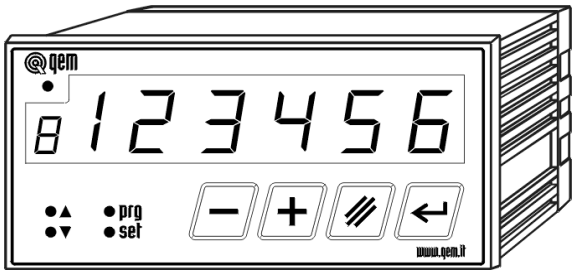
MUI

MC235.01

Quotas multifunction visualizator

User manual and installation



MUIMC235010EN - 25/07/2011

1. General Informations

Thanks for buying this QEM instruments. We'll be glad to receive at our e-mail address info@qem.it all your suggestions referred to this instruments end to the user manual.
Finally we suggest you to preserve this manual for future consultations.

Graphic Symbol Meaning


Not reading the message will be dangerous for the instruments integrity and/or for the success of the operation.


Note: Important information for the correct use of the instruments.


For more informations see the user manual indicated in the message.


For more informations see the pages indicated.

Specificated

Trade Marks:
- QEM® is a trade mark.

Limited Warranty

For two (2) years from the original acquisition, QEM will repair or replace for free controls and devices that QEM thinks be imperfect in materials or quality. This warranty is not valid if the object has been tampered by not autorized persons or used in an inappropriate way.
This warranty replaces all other warranties either expressed or implicit.
QEM desn't hold personally responsible for all charges (installation or uninstalling included), drawback, or damage caused by our products, made or sold. In any case, QEM total duty, always will not exceed the control total price.
Claims for refunds of selling price, reparations, or replacements must be referred to QEM with all pertinent data (damage, purchase date, developed work and problem).
It is not provided any duty for batteries and fusible cut-out consumption.
The product must be returned only with a written notification, included the Number of Restitution Autorization QEM and must be paid all forwarding charges.

Validity

The present document is fully valid excepted mistakes or omissions.

M: Manual;
S: Instruments.

Instrument Release	Description	Date
0	M New manual. M Data corrections. M Content review. M Insert new code M Insert CX9 model M Input's note	14/07/2005 29/07/2005 02/08/2005 30/08/2005 06/09/2005 14/09/2005 14/11/2005 28/02/2007 17/04/2007 03/10/2007 15/12/2010 25/07/2011

Purpose

This manual could give informations for the instrument using.

Indication

We raccomand to guard all instruments Programmation parameters (Set-up) for an easy service ore reaplace.

User Manuals

The documentation referred to the QEM strumentation in divided in many issues that allows an easy utilization.

	**MUI: User and installation manual** Instrument hardware and software informations.
	**MIMAT: Maintenance, service and installation manual.** Informations on: wiring, right calibration, parameters insertion and breakdown individuation.

It is possible to download manuals from *www.qem.it*

Norm references

European norm includes some rules and raccomandations about control security systems with elements of operator interface.

Protection rate	IP20 (Conforme a EN 60-5-29)
Frontal protection rate for container (optional)	IP54
IP65 frontal protection rate with packing for container(optional)	IP65
Vibration resistance	Conforme a IEC 68-2-6
Bump resistance	Conforme a IEC 68-2-27
Jamming immunity	Conforme a EN 50082-2
Emission level	Conforme a EN 50081-2
Container	DIN43700

2. Description

For more informations contact QEM sales office.

MC235.01 is an instrument made for viualize an incremental bidirectional encoder count.
This instruments replace: EC235.01, EC235.01A, EC235M01.

General Characteristics

– Bidirectional count;
– Resolution multiplier;
– Loading preset quota;
– Programmable input;
– Not volatile storage;
– Unscratchable keyboard with tactile feelingcon;
– Incorporated encoder alimentation;
– Absolut/incremental counter visualization;
– Extractable polarized junction-box.

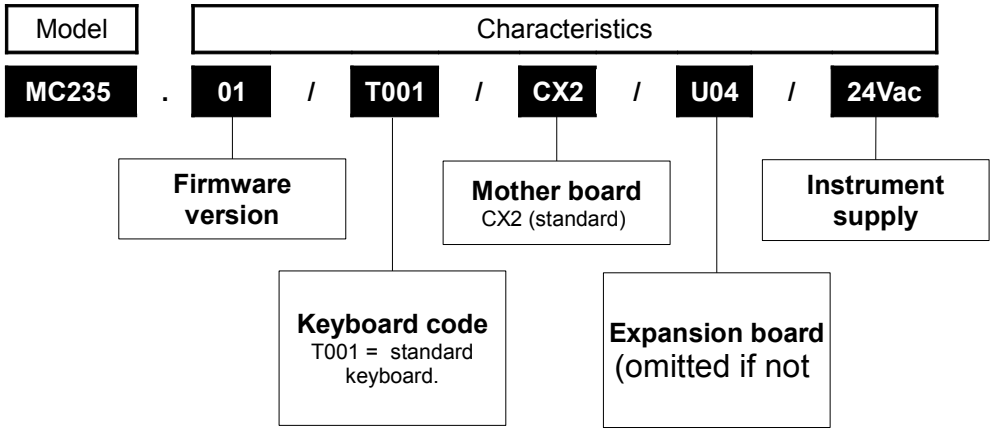
New functions

– Angular visualization in sexagesimal degrees;
– Display not significative zero turning off;
– Programmable philter antiglitch on inputs.

Options

- Personalized panel;
- Dedicated power supply voltage;
- Superior encoder counter frequencies;
- Specialization on customer specifications..

Product code



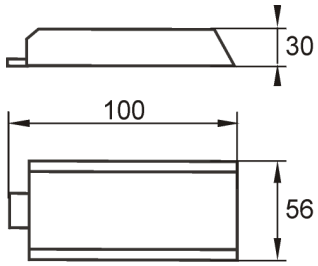
CX_ : Basic Card

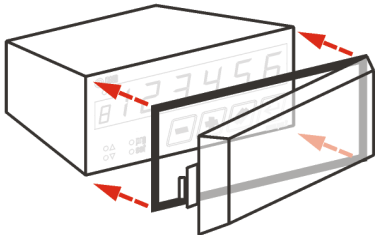
		CX1	CX2	CX3	CX4	CX5	CX6	CX7	CX8	CX9	CXA	CXB
PHA / PHB: Encoder phases	*Frequency*	15 KHz		200 KHz						15KHz	50 KHz	
	Encoder type	PP				LD				PP	PP	
	Voltage level of encoder phases	12 / 24 V				2 / 3,5 V				5V	12 / 24 V	
I1 / I2: Digital inputs	*Frequency*	10 KHz						100 KHz		10KHz	10 KHz	
	Polarization	PNP	NPN	PNP	NPN	PNP	NPN				PNP	NPN
	Inputs voltage level	10,5 / 26,5 V							5 V		10,5 / 26,5 V	
Vout ext	*Delivered power supply*	12 V						5 V			12 V	

Accessories

Description	Codice d'ordinazione
Container frontal protection (IP54)	23040001
Packing frontal protection for container (IP65)	23040044

Misured in mm.





