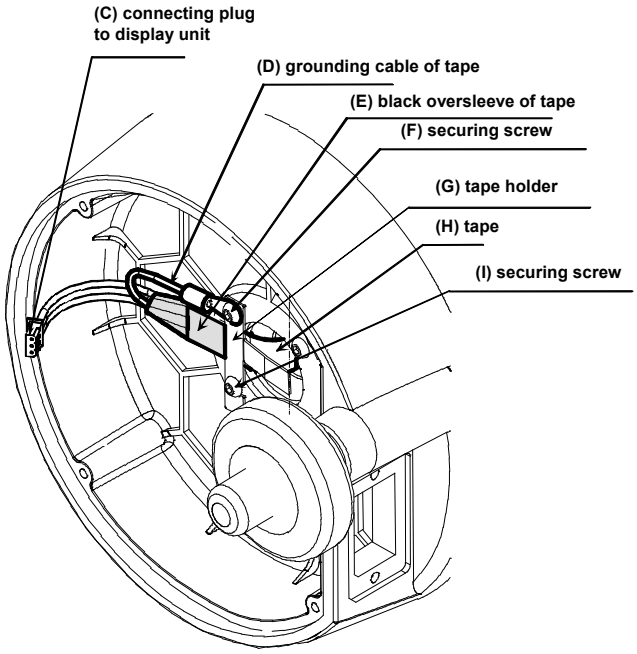


Figure 9-6

9.4.3 Disconnecting the tape from the reel axle

- Remove the external reel flange (3 screws to unscrew with the 2.5 Allen key).
- Remove the axle cover (3 screws to unscrew with the 2.5 Allen key).
- Unscrew with the 2.5 Allen key the 4 screws (K) of the washer holder, as shown on Figure 9-7.
- Remove the tape from the reel axle.

9.4.4 Removing the tape from the frame

- Remove the tape protection tube from the tape.
- Turn the tape cleaner in position "DOWN" to free the tape.
- Pull the tape gently out of the tape cleaner.
- Pull the tape adaptor end out of the housing, through the storage tube.
- Slacken the tape a few turns from the reel axle.
- Remove the tape from the housing.

9.4.5 Mounting the new tape

- Install the new tape on the reel axle.
- Leave approximatively 20 cm of tape free at the core.
- Make a loop (M) and a S-shape (L) with the tape as shown on Figure 9-7.
- Pass the tape end through the axle core.
- Secure the gaskets and the washers mounted on the tape in the axle core with the washer holder and its 4 screws (K) as shown on Figure 9-7.
- On the electronic box side, adjust the black oversleeve just to the edge of the tape holder (pull the tape gently from the other side) and tighten the tape end as shown on Figure 9-6 with.
- Follow in the reverse order the instructions of sub-section 9.4.2 to re-install the electronic box.
- If necessary, readjust the loop (M) and the S-shape (L) of the tape at the core of the reel axle.
- Follow the instructions of sub-section 9.4.4 in the reverse order to pass the tape through the tape cleaner, the storage tube and to mount the tape protection tube on.
- Put back the reel flange and its 3 securing screws.
- Follow the instructions of section 9.5 "Sensing probe replacement" to re-install the sensor on the tape.
- Carry out the functional tests as per 8.8 "Checking the functions before using the instrument".
- If there is any problem, refer to section 10 "Trouble shooting".

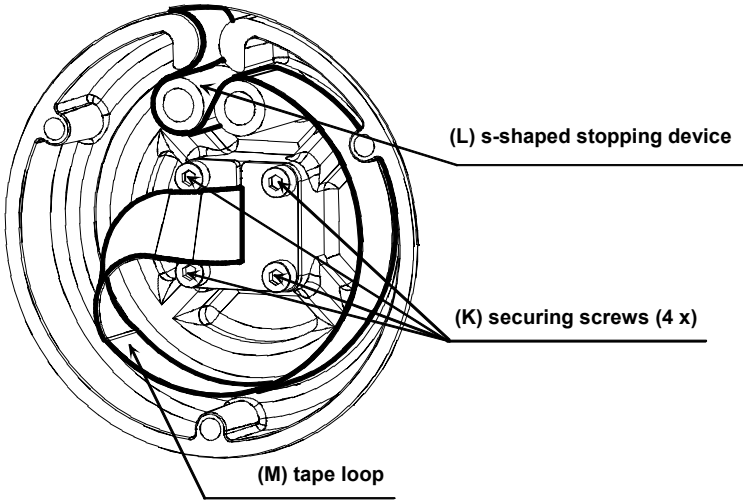


Figure 9-7

9.5 Sensing probe replacement

THE REPLACEMENT OF THE SENSING PROBE DOES NOT REQUIRE TO RE-CALIBRATE THE TEMPERATURE NOR THE ULLAGE / INTERFACE.

9.5.1 Disconnecting the old sensing probe

- Unscrew the securing screw with the 1.5 mm Hex Allen key.
- Pull carefully the adaptor out of the sensing probe tube by turning it slightly left and right. Make sure that the O-ring is not damaged when it passes the hole of the sensing probe tube.
- Disconnect the plug by pulling it gently out of the tube.

9.5.2 Connecting the new sensing probe

- Refer to Figure 9-8.
- Insert the 1.5 Allen key gently in the free hole in the middle of the tape plug.
- With one hand keep the sensing probe and the tape adaptor as shown on Figure 9-8.
- With the other hand drive the plug into the new sensor tube with the 1.5 Allen key to connect it to the sensing probe socket. Note this is a one way only plug. The wires shall be on the opposite side of the electronic circuit print as shown on Figure 9-8.
- Pull out gently the 1.5 Allen key from the plug while keeping the plug in place with another non sharp tool, for instance the 4 mm Allen key. Check that the plug is fully inserted.
- Switch on the unit and wait a few seconds. If all is OK, the temperature is displayed and the buzzer beeps every 2 seconds. If there is any problem, refer to the section 10 "Trouble shooting".
- Put some light grease on the O-ring.
- Push gently the adaptor into the sensing probe tube. Mind not to damage the O-ring when it passes the screw hole.
- Screw the securing screw back with the 1.5 mm Hex Allen key.

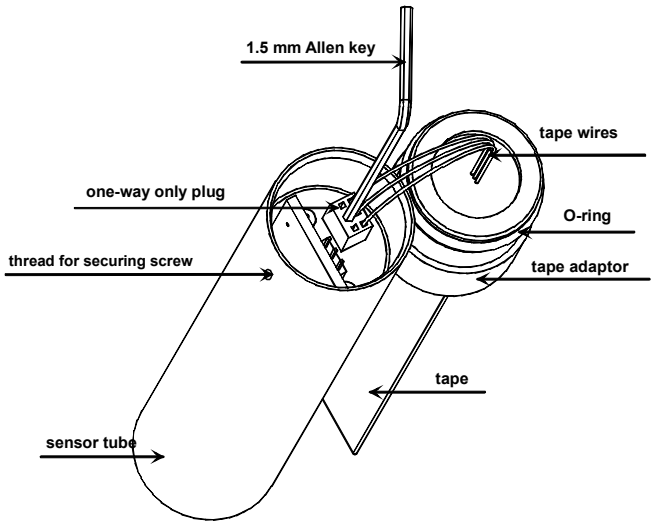


Figure 9-8

9.6 Tape wipers replacement and removing of tape cover

The 2 tape wipers can be easily replaced:

- Check that the tape cleaner is on "DOWN" position.
- Pull the tape cover out of the frame. Use pliers or a rod to help the clips to get out of the frame (as shown in figure 9.10)
- The tape wipers are inserted in holders grooves. Remove the old ones and insert the new ones.
- Push the tape cover back into the frame.
- Check that the tape cleaner is working properly.

Note: we recommend to change always both wipers.

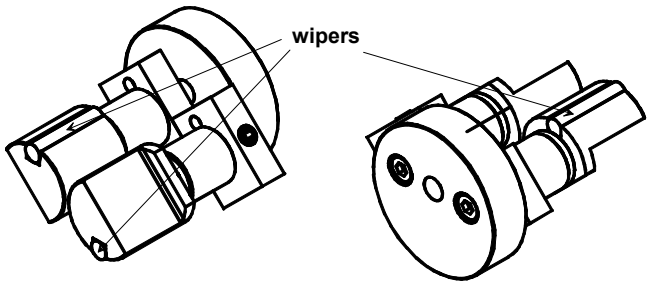


Figure 9-9

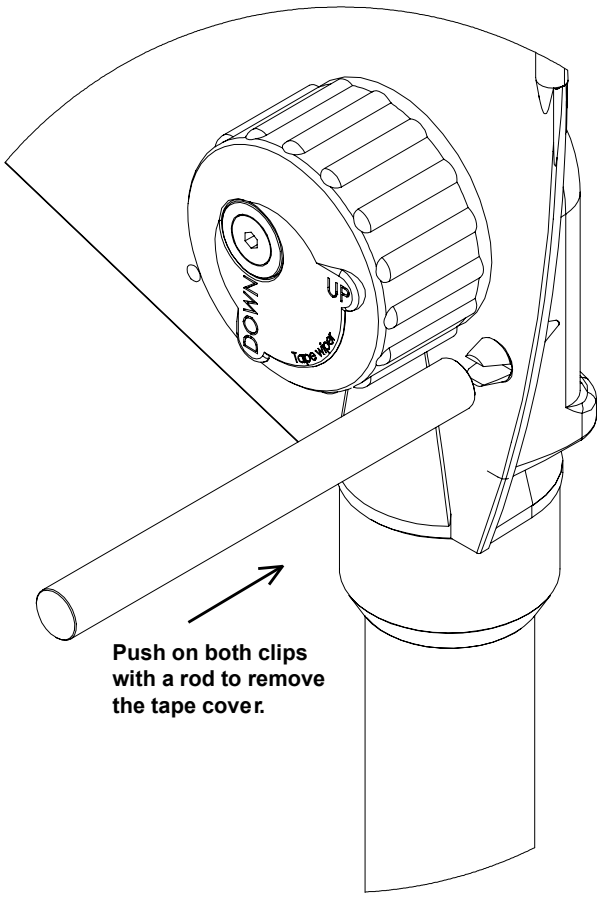


Figure 9-10

9.7 Display unit replacement

THE REPLACEMENT OF THE DISPLAY UNIT DOES NOT REQUIRE TO RE-CALIBRATE THE TEMPERATURE.

9.7.1 Disconnecting the old display unit

- Unscrew with the 2.5 Allen key the 2 screws (A) of the battery holder and pull it out as shown on Figure 9-11.
- Unscrew with the 2.5 Allen key the 4 screws (B) of the display unit and pull it gently out of the electronic box, as shown on Figure 9-11.
- Disconnect the tape plug, item (C) shown on Figure 9-6.

9.7.2 Connecting the new display unit

- Connect the tape plug to the new display unit.
- Put back the new display unit in the electronic box; tighten the 4 screws (B) of Figure 9-11.
- Reinstall the battery holder with the 2 screws (A) of Figure 9-11. Refer to Figure 9-4 page 38.
- Check that the unit is working properly, as described in 8.8.

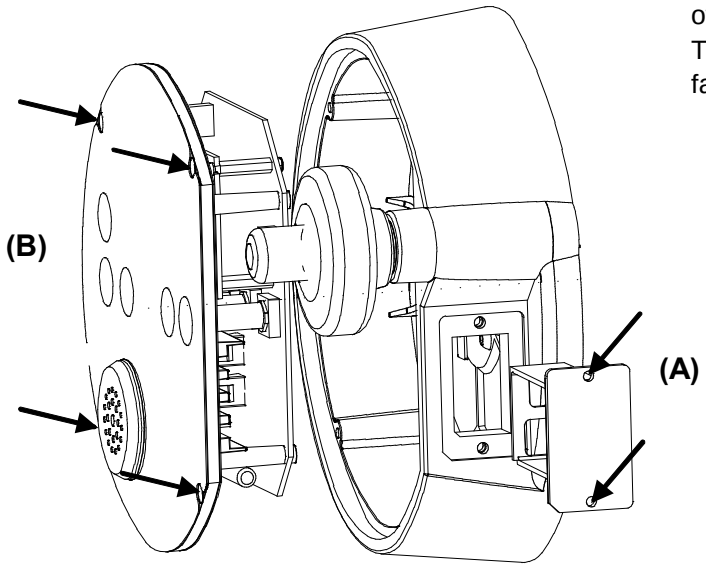


Figure 9-11

9.8 Verification and certification of tapes

The tape has to be periodically inspected for breaks, kinks, wear and illegible numbers.
As the tape is a cable it might be necessary to check its electrical conformity. Refer to section 9.12. It is necessary also to check it for accuracy regularly according to current National or International Standards, as API "Manual of Petroleum - Measurement Standards - Chapter 3 - Tank Gauging - Section 1A - Standard practice for the manual gauging of petroleum products in stationary tanks" or IP "Petroleum Measurement Manual - Part III - Manual Tank Gauging - Section 1 - Non-Electrical Methods" or relevant ISO standards.
In such a case it is important to remember that the bottom of the sensing probe is 4 mm lower than the zero of the tape, thus to assure that the electrical zero coincide with the tape zero.
It is also important to remember that the nominal tension at which the tape was produced is marked on each beginning of tape and is normally 6 N (1,3 lb). If tensioned at 44,5 N (10 lb) as per API this will result in a additional elongation up to 3.7 mm over 30 meters.
This periodical verification can be done at the factory or in a Service Station.

9.9 Verification and adjustment of the reading index

To verify or to adjust the reading index, in particular after having renewed a tape, apply the following instruction:

- if the equipment is fitted with a 2" connector (Q2) remove the clip and the collar as shown on Figure 9-12;
- put the tape cleaner on "DOWN" position;
- keep the equipment standing vertically on a flat surface;
- gently lower the tape until the sensor touches the surface (Figure 9-12);
- adjust the index to the value corresponding to the connector Q1 or Q2, as shown on Figure 9-12;
- In case of a 2" connector (Q2) put back the clip and the collar .

IMPORTANT NOTE: these adjusting values for the reading index are different from the heights shown in the section 7 "Examples of installation of the gauging system". They take into account the recessment of the reaction point from the sensor tip end and other mechanical parameters.

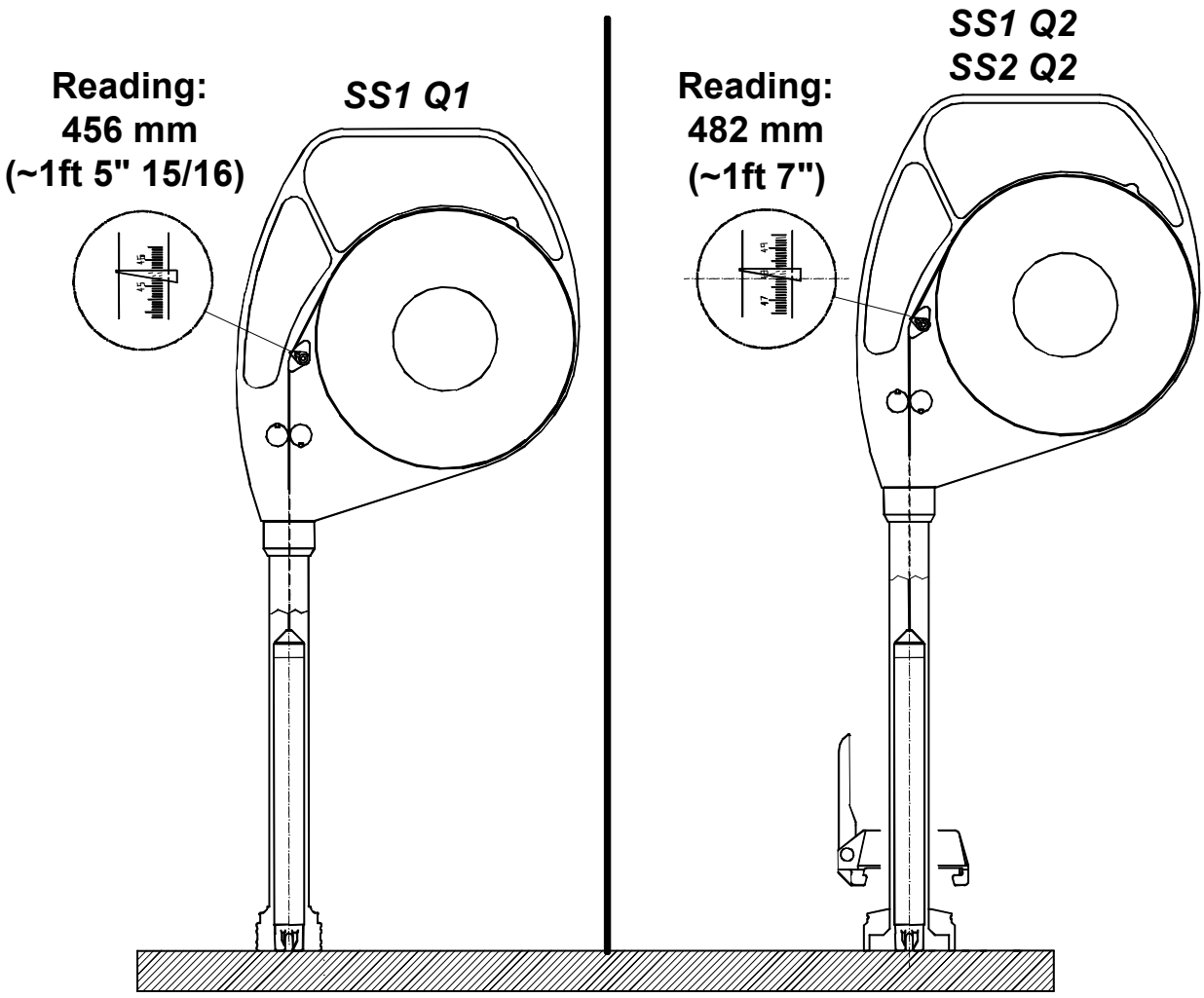


Figure 9-12

9.10 Temperature verification

The temperature calibration curve is stored in the sensor memory and cannot be modified. The calibration is set once at the factory and do not require subsequent adjustment.
Nevertheless it is recommended to check the temperature accuracy once a year. A one point check is enough to qualify the sensor.

