

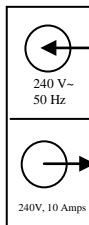
# caprari

pumping power

## CapSmart-IPS Caprari Intelligent Pressure System



Owner's manual





## CAUTION:

READ THIS INSTRUCTION MANUAL CAREFULLY BEFORE INSTALLING  
OR USING THE PRODUCT

The manufacturer guarantees this product for a period of 24 months as of the date of sale; the device must be returned together with this instruction manual, with the date of installation and programmed parameters noted in the last page of this document.

The guarantee will be rendered null and void if the device is tampered with, disassembled, or damaged due to causes attributable to incorrect use and/or improper installation, if it is used for purposes other than as specified, if it is installed in unsuitable environmental conditions or if it is connected to an electrical installation that does not comply with current standards.

The manufacturer declines all liability in the event of damage to objects and/or physical injury caused by failure to install the necessary electrical safety devices upline of the device, or due to an unprofessional installation.

Installation and maintenance of this device must be performed by specialist personnel, who is able to fully understand the contents of this instruction manual.

All operations performed with the device cover removed must be performed with the power mains disconnected.

As there are no concrete reasons for removal of the electronic board, take into account that some of the board parts remain live for a few minutes also after disconnecting the device from the mains.

The manufacturer declines all liability in the event of damage to objects and/or physical injury caused by failure of an internal protection device, with the exception of the refund of the device, if still covered by the guarantee.



**This device complies with the directive ROHS 2002/95/EC.**

**The crossed-out wheeled bin symbol shown above indicates that, in respect of the environment, the device must not be disposed of as public waste at the end of its lifetime.**

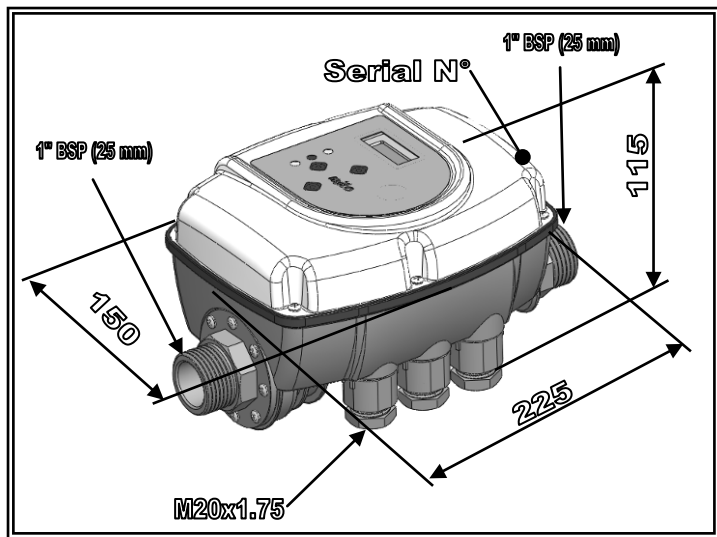
**Dispose of the device and packaging material in compliance with local legislation.**



# INDEX

LAYOUT-DIMENSION- IDENTIFICATION.....	4
DESCRIPTION.....	5
TECHNICAL DATA.....	6
FUNCTIONS.....	6
PROTECTIONS.....	6
INSTALLATION –HYDRAULIC CONNECTION.....	7
ELECTRICAL CONNECTION.....	8
START-UP.....	11
PROGRAMMING INTERFACE DESCRIPTION.....	12
KEYDESCRIPTION.....	12
DESCRIPTION OF PARAMETERS AND SCREENS.....	12
ALARMS.....	16
TROUBLESHOOTING.....	17
MAINTENANCE.....	18

↔ LAYOUT - DIMENSIONS - IDENTIFICATION





## DESCRIPTION

*CapSmart-IPS* (Short for Intelligent Prerssure System) is an electronic control device for single phase electric pumps which enables automatic start-up and shutdown of the pump, protecting it in the event of adverse operating conditions (failure of water supply, motor overload, risk of ice).

*CapSmart-IPS* can operate on various systems:

- with a single electric pump,
- in a twin pump system in which the two alternate automatically
- in conjunction with a variable speed device (*CapSmart-VFD*) for the set-up of constant pressure pumping units.

*CapSmart-IPS* is programmable to operate on the basis of two different principles:

- **mode P+F** (pressure + flow) = in this mode, the pump is started up following a fall in pressure, when the minimum set threshold is reached ( $P_{min}$ ); the pump operates until the water supply runs out and there is zero flow through the device. In this condition the resulting pressure in the system will correspond to the maximum pump head.

- **mode P+P** (pressure + pressure) = in this mode the pump operating mode is controlled within two pressure levels ( $P_{min}$  e  $P_{max}$ ); when the lower pressure threshold is reached ( $P_{min}$ ) the pump is started up, while it is stopped when the upper pressure threshold ( $P_{max}$ ) is reached. In this configuration, the use of an expansion vessel is essential, sized according to the system requirements and type of pump.

In both operating modes, the device protects the pump from dry running in the absence of water on intake, by means of a combined control on flow and pressure.

Operation of twin pumping units is admissible only in "P+P" mode.



