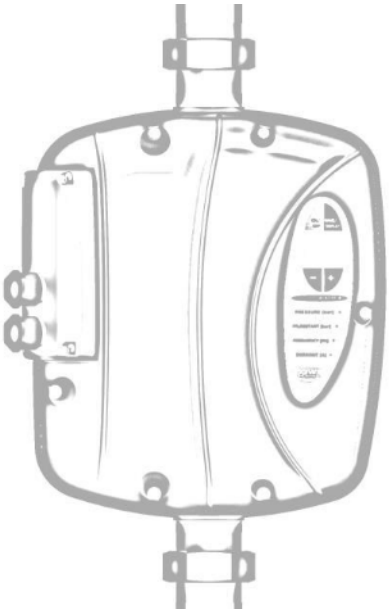
Invertor
EPower
e-MM/MT 230V



Manual de utilizare

User Manual

CE

WATER MEETS TECHNOLOGY

made in Italy

Cod. /620030200 Rev.1

Indice

Atentionari	Warning
	**PERICOL** Risc de vatamare personala si a bunurilor daca nu se respecta instructiunile PERICOL DE CURENTARE Risc de soc electric daca nu se respecta instructiunile	**DANGER** Risk of personal injury and property if not complied with the requirements **ELECTRIC SHOCK** Risk of electrical shock if not complied with the requirements
	**AVERTIZARE** Risc de distrugere a proprietatii sau a mediului daca nu se respecta instructiunile.	**WARNING** Risk of damage to property or the environment if not complied with the requirements.

	**AVERTIZARE** Inainte de a instala si a folosi produsul, cititi cu atentie manualul de utilizare. Instalarea, mentenanta si depanarea trebuie facuta de catre personal calificat, in deplin acord cu legislatia. Producatorul, MAC3 si importatorul, Expert Instal Group SRL nu sunt raspunzatori pentru nici o dauna provocata de utilizare, instalare sau depanare defectuoasa (gresita). Folosirea de piese de schimb altele decat cele originale, manipularea sau utilizarea defectuoasa duc la pierderea garantiei.	**WARNING** Before installing and using the product read this book in all its parts. Installation and maintenance must be performed by qualified personnel in accordance with current regulations. MAC3 will not be held responsible for any damage caused by improper or prohibited use and is not responsible for any damages caused by a not correct installation or maintenance. The use of non-original spare parts, tempering or improper use, make the product warranty null.
	**AVERTIZARE** EPOWER trebuie instalat conform descrierii din paragraful “Instalare si utilizare (detaliat)” Instalatia hidraulica trebuie configurata si dimensionata corect pentru a evita socurile de presiune (lovitura de berbec). Amortizorul de socuri, instalat pentru a evita socurile de presiune trebuie sa beneficieze de intretinere regulata. Avand in vedere ca EPOWER este un dispozitiv electric, in cazul in care este deteriorat din cauza socurilor de presiune, infiltrarea apei in aparat este periculoasa. Contactul apei cu circuitele electrice pot cauza distrugeri.	**WARNING** EPOWER must be installed as described in the paragraph “Functioning and Use” You must project correctly the hydraulic connection of EPOWER to avoid pressure shocks. The shock absorber, installed to avoid pressure shocks, must be keep under a correct maintenance. Epower is an electric device, if the case will be damage by pressure shocks a possible water infiltration could be dangerous due to the contact between electric components and the water flow.

	**PERICOL** EPOWER este etichetat CE (conform normelor europene), dar in cazul instalarii incorecte poate cauza interferente electromagnetice. Verificati functionarea corecta a celorlalte dispozitive electrice detinute in timp ce EPOWER este pornit. Functionarea defectuoasa a echipamentelor electrice poate fi daunatoare persoanelor si proprietatii. In cazul unor interferente electromagnetice inchideti reteaua electrica si contactati tehnicieni specializati. Inainte de orice interventie asupra produsului, asigurati-va ca EPOWER este deconectat de la reteaua electrica.Nu incercati nici o interventie asupra EPOWER in timp ce este pornit. Conectarea EPOWER la panoul electric trebuie facuta de catre personalizat specializat conform normelor in vigoare. EPOWER trebuie protejat cu un comutator/siguranta termic(a). EPOWER trebuie conectat la o instalatie cu impamantare functionala si eficienta.	**DANGER** EPOWER is CE labelled but in the case of wrong installation can cause electromagnetic interference. Verify the correct operation of other electronic devices with EPOWER on and running. Malfunction of equipment can be harmful to people and property. In the case of electromagnetic interference contact technical support and stop the plant. Before any intervention censure that the EPOWER is disconnected from the electricity supply Do not attempt operations with the EPOWER open The connection of the EPOWER to the electric panel must be carried out by qualified personnel in accordance with current norms EPOWER must be protected by a thermal switch. EPOWER must be connected to an efficient earthing system

Ghid de cumparare

RO Va multumim pentru increderea acordata si achizitionarea inverterului Epower! Incercam sa va oferim informatii folositoare pentru a utiliza corect Epower impreuna cu celelalte componente ale instalatiei de apa.

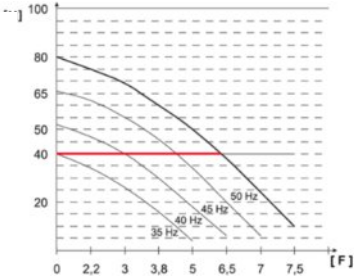
1. Cum sa alegem pompa: pentru a profita de caracteristicile performante ale Epower este esential sa alegeti pompa corecta.
Un inverter(convertizor de frecventa), prin insasi natura sa, comanda motorul pompei la turatia optima in functie de variatia fluxului de apa (cerere).
Pentru a avea un comportament optim este esential sa alegeti o pompa ce are diagrama (curba caracteristica) cat mai larga/accentuata – de obicei pompele multietajate; acest tip de pompe permit Epower sa controleze turatia la viteze variabile avand o plaja mai mare de functionare.
Pompa trebuie aleasa in functie de presiunea si debitul necesar instalatiei dvs.

Guide to purchase

EN Thanks to have bought Epower! We would like to notice some useful information to correctly use and install Epower and the available accessories.

1. How to choose pump: to take advantage of performance of Epower it is essential to choose the correct pump.
The inverter pilots the pump on several frequencies depending on the variation of flow. This is why it is possible to save energy and to increase life time of the pump.
For having correct behaviours it is essential to choose a pump with slope characteristic curve (see fig.), usually multiimpeller pumps; this kind of pump permits the Epower to pilots pump at variables speed.
The head and capacity of the pump must correct for request of the plant.

Head – Presiune(Bar=h/10)



Flow – Debit (m^3/h)

2. Adaptor pentru conexiuni lungi (ACL): Daca cablul de conectare dintre pompa si Epower este foarte lung, acesta inmagazineaza energie statica asemenea unui condensator, ducand la anomalii de functionare. Pentru a inlatura aceasta interferenta se poate achizitiona un adaptor pentru conexiuni lungi (ACL) de pana la 80 m. Mac3 produce si acest adaptor pentru solutii complete in caz de necesitate.

3.Filtrul IEM (interferenta electromagnetica): Toate Inverterele Mac3 au aprobari IEM pentru uzul casnic.
Daca Epower urmeaza a fi instalat intr-un mediu deosebit de sensibil la interferente electromagnetice, Mac3 produce si pune la dispozitie filtre IEM pentru a neutraliza problema.

2. Long Connection Adapter (LCA) The connection cable creates, between Epower and pump, a capacitive effect. For removing the disturbance Mac3 produces an adapter for long connection L>15mt (50 feet), up to 80 mt (260feet) of cable.
This device is normally used with submersible pumps in well applications.

3.EMC filter: Mac3 inverters have domestic use EMC approval.
If inverter is installed in enviroments particularly sensitive to electromagnetic interference Mac3 makes available additional EMI filters, to be installed between the supply and inverter, so as to eliminate.

Continutul pachetului

RO Epower se livreaza cu teava metalica de 1 ¼ si morsete pentru conectarea cablului.

Package contents

EN Epower is provided on metal pipe 1 ¼ "and easily accessible terminals for wiring.

Scurta descriere – Instalare rapida

Start Up procedure

Instalatia hidraulica

RO Mai jos aveti o schita cu titlu de exemplu. Pentru mai multe detalii cititi sectiunea “Instalare si utilizare (detaliat)”

Hydraulic Installation

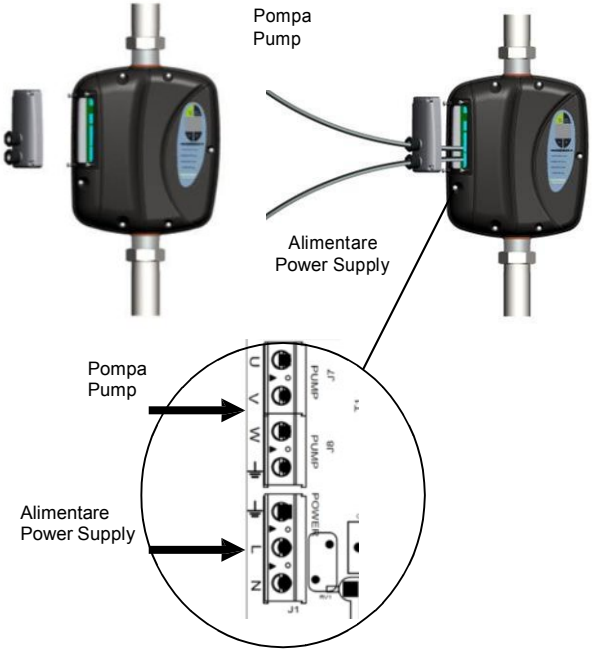
EN Hereafter a scheme, as example, for more details and warnings see the section "Functioning and Use"

Instalatia electrica

RO Mai jos aveti o schita cu titlu de exemplu. Pentru mai multe detalii cititi sectiunea “Instalare si utilizare (detaliat)”

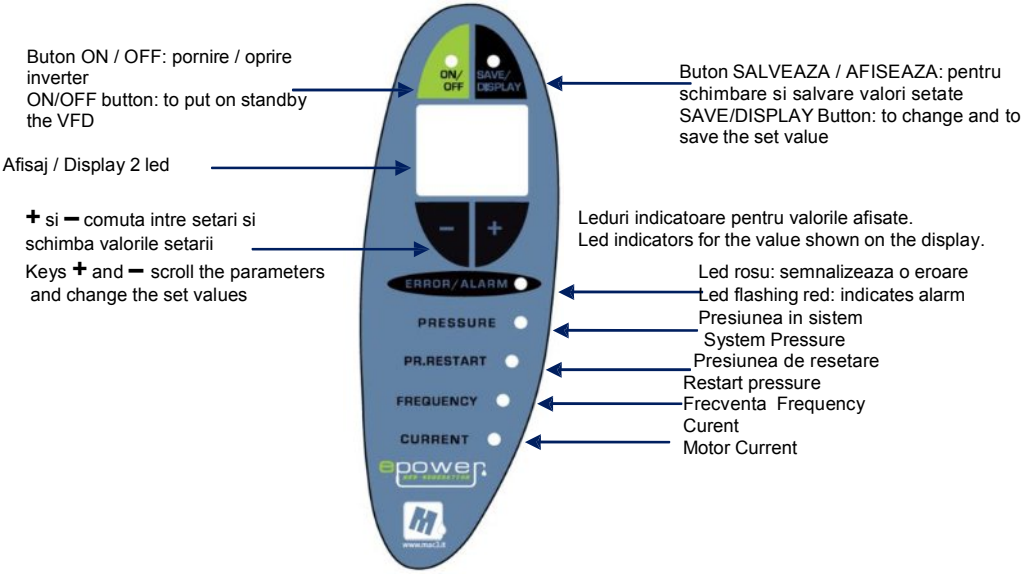
Electrical Installation

EN Hereafter a scheme, as example, for more details and warnings see the section "Functioning and Use”.



