VIP5 *Pro* Controller

Control system for small and medium size Lubrication Systems

Software Version 3.0

User Operating and Maintenance Manual

Original text translation

CONTENT

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1. INTRODUCTION

Thank you for purchasing the** Dropsa **VIP5 Pro controller – The control device for Lubrication Systems

The Controller subject of this operating and maintenance manual is an evolution of the Vip5 family of advanced lubrication control system. It maintains all its basic features and has additional functions and features such as the ability to directly switch on/off three-phase pump and other devices.

It is possible to obtain the latest documentation by visiting our website, www.dropsa.com
This manual contains important operating and safeguard information for users of this product. It is essential that you carefully read this manual and conserve a copy with the product so that other users may consult it at any time.

1.1 DEFINITION OF LUBRICATION AND STANDBY PHASE, LUBRICATION PHASE, AND LUBRICATION CYCLE

In this manual the **LUBRICATION PHASE** and **LUBRICATION CYCLE** refer to the specific instances when the lubrication pump is operating to provide lubrication in a system.
The **LUBRICATION CYCLE** is made up of: ***Cycle Start*** -> ***Control*** of a sensor device -> ***Delay*** time to allow sensor device to stabilize -> ***Wait*** Time before another Cycle Start. This sub-cycle can be repeated as many times as required and the completion of this repetition is considered the **LUBRICATION PHASE.** Fig. 1 illustrates this graphically.

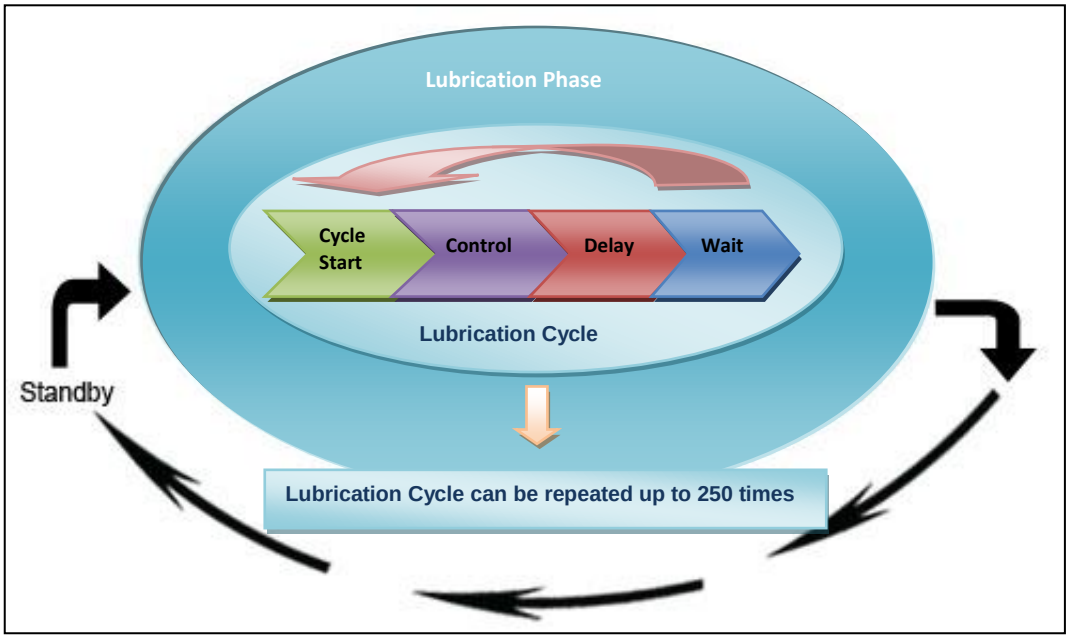


Fig.1 A Lubrication Phase can comprise of many Lubrication Cycles

The **STANDBY PHASE** defines the interval between each **LUBRICATION PHASE**.

2. PRODUCT FEATURES

VIP5 Pro offers many functions, the following brief summary are:

- Integrated LCD Display for diagnostic and ease of use;
- Diagnostic and Lubricant Counters for Operation and Alarm conditions;
- Three separate inputs (to monitor Dual line pressure switches, progressive cycle switch, injector pressure switch and external signals to use as a counter for standby or lubrication phase);
- Signal Inputs can be NPN, PNP or a Clean Contact (or Namur style switching);
- Time or counter based determination of both Lubrication and Standby Phase;
- Counter based Lubrication phase can be used independently while monitoring correct function of a cycle switch, ideal for use in impulse piloted system (e.g. chain and conveyor lubrication);
- Ability to configure pump output for Electrical or pneumatic pump (pump On/Pump Off values can be set individually);
- General Alarm Output Relay can be a constant signal or generate a coded alarm to allow remote PLC to determine nature of alarm;
- Monitoring and indication of the thermal protection trip input;
- Minimum Level Input;
- 4..20mA Input for analogue measurement of Reservoir Level;
- Maximum level monitoring;
- Separate remote output signalling for Minimum Level alarm and General Alarm conditions;
- Ability to control line inverter valves for dual line systems with pneumatic or electromagnetic actuators;
- Ability to power input and output circuits using different power sources;
- Ability to isolate the voltage of the inverter valve power circuit from the main power framework;
- Remote reporting of pump operating;
- Management of charging (automatic charge);
- Solenoid valve air pipes cleaning, at the end of lubrication cycles;
- Ability to select local/remote mode with remote cycle start;

All configuration parameters can be set from the Setup menu via the LCD display using the front panel keys. No complex internal switches need to be set.

3. DESCRIPTION OF OPERATING PROCEDURES

The **VIP5 *Pro*** controller has three operating modes:

1. **CYCLE**
2. **PULSE**
3. **FLOW**

CYCLE and PULSE modes are designed for intermittent or continuous lubrication system that requires the control of a pump and monitoring of feedback signals to determine when lubrication has successfully completed.

FLOW is designed as a monitoring only operating mode that allows the user to monitor a pulse signal and determine the actual flow rate. This is useful for process control and generally used in re-circulating systems.

3.1 CYCLE and PULSE Control System operating Principles.

The VIP5 control system is designed to control intermittent or continuous lubrication system with a variety of control inputs. Intermittent operating principle is based on three distinct phases.

- **PRELUBE Phase -> Pre Lubrication that occurs during power up of a system.**
- **LUBRICATION Phase (Lube –> Wait stages) -> This is when lubricant is provided (as above)**
- **STANDBY Phase -> The system is inactive awaiting for the next LUBRICATION PHASE**

Additionally, the VIP5 Pro Control system can also be used as a simple monitoring device in the “FLOW” operating Mode described later in this manual.

3.1.1 PRELUBE Phase

The user can specify the number of lubrication cycles up to a maximum of 250.

If Prelube is set to zero, the **VIP5 Pro** controller will not perform any pre-lubrication; in this case if the START parameter setting is "Resume", when the system is turned on it will revert to its pre-power down, or it will start from a lubrication cycle if the setting of the start is "Lube".

When Prelube is set greater than zero, pre-lubrication will start in the following cases:

- When the **VIP5 Pro** system is powered on;
- After the RESET button is pressed;
- After the **VIP5 Pro** exists from the SETUP menu.

3.1.2 LUBE (Lubrication) Phase

The Lubrication Phase is a set of Lubrication Cycles that can be repeated up to 250 times.
A Lubrication ***Cycle*** consists of activating the lubrication pump, then ***Control*** monitoring a feedback signal from a sensing device if installed. There is then ***Delay*** period before switching off the pump, and a ***Wait*** period before the lubrication cycle can be repeated. Specifically:

- ***Cycle*** (time) determine how long to wait for the control signal before determining an alarm condition.
- ***Control*** (Type) determines what kind of control signal (Single Line, Dual Line, Injectors). Alternatively a Timer only setting means no monitoring will occur.
- ***Delay*** (time): Is how long to wait for the signal to be confirmed and switch off the pump (in Pressure switch applications).
- ***Wait*** (time): determines how long to wait in a pump off condition before repeating the cycle. This is necessary in injector systems and represents the minimum time required for the injectors to reset. In progressive systems for example this can be set to zero.

3.1.3 STANDBY Phase

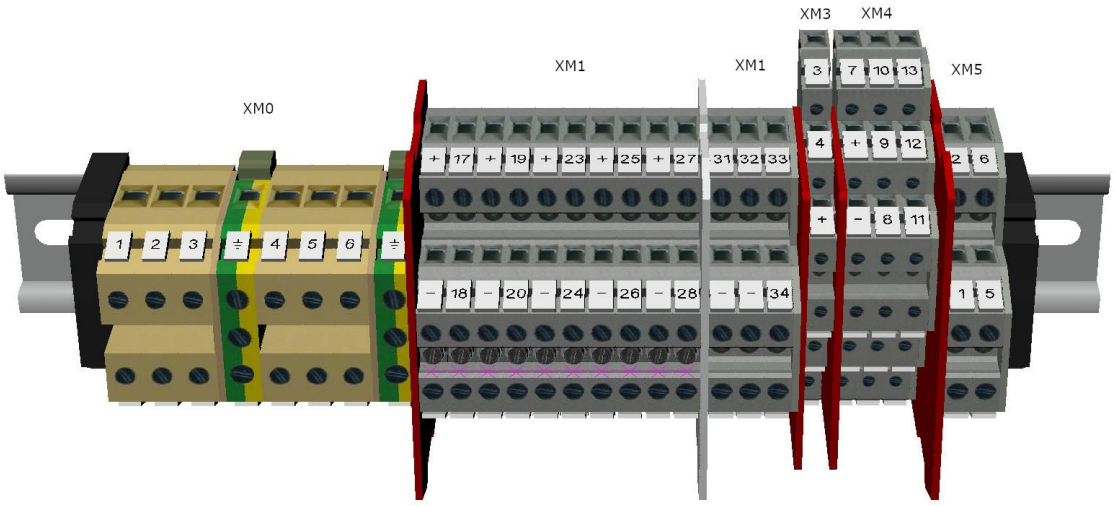
During the ***Standby*** the **VIP5 Pro** switches off the pump and waits for the start of another ***Lubrication Phase***. The duration of the ***Standby*** phase can be determined by a countdown timer or a by an external pulse signal that can be used as a counter. The VIP PRO also allows a combination of both timer and external pulse signals to determine either the next Lubrication phase or to signal an alarm if external pulse signals are not received within a pre-set time.

