

Fig. 1

Fig. 2

TAB 1



	ENG- Displaying of water cubic meters
	ITA- Visualizzazione contatore metri cubi acqua
	ESP- Visualización metros cúbicos de agua
	ENG- Displaying of gas cubic meters
	ITA- Visualizzazione contatore metri cubi gas
	ESP- Visualización metros cúbicos de gas
	ENG- Displaying of phase-to-neutral system voltage
	ITA- Visualizzazione tensione fase-neutro di sistema
	ESP- Visualización tensión sistema fase a neutro
	ENG- Displaying of phase-to-phase system voltage
	ITA- Visualizzazione tensione fase-fase di sistema
	ESP- Visualización tensión sistema fase a fase
	ENG- Displaying of max values
	ITA- Visualizzazione valori massimi
	ESP- Visualización valores máx.
	ENG- User ID
	ITA- Identificatore Utente
	ESP- ID, identificación de usuario

## ENGLISH

## ■ JOYSTICK AND KNOB FUNCTIONS

Refer to fig.1. In the measurement mode: 1) push for at least 3 seconds to enter programming; 2-3) to scroll the measurement pages according to tab. 3; 4-5) to display and scroll the information pages relevant to the programmed parameters and instrument firmware release (see TAB 5). In the programming mode: 1) to access to the menu or enter the modified value; 2-3) to scroll the menus or increase/decrease the values to be modified; 4-5) to scroll the menus or increase/decrease the values to be modified. The knob (see fig.2) prevents from accessing the programming mode when in position. It allows the direct access to a selected page (among the available ones, depending on the "APPLICAT" parameter, see tab.3) when in "1", "2" and positions. The frontal red LED (fig.2) flashes proportionally to the active imported energy consumption if the selector is in " - 1 - 2" position, and to the reactive inductive energy consumption in "kvarh" position. Any kind of negative (exported) energy and power will not be managed by the front LED.

## ■ DISPLAY LAYOUT

The display is divided into 3 lines (as illustrated by the dotted lines in the TAB 1 table). The engineering units are referred to the variable shown in the relevant line. The "negative" symbols ( $\Sigma$ , dmd) refer to all the displayed variables. To improve the display legibility, the EM24 uses some symbols (see TAB 1). In case of "OVERFLOW", the instrument displays "EEEE": at the same time the DMD calculation, the hour-counter and the energy meters functions are inhibited and the alarm outputs are activated. The indication "EEEE" in a single phase variable automatically implies the overflow condition of the relevant system variable, and the PF indication is forced to "0.00".

## ■ MEASUREMENT PAGES AND INFORMATION PAGES

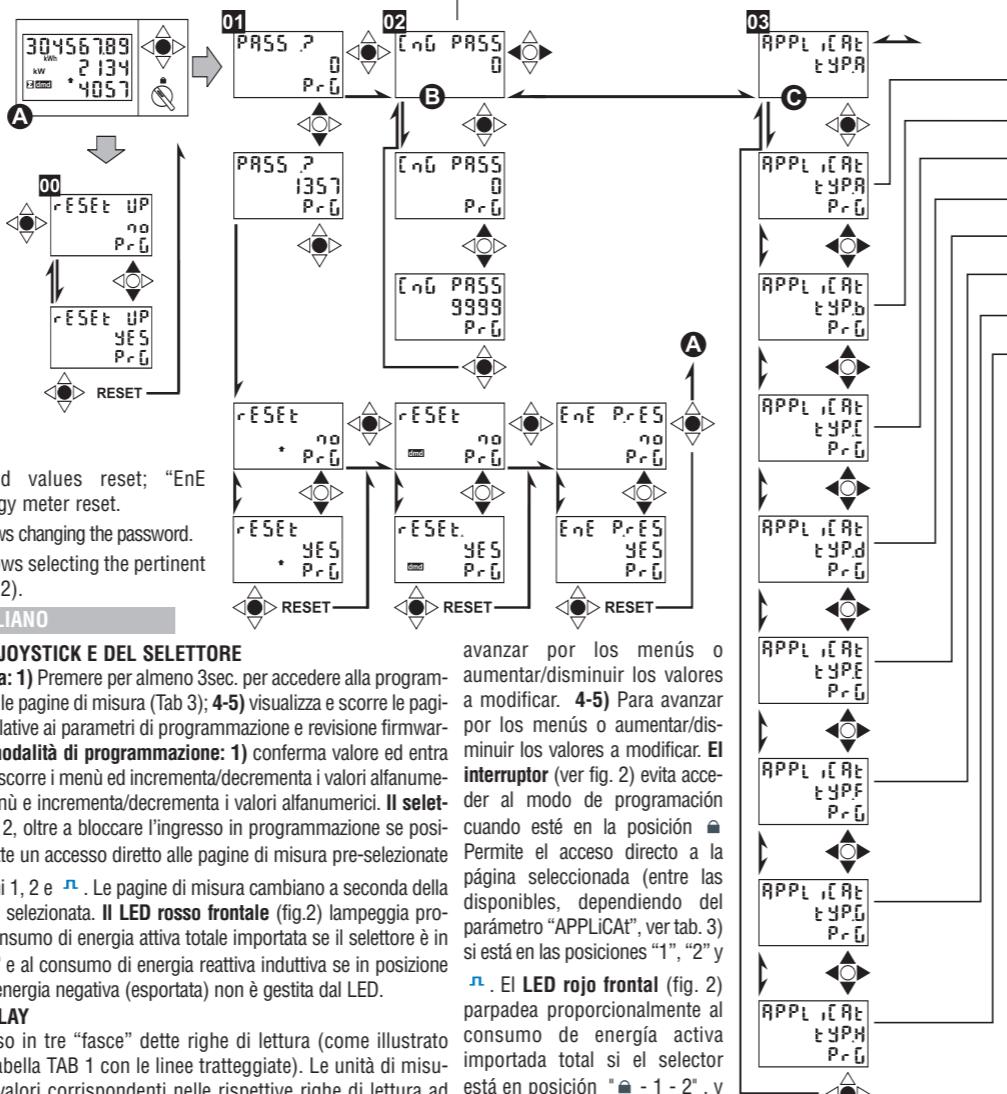
To display and scroll the measurement pages the joystick is to be moved to direction 2 or 3 (see fig.1). According to the selected "APPLICAT" parameter (see tab.2), different measurement pages are available (see tab.3). To display and scroll the information pages the joystick is to be moved to direction 4 or 5 (see fig.1).

## ■ BASIC PROGRAMMING AND RESET

To enter the complete programming mode the joystick is to be pressed in direction 1 for at least 3 sec. (see fig.1): the knob (see fig.2) is NOT to be in (with the knob in this position, the access to programming is allowed only for some of the menus, see tab. 7), otherwise the programming mode is not allowed. Entering the programming mode, all the measurements and control functions are inhibited.

only for A, B, C and E applications and only with the knob in position and moving the joystick towards direction 1 (see fig. 1), it will be possible to reset the "Wdmd max" and "VAdmd max" values; the display will show "rESEt no": set "YES" and confirm pushing the joystick towards direction 1 (this action may be made only once from the switching on of the instrument).

PASS?: entering the right password (default value is 0) allows accessing the main menu. **RESET:** entering the password value 1357 allows accessing the "reset" menu. "rESEt = peak dmd values reset;



"rESEt.dmd"= dmd values reset; "EnE P.rES"= partial energy meter reset.

- 02 CnG PASS: it allows changing the password.
- 03 APPLICAT: it allows selecting the pertinent application (see tab.2).

## ITALIANO

## ■ FUNZIONI DEL JOYSTICK E DEL SELETTORE

In modalità di misura: 1) Premere per almeno 3sec. per accedere alla programmazione; 2-3) scorre le pagine di misura (Tab 3); 4-5) visualizza e scorre le pagine di informazione relative ai parametri di programmazione e revisione firmware (vedi TAB 5). In modalità di programmazione: 1) conferma valore ed entra nei sotto menu; 2-3) scorre i menu ed incrementa/decrementa i valori alfanumerici; 4-5) scorre i menu e incrementa/decrementa i valori alfanumerici. Il selettore visibile in figura 2, oltre a bloccare l'ingresso in programmazione se posizionata in , permette un accesso diretto alle pagine di misura pre-selezionate (Tab 3) nelle posizioni 1, 2 e . Le pagine di misura cambiano a seconda della modalità "APPLICAT" selezionata. Il LED rosso frontale (fig.2) lampeggia proporzionalmente al consumo di energia attiva totale importata se il selettore è in posizione " - 1 - 2" e al consumo di energia reattiva inductive se in posizione "". Ogni tipo di energia negativa (esportata) non è gestita dal LED.