Technical characteristics

weight (max. hardware composition)	450 gR
Container material	Plastic noryl UL 94 V-O
Display	1 display h = 8 6 display h = 14
Buttons	4 mechanical buttons with tactile feeling
Led	5
Working temperature	0 / 50 °C
Relative humidity	90% senza condensa
Altitude	0 / 2000 m s.l.m.
Atmosphere	Not corrosive gasses
Transport and stocking temperature	-25 / +70 °C

Mechanical dimensions

*Misured in **mm**.*

Mechanical installation
pag. 8

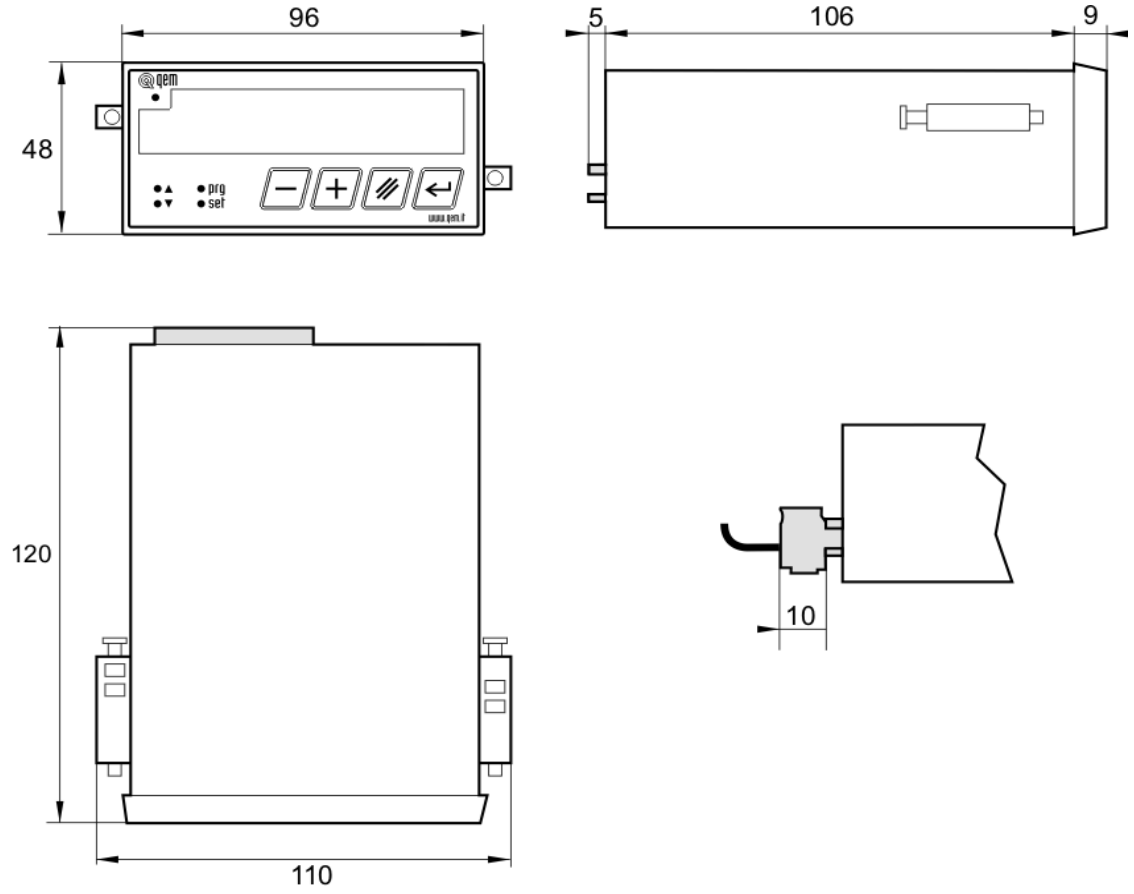


Fig. 1 Back view

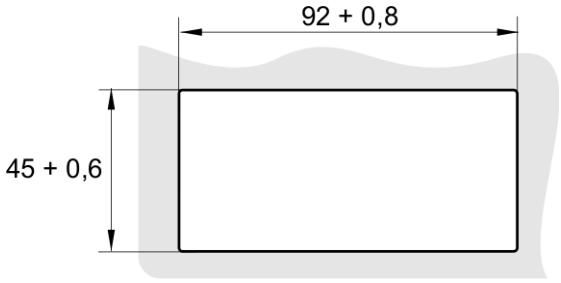
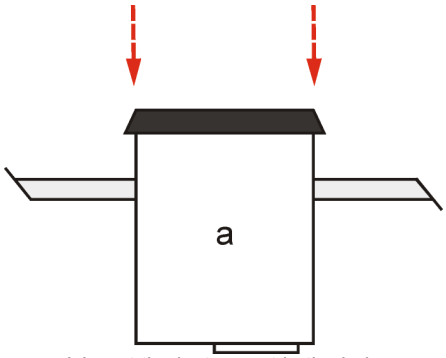


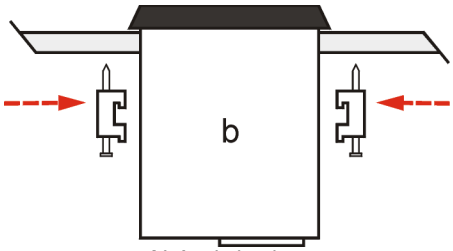
Fig. 2 Perforation area

3. Installation

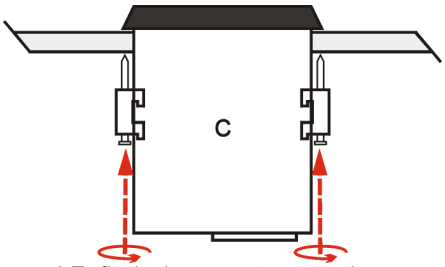
*For a correct installation read **MIMAT** manual*



***a)** Insert the instrument in the hole;*



***b)** Apply hooks;*



***c)** To fix the instruments screw down.*

4. Electric properties

Power supply

** = **Variable data.** See the model **Basic Card CX_** (pag. 5)*

	Vac	Vdc
Available power supply	24 / 27 / 110 / 230 Vac	24 Vdc
Range val	-15 / +10%	18 / 30 V
Frequency	50 / 60 Hz	dc
Assorbimento max.	8 VA	
*Volt ext.**	12 Vdc - 100mA	

I1 / I2: Digitalis inputs

** = **Variable data.** See the model **Basic Card CX_** (pag. 5)*

N.B.: For the other inputs' features, please contact QEM's sales office.