3.2 FLOW MODE OPERATING PRINCIPLES

The **VIP5 Pro** can also be used as a simple Flow monitoring system. When ***Flow*** mode is selected the unit operates as a flow display and monitors an external signal to calculate the flow based on external impulses. The User can additionally set a minimum and maximum Flow limit. If the flow is out of these limits, the remote alarm contact and the alarm LED on the front panel are both activated.

4. INLETS/OUTLETS

4.1 ELECTRICAL CONNECTIONS



Inside the panel there are 6 connection terminal strips available (see image).
XM0 power supply connection of the panel and to the three-phase command of the outlet pump
XM1 digital inputs connection
XM3 analogue inputs connection
XM4 exchange signals connection
XM5 digital outlet connection (pneumatic or electromagnetic valve)

The connection of the cables in the terminal strip depends on the type of configuration used (SEP, DUAL, TIME, DUAL TIME, PS).
The various associations are listed in Table 1. The XM1 terminal strip can be configured for connection of the PNP or NPN devices, simply moving the common bar (see Tables 2 and 3, highlighted in yellow).

In the connection of the “from and to the field” devices, use the predisposed channelling entirely in the panel; take care to ensure that the wires are not short, that they always have adequate insulation in good condition all the way to the terminal strip, and that they are correctly tightened.

Always carry out connections with the panel disconnected from power.

All connections must be carried out by qualified and authorised personnel, in compliance with the prevailing regulations.

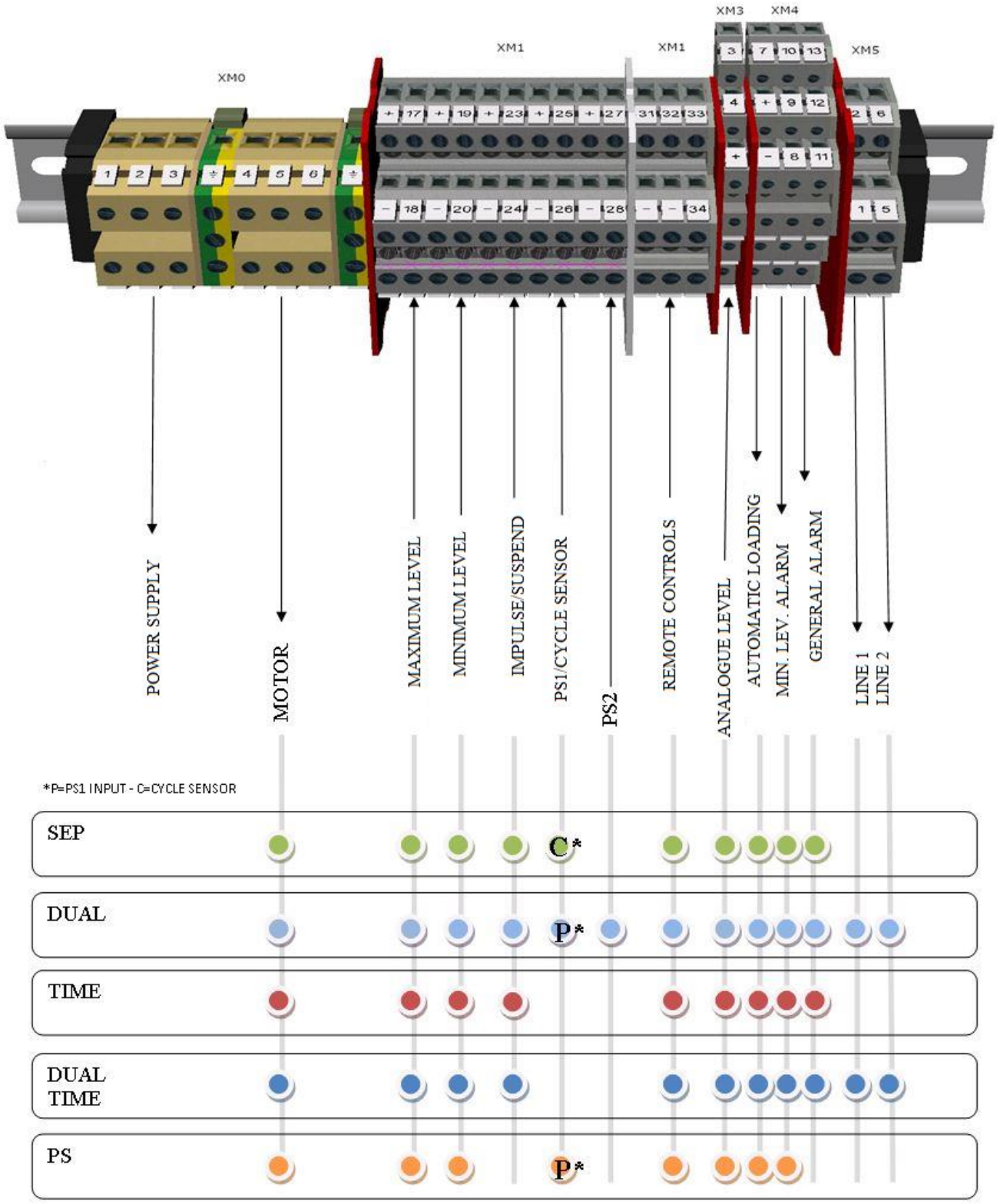
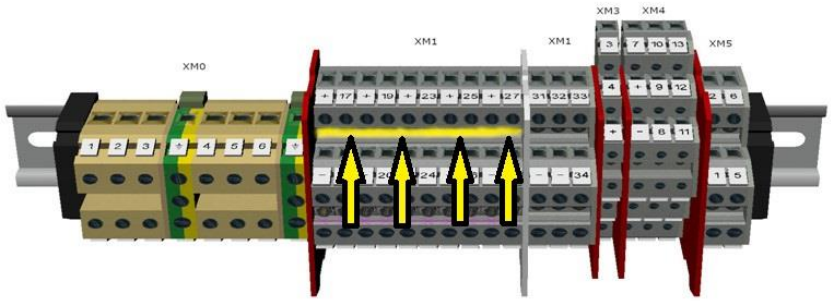

XM0
XM1
XM1
XM3
XM4
XM5
POWER SUPPLY
MOTOR
MAXIMUM LEVEL
MINIMUM LEVEL
IMPULSE/SUSPEND
PS1/CYCLE SENSOR
PS2
REMOTE CONTROLS
ANALOGUE LEVEL
AUTOMATIC LOADING
MIN. LEV. ALARM
GENERAL ALARM
LINE 1
LINE 2
*P=PS1 INPUT - C=CYCLE SENSOR
SEP
C*
DUAL
P*
TIME
DUAL
TIME
PS
P*

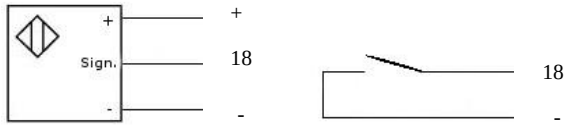
Table 1

NPN signals connection

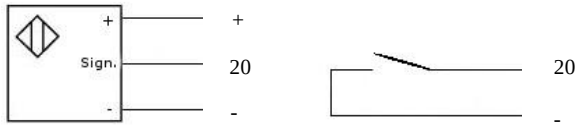
Insert the jumper as indicated in the image below



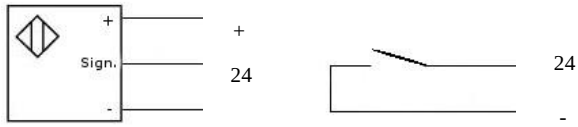
Max Level



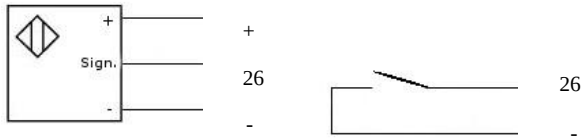
Min Level



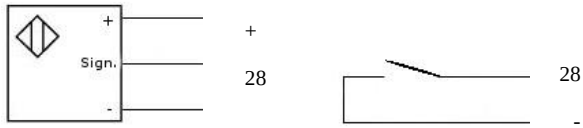
Pulse Input/Suspend



PS 1



PS 2



Cycle Sensor

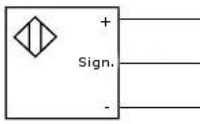
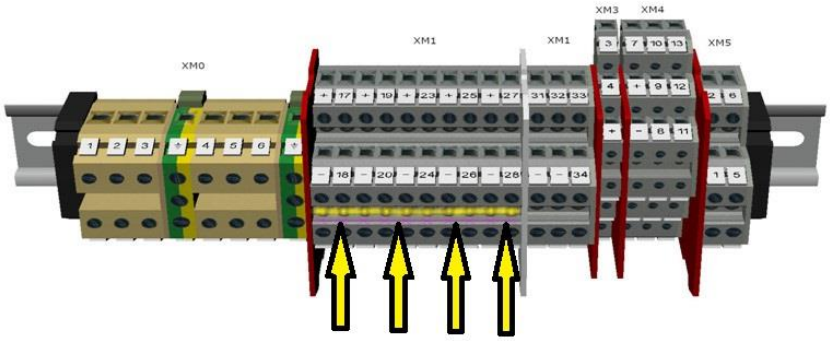


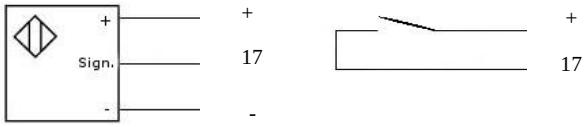
Table 2

PNP signals connection

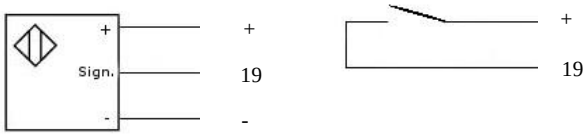
Insert the jumper as indicated in the image below



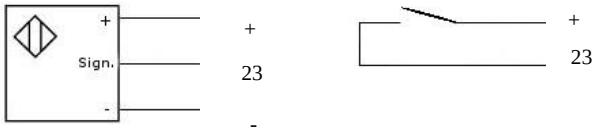
Max Level



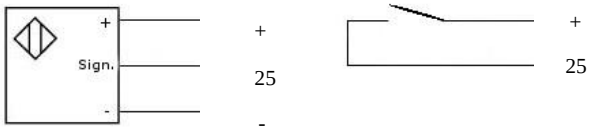
Min Level



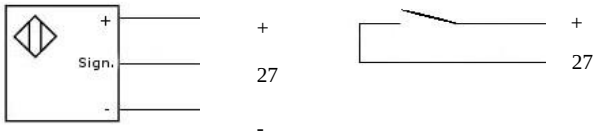
Pulse Input/Suspend



PS 1



PS 2



Cycle Sensor

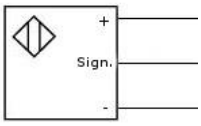


Table 3

There are five connection terminal strips inside the panel called XM0, XM1, XM3, XM4 and XM5 (see image below). The panel power supply voltage and the three-phase output command toward the pump should be connected to the XM0 terminal strip. The XM1 and XM3 terminal strips, on the other hand, should be used for the connection of panel input devices as indicated in the table. Connect the output signals to terminal strips XM4 and 5.