## ■ LETTURA DISPLAY

Il display è suddiviso in tre "fasce" dette righe di lettura (come illustrato nella immagine in tabella TAB 1 con le linee tratteggiate). Le unità di misura si riferiscono ai valori corrispondenti nelle rispettive righe di lettura ad eccezione di quelle scritte in "negativo" ( $\Sigma$ , dmd) che si riferiscono a tutti i valori visualizzati dal display. Al fine di migliorare la chiarezza e l'immediatza della lettura dello strumento, EM24 utilizza alcuni simboli grafici (Tab1). In caso di "OVERFLOW" lo strumento visualizza "EEEE": contemporaneamente le funzioni di calcolo DMD, conta-ore e contatori di energia vengono inibite e le uscite allarme vengono attivate. L'indicazione "EEEE" su una variabile di singola fase si estende automaticamente alla corrispondente variabile di sistema e l'indicazione PF viene portata a "0.00".

## ■ PAGINE DI MISURA E PAGINE INFORMAZIONI STRUMENTO

Per visualizzare e scorrere le pagine di misura agire sul joystick nelle direzioni 2-3 (fig 1). A seconda della modalità "APPLICAT" preselezionata (TAB 2) verranno visualizzate le pagine di misura della tabella "TAB 3". Per visualizzare le pagine informative dello strumento agire sul joystick nelle direzioni 4-5 (fig. 1). ■ PROGRAMMAZIONE BASE E RESET

Per accedere alla programmazione completa dello strumento premere il joystick nella direzione 1 per almeno 3sec. (fig. 1), il selettore di figura 2 NON si deve trovare nella posizione di blocco programmazione indicata con il simbolo (con il selettore in questa posizione è permesso l'accesso alla programmazione solo ad alcuni menu vedi TAB 7). Quando si accede alla programmazione, si inibiscono tutte le funzioni di misura e controllo.

: solamente per le applicazioni A, B, C ed E e solamente con il selettore in posizione premendo il joystick nella direzione 1 (fig. 1), sarà possibile resestare i valori "Wdmd max" e "VAdmd max": comparirà sul display l'indicazione "rESEt no" impostare "YES" e confermare premendo il joystick in direzione 1 tale opzione può essere fatta solamente una volta dall'accensione dello strumento.

PASS?: inserendo il valore di password corretto (di default 0) si accede al menù principale. **RESET:** inserendo il valore di password 1357 si accede al menù "reset". "rESEt dmd"= reset dei valori dmd massimi; "rESEt.(dmd)"= reset dei valori dmd; "EnE P.rES"= reset dei contatori di energia parziali.

CnG PASS: nuova password, personalizza la password.

APPLICAT: seleziona l'applicazione pertinente (vedere tabella TAB. 2).

## ESPAÑOL

## ■ FUNCIONES DEL JOYSTICK Y DEL INTERRUPTOR

Referente a la fig. 1. En el modo de medición: 1) presionar durante 3 segundos min. para entrar al modo de programación; 2-3) Para avanzar por las páginas de medición, según tab. 3. 4-5) Para visualizar y avanzar por las páginas de información relevantes a los parámetros programados y la versión firmware del instrumento (ver TAB 5). En el modo de programación: 1) para acceder al menú o introducir el valor modificado. 2-3) Para

	ENGLISH Application		ITALIANO Applicazione		Aplicaciones ESPAÑOL	
	A	B	C	D	E	F
<b>A</b>	Basic domestic Domestic base		Domestica base		Domésticas básicas	
<b>b</b>	Shopping centres		Centri commerciali		Centros comerciales	
<b>C</b>	Advanced domestic		Domestica avanzata		Domésticas avanzadas	
<b>d</b>	Multi domestic (camping, marinas)		Multi-domestica (campings, porti turistici)		Múltiples apl. domésticas (inc. campings y puertos)	
<b>E</b>	Solar energy		Energia solare		Energía solar	
<b>F</b>	Industrial		Industriale		Industrial	
<b>G</b>	Advanced industrial		Industriale avanzata		Industrial avanzada	
<b>H</b>	Advanced industrial for power generation		Industriale avanzata per cogenerazione		Industrial avanzada para cogeneración	

	TAB. 3		APPLICAT									
	No	Line 1 Riga 1 1ª linea	Line 2 Riga 2 2ª linea	Line 3 Riga 3 3ª linea	A	b	C	d	E	F	G	H
1	Phase seq.	VLN sys			x	x	x		x	x	x	x
2	Phase seq.	VLL sys							x	x	x	x
3	Tot kWh (+)	W sys dmd	W sys dmd max	x	x	x		x	x	x	x	x
4	kWh	A dmd max (5)	Part						x	x	x	x
5	Tot kvarh (+)	VA sys dmd	VA sys dmd max	x	x				x	x	x	x
6	kvarh	VA sys	Part						x	x	x	x
7 (1)	Totalizer 1 (2)	W sys	(3)						x	x	x	x
8 (1)	Totalizer 2 (2)	W sys	(3)						x	x	x	x
9 (1)	Totalizer 3 (2)	W sys	(3)						x	x	x	x
10 (1)	kWh (+)	t1 (4)	W sys dmd						x	x	x	x
11 (1)	kWh (+)	t2 (4)	W sys dmd						x	x	x	x
12 (1)	kWh (+)	t3 (4)	W sys dmd						x	x	x	x
13 (1)	kWh (+)	t4 (4)	W sys dmd						x	x	x	x
14 (1)	kvarh (+)	t1 (4)	W sys dmd						x	x	x	x
15 (1)	kvarh (+)	t2 (4)	W sys dmd						x	x	x	x
16 (1)	kvarh (+)	t3 (4)	W sys dmd						x	x	x	x
17 (1)	kvarh (+)	t4 (4)	W sys dmd						x	x	x	x
18 (1)	kWh (+) X	W X	User X						x			
19 (1)	kWh (+) Y	W Y	User Y						x			
20 (1)	kWh (+) Z	W Z	User Z						x			
21	Total kvarh (-)	VA sys dmd	VA sys dmd max						x			
22	Total kWh (-)	W sys dmd	W sys dmd max						x	x	x	x
23	Hours	W sys	PF sys						x	x	x	x
24	Hours	var sys	PF sys						x	x	x	x
25	var L1	var L2	var L3						x	x	x	x
26	VA L1	VA L2	VA L3						x	x	x	

## EM24 DIN "Compact 3-phase Energy Analyzer"

## ENGLISH

## ADVANCED PROGRAMMING

**04 USER:** (APPLiCAT® d only) it links an ID code (from 1 to 9999) to the user of the displayed consumption (three 1-phase independent users by instrument).

**05 SELECTor:** it allows selecting the measuring page (tab. 3) to be displayed according to the knob position (see fig.2); SELEC. 1 (2,3, LoC): it selects the knob position (1, 2, or ); PA.1 (31): it selects the page number to be displayed (from No. 1 to 31 see TAB 3).

**06 SYS:** it allows selecting the electrical system. 3P.n: 3-phase unbalanced with or without neutral; 3P: 3-phase unbalanced without neutral; 3P.1: 3-phase balanced with or without neutral 2P: 2-phase; 1P: single phase.

**07 Ut rAtio:** VT ratio (1.0 to 6000). Example: if the connected VT primary is 5kV and the secondary is 100V, the VT ratio to be set is 50 (that is 5000/100).

**08 Ct rAtio:** CT ratio (1.0 to 60.00k). Example: if the connected CT primary is 3000A and the secondary is 5A, the CT ratio is 600 (that is: 3000/5).

**09 P int.ti:** it is the integration time used to calculate the demanded powers (Wdmd, VAdmd). The selectable range is between 1 and 30 minutes.

