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A DECLARATION OF CONFORMITY

The undersigned:
PIUSI S.p.A. Via Pacinotti 16/A - 21. Rangavino
46029 Suzzara - Mantova - Italy

HEREBY STATES
under its own responsibility, that the equipment described below:
Description: METER
Model: K200
Serial number: refer to Lot Number shown on CE plate affixed to product/Year of manu-
facture: refer to the year of production shown on the CE plate affixed to the products in
conformity with the legal provisions indicated in the directives :
- Electromagnetic Compatibility Directive 2004/108/EC

The documentation is at the disposal of the competent authority following motivated
request at Piusi S.p.A. or following request sent to the email address: doc_tec@piusi.
com The person authorised to compile the technical file and draw up the declaration is
Otto Varini as legal representative.

Suzzara, 01/01/2012

Otto Varini
legal representative.

B GENERAL WARNINGS

**Important pre-
cautions**

To ensure operator safety and to protect the pump from poten-
tial damage, workers must be fully acquainted with this instruc-
tion manual before performing any operation.

**Symbols used
in the manual**

The following symbols will be used throughout the manual
to highlight safety information and precautions of particular
importance:

ATTENTION
This symbol indicates **safe working practices for opera-
tors and/or potentially exposed persons**.

WARNING
This symbol indicates that **there is risk of damage to the
equipment and/or its components**.

NOTE
This symbol indicates **useful information**.

his manual should be complete and legible throughout. It should
remain available to end users and specialist installation and
maintenance technicians for consultation at any time.
This manual belongs to Piusi S.p.A., which is the sole proprietor
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bution, marketing in any form, translation and/or processing,
loan and any other activity reserved by the law to Piusi S.p.A.,

C SAFETY INSTRUCTIONS

C.1 SAFETY WARNINGS

**Main - pre-
liminary checks
before instal-
lation**

ATTENTION
You must avoid any contact between the electrical power
supply and the fluid that needs to be FILTERED.

Before any checks or maintenance work are carried out, discon-
nect the power source.

C.2 FIRST AID RULES

**Contact with
the product**

In the event of problems developing following EYE/SKIN CON-
TACT, INHALATION or INGESTION of the treated product, please
refer to the SAFETY DATA SHEET of the fluid handled.
Please refer to the safety data sheet for the product

NOTE

When operating the dispensing system and in particular during
refuelling, do not smoke and do not use open flame.

SMOKING PROHIBITED

C.3 GENERAL SAFETY RULES

**Essential pro-
tective equip-
ment charac-
teristics**

Wear protective equipment that is:
suited to the operations that need to be performed;
resistant to cleaning products.

**Personal pro-
tective equip-
ment that must
be worn**

Wear the following personal protective equipment during hand-
ling and installation:
safety shoes;

close-fitting clothing;

protective gloves;

safety goggles;

Instruction manual

**Protective
equipment**

C.4 PACKAGING

FOREWORD
K200 COMES PACKED IN A CARDBOARD BOX WITH A LABEL
INDICATING THE FOLLOWING DATA:

1 - contents of the package

2 - weight of the contents

3 - description of the
product

C.5 PACKAGE CONTENTS/PRE-INSPECTION

FOREWORD
To open the packaging, use a pair of scissors or a cutter, being careful not
to damage the dispensing system or its components.

NOTE
In the event that one or more of the components de-
scribed below are missing from inside the package,
please contact Piusi technical support.

WARNING
Check that the data on the plate correspond to the de-
sired specifications. In the event of any anomaly, contact
the supplier immediately, indicating the nature of the
defects. Do not use equipment which you suspect might
not be safe.

D BECOMING ACQUAINTED WITH K200

FOREWORD
K200 is an electronic meter based on oval gears measuring system,
developed for an easy and exact measurement.
K200 is studied in particular to be directly installed on lines of dis-
tribution of fluid. An electronic card with microprocessor permits
control of the display and calibration of the meter.
The oval gear measuring principle adopted offers high precision and
low pressure losses together with a compact lightweight design and
easy installation. An electronic card with microprocessor permits
control of the display and calibration of the meter. K200 features a
non-volatile memory for storing the measuring data of the totals,
even in the event of a complete power break for long periods.