Meniu Software

Software Installation



Folosirea butoanelor **Keyboard use**

Buton/Button	EFECT	EFFECT
ON/OFF	Permite oprirea dispozitivului si inchide alimentarea pompei. - Apasat continuu 5 secunde: Led aprins: dispozitivul functioneaza Led stins: dispozitiv oprit	To set the device in stand by and switch off the pump. - Keep pressed for 5 seconds: Light on: device is operating Light off: device in stand by
SAVE/DISPLAY	Schimba intre modul de “afisare” si cel de “schimbare setari” Apasati 1 sec. pentru afisarea valorii setate Apasati 5 sec.pentru modul “schimbare a setarii” Apasati inca o data pentru salvare si intoarcere la modul “afisare”	It allows to switch from display mode to set mode: Press for 1 second to see the value set Press for 5 sec. to enter into set mode Press a second time to save the value and return to display mode
+/-	Daca ledul SAVE/DISPLAY everde: Permite navigarea intre setari Daca ledul SAVE/DISPLAY e rosu: permite schimbarea valorii setarilor	If LED SAVE / DISPLAY green: it Allows to scroll through the parameters If LED SAVE / DISPLAY red: it allows to change the selected parameter value.

Procedura de pornire

RO Alimentati EPOWER si in 2 secunde vor fi afisate date privind modelul aparatului si versiunea software.

Procedure

EN Power the EPOWER and in 2 seconds it will be displayed the model of the device and the version of the software.

MM

01

Afiseaza valoarea **Intensitatii Curentului** (amperi) pentru a fi setata. Apasati **+** pentru cresterea valorii si **–** pentru micsorare.
Apasati **SAVE** pentru salvare si continuare.

Displayed the value of current to be set. Press the + button to increase the value and - to decrease.
Press the **SAVE** key to save the value and move to the next.

6.8

Afiseaza valoarea **Presiunii instalatiei** pentru a fi setata.
Apasati **+** pentru cresterea valorii si **–** pentru micsorare.
Apasati **SAVE** pentru salvare si continuare.

Displayed the value of System Pressure to be set. Press the + button to increase the value and - to decrease.
Press the SAVE key to save the value and move to the next.

3.0

Afiseaza valoarea **Presiunii de resetare** pentru a fi setata.
Apasati **+** pentru cresterea valorii si **–** pentru micsorare.
Apasati **SAVE** pentru salvare si continuare. Procedura de instalare s-a finalizat.

Displayed the value of Restart Pressure to be set. Press the + button to increase the value and - to decrease. Press the **SAVE** key to save the value. The installation procedure is finished.

2.6

Dispozitivul salveaza setarile si afiseaza OFF. Pompa este oprita.

The device saves the parameters and displays OF (off). the pump is not powered.

OF

Pentru a active pompa apasati butonul ON/OFF pana cand se afiseaza ON.

To activate the pump push the ON/OFF button till the led display shows ON..

ON

Pe display apre afisata valoarea presiunii masurate in sistem.

The LED display shows the value of the measured pressure of system.

3.0

In timpul functionarii, se pot citi valorile masurate ale parametrilor (presiunea in sistem, presiunea de resetare, puterea consumata si frecventa de turatie a pompei) apasand butoanele + si -.

Pentru a citi valorile actuale ale setarilor apasati butonul SAVE / DISPLAY 1 secunda. Legatura dintre valoarea afisata si parametrul la care se face referire poate fi identificata prin aprinderea ledului aferent.

During operation, you can read the measured values of the parameters (pressure in the system, restart pressure, current consumption of the pump and frequency at which the pump is running) by pressing the + / - keys.

To read the values set of the parameters press the SAVE / DISPLAY button for 1 second. The link between the value displayed and the parameter is identified accordingly by the LED flashing.

Sensul de rotatie
In cazul in care se doreste inversarea sensului de rotatie al pompei, acest lucru se poate face prin programare, intrand in meniul extins (Parametrul “Rotation sense / Sensul de rotatie”)

Util:
Pentru a finaliza corect configurarea Epower dupa instalare, trebuie sa porniti pompa la turatia maxima timp de 60 secunde. In acest fel, Epower va inregistra si va retine correct valoarea maxima de putere absorbita a pompei.

Rotation sense
In case of need to reverse the rotation sense of the pump is possible to do so via software, entering the extended menu (Parameter “Rotation sense”)

NB:
In order for Epower is configured properly after the installation, you need to work the pump at full speed for 60 seconds. In this way the Epower will store the maximum value of the power absorbed by the pump

Informatii generale

RO Prin acest manual incercam sa oferim informatii esentiale pentru instalarea, folosirea si intretinerea Epower.
Este important ca utilizatorul si/sau instalatorul sa citeasca atent manualul inainte de instalarea si folosirea produsului. Instalarea si folosirea incorecta pot cauza pagube si pot duce la anularea garantiei.
Intotdeauna specificati datele de identificare ale modelului in momentul in care va adresati tehnicienilor service sau cand comandati piese de schimb.
In cazul in care aveti nevoie de instructiuni sau sunteti intr-o situatie ce nu este acoperita de acest manual, va rugam contactati departamentul de suport tehnic.

Descrierea produsului

RO Epower este un convertizor de turatie cu frecventa variabila (inverter) ce ajuta la ridicarea si mentinerea unei presiuni constante.
Epower, in functie de cererea de apa, regleaza automat numarul de turatii al pompei in timp ce mentine o presiune constanta in instalatie.

Epower este disponibil in urmatoarele versiuni:

- EPOWER-MM: inverter cu racirea in apa, monofazat, pentru pompe monofazate
- EPOWER-MT: inverter cu racirea in apa, monofazat, pentru pompe trifazate

Grupuri de pompare / presiune

- Este posibila instalarea cu un singur Epower a unei pompe auxiliare ON/OFF la o ritm fix (pompa de presiune). Pentru o instalare corecta, cititi diagrama de cablare si instructiunile din paragraful “Conexiuni suplimentare”. In catalogul Mac3 se poate gasi un Panou de Comanda special pentru aceasta aplicatie.
- Este posibila instalarea mai multor Epower cu ierarhie intre ele de tip Master/Slave
- Este posibila instalarea a pana la 8 Epower in sistem multipompe / Grup de Pompare pana la 8 pompe (Versiunea Avansata)
  Versiunea Avansata este compusa dintr-un inverter Master ce comanda pana la 7 invertere Slave. Inverterul Master regleaza functionarea intregului sistem.

De stiut: Instalarea trebuie efectuata numai de catre personal califcat

IMPORTANT: Pompele folosite in grupul de pompare trebuie sa aiba exact aceleasi caracteristici: Putere motor(kw/hp), presiune (Hmax).

Mod de folosire

RO Temperatura de operare: 0°C ÷ +40°C
Umiditate maxima: 50% la 40°C (fara condens)
Temperatura lichidului: +1°C +40°C
Tipul de lichid: apa curata, fara chimicale (ph 5÷9) si fara impuritati.

AVERTIZARE
EPOWER trebuie montat ferit de intemperii (ex. ploaie, umiditate) si inghet.
Instalatia hidraulica trebuie configurata si dimensionata corect pentru a evita socurile de presiune (lovitura de berbec).

General Remarks

EN This manual intends to provide essential information for the installation, use and maintenane of the Epower.

It is important that the user and/or installer carefully reads the manual before installing and using the product. Incorrect use may cause faults and result in the annulment of the guarantee terms.

Always specify the exact identification of the model if transit requests for technical information or spare parts from our sales and service support.

In the event of instructions, situations and events not contemplated in the present manual, please contact technical customer support.

Product Description

EN The Epower is a variable frequency drive (inverter) for lifting units under constant pressure.
Epower, according to the actual water requirements undertakes the automatic regulations of the number of revs of the electro-pump whilst maintaining the system pressure constant.

The Epower is available in the following versions:

- EPOWER-MM: inverter water coooled, single-phase line for single-phase pump.
- EPOWER-MT: inverter water coooled, single-phase line for three-stage pump.

Pressurization groups

- The Epower allows to drive a second pump ON/OFF at a fixed rate (booster pump). For correct installation, follow the wiring diagram and instructions refer to paragraph “Additional connections”. Mac3 has in the catalog a control panel specifically design for this application.

- It’s possible to install the EPOWER in Master/Slave configuration
- A multipump configuration (**ADVANCED model**) is available for running till 8 pumps.
  The ADVANCED version is composed by a Master that pilots till 7 Slaves.
  The inverter Master determines the function of the system.

NB: Installation must be performed by qualified personnel

IMPORTANT: The pumps used must be of the same characteristics: power engine (hp), head (Hmax).

Usage Condition

EN Operational temperature:0°C ÷ +40°C
Max.humidity: 50% at 40°C (no condensate)
Temperature of fluid: +1°C +40°C
Nature of fluid: water with no chemical add (ph 5÷9) and no debris.

WARNING
EPOWER must be installed in environments that are protected from freezing and weather-proof.
You must project correctly the hydraulic connection of EPOWER to avoid pressure shocks. The shock

Amortizorul de socuri, instalat pentru a evita socurile de presiune trebuie sa beneficieze de intretinere regulata.

EPOWER nu poate fi folosit pe tevi ce contin lichid abraziv, substante solide, lichide vascoase, inflamabile sau explozive.

absorber, installed to avoid pressure shocks, must be keep under a correct maintenance.

EPOWER cannot be used on pipes containing abrasive liquids, fibrous solid substances or inflammable liquids or explosives.

Caracteristici Tehnice - - Technical Features

Frecventa de iesire	5-100 hz
Acceleratie	1,5 – 5 s
Siguranta electrica Compatibilitate electromagnetica	EN60730 EN61000-6-3 EN61000-6-4
Afisaj	2 digit alfanumeric
Pozitie Montaj	oricare (vertical/orizontal)
Interval presiune	0,3 – 8 bar
Suprapresiune Maxima	12 bar
Temperatura functionare	5 - 40 °C
Clasa protectie electrica	IP65
Conexiuni	1 ¼" filet exterior
Dimensiuni	33 x 20 x 15 cm
Greutate	2kg

Output frequency	5-100 hz
Acceleration time	1,5 – 5 s
Electrical safety Electromagnetic compatibility	EN60730 EN61000-6-3 EN61000-6-4
Display	2 digit alphanumeric
Assembly position	any
Pressure to be set	0,3 – 8 bar
Max overpressure	12 bar
Operational Ta	5 - 40 °C
Protection category	IP65
Input/output	1 ¼" male
Dimension	33 x 20 x 15 cm
Weight	2kg

E-power MM

Alimentare monofazata	1x230 V (170 la 270 V)
Putere max. Pompa (P2) 230 V monofazata	1.1 kw (1.5 hp)
Intensitate maxima curent	8 A

Power Supply	1x230 Vac (170 ÷ 270 Vca)
Max Pump Power (P2) 230Vac single phase	1.1 kw (1.5 hp)
Max. Phase current	8 A

E Power MT

Alimentare monofazata	1x230 V (170 la 270 V)
Putere max. Pompa (P2) 230 V trifazata	2.2 kw (3 hp)
Intensitate maxima curent	10 A

Monophase power supply	1x230 Vac (da 170 a 270 Vca)
Max Pump Power (P2) 230Vac three-phase	2.2 kw (3 hp)
Max. Phase current	10 A

Tipuri de Protectie

RO In cazul sesizarii unor anomalii de functionare, Epower protejeaza instalatia prin oprirea sistemului. Totusi, pentru a asigura alimentarea cu apa Epower va incerca repornirea/resetarea automata sau programata.