**10 diG in 1 / diG in 2 / diG in 3:** (\*IS option only) it allows defining the digital inputs function. rEM: for reading the digital input status by means of serial communication; SYNc: dmd calculation synchronisation; tAr: multi-tariff management (see also Tab. 6); GAS: gas metering; Cold: cold water metering; Hot: hot water metering; kWh + Hot: distant heating (kWh) meters. PrESCAL.1 (or 2 or 3): it sets the weight of each pulse (from 0.1 to 999.9 m³ or kWh/pulse). Note: the digital inputs have to be set with different modes among them, in case they are used for GAS, CoLd o Hot kWh+ Hot.

**11 FiLteR.S:** it allows selecting the operating range of the digital filter as % of the full scale values (1 to 100). Only in case of applications F, G and H.

**12 FiLteR.co:** it allows selecting the filtering coefficient (from 1 to 32). The higher the coefficient, the higher is the stability and the updating time of the measurement. Only in case of applications F, G and H.

**13 AddrESS:** it allows selecting the serial address of the instrument (from 1 to 247). bAudrAtE: it allows selecting the baud rate (4.800 or 9.600 baud).

**14 diG out. 1 / diG out. 2 ("O2" and "R2" models only)** it allows selecting the digital outputs function. PuLS: pulse output selection (the pulse weight is to be set too) (kWh / kvarh per pulse, programmable from 0.001 to 10.00); tEST: activated on the pulse output when "YES" is selected. In the further menu program the simulated power value (kW or kvar) is corresponding to a pulse frequency proportional to it and based on the "PULSEou.1/2". The test is active until you exit from this menu. AL: alarm output (this function is active only in case of application C, E, G and H), selection of the variable to be controlled (Ph.AL: phase sequence alarm), activation setpoints "on AL" and deactivation setpoints "off AL", with "on AL" ≥ "off AL" equal to high alarm, with "on AL" < "off AL" equal to low alarm. "t.del dEL": delay on activation from 0 to 255 sec. "out1-2": output status in normal condition, "nE" if normally energised or "nd" if normally de-energised, are to be set too).

**15 En t.REs:** it allows the reset of all the total counters.

**16 End:** it allows exiting the programming mode by pressing the joystick in direction 1 (see fig. 1). Joystick directions 4 and 5 allow browsing the main menu again.

## ITALIANO

## PROGRAMMAZIONE AVANZATA

**04 USER:** (solo "APPLiCAT® d") associa un codice identificativo (da 1 a 9999) all'utente del consumo visualizzato (3 utenti monofase indipendenti per strumento).

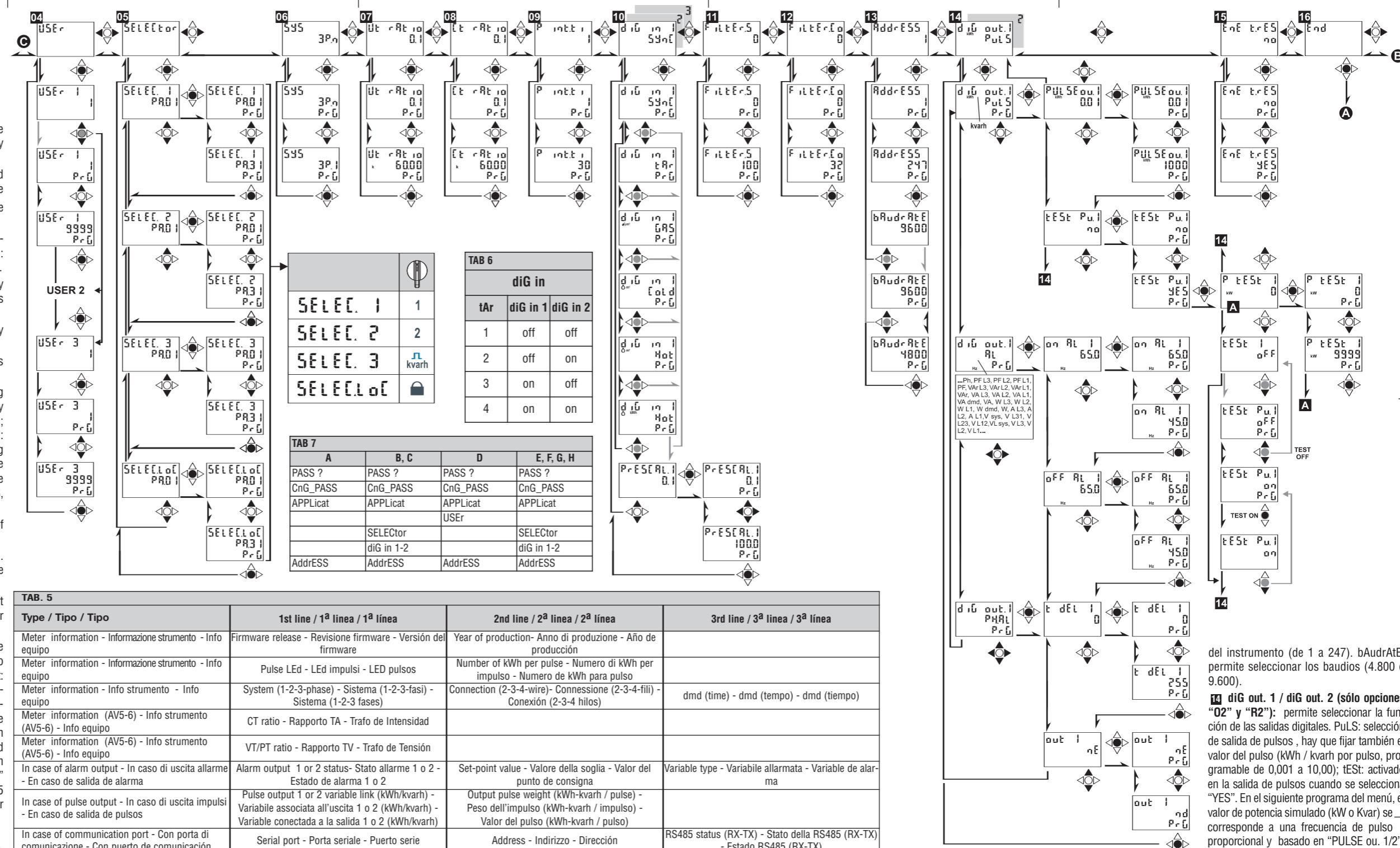
**05 SELECTor:** seleziona la pagina di misura (TAB 3) da associare alla posizione del selettori frontale (fig. 2); SELEC. 1 (2, 3, LoC): seleziona la posizione del selettori (1, 2, o ); PA.1 (31): seleziona la pagina da visualizzare (da No. 1 a 31 vedere TAB 3).

**06 SYS :** sistema elettrico: 3Pn: trifase sbilanciato con neutro; 3P: trifase sbilanciato senza neutro; 3P1: trifase sbilanciato con o senza neutro; 2P: bifase; 1P monofase.

**07 Ut rAtio :** rapporto TV (da 1,0 a 6000). **Esempio:** se il primario del TV connesso è di 5kV e il secondario è di 100V il rapporto di TV corrisponde a 50 (ottenuto eseguendo il calcolo: 5000/100).

**08 Ct rAtio :** rapporto TA (da 1,0 a 60.00k). **Esempio:** se il primario del TA ha una corrente di 3000A e il secondario di 5A, il rapporto TA corrisponde a 600 (ottenuto eseguendo il calcolo: 3000/5).

**09 P int.ti :** tempo di integrazione per il calcolo della potenza media: selezionare il tempo desiderato da 1 a 30 minuti.