K200 is available in 2 versions:
1 **METER** – with LCD display and calibration buttons
2 **PULSER** – single-channel impulse, connectable with a remote display.

D.1 COMPATIBLE LIQUIDS

**Measurement
system**
OVAL GEAR IN ACETAL RESIN FOR MEASURING VARIABLE VISCOSITY
FLUIDS.
The fluids compatible with K200 are the following:
DIESEL FUEL, RAPSOIL, OIL, GREASE

**K200 HP
(solo pulser)**
DIESEL FUEL, RAPSOIL, OIL, GREASE, ANTI-FREEZE FLUID, WINDSCREEN
FLUID

Main components
1 Insert battery 4 CAL button
2 Display/LCD 5 Measurement cham-ber
3 RESET button

The measurement elec-
tronics and the LCD display
are fitted in the top part of
the meter, isolated from
the fluid-bath measure-
ment chamber and sealed
from the outside by means
of a cover



D.2 DISPLAY LCD (ONLY METER VERSION)

FOREWORD
The "LCD" of the METER features two numerical registers and various indica-
tions, displayed to the user only when the applicable function so requires.

1 Partial register (4 figures) with moving
comma (0.0 + 9999), indicating quantity
dispensed from when the RESET button
was last pressed

2 Indication of Flow Rate mode

3 Indication of calibration mode

4 Totals register (6 figures with moving
comma 0.0 - 999999), that can indicate
two types of Total:

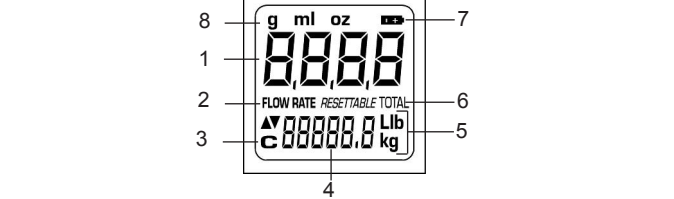
4.1 General Total that cannot be reset (TOTAL)
4.2 Resettable total

5 Indication of unit of measurement of Totals:
kg = kilograms L = Litres
lb = pounds

6 Indication of type of total, (TOTAL / RE-
SETTABLE TOTAL)

7 Indication of battery charge

8 Indication of unit of measurement of Partial:
g = grams ml = millilitres
oz = ounces



D3 USERS BUTTONS

FOREWORD
The METER features two buttons (RESET and CAL) which individu-
ally perform two main functions and, together, other secondary
functions.

**MAIN
FUNCTIONS
PERFORMED**
- for the RESET key, resetting the partial register and Reset Total
- for the CAL key, entering instrument calibration mode

**SECONDARY
FUNCTIONS
LEGEND**
Used together, the two keys permit entering configuration mode
where the desired unit of measurement can be set.

**CALIBRATE MEANS PERFORMING ACTIONS ON THE METER KEYS.
BELOW IS THE LEGEND OF THE SYMBOLS USED TO DESCRIBE THE
ACTIONS TO BE PERFORMED**

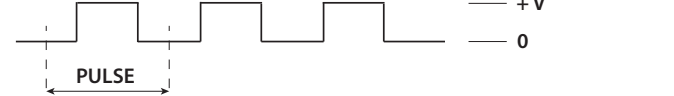
**SHORT
PRES-
SURE
OF CAL
KEY** **CAL** **LONG
PRES-
SURE
OF CAL
KEY** **CAL** **SHORT
PRES-
SURE
OF
RESET
KEY** **RESET** **LONG
PRES-
SURE
OF
RESET
KEY** **RESET**