Tip de protectie	Repornire / Resetare
Tensiune electrica prea scazuta	Automata (vezi “Depanare si Intretinere”)
Tensiune electrica prea ridicata	Automata (vezi “Depanare si Intretinere”)
Scurt circuit	* Incercari Repornire Automata (nr. de reporniri programabile –setare fabrica - 5); la epuizarea resetarilor trebuie repornit manual
Curentul de iesire peste limita admisa mai mult de 1 minut.	Incercari Repornire Automata *
Temperatura apei peste 75 °C	Automata (vezi “Depanare si Intretinere”)
Presiune insuficienta in sistem	Incercari Repornire Automata *
Lipsa apa sau prezenta aer in pompa	Incercari Repornire Automata *
Eroare la senzorul de presiune	---
Lovitura de berbec (soc de presiune)	Incercari Repornire Automata *
Antiblocare/ Antigripare (numai la vers.MM)	Daca pompa a fost oprita mai mult de 24 ore, Epower o porneste ridicand presiunea cu 0,5 bari

* Incercari Repornire Automata (nr. de reporniri programabile – nr. implicit setat de fabrica - 5); la epuizarea resetarilor trebuie repornit manual
Repornire manuala:
1. Deconectati alimentarea
2. Asteptati inchiderea afisajului
3. Re-conectati alimentarea

Protections

EN In the event of anomaly conditions Epower protects the autoclave by switching off, but to ensure water, attempts automatic or programmed reset operations.

Type of protection	Reset
Power voltage too low	Automatic (see “Troubleshooting & Maintenance”)
Power voltage too high	Automatic (see “Troubleshooting & Maintenance”)
Short circuit	Automatic attempts (n° programmable - factory default 5); on exhausting the reset attempts you need to restart manually*
Output current above threshold for over 1 min.	Automatic attempts (n° programmable - factory default 5); on exhausting the reset attempts you need to restart manually*
Water temperature above 75 °C	Automatic (see “Troubleshooting & Maintenance”)
Insufficient pressure in the system	Automatic restart attempts *
Lack of water or air in the pump	n° programmable attempts**
Pressure sensor fault	---
Pressure shock	Automatic
Anti-lock (only vers MM)	If the pump is stopped for more than 24 hours, the device restarts the pump raising the pressure of 0.5 bar

* programmable number of automatic restart attempts - factory default 5).
On exhausting the reset attempts you need to :
1. disconnect power
2. wait for display to switch off
3. re-power

Instalare si utilizare (detaliat)

Conectarea hidraulica

RO Epower poate fi montat in orice pozitie. Totusi, se recomanda pozitie vertical. In cazul in care trebuie sa-l montati in pozitie orizontala, se recomanda sa-i dati o usoara inclinatie, deoarece pe circuite de tevi orizontale si cu debit scazut de apa (3-5 litri/minut), se poate genera o crestere semnificativa a temperaturii apei. Acest lucru poate duce la intrarea dispozitivului in Protectie.

Avertizari:

- Asigurati-va ca pompa este bine amorsata inainte de a instala EPOWER.
- Instalati EPOWER in apropierea pompei; daca montarea se face chiar pe pompa, aveti grija sa nu existe vibratii nocive.
- Nu folositi tevi si fitinguri de dimensiuni mai mici decat conexiunile EPOWER.
- Evitati montarea in locuri predispuse la condens si umiditate.
- Instalati un vas de expansiune pentru a proteja produsul de socurile de presiune (lovitura de berbec) si pentru a evita resetarea continua in prezenta unor pierderi mici de apa.

Ex. dimensionare in functie de presiunea de lucru:
Pompa de 6 bar → vas expansiune de 10bar
Ex. dimensionare in functie de debitul pompei:
Pompa de 100lt/min → vas de expansiune de la 10lt (10% din debitul maxim al pompei)

Presiunea de pre-incarcare (cu aer) in vasul de expansiune ar trebuie sa fie 0.8 x presiunea in sistem.
Ex.
Presiunea sistemului = 3bar
Presiunea de resetare = 2,6bar
→ presiunea pre-incarcare vas = (0,8 x 3) = 2,4bar

Daca presiunea de resetare este cu cel putin 1 bar mai scazuta decat presiunea sistemului, atunci valoarea de pre-incarcare a vasului ar trebui sa fie 0.8 x presiunea de resetare
Ex.
Presiunea sistemului = 3bar
Presiunea de resetare = 2bar
→ presiunea pre-incarcare vas = (0,8 x 2) = 1.6bar

Indicatii de instalare
- E recomandata montarea unui robinet de purjare.
- Montati un cartus de filtre pentru a proteja atat instalatia cat si inverterul de impuritatile prezente in apa (Nota1)
- **Este obligatorie montarea unei supape de sens**
- Pentru o intretinere usoara, montati dispozitivul cu racord olandez
- Montati un robinet in apropierea Epower pentru a usura verificarile si controlul.
- Montati un robinet langa vasul de expansiune pentru a usura mentenanta.

Functioning and Use

Hydraulic connection

EN Epower can be installed in any position. However, we recommend the vertical positioning. In case you need to have the device in a horizontal position, it is recommended to install it with a light inclination, because in horizontal sections of pipe and simultaneously with low water flow (3-5 liters / minute), you could have a significant increase in temperature, which would bring the device in protection.

Warnings:

- Make sure pump is perfectly primed, before installing EPOWER.
- Install EPOWER near the pump; if installed directly on the pump, verify that there are no harmful vibrations.
- Use tube diameter not less than those of EPOWER attacks.
- Avoid places where is possible precence of condensation
- Install an expansion tank to protect the product against water hammer and to avoid continuous restarting in presence of small losses.

Eg. Size, according to pressure of work:
Pump 6 bar → expansion tank 10 bar
Eg. Size, in liters per minute according to the pump:
Pump 100lt/min → expansion tank from 10lt/min (10% of the maximum flow of the pump)

Preload value of the expansion tank should be about 0.8 x value of system pressure.
Eg.
System pressure = 3 bar
Restart pressure = 2.6 bar
→ value of precharge = (0.8 x 3) = 2.4 bar

If the restart pressure is at least 1 bar lower than the system pressure, then the precharge value of the expansion tank should be about 0.8 x pressure value of restart pressure.
Eg.
System pressure = 3 bar
Restart pressure = 2 bar
→ value of precharge = (0.8 x 2) = 1.6 bar

Installation Notes
- Recommended to install a tap sampling.
- Insert a cartridge filter to protect both the system that the device from impurities, always present in the water (Note1)
- **The inclusion of an external check valve is mandatory.**
- For easy maintenance, mount the drive using a 3-piece union fittings
- Install a tap near the drive to facilitate the control of the drive
- Install a gate valve in series with the expansion tank for easy maintenance

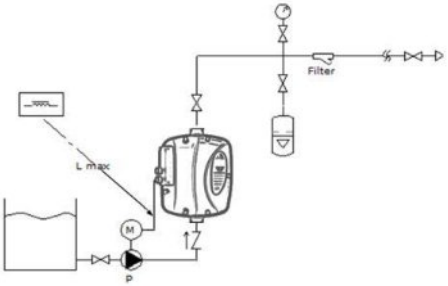
Nota1: Apa contine intotdeaua particule de nisip, fier, sparturi; aceste impuritati nu ar trebui sa intre in sistemul hidraulic deoarece deterioreaza tevile si aparatele conectate.

Instalarea unui filtru nu este optionala ci obligatorie!

Note 1: The water always contains sand, iron, debris; such impurities should not enter the hydraulic system because they cause corrosion of pipes, damaging the equipment connected to plumbing.
Water filtration for domestic use is required under the UNI-CTI 8065 and by decree of the Ministry of Health of 12.21.1990.
Installing a filter is not an option but a provision.

Mai jos aveti o schema cu sistemul folosit pentru o pompa de suprafata (pompa de hidrofor)

Hereafter a typical system diagram with surface pump suction head



Valvola di intercettazione		Shut of valve
Vaso di espansione		Expansion Vessel
Motore elettrico	M	Electric Motor
Pompa	P	Pump
Valvola di ritegno		Non return valve
Filtro		Hydraulic filter
Manometro		Pressure gauge
Sensore pressione	S	Pressure transmitter
Induttanza di compensazione		Impedance coil
Galleggiante		Float switch

Conectarea electrica

(vers. MM)

RO Dispozitivul vine echipat cu 2 morsete (Linie/Pompa) accesibile printr-un capac, cu papuci incorporati, conectati la aparat cu suruburi. Inlaturati capacul si introduceti cablul prin papucii aferenti:

- Conectati cablul de iesire (impamantare, monofaza) la pompa
- Conectati cablul de alimentare cu 3 fire (faza, nul , impamantare) la reteaua electrica monofazata, protejata cu o siguranta electrica dimensionata corect in functie de pompa.

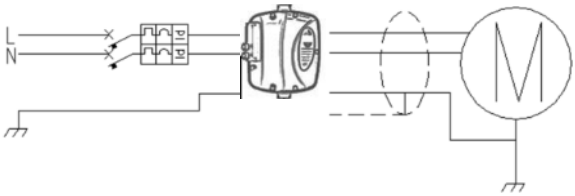
Mai jos aveti un exemplu de schema montaj electrica.

Electrical Connection

EN The device is provided with two terminals (line / pump) accessible through a door with built-in cable glands, which is connected to the device with screws. Remove the door, exposing the terminal and passing the cables in their cable glands:

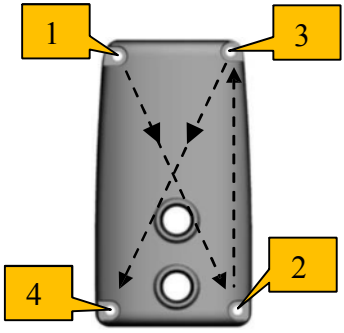
- Connect the output cable (ground, single phase) to the pump
- Connect the input cable (phase, neutral, ground) to the single-phase line through a circuit breaker sized according to the pump rating.

Hereafter an electrical link schema just for example.



- Inchideti capacul si asigurati o asezare corecta a garniturilor tip Oring (inel). Pentru a preveni infiltarea apei este absolut necesar sa se asambleze corect garniturile Oring.
- Strangeti suruburile usor, nu complet, folosind ordinea din figura de mai jos.
- Dupa ce capacul s-a apropiat uniform de Oringuri, continuati sa strangeti complet.

- Close the door and ensure the correct position of the O-Ring. To prevent any water infiltration is necessary to respect the correct assembly of the O-Ring.
- Tighten the screws but not completely, using the sequence in the figure.
- After having approached the door uniformly on the O-ring, continue to fully tighten.



(vers. MT)

RO Dispozitivul vine echipat cu 2 morsete (Linie/Pompa) accesibile printr-un capac, cu papuci incorporati, conectati la aparat cu suruburi. Inlaturati capacul si introduceti cablul prin papucii aferenti:

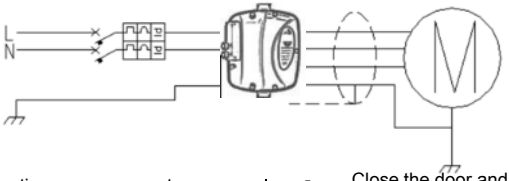
- Conectati cablul de iesire (impamantare, trifaza, ecranare) la pompa trifazata configurata in triunghi (Δ) 230v
- Conectati cablul de alimentare cu 3 fire (faza, nul , impamantare) la reteaua electrica monofazata, protejata cu o siguranta electrica dimensionata corect in functie de pompa.

Mai jos aveti un exemplu de schema montaj electrica.

EN The device is provided with two terminals (line / pump) accessible through a door with built-in cable glands, which is connected to the device with screws. Remove the door, exposing the terminal and passing the cables in their cable glands:

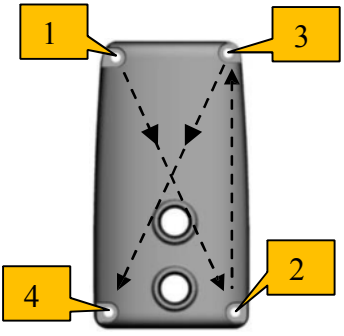
- Connect the output cable (ground, triple-phase, screen) to the three-phase pump with (Δ) triangle configuration 230 Vac.
- Connect the input cable with three wires (phase, neutral and ground) to the power supply through a single-phase 230Vac circuit breaker sized in function of the pump rating.

