



**DOSAPRO
MILTON ROY**

Groupe Sundstrand

LMI ELECTRONIC DOSING PUMPS

Code : H9

Basic manual

Mechanical Supplement / Liquid End Supplement

Spare parts list for drive assembly

Microprocessor programming guide

Declaration « CE » of conformity

List of « Technical assistance » and « spare parts » departments



**DOSAPRO
MILTON ROY**

Groupe Sundstrand

INSTRUCTION MANUAL

FOR INSTALLATION,
OPERATING,
AND MAINTENANCE.



**LMI ELECTRONIC DOSING PUMPS
Plunger liquid end
Basic manual**

This manual should be made available to the person responsible for installation,
operating and maintenance.

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PART I – DESCRIPTION

This manual addresses the installation, maintenance and troubleshooting procedures for electronic dosing pumps. An instruction supplement and a liquid end sheet complete this manual.

Please read them carefully before installing your pump.

I – 1. UNPACKING

The packaging must be carefully examined on receipt in order to ensure that the contents have not sustained any obvious damage.

The carton contains the items necessary to a proper installation.

I - 2 - DESCRIPTION

Your pump consists of two parts :

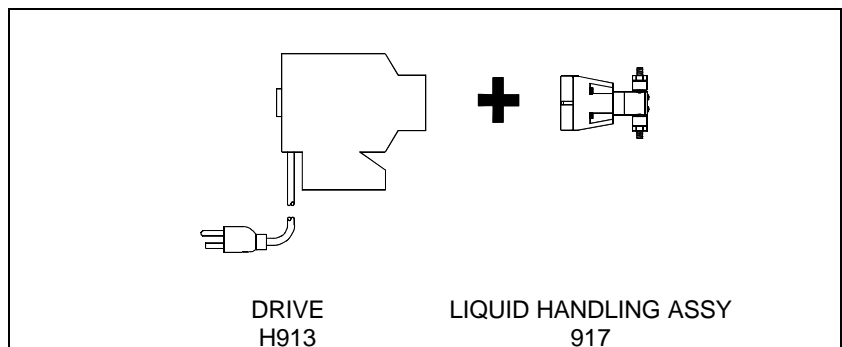
1. The drive assembly
2. The liquid handling assembly

The pump code which appears on the packaging and on the identification plate consists of two codes according to drive assembly type and liquid handling assembly type.

Output adjustment controls

- **Stroke adjustment**
Each pump is equipped with a stroke adjustment. Stroke control provides adjustment of percent of maximum diaphragm travel.
- **Speed adjustment**
The speed control can be adjusted manually, using the keypad or externally as described later. In either case, the speed adjustment controls the frequency or rate at which the chemicals is being injected.
- **Pressure control adjustment**
Pressure control provides the adjustment of the pump's pressure capability and power consumption, reducing heat, pipe shock and pulsation.

For more details, refer to Instruction supplement



I – 3. PRECAUTIONS

Always wear protective clothing, face shield, safety glasses and gloves when working on or near your metering pump.

All LMI pumps are shipped from factory with water in pump head to make easier priming.

If the pump head is empty, refill it with water or solution compatible with pumped solution before starting up the pump (see note on the liquid end sheet).

Solution compatibility

Verify that the liquid handling components are compatible with the pumped solution (refer to Liquid End Sheet).

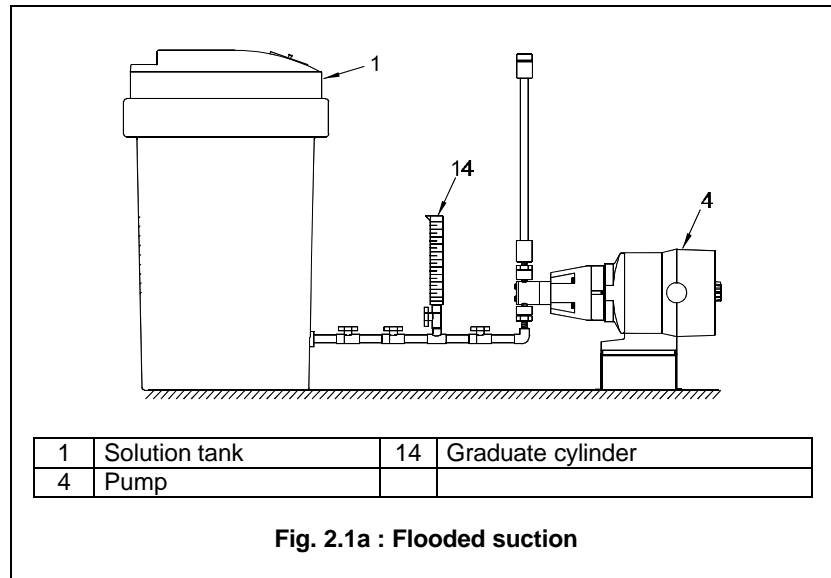
Make certain that all tubing is securely attached to fittings prior to start-up.

PART II – INSTALLATION

II – 1. HYDRAULIC INSTALLATION

This pump requires a flooded suction installation.

For calibration purposes, it is recommended that a 25 ml graduated cylinder be piped in-line, on the suction side of the pump.



Pump location

Locate pump in an area convenient to solution tank and electrical supply.

The pump should not be subjected to ambient temperatures above 50°C. Avoid exposing to direct sunlight the pump.

tubing connections

- This pump utilizes 1/8 " N.P.T. connections.
- These connections require the use of Teflon tape. When applying the Teflon tape, make sure it does not extend over the fitting. This would restrict the flow of chemical.

Refer also to the Liquid End Sheet.

Drip collection

Provide for outlets so that any leak or drips can be easily drained off without any danger. This is especially important in the case of harmful liquids.

A threaded hole allows a union to be fitted to channel leaks with the usual precautions depending on the liquid pumped.

II – 2. ELECTRICAL INSTALLATION

Check the specifications of the pump and compare them with the voltage available on your installation before making connections.

WARNING :

To reduce the risk of electrical shock, the metering pump must be plugged into a fused grounded outlet with ratings conforming to the pump specification chart (see Technical characteristics : refer to peak power to determine the appropriate fuse size).

DO NOT USE ADAPTERS.

All wiring must conform to local electrical codes.

OVER-VOLTAGE

LMI pumps include a Varistor connected on the supply voltage terminals.

This device is an over-voltage protection. It will burn if the supply voltage exceeds 150 V for 115 V rated pumps or 275 V for 230 V rated pumps to protect the pulser.

As soon as it happens, it means the pump got a too high voltage peak. After supply voltage control, replace the Varistor and the pump will run again.

PART III – START UP

Pumps are shipped from the factory with water in the pump head to aid in priming. After a long storage, refill the pump head with water or solution compatible with pumped solution.

III – 1. PRIMING

The control panel has a Start/Stop button labeled « Hold for Prime ». This key has a timer that shuts off after one minute of operation. The lengthy priming time of the pump renders this function unusable. The priming procedure should be done with the pump running in the internal mode.

1. Plug in or switch on your pump.
2. While the pump is running, turn the stroke dial knob to 100 %.
3. Make sure that any valves are open to allow chemical to enter the pump head.

III – 2. OUTPUT ADJUSTMENT CONTROLS

Once the pump has been primed, an appropriate output adjustment must be made.

The name plate indicates the output at max. stroke and max. speed (100%) and max. pressure. The graduations of stroke knob and speed knob correspond to percentage of this max. output.

Example :

Use max. output = 2,3 L/H. If the pump is set at 40% speed and 60% stroke length, the appropriate pump output is $2,3 \text{ L/H} \times 0,40 \times 0,60 = 0,55 \text{ L/H}$.

III – 3. CALIBRATION

Once installation is complete and the approximate output has been determined, the pump should be calibrated to adjust speed and stroke for your actual desired output.

1. Be sure the pump is in normal service (i.e. including factors such as injection pressure, fluid viscosity, suction lift ...).
2. The suction line should be valved to run off the in-line calibration cylinder (see Fig. 2.1a)
3. Plug in and switch pump to internal mode pump until all the air is exhausted from the suction line and head.
4. Turn the pump off. Refill graduated container to a level starting point.
5. Using a stopwatch or timer, turn the pump on for a measured amount of time (50 pump strokes minimum). The longer the time period, the more confident you can be of the results.
6. The volume and the time unit are known. Calculate the output. If the output is too low or too great, adjust speed and or stroke, estimating required correction.
7. Adjust stroke length knob to desired value referring to calibration.

PART IV – MAINTENANCE

IV – 1. SPARE PARTS REPLACEMENTS

WARNING : Always wear protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

LMI metering pumps are designed for trouble-free operation, yet routine maintenance of some parts is essential for optimum performance.

Refer to the spare parts list.

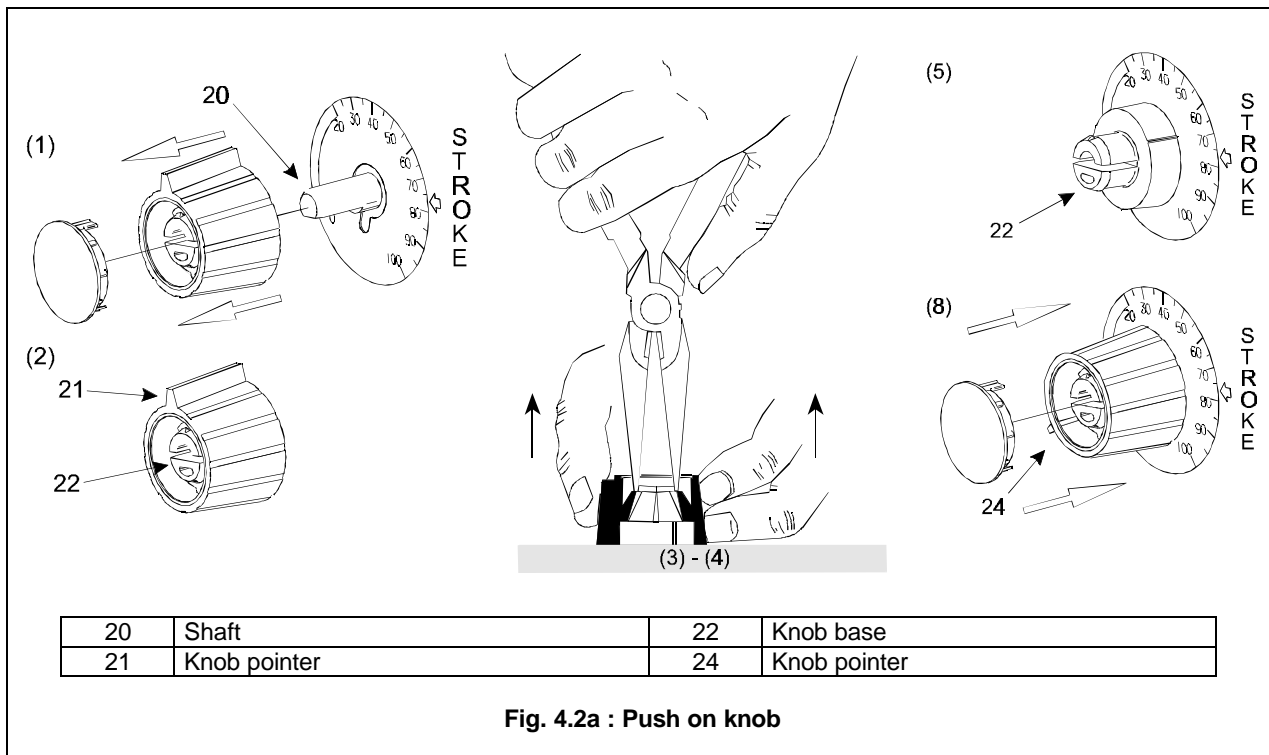
Replacements frequency will depend on your particular application. We recommend replacing these parts at least one a year.