Location		Function
Block	**Num**	
XM0	1	SUPPLY PANEL
	2	
	3	
	4	PUMP CONTROL
	5	
	6	

Block		Signal level		Function	Notes
Block	**Num**				
XM1	+	+	DIGITAL INPUT	MAXIMUM LEVEL INPUT	IF SENSOR IS EXI CERTIFIED, CONNECT TO BARRIER, XD 1/2 (SIMPLE DEVICE)
	17	PNP			
	-	-			
	18	NPN			
	+	+	DIGITAL INPUT	MINIMUM LEVEL INPUT	
	19	PNP			
	-	-			
	20	NPN			
	+	+	DIGITAL INPUT	PULSE INPUT/SUSPEND	
	23	PNP			
	-	-			
	24	NPN			
	+	+	DIGITAL INPUT	PRESSURE SWITCH 1 INPUT	IF SENSOR IS EXI CERTIFIED, CONNECT TO BARRIER, XD 4/5/6 (SIMPLE DEVICE)
	25	PNP			
	-	-			
	26	NPN			
	+	+	DIGITAL INPUT	PRESSURE SWITCH 2 INPUT	
	27	PNP			
	-	-			
	28	NPN			

XM3	3	IN	ANALOG INPUT	LASER PROBE	
	4	IN			
	+	+			

XM4	8	C	DIGITAL OUTPUT	MIN LEVEL ALARM	
	9	NC			
	10	NO			
	11	C	DIGITAL OUTPUT	COMM.ALARM	
	12	NC			
	13	NO			

XM5	1	OUT	SOLENOID VALVE	LINE 1	
	2	OUT			
	5	OUT	SOLENOID VALVE	LINE 2	
	6	OUT			

5. INPUTS/OUTPUTS

5.1 ELECTRICAL CONNECTIONS

As indicated on the electrical diagram of equipment (Part #1327290), it is suggested to use 2.5 mm2 section cable. The maximum thermal protection mounted on equipment can be 4 A.

NOTA: Nel collegamento dei dispositivi "da e verso il campo", utilizzare le canalizzazioni predisposte internamente al quadro.
Eseguire i collegamenti sempre con quadro privo di alimentazione.
Tutti i collegamenti devono essere eseguiti da personale qualificato e autorizzato nel rispetto delle normative vigenti.
Accertarsi che i fili:

- Possiedano una lunghezza adeguata;
- Possiedano un grado d'isolamento adeguato e integro fino al loro ingresso nel morsetto;
- Siano correttamente bloccati.

ATTE*NZIONE*: Il quadro standard ha un'alimentazione di rete 400V~.
Nelle varianti (A-B-C-D-E) verificare come riportata nel paragrafo 14 il valore di alimentazione corrispondente.
La non osservanza di tale prescrizione potrebbe causare danni permanenti al quadro di controllo.

These connections are routed from the main terminal boards on the **1639186** board according tables below. For correct wiring you should note the following:

1. All input and output signals refer to a nominal voltage of 24Vdc.
2. The outputs on terminal board M1 refer to voltage indicated as Vio on terminal 6 and 7 of M2.
3. The framework is provided with (Vio) power supply input coinciding with (Vint) internal power supply via bridges on the terminals: M2:M2.5 with M2.4 with M2.6.
   The inputs are provided galvanic isolated.
4. If you want to enter with active signals whose 24V alimentation is taken outside the framework is necessary to remove the connections on M2.5 with M2.7 and M2.4 with M2.6. In this case is also necessary carry this power to M2.7 and M2.6 in according to polarity.
5. The connections for dual line commands on M5 are configured for 24Vdc changeover valve. If it the changeover solenoid use different power supply, remove connections on terminal M7 and M5 and connect the appropriate voltage on M5.3 and M5.4.
6. Connections on terminal M6 aren't clean contacts.
7. Connections on terminal M4 are SPDT type clean contacts.

For further details also check the completed electrical diagram enclosure with your specific equipment.

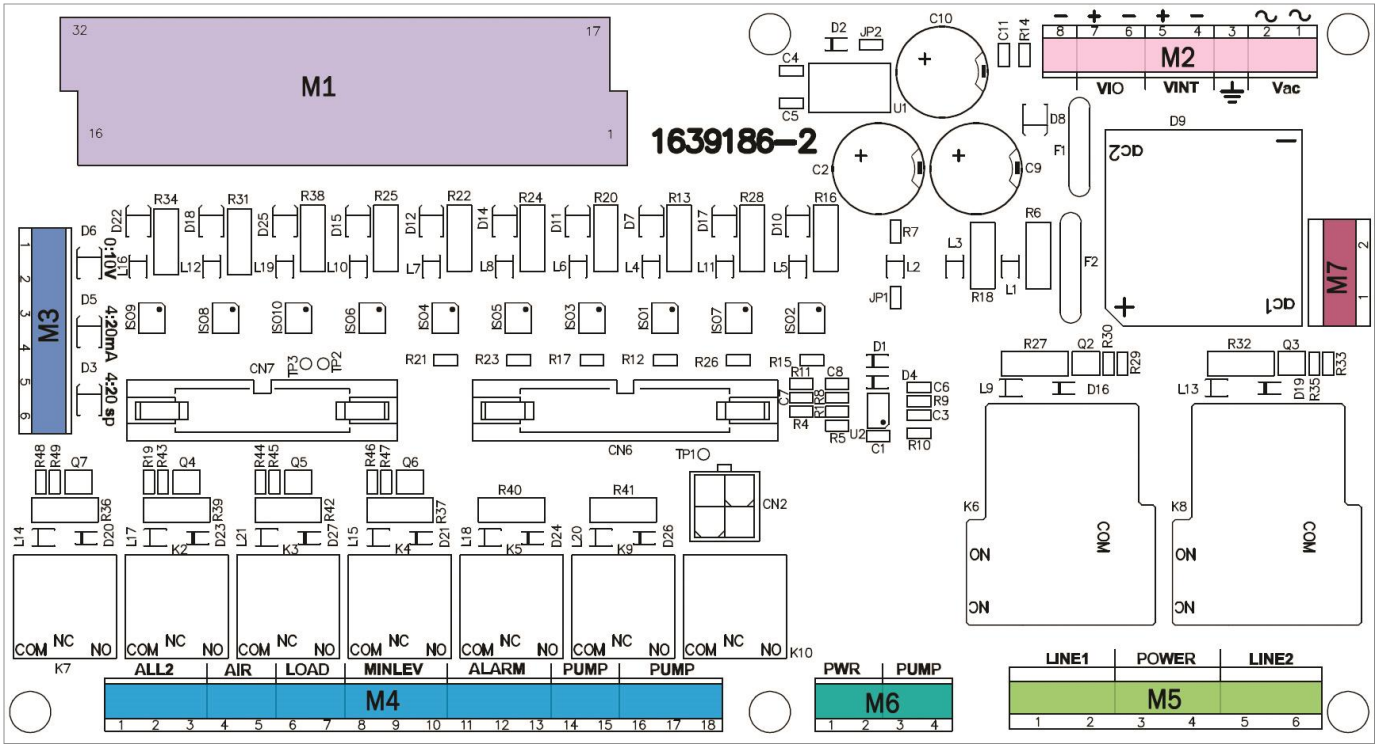


Fig. 4

NOTE: To connect micro-switches or clean contacts inputs, equipped by creating a terminals for the positive power supply (+) and the relative input P (IN +), you must make a link between (+) and (IN+) after that connect the 2 wires of micro-switch at (-) or (IN-)

Location		Signal level		Function	Note
Block	Num				
M1	1	+	24 Vdc inputs (Vio+)	Max level	
	17	IN +	input P		
	2	-	0 Vdc inputs (Vio-)		
	18	IN -	input N		
	3	+	24 Vdc inputs (Vio+)	Min level	
	19	IN +	Input P		
	4	-	0 Vdc inputs (Vio-)		
	20	IN -	Input N		
	5	+	24 Vdc inputs (Vio+)	Air pressure switch	Safety pressure switch, for example air-oil systems
	21	IN +	Input P		
	6	-	0 Vdc inputs (Vio-)		
	22	IN -	Input N		
	7	+	24 Vdc inputs (Vio+)	PULSE	Devices for counting
	23	IN +	Input P		
	8	-	0 Vdc inputs (Vio-)		
	24	IN -	Input N		
	9	+	24 Vdc inputs (Vio+)	P1	First sensor input for system monitoring. (Pressure injector, control loop for progressive, suspend for timer…..)
	25	IN +	Input P		
	10	-	0 Vdc inputs (Vio-)		
	26	IN -	Input N		
M1	11	+	24 Vdc inputs (Vio+)	P2	Second sensor input for system monitoring. (pressure 2 pressure switch dual line, Boost for cycle SEP, ...)
	27	IN +	Input P		
	12	-	0 Vdc inputs (Vio-)		
	28	IN -	Input N		
	13	-	0 Vdc inputs (Vio-)	Thermal protection	Input for motor thermal protection alarm
	29	IN -	Input N		
	14	-	0 Vdc inputs (Vio-)	Remote control	Enables remote control of the cycle
	30	IN -	Input N		
	15	-	0 Vdc inputs (Vio-)	Remote cycle start	If active the remote control input, activates the cycle start
	31	IN -	Input N		
	16	-	0 Vdc inputs (Vio-)	Clear errors	Delete any errors
	32	IN -	Input N		

Location		Signal level		Function	Note
Block	Num				
M2	1	Vac1	19 Vac	AC input	Possible inputs also with 24Vdc
	2	Vac2	19 Vac		
	3	Earth	Terra	Earth connection	If you want to report back to the ground power Connect these terminals 2
	4	Vint -	GND internal logic	Power logic and relay control	
	5	Vint +	24 V internal logic		max 1,5 A
	6	Vio -	0 Vdc inputs	Supply of external inputs	max 1,2 A
	7	Vio +	24 Vdc inputs		
	8	Vio -	0 Vdc inputs		