9.10.1 Equipment required

- A Dewar flask or any vacuum flask, approximately 8 cm in diameter and 36 cm deep.
- Ice, preferably made from distilled water.
- Water, preferably distilled and precooled.

9.10.2 Preparing the Ice Point bath

(1) Shave or crush the ice into small pieces, avoiding direct contact with the hands or any unclean object. The pieces shall be no more then 5 mm.
(2) Fill the Dewar flask with the crushed ice and add sufficient water to form a slush, just filling the voids between ice particles but not enough to float the ice.
(3) Insert the sensor, packing the ice gently about it.
(4) Let it stand for half an hour to permit the sensor temperature, the ice particles and the water to equilibrate.
(5) As the ice melts it will be necessary to drain off some water and add more crushed ice. Gently stir the ice with the sensor periodically to assist equilibration.

IMPORTANT NOTE: Attention to detail during the preparation of the Ice Point bath is critical to the accuracy and quality of the offset verification.

9.10.3 Checking the UTImeter

(6) After 30 minutes have elapsed, gently stir the bath with the sensor again to ensure complete equilibration of temperature.
(7) Switch on the UTImeter.
(8) Observe the reading. It should be ±0.10 °C (±0.20 °F) The temperature must be stable, i.e. within ± 0.04 °C (± 0.07 °F).
(9) If it is not OK, refer to section 10 "Trouble shooting".

9.11 Ullage/Interface verification

The sensitivity of the instrument in ullage / interface cannot be adjusted. Both ullage and interface levels are set at the factory.

Checking ullage and interface level detection

The test liquid should be the one to be gauged. Fill in a container with appropriate liquid.

Switch on the unit. The buzzer shall beep every 2 sec.

If the liquid is conductive (alcohol, water, ...)

- Check the **ullage** by immersing the ultrasonic gap sensor but not the electrodes (position A); The buzzer shall beep continuously.
- Check the **interface** by immersing the interface electrodes (position B). The buzzer shall beep intermittently.

If the liquid is non conductive (gasoline, oil, ...)

- Check the **ullage** by immersing the sensor (position B); The buzzer shall beep continuously.

- Check the interface by immersing the sensor (position B) in water. The buzzer shall beep intermittently.

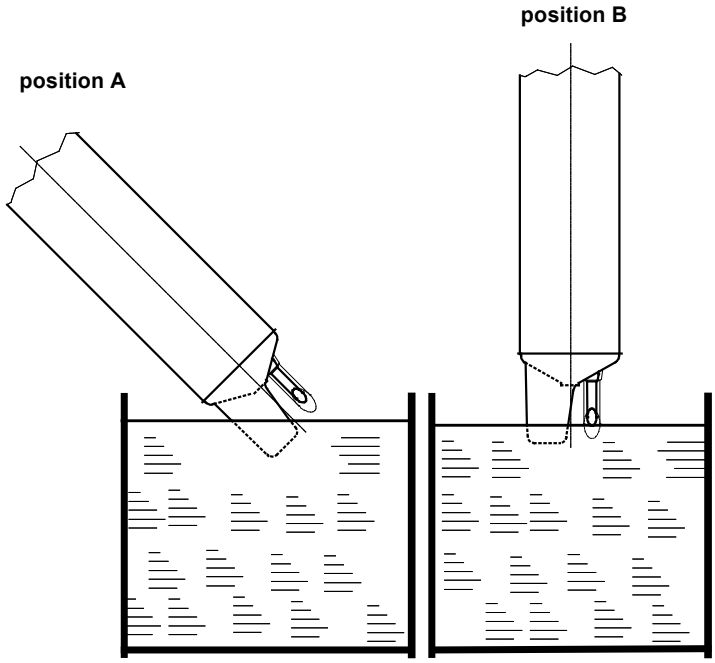


Figure 9-13

9.12 Electrical checking of the tape assembly

⇒ **Test for grounding**

- Remove the battery holder as described in section 9.3.

⇒ Measure the resistance between the ground (-) terminal (as shown on Figure 9-14) of the electronic circuit and the tube of the sensing probe; the resistance should be less than 10 Ω. If it is higher, the steel tape might be broken or the connection between the sensing probe circuit and the sensing probe tube might be interrupted.

⇒ **Test for short-circuit**

- Disconnect the tape at both ends: display unit side and sensing probe side (see sections 9.4.1 and 9.4.2).
- Measure the resistance between each conductor red-white, red-black, white-black. This resistance should be infinite as an open circuit. If not, the tape might be defective.

⇒ **Test for open-circuit (continuity)**

- Disconnect the tape at the sensing probe side see 9.4.1).
- Measure the resistance of each conductor of the tape (between red and red, white and white, etc.).
- The resistance should be less than 15 Ω. If not, the tape might be broken. To replace the tape see section 9.4.

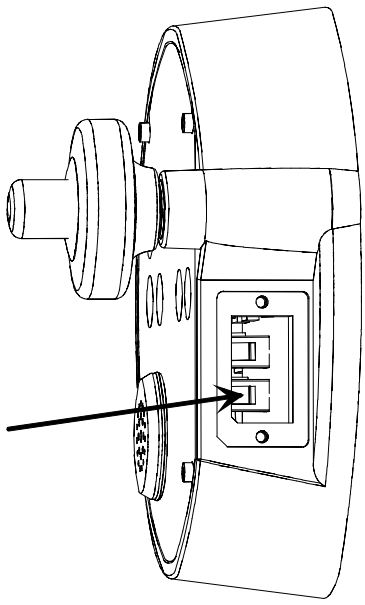


Figure 9-14

9.13 Visual inspection for damaged or missing parts

General condition: missing parts
Display unit: 5-key control pad, buzzer, front face, LED, screen
Sensing probe: sensors broken, smashed or damaged
Tape: check at least the first 3 m; wires still insulated, no breaks, no kinks, ...
Mechanical parts: check frame, axle, storage tube, wipers of tape cleaner, window wiper

9.14 Coated aluminium parts

PA 11: Rilsan = blue, grey or yellow colour
The coating should be subject to regular and careful inspection. The continued used of the apparatus should not be permitted if inspection reveals that the protective material has become damaged to the extend that the underlying protected metal is visible, until such damage has been satisfactorily repaired.

9.15 Winding action becoming stiff

If after repeated use the winding action is becoming slightly stiff apply the following simple process:
- engage the tape cleaner (position "UP"), with the sensor retained in the storage tube,
- slacken the tape a few turns, typically 10,
- gently shake the instrument to free up the tape within the tape housing,
- wind the tape again and disengage the tape cleaner (position "DOWN").

10. Trouble shooting

10.1 Safety warning

As this equipment is designed and approved for use in an explosive area (intrinsic safe equipment), only authorized service stations and the factory are allowed to repair electronic circuits.

However the customer can exchange parts and modules if the following points are observed :

1. Never open the instrument nor carry out any repair or trouble shooting in an hazardous area.

2. Use only original spare parts.

3. Work shall be done only by maintenance personnel who has an experience with intrinsically safe equipment.

The design of the equipment is modular, i.e. in case of breakdown the customer can find out which modules have to be replaced. The instrument consists of the following modules:

- Mechanical parts
- Sensing probe
- Tape assembly
- Display unit / electronic box
- Tape cleaner

The following sections should allow to identify the defective module and to replace it.

10.2 Power supply troubles

Symptom	Origin	Action	Section
The unit does not switch on	Battery too low	Change the battery	9.3
	Corrosion of terminals (battery side)	Clean the battery terminals	---
	Corrosion of terminals (display unit side)	Clean the display unit terminals	---
	Switch defective	Change the display unit	9.7
The unit switches on but stops on the message "battery"; the buzzer tones continuously	Battery too low	Change the battery	9.3

10.3 Transmission troubles

Symptom	Origin	Action	Section
"No Msg " is displayed	Sensor out of work or	Renew the sensor	9.5
	Tape out of work	Renew the tape	9.4
"Invalid" is displayed	Sensor out of work	Renew the sensor	9.5
"Unknown" is displayed	Sensor out of work	Renew the sensor	9.5

10.4 Ullage and/or Interface troubles

Symptom	Origin	Action	Section
The buzzer does not beep when the unit is switched on	Buzzer switched off or	Press on "-" to reactivate it	8.6
	Key-pad defective or	Pressing on "+" has no action Change the display unit	9.7
	Buzzer defective	Press on "+": "Settings" is displayed Change the display unit	9.7
The buzzer tones continuously when the sensing probe is in air or liquid or water	Battery too low	Change the battery	9.3
The buzzer gives the water signal whatever liquid is gauged	Sensing head contaminated by conductive residues	Wash, clean and brush (soft brush) the sensing head or change the sensor	--- 9.5
The buzzer gives the oil signal in water	Sensing head contaminated by non conductive residues	Wash, clean and brush (soft brush) the sensing head or change the sensor	--- 9.5

10.5 Temperature troubles

Symptom	Origin	Action	Section
"> 90°C" or "> 194°F"is displayed	Temperature to high	The temperature range shall be < 90°C / 194 °F	---
"< -40°C" or "< -40°F" is displayed	Temperature too low	The temperature range shall be > -40 °C/F	---
Temperature does not stabilise	Heated viscous liquid (such as heavy crude oils)	Check the stability in cold and hot water; if it is OK the problem is with the gauged liquid and not with the probe	---
	Contaminated sensing probe	Clean the temperature electrode; remove any residues or sludge; check the stability in cold and hot water	---

11. Specifications

General Specifications

Accuracy of ullage-interface detection	±2 mm (± 0.08” approx.)
Ullage, interface indication	Audible or visible
Tape length	15 m/50 ft, 30 m/100 ft, 35 m/115 ft
Tape graduation	Metric/English
Tape resolution	1 mm / 1/16”
Tape accuracy	±1.5 mm/30 m (±1/16”/100 ft approx.)

Meets ISO 4512 and API MPMS Chap 3.1A requirements

Diameter of probe (without load)	23 mm (29/32” approx.)
Minimum detectable tank bottom liquid level	4 mm (5/32” approx.)
Accuracy	±0.1°C (0°C to 70°C); ±0.2°F (32°F to 158°F)

meets ISO 4268, API MPMS Chap 7 and IP PMM Part IV requirements

Ambient temperature range	-20°C to 50 °C (-4°F to 122°F)
Temperature sensor measurement range	-40°C to 90°C (-40°F to to 194°F)
Temperature measurement resolution	0.01° or 0.1°, selectable
Temperature reading	°C or °F, selectable
LCD Display	8 characters
Mechanical coupling	Q2 (2”) or Q1 (1”)

Hazardous environments approvals

ATEX	II 1 G EEx ia IIB T4 / Tamb 50°C
Factory Mutual (FM Approvals)	CL I, DIV 1, GP C&D, T4 Tamb 50°C and CL I, ZN 0, AEx ia IIB T4 Tamb 50°C

Multifunctions-Sensor

Ullage detection	ultrasonic
Interface detection	conductivity
Temperature	Platinium RTD Pt 1000
Innage / Reference height	additional load (option)
Tape cleaning device	UP / DOWN tape cleaner
Tape protection tube	on all units equipped with TS storage tubes
Maintenance	modular design / easy exchange of parts

Specifications subject to change without notice.

12. Spare parts

12.1 How to proceed

Each spare part is identified by the letters TS followed by a 5 digits number, as for instance TS 12207 for the sensor or TS 10192 for the 30 meters tape.

Proceed as follows to identify the part you need to order:
1) Find the adequate drawing on the next pages;
2) Note the item TS number, ex. TS 10207;
3) With the assistance of the below table, identify its description, ex. "Sensor Ultra".

For each order, please note the item number, its description and the required quantity.
Example: TS 10207 "Sensor Ultra", 3 x.

12.2 List of parts descriptions

TS number	Description	Notes
10182	Storage tube S2-Q2 with load	
10183	Storage tube S1-Q2	
10184	Storage tube 1" S1-Q1	
10189	Battery holder assy	does not include TS 40300 & TS 37020
10190	Electronic box assy	does not include TS 11210 & TS 40765
10191	Tape 15m stand. double assy	kit (tape + 1 x TS 11603 + 1 x TS 40853)
10192	Tape 30m stand. double assy	kit (tape + 1 x TS 11603 + 1 x TS 40853)
10193	Tape 35m stand. double assy	kit (tape + 1 x TS 11603 + 1 x TS 40853)
10207	Sensor Ultra	
10210	Display unit assy	
11025	Nut for load 700gr	
11026	Load 700gr	
11082	Security tube assy	
11129	Ball Inox Ø5.556 (7/32")10x	
11130	Compression spring	
11131	Clip	
11132	O-Ring Ø29.7x3.5	
11169	Heat shrink tube 24/8 x 80	
11189	Quick coupler lock	
11207	Axle bearing	
11208	Bearing for tape cleaner	
11209	Belt	
11210	Tape holder	
11211	Electronic box	
11213	Button handle	
11214	Connecting lever	
11215	Tape cover	
11216	Spacer	
11217	Gasket for electronic unit	
11218	Finger for handle	

11221	Index	
11222	Collar for connector 2"	
11223	Knob	
11226	Index block	
11227	Washer holder	
11228	Screw cup	
11235	Plate for battery holder	
11240	Wiper holder	
11246	Spring for battery holder	
11248	Gasket for battery holder	
11249	Battery holder	
11252	O-Ring Ø26.7 x 1.78	
11254	Storage tube 1" - Q1	without gaskets
11255	Storage tube 1" - Q2	without gaskets
11257	Reel axle assy	
11259	External part of knob	
11260	Knob for handle	
11263	Front face assy	without gasket
11267	External reel flange	
11268	Frame Rtex	
11600	O-Ring Ø31x2	
11603	O-Ring Ø15x3	
12047	Lever	
12086	Gasket for electronic box	
12107	Wiper Viton	
14093	Spring	
20541	O-Ring Ø56.74x3.53	
20549	Clip	
35069	LCD 1x8 alphanum assy	
37004	Buzzer SC 235 B	
37020	Bat 9v alka mang Procell MN 1604	
37314	Push Button Distancer	
37340	PCB Display UTImeter Tested Assy	
37354	Hard Paper Washer 2.2mm	
40220	Dowel pin 3x35	
40300	Socket head cap screw M3x8	
40303	Socket head cap screw M4x12	
40306	Socket head cap screw M3x10	
40316	Socket head cap screw M3x6	
40555	Spacer M-M M3x6/M3x8	
40611	Slotted flat head mach. screw M5x16	
40621	Flat head socket screw M5x12	
40765	Socket button head cap screw M4x10	
40775	Cover cap S6	
40853	Socket set screw M3x3	
40857	Socket set screw M4x6	
40859	Socket set screw M4x4	
40906	Crescent ring Ø17 Benzing	

12.3 Spare parts drawings

The next pages show the following drawings:

- Figure 12-1 : general assembly, list of the main spare parts
- Figure 12-2: display unit assembly TS 10210, details
- Figure 12-3: battery holder assembly TS 10189, details
- Figure 12-4: electronic box assembly TS 10190, details
- Figure 12-5: storage tube SS1-Q1 TS 10184, details
- Figure 12-6: storage tube SS1-Q2 TS 10183, details
- Figure 12-7: storage tube SS2-Q2 with load TS 10182, details
- Figure 12-8: tape cleaner, details

