



EsiWelma[®] s.r.l.

Computer Head TEW1-VM User Guide



EsiWelma[®] s.r.l.

Via F.lli Canepa 134D-E
16010 Serra Riccò (Genova)
ITALIA

Tel: 0039 010 754211

Fax: 0039 010 7542178

email: commerciale@esiwelma.it

Type / N°	Rev.	Fw	Date	Page	Total pages
W017.600	H	F	December 30, 2009	1	19



CONTENTS

LIST OF PHOTOS	3
1. TECHNICAL DESCRIPTION	4
1.1. Structural specifications	4
1.2. Technical data	4
2. FUNCTIONAL DESCRIPTION	5
2.1. Data Display	5
2.2. Operating sequences description	5
2.2.1 Network interruption management	6
3. TROUBLESHOOTING	7
3.1. Fatal errors	7
3.2. Non fatal error	7
4. PROCEDURES	9
4.1. Computing head setup	9
4.2. Metric Office (Simulation of anomalies)	11
4.3. Verification of the last setting values.	12
4.4. Meter setting	12
4.5. Reading of the absolute totalizer	14
5. HARDWARE PERSONALIZATION	15
6. ELECTRICAL CONNECTION	16
6.1. Low voltage connection	16
6.2. High voltage connection	17
7. COMPUTER HEAD TEW1-VM IDENTIFICATION	18
8. LEGALIZING PROCEDURE OF THE COMPUTING HEAD TEW1-VM	19
8.1. CPU legalization plan	19
8.2. Display legalization plan	19

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	2	19



List of figures

Figure 1: Layout of computing head TEW1-VM4
Figure 2: Maximum visualization available.5
Figure 3: Beginning distribution sequence6
Figure 4: Example of parameter change “Number of Encoder`s channels”10
Figure 5: Example of parameter display “Number of displays used”10
Figure 6: Example of parameter display “Number of decimal digits used”10
Figure 7: Example of parameter display “100pulses/litre encoder used”10
Figure 8: Example of parameter display “Value of metric measure”11
Figure 9: Example of parameter display and modification “Unit of measure”11
Figure 10: Example of parameter display “Value of pulses transmitted”11
Figure 11: Request for access in Metric Office procedure11
Figure 12: Example of set value12
Figure 13: Example of modification of the type of encoder12
Figure 14: Example of meter setting parameter visualization12
Figure 15: Example of wrong fuel distribution display12
Figure 16: Example of “Absolute Total distributed” display”14

List of photos

Photo 1: CPU4
Photo 2: Setup button and E2 Jumper9
Photo 3: Hardware customizing15
Photo 4: Clamp device BT16
Photo 5: Clamp device AT17
Photo 6: Computing head TEW1-VM identification plate18
Photo 7: Computing head TEW1-VM; CPU front view19
Photo 8: Computing head TEW1-VM; front view Display19
Photo 9: Computing head TEW1-VM Display rear view19

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	3	19



1. TECHNICAL DESCRIPTION

The TEW1-VM electronic computing head is designed to operate on one-nozzle dispensers, for two-nozzle dispensers, two TEW1-VM computing heads are necessary. One or two-sided display systems can be used. It can deliver and give to Host pulses (copy of the pulses collected on encoder) about the current distribution.

1.1. Structural specifications

The computing head is made up of one single electronic card complete of a CPU, a supplier and a display. The card is settled into a plastic box to be mechanically protected. A second optional display can be used in case of two-sided dispensers.