		CX 1	CX 2 (standard)
*Polarization **		PNP	NPN
*Frequency **		10 Khz	
Optoinsulation		1500 V rms	
Nominal operating voltage		12 / 24 Vdc	
Logic state 0 Voltage		< 3 V	
Logic state 1 Voltage		> 8 V	
Input resistance		1,5 KΩ	
Internal voltage drop (see Fig.3)		1,2 V	
Lowest acquisition time I1	*Activation C*	50 ms	
	Activation I	10 µsec.	
Lowest acquisition I2		50 ms	

C: continuos
I: impulsive

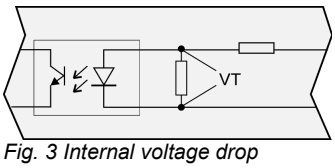


Fig. 3 Internal voltage drop

PH A /PH B: Bidirectional endoder phases

** = **Variable data.** See the model **Basic Card CX_** (pag. 5)*

N.B.: For the other inputs' features, please contact QEM's sales office.

	Encoder 12 V		Encoder 24 V
	CX 1	CX 2 (standard)	
*Polarization **	PNP	NPN / Push - Pull	
*Frequency **	20 Khz		
Optoinsulation	1500 Vrms		
Logic state 0 Voltage	< 3 Volt		
Logic state 1 Voltage	> 8 Volt		
Input resistance	1,5 KΩ		
Internal voltage drop	1,2 Volt		

5. Wiring

** = **Variable data.** See the model **Basic Card CX_** (pag. 5)*

*For more information on I1 input programming, see **Function I1 input** in **Program (set-up)** at pag 16*

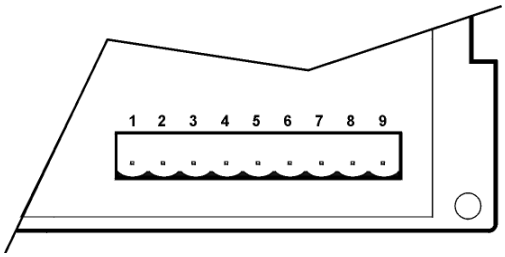


Fig. 4 Back connector

Terminal	Name	Logic activation state	Way of activation	Description
1	12 V *	-		**Volt ext.**
2	0 V			
3	I1 / PH Z	On	C / I	**Digital input I1 / Phasease Zero encoder.** Programmable.
4	I2	On	C	**Digital input I2.** Zero setting counter, or charging permission.
5	PH A	On	I	**Bidirectional encoder phases.**
6	PH B			
7	Vac / - Vdc	-		**Power supply voltage.**
8	Vac / + Vdc			
9	GND	-		**Ground connection.** Connect a conductor with 2mm^2 section to the PE bar.

C: continuos
I: impulsive

Wiring examples

The wiring examples change according to Basic Card CX characteristics installed in the instrument. (pag. 5)

*For other wiring example read **MIMAT** manual.*

Possible only with Basic Card CX2.

Basic card CX2 (Standard)

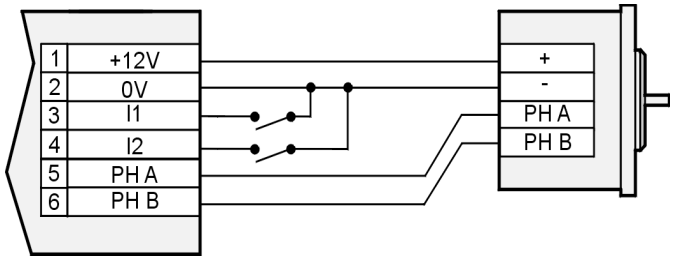


Fig. 5 Digital input polarization NPN.
Bidirectional encoder phases connection rNPN / Push Pull.

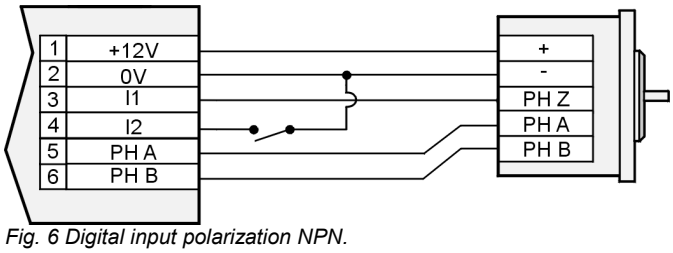


Fig. 6 Digital input polarization NPN.
Bidirectional encoder phases connection NPN / Push Pull with I1 Impulsive.

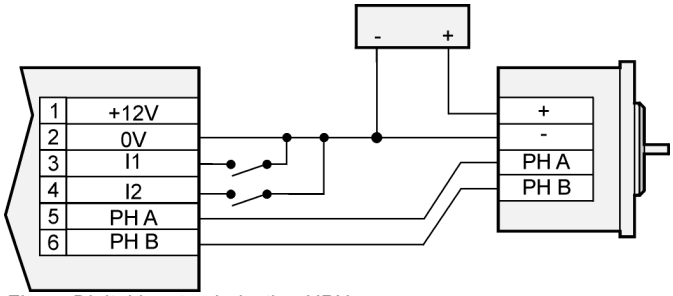


Fig. 7 Digital input polarization NPN.
Bidirectional encoder phases connection rNPN / Push Pull feeded externally

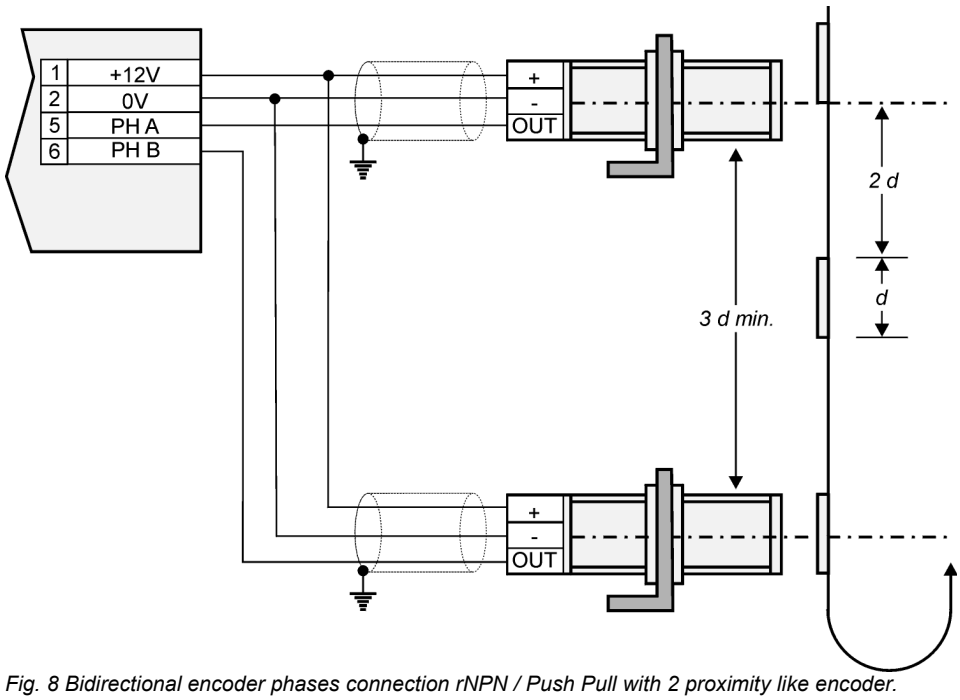


Fig. 8 Bidirectional encoder phases connection rNPN / Push Pull with 2 proximity like encoder.