Location		Signal level		Function	Note
Block	Num				
M3	1	0:10V	0:10 V input	Analog input 0:10V to future expansion	Not isolated, not buffered , load 20 Kohm
	2	0 V	0:10 V reference		
	3	4:20mA	4:20 mA input	Analog input 4:20mA to future expansion	Not isolated, not buffered, load 220R
	4	0 V	4:20 mA reference		
	5	4:20mA	4:20 mA input	Analog input 4:20mA to future expansion	Not isolated, not buffered, load 100R
	6	0 V	4:20 mA reference		

Location		Signal level		Function	Note
Block	Num				
M4	1	C	SPST, 3 A 250Vac resistive load	Command "Alarm" on Vip5 Pro panel	
	2	NC			
	3	NO			
	4	C	SPST, 3 A 250Vac resistive load	Command cleaning nozzles	
	5	NO			
	6	C	SPST, 3 A 250Vac resistive load	Load command	
	7	NO			
	8	C	SPST, 3 A 250Vac resistive load	Low alarm level	
	9	NC			
	10	NO			
	11	C	SPST, 3 A 250Vac resistive load	General alarm	
	12	NC			
	13	NO			
	14	C	SPST, 3 A 250Vac resistive load	Main pump control	
	15	NO			
	16	C	SPST, 3 A 250Vac resistive load	Main pump control	
	17	NC			
	18	NO			

Location		Signal level		Function	Note
Block	Num				
M5	1	V inv	SPST-NO 30 A 250Vac, 20 A 28Vdc	Inverter command line 1	Direct load
	2	NO			Dial, contact NO
	3	V inv	Direct load	Power inverter line	Bring the voltage at these terminals for the type of inverter used
	4	C	line of contact C		
	5	V inv	SPST-NO 30 A 250Vac, 20 A 28Vdc	Inverter command line 2	Direct load
	6	NO			Dial, contact NO

Location		Signal level		Function	Note
Block	Num				
M6	1	Vint +	Positive power	Power on board 1639186	
	2	Vint -	Negative power		
	3	24V		Pump control	
	4	0 V			

Location		Signal level		Function	Note
Block	Num				
M7	1	24 Vdc	Positive power	Power Inverter Line	For 24Vdc inverter
	2	0 Vdc	Negative power		

5.2 ACTIVATING THE BATTERY FOR REAL TIME CLOCK FUNCTIONS

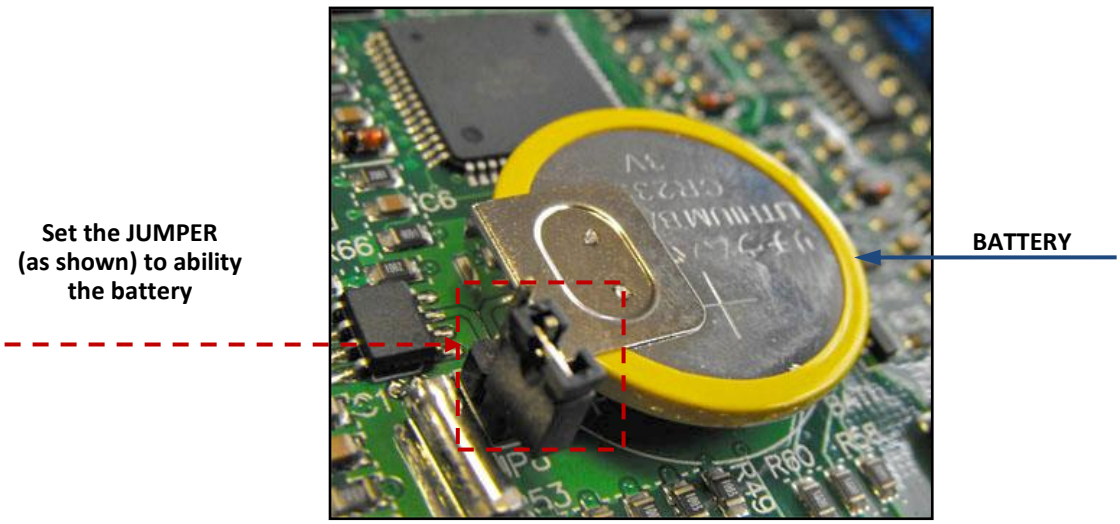


Fig. 5

By inserting the Jumper into the bridging pins, the battery function is activated and this allows the **VIP5 Pro** to operate with the Date/time and status save function when the power is removed.

Note: Every time the battery jumper is removed and reinserted causes the DATE/TIME function to be set to zero. Therefore it is recommended that after inserting the battery jumper, the date and time is set.

5. PARTICULAR PRECAUTIONS WHILE CARRYING OUT CONNECTIONS

5.1 ELECTRICAL CONNECTIONS

Never access the inside of the panel without first activating the door lock disconnect switch (Yellow-Red), positioning it to Opening = position 0

- To safely operate inside the panel, the power supply upstream of it must be interrupted, acting on the line where the necessary protections and necessary disconnect switches will be installed.
- If you must operate on electrical devices far from the panel (downstream of it), but connected to it, it is compulsory (in addition to activating the door lock disconnect switch) to insert a **safety padlock** in the appropriate slot provided in the disconnect switch itself. This is to prevent any accidental activation of the voltage by external personnel or distracted co-workers while you are operating on peripheral electrical controls.
- Always strictly follow the diagram attached to each panel. In the event of any doubt on connections that do not seem clear, ask our Technical Office before carrying out dangerous attempts.
- Ensure that the power supply to the panel is correct based on the characteristics for which the panel was constructed.
- The power supply to the door lock disconnect switch must come from a specific dedicated line on which (upstream of the panel) a device must be installed suitable for protection of indirect contacts (differential protection)
- It will therefore be the installing technician's duty to guarantee protection of indirect contacts, installing (or having installed by qualified personnel) an automatic power supply interruption with specific differential or magnetic-thermal type devices, depending on the prevailing standards (CEI 64-8). A disconnect switch upstream of the panel is always required. Qualified personnel capable of assessing the choice must be used, taking into consideration:
  the existing power supply circuit
  a maximum short circuit current (Icu) of 10ka
  the existing grounding system
  the diagram of the panel and its application
- Moreover, for the protection of indirect contacts, a grounding connection is predisposed:

  a) Male bolt with ring and yellow green cable or

  b) Ground terminal strip

The external protection cable with a gauge equal to that of the power supply phase cable must be connected. It is therefore compulsory to connect the bolt or the ground terminal strip to the mains power supply grounding system.
Check the efficiency of the customer's pre-existing grounding system preventively.
Request the certification of the customer's pre-existing grounding system preventively.
No other cables must be connected to the ground connection except the external protection cable.

Note
It is the installer's responsibility to issue the DECLARATION OF CONFORMITY relative to the installation of the panel at the end of the work

5.1 CABLES

For the connection to the panel, the cables must be correctly sized based on the loads and the specific type of use.
The grade of insulation must be proportional to the applied voltages.
Use cables with adequate gauge based on the absorption of the various users adequately protected against surges.

Use cables that are flame retardant and with low toxic fumes emission in the event of a fire.

ATTENTION:

In case of fire, DO NOT use WATER, but the specific extinguishers for live equipment

5.2 ELECTRICAL CHECKS PRIOR TO PROVIDING POWER

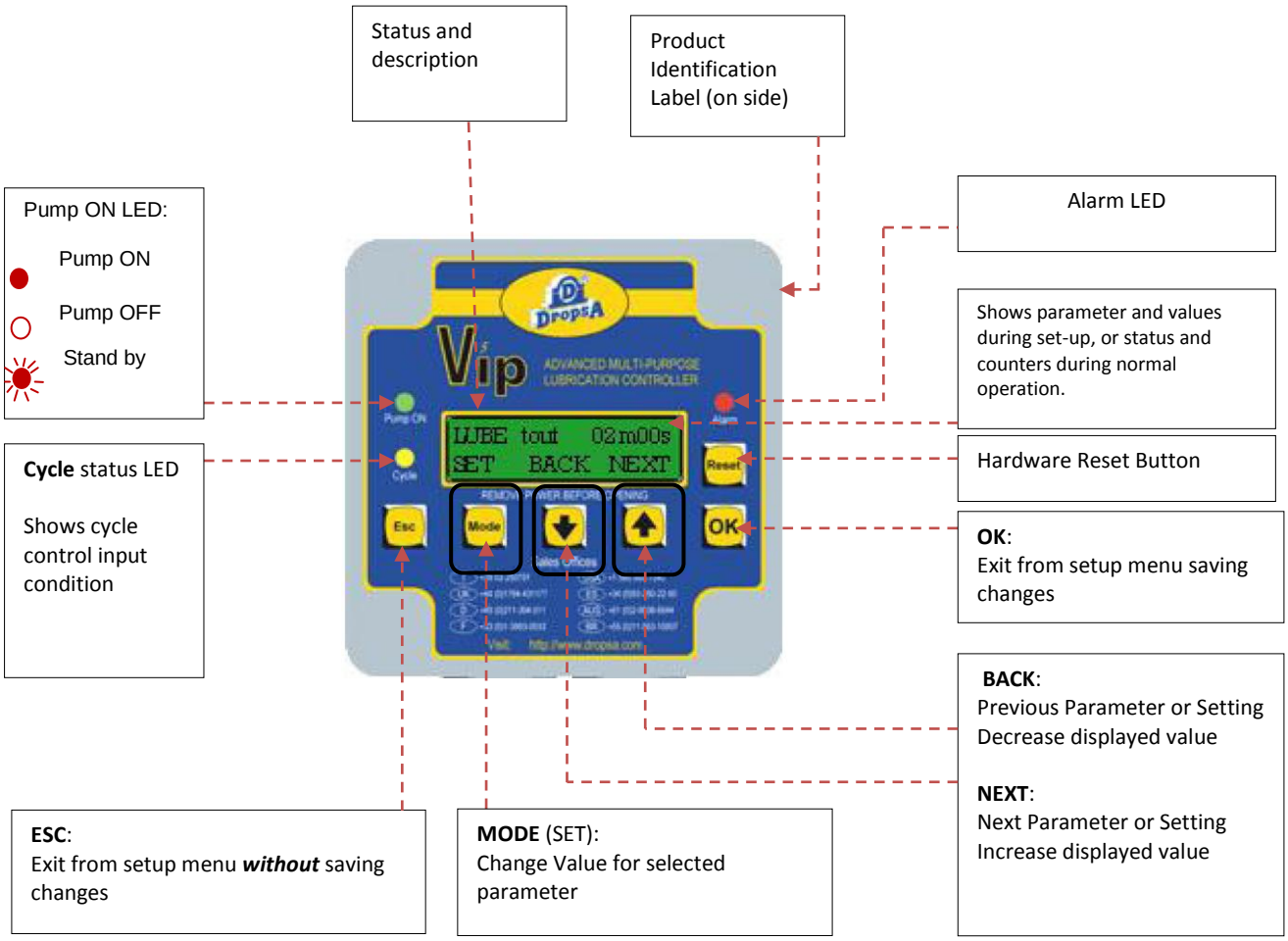
Recheck the correct correspondence of the connections made in the terminal strip, comparing them with the attached diagram;
Recheck the tightness of the terminal strip screws;
Also recheck the tightness of the connections outside the panel in the various terminal strips: motor, valves, signals and sensors
Check the correct operation of the external protection devices and the disconnect switches both upstream and downstream of the panel and their correct connection;