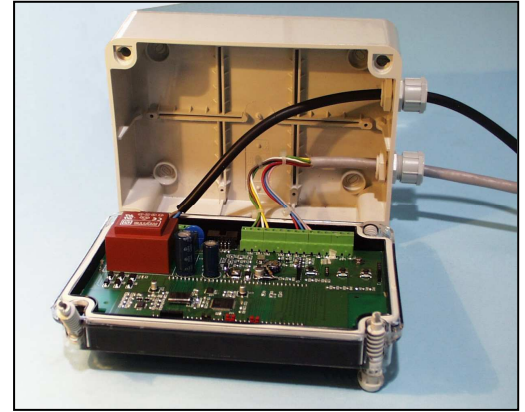


Photo 1: CPU

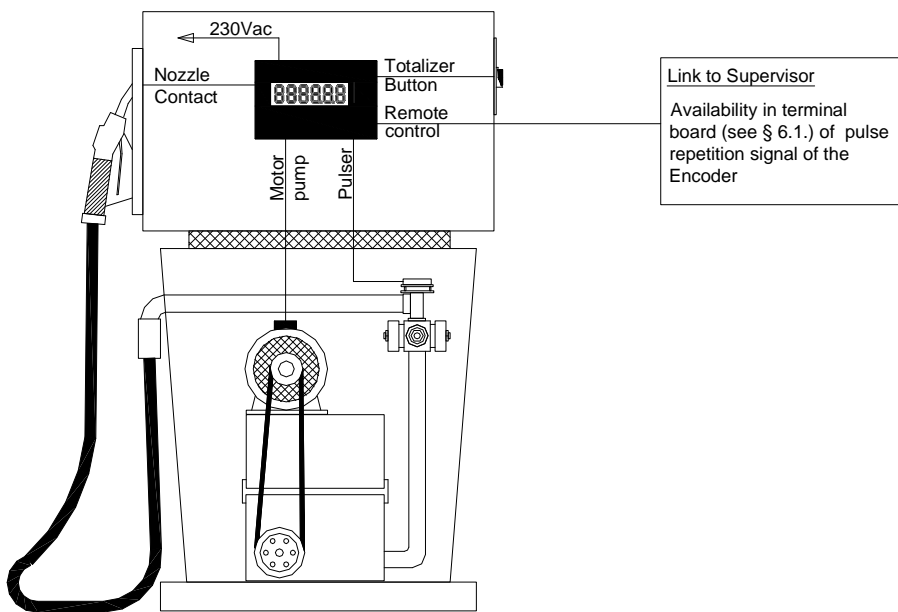


Figure 1: Layout of computing head TEW1-VM

1.2. Technical data

- Power supply: 230Vac ± 10%
- Absorbed power: 5VA
- Temperature: max. 85°C min. -25°C
- Humidity (without dew): 85%
- Max flow rate: ≤16l/s
- Measure: cl
- Motor control: N.O. max 250Vac/5(3)A
- Encoder: 2 channels: 1 pulse = 1cl
- Non-resetting electronic totalizer (6 digits): unit = Litres, US Gallons, UK Gallons

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	4	19



2. FUNCTIONAL DESCRIPTION

2.1. Data Display

The TEW1-VM computing head can be combined with one-nozzle fuel dispensers. Data is always displayed as follows: 6 digit display for the totalizer, 5 or 6 digit display for the fuel distributed (see Set-up §.4.1)

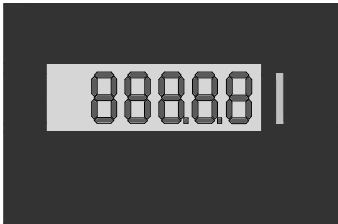


Figure 2: Maximum visualization available.

Display bars are made by 25mm high LCDs with backlighting. Backlighting system is made of amber-colored leds.

2.2. Operating sequences description

When switched on, the computing head performs some checks:

- EPROM - it checks the EPROM CRC and compares it to the data on the program.
- RAM - it checks the writing and reading ability of the data RAM
- EEROM - it checks the consistency of the data reported in EEROM
- DISPLAY - it checks the connection status of the display(s).

If the above mentioned checks give a positive result, display shows the following sequence:

- the program code (801.X.X)
- all 8
- all blank
- data regarding the last distribution

In case of anomalies, display shows, if possible, the corresponding error code, alternating it with the quantity delivered up to that moment. (See “Troubleshooting” §3.)

With nozzle in place the computing head performs the following checks:

- DISPLAY - it checks the display(s) condition
- RAM.

Distribution begins when nozzle is extracted:

If the above mentioned checks give a positive result, the computing head performs a further test to show the ability to control all the digits of the display:

- All digits show 8, this phase takes about one second.
- All digits show Blank, this phase takes about one second.
- All digits show 0.00 liters, this phase takes about one second also.
- Motor control is activated and distribution can begin.

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	5	19



This way the operator can check at a glance before starting the distribution that each digit of the display works.



Figure 3: Beginning distribution sequence

During distribution the computing head performs the following functions:

- Activation of the motor relay.
- Acquisition of pulses coming from the transducer. 1 pulse = 1cl.
- Calculation and display of quantity distributed.
- Check consistency of the data displayed (implicit with RAM and EPROM control).
- Functional check of the display(s).
- Check and management of the electronic totalizer.

Distribution ends because of:

- Nozzle back in place
- Anomaly.

...If distribution stops because of an anomaly

The display shows, if possible, the corresponding error code. (See troubleshooting §3.).