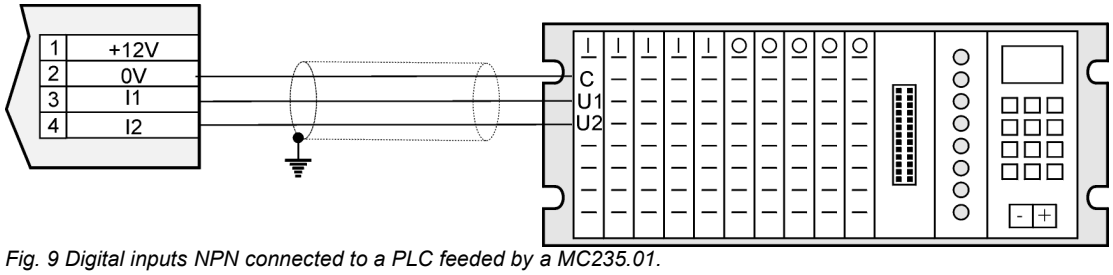


Fig. 9 Digital inputs NPN connected to a PLC feeded by a MC235.01.

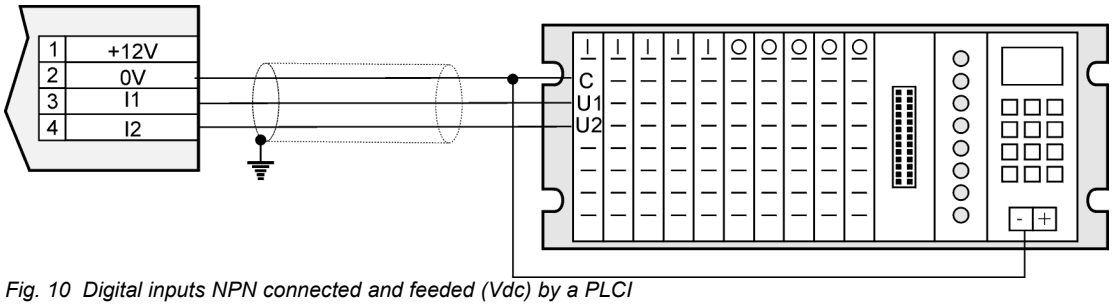


Fig. 10 Digital inputs NPN connected and feeded (Vdc) by a PLCI

Basic Card CX1

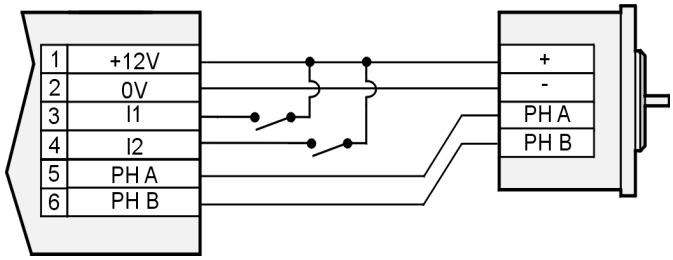


Fig. 11 Digital input polarization PNP.
Bidirectional encoder phases connection PNP

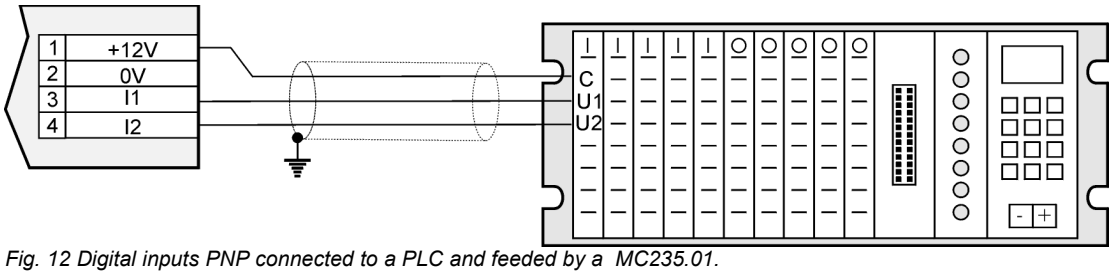


Fig. 12 Digital inputs PNP connected to a PLC and feeded by a MC235.01.

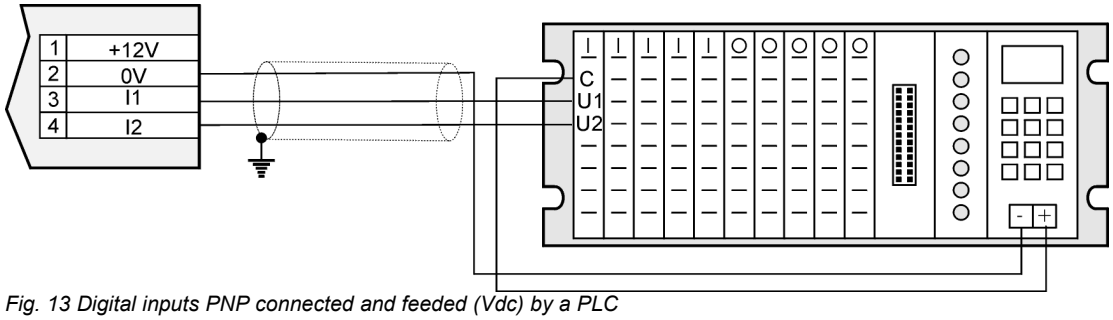
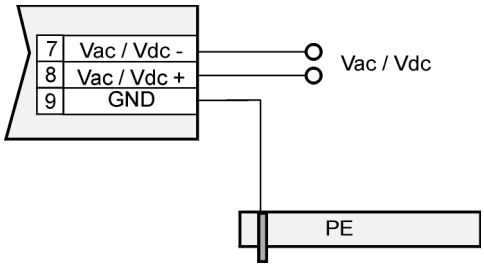