TAB. 5

Type / Tipo / Tipo	1st line / 1ª linea / 1ª línea	2nd line / 2ª linea / 2ª línea	3rd line / 3ª linea / 3ª línea
Meter information - Informazione strumento - Info	Firmware release - Revisione firmware - Versión del equipo	Year of production - Anno di produzione - Año de producción	
Meter information - Informazione strumento - Info	Pulse LED - Led impulsi - LED pulsos	Number of kWh per pulse - Número de kWh per impulso - Numero de kWh para pulso	
Meter information - Info strumento - Info	System (1-2-3-phase) - Sistema (1-2-3-fase) - Sistema (1-2-3 fases)	Connection (2-3-4-wire) - Connessione (2-3-4-fili) - Conexión (2-3-4 hilos)	dmd (time) - dmd (tempo) - dmd (tiempo)
Meter information (AV5-6) - Info strumento (AV5-6) - Info equipo	CT ratio - Rapporto TA - Trafo de Intensidad		
Meter information (AV5-6) - Info strumento (AV5-6) - Info equipo	VT/PT ratio - Rapporto TV - Trafo de Tensión		
In case of alarm output - In caso di uscita allarme - En caso de salida de alarma	Alarm output 1 or 2 status- Stato allarme 1 o 2 - Estado de alarma 1 o 2	Set-point value - Valore della soglia - Valor del punto de consigna	Variable type - Variabile allarmata - Variable de alarma
In case of pulse output - In caso di uscita impuls - En caso de salida de pulsos	Pulse output 1 or 2 variable link (kWh/kvarh) - Variabile associata all'uscita 1 o 2 (kWh/kvarh) - Variable conectada a la salida 1 o 2 (kWh/kvarh)	Output pulse weight (kWh-kvarh / pulse) - Peso dell'impulso (kWh-kvarh / impulso) - Valor del pulso (kWh-kvarh / pulso)	
In case of communication port - Con porta di comunicazione - Con puerto de comunicación	Serial port - Porta seriale - Puerto serie	Address - Indirizzo - Dirección	RS485 status (RX-TX) - Stato della RS485 (RX-TX) - Estado RS485 (RX-TX)

**10 diG in 1 / diG in 2 / diG in 3 :** (solo con opzione "IS") funzione ingressi digitali: rEM: remozione ingressi digitali. SYNc: sincronizzazione; tAr: tariffazione (Tab. 6); GAS: contatore gas; Cold: contatore acqua fredda; Hot: contatore acqua calda; kWh + Hot: teriscaldamento (kWh). PrESCAL.1 (o 2 o 3): impostazione peso impulsi (da 0,1 a 999,9 m³ o kWh per impulso). Nota: nel caso di utilizzo per GAS, CoLd, Hot e kWh + Hot, le ingressi digitali devono essere impostati con modalità differenti tra loro.

**11 FiLteR.S :** campo di intervento del filtro digitale espresso in % del valore di fondo scala (da 1 a 100). Solo per applicazioni F, G o H.

**12 FiLteR.co :** coefficiente di filtraggio da 1 a 32. Aumentando il coefficiente aumenta la stabilità e il tempo di assestamento dei valori visualizzati. Solo per applicazioni F, G e H.

**13 AddrESS :** (solo con opzione "IS") indirizzo seriale: da 1 a 247. bAudrAtE: velocità di trasmissione dati (4.800; 9.600 bit/s).

**14 diG out. 1 / diG out. 2 :** (solo con opzione "O2" e "R2") funzione uscita digitale: PuLS: come uscita impuls, seleziona il peso dell'impulso (kWh / kvarh per impulso; programmabile da 0,001 a 10,00); tEST: attivo su uscita impuls con selezione YES. Nel menù successivo impostare il valore di potenza (kW o kvar) simulata a cui corrisponderà una frequenza degli impulsi ad essa proporzionale in base a "PULSEou.1/2", la funzione è attiva finché si rimane nel menù. AL: come allarme (funzione attiva solo per le applicazioni C, E, G e H), seleziona la variabile da controllare (Ph.AL: allarme sequenza fase), le soglie "on AL" (attivazione) e "off

AL" (disattivazione); con "on AL" ≥ "off AL" = allarme di massima, con "on AL" < "off AL" = allarme di minima. "t.dEL": ritardo all'attivazione, da 0 a 255s. "out1-2": stato dell'uscita a riposo "nE" normalmente eccitata o "nd" normalmente diseccitata.

**15 En t.REs:** azzeramento di tutti i contatori totali.

**16 End :** per tornare al modo misura premere il joystick in direzione 1 (vedere figura 1), o in direzione 4-5 per restare nel menù di programmazione.

## ESPAÑOL

## PROGRAMACIÓN AVANZADA

**04 USER** (solo "APPLiCAT® d") vincula un código ID (de 1 a 9999) al usuario del consumo visualizado (tres usuarios monofásicos independientes por instrumento).

**05 SELECTor:** permite seleccionar la combinación de variables (página) a visualizar, según la posición del interruptor (ver fig. 2); SELEC. 1 (2, 3, LoC): selecciona la posición del interruptor (1, 2, o ); PA.1 (31): selecciona el número de página a visualizar (desde 1 a 31, ver TAB 3).

**06 SYS:** Permite seleccionar el sistema eléctrico. 3Pn: trifásico desequilibrado con neutro; 3P: trifásico desequilibrado sin neutro; 3P.1: trifásico desequilibrado con o sin neutro; 2P: bifásico; 1P: monofásico.

**07 Ut rAtio:** relación del trafo de intensidad CT (1,0 a 60,00k). Ej.: si el primario del trafo conectado es 3000A y el secundario es 5A, la relación del trafo de intensidad es 600 (es decir, 3000/5).

**08 Ct rAtio:** relación del trafo de intensidad CT (1,0 a 60,00k). Ej.: si el

primario del trafo conectado es 3000A y el secundario es 5A, la relación del trafo de intensidad es 600 (es decir, 3000/5).

**09 P int.ti:** es el tiempo de integración usado para calcular las potencias demandadas (Wdmd, VAdmd). El rango seleccionable está entre 1 y 30 minutos.

**10 diG in 1 / diG in 2 / diG in 3 (sólo opción "IS"):** permite definir la función de las entradas digitales. rEM: para lectura del estado de la entrada digital mediante el puerto de comunicación serie; SYNc: cálculo de la sincronización dmd; tAr: gestión multitarifa (ver también Tab. 3); GAS: medición de gas; Cold: medición de agua fría; Hot: medición de agua caliente; kWh+Hot: lectura remota de calefacción (kWh). PrESCAL.1 (o 2 ó 3): fija el valor de cada pulso (de 0,1 a 999,9 m³ o kWh por pulso).

Nota: Si las entradas digitales son empleadas para medir: GAS, agua fría, agua caliente o calefacción remota cada entrada digital debe fijarse con una función diferente. Cada entrada digital debe fijarse con una función diferente.

**11 FiLteR.S:** permite seleccionar el rango de funcionamiento del filtro digital como % de los valores a fondo de escala (1 a 100). Solo para aplicaciones: F, G, H.

**12 FiLteR.co :** permite seleccionar el coeficiente de filtrado (de 1 a 32). Cuanto mayor sea el coeficiente, mayor es la estabilidad y el tiempo de actualización de la medida. Solo para aplicaciones: F, G, H.

**13 AddrESS (sólo opción IS):** permite seleccionar la dirección serie

menú. AL: selección salida de alarma (esta función está activa sólo en el caso de las aplicaciones C, E, G y H), selección de la variable a controlar (Ph.AL: alarma de secuencia de fase) activación y desactivación de los puntos de control.

**14 diG out. 1 / diG out. 2 (sólo opciones "O2" y "R2"):** permite seleccionar la función de las salidas digitales. PuLS: selección de salida de pulsos, hay que fijar también el valor del pulso (kWh / kvarh por pulso, programable de 0,001 a 10,00); tEST: activado en la salida de pulsos cuando se selecciona "YES". En el siguiente programa del menú, el valor de potencia simulado (kW o Kvar) se corresponde a una frecuencia de pulso proporcional y basada en "PULSE ou. 1/2". El test está activo hasta que se sale de este

menú.