E HOW K200 METER WORKS

METER VERSION
K200 METER's metering system is based on a measuring chamber that contains two oval
gears, from which, when rotating, generate electric impulses which are detected and processed by a
microprocessor.
The gears are made to turn by the fluid flowing through the chamber. The volume of fluid
that flows through is calculated by the number of gear rotations, given that each rotation
corresponds to an identical amount of fluid. The magnetic coupling, between the magnets
installed on the gears and a magnetic switch outside the measurement chamber, ensures
measurement chamber sealing and ensures transmission of the pulses generated by gear
rotation to the electronic board microprocessor. By applying an appropriate calibration fac-
tor, the microprocessor transforms the impulses into the amount of fluid (in weight) that has
been dispensed, and displays the result on the LC display.
All K200 METER models are factory set with a calibration factor called FACTORY K FACTOR
equal to 1.000.
For best K200 METER performance - adapting this to the intrinsic characteristics of the fluid to
be measured - the instrument can be "calibrated". Calibration can be restored to factory set-
tings at any time (see "Calibrating").

PULSER VERSION
The Pulser Version is a pulse emitter (reed bulb) which translates the magnetic field varia-
tions generated by gear rotation into electric pulses to be sent to an external receiver to be
connected.

The pulser does not need any independent electric power supply, as it is directly powered
by the receiver connection. The issued pulse type is represented by a square wave gener-
ated by the voltage variation - see the following diagram:



The calibration of the instrument is made by means of the external receiver. The PULSER
version must be connected by cables and respecting the following characteristics:
Vmax: 28 - Ac / Dc - Imax: 100 mA

F OPERATING MODES

The user can choose between two different operating modes:
The meter features a non-volatile memory for storing the dispensing data,
even in the event of a complete power break for long periods.
The measurement electronics and the LCD display are fitted in the top
part of the K200 which remains isolated from the fluid-bath measurement
chamber and sealed from the outside by means of a cover.

**1 - Normal
Mode**
Normal Mode: Mode with display of Partial and Total dispensed
quantities.
Flow Rate Mode: Mode with display of Flow Rate, as well as
Partial dispensed quantity.

2 - Flow rate Mode

G INSTALLATION

FOREWORD
K200 can be installed directly on the tube for fluid delivery. The body is
provided with two female threads 1/8" (BSP or NPT according to the ver-
sions) on which to install the tube for fluid.

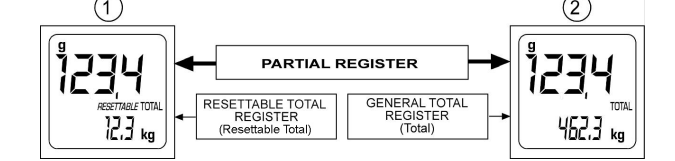
ATTENTION
For installations on system, position K200 so that the bat-
tery housing can be easily reached.
Always make sure that the thread on the hose and on all
attachments applied are compatible with the thread
on the chosen K200 model. To avoid damaging the fluid
handle, always fasten every component tightly using
the appropriate tools. Make sure the fluid is free from
impurities; foreign matter in the fluid can obstruct the
measuring gears. For the fluid handle to function properly,
it should be removed from the fluid supply line, ensuring a
smooth and regular fluid flow

H DAILY USE

FOREWORD
K200 is supplied ready to use. No commissioning operations are re-
quired even after long storage periods.
ONCE THE K200 PULSER HAS BEEN CORRECTLY CONNECTED TO
THE IMPULSE RECEIVER, THERE IS NO NEED TO SWITCH IT ON
OR OFF.

ATTENTION
K200 METER is designed for professional use and
should be operated only by authorised adult personnel.
Do not use K200 METER in conditions exceeding the
limits described in the "SPECIFICATIONS" section or
with fluids other than lubricating fluid.
Do not modify or tamper with K200 METER
Check K200 METER periodically to make sure it is in
good conditions
K200 METER is a high-precision fluid meter. Never aim the
nozzle toward any part of your body or toward anyone else.
Use all personal protection equipment prescribed by law
Discharge the pressure in the supply line before performing
maintenance
The only operations that need to be done for daily use are
Partial and/or Resettable total register resetting.

Below are the two typical normal operation displays. One display page shows the
Partial and Resettable Total registers. The other shows the partial and general total.
Switchover from Resettable Total to general Total display is automatic and tied to
phases and times that are factory set and cannot be changed by the user.