Fig. 13 Digital inputs PNP connected and feeded (Vdc) by a PLC

*For a correct installation see **MIMAT** manual.*

Power supply connections



5.1.1.1 Notes

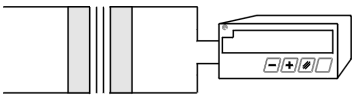


Fig. 14 Use a transformer 50VA min. sec. 24 Volt

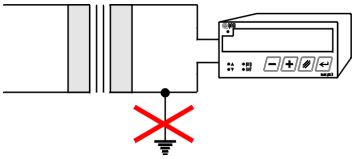


Fig. 15 Don't connect power supply voltage to the groud

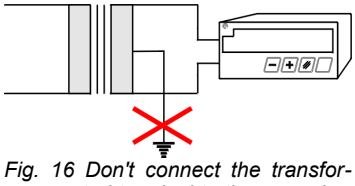


Fig. 16 Don't connect the transformer central terminal to the ground

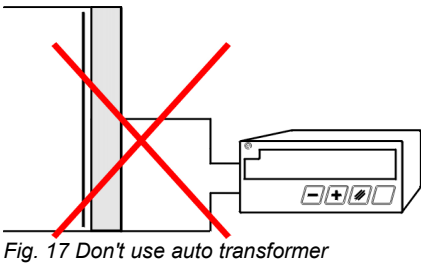


Fig. 17 Don't use auto transformer

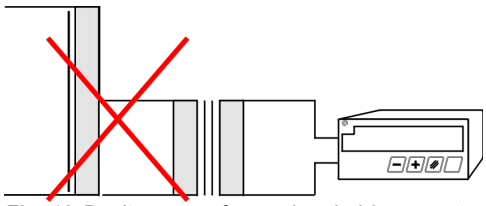


Fig. 18 Don't use tranformer headed by an auto-transformer

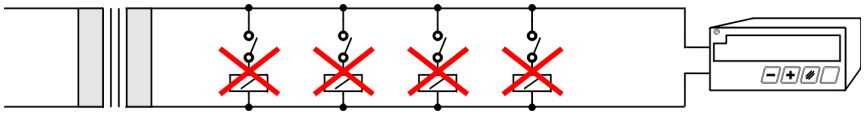
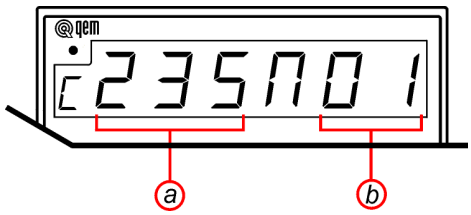


Fig. 19 Don't set coils, electro-valve etc. in parallel

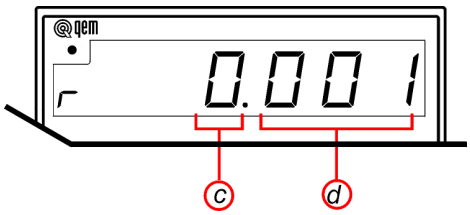
6. Functioning

Release message

At the turning on the display shows:



1°: a) Instrument family;
b) Instrument firmware version.



2°: c) Release;
b) Granting.

Keyboard functions

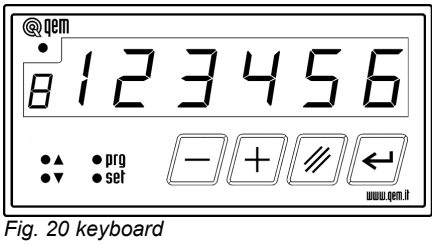
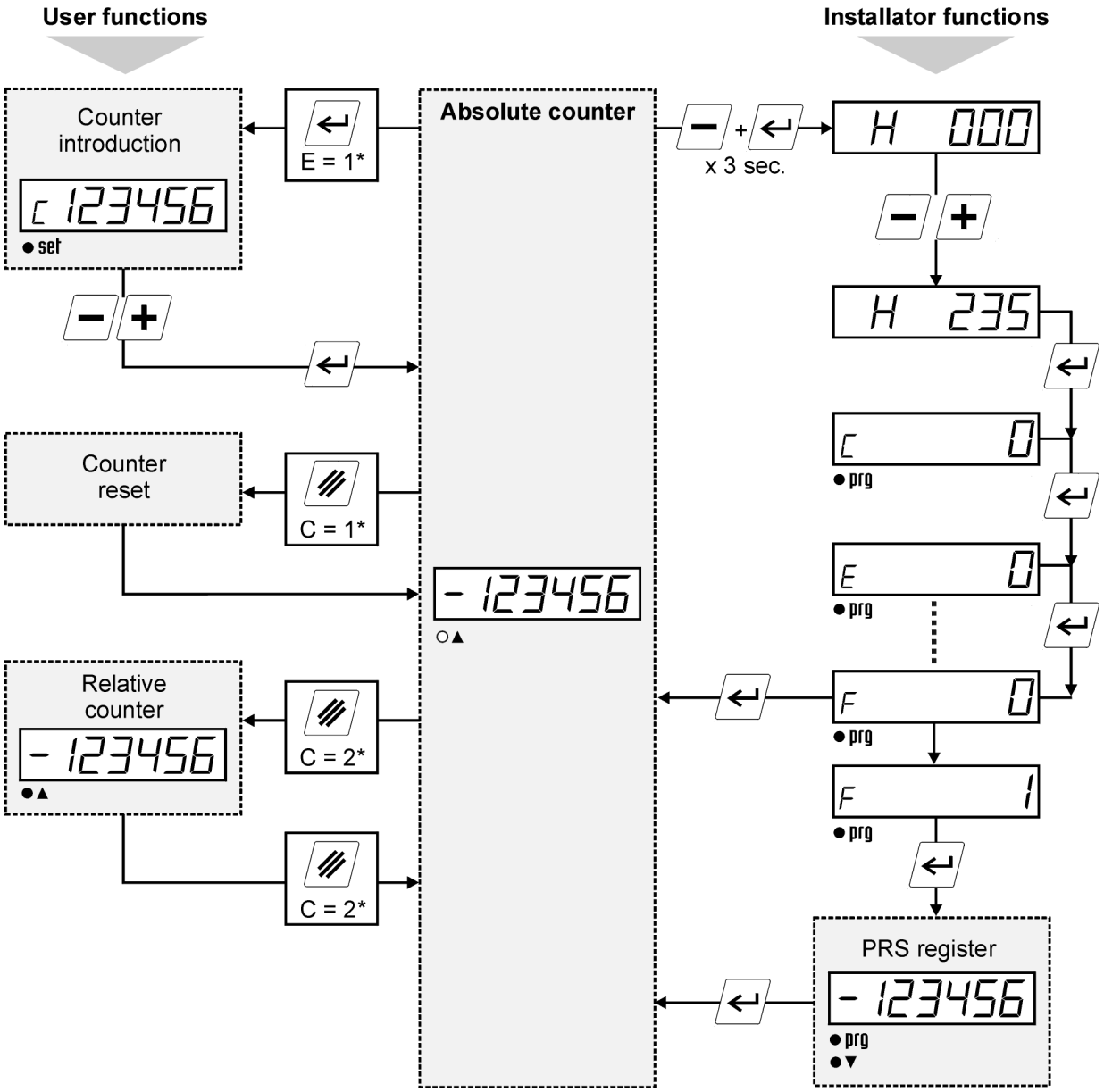