Compulsory checks to be carried out:

- Protection circuit continuity
- Insulation resistance tests
- Voltage tests
- Protection against residual current
- Electromagnetic tests
- Functional tests

6 OPERATOR INTERFACE FRONT PANEL

6.1 LAYOUT AND STATUS TABLE OF VIP5 FRONT PANEL



VIP5 Pro Condition	PUMP ON LED	CYCLE INPUT LED	ALARM LED
Alarm	OFF	ON	ON
Standby Phase	OFF	ON	OFF
Lubrication Phase/Cycle	ON	ON	OFF
Setup	OFF	OFF	ON

7. OPERATING MODE

VIP5 Pro has three different operating modes which are determined during the setup stage described previously.
These are: **CYCLE, PULSE** and **FLOW.**

7.1 CYCLE Mode

In *Cycle* mode a cycle sensor determines the completion of the LUBRICATION PHASE. If using timer setting, the Lubrication Cycle will complete when the timer expire. The Standby phase is determined by a timer or by an external input counter.

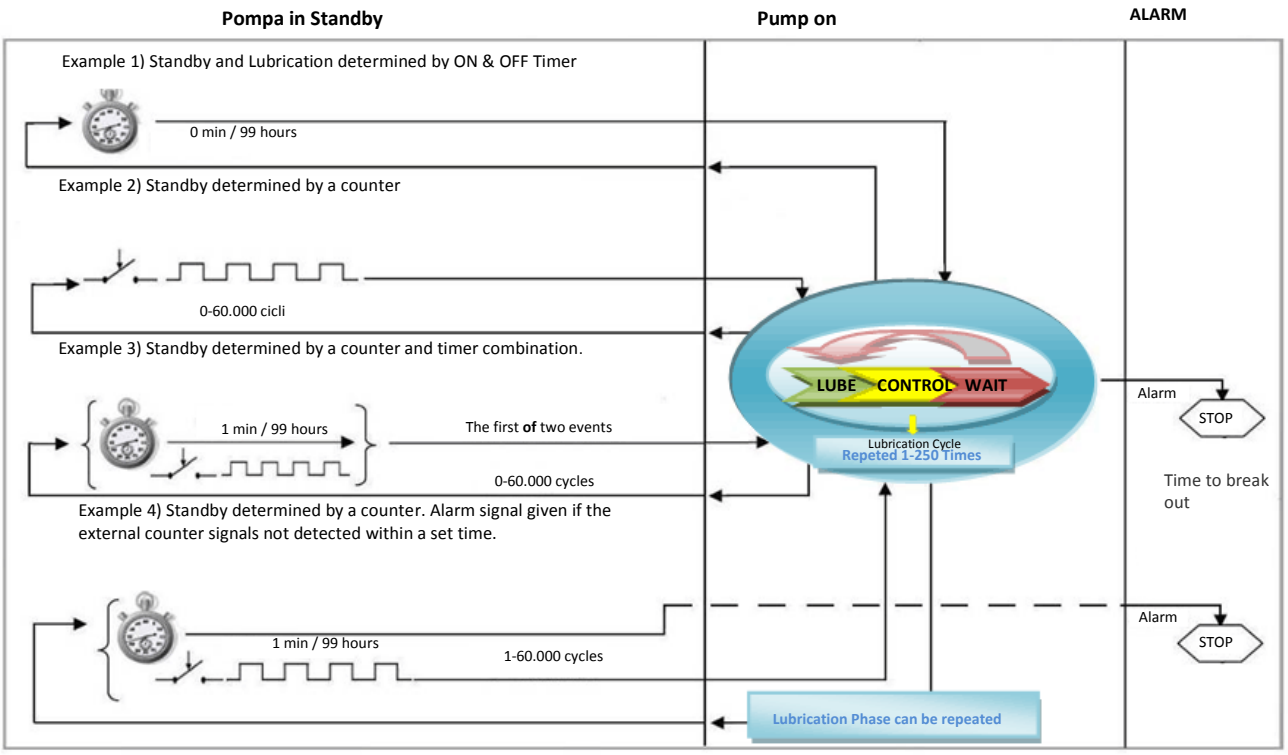


Fig. 6

7.2 PULSE Mode

In ***Pulse*** mode, the duration of the ***Standby Phase*** and the ***Lubrication Phase*** are both determined by an external counter. The correct operation of the ***Lubrication Cycle*** can be monitored using a cycle sensor.

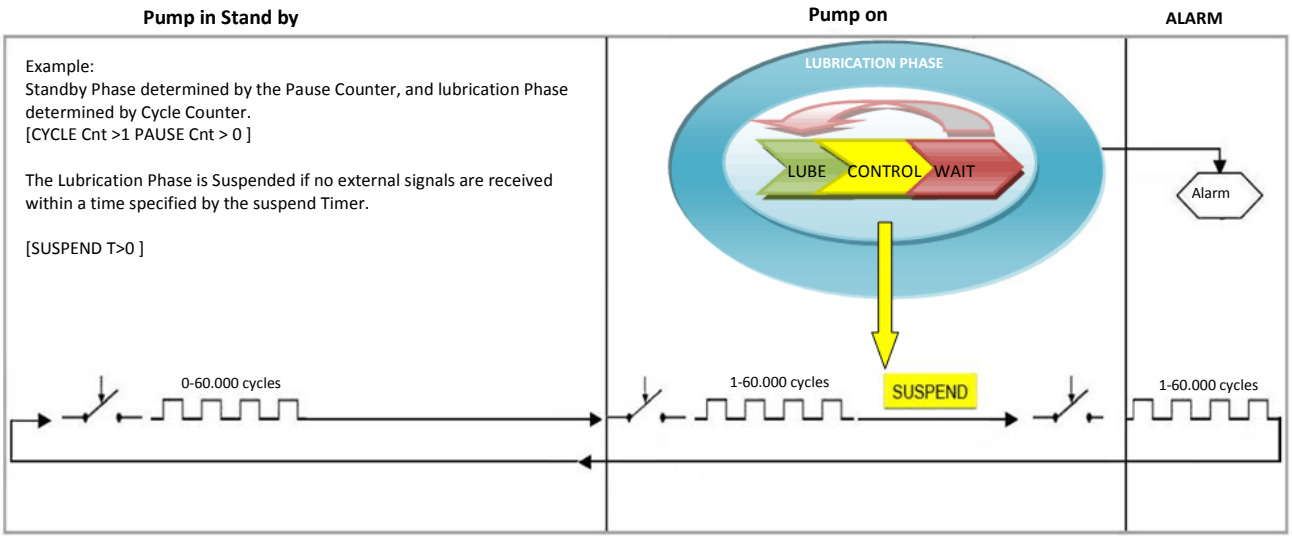


Fig. 7

7.3 FLOW Mode

Using this mode allows the **VIP5 Pro** to be used as a simple flow monitoring and display device.

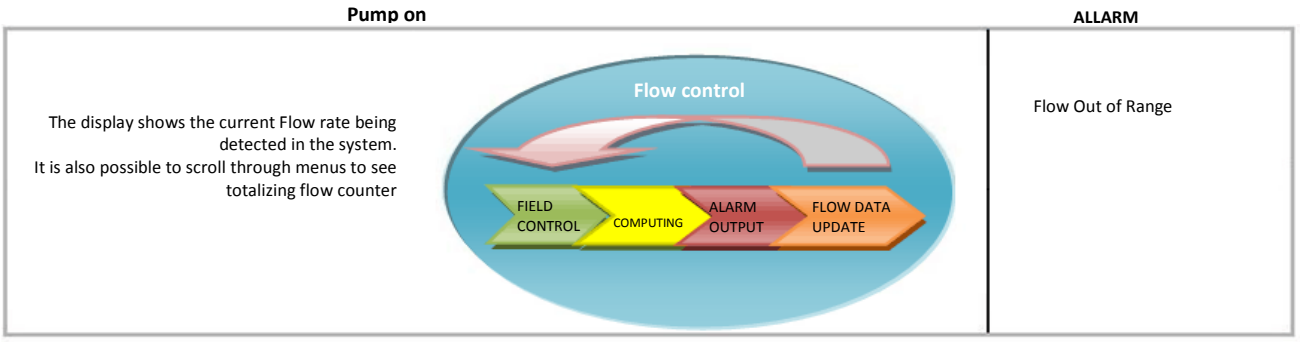
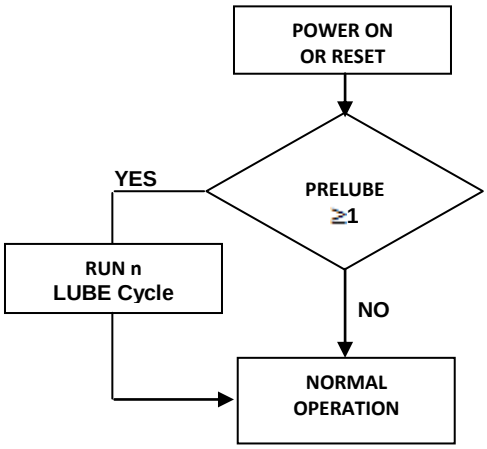


Fig. 8

7.4 PRELUBE

The Prelube cycle is a pre-lubrication cycle that is triggered when the system is powered on or reset. If the pre-lube cycle value is set to 1 or greater the VIP5 will perform the set number of ***Lubrication Phases***.

Note that if Each ***Lubrication Phase*** comprises two or more ***Lubrication Cycles,*** then the total cycles performed will be equal to the ***Lubrication Cycles*** multiplied by the ***Prelube*** Cycles.