IV – 2. CHECKING PUMP FOR PROPER ZEROING (STROKE KNOB)

1. With pump running, turn stroke knob counter-clockwise toward zero or end of black or red band.
2. Listen to the clicking as the pump is running. The pump should operate quietly at the zero position (no clicking). If the pump continues to click at zero or stops clicking before zero is reached, the pump zero must be reset.

Push on knob

1. Remove stroke knob from the pump by grasping the knob firmly and pulling it toward you.
2. Pry off the yellow cap.
3. Place the knob on a flat surface.
4. Using needle nose pliers, squeeze the inner section together while lifting the outer section up.
5. Push the inner section back onto the « D » shaped stroke shaft.
6. With the pump running, zero the pump by turning the inner section of the knob counter-clockwise until the pump stops clicking.
7. Position the outer section of the knob so that the pointer aligns with zero on the nameplate or end of the black or red band.
8. Push down on the outer section (a snap sound indicates parts are locked together).
9. Replace the yellow cap over the outer section of the knob, aligning the tabs on the cap with the slots inside the knob.



IV – 3. TROUBLESHOOTING

Pump will not prime

- Pump not turned on or plugged in.
Turn on pump/plug in pump.
- Output dials not set properly.
Always prime pump with speed at 80 % and stroke at 100 %.
- Worn seal stacks.
Check for the occurrence of a leak from the detection port. Replace the seal stacks, if necessary.

Pump loses prime

- Solution container ran dry.
Refill container with solution and reprime (see Part III).
- Worn seal stacks.
Check for the occurrence of a leak from the detection port. Replace the seal stacks, if necessary.
- Air leak on suction side.
Check for pinholes, cracks. Replace if necessary.

Leakage at tubing

- Worn tubing ends.
Cut tubing about 25 mm (1") off tubing and then replace as before.
- Worn seal rings.
Replace balls and seal rings (see part IV).

- Solution attacking Liquid handling assembly material.
Consult Technical Assistance Department for alternate materials compatible with the pumped solution.

Low output or failure to pump against pressure

- Pump's maximum pressure rating is exceeded by injection pressure.
Injection pressure cannot exceed pump's maximum pressure. See pump data plate.
- Worn seal rings.
Replace them : see Chapter IV –1.
- Incorrect stroke length.
Check zero on pump/Re-zero pump (See Chapter IV – 2.).

Failure to run

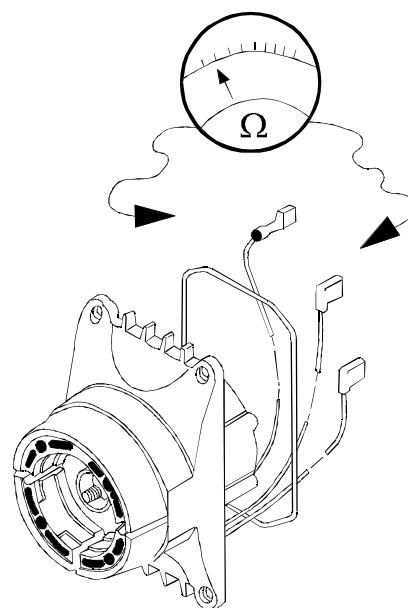
- Pump not turned on or plugged in.
Turn on or plug in pump. Check also programming.
- EPU failure.
Disassemble pump and measure the resistance of the EPU across the EPU wires. Resistance reading should be in accordance to the table (see Chapter IV – 4.). Also check EPU leads to ground.
- Pulser failure.
The pulser should be replaced if EPU checks out OK.

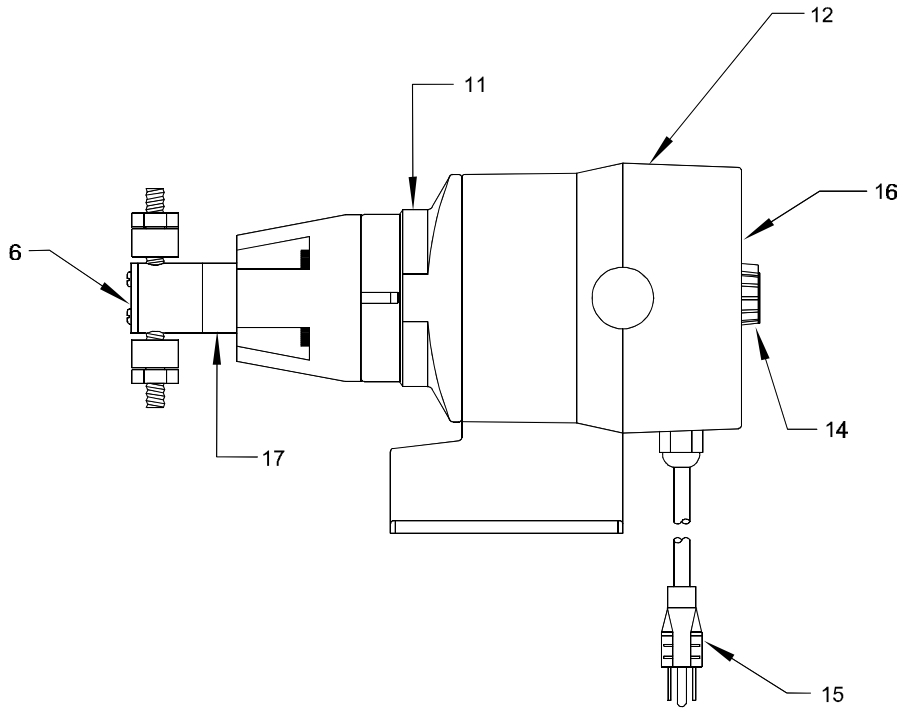
Excessive pump output

- Not enough back pressure.
Use appropriate back pressure valve.
- Excessive strokes per minute.
Replace pulser or control panel.

IV – 4. EPU RESISTANCE CHART

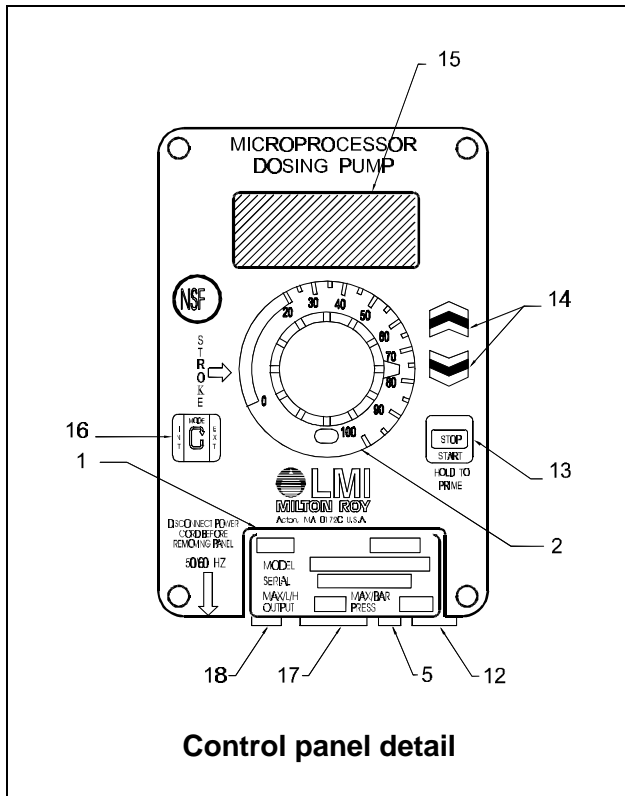
| Pump series | Voltage | Coil resistance (ohms) 20° C (68°F) |
|---|---------|--|
| Ax4, Ax5, Ax6 Px4, Px5, Px6, Px8 H9 | 115 V | 76 – 87 |
| | 230 V | 307 – 353 |
| Ax7, Ax8 Px2, Px3 | 115 V | 152 – 176 |
| | 230 V | 583 – 671 |
| Bx1, Bx2, Bx3, Bx4 | 115 V | 43 – 49 |
| | 230 V | 167 – 193 |
| Cx0, Cx1, Cx2, Cx3, Cx4, Cx5 E70, E71, E72, E73, E74 | 115 V | 22.8 – 26,2 |
| | 230 V | 91 – 105 |
| J54D, J55D, J56D | 12VDC | 1.1 – 1.3 |



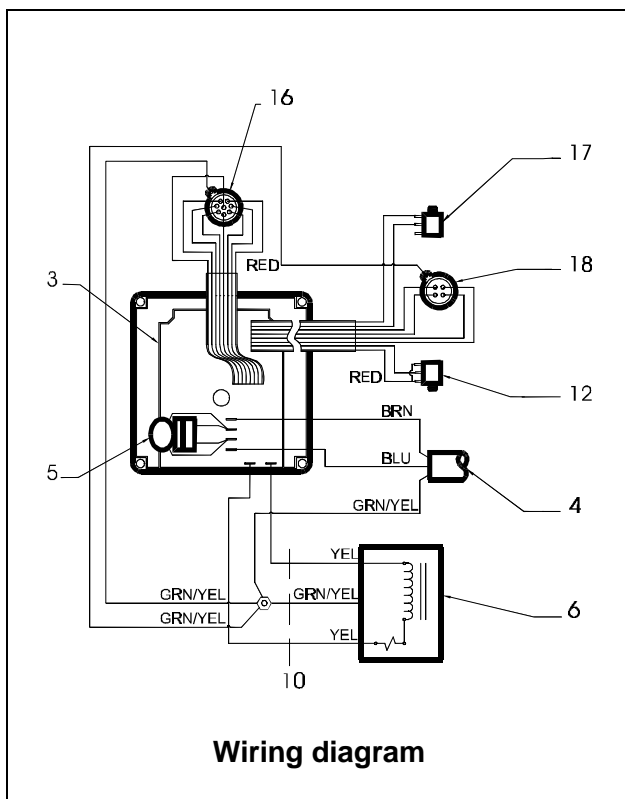


| | | | |
|----|-----------------------|----|------------------------|
| 6 | Pump head | 14 | Stroke knob |
| 11 | Spacer E.P.U. | 15 | Power cord |
| 12 | Metering pump housing | 16 | Liquid crystal display |
| 17 | Return port | | |