## TECHNICAL DATA

Mains power:.....	single phase 240Vac +5, -15% - 50/60Hz
Motor output:.....	single phase 240V~
Maximum motor power.....	2200W – 3Hp
Maximum motor phase current:.....	10 Amps
Maximum admissible pressure:.....	1000 KPa (10 bar)
Maximum liquid temperature.....	30°C
Max. Ambient temperature.....	55°C
Pressure drop:.....	0.7 Bar at 100 l/min
Hydraulic connection.....	1" BSP M-M
Protection rating:.....	IP 65
Weight.....	0.7 Kg
Dimensions.....	225x150x115 mm
Type of action.....	1 (according to EN 60730-1)



## FUNCTIONS

- ✓ Automatic start-up and shutdown of the pump.
- ✓ Operation with twin units operating alternately.
- ✓ Easy and precise control of working pressures via the display.
- ✓ Protection against dry running with automatic reset
- ✓ Installable in both horizontal and vertical positions
- ✓ Digital indicator of pressure and absorbed current on display
- ✓ Operating status indicator leds (mains, error, pump running)
- ✓ Digital input for float or remote control connection
- ✓ Configurable relay output
- ✓ Removable electrical terminals to facilitate wiring.
- ✓ Alarm log



## PROTECTIONS

- ✓ Dry-running
- ✓ Motor current control protection
- ✓ Overpressure cut-out
- ✓ Anti-freeze protection
- ✓ Prevention of mechanical pump part seizure

## INSTALLATION

### HYDRAULIC CONNECTION:


*CapSmart-IPS* must be installed on the pump delivery in a horizontal or vertical position, in observance of the flow direction indicated by the arrow on the cover. The water on the pump outlet passes through the device for subsequent distribution to the various utilities. The water entering the *CapSmart-IPS* must be free of impurities and/or other substances that could prevent movement of the check valve on the interior. To minimise this problem special filters should be fitted on the pump intake.

Install a small expansion vessel (1-2 litres) downline of *CapSmart-IPS*, to limit restarts caused by small leaks, the presence of which is normal on most systems. The pre-load valve of the expansion vessel must be suitable for the set pressure values. This provision also helps to improve constant performance levels in the event of low water demands by the system (e.g. washing machines, WC flushes, etc.).

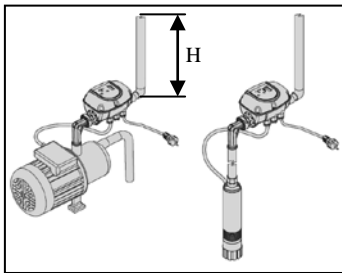
It is essential that no check valve is installed between *CapSmart-IPS* and the electric pump or between the device itself and the utilities, as this may cause device malfunctions.

However, a check valve may be fitted in the electric pump intake line to avoid drainage at the time of shutdown.

The device should not be installed in pits or watertight enclosures where there is a strong risk of condensation.

 **CAUTION:** when the pump stops the pipes might be still under pressure; therefore, before any intervention, it is advisable to discharge the system by opening a tap.

**CAUTION:** this device is not to be considered a mechanical pressure reducer and therefore all system parts must be sized according to the maximum supply pressure of the pump.

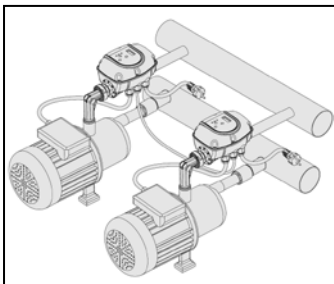


#### EXAMPLE OF INSTALLATION ON SINGLE ELECTRIC PUMP:

*CapSmart-IPS* can be fitted on submerged or surface pumps. Pressure settings must take into account the water column (H) on outlet from the device, considering 0.1 Bar pressure per metre of water column.

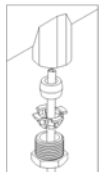
#### EXAMPLE OF INSTALLATION IN TWIN BOOSTER SETS


Connect the intake lines of the pumps to a common manifold and install one *CapSmart-IPS* on the delivery line of each electric pump. The device outlet couplings must be connected to a single delivery manifold, which must be connected to the expansion vessel.

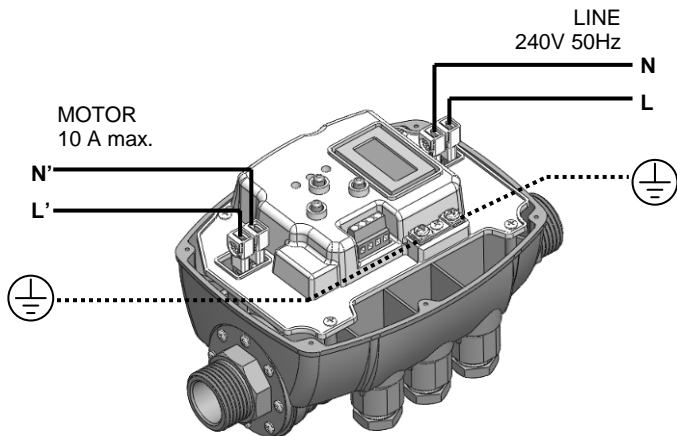
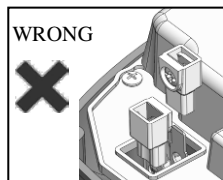
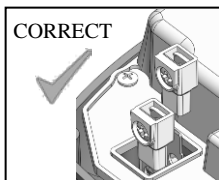