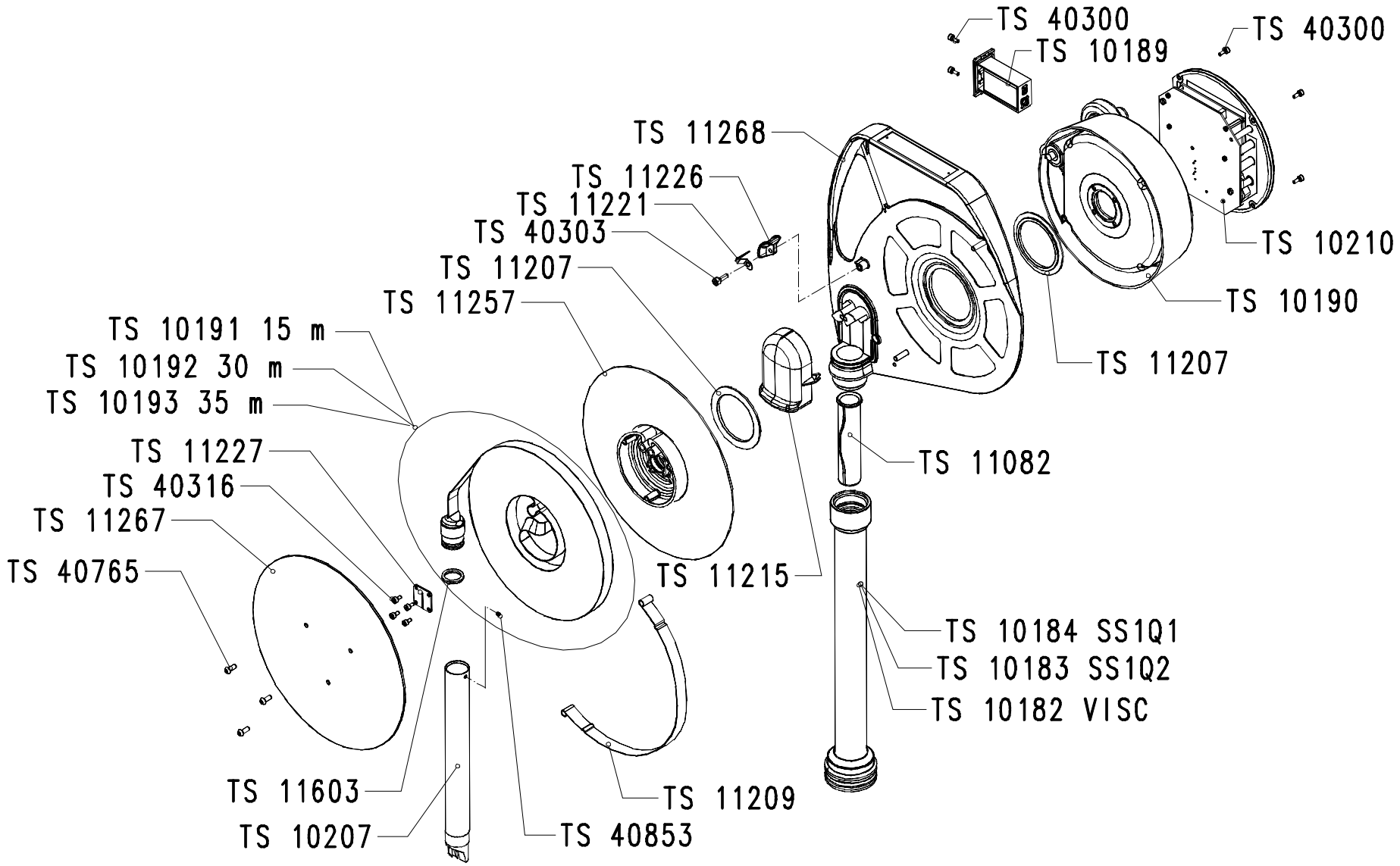


Figure 12-1 : general assembly, list of the main spare parts

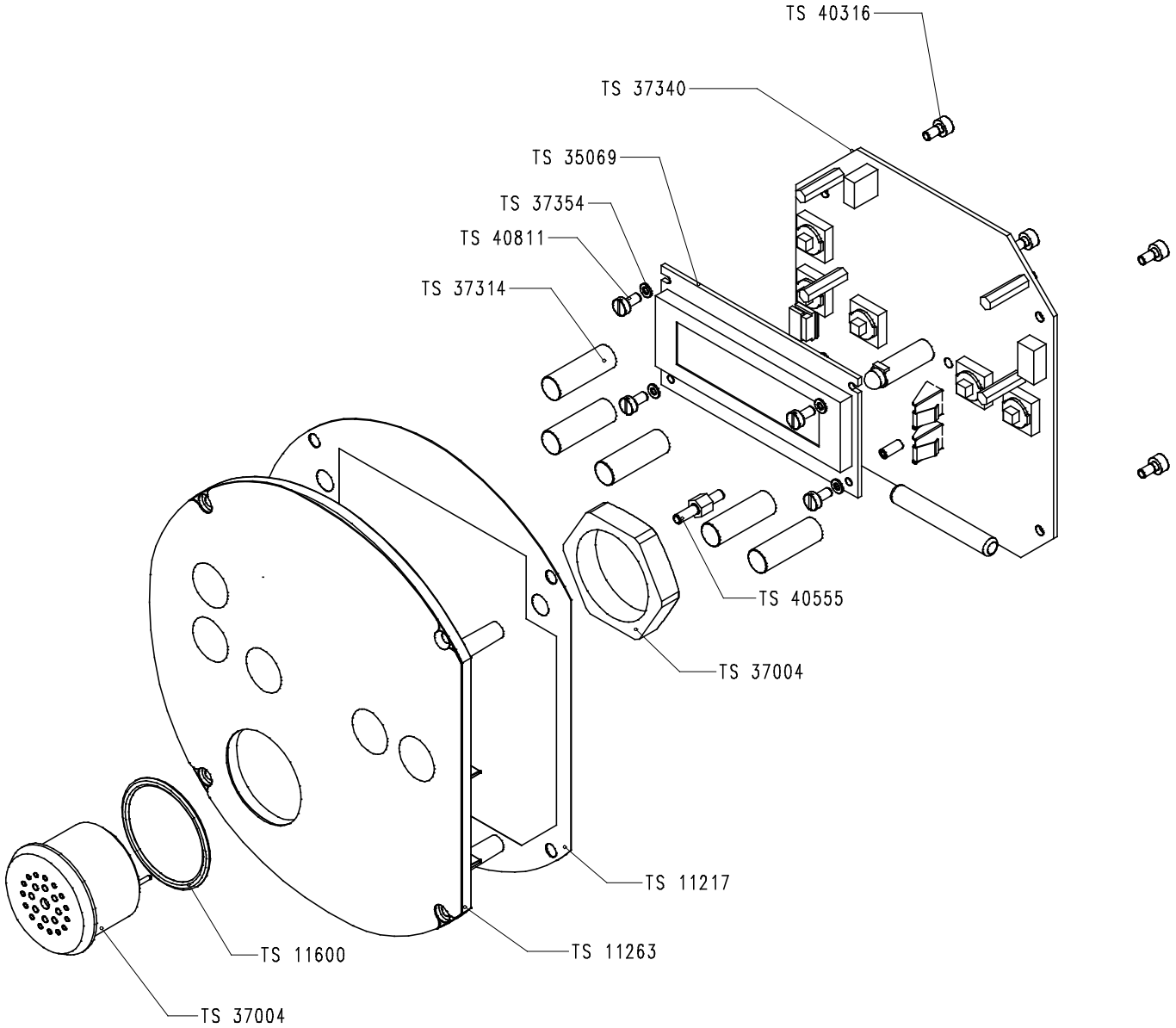


Figure 12-2: display unit assembly TS 10210, details

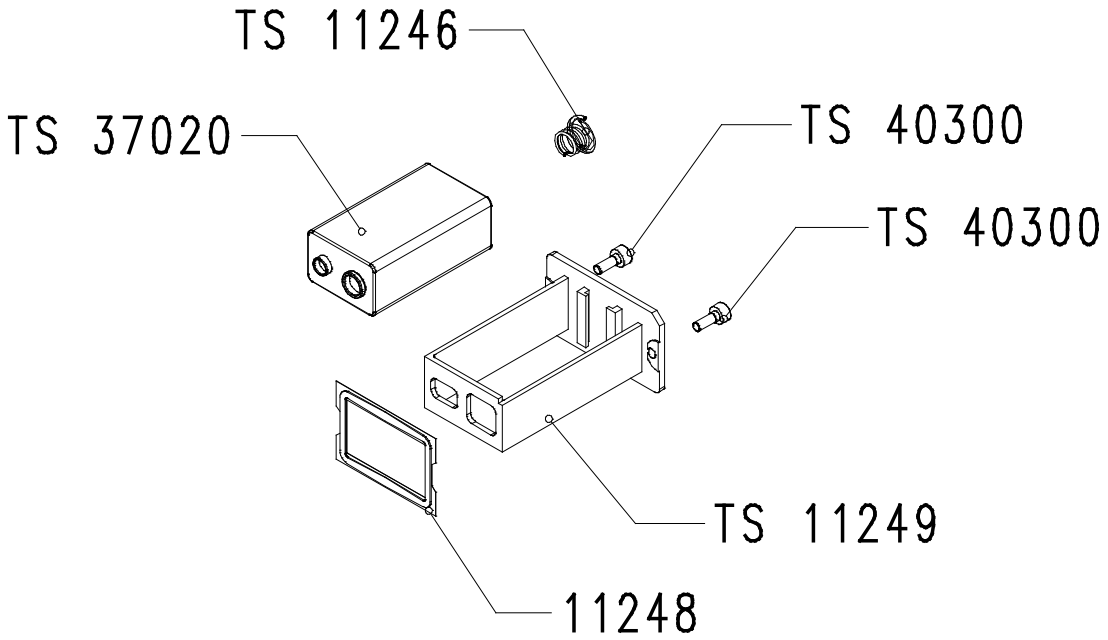


Figure 12-3: battery holder assembly TS 10189, details
(the screws TS 40300 are not included in the TS 10189 assembly; they shall be ordered separately)

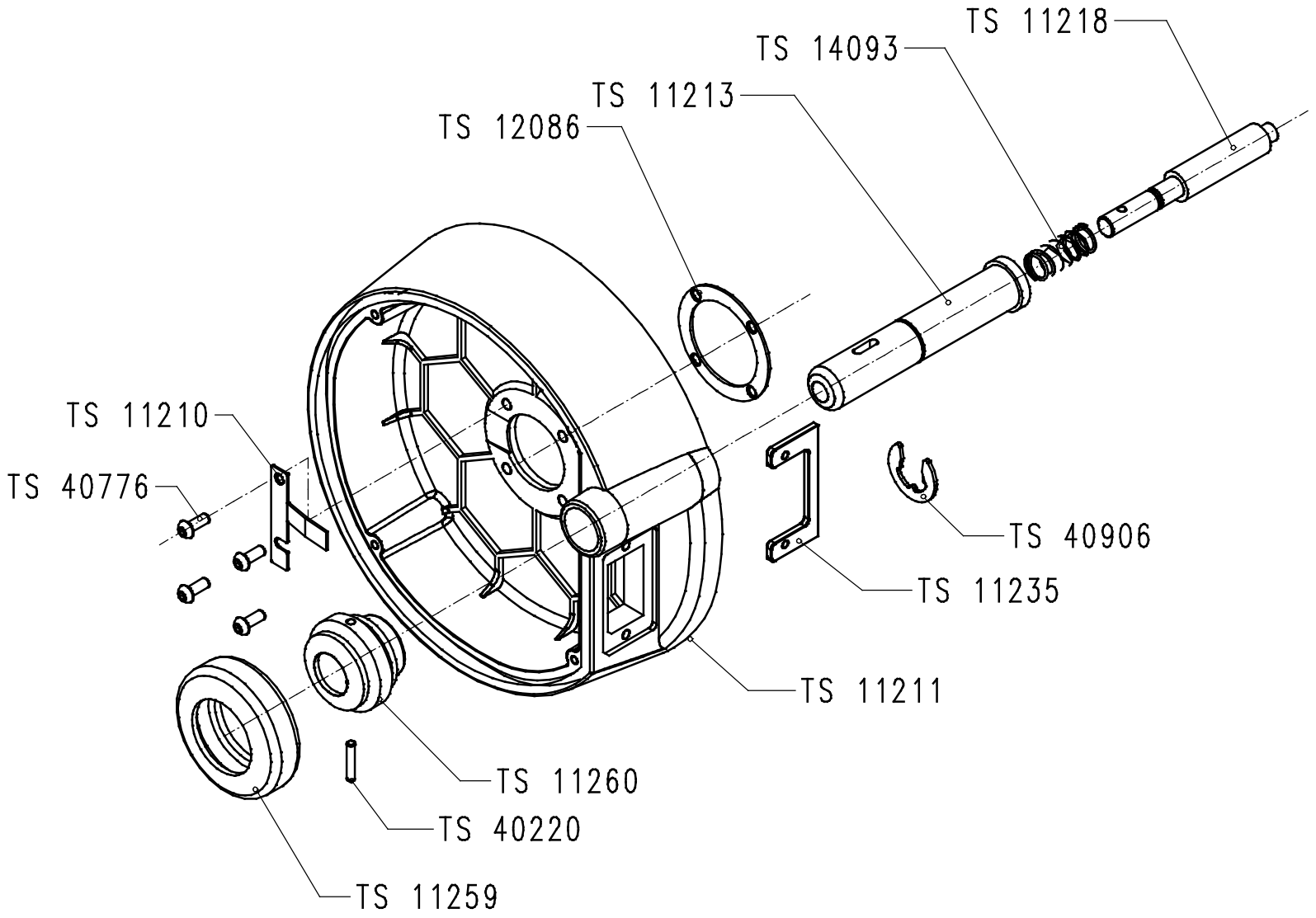


Figure 12-4: electronic box assembly TS 10190, details

(the screws TS 40765 and the plate TS 11210 are not included in the TS 10190 assembly; they shall be ordered separately)