2.2.1 Network interruption management

If during normal operations a power shortage or even a blackout should occur, both when nozzle is in place and during distribution, the computing head enters a procedure called PWF which allows to memorize: quantity distributed and totalizer. The data is displayed for about 30 minutes from the moment the network shortage occurred. The no-network status is shown by the lack of backlighting. When power supply is restored, data related to interrupted distribution is read from the memory and shown on the display.

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	6	19



3. TROUBLESHOOTING

During its normal functioning, the computing head controls the internal data flow and the congruence of data coming from outside. Possible anomalies are handled in different ways according to the damage they may cause to data. The computing head can find both *Fatal* and *Non Fatal Errors*. However, it stops the current distribution and displays the memorized error code.

3.1. Fatal errors

Fatal errors are normally due to malfunctioning, which may cause data loss. In such case the computing head stops the distribution, displays the corresponding code and does not restart. To start again it must be reset by switching off power supply.

- Data consistency
- EPROM error
- RAM error
- EEROM error
- Totalizer error
- Encoder presence error

3.2. Non fatal error

Belonging to this category are all blocks due to an anomalous status of the field and those related to a temporary operating anomaly, caused by a secondary situation such as, an incorrect data due to a disturbance. In this case, the error will be automatically deleted as soon as the anomalous status that created it ends.

The computing head makes 3 attempts to restart; at the fourth unsuccessful attempt, the error turns into fatal.

- Display
- Pulser channel control

ERROR CODE TABLE				
Non fatal errors		Fatal errors		
Display	Description		Display	Description
ErDy	Display 1		FECd	Data consistency
ErPU	Encoder alternating channel		FEEP	Eprom
			FErA	Ram
			FEEE	Eerom
			FETO	Totalizer
			FEPP	Encoder presence

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	7	19



Description of anomalies:

- Display
The computing head controls the presence of LCD display(s).
*Error code: **ErDy***
- Encoder channel control
The computing head checks the Encoder alternating output channels, in case it's negative distribution stops.
*Error code: **ErPU***
- Data consistency
Data consistency verification. The computing head checks continuously, even during distribution, all data saved in RAM, in case of error it blocks distribution.
*Error code: **FECd***
- EPROM error
With nozzle in place the computing head checks the Eprom checksum; if the check has negative result distribution stops.
*Error code: **FEEP***
- RAM error
With nozzle in place, the computing head checks the RAM, in case it's negative distribution stops.
*Error code: **FErA***
- EEROM error
With nozzle in place, the computing head checks the E²rom, in case it's negative distribution stops.
*Error code: **FEEE***
- Totalizer error
The computing head checks the totalizer data for consistency. In case an error occurs, the distribution stops.
*Error code: **FEto***
- Encoder presence error
The computing head checks for Encoder presence, in case it's missing distribution stops.
*Error code: **FEPP***

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	8	19



4. PROCEDURES

In addition to normal distribution, four more procedures are available:

- Computing head setup (changing of configuration parameters)
- Metric office (simulation of anomalies)
- Verification of the last calibration values.
- Meter calibration

4.1. Computing head setup

To adapt the computing head to the constructive specifications of the station, operator can change some functional parameters.

Move E2 Jumper into position A-B to enter set-up procedure.

The main display shows the first parameter while the red LED for anomaly comes on.

By pressing the S1 button, the operator chooses the parameter to be modified; by pressing buttons S2 and S3 the selected parameter is modified: S2 decreases the value, S3 increases it. Once parameters have been modified, move E2 Jumper into position A-C to quit.

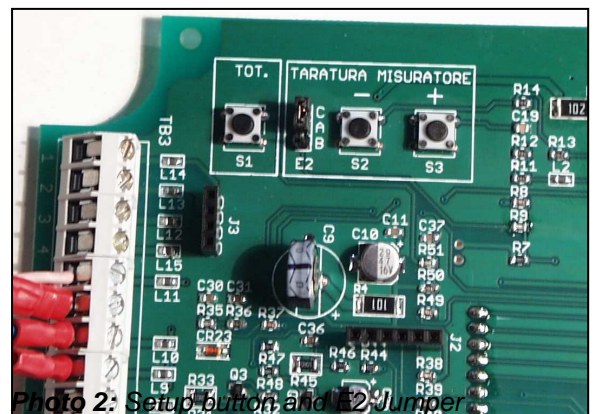
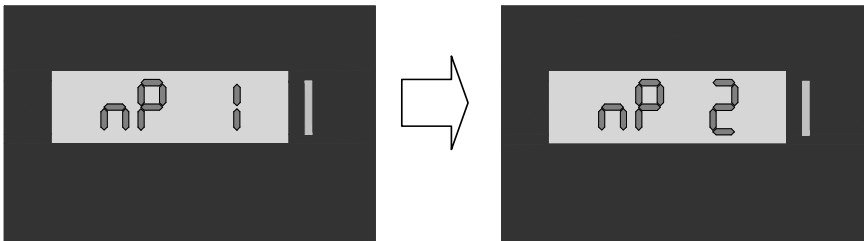