Fig. 20 keyboard

*Some II funz-buttons functio-ning depends by the **Programmation (Set-up)** pag. 16.*

Enter	**Data insertions:** It confirms the data introduction. **Normal working:** If E = 1, allows a value introduction in the counter.
Clear	**Data insertions:** Cancel the inserted value, giving the past value. **Normal working:** If L = 1 counter reset; If L = 2, allows / not allows relative counter.
+	It increases the selected number.
—	It selects the number with a shift from left to right.
● prg	**Led.** ON = gives the parameters introduction state (set-up).
● set	**Led.** If E = 1, informs the introduction state of a value on the counter.
●▼	**Led.** ON = informs the access to the storage register “PRS”.
●▲	**Led.** ON = informs the relative counter state. OFF = informs the absolute counter state.
a, b	**a) Led.** **Data insertion:** informs the insertion sign state (direction). **Normal working:** informs the input I1 state. **b) Display** (first display from left) gives a differentiation of visualized data. If A = 1 informs negative counter.
Enter + —	Access to password protected functions

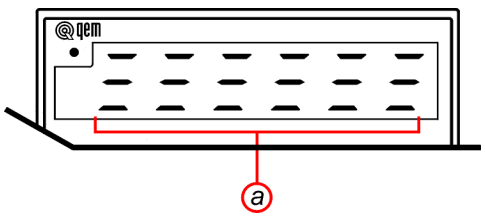
Using graphic



* = ***Programmation (Set-up)*** *parameter pag. 16*
○ ***Led*** = *Off.*
● ***Led*** = *On.*

"Data out of range" visualizzation

If introduced data are out of range, the display visualizes:

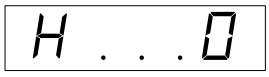
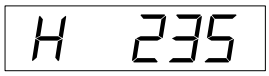


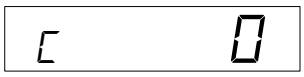
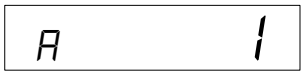
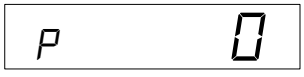
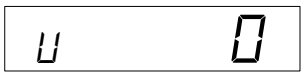
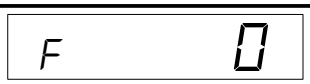
a) Data out of range

7. Parameters introduction

Programming (Set-up)

Parameters define the instrument functioning way, their access is reserved to an installator with a password.

Description	Keyboard	Visualizzation
For entering in the Programming (Set-up).	 + x 3 sec.	
Introduce the access code “235” and confirm with **enter**.		

Function	Display	Description
CLEAR button functions		**0** = BLOCKING FUNCTION; **1** = COUNTING RESET; **2** = ACTIVATE / DEACTIVATE RELATIVE COUNTER.
ENTER button functions		**0** = BLOCKING FUNCTION; **1** = COUNTER INTRODUCTION BY KEYBOARD. see ***Using graphic*** *pag. 15*
Activation counter sign		**0 =** WITHOUT SIGN COUNTER(one under zero = 999999); **1 =** COUNTER WITH SIGN (one under zero = -1).
Decimal cypher Max. 3		If parameter d = 0, 1 or 2: SPECIFIES THE NUMBER OF DECIMAN CYPHERS. If parameter d = 3 or 4: Specifies: **0** = DEGREES VISUALIZATION; **1** = DEGREES VISUALIZATION.
Counter exit code		Parameter value = 0.
Transducer risolution		ENCODER REVOLUTION IMPULSE MOLTIPLIER to visualize the lenght in the correct unit of measure. *Range: 0.00200 / 4.00000* *For other information see**MIMAT**.*
Visualization ways		**0 =** NORMAL VISUALIZATION. **1 =** Visualization with HDR system type 1. **2** = Visualization with HDR system type 2. **3** = MONOREVOLUTION sexagesimal vsualization. **4** = MULTIREVOLUTION sexagesimal visualization. *For other informations see **MIMAT**.*
Input function I1		**0** = NO ONE FUNCTION. **1** = CONTINOUS CHARGING PRS storage register on the counter. **2** = IMPULSIVE CHARGING PRS storage register on the counter ***Counter preset*** *pag. 20* **3** = ADDS the prs storage register content to the counter. **4** = SUBTRACTS the prs storage register content il contenuto del registro di memoria prs to the counter. **5** = SICURITY protecting programmable functions; possible programmation only with I1 input = ON (connectable to a key interruptor).

Function	Display	Description
		6 = VISUALITATION BLOCK. *In 1,3,4,5,6, functions the I2 input reset the contonous conter.* *Selecting functions 0,1,3,4,5,6, I1 input has acquisition time 50 milliseconds.*
PRS storage register	0	Led = ON. Introducing the value referred to the PRS storage register (value charged on the counter with the I1 input, if applied).
At the end of the programming, the instrument returns at the normal visualization.		

Transducer resolution calculation

In the “transducer resolution” parameter (L) is the number of measure units that we want to visualize in th impulse number generated by a transducer phase.

Exemple:

Space in unit of measure	Transducer impulses	Transducer resolution	d	P	Visualization (impulse conversion)
S	I	L = S / I			
500	2000	0,25000	0, 1, 2	0	500
500	2000	0,25000	0, 1, 2	1	50.0
7423	4096	1,81226	0, 1, 2	1	742.3
5000	2000	2,50000	0, 1, 2	1	500.0
360	9000	0,04000	3, 4	0	360
21600 (360x60)	9000	2,40000	3, 4	1	360.00

Errors caused by not ended risolution

In the “transducer risolition” parameter (L) is possible to specifing the value of the factor for the inpulse conversion with a precision up to the fifth decimal number.

If the factor has more than five decimal number is necessary inserting an approximed value. In this case we have an error. Here we can see when it cause problems.

If the space in a tenth part of mm is	S = 7423
And it correspond to a transducer impulse number equal to	I = 4096
The technical resolution is	L = 1.812255859...
Approximated to	L = 1.81226

In this way every 4096 impulses you have an error equal to 5×10^{-6} tenth part of mm.