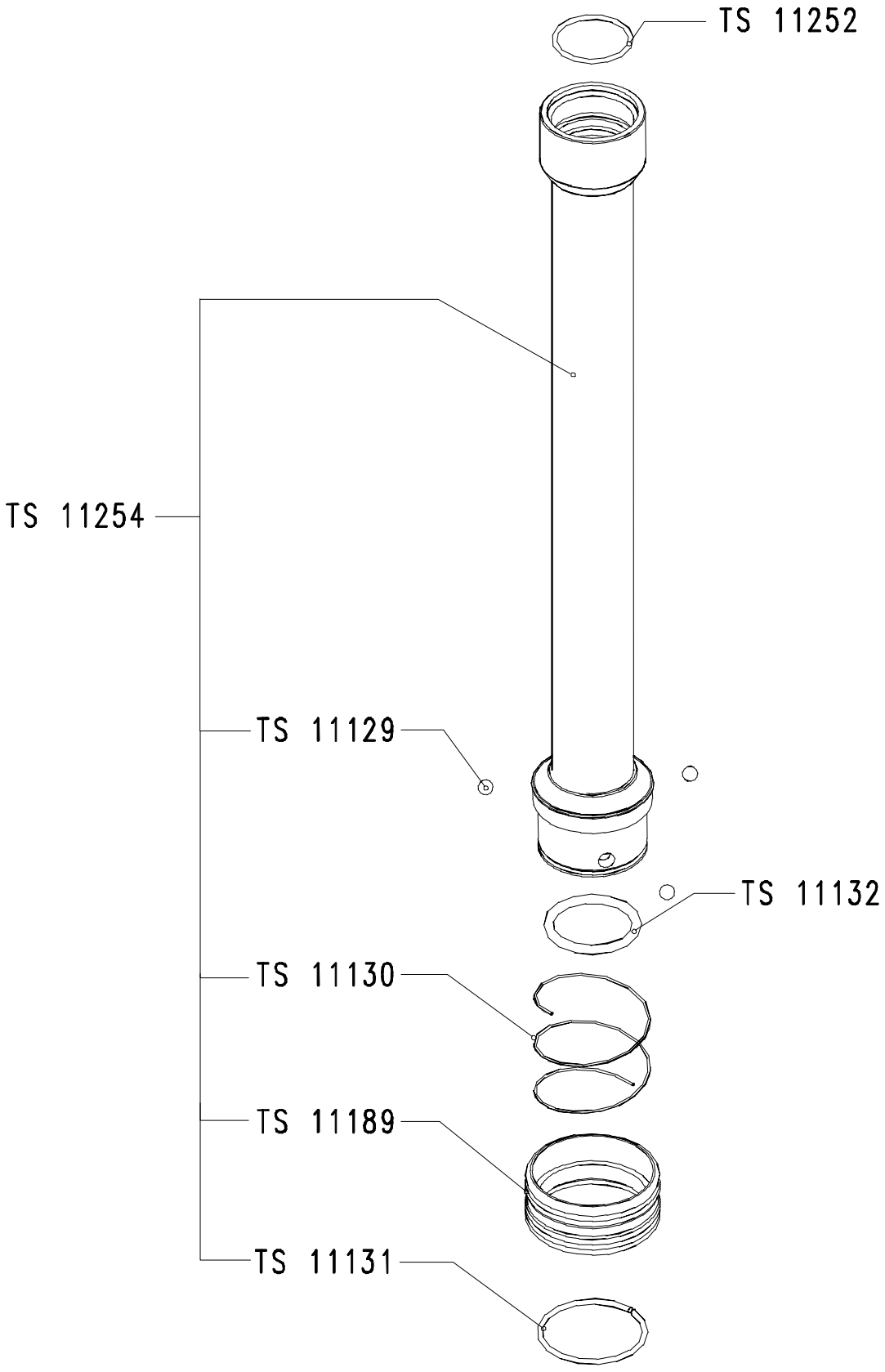


Figure 12-5: storage tube SS1-Q1 TS 10184, details

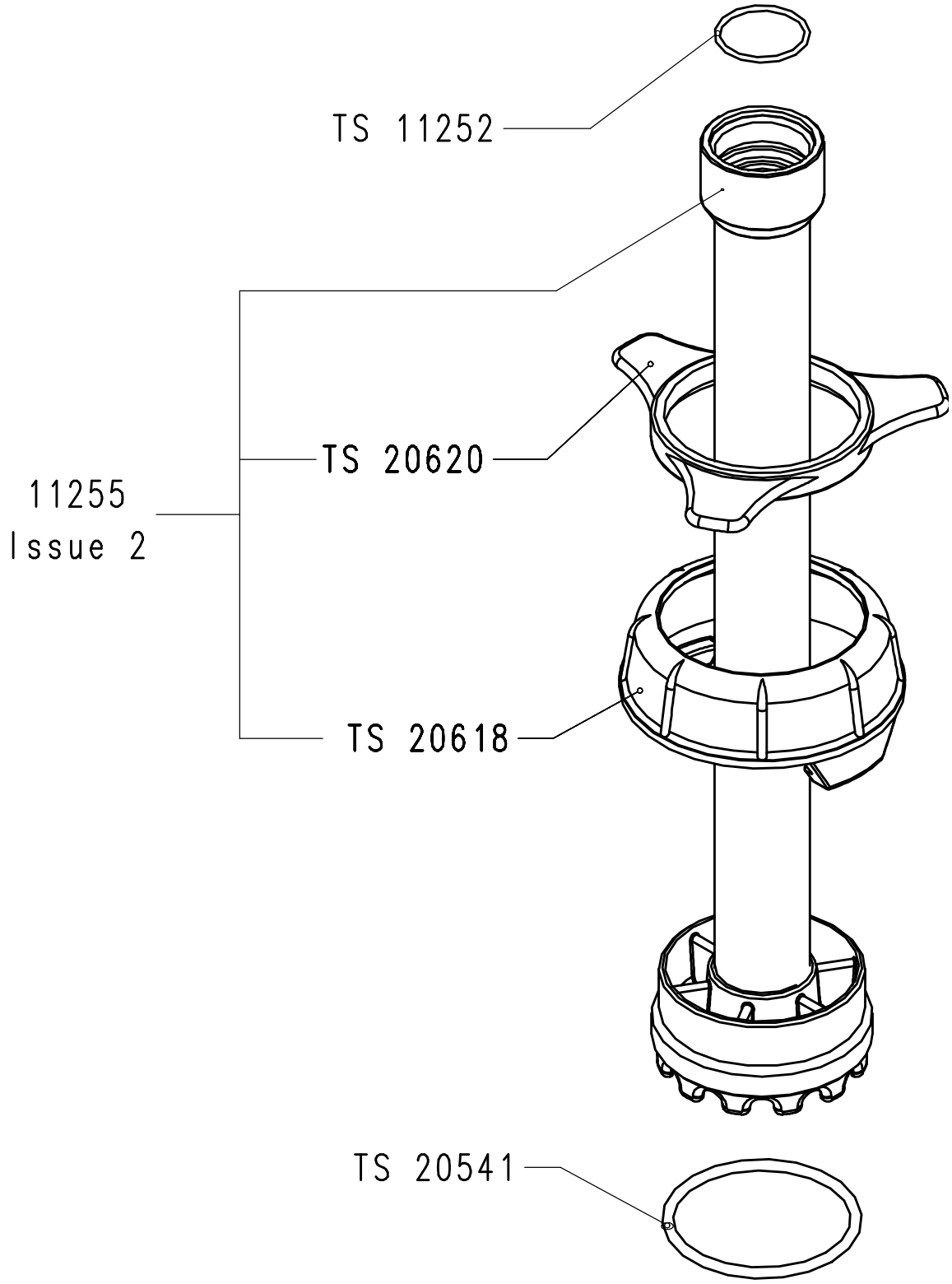


Figure 12-6: storage tube SS1-Q2 TS 10183, details

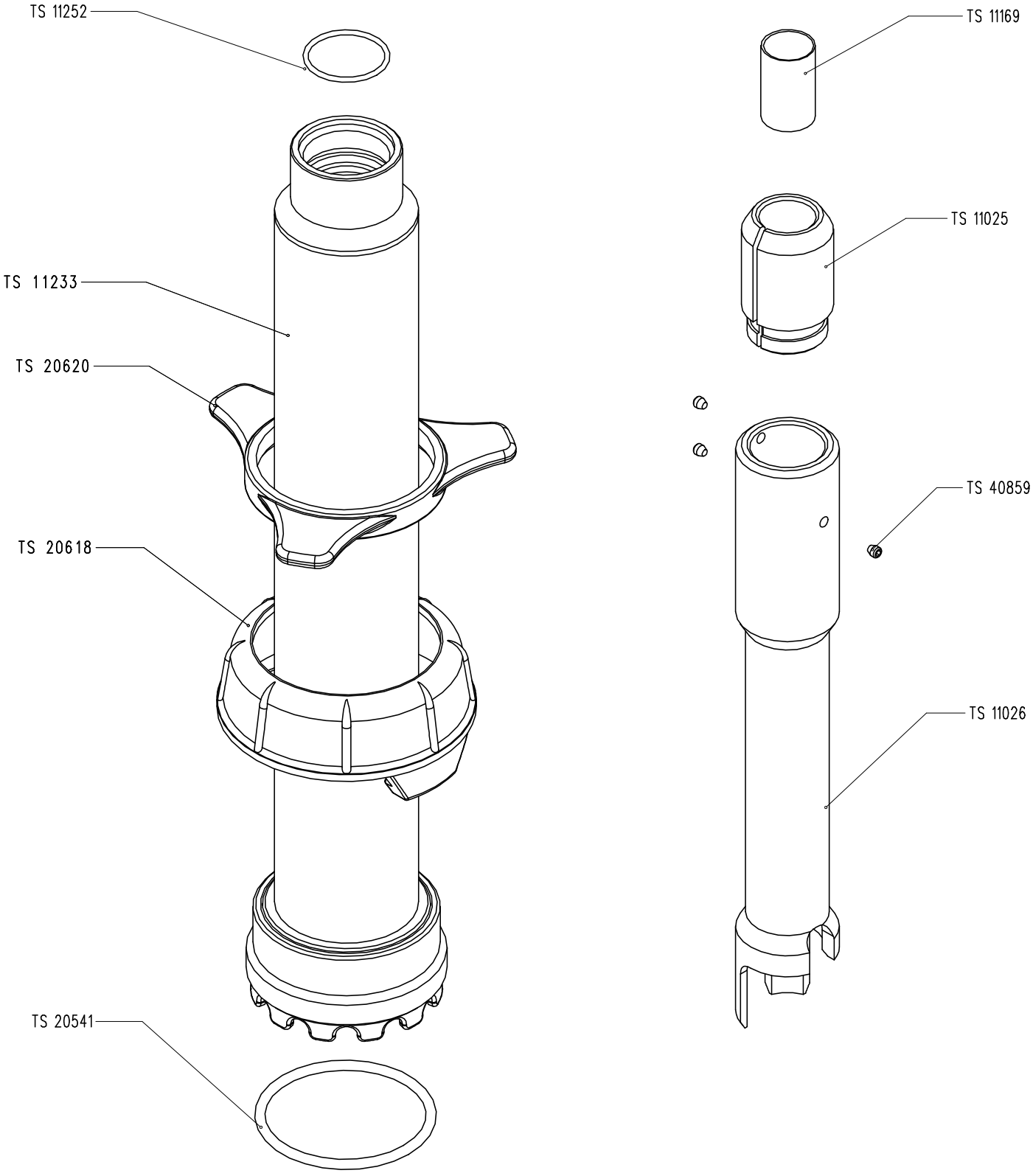


Figure 12-7: storage tube SS2-Q2 with load TS 10182, details

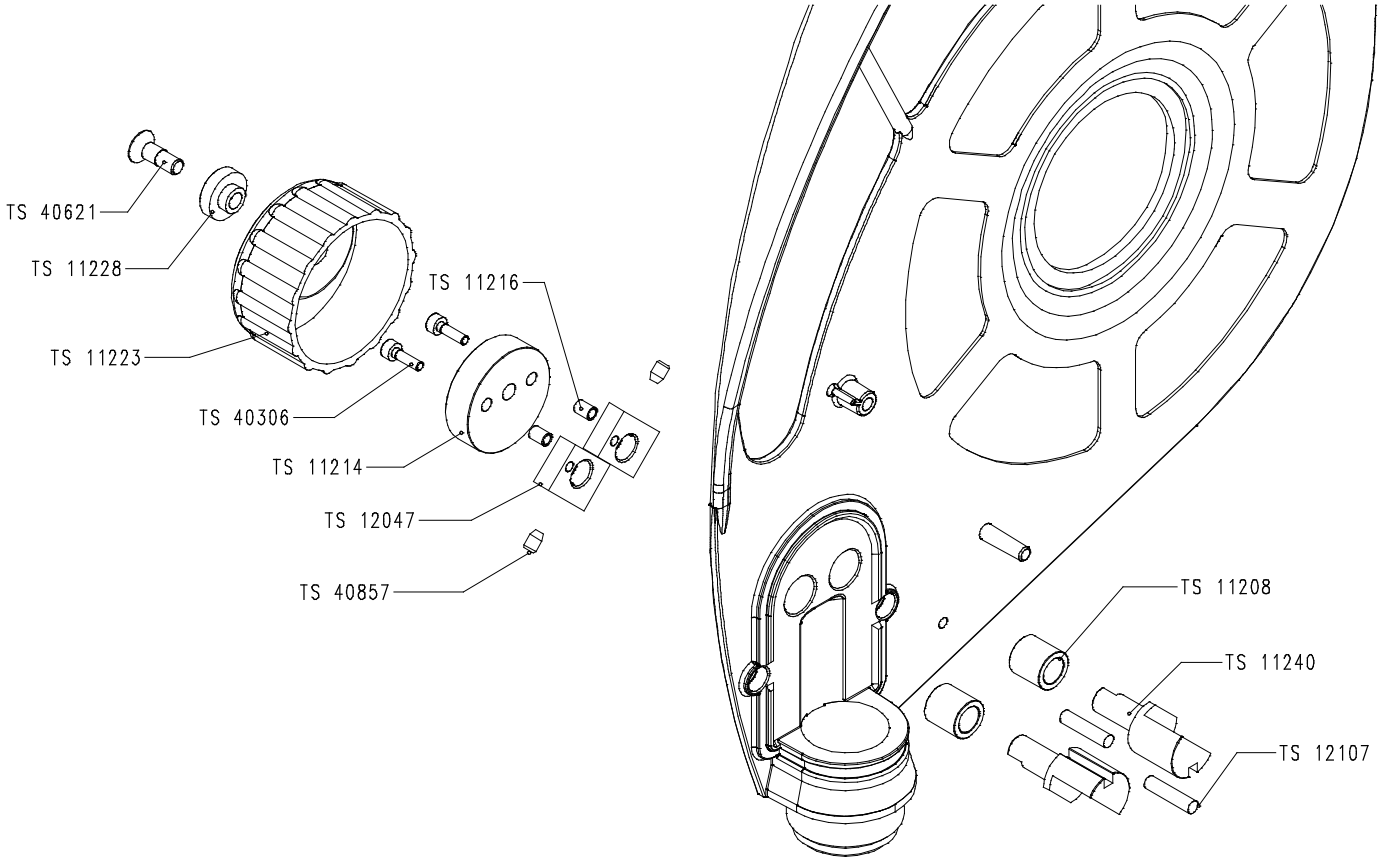


Figure 12-8: tape cleaner, details

13. Valves drawings & Declaration of conformity

These documents are enclosed in following pages.

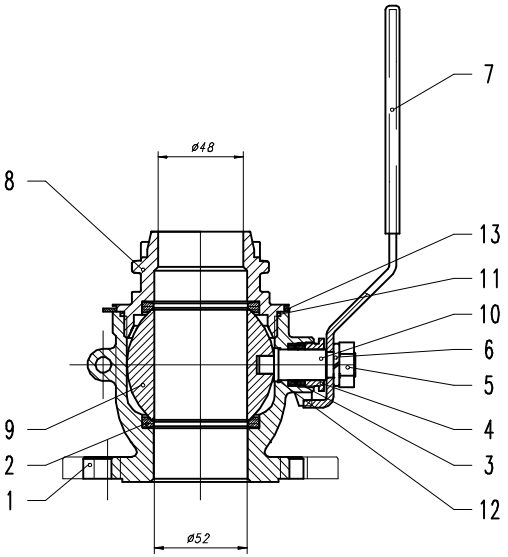
13.1 Valves

Description	ND	TS
Valve C2-SS-W, 2” flange DUJ, weather cap	20291	10083
Valve C2-SS-SEC, 2” flange DUJ, security cover	20287	10082
Valve C2-SS-BL, 2” flange DUJ, blind cover	20288	10081
Valve C2-SS-BL, 2" female, blind cover	30596	10085
Valve C2-SS-W, 2" female, weather cap	30391	10076
Valve C2-SS-SEC, 2" female, security cover	30374	10078
Valve C1-SS-W, 1” thread male, weather cap	30230	10055
Deck valve A-2 1/2" SS-W, 2 1/2” flange, weather cap	30393	10052
Deck valve A-4" SS-W, 4” flange, weather cap	20252	10053
Security cover with lock	40495	10408
Cover with weather cap	41040	10415
Weather cap assy	40543	22609
Blind cover	41034	10414

Important: Valves are supplied separately from Samplers. There are not included in Sampler scope of supply.