Photo 2: Setup button and E2 Jumper

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	9	19



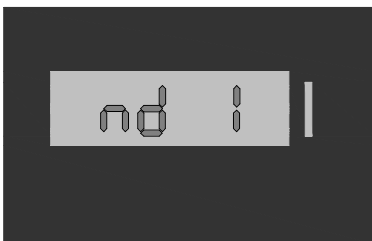
As described above, by moving E2 Jumper into position A-B, the computing head enters Set-up of the first parameter. By pressing buttons S2 or S3 the value of the parameter decreases or increases.



In this case the parameter allows to choose if encoder has to use 1 or 2 channels.

Figure 4: Example of parameter change “Number of Encoder’s channels”

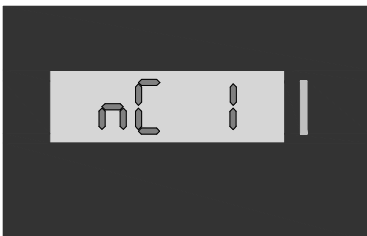
By pressing the S1 button the operator moves to the next parameter.



In this procedure the operator can choose how many displays to use, 1 or 2. This means that the dispenser on which the computing head is installed can be one-sided or two-sided.

Figure 5: Example of parameter display “Number of displays used”

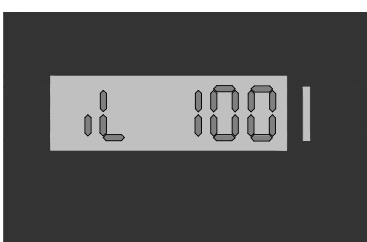
By pressing the button S1 the operator moves to the next parameter.



In this procedure it is possible to modify the number of decimal digits displayed. The computing head can distribute in **cl** displaying 0,00 or in **dl** displaying 0,0 depending on the measuring device.

Figure 6: Example of parameter display “Number of decimal digits used”

By pressing the S1 button again the operator moves to the next parameter.



The computing head can distribute by using a 100pulse/litre or 200impulses/litre encoder. In this procedure it is possible to modify the type of encoder to be used.

Figure 7: Example of parameter display “100pulses/litre encoder used”

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	10	19

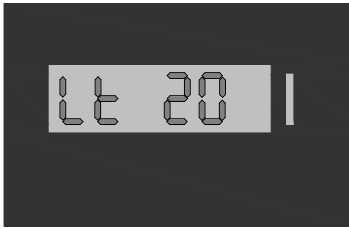


Figure 8: Example of parameter display "Value of metric measure"

As shown § 4.4, a metric measure must be used in order to tare the measuring device. The measuring value can be modified according to needs. The choice can be a metric measure ranging from 5 to 20.
Unit of measure: litres, US Gallons, UK Gallons, are set in the next parameter.



Figure 9: Example of parameter display and modification "Unit of measure"

By pressing the button S3 the unit of measure changes from:

Litres → US Gal → Imp Gal → US Gal → Imp Gal.

Press the button S2 to return to litres.

In order to adapt to the type of POS used, it is possible to modify the weight assigned to the pulses sent for the recording.

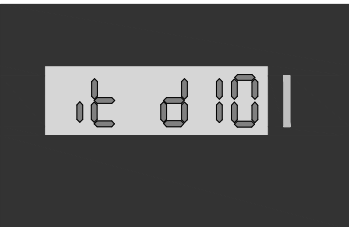


Figure 10: Example of parameter display "Value of pulses transmitted".

In this procedure it is possible to modify the weight of pulses, which can be of 1 cl or 1 dl per pulse.

4.2. Metric Office (Simulation of anomalies)

Press button S1 to go to the next parameter.

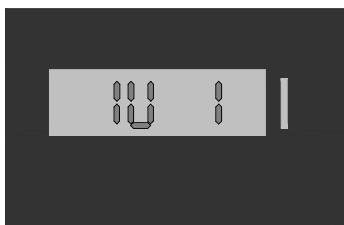


Figure 11: Request for access in Metric Office procedure

By setting 1 it is possible to access the procedure. When the jumper E2 is in the A-C position, the CPU automatically enable distribution, but it simulates all possible malfunctions in sequence, making sure that the checking devices operate.

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	11	19



4.3. Verification of the last setting values.

In order to go to the next parameter press S1 again.