Hereafter an electrical link schema just for example.



- Inchideti capacul si asigurati o asezare corecta a garniturilor tip Oring (inel). Pentru a preveni infiltarea apei este absolut necesar sa se asambleze corect garniturile Oring.
- Strangeti suruburile usor, nu complet, folosind ordinea din figura de mai jos.
- Dupa ce capacul s-a apropiat uniform de Oringuri, continuati sa strangeti complet.

- Close the door and ensure the correct position of the O-Ring. To prevent any water infiltration is necessary to respect the correct assembly of the O-Ring.
- Tighten the screws but not completely, using the sequence in the figure.
- After having approached the door uniformly on the O-ring, continue to fully tighten.



RO EPOWER este certificat:
EN60730 pentru siguranta
EN61000-6-4 emisii electromagnetice industriale
EN61000-6-3 emisii electromagnetice rezidentiale
Cu urmatorul cablu de iesire:

EN EPOWER is-certified:
EN60730 safety
EN61000-6-4 EMC industrial environment.
EN61000-6-3 EMC residential environment, with the following output cable:

Lungime – Lenght	Sectiune cablu - Section Output Cable (Impamantare - Screen to GND)
2 m	1.5 mm^2

RO Sectiune cablu in functie de lungime.

EN Section power supply cable linked to cable length.

Model MT- MM	
S mm^2	L max mt
1.5	20
2.5	50

Toate componentele interioare ale inverterului sunt sub tensiune electrica. In caz de contact cu acestea exista pericol de moarte!

Toata munca ce implica instalarea si intretinerea aparatului trebuie efectuata de catre personal calificat, folosind unelte adecvate si echipament de protectie.

In cazul unei erori, deconectati alimentarea electrica.

Inainte de a efectua reparatii la inverter, asteptati cel putin 5 minute dupa deconectarea electrica, pentru a permite descarcarea condensatorului. Pericol de electrocutare, arsuri sau moarte daca nu se respecta aceasta avertizare.

Dispozitive de protectie

Contactati furnizorul de energie electrica pentru informatii despre dispozitivele de protective.

De exemplu:

- impamantare de siguranta;
- dispozitive de siguranta (sigurante) folosite pentru reziduurile de curent continuu sau curent alternativ (RCD);
- sisteme TN

Impamantare de siguranta

- Data fiind prezenta curentului static si al condensatorului, se poate descarca curent la impamantare/masa.
- Alegeti un tip de protectie care sa fie in agrement cu legislatia locala.

Siguranta pentru curent rezidual / static (RCD/RCCB)

- Cand folositi o siguranta pentru curent rezidual (RCD), asigurati'va ca aceasta sare si cand apare un scurt-circuit in partea de descarcare (DC) a impamantarii
=> utilizati siguranta RCD sensibila la curent de impuls.
- Instalati siguranta numai in acord cu legile in vigoare

Intrerupator automat

- Folositi un intrerupator automat cu o curba caracteristica de tip-C.
- Pentru dimensionarea protectiei electrice principale, consultati paragraful “Caracteristici Tehnice”.

All internal parts of the drive are unde power supply. In case of contact may sussit risk of death.

All installation and maintenance work ,must be performed by qualified staff using suitable instruments! Staff must use suitable protective equipment.
In the event of a fault, disconnect or switch off the power supply.

Before performing repairs on the drive wait at least 5 minutes to allow the capacitor to discharge.
Danger of electrocution, burning or death if this precaution is not observed.

Safety devices

Contact the electricity provider for information concerning safety devices.
Applicable:

- safety earthing;
- safety devices operating with residue alternating and direct current (RCD);
- TN systems.

Safety earthing

- Given the presence of condensers in the inlet filter, current to mass may occur.
- Choose a suitable safety device according to local regulations.

Residual current circuit breaker (RCD/RCCB)

- When a residual current circuit breaker (RCD) is used, make sure it trips even if a short circuit occurs in the DC part of the earth connection of drive!
=> use RCD's that are sensitive to pulse currents.
- Install the residue current circuit breaker according to local bylaws!

Automatic switch

- Use an automatic circuit switch with a type-C characteristic curve.
- Consult the Technical Specifications for the size of the mains protection system.

Conexiuni suplimentare

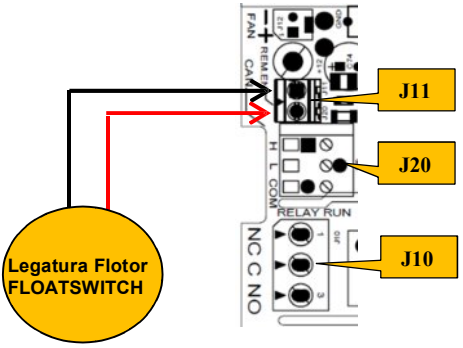
RO Morsetele interne sunt pentru:
- Alimentarea unui flotor sau a unei comenzi externe. Cand legatura este activata, Epower intra in mod StandBy
- Releu transmitere semnal:
  1. Comandarea unei pompe auxiliare la turatie fixa
  2. Activarea unei alarme externe
  3. Alcatuirea unui grup presiune cu doua EPower (Master/Slave)
- Conectarea cu alte aparate ePower (grup de pompare)

Invelisul este proiectat pentru a-l strapunge si a introduce cablul de legaturi suplimentare.
Pentru a seta optiunile suplimentare intrati in Meniul Extins (“vezi Lista Setari”)

Additional connections

EN The internal terminals are provided of:
- Input for dry running floating or remote control. If this input is enable, Epower is set in standby.
- Output relay:
  1. To pilot a second pump at fixed rate
  2. To activate an external alarm.
  3. To create a group of pressurization with two ePower (Master/Slave)
- Connection with other ePower (multipumps mode)

The terminal cover is designed for drilling and insertion of the cable for the additional links.
To set these options enter in extended menu (see “Parameter Table”)



Configurare flotor / plutitor lipsa apa

RO Este posibila montarea unui flotor suplimentar pentru activarea inverterului

Pentru activarea acestei setari:
- Conectati cablul flotorului in terminalele J11 (vezi fig. de sus)
- Activati setarea “remote control” (control extern) din meniul extins (vezi paragraful **Meniu Extins -** setarea 55)

Dry running float Configuration

EN It’s possible to use a floatswitch for activation of inverter.

To enable this function:
- Connect the floatswitch on the terminals J11 (see picture above)
- Enable “remote control” function on extended menu (par.55 paragraph **Extended Menu**)

Configurare releu semnal

RO Este posibila folosirea mufei (J10) de pe placa de baza ca un semnal de avertizare, pentru a porni pompa sau pentru a conecta o a doua pompa de presiune la turatie fixa. Setarea poate fi activate din Meniul Extins (setarea 50).

Relay Configuration

EN It’s possible to use the relay (J10) on the mother board as a warning signal, run pump, or to build boosting system with a second pump at fixed rate.The functions can be enabled by the extended menu (par.50).

Configurare pompa auxiliara (pompa ON/OFF)

RO

- Conectati controlerul pompei secundare in mufa J10 intre “C” si “NO”.
- Configurati setarea 50 : “Configuration.Relay” = “BO”
- Configurati setarea 51 “Inc Pres Booster” valoarea ridicarii presiunii (setare implicita = 0,2bar). Aceasta valoare determina ridicarea presiunii sitemului la pornirea pompei secundare.

Cum functioneaza:

Cum porneste pompa secundara ON/OFF:
Daca pompa principal nu resuseste sa creeze presiunea necesara in sistem, si frecventa este deja la valoarea maxima (ex. 50Hz/60Hz), atunci inverterul da comanda de pornire a pompei secundare.
De indata ce pompa secundara este activate, Epower regleaza cresterea presiunii in sistem cu valoarea configurata la setarea 51 “Inc Pres Booster” (implicit 0.2 bar)
Acest parametru determina cresterea presiunii pentru a evita oscilatiile. La nevoie presiunea poate fi crescuta cu pana la 1.5 bar daca o setati la aceasta valoare.

Cum se opreste pompa secundara ON/OFF:
Setarea ce opreste controlul pompei secundare este:
-setarea 64 “MinTresholdPar”. (implicit = 50%)
Cand procentajul puterii este mai scazut pragul setat si presiunea masurata este mai mare decat presiunea setata in sistem, atunci, inverterul opreste pompa secundara

Ex.
Setarea 47 “Motor Power” = 1000 watt
Setarea 64 “MinTresholdPar” = 50%
Setarea 72 “System Pressure” = 2.5 bar

In acest caz, valoarea Puterii Motorului la care se va opri pompa secundara este de 50% din 1000W, deci: 500W
Considerand ca presiunea este mai mare sau egala cu 2.5 bar si puterea este mai mica de 500W, inverterul va inchide pompa secundara.

De stiut:
Pornirea pompei secundare (activarea Booster) este active numai atunci cand modul de operare al inverterului este AUTOMATIC (vezi setarea 28 din Meniul Extins)

Booster Configuration (ON/OFF pump)

EN

- Connect the control of booster on J10 between “C” and “NO”.
- Set parameter 50 : ”Configuration Relay” = “BO”
- Set the parameter 51 “Inc Pres Booster” the value of pressure rise (default = 0.2 bar). This value determines the increase of the system pressure required after the starting of the pump ON / OFF.

Booster Operation:

How to start second pump ON / OFF:
If the first pump cannot reach pressure system and the frequency is at the maximum working value (es.50Hz/60Hz), the drive switch on the command to start the second pump ON / OFF.
As soon the second pump is started, the drive increase the system pressure value by an amount equal to the parameter 51 “Inc Pres Booster” (default 0.2bar [2.9psi]). This parameter determines the increase of the system pressure to avoid oscillation. In case of need can be increased up to a maximum of 1.5 bar [21.75 psi] (default = 0.2 bar [2.9psi]).
How to stop the second pump ON / OFF:
The parameter that switches off the control for the second pump is:
-parameter 64 “MinTresholdPar”. (Default = 50%)
When the percentage of power is lower than the threshold and the measured pressure is higher than the system pressure, then the drive switches off the second pump.