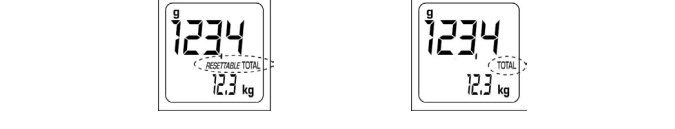
1 The Partial register positioned in the top part of the display indicates the quan-
tity dispensed since the RESET key was last pressed.
2 The Resettable Total register, positioned in the lower part of the display,
indicates the quantity dispensed since the
last Resettable total resetting. The Resettable Total cannot be reset until
the Partial has been reset, while vice versa,
the Partial can always be reset without resetting the Resettable Total.
3 The General Total register (Total) can never be reset by the user. It
continues to rise for the entire operating life of K200 METER.
The register of the two totals (Resettable Total and Total) share the same area and digits of the
display. For this reason, the two totals will never be visible at the same time, but will always be
displayed alternately. K200 METER is programmed to show one or the other of the two totals
at very precise times:
1 The General Total (Total) is shown during K200 METER standby
2 The Resettable Total is shown
3 At the end of a Partial reset for a certain time (a few seconds)
4 - During the entire dispensing stage
For a few seconds after the end of dispensing. Once this short time has
expired K200 METER switches to standby and lower register display
switches to General Total

H.1 DISPENSING IN NORMAL MODE

FOREWORD
Normal mode is the standard dispensing. While the count is made, the
partial and resettable total are displayed at the same time (reset total).

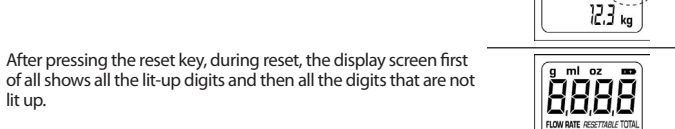
WARNING
Should one of the keys be accidentally pressed during dis-
pensing, this will have no effect.

STAND BY
A few seconds after dispensing has ended, on the lower register, the
display switches from resettable total to general total: the word reset
above the word total disappears, and the reset total is replaced by the
general total. This situation is called standby and remains stable until
the user operates the K200 again.

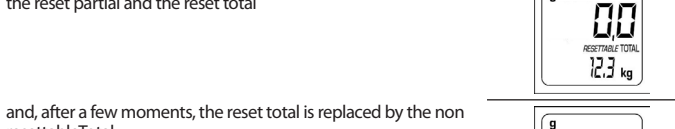


H.1.1 PARTIAL RESET (NORMAL MODE)

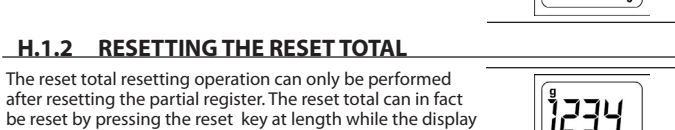
The partial register can be reset by pressing the reset key when
the meter is in standby, meaning when the display screen shows
the word "TOTAL".



After pressing the reset key, during reset, the display screen first
of all shows all the lit-up digits and then all the digits that are not
lit up.



At the end of the process, a display page is first of all shown with
the reset partial and the reset page

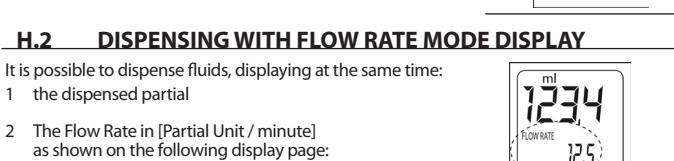


and, after a few moments, the reset total is replaced by the non
resettable total.

Schematically, the steps to be taken are:
1 Wait for the display to show normal standby display page
(with total only displayed)
2 Press the reset key quickly
3 The meter starts to reset the partial
4 While the display page showing the reset total is displayed

H.2 DISPENSING WITH FLOW RATE MODE DISPLAY

It is possible to dispense fluids, displaying at the same time:
1 the dispensed partial
2 The Flow Rate in (Partial Unit / minute)
as shown on the following display page:



Procedure for entering this mode:
1 wait for the meter to go to Standby, meaning the display
screen shows Total only
2 quickly press the CAL key
3 Start dispensing

The flow rate is updated every 0.7 seconds. Consequently, the display could be relatively
unstable at lower flow rates. The higher the flow rate, the more stable the displayed value.
To return to "Normal" mode, press the CAL key again. If one of the two keys RESET or CAL is
accidentally pressed during the count, this will have no effect.