8. CYCLE MONITORING

8.1 MONITORING OPTIONS.

There are four possible Cycle Monitoring Options, explained below.

1) DUAL – DUAL LINE

Dual Line cycles generally use two pressure switches connected to **P1** and **P2**.

The **VIP5 Pro** starts the pump and must see that **P1** switch is closed within the timeout time. After this, the Lubrication lines are inverted by use of a directional valve.

The **P2** switch must also then be made within the timeout timer setting.

A user configurable **DELAY** timer can be set to filter pressure spikes as in the **PS** operating mode.

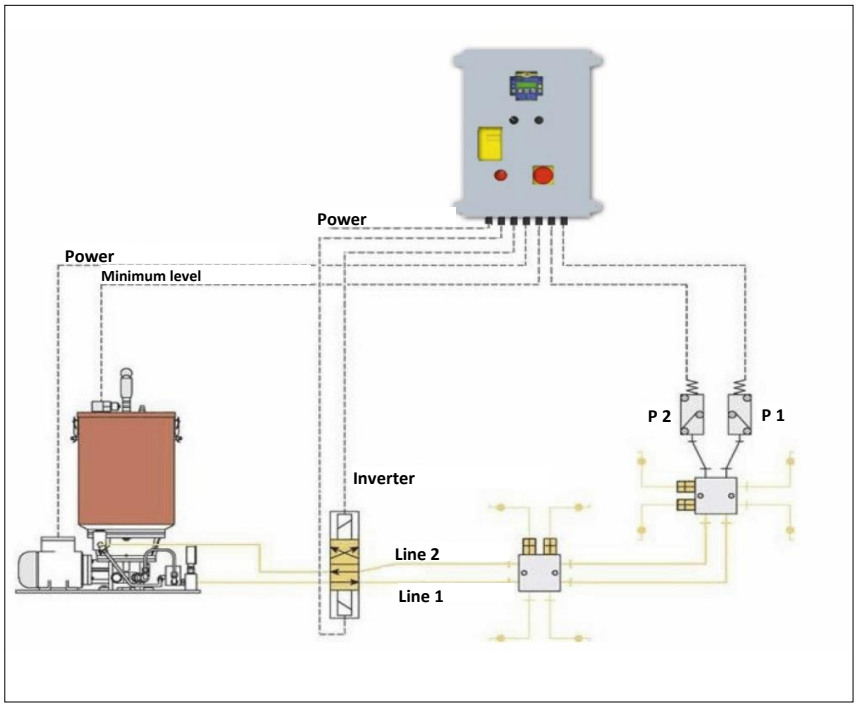


Fig. 9

2) TIMER – TIME ONLY

The Lubrication cycle is simply operated according to a preset Timer value.

Therefore, **no input is monitored** to confirm the correct completion of the lubrication cycle.

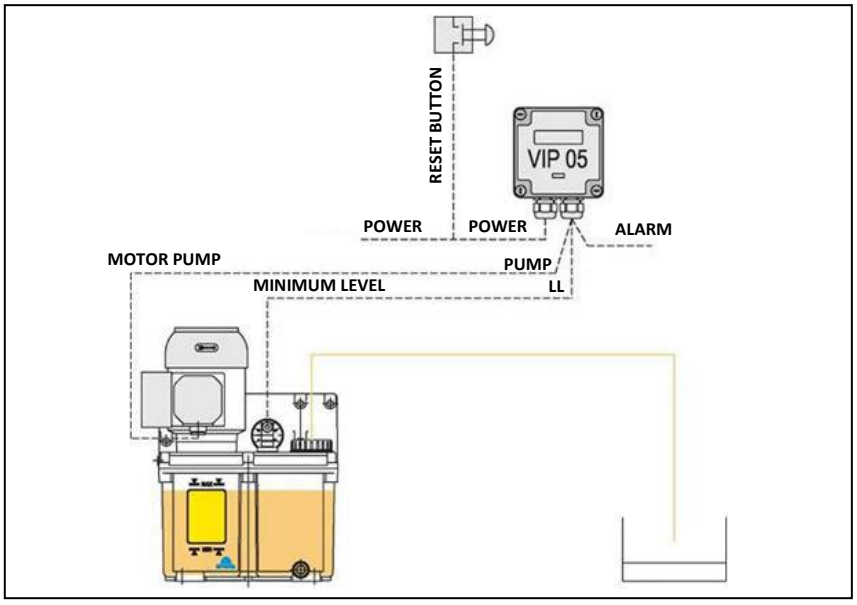


Fig. 10

3) PS – PRESSURE SWITCH

Pressure switch monitoring is typically used in injector system.

The **VIP5 Pro** will monitor input **P1** to verify that it is an **OPEN** contact at the start of the cycle.

The pump is activated and the pressure switch must **CLOSE** within a timeout period otherwise a cycle alarm is generated.

Once the **P1** contact is closed, a **DELAY** timer checks that the switch is not broken for a set time before switching off the pump. This ensures that pressure spikes at the start of a lubrication cycles on long lines are filtered out.

A **WAIT** timer can be set to allow the injectors to reset when using multi cycle configuration.

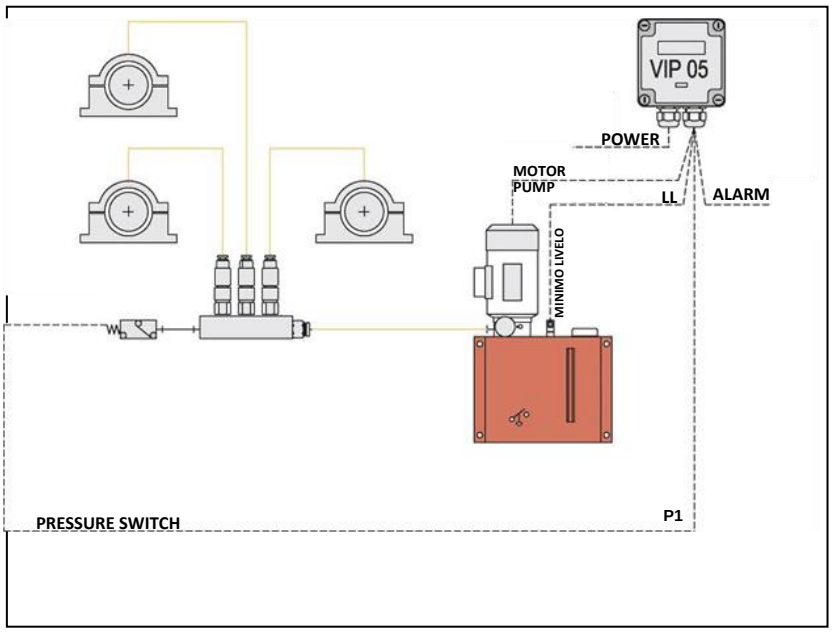


Fig. 11

3) SEP – SERIES PROGRESSIVE

Series progressive Operating mode is used for Cycle switch monitoring typically on progressive systems.

The Pump is switched on and P1 input is monitored and must change state twice within the timeout period otherwise a timeout alarm will be generated.

Once P1 changes state twice, the pump is switched off and **VIP5 Pro** goes to standby or the Lubrication Cycle is repeated for the desired number of times.

There is no WAIT time in this mode as progressive systems do not need venting time.

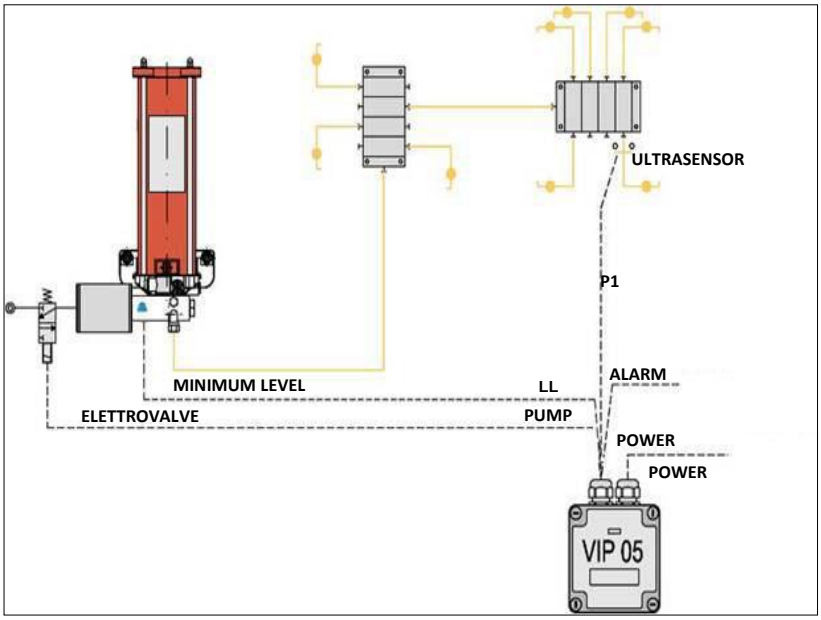


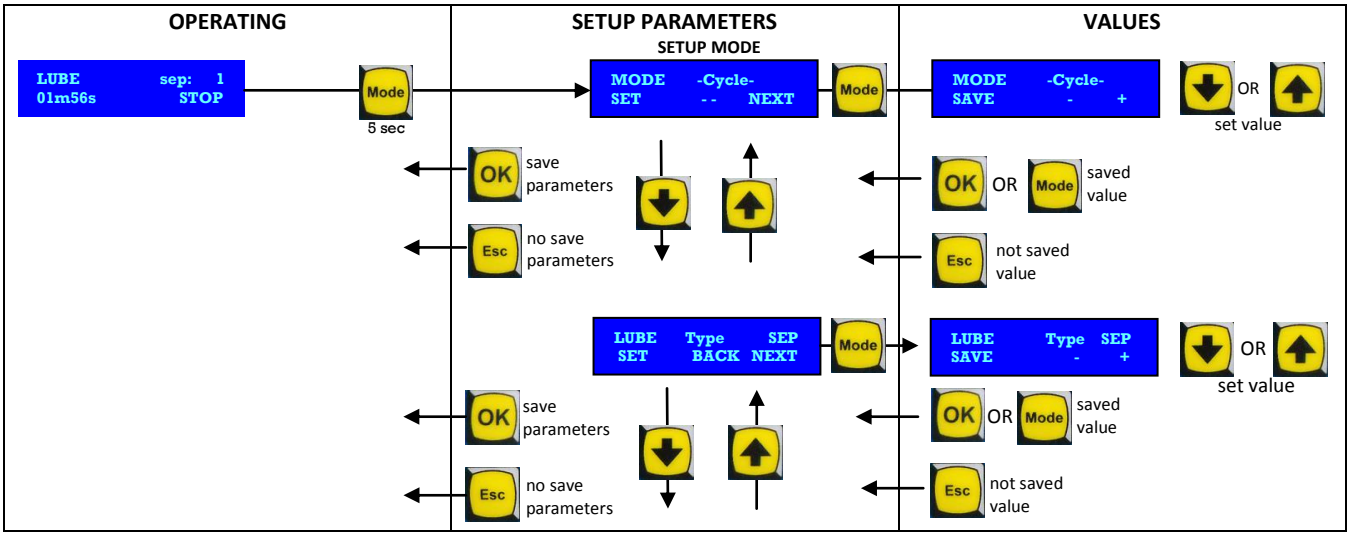
Fig. 12

9. SETUP PROGRAMMING

The following section explains how to navigate the **VIP5 Pro** setup menus and contains detailed explanation of each parameter and possible values.