You get after	$4096 / (5 \times 10^{-6}) = 8192 \times 10^{8}$ impulses

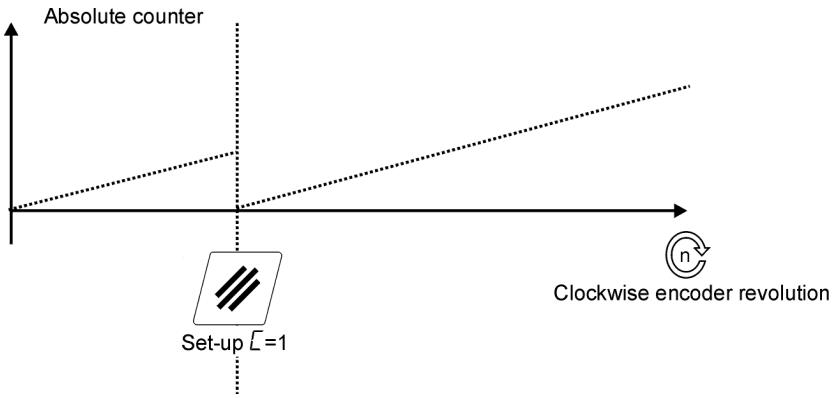
The measure visualization is uncorrect for the tenth part of mm. Now the user has to decide if this imprecision is tollerable for his application.

The possible cases are:

The impulse number to have an error of a tenth part of mm is hight and in the application can'7 be reached without before reset the counter, so there aren't problems. The impulse number can be reached, but the error is no relevant for the application. The highest impulse number reached during the application without reset the counter, is much bigger than the calculated value. So the error results bigger than the tenth part of a mm that is innaceptable. It this case is suggested to modify the mechanic or the transducer impulse number to reach an ended value up to the fifth decimal.

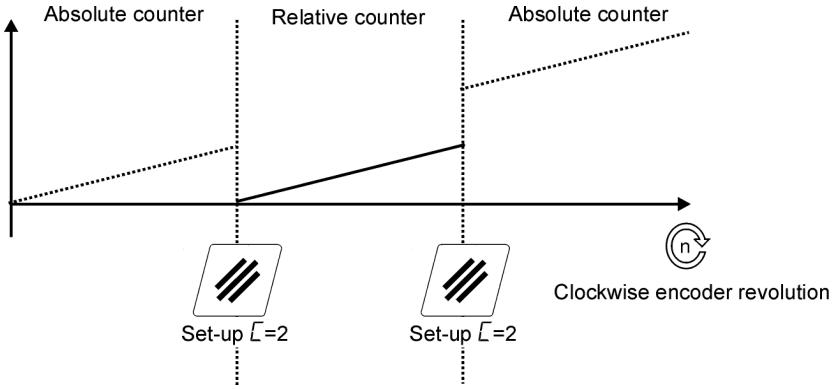
Counter reset (C = 1*)

* = ***Program (Set-up)****parameter pag. 16*



Relative/absolut counter(C = 2*)

* = ***Program (Set-up)****parameter pag. 16*



Angular visualization

Can be employe this unit of measure:

	Revolution angle
Rad	2 π rad
Hundredth degree	360.00°
Sexagesimal degree	360°00’00”

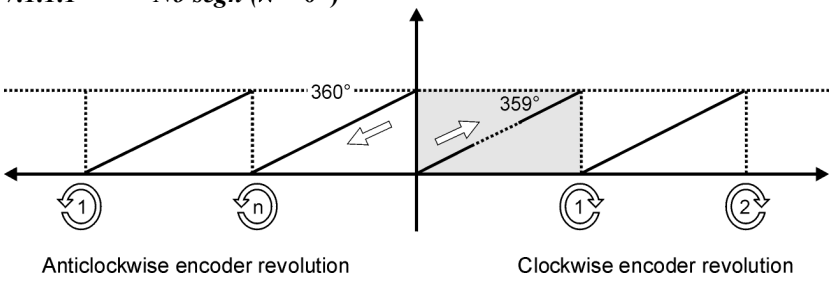
According to the application requirement the visualization could be monorevolution or multi revolution; in the below tabulation are persent the impostation to obtain the different visualizations:

Visualizzation type		Parameter impostation *		
		d	P	A
Monorevolution without sign in degrees	0° / 360°	3	0	0
Monorevolution without sign in degrees and primes	0° 00' / 360° 00'	3	1	0
Monorevolution with sign in degrees	-360° / 360°	3	0	1
Monorevolution with sign in degrees and primes	- 360° 00' / 360° 00'	3	1	1
Multirevolution without sign in degrees	0° / 999999°	4	0	0
Multirevolution without sign in degrees and primes	0° 00' / 9999° 99'	4	1	0
Multirevolution with sign in degrees	- 999999° / 999999°	4	0	1
Multirevolution with sign in degrees and primes	- 9999° 99' / 9999° 99'	4	1	1

Monorevolution counter (d = 3*)

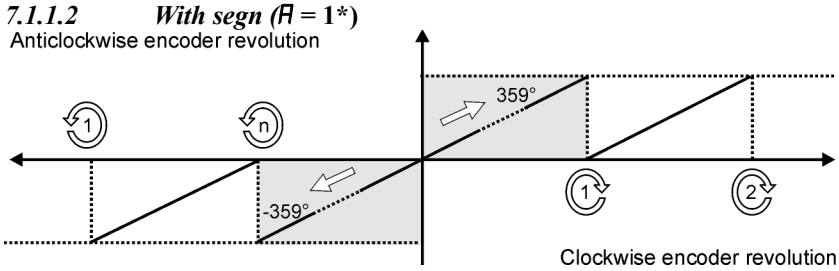
** = **Program (Set-up)**parameter pag. 16*

7.1.1.1 No segn (A = 0)*



Anticlockwise encoder revolution Clockwise encoder revolution

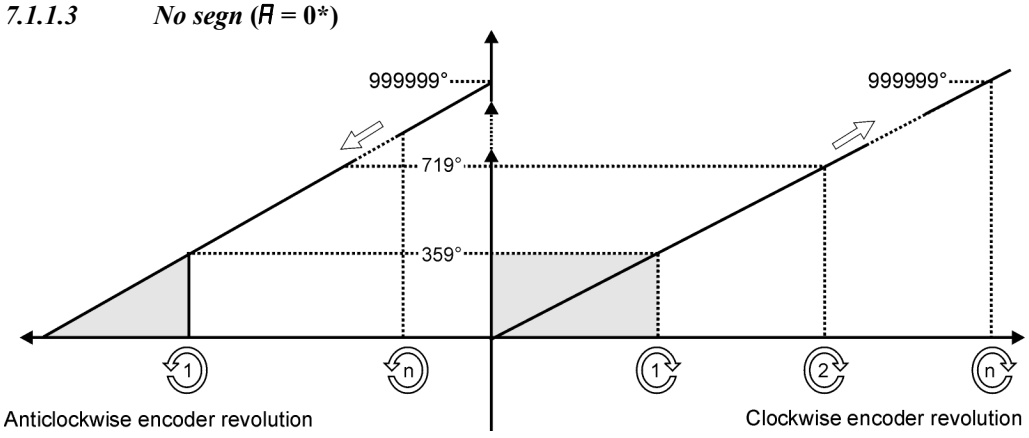
7.1.1.2 With segn (A = 1)*



Clockwise encoder revolution

Multirevolution sign(d = 4*)