ATTENTION
Even though in this mode they are not displayed, both the
Reset Total and the general Total (Total) increase. Their
value can be checked after dispensing has terminated,
returning to "Normal" mode, by quickly pressing CAL.

H.2.1 PARTIAL RESET (FLOW RATE MODE)

To reset the Partial Register, finish dispensing and wait for
the meter to show a Flow Rate of 0.0 as indicated in the il-
lustration

then quickly press RESET
Unlike Normal mode, in this case during reset, you do not
pass through the stages where the display segments are first
lit up and then switched off, but rather the reset partial regis-
ter is immediately displayed.

1 CALIBRATION
When operating close to extreme use or flow rate conditions (close to minimum or
maximum acceptable values), an on-the-spot calibration may be required to suit
the real conditions in which the K200 is required to operate.

I1 DEFINITIONS

**CALIBRATION
FACTOR OR
"K FACTOR"**
Factory-set default factor. It is equal to 1.000. This calibration factor en-
sures utmost precision in the following operating conditions:
Gerase NL.Gi grade 2/3
Temperature: 20°C
Flow rate: 0.1 - 2.5 Kg/min - 0.1 - 2.8 l/min - 0.2 - 5.5 l/min
Even after any changes have been made by the user, the factory k fac-
tor can be restored by means of a simple procedure.

USER K FACTOR:
Customized calibration factor, meaning modified by calibration.

I2 CALIBRATION MODE

Why calibrate?
1 Display the currently used calibration factor:
2 Return to factory calibration (Factory K Factor) after a previ-
ous calibration by the user
3 Change the calibration factor using one of the two previ-
ously indicated procedures

FOREWORD
Two procedures are available for changing the Calibration Factor:
1 In-Field Calibration, performed by means of a dispensing operation
2 Direct Calibration, performed by directly changing the calibration factor

In calibration mode, the partial and total dispensed quantities indicated on the display screen take
on different meanings according to the calibration procedure phase. In calibration mode, the K200
cannot be used for normal dispensing operations. In "Calibration" mode, the totals are not increased
ATTENTION
The K200 features a non-volatile memory that keeps
the data concerning calibration and total dispensed
quantity stored for an indefinite time, even in the case
of a long power break after changing the batteries,
calibration need not be repeated.

I.2.1 DISPLAY OF CURRENT CALIBRATION FACTOR AND RESTORING FACTORY FACTOR.

By pressing the CAL key while the appliance is
in Standby, the display page appears showing
the current calibration factor used.

Two cases can occur:
1) If no calibration has ever been performed, or
the factory setting has been restored after previous
calibrations, the following display page will appear:
The word "FACT" abbreviation for "factory" shows
that the factory calibration factor is being used
2) If, on the other hand, calibrations have
been made by the user, the display page will
appear showing the currently used calibration
factor (in our example 0.998). The word "user"
indicates a calibration factor set by the user is
being used



The flow chart alongside
shows the switchover logic
from one display page to
another
In this condition, the Reset
key permits switching from
User factor to Factory factor.
To confirm the choice of cal-
ibration factor, quickly press
CAL while "User" or "Fact" are
displayed.
After the restart cycle, the
K200 uses the calibration
factor that has just been
confirmed



ATTENTION
When the Factory Factor is confirmed, the old User fac-
tor is deleted from the memory

I.2.2 IN FIELD CALIBRATION

FOREWORD
This procedure calls for the fluid to be dispensed into a graduated
sample container in real operating conditions (flow rate, viscosity,
etc.) requiring maximum precision.