Figure 12: Example of set value

In this procedure it is possible to verify the last six changes of both the meter corrections and type of encoder used. The purpose is to verify that the mechanical tolerances are as steady as possible.



Figure 13: Example of modification of the type of encoder

This is the display of what described above on which is possible to verify that the type of encoder has been modified from 100 to 200pulses/litre.

4.4. Meter setting

In order to go to the next parameter, press S1 button again.

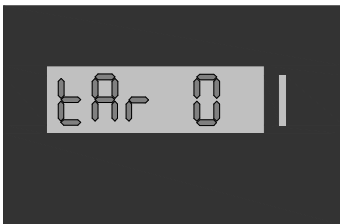


Figure 14: Example of meter setting parameter visualization

This parameter allows access to the meter correction procedure. By using the button S3 the value is set to 1, and this allows access to the modification of the value of the fuel distributed.

It is necessary to remember that in order to access the procedure a quantity of fuel equal to the standard measure set (Lt parameter) must be distributed first. Use a Certified Metric Measure as test. In case the last distribution value is too far from the nominal, the sequence does not take place and the displays shows Er-SuP because the malfunction is greater than what the computing head is able to correct.

If the value is left at 0, the procedure is skipped and the value previously inserted is kept.



Figure 15: Example of wrong fuel distribution display

Otherwise the previous distribution is displayed preceded by a "t", it is possible to modify the value shown using the buttons S1 and S3 so that it will show precisely how much was distributed. As shown in example 14, it goes from 20,34l to 20,00l, from this moment on the computing head will automatically correct the value of the fuel distributed.

At any time, during the Meter setup, the measuring correction is cancelled by pressing buttons S2 and S3 simultaneously for approximately 2 seconds (1 pulse=1 cl).

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	12	19



The table below shows all available parameters:

Computer Head Setup parameter					
Cod:	Abbrev	Description	Field	Increment	U/m
01	nP	Number of encoder channels used	1 - 2	1	----
02	nD	Number of displays used	1 - 2	1	----
03	nC	Number of decimal digits displayed	1 - 2	1	----
04	EC	Number of significant digits	3 - 4	1	----
05	iL	Number of pulses per litre	100-200	100	Imp/l
06	it	Weight of pulses transmitted	1-10	10	cl
07	Lt	Volume in l. of the metric measure	10-20	10	l
08	Litri	Delivery Units	----	L → US Gal → Imp Gal	
09	IU	Request for Units activation	0 - 1	1	----
10	H	Meter setting display	± 10%	1cl	L
11	L	Encoder type indicator	100-200	100	Imp/l

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	13	19



- **nP** Number of encoder channels used - Depending on the application, an encoder equipped with 1 or 2 channels can be used
- **nD** Number of displays used - If necessary, the information can be seen on a secondary satellite display also.
- **nC** Number of decimal digits displayed - The fuel distributed can be shown both in cl format (0,00cl) and in dl format (0,0dl).
- **iL** Number of pulses per litre - The encoder can be adapted to the meter if a 100imp/l or 200imp/l model can be chosen
- **EC** Number of significant digits - Change the maximum value reached, in other words: 990.00 or 9990.00
- **it** Weight of pulses transmitted - The weight of pulses transmitted can be modified from 1cl to 10cl (1dl) to adapt to the POS used.
- **Lt** Volume in l of the metric measure - In the meter setting it is possible to use a metric measure of 10l or 20l.
- **Litri** Delivery Units - By pressing S3 button toggles between two other Units: Liters → US Gal → Imp Gal
By pressing S2 button come back to Liters
- **IU** Request for UM activation - It automatically activates the procedure of malfunctions simulation during distribution.
- **H** Meter corrections - It displays the last 4 changes in the meter reading
- **L** Encoder type indicator - Indication of change in the type of encoder used
- **tAr** Meter setting - It allows to modify the distribution information shown in steps of 1cl at a time.

4.5. Reading of the absolute totalizer

To perform this procedure just push the button on the clamp device TB3 (clamps 4,5), the value of the total fuel distributed will appear in 6 digits.



As an alternative, if more convenient, the button S1 can be used also, it has the same function.