9.1 Navigating around the setup menu.

The navigation map below shows how to navigate around the setup menu.



To enter the SETUP menu from the OPERATING Mode, hold the Mode (Mode) button for 5 seconds.

The ▲ ▼ (Up and Down) keys allow scrolling through the parameters.

By pressing the Mode button again, the indicated parameter value can be modified by using the Up and Down keys.

To exit, use the OK (OK) key, or Esc (Esc) if you with to exit without saving.

9.2 PARAMETERS AND VALUES

The following table shows the parameters and possible values of **VIP5 Pro**. The first two parameters (MODE and TYPE) determine what parameters are available in the menu and they are the first that must be set.

PARAMETER NAME	DEFAULT VALUE	DESCRIPTION	VALUES/ RANGE	APPLICABILITY							
									PULSE	CYCLE	FLOW
MODE	**CYCLE**	**SELECT THE OPERATIMG MODE:**									
		Flow monitoring mode	**FLOW**								
		Lubrication Cycle completed when the cycle sensor confirms correct lubrication	**CYCLE**								
		Both Standby and Lubrication Phase determined by external signal.	**PULSE**								
TYPE	**SEP**	**SELECTS THE CYCLE MONITORING:**							X	X	
		Timer only	**TIMER**					TIMER/NO CONTROL			
		Pressure switch	**PS**				PS				
		Progressive Cycle switch	**SEP**			SEP					
		Dual Line cycle with control signals	**DUAL**		DUAL						
		Timed Dual Line cycle	**DUAL TIMED**	DUAL TIMED							
INVERTER	PNEUM	Type of connected inverter for Dual systems	PNEUM-ELETT		X				X	X	
INVER.Ton	3s	Time for inversion	0,1s - 25,0s	X	X				X	X	
INVE.Wait	.null.	Waiting time for inversion command and pump	1s - 1h	X	X				X	X	
CYCLE TOUT	2 min	Timeout counter determines how long to wait for cycle completion before a timeout alarm is generated	1s - 1h		X	X	X		X	X	X
LUBE TIME	2 min	In timer Mode, how long the pump will run	0s – 99h					X		X	
CYCLE CNT	1	The Duration of the Lubrication cycle (in PULSE Mode)	1 - 60000	X	X	X	X	X	X		
DELAY TIM	5s	When the pressure switch is made, how long to keep the pump running to ensure that the signal is genuine and not a pressure spike	0s – 2min	X	X		X		X	X	
		With FLOW mode time that alarm condition must exist before being reported									X
SUSPEND T	1s	In Pulse Mode, will suspend the Lubrication Phase if a signal is not received	Null – 2min	X	X	X	X	X	X		
PAUSE CNT	1	Counter for standby phase (PULSE input). See: PAUSE MULTIP.	Null -250 (cycle mode) Null-60000 (pulse mode)	X	X	X	X	X	X	X	
SUSPEND	Never	With cycle mode suspend remote signal on pulse input can be connected. The lubrication cycle is completed before any suspension	Never, In Pause In Cycle, Always	X	X	X	X	X		X	
PAUSE BY	Timer	Determines Standby Phase Timing		X	X	X	X	X		X	
		Time based Standby	Time								
		A set number of external PULSE signals	Counter								
		Whichever of above 2 events occurs first	Time & Counter								
		By PULSE signals. However, if PAUSE TIM. is reached, an alarm will be given	Tout & Count								
PAUSE TIM.	6m 00s	Standby Timer setting. Null means the standby phase will be skipped	Null – 99h 00m	X	X	X	X	X		X	
PUMP	Continuous	Pump output can be constant signal, pulsed signal or synchronized with control signal (see next 3 parameters)	Continuous, Pulsed	X	X	X	X	X	X	X	
			syncronyzed						X		
PUMP TON	5,0	Sets the ON value of the pump pulse	0,1-25,0s	X	X	X	X	X	X	X	
PUMP TOFF	5,0	Sets the OFF value of the pump pulse	0,1-25,0s	X	X	X	X	X	X	X	
PAUSE MULTIP.	1	Multiply pause settings by 10 or 100 to achive more higt values. See: PAUSE CNT	1; 10; 100	X	X	X	X	X	X		
LUBE CYCLES	1	Number of Lubrication Cycles to complete a Lubrication Phase	1 - 250	X	X	X	X	X		X	
BOOST CYCLES	1	In a SEP mode, If P2 input is closed the LUBE CYCLES values is increased by this value contained in this setting	1 - 250			X				X	

PRELUBE	0	Number of Prelube Cycles	0 - 250	X	X	X	X	X		X	
WAIT TIME	10s	Time between two Lubrication Cycles within the Lubrication Phase	Null - 2 min	X	X	X	X	X		X	
START IN	Resume	Determines state at power on:		X	X	X	X	X	X	X	
		Start in Lubrication Phase	Lube								
		Resume from power down state	Resume								
FLOW VALUE	1,0	Informational value of how much lubricant is dispensed per Lubrication Cycle	0,0 - 1000	X	X	X	X	X	X	X	X
UNITS	Counts	Information Unit for the flow value parameter used for display purposes only	Counts, CubicC., Liters, Pints, Gallons, Kilos, Grams	X	X	X	X	X	X	X	X
FLOW MIN	10,0	Minimum Flow Setting Totally excludes flow alarm if null	0,0 - 6000								X
FLOW MAX	100,0	Maximum Flow Setting	0,0 – 6000								X
ALARM	Standard	How REMOTE ALARM is managed		X	X	X	X	X	X	X	X
		Relay is powered off during alarm	Standard								
		Relay is powered On during alarm	Inverted								
		Coded alarm is signalling	Coded								
STOP	On All	Determines what Alarm conditions should stop the VIP5 Lubrication cycles VIP5 Pro		X	X	X	X	X	X	X	
		Never stop the lubrication cycle	On None								
		All alarm conditions	On All								
		All but min Level stops the Vip5 pro	All But Min Level								
		Only minimum level alarm stops the VIP5	All But Max Level								
		All but Maximum Level	Minlev Only								
MIN. LEV. INPUT	NC	Configuration for the input signal of minimum level	NC, NO, 4 - 20mA	X	X	X	X	X	X	X	
LO LEVEL MA	19,8	Setting a low level if you use 4-20mA input	4,0 - 20,0	X	X	X	X	X	X	X	
HI LEVEL MA	4,2	Setting a high level if you use 4-20mA input	4,0 - 20,0	X	X	X	X	X	X	X	
MININPUT DELAY	0,5s	When resetting a low level alarm, grace period before monitoring level inputs	0s-5s	X	X	X	X	X	X	X	
HI LEVEL IN	NO	Setting for max level signal	NC, NO	X	X	X	X	X	X	X	
THERMAL INPUT	NO	Setting for thermal protection signal	NC, NO	X	X	X	X	X	X	X	
FILL Tout	.null.	Max time for refilling activation after minimum level is switched off	Null – 10 h	X	X	X	X	X	X	X	
AIR Delay	0,5s	Drop-out delay after switching off the pump control	0,1 - 25,0s	X	X	X	X	X	X	X	
DATETIME	Disable	Enable or Disable the Real Time clock functions. Note: be sure battery is connected	Enable, Disable	X	X	X	X	X	X	X	X
DAY	1	Date Time: Day setting	1 – 31	X	X	X	X	X	X	X	X
MONTH	1	Date Time: Month setting	1 - 12	X	X	X	X	X	X	X	X
YEAR	2000	Date Time: Year setting	2000 - 2099	X	X	X	X	X	X	X	X
HOUR	0	Date Time: Hour setting	0 - 23	X	X	X	X	X	X	X	X
MINUTE	00	Date Time: Minute setting	0 - 59	X	X	X	X	X	X	X	X
SET DEFAULT VAL.		RESET TO FACTORY DEFAULT SETTINGS	Yes - No	X	X	X	X	X	X	X	X

9.4 SPECIAL FUNCTIONS:

1) **LCD CONTRAST ADJUSTMENT:** by Pressing ESC or OK during power on or immediately after a reset, you access the menu for adjusting the contrast of LCD; hold down OK the contrast decreases, with ESC increases;
2) **FLOW TOTALIZER DATA VISUALIZATION: w**ith the VIP5 in standby mode, pressing the OK key will allow you to scroll through the current average flow rate, or the total volume dispense in the last DAY, HOUR or TOTAL since last reset;
3) **RESETTING THE FLOW TOTALIZER: d**uring the visualization of the above parameters the flow can be reset by holding the DOWN key;
4) **TIME AND DATE:** during standby, it is possible to view time and date by using the ESC key only if DATETIME parameter is set on “enable” ;
5) **EVENT LOG VIEWER:** by holding the Up or Down key for five seconds it is possible to scroll through the Event Log. (Available in version FW 2.xx onwards)

10. PROBLEMS AND SOLUTIONS

***ATTENTION:** The VIP5 Pro should only be repaired by qualified Dropsa technicians.*

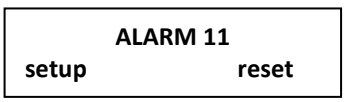
10.1 ALARM CODE TABLE

The following is a list of possible alarms generated by the VIP5 with information for troubleshooting purposes.