Metering pump component diagram



| | |
|----|------------------------|
| 1 | Identification plate |
| 2 | Stroke knob |
| 5 | Low level socket |
| 12 | 4-Pin connector |
| 13 | Start/stop/prime key |
| 14 | Speed control keys |
| 15 | Liquid crystal display |
| 16 | Mode select key |
| 17 | 8-pin connector |
| 18 | Flow monitor input |



| | |
|---------|---------------------|
| 3 | Pulser assembly |
| 4 | Power cord |
| 5 | Mov/cap assembly |
| 6 | EPU assembly |
| 10 | Housing wall |
| 12 | Low level socket |
| 16 | 8-Pin connector |
| 17 | Flow monitor socket |
| 18 | 4-Pin connector |
| BLU | Blue |
| BRN | Brown |
| GRN/YEL | Green/yellow |
| RED | Red |
| YEL | Yellow |

TECHNICAL CHARACTERISTICS

| | H91x | H92x | H93x |
|------------------------------------|-------|-------|-------|
| Output | | | |
| - max. (l/h) | 0.5 | 0.38 | 0.25 |
| - min (ml/h) | 0.021 | 0.016 | 0.010 |
| Max. pressure (bar) | 21 | 42 | 70 |
| Stroke capacity (ml) | | | |
| - min. | 0.02 | 0.015 | 0.01 |
| - max. | 0.08 | 0.06 | 0.04 |
| Stroke frequency (cps/h) | | | |
| - min. | 1 | 1 | 1 |
| - max. | 6000 | 6000 | 6000 |
| Min. recommended stroke length (%) | 25 | 25 | 25 |
| Peak power (W) | 150 | 150 | 150 |
| Average power (Wh) | 18 | 18 | 18 |

Note :

The « x » which appears in the code designates both voltage and power cord/plug type.

CAUTION :

When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering pump.

A. NOTES

- All debris must be cleaned or blown out of piping before connecting to the pump.
- The outer flange of the suction and discharge valves must be supported when connecting suction and discharge piping, to prevent overtightening.
- All NPT threaded connections require Teflon[®] tape.
- All piping must be installed so that it does not place a supportive load on the liquid end.
- The pump is capable of generating 1000 psi. Care must be given to make sure that the piping used is capable of withstanding maximum pressure.
- Adhere to all plumbing regulations and codes.
- The use of an in-line 100 micron filter or strainer in the suction line is highly recommended to keep the pump clear of debris which may impede the performance of the pump.

B. DISCHARGE AND SUCTION PIPE CONNECTIONS

Note : Flooded suction is required for proper pump operation.

The suction and discharge valve assemblies have NPT threads which will require the use of Teflon[®] tape when connecting to your system. Be careful not to over-wrap the ends or ports of the valves with the Teflon[®] tape.

It is recommended that a pipe union be installed on both suction and discharge piping, so that the pump can be removed if required.

After applying the Teflon[®] tape, connect piping to the suction side of the pump.

Liquid end LE917 only

Place and hold a 7/8 " wrench across the flats on the lower body of the check valve. This is allow the tightening of the fitting without over tightening of the check valve. Tighten the fittings and repeat this procedure for the discharge side of the pump, while holding the wrench across the flats on the upper body of the check valve.

C. PRIMING

Note :

The pump control panel has a STOP/START button labeled « Hold for prime ». This function has a cycle time of one minute. The lengthy priming time of the pump renders this function unusable.

To ensure pump performance and quality, all pumps are tested with water at maximum rated pressure, before they leave the factory. If the chemical that is being pumped is not compatible with water, disassemble the pump head assembly and dry all components.

1. Plug in, or power up the pump.
2. Set the pump to internal mode by pressing and holding the « Int/Ext » button for three seconds, or until the display reads « int ».
3. With the pump running, set the stroke dial to 100 %.
4. Set the pump speed to 100.

Note :

The H9 pump is a high pressure, low volume, precision metering pump. It injects very small amounts of solution. Due to this characteristic, the H9 will take a considerable amount of time to prime.

D. LIQUID END CONSTRUCTION

Material

| Components | LE-N...P | LE-917 |
|--------------------------|-----------|-----------------|
| Liquid end body | Inox | Stainless Steel |
| Ball | Hastelloy | Stainless Steel |
| Seal ring | Inox | PTFE |
| Seal stack | PTFE | PTFE + Viton |
| Valve housing/Valve seat | Inox | Stainless Steel |

Sizes

| Components | LE-N...P | 917 |
|----------------|-----------|-----------|
| Piston (Ø, mm) | 8/10/12 | 6.35 |
| Ball (Ø, mm) | 3.17 | 3.17 |
| Connections | 1/4 " NPT | 1/8 " NPT |

Assembly / Disassembly of the check valves

Drawing 106.6107.000 rev01

LMI000FRa

Disassembly

Assembly

Position

Torque value

[405]

50 N.m

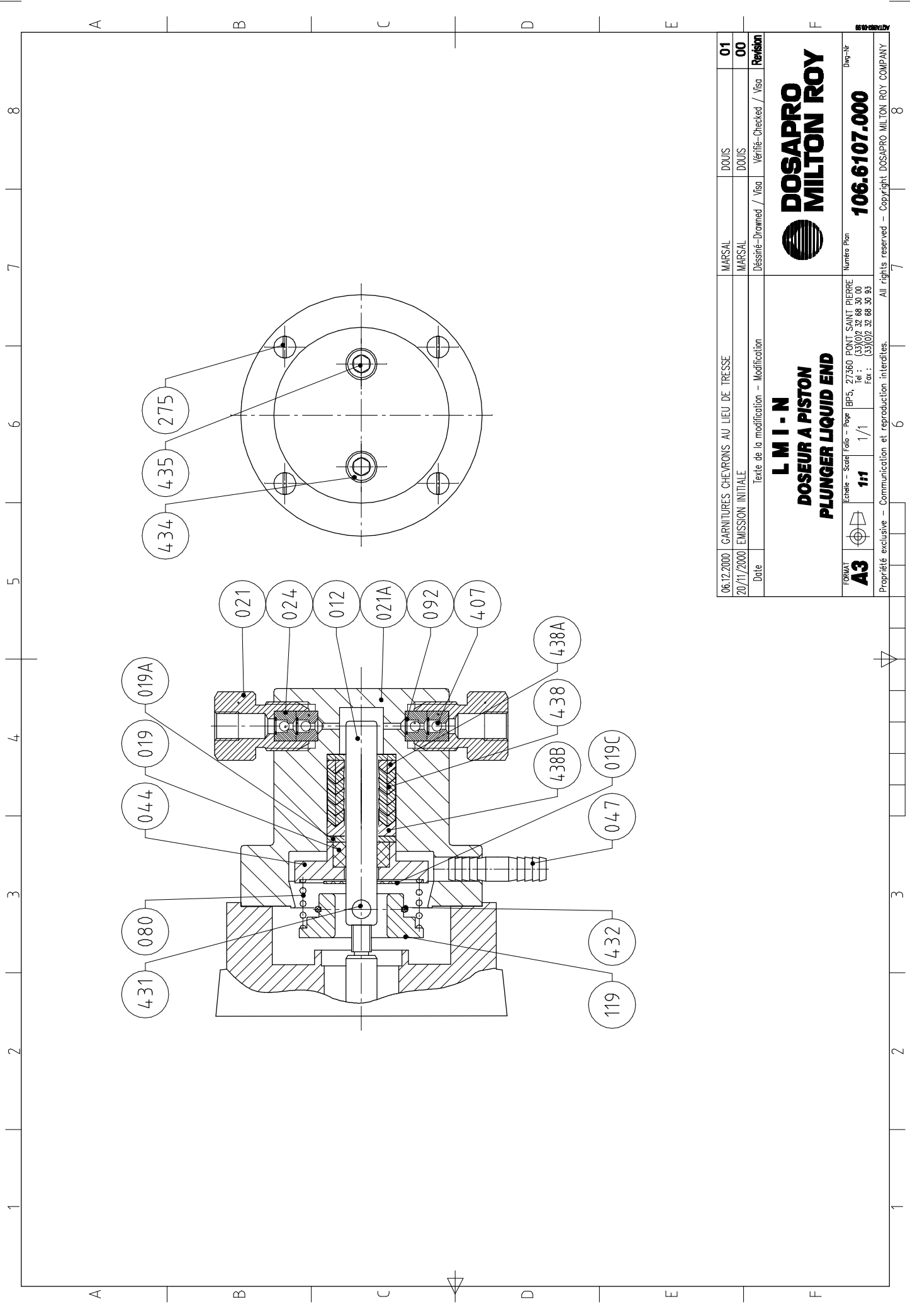
1. Unscrew the part [021]
2. Remove the whole [024]
3. Clean the part if necessary replace it

1. Insert the part [024] into the part [021A]



Position de la pièce [092]

2. Grease the thread of the part [021]
3. Screw the part [021]



| | | | | |
|------------|---|----------------------|------------------------|-----------|
| 06.12.2000 | GARNITURES CHEVRONS AU LIEU DE TRESSE | MARSAL | DOUIS | 01 |
| 20/11/2000 | EMISSION INITIALE | MARSAL | DOUIS | 00 |
| Date | Texte de la modification - Modification | Dessiné-Drawn / Viso | Vérifié-Checked / Viso | Revision |



LMI-N
DOSEUR A PISTON
PLUNGER LIQUID END

| | | | |
|--|--|---|-------------------------------|
| FORMA A3 | Echelle - Scale / Folio - Page 1/1 | BP-5, 27360 PONT SAINT PIERRE Tel : (33)(0)2 32 68 30 00 Fax : (33)(0)2 32 68 30 93 | Dwg-Nr 106.6107.000 |
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Assembly / Disassembly of the liquid end

Drawing 1066107000 rev01

LMI001GBa

Disassembly

Assembly

Position

Torque value

[275]