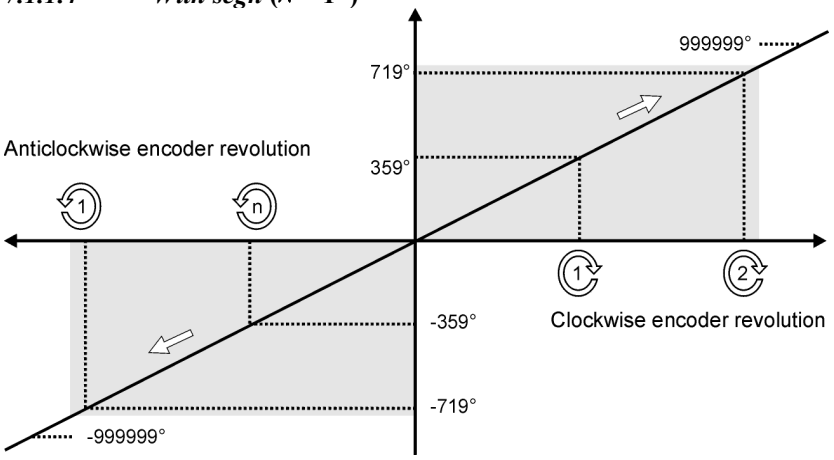
7.1.1.3 No segn (A = 0)*



Anticlockwise encoder revolution Clockwise encoder revolution

* = ***Program (Set-up)****parameter pag. 16*

7.1.1.4 With segn (A = 1)*



Counter preset

For other information see ***Navigation card*** *at pag15*

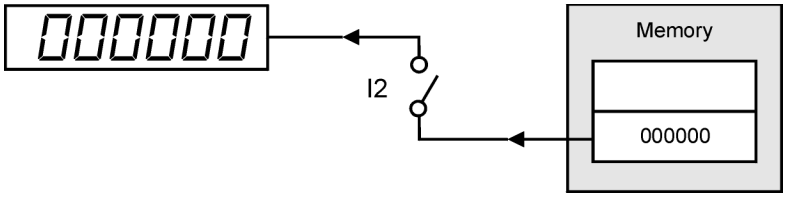
For more information read the ***MIMAT*** *manual.*

• = ***Program (Set-up)****parameter pag. 16*

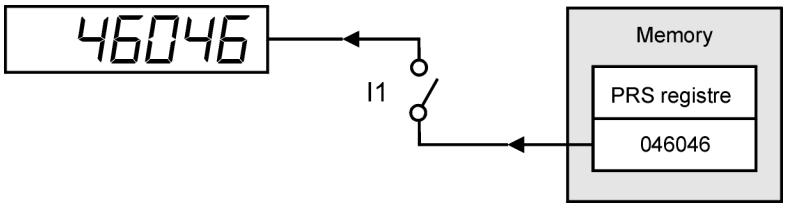
It is allowed user to modify the visualized value on the counter according to misurations done in the range. It is necesary to permit the “Introdution counter” function setting the “E=1”* parameter.
If the transducer con be removed while the instrument is feeded, it's necesay to provide at every switch on to counter rephasing respect to a phisic point i the axis; these functions, called “Preset”, con be obtained utilizing incremental transducer with zero impulse or with stroke end.

With the parameter (F = 1)*

The digital input I2 resets and blocks at zero the counter while it is activated.

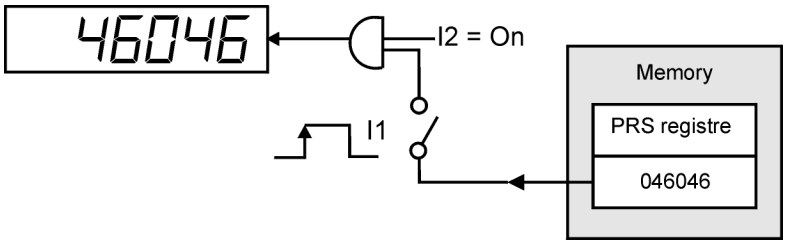


The digital input I1 transfers the PRS register value to the counter.
The counter is blocked at the PRS value while the input is activated.



With the parameter (F = 2*)

The digital input I1 transfers the PRS register value to the counter only if I2 is active.
The counter is not blocked.



8. Assistance

Request for assistance

To provide you a faster service, at a minimum cost, we do need your help.

a)

a) *Follow all the information in the manual MIMAT (www.qem.it)*

b)

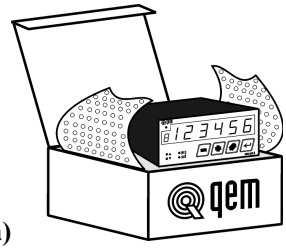
b) *If the problem persists, fill the* ***Module for technical service*** *attached to this manual and send it to QEM.*

c)

c) *Our technicians will get the fundamentals elements to understand your problem.*

Shipment

We recommend to pack the instrument with materials that can damp eventual falls.

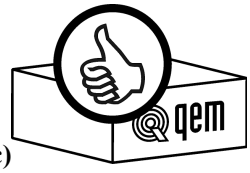


a)

a) Use the original package: *it has to protect the instrument during the transportation.*

b)

b) Attach:
- An anomaly description;
- Part of the electrical sketch where the instrument is inserted
- Programming of the instrument (set up, working quotes, parameters..).
- ***Request of a repairing estimate****; if not requested the cost will be calculated at the end.*



c)

c) An exhaustive description of the problem allows to find and solve your problem. An accurate package avoids further drawbacks.

QEM informs the courteous costumer that the shipped instruments unfairly packed won't be repaired, except for the cases where the costumer assumes completely the reparation cost.

Motivations
The QEM established like that because a too strong line may cause damages that could reveal in a temporal space of some months, causing doubts and shadows on the reparation done.

Modulo fax per Assistenza Tecnica
Module for Technical Service

Ditta / *Firm* :..... Rif.:.....

Indirizzo / *Address*:.....
.....
.....

Tel..... Fax.....

E – mail.....

Codice strumento / *Instrument Code* :.....

Alimentazione strumento / *Power Supply:* .....

Tipo di macchina / *Machine type*:
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Descrizione ciclo macchina / *Cycle machine description*:
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Parametri / *Parameters*:
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Descrizione anomalia / *Anomaly Description*:
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Frequenza anomalia / *Anomaly frequency* :

- ☐ Continuo / *Continous*
- ☐ Saltuario / *Irregular*
- ☐ Dopo un certo tempo / *After a few time*
- ☐ All'accensione / *At the switching on*
- ☐ Allo spegnimento / *At the switching off*
- ☐ Altro / *Other*: .....
  .....
  .....

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e-mail: info@qem.it

La marcatura CE dello strumento non solleva l' Installatore dal recepimento e adempimento degli obblighi normativi di riferimento al proprio prodotto.