13.2 Declaration of conformity

TS 10413
ND 20283



Valve fits on flange:

DIN PN10 DN50

DIN PN16 DN50

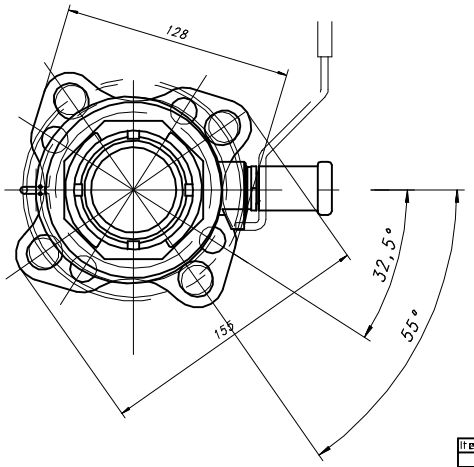
DIN PN25 DN50

DIN PN40 DN50

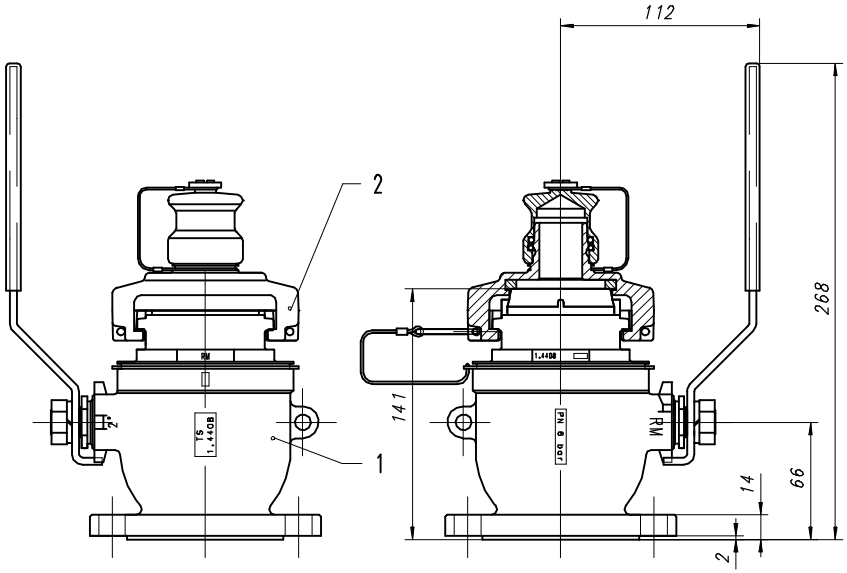
JIS 5K 50

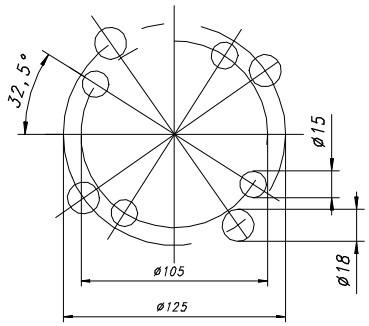
JIS 10K 50

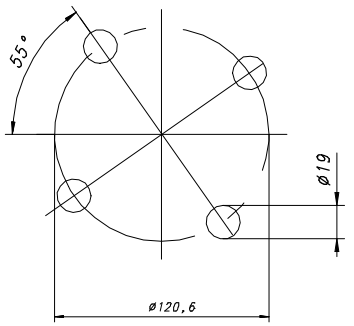
ANSI 150lbs 2"



Item	Qt	Weight	Description	Material	TS #	ND #
1	1	0	Body DUJ	1.4408	22649	-
2	2	0	Seat ø53/66x6	TFE	22630	40772
3	1	0	Stem packing ø17/23.9x8.5(2pces)	TFE	22631	40773
4	1	0	Gland	AISI 304	22632	40774
5	1	0	Nut	AISI 304	22633	-
6	1	0	Spring washer	AISI 304	22634	-
7	1	207	Handle	AISI304/PE	22635	40775
8	1	0	End cap	1.4408	22650	-
9	1	0	Ball DIN	1.4436	22645	40780
10	1	0	Stem	AISI 316	22638	40777
11	1	0	Gasket ø86/90x2.5	TFE	22640	40778
12	1	0	Gasket ø17/17x1	TFE	22641	40779
13	1	0	Washer for cable on valve	AISI 304	22648	40996







Item	Qt	Weight	Description	Material	TS #	ND #
1	1	4480	Compact valve C2 DUJ	-	10413	20283
2	1	590	Cover with weather cap	-	10415	41040

TOLERANCES UNLESS OTHERWISE SPECIFIED

Nom.Size	Over	6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	3000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

Weight: 5070 Th. 0 Eff.

REMOVE ALL BURRS AND SHARP EDGES

1:2

ISSUE 2 : 16.2.1999

MPSA 3110

Drawn: UPR 27.11.1996 Control: CPI 06.01.1997

Replacement for: ND Replaced by: ND

Valves

HERMetic Compact Valve C2-SS-W 2" flange DUJ

TS 10083

ND 20291

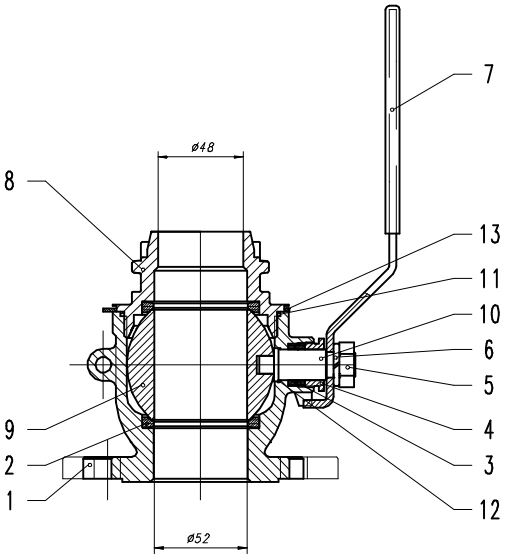
REF ND

Item | Qt | Weight | Description | Material | TS # | ND #

Issue | Date | Visa | Modification

Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505

TS 10413
ND 20283



Valve fits on flange:

DIN PN10 DN50

DIN PN16 DN50

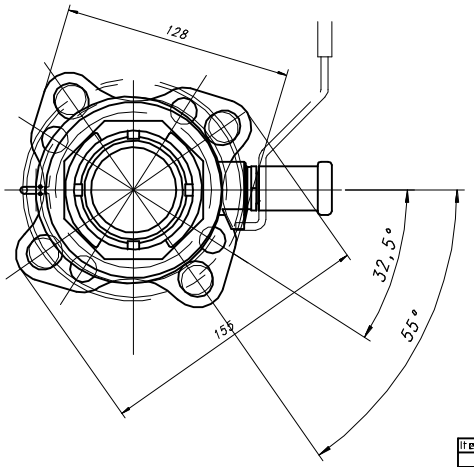
DIN PN25 DN50

DIN PN40 DN50

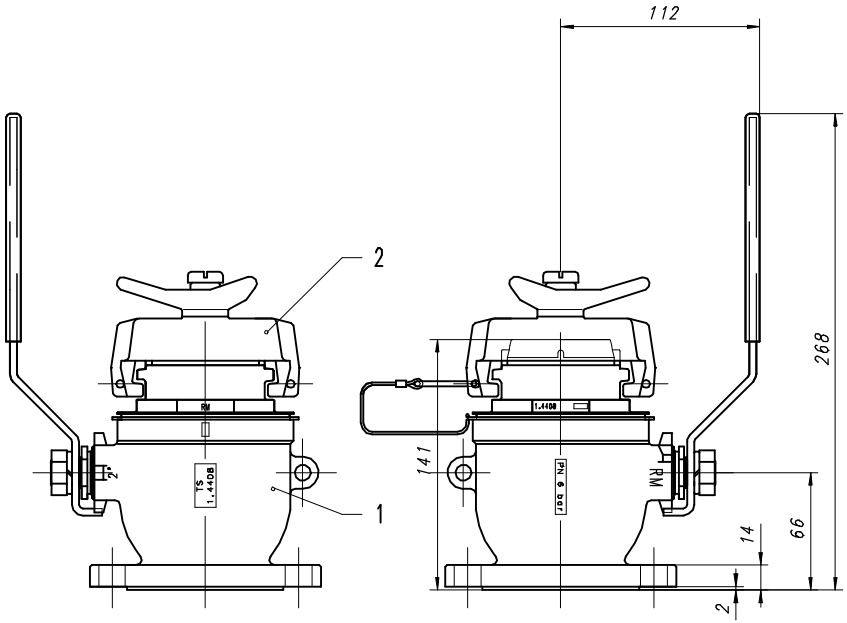
JIS 5K 50

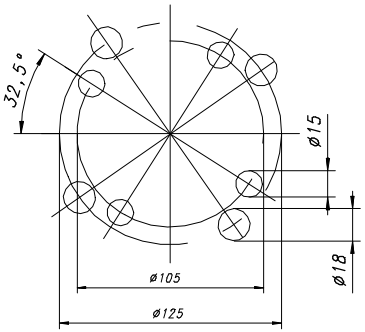
JIS 10K 50

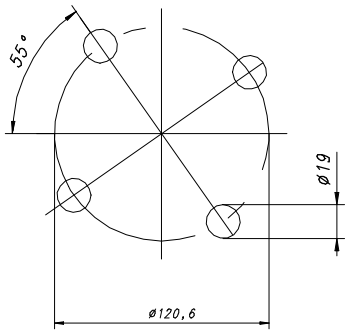
ANSI 150lbs 2"



Item	Qt	Weight	Description	Material	TS #	ND #
1	1	0	Body DUJ	1.4408	22649	-
2	2	0	Seat ø53/66x6	TFE	22630	40772
3	1	0	Stem packing ø17/23.9x8.5(2pces)	TFE	22631	40773
4	1	0	Gland	AISI 304	22632	40774
5	1	0	Nut	AISI 304	22633	-
6	1	0	Spring washer	AISI 304	22634	-
7	1	207	Handle	AISI304/PE	22635	40775
8	1	0	End cap	1.4408	22650	-
9	1	0	Ball DIN	1.4436	22645	40780
10	1	0	Stem	AISI 316	22638	40777
11	1	0	Gasket ø86/90x2.5	TFE	22640	40778
12	1	0	Gasket ø17/17x1	TFE	22641	40779
13	1	0	Washer for cable on valve	AISI 304	22648	40996







Item	Qt	Weight	Description	Material	TS #	ND #
1	1	4480	Compact valve C2 DUJ	-	10413	20283
2	1	957	Security cover w/Lock	-	10408	40495

TOLERANCES UNLESS OTHERWISE SPECIFIED

Nom.Size	Over	6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	3000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Weight: 5437 Th. 0 Eff.

1:2

ISSUE 2 : 16.2.1999

MPSA 3110

Drawn: UPR 27.11.1996 Control: CPI 06.01.1997

Replacement for: ND Replaced by: ND

Valves

HERMetic Compact Valve C2-SS-SEC 2" flange DUJ

TS 10082

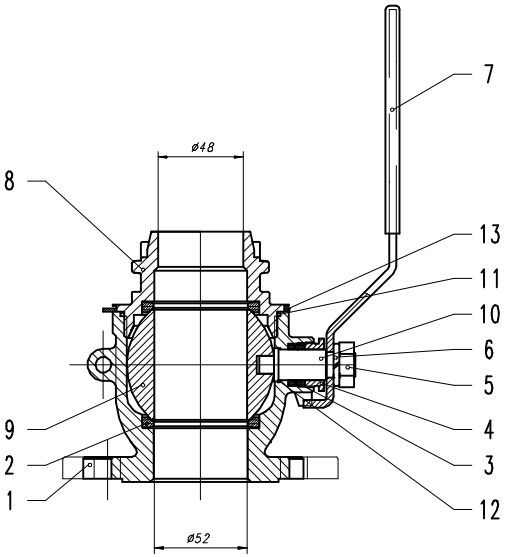
ND 20287

REF ND

Modification | Visa | Date

Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505

TS 10413
ND 20283



Valve fits on flange:

DIN PN10 DN50

DIN PN16 DN50

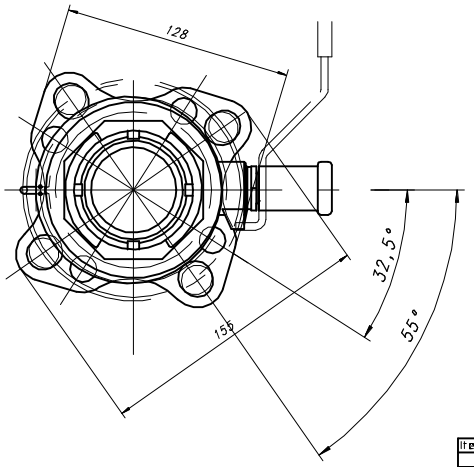
DIN PN25 DN50

DIN PN40 DN50

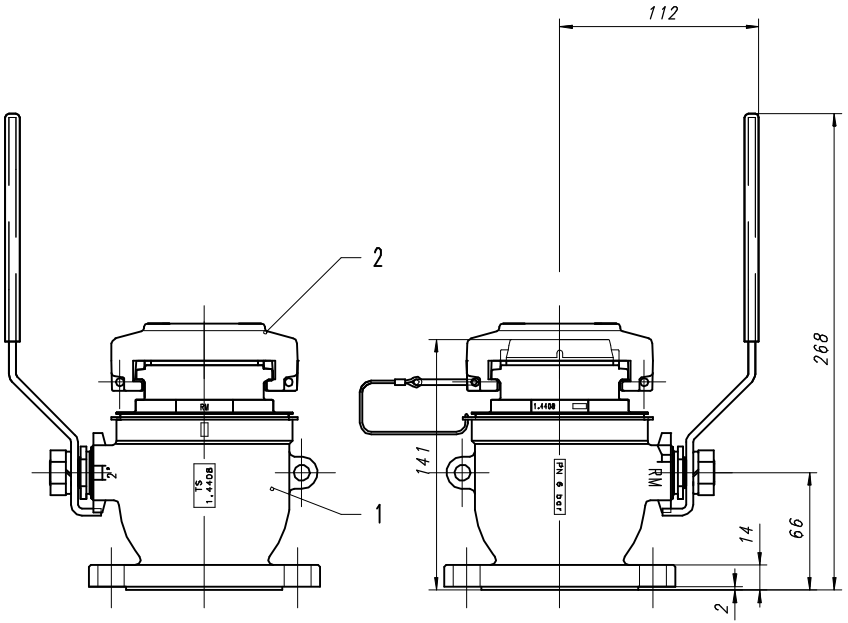
JIS 5K 50

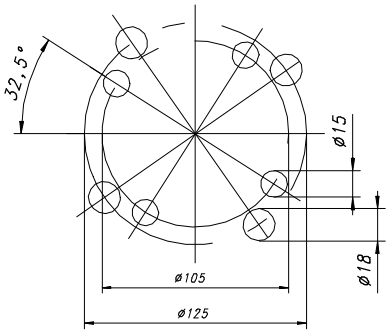
JIS 10K 50

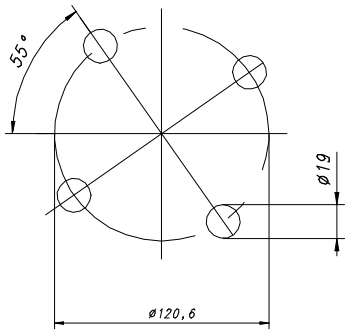
ANSI 150lbs 2"



Item	Qt	Weight	Description	Material	TS #	ND #
1	1	0	Body DUJ	1.4408	22649	-
2	2	0	Seat ø53/66x6	TFE	22630	40772
3	1	0	Stem packing ø17/23.9x8.5(2pces)	TFE	22631	40773
4	1	0	Gland	AISI 304	22632	40774
5	1	0	Nut	AISI 304	22633	-
6	1	0	Spring washer	AISI 304	22634	-
7	1	207	Handle	AISI304/PE	22635	40775
8	1	0	End cap	1.4408	22650	-
9	1	0	Ball DIN	1.4436	22645	40780
10	1	0	Stem	AISI 316	22638	40777
11	1	0	Gasket ø86/90x2.5	TFE	22640	40778
12	1	0	Gasket ø17/17x1	TFE	22641	40779
13	1	0	Washer for cable on valve	AISI 304	22648	40996







Item	Qt	Weight	Description	Material	TS #	ND #
1	1	4480	Compact valve C2 DUJ	-	10413	20283
2	1	370	Blind cover assy	-	10414	41034

TOLERANCES UNLESS OTHERWISE SPECIFIED

Nom.Size	Over	6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	3000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Weight: 4850 Th. 0 Eff.

1:2

ISSUE 2 : 16.2.1999

MPSA 3110

Drawn: UPR 27.11.1996 Control: CPI 06.01.1997

Replacement for: ND Replaced by: ND

Valves

HERMetic Compact Valve C2-SS-BL 2" flange DUJ

TS 10081

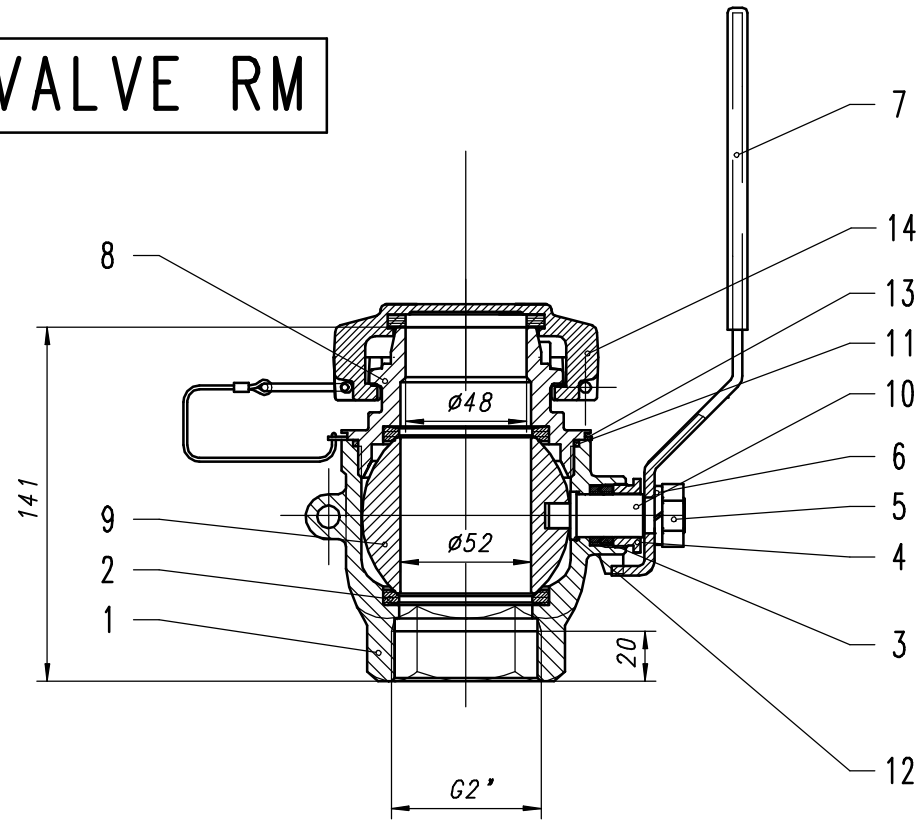
ND 20288

REF ND

Modification | Visa | Date

Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505

VALVE RM



Item	Qt	Weight	Description	Material	TS #	ND #
1	1	0	Body 2" female	1.4408	22646	-
2	2	0	Seat ¢53/66x6	TFE	22630	40772
3	1	0	Stem packing ¢17/23.9x8.5(2pces)	TFE	22631	40773
4	1	0	Gland	AISI 304	22632	40774
5	1	0	Nut	AISI 304	22633	-
6	1	0	Spring washer	AISI 304	22634	-
7	1	207	Handle	AISI304/PE	22635	40775
8	1	0	End cap	1.4408	22650	-
9	1	0	Ball 2"	1.4436	22645	40780
10	1	0	Stem	AISI 316	22638	40777
11	1	0	Gasket ¢86/90x2.5	TFE	22640	40778
12	1	0	Gasket ¢17/17x1	TFE	22641	40779
13	1	0	Washer for cable on valve	AISI 304	22648	40996

Item	Qt	Weight	Description	Material	TS #	ND #
14	1	370	Blind cover assy	-	10414	41034

TOLERANCES UNLESS OTHERWISE SPECIFIED									
Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Drawn: UPR 21.04.1994

Control:

Weight: Th. 4300 Eff.