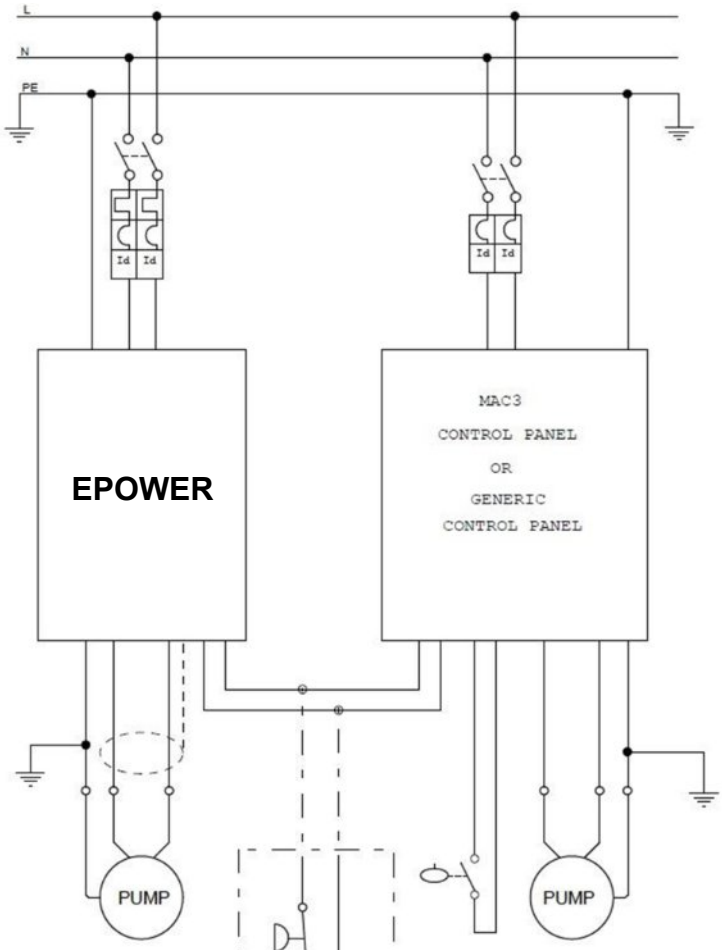
Eg.
Parameter 47 “Motor Power” = 1000 watts
parameter 64 “MinTresholdPar” = 50%
parameter 72 “System Pressure” = 2.5 bar [36.26 psi]

The power value to switch off the second pump is equal to 50% of 1000 watts then: 500 watts. So that if pressure is greater or equal to 2.5 bar [36.26 psi] and power is less than 500 watt the drive switch off the second pump

N.B. The Booster opration is only active when the operating mode of the inverter is AUTOMATIC (see parameter 28 in the Extended Menu)

RO Exemplu de configurare al modulului cu pompa auxiliara de presiune (pompa ON/OFF = versiune MM/MT)

EN Connection example for Mode Booster (pump ON / OFF – MM/MT version)



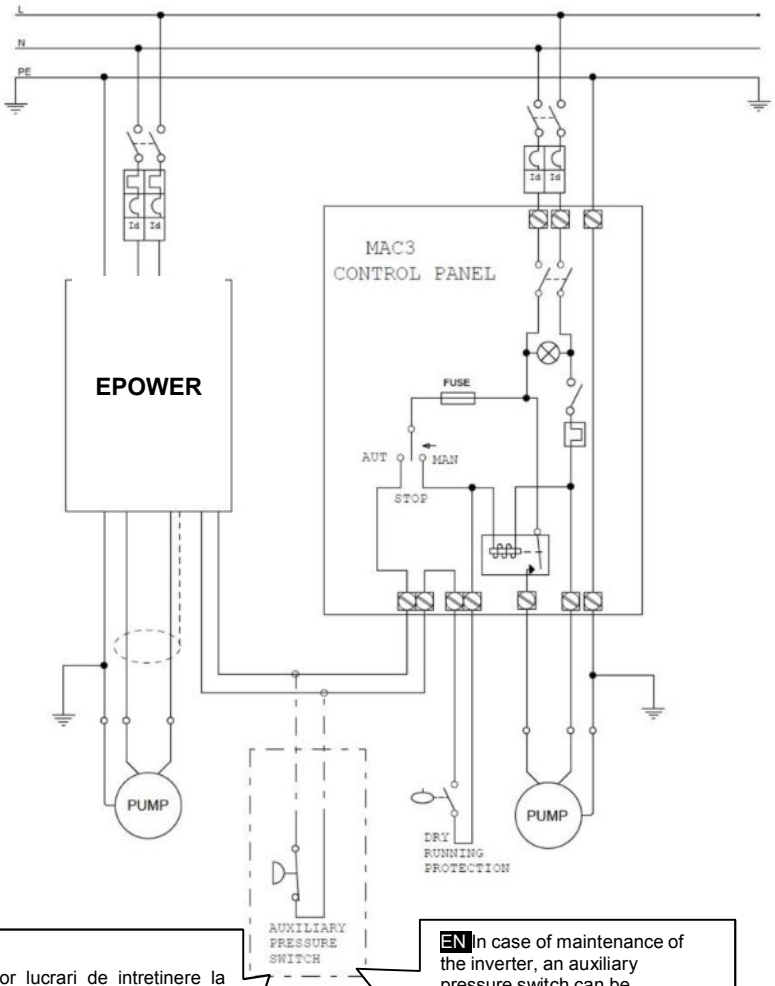
RO

In cazul unor lucrari de intretinere la inverter, se poate monta un presostat suplimentar pentru a garanta continuitatea functionarii sitemului cu pompa secundara. In caset caz este necesara si folosirea unui vas de expansiune dimensionat correct.

Atentie! Presostatul suplimentar trebuie scos din functiune cand Epower este repus in functiune.

EN In case of maintenance of the inverter, an auxiliary pressure switch can be connected to guarantee continuity of service to the system with the on-off pump. It is advisable to provide in this case the use of an expansion tank correctly dimensioned.

Beware the auxiliary switch should not be connected when the inverter.



RO

In cazul unor lucrari de intretinere la inverter, se poate monta un presostat suplimentar pentru a garanta continuitatea functionarii sitemului cu pompa secundara. In caset caz este necesara si folosirea unui vas de expansiune dimensionat correct.

Atentie! Presostatul suplimentar trebuie scos din functiune cand Epower este repus in functiune.

EN In case of maintenance of the inverter, an auxiliary pressure switch can be connected to guarantee continuity of service to the system with the on-off pump. It is advisable to provide in this case the use of an expansion tank correctly dimensioned.

Beware the auxiliary switch should not be connected when the inverter.

Configurare Grup de Pompare (mod Multipompa) (numai pentru versiunea avansata Epower)

RO Este posibila instalarea a pana la 8 Epower (doar Versiunea Avansata) in sistem multipompe / Grup de Pompare pana la 8 pompe
Grupul de pompare poate fi compus dintr-un inverter Master ce comanda pana la 7 invertere Slave. Inverterul Master regleaza functionarea intregului sistem.

Activarea modului Multipompa:

- Inlaturati capacul lateral si gauriti unul din locasurile deja pregatite ca in figura din dreapta. Montati o presetupa (protectie) si cablul de marimea necesara conexiunii Master/Slave (Principal/Secundar) intre 2 invertere. Conectati cablul in mufele J20 pentru a realiza conexiunea Master/Slave. Vezi sectiunea urmatoare, "Conexiunea Master/Slave"
- Configurati setarea 28 *"Next OpMpde"* la valoarea "MP": Multipompa
- Configurati setarea 4 "*Net Config ID*" cu un numar intre 0 si 7. Inverterul cu numarul cel mai mic setat va fi Master (Principal) in grup.
- Configurati setarea 47 "Motor Power" cu valoarea nominala a puterii pompei (P1). Daca se cunoaste doar puterea absorbita (P2), atunci puterea nominala (P1) se poate afla astfel: P2 / 0.7. Pentru ambele tipuri de putere, unitatea de masura este Watt-ul (W).
- Dupa ce iesiti din Meniul Extins, inverterul Master (Principal) va afisa "MA" in timp ce unitatile Slave (Secundare) vor afisa "Ux" (unde x este numarul desemnat inverterului respectiv la Setarea 4)

Exemplu de legaturi tip Master/Slave in mod Multipompa:

Multipump Configuration

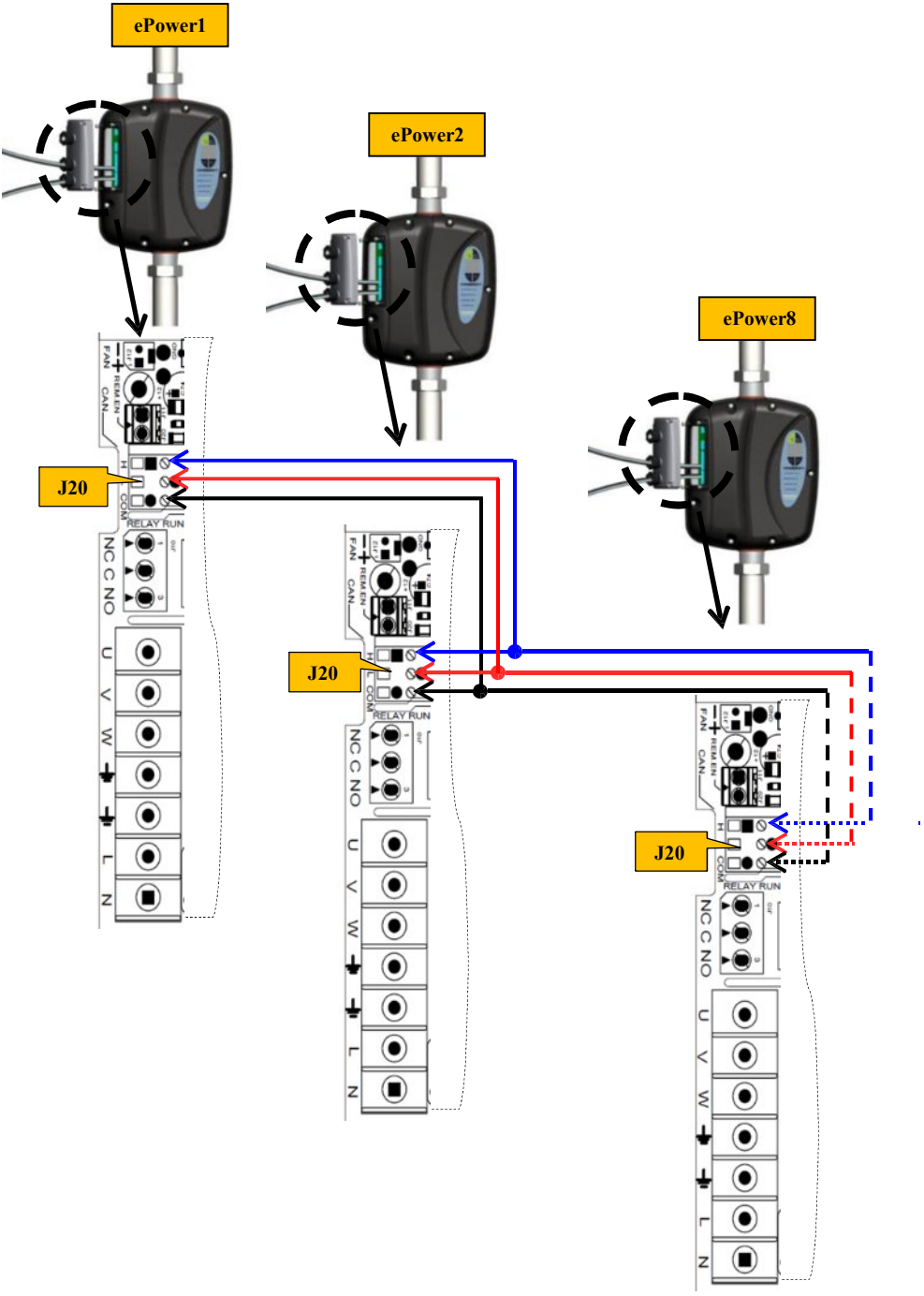
EN It's possible to connect ePower in multipumps configuration (ADVANCED model only) composed from an inverter Master that can drive 7 inverter Slave.

To enable mutipump mode is needed:

- Remove the lid and open one of the holes located in the area of pre-drilling. Apply a cable gland of adequate size for the type of cable used for the connection between Master and Slave and connect them using the terminals J20 see "*Connection between Master/Slave".*
- Set the parameter 28 *"Next OpMpde"* with the value "MP": Multipump.
- Set the parameter 4 "*Net Config ID*" with a number between 0 and 7. The inverter with lowest numerical value is the Master of the group.