Figure 16: Example of "Absolute Total distributed" display"

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	14	19



5. HARDWARE PERSONALIZATION

There are 3 selectors named E available on the CPU, placed on the inside of the container protected by metric sealing, which allow to modify the functionality of the computing head in the following way:

- E1 Allows to feed only 1 processor during a programming phase
- E2 Allows to perform all setup operations
 - Open position A – C normal distribution
 - Closed position A – B set-up qualified
- E3 Allows to use the encoder with different type of output:
 - Position A - B encoder with low active channel, output type Open Collector
 - Position A - C encoder with high active channel, output type Open Emitter
- E4 Allows to use encoder with different feeding:
 - Position A - B encoder with feeding +12V
 - Position A - C encoder with feeding +5V

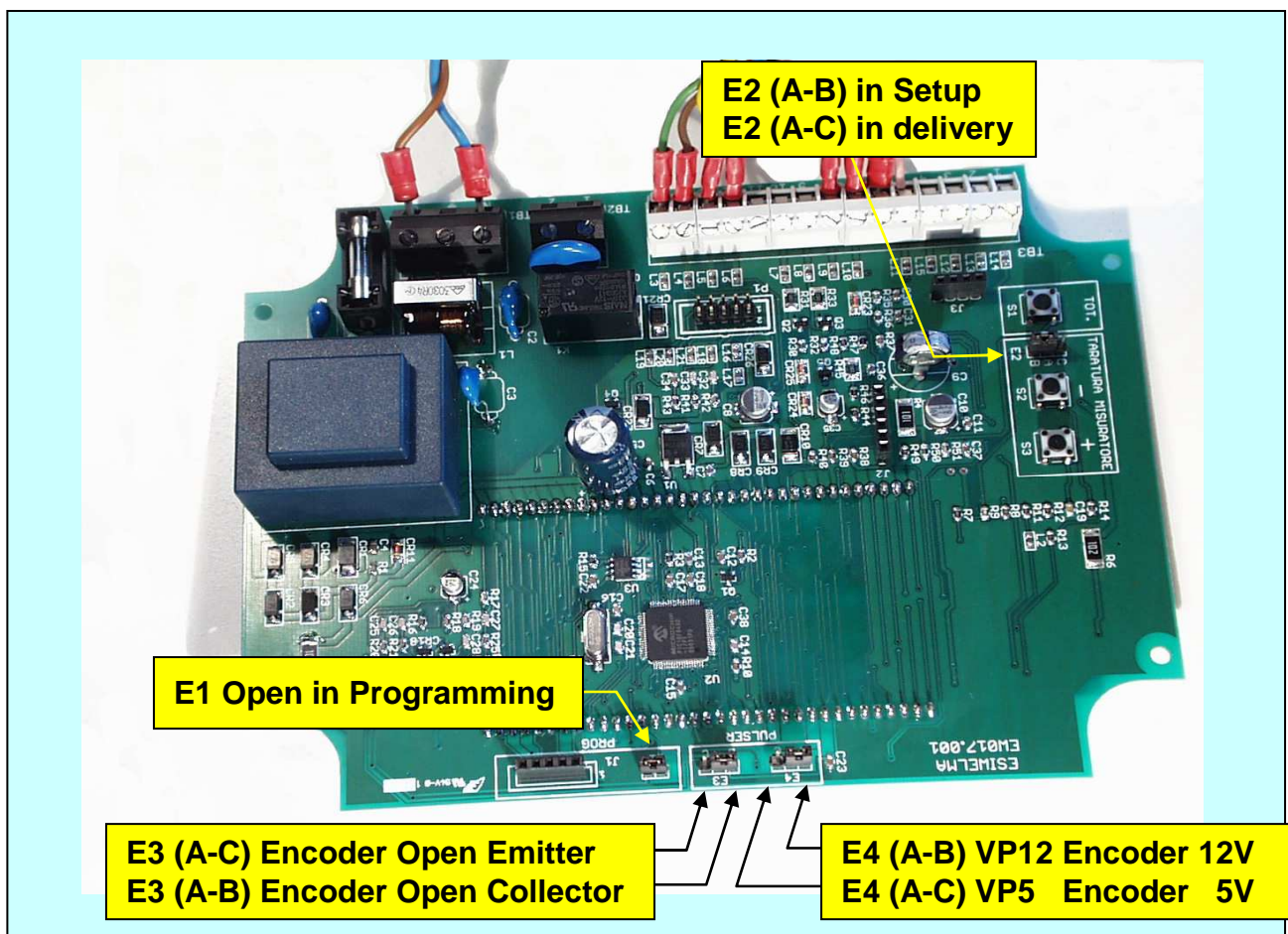


Photo 3: Hardware customizing

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	15	19



6. ELECTRICAL CONNECTION

6.1. Low voltage connection

Generally, all checks performer through microswitch or button are normally open type and must close at 0v when used.