## ELECTRICAL CONNECTION:

Insert the electric wires in the cable clamps, observing the correct order of assembly for all components. Tighten down the threaded nuts to avoid traction and rotation of the cables from the exterior. The central cable clamps for the auxiliary contact is blank; if you wish to insert a wire for remote control (or electric float), pierce the plastic nut by means of a screwdriver after removing the nut from the unit. For electrical connections use the terminals supplied with the device



 **CAUTION:** insert the terminals, positioning them so that the cable tightening screws are not adjacent!





## ✓ LINE CONNECTION

The device power supply is single phase at 240 Volt 50 Hz. The electrical system to which the device is connected must comply with current standards and must therefore be fitted with:

- automatic thermal magnetic circuit breaker with high breaking power and trip current in proportion to the power of the pump installed
- earthing connection with total resistance in conformity with local standards and in any event no more than 100Ω.

If the device is used in swimming pools, fountains, or garden ponds, a residual current circuit breaker type "A" must be installed, with  $I\Delta n=30\text{mA}$

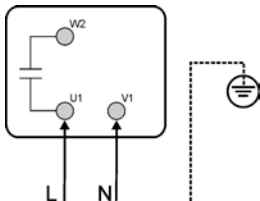
If the device is not equipped with a power cable and plug, install another device that ensures omnipolar disconnection from the mains with a contact opening gap of at least 3 mm.

If the terminals supplied are not used, the faston terminals must be crimped by specialist personnel using special pliers.

The recommended cable section is  $1.5\text{mm}^2$ , compatible with electric pumps up to 16A.

The type of electric cable must correspond to the conditions of use (use in domestic rooms, dry or wet, for installation indoors or outdoors).

## ✓ ELECTRIC PUMP CONNECTION



*CapSmart-IPS* can be installed on single phase pumps with 240Vac power supply, already fitted with capacitor. Therefore at the time of electrical connections, ensure that the terminals in the electrical compartment of the motor are connected according to the instructions of the electric pump manufacturer. The figure alongside shows a typical example of connection.

If the terminals supplied are not used, the faston terminals must be crimped by specialist personnel using special pliers. The recommended cable section is  $1.5\text{mm}^2$ .

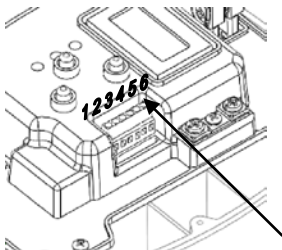
The type of electric cable must correspond to the conditions of use (use in domestic rooms, dry or wet, for installation indoors or outdoors).

Also observe the installation limits as declared by the manufacturer of the electric pump connected to *CapSmart-IPS*.

### ⚠ CAUTION:

- all electrical connections must be made by specialised personnel
- incorrect connections of the electric motor can cause damage to the device or the pump motor itself.
- failure to observe the instructions in this section can cause serious damage and/or physical injury and releases the manufacturer from all liability.
- in the event of damage to the power cable or the cable between *CapSmart-IPS* and the electric pump, it must be replaced exclusively by the device manufacturer or assigned and suitably qualified personnel, to prevent risks to objects and persons.

## ✓ AUXILIARY CONNECTOR CONNECTION



*CapSmart-IPS* is equipped with a connector to make auxiliary contacts available for additional functions, interfacing the device with other external equipment. The functions of each terminal depend on the settings of the parameter "Aux. Con." According to the diagram below. Functions "1" and "4" are available only if the operating mode is set to "P+P" (pressure+pressure). \* **Further information regarding the set-up of twin booster sets can be found at the end of this manual, in appendices A and B.**

**AUXILIARY CONNECTOR**

Setting Aux. Con.	Mode admitted	Associated function:
0	P+F / P+P	None, inputs and outputs disabled
1	P+P	Combination of two <i>CapSmart-IPS</i> units in a twin pumping system with automatic alternation.
2	P+F / P+P	Availability of an input to enable operation (for example of an external float) and a relay output for alarm status signals.
3	P+F / P+P	Availability of an input to enable operation (for example of an external float) and a relay output for motor operation signals.
4	P+P	Combination of one <i>CapSmart-IPS</i> with an inverter <i>CapSmart-VFD</i> for the set-up of a constant pressure twin pumping system with a reserve pump.

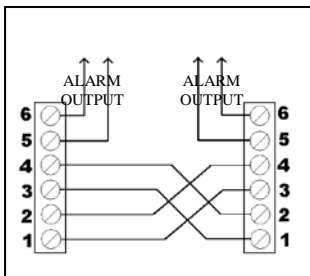
### DESCRIPTION OF FUNCTIONS OF AUXILIARY CONTACTS:

#### Parameter "Aux. Con." = 0

In this mode, all functions of the auxiliary contact are disabled.