**15 En t.REs:** permite la puesta a cero de todos los contadores totales.

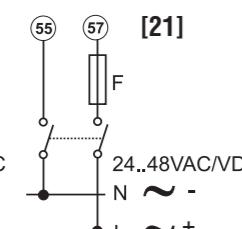
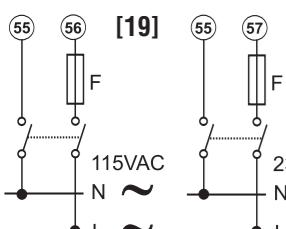
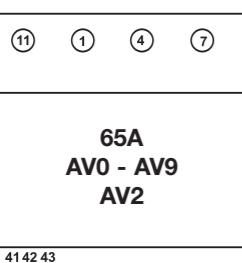
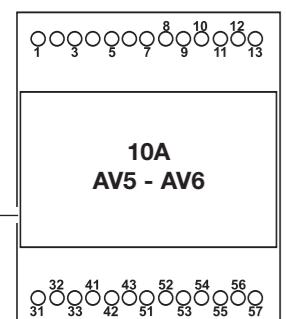
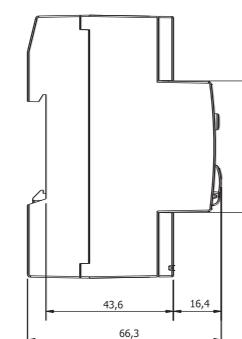
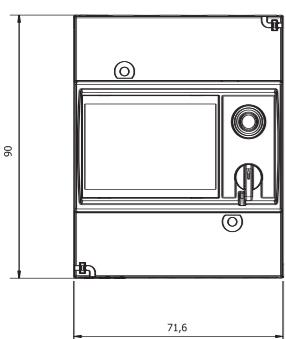
**16 End:** permite salir del modo de programación moviendo el joystick en dirección 1 (ver fig. 1). Las direcciones 4 y 5 del joystick permiten ir de nuevo al menú principal.

The menus availability depends on the "APPLiCAT" selection. La presenza dei menù è in funzione della selezione "APPLiCAT". La disponibilidad de los menús depende de la selección "APPLiCAT".

Document approved by the Notified Body 0102.



## EM24 DIN "Compact 3-phase Energy Analyzer"



## ENGLISH

## 65A Self power supply, system type selection 3P.n

[1]- 3-ph, 4-wire unbalanced/balanced load

## 65A Self power supply, system type selection 3P

[2]- 3-ph, 3-wire, unbalanced/balanced load, the neutral connection is mandatory with "IS" and "R2" options for the models AV0 and AV9.

## 65A Self power supply, system type selection 2P

[3]- 2-ph, 3-wire, unbalanced/balanced load, the "7" connection is mandatory with "IS" and "R2" options only for the models AV0 and AV9.

## 65A Self power supply, system type selection 1P

[4]- 1-ph, 2-wire, "O2" option

[5]- 1-ph, 2-wire, "IS" and "R2" option

## 10A System type selection 3P.n

[6]- 3-ph, 4-wire, unbalanced load, 3-CT connection

[7]- 3-ph, 4-wire, unbalanced load, 3-CT and 3-VT/PT connections

## 10A System type selection 3P

[8]- 3-ph, 3-wire, unbalanced load, 3-CT connection

[9]- 3-ph, 3-wire, unbalanced load, 3-CT and 2-VT/PT connections

[10]- 3-ph, 3-wire, unbalanced load, 2-CT connections (ARON)

[11]- 3-ph, 3-wire, unbalanced load, 2-VT/PT and 2-CT connections (ARON)

## 10A System type selection 3P.1

[12]- 3-ph, 3-wire, balanced load, 1-CT connection

[13]- 3-ph, 4-wire, balanced load, 1-CT connection

[14]- 3-ph, 3-wire, balanced load, 1-CT and 2-VT/PT connections

## 10A System type selection 2P

[15]- 2-ph, 3-wire, 2-CT connection

[16]- 2-ph, 3-wire, 2-CT and 2-VT/PT connections

## 10A System type selection 1P

[17]- 1-ph, 2-wire, 1-CT connection

[18]- 1-ph, 2-wire, 1-CT and 1-VT/PT connection

## Power supply

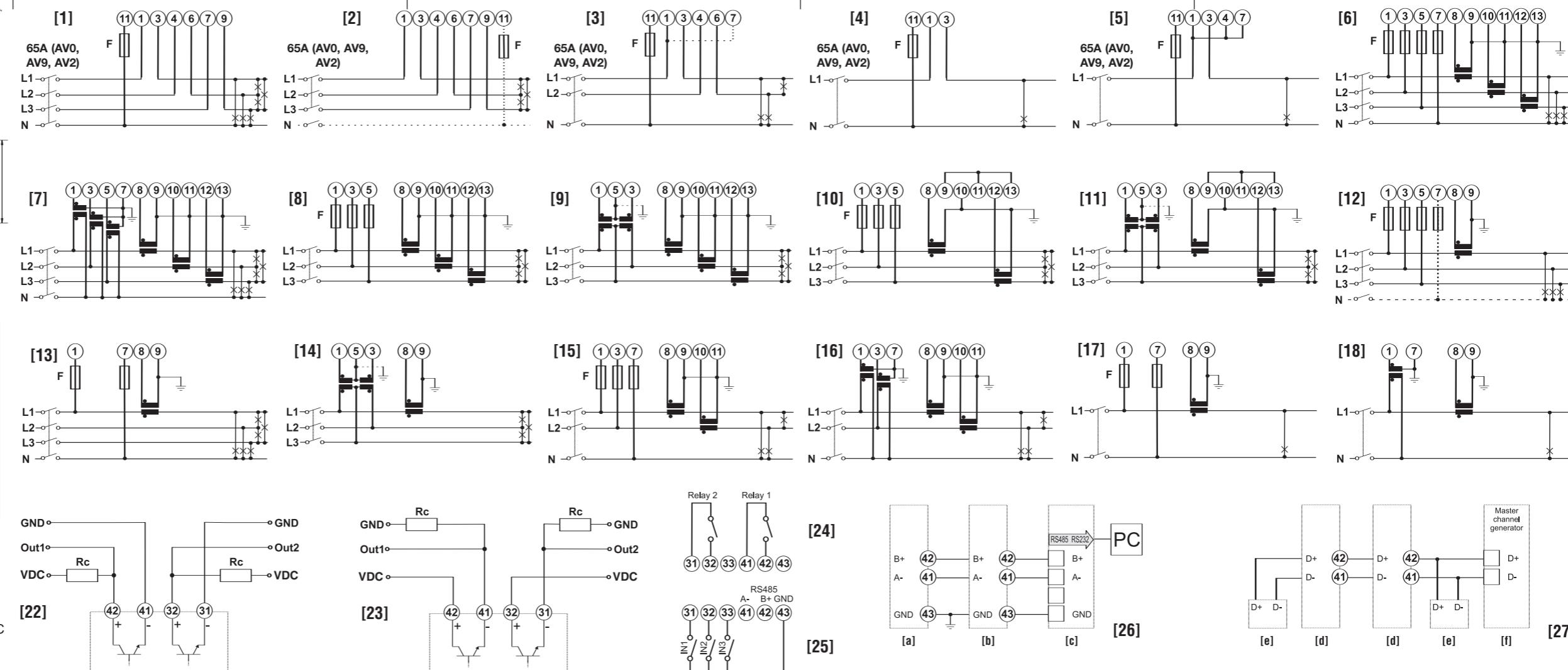
[19]- 115VAC power supply ("D" option); F=250V [T] 100mA

[20]- 230VAC power supply ("D" option); F=250V [T] 50mA

[21]- 24 to 48VAC/DC ("L" option); F=250V [T] 200mA

## Outputs

[22]- Open collector output (GND reference)



## [23]- Open collector output (VDC reference)

The value of the load resistances ( $R_c$ ) must make the close-contact current be lower than 100mA; the VDC voltage must be lower than or equal to 30VDC. VDC: Power supply voltage (external). Out: positive output contact (open collector type transistor). GND: output contact connected to ground (open collector type transistor).

[24]- Relay outputs

## Digital input and serial port

[25]- Digital inputs plus serial communication port.

[26]- RS485 connection 2 wires [a]- last instrument, [b]- instrument 1...n, [c]- RS485/RS232 transducer.

[27]- Dupline connection [d]- EM24, [e]- other Dupline modules, [f]- Master channel generator.