ALARM CODE	DESCRIPTION	NOTES/CHECKS/SOLUTIONS
ALARM 01	LOW LEVEL	The Low level sensor has triggered. Replenish the oil reservoir.
ALARM 02	CYCLE TIMEOUT	The cycle switch has not been detected in the specified time. Make sure that you have set the timer to a value that allows the cycle to complete.
ALARM 03	BOOST WARNING	The P2 input has been activated and the Boost Function has increased the number of Lubrication Cycles in the Lubrication Phase.
ALARM 04	THERMAL PROT.	The Thermal relay trip signal has been detected. Verify and repair.
ALARM 05	PS ALREDY ON	In PS Cycle mode, the pressure switch was already active before the pump was switched on. Check to ensure the venting system is operating correctly.
ALARM 06	PS AFTER WAIT	In PS Cycle mode, the Pressure switch cannot achieve pressure for the duration of the DELAY time parameter. Check parameters are correct and the pump is operating correctly and can maintain pressure.
ALARM 07	NOT IN PRESS.	No Pressure switch detected within the timeout time. Verify pump and pressure switch are operating correctly and there are no leaks.
ALARM 08	PAUSE TIMEOUT	In TOUT & Count Mode, no external signal has been received for the Timeout period setting. Verify external switch is operating.
ALARM 09	HI LEVEL	MAX level is present in tank.
ALARM 10	BAD SET 420MA	Programming error on the 4-20 mA input, modify parameters to have a range MIN-MAX >4mA
ALARM 11	BAD IN 420MA	Incorrect wiring on the 4-20 mA, signal underage or overage
ALARM 12	LO FLOW	In Flow mode, the current flow is below the minimum set level
ALARM 13	HI FLOW	In Flow mode, the current flow is above the maximum set level
ALARM 14	LO FLOWT	In Flow mode, the current flow is below the minimum set level because no flow input signal has been received for the timeout time. This generally indicates a broken sensor or that the system being monitored is switched off.
ALARM 15	UNCODED FAIL	An unknown Internal error has occurred. Try resetting the unit. If the error re-occurs, the unit must be returned to Dropsa for inspection.
ALARM 16	EXTERNAL PRESSURE	Overpressure alarm and safety signal in air-oil systems.

10.2 RESTART/RESET

When an alarm occurs it is displayed on the LCD display with the alarm number and a brief description of the alarm.
For Example:



By pressing the button located under the “Setup” label, the user can go and modify the parameter values if it is some incorrect parameter that is causing the alarm.

By pressing the button located under “Reset” (or the hard reset button) the VIP5 will restart its programming with the last saved parameters.

10.3 REMOTE CODED ALARM FUNCTION

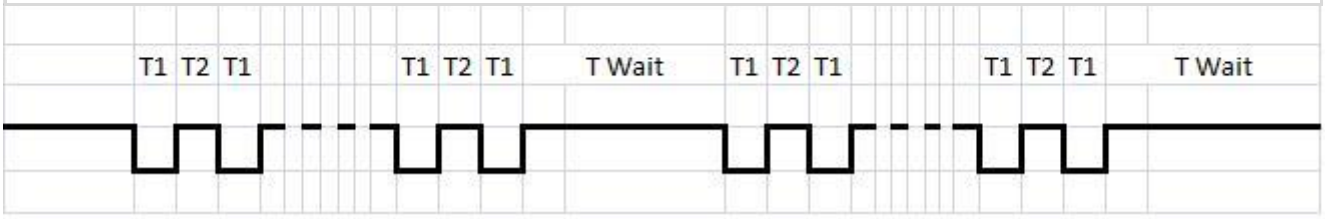
The VIP5 controller has the ability to use a remote pulsed coded alarm contact.
Every time the VIP5 control enters an alarm condition, the remote alarm relay contact is activated.
Most alarm contacts are simply a NC or NO contact that gives a remote system indication that the local controller is in a fault condition.

Additionally, the VIP5 can trigger the alarm according to the alarm code being generated and allow a remote PLC (or even a remote LAMP signal) to read the number of the alarm being generated.

This is done by pulsing the alarm relay in 500ms bursts with a 2000ms gap between each signal burst.

The timing chart below shows how to interface the logic with your PLC.

Alarm code= number of (T1+T2)
T1= 500ms = alarm contact activation time
T2= 500ms = alarm contact deactivation time
TWait= 2000ms= pause time before repetition of same alarm code

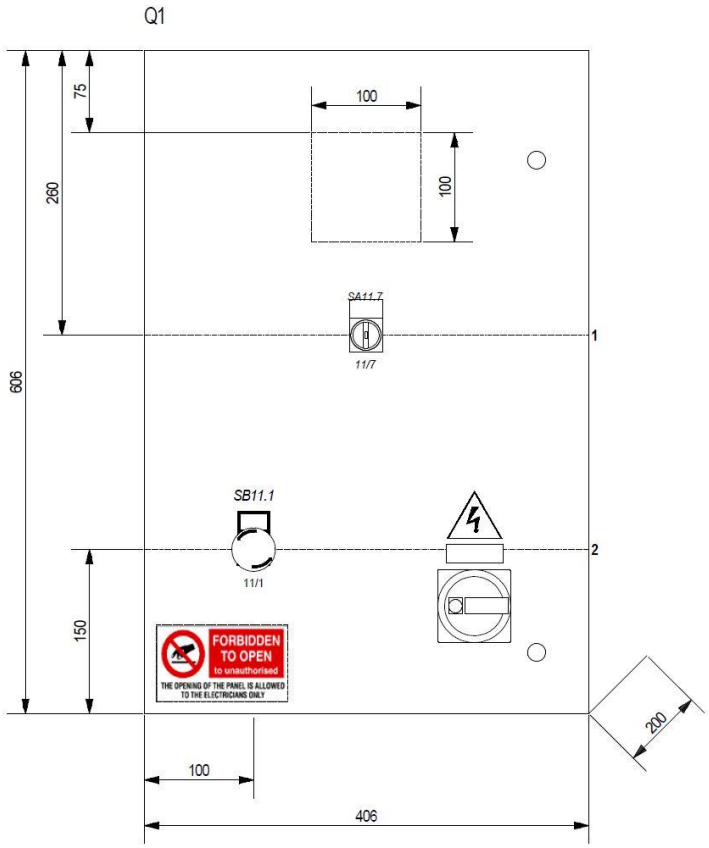


11. TECHNICAL SPECIFICATIONS

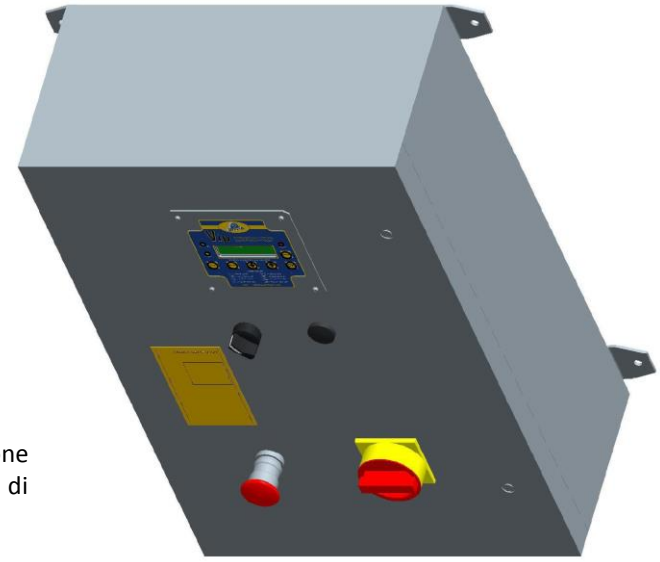
Supply voltage (see note par.5.1)	110V~ - 230V~ - 400V~ - 460V~
Power Consumption	2 W (In Stop) - 10 W (In Start)
Temperature Operating Range	- 5 °C ÷ + 70 °C
Permissible Temperature storage range	- 20°C ÷ + 80 °C)
Operating Relative Humidity	90% max
Frequency	50/60 Hz

12. MOUNTING AND INSTALLATION DETAILS

The maximum dimensions are demonstrated below.



12.1 DISIMBALLAGGIO



Una volta identificato il luogo adatto per l'installazione, aprire l'imballo ed estrarre l'apparecchiatura. Controllare che l'unità non abbia subito danni durante il trasporto. Il materiale d'imballo non richiede speciali precauzioni di smaltimento, non essendo in alcun modo pericoloso o inquinante. Per lo smaltimento, fare riferimento ai regolamenti locali.

12.2 INSTALLAZIONE

Il **VIP5 Pro** deve essere garantito fisicamente a una posizione di montaggio e cablato a tutte le componenti del Sistema di Lubrificazione.

It is recommended to:

- Install the equipment in an adequate position in order to avoid abnormal posture for personnel during use of the equipment and to have good visibility of the display;
- Provide adequate space for installation and maintenance, leaving a minimum perimeter space of 100 mm (3.93 in.) and install the unit in a position that is easy to reach;
- Do not install the unit in particularly dangerous or explosive/flammable environments or on surfaces subject to vibrations.

13. MAINTENANCE PROCEDURES

VIP5 Pro has been designed not to require any regular maintenance. We recommend to occasionally cleaning the unit with a damp cloth, not using solvents

The battery life is approximately 10 years. In the event that the battery needs to be replaced you should note that there are two possible battery types.

a) A Soldered type battery that must be removed and re-soldered.
This type of battery can be obtained from Panasonic PART NUMBER BT-CR2032-H, easily purchased all over the world.

b) The replaceable type battery can be simply removed and replaced.
This type of battery can be obtained from Panasonic PART NUMBER CR2032, easily purchased all over the world.

14. DISPOSAL PROCEDURES

The unit does not contain any harmful substances and should be disposed of following local regulations, including any recycling information indicated on the components themselves.

15. ORDING INFORMATION

VIP5 Pro

CODE	MODEL	DESCRIPTION
1639211 (Standard) **VIP5 "*PRO*"**	A	VIP5 "*PRO*" (Power supply 110V ~ - Inverter 24V DC)
	B	VIP5 "*PRO*" (Power supply 230V ~ - Inverter 24V DC)
	C	VIP5 "*PRO*" (Power supply 460V ~ - Inverter 24V DC)
	D	VIP5 "*PRO*" (Power supply 110V ~ - Inverter 110V~)
	E	VIP5 "*PRO*" (Power supply 230V ~ - Inverter 230V ~)

16. MOVING AND SHIPPING

Use suitable padded packaging when shipping the VIP5 controller and ensure that no damage has been sustained before reinstallation.

17. OPERATING PRECAUTIONS

ATTENTION: **It is necessary to carefully read about the instructions and the risks involved in the use of lubrication machines.**
The operator should make sure he fully understands the operating and safety procedures of the VIP5 Pro controller and any connected machinery or devices.