ATTENTION
For correct K200 calibration, it is most important to:

- 1 When the Factory Factor is confirmed, the old User factor is deleted
from the memory
- 2 use a precise Sample Container with a capacity of not less than 5 litres,
featuring an accurate graduated indicator.
- 3 ensure calibration dispensing is done at a constant flow rate equivalent
to that of normal use, until the container is full.
- 4 Not reduce the flow rate to reach the graduated area of the container
during the final dispensing stage (the correct method during the final
stages of sample container filling consists in making short top-ups at
normal operation flow rate)
- 5 after dispensing, wait a few minutes to make sure any air bubbles are
eliminated from the sample container; only read the Real value at the end
of this stage, during which the level in the container could drop.
- 6 Carefully follow the procedure indicated below.

I.2.2.1 IN-FIELD CALIBRATION PROCEDURE

ACTION
1 NONE
K200 METER in Stand-by

DISPLAY
1234
1234.5 kg

2 CAL key
LONG CAL KEY KEYING
K200 METER enters calibration mode, and the display shows <<C>>
and the current calibration factor instead of the partial. The words
"Fact" and "USER" indicate which of the two factors (factory or user)
is currently in use.
Important: This fact is that which the instrument also uses for field
calibration measurement operations

3 RESET key
LONG RESET KEY KEYING
K200 METER displays "FIELD" and the partial at zero ready for field
calibration.

4 DISPENSING INTO SAMPLE CONTAINER
Without pressing any key, start
dispensing into the sample
container.

Dispensing can be interrupted and started again by: Continue
dispensing until the level of the fluid in the sample container has
reached the graduated area. There is no need to reach a preset quantity

5 SHORT RESET KEY KEYING
K200 METER is informed that the calibration dispensing operation is
finished.
Make sure dispensing is correctly finished before performing this
operation.
Calibrate K200 METER, the value indicated by the partial totality
(example 9.800) must be forced to the real value marked on the
graduated sample container. To do this follow the instructions in
sections 6 and 7.

6 SHORT RESET KEY KEYING
Lets you choose the direction of the arrow in the lower left corner of
the display. The up arrow increases the factor shown, and the down
arrow reduces it.
The operation can be repeated to alternate the direction of the
arrow.

7 SHORT LONG CAL KEY KEYING
The arrow value changes in the direction indicated by the arrow
one unit for every short CAL key keying
continually if the CAL key is kept pressed. The speed increases
the longer the key is pressed.
If the desired value is exceeded, repeat the operations from point 6).

8 LONG RESET KEY KEYING
K200 METER is informed that the calibration procedure is finished.
Before doing this, make sure the displayed value is the ACTUAL
value.
K200 METER calculates the new USER K FACTOR: this calculation
could require a few seconds, depending on the correction to be
made.

9 NO OPERATION
At the end of the calculation, the new USER K FACTOR is shown for
a few seconds, after which the restart cycle is repeated to finally
achieve standby condition.
IMPORTANT: From now on, the indicated factor will become the
calibration factor used by K200 METER and will continue to remain
such even after a battery change.

10 NO OPERATION
K200 METER stores the new calibration factor and is ready
for dispensing, applying the newly defined USER K FACTOR.

I.2.3 DIRECT MODIFICATION OF K FACTOR

If normal Meter operation shows a mean percentage error, this can be corrected by applying
to the currently used calibration factor a correction of the same percentage. In this case, the
percentage correction of the USER K FACTOR must be calculated by the operator in the fol-
lowing way

New cal. Factor = Old Cal Factor * $\left(\frac{100 - E\%}{100} \right)$

Example:
Error percentage found: E% = 0.9 %
CURRENT calibration factor: 1.000
New USER K FACTOR: $1.000 * \left(\frac{100 - (-0.9)}{100} \right) = 1.000 * \left(\frac{100 + 0.9}{100} \right) = 1.009$

If the Meter indicates less than the real dispensed value (negative error) the new calibration
factor must be greater than the old one (positive error). The opposite applies if the
Meter shows more than the real dispensed value (positive error).

		12.34 12345 kg
2		1000 FACT 0.01
3		00 FIELD
4		1000 DIRECT
5		1000 DIRECT
6		1009 DIRECT
7		0 END
8		1009 END
9		00 12345 kg