#### Parameter "Aux. Con." = 1 – Operation in twin set mode with two *CapSmart-IPS*

In this mode two devices can be connected to operate in an alternating twin booster set. If pressure falls, the "master" pump is started up first, followed by the "slave" pump (when required); shutdown of the pumps is simultaneous when the maximum operating pressure is reached (Pmax). Terminals 1 to 4 are used for the connection of two devices while terminals 5 and 6 provide a relay output that is activated in the event of an alarm. The parameter "Aux. Con." can only be set to "1" if the current operating mode is "P+P" (pressure+pressure).

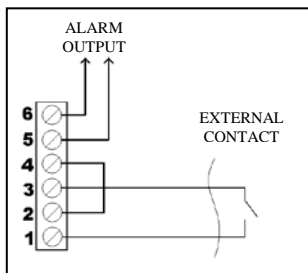


**Parameter "Aux. Con." = 2 – External enable and alarm signal.**

In this mode, an external electrical device (e.g. float, timer, switch, etc.) can be connected between terminals 1 and 3, to enable remote operation of the pump. In this mode the motor is only started up if the external contact between terminals 1 and 3 is closed.

Terminals 5 and 6 provide a relay output **that is activated in the event of an alarm.**

Jumpers must be wired onto terminals 2 and 4.

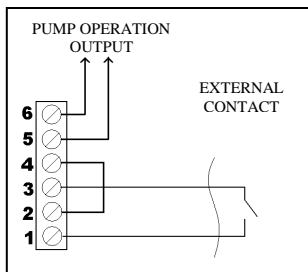


**Parameter "Aux. Con." = 3 – External enable and pump operation signal.**

In this mode, an external electrical device (e.g. float, timer, switch, etc.) can be connected between terminals 1 and 3, to enable remote operation of the pump. In this mode the motor is only started up if the external contact between terminals 1 and 3 is closed.

Terminals 5 and 6 provide a relay output **that is activated when the pump is running**; this signal enables the control of external devices that have to operated in conjunction with the electric pump (for example a batching system for chlorine, fertilizer, detergents etc.).

Jumpers must be wired onto terminals 2 and 4.



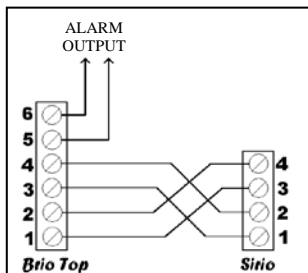
**Parameter "Aux. Con." = 4 – Combination with inverter device "Sirio"**

When the parameter "Aux. Aus." is set to 4 *CapSmart-IPS* can be interfaced with an inverter in the range *CapSmart-VFD* to produce a hybrid pressurisation unit, i.e. a variable speed pump and a fixed speed pump that intervenes as a backup to the main pump only in the event of increased water demands by the system.

During routine operation, the system demands are normally met by the pump with the *CapSmart-VFD* inverter, which is always started up first. When the demand for water increases to such a point that the first pump is no longer sufficient, the fixed speed pump, installed together with *CapSmart-IPS* is then started up.

Terminals 1 to 4 are used for the connection of two devices while terminals 5 and 6 provide a relay output that is activated in the event of an alarm. The

parameter "Aux. Con." can only be set to "4" if the current operating mode is "P+P" (pressure+pressure).



**⚠ CAUTION: incorrect connections of the auxiliary contact could cause irreparable damage to the device! Take great care when making the connection.**

## START-UP

**CAUTION: on initial start-up, fill the pump intake line before powering up the system!**

After making all the electrical connections and ensuring the correct condition of all components, close the unit cover and power up the system.

*CapSmart-IPS* starts up the pump automatically to enable circuit filling.

If the pump does not start, or anomalous vibrations are detected, ensure correct connection of the pump and relative capacitor.

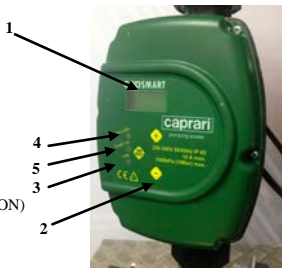
To facilitate the filling of the electric pump, press and hold the “+” key on the main screen to override pump operation without intervention of the dry-running protection (“Manual” mode).

**After setting all data in the device, note them on the relative form found at the end of this manual for future reference and to maintain the guarantee.**

## PROGRAMMING:

### ✓ INTERFACE DESCRIPTION

1. Display with digital pressure indicator, error display, configuration menus.
2. Programming keys
3. Green mains power ON indicator light (LINE)
4. Red error indicator light (FAILURE)
5. Yellow “pump running” indicator light (PUMP ON)



### ✓ KEY DESCRIPTION

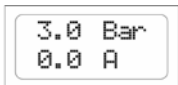
- » Arrow/reset: scrolls forward through menus and performs unit reset in the event of alarms and/or errors
- + “+” key: increments the parameter value currently on display; enables device operation override (starts pump as an override command and temporarily disables the dry-running protection to facilitate loading on initial start-up).
- “-” key: decreases the parameter value currently on display; shows the absorbed current (optional)

### ✓ DESCRIPTION OF PARAMETERS AND SCREENS

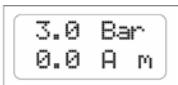
The menu is divided into two levels: the user level and the installer level. The user level is usually visible during normal operation and enables the user to control the system operating status, reset any errors and modify the language. To access the installer level, where the various operating parameters can be set, press keys “+” and “-” simultaneously for 5 seconds.