In particular:

- Nozzle contact ----- Open in stand-by, closed during delivering
 - Button requesting total ----- Normally open, closed while in action
 - Pulse generator provided ----- Shaft encoder type 01-09 ELTOMATIC
- Voltage feed: 4,5-25V
 Current per channel: 60mA
 Outputs: active low
 Impulses: 2x100xliters

Terminal Board TB3

With the T.B. in front, Terminal 1 is on the left

- 1 Future applications
- 2 Future applications
- 3 Future applications
- 4 0VfId
- 5 Input total request button
- 6 0VfId
- 7 input microswitch Nozzle
- 8 Not used
- 9 Output channel 2 repetition Encoder
- 10 Output channel 1 repetition Encoder
- 11 0VfId
- 12 Input Channel 2 Encoder
- 13 Input Channel 1 Encoder
- 14 0V feeding Encoder
- 15 +V feeding Encoder
(+5V, +12V see Jumper)

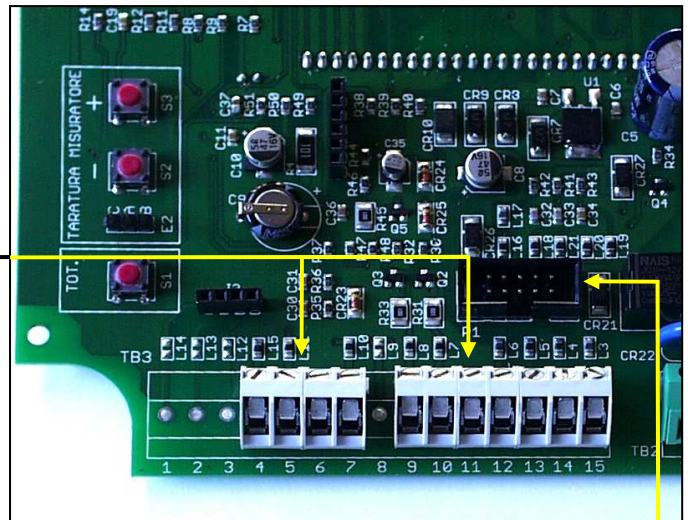


Photo 4: Clamp device BT

Note

The pulse repetition outputs (clamps 9 and 10 of TB3) are Open Collector type, able to provide 100mA of current with a maximum voltage of 24V.

Connector J1

Connection to second display

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	16	19



6.2. High voltage connection

The computing head provides contact free of voltage able to guide resisting and/or inductive charges with the following characteristics:

- Max voltage 230Vca
- Max power 2A

Terminal Board TB1

With the T.B. in front,
Terminal 1 is on the left

Power Supply 230Vac

- 1 Neutral
- 2 Ground
- 3 Phase

Terminal Board TB2

With the T.B. in front,
Terminal 1 is on the left

Voltage Free Contact
NO (230Vac 2A max.)

- 1 Common contact
- 2 Motor control

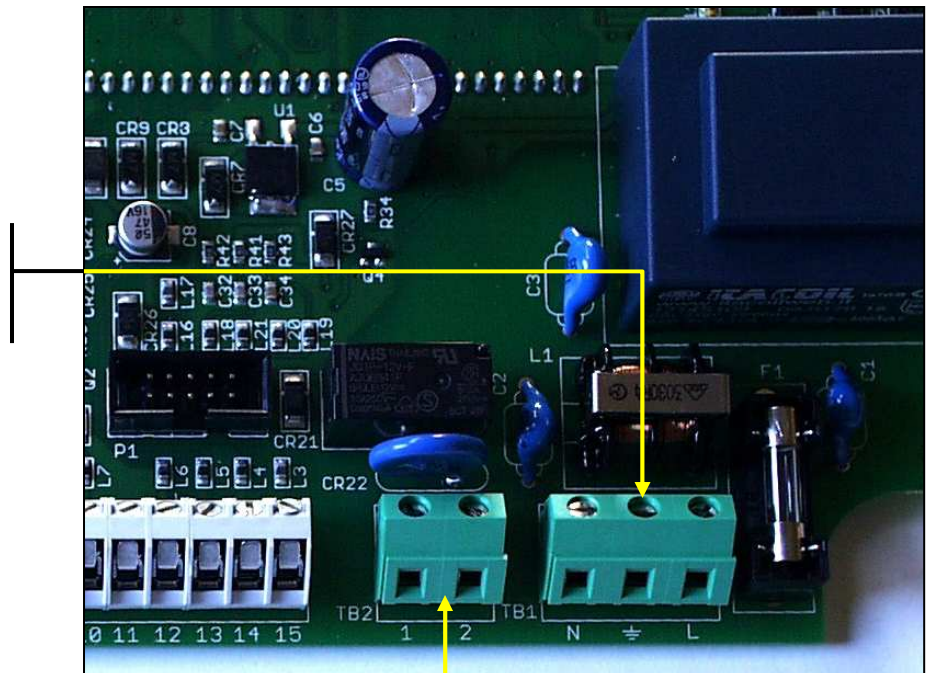


Photo 5: Clamp device AT

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	17	19



EsiWelma® s.r.l.