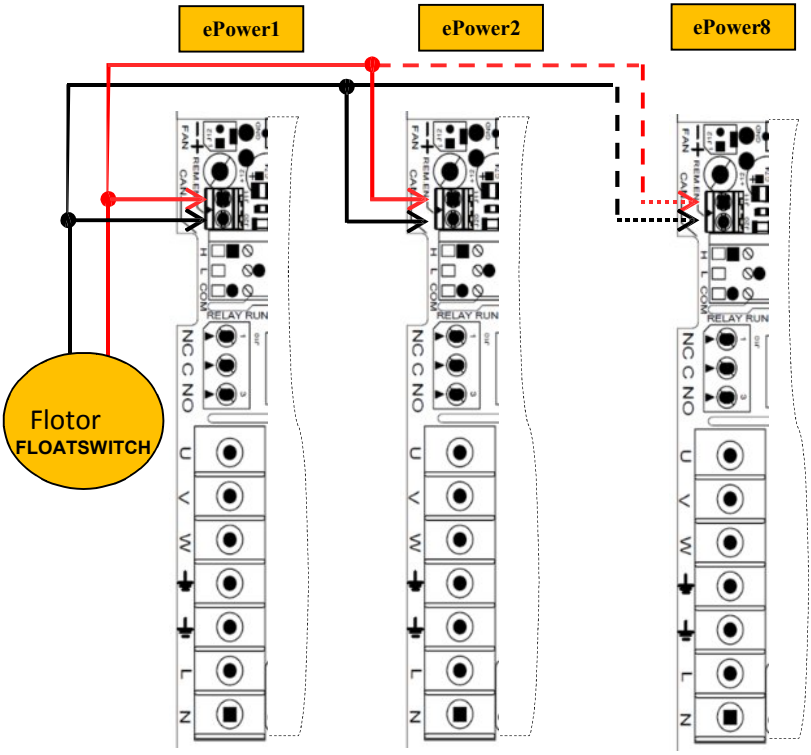
- Set the parameter N. 47 "Motor Power" with the nominal power value of the pump (P1). (See parameter 47 in **Extended Menu** section). If in the pump is shown only the useful power P2, the nominal power is given by P2/0.7. For both the power values (P1 and P2), the unit of measurement is expressed in watts.
- After exiting from extended menu, the Master unit displays "MA", while the Slave unit displays "Ux" (where *x* is the number assigned to the inverter with parameter 4).

Connection between Master/Slave:


ePower1
ePower2
ePower8
J20
J20
J20
FAN
CAN
RELAY RUN
NC C NO
U V W
L N

De stiut: Se poate folosi un singur flotor pentru a controla grupul de pompare:

N.B. It's possible to use only one floatswitch to control the multipump group:



Configurare ierarhie Master/Slave (2Epower + 2Pompe) (pentru versiunea normala Epower)

RO Pentru a realiza un grup de pompare cu doar 2 pompe se poate folosi modelul normal Epower (2 aparate) in modul Master/Slave, desi este recomandat a se folosi Modelul Avansat in mod Multipompe.

Daca achizitionati doar modelul normal Epower, exista posibilitatea modului Master/Slave sau modului cu Pompa auxiliara.

Diferenta dintre modul de operare Master/Slave (2 invertere + 2 pompe) si modul de operare cu Pompa auxiliara (1 inverter + 2 pompe) este fiabilitatea in timp(uzura mai mica) si performanta superioara data de coordonarea inverterelor.

De stiut: Nu este posibila folosirea modului Master/Slave in acelasi tip cu modul Multipompa

Configurare:

- Inlaturati capacul lateral si gauriti unul din locasurile deja pregatite ca in figura din dreapta. Montati o presetupa (protectie) si cablul de marimea necesara conexiunii Master/Slave (Principal/Secundar). Conectati inverterele folosind mufele J10 si J11.
- Configurati setarea 50 “Configuration Relay” cu valoarea “MA” pentru Master si “SL” pentru Slave. (vezi parametrul 50 din **Meniul Extins**)
- Configurati setarea 47 “Motor Power” cu valoarea nominala a puterii pompei (P1). Daca se cunoaste doar puterea absorbita (P2), atunci puterea nominala (P1) se poate afla astfel: P2 / 0.7. Pentru ambele tipuri de putere, unitatea de masura este Watt-ul (W).
- Configurati setarea 64 “Minimum Treshold” cu pragul in procente al puterii absorbite. Inverterul este inchis cand puterea absorbita a unitatii Slave este sub pragul setat (vezi setarea 64 din **Meniul Extins**)

Modul de operare Master/Slave nu are un sistem de a transmite setarile de la un inverter la celalalt. De aceea, valorile setate trebuie sa fie exact aceleasi la ambele invertere, in afara de Setarea 50 (care determina daca inverterul este Master sau Slave).

De stiut: Configuratia Master/Slave este activa numai daca modul de operare al inverterului este AUTOMATIC (vezi setarea 28 din Meniul Extins)

EN In order to realize a booster set with 2 pumps is highly recommended to use the Advanced model il Multipumps configuration.

But it is also possible to use the Master/Slave mode that allows to connect two inverters on the same system in order to improve its performance in a coordinated mode. The connection for this mode is via a communication line ON/OFF, using the output relay and the digital input available.

N.B. It’s not possible to use at the same time Master/Slave configuration and Multipump configuration.

Configuration:

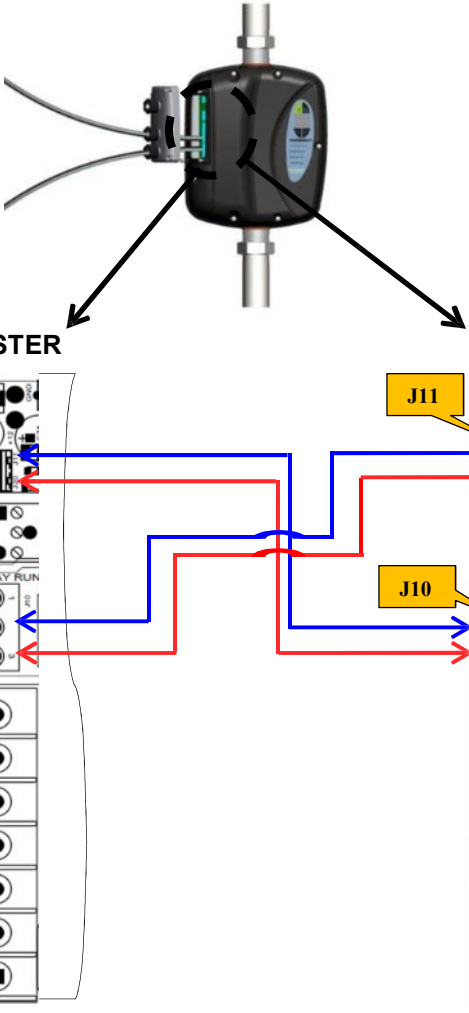
- Remove the lid and open one of the holes located in the area of pre-drilling. Apply a cable gland of adequate size for the type of cable used for the connection between Master and Slave and connect them using the terminals J10 and J11.
- Set the parameter N. 50 “Configuration Relay” with the value "MA" for the Master unit and "SL" for the Slave unit. (See parameter 50 in **Extended Menu** section)
- Set the parameter N. 47 “Motor Power” with the nominal power value of the pump (P1). (See parameter 47 in **Extended Menu** section). If in the pump is shown only the useful power P2, the nominal power is given by P2/0.7. For both the power values (P1 and P2), the unit of measurement is expressed in watts.
- Set the parameter N. 64 “Minimum threshold” with the threshold in % of the absorbed power. The inverter is turned off if the absorbed power of the Slave unit is below the threshold (See parameter 64 in **Extended Menu** section).

The Master/Slave configuration mode is not a system of passing parameters from one inverter to another. The parameters involved in the configuration of the Master/Slave mode must be set to the same values for both inverters, except Par.50 that determines whether the unit must be Master or Slave.

N.B. The Master/Slave configuration is only active when the operating mode of inverter is AUTOMATIC (see parameter 28 in the Extended Menu)

Exemplu de conectare Master/Slave:

Connection between Master/Slave:



RO Calibrare senzor:
Este important ca ambele invertere sa citeasca aceeasi presiune masurata din sistem. De aceea este necesar sa fiti foarte atenti la calibrarea senzorului de presiune.
Daca nu se poate calibrara presiunea in sine si inverterele citesc presiuni masurate diferite, este posibila decalarea presiunii setate pentru a compensa eroarea.
De exemplu, daca presiunea masurata este:
Master=2 bar
Slave=2.2 bar (diferenta de 0.2 bar), puteti seta presiunea in urmatorul mod:
Presiunea setata Master=2.5 bar
Presiunea setata Slave=2.7 bar (valoare obtinuta prin Presiune setata Master + diferenta de presiune dintre Master si Slave)

RO Comunicare
Comunicarea dintre invertere permite urmatoarele functii:

- Activarea unitatii Slave
- Schimbul Master/Slave

Unitatea Slave este activata numai de catre unitatea Master. Schimbul intre Master/Slave permite distribuirea volumului de munca intre cele doua invertere.

EN Sensor calibration
It is important that both units have the same value of the measured pressure. In order to obtain maximum performance from the Master/Slave configuration is therefore necessary to pay attention to the calibration of the pressure sensor.
In case it is complex to align the measured pressures, it is also possible to misalign the value of system pressure to compensate the error.

For example, if the pressure measured by the MASTER = 2 bar and the pressure measured by the
SLAVE = 2.2 bar (0.2 bar difference between the two units), you can set the system pressure as follows:
System pressure MASTER = 2.5bar
System pressure SLAVE = 2.7Bar. (value obtained by: MASTER System pressure + pressure difference measured between Master and Slave).

EN Communication
The communication allows to support the two following features:

- Activation Slave unit
- Rotation Master/Slave

The Slave is activated only by the Master. The rotation of Master/Slave allows to distribute the workload between the two units.

Meniu programare software

RO Folositi **+** si **–** pentru a selecta setarea dorita din cele listate in tabel, si pentru a citi valoarea sa.
Pentru a schimba setarea selectata, apasati butonul **SAVE/DISPLAY** pret de 5 secunde, pana cand LED-ul devine rosu. Schimbati valoarea setarii folosind **+** si **–**
Salvati valoarea cea noua apasand butonul **SAVE/DISPLAY** timp de 5 secunde.
Cititi si urmatoare sectiune: Depanare si Intretinere

Software Menu

EN Use the **+** and **–** to select the desired parameter, among those listed in the table, and read its value.
To change the selected parameter, press the **SAVE/DISPLAY** button for 5 seconds, until the LED turns red. Change the value of the parameter using the **+** and **-**.
Save the value by pressing for 5 seconds, the button **SAVE/DISPLAY**. You should consult also the next section for troubleshooting.

Setare	Descriere	Description
PRESSURE (Presiune)	Afiseaza presiunea curenta a ansamblului. Seteaza presiunea dorita in sistem *	Displays the in pipe pressure. Sets the required system pressure
PR.RESTART* (Presiune resetare)	Afiseaza presiunea de resetare Seteaza presiunea de resetare dorita	Displays the restart pressure. Sets the required restart pressure
FREQUENCY (Frecventa)	Afiseaza frecventa(turatiei) pompei Valoarea maxima setata a frecventei (nu se poate schimba din acest meniu)	Displays the instant pump frequency. Max value set for the frequency (not changeable in this menu)
CURRENT (Amperaj)	Vizualizeaza curentul absorbit de pompa (in amperi) Seteaza valoarea maxima a amperajului	Displays the current absorbed by the pump. Set the max rms value of the phase current

* Presiunea de resetare este calculata automat de catre Epower.

Presiunea resetare = Presiunea sitemului x 0.8

Pentru a schimba aceasta setare, va rugam adaugati noua valoarea dupa ce setati Presiunea sistemului.

The restart pressure is calculated from Epower.
Press. Restart = Press. System x 0.8.
To change it, please set the new value after setting the system pressure.

Depanare si Intretinere

RO Epower ofera pompei mai multe tipuri de protectie pentru probleme uzuale, iar pentru a asigura alimentarea cu apa, dupa intrarea in protectie incearca mai multe resetari automate.
Afisajul arata mesaje si coduri de eroare, pentru a va ajuta sa identificati sursa problemei.
Mesajele sunt afisate doar in limba engleza sau in alta limba configurata. Epower nu are meniu in limba romana!