## USER PARAMETERS:

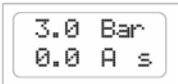
These parameters are normally accessible when the device is powered.



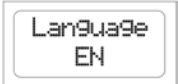
**Main screen:** during normal operation of *CapSmart-IPS*, the display shows the device status. The top line displays the pressure measured in the system, while the bottom line shows the motor current absorption. In this screen, press and hold the key "+" to override pump operation also when there is no water, temporarily disabling the dry-running protection to enable the pump to be filled.



When the device is configured to operate as part of an alternating twin pumping unit, the bottom line shows the "master" or "slave" status by means of the letter "m" or "s".

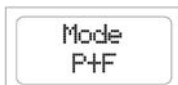


**Language:** the language of the menus and alarm messages can be personalised as required. Use keys + and - to modify the parameter value.



## INSTALLER PARAMETERS:

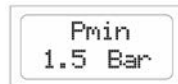
These parameters are located in concealed screens and are normally only modified during the installation phase. To access these pages, press and hold "+" and "-" simultaneously for 5 seconds. After accessing the concealed menu, use the arrow key ">>" to scroll through the screens and keys "+" and "-" to modify the parameters. To return to the main screen, press and hold keys "+" and "-" simultaneously for 5 seconds.



**Operating mode:** this parameter enables the user to set the operating mode implemented by *CapSmart-IPS* to control pump start-up and shutdown. In mode **P+F** (pressure+flow) the pump is started up when the pressure falls below the value set in Pmin (start-up pressure) and is stopped when the water flow through the device is virtually zero. In this condition the resulting pressure in the system will correspond to the maximum head of the pump installed. In mode **P+P** (pressure+ pressure) the pump is started up at the value set in Pmin and is then stopped when the system pressure reaches the value Pmax (stop pressure). In this mode, the installation of an expansion vessel is essential, sized according to the system specifications.

In both operating modes, the dry-running protection is enabled, and trips when the water flow is zero and the system pressure is below the value Pmin.

Operation within twin booster sets is only admissible in **mode P+P** and consequently, the settings of the parameters "Aux. Con.", "Pmax" and "Pmin2" depend on the pre-set operating mode.



**Pmin :** this parameter represents the minimum pressure at which the pump is started. The parameter can be set from 0.5 to 8.0 Bar. The factory setting is 1.5 bar. Use keys "+" and "-" to modify the set value.

Pmax  
3.0 Bar

**Pmin2** : this parameter is set to P+P and the operation of twin booster (slave) pump start-up can no longer meet the from a minimum of 0.5 Bar to a maximum value equal to the pressure Pmin-0.2 Bar. The factory setting is 1.2 bar. Use keys "+" and "-" to modify the set value.

Pmin2  
1.2 Bar

only available when the operating mode is parameter Aux. Con. is set to "1" to enable sets. This parameter defines the secondary pressure when the primary (master) pump system demands. The parameter can be set

Reset  
30 min

automatically from the error condition and system returns to operative status; otherwise another attempt is made after the same time interval. The maximum settable interval is 180 minutes (recommended interval: 60 min.). Use keys + and - to modify the parameter value.

**Auto-reset interval:** during operation of the pump, if water supply on intake fails temporarily, *CapSmart-IPS* shuts off the power supply to the motor to avoid any damage. This screen enables the user to set after how many minutes the device should auto-reset to check renewed availability of water on intake. If the attempt is successful, *CapSmart-IPS* exits

Reset  
05 test

to modify the parameter value.

**N° auto-reset tests:** this parameter defines the number of attempts made by *CapSmart-IPS* to try and resolve a shutdown caused by dry running conditions. When this limit is exceeded, the system shuts down and user intervention is required. The auto-reset is disabled if this value is set to zero. The maximum admissible number of attempts is 10. Use keys + and -

Stop  
Del. 10

frequent activation of the dry-running protection, especially in the case of submerged pumps or on those with self-priming problems. The factory setting is 10 seconds, and may be increased to a maximum of 120 seconds. Use keys "+" and "-" to modify the stop delay.

**Delay on stop:** this parameter enables the user to define after how many seconds the electric pump is stopped following closure of all utilities in mode P+F. At low flow rates, if frequent pump start-ups and shutdowns occur, increase the shutdown delay to render operation more uniform. An increase to this parameter may also be useful to eliminate excessively

24hProt.  
NO

system efficiency.