## ITALIANO

## 65A, selezione sistema tipo 3P.n

[1]- 3 fasi, 4 fili carico squilibrato/equilibrato

## 65A, selezione sistema tipo 3P

[2]- 3 fasi, 3 fili, carico squilibrato/equilibrato, (il neutro deve essere obbligatoriamente collegato con le opzioni "IS" e "R2")

## 65A, selezione sistema tipo 2P

[3]- 2 fasi, 3 fili, carico squilibrato/equilibrato, il morsetto "7" deve essere obbligatoriamente collegato nei moduli AVO e AV9 quando presenti le opzioni "IS" e "R2"

## 65A, selezione sistema tipo 1P

[4]- 1 fase, 2 fili, opzione "O2"

[5]- 1 fase, 2 fili, opzione "IS" e "R2"

## 10A, selezione sistema tipo 3P.n

[6]- 3 fasi, 4 fili, carico squilibrato, connessione da 3 TA

[7]- 3 fasi, 4 fili, carico squilibrato, connessione da 3 TA e 3 TV

## 10A, selezione sistema tipo 3P

[8]- 3 fasi, 3 fili, carico squilibrato, connessione da 3 TA

[9]- 3 fasi, 3 fili, carico squilibrato, connessione da 3 TA e 2 TV

[10]- 3 fasi, 3 fili, carico squilibrato, connessione da 2 TA (ARON)

[11]- 3 fasi, 3 fili, carico squilibrato, connessione da 2 TV e 2 TA (ARON)

## 10A, selezione sistema tipo 2P

[12]- 3 fasi, 3 fili, carico equilibrato, connessione da 1 TA

[13]- 3 fasi, 4 fili, carico equilibrato, connessione da 1 TA

[14]- 3 fasi, 3 fili, carico equilibrato, connessione da 1 TA e 2 TV

## 10A, selezione sistema tipo 2P

[15]- 2 fasi, 3 fili, connessione da 2 TA

## [16]- 2 fasi, 3 fili, connessione da 2 TA e 2 TV

## 10A, selezione sistema tipo 1P

[17]- 1 fase, 2 fili, connessione da 1 TA

[18]- 1 fase, 2 fili, connessione da 1 TA e 1 TV

## Alimentazioni

[19]- Alimentazione 115VCA (opzione "D"); F=250V [T] 100mA

[20]- Alimentazione 230VCA (opzione "D"); F=250V [T] 50mA

[21]- Alimentazione da 24 a 48VCA/CC (opzione "L"); F=250V [T] 200mA

## Uscite

[22]- Uscita a collettore aperto (riferimento GND)

[23]- Uscita a collettore aperto (riferimento VDC)

La resistenza di carico ( $R_c$ ) dev'essere costruita in modo che la corrente a contatto chiuso sia inferiore a 100 mA; la tensione VDC dev'essere inferiore o uguale a 30V.

VDC: Tensione di alimentazione (esterna). Out: contatto di uscita positivo (collettore aperto tipo transistor). GND: contatto di uscita collegato a massa (collettore aperto tipo transistor).

[24]- Uscite relè.

## Ingressi digitali e porta seriale

[25]- Ingressi digitali più porta comunicazione seriale.

[26]- RS485 connessione a 2 fili [a]- ultimo strumento, [b]- strumento 1...n, [c]- convertitore RS485/RS232.

[27]- Connessione Dupline, [d]- EM24, [e]- altri moduli Dupline, [f]- Master channel generator.

## ESPOLAN

## 65A, Autoalimentado, selección del sistema: 3P.n

[1]- Trifásico, 4 hilos, carga equilibrada y desequilibrada.

## 65A, Autoalimentado, selección del sistema: 3P

[2]- Trifásico, 3 hilos, carga equilibrada y desequilibrada, la conexión con neutro es obligatoria con las opciones "IS" y "R2" (sólo por los modelos AVO y AV9).

## 65A, Autoalimentado, selección del sistema: 2P

[3]- Bifásico, 3 hilos, carga equilibrada y desequilibrada, la conexión "7" es obligatoria con las opciones "IS" y "R2" (sólo por los modelos AVO y AV9).

## 65A, Autoalimentado, selección del sistema: 1P

[4]- 1 fase, 2 filos, opción "O2".

[5]- 1 fase, 2 filos, opción "IS" y DP.

## 10A, selección del sistema: 3P.n

[6]- Trifásico, 4 hilos, carga desequilibrada, conexión 3 tramos de intensidad.

[7]- Trifásico, 4 hilos, carga desequilibrada, conexiones 3 tramos de intensidad y 3 tramos de tensión/potencia.

## 10A, selección del sistema: 3P

[8]- Trifásico, 3 hilos, carga desequilibrada, conexiones 3 tramos de intensidad.

[9]- Trifásico, 3 hilos, carga desequilibrada, conexiones 3 tramos de tensión/potencia.

[10]- Trifásico, 3 hilos, carga desequilibrada, conexiones 2 tramos de intensidad (ARON).

[11]- Trifásico, 3 hilos, carga desequilibrada, conexiones 2 tramos de intensidad (ARON) y 2 tramos de tensión/potencia.

## 10A, selección del sistema: 3P.1

[12]- Trifásico, 3 hilos, conexión 2 tramos de intensidad.

[13]- Trifásico, 4 hilos, carga equilibrada, conexión 1 tramo de intensidad y 2 tramos de tensión/potencia.

## 10A, selección del sistema: 2P

[14]- Bifásico, 3 hilos, conexión 2 tramos de intensidad y 2 tramos de tensión/potencia.

## 10A, selección del sistema: 1P

[15]- Monofásico, 2 hilos, conexión 1 tramo de intensidad.

[16]- Monofásico, 2 hilos, conexiones 1 tramo de intensidad y 1 tramo de tensión/potencia.

## Alimentación

[19]- 115VCA (opción "D"); F=250V (T) 100mA.

[20]- 230VCA (opción "D"), F=250V (T) 50mA.

[21]- 24 a 48 VCA/CC (opción "L"), F=250V (T) 200 mA.

## Salidas

[22]- Colector abierto (referencia a negativo, GND)

[23]- Colector abierto (referencia a positivo, VDC)

El valor de las resistencias de la carga ( $R_c$ ) debe hacer que la intensidad sea inferior a 100mA; la tensión VDC debe ser menor o igual a 30VCC.

VCC: tensión de alimentación (externa). Salida: contacto salida positiva (transistor de tipo colector abierto). GND (tierra): salida a negativo (transistor de tipo colector abierto).

[24]- Salidas de relé.

## Entrada digital y puerto serie

[25]- Entradas digitales + Salida comunicación serie.

[26]- RS485, conexión dos hilos [a]- último instrumento, [b]- instrumento 1...n, [c]- transductor RS485/RS232.

[27]- Conexión Dupline [d]- EM24 [e]- Otros modulos Dupline [f]- Master channel generator.

## MID COMPLIANCE (annex MI-003)

The following models are approved according the annex "B" (type examination) of the MID (Measuring Instruments Directive).

## EM24-DIN AV9 3 X XX P

System 3-phase plus Neutral.

Allowed connections:

See fig.1 for line connection.

## EM24-DIN AV93 X O2 P

System 3-phase plus Neutral.

Allowed connections:

See fig.1 for line connection.

See fig.22 and 23 for open collector outputs.

## EM24-DIN AV93 X

## ENGLISH

### SAFETY PRECAUTIONS

**Read carefully the instruction manual.** If the instrument is used in a manner not specified by the producer, the protection provided by the instrument may be impaired. **Maintenance:** make sure that the connections are correctly carried out in order to avoid any malfunctioning or damage to the instrument. To keep the instrument clean, use a slightly damp cloth; do not use any abrasives or solvents. We recommend to disconnect the instrument before cleaning it.