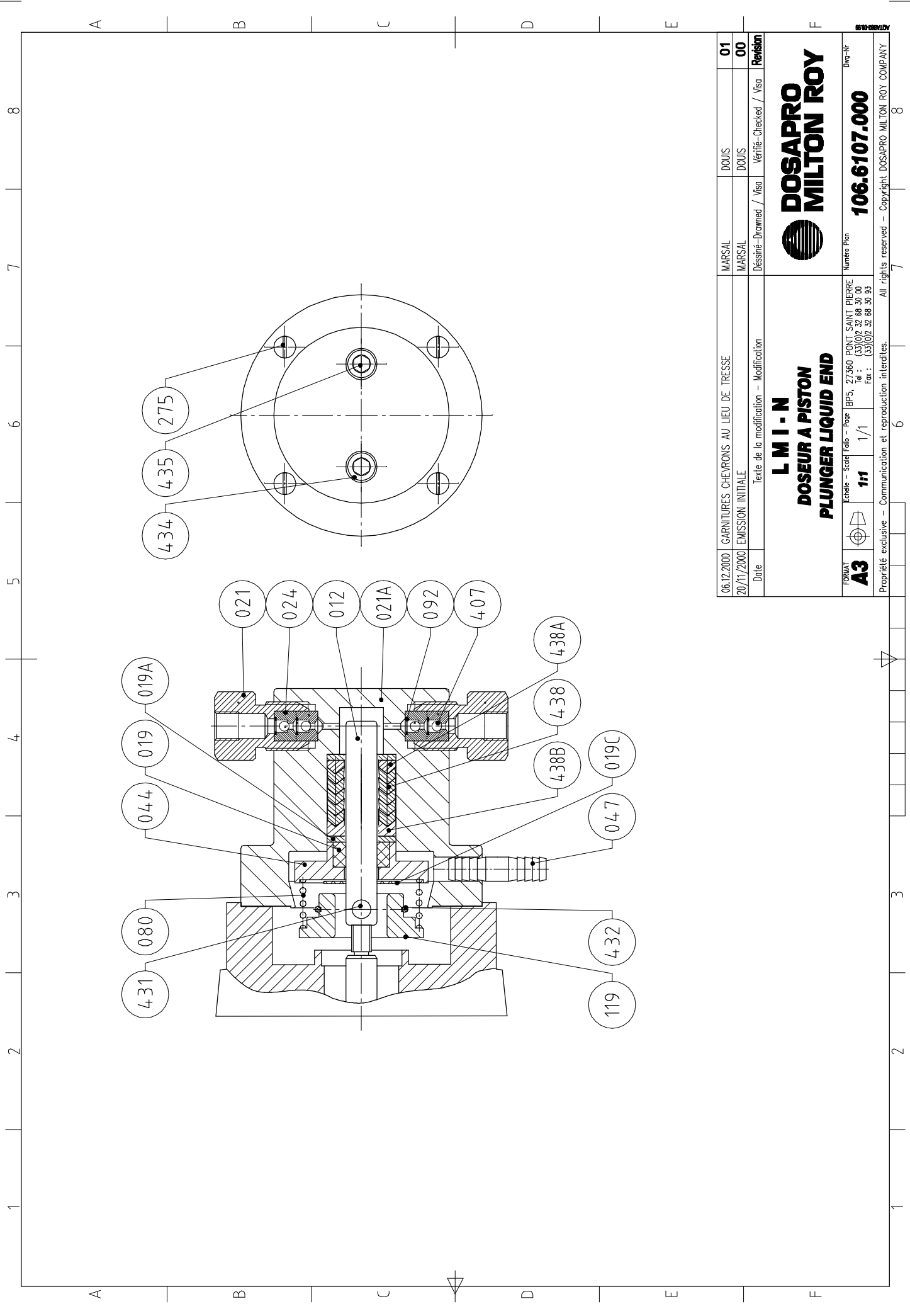
5 N.m

[435]

0.5 N.m

1. Unscrew the screw [275],[434]
2. Remove the part [021A]
3. Remove the part [019A],[438A],[438],[019A]
4. Remove the parts [019A],[044],[019C],[080]
5. Remove the parts [431],[119],[012]

1. Insert the part [019A] into the part [021A]
2. Insert the part [438A] into the part [021A] (lips inside)
3. Insert the part [438B] into the part [021A]
4. Insert the part [019A] into the part [021A]
5. Fit the parts [019],[044]
6. Insert the part [044] into the part [021A]
7. Position the screws [435]
8. Fit the part [119],[012],[431]
9. Insert the part [119] into the part [432]
10. Insert the part [019C] into the part [012]
11. Grease the parts [431],[012] (Kluber Paraliq GTE)
12. Fit the parts [080],[119]
13. Introduce the whole into the part [021A]
14. Fit the part [047],[021A]
15. Fit the liquid end to the mechanical assembly
16. Screw the screws [275]
17. Screw the screws [435]



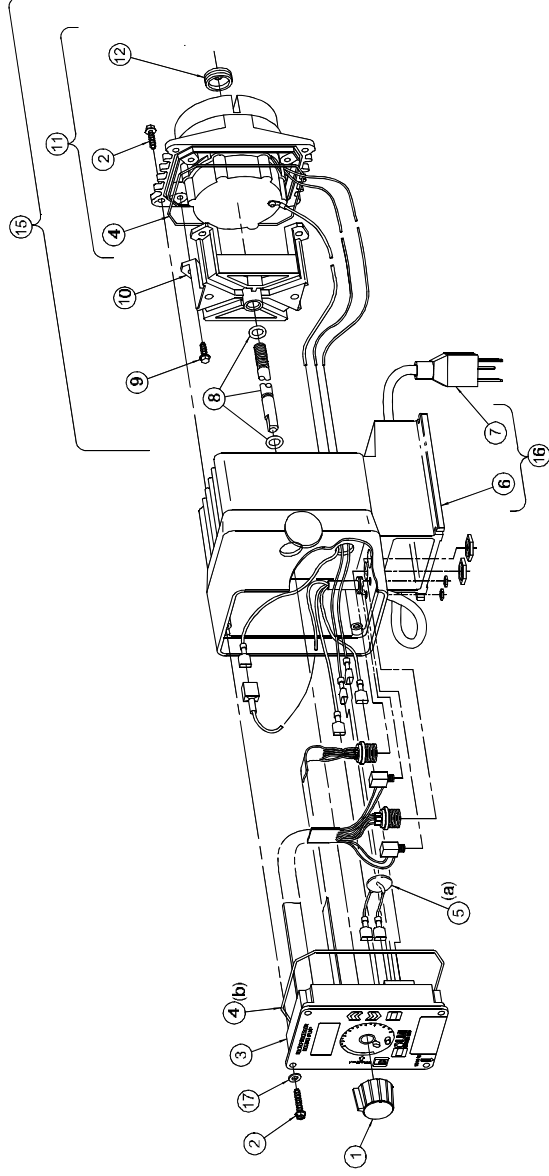
| | | | | |
|------------|---|----------------------|------------------------|-----------|
| 06.12.2000 | GARNITURES CHEVRONS AU LIEU DE TRESSE | MARSAL | DOUIS | 01 |
| 20/11/2000 | EMISSION INITIALE | MARSAL | DOUIS | 00 |
| Date | Texte de la modification - Modification | Dessiné-Drawn / Viso | Vérifié-Checked / Viso | Revision |

LMI-N
DOSEUR A PISTON
PLUNGER LIQUID END

DOSAPRO MILTON ROY

| | | | | |
|--------------------|-------------------------------|----------------------------|---|-------------------------------|
| FORMA A3 | Echelle - Scale 1:1 | Folio - Page 1/1 | BP-5, 27360 PONT SAINT PIERRE Tel : (33)(0)2 32 68 30 00 Fax : (33)(0)2 32 68 30 93 | Dwg-Nr 106.6107.000 |
|--------------------|-------------------------------|----------------------------|---|-------------------------------|

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(a) included with key no 3 (b) not included with key no 3

PREVENTIVE MAINTENANCE

| Key no | Qty | Description | H9xx |
|--------|-----|-------------|-------|
| 12 | 1 | Seal | 10973 |

CORRECTIVE MAINTENANCE

| Key no | Qty | Description | H911 | H912 | H913 | H915 | H916 | H917 | H921 | H922 | H923 | H925 | H926 | H927 | H931 | H932 | H933 | H935 | H936 | H937 |
|--------|-----|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 1 | Stroke knob | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 | 31890 |
| 3 | 1 | Control panel assembly | 35732CE | 35733CE | 35734CE | 35735CE | 35736CE | 35737CE | 35738CE | 35739CE | 35740CE | 35741CE | 35742CE | 35743CE | 35744CE | 35745CE | 35746CE | 35747CE | 35748CE | 35749CE |
| 5 | 1 | Varistor assembly | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 | 10626 |
| 11 | 1 | EPU | 35156CE | 35163CE | 35164CE | 35165CE | 35166CE | 35167CE | 35168CE | 35169CE | 35170CE | 35171CE | 35172CE | 35173CE | 35174CE | 35175CE | 35176CE | 35177CE | 35178CE | 35179CE |
| 15 | 1 | EPU w/stroke adjustment | 35157CE | 35162CE | 35163CE | 35164CE | 35165CE | 35166CE | 35167CE | 35168CE | 35169CE | 35170CE | 35171CE | 35172CE | 35173CE | 35174CE | 35175CE | 35176CE | 35177CE | 35178CE |

| Key no | Qty | Description | H9x1 | H9x2 | H9x3 | H9x5 | H9x6 | H9x7 |
|--------|-----|---------------------|---------|---------|---------|---------|---------|---------|
| 7 | 1 | Power cord assembly | 29033CE | 29039CE | 29042CE | 29044CE | 29046CE | 29048CE |
| 16 | 1 | Housing assembly | 33757CE | 33848CE | 33758CE | 33759CE | 33849CE | 33760CE |



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INSTRUCTION MANUAL

FOR INSTALLATION,
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**LMI ELECTRONIC DOSING PUMPS
SERIES H9
Microprocessor programming guide**

This manual should be made available to the person responsible for installation,
operating and maintenance.

CONTENTS

I – DESCRIPTION

- I – 1. Unpacking
- I – 2. Description
- I – 3. Accessories
- I – 4. Precautions

II – INSTALLATION

- II – 1. 4-Pin connector
- II – 2. 8-Pin connector (2-conductor cable)
- II – 3. 8-Pin connector (8-conductor cable)
- II - 4. Low level input

III – START UP

- III – 1. Operation
- III – 2. External control modes
- III – 3. Advanced features and the setup menu
- III – 4. Error messages

PART I – DESCRIPTION

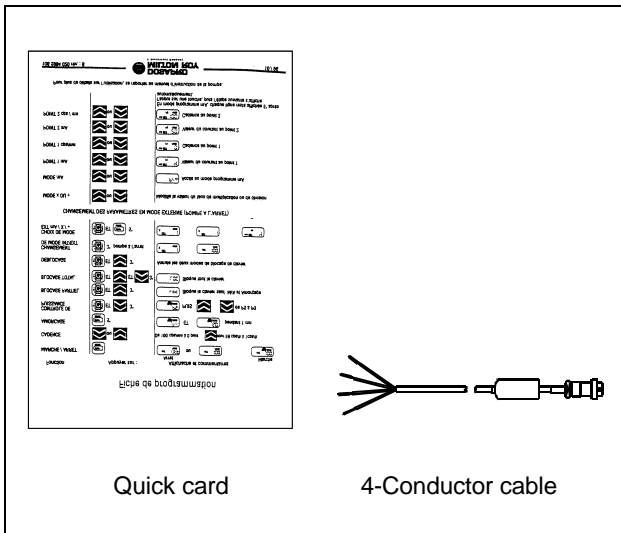
This manual supplement describes programming and operation. It also describe details of the pumps external inputs and outputs and how they are connected.

For complete details on installation, maintenance and troubleshooting, please refer to basic manual.