**24H anti-seizure protection** this parameter enables the activation of a function that automatically starts up the pump after 24 hours of disuse. If this function is activated, and the pump is not started up for 24 hours, *CapSmart-IPS* overrides to a cycle of 15 seconds to prevent system disuse from leading to mechanical seizure of parts (e.g. the seal), maintaining

4°C CProt.  
NO

risk of damage caused by ice, it is good practice not to use *CapSmart-IPS* and the electric pump in environments where temperatures can fall below 4°C. **The activation of this function is not sufficient to guarantee operation and protection of the system if temperatures are close to or below 0°C!!**

**4°C ice protection:** this parameter enables activation of a function that may help prevent damage due to lowering of ambient temperatures and the risk of ice formation. In particular, if the ambient temperature falls below 4°C, *CapSmart-IPS* starts up the pump every 30 minutes for a duration of 15 seconds, to avoid, when possible, the rapid freezing of the water inside the pump. CAUTION: although this function can reduce the

Imax  
OFF

**Imax** : this optional parameter enables entry of the maximum current absorbed by the electric pump in routine conditions, to enable shutdown of the motor in the event of excessive absorption. The motor is also shut down event if the current read during operation is below 0.5 A following interruption of the connection between the motor and *CapSmart-IPS*. The

trip time of the current overload safety device is inversely proportional to the entity of the overload in progress; therefore a slight overload will lead to a more delayed trip time while a more significant overload will accelerate the trip time. The parameter is settable from 0.5 to 16 A by means of the keys "+" and "-". To deactivate the current control protection of the motor, press the key "-" until the text "OFF" appears on display. CAUTION: the factory setting is OFF and therefore a maximum current value must be set to activate the protection.

Aux. Con.  
0

**Auxiliary Contact:** this parameter enables the user to assign a specific function to the auxiliary contacts available on *CapSmart-IPS* according to the scheme below:

Aux. Con.	Description
0	No function activated for auxiliary contacts
1	Enables communication between two <i>CapSmart-IPS</i> units within a twin booster set with automatic alternation of pumps
2	Sets up the auxiliary contact for an external enable signal (e.g. float, timer, irrigation controller) and enables the relay output (terminals 5 and 6 on the terminal board) for any error signals. The relay contact closes in the event of an alarm.
3	Sets up the auxiliary contact for an external enable signal (e.g. float, timer, irrigation controller) and enables the relay output (terminals 5 and 6 on the terminal board) for pump operation signals. The relay contact closes while the pump is running.
4	Enables communication between a <i>CapSmart-IPS</i> unit and an inverter <i>CapSmart-VFD</i> within a twin booster set.

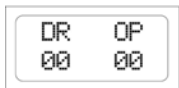
P.Limit  
OFF

**Limit pressure:** this parameter defines a pressure threshold over which the overpressure protection is activated. The factory setting is OFF, to indicate that the protection is disabled. To set a limit pressure, use keys "+" and "-". To disable the function, press the "+" key until the text OFF is displayed.

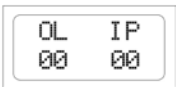
Deact.  
Thr. 20

**Deactivation threshold:** when *CapSmart-IPS* is configured to operate in conjunction with an inverter device *Sirio* (mode set to P+P and Aux. Con. set to "4"), this parameter can be set to define the secondary pump deactivation threshold. The secondary pump where the *CapSmart-IPS* is installed, is started up, on request of the inverter controlling the primary pump, when the

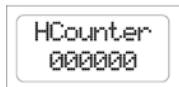
pressure falls below Pmin. The secondary pump is shut down when the required flow falls below a limit set in this parameter. The factory setting is 20 and the parameter can be set from 10 to 50. The setting of this threshold depends on the type of pumps used, considering that a higher value of this parameter corresponds to a quicker shutdown of the auxiliary pump, while a lower threshold value maintains the auxiliary pump in operation even when the flow rate falls to low values.



**Alarm log “1”** : in this screen the user can read the number of alarms that have tripped due to activation of the dry-running protection (DR) and the pressure overload device (OP). These data can be checked in the event of a malfunction.

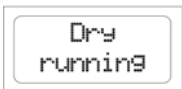


**Alarm log “2”** : in this screen the user can read the number of alarms that have tripped due to activation of the current overload protection (OL) and the ice protection (IP). These data can be checked in the event of a malfunction.

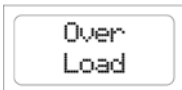


**Hour counter**: this screen displays the total operating hours of *CapSmart-IPS* (in terms of the time for which the device has been connected to the electric power supply). If the key “+” is pressed on this page, the number of pump operating hours is displayed.

## ✓ ALARMS

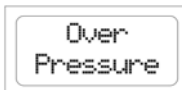


**Dry running**: this message appears when the system is shut down following absence of water on pump intake. If the auto-reset function is enabled, *Brio Top CapSmart-IPS* automatically attempts to restart and check for renewed availability of water. To remove the error message from the display immediately, simply press the central key “reset”.



**Current Overload**: this alarm is displayed when electric pump absorption exceeds the maximum set current as entered in the parameter *Imax*; this may occur following intensive use of the electric pump, continuous restarts at close intervals, problems with the motor windings, seizure of the pump rotor or following problems with the electrical connection between the motor and

*CapSmart-PS*. If this alarm trips frequently, arrange for the system to be checked by the installer. To remove the error message from the display immediately, simply press the central key “reset”.



**Overpressure**: when this alarm trips, this means that *CapSmart-IPS* has detected a system pressure value over the value set in the parameter “*Plimit*”. This may occur in applications with the pump under load conditions, i.e. when the pump pressure is added to the filling pressure on inlet. If the error occurs frequently, try to increase the parameter *Plimit* or contact the installer

for assistance. To remove the error message from the display immediately, simply press the central key “reset”.