Troubleshooting & Maintenance

EN The Epower provides pump protection from any type of common problems and to safeguard the water supply the drive attempts automatic restarts.
The display shows messages and error code to identify the type of fault .

Cod Eroare	Mesaj *Message*	Semnificatia mesajului	Ce trebuie facut	Message meaning	Action required
00	*ShortC. F-f*	Aveti un scurt-circuit Faza-faza sau Faza-Impamantare. Se incearca 5 resetari automate, dupa acestea aparatul se blocheaza.	Inlaturati scurt-circuitul. Verificati sa fie amperajul corect. Intrerupeti alimentarea. Asteptati inchiderea afisajului. Reconectati alimentarea.	Phase-Phase or Phase-Ground short circuit found. 5 Automatic restarts and then a permanent locked status	Remove the short circuit. Check the correct motor absorption. Disconnect the power supply. Wait for the display to switch off. Restore the power supply.
01	Imax Fault	Supratensiune detectata in pompa.	Verificati amperajul de iesire la setarea 36 “LoadCurrent” si setati valoarea corecta a amperajului maxim la setarea 49. Verificati ca pompa sa fie folosita in conditiile cerute de producator. Verificati ca nu exista frecare sau blocare in rotorul pompei.	Over current detected in the pump	Check current measurement output at parameter 36 “LoadCurrent “ and set the proper value of max. current at parameter 49. Verify that the pump is used under the conditions prescribed by its manufacturer Make sure that there are no conditions of friction or locking of the impeller

02	*Low Voltage*	Tensiunea de intrare masurata este prea mica (sub 170 Volti). Resetarea se face automat in momentul in care Voltajul revine in limitele normale.	Verificati instalatia electrica si incercati sa o aduceti in parametrii ceruti de Epower.	Power voltage measured is too low (less than 170 Vac). The reset is automatic when the voltage returns to the correct values	Check the electric system and reset the values to within the range prescribed for the EPOWER
03	*High voltage*	Tensiunea de intrare masurata este prea mare. (peste 270 Volti). Resetarea se face automat in momentul in care Voltajul revine in limitele normale.	Verificati instalatia electrica si incercati sa o aduceti in parametrii ceruti de Epower. Verificati prezenta aerului in pompa si daca este necesar eliminati-l.	Power voltage measured is too high (over 270 Vac). The reset is automatic when the voltage returns to the correct value	Check the wiring system and set the values in the range prescribed for the EPOWER. Check for the presence of air inside the pump and if necessary eliminate it.
04	*High Temp.*	Temperatura Interna >75°C. Resetare automata cant temperatura < 60 °C.	Verificati ca temperatura apei sa fie cea indicata de producator. Verificati si amorsati pompa corect.	Water Temp>75 °C. Automatic reset if Temp.< 60 °C:	Check water temperature is within the values indicated in the product specifications. Check and restore the correct pump priming action.
05	*Short Circ.Block*	Inverterul este in modul Blocare dupa 10 incercari de resetare in urma unui scurt-circuit	Pentru a inlatura modul Blocare aduceti la 0 valoarea setarii 65 “Tot.ShortC.Done” Daca problema persista incercati sa resetati inverterul deconectand alimentarea pompei.	The drive is in lock status after 10 reset attempts made following short circuit between phase and phase and phase-earth on the electro-pump.	To remove lock status set to zero the number of shortcircuit parameter 65 “Tot.ShortC.Done “ If the problem persists try to reset the drive unplugging the pump .
06	*I^2t protected*	Inverterul masoara amperaj ridicat al pompei.	Verificati ca pompa sa fie folosita in conditiile cerute de producator. Verificati ca nu exista frecare sau blocare in rotorul pompei..	The drive has measured an excessive current.	Verify that the pump is used under the conditions prescribed by its manufacturer Make sure that there are no conditions of friction or locking of the impeller
07	*Motor Unconnected*	Pompa nu este conectata la inverter	Verificati daca cablul de iesire din Epower este conectat la pompa.	The pump isn’t connected to the inverter	Check that the power output cable from the inverter is connected to the pump
10	*No water*	Lipsa apa. Configurare fabrica - 5 Incercari resetare automata la fiecare 5 minute. Daca nu reuseste se incearca din nou 24 resetari automate la fiecare 50 minute. Dupa aceasta sistemul intra in modul de blocare.	Verificati ca exista apa in put, bazin, etc. Amorsati pompa corect. Verificati sa nu fie infundate filtrele. Intrerupeti alimentarea curentului. Asteptati inchiderea afisajului. Reconectati energia electrica.	Lack of water found Automatic reset set in factory for 5 reset attempts every 5 minutes; if unsuccessful the reset is again attempted every 50 minutes for 24 times. After which the system remains in a state of permanent blockage.	Check for water presence. Reset the correct pump priming function. Check that the filter is not blocked. Disconnect the power supply. Wait for the display to switch off Re-connect power supply.

11	*Insuff. Pres*	Presiunea masurata este sub minimul setat.(setarea implicita 0.8bar) Configurare fabrica - 1 Incercare resetare automata la 5 minute. Daca nu reuseste se incearca din nou 24 resetari automate la fiecare 50 minute. Dupa aceasta sistemul intra in modul de blocare.	Verificati sa nu existe pierderi majore de apa. Verificati daca pompa este corect cumparata (poate ridica presiunea necesara) Intrerupeti alimentarea curentului. Asteptati inchiderea afisajului. Reconectati energia electrica.	The pressure measured is under the minum set value (default 0,8 bar). Automatic reset set in the factory for 1 reset attempt every 5 minutes if unsuccessful the reset operation is attempted again every 50 minutes for 24 times. After which the system is permanently blocked	Check that there is no major leakage on the system Check the correct dimensions of the electro-pump On eliminating the causes disconnect the power supply Wait for the display to switch off Restore power supply.
12	*Press Sensor Fault*	Detectata o eroare a senzorului de presiune.	Contactati service.	Detected a fault in the pressure sensor	Contact after selling service
13	*Water Hammer*	Lovitura de berbec. S-a detectat in sistem o presiune de 2 ori mai mare decat presiunea setata. Resetare automata. Inverterul intra in modul de blocare dupa 5 incercari de resetare automata.	Verificati functionarea corecta a vasului de expansiune	The system detected an overrun of more than 2 times the pressure set. The reset is automatic. The drive is blocked if the number of automatic restarts is over 5.	Verify the correct functioning of expansion tank.
15	*Pump Protection*	Pompa a functionat in continuu peste timpul configurat la setarea 40.	-Verificati eventuale pierderi de apa in sistem	The pump has been in operation continuously for the time set in parameter 40	-Check the leaks of the system
MA	Master	Inverterul este configurat ca Master.	Mesajul “MA” apare atunci cand inverterul este folosit intr-o configuratie tip Master/Slave (grup cu 2 invertere) si in Grup de pompare - multipompe	The inverter is configured like Master	The message "MA" can be displayed when the inverter is used in Master/Slave configuration (group with 2 inverter) and in the multipump mode.
SL	Slave	Inverterul este folosit in grup de 2 unitati si este setat ca Slave (vezi paragraful “Configurare ierarhie Master/Slave”)	-	The inverter is used in a group with 2 units and has been set as slave unit (see section *"Master/Slave Configuration"*)	-

CB	CANBUS	Modul Grup de Pompare-multipompa foloseste protocolul de comunicare CANBUS. Afisajul arata “CB” atunci cand este prezent un schimb de date intre invertere.	-	Multipump mode uses CANBUS communication protocol . The display shows "CB" when a data exchange is present between the inverters in a group.	-
ID	ID Error	In modul de operare Multipompa, utilizatorul aloca un numar de identificare (ID), ce identifica inverterul in grup. Mesajul indica faptul ca in grup exista invertere cu acelasi numar de identificare (ID)	Pentru a inlatura eroarea trebuie sa intrati in Meniul Extins si accesati setarea 4 "Net Config.ID". Acolo alocati inverterului un numar de la 0 la 7 care sa nu mai existe la alte invertere din sistem.	In Multipump mode the user assigns a numerical value (ID) that identifies the inverter in a group. The message indicates that in the group are inverters with the same numerical identifier.	To remove the error you need to change from extended menu, parameter 4 "Net Config.ID" and assign to inverter a new numeric value between 0 and 7.
Ux	Unit “*x*”	Identifica unitatea tip Slave(secundar) in modul Multipompa. “x” este numarul alocat acelui inverter la setarea 4 "Net Config. ID "	-	Identifies the slave unit in multipump mode. "*x*" is the numerical value assigned to the slave in parameter 4 "Net Config. ID "	-
FS	Fuori servizio Out of service	Mesajul este afisat numai in modul Multipompa. Inverterul a epuizat numarul de resetari automate.	Gasiti cauza erorii si reporniti inverterul	The message is displayed in multipump mode. The inverter finished the automatic restarts.	Find the cause of the fault and restart the inverter

Meniu Extins

RO Meniul extins permite vizualizarea tuturor setarilor. Pentru a accesa lista de setari apasati butoanele **+** si **–** simultan pentru cateva secunde. Apare pe afisaj EX urmat de numarul setarii.

Extended Menu

EN The extended menu permits the visualization of all parameters. To access to the parameter list keep the keys: **+** and **-** , pressed simultaneously for a few seconds. Displayed the initial EX and the parameter number.

EX

01

Apasati butoanele **+** si **–** pentru a selecta setarea dorita.

Pentru a vizualiza valoarea setarii apasati butonul SAVE/DISPLAY

De ex. alegeti setarea frecventei maxime.

Use the key **+** and **-** to select the desired parameter.
To view the parameter value press the SAVE / DISPLAY key.
Eg choice of the parameter maximum frequency.

01

Pentru a modifica setarea apasati SAVE/DISPLAY pana se aprind toate LEDurile.
Cu butoanele **+** si **–** schimbati valoarea setarii.
De ex. setati la 60Hz valoarea maxima.

To modify the parameter press the key SAVE / DISPLAY until all the LEDs light up.
With the key **+** and **-** change the parameter value.
Eg lead to 60Hz, the maximum value.

60

Pentru a salva noua valoarea apasati din nou butonul SAVE/DISPLAY pana cand apare EX si se sting LEDurile. Sunteti inapoi la lista de setari.

To save the new value press the key SAVE / DISPLAY until it appears EX and the leds are off; you are back to the parameter list.

EX

01

Pentru a parasi Meniul Extins si a salva setarile, apasati simultan butoanele **+** si **–** pana pe ecran apare EX timp de cateva secunde; astfel, schimbarile vor fi salvate in memorie.
Pentru a parasi Meniul Extins fara a salva setarile, apasati butonul ON/OFF: schimbarile efectuate nu vor fi salvate si se vor pierde odata cu inchiderea inverterului.

Afisarea valorilor cu mai mult de 2 cifre.
Valori cu 4 cifre: se afiseaza alternativ primele 2 cifre inainte de punct(veti sti ca urmeaza alte 2 cifre prin prezenta unui punct in dreapta primelor 2) si urmatoarele 2 cifre.
De ex: 1234

To exit the extended menu simultaneously press the keys +and -, until the EX is written on the display for a few seconds; so that the changes will be saved in memory.
To exit without saving the new value press the ON / OFF: the changes made will not be saved and will be lost with the shutdown of the device.

Value display for parameters of over 2 digits.
4-digit values: displayed alternate of the two most significant digits (indicated by the presence of the right point on the display) and the 2 least significant digits.
Eg 1234

12.

34

Valori cu 3 cifre: se afiseaza alternativ prima cifra inainte de punct(veti sti ca urmeaza alte 2 cifre prin prezenta unui punct in dreapta primei) si urmatoarele 2 cifre. De ex: 234

3-digit values: displayed alternate of the most significant digit (indicated by the presence of the right point on the display) and the 2 least significant digits. Eg 1234

Valori negative: se afiseaza alternativ semnul – si valoarea numerica
De ex: - 0.3

Display of **negative** numbers displayed alternate of the sign **-** and the numeric value.
Eg -0.3

Pentru a **modifica** valoarea setarilor cu peste 2 numere, actionati ca si la valorile cu 2 numere dar cand apasati **+ sau -** se vor modifica doar ultimele 2 cifre.