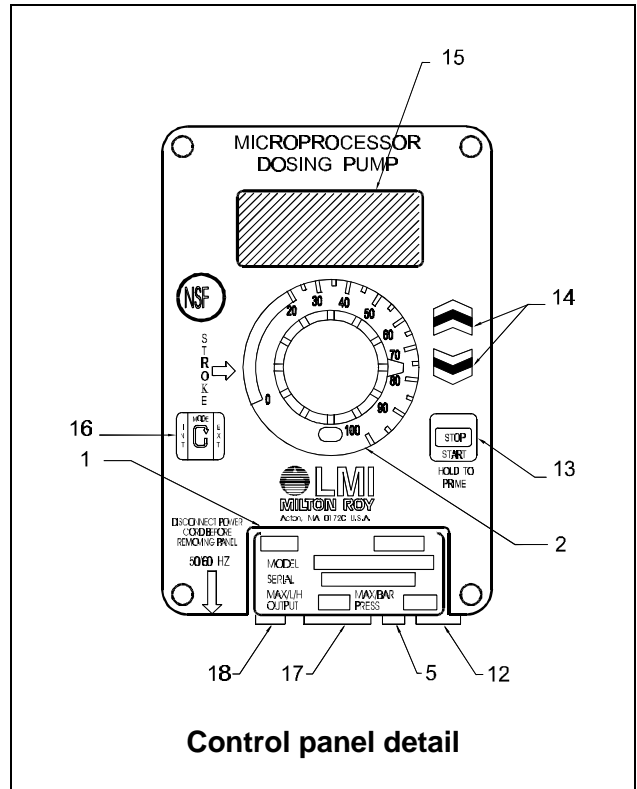
I – 1. UNPACKING

With your pump, you will find :

- 4-conductor cable (standard)
- a quick card



DISPLAY/KEYPAD



I - 2 - DESCRIPTION

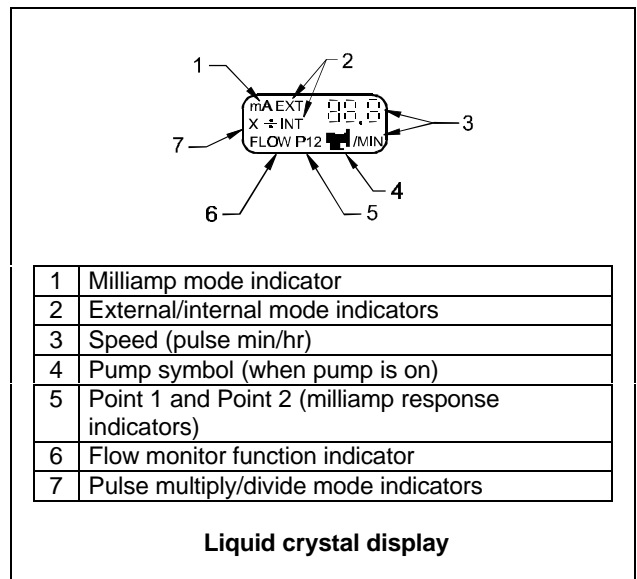
The programmable electronic metering pumps offer an extensive range of features, including microprocessor control for accurate and flexible automation in response to instrument signals.

The microprocessor design employs a customized liquid crystal display (LCD) and tactile response keypad.

The « state-of-the-art » surface mount electronics are fully encapsulated to ensure protection in its working environment. All external inputs and outputs are opto-isolated from the microprocessor.

LCD screen [15]

The LCD screen is a window in which all values and menu choices are displayed.



Start/stop key [13] {start/stop}

This key turns the pump on or off.

If the pump is not running, pressing this key will cause the pump to start running. The « pump » symbol appears on the display while the pump is running. Each time the pump strokes, the symbol « pump » clears.

If the pump is running, pressing this key will stop the pump

This key is also used to prime the pump (see basic manual).

Up and down keys [14] {down} {up}

These keys allow :

- changing the stroke frequency
- altering the pressure level
- activating and deactivating the keypad lock
- programming the divide and multiply values and milliamp response
- accessing the setup menu
- changing certain parameters included in the setup menu

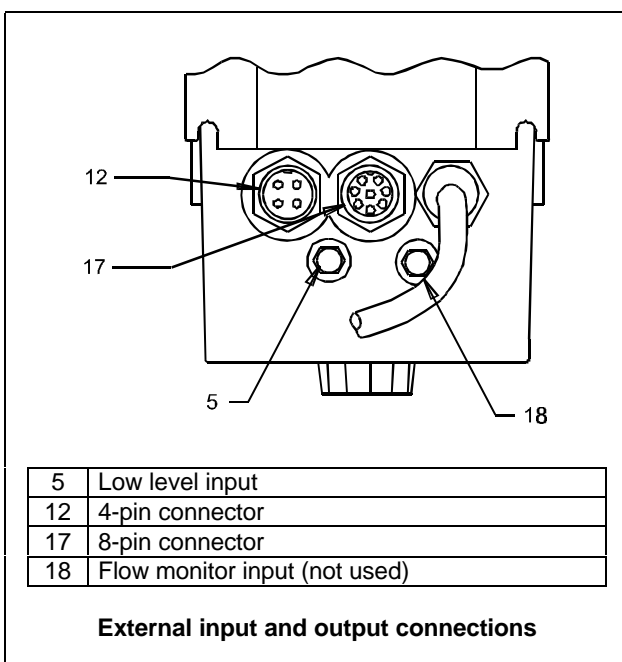
All of these functions are covered in greater detail later in this supplement.

Mode key [16] {INT/EXT}

This key allow

- changing to or from external or internal mode
- accessing the pressure level and keypad lock menus
- accessing specific advanced features in the setup menu

INPUT AND OUTPUT CONNECTIONS



FEATURES

- Stroke frequency adjustment from 0 SPH (strokes per hour) to 100 SPM (strokes per minute).
- Internal (manual) or external mode select.
- Flexible slope adjustable response to mA input signals.
- Divide or multiply (batch) incoming pulses (1 to 999).
- Keypad locking.
- Low-level shutoff with alarm output.
- 6-level pressure control.
- Continuous non-volatile memory (EEPROM) – no battery required.
- Remote ON/OFF control.
- Pulse (pacing) output.
- Automatic line voltage compensation and over voltage protection.
- Batch accumulate option.
- Programmable menu for optional features/parameters.
- Integral blowdown controller feature.

I - 3. ACCESSORIES

4-conductor cable

This cable is used for connecting incoming pulse or pacing signals such of those triggered by a manual switch, reed switch, opto-coupler or by NPN or PNP transistors.

The remote ON/OFF input is also accessed through this cable.

2-conductor cable (option)

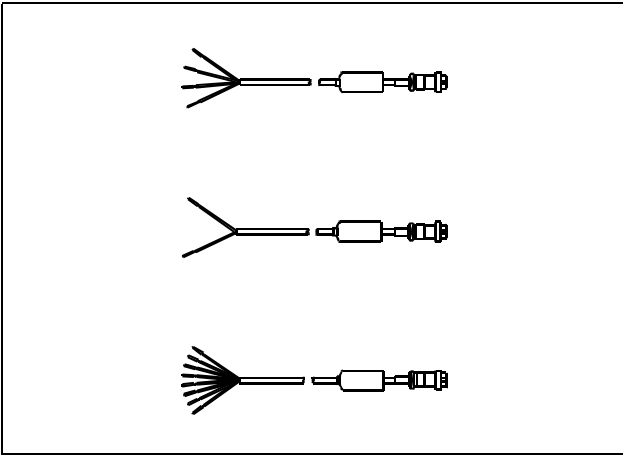
The 2-conductor cable which connects to a 8-pin connector, is supplied in option. It is available for pacing in response to a 0 to 20 mA (4-20 mA) instrument signal only.

8-conductor cable (option)

The optional 8-conductor cable can be used to control stroke frequency in response to a 0 to 20 mA or 4-20 mA instrument signal.

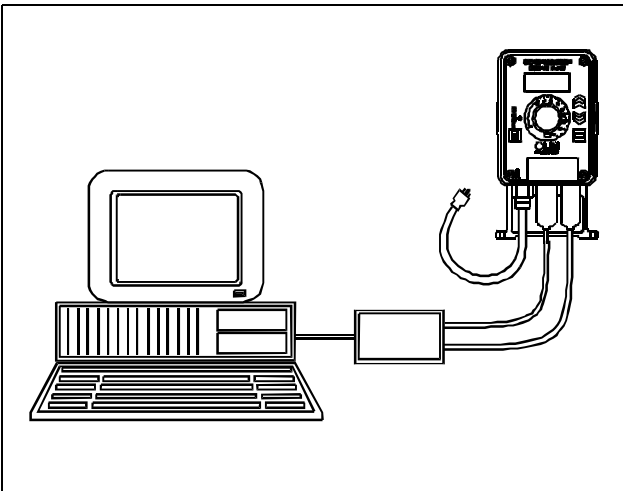
It provides an input for « flow monitoring ».

This cable assembly also provides output signals for pacing (pulse output), alarm (general) and computer alarm.



**LiquiComm[®] computer interface package
(option)**

The optional LiquiComm[®] package may be used to control and monitor up to 32 pumps from a computer over a serial RS485 interface (see drawing). Please contact us for further details.



I – 4. PRECAUTIONS

Please, refer to basic manual.

PART II – INSTALLATION

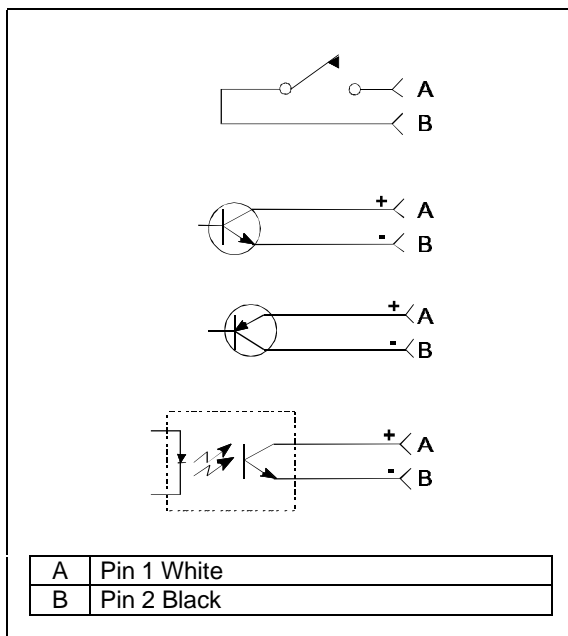
Refer to Part II (basic manual) to install the pump.

II – 1. 4-PIN CONNECTOR

Pin out table

| PIN | WIRE | SIGNAL |
|-----|-------|--------------------------------|
| 1 | White | + 15 V output |
| 2 | Black | Pacing input |
| 3 | Green | + 15 V ground |
| 4 | Red | Remote ON/OFF & computer input |

Methods of triggering



Note :

Switch or transistor must be capable of switching 2 mA at 15 VDC. When in divide mode, the switch must close then open to trigger.