## ? TROUBLESHOOTING

✓ **When one of the system valves is opened the pump does not start or starts only after a few seconds.**

The set Pmin value is too low, or a check valve has been fitted downline of the device. Check the setting of the parameter Pmin.

If the parameter "Aux. Con." is set to "2" or "3" and an electric float is used, check to ensure correct operation. If no electric float is used, check that the jumper is wired on the relative terminals.

Ensure correct connection between *CapSmart-IPS* and the electric pump

✓ **The pump does not stop**

The check valve inside *CapSmart-IPS* may be blocked in the open position; ensure correct valve movement and remove any foreign bodies by means of compressed air if necessary.

The sensor reading the valve position is faulty; arrange for the device to be checked by the manufacturer.

✓ **On closure of the valves, the pump stops but restarts after a few seconds without any leaks from the system.**

The difference between the values Pmin and Pmax is too small, and the pressure drop that occurs on pump shutdown is sufficient to enable restart. Increase the value Pmax or reduce the value Pmin. Increase the size of the expansion vessel installed.

✓ **The pump starts and stops continuously.**

There are leaks from the system. Check the various hydraulic connections. Check on display if there are any pressure drops when the valves are closed. Check for the possible presence of dirt in the check valve of *CapSmart-IPS* preventing total closure, and if necessary clean by means of a compressed air jet. Install a small expansion vessel on outlet from *CapSmart-IPS*.

✓ **The device frequently signals dry running conditions.**

The pump intake hose, during periods of system disuse, drains preventing pump filling and subsequent restart. Check sealing efficiency of the base valve (if fitted).

✓ **With very low water flow rates, pump operation is irregular.**

The water flow rate is too low, and is thus not detected by the device, with consequent pump shutdown. Install a small expansion vessel (1-2 litres) to enhance system flexibility and reduce the number of restarts.

✓ **The system pressure has risen above the set value in Pmax.**

If the ice protection or mechanical seizure protection devices have triggered, pressure may increase over the set values as the pump is operated in override for 15 seconds, regardless of the values set in Pmax and Pmin.

✓ **The device does not turn on**

The electronic board may be damaged; arrange for the device to be checked by the manufacturer.

## **MAINTENANCE:**

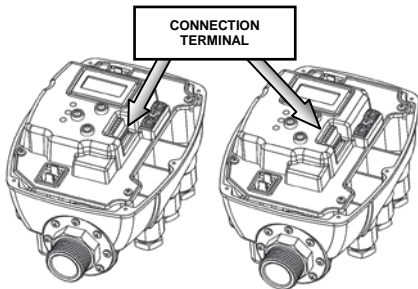
Your *CapSmart-IPS* has been designed to reduce maintenance requirements to a minimum. Always observe the following instructions to ensure prolonged efficiency of the device:

- never allow the device to reach temperatures below 4° C; if this is not possible, ensure that all the water in the circuit is drained to prevent damage to the plastic housing of the device if ice forms;
- if the pump is equipped with filters on intake, check their condition periodically;
- always ensure that the cover is closed properly to avoid the ingress of water from outside;
- disconnect the power and drain water from the system when the system is not to be used for a prolonged period;
- before using the device with liquids other than water, contact the manufacturer for further information;
- never perform work with the device open;
- before removing the device cover, wait for 3 minutes to enable discharge of the capacitors.

 **CAUTION:** the device does not contain components that may be repaired or replaced by the final user. Therefore do not remove the protection cover of the electronic board to avoid rendering the guarantee null and void.

Date of installation	..../..../.....	Installer	
Client			
Pump brand-model			
Serial N° CapSmart-PS			
FACTORY SETTINGS ON INSTALLATION			
Mode			
Pmin	Bar		
Pmin2	Bar		
Pmax	Bar		
Reset	Minutes		
Reset	Test		
Prot.24H			
Prot.4°C			
Stop delay	Seconds		
Imax	A		
Plimit	Bar		
Aux. Con.			
Deact. thresh.			
Notes			

## Installation and connection of twin booster sets



**CONNECTION:** the connection between the two *Brio Top* devices is by means of an unshielded cable (4x0.5 mm<sup>2</sup>) as shown in the diagram alongside. the maximum length of the cable is 100 cm including stripped sections.

A pre-assembled connection cable is available, with terminals and numbered wires (code no. SR-CBL4X05-100). The operating mode must be set to "P+P" and the parameter Aux. Con. to "1".

**MASTER STATUS:** when the device is MASTER it is sensitive to variations in system pressure, and is therefore able to start and stop the electric pump according to system demands.

**SLAVE STATUS:** when the device is SLAVE the letter "s" appears on the bottom line of the display; in this condition, the pump is only started if the pressure falls below the value set in the parameter "Pmin2".