### TECHNICAL SPECIFICATIONS

**Rated inputs:** three-phase system. Current type: galvanic insulation by means of built-in CT's (AV5 and AV6 models), current range 1/5(10) A; Direct input (AV0, AV2 and AV9 models) current range 10 (65) A. Voltage: AV0 and AV6 models: 120 VLN / 208 VLL; Models AV5 and AV9: 230VLN / 420VLL; AV2 model: 133-230VLN / 230-400VLL. **Accuracy** (Display + RS485): (@25°C ±5°C, R.H. ≤60%, 48 to 62Hz). AV5 model In: 5A, I<sub>max</sub>: 10A; Un: 160 to 480VLN (277 to 830VLL). AV6 model In: 5A, I<sub>max</sub>: 10A; Un: 40 to 144VLN (70 to 250VLL). AV0 model Ib: 10A, I<sub>max</sub>: 65A; Un: 96 to 144VLN (166 to 250VLL). AV2 model: Ib: 10A, I<sub>max</sub>: 65A; Un: from 113 to 265 VLN (196 to 460VLL). AV9 model Ib: 10A, I<sub>max</sub>: 65A; Un: 184 to 276VLN (318 to 480VLL). **Current:** AV5, AV6 models: from 0.002In to 0.2In: ±(0.5% RDG +3DGT); from 0.2In to I<sub>max</sub>. AV0, AV2, AV9 models: from 0.004lb to 0.2lb: ±(0.5% RDG +3DGT); from 0.2lb to I<sub>max</sub>: ±(0.5% RDG +1DGT). Phase-neutral voltage (in the range Un): ±(0.5% RDG +1DGT). Frequency: ±0.1Hz (45 to 65Hz). Active and Apparent power: ±(1%RDG +2DGT). Power Factor: ±[0.001+1%(1.000 - "PF RDG")]. Reactive power: ±(2%RDG +2DGT). Active Energy: Class B according to EN50470-3 and MID Annex MI-003 (Class 1 according to EN62053-21); Reactive energy: Class 2 according to EN62053-23. AV5, AV6 models In: 5A, I<sub>max</sub>: 10A; 0.1 In: 0.5A, start up current: 10mA. AV0, AV2 and AV9 models Ib: 10A, I<sub>max</sub>: 65A; 0.1 Ib: 1.0A, start up current: 40mA. **Energy additional errors:** Influence quantities according to EN50470-3, EN62053-21, EN62053-23. **Temperature drift:** ≤200ppm/°C. **Sampling rate:** 1600 samples/s @ 50Hz, 1900 samples/s @ 60Hz. **Display:** 3 lines (1 x 8 DGT; 2 x 4 DGT). Type LCD, h 7mm. Instantaneous variables read-out 4 DGT. Energies Imported Total/Partial/Tariff: 7+1DGT or 8DGT; Exported Total/Partial/Tariff: 6+1DGT or 7DGT (with "—" sign). Overload status EEEE indication when the value being measured is exceeding the "Continuous inputs overload" (maximum measurement capacity). Max. and Min. indication: Max. instantaneous variables: 9999; energies: 9 999 999.9 or 99 999999. Min. instantaneous variables: 0.000; energies 0.0. **LED:** Red LED (energy consumption), AV0, AV2, AV9 models: 0.001 kWh/kvarh per pulse (one pulse per Wh). Max frequency: 16Hz according to EN50470-1. **Measurements:** method TRMS measurements of distorted wave forms. Coupling type: direct for AV0, AV2 and AV9 models; by means of external CT's for AV5 and AV6. **Crest factor:** Ib: 10A ≤65 (91A max. peak), In 5A ≤3 (15A max. peak). **Current Overloads:** continuous: 1/5(10A): 10A @ 50Hz; 10(65A): 65A @ 50Hz. For 500ms: 1/5(10A): 200A @ 50Hz; for 10ms 10(65A): 1920A max @ 50Hz. **Voltage Overloads:** continuous: 1.2 Un. For 500ms: 2 Un. **Input impedance:** 208VL-L (AV6): >1600KΩ; 208VL-L (AV0): refer to "Power Consumption"; 230-400VLL (AV2): refer to "Power Consumption" 400VL-L: (AV5): >1600KΩ; 400VL-L (AV9): refer to "Power Consumption". 1/5(10A) (AV5-AV6): <0.3VA 10(65A); (AV0-AV9): <4VA. **Frequency:** 45 to 65 Hz. **Joystick:** For variable selection and programming of the instrument working parameters. **Digital outputs:** pulse type: number of outputs: up to 2, independent, programmable from 0.001 to 10.00 kWh or kvarh per pulse. Type: outputs connectable to the energy meters (kWh/kvarh). Pulse duration: ≥100ms < 120msec (ON), ≥120ms (OFF), according to EN62052-31. **Alarm type:** number of outputs: up to 2, independent alarm modes: up alarm, down alarm. Set-point adjustment: from 0 to 100% of the display scale. Hysteresis: from 0 to full scale. On-time delay: from 0 to 255s. Output status: selectable: normally de-energized or normally energized. Min. response time: ≤700ms (filters excluded and set-point on-time delay: "0 s"). **Note:** the 2 digital outputs can also work as a dual pulse output or dual alarm output or one pulse output and one alarm output. **Static output:** purpose for pulse output or alarm output. Signal Vn 1.2 VDC/ max. 100mA, Voff 30 VDC max. Insulation: by means of optocouplers, 4000 VRMS output to measuring inputs, 4000VRMS output to power supply input. **Relay outputs:** purpose for alarm output or pulse output. Type: Relay, SPST type AC 1-5A @ 250VAC, DC 12-5A @ 24VDC, AC 15-1.5A @ 250VAC, DC 13-1.5A @ 24VDC. Insulation 4000 VRMS output to measuring input. 4000 VRMS output to supply input. **RS485:** type: multidrop, bidirectional (static and dynamic variables). Connections: 2-wire max. distance 1000m. Addresses: up to 247, selectable by means of the front joystick. Protocol: MODBUS/JBUS (RTU). Data (bidirectional): dynamic (reading only): system and phase variable. Static (writing and reading): all the configuration parameters. Data format 1 start bit, 8 data bit, no parity, 1 stop bit. Baud-rate 4800, 9600 bits/s. Driver input capability 1/5 unit load. Maximum 160 transceivers on the same bus. **Dupline:** full Dupline Fieldbus compatibility, dynamic data (reading only): up to 6 counters per instrument (max 128 meters per network), up to 8 analogue variables per instrument (max 80 variables per network), 1 digital input per network (A5 channel), 2 alarms per instrument (selectable channels). **RS485 and DUPLINE Insulation:** by means of optocouplers, 4000VRMS outputs to measuring input, 4000VRMS output to supply input. **Digital inputs:** Number of inputs: 3. Input frequency: 20Hz max, duty cycle 50%. Prescaler adjustment from 0.1

to 999.9 m<sup>3</sup>/ pulse. Contact measuring voltage 5VDC +/- 5%. Contact measuring current: 10mA max. Input impedance: 680Ω. **Contact resistance** ≤100Ω; closed contact: ≥500kΩ, open contact. **Transformer ratio:** VT (PT): 1.0 to 999.9 / 1000 to 6000, CT: 1.0 to 999.9 / 1000 to 9999 / 10.000 to 60.000. (only AV5 and AV6) the maximum power being measured cannot exceed 210 MW (calculated as maximum input voltage and current. The maximum VT by CT ratio is 48600). For MID compliant applications the maximum power being measured is 25MW. **Operating temperature:** -25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C) according to EN50470-1 and EN62053-23. **Storage temperature:** -30°C to +70°C (-22°F to 140°F) (R.H. < 90% non-condensing @ 40°C) according to EN50470-1 and EN62053-23. **Installation category:** Cat. III (IEC60664, EN60664). **Insulation (for 1 minute):** 4000 VRMS between measuring inputs and power supply. 4000 VRMS between power supply and RS485/digital output. **Dielectric strength** 4000 VRMS for 1 minute. **Noise rejection:** CMRR 100 dB from 48 to 62 Hz. **EMC:** according to EN62052-11. Electrostatic discharges: 15kV air discharge; Immunity to irradiated electromagnetic fields: test with current: 10V/m from 80 to 2000MHz; test without any current: 30V/m from 80 to 2000MHz; Burst: on current and voltage measuring inputs circuit: 4kV. Immunity to conducted disturbances 10V/m from 150KHz to 80MHz. Surge: on current and voltage measuring inputs circuit: 4kV; on "L" auxiliary power supply input: 1kV; Radio frequency suppression according to CISPR 22. **Standard compliance:** Safety IEC60664, IEC61010-1 EN60664, EN61010-1 EN62052-11. Metrology: EN50470-3, EN62053-23. MID "annex MI-003". Pulse output DIN43864, IEC62053-31. Approvals: CE, MID in accordance to Annex B (Revenue Approvals). **Connections:** Screw-type. Cable cross-section area: AV0-AV9 models: max. 16 mm<sup>2</sup>, Min. 2.5mm<sup>2</sup> (measuring inputs) Min./Max. screws tightening torque: 1.7 Nm / 3 Nm.; Other inputs: 1.5mm<sup>2</sup>-Min./Max. screws tightening torque: 0.4 Nm / 0.8 Nm. Cable cross-section area: AV5-AV6 models: max. 1.5 mm<sup>2</sup>, Min. 2.5mm<sup>2</sup> (measuring inputs) Min./Max. screws tightening torque: 0.4 Nm / 0.8 Nm. **Housing DIN:** dimensions (WxHxD) 71 x 90 x 64.5 mm. Material: nylon PA66, self-extinguishing: UL 94 V-0. Mounting: DIN-rail. **Protection degree:** Front: IP50. Screw terminals: IP20. **Weight:** Approx. 400 g (packing included).