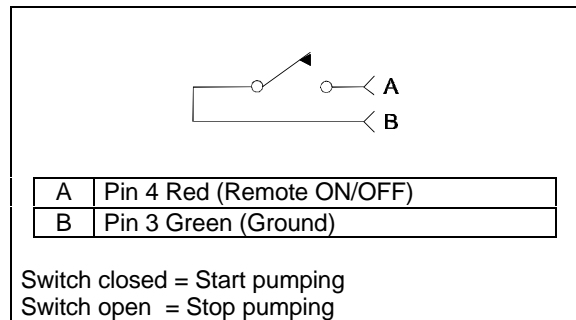
Minimum time in low impedance state (i.e. switch closed) is 60 mSec. By default.

Setup menu item 6 sets this value in multiples of 4 mSec. Example : Default = 4 x 15 = 60 mSec.

Remote On/Off

(Opto_isolated input)

Switching this line to ground starts the pump. Releasing this line, stops the pump. The {START/STOP} key will always override the Remote Start/Stop.



Note :

Switch must be capable of switching 2 mA at + 15VDC.

Minimum time in low impedance state (i.e. switch closed) is approximately one (1) second.

II – 2. 8-PIN CONNECTOR (2-conductor cable)

Optional equipment

Pin out table

| PIN | WIRE | SIGNAL |
|-----|-------|-----------|
| 1-2 | | Not used |
| 3 | White | + 4-20 mA |
| 4 | Black | - 4-20 mA |
| 5-8 | | Not used |

Milliamp input cable

Pin 3 : + 0 à 20 mA

Pin 4 : - 0 à 20 mA

This is a reverse polarity protected with a 22 ohms impedance, a resolution or 0,1 mA and an accuracy of \pm 0,2 mA typically.

II – 3. 8-PIN CONNECTOR (8-conductor cable)

Optional equipment

Pin out table

| PIN | WIRE | SIGNAL |
|-----|--------|---|
| 1 | Red | + 15 V output |
| 2 | Black | + 15 V ground |
| 3 | Violet | + 0-20 ou 4-20 mA (+) Input |
| 4 | Green | - 0-20 ou 4-20 mA (-) Input |
| 5 | Orange | Pulse output |
| 6 | Yellow | Alarm output |
| 7 | Brown | Flow input |
| 8 | Blue | Computer alarm output & computer output |

Milliamp input cable

Pin 3 : + 0 à 20 mA

Pin 4 : - 0 à 20 mA

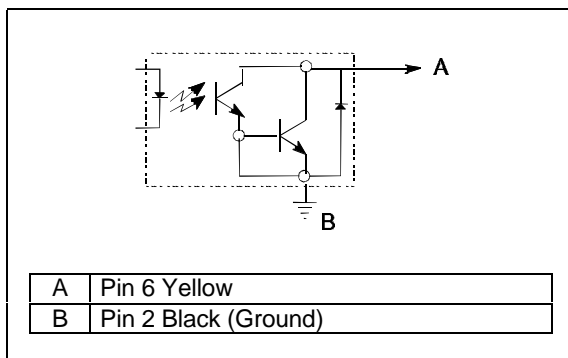
This is a reverse polarity protected with a 22 ohms impedance, a resolution of 0,1 mA and an accuracy of $\pm 0,2$ mA typically.

15 V output

The + 15 V output (pin 1, red) is regulated and capable of delivering 30 mA current.

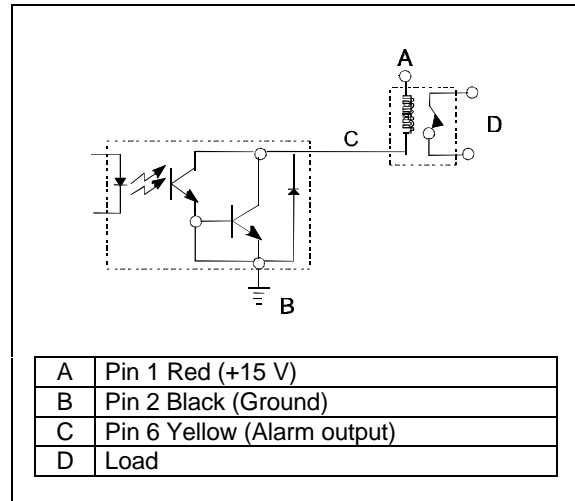
Alarm output

This is an opto-isolated open collector Darlington pair capable of switching 25 mA at + 24 VDC to within 1 V if ground typically.



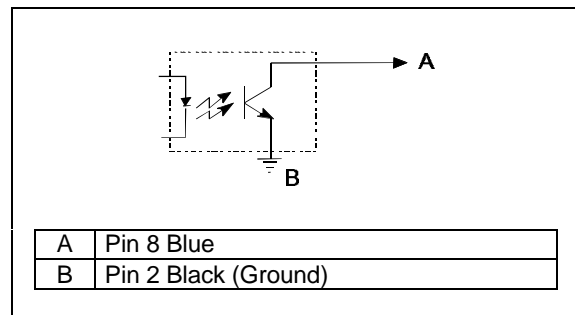
The output pair turns ON when an alarm condition occurs (i.e. low level) and remains ON until the alarm condition is cleared.

Application : relay switching



Computer alarm output

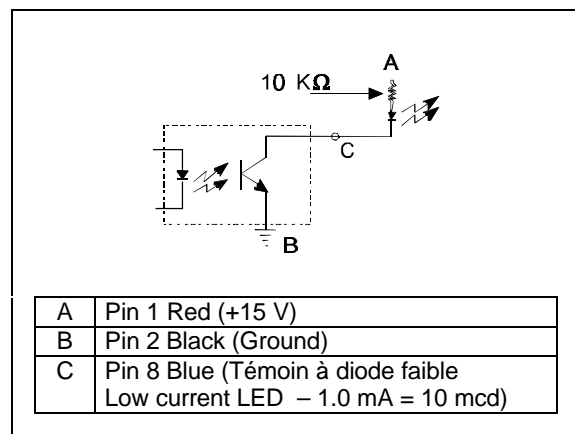
This is an opto isolated, open collector output capable of switching 2 mA at + 24 VDC to within 0,4 V of ground typically.



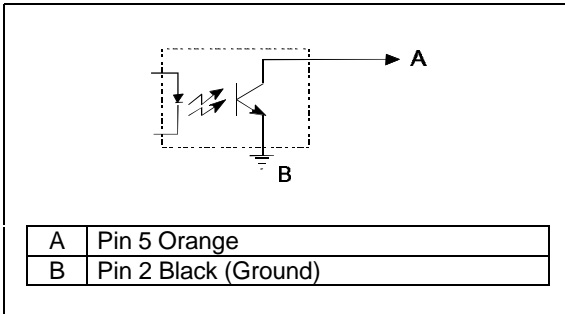
This output tracks the alarm output (i.e. the conditions for activating and de-activating this output are the same as for the alarm output).

This output may be used to directly switch small loads such as computer inpputs and low current LEDs. It may also be used to initiate switching of larger loads if suitable buffer circuitry is provided.

Application : Low current LED switching



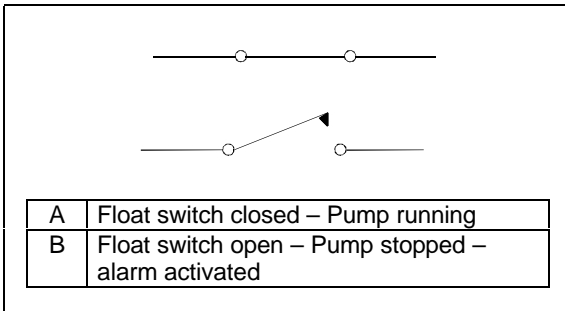
Pacing output (opto-isolated output)



The output transistor turns ON at the start of a stroke and remains ON for approximately 100 mSec.

II – 4. LOW LEVEL INPUT

Opening the float switch (i.e. breaking the line from ground) stops the pump and activates the alarm output.



Note :

Switch or transistor must be capable of switching 2 mA at 15 VDC. When in divide mode, the switch must close then open to trigger.

Minimum time in low impedance state (i.e. switch closed) is approximately 1 second (refer also Chapter III – 1. Section Low level Switch).

PART III – START UP

Refer to Part III (basic manual) to start up the pump.

These pumps feature EEPROM nonvolatile memory. The pump will always power up in the last used mode.

When shipped from the factory the pump will power up

- In the « internal » (manual) mode,
- With the pump off,
- And a speed setting of 100 SPM.

Note :

If the power to the pump is cut less than 15 seconds after the last programmed values have been set, the latest changes will not be stored in nonvolatile memory. Allow at least 15 seconds before disconnecting from power to ensure that the latest changes are stored.

III – 1. OPERATION

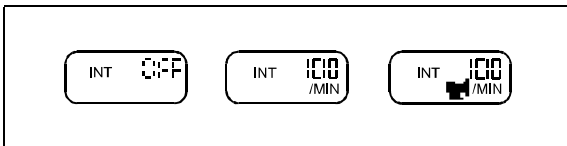
Pump START/STOP

When the pump is OFF, the LCD screen will alternate between [INT OFF] and [INT 100] every 16 seconds.

Press the {START/STOP} key to start pump. The symbol « pump » appears on the LCD. Each time the pump strokes, the symbol « pump » disappears. Press the {START/STOP} key again to stop the pump.

Note :

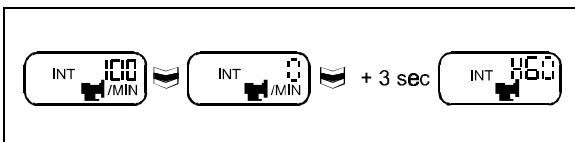
« INT » signifies that the pump is in the « internal » (manual) mode.



Speed

The speed may be changed with the pump ON or OFF. To increase or decrease the speed, press or hold the {UP} or {DOWN} key. The range runs from 0 SPH to 100 SPM. While normally the speed will be set in SPM, if settings of SPH are desired, hold the {DOWN} key until the display reads 0, then continue to hold it for an additional three (3) seconds. The display will then show H60, which is 60 SPH. The speed can be further reduced to 0 SPH with the {DOWN} key.

Example :

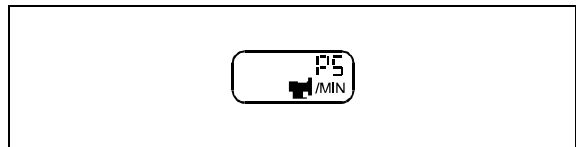


Pressure level control

The maximum pressure rating of your pump can be adjusted to reduce pulsation shock in your discharge line. The pumps have a 6-point pressure control scale. The minimum setting is 0 and the maximum is 5.

To access the pressure setting, press the {INT/EXT} key and {UP} key at the same time and hold for two (2) seconds. The current pressure setting may be altered using the {UP} and {DOWN} keys.

The pressure may be changed with the pump ON or OFF and in either internal or external mode.



Keypad lock

The pump has two (2) lock modes to prevent casual tampering.

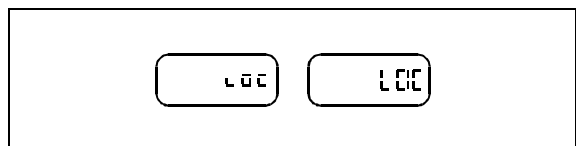
The small « loc » de-activates all key functions except START/STOP and PRIME.