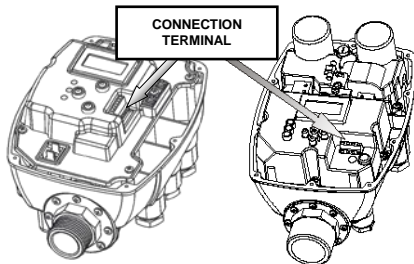
**OPERATION:** when switched on, the first device that manages to assume priority is assigned the status of "MASTER" while the other becomes "SLAVE". On opening of the utilities, the "MASTER" device starts up the pump first; if the water demand is such that operation of one pump only is not sufficient, the second pump (SLAVE device) is started up. On progressive closure of utilities, the rise in system pressure leads to simultaneous shutdown of the two pumps at the value set in Pmax.. After shutdown the status of "MASTER" is transferred to the other device, to ensure that there is continuous alternation of which pump is started up first. In the event of a fault or error on one of the two *CapSmart-IPS* devices, the other is automatically assigned the status of Master and starts to operate independently. If the current MASTER device shuts down due to a power failure, or blocks due to a fault, system control is transferred to the SLAVE device, which then immediately becomes the new MASTER.

**INSTALLATION:** install each *CapSmart-IPS* on the delivery line of the respective electric pump. Connect the outlet connector of each device to the delivery manifold without inserting any type of check valve. Connect the intake lines of the pumps to the common suction manifold, inserting a check valve for each pump to prevent drainage when stopped. *CapSmart-IPS* can be mounted vertically or horizontally.

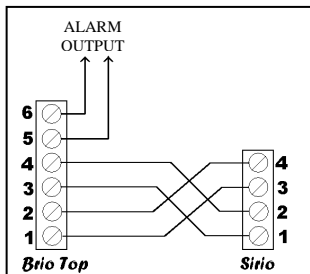


**The programmed values of Pmin, Pmin2 and Pmax must be the same on both devices.**

## Installation and connection of twin booster sets with *CapSmart-VFD* inverter



**INSTALLATION:** install the *CapSmart-IPS* on the delivery line of the secondary pump and the *CapSmart-VFD* inverter on the main variable speed pump. Connect the outlet connector of each device to the delivery manifold without inserting any type of check valve. Connect the intake lines of the pumps to the common suction manifold, inserting a check valve for each pump to prevent drainage when stopped. *CapSmart-IPS* and *CapSmart-VFD* can be mounted vertically or horizontally.



**CONNECTION:** the connection between the *CapSmart-IPS* and *CapSmart-VFD* devices is by means of an unshielded cable (4x0.5 mm<sup>2</sup>) as shown in the diagram alongside. The maximum length of the cable is 100 cm including stripped sections.

A pre-assembled connection cable is available, with terminals and numbered wires) code no. SR-CBL4X05-100). For *CapSmart-IPS* the operating mode must be set to "P+P" and the parameter Aux. Con. to "4". In the case of *CapSmart-VFD* it is sufficient to set the parameter "Aux. Con." to "1".

**OPERATION:** when switched on, the *CapSmart-VFD* device always sets to MASTER status and is assigned the role of main controller. On opening of the utilities, *CapSmart-VFD* starts up the pump first; if

the water demand is such that operation of one pump only is not sufficient, the second pump with *CapSmart-IPS* (SLAVE device) is started up. On progressive closure of the utilities, the reduction in the system flow rate leads first to the shutdown of the secondary pump on which the *CapSmart-IPS* is installed, later followed by the variable speed pump on which *CapSmart-VFD* is installed. The flow rate level at which the secondary pump is shut down depends on the value set in the parameter "Deactivation threshold" of the *CapSmart-IPS*; a higher value in this parameter leads to a quicker deactivation of the second pump, while a lower value maintains the "SLAVE" pump in operation even at lower flow rates.

If the *CapSmart-VFD*, i.e. the current MASTER device, shuts down due to a power failure, or blocks due to a fault, system control is transferred to the *CapSmart-IPS* device, which then immediately becomes the new MASTER to enable the system to continue operation. However, in this case operation at constant pressure is no longer guaranteed, as there is no variable speed device. It is recommended to install an expansion vessel of at least 5-8 litres, to prevent, in the event of a fault on the *CapSmart-VFD* and device, *CapSmart-IPS* from activating excessively frequent start-ups.

**The programmed values of Pmin and Pmax must be the same on both devices.**



## CE DECLARATION OF CONFORMITY

It is hereby declared that the machine specified herein, according to the specific design, type of construction and version released onto the market, complies with the essential health and safety requirements of EC directives. In the event of modifications to the machine without prior authorisation, this declaration will be rendered null and void.

**MODEL:** *CapSmart-PS*  
**TYPE:** **BT-XX-X-XX-XXX**

<i>DIRECTIVE:</i>	<i>WITH REFERENCE TO:</i>	<i>MARKING YEAR:</i>
<b>2006/95/EC</b> <b>LVD</b>	<b>EN 60730-1:2002</b>	<b>11</b>
<b>2004/108/EC</b> <b>EMC</b>	<b>EN 61000-6-3:2007</b> <b>EN 61000-6-1:2007</b>	<b>11</b>

**Month, 10 Feb 2011**

**Made for :-**  
**Caprari Pumps Australia Pty Ltd.**  
**3 Jeanes St**  
**BEVERLEY**  
**South Australia 5009**

### **Declaration :-**

**Mr. Demetrio Bertazzo**

Italtecnica srl  
Viale Europa 31  
35020 Tribano (PD) Italy

Caprari Pumps Australia, 3 Jeanes St Beverley South Australia

Tel. +61 8 8244 4442

Fax. +61 8 8244 4462

[www.caprari.com](http://www.caprari.com)