start up current: 10mA. AV0, AV2 and AV9 models Ib: 10A, I<sub>max</sub>: 65A; 0.1 Ib: 1.0A, start up current: 40mA. **Energy additional errors:** Influence quantities according to EN50470-3, EN62053-21, EN62053-23. **Temperature drift:** ≤200ppm/°C. **Sampling rate:** 1600 samples/s @ 50Hz, 1900 samples/s @ 60Hz. **Display:** 3 lines (1 x 8 DGT; 2 x 4 DGT). Type LCD, h 7mm. Instantaneous variables read-out 4 DGT. Energies Imported Total/Partial/Tariff: 7+1DGT or 8DGT; Exported Total/Partial/Tariff: 6+1DGT or 7DGT (with "—" sign). Overload status EEEE indication when the value being measured is exceeding the "Continuous inputs overload" (maximum measurement capacity). Max. and Min. indication: Max. instantaneous variables: 9999; energies: 9 999 999.9 or 99 999999. Min. instantaneous variables: 0.000; energies 0.0. **LED:** Red LED (energy consumption), AV0, AV2, AV9 models: 0.001 kWh/kvarh per pulse (one pulse per Wh). Max frequency: 16Hz according to EN50470-1. **Measurements:** method TRMS measurements of distorted wave forms. Coupling type: direct for AV0, AV2 and AV9 models; by means of external CT's for AV5 and AV6. **Crest factor:** Ib: 10A ≤65 (91A max. peak), In 5A ≤3 (15A max. peak). **Current Overloads:** continuous: 1/5(10A): 10A @ 50Hz; 10(65A): 65A @ 50Hz. For 500ms: 1/5(10A): 200A @ 50Hz; for 10ms 10(65A): 1920A max @ 50Hz. **Voltage Overloads:** continuous: 1.2 Un. For 500ms: 2 Un. **Input impedance:** 208VL-L (AV6): >1600KΩ; 208VL-L (AV0): refer to "Power Consumption"; 230-400VLL (AV2): refer to "Power Consumption" 400VL-L: (AV5): >1600KΩ; 400VL-L (AV9): refer to "Power Consumption". 1/5(10A) (AV5-AV6): <0.3VA 10(65A); (AV0-AV9): <4VA. **Frequency:** 45 to 65 Hz. **Joystick:** For variable selection and programming of the instrument working parameters. **Digital outputs:** pulse type: number of outputs: up to 2, independent, programmable from 0.001 to 10.00 kWh or kvarh per pulse. Type: outputs connectable to the energy meters (kWh/kvarh). Pulse duration: ≥100ms < 120msec (ON), ≥120ms (OFF), according to EN62052-31. **Alarm type:** number of outputs: up to 2, independent alarm modes: up alarm, down alarm. Set-point adjustment: from 0 to 100% of the display scale. Hysteresis: from 0 to full scale. On-time delay: from 0 to 255s. Output status: selectable: normally de-energized or normally energized. Min. response time: ≤700ms (filters excluded and set-point on-time delay: "0 s"). **Note:** the 2 digital outputs can also work as a dual pulse output or dual alarm output or one pulse output and one alarm output. **Static output:** purpose for pulse output or alarm output. Signal Vn 1.2 VDC/ max. 100mA, Voff 30 VDC max. Insulation: by means of optocouplers, 4000 VRMS output to measuring inputs, 4000VRMS output to power supply input. **Relay outputs:** purpose for alarm output or pulse output. Type: Relay, SPST type AC 1-5A @ 250VAC, DC 12-5A @ 24VDC, AC 15-1.5A @ 250VAC, DC 13-1.5A @ 24VDC. Insulation 4000 VRMS output to measuring input. 4000 VRMS output to supply input. **RS485:** type: multidrop, bidirectional (static and dynamic variables). Connections: 2-wire max. distance 1000m. Addresses: up to 247, selectable by means of the front joystick. Protocol: MODBUS/JBUS (RTU). Data (bidirectional): dynamic (reading only): system and phase variable. Static (writing and reading): all the configuration parameters. Data format 1 start bit, 8 data bit, no parity, 1 stop bit. Baud-rate 4800, 9600 bits/s. Driver input capability 1/5 unit load. Maximum 160 transceivers on the same bus. **Dupline:** full Dupline Fieldbus compatibility, dynamic data (reading only): up to 6 counters per instrument (max 128 meters per network), up to 8 analogue variables per instrument (max 80 variables per network), 1 digital input per network (A5 channel), 2 alarms per instrument (selectable channels). **RS485 and DUPLINE Insulation:** by means of optocouplers, 4000VRMS outputs to measuring input, 4000VRMS output to supply input. **Digital inputs:** Number of inputs: 3. Input frequency: 20Hz max, duty cycle 50%. Prescaler adjustment from 0.1

to 999.9 m<sup>3</sup>/ pulse. Contact measuring voltage 5VDC +/- 5%. Contact measuring current: 10mA max. Input impedance: 680Ω. **Contact resistance** ≤100Ω; closed contact: ≥500kΩ, open contact. **Transformer ratio:** VT (PT): 1.0 to 999.9 / 1000 to 6000, CT: 1.0 to 999.9 / 1000 to 9999 / 10.000 to 60.000. (only AV5 and AV6) the maximum power being measured cannot exceed 210 MW (calculated as maximum input voltage and current. The maximum VT by CT ratio is 48600). For MID compliant applications the maximum power being measured is 25MW. **Operating temperature:** -25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C) according to EN50470-1 and EN62053-23. **Storage temperature:** -30°C to +70°C (-22°F to 140°F) (R.H. < 90% non-condensing @ 40°C) according to EN50470-1 and EN62053-23. **Installation category:** Cat. III (IEC60664, EN60664). **Insulation (for 1 minute):** 4000 VRMS between measuring inputs and power supply. 4000 VRMS between power supply and RS485/digital output. **Dielectric strength** 4000 VRMS for 1 minute. **Noise rejection:** CMRR 100 dB from 48 to 62 Hz. **EMC:** according to EN62052-11. Electrostatic discharges: 15kV air discharge; Immunity to irradiated electromagnetic fields: test with current: 10V/m from 80 to 2000MHz; test without any current: 30V/m from 80 to 2000MHz; Burst: on current and voltage measuring inputs circuit: 4kV. Immunity to conducted disturbances 10V/m from 150KHz to 80MHz. Surge: on current and voltage measuring inputs circuit: 4kV; on "L" auxiliary power supply input: 1kV; Radio frequency suppression according to CISPR 22. **Standard compliance:** Safety IEC60664, IEC61010-1 EN60664, EN61010-1 EN62052-11. Metrology: EN50470-3, EN62053-31. Approvals: CE, MID in accordance to Annex B (Revenue Approvals). **Connections:** Screw-type. Cable cross-section area: AV0-AV9 models: max. 16 mm<sup>2</sup>, Min. 2.5mm<sup>2</sup> (measuring inputs) Min./Max. screws tightening torque: 1.7 Nm / 3 Nm.; Other inputs: 1.5mm<sup>2</sup>-Min./Max. screws tightening torque: 0.4 Nm / 0.8 Nm. Cable cross-section area: AV5-AV6 models: max. 1.5 mm<sup>2</sup>, Min. 2.5mm<sup>2</sup> (measuring inputs) Min./Max. screws tightening torque: 0.4 Nm / 0.8 Nm. **Housing DIN:** dimensions (WxHxD) 71 x 90 x 64.5 mm. Material: nylon PA66, self-extinguishing: UL 94 V-0. Mounting: DIN-rail. **Protection degree:** Front: IP50. Screw terminals: IP20. **Weight:** Approx. 400 g (packing included).

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to 999.9 m<sup>3</sup>/ pulse. Contact