To **change** the value for parameters over 2-digits act as in the case of parameters to 2-digits, but when pressing the + or - button will display only the 2 least significant digits.

Lista Setari

Parameter Table

Nr	Nume	Descriere	Digit	Name	Description
01	Max frequency	Frecventa maxima de iesire a inverterului.	2	Max frequency	Maximum frequency of drive output
03	Nominal frequ.	Seteaza frecventa de iesire pentru a obtine Puterea maxima a motorului (Vmax)	2	Nominal frequ.	Sets the applicable frequency on the motor to obtain Vmax
04	Net Config ID	Aloca numere de indentificare inverterelor dintr-un grup. Se foloseste doar la modul Grup de pompare – Multipompa.	2	Net Config ID	Sets numerical identifier to the inverters of the group. The parameter is used only in multipump mode.
06	Acceleration	Seteaza timpul de accelerare de la frecventa minima aplicata motorului la cea maxima.	2	Acceleration	Sets the acceleration time to move from null to maximum frequency applied to the motor
07	Deceleration	Seteaza timpul de decelerare de la frecventa maxima aplicata motorului la cea minima.	2	Deceleration	Sets the deceleration time to go from maximum to null frequency applied to the motor
08	Manual speed	Seteaza frecventa motorului in modul de operare manual (OpMode=manual)	2	Manual speed	Sets the frequency applied to the motor (OpMode=manual)
11	Unit measure	Seteaza unitatea de masura	2	Unit measure	Set the unit measure
14	Drive Rst Done	Afiseaza numarul de resetari (reporniri) intreprinse	2	Drive Rst Done	Displays restarts number undertaken
15	Shock Pressure	Seteaza presiunea maxima de activare a protectiei “Lovitura de berbec / Suprapresiune” Setata “NO” dezactiveaza protectia	2*	Shock Pressure	-Sets the maximum pressure to activate the alarm “Shock Pressure” -Sets “NO” to disable protection
18	Autoc Rst Done	Afiseaza numarul de resetari (reporniri) intreprinse pentru protectii hidraulice (De ex: lipsa apa, presiune insufucienta)	2	Autoc Rst Done	Displays the number of restarts undertaken for hydraulic alarms (i.e. dry running, Insuff. Pressure)
19	Perturb. Length	Durata defectiunii	2	Perturb. Length	Time length for perturbation
20	Water hammer	Numarul de ori in care presiunea masurata a fost de 2 ori mai mare decat cea setata. (Lovitura de berbec)	2	Water hammer	Counter events when the measured pressure is found to be double that of the pressure setpoint
21	PID Min. Fout	Frecventa minima transmisa motorului	2	PID Min. Fout	Minimal frequency applied to the motor
22	Min Pressure	Presiunea minima a sistemului sub care se activeaza o eroare (“Insufficient pressure”. Cod eroare 11).	2*	Min Pressure	Minimum system pressure, under which an anomaly state is indicated (“Insufficient pressure”. Error code 11).
25	Antilock enable	Activeaza/Dezactiveaza functia Antiblocare/Antigripare	2	Antilock enable	Enable/Disable the anti-lock function
26	PID KP	Coeficientul proportional al regulatorului de frecventa PID	2	PID KP	Proportional coefficient of the PID regulator
27	PID KI	Coeficientul integral al regulatorului de frecventa PID	2	PID KI	Integral coefficient of the PID regulator
28	Next OpMode	Seteaza modul de functionare al inverterului (MA: manual, AU: automat, MP:multipompe)	2	Next OpMode	Sets the operational mode of the drive (MA: manual, AU: automatic, MP: multipump)
29	Present OpMode	Modul actual de functionare al inverterului	2	Present OpMode	Autoclave operational mode
30	Plant Response	Parametrul acesta contine 3 presetari pentru functiile: PID KP, PID KI, Divisor T.PID, Perturb. Length, in functie de tipul aparatului: “SL”=Incet ”NO”= Normal ”FA”= Rapid	2	Plant Response	The parameter contains 3 presets of the parameters: PID KP, KI PID, Divisor T.PID, Perturb. Length, according to the type of plant: “SL”=Slow, ”NO”= Normal, ”FA”= Fast
31	PrsSensor Freq.	Frecventa senzorului de presiune	4	PrsSensor Freq.	Pressure sensor frequency
32	PrsSensor offset	Echilibrarea senzorului de presiune(de setat presiunea ambientala = 0bar)	4	PrsSensor offset	Offset pressure sensor (to set ambient pressure = 0 bar)

33	PrsSensor Gain	Calibrarea citirii presiunii	4	PrsSensor Gain	Calibration of full-scale pressure reading.
34	MeasuredPressure	Presiunea masurata in sistem	2*	MeasuredPressure	System pressure measured.
35	AcMain	Tensiunea alimentare EPOWER	3	AcMain	EPOWER power voltage
36	LoadCurrent	Curent – Amperaj motor	2	LoadCurrent	Motor phase current
37	Temp.monitor	Temperatura masurata la alimentarea electrica	2	Temp.monitor	Temperature measured on the power module
40	Max Time Pump ON	Seteaza timpul maxim (in minute) de functionare continua a pompei. Dupa epuizarea timpului setat se afiseaza mesajul “Pump Protection” si inverterul inchide pompa. Este posibila dezactivarea protectiei setand “NO”	2	Max Time Pump ON	Sets the maximum time (in minutes) of continuous power of the pump. After the time passed will be display the message "Pump Protection". It’s possible to disable the protection setting “NO”.
41	MaxTimeInsufPres	Durata anomaliei pana cand se afiseaza eroarea “Presiune insuficienta”	2	MaxTimeInsufPres	Time for entry in “insuff.pressure” state
43	MaxNowaterTime	Durata anomaliei pana cand se afiseaza eroarea “Lipsa Apa”	2	MaxNowaterTime	Time for entry into “No water” state
44	DeltaBar Time	Intervalul si frecventa anomaliei cand presiunea este constanta	2	DeltaBar Time	Range and frequency of disturbance when pressure is constant
45	Divisor T.PID	Incetineste timpul de raspuns al inverterului la fluctuatiile repetate de presiune: de folosit cand sistemul este instabil (De ex: oscilatii repetate de presiune)	2	Divisor T.PID	It slows down the speed of system response to changes in pressure: to use when the system is unstable (eg, continuous pressure oscillations)
46	Fout (Hz)	Frecventa aplicata motorului	2	Fout (Hz)	Frequency applied to the motor
47	Motor power	Seteaza Puterea Nominala a motorului (P1)	2	Motor power	Set the Power of the motor P1
48	Power	Puterea Absorbita a motorului (P2)	2	Power	Power absorbed by the pump (P1)
49	Max motor current	Valoarea maxima a curentului (amperi)	2	Max motor current	Maximum rms value of motor phase current
50	Configuration Relay	Alege functia releului: AL= Alarma, RU=Functionare,BO=Booster (ridicare presiune), MA=Master, SL=Slave	2	Configuration Relay	Choosing the function for the relay: AL=Alarm,RU=Run, BO=Booster, MA=Master,SL=Slave
51	Pressure Increment Booster	Cresterea de presiune cand pompa auxiliara/secundara este pornita (setare fabrica: 0.2bar)	2*	Pressure Increment Booster	Pressure increment when booster is ON (default 0,2 bar)
54	Peak Current	Seteaza valoarea maxima a Varfului de Curent la pornire, de la care se intra in protectia "I^2t protected"	2	Peak Current	Sets the maximum peak current detected at start up, after which the protection snaps: "I^2t protected"
55	Remote enable	Setata “ON”, functia introduce inverterul in modul STAND-BY, asteptand comanda externa (flotor electric)	2	Remote enable	If ON,the inverter is in STANDBY and wait external command to start (float switch)
57	Running motor	Pompa activa in modul Pompa auxiliara	2	Running motor	Active pumps in booster config.
62	Stop Frequency	Frecventa de oprire a motorului	2	Stop Frequency	Stop frequency of the pump
64	Minim. Threshold Par	Pragul de oprire a pompei secundare in modul de operare Master/Slave sau Multipompa.	2	Minim. Threshold Par	Deactivation threshold (%) of the second pump in Master/Slave configuration and in multipump mode.
65	Tot.shortC done	Numarul de scurt-circuite faza-faza sau faza-impamantare	2	Tot.shortC done	Short circuit counter of either phase-phase
72	System pressure	Seteaza Presiunea in Sistem dorita.	2*	System pressure	Sets the required system pressure
73	Restart Pressure	Seteaza presiunea de resetare/repornire	2*	Restart Pressure	Sets the drive restart pressure
74	Rotation sense	Determina sensul de rotire al pompei (doar la versiunea MT)	2	Rotation sense	Determines the rotation sense of the electro-pump (only MT

					version)
75	Software release	Afiseaza versiunea Software	2	Software release	Displays the software release used
76	ResetFactoryConfig	Revenire la Setarile din Fabrica	2	ResetFactoryConfig	Restore factory configuration
78	MaxPower No Flux	Puterea maxima absorbita fara curs de apa	2	MaxPower No Flux	Max power absorbed without flow
79	System start	Porneste/Opreste pompa	2	System start	Switches the pump on or off

* sau 3

DICHIARAZIONE DI CONFORMITÀ- CONFORMITY DECLARATION

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Il costruttore dichiara sotto la propria responsabilità che il prodotto specificato è conforme alle normative sotto riportate e soddisfa i requisiti essenziali richiesti dalle Direttive:
CEE 2006/95/CE (Materiale elettrico destinato ad essere utilizzato entro certi limiti di tensione)

The manufacturer hereby declares under its own responsibility that the specified product is in compliance with the standards indicated above and that it meets the essential requisites of Directive
CEE 2006/95/CE

Norma Applicata - APPLIED STANDARDS

Safety (General Requirements)	CEI EN 60335-1:2008+ /A13:2009 + /EC:2010 + /A14:2012 + /A15:2012

CEE 2004/108/CE (Compatibilità elettromagnetica - EMC)
Norme Applicate - APPLIED STANDARDS

Radiated Emissions: Disturbance Power	CEI EN 55014-1:2008 + /A1:2010 + /A2:2012
Radiated Emissions	CEI EN 61000-6-4:2007+ /A1:2012
Conducted Emissions	CEI EN 55014-1:2008 + /A1:2010 + /A2:2012 CEI EN 61000-6-4:2007+ /A1:2012
Radio Frequency Electromagnetic Fields	CEI EN 55014-2:1998 + /A1:2002 + /IS1:2007 +/A2:2009 CEI EN 61000-6-2:2006
Radio Frequency common mode	CEI EN 55014-2:1998 + /A1:2002 + /IS1:2007 /A2:2009 CEI EN 61000-6-2:2006
Fast transients (EFT-Bursts)	CEI EN 55014-2:1998 + /A1:2002 + /IS1:2007 +/A2:2009 CEI EN 61000-6-2:2006
Electrostatic discharges (ESD)	CEI EN 55014-2:1998 + /A1:2002 + /IS1:2007 /A2:2009 CEI EN 61000-6-2:2006
Surges	CEI EN 55014-2:1998 + /A1:2002 + /IS1:2007 +/A2:2009 CEI EN 61000-6-2:2006
Voltage dips and interruptions	CEI EN 55014-2:1998 + /A1:2002 + /IS1:2007 /A2:2009 CEI EN 61000-6-2:2006

Calenzano, 20 aprile 2012

CE

Responsible party: MIRIAN RONCHI (Chairman):

Distribuitor autorizat Mac 3 :Expert Instal Group srl
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MAC 3 WATER SYSTEMS

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