To activate this « loc » mode, press the {INT/EXT} key and {DOWN} key at the same time and hold for two (2) seconds. The LCD will read [loc] for five (5) seconds and then return to the previous display. This display [loc] re-appears when any key except the {START/STOP} key is pressed.

The large « LOC » disables all keypad entries, including START/STOP.

Activate this by pressing the Mode, Down, and Up keys at the same time and holding for two (2) seconds. The LCD will read [LOC] for five (5) seconds and then return to the previous display. This display [LOC] re-appears whenever any key is pressed.

To de-activate either lock mode, press the {INT/EXT} key and {DOWN} key at the same time, and hold for two (2) seconds.

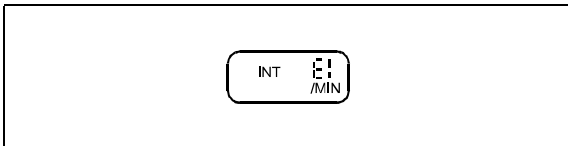


Low-level switch

When the Low-level switch is fitted to the pump and a fault condition exists, the « E1 » error code will flash on the LCD screen.

When a fault condition exists, the pump is stopped and the alarm and computer alarm lines are activated to allow remote monitoring. After clearing the fault (by filling the tank), the pump will automatically restart.

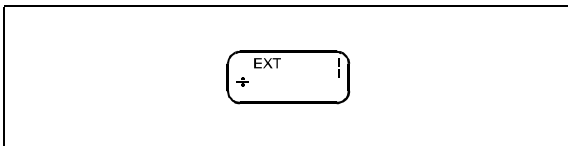
For more information on the Low-level switch, see the specific documentation.



III – 2. EXTERNAL CONTROL MODES

To access to pulse divide, pulse multiply or milliamp response, the pump must be changed from Internal (manual) mode to External mode.

To do this, first be sure the pump is stopped. Press the {INT/EXT} key and hold it for three (3) seconds. The LCD screen displays the last External mode that was programmed. If this is the first time the pump has been put in External mode, the factory default will be displayed on the LCD screen. The factory default mode is « External Pulse Divide » with a divide value of one (1). The display will alternate between SPM and OFF.

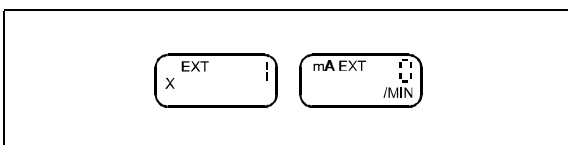


External mode select

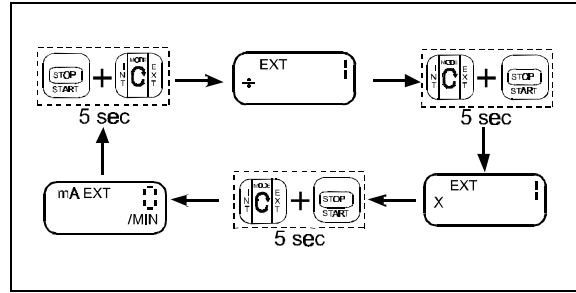
(pulse divide, pulse multiply, and mA response)

Any of three external modes may be selected when the pump is stopped by pressing and holding the {INT/EXT} key and {START/STOP} key for five (5) seconds, then releasing. Pressing and releasing these keys brings you to Pulse multiply mode. In this mode, the LCD screen alternates between the pulse multiply value and OFF.

Pressing and releasing these keys one more time brings you to the third external mode, mA response. In this mode, the LCD screen alternates between SPM and the mA value.



Summary of external mode select



Programming the pulse divide value

Be sure the pump is off.

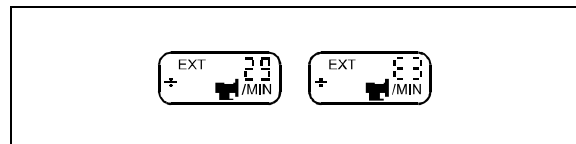
Select pulse divide mode (see above).

The divide value is altered by using the {UP} and {DOWN} keys. The valid range for the divide value runs from 1 to 999. With the pump running in the divide mode, the speed in SPM is calculated based on the rate of incoming pulses and the divide value.

Note :

If the calculated speed is less than one (1) SPM, the LCD screen will display 0 SPM.

If the calculated speed is greater than 100 SPM, the « E3 » error code will be displayed periodically until the fault condition is corrected. This error does not activate the alarm outputs or stop the pump.



Programming the pulse multiply (batch) value

Be sure the pump is off.

Select pulse multiply mode (see above).

The multiply value is altered by using the {UP} and {DOWN} keys. The valid range for the multiply value runs from 1 to 999.

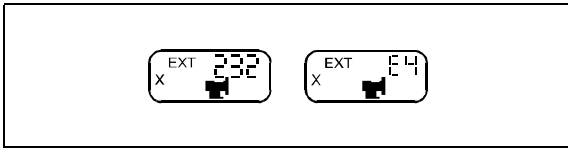
When the pump is on, a single external pulse will initiate a batch of pump strokes. The number of remaining pulses are displayed on the LCD screen. When 0 is reached, the display resets to the multiply value. The pump is now ready for another pulse input.

If a pulse is received before the countdown to 0 is complete, the « E4 » error code is displayed, and the pump batch count resets to the programmed multiply value. The countdown continues, the « E4 » error code will be displayed intermittently until the fault is corrected. The strokes that remained from the first batch are not accounted for.

To clear the fault display, the pump must be stopped and restarted.

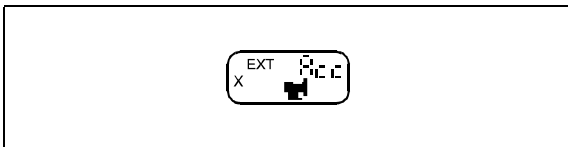
Note :

To allow true flow proportioning, the speed in the multiply mode is equal to the speed set in the internal (manual) mode.



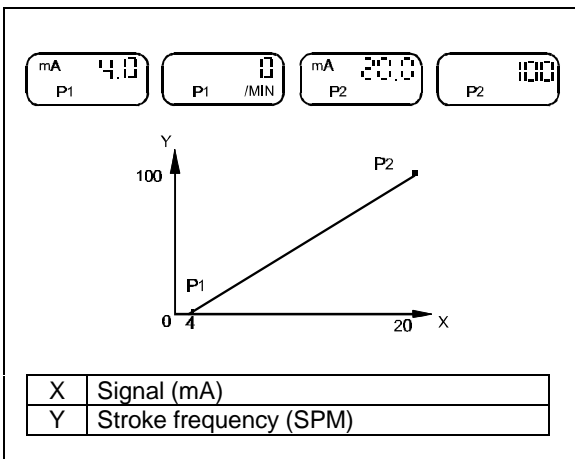
Batch accumulate

The batch accumulate function allows you to opt to have any extra input pulses received in the multiply mode accumulate up to a maximum batch of 999. If batch accumulate is enabled and a pulse is received during the countdown, the programmed multiply value will be added to the current displayed value. Pulses causing the maximum batch of 999 to be exceeded will result in an « E4 » error message. When batch accumulate is enabled, the LCD screen alternates between the current multiply value and « ACC ». The batch accumulate function is activated in the set menu (see Chapter III-3.).

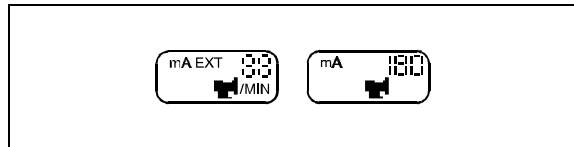


Programming the mA response

The pump accepts a 0-20 mA or a 4-20 mA signal directly. The response to this signal is fully programmable. In the mA mode, the pump speed is determined by the programmed response curve, as defined by points « P1 » and « P2 ». The factory default set values for P1 and P2 are (4 mA, 0 SPM) and (20 mA, 100 SPM). This is illustrated below.



While in the mA mode, the pump speed and the mA value are displayed alternately every four (4) seconds while the pump is running.



Programming points « P1 » and « P2 »

Check that the speed scale corresponds to the desired response (SPM or SPH), refer to Chapter III – Operation, Section Speed. To alter the speed scale, select internal mode.

Return to the external mode.

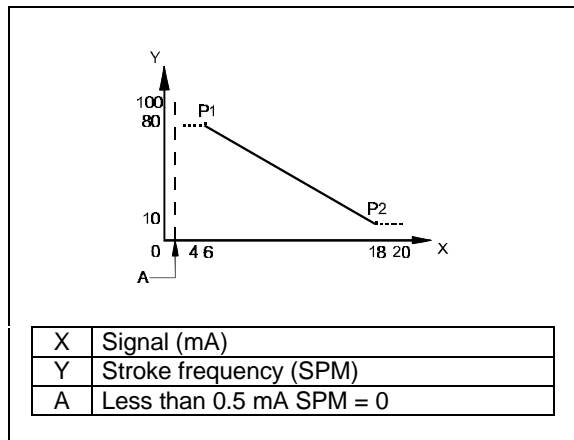
Be sure the pump is off.

Select the external mA mode (see above).

Pressing the {DOWN} key or {UP} key will change the display to [pro]. After five (5) seconds, the display will show the mA value for P1. This value may be altered by using the {Up} key or {DOWN} key within five (5) seconds. Five seconds following the last key press, the stroke rate for P1 will be displayed. This value may be altered within five (5) seconds using the {UP} or {DOWN} key.

Five (5) seconds after the last key press, the mA value for « P2 » will be displayed. Edit as described above. Likewise, five (5) seconds after the last keypress, the stroke rate for « P2 » is displayed and may be altered as above.

The below drawing corresponds to a signal 6-18 mA and strokes from 80 to 10 SPM.



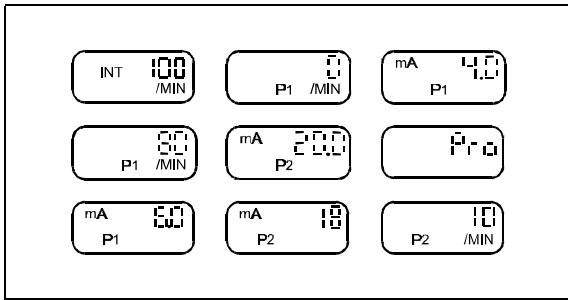
If the mA input goes below the value programmed for « P1 » or above the « P2 » value, the response will « plateau », as indicated by the dotted lines in the above drawing.

Note :

The valid input range is from 0,5 to 21 mA. Below 0,5 mA the cycle will be off. Above 21 mA, the « E5 » error code will be displayed intermittently.

When programming strokes per hour, the maximum rate is 60.

P1 and P2 must both be SPM or both SMH.