7. COMPUTER HEAD TEW1-VM IDENTIFICATION

According to regulations, a product identification plate is placed as shown in the picture:



EsiWelma s.r.l.

Via F.lli Canepa 134D-E 16010
Serra-Riccò GENOVA (Italia)

Testata tipo:	TEW1-VM
p/n:
Alimentazione:	230Vac
Assorbimento:	20mA



The following data is shown on the plate:

- Device manufacturer
- Address
- Device model
- P/n device identification
- Power Supply Voltage
- Consumption



Photo 6: Computing head TEW1-VM identification plate

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	18	19



8. LEGALIZING PROCEDURE OF THE COMPUTING HEAD TEW1-VM

8.1. CPU legalization plan

Lead keeping from removing the CPU cover, access to the card, connection to field removal, change setup parameters.

Lead keeping from removing the CPU case

It is possible to use any of the 4 screws available.

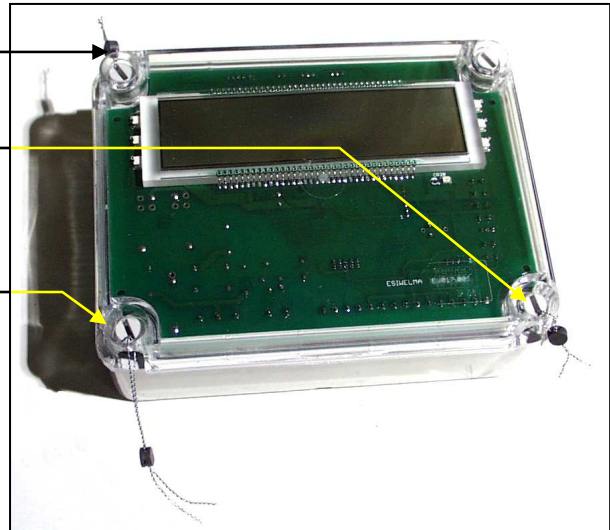


Photo 7: Computing head TEW1-VM; CPU front view

8.2. Display legalization plan

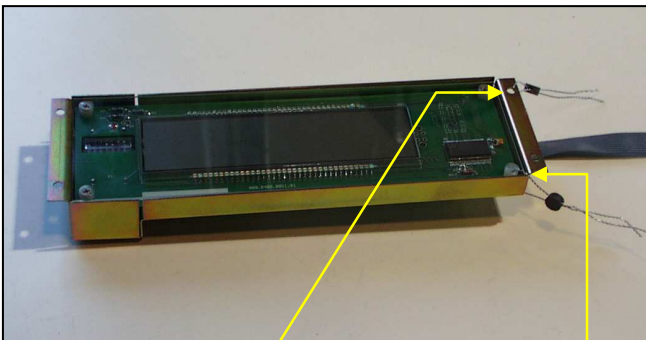


Photo 8: Computing head TEW1-VM; front view Display

Lead keeping from display removal

Lead blocking access to the display card

Lead keeping from removing the display cable

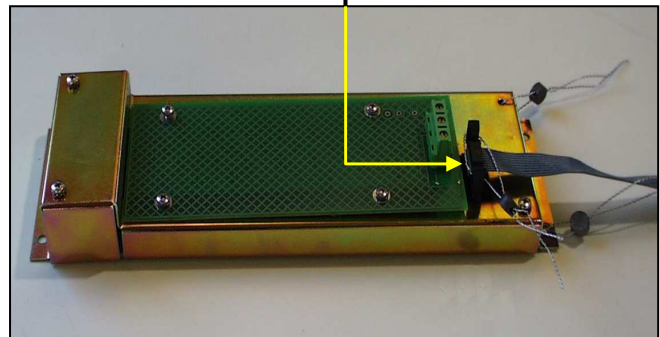


Photo 9: Computing head TEW1-VM Display rear view

Note

The spiral that keeps from removing the containers (CPU and Display) from the dispenser must be fastened to a part that cannot be moved from the dispenser.

Type / N°	Rev.	Fw	Date	Page	Total pages
W017. 600	H	F	December 30, 2009	19	19