1:2

ISSUE 2 : 25.6.1999

MPSA 4110

Replacement for: ND

Replaced by: ND

Valves

HERMetic Compact Valve C2-SS-BL 2" Female

TS 10085

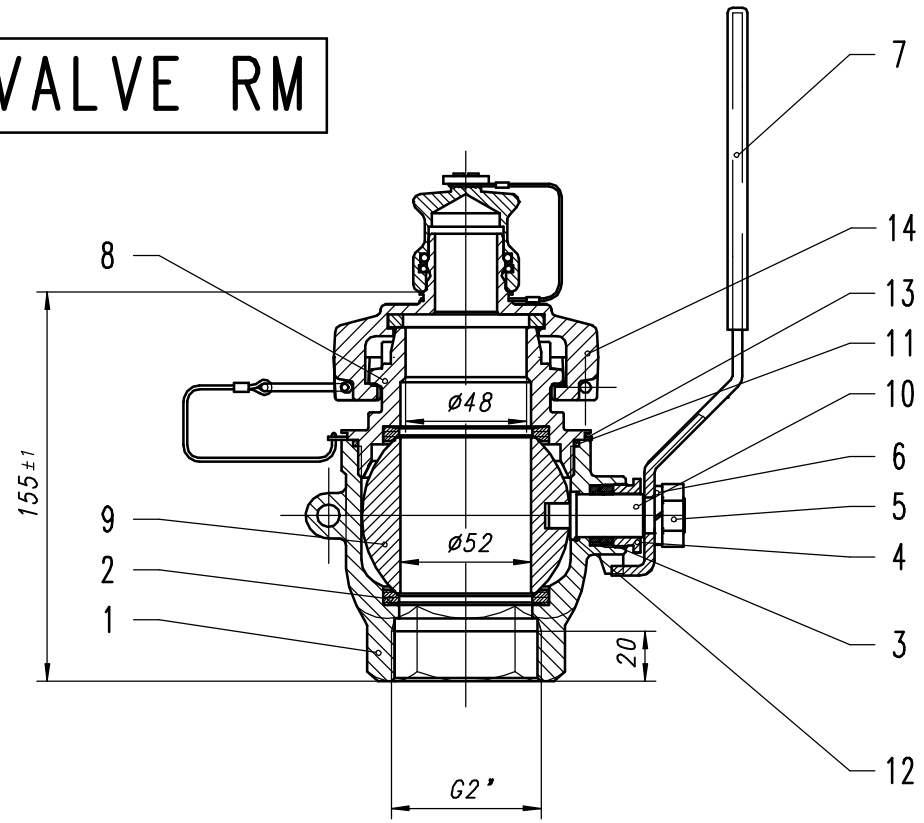
ND 30596

REF ND

Modification | Visa | Date | Is

Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505

VALVE RM



Item	Qt	Weight	Description	Material	TS #	ND #
1	1	0	Body 2" female	1.4408	22646	-
2	2	0	Seat ¢53/66x6	TFE	22630	40772
3	1	0	Stem packing ¢17/23.9x8.5(2pces)	TFE	22631	40773
4	1	0	Gland	AISI 304	22632	40774
5	1	0	Nut	AISI 304	22633	-
6	1	0	Spring washer	AISI 304	22634	-
7	1	207	Handle	AISI304/PE	22635	40775
8	1	0	End cap	1.4408	22650	-
9	1	0	Ball 2"	1.4436	22645	40780
10	1	0	Stem	AISI 316	22638	40777
11	1	0	Gasket ¢86/90x2.5	TFE	22640	40778
12	1	0	Gasket ¢17/17x1	TFE	22641	40779
13	1	0	Washer for cable on valve	AISI 304	22648	40996

Item	Qt	Weight	Description	Material	TS #	ND #
14	1	590	Cover with weather cap	-	10415	41040

+ Pos. 13	upr	12.2.96	-2
Modification	V'iso	Date	Is

TOLERANCES UNLESS OTHERWISE SPECIFIED

Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Weight: 4390 Eff.

ISSUE 3 : 25.6.1999

Drawn: UPR 21.04.1994

Control:

1:2

MPSA 4110

Replacement for: ND

Replaced by: ND

Valves

HERMetic Compact Valve C2SS 2" Female

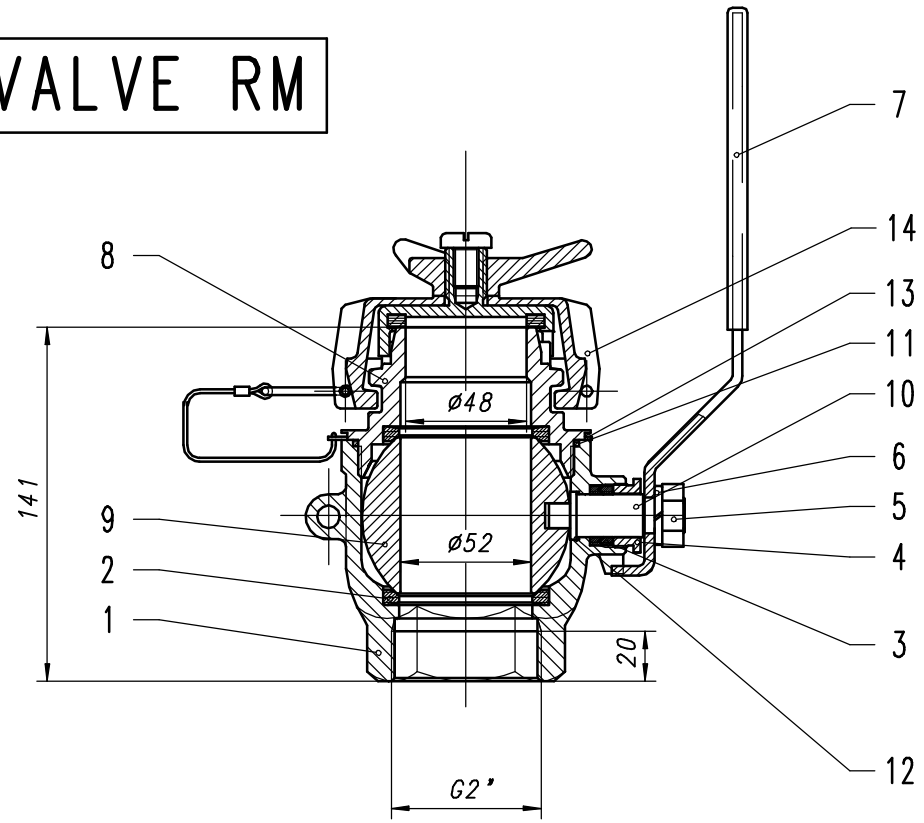
TS 10076

ND 30391

REF ND

Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505

VALVE RM



Item	Qt	Weight	Description	Material	TS #	ND #
1	1	0	Body 2" female	1.4408	22646	-
2	2	0	Seat ¢53/66x6	TFE	22630	40772
3	1	0	Stem packing ¢17/23.9x8.5(2pces)	TFE	22631	40773
4	1	0	Gland	AISI 304	22632	40774
5	1	0	Nut	AISI 304	22633	-
6	1	0	Spring washer	AISI 304	22634	-
7	1	207	Handle	AISI304/PE	22635	40775
8	1	0	End cap	1.4408	22650	-
9	1	0	Ball 2"	1.4436	22645	40780
10	1	0	Stem	AISI 316	22638	40777
11	1	0	Gasket ¢86/90x2.5	TFE	22640	40778
12	1	0	Gasket ¢17/17x1	TFE	22641	40779
13	1	0	Washer for cable on valve	AISI 304	22648	40996

Item	Qt	Weight	Description	Material	TS #	ND #
14	1	957	Security cover w/lock	-	10408	40495

Modification	Visa	Date	Is
+ Pos. 13	upr	12.2.96	-2

TOLERANCES UNLESS OTHERWISE SPECIFIED

Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Weight: 4746 Eff.

ISSUE 3 : 25.6.1999

Drawn: UPR 21.04.1994

Control:

1:2

MPSA 4110

Replacement for: ND

Replaced by: ND

Valves

HERMetic Compact Valve C2-SS-SEC 2" Female

TS 10078

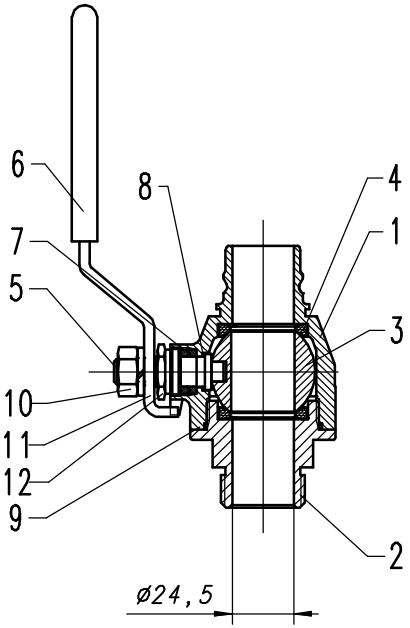
ND 30374

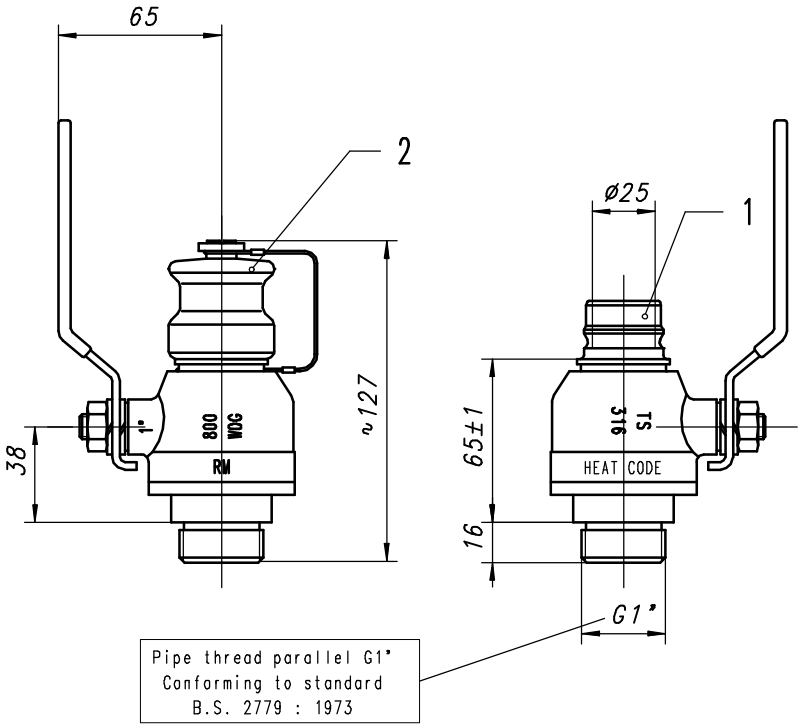
REF ND

Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505

VALVE RM

TS 10405
ND 30373





Pipe thread parallel G1"
Conforming to standard
B.S. 2779 : 1973

Please check production code when ordering parts :
RM letters use top parts list
No letters or RH contact TS Tanksystem for parts list

Item	Qt	Weight	Description	Material	TS #	ND #
1	1	860	Valve Compact 1"	-	10405	30373
2	1	166	Weather cap assy	AISI 316	22609	40543

Item	Qt	Weight	Description	Material	TS #	ND #
1	1	0	Body	AISI 316	22617	30552
2	1	0	End cap	AISI 316	22618	30553
3	1	0	Ball	AISI 316	22619	40756
4	2	0	Seat ¢25.6/36x5	PTFE	22620	40757
5	1	0	Stem	AISI 316	22621	40758
6	1	0	Plastic coated handle	AISI304/PE	22622	40832
7	1	0	Stem packing ¢12/17.5x7.5(2pces)	TFE	22623	40759
8	1	0	Stem steal	TFE	22624	40760
9	1	0	Gasket ¢44.5/46.8x2.5	TFE	22625	40761
10	1	0	Nut	AISI 304	22626	-
11	2	0	Spring washer	AISI 304	22627	-
12	1	0	Gland	AISI 304	22628	40762

0 Th.

TOLERANCES UNLESS OTHERWISE SPECIFIED									
Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

Weight: 1026 Th. 1050 Eff.

ISSUE 2 : 25.10.1999

REMOVE ALL BURRS AND SHARP EDGES

Drawn: mas 14.07.1992

Control:

1:2

MPSA 4110

Replacement for: ND

Replaced by: ND

Modification | Visa | Date | Is

Valves

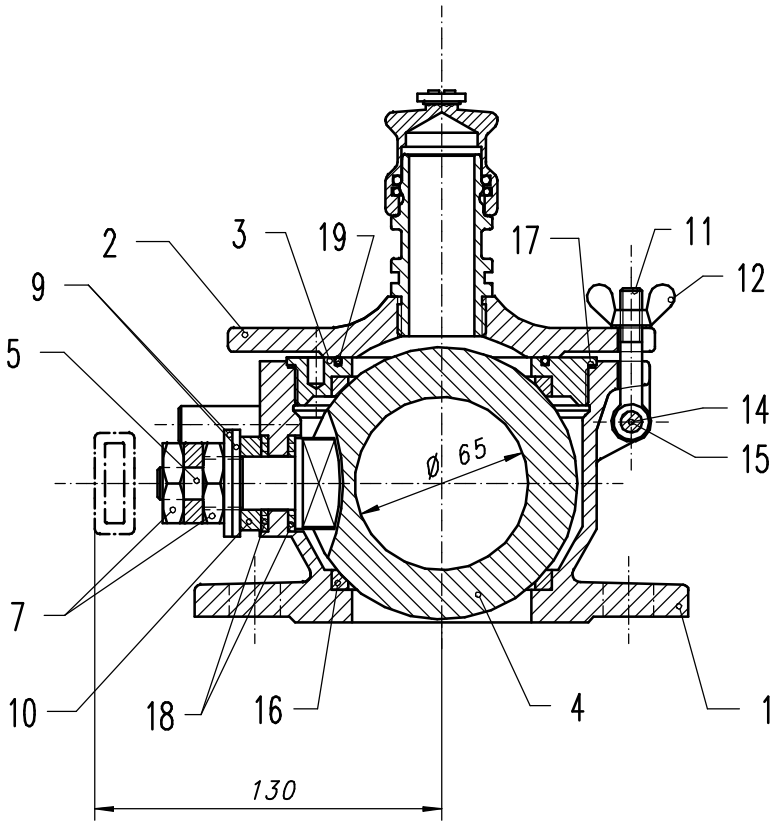
Hermetic Compact Valve C1SS

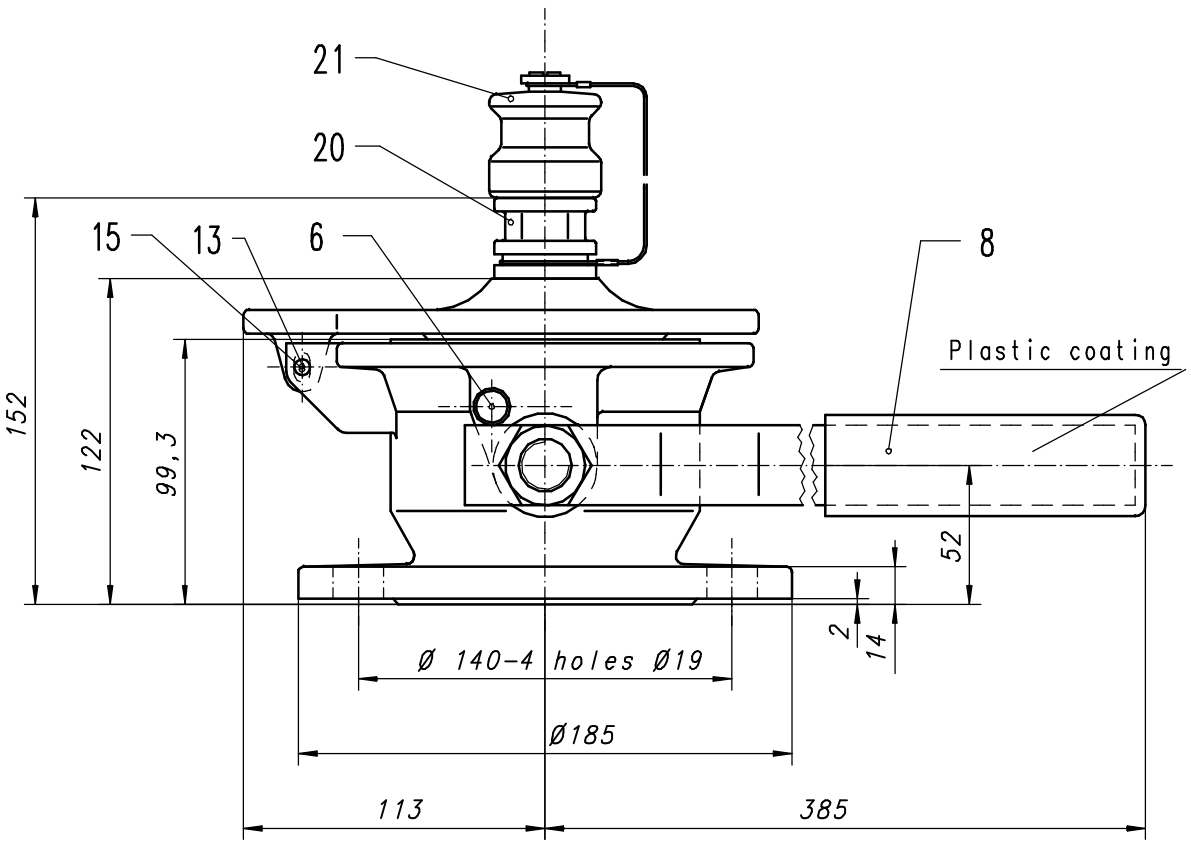
TS 10055

ND 30230

REF ND

Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505





Flange ANSI 150lbs. 2½" (65mm)

Item	Qt	Weight	Description	Material	TS #	ND #
1	1	0	Body	ACI CF8M	22528	
2	1	1612	Cover	ACI CF8M	22529	
3	1	556	Ring nut	ACI CF8M	22530	
4	1	1976	Ball	ACI CF8M	22531	
5	1	138	Stem	AISI 316	22532	
6	1	45	Stop rod	AISI 316	22533	
7	2	35	Nut	ACI CF8M	22534	
8	1	750	Plastic coated handle	AISI304/PE	22711	
9	2	14	Spring washer	AISI 316	22535	
10	1	21	Pressing bush	AISI 316	22536	
11	3	0	Tie rod	AISI 316	22537	
12	3	0	Fly nut	ACI CF8M	22538	
13	1	18	Shaft long	AISI 316	22539	
14	3	14	Shaft short	AISI 316	22540	
15	8	1	Split pin 2x20	A2	22541	DIN94
16	2	20	Seat Ø70/82,5 x 7,5	PTFE	22702	
17	1	2	Gasket Ø110/115 x 1	PTFE	22703	
18	2	1	Washer Ø20/36 x 2,5	PTFE	22704	
19	1	4	O-Ring Ø74.5x3	Viton	22705	
20	1	190	Coupling male 1"	AISI 316	23001	30330
21	1	166	Weather cap assy	AISI 316	22609	40543

Modification | Visa | Date | Is

TOLERANCES UNLESS OTHERWISE SPECIFIED									
Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Drawn: CPI 04.05.1994 | Control:

Weight: 10300 Eff.

ISSUE 1 : 4.5.1994

MPSA

Replacement for: ND | Replaced by: ND

Valves

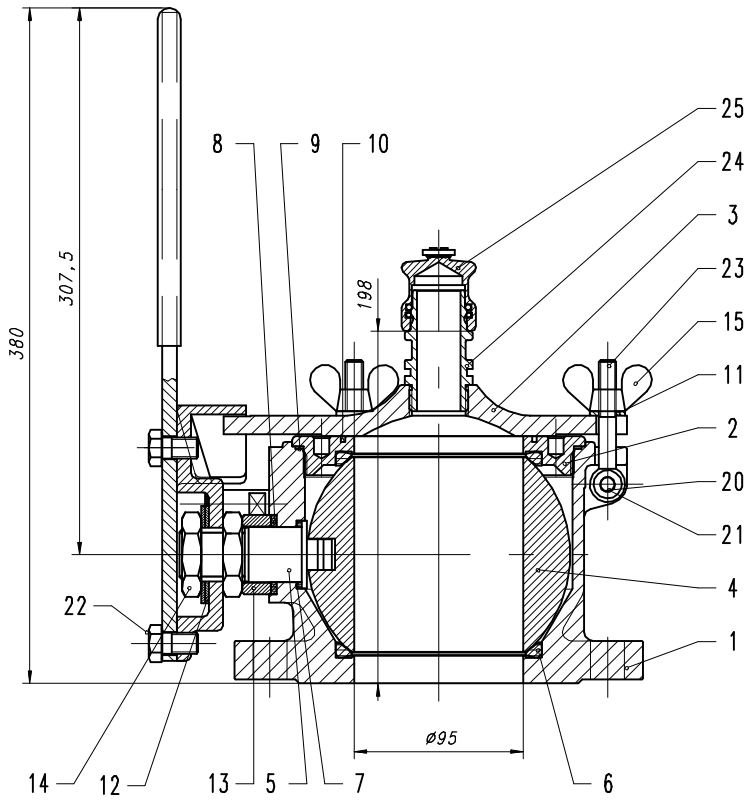
HERMetic Deck Valve A-2 1/2" SS

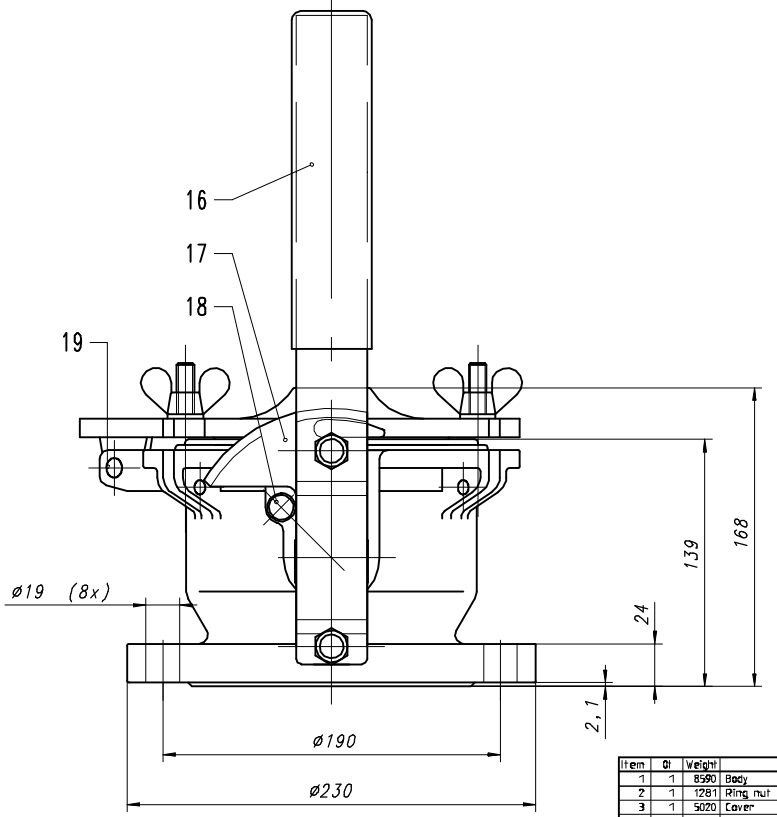
TS 10052

ND 30393

REF ND

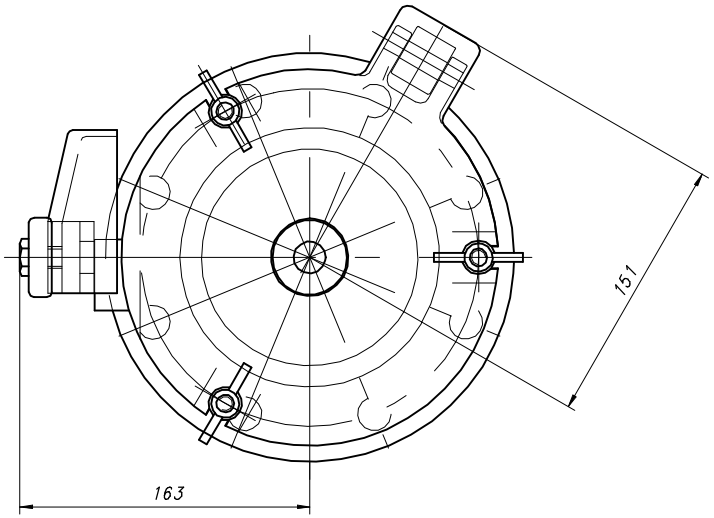
TS Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505





RM

Item	Qt	Weight	Description	Material	TS #	ND #
1	1	8590	Body	ACI CF8M	22542	-
2	1	1281	Ring nut	ACI CF8M	22544	30502
3	1	5020	Cover	ACI CF8M	22543	-
4	1	5945	Ball	AISI 316	22545	30501
5	1	428	Stem	AISI 316	22546	30504
6	2	51	Seat ¢ 98/116 x 10,5	PTFE	22706	40942
7	1	9	Washer ¢30/50 x 3	PTFE	22708	40943
8	1	0	Washer ¢31/44.5 x 3.5	PTFE	22721	40970
9	1	6	Gasket ¢150/158 x 1,5	PTFE	22707	40948
10	1	5	O-Ring ¢104.5x3	FKM	22709	-
11	6	1	Flat washer M10	A2	40113	DIN 125A
12	2	50	Spring washer	AISI 301	22549	40955
13	1	92	Pressing bush	AISI 304	22550	40956
14	2	80	Nut M30x2	AISI 304	22548	40954
15	3	12	Fly nut M10 DIN 315	A2	22552	40958
16	1	985	Plastic coated handle	--	22560	30506
17	1	0	Handle base	ACI CF8M	22561	30507
18	1	69	Stop rod	AISI 304	22547	40903
19	1	36	Long shaft	AISI 304	22553	40959
20	3	15	Short shaft	AISI 304	22554	40960
21	4	1	Split pin 2x20	A2	22541	DIN94
22	2	31	Hex cap screw M12x20	A2	40358	DIN 933
23	3	87	Tie rod M10x70 DIN 944 Type B	A2	22551	40957
24	1	190	Coupling male 1"	AISI 316	23001	30330
25	1	168	Weather cap assy	AISI 316	22609	40543



flange ANSI 150lbs. 4" (100mm.)

TOLERANCES UNLESS OTHERWISE SPECIFIED								
Nom.Size	Over	6	30	100	300	1000	3000	Angles
Fit	To	6	30	100	300	1000	3000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Weight: 23600 Th. 0 Eff.

1:2

ISSUE 1 : 27.11.1995

MPSA 4110

Drawn: UPR 12.09.1995 Control:

Replacement for: ND Replaced by: ND

Valves

HERMetic Deck Valve A-4" SS

TS 10053

ND 20252

REF ND

Modification | Visa | Date

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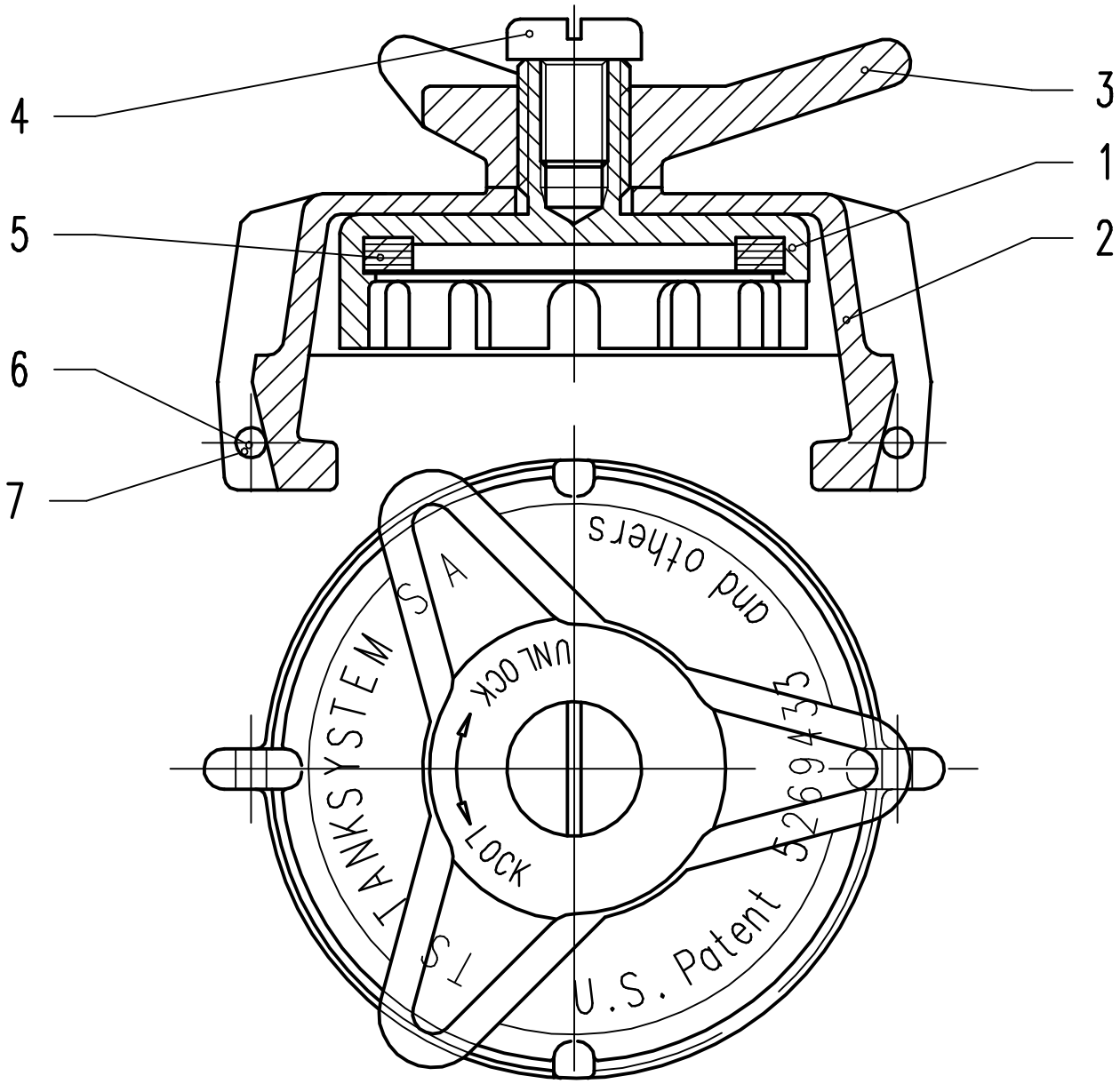

Item	Qt	Weight	Description	Material	TS #	ND #
1	1	220	Gasket holder	AISI 316	22714	40492
2	1	507	Cover	AISI 316	22715	30360
3	1	196	Lock 3/8"	AISI 316	22716	40521
4	1	20	Slotted pan head mach. screw M10x16	A4	40708	41004
5	1	11	Gasket 62/50x5	Viton	22713	
6	1	5	S Holder	AISI 304	11902	40537
7	1	7	Short cable assy	-	55135	40999

TOLERANCES UNLESS OTHERWISE SPECIFIED

Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Drawn: CPI 24.01.1990

Control:

Weight: 966 Th. 957 Eff.