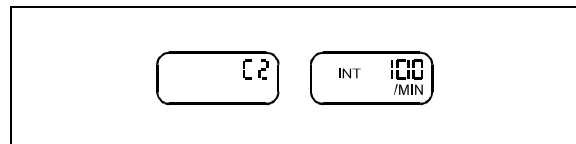
III – 3. ADVANCED FEATURES AND THE SETUP MENU

Advanced features such as « batch accumulate », « computer interfacing », « automatic voltage compensation » and « integral blowdown » may be selected and altered in the setup menu. The following configuration chart describes each menu item, its description, and available settings.

| Menu item | Description/function | setting | Notes |
|-----------|---|---------------------------|---|
| | Software revision | Read only | |
| 1 | Batch accumulate | 0 = disable 1 = enable | Applies to external multiply mode |
| 2 | Computer communication | 0 = disable 1 = enable | Allows computer interfacer to be established with LiquiComm® software. Remote Start/Stop and computer alarm lines are used in communication |
| 3 | Automatic voltage compensation | 0 = disable 1 = enable | Becomes active two (2) minutes after power up. |
| 4 | Flow monitoring | 0 = disable 1 = enable | Not used on H9. Do not enable. |
| 5 | Flow monitoring Pulse detection Pulse detection setting | 1 to 255 | No action. |
| 6 | Input pulse width | 0 – 15 | Allows pulse widths of 1 to 60 mSec to be set. Setting of 0 gives a debounce time of approximately 1 msec. Each unit corresponds to 4 mSec. |
| 7 | Integral blowdown | 0 = disable 1 = enable | Allows activation of the integral blowdown feature. |
| 8 | Integral blowdown solenoid ON time (seconds) | 0 to 255 | Set solenoid ON time in seconds. |
| 9 | Integral blowdown pump ON time (seconds) | 0 to 255 | Set pump ON time in seconds. |

Note :

If the power to the pump is cut less than 15 seconds after the last programmed values have been set, the latest changes will not be stored in nonvolatile memory. Allow at least 15 seconds before disconnecting from power to ensure that the latest changes are stored.



Accessing the setup menu

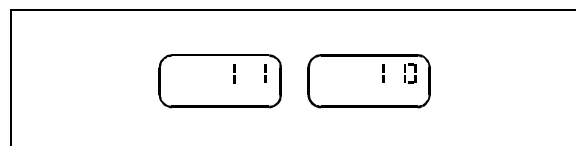
Ensure that the pump is OFF and in the internal mode.

Using the {UP} key, bring the stroke rate to 100 SPM. At this point, keep the {UP} key pressed for five (5) seconds. The LCD screen then displays the current software revision, indicating that you have entered the menu mode. Press the {INT/EXT} key to enable or disable menu functions and program values.

To exit the menu mode, press the {START/STOP} key or press no keys for 13 seconds.

Menu item 1 : Batch accumulate Enable/Disable

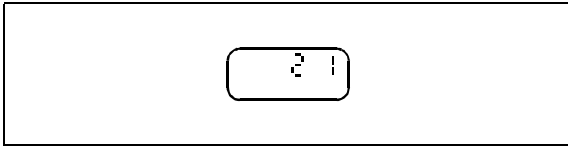
Batch accumulate may be enabled (1) or disabled (0). Use {UP} or {DOWN} key to change the selection.



Menu item 2 : Computer communication

Press the mode key to get to menu item 2, computer communication.

Setting the value to one (1) enables computer communication using the LiquiComm[®] interface box and software.



Note :

When Computer communication is enabled, the remote start/stop and computer alarm lines are deactivated and used for the computer communication link.

Menu item 3 : Automatic voltage compensation

Menu item 3 enables (1) or disables (0) automatic voltage compensation. This unique feature allows a constant power level to be delivered to the EPU of the pump, even when the voltage of the external power source is fluctuating. This results in smooth pump output in spite of fluctuating voltage and prevents overheating.

Note :

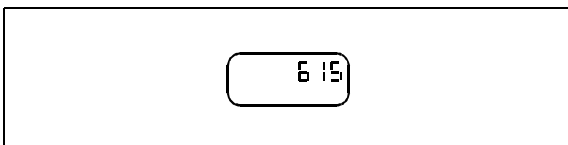
Automatic voltage compensation becomes active two minutes after power up.

Menu items 4 and 5 : Flow monitoring

This function is not used on H9 Series. Disable menu item 4.

Menu item 6 : Input signal pulse width (debounce)

Menu item 6 determines the « debounce » period (pulse width) to be applied to incoming pulse (pacing) signals. The default value is 15, which corresponds to a debounce value of 60 mSec. Each unit corresponds to approximately 4 mSec. This means that in order to be recognized, an input signal must be at least 60 mSec in duration. This setting may need to be reduced from its maximum setting for high frequency input pulse signals such as those from Hall effect flowmeter.



Menu items 7, 8 and 9 : Activate the integral blowdown feature

These menu items will require additional accessories and customer supplied components.

This integral blowdown feature provides cooling tower control when used in conjunction with a pulse output type flowmeter (batch mode) or 4-20 mA signal (milliamp mode).

These signals can then be input into the pump to provide activation of both the pump and a customer supplied solenoid valve.

Note :

The Relay pack must be ordered separately to provide power to the customer supplied solenoid.

Batch mode :

Programming menu,

Menu item 1 Batch accumulate select : 0 = (disable) or 1 = (enable)

Menu item 7 Integral blow down : select 1 = (enable)

Menu item 8 Solenoid ON time : select 0 to 255 (seconds)

Select « INT » mode and set the manual strokes per minute.

Select « EXT X » (multiply) mode (batch mode) and program stroke count.

On receipt of a pulse from the flowmeter, the solenoid valve is opened. The solenoid remains open for the length of time programmed in menu item 8.

If another flowmeter pulse is received before the above is completed the solenoid ON time is extended by the time programmed in menu item 8

Milliamp Mode

Programming menu,

Menu item 7 Integral blowdown : select 1 = (enable)

Menu item 8 Solenoid ON time : select 0 to 255 (seconds)

Menu item 9 Pump ON time : select 0 to 255 (seconds)

Select EXT mA mode (milliamp mode) and program the mA response (point P1 and point P2).

The pump strokes at a rate determined by the mA input signal for the length of time determined by Menu item 9. The solenoid remains open for the length of time programmed in menu item 8 of the menu.

The cycle time for this operation is determined by the longer of solenoid ON time or the pump ON time.

III – 4. ERROR MESSAGES

« E1 »

This message is caused by a low-level fault with a low-level switch connected to the pump.

The pump is stopped and the alarm outputs are activated. This operates in all Internal or External modes.

The pump automatically restarts when the fault is cleared.

« E2 »

This message indicates flow control (menu item 4) was accidentally enabled.

The pump is stopped and the alarm outputs are activated.

Disable menu item 4 (cannot be used on H9 Series).

« E3 »

This message is displayed in the External mode if the stroke rate exceeds 100 SPM.

The pump is not stopped and no alarm outputs are activated with this fault.

To stop E3 flashing, clear the fault condition, then stop and restart the pump.

« E4 »

This message is displayed in the External X (batch) mode in two situations :

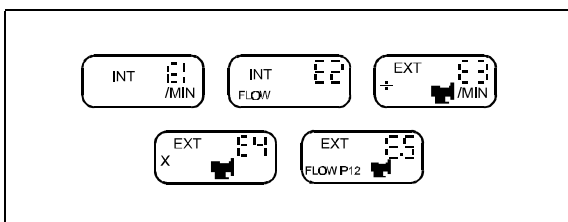
1. If « batch accumulate » is disabled and a pulse signal is received while the pump is counting down. The pump is not stopped, and the alarms are not activated. To clear the E4 message, the pump must be stopped and restarted.
2. If « batch accumulate » is enabled and the cumulative batch value exceeds 999, E4 will be displayed. The E4 message can only be cleared if the pump is stopped and restarted.

« E5 »

This message is displayed in the mA External mode if the mA input value exceeds 21,0 mA, whether the pump is running or stopped.

The alarms are not activated.

Once the mA signal goes below 21,0 mA, the E5 error message is cleared.





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| | | | |
|--|---|--------------------|--|
| F | DECLARATION "CE" DE CONFORMITE | | |
| Nous, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANCE | déclarons que le matériel désigné ci-après a été conçu et fabriqué suivant les directives et spécifications suivantes : | | |
| Directive basse tension 73/23/EEC | | Norme EN61010-1 | |
| Directive CEM 89/336/EEC | | Norme EN50081-1 | |
| | | Norme EN50082-1 | |
| GB | "EC" DECLARATION OF CONFORMITY | | |
| We, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANCE | certify that the equipment designated below has been designed and manufactured in accordance with the specifications of the following : | | |
| Low voltage Directive 73/23/EEC | | Standard EN61010-1 | |
| EMC Directive 89/336/EEC | | Standard EN50081-1 | |
| | | Standard EN50082-1 | |
| D | EG-KONFORMITÄTSERKLÄRUNG | | |
| Wir, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANKREICH | erklären, daß die nachgestehend bezeichneten Gerätschaften im Einklang mit folgenden Richtlinien und Spezifikationen geplant und hergestellt wurden : | | |
| EG-Richtlinie 73/23 für Niederspannung | | Norm EN61010-1 | |
| EG-Richtlinie 89/336 zur elektromagnetischen Verträglichkeit | | Norm EN50081-1 | |
| | | Norm EN50082-1 | |
| NL | EG FABRIKANTENCONFORMVERKLARING | | |
| De ondergetekenden, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANKRIJK | verklaren geheel onder eigen verantwoordelijkheid dat het produkt waarop deze verklaring betrekking heeft in overeenstemming is met: | | |
| Richtlijn 73/23/EEG inzake elektrisch materiaal | | Norm EN61010-1 | |
| bestemd voor gebruik binnen bepaalde spanningsgrenzen; | | Norm EN50081-1 | |
| Richtlijn 89/336/EEG inzake elektromagnetische compatibiliteit. | | Norm EN50082-1 | |
| I | DICHIARAZIONE DI CONFORMITA' "CE" | | |
| La società DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANCIA | Dichiara che il materiale sotto specificato è stato progettato e realizzato in conformità con le seguenti direttive e specifiche: | | |
| Direttiva bassa tensione 73/23/EEC | | Norma EN61010-1 | |
| Direttiva CEM 89/336/EEC | | Norma EN50081-1 | |
| | | Norma EN50082-1 | |
| E | DECLARACION "CE" DE CONFORMIDAD | | |
| Nosotros, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANCIA | Declaramos que el material detallado a continuación está diseñado y fabricado de acuerdo a la siguientes directivas y normas : | | |
| Directiva basa tension 72/23/CEE | | Norma EN61010-1 | |
| Directiva EMC 89/336/CEE | | Norma EN50081-1 | |
| | | Norma EN50082-1 | |

TYPE / TYP / TIPO

A1.. / A7.. / A9.. / B1.. / B7.. / B9.. / C1.. / C7.. / C9.. / H9.. / J5.. / P0.. / P1.. / P5..

Directeur Commercial / Marketing Manager

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