1:1

ISSUE 3 : 9.2.1996

MPSA

Replacement for: ND

Replaced by: ND

HERMetic Deck valve C2SS
Security cover with lock

TS 10408

ND 40495

REF ND 20135/20136/20146/30374

Is	Date	Visa	Modification
3	9.2.96	upr	Cable assy TS 55112
2	4.9.91	cpi	Forme TS22716/ND40521
1	11.7.91	mas	rajouté cable + S

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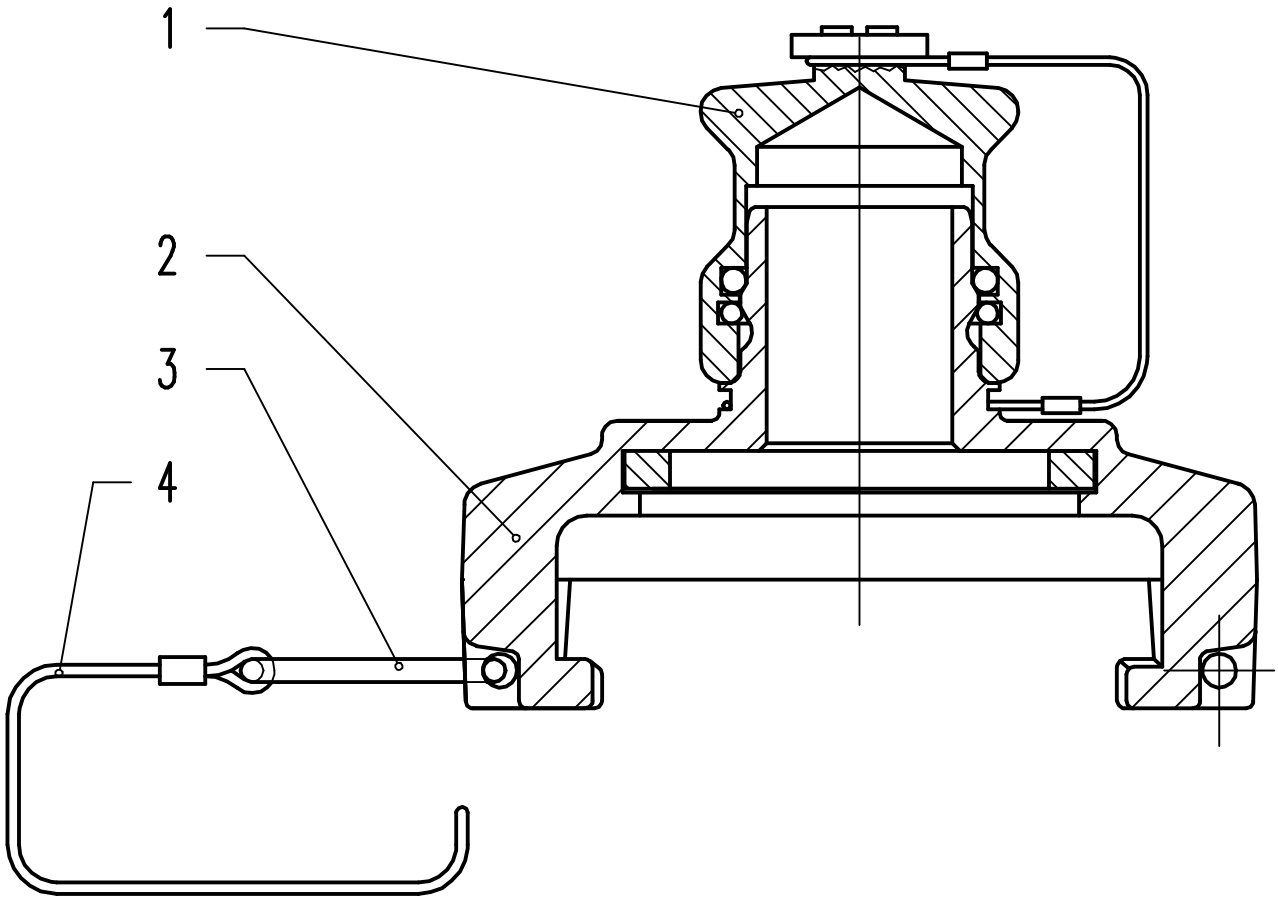

Item	Qt	Weight	Description	Material	TS #	ND #
1	1	166	Weather cap assy	AISI 316	22609	40543
2	1	401	Connector 1" - 2" FKM	-	22563	41032
3	1	5	S Holder	AISI 304	11902	40537
4	1	7	Short cable assy	-	55135	40999

TOLERANCES UNLESS OTHERWISE SPECIFIED

Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Drawn: UPR 24.01.1990

Control:

Weight: 579 Th. 0 Eff.

1:1

ISSUE 1 : 1.4.1997

MPSA 4110

Replacement for: ND

Replaced by: ND

HERMetic Deck valve C2SS
Cover with weather cap

TS 10415

ND 41040

REF ND

Modification | Visa | Date | Is

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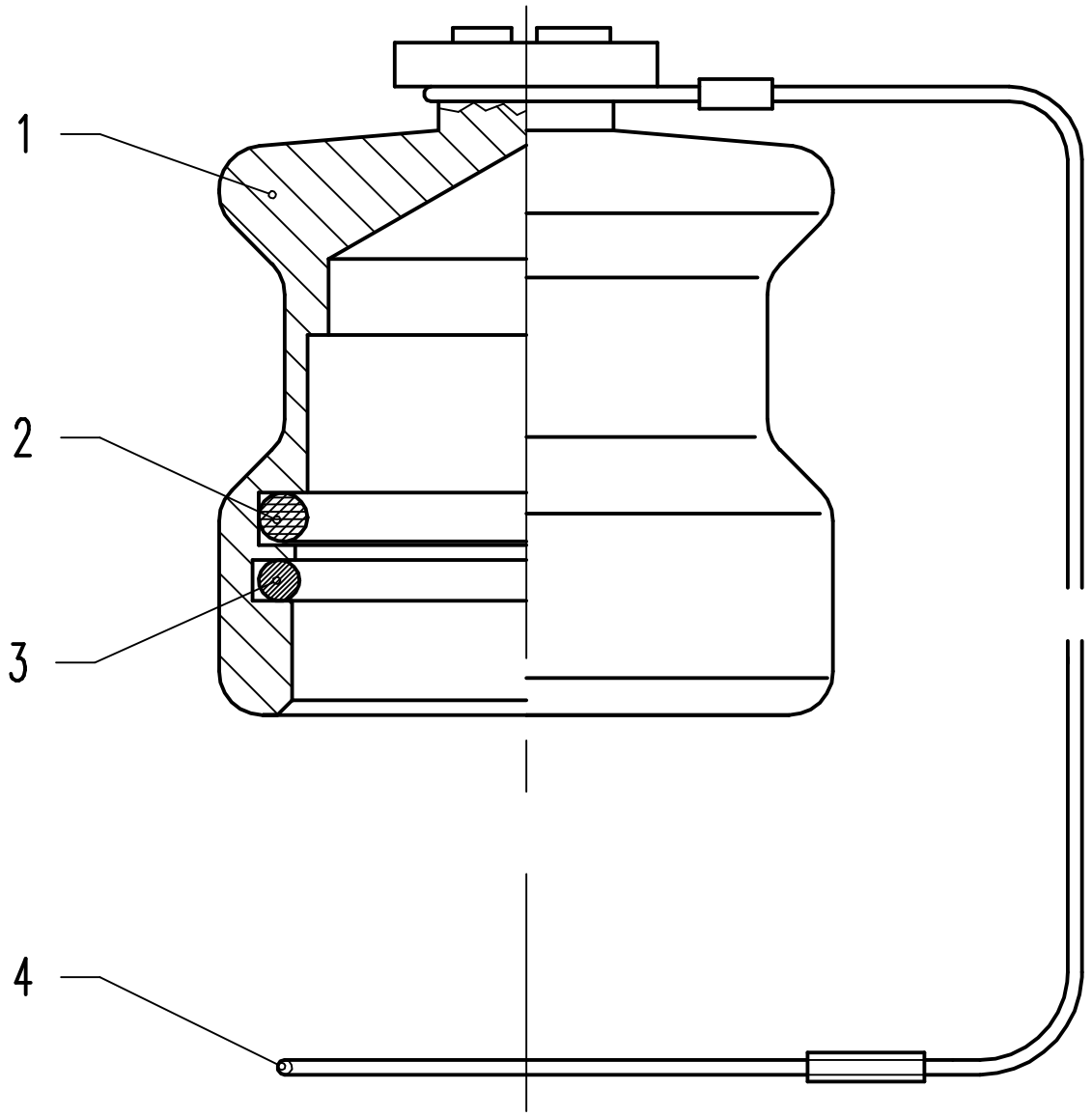

Item	Qt	Weight	Description	Material	TS #	ND #
1	1	180	Cap for nippel	AISI 316	22608	30396
2	1	2	O-Ring ¢29.7x3.5	FKM	11132	-
3	1	4	Clip for weather cap	AISI 301	40762	40542
4	1	4	Cable assy	-	55112	40525

TOLERANCES UNLESS OTHERWISE SPECIFIED

Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Weight: 190 Th. 190 Eff.

2:1

ISSUE 1 : 6.2.1992

MPSA

Drawn: CPI 17.05.1994

Control:

Replacement for: ND 40402

Replaced by: ND

Valves

Weather cap assy

TS 22609

ND 40543

REF ND

Modification | Visa | Date | Is

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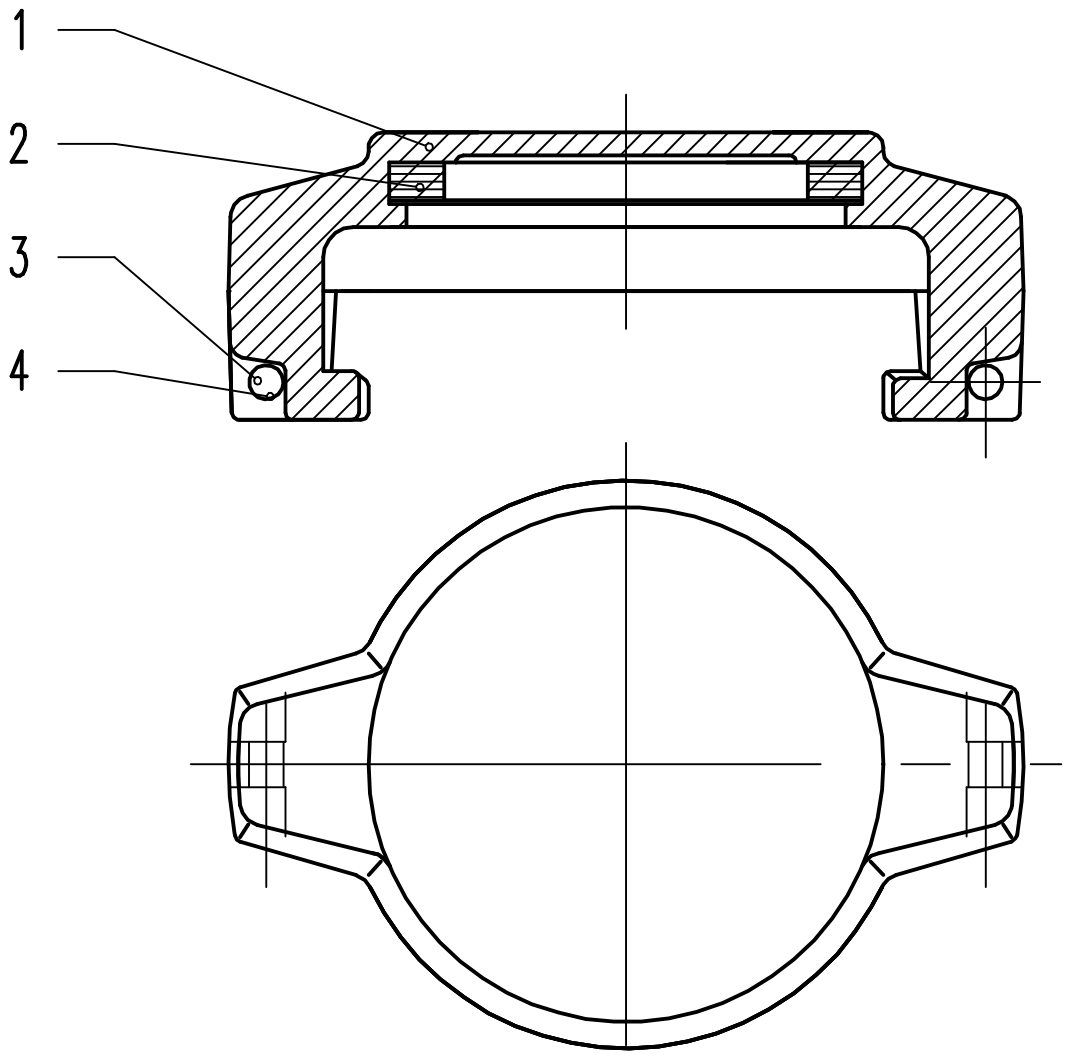

Item	Qt	Weight	Description	Material	TS #	ND #
1	1	332	Blind cover	1.4408	22651	41024
2	1	11	Gasket 62/50x5	FKM	22713	20135
3	1	5	S Holder	AISI 304	11902	40537
4	1	7	Short cable assy	-	55135	40999

TOLERANCES UNLESS OTHERWISE SPECIFIED

Norm.Size	Over		6	30	100	300	1000	Angles
Fit	To	6	30	100	300	1000	2000	
Fine	±	0,05	0,1	0,15	0,2	0,3	0,5	0,1°

REMOVE ALL BURRS AND SHARP EDGES

Weight: 355 Th. 0 Eff.

ISSUE 1 : 28.11.1997

Drawn: UPR 27.11.1996

Control:

1:1

MPSA 4110

Replacement for: ND

Replaced by: ND

HERMetic Deck valve C2SS
Blind cover assy

TS 10414

ND 41034

REF ND 20288

Material item 1	Modification
upr	Visa
28.11.97	Date
1	Is

Enraf Tanksystem SA
RUE DE L'INDUSTRIE 2 CH-1630 BULLE
Tel. +41 26 91 91 500 - Fax +41 26 91 91 505

Apparatus Identification **HERMetic UTImeter Gtex / Rtex / Otex**

Apparatus Classification Measurement Equipment

Statement of Conformity

Based on sample product test results using appropriate standards (industrial environment), and in accordance with the following EC Directives, we, Enraf Tanksystem SA, hereby declare under our sole responsibility that the HERMetic UTImeter is in conformity with:

Gtex / Rtex / Otex	EC ATEX Directive 94/9/EC, Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX). EC Type Examination Certificate: KEMA 02ATEX1097X + Amds 1 & 2 II 1 G EEx ia IIB T4
Gtex / Rtex / Otex	EC Directive 89/336/EEC, Electromagnetic Compatibility (EMC).
Gtex and Rtex only	EC Directive 96/98/EC on Marine Equipment (MED), as amended by Commission Directive 2002/75/EC.

Sample Product Testing for ATEX

Tested by	Kema Quality B.V., Utrechtseweg 310, P.O. Box 5185, 6812 AR Arnhem, The Netherlands
Standards Used	EN50014, (1997) + Amds 1 & 2, Electrical apparatus for potentially explosive atmospheres – General requirements EN50020, (2002) Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "I" EN50284, (1999) Special requirements for construction, test and marking of electrical apparatus of equipment group II, Category 1 G
Notified Body *Notified Body Number* *Report ID*	Kema Quality B.V., Utrechtseweg 310, P.O. Box 5185, 6812 AR Arnhem, The Netherlands 0344 KEMA 2018044
Quality Assurance notification *Notified Body* *Notified Body Number*	Baseefa ATEX 1536 Baseefa, Rockhead Business Park, Staden Lane, Buxton, Derbyshire, SK17 9RZ. United Kingdom 1180

Sample Product Testing for EMC

Tested by	Montena EMC SA, Zône industrielle, 1728 Rossens, Switzerland
Standards Used	EN61326-1, (2002-02) Electrical equipment for measurement, control and laboratory use - EMC requirements - General requirements
Report ID	EMC - Tests on the Hermetic UTImeter Gtex No. 13'381 issued 17.07.2003 EMC - Tests on the Hermetic UTImeter Otex No. 13'382 issued 31.07.2003

Sample Product Testing for MED

Tested by	See-Berufsgenossenschaft, Reimerstwiete 2, 20457 Hamburg, Germany	
Standards Used	IMO-Resolution MEPC.5(XIII)	
Report ID	334006 issued 01 July 2003	
Notified Body	Det Norske Veritas AS	
Notified Body Number	0575	
EC Type-Examination Certificate	MED-B-2764	issued on 03 December 2004
QS - Certificate of Assessment - EC	MED-D-595	issued on 03 December 2004

Manufacturer **ENRAF TANKSYSTEM SA,** Rue de l'Industrie 2, 1630 BULLE, Switzerland

Alain Bauer
General Manager

Created / modified		Approved	Released	Remarks
4	2006/08/22	2006/08/28	2006/08/28	Update of the MED certificate references
5	2007/04/02	2007/04/02	2007/04/02	Update of the ATEX references according to CAR 07/03/02
6	2008/06/17	2008/06/17	2008/06/17	Update of the company logo - Honeywell
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